FOR CONTRACT NO.: 07-138204

INFORMATION HANDOUT

ADDENDUM TO FINAL MATERIALS REPORT (APRIL 2, 2010) SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT LOS ANGELES COUNTY, CALIFORNIA (07-LA-47, PM 3.74, EA 238501) (DATED JUNE 7, 2010)

ADDENDUM TO "FINAL FOUNDATION REPORT, SCHUYLER HEIM BRIDGE (REPLACE), DATED MAY 10, 2010", BRIDGE NO. 53-3032, LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 3.58, EA 138201

REVISED ADDENDUM NO. 2 TO "FINAL FOUNDATION REPORT, SCHUYLER HEIM BRIDGE (REPLACE), DATED MAY 10, 2010", BRIDGE NO. 53-3032, LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 3.58, EA 138201

ADDENDUM TO "FINAL FOUNDATION REPORT, NB SR 103 OFF-RAMP, DATED MAY 7, 2010", BRIDGE NO. 53-3034K, LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 0.01, EA 138201 (DATED JULY 1, 2010)

ADDENDUM 2 TO "FINAL FOUNDATION REPORT, NB SR 103 OFF-RAMP, DATED MAY 7, 2010", BRIDGE NO. 53-3034K, LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 0.01, EA 238501 (DATED DECEMBER 21, 2010)

ADDENDUM TO "FINAL FOUNDATION REPORT, NEW DOCK STREET OFF-RAMP, DATED MAY 7, 2010", BRIDGE NO. 53-3031, LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 3.74, EA 138201 (DATED JULY 1, 2010)

ADDENDUM TO "FINAL FOUNDATION REPORT, NEW DOCK STREET ON-RAMP, DATED MAY 7, 2010", BRIDGE NO. 53-3033, LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 3.74, EA 138201 (DATED JULY 1, 2010)

ADDENDUM TO "FINAL FOUNDATION REPORT, SB SR 103 ON-RAMP, DATED MAY 7, 2010", BRIDGE NO. 53-3035S, LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 0.01, EA 138201 (DATED JULY 1, 2010)

ADDENDUM 2 TO "FINAL FOUNDATION REPORT, SB SR 103 ON-RAMP, DATED MAY 7, 2010", BRIDGE NO. 53-3035S, LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 0.01, EA 238501 (DATED DECEMBER 21, 2010)

ADDENDUM TO "FINAL FOUNDATION REPORT, RETAINING WALL A1 (BRIDGE NO. 53E0147), DATED MAY 10, 2010", LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 3.55, EA 138201 (DATED JULY 2, 2010)

ADDENDUM TO "FINAL FOUNDATION REPORT, RETAINING WALL C1 (BRIDGE NO. 53E0148), DATED MAY 10, 2010", LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 3.72, EA 138201 (DATED JULY 2, 2010)

ADDENDUM TO "FINAL FOUNDATION REPORT, RETAINING WALL E1 (BRIDGE NO. 53E0149) AND RETAINING WALL E2 (BRIDGE NO. 53E0150), DATED MAY 17, 2010", LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 0.10, EA 138201 (DATED JULY 2, 2010)

ADDENDUM TO "FINAL FOUNDATION REPORT, RETAINING WALL G1 (BRIDGE NO. 53E0151) AND RETAINING WALL G2 (BRIDGE NO. 53-RWG2), DATED MAY 10, 2010", LOS ANGELES COUNTY, CALIFORNIA, 7-LA-47, PM 0.17, EA 138201 (DATED JULY 2, 2010)

LETTER FROM DEPARTMENT OF TRANSPORTATION TO UNITED STATES COAST GUARD, BRIDGE ADMINISTRATION WITH SUBJECT "SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT, LOS ANGELES COUNTY, CA - RESPONSE TO QUESTIONS ON BRIDGE PERMIT APPLICATION" (DATED MARCH 17, 2010)

LETTER FROM STATE OF CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS DIVISION OF OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION MINING AND TUNNELING UNIT TO CALIFORNIA DEPARTMENT OF TRANSPORTATION WITH SUBJECT "UNDERGROUND CLASSIFICATION NUMBERS: C050-037-11T TO C054-037-11T EA 07-138204 - SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT (DATED JANUARY 4, 2011)

"AS-BUILTS" FOR CALTRANS SEISMIC RETROFIT PROJECT 07-265004

"AS-BUILTS" FOR PORT OF LONG BEACH MSE WALL AT PIER S TERMINAL

FINAL ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT AND SECTION 4(F) EVALUATION, VOLUMES I AND II.

HAZARDOUS WASTE RE-ASSESSMENT FOR PROPOSED CHANGES TO SCOPE OF WORK, SR-47 SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT, LONG BEACH, CALIFORNIA, LOS ANGELES COUNTY.

CORSS SECTION.

ROUTE: 07-LA-47,103-3.5/4.6, 0.0/1.1

ADDED PER ADDENDUM NO. 4 DATED APRIL 8, 2011

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

June 7, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

Attention: Mr. Lucien Hersh, P.E.
Project Manager

Subject: Addendum to Final Materials Report (April 2, 2010)
Schuyler Heim Bridge Replacement Project
Los Angeles County, California,
(07-LA-47, PM 3.74, EA 238501)

Dear Mr. Hersh:

The Final Materials Report for the subject project was submitted dated April 2, 2010. Caltrans District 7 Office of Engineering Services, Materials Investigations (District 7) issued a memorandum dated April 14, 2010 with review comments on the 95% PS&E submittal. This addendum documents the changes to the Final Materials Report to incorporate Caltans comments. A copy of the Caltrans Memorandum is included in Attachment 1 to this Addendum.

As stated in the Final Materials Report, a significant portion of the structural pavement sections for the project will be constructed atop import fill material. The original recommendations were to specify that import fill placed within the top 5 ft below pavement subgrade have a minimum R-Value of 40 for the entire project. Caltrans review comments indicate a concern that the import fill materials could have minimum R-values less than 40; therefore, additional recommendations are required for structural pavements constructed atop subgrade with an R-value less than 40. Based on our conversations with the designers, all rigid pavement sections within the project require a design TI of 17.5. The revised rigid pavement section recommendations are provided in Table 3 below.

In addition to the comments provided by Caltrans in the April 14, 2010 Memorandum (Attachment 1), District 7 has commented that the binder specifications for HMA pavement sections be changed from PG 64-28 PM to PG 64-10. Based on our conversations with the designers, all flexible pavement sections within the project are based on a design TI of 11.0. The revised flexible pavement section recommendations are provided in Table 4 below.

We appreciate the opportunity to provide geotechnical services for this project. If you have any questions, please do not hesitate to call us.

EARTH MECHANICS, INC.

REGISTERED PROFESSIONAL ENGINEER
ERIC BROWN
NO. GE 2806
EXP. 6-30-2010
GEOTECHNICAL
STATE OF CALIFORNIA

Eric Brown, GE 2806
Senior Engineer

REGISTERED PROFESSIONAL ENGINEER
KANDIAH ARULMOLI
NO. 2090
EXP. 12-31-2011
GEOTECHNICAL
STATE OF CALIFORNIA

(Arul) K. Arulmoli, GE 2090
Project Manager

17660 Newhope Street, Suite E, Fountain Valley, California 92708 Tel: (714) 751-3826 Fax: (714) 751-3928

Table 3. Recommended Rigid Pavement Structural Sections

Traffic Index	***Subgrade Type***	***Undrained Pavement Structural Sections*** [1]	
		With Lateral Support	***Without Lateral Support***
17.5	Type I (R > 40)	1.05' JPCP / BB / 0.50' LCB **or** 1.05' JPCP / 0.50' HMA-A	1.15' JPCP / BB / 0.50' LCB **or** 1.15' JPCP / 0.50' HMA-A
17.5	Type II (15 ≤ R ≤ 40)	1.15' JPCP / BB / 0.50' LCB / 0.70' AB **or** 1.15' JPCP / 0.50' HMA-A / 0.70' AB	

Notes:

1. JPCP = Jointed Plain Concrete Pavement; LCB = Lean Concrete Base; HMA-A = Hot Mix Asphalt (Type A); AB = Aggregate Base (Class 3); BB = Bond Breaker per HDM, Topic 622.6.
2. Rigid pavement sections based upon Caltrans HDM (2008) Table 623.1D and 623.1E for South Coast/Central Coast, Type I and Type II Subgrade, respectively. No lateral support per HDM, Topic 623.1(4) is assumed. Lateral support, such as tied rigid-pavement Jointed Plain Concrete Pavement (JPCP) shoulder or shoulders, should be constructed for superior long-term pavement life.

Table 4. Recommended Flexible Pavement Structural Sections

Traffic Index	***Pavement Design Life***	***Undrained Pavement Structural Sections***[1]
11.0	20 years	0.55' HMA-A / 0.90' AB / 0.20' AS **or** 0.55' HMA-A / 1.25' AB **or** 1.05' HMA-A Full Depth

Notes:

1. PG 64-10 binder should be used for HMA pavement.
2. HMA-A = Hot Mix Asphalt (Type A); AB = Aggregate Base (Class 2); AS = Aggregate Subbase (Class 2).

ATTACHMENT 1

CALTRANS MEMORANDUM DATED APRIL 14, 2010

State of California Business, Transportation, and Housing Agency

Memorandum

To : **Hamid Toossi**
Senior Transportation Engineer
Office of Project Development "D"
Attn: Hector Bedolla

Date : April 14, 2010

File No.: 07-LA-47, PM 2.75/5.81
From Ocean Blvd to Alameda Street

Kirsten Stahl, P. E.
Office of Engineering Services, Materials Investigations

07271 – 138201

From : **DEPARTMENT OF TRANSPORTATION**

Subject: **95% PS&E REVIEW**

Materials Investigations has reviewed the 95% PS&E package and offers the following comments and recommendations for the above mentioned project:

PLANS:

- In Sheet X-1, proposed structural section Type [1], please include a 0.70' of Class 3 Aggregate Base layer in the proposed structural section. Since this project is in a fill section, it is unlikely to have a soil R-value more than 40 for **imported fill materials** in District 7. Revise the proposed as the follows:

1.05' JPCP	to read	**1.15'** JPCP
0.50' LCB		0.50' LCB
1.55' Total		**0.70' AB, Class 3**
		2.35' Total

  Note: The above recommended structural section is based on given $T.I._{40}$ of 17.5 and soil R-value less than 40. Per our meeting agreement, the above recommended structural section is based on a 40-year JPCP design.

- In Sheet X-1, proposed structural section Type [3], a maintenance vehicle pullout (MVP) pavement design is based on 2% ESAL of the adjacent traveled way. Per the $T.I._{40}$ of 11 (2% ESAL of $T.I._{40}$=17.5) and fill soil R-value less than 40, revise the proposed structural section Type [3] as follows:

0.70' JPCP	to read	0.80' JPCP
0.35' LCB		0.40' LCB
1.05' Total		0.60' AB, Class 3
		1.80' Total

  Note: Since the quantity of MVP is not significant, for constructability, Materials recommends to use the proposed structural section Type [1] for MVP.

- In Sheet X-1, please indicate the classification of AB in the existing typical structural section Type [B] .

- In Sheet Q-1, Summary of Quantities, the quantities of materials shall be changed based on revisions made to the structural section selections.

SPECIFICATIONS:

- SSP 19-040, revise paragraph 5 "…(R-Value) of not less than **40**." to read "…not less than **15**".

- SSP 39-050, keep "Data Cores" specifications, including paragraphs 7 through 10, and paragraphs 28 through 31.

- Delete SSP 39-550 for Prime Coat.

- SSP 40-010, Jointed Plain Concrete Pavement, delete paragraph 29. Delete paragraph 45, since there is no transition panel shown in the plans.

- SSP 40-250 is included in the Special Provisions. Keep paragraph 36 in SSP 40-010.

ESTIMATES:

- Add pay item of 260301 for Class 3 Aggregate Base.

- Add pay item of 397005 for Tack Coat.

- Add pay item of 394060 for Data Core.

If you have any questions, please call me at 7-0470 or Jeff C. Tsai of my staff at 7-0471.

KIRSTEN STAHL, P. E.
Civil Engineering License No. C46857 – Exp. 06/30/11
District Materials Engineer

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

July 6, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum to "Final Foundation Report, Schuyler Heim Bridge (Replace), Dated May 10, 2010", Bridge No. 53-3032, Los Angeles County, California, 7-LA-47, PM 3.58, EA 138201

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Foundation Report for the subject bridge, dated February 11, 2010, to Caltrans for review and comments. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the report and provided its comments in an email dated April 7, 2010. EMI incorporated the responses to Caltrans OGDS-1 comments into the Final Foundation Report, dated May 10, 2010 and submitted it to Caltrans. Caltrans OGDS-1 reviewed the Final Foundation Report and provided its comments in two emails dated June 9, 2010 and June 17, 2010.

EMI developed its responses to Caltrans comments (Attachment 1) and submitted them to OGDS-1 for an early review in an email dated June 25, 2009, which were reviewed and accepted by OGDS-1.

Based on Caltrans review comments, the following changes have been made to Section 5.7.2 (Passive Resistance) and Settlement Monitoring Recommendation in Section 5.8.1 (Static Settlement) of the Final Foundation Report:

(1) Section 5.7.2 (Passive Resistance) in the Final Foundation Report has been revised as follows:

"5.7.2 Passive Resistance

Under seismic loading, an ultimate passive earth pressure of 5 ksf may be used for the approach backfill and abutment backwalls with a height equal to or greater than 5.5 ft. For abutment backwalls with heights less than 5.5 ft, the maximum passive pressure may be calculated proportionally (e.g., for a 4 ft high wall, the maximum passive pressure is [4/5.5]x5 ksf = 3.6 ksf). The horizontal movement at which the maximum passive pressure is expected to be fully mobilized can be determined following the procedure outlined in Section 7.8.1 of the Caltrans SDC (Caltrans, 2006d)."

(2) The "Settlement Monitoring" paragraph of Section 5.8.1 (Static Settlement) in the Final Foundation Report has been revised as follows:

"<u>Settlement Monitoring Recommendations:</u> Based on our past experience, calculated settlements and settlement periods are usually approximations of actual field observations. Due to the variability of subsurface conditions and the thinly layered nature of deposits, it is recommended that settlement monitoring be conducted at the abutment. Surface settlement monuments, constructed in accordance with Caltrans Standard Plan Sheet A74 or equivalent, should be placed near the proposed abutment location and two other points selected by the Engineer. The settlement monuments should be installed in a timely manner upon completion of embankment construction. Special care should be exercised in the field to survey and protect these settlement devices. The monuments should be monitored at the time of installation, on a weekly basis for a month, and then once every 2 weeks thereafter until it has been verified by the Engineer that the remaining settlement for the embankment is acceptable. Settlement of the embankment fill should be verified by the Engineer prior to installation of abutment piles to prevent a reduction in axial pile capacity due to downdrag loads being applied to the piles. The installation of abutment pile should not begin until the long-term residual settlement becomes ½-inch or less. However, waiting period for the installation of abutment pile can be modified based on in-situ settlement measurement upon Engineer's approval."

This addendum should be attached to the front of the Final Foundation Report for the subject bridge, dated May 10, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.

(Ranjan) G. J. Gunaranjan, PE 71758
Senior Staff Engineer

(Arul) K. Arulmoli, GE 2090
Project Manager

GJG/ka

ATTACHMENT

Attachment 1. EMI Responses to Caltrans Comments on the Final Foundation Report for Schuyler Heim Bridge (Replace), Dated May 10, 2010

ATTACHMENT 1

EMI Responses to Caltrans Comments on the Final Foundation Report for Schuyler Heim Bridge (Replace), Dated May 10, 2010

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

June 25, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

Attention: Mr. Lucien Hersh, P.E.
Project Manager

Subject: ***Schuyler Heim Bridge Replacement Project, Responses to Caltrans Comments on the Final Foundation Report, Schuyler Heim Bridge (Replace), Bridge No. 53-3032, Los Angeles County, California, (7-LA-47, PM 3.58, EA 138201)***

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Foundation Report for the subject bridge, dated February 11, 2010, to Caltrans for review and comments. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the report and provided its comments in an email dated April 7, 2010. EMI incorporated the responses to Caltrans OGDS-1 comments into the Final Foundation Report, dated May 10, 2010 and submitted it to Caltrans. Caltrans OGDS-1 reviewed the Final Foundation Report and provided its comments in two emails dated June 9, 2010 and June 17, 2010 (Attachment A).

EMI's responses to Caltrans comments are documented in this addendum and submitted to Caltrans for review and acceptance. For convenience, Caltrans comments are provided in italics followed by EMI responses.

Comments Made on June 9, 2010

1. For the driving resistance of permanent casing, I think still it could be a good idea to include end bearing of the steel shell and friction resistance inside the casing as part of the nominal driving resistance. The rule of thumb estimate for the friction inside is usually 30% of outside friction. But this number could be off for quite a bit, considering the variation of the casing diameter and soil property.

Based on the latest plans provided, approximately 25-ft long permanent driven steel casings are proposed from the pile cut-off at all the bents, except the channel bents (Bents 13 through 16) where the length of driven steel casings vary between 75 ft and 105 ft. However, the means and methods for installation of these permanent casings to be performed by the contractor are not specified in the plans. The installation of the steel casings is expected to be

performed using center-relief driving method which would eliminate inside friction and undermine end bearing of the steel casings. Therefore, it is recommended to keep the lower-bound value of required nominal driving resistance for steel casings by estimating the resistance using outside skin friction only. It should be noted that the specified tip elevations for steel casings are not controlled by the nominal driving resistance estimated since the specified tip elevations shall not be raised as noted in the Pile Data Table (PDT).

It was agreed that no changes will be made to the required nominal driving resistance for steel casings shown in the current PDT.

A follow up comment was made on June 15, 2010 regarding the impact on driving resistance for steel casings due to the presence of scour depth at the Cerritos channel bents. Based on the conclusions of Hydraulics and Scour Analyses provided by URS, a scour depth of 10 ft is recommended in the Cerritos Channel. Therefore, scour is expected to be a design issue; the recommended scour depths of 10 ft and 5 ft were considered in evaluations of driving resistance for steel casings under strength and extreme limit conditions, respectively. However, in comparison to the driving resistance for steel casings considering scour effects, the revised values without considering scour effects are higher only by less than 15% under strength limit condition. Therefore, it was agreed that no changes will be made to the required nominal driving resistance for steel casings, shown in the current PDT, due to scour effects. The comparison of driving resistance for steel casings with and without considering scour effects under strength limit condition are provided in Table 1 and the revised driving resistance calculations at channel bents under strength limit condition is included in Attachment B.

TABLE 1. COMPARISON OF DRIVING RESISTANCE FOR STEEL CASINGS AT CHANNEL BENTS

Channel Bent Location	Pile Type	Condition	Channel Bottom El. (ft)	Depth of Scour (ft)	Approximate Estimated Driving Resistance for Steel Casings (Tons)	
					With Considering Scour Effects (In Current PDT)	Without Considering Scour Effects
Bent 13	11 ft CIDH	Strength Limit	-33.0	10	405	455
Bent 14	11 ft CIDH	Strength Limit	-44.0	10	730	815
Bent 15	11 ft CIDH	Strength Limit	-48.0	10	695	780
Bent 16	11 ft CIDH	Strength Limit	-39.0	10	380	430

2. Section 5.7.2 (Passive Resistance): Please refer to the comment No. 3 for those ramp structures. "Abutment Backwall", instead of "Abutment Wall" should be used in the report. Basically, all applicable comments for ramp structures can be considered for main bridge.

EMI will incorporate the comment No. 3 provided for the ramp structures into the subject Final Foundation Report. The revised paragraph in Section 5.7.2 (Passive Resistance) of the Final Foundation Report is provided below:

"5.7.2 Passive Resistance

Under seismic loading, an ultimate passive earth pressure of 5 ksf may be used for the approach backfill and abutment backwalls with a height equal to or greater than 5.5 ft. For abutment backwalls with heights less than 5.5 ft, the maximum passive pressure may be calculated proportionally (e.g., for a 4 ft high wall, the maximum passive pressure is [4/5.5]x5 ksf = 3.6 ksf). The horizontal movement at which the maximum passive pressure is expected to be fully mobilized can be determined following the procedure outlined in Section 7.8.1 of the Caltrans SDC (Caltrans, 2006d)."

The above change to Section 5.7.2 will be documented in an Addendum to the Final Foundation Report for Schuyler Heim Bridge.

3. Section 5.8.1 (Settlement Monitoring Recommendation): Since the long-term residual settlement for the embankment could be a very difficult value to guess during construction, I would suggest using waiting period to control the timing for pile installation. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to leave some maneuverable space to whoever handle the issue.

EMI will incorporate the comment into the subject Final Foundation Report. The revised paragraph for Settlement Monitoring Recommendation in Section 5.8.1 (Static Settlement) of the Final Foundation Report is provided below:

"**Settlement Monitoring Recommendations:** Based on our past experience, calculated settlements and settlement periods are usually approximations of actual field observations. Due to the variability of subsurface conditions and the thinly layered nature of deposits, it is recommended that settlement monitoring be conducted at the abutment. Surface settlement monuments, constructed in accordance with Caltrans Standard Plan Sheet A74 or equivalent, should be placed near the proposed abutment location and two other points selected by the Engineer. The settlement monuments should be installed in a timely manner upon completion of embankment construction. Special care should be exercised in the field to survey and protect these settlement devices. The monuments should be monitored at the time of installation, on a weekly basis for a month, and then once every 2 weeks thereafter until it has been verified by the Engineer that the remaining settlement for the embankment is acceptable. Settlement of the embankment fill should be verified by the Engineer prior to installation of abutment piles to prevent a reduction in axial pile capacity due to downdrag loads being applied to the piles. The installation of abutment pile should not begin until the

long-term residual settlement becomes ½-inch or less. However, waiting period for the installation of abutment pile can be modified based on in-situ settlement measurement upon Engineer's approval."

The above change to Section 5.8.1 will be documented in an Addendum to the Final Foundation Report for Schuyler Heim Bridge.

4. Abutment 1 Axial Capacity Calculations: We agreed to use end bearing to develop up to 20% of nominal resistance. But since the pile design is actually controlled by seismic, it is 20% of the required axial resistance for extreme event that needs to be developed from pile tip. In this case, the required nominal resistance will be less than two times of service load, which may force us to tip the pile two feet more. If you think that pile constructability limit set up by Caltrans is very important, then I would agree to use 25% of required axial pile resistance. Since the pile diameter is relatively small, no more than 0.5" of settlement will be needed to mobilize the required tip bearing matter.

Based on the latest Caltrans Memo To Designers 3-1 (Caltrans, 2008), the length of cast-in-drilled-hole (CIDH) piles should be limited to 30 times the pile diameter in order to ensure the constructability and quality. We believe that the 30-diameter limit imposed by Caltrans is one of the rules when designing CIDH piles and it should not be violated.

Based on our discussion, it was agreed that pile settlement is not considered to be a design issue during a design earthquake (extreme event) and since the abutment piles are small-diameter piles (i.e., 2.5-ft diameter piles), much higher percentage of end bearing is expected to be mobilized under extreme event. Therefore, the axial pile capacity of the abutment pile will be revised under extreme event condition by limiting only 25% of the required axial pile resistance for end bearing. For extreme event limit state, the required axial pile resistance is estimated by adding the negative skin friction (downdrag load) due to seismic settlement to the permanent load per pile under service limit state, considering pile group effects.

The revised axial pile capacity calculation of the abutment pile under extreme event condition is included in Attachment C. It should be noted that the design tip elevations for the abutment pile, presented in the current PDT, remain the same.

Comments Made on June 17, 2010

1. If possible, please update the final calculation volume; delete the unnecessary calculation/information.

EMI will comply with the comment. The necessary changes will be made to the Final Calculation Volume, Dated May 10, 2010 and the PDF copy of the Revised Final Calculation Volume will be resubmitted for your files.

2. If possible, please include in your future submittal or addendum, the L-Pile outputs and calculations for the lateral controlled pile tip.

EMI will comply with the comment. LPILE output files and calculations for design lateral controlled pile tip elevations will be provided and also be included in the Revised Final Calculation Volume. It should be noted that LPILE analyses were performed at selected abutment and bents to represent the entire project.

The lateral controlled pile tip elevation can be estimated in several ways. Details of the procedure that was followed for estimating lateral pile tip elevations in this project and sample calculations will be included in the Revised Final Calculation Volume.

A follow up comment was made by Caltrans OGDS-1 on June 22, 2010 regarding the procedure for estimating lateral controlled pile tip elevation. It was suggested that the lateral controlled pile tip elevation be estimated using plastic moment (or moment capacity) and corresponding maximum shear force at the bottom of the column. EMI will coordinate with Caltrans Structural Engineers to obtain necessary information and perform the requested analyses.

Since the lateral controlled pile tip elevations do not control the design, it was agreed that no changes will be made to the design lateral controlled pile tip elevations shown in the current PDT.

We appreciate the opportunity to provide geotechnical services for this project. If you have any questions please call us.

Sincerely,
EARTH MECHANICS, INC.

REGISTERED PROFESSIONAL ENGINEER
GNANAPRAGASAM J. GUNARANJAN
No. C71758
Exp: 12-31-2011
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
KANDIAH ARULMOLI
NO. GE-002090
EXP. 12-31-2011
GEOTECHNICAL
STATE OF CALIFORNIA

(Ranjan) G.J. Gunaranjan, PE 71758
Senior Staff Engineer

(Arul) K. Arulmoli, PhD, GE 2090
Project Manager

References

California Department of Transportation (Caltrans), 2006d, Seismic Design Criteria, Version 1.4, June.

Caltrans, 2008, Memo to Designers 3-1, July.

Attachments

Attachment A – Caltrans OGDS-1 Review Comments, Dated June 9, 2010 and June 17, 2010, on the Final Foundation Report, Dated May 10, 2010.

Attachment B – Revised Driving Resistance Calculations for Steel Casing at Channel Bents With and Without Considering Scour Depth Under Strength Limit Condition.

Attachment C – Revised Axial Pile Capacity Calculation of the Abutment Pile Under Extreme Event Limit State.

ATTACHMENT A

Review Comments by Caltrans Office of Geotechnical South 1 (OGDS-1), Dated June 9, 2010 and June 17, 2010, on the Final Foundation Report, Schuyler Heim Bridge (53-3032), Prepared by Earth Mechanics, Inc., Dated May 10, 2010

Subject: Review comments for Heim Bridge
From: Haitao Liu <haitao_liu@dot.ca.gov>
Date: Wed, 9 Jun 2010 22:37:24 -0400
To: Arul Arulmoli <arulmoli@earthmech.com>, Ranjan Gunaranjan <ranjan@earthmech.com>
CC: Ae F Tern <ae_f_tern@dot.ca.gov>

Hi, Arul and Ranjan,

Here are few items I want to discuss with you for the subject bridge:

1) For the driving resistance of permanent casing. I think still it could be a good idea to include end bearing of the steel shell and friction resistance inside the casing as part of the nominal driving resistance. The rule of thumb estimate for the friction inside is usually 30% of outside friction. But this number could be off for quite a bit, considering the variation of the casing diameter and soil property. You may have a better idea for this than us.

2) Section 5.7.2 (Passive Resistance): Please refer to the comment No. 3 for those ramp structures. "Abutment Backwall", instead of "Abutment Wall" should be used in the report. Basically, all applicable comments for ramp structures can be considered for main bridge.

3) Section 5.8.1 (Settlement Monitoring Recommendation): Since the long-term residual settlement for the embankment could be a very difficult value to guess during construction, I would suggest using waiting period to control the timing for pile installation. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to leave some maneuverable space to whoever handle the issue.

4) Abutment 1 axial capacity calculations: We agreed to use end bearing to develop up to 20% of nominal resistance. But since the pile design is actually controlled by seismic, it is 20% of the required axial resistance for extreme event that needs to be developed from pile tip. In this case, the required nominal resistance will be less than two times of service load, which may force us to tip the pile two feet more. If you think that pile constructability limit set up by Caltrans is very important, then I would agree to use 25% of required axial pile resistance. Since the pile diameter is relatively small, no more than 0.5" of settlement will be needed to mobilize the required tip bearing.

Those are pretty much all I want to say about your final report for the main bridge.

I know I had made a very ambitious promise for the delivery of my review comment without knowing that I will be tied up with several other assignments. If you don't mind, we will submit our review for the ramp structures early next week, and MSE walls early the week after next week.

Please let me know if you have any question.

Best regards,

Haitao Liu, P.E.

Transportation Engineer - Civil
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Subject: Review Comments for Ramp Structures
From: Haitao Liu <haitao_liu@dot.ca.gov>
Date: Thu, 17 Jun 2010 20:47:43 -0400
To: Arul Arulmoli <arulmoli@earthmech.com>
CC: Ranjan Gunaranjan <ranjan@earthmech.com>, Ae F Tern <ae_f_tern@dot.ca.gov>, Eric Brown <e.brown@earthmech.com>, Pat Wilson <P.Wilson@earthmech.com>

Hi Arul,

Just few minor items to discuss with you for those reports.

For all foundation reports (FR):

1) If possible, please update the final calculation volume, delete the unnecessary calculation/information.
2) If possible, please include in your future submittal or addendum, the L-Pile outputs and calculations for the lateral controlled pile tip.
3) Same comment as the one we made for the main bridge, for the abutments of all ramp structures, use end bearing to develop up to 20% of required axial resistance under extreme event (controlling limit state) in pile design. If design pile length reaches 30D limit, try to increase that percentage.
4) This item is just for your information only. For abutments, the group effect (or "shielding effect") can be applied to reduce the effective down-drag load on each individual pile within pile group. The above load should be combined directly with the effective service load (group effect considered) for piles under group condition, instead of being divided by the group factor again to its original value.

For FR for SB SR-103 On-Ramp (BR53-3035S):

1) At Bent 25, the depth to steel cutoff is 43 ft according to calculation sheet "Revised Axial Pile Capacity for Strength limit State". However, in Shaft analysis, 39 ft was used as the "Ignored Top Portion", which is equivalent to the depth from FG to steel cut-off. Please revise the pile axial analysis, and the pile data table if necessary.

For FR for New Dock St. Off-Ramp (BR53-3031):

1) Please present settlement analysis in the calculation volume. The one shown in the report is for the on-ramp structure.

Please let me know if you have any question.

Best Regards,

Haitao Liu, P.E.

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ATTACHMENT B

Revised Driving Resistance Calculations for Steel Casing at Channel Bents With and Without Considering Scour Depth Under Strength Limit Condition

With Considering the Scour Effects
(Ignore Top 10 ft Depth)

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING

Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan

EMI Project No: 06-123-03

SKIN FRICTION IN SAND

Qs = Ks x tan (d x Ø) x (P x L) x Svo

WHERE: Svo = average effective overburden pressure
P = pile perimeter (feet)
L = pile length in soil layer (ft)
Ks = Coefficient of horizontal soil stress
Ø = friction angle of the soil
d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (Inches)

	Case 1 Steel Casing	Case 2 Steel Casing
	12" x 1"	
Perim (feet)	38.22	
Area (sq. ft)	3.16	
Ks	0.8	
d	0.8	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb

Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

Qs = alpha x c x P x L

WHERE: alpha = adhesion factor (See chart below)
c = cohesion (tons/sq. foot)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf , alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1998)

END BEARING IN CLAY, Qb

Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:
1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

-33 ft = top of pile el. -43 ft = top of ground el. 5 ft = water table el.

(Case 1) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

(Case 2) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N1)60	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	12' x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-34	-43	-34	CL/ML-1	120		0	0.125	-9	-4.5	-0.13	-9	1	-0.26	9	-43.0	-43.0	-43.0	3.6	3.6	-39	-20	-34
-35	-34	-35	CL/ML-1	120		0	0.125	1	-8.5	-0.24	-8	2	-0.23	9	4.8	4.8	-38.2	3.6	3.6	-35	-17	-31
-36	-35	-36	CL/ML-1	120		0	0.125	1	-7.5	-0.22	-7	3	-0.20	9	4.8	4.8	-33.4	3.6	3.6	-30	-15	-27
-37	-36	-37	CL/ML-1	120		0	0.125	1	-6.5	-0.19	-6	4	-0.17	9	4.8	4.8	-28.7	3.6	3.6	-25	-13	-23
-38	-37	-38	CL/ML-1	120		0	0.125	1	-5.5	-0.16	-5	5	-0.14	9	4.8	4.8	-23.9	3.6	3.6	-20	-10	-19
-39	-38	-39	CL/ML-1	120		0	0.125	1	-4.5	-0.13	-4	6	-0.12	9	4.8	4.8	-19.1	3.6	3.6	-16	-8	-15
-40	-39	-40	CL/ML-1	120		0	0.125	1	-3.5	-0.10	-3	7	-0.09	9	4.8	4.8	-14.3	3.6	3.6	-11	-5	-11
-41	-40	-41	CL/ML-1	120		0	0.125	1	-2.5	-0.07	-2	8	-0.06	9	4.8	4.8	-9.6	3.6	3.6	-6	-3	-8
-42	-41	-42	CL/ML-1	120		0	0.125	1	-1.5	-0.04	-1	9	-0.03	9	4.8	4.8	-4.8	3.6	3.6	-1	-1	-4
-43	-42	-43	CL/ML-1	120		0	0.125	1	-0.5	-0.01	0	10	0.00	9	4.8	4.8	0.0	3.6	3.6	4	2	0
-44	-43	-44	CL/ML-1	120		0	0.125	1	0.5	0.01	1	11	0.03	9	4.8	4.8	4.8	3.6	3.6	8	4	4
-45	-44	-45	CL/ML-1	120		0	0.125	1	1.5	0.04	2	12	0.06	9	4.8	4.8	9.6	3.6	3.6	13	7	8
-46	-45	-46	CL/ML-2	120		0	0.625	1	2.5	0.07	3	13	0.09	9	14.9	14.9	24.5	17.8	17.8	42	21	20
-47	-46	-47	CL/ML-2	120		0	0.625	1	3.5	0.10	4	14	0.12	9	14.9	14.9	39.4	17.8	17.8	57	29	32
-48	-47	-48	CL/ML-2	120		0	0.625	1	4.5	0.13	5	15	0.14	9	14.9	14.9	54.3	17.8	17.8	72	36	43
-49	-48	-49	CL/ML-2	120		0	0.625	1	5.5	0.16	6	16	0.17	9	14.9	14.9	69.3	17.8	17.8	87	44	55
-50	-49	-50	CL/ML-2	120		0	0.625	1	6.5	0.19	7	17	0.20	9	14.9	14.9	84.2	17.8	17.8	102	51	67
-51	-50	-51	CL/ML-2	120		0	0.625	1	7.5	0.22	8	18	0.23	9	14.9	14.9	99.1	17.8	17.8	117	58	79
-52	-51	-52	CL/ML-2	120		0	0.625	1	8.5	0.24	9	19	0.26	9	14.9	14.9	114.1	17.8	17.8	132	66	91
-53	-52	-53	CL/ML-2	120		0	0.625	1	9.5	0.27	10	20	0.29	9	14.9	14.9	129.0	17.8	17.8	147	73	103
-54	-53	-54	CL/ML-2	120		0	0.625	1	10.5	0.30	11	21	0.32	9	14.9	14.9	143.9	17.8	17.8	162	81	115
-55	-54	-55	CL/ML-2	120		0	0.625	1	11.5	0.33	12	22	0.35	9	14.9	14.9	158.9	17.8	17.8	177	88	127
-56	-55	-56	ML/CL-ML/CL	120		0	1.250	1	12.5	0.36	13	23	0.37	9	23.9	23.9	182.8	35.6	35.6	218	109	146
-57	-56	-57	ML/CL-ML/CL	120		0	1.250	1	13.5	0.39	14	24	0.40	9	23.9	23.9	206.6	35.6	35.6	242	121	165
-58	-57	-58	ML/CL-ML/CL	120		0	1.250	1	14.5	0.42	15	25	0.43	9	23.9	23.9	230.5	35.6	35.6	266	133	184
-59	-58	-59	ML/CL-ML/CL	120		0	1.250	1	15.5	0.45	16	26	0.46	9	23.9	23.9	254.4	35.6	35.6	290	145	204
-60	-59	-60	ML/CL-ML/CL	120		0	1.250	1	16.5	0.48	17	27	0.49	9	23.9	23.9	278.3	35.6	35.6	314	157	223
-61	-60	-61	ML/CL-ML/CL	120		0	1.250	1	17.5	0.50	18	28	0.52	9	23.9	23.9	302.2	35.6	35.6	338	169	242
-62	-61	-62	ML/CL-ML/CL	120		0	1.250	1	18.5	0.53	19	29	0.55	9	23.9	23.9	326.1	35.6	35.6	362	181	261
-63	-62	-63	ML/CL-ML/CL	120		0	1.250	1	19.5	0.56	20	30	0.58	9	23.9	23.9	350.0	35.6	35.6	386	193	280
-64	-63	-64	ML/CL-ML/CL	120		0	1.250	1	20.5	0.59	21	31	0.60	9	23.9	23.9	373.9	35.6	35.6	409	205	299
-65.3	-64	-65.3	ML/CL-ML/CL	120		0	1.250	1.3	21.7	0.62	22.3	32.3	0.64	9	31.1	31.1	404.9	35.6	35.6	441	220	324
-66	-65.3	-66	ML/CL-ML/CL	120		0	1.250	0.7	22.7	0.65	23	33	0.66	9	16.7	16.7	421.6	35.6	35.6	457	229	337
-67	-66	-67	ML/CL-ML/CL	120		0	1.250	1	23.5	0.68	24	34	0.69	9	23.9	23.9	445.5	35.6	35.6	481	241	356
-68	-67	-68	ML/CL-ML/CL	120		0	1.250	1	24.5	0.71	25	35	0.72	9	23.9	23.9	469.4	35.6	35.6	505	253	376

Ignore top 10' depth (in PDT)

405 tons

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING
Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan

EMI Project No: 06-123-03

SKIN FRICTION IN SAND
Qs = Ks x tan (d x Ø) x (P x L) x Svo

WHERE:
- Svo = average effective overburden pressure
- P = pile perimeter (feet)
- L = pile length in soil layer (ft)
- Ks = Coefficient of horizontal soil stress
- Ø = friction angle of the soil
- d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)

	Case 1 Steel Casing 12" x 1"	Case 2 Steel Casing
Perim (feet)	38.22	
Area (sq. ft)	3.18	
Ks	0.8	
d	0.6	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb
Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	88
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs
Qs = alpha x c x P x L

WHERE:
- alpha = adhesion factor (See chart below)
- c = cohesion (tons/sq. foot)
- P = pile perimeter (feet)
- L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf , alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb
Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

-44 ft = top of pile el. -54 ft = top of ground el. 5 ft = water table el.

(Case 1) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

(Case 2) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N₆₀)	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	12" x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-45	-54	-45	CL/ML/CH	120		0	0.125	-9	-4.5	-0.13	-9	1	-0.26	9	-43.0	-43.0	-43.0	3.6	3.6	-39	-20	-34
-46	-45	-46	CL/ML/CH	120		0	0.125	1	-8.5	-0.24	-8	2	-0.23	9	4.8	4.8	-38.2	3.6	3.6	-35	-17	-31
-48	-46	-48	CL/ML/CH	120		0	0.125	2	-7.0	-0.20	-6	4	-0.17	9	9.6	9.6	-28.7	3.6	3.6	-25	-13	-23
-50	-48	-50	CL/ML/CH	120		0	0.125	2	-5.0	-0.14	-4	6	-0.12	9	9.6	9.6	-19.1	3.6	3.6	-16	-8	-15
-52	-50	-52	CL/ML/CH	120		0	0.125	2	-3.0	-0.09	-2	8	-0.06	9	9.6	9.6	-9.6	3.6	3.6	-6	-3	-8
-54	-52	-54	CL/ML/CH	120		0	0.125	2	-1.0	-0.03	0	10	0.00	9	9.6	9.6	0.0	3.6	3.6	4	2	0
-55	-54	-55	CL/ML/CH	120		0	0.125	1	0.5	0.01	1	11	0.03	9	4.8	4.8	4.8	3.6	3.6	8	4	4
-56	-55	-56	CL/ML	120		0	0.625	1	1.5	0.04	2	12	0.06	9	14.9	14.9	19.7	17.8	17.8	38	19	16
-57	-56	-57	CL/ML	120		0	0.625	1	2.5	0.07	3	13	0.09	9	14.9	14.9	34.6	17.8	17.8	52	26	28
-58	-57	-58	CL/ML	120		0	0.625	1	3.5	0.10	4	14	0.12	9	14.9	14.9	49.6	17.8	17.8	67	34	40
-59	-58	-59	CL/ML	120		0	0.625	1	4.5	0.13	5	15	0.14	9	14.9	14.9	64.5	17.8	17.8	82	41	52
-60	-59	-60	CL/ML	120		0	0.625	1	5.5	0.16	6	16	0.17	9	14.9	14.9	79.4	17.8	17.8	97	49	64
-61	-60	-61	CL/ML	120		0	0.625	1	6.5	0.19	7	17	0.20	9	14.9	14.9	94.4	17.8	17.8	112	56	75
-62	-61	-62	CL/ML	120		0	0.625	1	7.5	0.22	8	18	0.23	9	14.9	14.9	109.3	17.8	17.8	127	64	87
-64	-62	-64	CL/ML	120		0	0.625	2	9.0	0.26	10	20	0.29	9	29.9	29.9	139.2	17.8	17.8	157	78	111
-66	-64	-66	CL/ML	120		0	0.625	2	11.0	0.32	12	22	0.35	9	29.9	29.9	169.0	17.8	17.8	187	93	135
-68	-66	-68	CL/ML	120		0	0.625	2	13.0	0.37	14	24	0.40	9	29.9	29.9	198.9	17.8	17.8	217	108	159
-70	-68	-70	CL/ML	120		0	0.625	2	15.0	0.43	16	26	0.46	9	29.9	29.9	228.7	17.8	17.8	247	123	183
-71	-70	-71	ML/CL/MH	120		0	1.250	1	16.5	0.48	17	27	0.49	9	23.9	23.9	252.6	35.6	35.6	288	144	202
-73	-71	-73	ML/CL/MH	120		0	1.250	2	18.0	0.52	19	29	0.55	9	47.8	47.8	300.4	35.6	35.6	336	168	240
-75	-73	-75	ML/CL/MH	120		0	1.250	2	20.0	0.58	21	31	0.60	9	47.8	47.8	348.2	35.6	35.6	384	192	279
-77	-75	-77	ML/CL/MH	120		0	1.250	2	22.0	0.63	23	33	0.66	9	47.8	47.8	396.0	35.6	35.6	432	216	317
-79	-77	-79	ML/CL/MH	120		0	1.250	2	24.0	0.69	25	35	0.72	9	47.8	47.8	443.7	35.6	35.6	479	240	355
-81	-79	-81	ML/CL/MH	120		0	1.250	2	26.0	0.75	27	37	0.78	9	47.8	47.8	491.5	35.6	35.6	527	264	393
-83	-81	-83	ML/CL/MH	120		0	1.250	2	28.0	0.81	29	39	0.84	9	47.8	47.8	539.3	35.6	35.6	575	287	431
-84	-83	-84	ML/CL/MH	120		0	1.250	1	29.5	0.85	30	40	0.86	9	23.9	23.9	563.2	35.6	35.6	599	299	451
-85	-84	-85	ML/CL/MH	120		0	1.250	1	30.5	0.88	31	41	0.89	9	23.9	23.9	587.1	35.6	35.6	623	311	470
-86	-85	-86	SP/SP-SM/SM	125		38	0.000	1	31.5	0.91	32	42	0.92	86	11.7	42.8	598.8	251.4	363.8	850	425	476
-88	-86	-88	SP/SP-SM/SM	125		38	0.000	2	33.0	0.96	34	44	0.99	86	24.6	85.6	623.3	268.4	363.8	892	446	490
-90	-88	-90	SP/SP-SM/SM	125		38	0.000	2	35.0	1.02	36	46	1.05	86	26.2	85.6	649.5	285.5	363.8	935	467	505
-92	-90	-92	SP/SP-SM/SM	125		38	0.000	2	37.0	1.08	38	48	1.11	86	27.8	85.6	677.3	302.5	363.8	980	490	520
-94	-92	-94	SP/SP-SM/SM	125		38	0.000	2	39.0	1.14	40	50	1.17	86	29.4	85.6	706.7	319.5	363.8	1026	513	537
-95.3	-94	-95.3	SP/SP-SM/SM	125		38	0.000	1.3	40.7	1.19	41.3	51.3	1.22	86	20.0	55.7	726.6	330.6	363.8	1057	529	548
-96	-95.3	-96	SP/SP-SM/SM	125		38	0.000	0.7	41.7	1.23	42	52	1.24	86	11.0	30.0	737.7	336.6	363.8	1074	537	554
-97	-96	-97	SP/SP-SM/SM	125		38	0.000	1	42.5	1.25	43	53	1.27	86	16.1	42.8	753.8	345.1	363.8	1099	549	563

Ignore top 10' depth

730 tons

Casing tip

NOTES:
1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING

Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan

EMI Project No: 06-123-03

SKIN FRICTION IN SAND

Qs = Ks x tan (d x Ø) x (P x L) x Svo

WHERE: Svo = average effective overburden pressure
P = pile perimeter (feet)
L = pile length in soil layer (ft)
Ks = Coefficient of horizontal soil stress
Ø = friction angle of the soil
d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)	Case 1 Steel Casing	Case 2 Steel Casing
	12" x 1"	
Perim (feet)	38.22	
Area (sq. ft)	3.16	
Ks	0.6	
d	0.8	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb

Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

Qs = alpha x c x P x L

WHERE: alpha = adhesion factor (See chart below)
c = cohesion (tons/sq. feet)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf , alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb

Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:
1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

-48 ft = top of pile el. -58 ft = top of ground el. 5 ft = water table el.

(Case 1) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

(Case 2) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N1)60	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	12" x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-49	-58	-49	CL/ML/CH	120		0	0.125	-9	-4.5	-0.13	-9	1	-0.26	9	-43.0	-43.0	-43.0	3.6	3.6	-39	-20	-34
-50	-49	-50	CL/ML/CH	120		0	0.125	1	-8.5	-0.24	-8	2	-0.23	9	4.8	4.8	-38.2	3.6	3.6	-35	-17	-31
-52	-50	-52	CL/ML/CH	120		0	0.125	2	-7.0	-0.20	-6	4	-0.17	9	9.6	9.6	-28.7	3.6	3.6	-25	-13	-23
-54	-52	-54	CL/ML/CH	120		0	0.125	2	-5.0	-0.14	-4	6	-0.12	9	9.6	9.6	-19.1	3.6	3.6	-16	-8	-15
-55	-54	-55	CL/ML/CH	120		0	0.125	1	-3.5	-0.10	-3	7	-0.09	9	4.8	4.8	-14.3	3.6	3.6	-11	-5	-11
-56	-55	-56	CL/ML	120		0	0.625	1	-2.5	-0.07	-2	8	-0.06	9	14.9	14.9	0.6	17.8	17.8	18	9	0
-57	-56	-57	CL/ML	120		0	0.625	1	-1.5	-0.04	-1	9	-0.03	9	14.9	14.9	15.5	17.8	17.8	33	17	12
-58	-57	-58	CL/ML	120		0	0.625	1	-0.5	-0.01	0	10	0.00	9	14.9	14.9	30.5	17.8	17.8	48	24	24
-59	-58	-59	CL/ML	120		0	0.625	1	0.5	0.01	1	11	0.03	9	14.9	14.9	45.4	17.8	17.8	63	32	36
-60	-59	-60	CL/ML	120		0	0.625	1	1.5	0.04	2	12	0.06	9	14.9	14.9	60.3	17.8	17.8	78	39	48
-61	-60	-61	CL/ML	120		0	0.625	1	2.5	0.07	3	13	0.09	9	14.9	14.9	75.3	17.8	17.8	93	47	60
-62	-61	-62	CL/ML	120		0	0.625	1	3.5	0.10	4	14	0.12	9	14.9	14.9	90.2	17.8	17.8	108	54	72
-63	-62	-63	CL/ML	120		0	0.625	1	4.5	0.13	5	15	0.14	9	14.9	14.9	105.1	17.8	17.8	123	61	84
-64	-63	-64	CL/ML	120		0	0.625	1	5.5	0.16	6	16	0.17	9	14.9	14.9	120.0	17.8	17.8	138	69	96
-66	-64	-66	CL/ML	120		0	0.625	2	7.0	0.20	8	18	0.23	9	29.9	29.9	149.9	17.8	17.8	168	84	120
-68	-66	-68	CL/ML	120		0	0.625	2	9.0	0.26	10	20	0.29	9	29.9	29.9	179.8	17.8	17.8	198	99	144
-69	-68	-69	CL/ML	120		0	0.625	1	10.5	0.30	11	21	0.32	9	14.9	14.9	194.7	17.8	17.8	212	106	156
-70	-69	-70	CL/ML	120		0	0.625	1	11.5	0.33	12	22	0.35	9	14.9	14.9	209.6	17.8	17.8	227	114	168
-71	-70	-71	ML/CL/MH	120		0	1.250	1	12.5	0.36	13	23	0.37	9	23.9	23.9	233.5	35.6	35.6	269	135	187
-73	-71	-73	ML/CL/MH	120		0	1.250	2	14.0	0.40	15	25	0.43	9	47.8	47.8	281.3	35.6	35.6	317	158	225
-75	-73	-75	ML/CL/MH	120		0	1.250	2	16.0	0.46	17	27	0.49	9	47.8	47.8	329.1	35.6	35.6	365	182	263
-77	-75	-77	ML/CL/MH	120		0	1.250	2	18.0	0.52	19	29	0.55	9	47.8	47.8	376.9	35.6	35.6	412	206	301
-79	-77	-79	ML/CL/MH	120		0	1.250	2	20.0	0.58	21	31	0.60	9	47.8	47.8	424.6	35.6	35.6	460	230	340
-81	-79	-81	ML/CL/MH	120		0	1.250	2	22.0	0.63	23	33	0.66	9	47.8	47.8	472.4	35.6	35.6	508	254	378
-83	-81	-83	ML/CL/MH	120		0	1.250	2	24.0	0.69	25	35	0.72	9	47.8	47.8	520.2	35.6	35.6	556	278	416
-84	-83	-84	ML/CL/MH	120		0	1.250	1	25.5	0.73	26	36	0.75	9	23.9	23.9	544.1	35.6	35.6	580	290	435
-85	-84	-85	ML/CL/MH	120		0	1.250	1	26.5	0.76	27	37	0.78	9	23.9	23.9	568.0	35.6	35.6	604	302	454
-86	-85	-86	SP/SP-SM/SM	125		38	0.000	1	27.5	0.79	28	38	0.81	86	10.2	42.8	578.2	220.1	363.8	798	399	460
-88	-86	-88	SP/SP-SM/SM	125		38	0.000	2	29.0	0.84	30	40	0.87	86	21.6	85.6	599.8	237.1	363.8	837	418	472
-90	-88	-90	SP/SP-SM/SM	125		38	0.000	2	31.0	0.90	32	42	0.93	86	23.2	85.6	623.0	254.1	363.8	877	439	485
-92	-90	-92	SP/SP-SM/SM	125		38	0.000	2	33.0	0.97	34	44	1.00	86	24.8	85.6	647.8	271.2	363.8	919	459	499
-94	-92	-94	SP/SP-SM/SM	125		38	0.000	2	35.0	1.03	36	46	1.06	86	26.4	85.6	674.2	288.2	363.8	962	481	514
-95.3	-94	-95.3	SP/SP-SM/SM	125		38	0.000	1.3	36.7	1.08	37.3	47.3	1.10	86	18.0	55.7	692.3	299.3	363.8	992	496	524
-96	-95.3	-96	SP/SP-SM/SM	125		38	0.000	0.7	37.7	1.11	38	48	1.12	86	10.0	30.0	702.3	305.2	363.8	1007	504	530
-97	-96	-97	SP/SP-SM/SM	125		38	0.000	1	38.5	1.14	39	49	1.15	86	14.6	42.8	716.9	313.7	363.8	1031	515	538

Ignore top 15' depth

695 ton

Casing tip

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING

Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan

EMI Project No: 06-123-03

SKIN FRICTION IN SAND

Qs = Ks x tan (d x Ø) x (P x L) x Svo

WHERE:
- Svo = average effective overburden pressure
- P = pile perimeter (feet)
- L = pile length in soil layer (ft)
- Ks = Coefficient of horizontal soil stress
- Ø = friction angle of the soil
- d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)

	Case 1 Steel Casing 12" x 1"	Case 2 Steel Casing
Perim (feet)	38.22	
Area (sq. ft)	3.16	
Ks	0.8	
d	0.6	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb

Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-104 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-104

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

Qs = alpha x c x P x L

WHERE: alpha = adhesion factor (See chart below)
c = cohesion (tons/sq. foot)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf, alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb

Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:

1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

-39 ft = top of pile el. -49 ft = top of ground el. 5 ft = water table el.

(Case 1) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

(Case 2) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N1)60	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	12" x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-40	-49	-40	CL/ML/CH	120		0	0.125	-9	-4.5	-0.13	-9	1	-0.26	9	-43.0	-43.0	-43.0	3.6	3.6	-39	-20	-34
-41	-40	-41	CL/ML/CH	120		0	0.125	1	-8.5	-0.24	-8	2	-0.23	9	4.8	4.8	-38.2	3.6	3.6	-35	-17	-31
-43	-41	-43	CL/ML/CH	120		0	0.125	2	-7.0	-0.20	-6	4	-0.17	9	9.6	9.6	-28.7	3.6	3.6	-25	-13	-23
-45	-43	-45	CL/ML/CH	120		0	0.125	2	-5.0	-0.14	-4	6	-0.12	9	9.6	9.6	-19.1	3.6	3.6	-16	-8	-15
-46	-45	-46	CL/ML/CH	120		0	0.125	1	-3.5	-0.10	-3	7	-0.09	9	4.8	4.8	-14.3	3.6	3.6	-11	-5	-11
-47	-46	-47	CL/ML/CH	120		0	0.125	1	-2.5	-0.07	-2	8	-0.06	9	4.8	4.8	-9.6	3.6	3.6	-6	-3	-8
-48	-47	-48	CL/ML/CH	120		0	0.125	1	-1.5	-0.04	-1	9	-0.03	9	4.8	4.8	-4.8	3.6	3.6	-1	-1	-4
-49	-48	-49	CL/ML/CH	120		0	0.125	1	-0.5	-0.01	0	10	0.00	9	4.8	4.8	0.0	3.6	3.6	4	2	0
-50	-49	-50	CL/ML/CH	120		0	0.125	1	0.5	0.01	1	11	0.03	9	4.8	4.8	4.8	3.6	3.6	8	4	4
-51	-50	-51	CL/ML/CH	120		0	0.125	1	1.5	0.04	2	12	0.06	9	4.8	4.8	9.6	3.6	3.6	13	7	8
-52	-51	-52	CL/ML/CH	120		0	0.125	1	2.5	0.07	3	13	0.09	9	4.8	4.8	14.3	3.6	3.6	18	9	11
-53	-52	-53	CL/ML/CH	120		0	0.125	1	3.5	0.10	4	14	0.12	9	4.8	4.8	19.1	3.6	3.6	23	11	15
-54	-53	-54	CL/ML/CH	120		0	0.125	1	4.5	0.13	5	15	0.14	9	4.8	4.8	23.9	3.6	3.6	27	14	19
-55	-54	-55	CL/ML/CH	120		0	0.125	1	5.5	0.16	6	16	0.17	9	4.8	4.8	28.7	3.6	3.6	32	16	23
-56	-55	-56	CL/ML	120		0	0.625	1	6.5	0.19	7	17	0.20	9	14.9	14.9	43.6	17.8	17.8	61	31	35
-58	-56	-58	CL/ML	120		0	0.625	2	8.0	0.23	9	19	0.26	9	29.9	29.9	73.5	17.8	17.8	91	46	59
-59	-58	-59	CL/ML	120		0	0.625	1	9.5	0.27	10	20	0.29	9	14.9	14.9	88.4	17.8	17.8	106	53	71
-60	-59	-60	CL/ML	120		0	0.625	1	10.5	0.30	11	21	0.32	9	14.9	14.9	103.3	17.8	17.8	121	61	83
-61	-60	-61	CL/ML	120		0	0.625	1	11.5	0.33	12	22	0.35	9	14.9	14.9	118.3	17.8	17.8	136	68	95
-63	-61	-63	CL/ML	120		0	0.625	2	13.0	0.37	14	24	0.40	9	29.9	29.9	148.1	17.8	17.8	166	83	118
-65	-63	-65	CL/ML	120		0	0.625	2	15.0	0.43	16	26	0.46	9	29.9	29.9	178.0	17.8	17.8	196	98	142
-67	-65	-67	CL/ML	120		0	0.625	2	17.0	0.49	18	28	0.52	9	29.9	29.9	207.8	17.8	17.8	226	113	166
-69	-67	-69	CL/ML	120		0	0.625	2	19.0	0.55	20	30	0.58	9	29.9	29.9	237.7	17.8	17.8	255	128	190
-70	-69	-70	CL/ML	120		0	0.625	1	20.5	0.59	21	31	0.60	9	14.9	14.9	252.6	17.8	17.8	270	135	202
-71	-70	-71	ML/CL/MH	120		0	1.250	1	21.5	0.62	22	32	0.63	9	23.9	23.9	276.5	35.6	35.6	312	156	221
-72	-71	-72	ML/CL/MH	120		0	1.250	1	22.5	0.65	23	33	0.66	9	23.9	23.9	300.4	35.6	35.6	336	168	240
-73	-72	-73	ML/CL/MH	120		0	1.250	1	23.5	0.68	24	34	0.69	9	23.9	23.9	324.3	35.6	35.6	360	180	259
-74	-73	-74	ML/CL/MH	125		0	1.250	1	24.5	0.71	25	35	0.72	9	23.9	23.9	348.2	35.6	35.6	384	192	279
-75.3	-74	-75.3	ML/CL/MH	125		0	1.250	1.3	25.7	0.74	26.3	36.3	0.76	9	31.1	31.1	379.2	35.6	35.6	415	207	303
-76	-75.3	-76	ML/CL/MH	125		0	1.250	0.7	26.7	0.77	27	37	0.79	9	16.7	16.7	396.0	35.6	35.6	432	216	317
-77	-76	-77	ML/CL/MH	125		0	1.250	1	27.5	0.80	28	38	0.82	9	23.9	23.9	419.9	35.6	35.6	455	228	336
-78	-77	-78	ML/CL/MH	125		0	1.250	1	28.5	0.83	29	39	0.85	9	23.9	23.9	443.7	35.6	35.6	479	240	355
-79	-78	-79	ML/CL/MH	125		0	1.250	1	29.5	0.86	30	40	0.88	9	23.9	23.9	467.6	35.6	35.6	503	252	374
-80	-79	-80	ML/CL/MH	125		0	1.250	1	30.5	0.89	31	41	0.91	9	23.9	23.9	491.5	35.6	35.6	527	264	393
-81	-80	-81	ML/CL/MH	125		0	1.250	1	31.5	0.93	32	42	0.94	9	23.9	23.9	515.4	35.6	35.6	551	275	412

Ignore top 10' depth

380 tons

Casing tip

Without Considering the Scour Effects
(Consider Top 10 ft Depth)

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING
Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan **EMI Project No:** 06-123-03

SKIN FRICTION IN SAND

Qs = Ks x tan (d x Ø) x (P x L) x Svo

WHERE: Svo = average effective overburden pressure
P = pile perimeter (feet)
L = pile length in soil layer (ft)
Ks = Coefficient of horizontal soil stress
Ø = friction angle of the soil
d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)

	Case 1 Steel Casing 12" x 1"	Case 2 Steel Casing
Perim (feet)	38.22	
Area (sq. ft)	3.16	
Ks	0.8	
d	0.6	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb

Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

Qs = alpha x c x P x L

WHERE: alpha = adhesion factor (See chart below)
c = cohesion (tons/sq. feet)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf , alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb

Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:
1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

-33 ft = top of pile el. -33 ft = top of ground el. 5 ft = water table el.

(Case 1) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

(Case 2) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N60)	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	12" x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-34	-33	-34	CL/ML-1	120		0	0.125	1	0.5	0.01	1	1	0.03	9	4.8	4.8	4.8	3.6	3.6	8	4	4
-35	-34	-35	CL/ML-1	120		0	0.125	1	1.5	0.04	2	2	0.06	9	4.8	4.8	9.6	3.6	3.6	13	7	8
-36	-35	-36	CL/ML-1	120		0	0.125	1	2.5	0.07	3	3	0.09	9	4.8	4.8	14.3	3.6	3.6	18	9	11
-37	-36	-37	CL/ML-1	120		0	0.125	1	3.5	0.10	4	4	0.12	9	4.8	4.8	19.1	3.6	3.6	23	11	15
-38	-37	-38	CL/ML-1	120		0	0.125	1	4.5	0.13	5	5	0.14	9	4.8	4.8	23.9	3.6	3.6	27	14	19
-39	-38	-39	CL/ML-1	120		0	0.125	1	5.5	0.16	6	6	0.17	9	4.8	4.8	28.7	3.6	3.6	32	16	23
-40	-39	-40	CL/ML-1	120		0	0.125	1	6.5	0.19	7	7	0.20	9	4.8	4.8	33.4	3.6	3.6	37	19	27
-41	-40	-41	CL/ML-1	120		0	0.125	1	7.5	0.22	8	8	0.23	9	4.8	4.8	38.2	3.6	3.6	42	21	31
-42	-41	-42	CL/ML-1	120		0	0.125	1	8.5	0.24	9	9	0.26	9	4.8	4.8	43.0	3.6	3.6	47	23	34
-43	-42	-43	CL/ML-1	120		0	0.125	1	9.5	0.27	10	10	0.29	9	4.8	4.8	47.8	3.6	3.6	51	26	38
-44	-43	-44	CL/ML-1	120		0	0.125	1	10.5	0.30	11	11	0.32	9	4.8	4.8	52.6	3.6	3.6	56	28	42
-45	-44	-45	CL/ML-1	120		0	0.125	1	11.5	0.33	12	12	0.35	9	4.8	4.8	57.3	3.6	3.6	61	30	46
-46	-45	-46	CL/ML-2	120		0	0.625	1	12.5	0.36	13	13	0.37	9	14.9	14.9	72.3	17.8	17.8	90	45	58
-47	-46	-47	CL/ML-2	120		0	0.625	1	13.5	0.39	14	14	0.40	9	14.9	14.9	87.2	17.8	17.8	105	52	70
-48	-47	-48	CL/ML-2	120		0	0.625	1	14.5	0.42	15	15	0.43	9	14.9	14.9	102.1	17.8	17.8	120	60	82
-49	-48	-49	CL/ML-2	120		0	0.625	1	15.5	0.45	16	16	0.46	9	14.9	14.9	117.1	17.8	17.8	135	67	94
-50	-49	-50	CL/ML-2	120		0	0.625	1	16.5	0.48	17	17	0.49	9	14.9	14.9	132.0	17.8	17.8	150	75	106
-51	-50	-51	CL/ML-2	120		0	0.625	1	17.5	0.50	18	18	0.52	9	14.9	14.9	146.9	17.8	17.8	165	82	118
-52	-51	-52	CL/ML-2	120		0	0.625	1	18.5	0.53	19	19	0.55	9	14.9	14.9	161.8	17.8	17.8	180	90	129
-53	-52	-53	CL/ML-2	120		0	0.625	1	19.5	0.56	20	20	0.58	9	14.9	14.9	176.8	17.8	17.8	195	97	141
-54	-53	-54	CL/ML-2	120		0	0.625	1	20.5	0.59	21	21	0.60	9	14.9	14.9	191.7	17.8	17.8	210	105	153
-55	-54	-55	CL/ML-2	120		0	0.625	1	21.5	0.62	22	22	0.63	9	14.9	14.9	206.6	17.8	17.8	224	112	165
-56	-55	-56	ML/CL-ML/CL	120		0	1.250	1	22.5	0.65	23	23	0.66	9	23.9	23.9	230.5	35.6	35.6	266	133	184
-57	-56	-57	ML/CL-ML/CL	120		0	1.250	1	23.5	0.68	24	24	0.69	9	23.9	23.9	254.4	35.6	35.6	290	145	204
-58	-57	-58	ML/CL-ML/CL	120		0	1.250	1	24.5	0.71	25	25	0.72	9	23.9	23.9	278.3	35.6	35.6	314	157	223
-59	-58	-59	ML/CL-ML/CL	120		0	1.250	1	25.5	0.73	26	26	0.75	9	23.9	23.9	302.2	35.6	35.6	338	169	242
-60	-59	-60	ML/CL-ML/CL	120		0	1.250	1	26.5	0.76	27	27	0.78	9	23.9	23.9	326.1	35.6	35.6	362	181	261
-61	-60	-61	ML/CL-ML/CL	120		0	1.250	1	27.5	0.79	28	28	0.81	9	23.9	23.9	350.0	35.6	35.6	386	193	280
-62	-61	-62	ML/CL-ML/CL	120		0	1.250	1	28.5	0.82	29	29	0.84	9	23.9	23.9	373.9	35.6	35.6	409	205	299
-63	-62	-63	ML/CL-ML/CL	120		0	1.250	1	29.5	0.85	30	30	0.86	9	23.9	23.9	397.8	35.6	35.6	433	217	318
-64	-63	-64	ML/CL-ML/CL	120		0	1.250	1	30.5	0.88	31	31	0.89	9	23.9	23.9	421.6	35.6	35.6	457	229	337
-65.3	-64	-65.3	ML/CL-ML/CL	120		0	1.250	1.3	31.7	0.91	32.3	32.3	0.93	9	31.1	31.1	452.7	35.6	35.6	488	244	362
-66	-65.3	-66	ML/CL-ML/CL	120		0	1.250	0.7	32.7	0.94	33	33	0.95	9	16.7	16.7	469.4	35.6	35.6	505	253	376
-67	-66	-67	ML/CL-ML/CL	120		0	1.250	1	33.5	0.96	34	34	0.98	9	23.9	23.9	493.3	35.6	35.6	529	264	395
-68	-67	-68	ML/CL-ML/CL	120		0	1.250	1	34.5	0.99	35	35	1.01	9	23.9	23.9	517.2	35.6	35.6	553	276	414

Consider top 10' depth

455 ton

Bent 13

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING
Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan EMI Project No: 06-123-03

SKIN FRICTION IN SAND

$Qs = Ks \times \tan(d \times \emptyset) \times (P \times L) \times Svo$

WHERE:
- Svo = average effective overburden pressure
- P = pile perimeter (feet)
- L = pile length in soil layer (ft)
- Ks = Coefficient of horizontal soil stress
- Ø = friction angle of the soil
- d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)

	Case 1 Steel Casing 12' x 1"	Case 2 Steel Casing
Perim (feet)	38.22	
Area (sq. ft)	3.16	
Ks	0.8	
d	0.6	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb

$Qb = (Nq^*)(Svb)Ab$

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

$Qs = alpha \times c \times P \times L$

WHERE: alpha = adhesion factor (See chart below)
c = cohesion (tons/sq. foot)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf , alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb

$Qb = Nc \times Cb \times Ab$

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

$Qb = 9 \times Cb \times Ab$

NOTES:
1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

-44 ft = top of pile el. -44 ft = top of ground el. 5 ft = water table el.

(Case 1) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

(Case 2) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N1)60	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	12' x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-45	-44	-45	CL/ML/CH	120		0	0.125	1	0.5	0.01	1	1	0.03	9	4.8	4.8	4.8	3.6	3.6	8	4	4
-46	-45	-46	CL/ML/CH	120		0	0.125	1	1.5	0.04	2	2	0.06	9	4.8	4.8	9.6	3.6	3.6	13	7	8
-48	-46	-48	CL/ML/CH	120		0	0.125	2	3.0	0.09	4	4	0.12	9	9.6	9.6	19.1	3.6	3.6	23	11	15
-50	-48	-50	CL/ML/CH	120		0	0.125	2	5.0	0.14	6	6	0.17	9	9.6	9.6	28.7	3.6	3.6	32	16	23
-52	-50	-52	CL/ML/CH	120		0	0.125	2	7.0	0.20	8	8	0.23	9	9.6	9.6	38.2	3.6	3.6	42	21	31
-54	-52	-54	CL/ML/CH	120		0	0.125	2	9.0	0.26	10	10	0.29	9	9.6	9.6	47.8	3.6	3.6	51	26	38
-55	-54	-55	CL/ML/CH	120		0	0.125	1	10.5	0.30	11	11	0.32	9	4.8	4.8	52.6	3.6	3.6	56	28	42
-56	-55	-56	CL/ML	120		0	0.625	1	11.5	0.33	12	12	0.35	9	14.9	14.9	67.5	17.8	17.8	85	43	54
-57	-56	-57	CL/ML	120		0	0.625	1	12.5	0.36	13	13	0.37	9	14.9	14.9	82.4	17.8	17.8	100	50	66
-58	-57	-58	CL/ML	120		0	0.625	1	13.5	0.39	14	14	0.40	9	14.9	14.9	97.3	17.8	17.8	115	58	78
-59	-58	-59	CL/ML	120		0	0.625	1	14.5	0.42	15	15	0.43	9	14.9	14.9	112.3	17.8	17.8	130	65	90
-60	-59	-60	CL/ML	120		0	0.625	1	15.5	0.45	16	16	0.46	9	14.9	14.9	127.2	17.8	17.8	145	73	102
-61	-60	-61	CL/ML	120		0	0.625	1	16.5	0.48	17	17	0.49	9	14.9	14.9	142.1	17.8	17.8	160	80	114
-62	-61	-62	CL/ML	120		0	0.625	1	17.5	0.50	18	18	0.52	9	14.9	14.9	157.1	17.8	17.8	175	87	126
-64	-62	-64	CL/ML	120		0	0.625	2	19.0	0.55	20	20	0.58	9	29.9	29.9	186.9	17.8	17.8	205	102	150
-66	-64	-66	CL/ML	120		0	0.625	2	21.0	0.60	22	22	0.63	9	29.9	29.9	216.8	17.8	17.8	235	117	173
-68	-66	-68	CL/ML	120		0	0.625	2	23.0	0.66	24	24	0.69	9	29.9	29.9	246.7	17.8	17.8	264	132	197
-70	-68	-70	CL/ML	120		0	0.625	2	25.0	0.72	26	26	0.75	9	29.9	29.9	276.5	17.8	17.8	294	147	221
-71	-70	-71	ML/CL/MH	120		0	1.250	1	26.5	0.76	27	27	0.78	9	23.9	23.9	300.4	35.6	35.6	336	168	240
-73	-71	-73	ML/CL/MH	120		0	1.250	2	28.0	0.81	29	29	0.84	9	47.8	47.8	348.2	35.6	35.6	384	192	279
-75	-73	-75	ML/CL/MH	120		0	1.250	2	30.0	0.86	31	31	0.89	9	47.8	47.8	396.0	35.6	35.6	432	216	317
-77	-75	-77	ML/CL/MH	120		0	1.250	2	32.0	0.92	33	33	0.95	9	47.8	47.8	443.7	35.6	35.6	479	240	355
-79	-77	-79	ML/CL/MH	120		0	1.250	2	34.0	0.98	35	35	1.01	9	47.8	47.8	491.5	35.6	35.6	527	264	393
-81	-79	-81	ML/CL/MH	120		0	1.250	2	36.0	1.04	37	37	1.07	9	47.8	47.8	539.3	35.6	35.6	575	287	431
-83	-81	-83	ML/CL/MH	120		0	1.250	2	38.0	1.09	39	39	1.12	9	47.8	47.8	587.1	35.6	35.6	623	311	470
-84	-83	-84	ML/CL/MH	120		0	1.250	1	39.5	1.14	40	40	1.15	9	23.9	23.9	611.0	35.6	35.6	647	323	489
-85	-84	-85	ML/CL/MH	120		0	1.250	1	40.5	1.17	41	41	1.18	9	23.9	23.9	634.9	35.6	35.6	670	335	508
-86	-85	-86	SP/SP-SM/SM	125		38	0.000	1	41.5	1.20	42	42	1.21	86	15.4	42.8	650.2	329.8	363.8	980	490	516
-88	-86	-88	SP/SP-SM/SM	125		38	0.000	2	43.0	1.24	44	44	1.27	86	32.0	85.6	682.2	346.8	363.8	1029	514	534
-90	-88	-90	SP/SP-SM/SM	125		38	0.000	2	45.0	1.31	46	46	1.34	86	33.6	85.6	715.8	363.8	363.8	1080	540	553
-92	-90	-92	SP/SP-SM/SM	125		38	0.000	2	47.0	1.37	48	48	1.40	86	35.2	85.6	751.0	380.8	363.8	1115	557	573
-94	-92	-94	SP/SP-SM/SM	125		38	0.000	2	49.0	1.43	50	50	1.46	86	36.8	85.6	787.8	397.9	363.8	1152	576	594
-95.3	-94	-95.3	SP/SP-SM/SM	125		38	0.000	1.3	50.7	1.48	51.3	51.3	1.50	86	24.8	55.7	812.5	408.9	363.8	1176	588	607
-96	-95.3	-96	SP/SP-SM/SM	125		38	0.000	0.7	51.7	1.51	52	52	1.53	86	13.6	30.0	826.2	414.9	363.8	1190	595	615
-97	-96	-97	SP/SP-SM/SM	125		38	0.000	1	52.5	1.54	53	53	1.56	86	19.8	42.8	846.0	423.4	363.8	1210	605	626

Consider 10' depth

815 ton

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING
Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan

EMI Project No: 06-123-03

SKIN FRICTION IN SAND

$Qs = Ks \times \tan(d \times \emptyset) \times (P \times L) \times Svo$

WHERE: Svo = average effective overburden pressure
P = pile perimeter (feet)
L = pile length in soil layer (ft)
Ks = Coefficient of horizontal soil stress
Ø = friction angle of the soil
d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)

	Case 1 Steel Casing 12' x 1"	Case 2 Steel Casing
Perim (feet)	38.22	
Area (sq. ft)	3.16	
Ks	0.8	
d	0.6	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb

$Qb = (Nq^*)(Svb)Ab$

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

$Qs = alpha \times c \times P \times L$

WHERE: alpha = adhesion factor (See chart below)
c = cohesion (tons/sq. feet)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha
0.10	1.00
0.25	1.00
0.50	0.75
0.75	0.50
1.00	0.50
2.00	0.50
7.00	0.50

For 0 < c < 0.25 tsf , alpha = 1.0
For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
For c > 0.75 tsf, alpha = 0.5

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb

$Qb = Nc \times Cb \times Ab$

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

$Qb = 9 \times Cb \times Ab$

-48 ft = top of pile el. -48 ft = top of ground el. 5 ft = water table el.

(Case 1)
SKIN FRICTION ON OUTER SURFACE
STEEL AREA END BEARING

(Case 2)
SKIN FRICTION ON OUTER SURFACE
STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N1)60	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	12' x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-49	-48	-49	CL/ML/CH	120		0	0.125	1	0.5	0.01	1	1	0.03	9	4.8	4.8	4.8	3.6	3.6	8	4	4
-50	-49	-50	CL/ML/CH	120		0	0.125	1	1.5	0.04	2	2	0.06	9	4.8	4.8	9.6	3.6	3.6	13	7	8
-52	-50	-52	CL/ML/CH	120		0	0.125	2	3.0	0.09	4	4	0.12	9	9.6	9.6	19.1	3.6	3.6	23	11	15
-54	-52	-54	CL/ML/CH	120		0	0.125	2	5.0	0.14	6	6	0.17	9	9.6	9.6	28.7	3.6	3.6	32	16	23
-55	-54	-55	CL/ML/CH	120		0	0.125	1	6.5	0.19	7	7	0.20	9	4.8	4.8	33.4	3.6	3.6	37	19	27
-56	-55	-56	CL/ML	120		0	0.625	1	7.5	0.22	8	8	0.23	9	14.9	14.9	48.4	17.8	17.8	66	33	39
-57	-56	-57	CL/ML	120		0	0.625	1	8.5	0.24	9	9	0.26	9	14.9	14.9	63.3	17.8	17.8	81	41	51
-58	-57	-58	CL/ML	120		0	0.625	1	9.5	0.27	10	10	0.29	9	14.9	14.9	78.2	17.8	17.8	96	48	63
-59	-58	-59	CL/ML	120		0	0.625	1	10.5	0.30	11	11	0.32	9	14.9	14.9	93.2	17.8	17.8	111	55	75
-60	-59	-60	CL/ML	120		0	0.625	1	11.5	0.33	12	12	0.35	9	14.9	14.9	108.1	17.8	17.8	126	63	86
-61	-60	-61	CL/ML	120		0	0.625	1	12.5	0.36	13	13	0.37	9	14.9	14.9	123.0	17.8	17.8	141	70	98
-62	-61	-62	CL/ML	120		0	0.625	1	13.5	0.39	14	14	0.40	9	14.9	14.9	138.0	17.8	17.8	156	78	110
-63	-62	-63	CL/ML	120		0	0.625	1	14.5	0.42	15	15	0.43	9	14.9	14.9	152.9	17.8	17.8	171	85	122
-64	-63	-64	CL/ML	120		0	0.625	1	15.5	0.45	16	16	0.46	9	14.9	14.9	167.8	17.8	17.8	186	93	134
-66	-64	-66	CL/ML	120		0	0.625	2	17.0	0.49	18	18	0.52	9	29.9	29.9	197.7	17.8	17.8	215	108	158
-68	-66	-68	CL/ML	120		0	0.625	2	19.0	0.55	20	20	0.58	9	29.9	29.9	227.5	17.8	17.8	245	123	182
-69	-68	-69	CL/ML	120		0	0.625	1	20.5	0.59	21	21	0.60	9	14.9	14.9	242.5	17.8	17.8	260	130	194
-70	-69	-70	CL/ML	120		0	0.625	1	21.5	0.62	22	22	0.63	9	14.9	14.9	257.4	17.8	17.8	275	138	206
-71	-70	-71	ML/CL/MH	120		0	1.250	1	22.5	0.65	23	23	0.66	9	23.9	23.9	281.3	35.6	35.6	317	158	225
-73	-71	-73	ML/CL/MH	120		0	1.250	2	24.0	0.69	25	25	0.72	9	47.8	47.8	329.1	35.6	35.6	365	182	263
-75	-73	-75	ML/CL/MH	120		0	1.250	2	26.0	0.75	27	27	0.78	9	47.8	47.8	376.9	35.6	35.6	412	206	301
-77	-75	-77	ML/CL/MH	120		0	1.250	2	28.0	0.81	29	29	0.84	9	47.8	47.8	424.6	35.6	35.6	460	230	340
-79	-77	-79	ML/CL/MH	120		0	1.250	2	30.0	0.86	31	31	0.89	9	47.8	47.8	472.4	35.6	35.6	508	254	378
-81	-79	-81	ML/CL/MH	120		0	1.250	2	32.0	0.92	33	33	0.95	9	47.8	47.8	520.2	35.6	35.6	556	278	416
-83	-81	-83	ML/CL/MH	120		0	1.250	2	34.0	0.98	35	35	1.01	9	47.8	47.8	568.0	35.6	35.6	604	302	454
-84	-83	-84	ML/CL/MH	120		0	1.250	1	35.5	1.02	36	36	1.04	9	23.9	23.9	591.9	35.6	35.6	627	314	473
-85	-84	-85	ML/CL/MH	120		0	1.250	1	36.5	1.05	37	37	1.07	9	23.9	23.9	615.7	35.6	35.6	651	326	493
-86	-85	-86	SP/SP-SM/SM	125		38	0.000	1	37.5	1.08	38	38	1.10	86	13.9	42.8	629.6	298.4	363.8	928	464	500
-88	-86	-88	SP/SP-SM/SM	125		38	0.000	2	39.0	1.13	40	40	1.16	86	29.0	85.6	658.6	315.4	363.8	974	487	517
-90	-88	-90	SP/SP-SM/SM	125		38	0.000	2	41.0	1.19	42	42	1.22	86	30.6	85.6	689.3	332.5	363.8	1022	511	534
-92	-90	-92	SP/SP-SM/SM	125		38	0.000	2	43.0	1.25	44	44	1.28	86	32.2	85.6	721.5	349.5	363.8	1071	535	552
-94	-92	-94	SP/SP-SM/SM	125		38	0.000	2	45.0	1.32	46	46	1.35	86	33.8	85.6	755.3	366.5	363.8	1119	560	571
-95.3	-94	-95.3	SP/SP-SM/SM	125		38	0.000	1.3	46.7	1.37	47.3	47.3	1.39	86	22.9	55.7	778.2	377.6	363.8	1142	571	584
-96	-95.3	-96	SP/SP-SM/SM	125		38	0.000	0.7	47.7	1.40	48	48	1.41	86	12.6	30.0	790.8	383.6	363.8	1155	577	591
-97	-96	-97	SP/SP-SM/SM	125		38	0.000	1	48.5	1.43	49	49	1.44	86	18.3	42.8	809.1	392.1	363.8	1173	586	601

Consider 10' depth

780 ton

NOTES:
1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING
Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan EMI Project No: 06-123-03

SKIN FRICTION IN SAND

Qs = Ks x tan (d x Ø) x (P x L) x Svo

WHERE:
- Svo = average effective overburden pressure
- P = pile perimeter (feet)
- L = pile length in soil layer (ft)
- Ks = Coefficient of horizontal soil stress
- Ø = friction angle of the soil
- d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)

	Case 1 Steel Casing 12' x 1"	Case 2 Steel Casing
Perim (feet)	38.22	
Area (sq. ft)	3.16	
Ks	0.8	
d	0.6	

Where: Area = Area of the pile tip; Perim = Perimeter of the pile

END BEARING IN SAND, Qb

Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

Qs = alpha x c x P x L

WHERE:
- alpha = adhesion factor (See chart below)
- c = cohesion (tons/sq. feet)
- P = pile perimeter (feet)
- L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf, alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb

Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:
1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

-39 ft = top of pile el. -39 ft = top of ground el. 5 ft = water table el.

(Case 1) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

(Case 2) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N1)60	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	12' x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-40	-39	-40	CL/ML/CH	120		0	0.125	1	0.5	0.01	1	1	0.03	9	4.8	4.8	4.8	3.6	3.6	8	4	4
-41	-40	-41	CL/ML/CH	120		0	0.125	1	1.5	0.04	2	2	0.06	9	4.8	4.8	9.6	3.6	3.6	13	7	8
-43	-41	-43	CL/ML/CH	120		0	0.125	2	3.0	0.09	4	4	0.12	9	9.6	9.6	19.1	3.6	3.6	23	11	15
-45	-43	-45	CL/ML/CH	120		0	0.125	2	5.0	0.14	6	6	0.17	9	9.6	9.6	28.7	3.6	3.6	32	16	23
-46	-45	-46	CL/ML/CH	120		0	0.125	1	6.5	0.19	7	7	0.20	9	4.8	4.8	33.4	3.6	3.6	37	19	27
-47	-46	-47	CL/ML/CH	120		0	0.125	1	7.5	0.22	8	8	0.23	9	4.8	4.8	38.2	3.6	3.6	42	21	31
-48	-47	-48	CL/ML/CH	120		0	0.125	1	8.5	0.24	9	9	0.26	9	4.8	4.8	43.0	3.6	3.6	47	23	34
-49	-48	-49	CL/ML/CH	120		0	0.125	1	9.5	0.27	10	10	0.29	9	4.8	4.8	47.8	3.6	3.6	51	26	38
-50	-49	-50	CL/ML/CH	120		0	0.125	1	10.5	0.30	11	11	0.32	9	4.8	4.8	52.6	3.6	3.6	56	28	42
-51	-50	-51	CL/ML/CH	120		0	0.125	1	11.5	0.33	12	12	0.35	9	4.8	4.8	57.3	3.6	3.6	61	30	46
-52	-51	-52	CL/ML/CH	120		0	0.125	1	12.5	0.36	13	13	0.37	9	4.8	4.8	62.1	3.6	3.6	66	33	50
-53	-52	-53	CL/ML/CH	120		0	0.125	1	13.5	0.39	14	14	0.40	9	4.8	4.8	66.9	3.6	3.6	70	35	54
-54	-53	-54	CL/ML/CH	120		0	0.125	1	14.5	0.42	15	15	0.43	9	4.8	4.8	71.7	3.6	3.6	75	38	57
-55	-54	-55	CL/ML/CH	120		0	0.125	1	15.5	0.45	16	16	0.46	9	4.8	4.8	76.4	3.6	3.6	80	40	61
-56	-55	-56	CL/ML	120		0	0.625	1	16.5	0.48	17	17	0.49	9	14.9	14.9	91.4	17.8	17.8	109	55	73
-58	-56	-58	CL/ML	120		0	0.625	2	18.0	0.52	19	19	0.55	9	29.9	29.9	121.2	17.8	17.8	139	70	97
-59	-58	-59	CL/ML	120		0	0.625	1	19.5	0.56	20	20	0.58	9	14.9	14.9	136.2	17.8	17.8	154	77	109
-60	-59	-60	CL/ML	120		0	0.625	1	20.5	0.59	21	21	0.60	9	14.9	14.9	151.1	17.8	17.8	169	84	121
-61	-60	-61	CL/ML	120		0	0.625	1	21.5	0.62	22	22	0.63	9	14.9	14.9	166.0	17.8	17.8	184	92	133
-63	-61	-63	CL/ML	120		0	0.625	2	23.0	0.66	24	24	0.69	9	29.9	29.9	195.9	17.8	17.8	214	107	157
-65	-63	-65	CL/ML	120		0	0.625	2	25.0	0.72	26	26	0.75	9	29.9	29.9	225.8	17.8	17.8	244	122	181
-67	-65	-67	CL/ML	120		0	0.625	2	27.0	0.78	28	28	0.81	9	29.9	29.9	255.6	17.8	17.8	273	137	204
-69	-67	-69	CL/ML	120		0	0.625	2	29.0	0.84	30	30	0.86	9	29.9	29.9	285.5	17.8	17.8	303	152	228
-70	-69	-70	CL/ML	120		0	0.625	1	30.5	0.88	31	31	0.89	9	14.9	14.9	300.4	17.8	17.8	318	159	240
-71	-70	-71	ML/CL/MH	120		0	1.250	1	31.5	0.91	32	32	0.92	9	23.9	23.9	324.3	35.6	35.6	360	180	259
-72	-71	-72	ML/CL/MH	120		0	1.250	1	32.5	0.94	33	33	0.95	9	23.9	23.9	348.2	35.6	35.6	384	192	279
-73	-72	-73	ML/CL/MH	120		0	1.250	1	33.5	0.96	34	34	0.98	9	23.9	23.9	372.1	35.6	35.6	408	204	298
-74	-73	-74	ML/CL/MH	125		0	1.250	1	34.5	0.99	35	35	1.01	9	23.9	23.9	396.0	35.6	35.6	432	216	317
-75.3	-74	-75.3	ML/CL/MH	125		0	1.250	1.3	35.7	1.03	36.3	36.3	1.05	9	31.1	31.1	427.0	35.6	35.6	463	231	342
-76	-75.3	-76	ML/CL/MH	125		0	1.250	0.7	36.7	1.06	37	37	1.07	9	16.7	16.7	443.7	35.6	35.6	479	240	355
-77	-76	-77	ML/CL/MH	125		0	1.250	1	37.5	1.09	38	38	1.10	9	23.9	23.9	467.6	35.6	35.6	503	252	374
-78	-77	-78	ML/CL/MH	125		0	1.250	1	38.5	1.12	39	39	1.14	9	23.9	23.9	491.5	35.6	35.6	527	264	393
-79	-78	-79	ML/CL/MH	125		0	1.250	1	39.5	1.15	40	40	1.17	9	23.9	23.9	515.4	35.6	35.6	551	275	412
-80	-79	-80	ML/CL/MH	125		0	1.250	1	40.5	1.18	41	41	1.20	9	23.9	23.9	539.3	35.6	35.6	575	287	431
-81	-80	-81	ML/CL/MH	125		0	1.250	1	41.5	1.21	42	42	1.23	9	23.9	23.9	563.2	35.6	35.6	599	299	451

Consider 10' depth

430 tons

ATTACHMENT C

Revised Axial Pile Capacity Calculation of the Abutment Pile Under Extreme Event Limit State

Project: Schuyler Heim Bridge Replacement Project No.: 06-123-03
By: Ranjan (RS) Date: 06/14/10 Checked By: Arul Date: 06/14/10 Sheet: 3 of 3
Subject:

(III) Seismic Condition - (downdrag layer down to El. -50')

Based on R-09-001 & R-09-002,

The bottom El. of downdrag layer ≐ -49'

Corresponding SHAFT depth = 52'

@ 52' depth, downdrag load ≐ 100 tons (See attached SHAFT output files)

Group reduction η ≐ 0.9

Apply η ⇒ Effective downdrag load = 100 × 0.9
= 90 tons //

Permanent load per pile provided = 257 kips
= 128.5 tons

Apply η ⇒ Effective Permanent load = 128.5/0.9
= 142 tons //

Total required axial pile resistance = 142 + 90
≐ 232 tons //

25% of total required axial resistance is allowed for end bearing (∵ pile settlement is not a concern & small diameter piles)

End bearing Q_b = 232 × 0.25
= 58 tons //

Total reqd axial pile resistance = (Effective Permanent load per pile) + (downdrag load)

Required Q_s = 232 − 58 = 174 tons

Per SHAFT, Required design pile tip El. = +3' − 80' = −77' //

⇒ 2.5' diameter & 75' long CIDH pile is adequate.

17660 Newhope Street, Suite E, Fountain Valley, CA 92708 Tel: (714) 751-3826 Fax: (714) 751-3928

VERTICALLY LOADED DRILLED SHAFT ANALYSIS PROGRAM SHAFT
VERSION 6 (C)COPYRIGHT ENSOFT,INC.1989,1995,1998,2001,2003,2007

Schuyler Heim Bridge Project - Abutment 1

PROPOSED DEPTH = 80.0 FT

NUMBER OF LAYERS = 7

WATER TABLE DEPTH = 0.0 FT.

FACTOR OF SAFETY APPLIED TO THE TOTAL ULTIMATE CAPACITY = 1.00

FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE CAPACITY = 1.00

SOIL INFORMATION

LAYER NO 1----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.120E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.114E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.700E+01

LAYER NO 2----CLAY

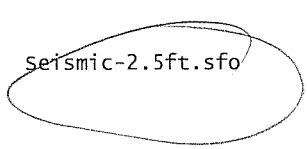
AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.700E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.700E+01

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.700E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.230E+02

LAYER NO 3----SAND



AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.853E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.115E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.230E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.724E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.115E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.330E+02

LAYER NO 4----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.800E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.115E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.330E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.800E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.115E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.530E+02

LAYER NO 5----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.517E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.360E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.530E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.362E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.360E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.710E+02

LAYER NO 6----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.300E+04

INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.710E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.300E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.780E+02

LAYER NO 7----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.308E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.780E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.100E+03

DRILLED SHAFT INFORMATION

DIAMETER OF STEM	=	2.500	FT.
DIAMETER OF BASE	=	2.500	FT.
END OF STEM TO BASE	=	0.000	FT.
ANGLE OF BELL	=	0.000	DEG.
IGNORED TOP PORTION	=	6.000	FT.
IGNORED BOTTOM PORTION	=	0.000	FT.
AREA OF ONE PERCENT STEEL	=	7.069	SQ.IN.
ELASTIC MODULUS, Ec	=	0.360E+07	LB/SQ IN
VOLUME OF UNDERREAM	=	0.000	CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (FOR UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
QBD = TOTAL ALLOWABLE LOAD USING A FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE RESISTANCE;
QDN = TOTAL ALLOWABLE LOAD USING FACTORS OF SAFETY APPLIED TO THE ULTIMATE SIDE RESISTANCE AND THE ULTIMATE BASE RESISTANCE.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	QBD (TONS)	QDN (TONS)	QU/VOLUME (TONS/CU.YDS)
7.0	1.27	1.50	15.46	16.96	16.96	16.96	13.19
8.0	1.45	3.01	15.46	18.47	18.47	18.47	12.70
9.0	1.64	4.52	15.46	19.98	19.98	19.98	12.21
10.0	1.82	6.03	15.46	21.50	21.50	21.50	11.82

11.0	2.00	7.54	15.46	23.01	23.01	23.01	11.50
12.0	2.18	9.06	15.46	24.52	24.52	24.52	11.24
13.0	2.36	10.57	15.46	26.03	26.03	26.03	11.01
14.0	2.55	12.08	15.46	27.54	27.54	27.54	10.82
15.0	2.73	13.59	15.46	29.06	29.06	29.06	10.65
16.0	2.91	15.10	15.46	30.57	30.57	30.57	10.51
17.0	3.09	16.62	15.46	32.08	32.08	32.08	10.38
18.0	3.27	18.13	15.46	33.59	33.59	33.59	10.26
19.0	3.45	19.64	24.96	44.60	44.60	44.60	12.91
20.0	3.64	21.15	36.61	57.76	57.76	57.76	15.88
21.0	3.82	22.66	46.77	69.43	69.43	69.43	18.18
22.0	4.00	24.18	52.09	76.26	76.26	76.26	19.06
23.0	4.18	25.69	52.37	78.06	78.06	78.06	18.67
24.0	4.36	29.47	52.37	81.84	81.84	81.84	18.75
25.0	4.55	33.36	52.37	85.73	85.73	85.73	18.86
26.0	4.73	37.35	52.37	89.72	89.72	89.72	18.98
27.0	4.91	41.44	52.37	93.82	93.82	93.82	19.11
28.0	5.09	45.63	52.37	98.01	98.01	98.01	19.25
29.0	5.27	49.91	42.91	92.82	92.82	92.82	17.60
30.0	5.45	54.28	31.87	86.15	86.15	86.15	15.79
31.0	5.64	58.74	22.41	81.14	81.14	81.14	14.40
32.0	5.82	63.27	17.67	80.95	80.95	80.95	13.91
33.0	6.00	67.89	17.67	85.56	85.56	85.56	14.26
34.0	6.18	69.61	17.67	87.29	87.29	87.29	14.12
35.0	6.36	71.34	17.67	89.02	89.02	89.02	13.99
36.0	6.55	73.07	17.67	90.74	90.74	90.74	13.86
37.0	6.73	74.80	17.67	92.47	92.47	92.47	13.75
38.0	6.91	76.53	17.67	94.20	94.20	94.20	13.63
39.0	7.09	78.25	17.67	95.93	95.93	95.93	13.53
40.0	7.27	79.98	17.67	97.66	97.66	97.66	13.43
41.0	7.45	81.71	17.67	99.38	99.38	99.38	13.33
42.0	7.64	83.44	17.67	101.11	101.11	101.11	13.24
43.0	7.82	85.17	17.67	102.84	102.84	102.84	13.15
44.0	8.00	86.90	17.67	104.57	104.57	104.57	13.07
45.0	8.18	88.62	17.67	106.30	106.30	106.30	12.99
46.0	8.36	90.35	17.67	108.03	108.03	108.03	12.92
47.0	8.55	92.08	17.67	109.75	109.75	109.75	12.84
48.0	8.73	93.81	17.67	111.48	111.48	111.48	12.77
49.0	8.91	95.54	34.28	129.81	129.81	129.81	14.57
50.0	9.09	97.26	53.65	150.92	150.92	150.92	16.60
51.0	9.27	98.99	70.26	169.25	169.25	169.25	18.25
52.0	9.46	100.72	78.56	179.28	179.28	179.28	18.96
53.0	9.64	102.45	78.56	181.01	181.01	181.01	18.78
54.0	9.82	107.90	78.56	186.46	186.46	186.46	18.99
55.0	10.00	113.36	78.56	191.92	191.92	191.92	19.19
56.0	10.18	118.83	78.56	197.39	197.39	197.39	19.39
57.0	10.36	124.31	78.56	202.87	202.87	202.87	19.57
58.0	10.55	129.80	78.56	208.36	208.36	208.36	19.76
59.0	10.73	135.29	78.56	213.85	213.85	213.85	19.93
60.0	10.91	140.78	78.56	219.34	219.34	219.34	20.10
61.0	11.09	146.26	78.56	224.82	224.82	224.82	20.27
62.0	11.27	151.74	78.56	230.30	230.30	230.30	20.43
63.0	11.46	157.21	78.56	235.77	235.77	235.77	20.58
64.0	11.64	162.66	78.56	241.22	241.22	241.22	20.73
65.0	11.82	168.10	78.56	246.66	246.66	246.66	20.87
66.0	12.00	173.52	78.56	252.08	252.08	252.08	21.01
67.0	12.18	178.91	75.21	254.12	254.12	254.12	20.86
68.0	12.36	184.29	71.30	255.59	255.59	255.59	20.67
69.0	12.55	189.63	67.95	257.58	257.58	257.58	20.53
70.0	12.73	194.95	66.28	261.22	261.22	261.22	20.52
71.0	12.91	200.23	66.28	266.50	266.50	266.50	20.64
72.0	13.09	206.71	66.28	272.98	272.98	272.98	20.85
73.0	13.27	213.19	66.28	279.46	279.46	279.46	21.05
74.0	13.46	219.67	88.37	308.04	308.04	308.04	22.89
75.0	13.64	226.15	114.14	340.29	340.29	340.29	24.95
76.0	13.82	232.63	136.24	368.86	368.86	368.86	26.69
77.0	14.00	239.11	147.28	386.39	386.39	386.39	27.60
78.0	14.18	245.59	147.28	392.87	392.87	392.87	27.70
79.0	14.36	250.55	147.28	397.83	397.83	397.83	27.70
80.0	14.55	255.46	147.28	402.74	402.74	402.74	27.69

Bottom of downdrag layer

RESULT FROM TREND (AVERAGED) LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.5383E-01	0.3267E-04	0.1718E-02	0.1000E-04
0.2692E+00	0.1633E-03	0.8591E-02	0.5000E-04
0.5383E+00	0.3267E-03	0.1718E-01	0.1000E-03

0.2699E+02	0.1634E-01	0.8591E+00	0.5000E-02
0.4058E+02	0.2454E-01	0.1289E+01	0.7500E-02
0.5417E+02	0.3276E-01	0.1718E+01	0.1000E-01
0.1201E+03	0.7876E-01	0.4296E+01	0.2500E-01
0.1810E+03	0.1350E+00	0.8591E+01	0.5000E-01
0.2155E+03	0.1799E+00	0.1289E+02	0.7500E-01
0.2359E+03	0.2169E+00	0.1718E+02	0.1000E+00
0.2871E+03	0.4006E+00	0.4247E+02	0.2500E+00
0.3125E+03	0.6722E+00	0.7524E+02	0.5000E+00
0.3188E+03	0.8023E+00	0.8475E+02	0.6250E+00
0.3282E+03	0.9344E+00	0.9426E+02	0.7500E+00
0.3830E+03	0.1726E+01	0.1495E+03	0.1500E+01

RESULT FROM UPPER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.8678E-01	0.4459E-04	0.2455E-02	0.1000E-04
0.4339E+00	0.2230E-03	0.1227E-01	0.5000E-04
0.8678E+00	0.4459E-03	0.2455E-01	0.1000E-03
0.4369E+02	0.2236E-01	0.1227E+01	0.5000E-02
0.6567E+02	0.3360E-01	0.1841E+01	0.7500E-02
0.8595E+02	0.4468E-01	0.2455E+01	0.1000E-01
0.1714E+03	0.1022E+00	0.6137E+01	0.2500E-01
0.2310E+03	0.1613E+00	0.1227E+02	0.5000E-01
0.2589E+03	0.2033E+00	0.1841E+02	0.7500E-01
0.2739E+03	0.2380E+00	0.2455E+02	0.1000E+00
0.3179E+03	0.4201E+00	0.5940E+02	0.2500E+00
0.3518E+03	0.6979E+00	0.1009E+03	0.5000E+00
0.3555E+03	0.8259E+00	0.1064E+03	0.6250E+00
0.3611E+03	0.9551E+00	0.1119E+03	0.7500E+00
0.4082E+03	0.1741E+01	0.1591E+03	0.1500E+01

RESULT FROM LOWER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.2838E-01	0.2267E-04	0.9819E-03	0.1000E-04
0.1419E+00	0.1133E-03	0.4909E-02	0.5000E-04
0.2838E+00	0.2267E-03	0.9819E-02	0.1000E-03
0.1419E+02	0.1133E-01	0.4909E+00	0.5000E-02
0.2130E+02	0.1700E-01	0.7364E+00	0.7500E-02
0.2844E+02	0.2268E-01	0.9819E+00	0.1000E-01
0.6947E+02	0.5642E-01	0.2455E+01	0.2500E-01
0.1231E+03	0.1069E+00	0.4909E+01	0.5000E-01
0.1616E+03	0.1517E+00	0.7364E+01	0.7500E-01
0.1887E+03	0.1909E+00	0.9819E+01	0.1000E+00
0.2562E+03	0.3810E+00	0.2553E+02	0.2500E+00
0.2713E+03	0.6452E+00	0.4958E+02	0.5000E+00
0.2820E+03	0.7787E+00	0.6309E+02	0.6250E+00
0.2954E+03	0.9138E+00	0.7659E+02	0.7500E+00
0.3577E+03	0.1711E+01	0.1399E+03	0.1500E+01

VERTICALLY LOADED DRILLED SHAFT ANALYSIS PROGRAM SHAFT
VERSION 6 (C)COPYRIGHT ENSOFT,INC.1989,1995,1998,2001,2003,2007

Schuyler Heim Bridge Project - Abutment 1

PROPOSED DEPTH = 82.0 FT

NUMBER OF LAYERS = 7

WATER TABLE DEPTH = 0.0 FT.

FACTOR OF SAFETY APPLIED TO THE TOTAL ULTIMATE CAPACITY = 1.00

FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE CAPACITY = 1.00

SOIL INFORMATION

LAYER NO 1----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.120E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.114E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.700E+01

LAYER NO 2----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.700E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.700E+01

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.700E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.230E+02

LAYER NO 3----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.853E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.115E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.230E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.724E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.115E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.330E+02

LAYER NO 4----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.800E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.330E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.800E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.530E+02

LAYER NO 5----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.517E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.360E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.530E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.362E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.360E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.710E+02

LAYER NO 6----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.300E+04

INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.710E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.300E+04
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.780E+02

LAYER NO 7----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.308E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.780E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.100E+03

DRILLED SHAFT INFORMATION

DIAMETER OF STEM	=	2.500	FT.
DIAMETER OF BASE	=	2.500	FT.
END OF STEM TO BASE	=	0.000	FT.
ANGLE OF BELL	=	0.000	DEG.
IGNORED TOP PORTION	=	53.000	FT.
IGNORED BOTTOM PORTION	=	0.000	FT.
AREA OF ONE PERCENT STEEL	=	7.069	SQ.IN.
ELASTIC MODULUS, Ec	=	0.360E+07	LB/SQ IN
VOLUME OF UNDERREAM	=	0.000	CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (FOR UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
QBD = TOTAL ALLOWABLE LOAD USING A FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE RESISTANCE;
QDN = TOTAL ALLOWABLE LOAD USING FACTORS OF SAFETY APPLIED TO THE ULTIMATE SIDE RESISTANCE AND THE ULTIMATE BASE RESISTANCE.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	QBD (TONS)	QDN (TONS)	QU/VOLUME (TONS/CU.YDS)
53.0	9.64	0.00	78.56	78.56	78.56	78.56	8.21
54.0	9.82	6.75	78.56	85.31	85.31	85.31	8.71
55.0	10.00	13.49	78.56	92.05	92.05	92.05	9.20
56.0	10.18	20.23	78.56	98.79	98.79	98.79	9.70

57.0	10.36	26.97	78.56	105.53	105.53	105.53	10.18
58.0	10.55	33.70	78.56	112.26	112.26	112.26	10.64
59.0	10.73	40.42	78.56	118.98	118.98	118.98	11.09
60.0	10.91	47.12	78.56	125.68	125.68	125.68	11.52
61.0	11.09	53.80	78.56	132.36	132.36	132.36	11.93
62.0	11.27	60.46	78.56	139.02	139.02	139.02	12.33
63.0	11.46	67.10	78.56	145.66	145.66	145.66	12.72
64.0	11.64	73.71	78.56	152.27	152.27	152.27	13.08
65.0	11.82	80.28	78.56	158.84	158.84	158.84	13.44
66.0	12.00	86.83	78.56	165.39	165.39	165.39	13.78
67.0	12.18	93.33	75.21	168.54	168.54	168.54	13.83
68.0	12.36	99.80	71.30	171.10	171.10	171.10	13.84
69.0	12.55	106.22	67.95	174.18	174.18	174.18	13.88
70.0	12.73	112.60	66.28	178.88	178.88	178.88	14.05
71.0	12.91	118.93	66.28	185.20	185.20	185.20	14.35
72.0	13.09	125.41	66.28	191.68	191.68	191.68	14.64
73.0	13.27	131.89	66.28	198.16	198.16	198.16	14.93
74.0	13.46	138.37	88.37	226.74	226.74	226.74	16.85
75.0	13.64	144.85	114.14	258.99	258.99	258.99	18.99
76.0	13.82	151.33	136.24	287.56	287.56	287.56	20.81
77.0	14.00	157.81	147.28	305.09	305.09	305.09	21.79
78.0	14.18	164.29	147.28	311.57	311.57	311.57	21.97
79.0	14.36	170.12	147.28	317.40	317.40	317.40	22.10
80.0	14.55	175.87	147.28	323.15	323.15	323.15	22.22
81.0	14.73	181.55	147.28	328.83	328.83	328.83	22.33
82.0	14.91	187.14	147.28	334.42	334.42	334.42	22.43

Required
Qs = 174 tons

RESULT FROM TREND (AVERAGED) LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.8665E-01	0.4616E-04	0.1718E-02	0.1000E-04
0.4333E+00	0.2308E-03	0.8591E-02	0.5000E-04
0.8665E+00	0.4616E-03	0.1718E-01	0.1000E-03
0.4468E+02	0.2351E-01	0.8591E+00	0.5000E-02
0.6713E+02	0.3533E-01	0.1289E+01	0.7500E-02
0.8834E+02	0.4697E-01	0.1718E+01	0.1000E-01
0.1855E+03	0.1080E+00	0.4296E+01	0.2500E-01
0.2665E+03	0.1756E+00	0.8591E+01	0.5000E-01
0.3100E+03	0.2258E+00	0.1289E+02	0.7500E-01
0.3324E+03	0.2645E+00	0.1718E+02	0.1000E+00
0.3869E+03	0.4515E+00	0.4247E+02	0.2500E+00
0.4052E+03	0.7206E+00	0.7524E+02	0.5000E+00
0.4098E+03	0.8501E+00	0.8475E+02	0.6250E+00
0.4193E+03	0.9824E+00	0.9426E+02	0.7500E+00
0.4740E+03	0.1775E+01	0.1495E+03	0.1500E+01

RESULT FROM UPPER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.1460E+00	0.6762E-04	0.2455E-02	0.1000E-04
0.7298E+00	0.3381E-03	0.1227E-01	0.5000E-04
0.1460E+01	0.6762E-03	0.2455E-01	0.1000E-03
0.7638E+02	0.3490E-01	0.1227E+01	0.5000E-02
0.1116E+03	0.5203E-01	0.1841E+01	0.7500E-02
0.1427E+03	0.6839E-01	0.2455E+01	0.1000E-01
0.2596E+03	0.1432E+00	0.6137E+01	0.2500E-01
0.3311E+03	0.2101E+00	0.1227E+02	0.5000E-01
0.3632E+03	0.2551E+00	0.1841E+02	0.7500E-01
0.3797E+03	0.2910E+00	0.2455E+02	0.1000E+00
0.4244E+03	0.4747E+00	0.5940E+02	0.2500E+00
0.4518E+03	0.7503E+00	0.1009E+03	0.5000E+00
0.4548E+03	0.8780E+00	0.1064E+03	0.6250E+00
0.4603E+03	0.1007E+01	0.1119E+03	0.7500E+00
0.5074E+03	0.1794E+01	0.1591E+03	0.1500E+01

RESULT FROM LOWER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.4332E-01	0.2923E-04	0.9819E-03	0.1000E-04
0.2166E+00	0.1462E-03	0.4909E-02	0.5000E-04
0.4332E+00	0.2923E-03	0.9819E-02	0.1000E-03

0.2201E+02	0.1473E-01	0.4909E+00	0.5000E-02
0.3309E+02	0.2212E-01	0.7364E+00	0.7500E-02
0.4417E+02	0.2952E-01	0.9819E+00	0.1000E-01
0.1065E+03	0.7288E-01	0.2455E+01	0.2500E-01
0.1844E+03	0.1352E+00	0.4909E+01	0.5000E-01
0.2380E+03	0.1878E+00	0.7364E+01	0.7500E-01
0.2723E+03	0.2312E+00	0.9819E+01	0.1000E+00
0.3491E+03	0.4284E+00	0.2553E+02	0.2500E+00
0.3558E+03	0.6892E+00	0.4958E+02	0.5000E+00
0.3649E+03	0.8221E+00	0.6309E+02	0.6250E+00
0.3782E+03	0.9575E+00	0.7659E+02	0.7500E+00
0.4405E+03	0.1756E+01	0.1399E+03	0.1500E+01

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

February 22, 2011

EMI Project No. 06-123-06

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Revised Addendum No. 2 to "Final Foundation Report, Schuyler Heim Bridge (Replace), Dated May 10, 2010", Bridge No. 53-3032, Los Angeles County, California, 7-LA-47, PM 3.58, EA 138201

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Final Foundation Report for the subject bridge, dated May 10, 2010, to Caltrans for review and comment. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the Final Foundation Report and provided its comments in two emails dated June 9, 2010 and June 17, 2010. EMI developed its responses to Caltrans comments and submitted them in an Addendum No. 1, dated July 6, 2010, which were reviewed and accepted by Caltrans OGDS-1.

After the Final Foundation Report and Addendum No. 1 were completed, EMI prepared an Addendum No. 2, dated January 4, 2011, which addressed the revisions that have been made to the project since November 2010, and submitted it to Caltrans for review. Caltrans OGDS-1 reviewed the Addendum No. 2 and provided its comments in an email dated January 19, 2011. EMI developed its responses to Caltrans comments (see Attachment 8) and submitted them to OGDS-1 for an early review in an email dated January 24, 2011, which were reviewed and accepted by OGDS-1. Based on Caltrans review comments, additional finite element (FE) analyses were performed (see Attachment 3) and corresponding axial pile calculations were completed using the results of these FE analyses (see Attachment 4).

Project Description: As part of the Port of Long Beach (POLB) future development plans, the existing grade north of Cerritos Channel below the Schuyler Heim Bridge is proposed to be raised. The project site location is shown in Figure 1. This development will include placement of up to 19 ft of fill between Bents 17 and 23 (Heim) north of the channel to provide an elevated grade at about El. +16 ft underneath the Schuyler Heim Bridge. In addition, up to 4.5 ft of fill will be placed north of the Heim Bridge (i.e., North of Bent 23). The proposed fill plan for the subject project is shown in Figure 2.

As a result of the proposed fill placement, consolidation settlement of the foundation soils is anticipated that will induce static downdrag loading on the foundation piles of the three bridge structures located on the north side of the channel: Heim (Bridge No. 53-3032), NB SR-103 Off-

Ramp (53-3034K), and SB SR-103 On-Ramp (53-3035S). The appropriate mitigation measures for the static downdrag effect on foundation piles of the above-mentioned two ramp structures are addressed in separate addenda (EMI, 2010b and EMI, 2010c). For the Heim Bridge, Bents 17 through 23 north of the channel are impacted by the static downdrag loading. In addition, the proposed fill placement around Bent 17 (Heim) will induce kinematic loading, which, if not mitigated, will impose significant lateral loads on the piles (Figure 2).

It is our understanding that as a part of the agreement between Caltrans and POLB, the Heim Bridge pile foundations are required to be designed to accommodate the future POLB development plans; therefore, appropriate ground improvement measures need to be taken to mitigate the downdrag and kinematic loading effects on the Heim Bridge foundation piles during the future development. Based on preliminary cost estimates, improving the subsurface soils around the piles using cement-deep-soil-mix (CDSM) prior to placement of fill is a more cost-effective option to mitigate the downdrag effects than extending the piles by about 50 ft to 70 ft. Therefore, CDSM ground improvement is proposed around piles at effected bent locations.

CDSM ground improvement is also proposed to account for the potential ground settlement of the existing ACTA tracks which are located west of the existing west MSE wall on the north side of the channel, due to the proposed future fill placement (Figure 2). Existing utilities in place prior to fill placement and proposed utilities should also be evaluated for differential settlement. Settlement estimates for existing and proposed utilities located within the footprint of the proposed fill are addressed in this addendum.

Purpose and Scope of Work: The subject Addendum presents the findings and conclusions of finite element (FE) analyses, which were conducted by EMI to evaluate CDSM ground improvement scheme for minimizing adverse effects associated with the fill placement beneath the subject bridge. This Addendum also presents results of our geotechnical analysis and provides design and construction recommendations to assist the designers in preparing the project Plans, Specifications, and Estimates (PS&E) for the fill placement project.

The geotechnical services provided for this project included the following tasks:

- Collection and review of existing geotechnical information;
- Field exploration consisting of drilling, sampling and logging fourteen exploratory borings and two Cone Penetration Test (CPT) soundings;
- Laboratory testing of selected bulk and relatively undisturbed soil samples;
- Finite Element analysis to evaluate the CDSM ground improvement scheme;
- Engineering analysis to develop foundation design and construction recommendations;
- Preparation of this Addendum presenting our findings, conclusions, and recommendations.

Field Exploration: Existing subsurface information beneath the Schuyler Heim Bridge is available from the report prepared by EMI (EMI, 2010a) for replacement of the existing Schuyler Heim Bridge. A supplemental site-specific geotechnical field investigation was

conducted by EMI for the subject project between November and December, 2010 which included a total of thirteen hollow-stem auger borings, one rotary wash borings and two CPT soundings. The purpose of the exploration was to collect soil samples from locations near selected bridge supports for relevant CDSM and other laboratory testing and to log subsurface conditions near the existing west MSE wall at north of the channel. The details of the field exploration are provided in Attachment 1.

Laboratory Testing: Laboratory tests were performed on selected soil samples by AP Engineering & Testing, Inc. (AP) Laboratory of Pomona, California, as a subcontractor to Earth Mechanics, Inc. (EMI), to determine relevant physical characteristics and engineering properties of soils that exist at the site. In addition, laboratory tests for the proposed cement-soil-mix (CSM) were also performed on selected samples, collected from previously available and site-specific current field explorations, mixed with different percentages of cement. The details of the laboratory testing are provided in Attachment 2.

Cement-Deep-Soil-Mix (CDSM): The proposed ground improvement consists of constructing two co-centric rings of CDSM around each CIDH pile, each with a width of 4 ft separated by a radial clear distance of 2 ft with an area replacement ratio (ARR) of about 75%. The general configuration for the CDSM is shown in Figure 3. The intent of the ground improvement is to reduce the settlement of the foundation soils immediately supporting the CIDH pile to minimize the downdrag loads applied to the pile. The downdrag forces resulting from consolidation settlement of compressible soils are transferred to the deeper incompressible soils through the two rings of CDSM instead of allowing them to be imposed on the CIDH pile. At Bent 17, the intent of the ground improvement is also to reduce kinematic loading on the piles due to the proposed fill placement. In addition, a single row of CDSM ground improvement, about 4-ft wide and 865-ft long with an ARR of 75%, located just east of the existing west MSE wall, is proposed to be constructed to reduce the ground settlement of the existing rail lines, located just west of the existing MSE wall (Figure 4).

There are two types of deep soil mixing methods considered: wet soil mixing and dry soil mixing. Depending on the cost, schedule, and amount of spoils generated, one of the deep soil mixing methods can be chosen. It should be noted that all CDSM columns should be installed from the existing grade prior to the fill placement and extended down to the specified tip elevation of -62 ft north of the channel.

Finite element (FE) analyses were performed to develop optimum CDSM ground improvement schemes. Based on the FE analyses, settlements of the foundation soils inside the inner ring of the CDSM supporting the CIDH pile north of the channel are reduced to less than 0.5 inches at about elevation -48 ft. It also indicates that the ground settlement of the existing rail lines, located west of the proposed CDSM ground improvement, is reduced to less than 1 inch, a value considered acceptable by ACTA. Soil-cement samples obtained from wet grab samples shall conform to the following requirements.

1. The 28-day unconfined compressive (UC) strength, performed in accordance with ASTM D-2166, should be at least 100 psi as the strength acceptance criteria.

2. A minimum ARR of 75% is required to develop the required compressive strength and stiffness values as described in the Technical Memorandum (Attachment 3).
3. A minimum cement content of 15% should be used.

Per Caltrans review comments received on January 19, 2011 (see Attachment 8), additional FE analyses were performed using the recent laboratory test results on soil-cement samples up to 56 days of curing. Based on the additional FE analyses, settlements of the foundation soils inside the inner ring of the CDSM supporting the CIDH pile north of the channel are reduced to less than 0.5 inches at about elevation -56 ft. Also, estimated ground settlement of the existing rail lines is expected to be about 1 inch, a value considered acceptable by ACTA.

Details of the revised FE analyses, including the additional FE analyses, used to develop CDSM ground improvement configurations and construction recommendations for pile foundations and existing rail lines/west MSE wall are provided in Technical Memoranda included in Attachment 3.

Methodology for Downdrag Calculations: The representative location of Bent 19 for north of the channel, which is anticipated to experience the largest static downdrag load, was selected for the static downdrag analyses. From FE analyses, the downdrag tip elevation was estimated to be about -48 ft where the downward movement of the soil surrounding a pile is about 0.5 inches. According to NAVFAC (1986), relative downward movement of 0.6 inches in the soil surrounding a pile is required to mobilize downward skin friction. Per recommendations by Tomlinson (1987) and API (2000), the maximum static downdrag load of approximately 720 kips is expected to be imposed between the pile cutoff elevation and the downdrag tip elevation with CDSM. Sample axial pile static downdrag calculations with CDSM are included in Attachment 4.

It should be noted that no revisions have been made to the specified pile tip elevations of the subject structure due to the proposed fill placement. This is because the additional positive axial capacity increases due to the proposed fill placement are greater than the maximum static downdrag estimated above El. -48 ft. The revised Foundation Recommendations for Bents (Table 12) and Pile Data Table (Table 13) in the Final Foundation Report is provided in the following pages.

Downdrag Calculation Check Using the Revised FE Analyses: Based on the revised FE analyses, the downdrag tip elevation at Bent 19 was estimated to be about -56 ft where the downward movement of the soil surrounding a pile is about 0.5 inches. Using the FE results from the most conservative scenario (i.e., Scenario 3-C, see FE Memorandum in Attachment 3 for details), the maximum static downdrag load that is expected to be imposed on the pile above this elevation was estimated. The increase in pile capacity below the bottom of the CDSM due to the increase in overburden after placement of the fill was estimated to be greater than the loss of skin friction in the downdrag zone plus the downdrag load. Therefore, the original pile tip elevations are adequate and no further revisions to these elevations are necessary. The downdrag calculation check using the revised FE analyses is also provided in Attachment 4.

TABLE 12. FOUNDATION RECOMMENDATIONS FOR BENTS

Location	Pile Type	Cut-off Elevation (ft)	Service-I Limit State Load (kips) per Column	Total Permissible Support Settlement (inch)	Required Factored Nominal Resistance (kips)				CIDH Design Tip Elevation (ft)	CIDH Specified Tip Elevation (ft)	Steel Casing Specified Tip Elevation (ft)	Steel Casing Nominal Driving Resistance (kips)
					Strength Limit		Extreme Event					
					Comp (φ= 0.7)	Tension (φ= 0.7)	Comp (φ= 1.0)	Tension (φ= 1.0)				
Bent 2	10 ft CIDH	-12.5	2,787	1	3,972	0	2,296	0	-127 (a-I), -82 (a-II), -71 (c), -98 (d)	-127	-38	360
Bent 3	10 ft CIDH	-2.0	3,141	1	4,393	0	2,604	0	-136 (a-I), -91 (a-II), -82 (c), -87 (d)	-136	-27	210
Bent 4	10 ft CIDH	-2.0	3,303	1	4,597	0	2,845	0	-149 (a-I), -107 (a-II), -91 (c), -87 (d)	-149	-27	190
Bent 5	10 ft CIDH	-2.0	2,747	1	3,910	0	2,271	0	-131 (a-I), -88 (a-II), -74 (c), -87 (d)	-131	-27	210
Bent 6	10 ft CIDH	-3.0	2,973	1	4,175	0	2,508	0	-136 (a-I), -72 (a-II), -87 (c), -88 (d)	-136	-28	210
Bent 7	10 ft CIDH	-3.0	3,193	1	4,472	0	2,674	0	-145 (a-I), -75 (a-II), -88 (c), -88 (d)	-145	-28	200

Notes:

(1) Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (b-I) Tension (Strength Limit), (a-II) Compression (Extreme Event), (b-II) Tension (Extreme Event), (c) Settlement, and (d) Lateral Load.

(2) The specified tip elevation shall not be raised.

(3) Maximum static downdrag load for Bents 17 to 23 is estimated to be 720 kips at El. -48 ft.

TABLE 12. FOUNDATION RECOMMENDATIONS FOR BENTS (CONT.)

Location	Pile Type	Cut-off Elevation (ft)	Service-I Limit State Load (kips) per Column	Total Permissible Support Settlement (inch)	Required Factored Nominal Resistance (kips)				CIDH Design Tip Elevation (ft)	CIDH Specified Tip Elevation (ft)	Steel Casing Specified Tip Elevation (ft)	Steel Casing Nominal Driving Resistance (kips)
					Strength Limit		Extreme Event					
					Comp (φ= 0.7)	Tension (φ= 0.7)	Comp (φ= 1.0)	Tension (φ= 1.0)				
Bent 8	10 ft CIDH	-4.0	3,955	1	5,353	0	3,382	0	-161 (a-I), -119 (a-II), -110 (c), -89 (d)	-161	-29	190
Bent 9	10 ft CIDH	-4.0	3,399	1	4,632	0	2,872	0	-143 (a-I), -90 (a-II), -89 (c), -89 (d)	-143	-29	190
Bent 10	10 ft CIDH	-4.0	3,180	1	4,458	0	2,706	0	-144 (a-I), -100 (a-II), -92 (c), -89 (d)	-144	-29	280
Bent 11	10 ft CIDH	-1.0	3,836	1	5,281	0	3,309	0	-156 (a-I), -107 (a-II), -110 (c), -86 (d)	-156	-26	280
Bent 12	10 ft CIDH	+6.0	3,341	1	4,617	0	2,810	0	-133 (a-I), -69 (a-II), -81 (c), -79 (d)	-133	-19	310
Bent 13	11 ft CIDH	-1.0	4,906	1	6,460	0	4,366	0	-181 (a-I), -103 (a-II), -151 (c), -127 (d)	-181	-76	810

Notes:

(1) Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (b-I) Tension (Strength Limit), (a-II) Compression (Extreme Event), (b-II) Tension (Extreme Event), (c) Settlement, and (d) Lateral Load.

(2) The specified tip elevation shall not be raised.

(3) Maximum static downdrag load for Bents 17 to 23 is estimated to be 720 kips at El. -48 ft.

TABLE 12. FOUNDATION RECOMMENDATIONS FOR BENTS (CONT.)

Location	Pile Type	Cut-off Elevation (ft)	Service-I Limit State Load (kips) per Column	Total Permissible Support Settlement (inch)	Required Factored Nominal Resistance (kips)				CIDH Design Tip Elevation (ft)	CIDH Specified Tip Elevation (ft)	Steel Casing Specified Tip Elevation (ft)	Steel Casing Nominal Driving Resistance (kips)
					Strength Limit		Extreme Event					
					Comp (φ= 0.7)	Tension (φ= 0.7)	Comp (φ= 1.0)	Tension (φ= 1.0)				
Bent 14	11 ft CIDH	+10.0	5,264	1	6,953	0	4,661	0	-200 (a-I), -119 (a-II), -165 (c), -138 (d)	-200	-95	1,460
Bent 15	11 ft CIDH	+10.0	5,489	1	7,240	0	4,876	0	-206 (a-I), 123 (a-II), -168 (c), -142 (d)	-206	-95	1,390
Bent 16	11 ft CIDH	-1.0	4,868	1	6,397	0	4,356	0	-189 (a-I), -114 (a-II), -154 (c), -133 (d)	-189	-86	760
Bent 17	12 ft CIDH	-5.5	3,945	1	5,364	0	3,397	0	-143 (a-I), -64 (a-II), -96 (c), -84 (d)	-143	-31	210
Bent 18	12 ft CIDH	-5.5	3,804	1	5,165	0	3,239	0	-140 (a-I), -99 (a-II), -95 (c), -83 (d)	-140	-31	250
Bent 19	12 ft CIDH	-5.5	3,483	1	4,760	0	2,923	0	-138 (a-I), -92 (a-II), -91 (c), -84 (d)	-138	-31	200

Notes:

(1) Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (b-I) Tension (Strength Limit), (a-II) Compression (Extreme Event), (b-II) Tension (Extreme Event), (c) Settlement, and (d) Lateral Load.

(2) The specified tip elevation shall not be raised.

(3) Maximum static downdrag load for Bents 17 to 23 is estimated to be 720 kips at El. -48 ft.

TABLE 12. FOUNDATION RECOMMENDATIONS FOR BENTS (CONT.)

Location	Pile Type	Cut-off Elevation (ft)	Service-I Limit State Load (kips) per Column	Total Permissible Support Settlement (inch)	Required Factored Nominal Resistance (kips)				CIDH Design Tip Elevation (ft)	CIDH Specified Tip Elevation (ft)	Steel Casing Specified Tip Elevation (ft)	Steel Casing Nominal Driving Resistance (kips)
					Strength Limit		Extreme Event					
					Comp (φ= 0.7)	Tension (φ= 0.7)	Comp (φ= 1.0)	Tension (φ= 1.0)				
Bent 20	12 ft CIDH	-5.5	3,706	1	5,047	0	3,190	0	-137 (a-I), -95 (a-II), -84 (c), -83 (d)	-137	-31	210
Bent 21	12 ft CIDH	-5.5	3,387	1	4,628	0	2,967	0	-129 (a-I), -64 (a-II), -94 (c), -84 (d)	-129	-31	330
Bent 22	12 ft CIDH	-5.5	3,416	1	4,688	0	2,950	0	-134 (a-I), -75 (a-II), -94 (c), -84 (d)	-134	-31	210
Bent 23	12 ft CIDH	-5.5	4,242	1	5,614	0	3,735	0	-142 (a-I), -104 (a-II), -103 (c), -85 (d)	-142	-31	250
Bent 24	12 ft CIDH	-5.5	4,200	1	5,735	0	3,718	0	-148 (a-I), -90 (a-II), -101 (c), -84 (d)	-148	-31	200

Notes:

(1) Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (b-I) Tension (Strength Limit), (a-II) Compression (Extreme Event), (b-II) Tension (Extreme Event), (c) Settlement, and (d) Lateral Load.

(2) The specified tip elevation shall not be raised.

(3) Maximum static downdrag load for Bents 17 to 23 is estimated to be 720 kips at El. -48 ft.

TABLE 13. PILE DATA TABLE

Location	Pile Type	Nominal Resistance (kips)		Nominal Resistance (Driven Steel Casing) (kips)		Driven Steel Casing Specified Tip Elevation (ft)	CIDH Design Tip Elevation (ft)	CIDH Specified Tip Elevation (ft)	Steel Casing Nominal Driving Resistance Required (kips)
		Compr.	Tension	Compr.	Tension				
Abut 1	2.5 ft CIDH	560	0	N/A	N/A	N/A	-77 (a), -47 (c), & -49 (d)	-77	N/A
Bent 2	10 ft CIDH	5,680	0	360	0	-38	-127 (a), -71 (c), & -98 (d)	-127	360
Bent 3	10 ft CIDH	6,280	0	210	0	-27	-136 (a), -82 (c), & -87 (d)	-136	210
Bent 4	10 ft CIDH	6,570	0	190	0	-27	-149 (a), -91 (c), & -87 (d)	-149	190
Bent 5	10 ft CIDH	5,590	0	210	0	-27	-131 (a), -74 (c), & -87 (d)	-131	210
Bent 6	10 ft CIDH	5,970	0	210	0	-28	-136 (a), -87 (c), & -88 (d)	-136	210
Bent 7	10 ft CIDH	6,390	0	200	0	-28	-145 (a), -88 (c), & -88 (d)	-145	200
Bent 8	10 ft CIDH	7,650	0	190	0	-29	-161 (a), -110 (c), & -89 (d)	-161	190
Bent 9	10 ft CIDH	6,620	0	190	0	-29	-143 (a), -89 (c), & -89 (d)	-143	190
Bent 10	10 ft CIDH	6,370	0	280	0	-29	-144 (a), -92 (c), & -89 (d)	-144	280
Bent 11	10 ft CIDH	7,550	0	280	0	-26	-156 (a), -110 (c), & -86 (d)	-156	280
Bent 12	10 ft CIDH	6,600	0	320	0	-19	-133 (a), -81 (c), & -79 (d)	-133	320
Bent 13	11 ft CIDH	9,230	0	810	0	-76	-181 (a), -151 (c), & -127 (d)	-181	810
Bent 14	11 ft CIDH	9,940	0	1,460	0	-95	-200 (a), -165 (c), & -138 (d)	-200	1,460

Notes:

(1) Design Tip Elevations are controlled by the following demands: (a) Compression, (b) Tension, (c) Settlement, and (d) Lateral Load.
(2) The specified tip elevation shall not be raised.
(3) Nominal Resistance for Bents 17 to 23 does NOT include the geotechnical (pile) resistance against 720 kips of static downdrag loading at El. -48 ft.
(4) Compressive tip elevations for Bents 17 to 23 are controlled by Nominal Resistance plus the required geotechnical (pile) resistance against 720 kips of static downdrag loading at El. -48 ft.

TABLE 13. PILE DATA TABLE (CONT.)

Location	Pile Type	Nominal Resistance (kips)		Nominal Resistance (Driven Steel Casing) (kips)		Driven Steel Casing Specified Tip Elevation (ft)	CIDH Design Tip Elevation (ft)	CIDH Specified Tip Elevation (ft)	Steel Casing Nominal Driving Resistance Required (kips)
		Compr.	Tension	Compr.	Tension				
Bent 15	11 ft CIDH	10,350	0	1,390	0	-95	-206 (a), -168 (c), & -142 (d)	-206	1,390
Bent 16	11 ft CIDH	9,140	0	760	0	-86	-189 (a), -154 (c), & -133 (d)	-189	760
Bent 17	12 ft CIDH	7,670	0	210	0	-31	-143 (a), -96 (c), & -84 (d)	-143	210
Bent 18	12 ft CIDH	7,380	0	250	0	-31	-140 (a), -95 (c), & -83 (d)	-140	250
Bent 19	12 ft CIDH	6,800	0	200	0	-31	-138 (a), -91 (c), & -84 (d)	-138	200
Bent 20	12 ft CIDH	7,210	0	210	0	-31	-137 (a), -84 (c), & -83 (d)	-137	210
Bent 21	12 ft CIDH	6,620	0	330	0	-31	-129 (a), -94 (c), & -84 (d)	-129	330
Bent 22	12 ft CIDH	6,700	0	210	0	-31	-134 (a), -94 (c), & -84 (d)	-134	210
Bent 23	12 ft CIDH	8,020	0	250	0	-31	-142 (a), -103 (c), & -85 (d)	-142	250
Bent 24	12 ft CIDH	8,200	0	200	0	-31	-148 (a), -101 (c), & -84 (d)	-148	200

Notes:

(1) Design Tip Elevations are controlled by the following demands: (a) Compression, (b) Tension, (c) Settlement, and (d) Lateral Load.
(2) The specified tip elevation shall not be raised.
(3) Nominal Resistance for Bents 17 to 23 does NOT include the geotechnical (pile) resistance against 720 kips of static downdrag loading at El. -48 ft.
(4) Compressive tip elevations for Bents 17 to 23 are controlled by Nominal Resistance plus the required geotechnical (pile) resistance against 720 kips of static downdrag loading at El. -48 ft.

Kinematic Analyses at Bent 17:

As mentioned earlier, the proposed fill placement will induce kinematic loading on the piles at Bent 17 during the future development. The proposed CDSM ground improvement will mitigate the kinematic loading on the piles. According to the Caltrans guidelines (Caltrans, 2006), all the slopes should meet the minimum required factor-of-safety of 1.1 when using one-third of the peak ground acceleration in the pseudo-static analyses. With the implementation of CDSM ground improvement around the piles at Bent 17, the slope meets the minimum required factor-of-safety. Therefore, lateral spreading/slope deformation is not expected to occur under design earthquake condition. The details of the kinematic analyses are provided in Attachment 5

Embankment Settlement Analyses:

Standard procedures were used to evaluate ground settlement of the underlying foundation soils due to the proposed fill placement. Generally, fills induce immediate and consolidation settlement of underlying soils. Immediate settlement occurs during grading and consolidation settlement occurs over varying time periods. Consolidation settlement (magnitude and time period) is directly related to the depth of fill placed over compressible soil and the thickness of compressible soil layers. Immediate settlement which is estimated to be negligible in this case occurs during grading or shortly thereafter while consolidation settlement, which in this case is considerable, occurs over varying time periods.

A generalized idealized soil profile was developed for the area where the fill is proposed based on site-specific soil borings, Cone Penetration Test (CPT) soundings, and laboratory test results. An average grade elevation of +0 ft and a design groundwater elevation of +0 ft was used in the analysis. A cross-section was selected to evaluate the potential settlement beneath the existing embankment (Pier A) and beneath the proposed fill based on 17 ft of fill placed adjacent to an existing 17 ft tall sloped embankment graded at an inclination of 2.5:1 (Horizontal:Vertical).

Based on our calculations, the maximum settlement of soils underlying the proposed fill is estimated to be about 8 inches. The maximum settlement beneath the slope of the existing embankment varies from about 3 inches to 8 inches.

Utility Settlement Analyses:

It is our understanding that most, if not all of the existing utilities beneath the proposed fill will be abandoned or removed prior to fill placement; however, some of the proposed drainage improvements will be tied into existing drainage system surrounding the proposed fill area. Also, there are some new utilities proposed to be constructed following placement of the proposed fill.

As described above, the maximum settlement of soils underlying the proposed fill is estimated to be about 8 inches. The maximum settlement beneath the slope of the existing embankment varies from about 3 inches to 8 inches. Differential settlements on the order of 5 inches over 20 ft are anticipated for any utility normal to the face of the existing Pier A embankment. Differential

settlements on the order of 2 inches over 50 ft are anticipated for any utility parallel to the face of the existing Pier A embankment.

Existing utilities: Three potential mitigation measures can be considered to reduce the total and differential settlements of existing utilities that will not be abandoned, if the estimated settlements are not acceptable for the proposed pipes.

(1) Improve the ground below the existing utilities using deep soil mixing (DSM): DSM should extend down to El. -65 ft. Based on our preliminary estimates, the width of the DSM zone is approximately 8 ft with an approximate area replacement ratio of not less than 90 percent. As a result of the DSM improvement, total settlement below the pipe inverts is expected to be on the order of 0.5 inch and differential settlement (over a distance of 50 ft of the pipes) is expected to be on the order of 0.25 inch.

(2) Support utilities on piles: Piles (either cast-in-drilled-hole or driven) should be extended down to approximate El. -95 ft. Center-to-center spacing of piles should be at least three diameters. If the utilities are supported on piles, total settlement below the pipe inverts is expected to be on the order of 0.25 inch and differential settlement (over a distance of 50 ft of the pipes) is expected to be on the order of 1/8 inch.

(3) Use light-weight fill as backfill material: Light-weight fill as backfill material for the future fill instead of soil above water table could also be used to mitigate the settlement effects. As a result of using light-weight fill as backfill material, total settlement below the pipe inverts is expected to be on the order of 2 inches and differential settlement (over a distance of 50 ft of the pipes) is expected to be on the order of 1 inch.

Depending on the allowable total and differential settlements, cost, and schedule, one of the settlement mitigation measures can be chosen. Detailed soil investigation, laboratory testing, and engineering analyses should be performed to finalize the design of selected mitigation measure.

Proposed Utilities: Due to the magnitude of the anticipated settlement beneath the proposed fill, we recommend proposed utilities and drainage improvements tied in to existing drainage systems be constructed after the proposed fill is placed and the anticipated settlements have been reduced to be within tolerable limits of the proposed improvements.

The settlement period for the proposed fill is estimated to be about 6 months to reduce the remaining long-term settlement to less than ½-inch. If a 5-ft embankment surcharge is applied, the settlement period is reduced to about 3 months. For a 10-ft embankment surcharge, the settlement periods is reduced to about 2.5 months.

The surcharge heights referred to in these recommendations are measured relative to the finished grade of the proposed fill. Settlement periods with surcharge begin once the full surcharge height is completed. Waiting periods without surcharge begin once the project grade is constructed to the top of the finished subgrade.

Settlement of existing and proposed utilities surrounding the proposed fill is covered in greater detail in a Technical Memorandum included in Attachment 6.

ACTA Rail Tracks Settlement Analyses:

As described earlier, CDSM ground improvement is proposed to account for the potential ground settlement of the existing ACTA tracks, which are located west of the existing west MSE wall on the north side of the channel, due to future fill placement. A single row of CDSM columns, about 4-ft wide and 865-ft long with an ARR of 75%, is proposed to be constructed just east of the existing west MSE wall (Figure 4) to reduce the ground settlement of the existing rail lines to less than 1 inch. Details of the subsurface soil profile and settlement estimates are provided in Attachment 7. Details of the FE analyses used to develop CDSM ground improvement for existing ACTA rail tracks are provided in a Technical Memorandum included in Attachment 3.

Construction Considerations:

CDSM Construction:

1. Water, debris or any spoil material should not be dumped or otherwise allowed to enter the soil-cement element. They should be properly disposed of off-site.

2. During the first 60 days after completing the CDSM columns in an area, no more than 5 ft of future fill or 600 psf of vertical pressure should be placed over the CDSM columns within a clear distance of at least 50 ft from the CDSM columns.

3. The Contractor should take all necessary precautions and implement measures to protect the existing and proposed storm drain structures, drainage courses, and other utility lines during the CDSM column installations. The CDSM installations should not encroach within a minimum clear distance of 3 ft from any existing or proposed substructures that are located at depths more than 5 ft below existing grade.

4. Where obstructions such as existing abandoned substructures are encountered during the CDSM column installation, these obstructions should be removed by the Contractor prior to installation of CDSM column.

Earthwork:

The bottom of the fill areas should be scarified to a minimum depth of 8 inches and proof rolled prior to placement of fill. Fill placed between existing grade and 3 ft below finished grade should be compacted to a minimum 90 percent relative compaction based on ASTM D 1557. The upper 3 ft of fill should be compacted to a minimum 95 percent relative compaction based on ASTM D 1557.

Fill soils should be placed in horizontal lifts, moisture-conditioned to slightly above the optimum moister, and mechanically compacted to the relative compaction described above. The maximum lift thickness should not be greater than 8 inches and each lift should be thoroughly compacted

and accepted prior to subsequent lifts. The optimum lift thickness will depend on the compaction equipment used and can best be determined in the field.

Any additional requirements on preparation of subgrade and placement of compacted fill necessary to conform to project environmental restrictions should also be incorporated into the plans and specifications.

Pavement should not be constructed until the remaining settlement is within acceptable limits or the waiting period has been completed.

This revised addendum should be attached to the front of the Final Foundation Report for the subject bridge, dated May 10, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.

(Ranjan) G. J. Gunaranjan, PE 71758
Senior Staff Engineer

Eric Brown, GE 2806
Senior Engineer

(Arul) K. Arulmoli, PhD, GE 2090
Project Manager

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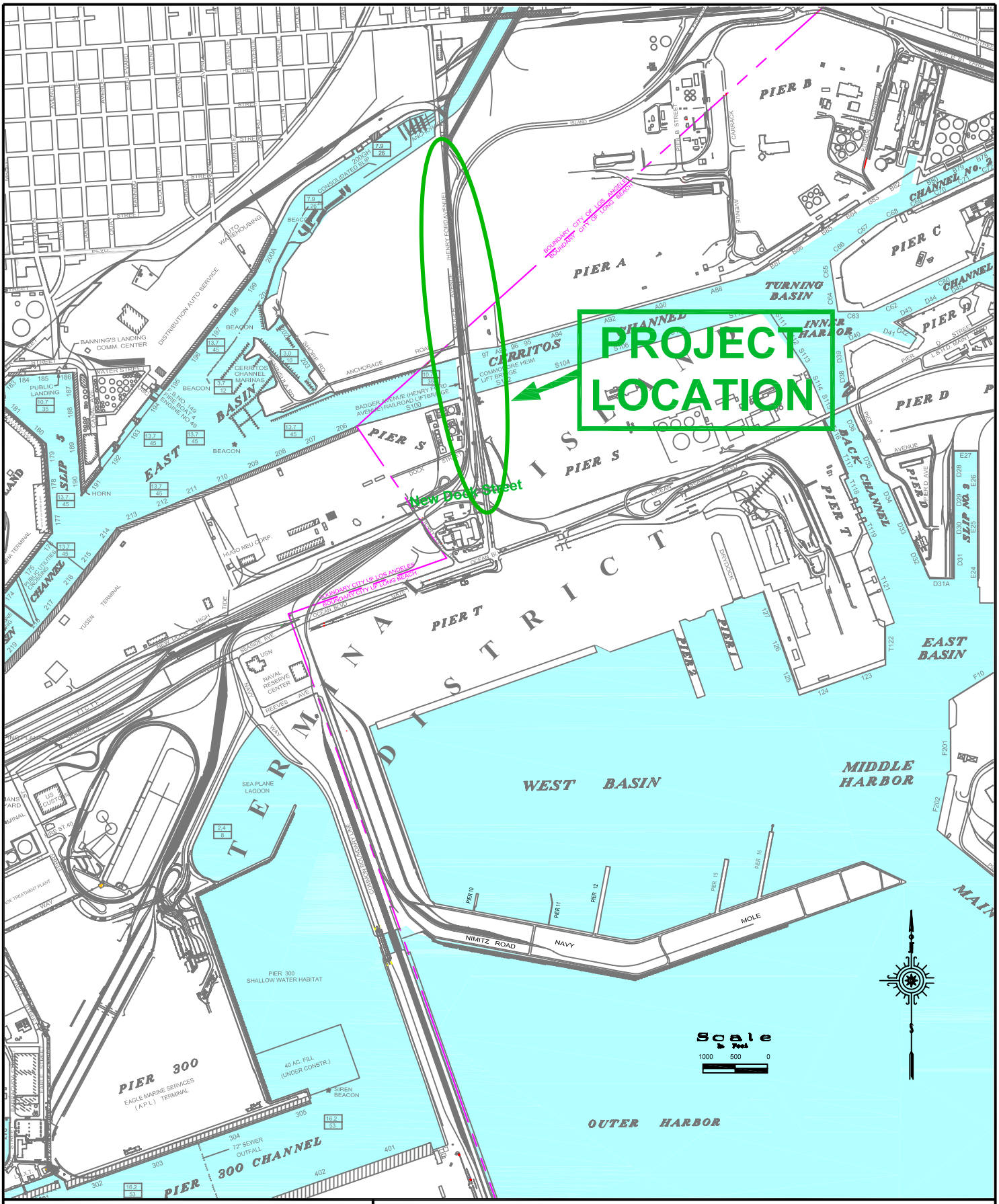
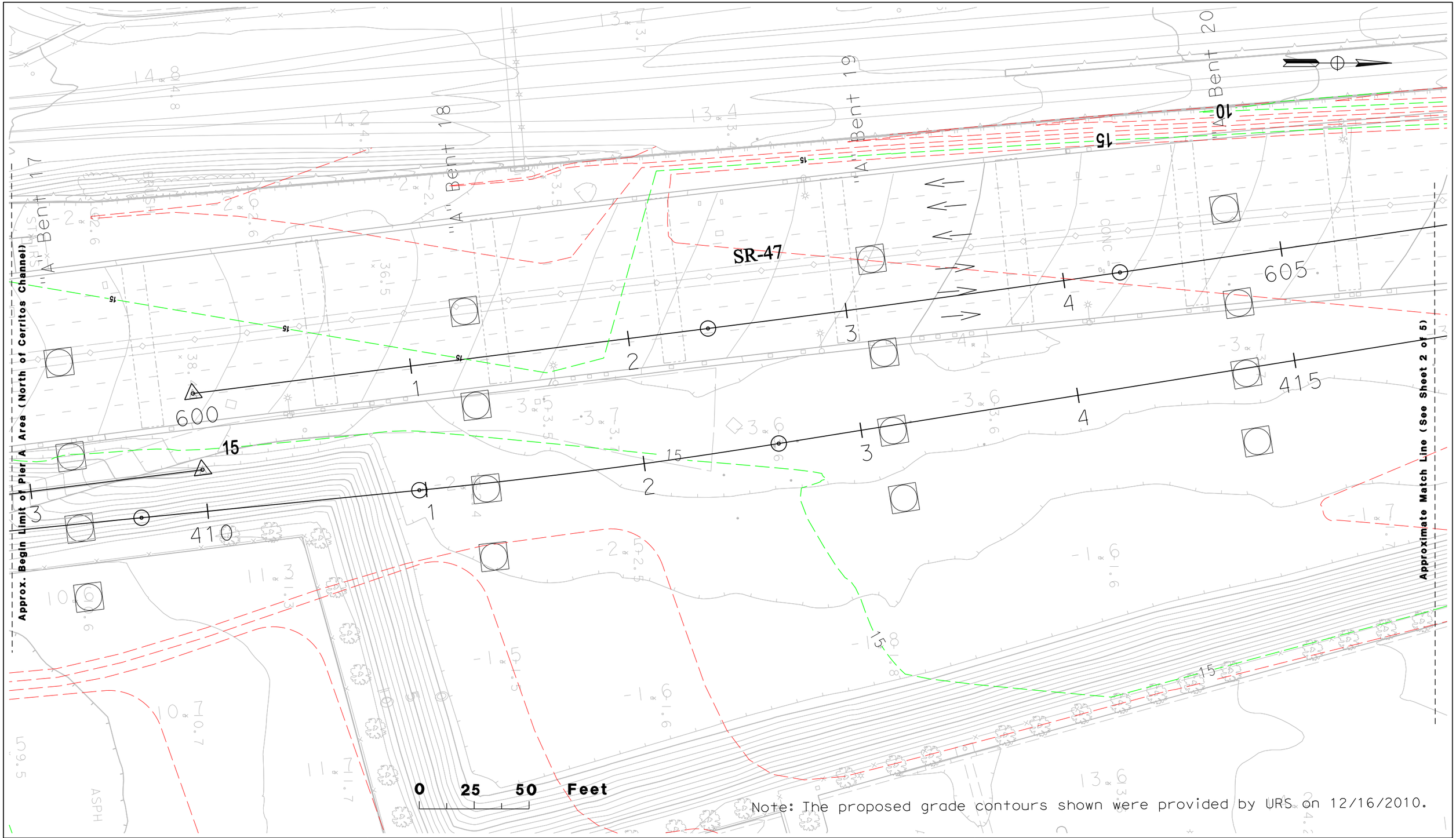
ATTACHMENTS

Attachment 1. Field Investigation
Attachment 2. Laboratory Testing
Attachment 3. Finite Element Analyses of Cement-Deep-Soil-Mix Ground Improvement
Attachment 4. Sample Axial Pile Downdrag Calculations With CDSM
Attachment 5. Kinematic Analyses with CDSM at Bent 17 (Heim Bridge; 53-3032)
Attachment 6. Utility Settlements Due to Proposed Fill
Attachment 7. Settlement Calculations for ACTA Tracks Due to Proposed Fill
Attachment 8. EMI Responses to Caltrans Comments on Addendum No. 2, dated January 4, 2011



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT	
Project No. 06-123-06 | Date: 01-03-11	Project Location Map	Figure 1



Note: The proposed grade contours shown were provided by URS on 12/16/2010.

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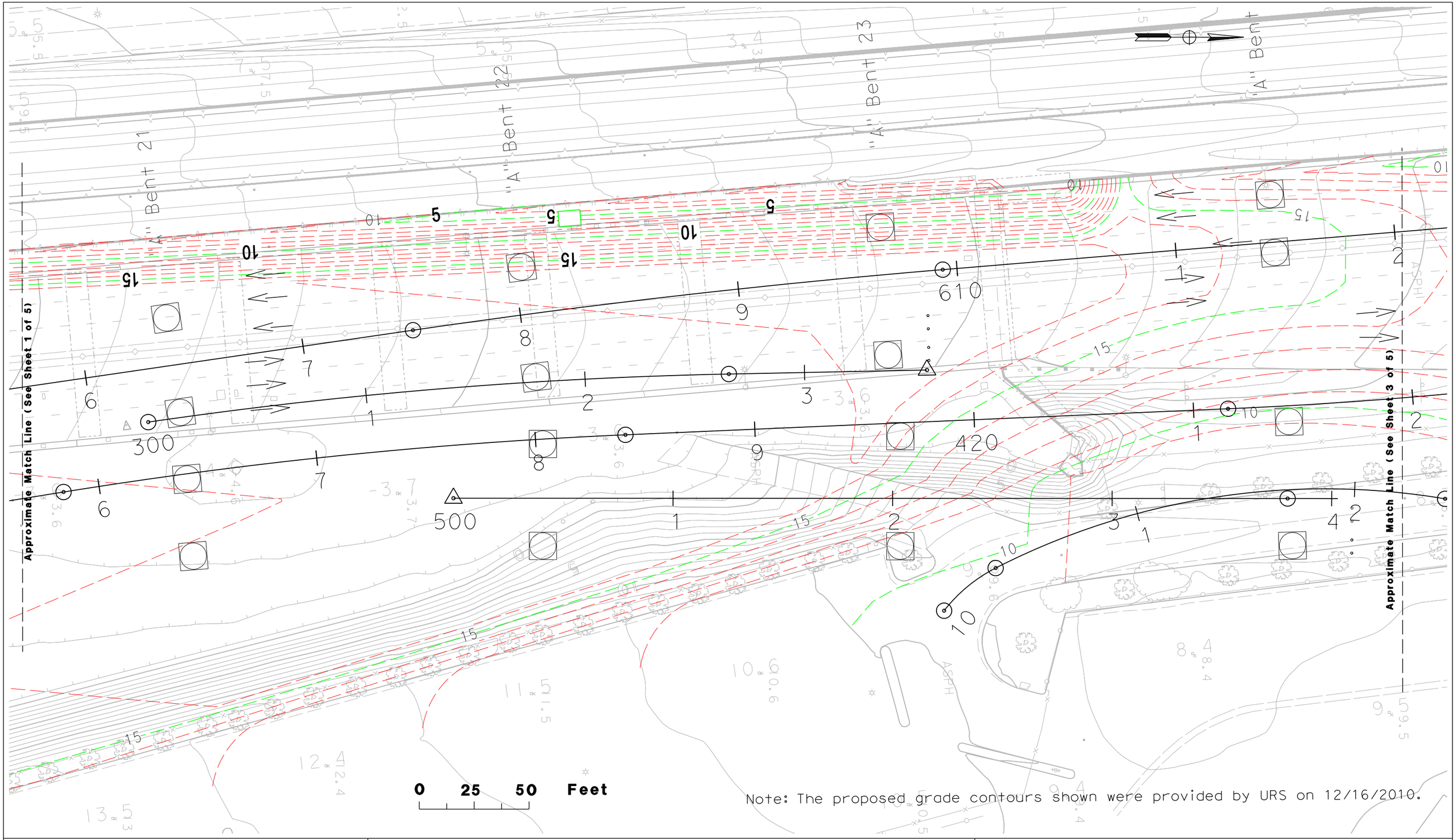
ACTA HEIM BRIDGE PROJECT
PIER A FILL (NORTH) AND PUMP STATION

Project No.: 06-123-06 | **Date: 01-03-11**

Proposed Fill Location Map
(Sheet 1 of 5)

Figure 2



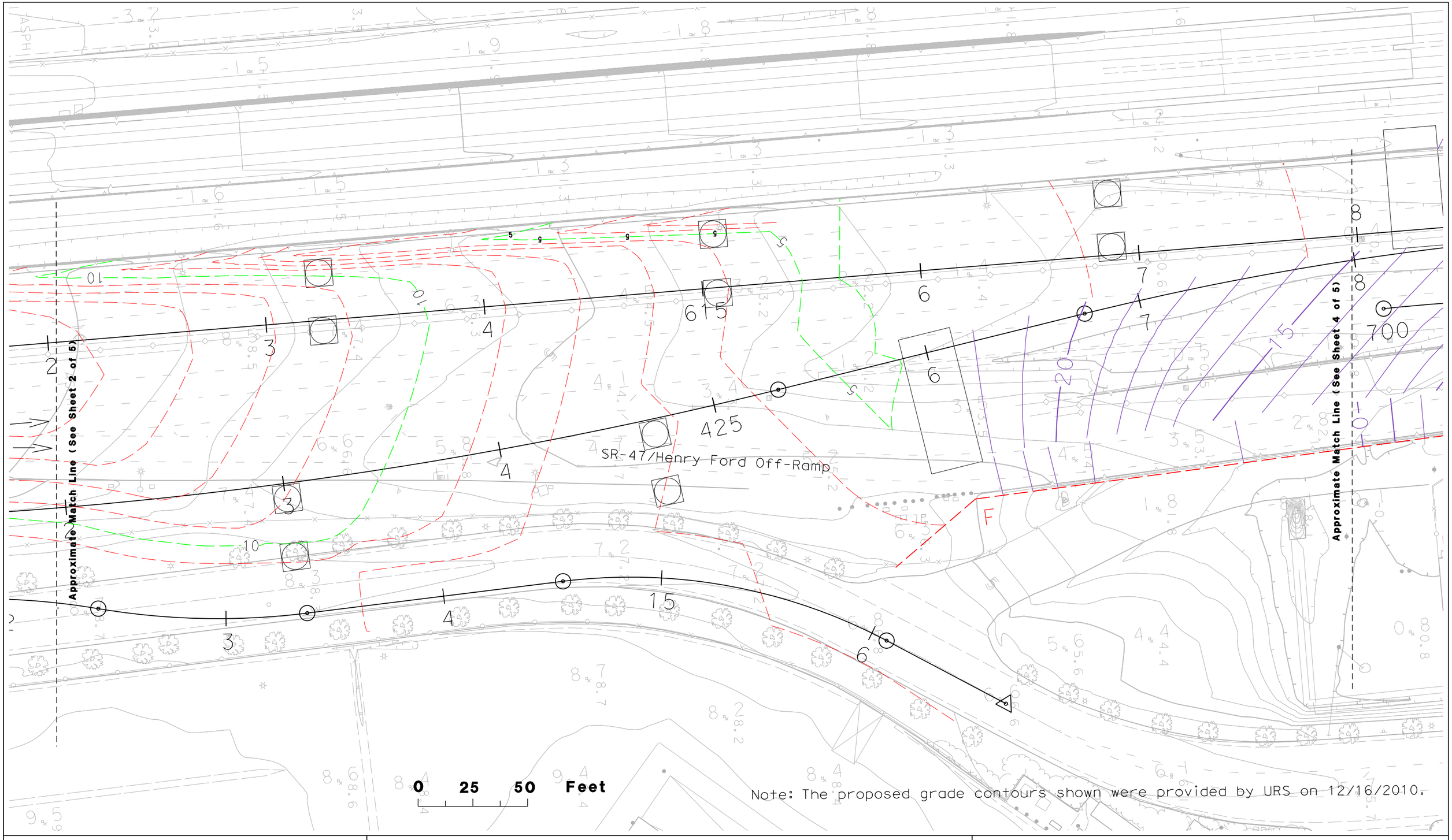
Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

ACTA HEIM BRIDGE PROJECT
PIER A FILL (NORTH) AND PUMP STATION

Project No.: 06-123-06 | **Date: 01-03-11**

Proposed Fill Location Map
(Sheet 2 of 5)

Figure 2



Note: The proposed grade contours shown were provided by URS on 12/16/2010.

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

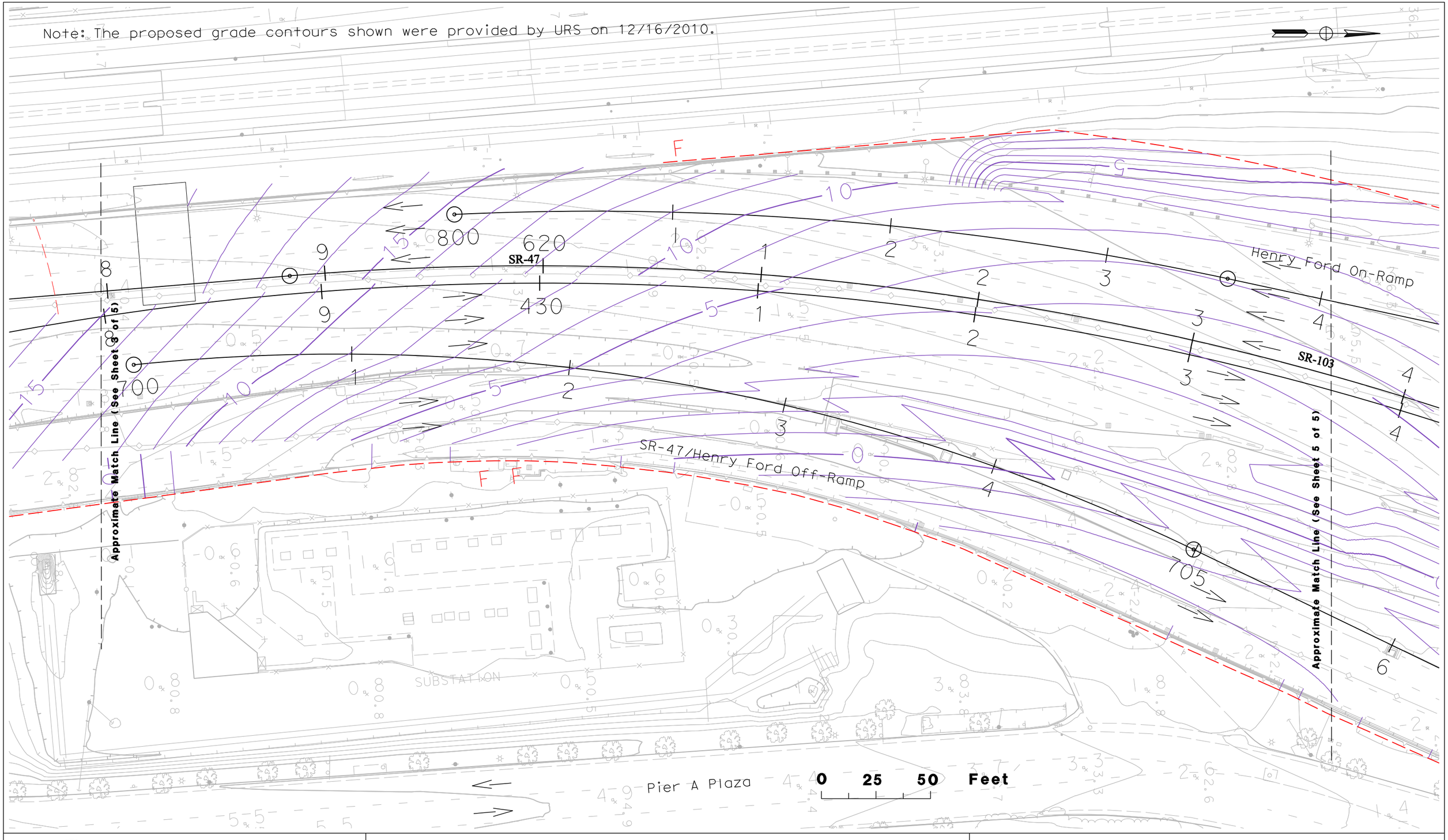
ACTA HEIM BRIDGE PROJECT
PIER A FILL (NORTH) AND PUMP STATION

Project No.: 06-123-06 | **Date: 01-03-11**

Proposed Fill Location Map
(Sheet 3 of 5)

Figure 2

Note: The proposed grade contours shown were provided by URS on 12/16/2010.



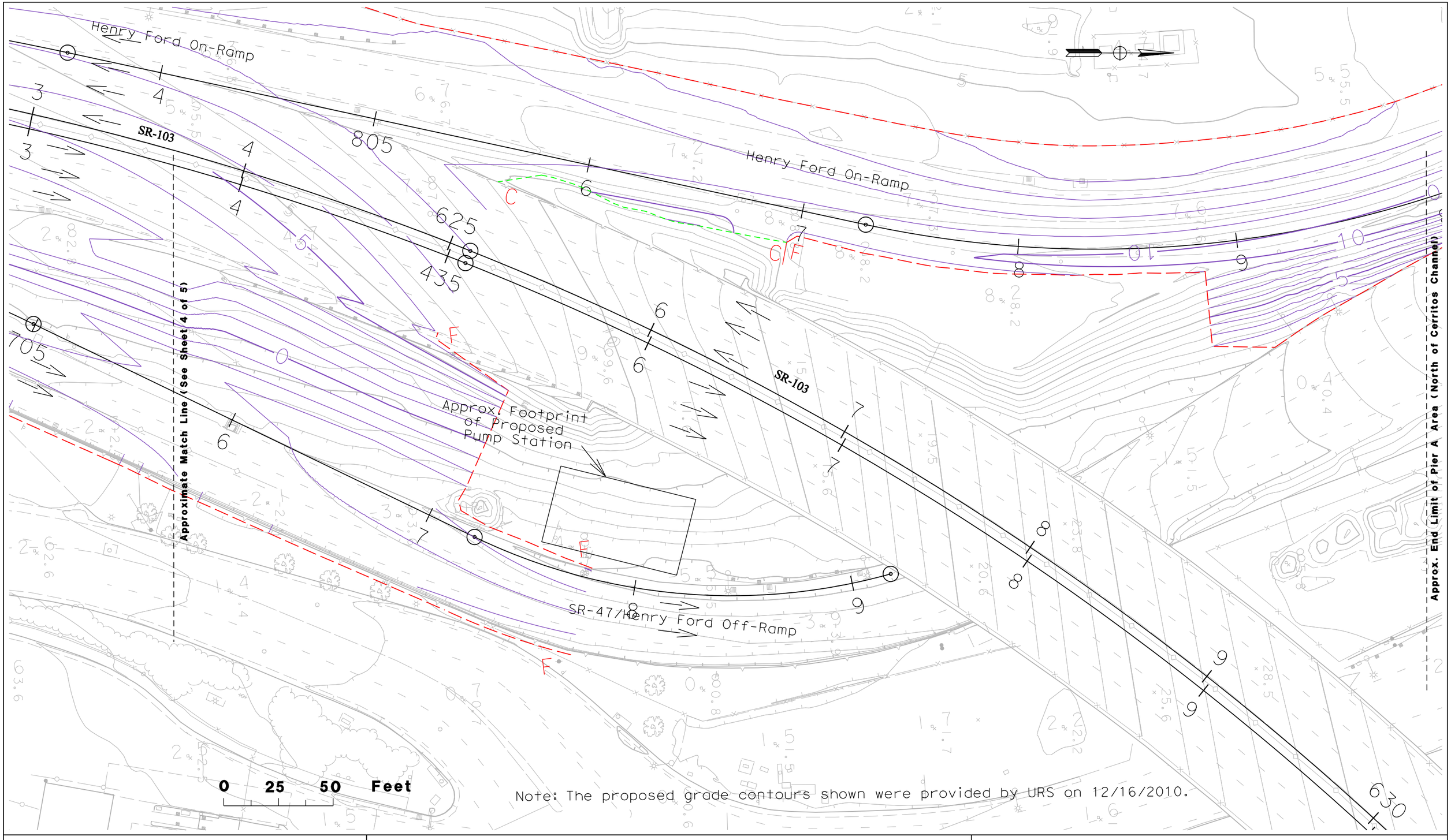
Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

ACTA HEIM BRIDGE PROJECT
PIER A FILL (NORTH) AND PUMP STATION

Project No.: 06-123-06 | **Date: 01-03-11**

Proposed Fill Location Map
(Sheet 4 of 5)

Figure 2



Note: The proposed grade contours shown were provided by URS on 12/16/2010.

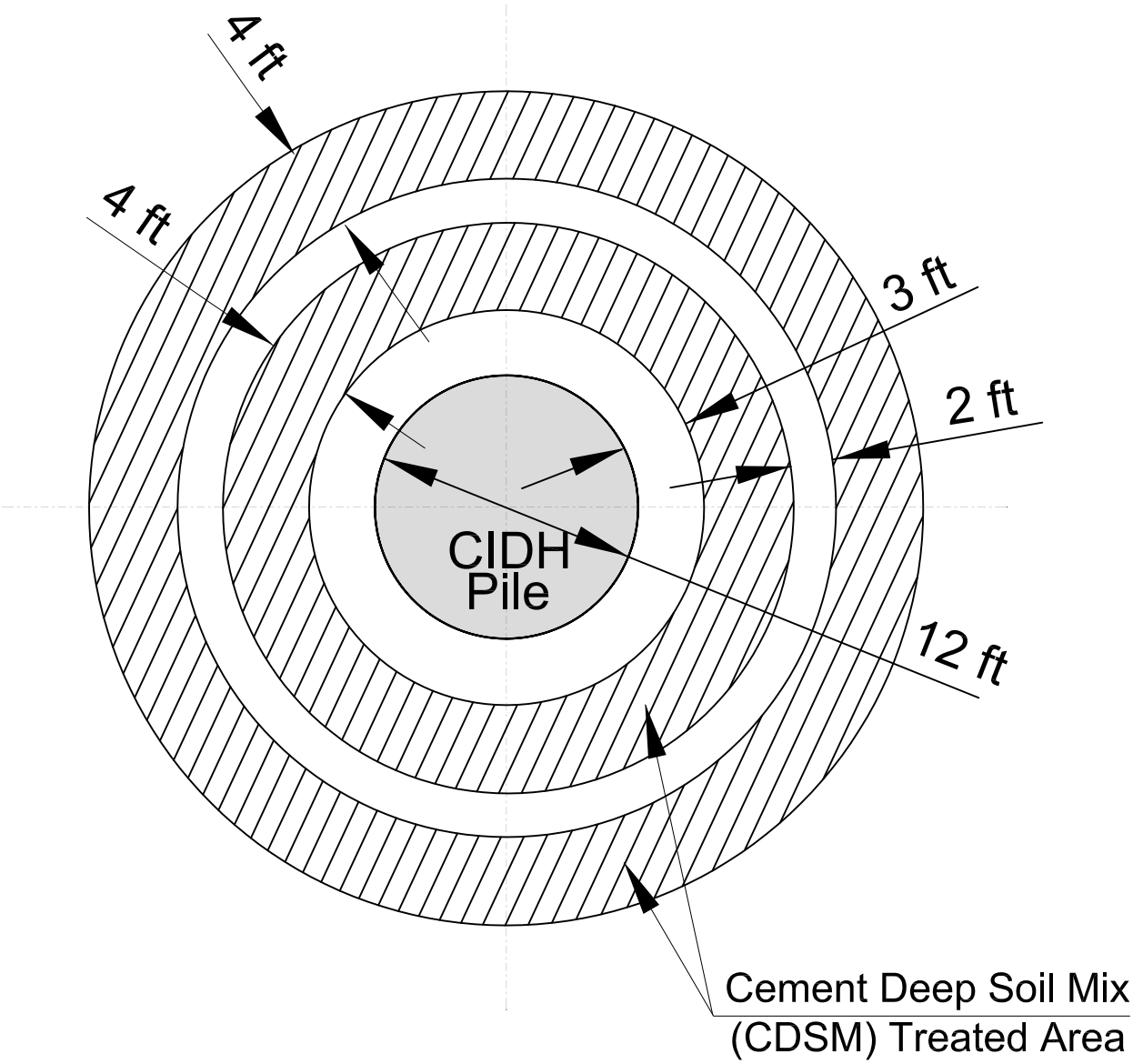
Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

ACTA HEIM BRIDGE PROJECT
PIER A FILL (NORTH) AND PUMP STATION

Project No.: 06-123-06 | **Date: 01-03-11**

Proposed Fill Location Map
(Sheet 5 of 5)

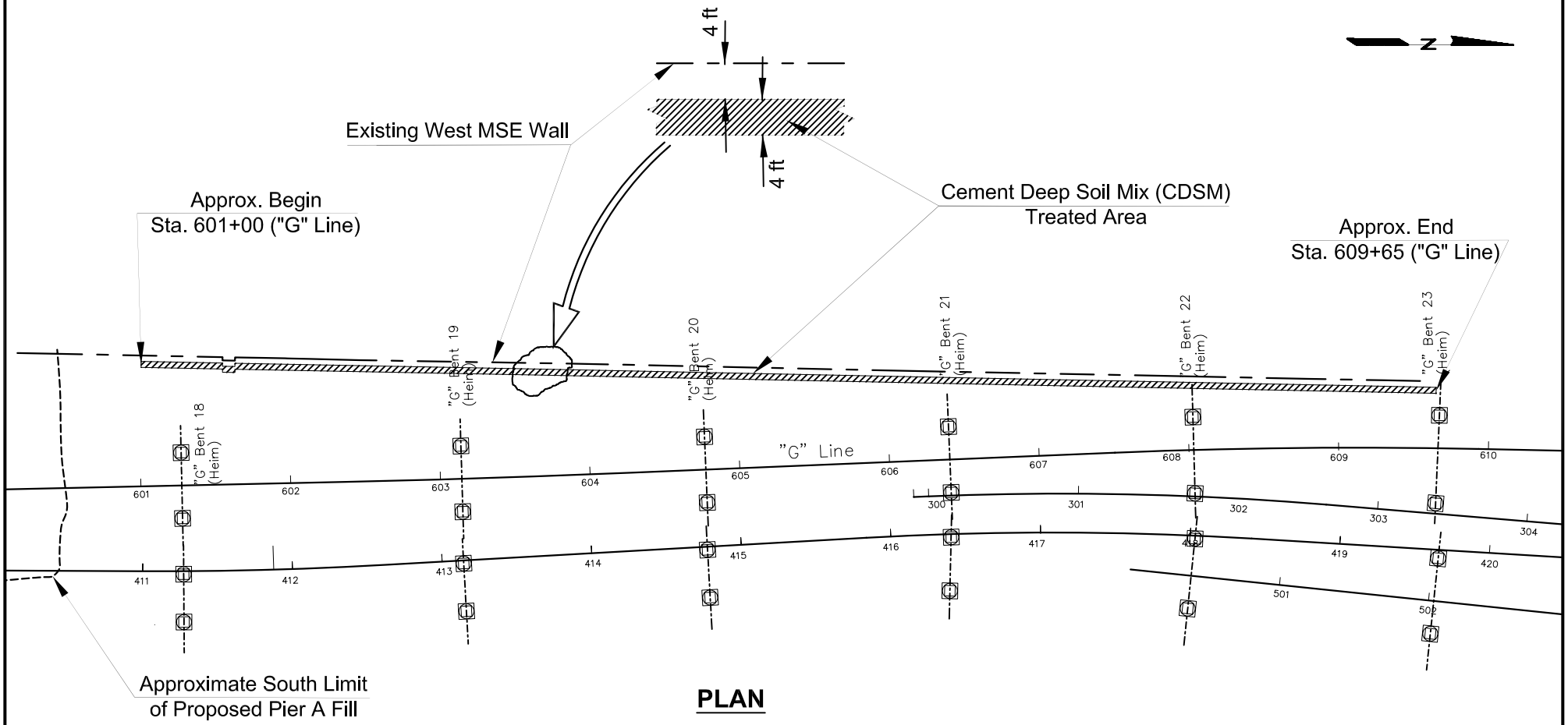
Figure 2



Requirement: At least 75% of the hatched areas shall be treated with CDSM.

Notes: 1. CDSM treatment is required for all piles at Bents 17, 18, 19, 20, 21, 22, and 23 of Heim Bridge (North of Cerritos Channel).
2. ALL CDSM columns shall extend from grade before fill placement down to El. -62 ft.

SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT - **PIER A FILL (NORTH AREA)**	Schematic Showing Preliminary Configuration of Cement Deep Soil Mixing (CDSM) Around Piles at TYPICAL Supports
Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	Figure 3
	Project No. 06-123-06 | Date: 01-03-2011



PLAN

Requirement: At least 75% of the hatched areas shall be treated with CDSM.

Notes: 1. ALL CDSM columns shall extend from grade before fill placement down to El. -62 ft.

2. Recommended clear distance between the CDSM columns and the outer face of the MSE wall is 4 ft

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT - **PIER A FILL (NORTH AREA)**	Schematic Showing Preliminary Configuration of Cement Deep Soil Mixing (CDSM) East of the Existing West MSE Wall
	Project No. 06-123-06 / Date: 01-03-2011	Figure 4

ATTACHMENT 1

FIELD INVESTIGATION

FIELD INVESTIGATION

Existing Information

An extensive geotechnical field exploration program was conducted by EMI between October and November, 2009 for the Schuyler Heim Bridge Replacement Project which included a total of eight hollow-stem auger borings, forty two rotary wash borings and thirty four Cone Penetration Test (CPT) soundings. Of that exploration program, twenty nine land rotary wash borings, four over water rotary wash borings, and twenty five land CPT soundings were performed in the vicinity of the Schuyler Heim Bridge. Existing subsurface information for the Schuyler Heim Bridge is available from the final foundation report prepared by EMI for replacement of the existing Schuyler Heim Bridge (EMI, 2010a).

Supplement Field Exploration

A site-specific geotechnical field investigation was conducted by EMI for the subject project between November 29, 2010 and December 6, 2010 which included a total of thirteen hollow-stem auger borings, one rotary wash boring, and two CPT soundings. The exploration locations were chosen to obtain soil samples to perform laboratory tests for the proposed cement-deep-soil-mix (CDSM) ground improvement scheme. The exploration depths were selected to cover the anticipated CDSM depths. The specific purposes of the exploration were:

- To collect soil samples from locations within the proposed fill areas for relevant CDSM and other laboratory testing, and
- To log subsurface conditions and collect soil samples in the vicinity of the existing west MSE walls at north of channel for relevant laboratory testing.

Soil boring and CPT sounding information are summarized in Table 1 and Table 2, respectively. Approximate locations of explorations performed by EMI for this project are shown on Figure 1. The logs of soil borings and CPT soundings are included at the end of the text.

Soil Borings

The soil borings were drilled at grade in the undeveloped area near or beneath the existing Schuyler Heim bridge structure at south and north sides of the channel. The deepest hollow stem auger boring penetrated down to about elevation -74 ft, approximately 70 ft below ground surface. The rotary wash boring penetrated down to about elevation -105 ft, approximately 101.5 ft below ground surface.

The borings were performed by 2R Drilling Inc. (2R), using a truck-mounted hollow-stem auger drill rig equipped with 8-inch diameter augers and by SoCal Drilling Co. (SoCal), using a truck-mounted drill rig equipped with 5-inch diameter tri-cone drill bit and a mud-rotary circulation drill system, under a subcontract with EMI. Subsurface soils and conditions were logged and samples of soils were collected for laboratory testing. Large 5-

gallon bucket soils samples were collected generally at 10 ft vertical intervals from hollow stem auger borings especially for the CDSM testing. In addition, few smaller soil samples were also collected from hollow stem auger borings by means of the Modified California Drive (MCD) sampler especially for the consolidation testing. In the rotary wash boring, smaller soil samples were collected generally at 5 ft vertical intervals by means of split-spoon drive samplers; the Standard Penetration Test (SPT) sampler and the (MCD sampler were used to collect small disturbed and relatively undisturbed samples, respectively. The MCD is a split-barrel sampler with a tapered cutting tip and lined with a series of 1 inch tall brass rings. The SPT sampler (1.4 inch ID) and MCD sampler (2.4 inch ID, 3.25 inch OD) were driven using a 140 pound hammer falling 30 inches down a total depth of 18 inches or until refusal. The blowcounts for the last ft of penetration were recorded on the boring logs. Soil samples were visually classified and logged in the field by EMI personnel.

The logs of soil borings are included at the end of the text.

CPT Soundings

Two CPT soundings were also performed at grade in the undeveloped area beneath the existing the existing Schuyler Heim bridge structure, just east of the existing west MSE wall at north of the channel. The deepest sounding was advanced down to approximate elevation -109 ft, approximately 106 ft below ground surface.

The CPT soundings were performed by Middle Earth Geo Testing, Inc. (Middle Earth) under subcontract with EMI. The CPT sounding was performed using an electronic cone penetrometer in general accordance with the current ASTM Standards (ASTM D5778 and ASTM D3441). The CPT equipment consisted of a cone penetrometer assembly mounted at the end of a series of hollow sounding rods. The cone penetrometer assembly consisted of a conical tip with a 60° apex angle and a projected cross sectional area of 1.55 in^2 (10 cm^2) and a cylindrical friction sleeve with a surface area of 23.25 in^2 (150 cm^2). The interior of the cone penetrometer is instrumented with strain gauges that allow simultaneous measurements of cone tip and friction sleeve resistance during penetration. The cone penetrometer assembly is continuously pushed into the soil by a set of hydraulic rams at a standard rate of 0.79 inch per second (20 mm per second) while the cone tip resistance and sleeve friction resistance are recorded every 1.967 inches (50 mm) and stored in digital form. A specially designed all wheel drive 25-ton truck provides the required reaction weight for pushing the cone assembly and is also used to transport and house the test equipment. The computer generated graphical logs include cone resistance, friction resistance, and friction ratio. Soil behavior type interpretations are based on guidelines by Robertson and Campanella (1989).

The logs of CPT soundings are included at the end of the text.

Groundwater Conditions

During this geotechnical field investigation by EMI in 2010, groundwater was recorded between El. -2 ft and El. -12 ft in twelve of the fourteen site-specific borings performed within the proposed fill area. The elevation that groundwater was encountered at in each

boring is listed in Table 1 and also on log of boring sheets at the end of the text. However, due to the close proximity to the ocean, the ground water table at the project site is directly related to tidal fluctuations

TABLE 1. SOIL BORING INFORMATION

Boring No.	Approx. Northing (ft)	Approx. Easting (ft)	Approx. GSE (ft)	Approx. GWD (ft)	Approx. Boring Depth (ft)	Date Performed	Exploration Method
A-10-201	1,735,634	6,488,968	-1.0	3.0	70.0	11/29/2010	HSA
A-10-202	1,735,917	6,489,036	-1.0	3.0	70.0	11/29/2010	HSA
A-10-203	1,736,116	6,489,027	-1.0	5.0	70.0	12/02/2010	HSA
A-10-204	1,736,334	6,489,019	-1.0	4.0	70.0	12/02/2010	HSA
A-10-205	1,736,513	6,488,978	-2.0	4.0	70.0	12/03/2010	HSA
A-10-206	1,736,704	6,488,949	+1.0	12.0	70.0	12/03/2010	HSA
A-10-207	1,737,839	6,488,844	+10.5	14.0	80.0	11/30/2010	HSA
A-10-208	1,738,022	6,488,753	-4.0	4.0	70.0	11/30/2010	HSA
A-10-209	1,738,378	6,488,740	-4.0	5.0	70.0	12/06/2010	HSA
A-10-210	1,738,705	6,488,727	-4.0	5.0	70.0	12/01/2010	HSA
A-10-211	1,739,059	6,488,699	+8.0	20.0	70.0	12/06/2010	HSA
A-10-212	1,738,329	6,488,647	-3.5	NR	70.0	12/01/2010	HSA
A-10-213	1,738,795	6,488,604	-3.5	6.0	70.0	12/01/2010	HSA
R-10-301	1,738,530	6,488,626	-3.5	NR	101.5	12/01/2010	RW

Notes: 1. CA State Plane NAD 83 and NAVD 1988 coordinate systems.
2. GSE = Ground Surface Elevation; GWD = Groundwater Depth; NR = Not Recorded; HSA = Hollow Stem Auger; and RW = Rotary Wash.

TABLE 2. CPT SOUNDING INFORMATION

CPT No.	Approx. Northing (ft)	Approx. Easting (ft)	Approx. GSE (ft)	Approx. GWD (ft)	Approx. CPT Depth (ft)	Date Performed	Exploration Method
CPT-10-351	1,738,323	6,488,648	-3.5	NR	82.6	11/30/2010	CPT
CPT-10-352	1,738,790	6,488,605	-3.5	NR	74.8	11/30/2010	CPT

Notes: 1. CA State Plane NAD 83 and NAVD 1988 coordinate systems.
2. GSE = Ground Surface Elevation; GWD = Groundwater Depth; NR = Not Recorded; and CPT = Cone Penetration Test.

REFERENCES

Earth Mechanics, Inc. (EMI), 2010a, "Final Foundation Report for Schuyler Heim Bridge (Replace), Bridge No. 53-3032, Los Angeles County, California", EMI Project No. 06-123, May 10 (and Addendum to Final Foundation Report, July 6).

Robertson, P. K. and Campanella, R. G., 1989, "Guidelines for Geotechnical Design Using CPT and CPTU", Civil Engineering Department, University of British Columbia, Vancouver, Canada, November.

LEGEND

- A-10-200 (70') — EMI Hollow Stem Borings by EMI (Terminated Depth Below Grade)
- R-10-300 (100') — EMI Rotary Wash Borings by EMI (Terminated Depth Below Grade)
- CPT-10-350 (100') — EMI CPT Soundings by EMI (Terminated Depth Below Grade)

Approximate Begin Limit of Pier S Area (South of Cerritos Channel)

Approximate Match Line (See Sheet 2 of 5)

A-10-201 (70')

New Dock Street

Rail Road

New Dock Off-Ramp

New Dock On-Ramp

SR-47

"A" Bent 3

"A" Bent 4

"A" Bent 5

"A" Bent 6

Note: The proposed grade contours shown were provided by URS on 12/16/2010.

0 25 50 Feet

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ACTA HEIM BRIDGE PROJECT
PIER A FILL (NORTH) AND PUMP STATION

Project No.: 06-123 | **Date: 12-22-10**

Exploration Location Map
(Sheet 1 of 5)

Figure 1

Approximate Match Line (See Sheet 1 of 5)

Approximate Match Line (See Sheet 3 of 5)

Rail Road

New Dock off-Ramp

New Dock On-Ramp

SR-47

Bent 7

Bent 8

Bent 9

Bent 10

A-10-202
(70')

A-10-203
(70')

A-10-204
(70')

A-10-205
(70')

Note: The proposed grade contours shown were provided by URS on 12/16/2010.

0 25 50 Feet

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Exploration Location Map
(Sheet 2 of 5)

Figure 1

Note: The proposed grade contours shown were provided by URS on 12/16/2010.

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PIER A FILL (NORTH) AND PUMP STATION

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Exploration Location Map
(Sheet 3 of 5)

Figure 1

Existing West MSE Wall

Approx. Begin Limit of Pier A Area (North of Cerritos Channel)

Approximate Match Line (See Sheet 5 of 5)

SR-47

A-10-212 (70')

CPT-10-351 (100')

A-10-208 (70')

A-10-209 (70')

A-10-207 (70')

0 25 50 Feet

Note: The proposed grade contours shown were provided by URS on 12/16/2010.

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PIER A FILL (NORTH) AND PUMP STATION

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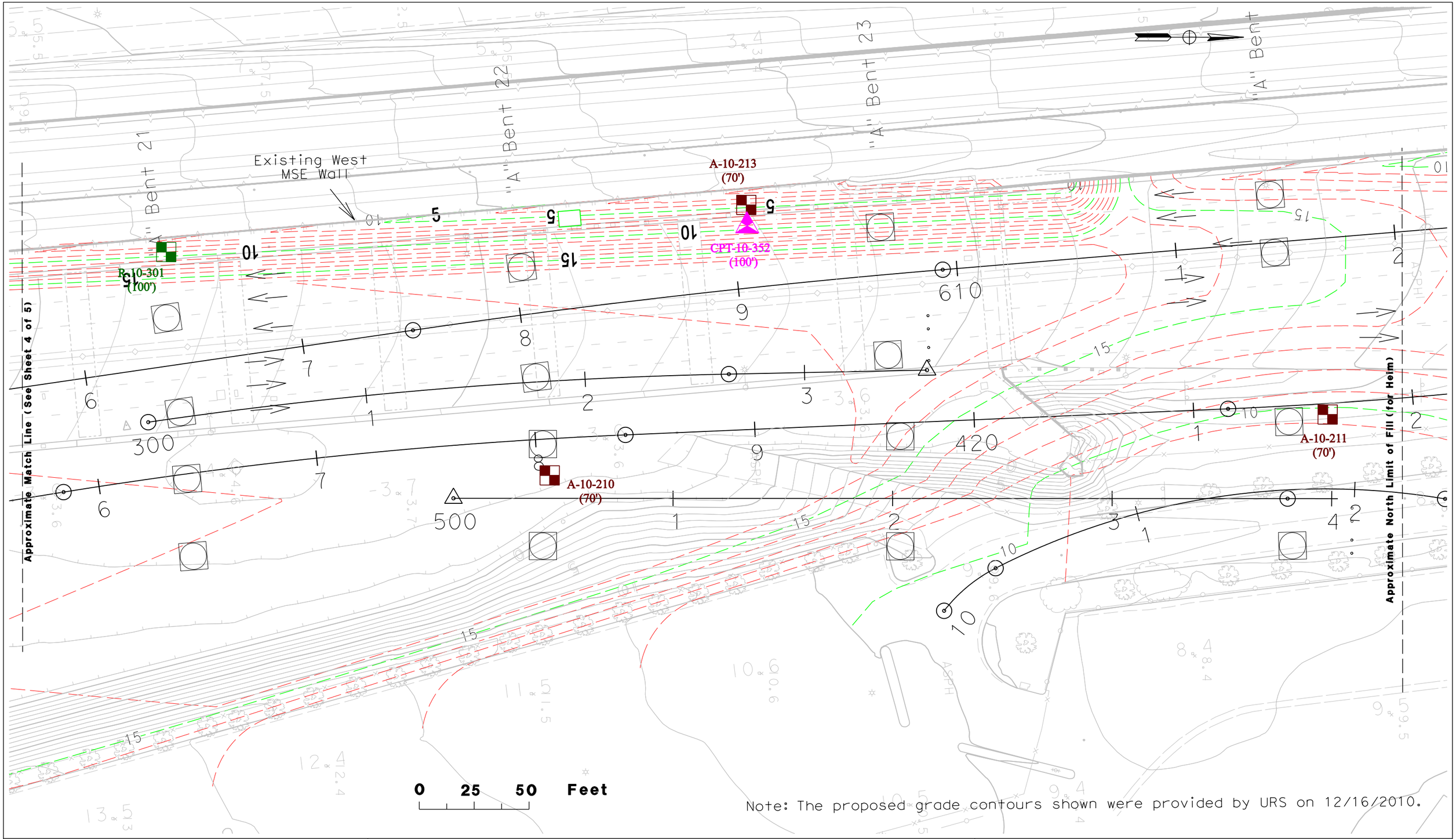
Exploration Location Map
(Sheet 4 of 5)

Figure 1



Note: The proposed grade contours shown were provided by URS on 12/16/2010.

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ACTA HEIM BRIDGE PROJECT
PIER A FILL (NORTH)

Project No.: 06-123 | **Date: 12-22-10**

Proposed Exploration Location Map (Sheet 5 of 5)

Figure 1

LOGS OF SITE-SPECIFIC SOIL BORINGS

LOG OF BORING NO. A-10-201

Grade Elevation:	± -1.0 feet				
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2	
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer	
Date Drilled:	11-29-10	Drive Wt. (lbs):	140	2. 3.25" O.D. ring sampler	
Logged By:	K.K.	Drop (inches):	30	3. Northing = ±1,735,634 ft & Easting = ±6,488,968 ft	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0	B	1	-		SILTY SAND (SM): gray, wet, 4% fine GRAVEL, 57% fine SAND, 39% nonlastic fines.	33	-	PA, PI, CR
5	D	1	10		Lean CLAY (CL): medium stiff, gray, moist, 3% fine SAND, 97% medium plasticity fines.	-	-	PA, PI
10	B	2	-			-	-	

1. 'Sample Type' - Graphical representation of sample type as shown below.
   D: Drive Sample - California Drive Sampler
   B: Bucket Sample - Obtained by collecting cuttings from the auger over a distance of 5 ft. to 10 ft. Therefore the samples are a mixture of adjacent soil layers and are used for laboratory soil-cement mix testing The geotechnical descriptions based on these samples should be considered approximate and should not be used for engineering design.

2. 'Sample' - Sample Number

3. 'Blows/foot' - Number of blows required to advance sampler one foot (unless a distance is specified). Samplers in general were driven into the soil at the bottom of the hole with an automatic drop type 140-lb hammer dropping a standard 30 inches (as specified in header).

4. 'Graphic Log' - Standard symbols for soil and rock types, as shown in Note B, Sheet 2 of 2

5. ▼ Encountered groundwater depth while drilling.

6. 'Approximate Geotechnical Description' (See also Note 1 & Note A, Sheet 2 of 2)
   Soil - Soil classifications are in general accordance with the American Society for Testing and Materials (ASTM) D2487.06. Designations include consistency, moisture, and color. Field description have been modified to reflect results of laboratory analyses where deemed appropriate.

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 | Date: 12-23-10

LEGEND FOR GEOTECHNICAL BORING LOGS

(SHEET 1 OF 2)

7. 'Moisture Content' and 'Dry Density' determined by laboratory testing.

8. 'Tests/Results' - Identify types of laboratory tests performed on samples collected from the field investigation. Abbreviations of tests are provided below:

C	Consolidation
CR	Corrosion, Sulfates, Chlorides
DS	Direct Shear
OC	Organic Content
PA	Particle Size Analysis
PI	Liquid Limit, Plastic Limit, Plasticity Index
UU	Unconsolidated-Undrained Triaxial

Pocket penetrometer and Torvane Shear measurements are given on the boring logs directly as the reading taken from the measuring instrument.

NOTE A

Criteria for Describing Moisture Condition

Description	Criteria (After ASTM D 2488)
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

Relative Density of Coarse-Grained Soil

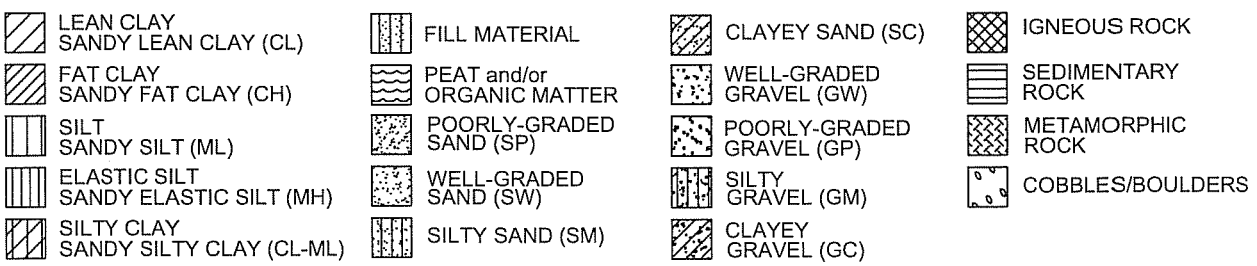
Blows/foot	Relative Density	Field Test (After Sowers, 1979)
0 - 4	Very Loose	Easily penetrated 12" with 0.5-inch steel rod pushed by hand
5 - 10	Loose	Easily penetrated with 0.5-inch steel rod pushed by hand
11 - 30	Medium Dense	Easily penetrated with 0.5-inch steel rod driven by 5-lb hammer
31 - 50	Dense	Penetrated a foot with 0.5-inch steel rod driven by 5-lb hammer
> 50	Very Dense	Penetrated a few inches with 0.5-inch steel rod driven by 5-lb hammer

Consistency of Fine-Grained Soil

UC Strength (tsf)	Consistency	Field Test (After Sowers, 1979)
< 0.25	Very Soft	Easily penetrated several inches by fist
0.25 - 0.5	Soft	Easily penetrated by thumb
0.5 - 1.0	Medium Stiff	Can be penetrated several inches by thumb with moderate effort
1.0 - 2.0	Stiff	Readily indented by thumb, but penetrated only with great effort
2.0 - 4.0	Very Stiff	Readily Indented by thumbnail
> 4.0	Hard	Indented with difficulty by thumbnail

NOTE B

Legend of Earth Materials



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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 | Date: 12-23-10

LEGEND FOR GEOTECHNICAL BORING LOGS

(SHEET 2 OF 2)

LOG OF BORING NO. A-10-201

Grade Elevation:	± -1.0 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	11-29-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,735,634 ft & Easting= ±6,488,968 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0					GRAVEL with SAND (GP)			
					Aggregate Base, $\frac{3}{4}$" GRAVEL.			
5	B	1	-		SANDY SILT (ML): gray, wet, some fine SAND, mostly nonplastic fines.	-	-	
10	B	2	-		SILTY SAND (SM): gray, wet, 4% fine GRAVEL, 57% fine SAND, 39% nonplastic fines.	33	-	PA, PI, CR, OC
20	B	3	-			-	-	
30	B	4	-		SANDY SILT (ML): gray, wet, some medium to fine SAND, mostly nonplastic fines.	-	-	
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-201

Date Drilled:	11-29-10	Comments	SHEET 2 OF 2
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35	D	1	7		Lean CLAY with SAND (CL): medium stiff, gray, moist, 4% fine GRAVEL, 16% fine SAND, 80% low plasticity fines, some SILTY SAND found at top.	-	-	PA, PI, C
40	B	5	-		SANDY SILT (ML): gray, wet, some medium to fine SAND, mostly nonplastic fines.	-	-	
45								
50	D	2	10		Lean CLAY (CL): medium stiff, gray, moist, 3% fine SAND, 97% medium plasticity fines.	-	-	PA, PI
	B	6	-		SANDY SILT (ML): gray, wet, some medium to fine SAND, mostly nonplastic fines.	-	-	
55								
60	B	7	-			-	-	
65								
70					Terminated Boring at 70.0 feet depth. Groundwater was encountered at 3.0 feet depth.			

LOG OF BORING NO. A-10-202

Grade Elevation:	± -1.0 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	11-29-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,735,917 ft & Easting= ±6,489,036 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0					GRAVEL with SAND (GP), $\frac{3}{4}$" GRAVEL.			
					COBBLES, 3"-5" size.			
5	B	1	-		CLAYEY SAND (SC): gray, wet, mostly medium to fine SAND, little low plasticity fines.	-	-	
10	B	2	-			-	-	
15								
20	B	3	-		SANDY SILT (ML): gray, wet, some fine SAND, mostly nonplastic fines.	-	-	
25								
30	B	4	-			-	-	
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-202

Date Drilled:	11-29-10	Comments	SHEET 2 OF 2
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35	D	1	6		Lean CLAY (CL): gray, moist, 5% fine SAND, 95% low plasticity fines.	-	-	PA, PI
40	B	5	-		SANDY SILTY CLAY (CL-ML): gray, wet, 33% fine SAND, 67% low plasticity fines.	41	-	PA, PI, CR, OC
50	D	2	15		Lean CLAY CL): stiff, gray, moist, 6% fine SAND, 94% medium plasticity fines.	-	-	PA, PI, C
	B	6	-		SANDY SILT (ML): gray, wet, some fine SAND, mostly nonplastic fines.	-	-	PI
60	B	7	-			-	-	
70					Terminated Boring at 11.5 feet depth. Groundwater was encountered at 3.0 feet depth.			

LOG OF BORING NO. A-10-203

Grade Elevation:	± -1.0 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	12-02-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,736,116 ft & Easting= ±6,489,027 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0	B	1	-		CLAYEY SAND (SC): gray, wet, mostly medium SAND, some low plasticity fines.	-	-	
10	B	2	-		SANDY SILT (ML): gray, wet, some medium SAND, mostly nonplastic fines.	-	-	
20	B	3	-		SILTY SAND (SM): gray, wet, mostly fine SAND, some nonplastic fines.	-	-	
30	B	4	-		54% fine SAND, 46% nonplastic fines.	37	-	PA, PI, CR, OC
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-203

Date Drilled:	12-02-10	Comments	SHEET 2 OF 2
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	B	5	-			-	-	
45								
50	B	6	-			-	-	
55								
60	B	7	-			-	-	
65								
70					Terminated Boring at 70.0 feet depth. Groundwater was encountered at 5.0 feet depth.			

LOG OF BORING NO. A-10-204

Grade Elevation:	± -1.0 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	12-02-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,736,334 ft & Easting= ±6,489,019 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0	B	1	-		SILTY SAND (SM): gray, wet, mostly medium to fine SAND, some nonplastic fines.	-	-	
10	B	2	-		SILT with SAND (ML): gray, wet, little fine SAND, mostly nonplastic fines.	-	-	
20	B	3	-			-	-	
30	D	1	8		Fat CLAY (CH): medium stiff, gray, moist, 2% fine SAND, 98% high plasticity fines, some SILTY SAND found at bottom.	-	-	PA, PI
	B	4	-		SANDY SILT (ML): gray, wet, some fine SAND, mostly nonplastic fines.	-	-	
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-204

Date Drilled:	12-02-10	Comments	SHEET 2 OF 2
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	B	5	-		SANDY SILT (ML): gray, moist, 41% fine SAND, 59% nonplastic fines.	34	-	PA, PI, CR, OC
45								
50	D	2	5		Poorly graded SAND with SILT (SP-SM): loose, gray, wet, 90% fine SAND, 10% nonplastic fines.	-	-	PA, PI, C
	B	6	-		SILT with SAND (ML): gray, wet, little fine SAND, mostly nonplastic fines.	-	-	
55								
60	B	7	-			-	-	
65								
70					Terminated Boring at 70.0 feet depth. Groundwater was encountered at 4.0 feet depth.			

LOG OF BORING NO. A-10-205

Grade Elevation:	± -2.0 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	12-03-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,736,513 ft & Easting= ±6,488,978 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0					GRAVEL (GP)			
5	B	1	-		SANDY SILT (ML): gray, wet, some medium to fine SAND, mostly nonplastic fines.	-	-	
10	B	2	-			-	-	
15								
20	D	1	6			-	-	PI
	B	3	-			-	-	
25								
30	B	4	-		SILTY CLAY with SAND (CL-ML): gray, moist, 27% fine SAND, 73% low plasticity fines.	39	-	PA, PI, CR, OC
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-205

Date Drilled:	12-03-10	Comments	SHEET 2 OF 2
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	D	2	14		SANDY SILT (ML): stiff, gray, wet, some fine SAND, mostly nonplastic fines.	-	-	
	B	5	-			-	-	
45								
50	D	3	12		36% fine SAND, 64% nonplastic fines.	-	-	PA, PI, C
	B	6	-			-	-	
55								
60	D	4	30		SILTY CLAY with SAND (CL-ML): very stiff, gray moist, 17% fine SAND, 83% low plasticity fines.	-	-	PA, PI
	B	7	-		SILT with SAND (ML): gray, wet, little fine SAND, mostly nonplastic fines.	-	-	
65								
70					Terminated Boring at 70.0 feet depth. Groundwater was encountered at 4.0 feet depth.			

LOG OF BORING NO. A-10-206

Grade Elevation:	± +1.0 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	12-03-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,736,704 ft & Easting= ±6,488,949 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0					SILTY SAND with GRAVEL (SM), GRAVEL up to $\frac{3}{4}$".			
5	B	1	-		SILTY SAND (SM): gray, wet, mostly medium to fine SAND, some nonplastic fines.	-	-	
10	B	2	-		SANDY SILT (ML): gray, wet, 48% fine SAND, 52% nonplastic fines.	36	-	PA, PI, CR, OC
15								
20	D	1	4		soft, gray, moist.	-	-	PI
	B	3	-			-	-	
25								
30	D	2	5		30% fine SAND, 70% nonplastic fines.	-	-	PA, PI, C
	B	4	-			-	-	
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-206

Date Drilled: 12-03-10
Logged By: K.K

Comments
1. Drillhole was backfilled with soil-cement mix.

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	B	5	-		SILT (ML): gray, moist, trace fine SAND, mostly nonplastic fines.	-	-	PI
45								
50	B	6	-		SANDY SILT (ML): stiff, gray, moist, 46% fine SAND, 54% nonplastic fines.	35	-	PA, PI, CR, OC
55	D	3	12			-	-	PA, PI, C
60	B	7	-			-	-	
65	D	4	19		Lean CLAY (CL): stiff, gray, moist, 1% fine GRAVEL, 11% fine SAND, 88% medium plasticity fines, some SANDY SILT found at bottom.	-	-	PA, PI, C
70					Terminated Boring at 70.0 feet depth. Groundwater was encountered at 12.0 feet depth.			

LOG OF BORING NO. A-10-207

Grade Elevation:	± +10.5 ft MLLW			
Boring Depth:	81.5 feet	Driller:	2R Drilling	SHEET 1 OF 3
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	11-30-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,737,839 ft & Easting= ±6,488,844 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0					9" Asphalt Concrete and 10" Aggregate Base			
	B	1	-		SANDY SILT (ML): grayish brown, moist, some medium to fine SAND, mostly nonplastic fines.	-	-	
5					GRAVEL up to $\frac{3}{8}$".			
10	B	2	-		some CLAYEY SAND encountered.	-	-	
15								
20	D	1	21		Poorly graded SAND with SILT (SP-SM): medium dense, gray, wet, mostly medium SAND, little nonplastic fines.	-	-	DS
	B	4	-		CLAYEY SAND (SC): dark olive brown, moist, mostly medium to fine SAND, some nonplastic fines.	-	-	
25								
30	B	4	-		SANDY SILT (ML): gray, wet, some fine SAND, mostly nonplastic fines.	-	-	
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-207

Date Drilled:	11-30-10	Comments	SHEET 2 OF 3
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	B	5	-			-	-	
45								
50	D	2	9		No Recovery	-	-	
	B	6	-		Poorly graded SAND with SILT (SP-SM): gray, wet, mostly coarse to medium SAND, little nonplastic fines.	-	-	
55	D	3	18		medium dense.	-	-	
60	D	4	13		Fat CLAY (CH): stiff, gray, moist, 100% high plasticity fines.	41	80	PA, PI, UU, C
	B	7	-		SILTY CLAY with SAND (CL-ML): gray, moist, little fine SAND, mostly low plasticity fines.	-	-	
65								
70	D	5	18		SILTY SAND (SM): medium dense, gray, wet, mostly medium SAND, some nonplastic fines.	-	-	
	B	8	-			-	-	

CONTINUED LOG OF BORING NO. A-10-207

Date Drilled:	11-30-10	Comments	SHEET 3 OF 3
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
75	D	6	19		SILT (ML): stiff, gray, moist, 3% fine SAND, 97% low plasticity fines.	-	-	PA, PI, UU, C
80	D	7	37		SILT with SAND (ML): very stiff, gray, moist, 25% fine SAND, 75% nonplastic fines.	-	-	PA, PI
					Terminated Boring at 81.5 feet depth. Groundwater was encountered at 14.0 feet depth.			
85								
90								
95								
100								
105								
110								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 | Date: 12-23-10

LOG OF BORING NO. A-10-208

Grade Elevation:	± -4.0 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	11-30-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,738,022 ft & Easting= ±6,488,753 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0	B	1	-		SILT (ML): gray, moist to wet, trace fine SAND, mostly nonplastic fines.	-	-	
5								
10	B	2	-			-	-	
15								
20	B	3	-			-	-	
25								
30	B	4	-			-	-	
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-208

Date Drilled:	11-30-10	Comments	SHEET 2 OF 2
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	B	5	-		SANDY SILT (ML): gray, moist, some medium to fine SAND, mostly nonplastic fines.	-	-	PI
45								
50	B	6	-		SANDY SILT (ML): gray, moist, 50% fine SAND, 50% nonplastic fines.	34	-	PA, PI, CR, OC
55								
60	B	7	-			-	-	PI
65								
70					Terminated Boring at 70.0 feet depth. Groundwater was encountered at 4.0 feet depth.			

LOG OF BORING NO. A-10-209

Grade Elevation:	± -4.0 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	12-06-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,738,378 ft & Easting= ±6,488,740 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0					5" Asphalt Concrete and 3" Aggregate Base.			
	B	1	-		SILT with SAND (ML): gray, wet, little fine SAND, mostly nonplastic fines.	-	-	
5								
10	B	2	-			-	-	
15								
20	B	3	-		SILT (ML): gray, wet, trace fine SAND, mostly low plasticity fines.	-	-	
25								
30	B	4	-		SANDY SILT (ML): gray, wet, 49% fine SAND, 51% nonplastic fines.	34	-	PA, PI, CR, OC
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 | Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-209

Date Drilled:	12-06-10	Comments	SHEET 2 OF 2
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	D	1	18		SILTY SAND (SM): medium dense, gray, wet, mostly medium to fine SAND, some nonplastic fines.	-	-	
	B	5	-		SANDY SILT (ML): gray, wet, some fine SAND, mostly nonplastic fines.	-	-	
45	D	2	6		Fat CLAY (CH): medium stiff, gray, moist, 100% high plasticity fines.	-	-	PA, PI, C
50	D	3	18		SILT (ML): stiff, gray, moist, mostly low plasticity fines.	-	-	PI
	B	6	-			-	-	
55	D	4	10		SILTY SAND (SM): loose, gray, wet, mostly medium to fine SAND, some nonplastic fines.	-	-	
60	D	5	18		Lean CLAY (CL): stiff, gray, moist, 6% fine SAND, 94% medium to high plasticity fines.	-	-	PA, PI, C
	B	7	-		SILTY SAND (SM): gray, moist, mostly fine SAND, some nonplastic fines.	-	-	
65	D	6	57		SANDY SILT (ML): hard, gray, moist, some fine SAND, mostly nonplastic fines.	-	-	
70					Terminated Boring at 70.0 feet depth. Groundwater was encountered at 5.0 feet depth.			

LOG OF BORING NO. A-10-210

Grade Elevation:	± -4.0 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	12-06-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,738,705 ft & Easting= ±6,488,727 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0	B	1	-		SANDY SILT (ML): dark gray, moist, some fine SAND, mostly low plasticity fines.	-	-	
5								
10	B	2	-			-	-	PI
15								
20	B	3	-		SILT (ML): dark gray, wet, trace fine SAND, mostly low plasticity fines.	-	-	
25								
30	B	4	-		SANDY SILT (ML): gray wet, some fine SAND, mostly nonplastic fines.	-	-	PI
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-210

Date Drilled: 12-06-10
Logged By: K.K
Comments
1. Drillhole was backfilled with soil-cement mix.
SHEET 2 OF 2

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	D	1	4		SILT (ML): soft, dark gray, moist, 4% fine SAND, 96% low plasticity fines.	-	-	PA, PI, C
	B	5	-			-	-	
45	D	2	8		SANDY SILTY CLAY (CL-ML): medium stiff, dark gray, moist, some medium to fine SAND, mostly nonplastic fines.	-	-	PI
50	B	6	-		SANDY SILT (ML): dark gray, moist, 1% fine GRAVEL, 49% medium to fine SAND, 50% nonplastic fines.	30	-	PA, PI, CR, OC
55								
60	B	7	-			-	-	
65								
70					Terminated Boring at 70.0 feet depth. Groundwater was encountered at 5.0 feet depth.			

LOG OF BORING NO. A-10-211

Grade Elevation:	± +8.0 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	12-06-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,739,059 ft & Easting= ±6,488,699 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0					18" Asphalt Concrete			
	B	1	-		SILTY SAND (SM): olive brown, moist, few GRAVEL up to $\frac{3}{4}$", mostly medium to fine SAND, some nonplastic fines.	-	-	
5								
10	B	2	-		CLAYEY SAND (SC): olive gray, moist, mostly medium to fine SAND, some low plasticity fines.	-	-	
15					SILT with SAND (ML) encountered.			
20	B	3	-		SANDY SILT (ML): gray, wet, some fine SAND, mostly nonplastic fines.	-	-	
25								
30	B	4	-		SILTY SAND (SM): gray, wet, mostly fine SAND, some nonplastic fines.	-	-	
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-211

Date Drilled:	12-06-10	Comments	SHEET 2 OF 2
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	B	5	-		52% fine SAND, 48% nonplastic fines.	27	-	PA, PI, CR, OC
45								
50	B	6	-			-	-	
55	D	1	14			-	-	
	D	2	11		Lean CLAY with SAND (CL): stiff, gray, moist, 15% fine SAND, 85% low plasticity fines.	-	-	PA, PI, C
	D	3	20		SILT with SAND (ML): stiff, gray, wet, little fine SAND, mostly nonplastic fines..	-	-	
60	D	4	23		15% fine SAND, 85% nonplastic fines.	-	-	PA, PI
	D	5	89/11"		SILTY SAND (SM): very dense, gray, wet, mostly medium to fine SAND, some nonplastic fines.	-	-	
	B	7	-			-	-	
65								
70					Terminated Boring at 70.0 feet depth. Groundwater was encountered at 20.0 feet depth.			

LOG OF BORING NO. A-10-212

Grade Elevation:	± -3.5 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	12-01-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,738,329 ft & Easting= ±6,488,647 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0	B	1	-		SILTY SAND (SM): grayish brown, moist, 51 medium to fine SAND, 49% nonplastic fines.	34	-	PA, PI, CR, OC
10	B	2	-		CLAYEY SAND (SC): gray, wet, mostly medium to fine SAND, some low plasticity fines.	-	-	
20	B	3	-		SILTY SAND (SM): gray, wet, 51% medium to fine SAND, 49% nonplastic fines.	30	-	PA, PI, CR, OC
30	B	4	-			-	-	

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 Date: 12-23-10

CONTINUED LOG OF BORING NO. A-10-212

Date Drilled: 12-01-10	Comments	SHEET 2 OF 2
Logged By: K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	B	5	-		SANDY SILT (ML): gray, moist, 47% fine SAND, 53% nonplastic fines.	30	-	PA, PI, CR, OC
45								
50	B	6	-			-	-	
55								
60	B	7	-		SILTY SAND (SM): gray, moist, mostly medium to fine SAND, some nonplastic fines.	-	-	
65								
70					Terminated Boring at 70.0 feet depth. Groundwater was not measured.			

LOG OF BORING NO. A-10-213

Grade Elevation:	± -3.5 ft MLLW			
Boring Depth:	70 feet	Driller:	2R Drilling	SHEET 1 OF 2
Borehole Diameter:	8 inches	Type of Rig:	Hollow-stem auger	Comments: 1. CME 75 with automatic hammer
Date Drilled:	12-01-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,738,795 ft & Easting= ±6,488,604 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0	B	1	-		CLAYEY SAND (SC): grayish brown, moist, mostly medium to fine SAND, some low plasticity fines.	-	-	
5								
10	B	2	-			-	-	
15								
20	B	3	-		SANDY SILT (ML): gray, moist, 43% fine SAND, 57% nonplastic fines.	31	-	PA, PI, CR, OC
25								
30	B	4	-		SANDY SILT (ML): gray, moist, some medium to fine SAND, mostly nonplastic fines.	-	-	PI
35								

CONTINUED LOG OF BORING NO. A-10-213

Date Drilled:	12-01-10	Comments	SHEET 2 OF 2
Logged By:	K.K	1. Drillhole was backfilled with soil-cement mix.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	APPROXIMATE GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35								
40	B	5	-			-	-	
45								
50	B	6	-			-	-	PI
55								
60	B	7	-			-	-	
65								
70					Terminated Boring at 70.0 feet depth. Groundwater was encountered at 6.0 feet depth.			

LOG OF BORING NO. R-10-301

Grade Elevation:	± -3.5 ft MLLW			
Boring Depth:	101.5 feet	Driller:	SoCal Drilling Co.	SHEET 1 OF 3
Borehole Diameter:	5 inches	Type of Rig:	Mud Rotary	Comments: 1. Mayhew 1000 with automatic hammer
Date Drilled:	12-01-10	Drive Wt. (lbs):	140	2. Ring sampler of 3.25" O.D.
Logged By:	K.K.	Drop (inches):	30	3. Northing= ±1,738,530 ft & Easting= ±6,488,626 ft

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
0					CLAYEY SAND (SC): dark brown, moist, mostly medium to fine SAND, some low plasticity fines.			
5	S	1	6		No Recovery	-	-	
10	D	2	12		Lean CLAY (CL): stiff, dark gray, moist, 2% fine SAND, 98% medium plasticity fines.	-	-	PA, PI, C, CR
15	T	3	-		Poorly graded SAND with SILT (SP-SM): medium dnse gray, wet, 88% medium to fine SAND, 12% nonplastic fines.	-	-	PA, DS
20	S	4	26			-	-	
25	D	5	28			-	-	
30	S	6	9		Lean CLAY (CL): stiff, dark gray, moist, trace fine SAND, mostly low plasticity fines, some SILTY SAND (SM) found at bottom.	-	-	
35								

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ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No. 06-123-06 | Date: 12-23-10

CONTINUED LOG OF BORING NO. R-10-301

Date Drilled: 12-01-10	Comments	SHEET 2 OF 3
Logged By: K.K	1. Drillhole was backfilled with cement grout.	

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
35	D	7	12		SILT (ML): stiff, dark gray, moist, few fine SAND, mostly nonplastic fines, some SILTY SAND found at top.	-	-	
	T	8	-		6% fine SAND, 94% nonplastic fines.	-	-	PA, PI
40	D	9	15		some SILTY SAND (SM) found at bottom.	-	-	
45	T	10	-		SILTY CLAY sith SAND (CL-ML): stiff, gray, moist, 2% fine GRAVEL, 22% fine SAND, 76% low plasticity fines, some SILTY SAND (SM) found at bottom.	30	94	PA, PI, UU, C
50	S	11	9		SILT (ML): stiff, gray, moist, trace fine SAND, mostly nonplastic fines.	29	-	PI
55	D	12	50/5"		Poorly graded SAND with SILT (SP-SM): very dense, wet, mostly medium SAND, little nonplastic fines.	-	-	
60	S	13	62		moist, 91% medium SAND, 9% nonplastic fines.	26	-	PA
65	D	14	50/6"			-	-	
70	S	15	61		SILTY SAND (SM): very dense, moist, gray, mostly medium to fine SAND, some nonplastic fines.	-	-	

CONTINUED LOG OF BORING NO. R-10-301

Date Drilled: 12-01-10
Logged By: K.K
Comments
1. Drillhole was backfilled with cement grout.
SHEET 3 OF 3

Depth (feet)	Sampler Type	Sample	Blows/foot	Graphic Log	GEOTECHNICAL DESCRIPTION	Moisture (%)	Dry Density (pcf)	Tests/ Results
75	D	16	36		SILT with SAND (ML): stiff, gray, moist, 15% fine SAND, 85% nonplastic fines.	53	69	PA, PI, UU, C
80	D	17	18		Lean CLAY (CL): stiff, gray, moist, mostly low plasticity fines.	-	-	PI
85	S	18	35		SILT with SAND (ML): very stiff, gray, moist, little fine SAND, mostly low plasticity fines, some poorly graded SAND (SP) found at bottom.	-	-	
90	S	19	73		Poorly graded SAND (SP): very dense, gray, moist, mostly coarse SAND, trace nonplastic fines.	-	-	
95								
100	S	20	58		SANDY SILT (ML): hard, dark gray, moist, 35% medium to fine SAND, 65% nonplastic fines.	-	-	PA
					Terminated Boring at 101.5 feet depth. Groundwater was not measured.			
105								
110								

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

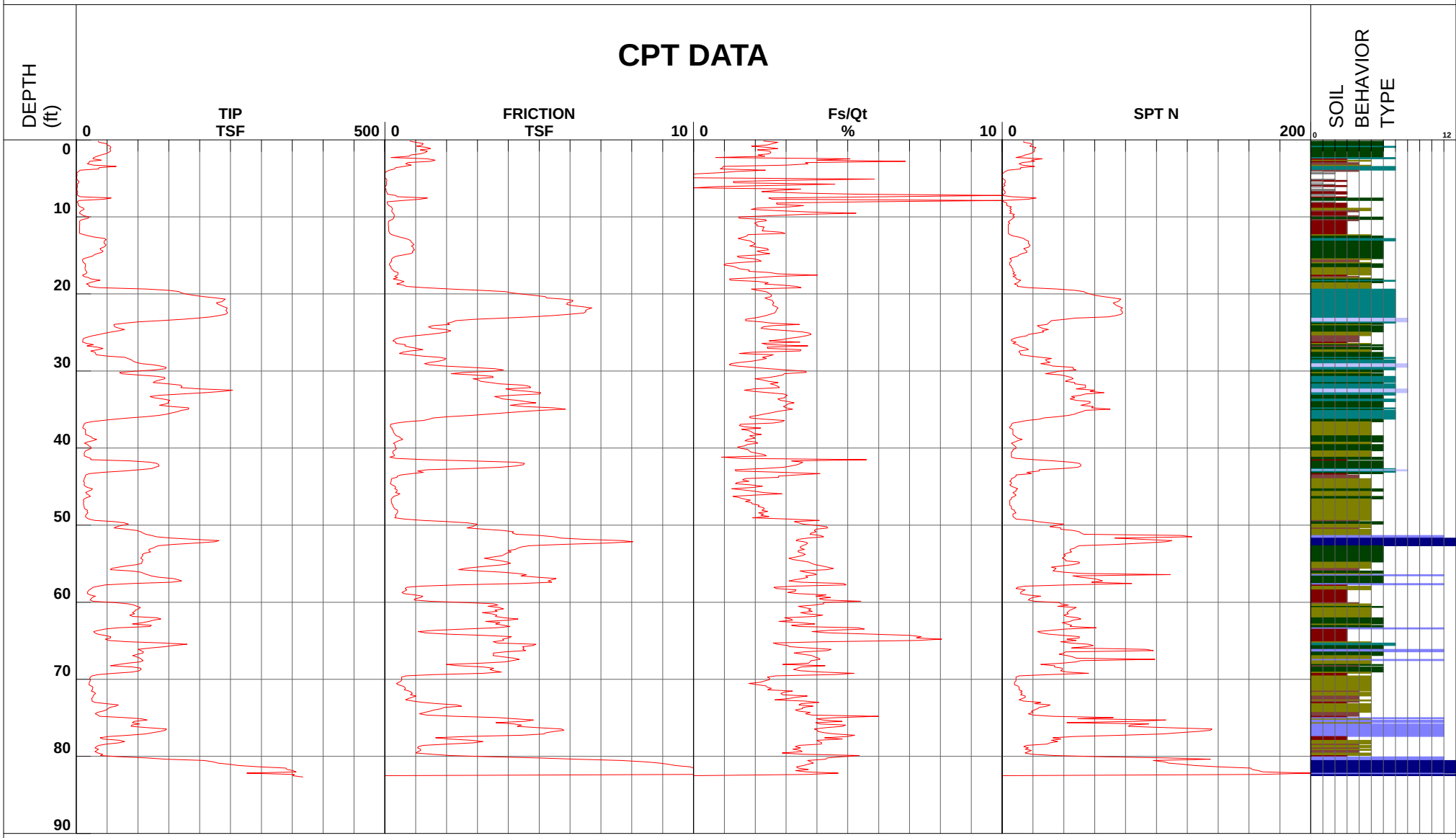
Project No. 06-123-06 | Date: 12-23-10

LOGS OF SITE-SPECIFIC CPT SOUNDINGS

Earth Mechanics

Location	Schuyler Heim Bridge	Operator	ML/RS	Filename	SDF(632).cpt
Job Number	06-123	Cone Number	DSG0906	GPS	
Hole Number	C-10-351	Date and Time	11/30/2010 10:18:31 AM	Maximum Depth	82.68 ft
Water Table Depth	5.00 ft				

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

Schuyler Heim Bridge

Project ID: Earth Mechanics
Data File: SDF(632).cpt
CPT Date: 11/30/2010 10:18:31 AM
GW During Test: 5 ft

Sounding ID: C-10-351
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	qcln PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Ratio %	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Nk -	Vol Strn %	Dry Stlmt 0.00	Liq Stlmt 0.22	Cycl SStn %
0.33	36.8	59.0	130.3	1.0	6.4	2.7	silty SAND to sandy SILT	120	4.0	9	15	50	48	-	-	25	16	N/A	0.00	N/A	N/A
0.49	48.4	77.7	144.1	1.2	6.4	2.6	silty SAND to sandy SILT	120	4.0	12	19	59	48	-	-	21	16	N/A	0.00	N/A	N/A
0.66	50.5	81.0	142.4	1.2	5.7	2.4	silty SAND to sandy SILT	120	4.0	13	20	60	48	-	-	20	16	N/A	0.00	N/A	N/A
0.82	54.9	88.1	134.2	1.0	5.9	1.9	silty SAND to sandy SILT	120	4.0	14	22	63	48	-	-	17	16	N/A	0.00	N/A	N/A
0.98	56.1	90.0	152.7	1.4	2.1	2.5	silty SAND to sandy SILT	120	4.0	14	23	64	48	-	-	19	16	N/A	0.00	N/A	N/A
1.15	54.3	87.1	158.0	1.5	0.2	2.7	silty SAND to sandy SILT	120	4.0	14	22	62	48	-	-	21	16	N/A	0.00	N/A	N/A
1.31	55.5	89.0	140.6	1.1	-2.0	2.1	silty SAND to sandy SILT	120	4.0	14	22	63	48	-	-	18	16	N/A	0.00	N/A	N/A
1.48	55.6	89.1	152.5	1.4	-4.2	2.5	silty SAND to sandy SILT	120	4.0	14	22	63	48	-	-	20	16	N/A	0.00	N/A	N/A
1.64	52.1	83.6	148.3	1.3	-4.9	2.5	silty SAND to sandy SILT	120	4.0	13	21	61	48	-	-	20	16	N/A	0.00	N/A	N/A
1.80	47.2	75.7	138.8	1.1	-8.4	2.4	silty SAND to sandy SILT	120	4.0	12	19	58	48	-	-	21	16	N/A	0.00	N/A	N/A
1.97	40.2	64.5	119.3	0.8	-9.1	2.1	silty SAND to sandy SILT	120	4.0	10	16	53	46	-	-	21	16	N/A	0.00	N/A	N/A
2.13	34.1	54.7	115.7	0.8	-10.4	2.3	silty SAND to sandy SILT	120	4.0	9	14	47	45	-	-	24	16	N/A	0.00	N/A	N/A
2.30	28.3	45.4	67.0	0.2	-10.7	0.7	silty SAND to sandy SILT	120	4.0	7	11	41	44	-	-	16	16	N/A	0.00	N/A	N/A
2.46	27.1	43.4	-	1.4	-11.2	5.1	silty CLAY to CLAY	115	1.5	18	29	-	-	1.9	9.9	38	15	N/A	0.00	N/A	N/A
2.62	40.8	65.4	169.4	1.6	-11.1	4.0	clayy SILT to silty CLAY	115	2.0	20	33	-	-	2.9	9.9	29	15	N/A	0.00	N/A	N/A
2.79	21.6	34.6	-	1.5	-10.8	6.9	silty CLAY to CLAY	115	1.5	14	23	-	-	1.5	9.9	47	15	N/A	0.00	N/A	N/A
2.95	20.7	33.2	-	0.8	-11.0	3.7	clayy SILT to silty CLAY	115	2.0	10	17	-	-	1.5	9.9	38	15	N/A	0.00	N/A	N/A
3.12	18.1	29.0	-	0.7	-12.6	3.7	clayy SILT to silty CLAY	115	2.0	9	15	-	-	1.3	9.9	40	15	N/A	0.00	N/A	N/A
3.28	28.1	45.1	123.2	0.9	-14.0	3.1	clayy SILT to silty CLAY	115	2.0	14	23	-	-	2.0	9.9	30	15	0.91	-	0.24	48.0
3.45	64.7	103.8	122.5	0.6	-14.4	1.0	clean SAND to silty SAND	125	5.0	13	21	68	46	-	-	10	16	1.06	-	0.24	4.2
3.61	36.9	59.2	84.1	0.3	-15.7	1.0	silty SAND to sandy SILT	120	4.0	9	15	50	44	-	-	15	16	2.69	-	0.24	34.6
3.77	36.4	58.4	81.3	0.3	-16.3	0.9	silty SAND to sandy SILT	120	4.0	9	15	49	43	-	-	15	16	2.77	-	0.24	35.4
3.94	6.4	10.3	-	0.2	-17.2	2.4	silty CLAY to CLAY	115	1.5	4	7	-	-	0.4	9.8	55	15	-	-	0.23	-
4.10	4.0	6.4	-	0.1	-19.5	1.5	silty CLAY to CLAY	115	1.5	3	4	-	-	0.3	5.8	60	15	-	-	0.23	-
4.27	1.0	1.7	-	0.0	-21.3	1.1	sensitive fine SOIL	115	2.0	1	1	-	-	0.1	1.2	95	15	-	-	0.23	-
4.43	1.0	1.6	-	0.0	-20.1	0.1	sensitive fine SOIL	115	2.0	1	1	-	-	0.1	1.1	89	15	-	-	0.23	-
4.59	1.4	2.2	-	0.0	-20.4	0.1	sensitive fine SOIL	115	2.0	1	1	-	-	0.1	1.6	76	15	-	-	0.23	-
4.76	1.1	1.4	-	0.0	-19.5	0.1	sensitive fine SOIL	115	2.0	1	1	-	-	0.1	1.2	95	15	-	-	0.23	-
4.92	1.1	1.4	-	0.0	-18.7	0.1	sensitive fine SOIL	115	2.0	1	1	-	-	0.1	1.1	95	15	-	-	0.23	-
5.09	1.1	1.4	-	0.1	-16.2	9.0	Organic SOILS - Peats	100	1.0	1	1	-	-	0.1	1.1	95	10	-	-	0.23	-
5.25	2.4	3.8	-	0.1	-7.6	3.3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	2.8	92	15	-	-	0.23	-
5.41	4.6	7.3	-	0.1	-8.6	1.4	silty CLAY to CLAY	115	1.5	3	5	-	-	0.3	5.7	56	15	-	-	0.23	-
5.58	3.8	6.2	-	0.1	-15.9	1.4	silty CLAY to CLAY	115	1.5	3	4	-	-	0.3	4.6	62	15	-	-	0.23	-
5.74	1.4	2.2	-	0.1	-8.1	6.1	Organic SOILS - Peats	100	1.0	1	2	-	-	0.1	1.4	95	10	-	-	0.23	-
5.91	1.8	2.9	-	0.0	-10.4	3.2	silty CLAY to CLAY	115	1.5	1	2	-	-	0.1	1.9	95	15	-	-	0.23	-
6.07	2.1	3.3	-	0.0	-13.1	0.8	sensitive fine SOIL	115	2.0	1	2	-	-	0.1	2.2	76	15	-	-	0.23	-
6.23	1.5	2.4	-	0.0	-18.2	0.1	sensitive fine SOIL	115	2.0	1	1	-	-	0.1	1.4	75	15	-	-	0.23	-
6.40	1.1	1.8	-	0.0	-19.9	5.2	Organic SOILS - Peats	100	1.0	1	2	-	-	0.1	0.9	95	10	-	-	0.23	-
6.56	1.3	2.1	-	0.0	-21.7	3.8	Organic SOILS - Peats	100	1.0	1	2	-	-	0.1	1.1	95	10	-	-	0.23	-
6.73	2.4	3.9	-	0.1	-19.8	2.6	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	2.4	88	15	-	-	0.23	-
6.89	2.2	3.5	-	0.1	-18.2	4.2	silty CLAY to CLAY	115	1.5	1	2	-	-	0.1	2.1	95	15	-	-	0.23	-
7.05	1.6	2.6	-	0.1	-18.1	7.1	Organic SOILS - Peats	100	1.0	2	3	-	-	0.1	1.4	95	10	-	-	0.23	-
7.22	2.7	4.4	-	0.3	-18.4	9.9	Organic SOILS - Peats	100	1.0	3	4	-	-	0.3	2.6	95	10	-	-	0.23	-
7.38	6.5	10.5	-	0.4	-17.7	6.7	silty CLAY to CLAY	115	1.5	4	7	-	-	0.4	6.9	74	15	-	-	0.23	-
7.55	56.6	90.8	153.8	1.4	-17.1	2.5	silty SAND to sandy SILT	120	4.0	14	23	64	44	-	-	19	16	0.40	-	0.23	2.3
7.71	44.7	71.8	139.3	1.1	-14.0	2.6	silty SAND to sandy SILT	120	4.0	11	18	56	43	-	-	22	16	1.02	-	0.23	7.7
7.87	4.8	7.7	-	0.6	-23.7	9.9	Organic SOILS - Peats	100	1.0	5	8	-	-	0.5	4.7	93	10	-	-	0.23	-
8.04	1.4	2.3	-	0.1	-16.2	8.3	Organic SOILS - Peats	100	1.0	1	2	-	-	0.1	1.1	95	10	-	-	0.23	-
8.20	2.9	4.7	-	0.1	-16.3	3.2	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	2.6	86	15	-	-	0.23	-
8.37	3.5	5.6	-	0.1	-20.0	3.1	silty CLAY to CLAY	115	1.5	2	4	-	-	0.2	3.1	79	15	-	-	0.23	-
8.53	3.7	5.9	-	0.1	-17.8	4.1	silty CLAY to CLAY	115	1.5	2	4	-	-	0.2	3.3	82	15	-	-	0.23	-
8.69	6.7	10.8	-	0.2	-42.3	3.4	silty CLAY to CLAY	115	1.5	4	7	-	-	0.5	6.3	60	15	-	-	0.23	-
8.86	11.5	18.4	-	0.2	-29.3	2.1	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	9.9	41	15	-	-	0.23	-
9.02	12.9	20.7	-	0.2	-16.7	1.9	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.9	9.9	38	15	-	-	0.23	-
9.19	8.1	13.0	-	0.2	-17.4	2.9	silty CLAY to CLAY	115	1.5	5	9	-	-	0.5	7.4	53	15	-	-	0.23	-
9.35	6.2	9.9	-	0.2	-22.4	4.0	silty CLAY to CLAY	115	1.5	4	7	-	-	0.4	5.5	66	15	-	-	0.23	-
9.51	5.1	8.1	-	0.3	-24.6	5.9	silty CLAY to CLAY	115	1.5	3	5	-	-	0.3	4.3	80	15	-	-	0.23	-
9.68	8.4	13.5	-	0.3	-27.1	3.8	silty CLAY to CLAY	115	1.5	6	9	-	-	0.6	7.4	57	15	-	-	0.23	-
9.84	11.8	19.0	-	0.3	-29.1	2.7	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	9.9	44	15	-	-	0.23	-
10.01	20.5	30.9	75.9	0.3	-36.8	1.5	silty SAND to sandy SILT	120	4.0	5	8	28	37	-	-	28	16	2.93	-	0.23	51.2
10.17	19.1	28.6	74.5	0.3	-48.4	1.5	silty SAND to sandy SILT	120	4.0	5	7	26	37	-	-	29	16	2.98	-	0.22	51.2
10.34	10.4	16.8	-	0.2	-47.4	2.5	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	8.8	45	15	-	-	0.22	-
10.50	5.9	9.4	-	0.1	-46.0	2.6	silty CLAY to CLAY	115	1.5	4	6	-	-	0.4	4.7	60	15	-	-	0.22	-
10.66	5.5	8.8	-	0.1	-66.4	2.3	silty CLAY to CLAY	115	1.5	4	6	-	-	0.4	4.3	60	15	-	-	0.22	-
10.83	5.8	9.3	-	0.1	-65.6	2.2	silty CLAY to CLAY	115	1.5	4	6	-	-	0.4	4.5	58	15	-	-	0.22	-
10.99	5.6	9.0	-	0.1	-67.1	2.3	silty CLAY to CLAY	115	1.5	4	6	-	-	0.4	4.3	60	15	-	-	0.22	-
11.16	5.6	9.0	-	0.1	-65.1	2.3	silty CLAY to CLAY	115	1.5	4	6	-	-	0.4	4.2	60	15	-	-	0.22	-
11.32	5.4	8.7	-	0.1	-65.1	2.6	silty CLAY to CLAY	115	1.5	4	6	-	-	0.4	4.0	63	15	-	-	0.22	-
11.48	5.4	8.7	-	0.1	-64.6	2.6	silty CLAY to CLAY	115	1.5	4	6	-	-	0.4	4.0	62	15	-	-	0.22	-
11.65	5.7	9.1	-	0.1	-69.9	2.6	silty CLAY to CLAY	115	1.5	4	6	-	-	0.4	4.1	61	15	-	-	0.22	-
11.81	5.5	8.8	-	0.1	-67.8	2.5	silty CLAY to CLAY	115	1.5	4	6	-	-	0.4	3.9	62	15	-	-	0.22	-
11.98	5.2	8.3	-	0.1	-70.0	3.3	silty CLAY to CLAY	115	1.5	3	6	-	-	0.3	3.6	68	15	-	-	0.22	-
12.14	5.4	8.7	-	0.2	-70.4	3.4	silty CLAY to CLAY	115	1.5	4	6	-	-	0.4	3.7	67	15	-	-	0.22	-
12.30	12.5	20.0	-	0.2	-79.3	1.9	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.9	9.3	38	15	-	-	0.22	-
12.47	20.3	28.5	80.3	0.4	-67.6	1.8	silty SAND to sandy SILT	120	4.0	5	7	26	36	-	-	31	16	2.80	-	0.22	51.2
12.63	30.6	42.6	89.6	0.5	-62.1	1.7	silty SAND to sandy SILT	120	4.0	8	11	39	39	-	-	24	16	2.56	-	0.22	51.2
12.80	45.9	63.7	102.3	0.7	-61.7	1.5	silty SAND to sandy SILT	120	4.0	11	16	52	41	-	-	18	16	2.29	-	0.21	31.7
12.96	48.5	67.0	109.6	0.8	-60.8	1.6	silty SAND to sandy SILT	120	4.0	12	17	54	41	-	-	19	16	2.17	-	0.21	29.8
13.12	45.3	62.3	112.2	0.8	-62.2	1.9	silty SAND to sandy SILT	120	4.0	11	16	51	41	-	-	21	16	2.13	-	0.20	32.6
13.29	45.1	61.7	113.1	0.9	-61.7	1.9	silty SAND to sandy SILT	120	4.0	11	15	51	41	-	-	21	16	2.11	-	0.20	32.9
13.45	45.5	61.9	116.0	0.9	-62.8	2.0	silty SAND to sandy SILT	120	4.0	11	15	51	41	-	-	22	16	2.07	-	0.20	32.8
13.62	48.2	65.4	117.8	0.9	-62.4	2.0	silty SAND to sandy SILT	120	4.0	12	16	53	41	-	-	21	16	2.04	-	0.19	30.7
13.78	47.2	63.7	112.6	0.9	-61.7	1.9	silty SAND to sandy SILT	120	4.0	12	16	52	41	-	-	20	16	2.12	-	0.19	31.7
13.94	44.2	59.3	115.4	0.9	-59.6	2.1	silty SAND to sandy SILT	120	4.0	11	15	50	40	-	-	22	16	2.08	-	0.19	34.5
14.11	38.7	51.7	117.0	0.9	-58.0	2.4	silty SAND to sandy SILT	120	4.0	10	13	45	39	-	-	26	16	2.05	-	0.18	42.3
14.27	39.6	52.8	119.1	1.0	-56.9	2.5	silty SAND to sandy SILT	120	4.0	10	13	46	40	-	-	26	16	2.03	-	0.18	41.1
14.44	43.4	57.5	113.7	0.9	-56.9	2.1	silty SAND to sandy SILT	120	4.0	11	14	49	40	-	-	23	16	2.10	-	0.18	36.3
14.60	41.4	54.6	114.7	0.9	-56.4	2.2	silty SAND to sandy SILT	120	4.0	10	14	47	40	-	-	24	16	2.09	-	0.17	39.2
14.76	34.1	44.8	112.5	0.8	-55.0	2.5	silty SAND to sandy SILT	120	4.0	9	11	41	39	-	-	28	16	2.12	-	0.17	50.3
14.93	29.1	38.1	98.5	0.6	-56.6	2.2	silty SAND to sandy SILT	120	4.0	7	10	35	38	-	-	29	16	2.36	-	0.17	51.2
15.09	26.0	33.9	78.0	0.4	-55.7	1.5	silty SAND to sandy SILT	120	4.0	7	8	31	37	-	-	26	16	2.87	-	0.16	51.2
15.26	18.6	24.1	71.5	0.3	-54.7	1.6	clayy SILT to silty CLAY	115	2.0	9	12	-	-	1.3	9.9	32	15	3.08	-	0.16	51.2
15.42	11.8	19.0	-	0.2	-52.4	2.1	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	7.1	41	15	-	-	0.15	-

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Project ID: Earth Mechanics
Data File: SDF(632).cpt
CPT Date: 11/30/2010 10:18:31 AM
GW During Test: 5 ft

Sounding ID: C-10-351
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	*qcln PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	*Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	*SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Nk -	Vol Strn %	Dry Stlmt 0.00	Liq Stlmt 0.22	*Cycl SStn %
15.58	10.2	16.3	-	0.2	-52.6	2.3	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	6.0	45	15	-	-	0.15	-
15.75	10.4	16.7	-	0.2	-50.9	2.4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	6.0	46	15	-	-	0.15	-
15.91	11.6	18.6	-	0.2	-53.0	1.7	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	6.7	39	15	-	-	0.15	-
16.08	14.6	18.6	58.2	0.2	-53.0	1.1	clayy SILT to silty CLAY	115	2.0	7	9	-	-	1.0	8.6	34	15	3.64	-	0.15	51.2
16.24	14.7	18.7	56.7	0.1	-50.1	1.1	silty SAND to sandy SILT	120	4.0	4	5	12	33	-	-	33	16	3.72	-	0.15	51.2
16.40	15.2	19.2	63.3	0.2	-48.9	1.4	clayy SILT to silty CLAY	115	2.0	8	10	-	-	1.0	8.8	35	15	3.40	-	0.14	51.2
16.57	14.1	19.9	-	0.2	-48.7	1.5	clayy SILT to silty CLAY	115	2.0	7	10	-	-	1.0	8.0	36	15	-	-	0.13	-
16.73	14.3	20.1	-	0.2	-47.3	1.6	clayy SILT to silty CLAY	115	2.0	7	10	-	-	1.0	8.1	36	15	-	-	0.13	-
16.90	14.9	23.8	-	0.3	-48.3	1.9	clayy SILT to silty CLAY	115	2.0	7	12	-	-	1.0	8.4	35	15	-	-	0.12	-
17.06	16.3	22.6	-	0.3	-47.2	1.9	clayy SILT to silty CLAY	115	2.0	8	11	-	-	1.1	9.1	36	15	-	-	0.12	-
17.23	17.4	27.9	-	0.4	-46.9	2.6	clayy SILT to silty CLAY	115	2.0	9	14	-	-	1.2	9.7	37	15	-	-	0.12	-
17.39	15.5	24.9	-	0.4	-46.0	2.9	clayy SILT to silty CLAY	115	2.0	8	12	-	-	1.1	8.5	40	15	-	-	0.12	-
17.55	10.3	16.5	-	0.4	-51.2	4.5	silty CLAY to CLAY	115	1.5	7	11	-	-	0.7	5.4	56	15	-	-	0.12	-
17.72	12.1	19.3	-	0.3	-51.2	2.9	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.8	6.4	45	15	-	-	0.12	-
17.88	19.9	27.1	87.0	0.4	-50.9	2.2	clayy SILT to silty CLAY	115	2.0	10	14	-	-	1.4	9.9	34	15	2.62	-	0.12	51.2
18.05	23.8	29.0	68.5	0.3	-51.4	1.2	silty SAND to sandy SILT	120	4.0	6	7	26	35	-	-	27	16	3.19	-	0.12	51.2
18.21	38.6	46.9	82.4	0.5	-51.6	1.2	silty SAND to sandy SILT	120	4.0	10	12	42	38	-	-	20	16	2.74	-	0.11	47.8
18.37	29.5	35.7	95.5	0.6	-49.6	2.2	silty SAND to sandy SILT	120	4.0	7	9	33	37	-	-	30	16	2.43	-	0.11	51.2
18.54	22.0	29.3	96.9	0.5	-50.2	2.5	clayy SILT to silty CLAY	115	2.0	11	15	-	-	1.5	9.9	35	15	2.40	-	0.10	51.2
18.70	16.7	25.5	-	0.4	-51.9	2.5	clayy SILT to silty CLAY	115	2.0	8	13	-	-	1.1	8.6	37	15	-	-	0.10	-
18.87	21.2	32.2	-	0.6	-50.2	3.1	clayy SILT to silty CLAY	115	2.0	11	16	-	-	1.5	9.9	36	15	-	-	0.10	-
19.03	20.8	31.4	-	0.7	-50.2	3.5	clayy SILT to silty CLAY	115	2.0	10	16	-	-	1.4	9.9	39	15	-	-	0.10	-
19.19	36.8	43.8	135.0	1.3	-51.5	3.6	clayy SILT to silty CLAY	115	2.0	18	22	-	-	2.6	9.9	33	15	1.65	-	0.10	51.2
19.36	114.3	135.6	178.4	2.1	-52.6	1.9	silty SAND to sandy SILT	120	4.0	29	34	77	44	-	-	13	16	0.00	-	0.09	0.0
19.52	149.5	176.7	222.6	3.1	-52.9	2.1	clean SAND to silty SAND	125	5.0	30	35	86	45	-	-	12	16	0.00	-	0.09	0.0
19.69	166.7	196.3	250.7	3.9	-55.2	2.4	silty SAND to sandy SILT	120	4.0	42	49	89	45	-	-	12	16	0.00	-	0.09	0.0
19.85	169.7	199.1	256.1	4.1	-55.2	2.4	silty SAND to sandy SILT	120	4.0	42	50	90	45	-	-	13	16	0.00	-	0.09	0.0
20.01	178.0	208.1	267.4	4.4	-56.2	2.5	silty SAND to sandy SILT	120	4.0	44	52	91	46	-	-	13	16	0.00	-	0.09	0.0
20.18	190.1	221.6	282.1	4.8	-60.0	2.5	silty SAND to sandy SILT	120	4.0	48	55	93	46	-	-	12	16	0.00	-	0.09	0.0
20.34	206.9	240.3	299.5	5.2	-61.6	2.5	stiff SAND to clayy SAND	115	1.0	100	100	-	-	13.7	9.9	12	16	0.00	-	0.09	0.0
20.51	226.1	261.8	312.6	5.2	-61.7	2.3	clean SAND to silty SAND	125	5.0	45	52	95	47	-	-	11	16	0.00	-	0.09	0.0
20.67	241.1	278.2	331.7	5.8	-59.6	2.4	clean SAND to silty SAND	125	5.0	48	56	95	47	-	-	10	16	0.00	-	0.09	0.0
20.83	238.9	274.6	334.3	6.1	-65.7	2.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.8	9.9	11	16	0.00	-	0.09	0.0
21.00	236.3	270.8	331.5	6.1	-79.7	2.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.6	9.9	11	16	0.00	-	0.09	0.0
21.16	227.0	259.5	321.7	5.9	-80.6	2.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.0	9.9	12	16	0.00	-	0.09	0.0
21.33	230.0	262.1	322.6	5.9	-73.1	2.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.2	9.9	11	16	0.00	-	0.09	0.0
21.49	234.2	266.0	327.0	6.0	-74.5	2.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.5	9.9	11	16	0.00	-	0.09	0.0
21.65	239.0	270.7	335.7	6.4	-74.6	2.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.8	9.9	12	16	0.00	-	0.09	0.0
21.82	244.6	276.3	343.8	6.7	-73.4	2.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.2	9.9	12	16	0.00	-	0.09	0.0
21.98	243.8	274.5	340.4	6.6	-74.7	2.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.1	9.9	12	16	0.00	-	0.09	0.0
22.15	242.4	272.2	337.4	6.5	-72.2	2.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.0	9.9	12	16	0.00	-	0.09	0.0
22.31	244.4	273.6	338.1	6.5	-70.6	2.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.1	9.9	12	16	0.00	-	0.09	0.0
22.47	245.1	273.6	336.5	6.4	-71.3	2.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.2	9.9	11	16	0.00	-	0.09	0.0
22.64	241.5	268.8	325.5	6.0	-66.0	2.5	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.0	9.9	11	16	0.00	-	0.09	0.0
22.80	231.3	256.8	309.2	5.4	-64.4	2.4	clean SAND to silty SAND	125	5.0	46	51	95	46	-	-	11	16	0.00	-	0.09	0.0
22.97	218.5	241.8	288.2	4.8	-63.5	2.2	clean SAND to silty SAND	125	5.0	44	48	95	46	-	-	10	16	0.00	-	0.09	0.0
23.13	197.2	217.5	256.8	3.8	-66.0	2.0	clean SAND to silty SAND	125	5.0	39	43	93	46	-	-	10	16	0.00	-	0.09	0.0
23.30	173.1	190.2	222.5	2.9	-71.8	1.7	clean SAND to silty SAND	125	5.0	35	38	88	45	-	-	10	16	0.00	-	0.09	0.0
23.46	136.3	149.3	184.9	2.3	-73.2	1.7	clean SAND to silty SAND	125	5.0	27	30	80	44	-	-	12	16	0.00	-	0.09	0.0
23.62	99.6	108.7	164.3	2.2	-68.9	2.2	silty SAND to sandy SILT	120	4.0	25	27	70	42	-	-	17	16	0.00	-	0.09	0.0
23.79	79.2	86.2	154.6	2.0	-65.9	2.6	silty SAND to sandy SILT	120	4.0	20	22	62	41	-	-	21	16	0.77	-	0.09	4.9
23.95	61.1	66.3	159.6	2.1	-67.2	3.5	clayy SILT to silty CLAY	115	2.0	31	33	-	-	4.3	9.9	27	15	0.58	-	0.09	4.1
24.12	61.2	66.3	136.5	1.6	-71.4	2.6	silty SAND to sandy SILT	120	4.0	15	17	53	39	-	-	24	16	1.61	-	0.09	28.9
24.28	62.7	67.7	128.8	1.4	-69.0	2.3	silty SAND to sandy SILT	120	4.0	16	17	54	40	-	-	22	16	1.89	-	0.09	29.4
24.44	69.6	75.0	133.6	1.5	-74.5	2.2	silty SAND to sandy SILT	120	4.0	17	19	57	40	-	-	21	16	1.72	-	0.09	25.6
24.61	78.3	84.0	151.5	2.0	-75.3	2.6	silty SAND to sandy SILT	120	4.0	20	21	61	41	-	-	21	16	0.91	-	0.08	6.2
24.77	68.7	73.5	158.3	2.1	-70.0	3.2	silty SAND to sandy SILT	120	4.0	17	18	57	40	-	-	25	16	0.63	-	0.08	4.3
24.94	57.6	61.4	156.9	2.0	-66.3	3.6	clayy SILT to silty CLAY	115	2.0	29	31	-	-	4.0	9.9	29	15	0.68	-	0.08	5.6
25.10	46.7	49.6	149.1	1.8	-71.0	3.9	clayy SILT to silty CLAY	115	2.0	23	25	-	-	3.2	9.9	33	15	1.02	-	0.08	36.2
25.26	37.1	41.3	-	1.4	-73.9	4.0	clayy SILT to silty CLAY	115	2.0	19	21	-	-	2.6	9.9	36	15	-	-	0.08	-
25.43	26.7	31.8	-	1.0	-71.4	3.9	clayy SILT to silty CLAY	115	2.0	13	16	-	-	1.8	9.9	40	15	-	-	0.08	-
25.59	18.2	21.5	-	0.6	-72.2	3.7	silty CLAY to CLAY	115	1.5	12	14	-	-	1.2	7.0	47	15	-	-	0.08	-
25.76	12.8	15.0	-	0.4	-70.1	3.5	silty CLAY to CLAY	115	1.5	9	10	-	-	0.8	4.7	54	15	-	-	0.08	-
25.92	11.0	12.8	-	0.3	-63.4	3.3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.7	3.9	58	15	-	-	0.08	-
26.08	10.7	12.4	-	0.3	-60.8	2.9	silty CLAY to CLAY	115	1.5	7	8	-	-	0.7	3.8	56	15	-	-	0.08	-
26.25	10.3	11.9	-	0.4	-52.9	4.0	silty CLAY to CLAY	115	1.5	7	8	-	-	0.7	3.6	63	15	-	-	0.08	-
26.41	16.2	18.7	-	0.4	-54.8	2.5	clayy SILT to silty CLAY	115	2.0	8	9	-	-	1.1	6.0	44	15	-	-	0.08	-
26.58	27.6	29.9	97.7	0.7	-46.3	2.5	clayy SILT to silty CLAY	115	2.0	14	15	-	-	1.9	9.9	35	15	2.38	-	0.08	51.2
26.74	17.5	20.0	-	0.6	-46.6	4.1	silty CLAY to CLAY	115	1.5	12	13	-	-	1.2	6.4	50	15	-	-	0.07	-
26.90	34.1	35.3	103.0	0.8	-47.0	2.5	clayy SILT to silty CLAY	115	2.0	17	18	-	-	2.3	9.9	32	15	2.28	-	0.07	51.2
27.07	43.4	44.8	112.4	1.0	-45.3	2.5	silty SAND to sandy SILT	120	4.0	11	11	41	37	-	-	28	16	2.12	-	0.07	50.3
27.23	35.5	37.8	-	1.2	-44.5	3.6	clayy SILT to silty CLAY	115	2.0	18	19	-	-	2.4	9.9	36	15	-	-	0.07	-
27.40	23.7	26.5	-	0.8	-60.7	3.7	clayy SILT to silty CLAY	115	2.0	12	13	-	-	1.6	8.7	43	15	-	-	0.06	-
27.56	30.3	31.0	88.2	0.6	-62.6	2.0	clayy SILT to silty CLAY	115	2.0	15	16	-	-	2.1	9.9	31	15	2.59	-	0.06	51.2
27.72	31.5	32.2	79.5	0.5	-61.0	1.6	silty SAND to sandy SILT	120	4.0	8	8	30	35	-	-	28	16	2.82	-	0.06	51.2
27.89	32.4	33.1	105.0	0.8	-63.0	2.7	clayy SILT to silty CLAY	115	2.0	16	17	-	-	2.2	9.9	34	15	2.24	-	0.05	51.2
28.05	48.9	49.8	118.1	1.2	-62.2	2.5	silty SAND to sandy SILT	120	4.0	12	12	44	37	-	-	27	16	2.04	-	0.05	44.4
28.22	78.6	79.7	139.5	1.8	-65.1	2.3	silty SAND to sandy SILT	120	4.0	20	20	60	40	-	-	20	16	1.48	-	0.05	16.5
28.38	83.5	84.5	147.6	2.0	-64.7	2.4	silty SAND to sandy SILT	120	4.0	21	21	61	40	-	-	20	16	1.11	-	0.04	8.4
28.54	89.4	90.2	146.7	1.9	-65.6	2.2	silty SAND to sandy SILT	120	4.0	22	23	64	41	-	-	18	16	1.15	-	0.04	8.2
28.71	91.9	92.6	141.2	1.8	-68.3	2.0	silty SAND to sandy SILT	120	4.0	23	23	64	41	-	-	17	16	1.41	-	0.04	11.1
28.87	96.9	97.4	133.4	1.5	-66.7	1.5	silty SAND to sandy SILT	120	4.0	24	24	66	41	-	-	14	16	1.74	-	0.04	15.7
29.04	105.8	106.0	132.1	1.3	-66.9	1.2	clean SAND to silty SAND	125	5.0	21	21	69	41	-	-	12	16	1.79	-	0.03	13.1
29.20	124.6	124.5	146.9	1.4	-65.5	1.2	clean SAND to silty SAND	125	5.0	25	25	74	42	-	-	10	16	1.14	-	0.03	5.6
29.36	136.8	136.3	165.1	1.9	-63.2	1.4	clean SAND to silty SAND	125	5.0	27	27	77	43	-	-	11	16	0.00	-	0.03	0.0
29.53	145.6	144.7	187.8	2.8	-63.7	1.9	silty SAND to sandy SILT	120	4.0	36	36	79	43	-	-	13	16	0.00	-	0.03	0.0
29.69	144.5	143.3	205.1	3.6	-63.4	2.5	silty SAND to sandy SILT	120	4.0	36	36	79	43	-	-	15	16	0.00	-	0.03	0.0
29.86	126.7	125.3	207.4	3.9	-66.6	3.1	silty SAND to sandy SILT	120	4.0	32	31	74	42	-	-	19	16	0.00	-	0.03	0.0
30.02	97.1	95.8	196.5	3.5	-63.8	3.7	silty SAND to sandy SILT	120	4.0	24	24	66	41	-	-	24	16	0.00	-	0.03	0.0
30.19	70.4	69.3	169.3	2.6	-63.1	3.8	clayy SILT to silty CLAY	115	2.0	35	35	-	-	4.9	9.9	28	15	0.00	-	0.03	0.0
30.35	73.2	71.9	152.5	2.2	-62.1	3.0	silty SAND to sandy SILT	120	4.0	18	18	56	39	-	-	24	16	0.88	-	0.03	7.4
30.51	99.2	97.2	175.7	2.9	-63.1	3.0	silty SAND to sandy SILT	120	4.0	25	24	66	41	-	-	21	16	0.00	-	0.03	0.0
30.68	130.8	127.8	197.4	3.5	-57.5	2.7	silty SAND to sandy SILT	120	4.0	33	32	75	42	-	-	17	16	0.00	-	0.03	0.0
30.84	143.3	139.7	201.2	3.5	-60.7	2.5	silty SAND to sandy SILT	120	4.0	36	35	78	43	-	-	16	16	0.00	-	0.03	0.0

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Schuyler Heim Bridge

Project ID: Earth Mechanics
Data File: SDF(632).cpt
CPT Date: 11/30/2010 10:18:31 AM
GW During Test: 5 ft

Sounding ID: C-10-351
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Ratio %	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic -	Nk -	Vol Strn %	Dry Stlmt 0.00	Liq Stlmt 0.22	Cycl SStn %
31.01	143.6	139.7	186.0	2.9	-57.7	2.0	silty SAND to sandy SILT	120	4.0	36	35	78	43	-	-	14	16	0.00	-	0.03	0.0
31.17	134.9	130.9	186.4	3.0	-56.5	2.3	silty SAND to sandy SILT	120	4.0	34	33	76	42	-	-	15	16	0.00	-	0.03	0.0
31.33	127.9	123.8	185.6	3.1	-56.8	2.5	silty SAND to sandy SILT	120	4.0	32	31	74	42	-	-	17	16	0.00	-	0.03	0.0
31.50	124.7	120.5	192.9	3.4	-55.9	2.8	silty SAND to sandy SILT	120	4.0	31	30	73	42	-	-	18	16	0.00	-	0.03	0.0
31.66	148.7	143.3	206.2	3.7	-62.3	2.5	silty SAND to sandy SILT	120	4.0	37	36	79	43	-	-	16	16	0.00	-	0.03	0.0
31.83	168.7	162.1	229.3	4.5	-68.1	2.7	silty SAND to sandy SILT	120	4.0	42	41	83	43	-	-	15	16	0.00	-	0.03	0.0
31.99	171.3	164.3	234.7	4.7	-71.6	2.8	silty SAND to sandy SILT	120	4.0	43	41	83	43	-	-	15	16	0.00	-	0.03	0.0
32.15	169.5	162.2	234.4	4.7	-77.1	2.8	silty SAND to sandy SILT	120	4.0	42	41	83	43	-	-	16	16	0.00	-	0.03	0.0
32.32	200.2	191.1	232.6	3.9	-98.2	2.0	clean SAND to silty SAND	125	5.0	40	38	88	44	-	-	11	16	0.00	-	0.03	0.0
32.48	253.3	241.3	268.1	4.2	-109.9	1.7	clean SAND to silty SAND	125	5.0	51	48	95	45	-	-	8	16	0.00	-	0.03	0.0
32.65	238.7	226.8	265.3	4.6	-119.6	2.0	clean SAND to silty SAND	125	5.0	48	45	94	45	-	-	10	16	0.00	-	0.03	0.0
32.81	207.5	196.7	254.8	5.1	-132.9	2.5	silty SAND to sandy SILT	120	4.0	52	49	89	44	-	-	13	16	0.00	-	0.03	0.0
32.97	171.5	162.1	239.4	5.0	-136.7	3.0	silty SAND to sandy SILT	120	4.0	43	41	83	43	-	-	16	16	0.00	-	0.03	0.0
33.14	135.7	128.0	210.3	4.1	-138.3	3.1	silty SAND to sandy SILT	120	4.0	34	32	75	42	-	-	19	16	0.00	-	0.03	0.0
33.30	119.7	112.7	193.1	3.6	-137.3	3.0	silty SAND to sandy SILT	120	4.0	30	28	71	41	-	-	20	16	0.00	-	0.03	0.0
33.47	124.9	117.3	197.3	3.7	-133.6	3.0	silty SAND to sandy SILT	120	4.0	31	29	72	42	-	-	19	16	0.00	-	0.03	0.0
33.63	139.7	131.0	202.6	3.8	-139.3	2.8	silty SAND to sandy SILT	120	4.0	35	33	76	42	-	-	17	16	0.00	-	0.03	0.0
33.79	151.7	141.8	215.9	4.3	-135.9	2.9	silty SAND to sandy SILT	120	4.0	38	35	79	43	-	-	17	16	0.00	-	0.03	0.0
33.96	149.0	139.0	222.0	4.6	-79.2	3.1	silty SAND to sandy SILT	120	4.0	37	35	78	42	-	-	18	16	0.00	-	0.03	0.0
34.12	150.0	139.7	229.3	4.9	-72.3	3.3	silty SAND to sandy SILT	120	4.0	38	35	78	42	-	-	19	16	0.00	-	0.03	0.0
34.29	144.5	134.3	216.7	4.4	-65.7	3.1	silty SAND to sandy SILT	120	4.0	36	34	77	42	-	-	18	16	0.00	-	0.03	0.0
34.45	134.8	124.9	206.3	4.1	-60.0	3.1	silty SAND to sandy SILT	120	4.0	34	31	74	42	-	-	19	16	0.00	-	0.03	0.0
34.61	154.9	143.3	220.8	4.5	-46.7	3.0	silty SAND to sandy SILT	120	4.0	39	36	79	43	-	-	17	16	0.00	-	0.03	0.0
34.78	182.1	168.1	247.9	5.5	-40.8	3.0	silty SAND to sandy SILT	120	4.0	46	42	84	43	-	-	16	16	0.00	-	0.03	0.0
34.94	182.2	167.8	255.5	5.8	-36.6	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	12.0	9.9	17	16	0.00	-	0.03	0.0
35.11	170.5	156.7	235.3	5.0	-31.9	3.0	silty SAND to sandy SILT	120	4.0	43	39	82	43	-	-	17	16	0.00	-	0.03	0.0
35.27	164.3	150.7	220.3	4.4	-27.8	2.7	silty SAND to sandy SILT	120	4.0	41	38	81	43	-	-	16	16	0.00	-	0.03	0.0
35.43	155.1	142.0	205.4	3.9	-24.6	2.5	silty SAND to sandy SILT	120	4.0	39	36	79	42	-	-	16	16	0.00	-	0.03	0.0
35.60	146.6	133.9	190.3	3.3	-23.0	2.3	silty SAND to sandy SILT	120	4.0	37	33	77	42	-	-	15	16	0.00	-	0.03	0.0
35.76	133.8	122.0	172.8	2.8	-21.4	2.1	silty SAND to sandy SILT	120	4.0	33	30	74	42	-	-	15	16	0.00	-	0.03	0.0
35.93	113.0	102.8	147.5	2.1	-19.0	1.9	silty SAND to sandy SILT	120	4.0	28	26	68	41	-	-	15	16	1.08	-	0.03	6.1
36.09	85.6	77.7	126.3	1.6	-13.4	1.9	silty SAND to sandy SILT	120	4.0	21	19	59	39	-	-	18	16	1.93	-	0.03	24.2
36.26	62.1	56.3	121.1	1.4	-4.5	2.4	silty SAND to sandy SILT	120	4.0	16	14	48	37	-	-	25	16	2.00	-	0.02	37.5
36.42	42.3	38.3	119.3	1.2	5.8	3.1	clayy SILT to silty CLAY	115	2.0	21	19	-	-	2.9	9.9	34	15	2.02	-	0.02	51.2
36.58	24.4	21.0	-	0.7	10.2	3.1	clayy SILT to silty CLAY	115	2.0	12	11	-	-	1.6	6.6	45	15	-	-	0.02	-
36.75	14.8	12.7	-	0.4	10.0	3.0	silty CLAY to CLAY	115	1.5	10	8	-	-	1.0	3.8	56	15	-	-	0.02	-
36.91	12.6	10.8	-	0.2	7.4	1.8	silty CLAY to CLAY	115	1.5	8	7	-	-	0.8	3.1	54	15	-	-	0.02	-
37.08	12.1	10.4	-	0.2	-6.3	1.8	silty CLAY to CLAY	115	1.5	8	7	-	-	0.8	2.9	54	15	-	-	0.02	-
37.24	10.7	9.1	-	0.2	-0.1	2.1	silty CLAY to CLAY	115	1.5	7	6	-	-	0.7	2.5	61	15	-	-	0.02	-
37.40	10.8	9.2	-	0.2	2.4	2.7	silty CLAY to CLAY	115	1.5	7	6	-	-	0.7	2.5	65	15	-	-	0.02	-
37.57	14.7	12.5	-	0.2	4.3	1.8	clayy SILT to silty CLAY	115	2.0	7	6	-	-	1.0	3.7	50	15	-	-	0.02	-
37.73	15.5	13.0	-	0.3	4.5	2.1	clayy SILT to silty CLAY	115	2.0	8	7	-	-	1.0	3.9	50	15	-	-	0.02	-
37.90	14.6	12.2	-	0.3	4.4	2.2	silty CLAY to CLAY	115	1.5	10	8	-	-	0.9	3.6	53	15	-	-	0.02	-
38.06	15.4	12.9	-	0.3	8.5	2.3	silty CLAY to CLAY	115	1.5	10	9	-	-	1.0	3.8	52	15	-	-	0.02	-
38.22	14.9	12.4	-	0.3	2.3	2.6	silty CLAY to CLAY	115	1.5	10	8	-	-	1.0	3.7	55	15	-	-	0.02	-
38.39	20.0	16.6	-	0.4	-0.3	2.1	clayy SILT to silty CLAY	115	2.0	10	8	-	-	1.3	5.1	44	15	-	-	0.02	-
38.55	24.6	20.3	-	0.5	-3.4	2.1	clayy SILT to silty CLAY	115	2.0	12	10	-	-	1.7	6.4	40	15	-	-	0.02	-
38.72	26.0	21.4	-	0.5	-5.7	2.2	clayy SILT to silty CLAY	115	2.0	13	11	-	-	1.8	6.8	39	15	-	-	0.02	-
38.88	33.3	29.3	84.7	0.6	-3.3	1.9	clayy SILT to silty CLAY	115	2.0	17	15	-	-	2.3	8.8	32	15	2.68	-	0.02	51.2
39.04	26.8	21.9	-	0.4	-6.6	1.8	clayy SILT to silty CLAY	115	2.0	13	11	-	-	1.8	6.9	37	15	-	-	0.01	-
39.21	17.7	14.5	-	0.4	-10.1	2.3	clayy SILT to silty CLAY	115	2.0	9	7	-	-	1.2	4.4	49	15	-	-	0.01	-
39.37	13.7	11.1	-	0.3	-14.4	2.5	silty CLAY to CLAY	115	1.5	9	7	-	-	0.9	3.2	57	15	-	-	0.01	-
39.54	18.3	14.8	-	0.3	-16.6	2.0	clayy SILT to silty CLAY	115	2.0	9	7	-	-	1.2	4.5	46	15	-	-	0.01	-
39.70	20.2	16.3	-	0.3	-21.1	1.9	clayy SILT to silty CLAY	115	2.0	10	8	-	-	1.3	5.0	43	15	-	-	0.01	-
39.86	23.6	19.0	-	0.3	-24.3	1.6	clayy SILT to silty CLAY	115	2.0	12	9	-	-	1.6	5.9	38	15	-	-	0.01	-
40.03	24.3	19.4	-	0.4	-25.5	1.7	clayy SILT to silty CLAY	115	2.0	12	10	-	-	1.6	6.1	38	15	-	-	0.01	-
40.19	19.9	15.9	-	0.4	-30.9	2.0	clayy SILT to silty CLAY	115	2.0	10	8	-	-	1.3	4.8	45	15	-	-	0.01	-
40.36	15.4	12.2	-	0.3	-38.9	2.1	silty CLAY to CLAY	115	1.5	10	8	-	-	1.0	3.6	52	15	-	-	0.01	-
40.52	13.6	10.8	-	0.3	-44.2	2.3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.9	3.1	57	15	-	-	0.01	-
40.68	12.9	10.2	-	0.3	-67.2	2.6	silty CLAY to CLAY	115	1.5	9	7	-	-	0.8	2.9	60	15	-	-	0.01	-
40.85	13.0	10.2	-	0.3	-69.1	2.8	silty CLAY to CLAY	115	1.5	9	7	-	-	0.8	2.9	62	15	-	-	0.01	-
41.01	13.1	10.3	-	0.3	-72.7	2.9	silty CLAY to CLAY	115	1.5	9	7	-	-	0.8	2.9	62	15	-	-	0.01	-
41.18	17.8	13.9	-	0.2	-76.5	1.1	clayy SILT to silty CLAY	115	2.0	9	7	-	-	1.2	4.2	40	15	-	-	0.01	-
41.34	23.7	18.5	-	0.4	-76.7	1.7	clayy SILT to silty CLAY	115	2.0	12	9	-	-	1.6	5.7	40	15	-	-	0.01	-
41.50	23.5	18.3	-	1.3	-79.9	6.3	silty CLAY to CLAY	115	1.5	16	12	-	-	1.6	5.6	60	15	-	-	0.01	-
41.67	89.4	76.4	164.4	2.8	-84.0	3.3	silty SAND to sandy SILT	120	4.0	22	19	58	39	-	-	25	16	0.00	-	0.01	0.0
41.83	119.6	102.0	201.2	4.2	-83.7	3.6	silty SAND to sandy SILT	120	4.0	30	26	68	40	-	-	23	16	0.00	-	0.01	0.0
42.00	130.7	111.3	208.1	4.5	-86.1	3.5	silty SAND to sandy SILT	120	4.0	33	28	71	41	-	-	22	16	0.00	-	0.01	0.0
42.16	133.5	113.4	207.0	4.5	-86.5	3.4	silty SAND to sandy SILT	120	4.0	33	28	71	41	-	-	21	16	0.00	-	0.01	0.0
42.32	134.3	113.9	200.5	4.2	-87.9	3.2	silty SAND to sandy SILT	120	4.0	34	28	71	41	-	-	20	16	0.00	-	0.01	0.0
42.49	127.9	108.3	187.4	3.7	-88.4	3.0	silty SAND to sandy SILT	120	4.0	32	27	70	41	-	-	20	16	0.00	-	0.01	0.0
42.65	122.4	103.4	161.1	2.7	-89.5	2.3	silty SAND to sandy SILT	120	4.0	31	26	68	40	-	-	17	16	0.00	-	0.01	0.0
42.82	102.9	86.8	120.0	1.4	-90.0	1.4	silty SAND to sandy SILT	120	4.0	26	22	62	39	-	-	15	16	2.01	-	0.01	20.8
42.98	77.4	65.2	102.8	1.1	-91.6	1.4	silty SAND to sandy SILT	120	4.0	19	16	53	38	-	-	18	16	2.29	-	0.01	30.8
43.15	42.5	31.8	-	1.2	-89.9	3.1	clayy SILT to silty CLAY	115	2.0	21	16	-	-	2.9	9.9	37	15	-	-	0.01	-
43.31	21.4	16.0	-	0.9	-92.2	4.6	silty CLAY to CLAY	115	1.5	14	11	-	-	1.4	4.8	58	15	-	-	0.01	-
43.47	15.7	11.7	-	0.5	-91.8	4.0	silty CLAY to CLAY	115	1.5	10	8	-	-	1.0	3.4	64	15	-	-	0.01	-
43.64	14.7	10.9	-	0.4	-94.4	3.3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	3.1	63	15	-	-	0.01	-
43.80	14.3	10.6	-	0.4	-97.7	3.4	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	3.0	64	15	-	-	0.01	-
43.97	13.0	9.6	-	0.2	-101.8	2.1	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.6	59	15	-	-	0.01	-
44.13	13.0	9.5	-	0.2	-101.5	2.0	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.6	59	15	-	-	0.01	-
44.29	11.5	8.4	-	0.2	-84.2	2.3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.3	65	15	-	-	0.01	-
44.46	13.2	9.6	-	0.2	-83.1	1.8	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.7	56	15	-	-	0.01	-
44.62	13.1	9.5	-	0.2	-84.7	1.7	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.6	56	15	-	-	0.01	-
44.79	12.6	9.1	-	0.2	-85.2	2.4	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.5	63	15	-	-	0.01	-
44.95	14.7	10.6	-	0.3	-84.1	2.7	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	3.0	60	15	-	-	0.01	-
45.11	18.3	13.2	-	0.4	-85.4	2.3	clayy SILT to silty CLAY	115	2.0	9	7	-	-	1.2	3.9	51	15	-	-	0.01	-
45.28	26.1	18.7	-	0.3	-83.7	1.4	clayy SILT to silty CLAY	115	2.0	13	9	-	-	1.7	5.8	36	15	-	-	0.01	-
45.44	24.7	17.7	-	0.4	-83.7	1.8	clayy SILT to silty CLAY	115	2.0	12	9	-	-	1.6	5.4	41	15	-	-	0.01	-
45.61	19.5	13.9	-	0.4	-82.6	2.3	clayy SILT to silty CLAY	115	2.0	10	7	-	-	1.3	4.1	50	15	-	-	0.01	-
45.77	15.3	10.9	-	0.3	-83.1	2.7	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	3.1	59	15	-	-	0.01	-
45.93	17.1	12.1	-	0.5	-82.6	3.4	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.5	60	15	-	-	0.01	-
46.10	20.5	14.5	-	0.4	-84.3	2.3	clayy SILT to silty CLAY	115	2.0	10	7	-	-	1.4	4.3	49	15	-	-	0.01	-
46.26	22.9	16.2	-	0.3	-76.5	1.5	clayy SILT to silty CLAY	115	2.0	11	8	-	-	1.5	4.9	40	15	-	-	0.01	-

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Project ID: Earth Mechanics
Data File: SDF(632).cpt
CPT Date: 11/30/2010 10:18:31 AM
GW During Test: 5 ft

Sounding ID: C-10-351
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	qcln * PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Ratio %	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60% *	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Nk -	Vol Strn %	Dry Stlmt 0.00	Liq Stlmt 0.22	Cycl SStn %
46.43	17.0	12.0	-	0.3	-74.9	1.8	clayy SILT to silty CLAY	115	2.0	9	6	-	-	1.1	3.5	50	15	-	-	0.01	-
46.59	13.0	9.1	-	0.2	-80.3	2.1	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.5	60	15	-	-	0.01	-
46.75	11.3	7.9	-	0.2	-79.9	2.4	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	2.1	68	15	-	-	0.01	-
46.92	12.5	8.7	-	0.2	-81.5	2.2	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.3	63	15	-	-	0.01	-
47.08	11.7	8.2	-	0.2	-80.4	2.5	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	2.1	67	15	-	-	0.01	-
47.25	11.7	8.1	-	0.2	-79.3	2.5	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	2.1	67	15	-	-	0.01	-
47.41	12.3	8.5	-	0.3	-79.8	2.7	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.3	68	15	-	-	0.01	-
47.57	12.7	8.8	-	0.3	-77.4	2.7	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.4	66	15	-	-	0.01	-
47.74	13.1	9.0	-	0.3	-76.9	2.9	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.4	67	15	-	-	0.01	-
47.90	14.0	9.6	-	0.3	-83.4	2.9	silty CLAY to CLAY	115	1.5	9	6	-	-	0.9	2.6	64	15	-	-	0.01	-
48.07	18.4	12.6	-	0.4	-78.8	2.6	silty CLAY to CLAY	115	1.5	12	8	-	-	1.2	3.7	55	15	-	-	0.01	-
48.23	17.5	11.9	-	0.4	-76.0	2.9	silty CLAY to CLAY	115	1.5	12	8	-	-	1.1	3.4	57	15	-	-	0.01	-
48.39	19.0	12.9	-	0.4	-76.3	2.5	silty CLAY to CLAY	115	1.5	13	9	-	-	1.2	3.8	53	15	-	-	0.01	-
48.56	16.4	11.1	-	0.4	-77.0	2.7	silty CLAY to CLAY	115	1.5	11	7	-	-	1.1	3.2	59	15	-	-	0.01	-
48.72	15.5	10.5	-	0.3	-76.3	2.7	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.9	60	15	-	-	0.01	-
48.89	14.9	10.0	-	0.4	-77.1	3.0	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.8	64	15	-	-	0.01	-
49.05	16.8	11.3	-	0.3	-76.7	2.3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.2	56	15	-	-	0.01	-
49.22	20.6	13.8	-	0.6	-77.7	3.6	silty CLAY to CLAY	115	1.5	14	9	-	-	1.4	4.1	57	15	-	-	0.01	-
49.38	30.4	20.3	-	1.2	-78.8	4.5	silty CLAY to CLAY	115	1.5	20	14	-	-	2.0	6.3	52	15	-	-	0.01	-
49.54	61.7	48.9	139.2	2.0	-76.1	3.4	clayy SILT to silty CLAY	115	2.0	31	24	-	-	4.3	9.9	31	15	1.35	-	0.01	41.9
49.71	78.3	61.9	156.7	2.7	-76.5	3.5	clayy SILT to silty CLAY	115	2.0	39	31	-	-	5.4	9.9	29	15	0.58	-	0.00	4.2
49.87	84.5	66.8	165.3	3.0	-77.7	3.7	clayy SILT to silty CLAY	115	2.0	42	33	-	-	5.9	9.9	28	15	0.00	-	0.00	0.0
50.04	73.6	58.1	166.7	2.9	-81.4	4.2	clayy SILT to silty CLAY	115	2.0	37	29	-	-	5.1	9.9	32	15	0.00	-	0.00	0.0
50.20	65.7	43.2	-	2.8	-81.2	4.5	clayy SILT to silty CLAY	115	2.0	33	22	-	-	4.5	9.9	37	15	-	-	0.00	-
50.36	61.2	40.1	-	2.7	-82.2	4.6	clayy SILT to silty CLAY	115	2.0	31	20	-	-	4.2	9.9	39	15	-	-	0.00	-
50.53	81.0	63.6	172.9	3.2	-81.6	4.1	clayy SILT to silty CLAY	115	2.0	41	32	-	-	5.6	9.9	30	15	0.00	-	0.00	0.0
50.69	97.9	76.8	186.1	3.8	-81.0	4.0	clayy SILT to silty CLAY	115	2.0	49	38	-	-	6.8	9.9	28	15	0.00	-	0.00	0.0
50.86	104.8	82.1	193.7	4.2	-82.8	4.1	clayy SILT to silty CLAY	115	2.0	52	41	-	-	7.3	9.9	27	15	0.00	-	0.00	0.0
51.02	108.1	84.5	192.0	4.1	-83.4	3.9	clayy SILT to silty CLAY	115	2.0	54	42	-	-	7.5	9.9	26	15	0.00	-	0.00	0.0
51.18	112.9	88.2	194.4	4.3	-83.3	3.9	clayy SILT to silty CLAY	115	2.0	56	44	-	-	7.9	9.9	25	15	0.00	-	0.00	0.0
51.35	121.8	95.0	211.8	5.0	-85.8	4.2	clayy SILT to silty CLAY	115	2.0	61	48	-	-	8.5	9.9	26	15	0.00	-	0.00	0.0
51.51	130.2	101.4	222.3	5.5	-89.8	4.3	very stiff fine SOIL	120	2.0	65	51	67	40	-	-	25	30	0.00	-	0.00	0.0
51.68	154.2	119.9	225.4	5.7	-137.6	3.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	10.1	9.9	22	16	0.00	-	0.00	0.0
51.84	191.3	148.6	243.5	6.5	-137.1	3.4	silty SAND to sandy SILT	120	4.0	48	37	80	42	-	-	19	16	0.00	-	0.00	0.0
52.00	231.4	179.5	272.1	7.7	-148.0	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.2	9.9	17	16	0.00	-	0.00	0.0
52.17	224.3	173.7	276.3	8.0	-146.0	3.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	14.8	9.9	18	16	0.00	-	0.00	0.0
52.33	194.9	150.7	257.2	7.2	-145.3	3.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	12.8	9.9	20	16	0.00	-	0.00	0.0
52.50	157.2	121.4	225.1	5.7	-148.3	3.7	silty SAND to sandy SILT	120	4.0	39	30	73	41	-	-	21	16	0.00	-	0.00	0.0
52.66	132.8	102.4	201.9	4.7	-152.2	3.6	silty SAND to sandy SILT	120	4.0	33	26	68	40	-	-	23	16	0.00	-	0.00	0.0
52.82	128.1	98.6	195.6	4.4	-158.3	3.5	silty SAND to sandy SILT	120	4.0	32	25	67	40	-	-	23	16	0.00	-	0.00	0.0
52.99	124.3	95.6	193.1	4.3	-178.7	3.6	silty SAND to sandy SILT	120	4.0	31	24	66	39	-	-	23	16	0.00	-	0.00	0.0
53.15	117.8	90.4	191.4	4.2	-185.8	3.7	clayy SILT to silty CLAY	115	2.0	59	45	-	-	8.2	9.9	24	15	0.00	-	0.00	0.0
53.32	117.8	90.3	185.2	4.0	-184.3	3.5	silty SAND to sandy SILT	120	4.0	29	23	64	39	-	-	24	16	0.00	-	0.00	0.0
53.48	120.5	92.3	187.4	4.1	-144.9	3.5	silty SAND to sandy SILT	120	4.0	30	23	64	39	-	-	23	16	0.00	-	0.00	0.0
53.64	110.8	84.7	184.3	3.9	-142.7	3.7	clayy SILT to silty CLAY	115	2.0	55	42	-	-	7.7	9.9	25	15	0.00	-	0.00	0.0
53.81	107.0	81.7	183.3	3.9	-140.1	3.7	clayy SILT to silty CLAY	115	2.0	53	41	-	-	7.5	9.9	26	15	0.00	-	0.00	0.0
53.97	108.0	82.4	180.8	3.8	-138.7	3.6	clayy SILT to silty CLAY	115	2.0	54	41	-	-	7.5	9.9	25	15	0.00	-	0.00	0.0
54.14	105.9	80.7	173.5	3.5	-138.8	3.4	clayy SILT to silty CLAY	115	2.0	53	40	-	-	7.4	9.9	25	15	0.00	-	0.00	0.0
54.30	104.5	79.5	165.6	3.2	-138.1	3.2	silty SAND to sandy SILT	120	4.0	26	20	59	38	-	-	24	16	0.00	-	0.00	0.0
54.46	107.6	81.7	171.6	3.5	-131.7	3.3	silty SAND to sandy SILT	120	4.0	27	20	60	38	-	-	24	16	0.00	-	0.00	0.0
54.63	107.7	81.7	179.7	3.8	-127.3	3.6	clayy SILT to silty CLAY	115	2.0	54	41	-	-	7.5	9.9	25	15	0.00	-	0.00	0.0
54.79	106.3	80.5	185.3	4.0	-124.4	3.8	clayy SILT to silty CLAY	115	2.0	53	40	-	-	7.4	9.9	26	15	0.00	-	0.00	0.0
54.96	106.3	80.4	187.9	4.1	-119.8	3.9	clayy SILT to silty CLAY	115	2.0	53	40	-	-	7.4	9.9	27	15	0.00	-	0.00	0.0
55.12	98.3	74.3	184.1	3.9	-122.8	4.1	clayy SILT to silty CLAY	115	2.0	49	37	-	-	6.8	9.9	28	15	0.00	-	0.00	0.0
55.28	82.3	62.1	176.1	3.4	-124.9	4.3	clayy SILT to silty CLAY	115	2.0	41	31	-	-	5.7	9.9	31	15	0.00	-	0.00	0.0
55.45	68.7	41.3	-	3.0	-125.2	4.6	clayy SILT to silty CLAY	115	2.0	34	21	-	-	4.7	9.9	38	15	-	-	0.00	-
55.61	57.2	34.3	-	2.6	-127.8	4.8	silty CLAY to CLAY	115	1.5	38	23	-	-	3.9	9.9	42	15	-	-	0.00	-
55.78	55.2	33.1	-	2.4	-129.7	4.6	silty CLAY to CLAY	115	1.5	37	22	-	-	3.8	9.9	42	15	-	-	0.00	-
55.94	88.3	66.2	162.6	3.0	-128.2	3.6	clayy SILT to silty CLAY	115	2.0	44	33	-	-	6.1	9.9	28	15	0.00	-	0.00	0.0
56.11	105.1	78.8	180.5	3.8	-127.3	3.7	clayy SILT to silty CLAY	115	2.0	53	39	-	-	7.3	9.9	26	15	0.00	-	0.00	0.0
56.27	109.6	82.0	192.5	4.3	-131.6	4.0	clayy SILT to silty CLAY	115	2.0	55	41	-	-	7.6	9.9	27	15	0.00	-	0.00	0.0
56.43	115.3	86.2	198.8	4.6	-133.9	4.1	clayy SILT to silty CLAY	115	2.0	58	43	-	-	8.0	9.9	26	15	0.00	-	0.00	0.0
56.60	121.4	90.6	193.3	4.4	-129.1	3.7	clayy SILT to silty CLAY	115	2.0	61	45	-	-	8.5	9.9	25	15	0.00	-	0.00	0.0
56.76	134.2	100.0	205.0	5.0	-128.4	3.8	silty SAND to sandy SILT	120	4.0	34	25	67	39	-	-	24	16	0.00	-	0.00	0.0
56.93	157.0	116.9	216.9	5.5	-139.0	3.6	silty SAND to sandy SILT	120	4.0	39	29	72	40	-	-	21	16	0.00	-	0.00	0.0
57.09	165.5	123.1	214.1	5.4	-145.7	3.3	silty SAND to sandy SILT	120	4.0	41	31	74	41	-	-	20	16	0.00	-	0.00	0.0
57.25	170.9	126.9	212.0	5.3	-150.6	3.2	silty SAND to sandy SILT	120	4.0	43	32	75	41	-	-	19	16	0.00	-	0.00	0.0
57.42	154.0	114.2	213.4	5.4	-149.0	3.6	silty SAND to sandy SILT	120	4.0	38	29	71	40	-	-	22	16	0.00	-	0.00	0.0
57.58	90.3	52.5	-	4.4	-150.5	5.1	clayy SILT to silty CLAY	115	2.0	45	26	-	-	6.3	9.9	36	15	-	-	0.00	-
57.75	47.4	27.5	-	2.3	-143.9	5.3	silty CLAY to CLAY	115	1.5	32	18	-	-	3.2	8.7	48	15	-	-	0.00	-
57.91	36.2	21.0	-	1.2	-393.1	3.6	silty CLAY to CLAY	115	1.5	24	14	-	-	2.4	6.5	47	15	-	-	0.00	-
58.07	27.2	15.7	-	0.7	-379.4	3.0	silty CLAY to CLAY	115	1.5	18	10	-	-	1.8	4.7	51	15	-	-	0.00	-
58.24	24.5	14.1	-	0.7	-368.0	3.1	silty CLAY to CLAY	115	1.5	16	9	-	-	1.6	4.1	54	15	-	-	0.00	-
58.40	21.4	12.3	-	0.7	-395.4	4.0	silty CLAY to CLAY	115	1.5	14	8	-	-	1.4	3.5	62	15	-	-	0.00	-
58.57	19.3	11.1	-	0.6	-373.6	4.0	silty CLAY to CLAY	115	1.5	13	7	-	-	1.2	3.1	66	15	-	-	0.00	-
58.73	18.1	10.3	-	0.6	-366.1	3.8	silty CLAY to CLAY	115	1.5	12	7	-	-	1.2	2.9	67	15	-	-	0.00	-
58.89	18.2	10.4	-	0.6	-372.3	4.2	silty CLAY to CLAY	115	1.5	12	7	-	-	1.2	2.9	69	15	-	-	0.00	-
59.06	22.4	12.8	-	1.0	-371.7	5.1	silty CLAY to CLAY	115	1.5	15	9	-	-	1.5	3.7	66	15	-	-	0.00	-
59.22	31.0	17.6	-	1.2	-357.3	4.5	silty CLAY to CLAY	115	1.5	21	12	-	-	2.1	5.3	55	15	-	-	0.00	-
59.39	26.3	14.9	-	1.2	-350.5	5.1	silty CLAY to CLAY	115	1.5	18	10	-	-	1.7	4.4	62	15	-	-	0.00	-
59.55	24.0	13.6	-	1.0	-336.5	4.8	silty CLAY to CLAY	115	1.5	16	9	-	-	1.6	4.0	63	15	-	-	0.00	-
59.71	22.4	12.6	-	0.9	-331.0	5.0	silty CLAY to CLAY	115	1.5	15	8	-	-	1.5	3.6	66	15	-	-	0.00	-
59.88	26.9	15.1	-	1.5	-326.8	6.2	silty CLAY to CLAY	115	1.5	18	10	-	-	1.8	4.5	65	15	-	-	0.00	-
60.04	62.1	34.8	-	2.6	-324.1	4.5	silty CLAY to CLAY	115	1.5	41	23	-	-	4.3	9.9	41	15	-	-	0.00	-
60.21	83.5	46.7	-	3.5	-318.2	4.4	clayy SILT to silty CLAY	115	2.0	42	23	-	-	5.8	9.9	36	15	-	-	0.00	-
60.37	93.5	67.8	176.9	3.7	-299.2	4.1	clayy SILT to silty CLAY	115	2.0	47	34	-	-	6.5	9.9	29	15	0.00	-	0.00	0.0
60.53	98.6	71.4	166.7	3.3	-301.5	3.5	clayy SILT to silty CLAY	115	2.0	49	36	-	-	6.8	9.9	27	15	0.00	-	0.00	0.0
60.70	103.7	75.1	175.4	3.7	-292.5	3.7	clayy SILT to silty CLAY	115	2.0	52	38	-	-	7.2	9.9	27	15	0.00	-	0.00	0.0
60.86	101.1	73.0	179.6	3.8	-288.5	3.9	clayy SILT to silty CLAY	115	2.0	51	37	-	-	7.0	9.9	28	15	0.00	-	0.00	0.0
61.03	95.7	69.1	173.4	3.6	-286.5	3.9	clayy SILT to silty CLAY	115	2.0	48	35	-	-	6.6	9.9	28	15	0.00	-	0.00	0.0
61.19	94.6	68.2	175.5	3.6	-284.9	4.0	clayy SILT to silty CLAY	115	2.0	47	34	-	-	6.6	9.9	29	15	0.00	-	0.00	0.0
61.35	91.0	65.5	162.8	3.2	-282.4	3.6	clayy SILT to silty CLAY	115	2.0	46	33	-	-	6.3	9.9	28	15	0.00	-	0.00	0.0
61.52	94.2	67.8	170.6	3.5	-283.1	3.8	clayy SILT to silty CLAY	115	2.0	47	34	-	-	6.5	9.9	28	15	0.00	-	0.00	0.0
61.68	86.6	62.2	177.5	3.6	-281.5	4.4	clayy SILT to silty CLAY	115	2.0	43	31	-	-	6.0	9.9	31	15	0.00	-	0.00	0.0

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Project ID: Earth Mechanics
Data File: SDF(632).cpt
CPT Date: 11/30/2010 10:18:31 AM
GW During Test: 5 ft

Sounding ID: C-10-351
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	qcln PS -	q1ncs PS -	Slv pore Stss tsf	prss (psi)	Frct Ratio %	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic -	Nk -	Vol Strn %	Dry Stlmt 0.00	Liq Stlmt 0.22	Cycl SStn %
61.85	91.5	65.6	174.5	3.6-280.8		4.1	clayy SILT to silty CLAY	115	2.0	46	33	-	-	6.3	9.9	30	15	0.00	-	0.00	0.0
62.01	130.7	93.7	175.6	3.9-278.9		3.0	silty SAND to sandy SILT	120	4.0	33	23	65	39	-	-	22	16	0.00	-	0.00	0.0
62.17	137.0	98.1	185.9	4.3-277.6		3.2	silty SAND to sandy SILT	120	4.0	34	25	66	39	-	-	22	16	0.00	-	0.00	0.0
62.34	125.0	89.3	179.4	4.0-328.9		3.3	silty SAND to sandy SILT	120	4.0	31	22	63	39	-	-	23	16	0.00	-	0.00	0.0
62.50	117.8	84.1	160.9	3.3-287.1		2.9	silty SAND to sandy SILT	120	4.0	29	21	61	38	-	-	22	16	0.00	-	0.00	0.0
62.67	106.8	76.1	174.2	3.7-283.6		3.6	clayy SILT to silty CLAY	115	2.0	53	38	-	-	7.4	9.9	26	15	0.00	-	0.00	0.0
62.83	91.4	65.1	174.3	3.6-280.8		4.1	clayy SILT to silty CLAY	115	2.0	46	33	-	-	6.3	9.9	30	15	0.00	-	0.00	0.0
63.00	121.7	86.6	175.7	3.9-281.2		3.3	silty SAND to sandy SILT	120	4.0	30	22	62	38	-	-	23	16	0.00	-	0.00	0.0
63.16	119.2	84.7	180.6	4.1-283.7		3.5	clayy SILT to silty CLAY	115	2.0	60	42	-	-	8.3	9.9	25	15	0.00	-	0.00	0.0
63.32	67.5	36.0	-	3.6-278.5		5.6	silty CLAY to CLAY	115	1.5	45	24	-	-	4.6	9.9	44	15	-	-	0.00	-
63.49	46.7	24.8	-	2.6-280.4		6.0	silty CLAY to CLAY	115	1.5	31	17	-	-	3.2	7.8	52	15	-	-	0.00	-
63.65	36.9	19.6	-	1.6-268.6		4.9	silty CLAY to CLAY	115	1.5	25	13	-	-	2.5	6.0	54	15	-	-	0.00	-
63.82	28.2	14.9	-	1.1-268.4		4.4	silty CLAY to CLAY	115	1.5	19	10	-	-	1.9	4.4	59	15	-	-	0.00	-
63.98	30.1	15.9	-	1.3-264.2		5.0	silty CLAY to CLAY	115	1.5	20	11	-	-	2.0	4.7	59	15	-	-	0.00	-
64.14	34.8	18.3	-	2.0-259.4		6.4	silty CLAY to CLAY	115	1.5	23	12	-	-	2.3	5.6	61	15	-	-	0.00	-
64.31	45.7	24.1	-	3.2-254.2		7.6	silty CLAY to CLAY	115	1.5	30	16	-	-	3.1	7.5	58	15	-	-	0.00	-
64.47	55.6	29.2	-	4.1-251.5		7.9	silty CLAY to CLAY	115	1.5	37	19	-	-	3.8	9.3	54	15	-	-	0.00	-
64.64	55.5	29.1	-	4.0-244.5		7.7	silty CLAY to CLAY	115	1.5	37	19	-	-	3.8	9.2	54	15	-	-	0.00	-
64.80	47.4	24.8	-	3.8-241.1		8.7	silty CLAY to CLAY	115	1.5	32	17	-	-	3.2	7.8	60	15	-	-	0.00	-
64.96	53.2	27.7	-	3.8-240.8		7.8	silty CLAY to CLAY	115	1.5	35	18	-	-	3.6	8.8	55	15	-	-	0.00	-
65.13	82.3	42.8	-	3.5-234.9		4.5	clayy SILT to silty CLAY	115	2.0	41	21	-	-	5.7	9.9	37	15	-	-	0.00	-
65.29	141.2	98.8	168.9	3.6-231.6		2.7	silty SAND to sandy SILT	120	4.0	35	25	67	39	-	-	20	16	0.00	-	0.00	0.0
65.46	179.4	125.4	198.4	4.9-230.7		2.8	silty SAND to sandy SILT	120	4.0	45	31	74	40	-	-	18	16	0.00	-	0.00	0.0
65.62	157.1	109.7	194.3	4.8-225.3		3.1	silty SAND to sandy SILT	120	4.0	39	27	70	40	-	-	20	16	0.00	-	0.00	0.0
65.78	143.5	100.1	186.8	4.5-217.6		3.2	silty SAND to sandy SILT	120	4.0	36	25	67	39	-	-	22	16	0.00	-	0.00	0.0
65.95	120.8	84.1	189.8	4.5-214.6		3.9	clayy SILT to silty CLAY	115	2.0	60	42	-	-	8.4	9.9	26	15	0.00	-	0.00	0.0
66.11	100.3	69.8	193.7	4.5-210.7		4.6	clayy SILT to silty CLAY	115	2.0	50	35	-	-	7.0	9.9	31	15	0.00	-	0.00	0.0
66.28	104.9	72.9	194.7	4.6-206.6		4.5	clayy SILT to silty CLAY	115	2.0	52	36	-	-	7.3	9.9	30	15	0.00	-	0.00	0.0
66.44	108.8	75.5	176.4	3.9-204.2		3.7	clayy SILT to silty CLAY	115	2.0	54	38	-	-	7.6	9.9	27	15	0.00	-	0.00	0.0
66.60	107.8	74.7	166.7	3.5-199.1		3.4	clayy SILT to silty CLAY	115	2.0	54	37	-	-	7.5	9.9	26	15	0.00	-	0.00	0.0
66.77	98.9	68.5	168.5	3.5-196.6		3.7	clayy SILT to silty CLAY	115	2.0	49	34	-	-	6.9	9.9	28	15	0.00	-	0.00	0.0
66.93	91.5	63.3	170.1	3.5-202.4		4.0	clayy SILT to silty CLAY	115	2.0	46	32	-	-	6.3	9.9	30	15	0.00	-	0.00	0.0
67.10	98.2	67.9	177.7	3.9-203.4		4.1	clayy SILT to silty CLAY	115	2.0	49	34	-	-	6.8	9.9	29	15	0.00	-	0.00	0.0
67.26	103.1	71.2	185.1	4.2-201.2		4.2	clayy SILT to silty CLAY	115	2.0	52	36	-	-	7.2	9.9	29	15	0.00	-	0.00	0.0
67.42	106.2	73.2	188.4	4.4-190.1		4.3	clayy SILT to silty CLAY	115	2.0	53	37	-	-	7.4	9.9	29	15	0.00	-	0.00	0.0
67.59	108.3	74.6	182.0	4.1-181.2		4.0	clayy SILT to silty CLAY	115	2.0	54	37	-	-	7.5	9.9	28	15	0.00	-	0.00	0.0
67.75	103.1	71.0	177.1	3.9-186.3		3.9	clayy SILT to silty CLAY	115	2.0	52	35	-	-	7.2	9.9	28	15	0.00	-	0.00	0.0
67.92	83.8	42.0	-	3.1-187.7		3.9	clayy SILT to silty CLAY	115	2.0	42	21	-	-	5.8	9.9	35	15	-	-	0.00	-
68.08	68.9	47.3	130.0	2.0-187.6		3.1	clayy SILT to silty CLAY	115	2.0	34	24	-	-	4.7	9.9	31	15	1.53	-	0.00	45.3
68.24	55.8	27.8	-	2.4-190.1		4.6	silty CLAY to CLAY	115	1.5	37	19	-	-	3.8	8.8	45	15	-	-	0.00	-
68.41	91.1	62.4	160.5	3.2-196.1		3.7	clayy SILT to silty CLAY	115	2.0	46	31	-	-	6.3	9.9	29	15	0.00	-	0.00	0.0
68.57	104.7	71.7	166.7	3.5-195.7		3.5	clayy SILT to silty CLAY	115	2.0	52	36	-	-	7.3	9.9	27	15	0.00	-	0.00	0.0
68.74	105.0	71.8	163.3	3.4-198.8		3.4	clayy SILT to silty CLAY	115	2.0	52	36	-	-	7.3	9.9	26	15	0.00	-	0.00	0.0
68.90	101.8	69.6	167.4	3.5-203.7		3.6	clayy SILT to silty CLAY	115	2.0	51	35	-	-	7.1	9.9	27	15	0.00	-	0.00	0.0
69.07	90.8	44.8	-	3.8-207.6		4.4	clayy SILT to silty CLAY	115	2.0	45	22	-	-	6.3	9.9	36	15	-	-	0.00	-
69.23	61.0	30.1	-	3.2-210.0		5.6	silty CLAY to CLAY	115	1.5	41	20	-	-	4.2	9.5	47	15	-	-	0.00	-
69.39	35.7	17.6	-	1.6-213.3		5.1	silty CLAY to CLAY	115	1.5	24	12	-	-	2.4	5.3	58	15	-	-	0.00	-
69.56	25.8	12.7	-	0.7-216.4		3.2	silty CLAY to CLAY	115	1.5	17	8	-	-	1.7	3.6	58	15	-	-	0.00	-
69.72	22.7	11.1	-	0.5-216.1		2.9	silty CLAY to CLAY	115	1.5	15	7	-	-	1.5	3.1	60	15	-	-	0.00	-
69.89	21.9	10.7	-	0.5-219.1		3.0	silty CLAY to CLAY	115	1.5	15	7	-	-	1.4	3.0	62	15	-	-	0.00	-
70.05	22.5	11.0	-	0.6-222.4		3.0	silty CLAY to CLAY	115	1.5	15	7	-	-	1.4	3.0	61	15	-	-	0.00	-
70.21	22.7	11.0	-	0.5-224.0		2.8	silty CLAY to CLAY	115	1.5	15	7	-	-	1.5	3.1	60	15	-	-	0.00	-
70.38	21.3	10.3	-	0.5-254.8		2.7	silty CLAY to CLAY	115	1.5	14	7	-	-	1.4	2.8	61	15	-	-	0.00	-
70.54	21.1	10.2	-	0.4-255.5		2.2	silty CLAY to CLAY	115	1.5	14	7	-	-	1.3	2.8	58	15	-	-	0.00	-
70.71	20.6	9.9	-	0.4-256.6		2.6	silty CLAY to CLAY	115	1.5	14	7	-	-	1.3	2.7	62	15	-	-	0.00	-
70.87	24.0	11.6	-	0.6-257.1		2.8	silty CLAY to CLAY	115	1.5	16	8	-	-	1.6	3.2	58	15	-	-	0.00	-
71.03	27.0	13.0	-	0.6-258.5		2.8	silty CLAY to CLAY	115	1.5	18	9	-	-	1.8	3.7	55	15	-	-	0.00	-
71.20	26.4	12.7	-	0.7-263.4		3.0	silty CLAY to CLAY	115	1.5	18	8	-	-	1.7	3.6	57	15	-	-	0.00	-
71.36	26.2	12.6	-	0.6-262.8		2.9	silty CLAY to CLAY	115	1.5	17	8	-	-	1.7	3.6	56	15	-	-	0.00	-
71.53	24.4	11.7	-	0.8-261.4		3.9	silty CLAY to CLAY	115	1.5	16	8	-	-	1.6	3.3	63	15	-	-	0.00	-
71.69	29.3	14.0	-	0.9-260.4		3.4	silty CLAY to CLAY	115	1.5	20	9	-	-	1.9	4.1	56	15	-	-	0.00	-
71.85	31.5	15.0	-	0.9-260.1		3.3	silty CLAY to CLAY	115	1.5	21	10	-	-	2.1	4.4	54	15	-	-	0.00	-
72.02	28.8	13.7	-	0.8-261.3		3.4	silty CLAY to CLAY	115	1.5	19	9	-	-	1.9	4.0	57	15	-	-	0.00	-
72.18	27.4	13.0	-	1.0-259.1		4.4	silty CLAY to CLAY	115	1.5	18	9	-	-	1.8	3.7	63	15	-	-	0.00	-
72.35	26.6	12.6	-	0.9-257.7		3.9	silty CLAY to CLAY	115	1.5	18	8	-	-	1.7	3.6	61	15	-	-	0.00	-
72.51	24.7	11.7	-	0.8-255.7		3.7	silty CLAY to CLAY	115	1.5	16	8	-	-	1.6	3.3	63	15	-	-	0.00	-
72.67	25.6	12.1	-	0.7-253.1		3.2	silty CLAY to CLAY	115	1.5	17	8	-	-	1.7	3.4	59	15	-	-	0.00	-
72.84	25.5	12.0	-	0.9-253.3		4.3	silty CLAY to CLAY	115	1.5	17	8	-	-	1.7	3.4	65	15	-	-	0.00	-
73.00	30.2	14.2	-	1.2-253.9		4.7	silty CLAY to CLAY	115	1.5	20	9	-	-	2.0	4.1	62	15	-	-	0.00	-
73.17	48.1	22.6	-	1.7-251.6		3.8	silty CLAY to CLAY	115	1.5	32	15	-	-	3.3	7.0	47	15	-	-	0.00	-
73.33	68.1	31.9	-	2.3-246.9		3.6	clayy SILT to silty CLAY	115	2.0	34	16	-	-	4.7	9.9	39	15	-	-	0.00	-
73.49	64.2	30.0	-	2.5-252.2		4.1	clayy SILT to silty CLAY	115	2.0	32	15	-	-	4.4	9.5	42	15	-	-	0.00	-
73.66	54.3	25.3	-	1.9-254.6		3.8	clayy SILT to silty CLAY	115	2.0	27	13	-	-	3.7	7.9	44	15	-	-	0.00	-
73.82	51.5	24.0	-	1.8-249.0		3.9	silty CLAY to CLAY	115	1.5	34	16	-	-	3.5	7.4	46	15	-	-	0.00	-
73.99	48.4	22.5	-	1.6-247.6		3.6	silty CLAY to CLAY	115	1.5	32	15	-	-	3.3	6.9	46	15	-	-	0.00	-
74.15	42.3	19.6	-	1.4-246.0		3.8	silty CLAY to CLAY	115	1.5	28	13	-	-	2.8	6.0	50	15	-	-	0.00	-
74.31	34.3	15.8	-	1.3-243.0		4.3	silty CLAY to CLAY	115	1.5	23	11	-	-	2.3	4.7	57	15	-	-	0.00	-
74.48	30.8	14.2	-	1.1-242.9		4.2	silty CLAY to CLAY	115	1.5	21	9	-	-	2.0	4.1	59	15	-	-	0.00	-
74.64	35.1	16.2	-	1.3-241.5		4.4	silty CLAY to CLAY	115	1.5	23	11	-	-	2.3	4.8	57	15	-	-	0.00	-
74.81	38.1	17.5	-	2.3-243.6		6.8	silty CLAY to CLAY	115	1.5	25	12	-	-	2.5	5.2	63	15	-	-	0.00	-
74.97	78.4	36.0	-	3.7-244.5		4.9	silty CLAY to CLAY	115	1.5	52	24	-	-	5.4	9.9	42	15	-	-	0.00	-
75.13	105.2	69.1	181.1	4.2-246.9		4.2	clayy SILT to silty CLAY	115	2.0	53	35	-	-	7.3	9.9	29	15	0.00	-	0.00	0.0
75.30	114.9	75.4	193.7	4.8-265.4		4.4	clayy SILT to silty CLAY	115	2.0	57	38	-	-	8.0	9.9	29	15	0.00	-	0.00	0.0
75.46	93.8	42.7	-	4.5-247.6		5.1	silty CLAY to CLAY	115	1.5	63	28	-	-	6.5	9.9	39	15	-	-	0.00	-
75.63	90.8	41.3	-	3.6-251.4		4.2	clayy SILT to silty CLAY	115	2.0	45	21	-	-	6.3	9.9	37	15	-	-	0.00	-
75.79	102.4	67.0	181.2	4.2-253.9		4.3	clayy SILT to silty CLAY	115	2.0	51	33	-	-	7.1	9.9	30	15	0.00	-	0.00	0.0
75.96	89.9	40.7	-	4.4-255.8		5.2	silty CLAY to CLAY	115	1.5	60	27	-	-	6.2	9.9	40	15	-	-	0.00	-
76.12	89.0	40.3	-	4.3-257.3		5.1	silty CLAY to CLAY	115	1.5	59	27	-	-	6.1	9.9	40	15	-	-	0.00	-
76.28	114.6	74.8	196.3	4.9-263.5		4.5	clayy SILT to silty CLAY	115	2.0	57	37	-	-	7.9	9.9	29	15	0.00	-	0.00	0.0
76.45	146.1	95.2	207.6	5.7-260.9		4.0	clayy SILT to silty CLAY	115	2.0	73	48	-	-	10.2	9.9	25	15	0.00	-	0.00	0.0
76.61	144.4	94.0	209.5	5.8-262.6		4.1	clayy SILT to silty CLAY	115	2.0	72	47	-	-	10.1	9.9	26	15	0.00	-	0.00	0.0
76.78	136.2	88.6	204.0	5.5-269.1		4.2	clayy SILT to silty CLAY	115	2.0	68	44	-	-	9.5	9.9	26	15	0.00	-	0.00	0.0
76.94	123.7	80.4	200.6	5.2-270.4		4.4	clayy SILT to silty CLAY	115	2.0	62	40	-	-	8.6	9.9	28	15	0.00	-	0.00	0.0
77.10	112.2	50.1	-	5.1-280.9		4.8	clayy SILT to silty CLAY	115	2.0	56	25	-	-	7.8	9.9	36	15	-	-	0.00	-

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The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Project ID: Earth Mechanics
Data File: SDF(632).cpt
CPT Date: 11/30/2010 10:18:31 AM
GW During Test: 5 ft

Sounding ID: C-10-351
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	qc1n PS -	qInCs PS -	Slv pore Stss prss tsf (psi)	Frct Ratio %	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Nk -	Vol Strn %	Dry Stlmt 0.00	Liq Stlmt 0.22	Cycl SStn %
77.27	85.5	38.1	-	4.5-278.0	5.5	silty CLAY to CLAY	115	1.5	57	25	-	-	5.9	9.9	43	15	-	-	0.00	-
77.43	52.8	23.5	-	2.6-277.6	5.5	silty CLAY to CLAY	115	1.5	35	16	-	-	3.6	7.3	52	15	-	-	0.00	-
77.60	38.8	17.2	-	1.6-284.1	4.8	silty CLAY to CLAY	115	1.5	26	11	-	-	2.6	5.2	57	15	-	-	0.00	-
77.76	43.5	19.3	-	2.1-279.3	5.4	silty CLAY to CLAY	115	1.5	29	13	-	-	2.9	5.9	56	15	-	-	0.00	-
77.92	70.4	31.2	-	2.8-285.6	4.3	silty CLAY to CLAY	115	1.5	47	21	-	-	4.8	9.9	42	15	-	-	0.00	-
78.09	78.3	34.6	-	3.2-284.1	4.3	clayy SILT to silty CLAY	115	2.0	39	17	-	-	5.4	9.9	40	15	-	-	0.00	-
78.25	69.3	30.6	-	2.9-286.0	4.4	silty CLAY to CLAY	115	1.5	46	20	-	-	4.7	9.7	43	15	-	-	0.00	-
78.42	49.0	21.6	-	2.0-283.0	4.6	silty CLAY to CLAY	115	1.5	33	14	-	-	3.3	6.6	51	15	-	-	0.00	-
78.58	36.6	16.1	-	1.3-280.5	3.9	silty CLAY to CLAY	115	1.5	24	11	-	-	2.4	4.8	55	15	-	-	0.00	-
78.74	32.8	14.4	-	1.1-277.0	3.8	silty CLAY to CLAY	115	1.5	22	10	-	-	2.2	4.2	57	15	-	-	0.00	-
78.91	30.5	13.4	-	1.1-266.0	4.1	silty CLAY to CLAY	115	1.5	20	9	-	-	2.0	3.8	61	15	-	-	0.00	-
79.07	35.9	15.7	-	1.2-258.9	3.7	silty CLAY to CLAY	115	1.5	24	10	-	-	2.4	4.6	55	15	-	-	0.00	-
79.24	33.5	14.6	-	1.2-259.6	4.0	silty CLAY to CLAY	115	1.5	22	10	-	-	2.2	4.3	58	15	-	-	0.00	-
79.40	30.4	13.2	-	1.1-264.3	4.1	silty CLAY to CLAY	115	1.5	20	9	-	-	2.0	3.8	61	15	-	-	0.00	-
79.56	35.1	15.3	-	1.0-251.3	3.3	silty CLAY to CLAY	115	1.5	23	10	-	-	2.3	4.5	53	15	-	-	0.00	-
79.73	42.8	18.6	-	1.5-253.2	4.0	silty CLAY to CLAY	115	1.5	29	12	-	-	2.9	5.6	52	15	-	-	0.00	-
79.89	39.3	17.0	-	2.1-251.8	6.1	silty CLAY to CLAY	115	1.5	26	11	-	-	2.6	5.1	62	15	-	-	0.00	-
80.06	72.1	31.1	-	3.5-245.8	5.1	silty CLAY to CLAY	115	1.5	48	21	-	-	4.9	9.9	45	15	-	-	0.00	-
80.22	114.9	73.2	195.5	5.0-239.3	4.5	clayy SILT to silty CLAY	115	2.0	57	37	-	-	8.0	9.9	30	15	0.00	-	0.00	0.0
80.38	144.9	92.3	215.7	6.2-240.7	4.4	clayy SILT to silty CLAY	115	2.0	72	46	-	-	10.1	9.9	27	15	0.00	-	0.00	0.0
80.55	207.1	131.8	238.6	7.7-225.3	3.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	13.6	9.9	21	16	0.00	-	0.00	0.0
80.71	221.9	141.1	252.1	8.4-232.5	3.9	stiff SAND to clayy SAND	115	1.0	100	100	-	-	14.6	9.9	21	16	0.00	-	0.00	0.0
80.88	229.7	145.9	259.8	8.9-236.7	4.0	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.1	9.9	20	16	0.00	-	0.00	0.0
81.04	247.9	157.4	265.1	9.2-223.4	3.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.3	9.9	19	16	0.00	-	0.00	0.0
81.20	263.9	167.4	270.0	9.4-245.0	3.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	17.3	9.9	18	16	0.00	-	0.00	0.0
81.37	296.1	187.6	281.6	9.9-230.3	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.5	9.9	17	16	0.00	-	0.00	0.0
81.53	339.4	214.9	311.2	11.5-246.6	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.3	9.9	16	16	0.00	-	0.00	0.0
81.70	341.2	215.8	325.8	12.7-253.5	3.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.5	9.9	17	16	0.00	-	0.00	0.0
81.86	351.2	221.9	314.6	11.6-271.3	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	23.1	9.9	15	16	0.00	-	0.00	0.0
82.02	356.3	225.0	332.7	13.0-284.0	3.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	23.5	9.9	16	16	0.00	-	0.00	0.0
82.19	276.4	174.3	321.3	13.0-239.4	4.8	very stiff fine SOIL	120	2.0	100	87	85	41	-	-	21	30	0.00	-	0.00	0.0
82.35	353.2	222.6	331.7	13.0-226.1	3.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	23.2	9.9	16	16	0.00	-	0.00	0.0

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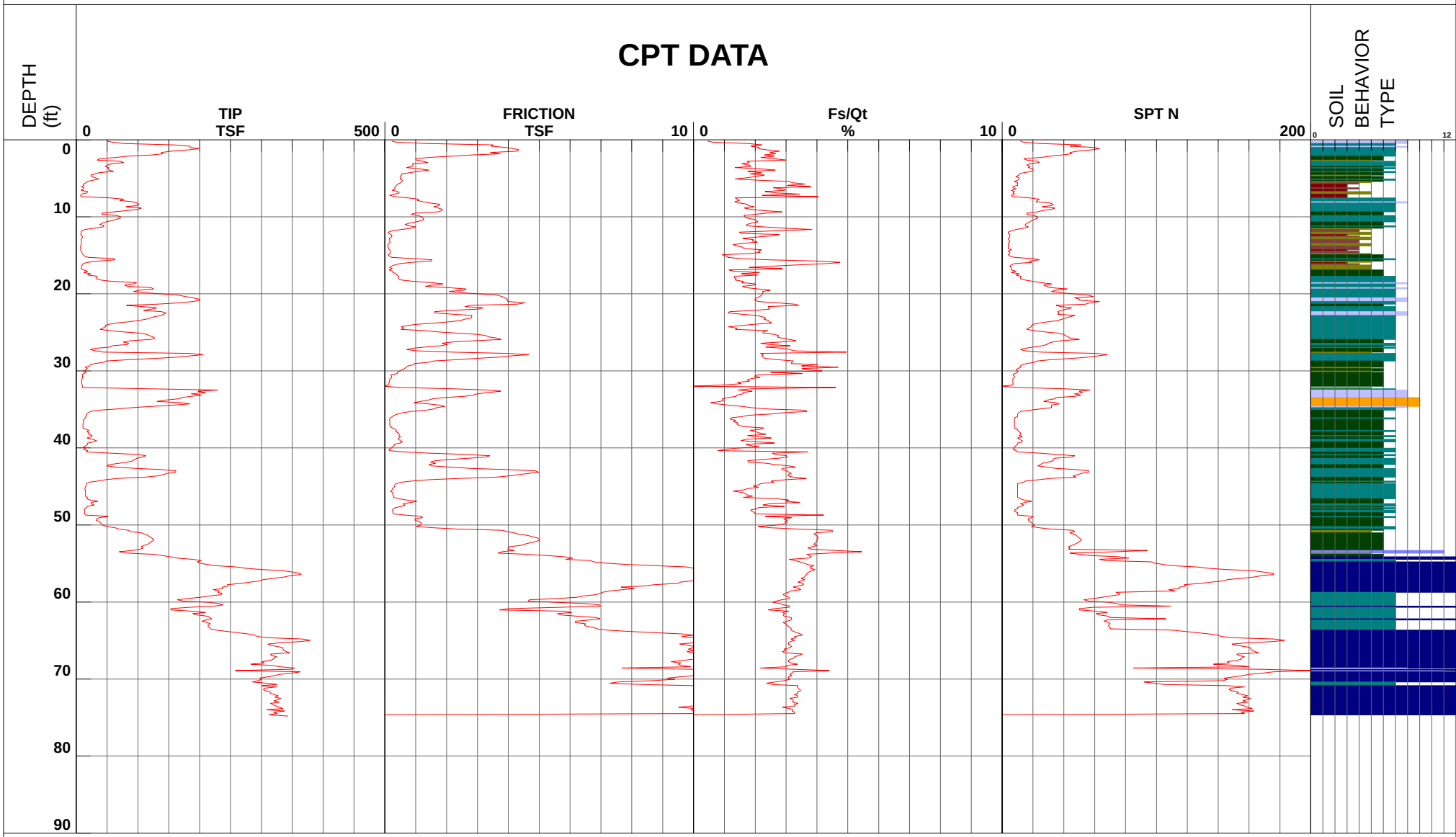
Middle Earth Geo Testing

Earth Mechanics

Location	Schuyler Heim Bridge	Operator	ML/RS	Filename	SDF(631).cpt
Job Number	06-123	Cone Number	DSG0906	GPS	
Hole Number	C-10-352	Date and Time	11/30/2010 8:16:29 AM	Maximum Depth	74.80 ft
Water Table Depth	5.00 ft				

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

Schuyler Heim Bridge

Project ID: Earth Mechanics
Data File: SDF(631).cpt
CPT Date: 11/30/2010 8:16:29 AM
GW During Test: 5 ft

Sounding ID: C-10-352
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Ratio %	* Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	* SPT R-N1 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	Fin Ic %	Nk -	Vol Strn %	Dry Stlmt 0.00	* Liq Stlmt 0.25	* Cycl SStn %
0.33	59.1	94.7	105.4	0.4	-19.5	0.6	clean SAND to silty SAND	125	5.0	12	19	65	48	-	-	8	16	N/A	0.00	N/A	N/A
0.49	77.4	124.1	163.3	1.4	-9.4	1.8	silty SAND to sandy SILT	120	4.0	19	31	74	48	-	-	13	16	N/A	0.00	N/A	N/A
0.66	158.9	254.8	301.1	3.5	4.0	2.2	clean SAND to silty SAND	125	5.0	32	51	95	48	-	-	10	16	N/A	0.00	N/A	N/A
0.82	184.4	295.8	326.3	3.4	11.7	1.9	clean SAND to silty SAND	125	5.0	37	59	95	48	-	-	8	16	N/A	0.00	N/A	N/A
0.98	184.8	296.3	336.9	3.9	13.3	2.1	clean SAND to silty SAND	125	5.0	37	59	95	48	-	-	9	16	N/A	0.00	N/A	N/A
1.15	198.3	318.1	357.3	4.2	16.6	2.1	clean SAND to silty SAND	125	5.0	40	64	95	48	-	-	9	16	N/A	0.00	N/A	N/A
1.31	182.6	292.8	344.2	4.3	16.0	2.4	clean SAND to silty SAND	125	5.0	37	59	95	48	-	-	10	16	N/A	0.00	N/A	N/A
1.48	154.5	247.8	316.6	4.3	15.4	2.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	10.2	9.9	12	16	N/A	0.00	N/A	N/A
1.64	138.1	221.5	279.1	3.4	14.2	2.5	silty SAND to sandy SILT	120	4.0	35	55	93	48	-	-	12	16	N/A	0.00	N/A	N/A
1.80	140.0	224.6	289.3	3.7	9.4	2.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	9.3	9.9	13	16	N/A	0.00	N/A	N/A
1.97	123.2	197.6	249.9	2.8	14.8	2.3	silty SAND to sandy SILT	120	4.0	31	49	89	48	-	-	12	16	N/A	0.00	N/A	N/A
2.13	82.1	131.6	197.1	2.1	9.5	2.6	silty SAND to sandy SILT	120	4.0	21	33	76	48	-	-	17	16	N/A	0.00	N/A	N/A
2.30	65.0	104.3	158.0	1.4	-0.3	2.2	silty SAND to sandy SILT	120	4.0	16	26	68	48	-	-	17	16	N/A	0.00	N/A	N/A
2.46	37.6	60.3	129.5	1.0	-4.4	2.6	silty SAND to sandy SILT	120	4.0	9	15	50	45	-	-	25	16	N/A	0.00	N/A	N/A
2.62	34.3	55.0	133.0	1.0	-8.0	3.0	clayy SILT to silty CLAY	115	2.0	17	27	-	-	2.4	9.9	27	15	N/A	0.00	N/A	N/A
2.79	70.8	113.5	153.3	1.2	-9.8	1.8	silty SAND to sandy SILT	120	4.0	18	28	71	47	-	-	14	16	N/A	0.00	N/A	N/A
2.95	76.6	122.8	163.5	1.4	-23.3	1.8	silty SAND to sandy SILT	120	4.0	19	31	74	47	-	-	14	16	N/A	0.00	N/A	N/A
3.12	56.9	91.3	128.2	0.9	-18.3	1.6	silty SAND to sandy SILT	120	4.0	14	23	64	46	-	-	15	16	N/A	0.00	N/A	N/A
3.28	50.8	81.5	126.5	0.9	-21.3	1.8	silty SAND to sandy SILT	120	4.0	13	20	60	45	-	-	17	16	0.68	-	0.27	3.4
3.45	47.5	76.1	123.3	0.9	-26.5	1.9	silty SAND to sandy SILT	120	4.0	12	19	58	45	-	-	18	16	0.99	-	0.27	5.1
3.61	52.6	84.3	116.0	0.7	-32.7	1.4	silty SAND to sandy SILT	120	4.0	13	21	61	45	-	-	14	16	1.59	-	0.26	8.6
3.77	51.4	82.5	138.5	1.1	-31.1	2.2	silty SAND to sandy SILT	120	4.0	13	21	61	45	-	-	19	16	0.38	-	0.26	1.9
3.94	53.4	85.7	154.7	1.4	-30.3	2.7	silty SAND to sandy SILT	120	4.0	13	21	62	45	-	-	21	16	0.16	-	0.26	0.7
4.10	60.1	96.4	138.7	1.1	-90.2	1.8	silty SAND to sandy SILT	120	4.0	15	24	66	46	-	-	16	16	0.43	-	0.26	2.3
4.27	37.1	59.4	117.5	0.8	-106.6	2.2	silty SAND to sandy SILT	120	4.0	9	15	50	43	-	-	23	16	1.70	-	0.26	22.5
4.43	30.1	48.3	98.4	0.6	-62.6	1.8	silty SAND to sandy SILT	120	4.0	8	12	43	42	-	-	24	16	2.37	-	0.26	46.1
4.59	23.8	38.2	99.9	0.5	-61.6	2.3	silty SAND to sandy SILT	120	4.0	6	10	35	41	-	-	29	16	2.34	-	0.25	51.2
4.76	24.4	39.1	95.3	0.5	-39.2	2.1	silty SAND to sandy SILT	120	4.0	6	10	36	41	-	-	28	16	2.43	-	0.25	51.2
4.92	30.3	48.6	96.2	0.5	-32.9	1.7	silty SAND to sandy SILT	120	4.0	8	12	43	42	-	-	23	16	2.41	-	0.25	45.8
5.09	36.4	58.4	94.4	0.5	-37.1	1.4	silty SAND to sandy SILT	120	4.0	9	15	49	43	-	-	18	16	2.45	-	0.24	35.4
5.25	26.6	42.7	101.0	0.6	-32.4	2.2	silty SAND to sandy SILT	120	4.0	7	11	39	41	-	-	27	16	2.32	-	0.24	51.2
5.41	17.8	28.5	-	0.6	-37.4	3.2	clayy SILT to silty CLAY	115	2.0	9	14	-	-	1.2	9.9	38	15	-	-	0.23	-
5.58	16.0	25.7	-	0.5	-31.6	3.3	clayy SILT to silty CLAY	115	2.0	8	13	-	-	1.1	9.9	40	15	-	-	0.23	-
5.74	11.7	18.8	-	0.4	-112.0	3.7	silty CLAY to CLAY	115	1.5	8	13	-	-	0.8	9.9	49	15	-	-	0.23	-
5.91	12.3	19.8	-	0.4	-122.4	3.1	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.9	9.9	45	15	-	-	0.23	-
6.07	9.1	14.6	-	0.3	-120.2	4.0	silty CLAY to CLAY	115	1.5	6	10	-	-	0.6	9.9	55	15	-	-	0.23	-
6.23	12.1	19.4	-	0.3	-30.7	2.7	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.8	9.9	43	15	-	-	0.23	-
6.40	11.4	18.3	-	0.3	-113.8	3.1	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	9.9	46	15	-	-	0.23	-
6.56	8.1	13.0	-	0.2	-115.5	3.1	silty CLAY to CLAY	115	1.5	5	9	-	-	0.6	8.9	54	15	-	-	0.23	-
6.73	18.3	29.3	91.9	0.4	-111.7	2.4	clayy SILT to silty CLAY	115	2.0	9	15	-	-	1.3	9.9	34	15	2.50	-	0.23	51.2
6.89	17.1	27.5	-	0.5	-117.2	2.8	clayy SILT to silty CLAY	115	2.0	9	14	-	-	1.2	9.9	37	15	-	-	0.23	-
7.05	9.1	14.6	-	0.3	-48.3	3.6	silty CLAY to CLAY	115	1.5	6	10	-	-	0.6	9.6	54	15	-	-	0.23	-
7.22	7.1	11.4	-	0.2	-78.8	2.4	silty CLAY to CLAY	115	1.5	5	8	-	-	0.5	7.3	53	15	-	-	0.23	-
7.38	7.7	12.3	-	0.3	-44.4	4.3	silty CLAY to CLAY	115	1.5	5	8	-	-	0.5	7.8	61	15	-	-	0.23	-
7.55	55.8	89.5	121.0	0.8	-43.0	1.4	silty SAND to sandy SILT	120	4.0	14	22	63	44	-	-	14	16	1.92	-	0.23	18.1
7.71	76.7	122.3	151.8	1.1	-31.3	1.4	clean SAND to silty SAND	125	5.0	15	24	74	45	-	-	12	16	0.44	-	0.23	2.6
7.87	70.8	112.1	144.7	1.1	-23.0	1.5	clean SAND to silty SAND	125	5.0	14	22	71	44	-	-	13	16	0.72	-	0.23	3.5
8.04	91.0	143.0	168.2	1.2	-13.4	1.3	clean SAND to silty SAND	125	5.0	18	29	79	46	-	-	10	16	0.00	-	0.22	0.0
8.20	97.9	152.9	181.7	1.5	2.0	1.5	clean SAND to silty SAND	125	5.0	20	31	81	46	-	-	10	16	0.00	-	0.22	0.0
8.37	101.8	157.9	194.4	1.8	2.3	1.8	clean SAND to silty SAND	125	5.0	20	32	82	46	-	-	11	16	0.00	-	0.22	0.0
8.53	98.7	152.1	189.5	1.7	3.7	1.8	clean SAND to silty SAND	125	5.0	20	30	81	46	-	-	12	16	0.00	-	0.22	0.0
8.69	81.1	124.1	169.8	1.6	3.2	2.0	silty SAND to sandy SILT	120	4.0	20	31	74	45	-	-	14	16	0.00	-	0.22	0.0
8.86	105.0	159.9	193.2	1.7	5.3	1.7	clean SAND to silty SAND	125	5.0	21	32	82	46	-	-	11	16	0.00	-	0.22	0.0
9.02	99.9	151.2	191.8	1.9	11.8	1.9	clean SAND to silty SAND	125	5.0	20	30	81	46	-	-	12	16	0.00	-	0.22	0.0
9.19	81.4	122.3	178.2	1.8	10.6	2.3	silty SAND to sandy SILT	120	4.0	20	31	74	45	-	-	16	16	0.00	-	0.22	0.0
9.35	60.4	90.4	166.6	1.7	7.9	2.9	silty SAND to sandy SILT	120	4.0	15	23	64	43	-	-	21	16	0.00	-	0.22	0.0
9.51	41.7	62.0	125.2	1.0	11.8	2.4	silty SAND to sandy SILT	120	4.0	10	16	51	41	-	-	23	16	1.83	-	0.22	32.5
9.68	42.2	62.4	116.5	0.9	5.1	2.0	silty SAND to sandy SILT	120	4.0	11	16	51	41	-	-	22	16	2.06	-	0.22	32.5
9.84	65.8	96.8	135.7	1.1	10.3	1.6	silty SAND to sandy SILT	120	4.0	16	24	66	43	-	-	15	16	1.33	-	0.22	7.8
10.01	72.3	105.7	144.5	1.2	14.5	1.7	silty SAND to sandy SILT	120	4.0	18	26	69	44	-	-	14	16	0.88	-	0.22	4.3
10.17	70.6	102.8	144.3	1.2	9.7	1.8	silty SAND to sandy SILT	120	4.0	18	26	68	44	-	-	15	16	0.90	-	0.21	4.5
10.34	64.0	92.6	142.1	1.3	14.7	2.0	silty SAND to sandy SILT	120	4.0	16	23	64	43	-	-	17	16	1.02	-	0.21	5.8
10.50	57.8	83.2	135.5	1.2	12.0	2.1	silty SAND to sandy SILT	120	4.0	14	21	61	42	-	-	18	16	1.37	-	0.21	10.4
10.66	47.9	68.6	123.9	1.0	18.4	2.1	silty SAND to sandy SILT	120	4.0	12	17	55	41	-	-	21	16	1.90	-	0.21	28.9
10.83	42.3	60.3	110.9	0.8	14.5	1.9	silty SAND to sandy SILT	120	4.0	11	15	50	41	-	-	21	16	2.15	-	0.21	33.8
10.99	38.1	54.0	101.6	0.7	8.3	1.8	silty SAND to sandy SILT	120	4.0	10	14	47	40	-	-	22	16	2.31	-	0.20	39.8
11.16	45.5	64.2	110.0	0.8	24.3	1.7	silty SAND to sandy SILT	120	4.0	11	16	52	41	-	-	20	16	2.16	-	0.20	31.4
11.32	43.1	60.5	123.0	1.0	20.1	2.4	silty SAND to sandy SILT	120	4.0	11	15	50	41	-	-	23	16	1.94	-	0.20	33.7
11.48	28.5	39.8	118.6	0.9	25.1	3.1	clayy SILT to silty CLAY	115	2.0	14	20	-	-	2.0	9.9	32	15	2.03	-	0.19	51.2
11.65	14.1	22.6	-	0.5	26.2	4.0	silty CLAY to CLAY	115	1.5	9	15	-	-	1.0	9.9	47	15	-	-	0.19	-
11.81	8.9	14.2	-	0.2	23.7	2.9	silty CLAY to CLAY	115	1.5	6	9	-	-	0.6	6.2	52	15	-	-	0.19	-
11.98	8.0	12.9	-	0.1	34.0	1.6	clayy SILT to silty CLAY	115	2.0	4	6	-	-	0.5	5.5	46	15	-	-	0.19	-
12.14	7.9	12.6	-	0.1	36.7	1.7	clayy SILT to silty CLAY	115	2.0	4	6	-	-	0.5	5.3	47	15	-	-	0.19	-
12.30	7.3	11.7	-	0.2	-107.0	3.1	silty CLAY to CLAY	115	1.5	5	8	-	-	0.5	4.8	58	15	-	-	0.19	-
12.47	9.3	14.9	-	0.2	-64.5	2.7	silty CLAY to CLAY	115	1.5	6	10	-	-	0.6	6.2	50	15	-	-	0.19	-
12.63	10.3	16.6	-	0.2	-51.3	2.2	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	6.9	44	15	-	-	0.19	-
12.80	9.0	14.4	-	0.1	-54.5	1.7	clayy SILT to silty CLAY	115	2.0	4	7	-	-	0.6	5.9	44	15	-	-	0.19	-
12.96	7.9	12.7	-	0.2	-68.4	2.1	clayy SILT to silty CLAY	115	2.0	4	6	-	-	0.5	5.0	50	15	-	-	0.19	-
13.12	8.3	13.3	-	0.2	-61.8	2.1	clayy SILT to silty CLAY	115	2.0	4	7	-	-	0.6	5.3	49	15	-	-	0.19	-
13.29	8.4	13.5	-	0.2	-42.2	2.3	clayy SILT to silty CLAY	115	2.0	4	7	-	-	0.6	5.3	49	15	-	-	0.19	-
13.45	8.2	13.2	-	0.1	-48.8	1.7	clayy SILT to silty CLAY	115	2.0	4	7	-	-	0.5	5.1	46	15	-	-	0.19	-
13.62	8.1	12.9	-	0.1	-51.1	1.4	clayy SILT to silty CLAY	115	2.0	4	6	-	-	0.5	4.9	44	15	-	-	0.19	-
13.78	7.1	11.3	-	0.1	-97.2	1.6	clayy SILT to silty CLAY	115	2.0	4	6	-	-	0.5	4.2	49	15	-	-	0.19	-
13.94	6.8	10.9	-	0.1	-84.5	1.8	clayy SILT to silty CLAY	115	2.0	3	5	-	-	0.4	4.0	51	15	-	-	0.19	-
14.11	7.0	11.2	-	0.1	-70.4	1.9	clayy SILT to silty CLAY	115	2.0	3	6	-	-	0.5	4.1	51	15	-	-	0.19	-
14.27	7.0	11.3	-	0.2	-76.7	2.5	silty CLAY to CLAY	115	1.5	5	8	-	-	0.5	4.1	56	15	-	-	0.19	-
14.44	7.7	12.4	-	0.2	-47.2	2.4	silty CLAY to CLAY	115	1.5	5	8	-	-	0.5	4.5	52	15	-	-	0.19	-
14.60	8.7	14.0	-	0.2	-64.0	2.4	clayy SILT to silty CLAY	115	2.0	4	7	-	-	0.6	5.1	49	15	-	-	0.19	-
14.76	9.8	15.7	-	0.2	-5.0	2.0	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	5.7	44	15	-	-	0.19	-
14.93	11.2	16.2	-	0.1	7.6	1.0	clayy SILT to silty CLAY	115	2.0	6	8	-	-	0.8	6.6	36	15	-	-	0.19	-
15.09	13.3	19.2	59.2	0.1	21.5	1.1	silty SAND to sandy SILT	120	4.0	3	5	13	32	-	-	33	16	3.59	-	0.18	51.2
15.26	19.7	25.1	64.1	0.2	35.2	1.2	silty SAND to sandy SILT	120	4.0	5	6	21	35	-	-	29	16	3.37	-	0.18	51.2
15.42	61.2	77.6	116.8	0.9	50.0	1.6	silty SAND to sandy SILT	120	4.0	15	19	59	41	-	-	17	16	2.06	-	0.17	24.3

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Project ID: Earth Mechanics
Data File: SDF(631).cpt
CPT Date: 11/30/2010 8:16:29 AM
GW During Test: 5 ft

Sounding ID: C-10-352
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Ratio %	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Nk -	Vol Strn %	Dry Stlmt 0.00	Liq Stlmt 0.25	Cycl SStn %
15.58	62.7	79.2	143.7	1.5	79.0	2.5	silty SAND to sandy SILT	120	4.0	16	20	59	41	-	-	21	16	1.13	-	0.17	8.9
15.75	37.4	47.0	149.8	1.5	79.5	4.1	clayy SILT to silty CLAY	115	2.0	19	24	-	-	2.6	9.9	34	15	0.84	-	0.17	42.1
15.91	18.2	29.2	-	0.9	84.9	5.0	silty CLAY to CLAY	115	1.5	12	19	-	-	1.2	9.9	46	15	-	-	0.16	-
16.08	11.2	18.0	-	0.5	127.0	4.7	silty CLAY to CLAY	115	1.5	7	12	-	-	0.8	6.2	55	15	-	-	0.16	-
16.24	9.4	15.1	-	0.3	185.8	3.7	silty CLAY to CLAY	115	1.5	6	10	-	-	0.6	5.0	55	15	-	-	0.16	-
16.40	8.3	13.3	-	0.2	195.7	2.9	silty CLAY to CLAY	115	1.5	6	9	-	-	0.5	4.3	54	15	-	-	0.16	-
16.57	8.6	13.7	-	0.2	231.4	2.0	clayy SILT to silty CLAY	115	2.0	4	7	-	-	0.6	4.4	48	15	-	-	0.16	-
16.73	8.1	13.1	-	0.2	252.9	3.3	silty CLAY to CLAY	115	1.5	5	9	-	-	0.5	4.2	57	15	-	-	0.16	-
16.90	12.0	16.3	-	0.1	265.6	1.3	clayy SILT to silty CLAY	115	2.0	6	8	-	-	0.8	6.3	38	15	-	-	0.16	-
17.06	18.5	22.6	67.0	0.2	287.9	1.4	silty SAND to sandy SILT	120	4.0	5	6	18	34	-	-	32	16	3.24	-	0.16	51.2
17.23	12.2	19.2	-	0.3	297.7	2.3	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.8	6.4	42	15	-	-	0.15	-
17.39	23.1	28.0	76.9	0.4	333.3	1.6	silty SAND to sandy SILT	120	4.0	6	7	25	35	-	-	30	16	2.90	-	0.15	51.2
17.55	18.5	24.7	-	0.4	346.4	2.2	clayy SILT to silty CLAY	115	2.0	9	12	-	-	1.3	9.8	36	15	-	-	0.15	-
17.72	33.7	40.6	81.4	0.5	362.0	1.4	silty SAND to sandy SILT	120	4.0	8	10	37	37	-	-	23	16	2.77	-	0.14	51.2
17.88	33.5	40.2	80.5	0.4	364.0	1.4	silty SAND to sandy SILT	120	4.0	8	10	37	37	-	-	23	16	2.79	-	0.14	51.2
18.05	32.9	39.3	81.5	0.5	377.6	1.4	silty SAND to sandy SILT	120	4.0	8	10	36	37	-	-	24	16	2.76	-	0.13	51.2
18.21	40.0	47.7	87.3	0.5	393.2	1.4	silty SAND to sandy SILT	120	4.0	10	12	43	38	-	-	21	16	2.61	-	0.13	46.8
18.37	57.8	68.7	111.5	0.9	403.4	1.7	silty SAND to sandy SILT	120	4.0	14	17	55	40	-	-	18	16	2.14	-	0.13	28.9
18.54	97.3	115.2	150.2	1.5	432.0	1.6	clean SAND to silty SAND	125	5.0	19	23	72	43	-	-	13	16	0.88	-	0.12	4.4
18.70	93.4	110.2	159.3	1.9	460.1	2.0	silty SAND to sandy SILT	120	4.0	23	28	70	43	-	-	16	16	0.53	-	0.12	3.0
18.87	78.7	92.5	141.6	1.5	501.3	2.0	silty SAND to sandy SILT	120	4.0	20	23	64	42	-	-	17	16	1.29	-	0.12	9.1
19.03	82.7	96.8	134.7	1.3	534.9	1.6	silty SAND to sandy SILT	120	4.0	21	24	66	42	-	-	15	16	1.63	-	0.12	12.9
19.19	121.5	141.8	177.6	2.0	537.7	1.7	clean SAND to silty SAND	125	5.0	24	28	79	44	-	-	12	16	0.00	-	0.12	0.0
19.36	124.6	144.8	194.3	2.6	545.5	2.1	silty SAND to sandy SILT	120	4.0	31	36	79	44	-	-	14	16	0.00	-	0.12	0.0
19.52	102.3	118.5	182.2	2.5	558.2	2.5	silty SAND to sandy SILT	120	4.0	26	30	73	43	-	-	17	16	0.00	-	0.12	0.0
19.69	93.3	107.7	164.1	2.1	572.0	2.3	silty SAND to sandy SILT	120	4.0	23	27	69	42	-	-	17	16	0.00	-	0.12	0.0
19.85	107.8	124.1	180.0	2.4	583.0	2.3	silty SAND to sandy SILT	120	4.0	27	31	74	43	-	-	16	16	0.00	-	0.12	0.0
20.01	139.3	159.8	212.4	3.1	590.4	2.3	silty SAND to sandy SILT	120	4.0	35	40	82	44	-	-	14	16	0.00	-	0.12	0.0
20.18	165.8	189.6	239.2	3.6	590.7	2.2	clean SAND to silty SAND	125	5.0	33	38	88	45	-	-	12	16	0.00	-	0.12	0.0
20.34	176.9	201.6	248.9	3.8	601.8	2.2	clean SAND to silty SAND	125	5.0	35	40	90	45	-	-	12	16	0.00	-	0.12	0.0
20.51	189.2	214.8	257.9	3.9	605.2	2.1	clean SAND to silty SAND	125	5.0	38	43	92	46	-	-	11	16	0.00	-	0.12	0.0
20.67	198.2	224.2	264.8	4.0	622.1	2.0	clean SAND to silty SAND	125	5.0	40	45	94	46	-	-	10	16	0.00	-	0.12	0.0
20.83	200.7	226.3	266.3	4.0	638.0	2.0	clean SAND to silty SAND	125	5.0	40	45	94	46	-	-	10	16	0.00	-	0.12	0.0
21.00	189.1	212.4	257.6	4.0	672.8	2.1	clean SAND to silty SAND	125	5.0	38	42	92	45	-	-	11	16	0.00	-	0.12	0.0
21.16	167.6	187.6	255.7	4.5	675.2	2.7	silty SAND to sandy SILT	120	4.0	42	47	88	45	-	-	14	16	0.00	-	0.12	0.0
21.33	130.8	146.0	235.7	4.3	685.4	3.3	silty SAND to sandy SILT	120	4.0	33	36	79	44	-	-	18	16	0.00	-	0.12	0.0
21.49	81.5	90.7	184.0	2.8	698.8	3.5	silty SAND to sandy SILT	120	4.0	20	23	64	41	-	-	23	16	0.00	-	0.12	0.0
21.65	107.4	119.2	180.6	2.6	712.7	2.4	silty SAND to sandy SILT	120	4.0	27	30	73	43	-	-	17	16	0.00	-	0.12	0.0
21.82	130.3	144.1	204.8	3.2	712.8	2.5	silty SAND to sandy SILT	120	4.0	33	36	79	44	-	-	15	16	0.00	-	0.12	0.0
21.98	121.8	134.3	196.5	3.0	711.3	2.5	silty SAND to sandy SILT	120	4.0	30	34	77	43	-	-	16	16	0.00	-	0.12	0.0
22.15	109.4	120.2	167.2	2.2	734.1	2.0	silty SAND to sandy SILT	120	4.0	27	30	73	43	-	-	15	16	0.00	-	0.12	0.0
22.31	138.2	151.5	170.8	1.6	736.7	1.2	clean SAND to silty SAND	125	5.0	28	30	81	44	-	-	9	16	0.00	-	0.12	0.0
22.47	145.2	158.6	175.8	1.6	738.6	1.1	clean SAND to silty SAND	125	5.0	29	32	82	44	-	-	8	16	0.00	-	0.12	0.0
22.64	142.0	154.6	185.3	2.2	704.7	1.6	clean SAND to silty SAND	125	5.0	28	31	81	44	-	-	11	16	0.00	-	0.12	0.0
22.80	137.4	149.1	196.4	2.8	700.7	2.1	silty SAND to sandy SILT	120	4.0	34	37	80	44	-	-	13	16	0.00	-	0.12	0.0
22.97	126.6	137.0	190.9	2.8	693.1	2.2	silty SAND to sandy SILT	120	4.0	32	34	77	43	-	-	15	16	0.00	-	0.12	0.0
23.13	119.5	128.9	187.1	2.8	703.6	2.4	silty SAND to sandy SILT	120	4.0	30	32	75	43	-	-	16	16	0.00	-	0.12	0.0
23.30	113.4	122.0	179.0	2.6	711.8	2.3	silty SAND to sandy SILT	120	4.0	28	31	74	43	-	-	16	16	0.00	-	0.12	0.0
23.46	101.0	108.3	171.1	2.5	712.5	2.5	silty SAND to sandy SILT	120	4.0	25	27	70	42	-	-	18	16	0.00	-	0.12	0.0
23.62	84.9	90.8	155.4	2.1	719.8	2.5	silty SAND to sandy SILT	120	4.0	21	23	64	41	-	-	20	16	0.70	-	0.12	4.2
23.79	64.1	68.4	137.5	1.6	724.9	2.6	silty SAND to sandy SILT	120	4.0	16	17	54	39	-	-	23	16	1.53	-	0.11	26.0
23.95	52.3	55.6	109.7	1.0	741.1	2.0	silty SAND to sandy SILT	120	4.0	13	14	48	38	-	-	23	16	2.17	-	0.11	38.1
24.12	47.5	50.4	95.9	0.8	733.3	1.6	silty SAND to sandy SILT	120	4.0	12	13	44	38	-	-	22	16	2.42	-	0.11	43.7
24.28	47.4	50.1	83.4	0.5	753.4	1.2	silty SAND to sandy SILT	120	4.0	12	13	44	38	-	-	19	16	2.71	-	0.10	44.0
24.44	43.3	45.6	87.5	0.6	743.4	1.5	silty SAND to sandy SILT	120	4.0	11	11	41	37	-	-	22	16	2.61	-	0.10	49.3
24.61	38.8	40.8	82.7	0.5	765.0	1.4	silty SAND to sandy SILT	120	4.0	10	10	37	36	-	-	23	16	2.73	-	0.10	51.2
24.77	54.5	57.2	123.5	1.3	782.2	2.5	silty SAND to sandy SILT	120	4.0	14	14	49	38	-	-	25	16	1.97	-	0.09	36.6
24.94	74.7	78.2	136.3	1.7	753.5	2.3	silty SAND to sandy SILT	120	4.0	19	20	59	40	-	-	20	16	1.49	-	0.09	17.3
25.10	103.2	107.7	165.0	2.3	717.2	2.3	silty SAND to sandy SILT	120	4.0	26	27	69	42	-	-	17	16	0.00	-	0.09	0.0
25.26	114.2	118.8	187.3	3.0	729.7	2.7	silty SAND to sandy SILT	120	4.0	29	30	73	42	-	-	18	16	0.00	-	0.09	0.0
25.43	118.8	123.2	195.7	3.3	722.1	2.8	silty SAND to sandy SILT	120	4.0	30	31	74	42	-	-	18	16	0.00	-	0.09	0.0
25.59	124.6	128.9	199.7	3.4	711.9	2.7	silty SAND to sandy SILT	120	4.0	31	32	75	43	-	-	17	16	0.00	-	0.09	0.0
25.76	127.2	131.3	207.0	3.6	712.6	2.9	silty SAND to sandy SILT	120	4.0	32	33	76	43	-	-	18	16	0.00	-	0.09	0.0
25.92	120.4	123.9	208.7	3.8	678.3	3.2	silty SAND to sandy SILT	120	4.0	30	31	74	42	-	-	19	16	0.00	-	0.09	0.0
26.08	88.2	90.5	181.6	2.9	676.3	3.4	silty SAND to sandy SILT	120	4.0	22	23	64	41	-	-	23	16	0.00	-	0.09	0.0
26.25	76.4	78.2	155.6	2.2	673.2	2.9	silty SAND to sandy SILT	120	4.0	19	20	59	40	-	-	23	16	0.70	-	0.09	4.6
26.41	84.9	86.7	143.7	1.8	669.5	2.2	silty SAND to sandy SILT	120	4.0	21	22	62	41	-	-	19	16	1.24	-	0.08	9.5
26.58	82.9	84.5	149.7	2.0	603.4	2.5	silty SAND to sandy SILT	120	4.0	21	21	61	40	-	-	20	16	0.96	-	0.08	6.5
26.74	57.9	58.9	144.1	1.8	598.7	3.2	clayy SILT to silty CLAY	115	2.0	29	29	-	-	4.0	9.9	28	15	1.22	-	0.08	20.7
26.90	55.3	56.0	121.2	1.3	583.4	2.4	silty SAND to sandy SILT	120	4.0	14	14	48	38	-	-	25	16	2.00	-	0.08	37.7
27.07	30.8	33.4	-	0.9	594.4	3.1	clayy SILT to silty CLAY	115	2.0	15	17	-	-	2.1	9.9	36	15	-	-	0.08	-
27.23	22.9	24.7	-	0.7	593.7	3.4	clayy SILT to silty CLAY	115	2.0	11	12	-	-	1.6	8.1	43	15	-	-	0.08	-
27.40	31.9	34.2	-	1.0	582.3	3.4	clayy SILT to silty CLAY	115	2.0	16	17	-	-	2.2	9.9	37	15	-	-	0.08	-
27.56	44.0	47.0	-	2.2	567.4	5.1	clayy SILT to silty CLAY	115	2.0	22	24	-	-	3.1	9.9	38	15	-	-	0.08	-
27.72	182.3	182.5	231.9	4.0	601.0	2.2	silty SAND to sandy SILT	120	4.0	46	46	87	44	-	-	12	16	0.00	-	0.08	0.0
27.89	205.2	205.0	256.5	4.6	616.3	2.3	clean SAND to silty SAND	125	5.0	41	41	91	45	-	-	12	16	0.00	-	0.08	0.0
28.05	184.6	183.9	234.6	4.1	649.5	2.2	silty SAND to sandy SILT	120	4.0	46	46	87	44	-	-	12	16	0.00	-	0.08	0.0
28.22	162.0	161.0	214.4	3.6	806.1	2.3	silty SAND to sandy SILT	120	4.0	41	40	83	44	-	-	14	16	0.00	-	0.08	0.0
28.38	129.9	128.8	186.2	3.0	879.7	2.3	silty SAND to sandy SILT	120	4.0	32	32	75	42	-	-	16	16	0.00	-	0.08	0.0
28.54	87.4	86.5	159.5	2.4	896.5	2.8	silty SAND to sandy SILT	120	4.0	22	22	62	40	-	-	21	16	0.56	-	0.08	3.4
28.71	48.8	48.1	135.6	1.6	735.2	3.4	clayy SILT to silty CLAY	115	2.0	24	24	-	-	3.4	9.9	31	15	1.63	-	0.07	46.3
28.87	44.8	44.1	129.9	1.4	699.9	3.3	clayy SILT to silty CLAY	115	2.0	22	22	-	-	3.1	9.9	32	15	1.84	-	0.07	51.2
29.04	30.7	31.4	-	1.0	691.7	3.4	clayy SILT to silty CLAY	115	2.0	15	16	-	-	2.1	9.9	38	15	-	-	0.07	-
29.20	23.3	23.7	-	0.9	665.0	4.3	silty CLAY to CLAY	115	1.5	16	16	-	-	1.6	7.7	48	15	-	-	0.07	-
29.36	21.4	21.7	-	0.7	671.1	3.8	silty CLAY to CLAY	115	1.5	14	14	-	-	1.4	7.0	47	15	-	-	0.07	-
29.53	14.6	14.8	-	0.7	676.7	5.3	silty CLAY to CLAY	115	1.5	10	10	-	-	1.0	4.5	62	15	-	-	0.07	-
29.69	18.0	18.1	-	0.6	650.5	3.9	silty CLAY to CLAY	115	1.5	12	12	-	-	1.2	5.7	52	15	-	-	0.07	-
29.86	15.1	15.1	-	0.6	623.9	4.2	silty CLAY to CLAY	115	1.5	10	10	-	-	1.0	4.6	58	15	-	-	0.07	-
30.02	11.5	11.5	-	0.5	599.9	4.9	silty CLAY to CLAY	115	1.5	8	8	-	-	0.7	3.4	68	15	-	-	0.07	-
30.19	16.1	16.0	-	0.4	650.1	2.8	silty CLAY to CLAY	115	1.5	11	11	-	-	1.1	5.0	49	15	-	-	0.07	-
30.35	11.5	11.3	-	0.4	649.2	4.2	silty CLAY to CLAY	115	1.5	8	8	-	-	0.7	3.3	65	15	-	-	0.07	-
30.51	9.8	9.6	-	0.2	660.1	2.6	silty CLAY to CLAY	115	1.5	7	6	-	-	0.6	2.7	62	15	-	-	0.07	-
30.68	10.3	10.1	-	0.2	673.7	2.4	silty CLAY to CLAY	115	1.5	7	7	-	-	0.7	2.9	59	15	-	-	0.07	-
30.84	10.2	10.0	-	0.2	649.9	2.6	silty CLAY to CLAY	115	1.5	7	7	-	-	0.7	2.9	61	15	-	-	0.07	-

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Schuyler Heim Bridge

Project ID: Earth Mechanics
Data File: SDF(631).cpt
CPT Date: 11/30/2010 8:16:29 AM
GW During Test: 5 ft

Sounding ID: C-10-352
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Ratio %	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	* SPT R-N1 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	Fin Ic %	Nk - -	* Vol Strn %	Dry Stlmt 0.00	* Liq Stlmt 0.25	* Cycl SStn %
31.01	9.5	9.2	-	0.2	652.2	2.3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	2.6	62	15	-	-	0.07	-
31.17	8.8	8.5	-	0.2	684.8	2.2	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	2.3	63	15	-	-	0.07	-
31.33	8.5	8.2	-	0.2	690.2	2.3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	2.2	65	15	-	-	0.07	-
31.50	9.1	8.7	-	0.1	692.5	1.8	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	2.4	60	15	-	-	0.07	-
31.66	8.8	8.4	-	0.1	692.9	2.0	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	2.3	62	15	-	-	0.07	-
31.83	9.6	9.2	-	0.1	680.4	1.2	clayy SILT to silty CLAY	115	2.0	5	5	-	-	0.6	2.6	53	15	-	-	0.07	-
31.99	10.0	9.5	33.0	0.0	677.4	0.1	sensitive fine SOIL	115	2.0	5	5	-	-	0.6	2.7	35	15	5.80	-	0.07	51.2
32.15	10.3	9.7	-	0.5	669.2	5.6	silty CLAY to CLAY	115	1.5	7	6	-	-	0.7	2.8	76	15	-	-	0.06	-
32.32	115.3	108.5	154.8	2.2	680.2	1.9	silty SAND to sandy SILT	120	4.0	29	27	70	41	-	-	15	16	0.73	-	0.06	3.9
32.48	229.5	215.6	237.6	3.3	631.5	1.5	clean SAND to silty SAND	125	5.0	46	43	92	45	-	-	8	16	0.00	-	0.06	0.0
32.65	197.3	185.0	225.0	3.8	652.8	1.9	clean SAND to silty SAND	125	5.0	39	37	87	44	-	-	11	16	0.00	-	0.06	0.0
32.81	208.5	195.0	224.1	3.3	649.8	1.6	clean SAND to silty SAND	125	5.0	42	39	89	44	-	-	9	16	0.00	-	0.06	0.0
32.97	186.7	174.2	205.1	3.0	634.0	1.6	clean SAND to silty SAND	125	5.0	37	35	85	44	-	-	10	16	0.00	-	0.06	0.0
33.14	203.2	189.1	212.2	2.9	703.7	1.4	clean SAND to silty SAND	125	5.0	41	38	88	44	-	-	9	16	0.00	-	0.06	0.0
33.30	185.9	172.6	196.6	2.6	698.4	1.4	clean SAND to silty SAND	125	5.0	37	35	85	43	-	-	9	16	0.00	-	0.06	0.0
33.47	171.6	158.9	176.5	1.9	648.1	1.1	clean SAND to silty SAND	125	5.0	34	32	82	43	-	-	8	16	0.00	-	0.06	0.0
33.63	165.4	152.9	164.8	1.5	676.6	0.9	clean SAND to silty SAND	125	5.0	33	31	81	43	-	-	7	16	0.00	-	0.06	0.0
33.79	143.5	132.3	148.4	1.4	672.4	1.0	clean SAND to silty SAND	125	5.0	29	26	76	42	-	-	9	16	1.02	-	0.06	4.8
33.96	131.4	120.9	135.2	1.1	684.7	0.9	clean SAND to silty SAND	125	5.0	26	24	73	42	-	-	8	16	1.64	-	0.06	8.8
34.12	170.8	156.7	156.7	1.0	718.8	0.6	clean SAND to silty SAND	125	5.0	34	31	82	43	-	-	5	16	0.66	-	0.05	3.5
34.29	184.0	168.5	171.2	1.4	731.0	0.8	clean SAND to silty SAND	125	5.0	37	34	84	43	-	-	6	16	0.00	-	0.05	0.0
34.45	157.1	143.5	162.7	1.8	754.7	1.1	clean SAND to silty SAND	125	5.0	31	29	79	42	-	-	9	16	0.00	-	0.05	0.0
34.61	122.6	111.8	148.1	1.9	765.6	1.6	clean SAND to silty SAND	125	5.0	25	22	71	41	-	-	13	16	1.03	-	0.05	5.2
34.78	90.1	82.0	130.9	1.7	742.5	1.9	silty SAND to sandy SILT	120	4.0	23	20	60	40	-	-	18	16	1.80	-	0.05	22.2
34.94	64.1	58.2	126.1	1.6	691.6	2.5	silty SAND to sandy SILT	120	4.0	16	15	49	38	-	-	25	16	1.93	-	0.05	35.6
35.11	37.0	32.2	-	1.3	634.1	3.8	clayy SILT to silty CLAY	115	2.0	18	16	-	-	2.5	9.9	40	15	-	-	0.04	-
35.27	22.9	19.9	-	0.8	548.8	4.0	silty CLAY to CLAY	115	1.5	15	13	-	-	1.5	6.3	50	15	-	-	0.04	-
35.43	19.9	17.2	-	0.6	607.0	3.3	silty CLAY to CLAY	115	1.5	13	11	-	-	1.3	5.3	50	15	-	-	0.04	-
35.60	16.8	14.4	-	0.4	577.7	2.9	silty CLAY to CLAY	115	1.5	11	10	-	-	1.1	4.4	52	15	-	-	0.04	-
35.76	17.1	14.6	-	0.3	626.5	2.0	clayy SILT to silty CLAY	115	2.0	9	7	-	-	1.1	4.4	47	15	-	-	0.04	-
35.93	15.5	13.2	-	0.2	650.7	1.8	clayy SILT to silty CLAY	115	2.0	8	7	-	-	1.0	3.9	48	15	-	-	0.04	-
36.09	14.3	12.2	-	0.2	652.1	1.4	clayy SILT to silty CLAY	115	2.0	7	6	-	-	0.9	3.6	47	15	-	-	0.04	-
36.26	12.5	10.6	-	0.1	666.6	1.4	clayy SILT to silty CLAY	115	2.0	6	5	-	-	0.8	3.0	51	15	-	-	0.04	-
36.42	11.4	9.6	-	0.2	713.2	1.7	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.7	56	15	-	-	0.04	-
36.58	12.4	10.4	-	0.2	661.6	1.6	clayy SILT to silty CLAY	115	2.0	6	5	-	-	0.8	3.0	52	15	-	-	0.04	-
36.75	11.4	9.5	-	0.2	652.3	1.8	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.7	57	15	-	-	0.04	-
36.91	10.9	9.1	-	0.2	727.1	1.8	silty CLAY to CLAY	115	1.5	7	6	-	-	0.7	2.5	58	15	-	-	0.04	-
37.08	11.3	9.4	-	0.2	577.7	1.8	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.6	58	15	-	-	0.04	-
37.24	10.7	8.9	-	0.2	627.3	2.1	silty CLAY to CLAY	115	1.5	7	6	-	-	0.7	2.4	61	15	-	-	0.04	-
37.40	10.8	8.9	-	0.2	669.1	2.9	silty CLAY to CLAY	115	1.5	7	6	-	-	0.7	2.4	66	15	-	-	0.04	-
37.57	15.4	12.6	-	0.3	698.4	2.6	silty CLAY to CLAY	115	1.5	10	8	-	-	1.0	3.7	54	15	-	-	0.04	-
37.73	20.3	16.7	-	0.4	722.3	2.1	clayy SILT to silty CLAY	115	2.0	10	8	-	-	1.4	5.1	44	15	-	-	0.04	-
37.90	17.7	14.4	-	0.4	727.8	2.3	clayy SILT to silty CLAY	115	2.0	9	7	-	-	1.2	4.4	49	15	-	-	0.04	-
38.06	20.7	16.8	-	0.4	743.2	2.4	clayy SILT to silty CLAY	115	2.0	10	8	-	-	1.4	5.2	46	15	-	-	0.04	-
38.22	19.8	16.1	-	0.5	757.5	2.6	clayy SILT to silty CLAY	115	2.0	10	8	-	-	1.3	4.9	48	15	-	-	0.04	-
38.39	26.1	21.1	-	0.5	596.4	1.9	clayy SILT to silty CLAY	115	2.0	13	11	-	-	1.8	6.6	38	15	-	-	0.04	-
38.55	24.1	19.4	-	0.5	599.0	2.3	clayy SILT to silty CLAY	115	2.0	12	10	-	-	1.6	6.1	42	15	-	-	0.04	-
38.72	17.9	14.4	-	0.4	577.6	2.9	silty CLAY to CLAY	115	1.5	12	10	-	-	1.2	4.3	52	15	-	-	0.04	-
38.88	25.5	20.4	-	0.4	564.5	1.9	clayy SILT to silty CLAY	115	2.0	13	10	-	-	1.7	6.4	38	15	-	-	0.04	-
39.04	32.9	28.5	79.3	0.5	556.4	1.7	silty SAND to sandy SILT	120	4.0	8	7	26	33	-	-	31	16	2.83	-	0.04	51.2
39.21	27.3	21.7	-	0.6	540.0	2.3	clayy SILT to silty CLAY	115	2.0	14	11	-	-	1.8	6.8	40	15	-	-	0.04	-
39.37	18.6	14.7	-	0.5	527.7	3.0	silty CLAY to CLAY	115	1.5	12	10	-	-	1.2	4.4	52	15	-	-	0.04	-
39.54	18.1	14.3	-	0.3	505.4	2.0	clayy SILT to silty CLAY	115	2.0	9	7	-	-	1.2	4.3	47	15	-	-	0.04	-
39.70	16.3	12.8	-	0.3	507.7	2.1	clayy SILT to silty CLAY	115	2.0	8	6	-	-	1.1	3.8	51	15	-	-	0.04	-
39.86	11.7	9.2	-	0.2	616.3	2.7	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.5	64	15	-	-	0.04	-
40.03	15.3	12.0	-	0.2	673.6	1.6	clayy SILT to silty CLAY	115	2.0	8	6	-	-	1.0	3.5	49	15	-	-	0.04	-
40.19	12.2	9.5	-	0.1	678.3	1.3	clayy SILT to silty CLAY	115	2.0	6	5	-	-	0.8	2.6	52	15	-	-	0.04	-
40.36	18.5	14.3	-	0.1	670.0	0.9	clayy SILT to silty CLAY	115	2.0	9	7	-	-	1.2	4.3	38	15	-	-	0.04	-
40.52	16.5	12.8	-	0.6	662.8	4.3	silty CLAY to CLAY	115	1.5	11	9	-	-	1.1	3.8	63	15	-	-	0.04	-
40.68	56.9	48.5	120.8	1.5	641.0	2.7	silty SAND to sandy SILT	120	4.0	14	12	43	36	-	-	28	16	2.00	-	0.04	45.9
40.85	100.5	85.5	157.6	2.7	648.0	2.7	silty SAND to sandy SILT	120	4.0	25	21	62	39	-	-	21	16	0.63	-	0.04	3.8
41.01	112.6	95.6	178.4	3.4	652.1	3.1	silty SAND to sandy SILT	120	4.0	28	24	66	40	-	-	22	16	0.00	-	0.04	0.0
41.18	107.4	91.1	174.9	3.3	673.8	3.1	silty SAND to sandy SILT	120	4.0	27	23	64	40	-	-	22	16	0.00	-	0.04	0.0
41.34	98.3	83.2	158.8	2.7	669.8	2.8	silty SAND to sandy SILT	120	4.0	25	21	61	39	-	-	22	16	0.58	-	0.04	3.6
41.50	94.6	80.0	139.4	2.1	691.4	2.3	silty SAND to sandy SILT	120	4.0	24	20	60	39	-	-	20	16	1.44	-	0.03	14.7
41.67	91.6	77.3	123.8	1.6	708.6	1.8	silty SAND to sandy SILT	120	4.0	23	19	58	39	-	-	18	16	1.96	-	0.03	24.4
41.83	83.3	70.1	118.7	1.5	778.1	1.8	silty SAND to sandy SILT	120	4.0	21	18	55	38	-	-	19	16	2.03	-	0.03	28.1
42.00	70.1	58.9	124.7	1.6	779.1	2.4	silty SAND to sandy SILT	120	4.0	18	15	50	37	-	-	24	16	1.95	-	0.03	34.9
42.16	54.1	45.4	120.3	1.4	785.0	2.8	clayy SILT to silty CLAY	115	2.0	27	23	-	-	3.7	9.9	30	15	2.01	-	0.02	49.7
42.32	49.3	41.3	126.1	1.5	798.9	3.2	clayy SILT to silty CLAY	115	2.0	25	21	-	-	3.4	9.9	33	15	1.93	-	0.02	51.2
42.49	63.9	53.4	144.6	2.1	809.6	3.5	clayy SILT to silty CLAY	115	2.0	32	27	-	-	4.4	9.9	30	15	1.15	-	0.02	28.9
42.65	96.7	80.8	159.8	2.8	841.7	2.9	silty SAND to sandy SILT	120	4.0	24	20	60	39	-	-	23	16	0.54	-	0.01	3.3
42.82	137.5	114.6	191.9	3.9	866.6	2.9	silty SAND to sandy SILT	120	4.0	34	29	72	41	-	-	19	16	0.00	-	0.01	0.0
42.98	161.3	134.3	216.1	4.9	885.7	3.1	silty SAND to sandy SILT	120	4.0	40	34	77	42	-	-	18	16	0.00	-	0.01	0.0
43.15	161.1	133.8	218.1	5.0	887.3	3.1	silty SAND to sandy SILT	120	4.0	40	33	77	42	-	-	18	16	0.00	-	0.01	0.0
43.31	146.6	121.6	208.7	4.6	911.3	3.2	silty SAND to sandy SILT	120	4.0	37	30	73	41	-	-	20	16	0.00	-	0.01	0.0
43.47	140.7	116.5	200.3	4.3	928.2	3.1	silty SAND to sandy SILT	120	4.0	35	29	72	41	-	-	20	16	0.00	-	0.01	0.0
43.64	131.3	108.5	192.6	4.0	956.8	3.1	silty SAND to sandy SILT	120	4.0	33	27	70	40	-	-	20	16	0.00	-	0.01	0.0
43.80	111.3	91.8	181.6	3.6	963.0	3.3	silty SAND to sandy SILT	120	4.0	28	23	64	40	-	-	23	16	0.00	-	0.01	0.0
43.97	66.4	54.7	154.2	2.4	976.6	3.8	clayy SILT to silty CLAY	115	2.0	33	27	-	-	4.6	9.9	31	15	0.70	-	0.01	19.1
44.13	48.0	34.4	-	1.4	996.0	3.2	clayy SILT to silty CLAY	115	2.0	24	17	-	-	3.3	9.9	36	15	-	-	0.01	-
44.29	34.0	24.3	-	0.91	003.6	2.7	clayy SILT to silty CLAY	115	2.0	17	12	-	-	2.3	7.7	40	15	-	-	0.01	-
44.46	20.8	14.8	-	0.51	012.6	3.0	silty CLAY to CLAY	115	1.5	14	10	-	-	1.4	4.5	52	15	-	-	0.01	-
44.62	16.8	11.9	-	0.41	054.8	2.6	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.4	56	15	-	-	0.01	-
44.79	15.7	11.1	-	0.31	078.6	2.5	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	3.2	58	15	-	-	0.01	-
44.95	16.1	11.4	-	0.31	087.4	2.3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.0	3.3	55	15	-	-	0.01	-
45.11	14.6	10.3	-	0.31	123.0	2.6	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.9	60	15	-	-	0.01	-
45.28	13.9	9.8	-	0.21	128.4	2.2	silty CLAY to CLAY	115	1.5	9	7	-	-	0.9	2.7	59	15	-	-	0.01	-
45.44	14.6	10.2	-	0.21	115.5	2.0	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.9	57	15	-	-	0.01	-
45.61	14.8	10.3	-	0.21	087.0	1.6	clayy SILT to silty CLAY	115	2.0	7	5	-	-	0.9	2.9	53	15	-	-	0.01	-
45.77	15.1	10.5	-	0.21	077.7	1.9	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	3.0	55	15	-	-	0.01	-
45.93	15.0	10.4	-	0.31	089.1	2.1	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.9	56	15	-	-	0.01	-
46.10	15.1	10.4	-	0.31	084.8	2.1	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.9	57	15	-	-	0.01	-
46.26	15.0	10.3	-	0.31	043.1	2.3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.9	58	15	-	-	0.01	-

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Project ID: Earth Mechanics
Data File: SDF(631).cpt
CPT Date: 11/30/2010 8:16:29 AM
GW During Test: 5 ft

Sounding ID: C-10-352
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	Slv pore Stss prss tsf (psi)	Frct Ratio %	* Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	* SPT R-N1 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	Fin Ic %	Nk - -	* Vol Strn %	* Dry Stlmt 0.00	* Liq Stlmt 0.25	* Cycl SStn %
46.43	18.1	12.4	-	0.31027.4	1.9	clayy SILT to silty CLAY	115	2.0	9	6	-	-	1.2	3.6	50	15	-	-	0.01	-
46.59	17.1	11.7	-	0.51027.6	3.2	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.4	60	15	-	-	0.01	-
46.75	22.5	15.3	-	0.71018.0	3.5	silty CLAY to CLAY	115	1.5	15	10	-	-	1.5	4.6	54	15	-	-	0.01	-
46.92	34.7	23.6	-	1.01001.0	3.2	clayy SILT to silty CLAY	115	2.0	17	12	-	-	2.4	7.5	43	15	-	-	0.01	-
47.08	25.0	17.0	-	0.9 970.8	3.9	silty CLAY to CLAY	115	1.5	17	11	-	-	1.7	5.2	53	15	-	-	0.01	-
47.25	23.9	16.2	-	0.6 981.3	2.8	silty CLAY to CLAY	115	1.5	16	11	-	-	1.6	4.9	49	15	-	-	0.01	-
47.41	28.6	19.3	-	0.6 952.9	2.5	clayy SILT to silty CLAY	115	2.0	14	10	-	-	1.9	6.0	43	15	-	-	0.01	-
47.57	18.6	12.5	-	0.5 955.8	3.5	silty CLAY to CLAY	115	1.5	12	8	-	-	1.2	3.6	59	15	-	-	0.01	-
47.74	16.2	10.9	-	0.3 943.6	2.6	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	3.1	58	15	-	-	0.01	-
47.90	13.6	9.1	-	0.3 939.7	2.6	silty CLAY to CLAY	115	1.5	9	6	-	-	0.9	2.5	64	15	-	-	0.01	-
48.07	13.2	8.8	-	0.2 927.1	2.4	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.4	64	15	-	-	0.01	-
48.23	13.3	8.9	-	0.3 918.3	2.4	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.4	64	15	-	-	0.01	-
48.39	13.4	8.9	-	0.3 837.4	2.5	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.4	64	15	-	-	0.01	-
48.56	13.7	9.1	-	0.3 821.8	2.5	silty CLAY to CLAY	115	1.5	9	6	-	-	0.9	2.5	64	15	-	-	0.01	-
48.72	15.6	10.3	-	0.7 811.0	5.2	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.9	73	15	-	-	0.01	-
48.89	51.5	40.6	108.6	1.2 786.1	2.5	clayy SILT to silty CLAY	115	2.0	26	20	-	-	3.5	9.9	30	15	2.18	-	0.01	51.2
49.05	38.3	25.1	-	1.2 787.9	3.4	clayy SILT to silty CLAY	115	2.0	19	13	-	-	2.6	7.9	43	15	-	-	0.01	-
49.22	33.3	21.8	-	1.0 784.0	3.2	clayy SILT to silty CLAY	115	2.0	17	11	-	-	2.2	6.8	44	15	-	-	0.01	-
49.38	32.3	21.1	-	1.0 784.5	3.3	clayy SILT to silty CLAY	115	2.0	16	11	-	-	2.2	6.6	46	15	-	-	0.01	-
49.54	36.7	23.9	-	1.1 777.5	3.2	clayy SILT to silty CLAY	115	2.0	18	12	-	-	2.5	7.5	43	15	-	-	0.01	-
49.71	39.0	25.3	-	1.2 773.3	3.3	clayy SILT to silty CLAY	115	2.0	20	13	-	-	2.7	8.0	42	15	-	-	0.01	-
49.87	40.6	26.3	-	1.2 772.7	3.1	clayy SILT to silty CLAY	115	2.0	20	13	-	-	2.8	8.3	40	15	-	-	0.01	-
50.04	43.2	27.9	-	1.1 760.5	2.8	clayy SILT to silty CLAY	115	2.0	22	14	-	-	2.9	8.9	38	15	-	-	0.01	-
50.20	48.9	38.1	101.2	1.0 758.7	2.2	silty SAND to sandy SILT	120	4.0	12	10	35	34	-	-	30	16	2.31	-	0.01	51.2
50.36	62.8	48.9	120.5	1.6 755.8	2.6	silty SAND to sandy SILT	120	4.0	16	12	43	35	-	-	28	16	2.01	-	0.00	45.4
50.53	69.3	53.8	146.9	2.3 755.4	3.5	clayy SILT to silty CLAY	115	2.0	35	27	-	-	4.8	9.9	30	15	0.97	-	0.00	24.3
50.69	85.1	66.0	188.7	3.8 744.1	4.7	clayy SILT to silty CLAY	115	2.0	43	33	-	-	5.9	9.9	31	15	0.00	-	0.00	0.0
50.86	87.4	67.7	191.4	3.9 741.2	4.7	clayy SILT to silty CLAY	115	2.0	44	34	-	-	6.1	9.9	31	15	0.00	-	0.00	0.0
51.02	105.5	81.6	193.2	4.2 632.5	4.1	clayy SILT to silty CLAY	115	2.0	53	41	-	-	7.3	9.9	27	15	0.00	-	0.00	0.0
51.18	110.7	85.5	195.3	4.3 614.9	4.0	clayy SILT to silty CLAY	115	2.0	55	43	-	-	7.7	9.9	26	15	0.00	-	0.00	0.0
51.35	115.8	89.3	201.5	4.6 608.0	4.1	clayy SILT to silty CLAY	115	2.0	58	45	-	-	8.1	9.9	26	15	0.00	-	0.00	0.0
51.51	118.5	91.3	205.5	4.8 597.5	4.1	clayy SILT to silty CLAY	115	2.0	59	46	-	-	8.3	9.9	26	15	0.00	-	0.00	0.0
51.68	122.1	93.9	208.6	4.9 591.2	4.1	clayy SILT to silty CLAY	115	2.0	61	47	-	-	8.5	9.9	25	15	0.00	-	0.00	0.0
51.84	125.1	96.1	209.9	5.0 580.9	4.1	clayy SILT to silty CLAY	115	2.0	63	48	-	-	8.7	9.9	25	15	0.00	-	0.00	0.0
52.00	125.0	95.9	209.8	5.0 567.2	4.1	clayy SILT to silty CLAY	115	2.0	63	48	-	-	8.7	9.9	25	15	0.00	-	0.00	0.0
52.17	122.0	93.5	206.8	4.9 556.7	4.1	clayy SILT to silty CLAY	115	2.0	61	47	-	-	8.5	9.9	25	15	0.00	-	0.00	0.0
52.33	118.9	90.9	202.8	4.7 543.9	4.1	clayy SILT to silty CLAY	115	2.0	59	45	-	-	8.3	9.9	26	15	0.00	-	0.00	0.0
52.50	116.2	88.8	198.7	4.5 531.7	4.0	clayy SILT to silty CLAY	115	2.0	58	44	-	-	8.1	9.9	26	15	0.00	-	0.00	0.0
52.66	109.4	83.5	196.3	4.4 526.4	4.1	clayy SILT to silty CLAY	115	2.0	55	42	-	-	7.6	9.9	27	15	0.00	-	0.00	0.0
52.82	105.2	80.1	187.4	4.0 524.3	3.9	clayy SILT to silty CLAY	115	2.0	53	40	-	-	7.3	9.9	27	15	0.00	-	0.00	0.0
52.99	108.6	82.6	186.6	4.0 521.0	3.8	clayy SILT to silty CLAY	115	2.0	54	41	-	-	7.6	9.9	26	15	0.00	-	0.00	0.0
53.15	103.9	78.9	186.4	4.0 518.3	4.0	clayy SILT to silty CLAY	115	2.0	52	39	-	-	7.2	9.9	27	15	0.00	-	0.00	0.0
53.32	90.8	68.9	195.5	4.2 517.5	4.8	clayy SILT to silty CLAY	115	2.0	45	34	-	-	6.3	9.9	31	15	0.00	-	0.00	0.0
53.48	69.8	42.5	-	3.8 513.0	5.7	silty CLAY to CLAY	115	1.5	47	28	-	-	4.8	9.9	41	15	-	-	0.00	-
53.64	83.7	63.4	183.1	3.7 510.8	4.6	clayy SILT to silty CLAY	115	2.0	42	32	-	-	5.8	9.9	32	15	0.00	-	0.00	0.0
53.81	123.9	93.7	197.3	4.5 501.0	3.8	clayy SILT to silty CLAY	115	2.0	62	47	-	-	8.6	9.9	24	15	0.00	-	0.00	0.0
53.97	140.2	105.9	212.5	5.3 504.9	3.8	silty SAND to sandy SILT	120	4.0	35	26	69	40	-	-	23	16	0.00	-	0.00	0.0
54.14	152.4	114.9	224.2	5.8 497.1	3.9	stiff SAND to clayy SAND	115	1.0	100	100	-	-	10.0	9.9	23	16	0.00	-	0.00	0.0
54.30	163.4	123.0	229.5	6.1 497.7	3.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	10.7	9.9	22	16	0.00	-	0.00	0.0
54.46	188.8	142.0	226.8	5.9 498.1	3.2	silty SAND to sandy SILT	120	4.0	47	35	79	41	-	-	18	16	0.00	-	0.00	0.0
54.63	202.5	152.1	243.8	6.7 495.1	3.4	silty SAND to sandy SILT	120	4.0	51	38	81	42	-	-	18	16	0.00	-	0.00	0.0
54.79	196.3	147.2	244.2	6.8 389.2	3.5	stiff SAND to clayy SAND	115	1.0	100	100	-	-	12.9	9.9	19	16	0.00	-	0.00	0.0
54.96	200.2	150.0	252.1	7.2 383.3	3.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	13.2	9.9	19	16	0.00	-	0.00	0.0
55.12	211.1	157.9	264.2	7.8 364.8	3.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	13.9	9.9	19	16	0.00	-	0.00	0.0
55.28	225.4	168.4	283.0	8.8 355.6	4.0	stiff SAND to clayy SAND	115	1.0	100	100	-	-	14.8	9.9	19	16	0.00	-	0.00	0.0
55.45	259.1	193.3	303.9	9.8 349.5	3.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	17.1	9.9	18	16	0.00	-	0.00	0.0
55.61	273.6	203.9	315.4	10.4 324.3	3.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	18.0	9.9	17	16	0.00	-	0.00	0.0
55.78	299.1	222.6	341.4	11.8 311.7	4.0	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.7	9.9	17	16	0.00	-	0.00	0.0
55.94	336.0	249.7	364.5	12.8 293.3	3.9	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.2	9.9	16	16	0.00	-	0.00	0.0
56.11	349.6	259.5	371.3	13.1 256.6	3.8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	23.1	9.9	15	16	0.00	-	0.00	0.0
56.27	363.2	269.3	378.6	13.4 257.2	3.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	24.0	9.9	15	16	0.00	-	0.00	0.0
56.43	364.2	269.7	378.7	13.4 258.9	3.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	24.0	9.9	15	16	0.00	-	0.00	0.0
56.60	346.6	256.3	362.4	12.5 238.2	3.7	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.8	9.9	15	16	0.00	-	0.00	0.0
56.76	336.3	248.4	353.6	12.1 228.9	3.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.2	9.9	15	16	0.00	-	0.00	0.0
56.93	319.8	235.9	336.3	11.2 223.8	3.5	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.1	9.9	15	16	0.00	-	0.00	0.0
57.09	302.6	223.0	327.7	10.9 209.0	3.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.9	9.9	16	16	0.00	-	0.00	0.0
57.25	298.7	219.8	320.6	10.5 178.2	3.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.7	9.9	16	16	0.00	-	0.00	0.0
57.42	282.6	207.7	303.2	9.6 150.2	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	18.6	9.9	16	16	0.00	-	0.00	0.0
57.58	267.9	196.6	298.5	9.5 158.6	3.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	17.6	9.9	17	16	0.00	-	0.00	0.0
57.75	244.9	179.5	281.7	8.7 145.1	3.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.1	9.9	18	16	0.00	-	0.00	0.0
57.91	246.1	180.2	276.5	8.4 174.3	3.5	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.2	9.9	17	16	0.00	-	0.00	0.0
58.07	236.7	173.1	262.6	7.7 196.8	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.6	9.9	17	16	0.00	-	0.00	0.0
58.24	238.1	174.0	269.3	8.1 189.4	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.7	9.9	17	16	0.00	-	0.00	0.0
58.40	222.0	161.9	260.5	7.7 202.7	3.5	stiff SAND to clayy SAND	115	1.0	100	100	-	-	14.6	9.9	18	16	0.00	-	0.00	0.0
58.57	231.5	168.7	254.9	7.3 196.3	3.2	silty SAND to sandy SILT	120	4.0	58	42	84	42	-	-	17	16	0.00	-	0.00	0.0
58.73	229.8	167.2	250.5	7.1 179.4	3.1	silty SAND to sandy SILT	120	4.0	57	42	84	42	-	-	17	16	0.00	-	0.00	0.0
58.89	236.4	171.8	250.6	7.0 203.5	3.0	silty SAND to sandy SILT	120	4.0	59	43	85	42	-	-	16	16	0.00	-	0.00	0.0
59.06	234.4	170.1	247.3	6.8 195.3	2.9	silty SAND to sandy SILT	120	4.0	59	43	85	42	-	-	16	16	0.00	-	0.00	0.0
59.22	215.7	156.4	236.9	6.4 194.9	3.0	silty SAND to sandy SILT	120	4.0	54	39	82	42	-	-	17	16	0.00	-	0.00	0.0
59.39	201.0	145.5	230.3	6.2 185.7	3.2	silty SAND to sandy SILT	120	4.0	50	36	79	41	-	-	18	16	0.00	-	0.00	0.0
59.55	181.2	131.0	216.4	5.6 202.0	3.2	silty SAND to sandy SILT	120	4.0	45	33	76	41	-	-	19	16	0.00	-	0.00	0.0
59.71	164.1	118.5	195.8	4.7 206.8	2.9	silty SAND to sandy SILT	120	4.0	41	30	73	40	-	-	19	16	0.00	-	0.00	0.0
59.88	173.1	124.8	196.0	4.6 192.9	2.7	silty SAND to sandy SILT	120	4.0	43	31	74	40	-	-	18	16	0.00	-	0.00	0.0
60.04	216.3	155.8	221.5	5.6 191.2	2.6	silty SAND to sandy SILT	120	4.0	54	39	82	42	-	-	15	16	0.00	-	0.00	0.0
60.21	230.6	165.8	239.9	6.5 183.7	2.9	silty SAND to sandy SILT	120	4.0	58	41	84	42	-	-	16	16	0.00	-	0.00	0.0
60.37	237.9	170.9	248.6	6.9 164.1	3.0	silty SAND to sandy SILT	120	4.0	59	43	85	42	-	-	16	16	0.00	-	0.00	0.0
60.53	224.2	160.8	246.1	7.0 170.1	3.2	silty SAND to sandy SILT	120	4.0	56	40	83	42	-	-	17	16	0.00	-	0.00	0.0
60.70	183.8	131.7	216.6	5.7 176.9	3.2	silty SAND to sandy SILT	120	4.0	46	33	76	41	-	-	19	16	0.00	-	0.00	0.0
60.86	153.1	109.5	179.5	4.0 154.8	2.7	silty SAND to sandy SILT	120	4.0	38	27	70	40	-	-	19	16	0.00	-	0.00	0.0
61.03	153.3	109.6	173.6	3.7 154.4	2.5	silty SAND to sandy SILT	120	4.0	38	27	70	40	-	-	18	16	0.00	-	0.00	0.0
61.19	188.0	134.1	219.1	5.8 167.0	3.2	silty SAND to sandy SILT	120	4.0	47	34	77	41	-	-	19	16	0.00	-	0.00	0.0
61.35	209.2	149.1	226.6	6.1 167.2	2.9	silty SAND to sandy SILT	120	4.0	52	37	80	41	-	-	17	16	0.00	-	0.00	0.0
61.52	188.9	134.5	215.0	5.6 174.3	3.0	silty SAND to sandy SILT	120	4.0	47	34	77	41	-	-	18	16	0.00	-	0.00	0.0
61.68	195.9	139.3	217.6	5.7 181.0	3.0	silty SAND to sandy SILT	120	4.0	49	35	78	41	-	-	18	16	0.00	-	0.00	0.0

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Schuyler Heim Bridge

Project ID: Earth Mechanics
Data File: SDF(631).cpt
CPT Date: 11/30/2010 8:16:29 AM
GW During Test: 5 ft

Sounding ID: C-10-352
Project No: 06-123
Cone/Rig: DSG0906

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Ratio %	* Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	* SPT R-N1 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Nk -	* Vol Strn %	* Dry Stlmt 0.00	* Liq Stlmt 0.25	* Cycl SStn %
61.85	213.0	151.2	230.2	6.3	250.4	3.0	silty SAND to sandy SILT	120	4.0	53	38	81	41	-	-	17	16	0.00	-	0.00	0.0
62.01	216.1	153.3	240.6	6.9	216.1	3.2	silty SAND to sandy SILT	120	4.0	54	38	81	41	-	-	18	16	0.00	-	0.00	0.0
62.17	219.3	155.3	242.9	7.0	186.1	3.2	silty SAND to sandy SILT	120	4.0	55	39	82	41	-	-	18	16	0.00	-	0.00	0.0
62.34	210.3	148.8	235.9	6.6	187.2	3.2	silty SAND to sandy SILT	120	4.0	53	37	80	41	-	-	18	16	0.00	-	0.00	0.0
62.50	203.7	143.9	226.5	6.2	184.9	3.1	silty SAND to sandy SILT	120	4.0	51	36	79	41	-	-	18	16	0.00	-	0.00	0.0
62.67	212.1	149.6	227.6	6.2	186.6	3.0	silty SAND to sandy SILT	120	4.0	53	37	80	41	-	-	17	16	0.00	-	0.00	0.0
62.83	217.1	153.0	233.9	6.5	188.4	3.0	silty SAND to sandy SILT	120	4.0	54	38	81	41	-	-	17	16	0.00	-	0.00	0.0
63.00	214.0	150.6	232.8	6.5	188.8	3.1	silty SAND to sandy SILT	120	4.0	54	38	81	41	-	-	17	16	0.00	-	0.00	0.0
63.16	213.4	150.0	233.6	6.5	178.2	3.1	silty SAND to sandy SILT	120	4.0	53	38	80	41	-	-	17	16	0.00	-	0.00	0.0
63.32	216.2	151.8	237.9	6.8	177.3	3.2	silty SAND to sandy SILT	120	4.0	54	38	81	41	-	-	18	16	0.00	-	0.00	0.0
63.49	216.9	152.1	239.4	6.9	184.9	3.2	silty SAND to sandy SILT	120	4.0	54	38	81	41	-	-	18	16	0.00	-	0.00	0.0
63.65	227.4	159.3	246.2	7.2	174.0	3.2	silty SAND to sandy SILT	120	4.0	57	40	82	42	-	-	17	16	0.00	-	0.00	0.0
63.82	243.4	170.3	259.9	7.9	175.4	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.0	9.9	17	16	0.00	-	0.00	0.0
63.98	261.2	182.5	276.2	8.7	174.9	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	17.2	9.9	17	16	0.00	-	0.00	0.0
64.14	277.8	193.9	292.5	9.6	179.8	3.5	stiff SAND to clayy SAND	115	1.0	100	100	-	-	18.3	9.9	17	16	0.00	-	0.00	0.0
64.31	289.8	202.0	303.2	10.2	165.7	3.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.1	9.9	17	16	0.00	-	0.00	0.0
64.47	293.2	204.2	295.5	9.6	172.0	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.3	9.9	16	16	0.00	-	0.00	0.0
64.64	309.3	215.2	308.3	10.3	170.7	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.4	9.9	15	16	0.00	-	0.00	0.0
64.80	365.4	253.9	340.3	11.5	146.3	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	24.1	9.9	14	16	0.00	-	0.00	0.0
64.96	379.0	263.0	354.3	12.4	209.0	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	25.0	9.9	14	16	0.00	-	0.00	0.0
65.13	365.3	253.3	339.0	11.5	135.5	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	24.1	9.9	14	16	0.00	-	0.00	0.0
65.29	330.3	228.7	311.7	10.2	134.8	3.1	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.8	9.9	14	16	0.00	-	0.00	0.0
65.46	310.4	214.7	297.9	9.6	115.4	3.1	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.4	9.9	15	16	0.00	-	0.00	0.0
65.62	315.8	218.3	302.8	9.8	122.9	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.8	9.9	15	16	0.00	-	0.00	0.0
65.78	325.8	224.9	312.0	10.4	115.5	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.5	9.9	15	16	0.00	-	0.00	0.0
65.95	334.7	230.8	315.6	10.4	120.4	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.0	9.9	14	16	0.00	-	0.00	0.0
66.11	335.0	230.8	308.0	9.8	99.9	3.0	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.1	9.9	14	16	0.00	-	0.00	0.0
66.28	336.3	231.4	311.1	10.1	103.9	3.0	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.2	9.9	14	16	0.00	-	0.00	0.0
66.44	340.8	234.2	308.9	9.8	120.6	2.9	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.4	9.9	13	16	0.00	-	0.00	0.0
66.60	345.4	237.1	316.4	10.3	97.5	3.0	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.8	9.9	14	16	0.00	-	0.00	0.0
66.77	315.0	216.1	317.4	11.1	222.4	3.6	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.7	9.9	16	16	0.00	-	0.00	0.0
66.93	315.7	216.3	313.6	10.8	215.8	3.5	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.8	9.9	16	16	0.00	-	0.00	0.0
67.10	324.3	222.0	313.3	10.6	223.1	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.4	9.9	15	16	0.00	-	0.00	0.0
67.26	319.9	218.7	308.9	10.4	231.3	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.1	9.9	15	16	0.00	-	0.00	0.0
67.42	319.5	218.2	304.1	10.1	237.5	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.0	9.9	15	16	0.00	-	0.00	0.0
67.59	314.5	214.6	297.5	9.7	234.3	3.1	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.7	9.9	15	16	0.00	-	0.00	0.0
67.75	301.2	205.3	288.7	9.3	216.4	3.1	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.8	9.9	15	16	0.00	-	0.00	0.0
67.92	304.2	207.1	293.3	9.6	239.8	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.0	9.9	15	16	0.00	-	0.00	0.0
68.08	283.2	192.6	287.1	9.5	231.3	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	18.6	9.9	16	16	0.00	-	0.00	0.0
68.24	317.9	215.9	296.9	9.6	222.0	3.1	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.9	9.9	14	16	0.00	-	0.00	0.0
68.41	330.2	224.1	303.9	9.9	213.7	3.0	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.7	9.9	14	16	0.00	-	0.00	0.0
68.57	353.4	239.6	286.7	7.7	217.0	2.2	clean SAND to silty SAND	125	5.0	71	48	95	43	-	-	11	16	0.00	-	0.00	0.0
68.74	348.3	235.8	325.7	11.3	243.8	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.9	9.9	15	16	0.00	-	0.00	0.0
68.90	257.7	174.3	309.1	11.3	261.7	4.5	very stiff fine SOIL	120	2.0	100	87	85	42	-	-	20	30	0.00	-	0.00	0.0
69.07	362.9	245.1	334.1	11.7	289.0	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	23.9	9.9	14	16	0.00	-	0.00	0.0
69.23	349.4	235.8	323.1	11.1	218.2	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	23.0	9.9	14	16	0.00	-	0.00	0.0
69.39	329.5	222.2	307.1	10.3	256.3	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.7	9.9	15	16	0.00	-	0.00	0.0
69.56	321.6	216.6	303.8	10.2	247.2	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.2	9.9	15	16	0.00	-	0.00	0.0
69.72	309.7	208.4	291.6	9.5	254.1	3.1	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.4	9.9	15	16	0.00	-	0.00	0.0
69.89	297.5	199.9	283.2	9.1	256.4	3.1	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.6	9.9	15	16	0.00	-	0.00	0.0
70.05	300.4	201.7	286.9	9.4	249.6	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.8	9.9	15	16	0.00	-	0.00	0.0
70.21	294.7	197.6	275.6	8.7	240.9	3.0	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.4	9.9	15	16	0.00	-	0.00	0.0
70.38	285.7	191.4	258.5	7.6	238.0	2.7	silty SAND to sandy SILT	120	4.0	71	48	88	42	-	-	14	16	0.00	-	0.00	0.0
70.54	308.2	206.3	262.1	7.3	228.3	2.4	silty SAND to sandy SILT	120	4.0	77	52	91	43	-	-	12	16	0.00	-	0.00	0.0
70.71	325.0	217.2	280.2	8.3	220.8	2.6	silty SAND to sandy SILT	120	4.0	81	54	93	43	-	-	13	16	0.00	-	0.00	0.0
70.87	301.5	201.3	296.9	10.2	216.3	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	19.8	9.9	16	16	0.00	-	0.00	0.0
71.03	324.0	216.1	311.3	10.9	209.7	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.3	9.9	16	16	0.00	-	0.00	0.0
71.20	305.7	203.7	299.4	10.4	220.0	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.1	9.9	16	16	0.00	-	0.00	0.0
71.36	303.2	201.8	300.1	10.5	271.5	3.5	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.0	9.9	16	16	0.00	-	0.00	0.0
71.53	306.8	204.0	302.8	10.6	275.9	3.5	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.2	9.9	16	16	0.00	-	0.00	0.0
71.69	314.4	208.9	303.7	10.6	300.4	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.7	9.9	16	16	0.00	-	0.00	0.0
71.85	314.5	208.7	304.5	10.7	272.4	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.7	9.9	16	16	0.00	-	0.00	0.0
72.02	321.1	212.9	304.0	10.5	289.3	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.1	9.9	15	16	0.00	-	0.00	0.0
72.18	327.0	216.6	312.2	11.1	289.2	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.5	9.9	16	16	0.00	-	0.00	0.0
72.35	322.1	213.1	308.4	10.9	282.9	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.2	9.9	16	16	0.00	-	0.00	0.0
72.51	331.4	219.1	304.1	10.3	277.7	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.8	9.9	15	16	0.00	-	0.00	0.0
72.67	327.3	216.1	305.1	10.5	293.8	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.5	9.9	15	16	0.00	-	0.00	0.0
72.84	320.5	211.4	301.0	10.4	310.0	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.1	9.9	15	16	0.00	-	0.00	0.0
73.00	328.8	216.7	305.4	10.6	194.3	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.6	9.9	15	16	0.00	-	0.00	0.0
73.17	314.9	207.3	303.2	10.7	205.8	3.4	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.7	9.9	16	16	0.00	-	0.00	0.0
73.33	318.9	209.8	300.7	10.4	218.8	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.0	9.9	15	16	0.00	-	0.00	0.0
73.49	323.3	212.4	304.5	10.6	247.7	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.3	9.9	15	16	0.00	-	0.00	0.0
73.66	329.1	216.1	291.9	9.5	201.7	2.9	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.7	9.9	14	16	0.00	-	0.00	0.0
73.82	334.9	219.6	303.8	10.4	213.7	3.1	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.0	9.9	15	16	0.00	-	0.00	0.0
73.99	308.5	202.1	291.2	9.9	226.7	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	20.3	9.9	16	16	0.00	-	0.00	0.0
74.15	337.0	220.6	308.7	10.8	222.7	3.2	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.2	9.9	15	16	0.00	-	0.00	0.0
74.31	320.2	209.4	300.8	10.5	221.9	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.1	9.9	16	16	0.00	-	0.00	0.0
74.48	325.4	212.6	303.5	10.6	212.1	3.3	stiff SAND to clayy SAND	115	1.0	100	100	-	-	21.4	9.9	15	16	0.00	-	0.00	0.0

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

ATTACHMENT 2

LABORATORY TESTING

LABORATORY TESTING

Test Program

Laboratory tests were performed on selected soil samples by AP Engineering & Testing, Inc. (AP) Laboratory of Pomona, California, as a subcontractor to Earth Mechanics, Inc. (EMI), to determine relevant physical characteristics and engineering properties of soils that exist at the site. In addition, laboratory tests for the proposed cement-soil-mix (CSM) samples are also performed on selected soil samples, collected from previously available and site-specific current field explorations, mixed with different percentages of cement. A list of tests performed, the corresponding test methods, and purpose of testing is presented in Table 1.

TABLE 1. EXPLANATION OF LABORATORY TESTS PERFORMED

Type of Test	Applicable Test Method	Purpose
Dry Density	ASTM D 2937	Estimate in-situ dry soil density
Moisture Content	ASTM D 2216	Estimate in-situ soil moisture content
No. 200 Wash	ASTM D 1140	Determine the percentage of fine-grained particles of soil
Sieve Analysis & Hydrometer	ASTM D 422	Determine particle size distribution of soil
Atterberg Limits	ASTM D 4318	Determine plasticity of fine-grained soil
Consolidation	ASTM D 2435	Determine compressibility of fine-grained soil
Unconsolidated Undrained (UU) Triaxial	ASTM D 2850	Estimate confined strength parameters of fine-grained soil
Unconfined Compression (UC)	ASTM D 2166-6	Estimate unconfined strength parameters of fine-grained soil
Direct Shear	ASTM D 3080	Estimate strength parameters of coarse-grained soil
Soil pH	CT 532/643	Determine corrosion potential of soil
Minimum Resistivity	CT 532/643	Determine corrosion potential of soil
Sulfate Content	CT 417	Determine corrosion potential of soil
Chloride Content	CT 422	Determine corrosion potential of soil

Notes: 1. ASTM = American Society for Testing and Materials.
2. CT = California Test Method.

The laboratory soil tests were conducted in general accordance with California Test (CT) methods or American Society for Testing and Materials (ASTM) standards. Test results are shown on the logs of boring sheets and are also included at the end of the text.

Additional CSM laboratory testing program including soil classification, soil chemistry (pH, Sulfate Content, and Chloride Content), UC, and UU triaxial tests are performed on selected soil samples mixed with different percentages of cement to determine relevant material properties. The CSM laboratory testing was performed to understand the behavior of cement-treated soils and develop/optimize our design recommendations. An increase in the quantity of cement will increase the compressive strength at different rates, depending on the type of soil. Soil samples were selected for CSM laboratory testing program to represent the soil types found at the project site. Since the strength of soil-cement material increases with time, strength tests (i.e., UUs and UCs) are also performed at different days of curing after sample preparation.

CSM Laboratory Testing Procedure

The steps involved in the CSM laboratory testing program are illustrated with photos below:

Step 1. Mixer, sample containers, and other necessary equipment for mixing process were acquired.

Step 2. Representative site soil samples collected from 5-gallon buckets were placed in a tray and mixed.

Step 3. In order to estimate the required amount of cement (i.e. 10% or 15% or 20%) using dry weight of the soil sample, the in-situ moisture content of the soil was determined.

Step 4. The weight of the soil sample was measured, placed in a bucket, and mixed again.

Step 5. The estimated cement amount was added to the soil sample in 3 to 4 portions. Water was added as necessary while cement portions were added and the soil-cement material was mixed again.

Step 6. The mixing process was continued until the desired workability (paste-like consistency as shown above) of the soil-cement mixture was obtained.

Step 7. The soil-cement mixture was placed into 3-inch diameter and 6-inch high plastic containers in 5 layers; each layer was tamped about 25 times with a steel tamping rod.

Step 8. After filling the plastic container with cement-soil mix (i.e., after placing the fifth layer), the top surface was smoothened and flattened with a steel straight edge.

Step 9. Plastic containers were capped and samples were allowed to set overnight. After setting, samples were placed in a water tub for curing.

Step 10. After different days of curing, samples were extruded from plastic containers and initial diameter, height, and weight of the samples were measured.

Step 11. The UC and UU Triaxial tests were performed on samples.

Laboratory Test Results

Laboratory test results including soil classification, soil chemistry (pH, Sulfate Content, and Chloride Content), and other tests on selected soil samples for CSM testing for pile foundations at north (Pier A area) and south (Pier S area) sides of the channel are summarized in Table 2 and Table 3, respectively. Laboratory test results including soil classification, soil chemistry, and other tests on selected soil samples for CSM testing for existing MSE wall are summarized in Table 4.

The CSM laboratory testing were initially conducted on selected soil samples (i.e., on CL materials mixed with 15% of cement) collected from previous available field explorations performed by EMI between October and November, 2009 for Schuyler Heim Bridge Replacement Project (EMI, 2010a). Selected UC and UU test results for soil-cement samples collected from previous field explorations are summarized in Table 5 and Table 6, respectively. Additional CSM laboratory tests are performed on site-specific soil samples mixed with 10%, 15%, and 20% of cement to determine relevant material properties. Selected UC and UU test results for soil-cement samples collected from site-specific field explorations performed for pile foundations at north side of the channel (Pier A area) are summarized in Table 7 and Table 8, respectively. Selected UC and UU test results for soil-cement samples collected from site-specific field explorations performed for pile foundations at south side of the channel (Pier S area) are summarized in Table 9 and Table 10, respectively. Selected UC and UU test results for soil-cement samples collected from site-specific field explorations performed near existing west MSE wall are summarized in Table 11 and Table 12, respectively

As a part of the Port of Los Angeles Berths 148 – 151 Marine Oil Terminal Project, similar laboratory testing is being performed by EMI on selected sandy soil samples mixed with 15% of cement. The laboratory test results from this project are provided in Table 13 to provide additional data on the behavior of cement mixed soils in the harbor area.

References

American Society for Testing and Materials (ASTM), 2010, Annual Book of Standards, Soil and Rock, Vol. 04.08.

California Department of Transportation (Caltrans), 2003, California Test (CT) Method, Corrosion Guidelines, Version 1.0, Office of Materials Engineering and Testing Services, Corrosion Technology Branch, September.

Earth Mechanics, Inc. (EMI), 2010a, “Final Foundation Report for Schuyler Heim Bridge (Replace), Bridge No. 53-3032, Los Angeles County, California”, EMI Project No. 06-123, May 10 (and Addendum to Final Foundation Report, July 6).

TABLE 2. SUMMARY OF LABORATORY TEST RESULTS ON SELECTED SOIL SAMPLES, NORTH SIDE OF THE CHANNEL (PIER A)

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Moisture Content (%)	Organic Content (%)	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)	Percent Fines (%)	Atterberg Limit (%) (LL,PL,PI) [1]
A-10-208	B-6	50	ML	33.8	0.8	159	7.3	965	1800	50	NP
A-10-209	B-4	30	ML	33.8	1.0	115	7.3	1052	4800	51	NP
A-10-210	B-6	50	ML	30.0	0.6	126	6.7	902	1200	50	NP
A-10-211	B-5	40	SM	26.8	0.7	97	7.0	644	2400	48	NP
A-10-212	B-1	0-10	SM	34.2	0.8	114	7.3	748	5400	49	NP

Note:
1) LL – Liquid Limit; PL – Plastic Limit; PI – Plastic Index

TABLE 3. SUMMARY OF LABORATORY TEST RESULTS ON SELECTED SOIL SAMPLES FOR PILES AT SOUTH SIDE OF THE CHANNEL (PIER S)

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Moisture Content (%)	Organic Content (%)	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)	Percent Fines (%)	Atterberg Limit (%) (LL,PL,PI) [1]
A-10-201	B-2	50	SM	33.4	0.5	1371	6.8	43	240	39	NP
A-10-202	B-5	40	CL-ML	40.7	0.8	149	7.3	520	2400	67	25,20,5
A-10-203	B-4	30	SM	36.9	0.6	122	7.3	154	1200	46	NP
A-10-204	B-5	40	ML	33.7	0.6	174	6.9	79	1800	59	NP
A-10-205	B-4	30	CL-ML	39.0	0.9	108	7.0	132	1800	73	24,20,4
A-10-206	B-2	10	ML	35.8	0.6	60	7.3	251	3000	52	NP
A-10-206	B-6	50	ML	35.0	0.6	89	7.0	1051	2400	54	NP

Note:
1) LL – Liquid Limit; PL – Plastic Limit; PI – Plastic Index

TABLE 4. SUMMARY OF LABORATORY TEST RESULTS ON SELECTED SOIL SAMPLES NEAR EXISTING MSE WALL

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Moisture Content (%)	Organic Content (%)	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)	Percent Fines (%)	Atterberg Limit (%) (LL,PL,PI) [1]
A-10-212	B-3	20	SM	30.4	1.0	109	7.1	282	1800	49	NP
A-10-212	B-5	40	ML	30.0	0.7	67	7.4	506	1800	53	NP
A-10-213	B-3	20	ML	31.0	0.7	206	7.6	421	1800	57	NP

Note:
1) LL – Liquid Limit; PL – Plastic Limit; PI – Plastic Index

TABLE 5. SUMMARY OF UC TESTS ON CEMENT-SOIL MIX SAMPLES USING CLAYEY SOILS FROM PREVIOUS BORINGS

Location	Sample No. [1,2]	Date Tested	Cement Content (%)	Days Cured	Dry Density (pcf)	Moisture Content (%)	UC Strength [3] (ksf)
North Side [1]	N-1	11/22/2010	15	3	74.8	44.5	7.6
	N-2	11/26/2010	15	7	72.4	47.7	10.1
	N-3	12/3/2010	15	14	73.3	47.1	14.0
	N-7	12/12/2010	15	14	69.3	48.4	10.9
	N-4	12/17/2010	15	28	75.9	40.5	20.7
	N-9	12/27/2010	15	28	65.4	57.4	16.7
	N-11	1/24/2011	15	56	68.9	49.5	19.4
	CB-1	1/6/2011	20	7	67.8	48.7	7.7
	CB-3	1/27/2011	20	28	64.4	57.9	18.9
South Side [2]	S-1	11/20/2010	15	3	68.6	52.9	7.9
	S-2	11/24/2010	15	7	68.5	53.6	10.4
	S-2 (b)	12/1/2010	15	14	73.7	43.7	13.5
	S-5	12/15/2010	15	28	76.0	38.5	21.3
	S-7	1/12/2011	15	56	73.3	44.1	29.0

Notes:
1) "N"– North side of the Cerritos Channel. Clayey soil samples were collected from previous borings R-09-022, R-09-023, R-09-024, R-09-025, and R-09-026.
2) "S" – South side of the Cerritos Channel. Clayey soil samples were collected from previous borings R-09-008, R-09-009, R-09-011, R-09-013, R-09-015, R-09-018, and R-09-019.
3) UC – Unconfined Compressive Strength.

TABLE 6. SUMMARY OF UU TRIAXIAL TESTS ON CEMENT-SOIL MIX SAMPLES USING CLAYEY SOILS FROM PREVIOUS BORINGS

Location	Sample No. [1,2]	Date Tested	Cement Content (%)	Days Cured	Dry Density (pcf)	Moisture Content (%)	Confining Pressure (psi)	S_u [3] (ksf)
North Side [1]	N-5	11/26/2010	15	7	72.4	47.8	13	5.3
	N-8	12/13/2010	15	14	75	37.7	15	6.6
	N-9 (b)	12/27/2010	15	28	65.8	56.6	15	8.9
	N-13	1/24/2011	15	56	70.2	48.4	15	10.1
	CB-2	1/6/2011	20	7	65.7	54.9	15	5.1
	CB-4	1/27/2011	20	28	65.7	55.3	15	9.9
South Side [2]	S-4	12/1/2010	15	14	73.2	43.1	13	8.8
	S-6	12/15/2010	15	28	77.9	36.7	15	9.5

Notes:

1) "N" – North side of the Cerritos Channel. Clayey soil samples were collected from previous borings R-09-022, R-09-023, R-09-024, R-09-025, and R-09-026.

2) "S" – South side of the Cerritos Channel. Clayey soil samples were collected from previous borings R-09-008, R-09-009, R-09-011, R-09-013, R-09-015, R-09-018, and R-09-019.

3) S_u – Shear Strength.

TABLE 7. SUMMARY OF UC TESTS ON CEMENT-SOIL MIX SAMPLES WITH DIFFERENT CEMENT CONTENTS, NORTH SIDE OF THE CHANNEL (PIER A)

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date Tested	Cement Content (%)	Curing Period (Days)	Dry Density (pcf)	Moisture Content (%)	UC Strength [1] (ksf)
A-10-208	B6-1	50	ML	12/22/2010	15	7	91.6	26.8	27.8
A-10-208	B6-2	50	ML	12/22/2010	15	7	88.0	32.4	11.6
A-10-208	B6-4	50	ML	12/29/2010	15	14	90.4	28.3	18.9
A-10-208	B6-5	50	ML	1/12/2011	15	28	94.1	25.5	35.2
A-10-208	B6-6	50	ML	1/12/2011	15	28	92.9	26.6	26.4
A-10-208	B6-11	50	ML	12/22/2010	20	7	87.3	32.6	29.7
A-10-208	B6-12	50	ML	12/22/2010	20	7	90.8	27.6	25.4
A-10-208	B6-14	50	ML	12/29/2010	20	14	90.0	28.9	24.5
A-10-208	B6-15	50	ML	1/12/2011	20	28	92.4	28.1	62.2
A-10-208	B6-16	50	ML	1/12/2011	20	28	95.9	22.9	66.6
A-10-208	B6-19	50	ML	2/9/2011	20	56	92.3	26.9	58.9
A-10-208	B6-21	50	ML	12/22/2010	10	7	88.2	31.0	11.1
A-10-208	B6-22	50	ML	12/29/2010	10	14	88.1	31.3	12.8
A-10-208	B6-23	50	ML	1/12/2011	10	28	90.8	28.3	16.3
A-10-208	B6-24	50	ML	2/9/2011	10	56	89.2	30.3	16.1
A-10-209	B4-1	30	ML	12/17/2010	15	7	87.0	32.5	27.7
A-10-209	B4-3	30	ML	12/24/2010	15	14	86.4	34.2	28.4
A-10-209	B4-4	30	ML	1/7/2011	15	28	87.4	33.7	32.0
A-10-209	B4-5	30	ML	1/7/2011	15	28	87.0	33.8	31.0
A-10-209	B4-8	30	ML	2/4/2011	15	56	87.1	34.0	30.8
A-10-209	B4-11	30	ML	12/17/2010	20	7	89.4	30.5	53.3
A-10-209	B4-13	30	ML	12/24/2010	20	14	88.4	32.5	57.3
A-10-209	B4-14	30	ML	1/7/2011	20	28	89.4	31.3	60.7
A-10-209	B4-15	30	ML	1/7/2011	20	28	89.2	31.7	66.6
A-10-209	B4-18	30	ML	2/4/2011	20	56	89.7	32.0	57.7
A-10-210	B6-1	50	ML	12/23/2010	15	7	90.2	30.9	25.6
A-10-210	B6-2	50	ML	12/23/2010	15	7	90.5	30.9	24.8
A-10-210	B6-4	50	ML	12/30/2010	15	14	90.3	31.0	31.7
A-10-210	B6-5	50	ML	1/13/2011	15	28	94.0	27.1	40.2
A-10-210	B6-6	50	ML	1/13/2011	15	28	93.9	26.8	38.7
A-10-210	B6-9	50	ML	2/10/2011	15	56	94.9	24.8	37.9

Note:
1) UC – Unconfined Compressive Strength.

TABLE 7. SUMMARY OF UC TESTS ON CEMENT-SOIL MIX SAMPLES WITH DIFFERENT CEMENT CONTENTS, NORTH SIDE OF THE CHANNEL (PIER A) (CONTINUED)

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date Tested	Cement Content (%)	Curing Period (Days)	Dry Density (pcf)	Moisture Content (%)	UC Strength [1] (ksf)
A-10-210	B6-11	50	ML	12/23/2010	20	7	92.1	29.1	66.2
A-10-210	B6-12	50	ML	12/23/2010	20	7	90.8	30.4	22.0
A-10-210	B6-14	50	ML	12/30/2010	20	14	91.5	30.0	42.3
A-10-210	B-6-15	50	ML	1/13/2011	20	28	96.8	23.8	43.5
A-10-210	B-6-16	50	ML	1/13/2011	20	28	94.1	26.7	41.2
A-10-210	B-6-19	50	ML	2/10/2011	20	56	97.6	22.1	85.0
A-10-211	B5-1	40	SM	12/17/2010	15	7	89.2	29.4	30.8
A-10-211	B5-3	40	SM	12/24/2010	15	14	87.7	32.8	38.1
A-10-211	B5-4	40	SM	1/7/2011	15	28	88.4	32.5	41.6
A-10-211	B5-5	40	SM	1/7/2011	15	28	88.1	32.6	40.4
A-10-211	B5-8	40	SM	2/4/2011	15	56	88.0	32.3	39.6
A-10-212	B1-1	0	SM	12/21/2010	15	7	81.2	35.4	8.4
A-10-212	B1-2	0	SM	12/28/2010	15	7	84.6	30.2	18.1
A-10-212	B1-3	0	SM	1/11/2011	15	28	84.0	34.2	31.0
A-10-212	B1-4	0	SM	1/11/2011	15	28	82.8	34.5	27.4

Note:
1) UC – Unconfined Compressive Strength.

TABLE 8. SUMMARY OF UU TRIAXIAL TESTS ON CEMENT-SOIL MIX SAMPLES WITH DIFFERENT CEMENT CONTENTS, NORTH SIDE OF THE CHANNEL (PIER A)

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date Tested	Cement Content (%)	Curing Period (Days)	Dry Density (pcf)	Moisture Content (%)	Confining Pressure (psi)	S_u [1] (ksf)
A-10-208	B6-3	50	ML	12/22/2010	15	7	87.5	32.9	15	11.8
A-10-208	B6-7	50	ML	1/12/2011	15	28	92.4	27.3	15	21.2
A-10-208	B6-8	50	ML	1/12/2011	15	28	90.2	30.2	15	13.0
A-10-208	B6-13	50	ML	12/22/2010	20	7	88.0	32.2	15	15.5
A-10-208	B6-17	50	ML	1/12/2011	20	28	90.7	29.6	15	27.7
A-10-208	B6-18	50	ML	1/12/2011	20	28	93.7	26.2	15	25.2
A-10-209	B4-2	30	ML	12/17/2010	15	7	89.7	30.7	15	15.3
A-10-209	B4-6	30	ML	1/7/2011	15	28	87.4	33.4	15	18.1
A-10-209	B4-7	30	ML	1/7/2011	15	28	87.5	33.4	15	16.9
A-10-209	B4-10	30	ML	2/14/2011	15	66	87.2	33.1	15	15.8
A-10-209	B4-12	30	ML	12/17/2010	20	7	89.4	31.9	15	25.9
A-10-209	B4-16	30	ML	1/7/2011	20	28	89.1	31.3	15	31.9
A-10-209	B4-17	30	ML	1/7/2011	20	28	89.0	31.3	15	29.7
A-10-210	B6-3	50	ML	12/23/2010	15	7	89.9	31.6	15	14.9
A-10-210	B6-7	50	ML	1/13/2011	15	28	92.3	30.4	15	18.4
A-10-210	B6-8	50	ML	1/13/2011	15	28	90.7	31.6	15	15.8
A-10-210	B6-13	50	ML	12/23/2010	20	7	90.8	30.1	15	21.0
A-10-210	B6-17	50	ML	1/13/2011	20	28	99.3	21.2	15	32.4
A-10-210	B6-18	50	ML	1/13/2011	20	28	96.8	24.0	15	35.1
A-10-211	B5-2	40	SM	12/17/2010	15	7	88.8	32.0	15	16.8
A-10-211	B5-6	40	SM	1/7/2011	15	28	87.9	32.4	15	22.0

Note:

1) S_u – Shear Strength.

TABLE 9. SUMMARY OF UC TESTS ON CEMENT-SOIL MIX SAMPLES WITH DIFFERENT CEMENT CONTENTS, SOUTH SIDE OF THE CHANNEL (PIER S)

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date Tested	Cement Content (%)	Curing Period (Days)	Dry Density (pcf)	Moisture Content (%)	UC Strength [1] (ksf)
A-10-201	B2-1	10	SM	12/27/2010	15	7	90.2	30.9	19.1
A-10-201	B2-2	10	SM	1/17/2011	15	28	92.0	28.3	27.3
A-10-202	B5-1	40	CL-ML	12/27/2010	10	10	85.4	32.6	7.6
A-10-202	B5-2	40	CL-ML	1/14/2011	10	28	83.8	36.6	12.4
A-10-202	B5-3	40	CL-ML	2/11/2011	10	56	82.3	37.6	13.9
A-10-202	B5-5	40	CL-ML	12/24/2010	15	7	86.2	31.6	20.0
A-10-202	B5-6	40	CL-ML	12/27/2010	15	10	83.1	36.4	20.5
A-10-202	B5-11	40	CL-ML	2/11/2011	15	56	82.8	36.9	28.2
A-10-202	B5-15	40	CL-ML	12/27/2010	20	10	87.1	33.0	37.1
A-10-202	B5-16	40	CL-ML	12/24/2010	20	7	89.6	28.3	37.7
A-10-202	B5-18	40	CL-ML	1/14/2011	20	28	84.1	35.7	41.0
A-10-202	B5-21	40	CL-ML	2/11/2011	20	56	84.7	36.0	54.2
A-10-203	B4-1	30	SM	12/29/2010	15	7	84.8	32.1	14.1
A-10-203	B4-3	30	SM	1/19/2011	15	28	83.8	32.5	19.4
A-10-203	B4-4	30	SM	1/19/2011	15	28	85.4	31.8	20.0
A-10-203	B4-7	30	SM	2/16/2011	15	56	85.0	32.5	23.5
A-10-203	B4-9	30	SM	12/29/2010	20	7	86.2	30.6	26.3
A-10-203	B4-11	30	SM	1/19/2011	20	28	88.1	29.2	38.1
A-10-203	B4-12	30	SM	1/19/2011	20	28	87.2	30.3	37.2
A-10-203	B4-15	30	SM	2/16/2011	20	56	85.8	32.0	44.3
A-10-204	B5-1	40	ML	12/27/2010	15	7	86.7	34.1	19.7
A-10-204	B5-3	40	ML	1/17/2011	15	28	92.1	25.0	29.4
A-10-204	B5-4	40	ML	1/17/2011	15	28	93.0	24.5	25.5
A-10-204	B5-7	40	ML	2/14/2011	15	56	89.2	30.0	24.9
A-10-205	B4-1	41.5	CL-ML	12/27/2010	15	7	82.6	35.6	13.2
A-10-205	B4-3	41.5	CL-ML	1/17/2011	15	28	87.4	29.1	22.9
A-10-205	B4-4	41.5	CL-ML	1/17/2011	15	28	80.3	39.1	22.0
A-10-205	B4-7	41.5	CL-ML	2/14/2011	15	56	83.7	35.4	20.6
A-10-206	B2-1	10	ML	12/28/2010	15	7	89.9	28.0	16.0
A-10-206	B2-2	10	ML	1/18/2011	15	28	88.3	29.2	23.3

Note:
1) UC – Unconfined Compressive Strength.

TABLE 9. SUMMARY OF UC TESTS ON CEMENT-SOIL MIX SAMPLES WITH DIFFERENT CEMENT CONTENTS, SOUTH SIDE OF THE CHANNEL (PIER S) (CONTINUED)

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date Tested	Cement Content (%)	Curing Period (Days)	Dry Density (pcf)	Moisture Content (%)	UC Strength [1] (ksf)
A-10-206	B6-1	50	ML	12/27/2010	15	9	84.0	35.0	15.6
A-10-206	B6-2	50	ML	12/25/2010	15	7	82.9	36.6	15.5
A-10-206	B6-4	50	ML	1/15/2011	15	28	81.8	37.1	22.0
A-10-206	B6-7	50	ML	2/12/2011	15	56	82.2	37.8	22.3
A-10-206	B6-11	50	ML	12/25/2010	20	7	86.2	31.3	31.2
A-10-206	B6-12	50	ML	12/27/2010	20	9	82.7	37.4	25.4
A-10-206	B6-14	50	ML	1/15/2011	20	28	82.0	37.6	42.4
A-10-206	B6-17	50	ML	2/12/2011	20	56	81.8	38.1	50.4

Note:
1) UC – Unconfined Compressive Strength.

TABLE 10. SUMMARY OF UU TRIAXIAL TESTS ON CEMENT-SOIL MIX SAMPLES WITH DIFFERENT CEMENT CONTENTS, SOUTH SIDE OF THE CHANNEL (PIER S)

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date Tested	Cement Content (%)	Curing Period (Days)	Dry Density (pcf)	Moisture Content (%)	Confining Pressure (psi)	S_u [1] (ksf)
A-10-202	B5-7	40	CL-ML	12/27/2010	15	10	83.4	35.8	15	9.5
A-10-202	B5-9	40	CL-ML	1/14/2011	15	28	83.3	36.7	15	14.8
A-10-202	B5-10	40	CL-ML	1/14/2011	15	28	82.5	37.1	15	10.3
A-10-202	B5-17	40	CL-ML	12/27/2010	20	10	85.0	35.0	15	18.0
A-10-202	B5-19	40	CL-ML	1/14/2011	20	28	84.1	35.4	15	18.2
A-10-202	B5-20	40	CL-ML	1/14/2011	20	28	84.2	35.7	15	22.0
A-10-203	B4-2	30	SM	12/29/2010	15	7	83.6	33.0	15	7.9
A-10-203	B4-5	30	SM	1/19/2011	15	28	82.8	35.3	15	11.5
A-10-203	B4-6	30	SM	1/19/2011	15	28	81.3	38.0	15	11.1
A-10-203	B4-10	30	SM	12/29/2010	20	7	87.5	28.7	15	12.8
A-10-203	B4-13	30	SM	1/19/2011	20	28	82.4	37.0	15	21.5
A-10-203	B4-14	30	SM	1/19/2011	20	28	82.7	36.4	15	19.5
A-10-204	B5-2	40	ML	12/27/2010	15	7	88.5	32.0	15	10.5
A-10-204	B5-5	40	ML	1/17/2011	15	28	91.1	27.2	15	17.3
A-10-204	B5-6	40	ML	1/17/2011	15	28	91.5	26.7	15	17.3
A-10-205	B4-2	41.5	CL-ML	12/27/2010	15	7	84.6	32.8	15	10.5
A-10-205	B4-5	41.5	CL-ML	1/17/2011	15	28	83.4	33.7	15	12.0
A-10-205	B4-6	41.5	CL-ML	1/17/2011	15	28	83.4	34.3	15	11.9
A-10-206	B6-3	50	ML	12/27/2010	15	9	84.0	34.7	15	8.7
A-10-206	B6-5	50	ML	1/15/2011	15	28	81.2	37.9	15	11.5
A-10-206	B6-6	50	ML	1/15/2011	15	28	81.9	37.9	15	11.9
A-10-206	B6-13	50	ML	12/27/2010	20	9	83.8	35.8	15	13.3
A-10-206	B6-15	50	ML	1/15/2011	20	28	81.6	38.1	15	16.0
A-10-206	B6-16	50	ML	1/15/2011	20	28	81.8	38.4	15	16.0

Note:
1) S_u – Shear Strength.

TABLE 11. SUMMARY OF UC TESTS ON CEMENT-SOIL MIX SAMPLES WITH DIFFERENT CEMENT CONTENTS NEAR EXISTING WEST MSE WALL

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date Tested	Cement Content (%)	Curing Period (Days)	Dry Density (pcf)	Moisture Content (%)	UC Strength [1] (ksf)
A-10-212	B3-1	20	SM	12/29/2010	15	7	87.5	30.2	16.0
A-10-212	B3-2	20	SM	1/5/2011	15	14	85.0	34.5	17.3
A-10-212	B3-3	20	SM	1/19/2011	15	28	86.9	30.9	20.8
A-10-212	B3-4	20	SM	1/19/2011	15	28	87.3	30.4	19.8
A-10-212	B5-1	40	ML	12/30/2010	15	7	86.2	33.0	26.8
A-10-212	B5-3	40	ML	1/6/2011	15	14	88.5	31.1	24.5
A-10-212	B5-4	40	ML	1/20/2011	15	28	86.5	33.8	30.7
A-10-212	B5-5	40	ML	1/20/2011	15	28	85.8	34.5	31.0
A-10-212	B5-9	40	ML	12/30/2010	20	7	87.8	32.4	33.6
A-10-212	B5-11	40	ML	1/6/2011	20	14	89.3	30.5	36.8
A-10-212	B5-12	40	ML	1/20/2011	20	28	87.2	32.7	48.8
A-10-212	B5-13	40	ML	1/20/2011	20	28	88.1	31.7	54.4
A-10-212	B5-16	40	ML	2/17/2011	20	56	93.9	23.5	54.7
A-10-213	B3-1	20	ML	12/30/2010	15	7	84.2	35.9	23.4
A-10-213	B3-2	20	ML	12/30/2010	15	7	84.5	35.5	23.8
A-10-213	B3-4	20	ML	1/6/2011	15	14	86.0	32.3	12.5
A-10-213	B3-5	20	ML	1/20/2011	15	28	84.2	36.1	29.8
A-10-213	B3-6	20	ML	1/20/2011	15	28	84.0	36.0	25.8
A-10-213	B3-9	20	ML	2/17/2011	15	56	88.1	29.3	34.8
A-10-213	B3-11	20	ML	12/30/2010	20	7	83.2	37.2	28.7
A-10-213	B3-12	20	ML	12/30/2010	20	7	83.6	36.6	26.1
A-10-213	B3-14	20	ML	1/6/2011	20	14	87.2	31.5	30.9
A-10-213	B3-15	20	ML	1/20/2011	20	28	85.0	35.1	57.4
A-10-213	B3-16	20	ML	1/20/2011	20	28	84.4	35.1	54.4
A-10-213	B3-19	20	ML	2/17/2011	20	56	89.2	27.9	45.9
A-10-213	B3-21	20	ML	12/30/2010	10	7	81.9	37.6	7.1
A-10-213	B3-22	20	ML	1/20/2011	10	28	83.1	37.3	11.3

Note:
1) UC – Unconfined Compressive Strength.

TABLE 12. SUMMARY OF UU TRIAXIAL TESTS ON CEMENT-SOIL MIX SAMPLES WITH DIFFERENT CEMENT CONTENTS NEAR EXISTING WEST MSE WALL

Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date Tested	Cement Content (%)	Curing Period (Days)	Dry Density (pcf)	Moisture Content (%)	Confining Pressure (psi)	S_u [1] (ksf)
A-10-212	B5-2	40	ML	12/30/2010	15	7	86.3	34.0	15	12.4
A-10-212	B5-6	40	ML	1/20/2011	15	28	86.3	34.0	15	15.0
A-10-212	B5-7	40	ML	1/20/2011	15	28	86.7	33.6	15	16.0
A-10-212	B5-10	40	ML	12/30/2010	20	7	87.9	33.0	15	16.8
A-10-212	B5-14	40	ML	1/20/2011	20	28	87.9	32.8	15	23.8
A-10-212	B5-15	40	ML	1/20/2011	20	28	88.8	32.6	15	21.1
A-10-213	B3-3	20	ML	12/30/2010	15	7	83.6	36.2	15	8.8
A-10-213	B3-7	20	ML	1/20/2011	15	28	84.3	35.3	15	10.0
A-10-213	B3-8	20	ML	1/20/2011	15	28	83.7	36.1	15	14.3
A-10-213	B3-13	20	ML	12/30/2010	20	7	84.3	36.3	15	14.7
A-10-213	B3-17	20	ML	1/20/2011	20	28	85.1	34.9	15	30.6
A-10-213	B3-18	20	ML	1/20/2011	20	28	83.9	36.1	15	20.1

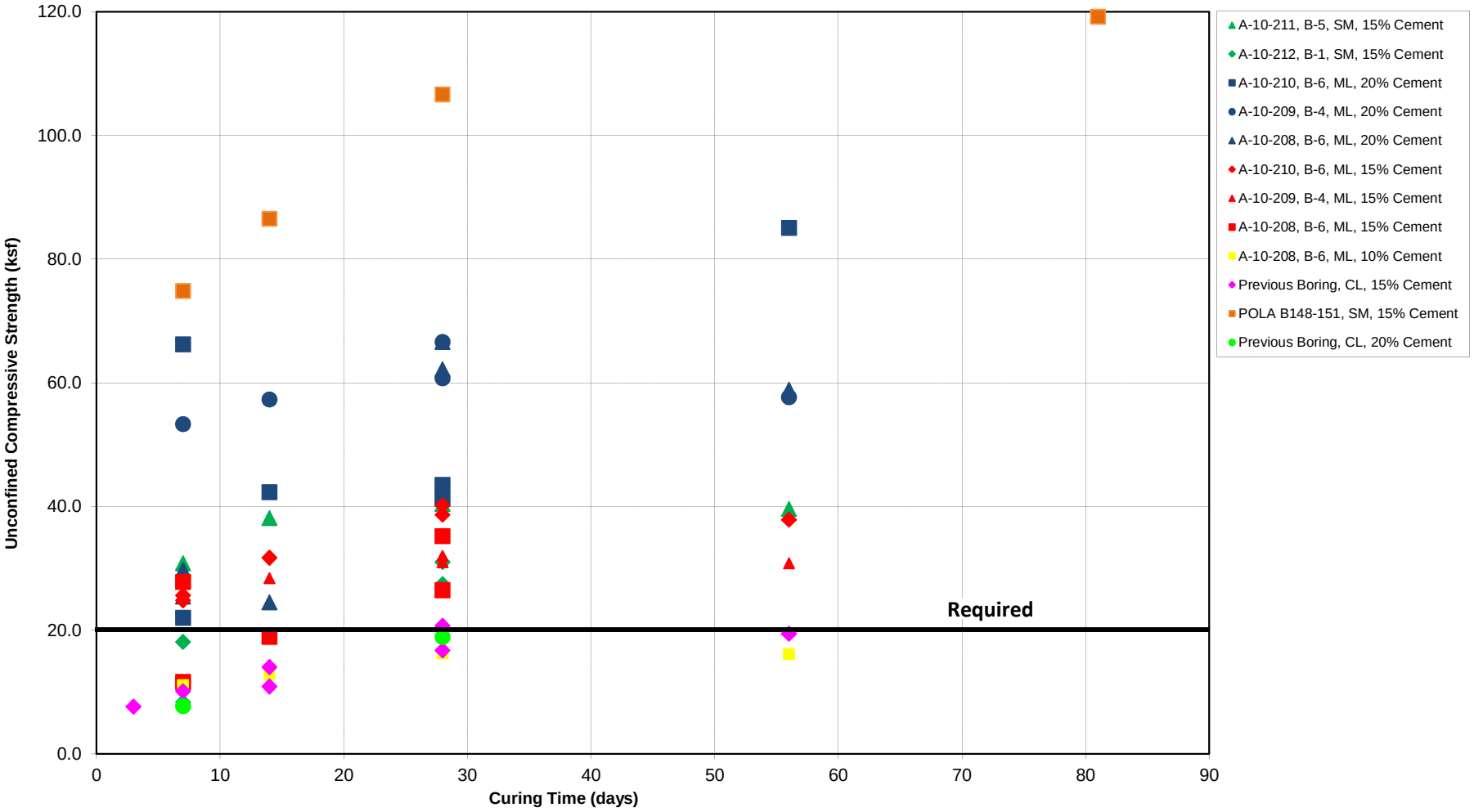
Note:
1) S_u – Shear Strength.

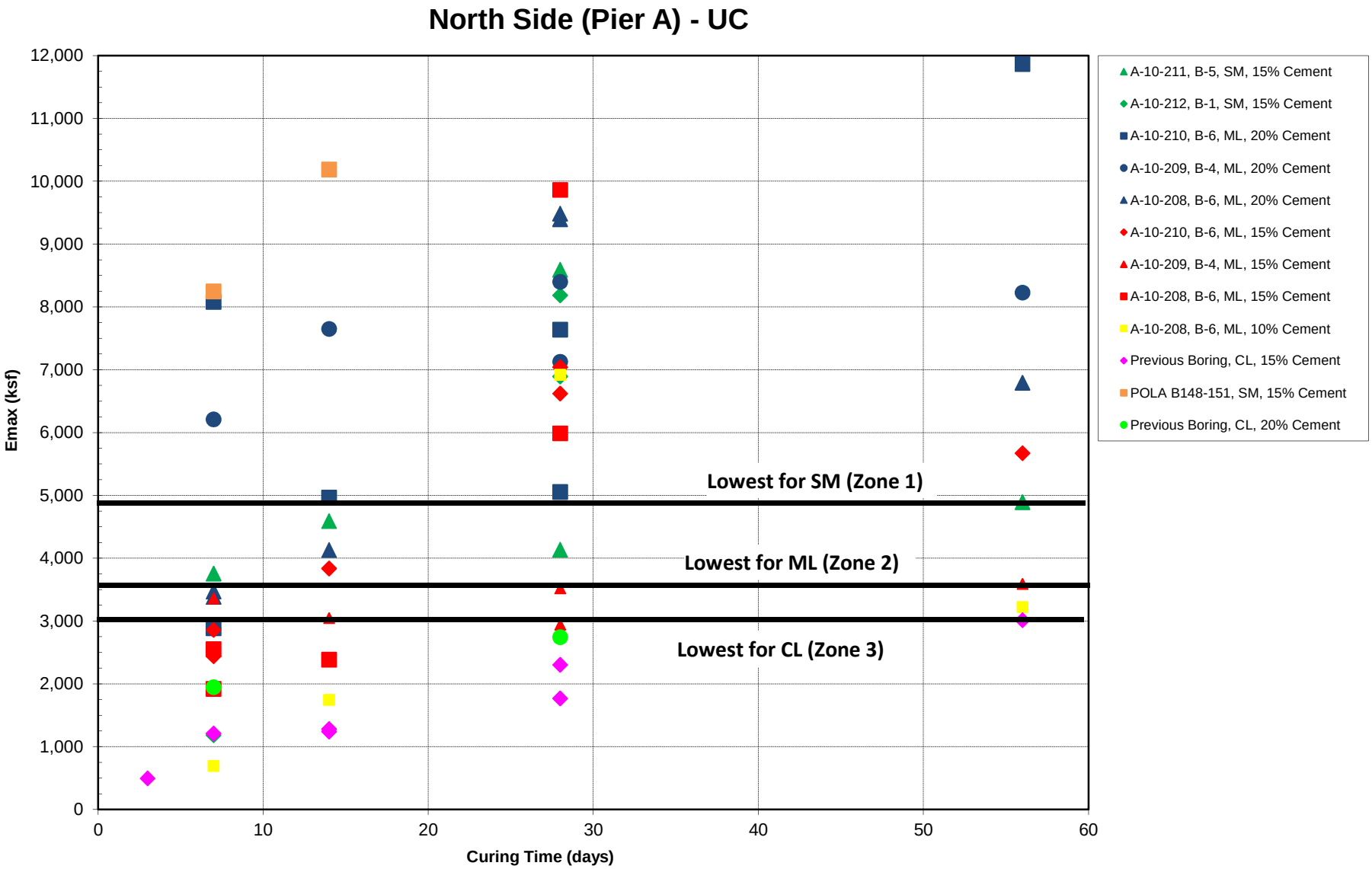
TABLE 13. SUMMARY OF UC TESTS FOR CEMENT-SOIL MIX SAMPLES ON SANDY SOILS WITH 15% CEMENT

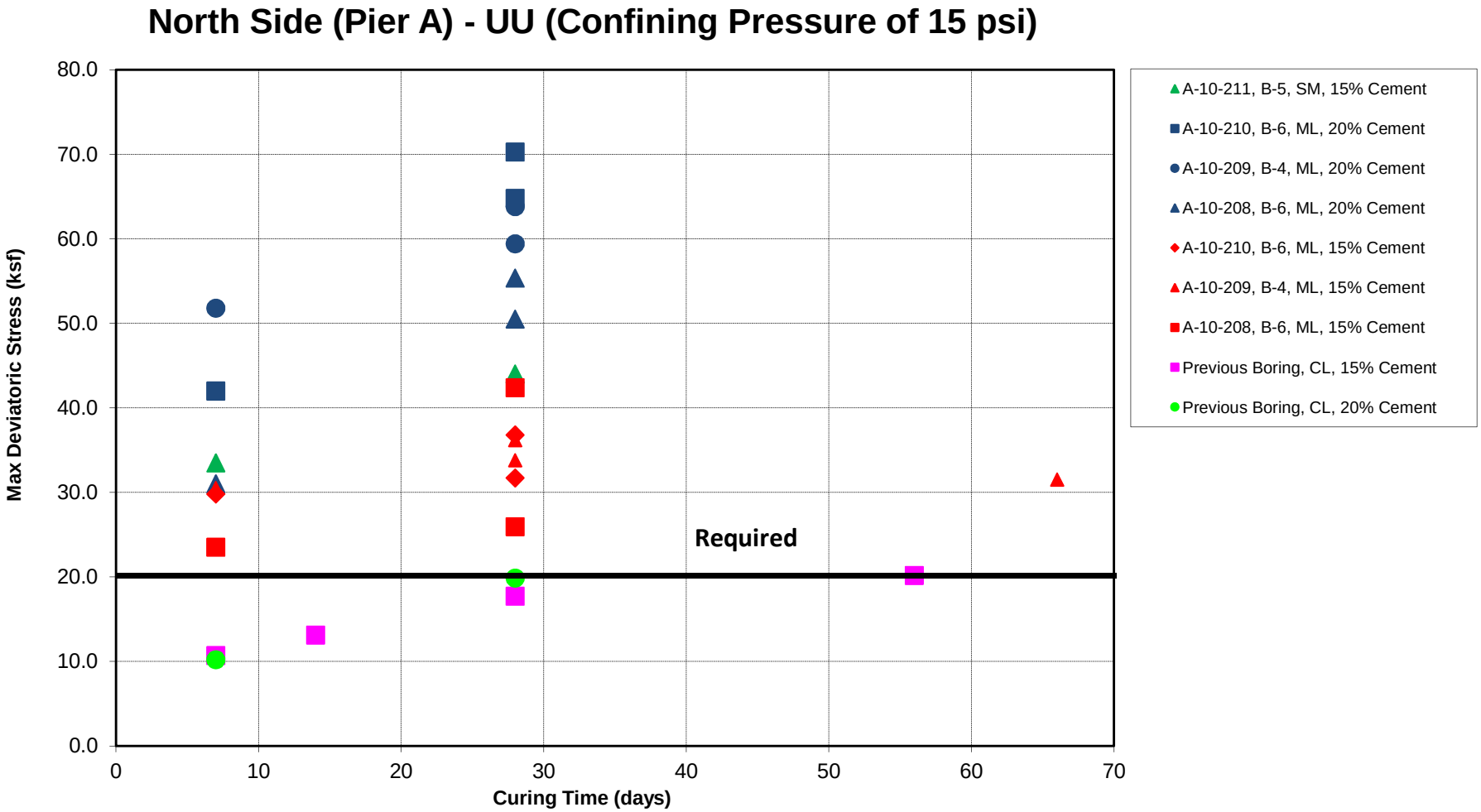
Location	Boring No.	Sample No.	Date Tested	Days Cured	Dry Density (pcf)	Moisture Content (%)	UC Strength [2] (ksf)
POLA Berths 148-151 [1]	10LH-2	B-2-1	11/18/2010	7	99.1	22.9	74.8
		B-2-2	11/25/2010	14	97.0	24.3	86.5
		B-2-3	12/09/2010	28	106.3	14.5	106.6
		B-2-4	1/31/2011	81	98.8	23.7	119.2

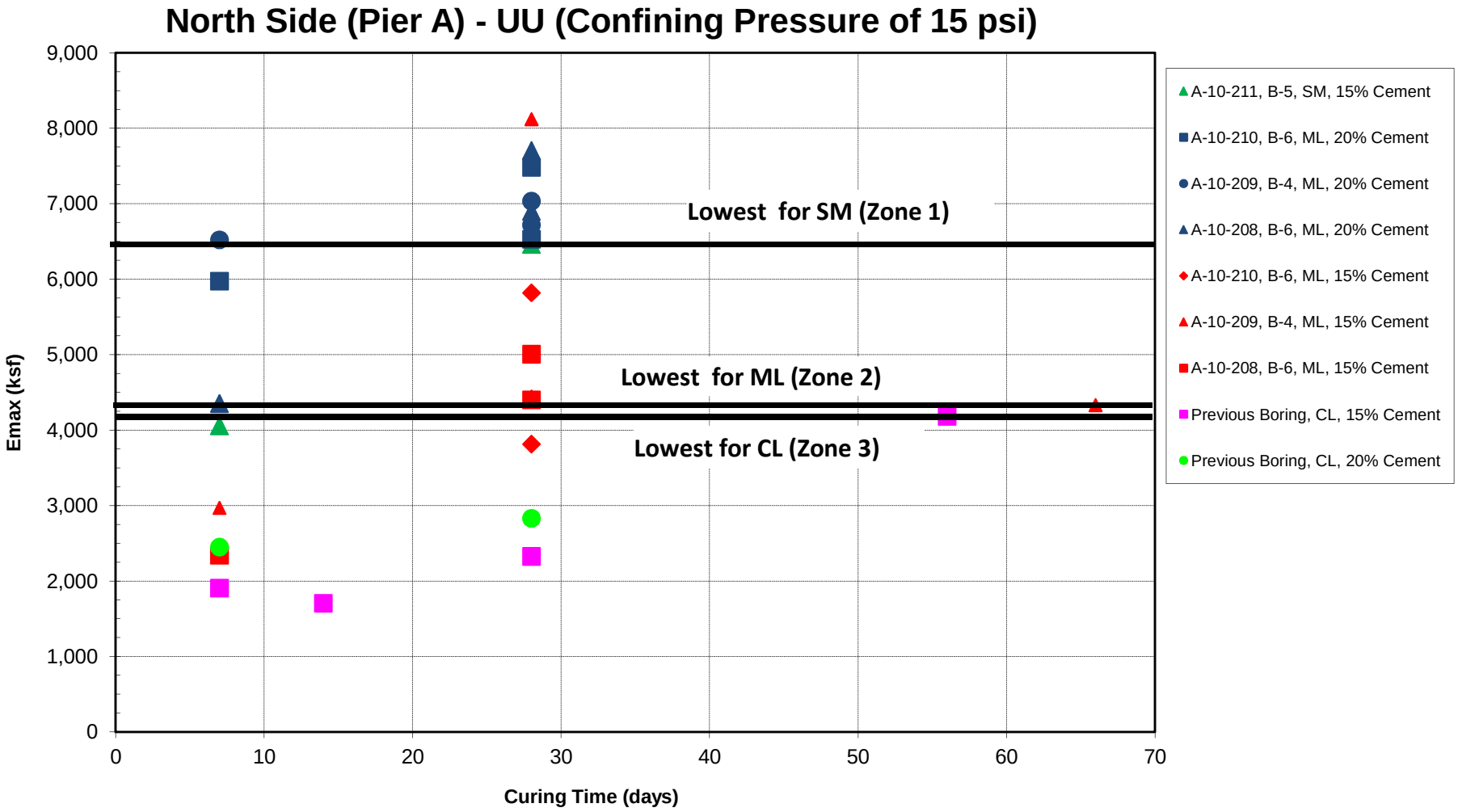
Notes:
1) Port of Los Angeles Berths 148 – 151 Marine Oil Terminal Project.
2) UC – Unconfined Compressive Strength.

North Side (Pier A) - UC

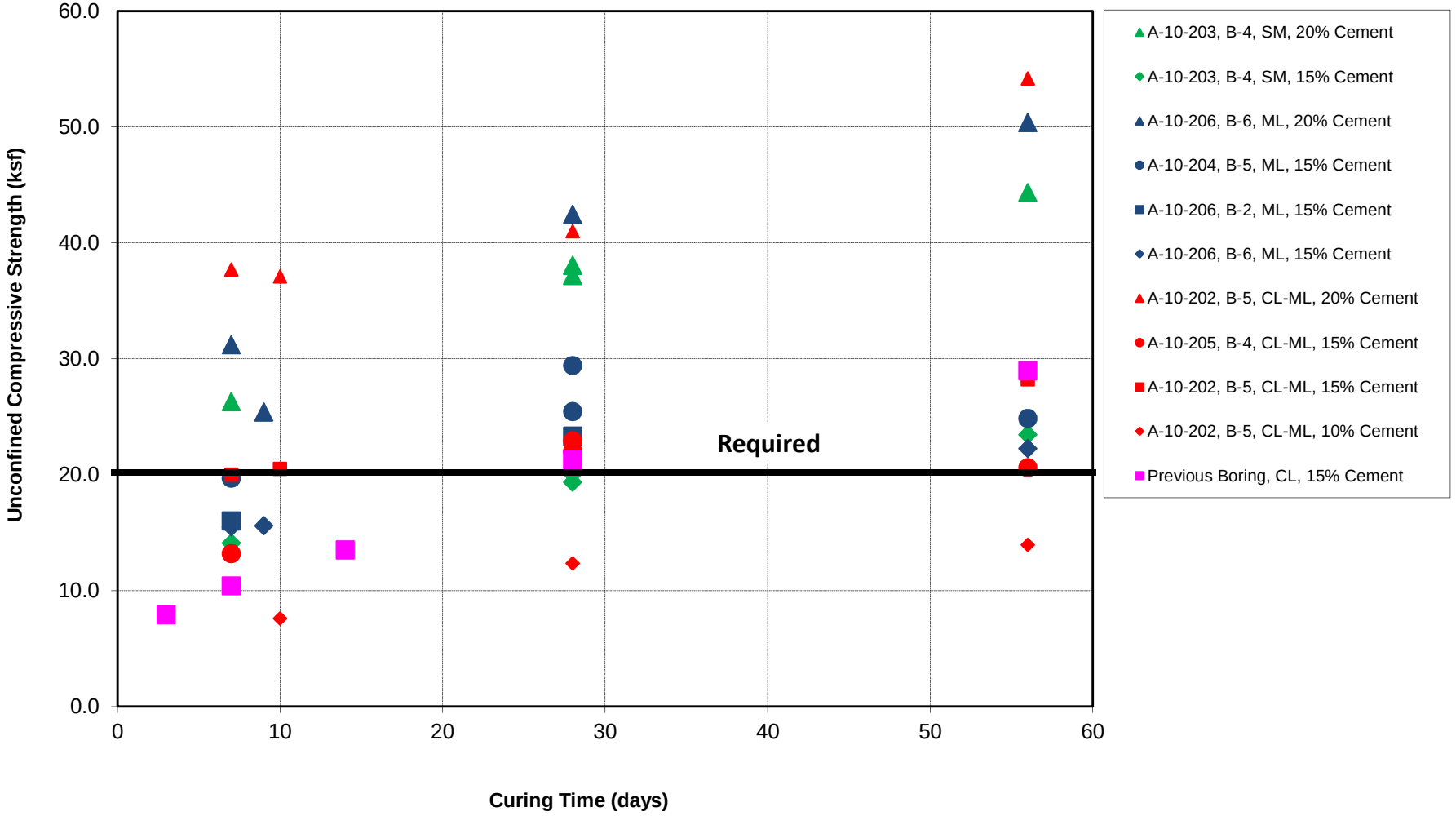



North Side (Pier A) - UC
Emax (ksf)
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
0
10
20
30
40
50
60
Curing Time (days)
Lowest for SM (Zone 1)
Lowest for ML (Zone 2)
Lowest for CL (Zone 3)
A-10-211, B-5, SM, 15% Cement
A-10-212, B-1, SM, 15% Cement
A-10-210, B-6, ML, 20% Cement
A-10-209, B-4, ML, 20% Cement
A-10-208, B-6, ML, 20% Cement
A-10-210, B-6, ML, 15% Cement
A-10-209, B-4, ML, 15% Cement
A-10-208, B-6, ML, 15% Cement
A-10-208, B-6, ML, 10% Cement
Previous Boring, CL, 15% Cement
POLA B148-151, SM, 15% Cement
Previous Boring, CL, 20% Cement

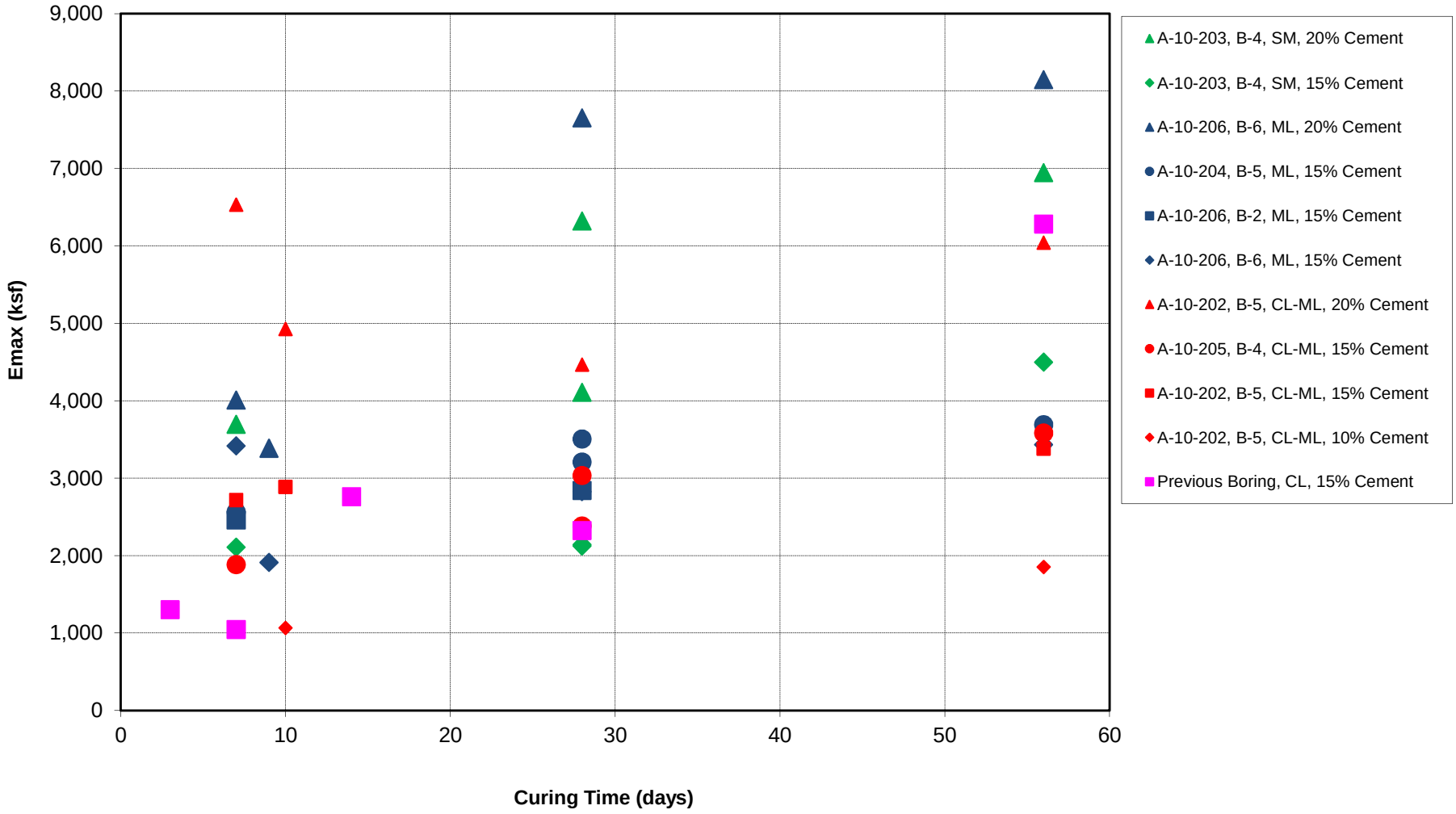

North Side (Pier A) - UU (Confining Pressure of 15 psi)
Max Deviatoric Stress (ksf)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0
10
20
30
40
50
60
70
Curing Time (days)
Required
A-10-211, B-5, SM, 15% Cement
A-10-210, B-6, ML, 20% Cement
A-10-209, B-4, ML, 20% Cement
A-10-208, B-6, ML, 20% Cement
A-10-210, B-6, ML, 15% Cement
A-10-209, B-4, ML, 15% Cement
A-10-208, B-6, ML, 15% Cement
Previous Boring, CL, 15% Cement
Previous Boring, CL, 20% Cement

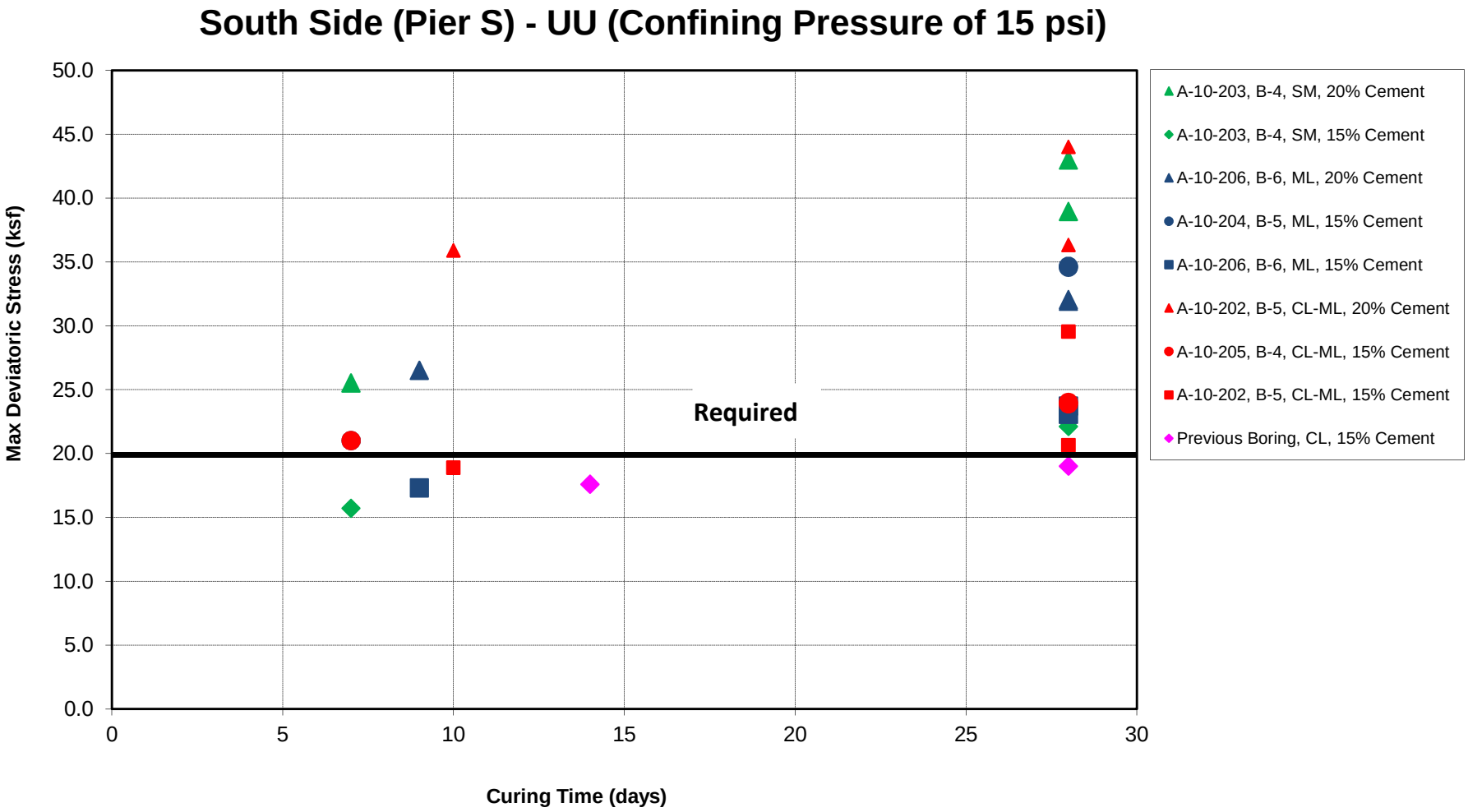

North Side (Pier A) - UU (Confining Pressure of 15 psi)
Emax (ksf)
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
0
10
20
30
40
50
60
70
Curing Time (days)
Lowest for SM (Zone 1)
Lowest for ML (Zone 2)
Lowest for CL (Zone 3)
A-10-211, B-5, SM, 15% Cement
A-10-210, B-6, ML, 20% Cement
A-10-209, B-4, ML, 20% Cement
A-10-208, B-6, ML, 20% Cement
A-10-210, B-6, ML, 15% Cement
A-10-209, B-4, ML, 15% Cement
A-10-208, B-6, ML, 15% Cement
Previous Boring, CL, 15% Cement
Previous Boring, CL, 20% Cement

South Side (Pier S) - UC

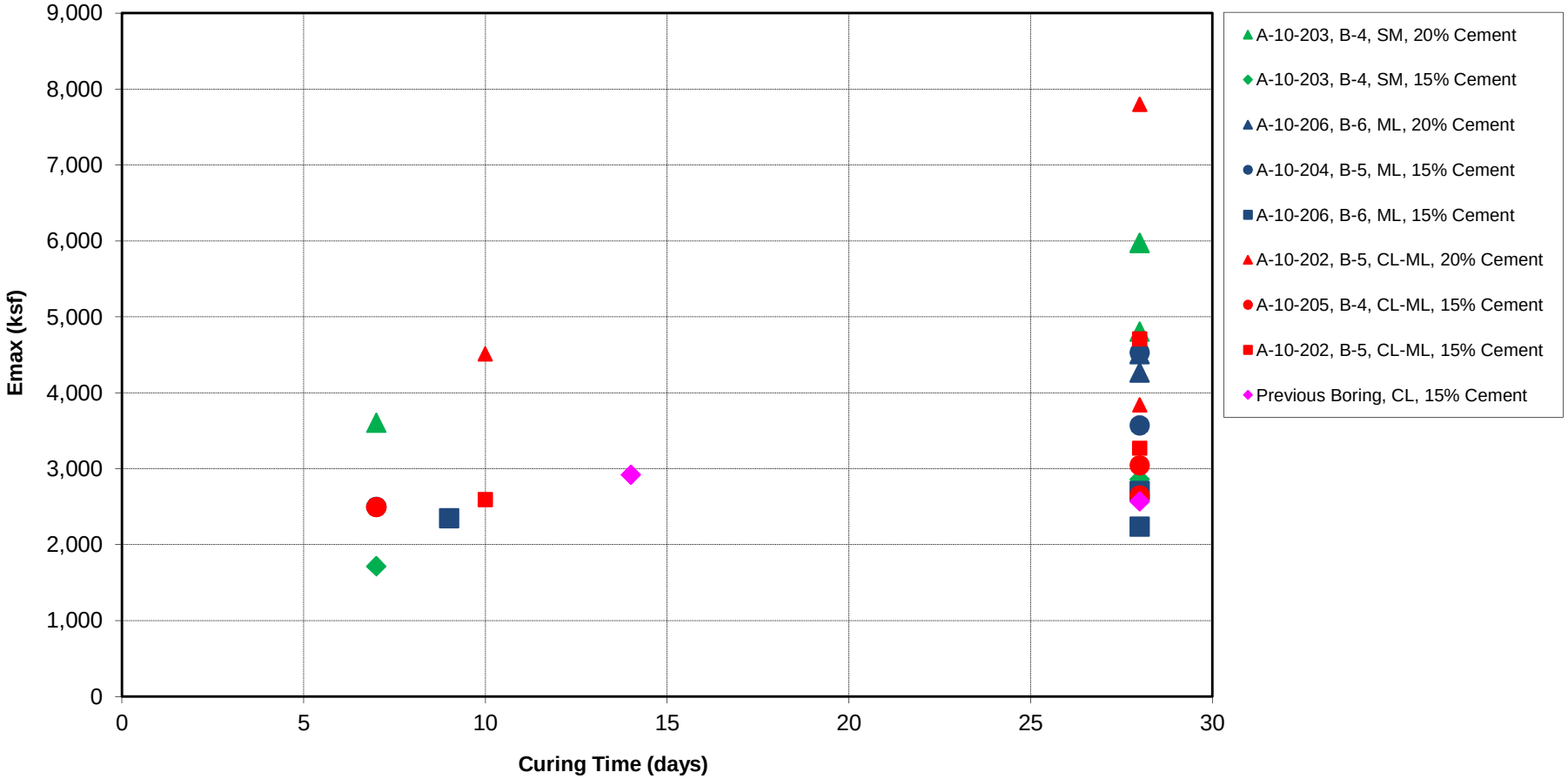


South Side (Pier S) - UC

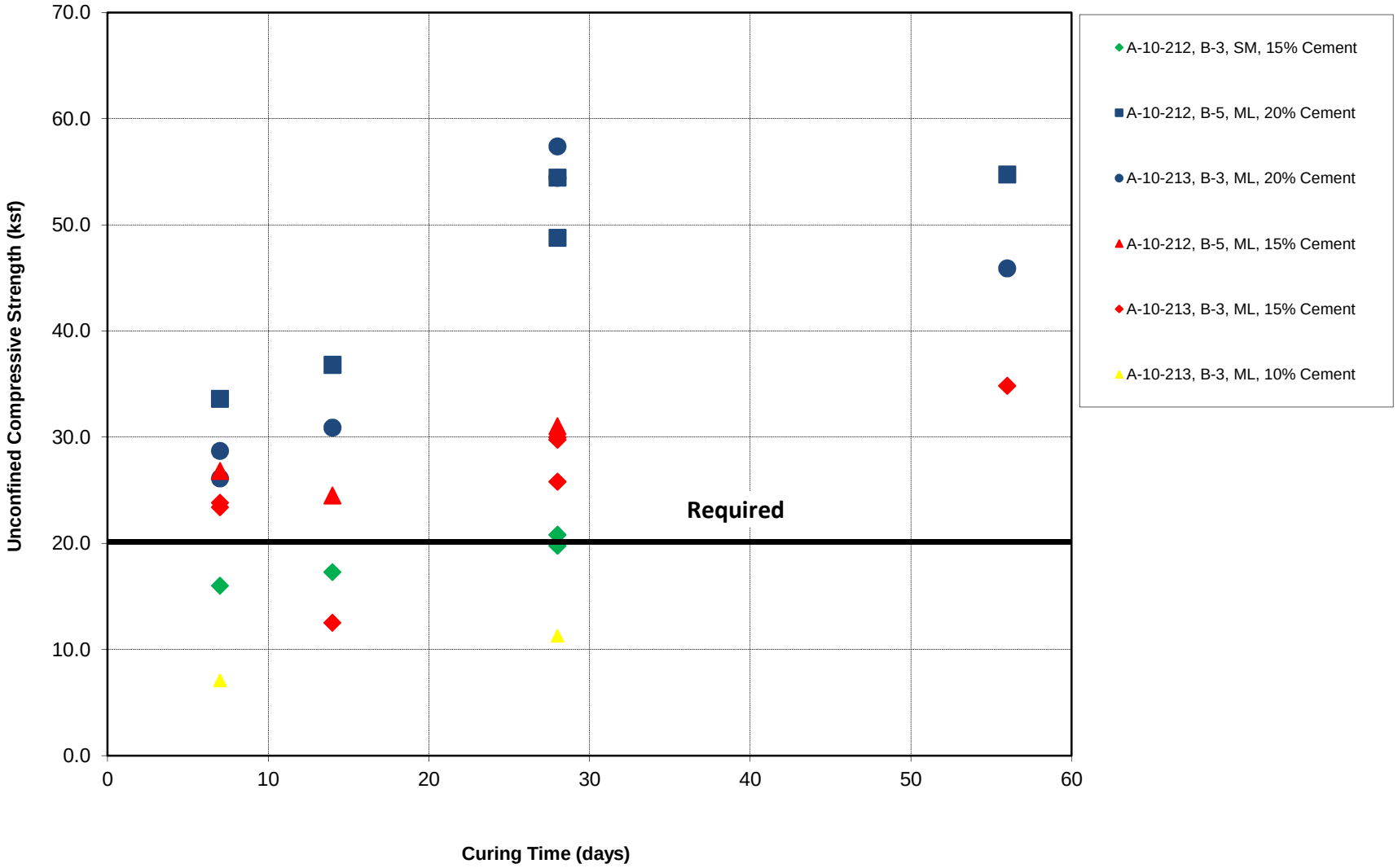


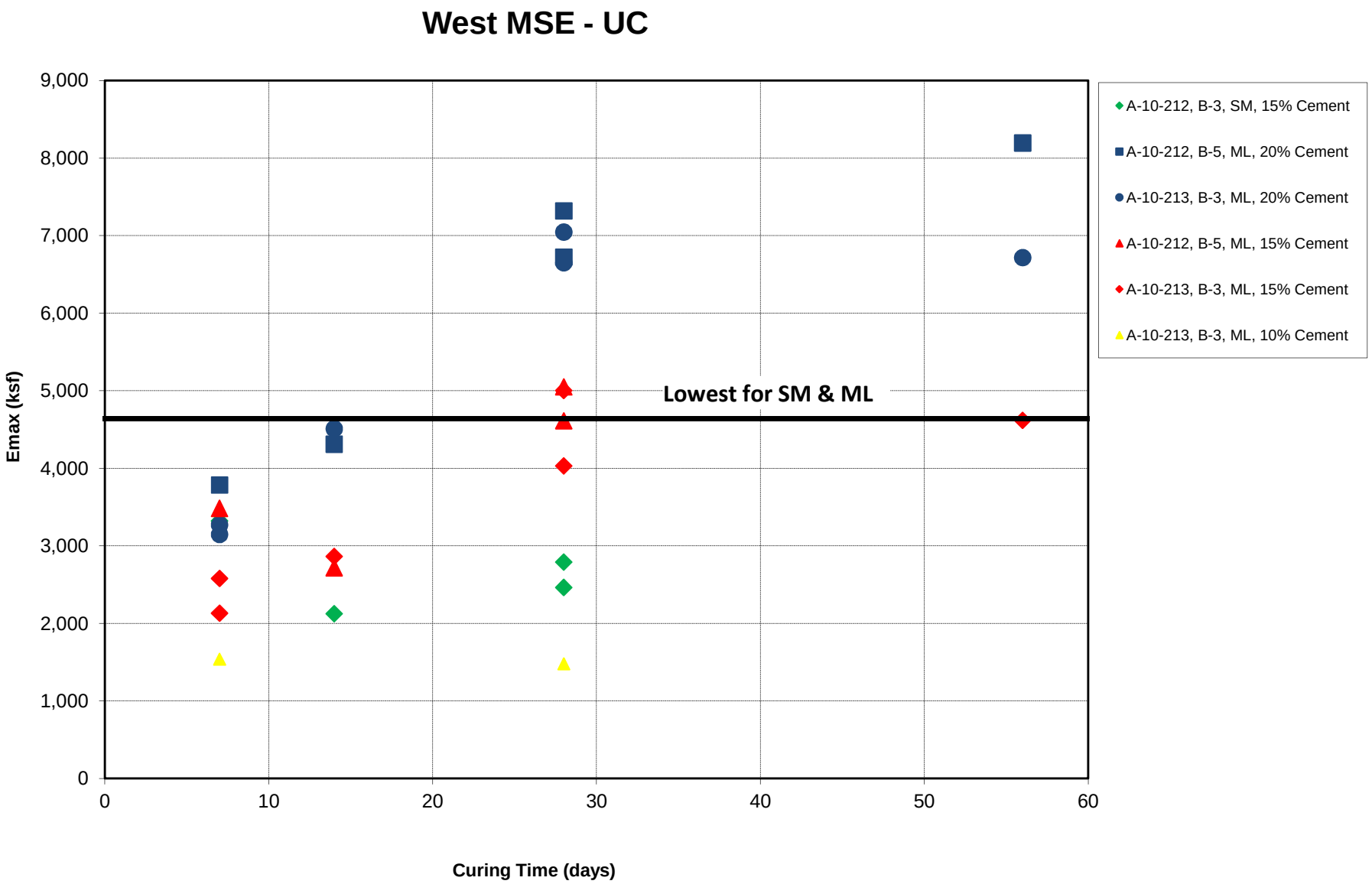

South Side (Pier S) - UU (Confining Pressure of 15 psi)
Max Deviatoric Stress (ksf)
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0
5
10
15
20
25
30
Curing Time (days)
Required
A-10-203, B-4, SM, 20% Cement
A-10-203, B-4, SM, 15% Cement
A-10-206, B-6, ML, 20% Cement
A-10-204, B-5, ML, 15% Cement
A-10-206, B-6, ML, 15% Cement
A-10-202, B-5, CL-ML, 20% Cement
A-10-205, B-4, CL-ML, 15% Cement
A-10-202, B-5, CL-ML, 15% Cement
Previous Boring, CL, 15% Cement

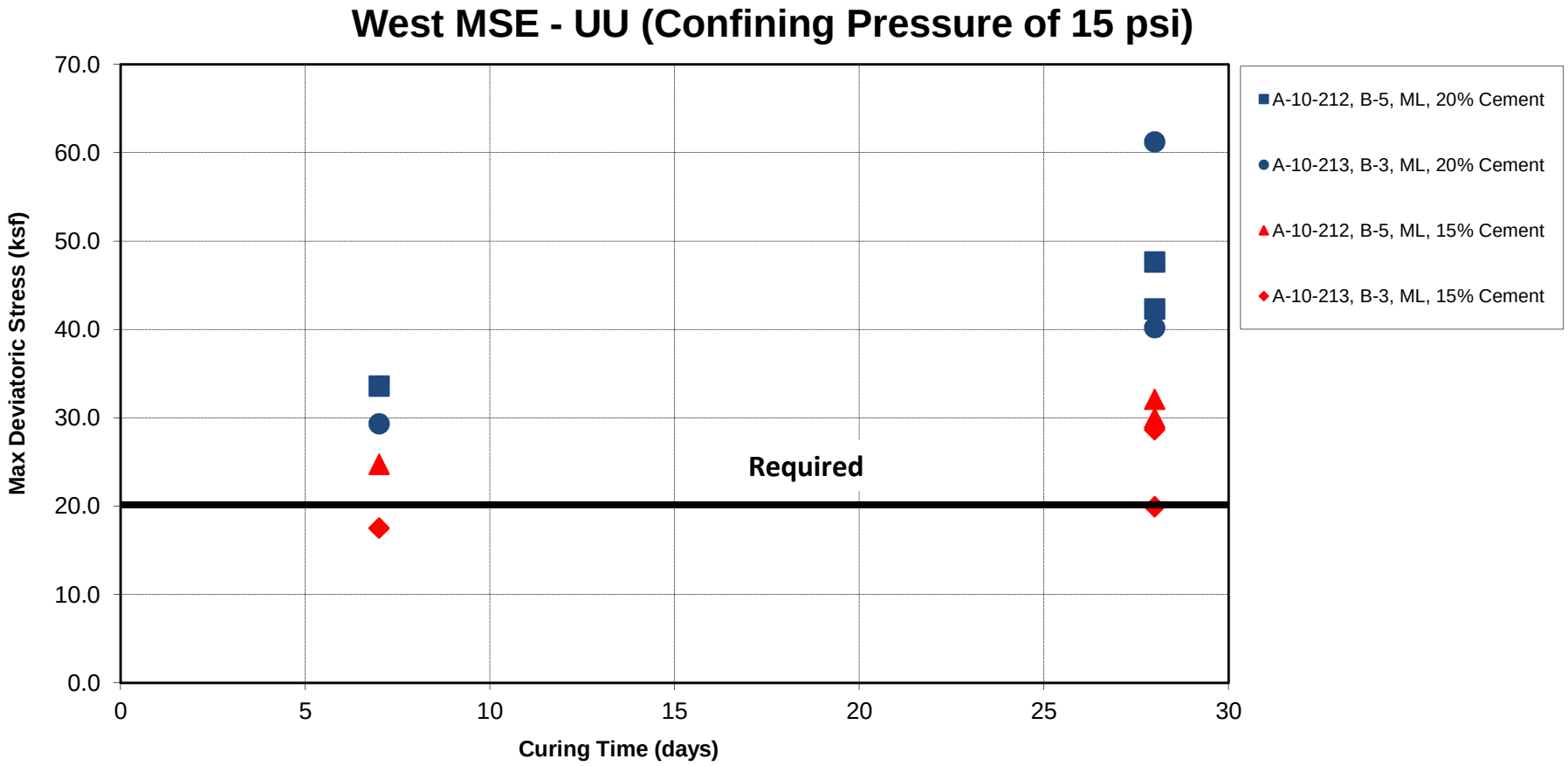
South Side (Pier S) - UU (Confining Pressure of 15 psi)

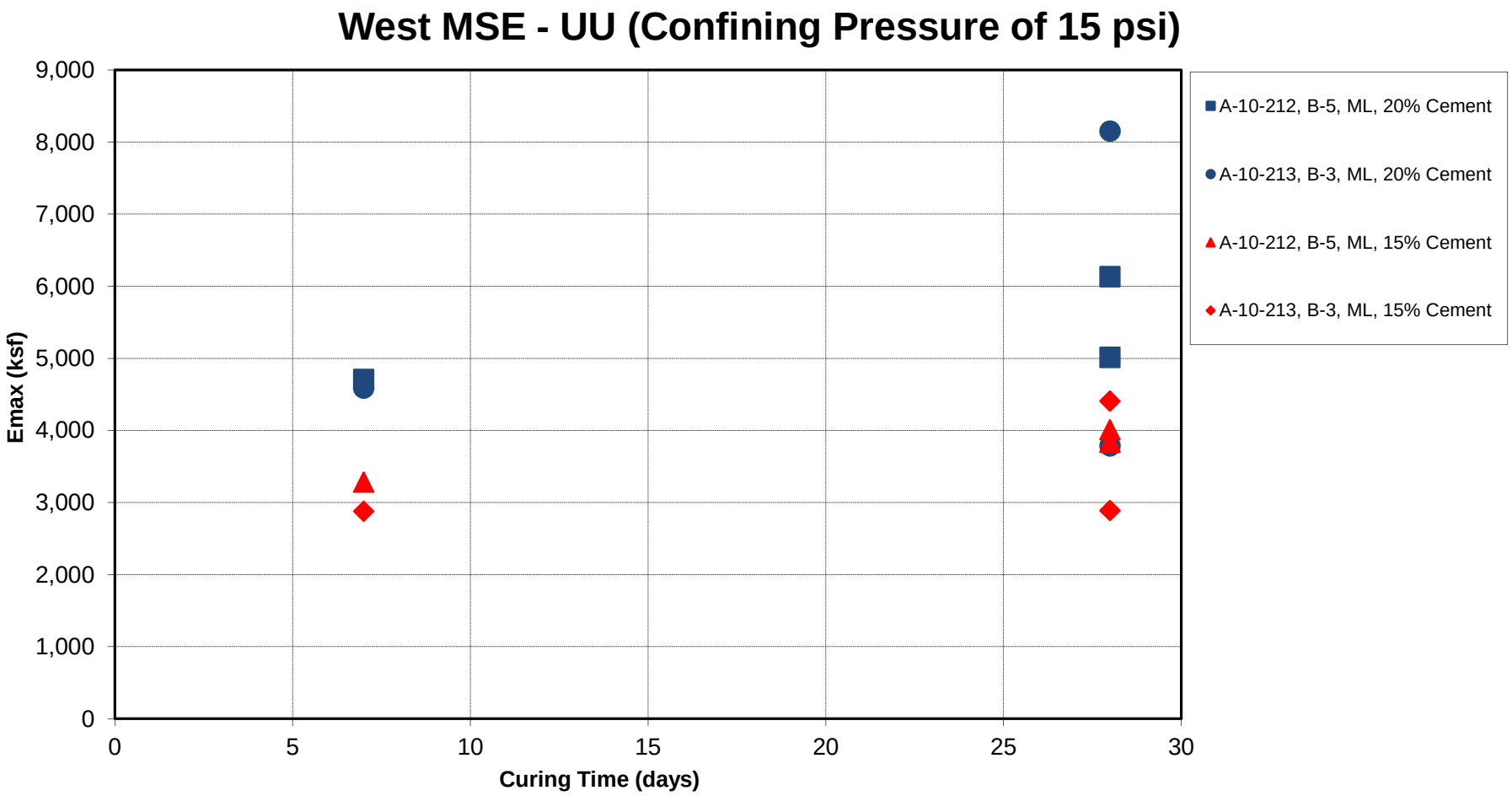


West MSE - UC


70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0
10
20
30
40
50
60
Unconfined Compressive Strength (ksf)
Curing Time (days)
Required
A-10-212, B-3, SM, 15% Cement
A-10-212, B-5, ML, 20% Cement
A-10-213, B-3, ML, 20% Cement
A-10-212, B-5, ML, 15% Cement
A-10-213, B-3, ML, 15% Cement
A-10-213, B-3, ML, 10% Cement


West MSE - UC
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Emax (ksf)
0
10
20
30
40
50
60
Curing Time (days)
Lowest for SM & ML
A-10-212, B-3, SM, 15% Cement
A-10-212, B-5, ML, 20% Cement
A-10-213, B-3, ML, 20% Cement
A-10-212, B-5, ML, 15% Cement
A-10-213, B-3, ML, 15% Cement
A-10-213, B-3, ML, 10% Cement


West MSE - UU (Confining Pressure of 15 psi)
Max Deviatoric Stress (ksf)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0
5
10
15
20
25
30
Curing Time (days)
Required
A-10-212, B-5, ML, 20% Cement
A-10-213, B-3, ML, 20% Cement
A-10-212, B-5, ML, 15% Cement
A-10-213, B-3, ML, 15% Cement


West MSE - UU (Confining Pressure of 15 psi)
Emax (ksf)
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
0
5
10
15
20
25
30
Curing Time (days)
A-10-212, B-5, ML, 20% Cement
A-10-213, B-3, ML, 20% Cement
A-10-212, B-5, ML, 15% Cement
A-10-213, B-3, ML, 15% Cement

LABORATORY TEST RESULTS FOR SELECTED IN-SITU SOIL SAMPLES

MOISTURE AND DENSITY

AP Engineering & Testing, Inc.

MOISTURE AND DENSITY TEST RESULTS

Client Name: Earth Mechanics, Inc.
Project Name: ACTA Schuyler Heim Bridge Future Fill
Project Number: 06-123

Laboratory No.: 10-1151
Date: 12/29/10

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
A 10 201	B2	10-20	33.4	NA
A 10 202	B5	40-50	40.7	NA
A 10 203	B4	30-40	36.9	NA
A 10 204	B5	40-50	33.7	NA
A 10 205	B4	30-40	39.0	NA
A 10 206	B2	10-20	35.8	NA
A 10 206	B6	50-60	35.0	NA
A 10 208	B6	50-60	33.8	NA
A 10 209	B4	30-40	33.8	NA
A 10 210	B6	50-60	30.0	NA
A 10 211	B5	40-50	26.8	NA
A 10 212	B1	0-10	34.2	NA
A 10 212	B3	20-30	30.4	NA
A 10 212	B5	40-50	30.0	NA
A 10 213	B3	20-30	31.0	NA

AP Engineering & Testing, Inc.

MOISTURE AND DENSITY TEST RESULTS

Client Name: Earth Mechanics, Inc.
Project Name: ACTA Schuyler Heim Bridge Future Fill
Project Number: 06-123

Laboratory No.: 10-1226
Date: 12/15/10

Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
R 10 301	S11	50.0	28.9	NA
R 10 301	S13	60.0	25.8	NA

PARTICLE SIZE ANALYSIS

AP Engineering & Testing, Inc.

PERCENT PASSING NO. 200 SIEVE

Client: Earth Mechanics, Inc.
Project Name: ACTA Schuyler Heim Bridge Future Fill
Project Number: 06-123

AP Lab No.: 10-1226
Date: 12/15/10

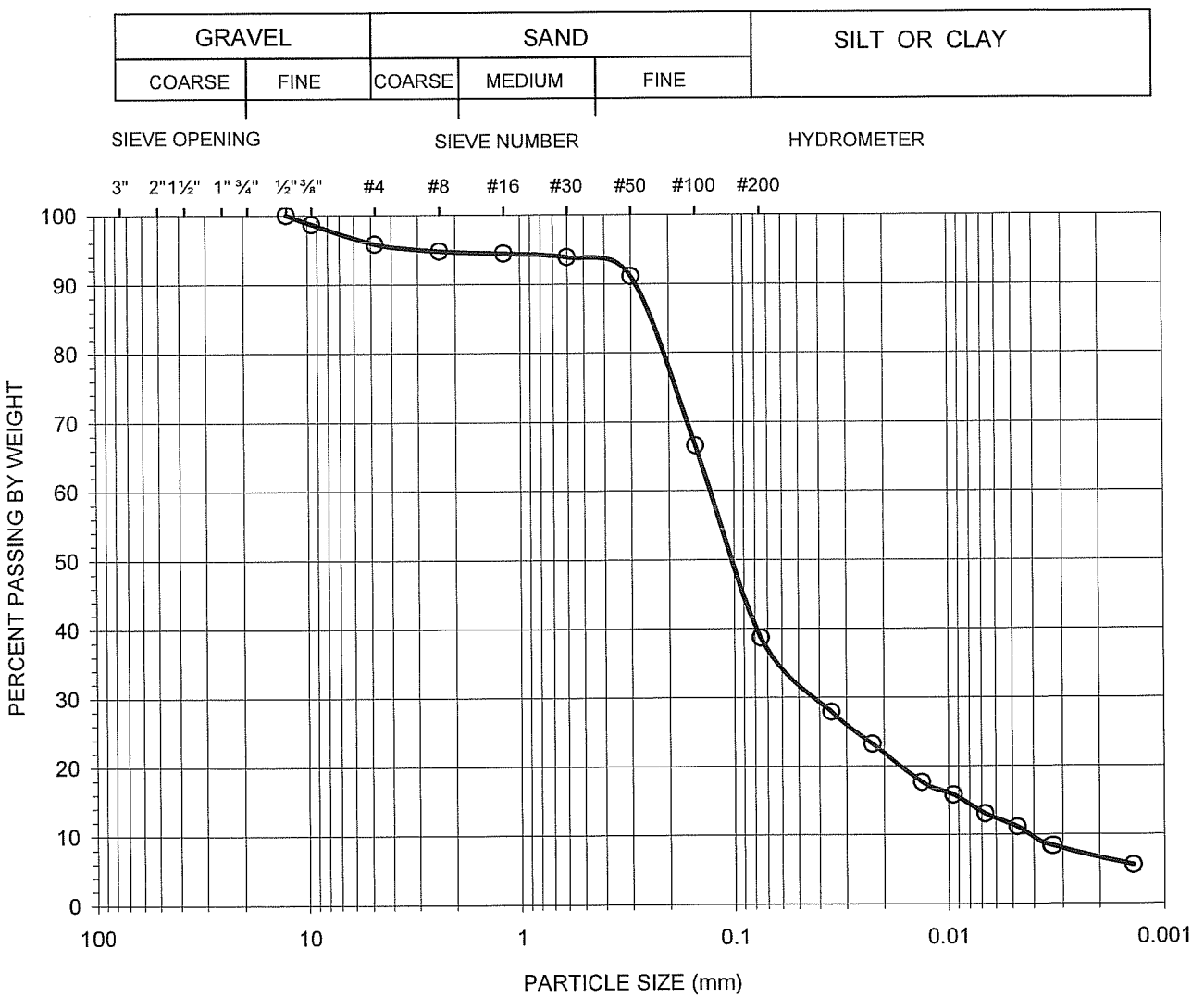
Boring No.	Sample No.	Sample Depth (ft)	Percent Fines (%)
R 10 301	T3	15	11.98
R 10 301	S13	60	8.73
R 10 301	S20	100	64.56

2607 Pomona Boulevard. Pomona, California 91768
Tel. (909) 869-6316, Fax (909) 869-6318

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	DK	Date:	12/22/10
Project Name:	Heim Bridge Future Fill DSM	Computed by:	KM	Date:	12/23/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

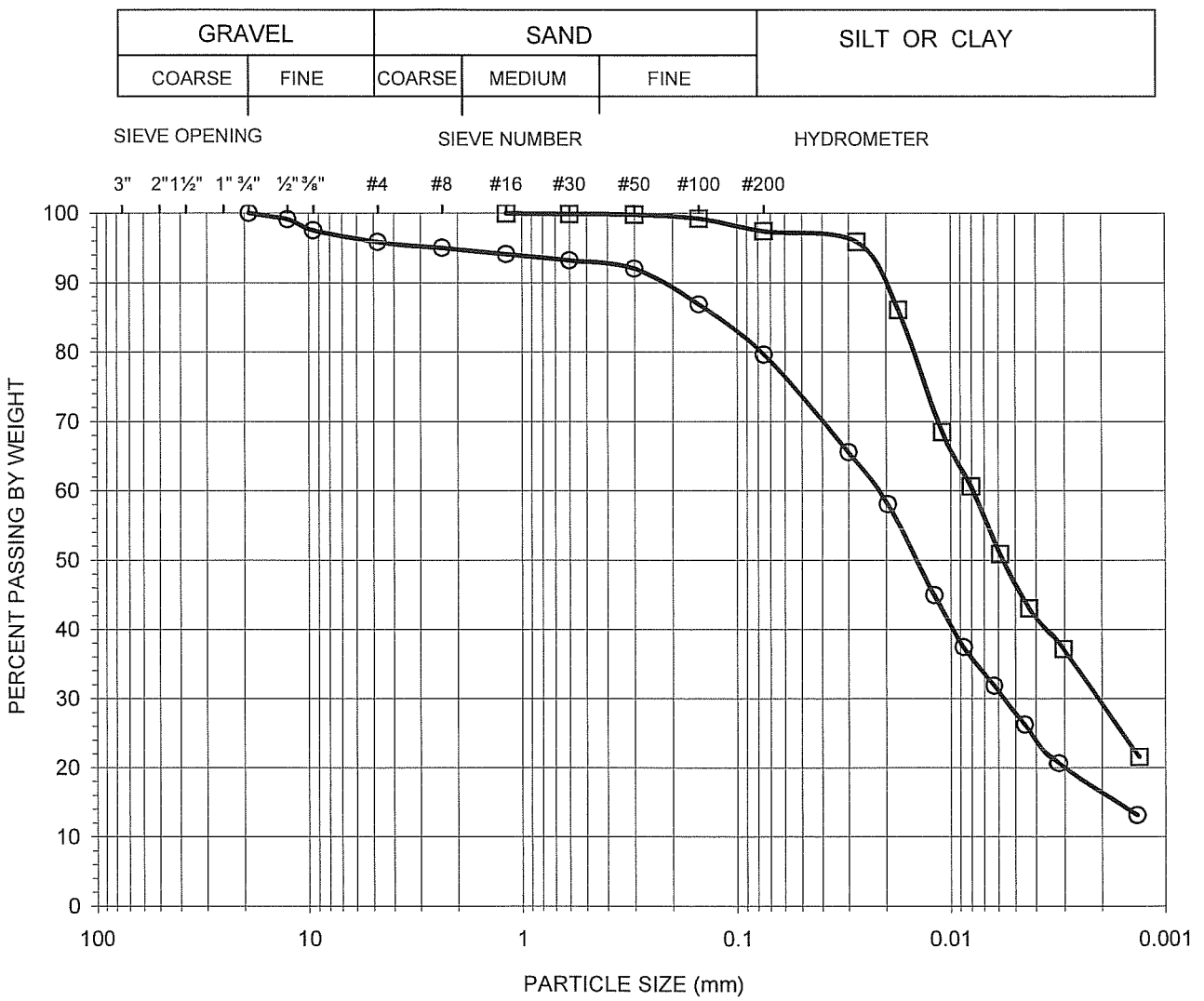


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 201	B2	10-20	4	57	39	N/P	SM

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/21/10

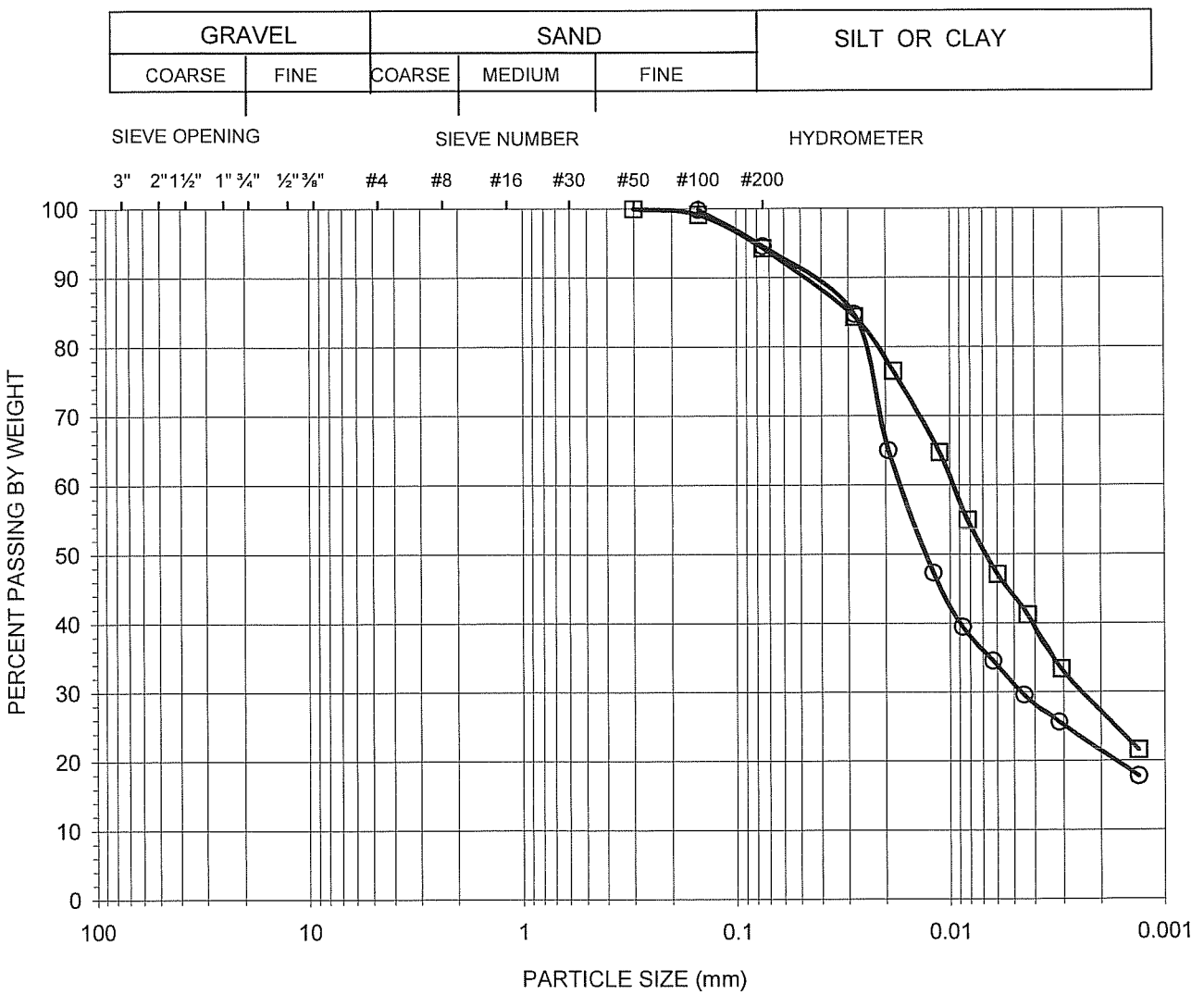


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 201	D1	35	4	16	80	32:22:10	CL
□	A 10 201	D2	50	0	3	97	45:23:22	CL

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/21/10

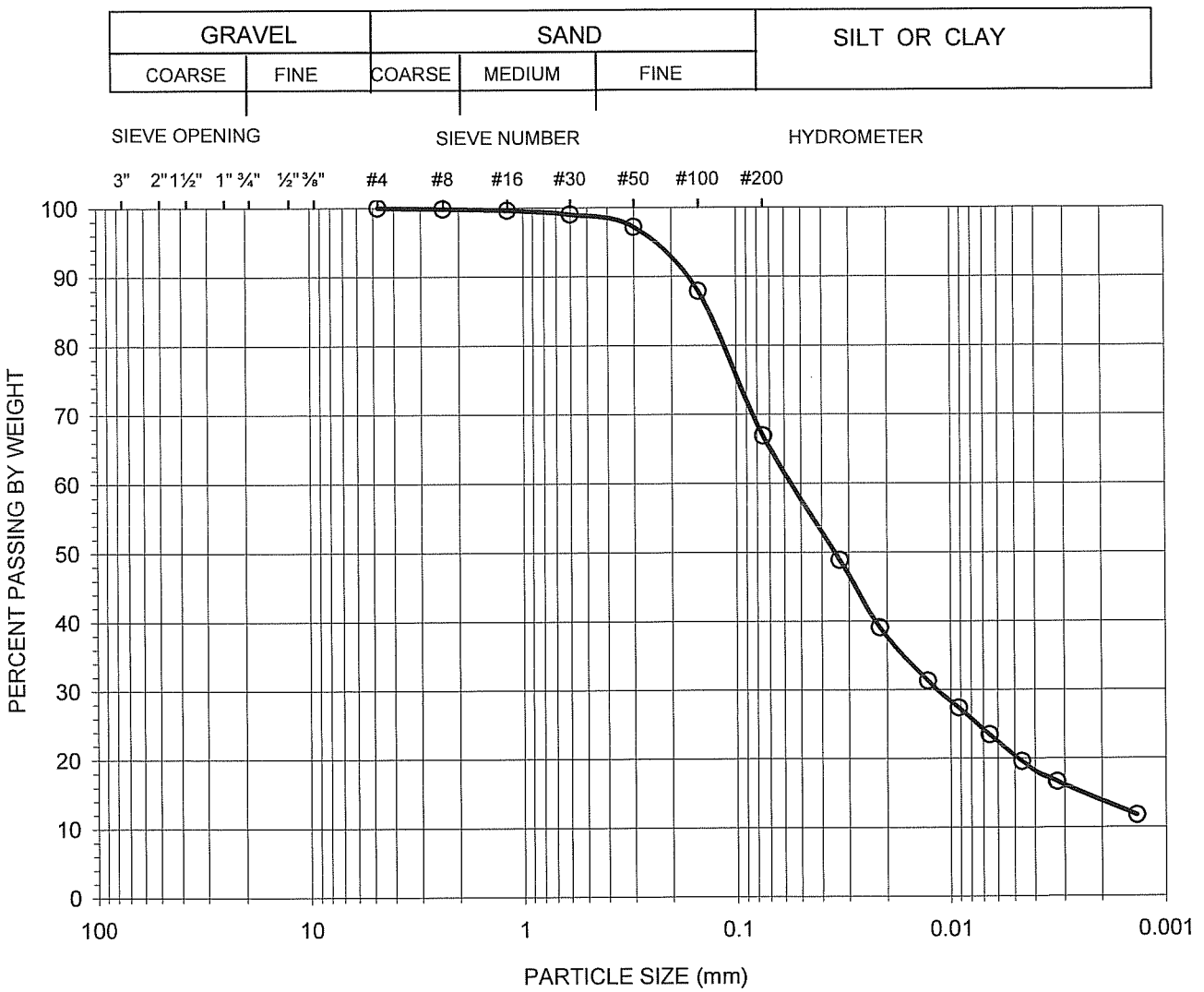


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 202	D1	35	0	5	95	35:24:11	CL
□	A 10 202	D2	50	0	6	94	42:21:21	CL

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	DK	Date:	12/22/10
Project Name:	Heim Bridge Future Fill DSM	Computed by:	KM	Date:	12/23/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

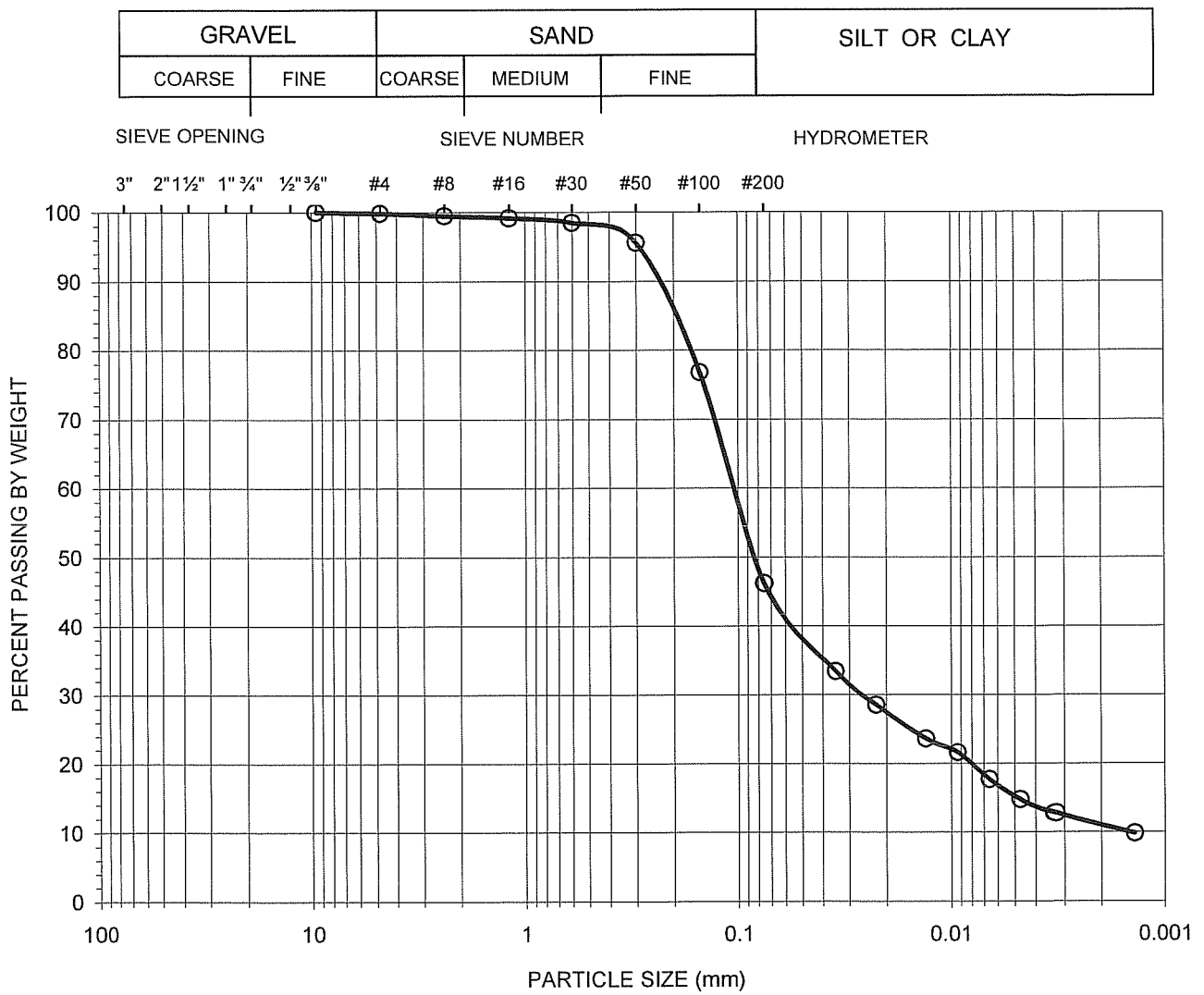


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 202	B5	40-50	0	33	67	25:20:5	CL-ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/27/10
Project Name:	Heim Bridge DSM (Soil-Cement)	Computed by:	KM	Date:	12/28/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

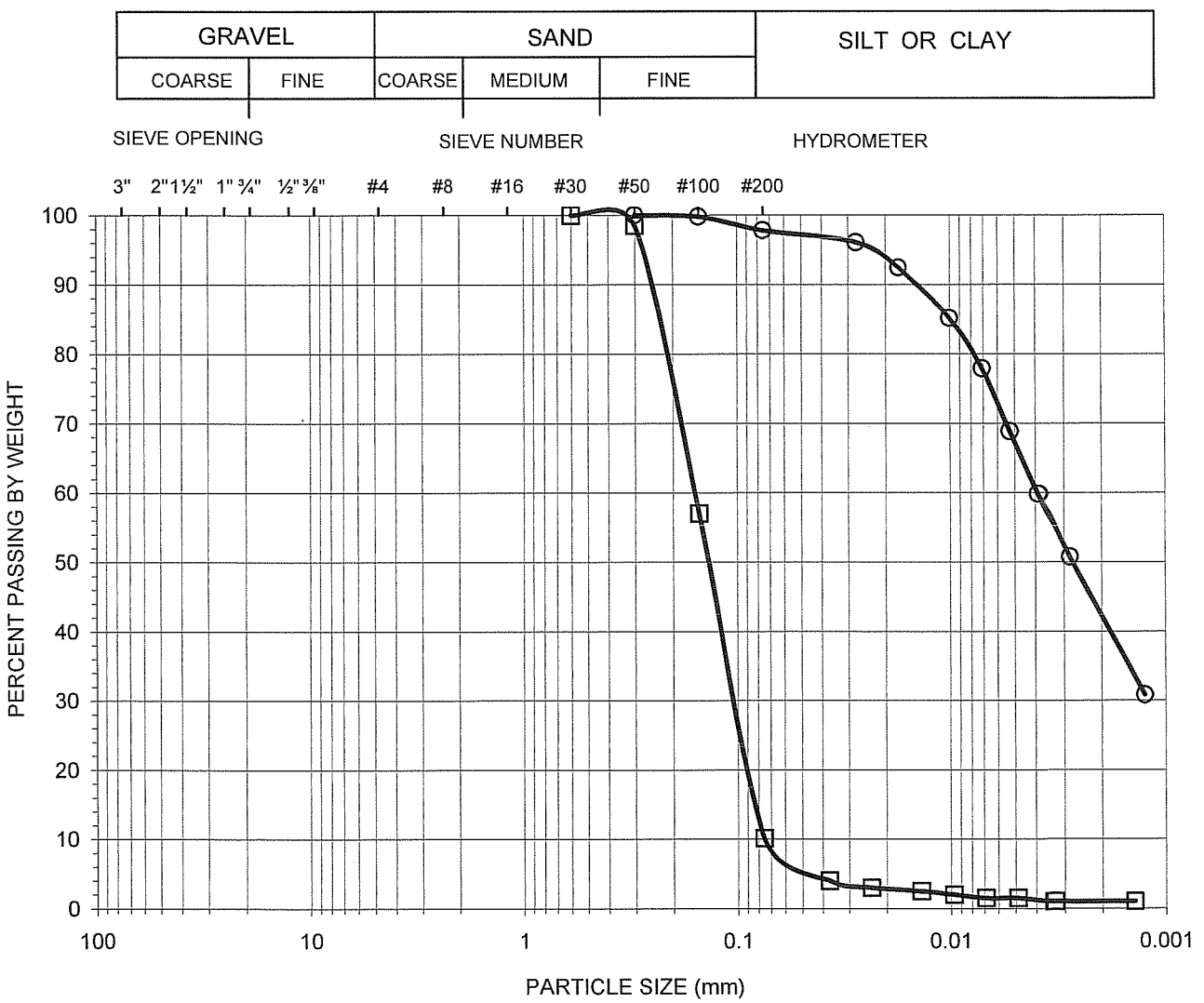


Symbol	Location	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 203	B4	30-40	0	54	46	N/P	SM

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/21/10

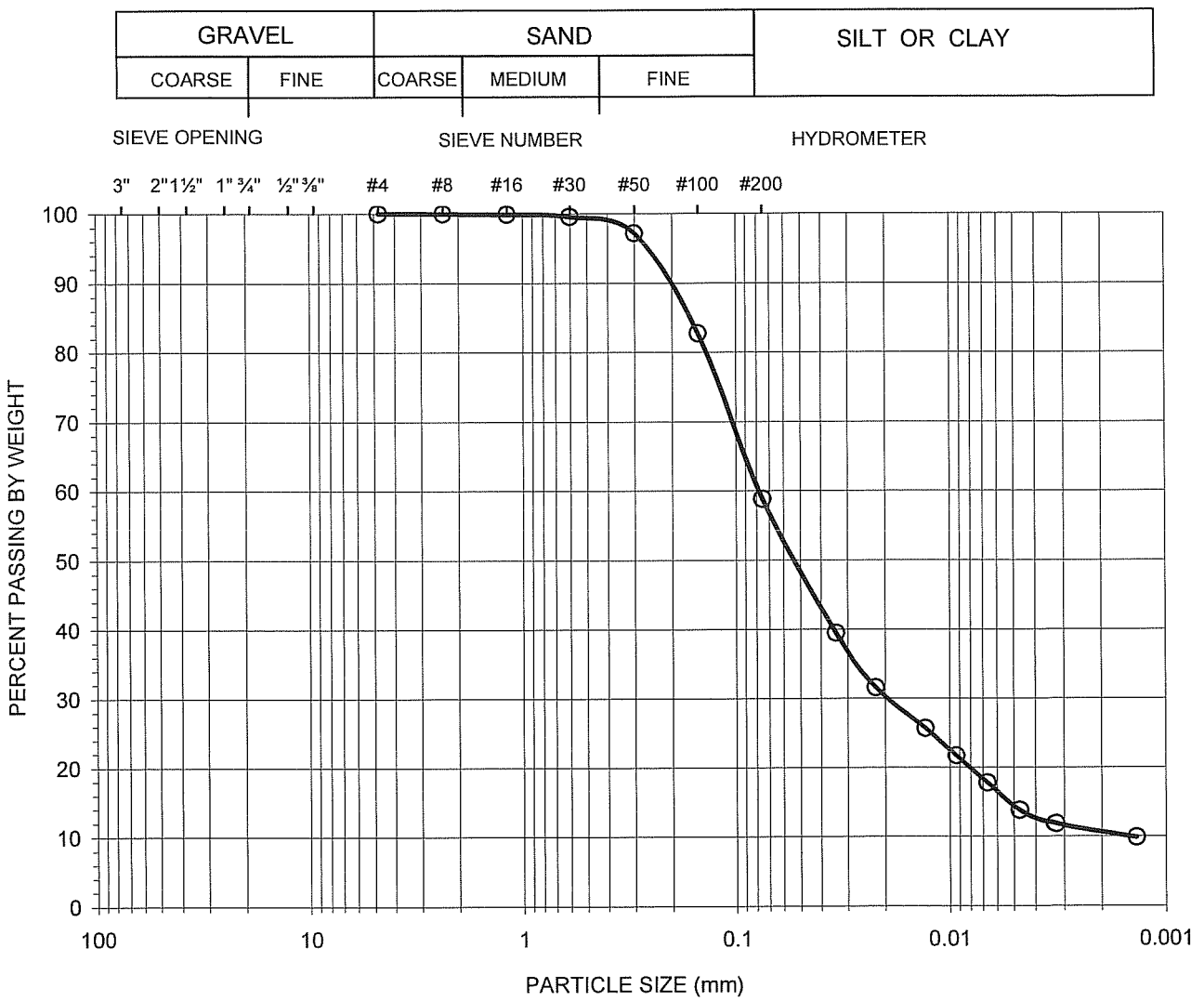


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 204	D1	30	0	2	98	54:26:28	CH
□	A 10 204	D2	50	0	90	10	N/P	SP-SM

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	DK	Date:	12/22/10
Project Name:	Heim Bridge Future Fill DSM	Computed by:	KM	Date:	12/23/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

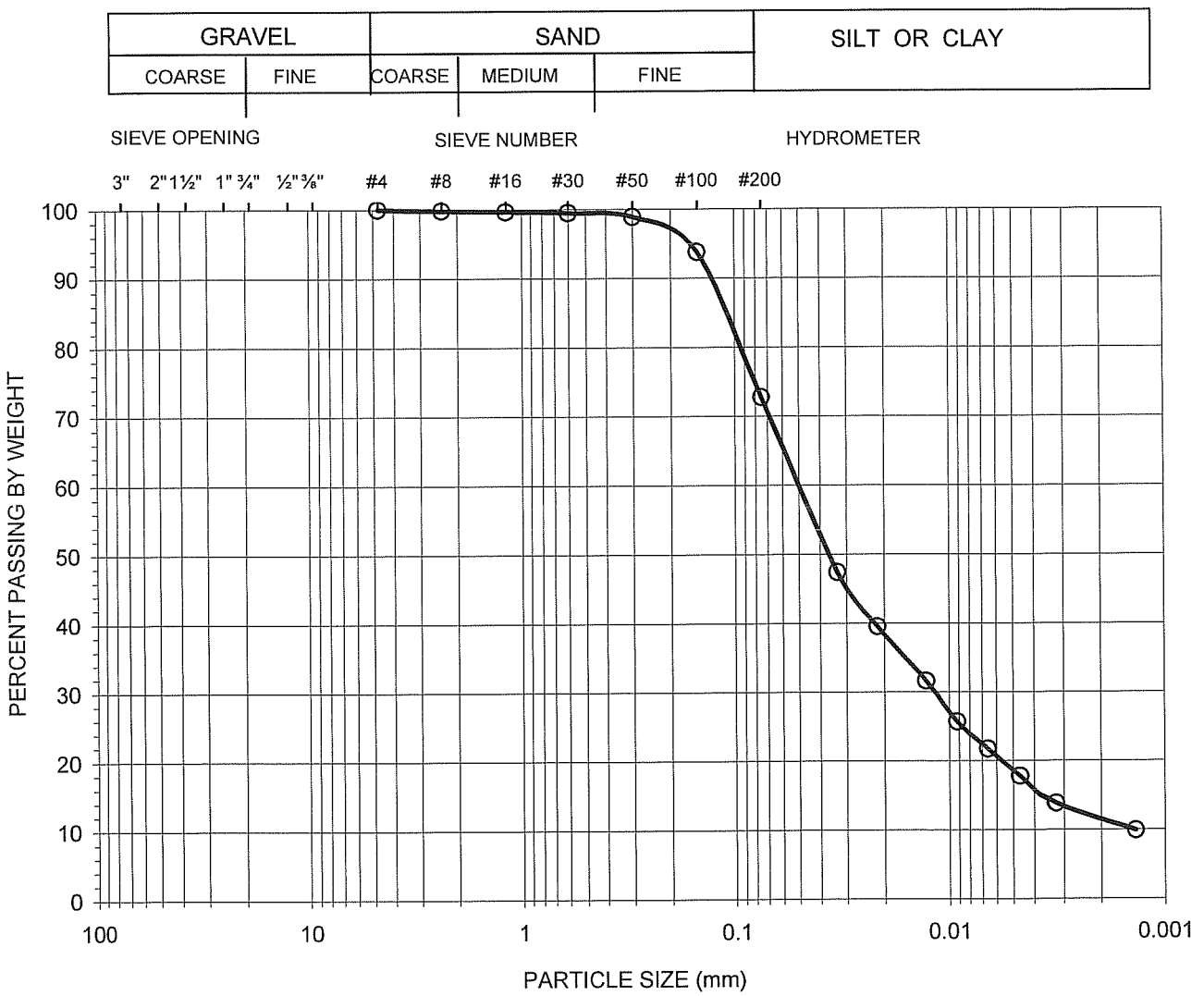


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 204	B5	40-50	0	41	59	N/P	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	DK	Date:	12/22/10
Project Name:	Heim Bridge Future Fill DSM	Computed by:	KM	Date:	12/23/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

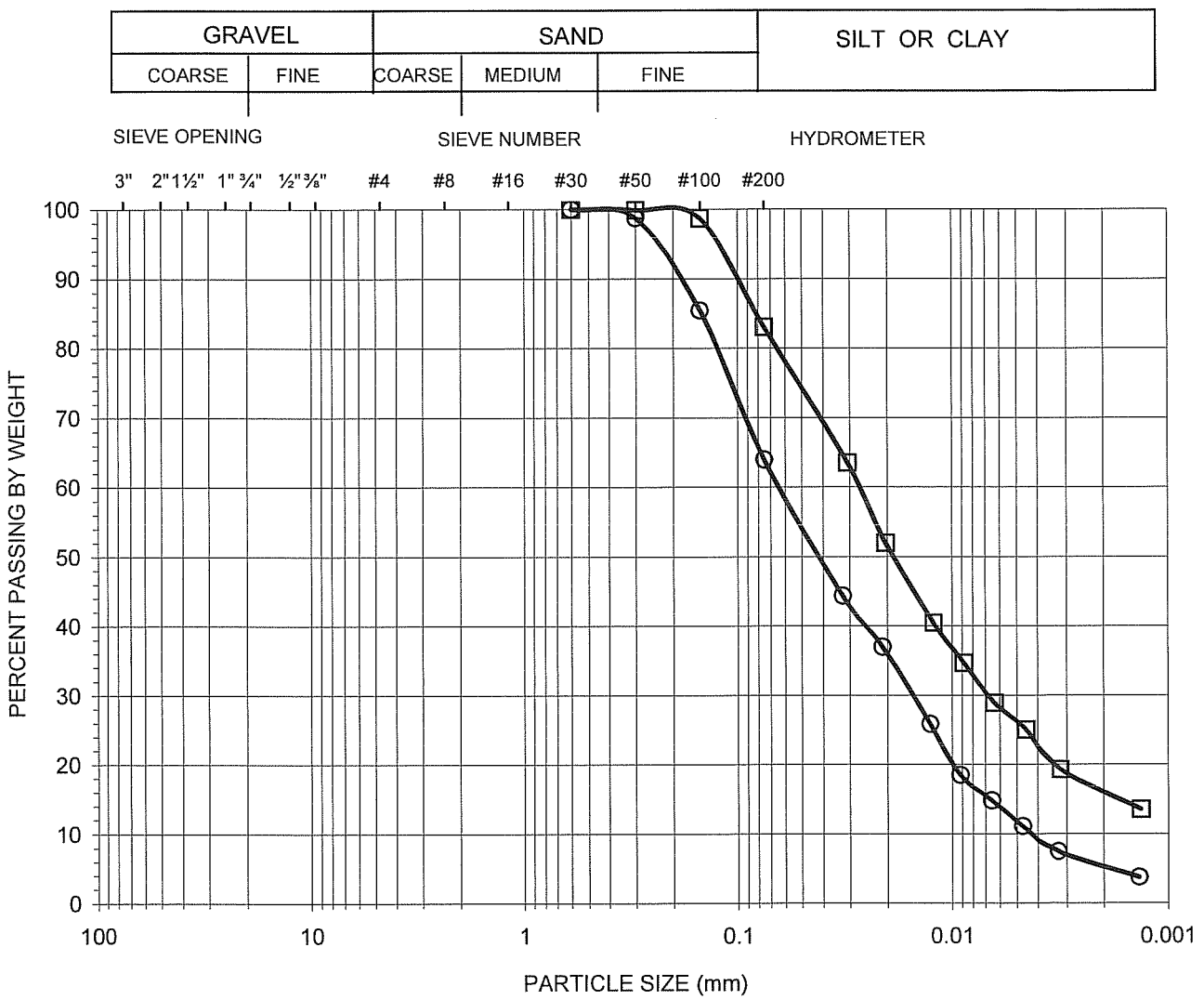


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 205	B4	30-40	0	27	73	24:20:4	CL-ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/21/10

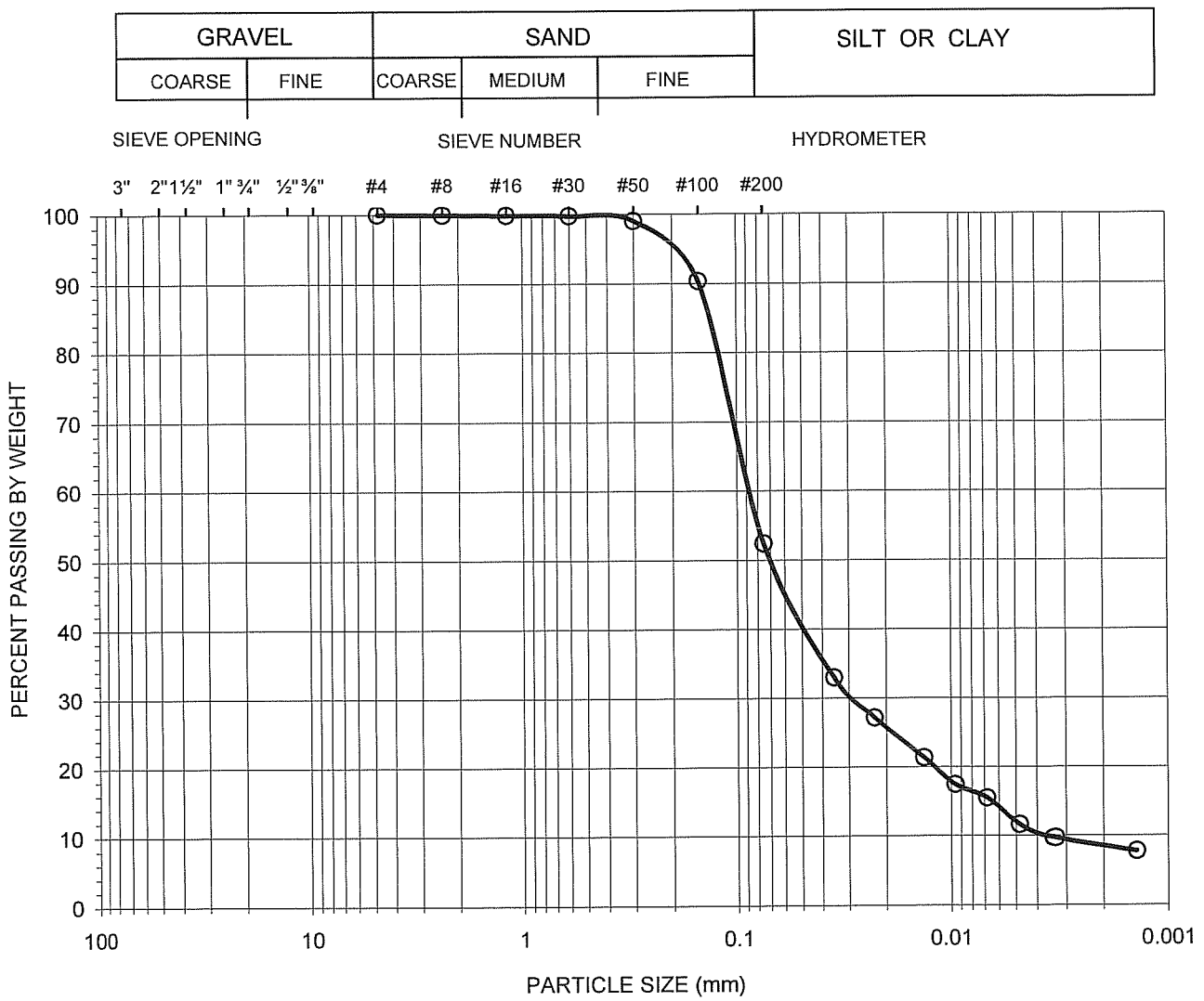


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 205	D3	50	0	36	64	N/P	ML
□	A 10 205	D4	60	0	17	83	28:22:6	CL-ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/27/10
Project Name:	Heim Bridge DSM (Soil-Cement)	Computed by:	KM	Date:	12/28/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

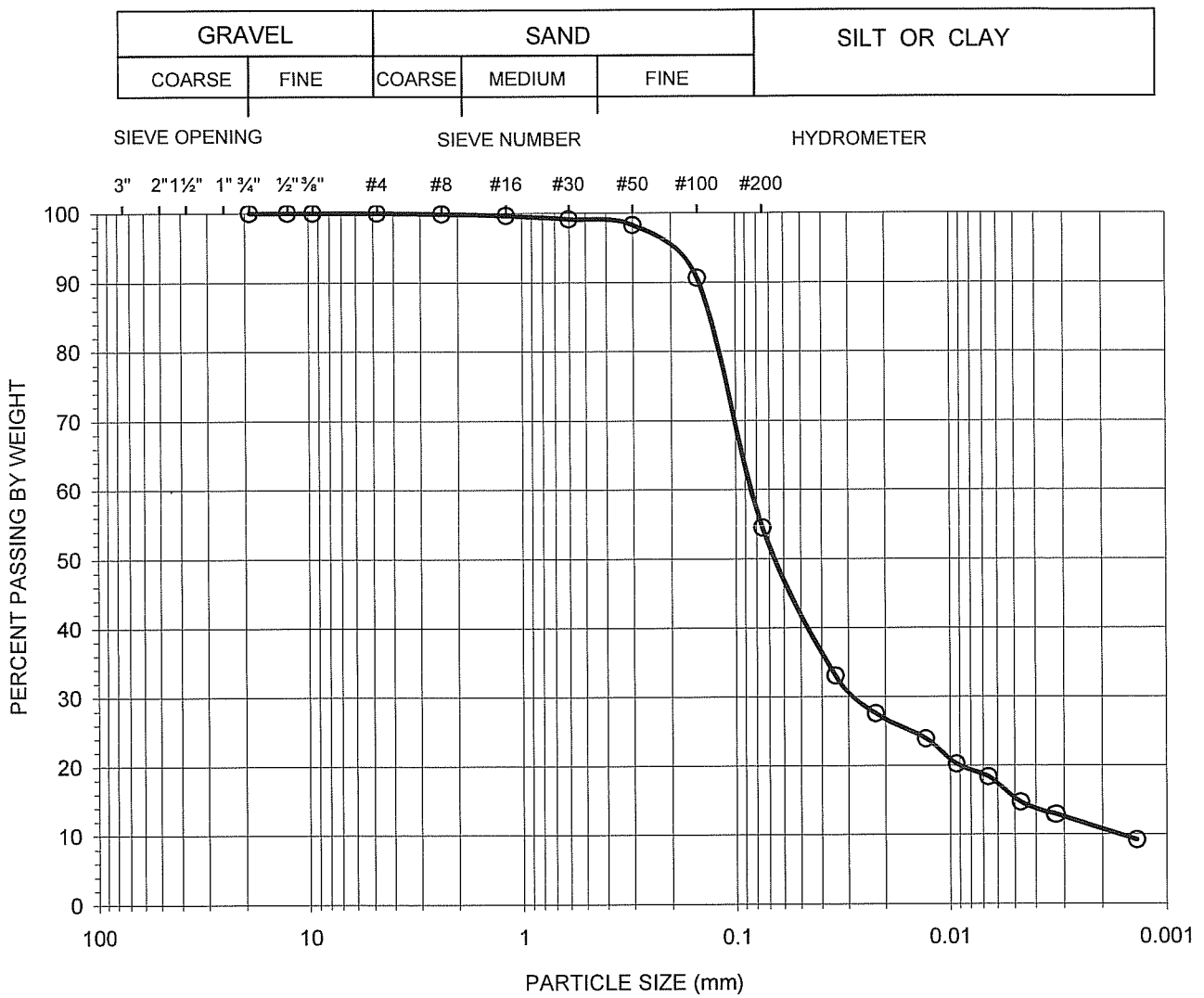


Symbol	Location	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 206	B2	10-20	0	48	52	N/P	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/12/10
Project Name:	Heim Bridge Future Fill DSM	Computed by:	KM	Date:	12/23/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

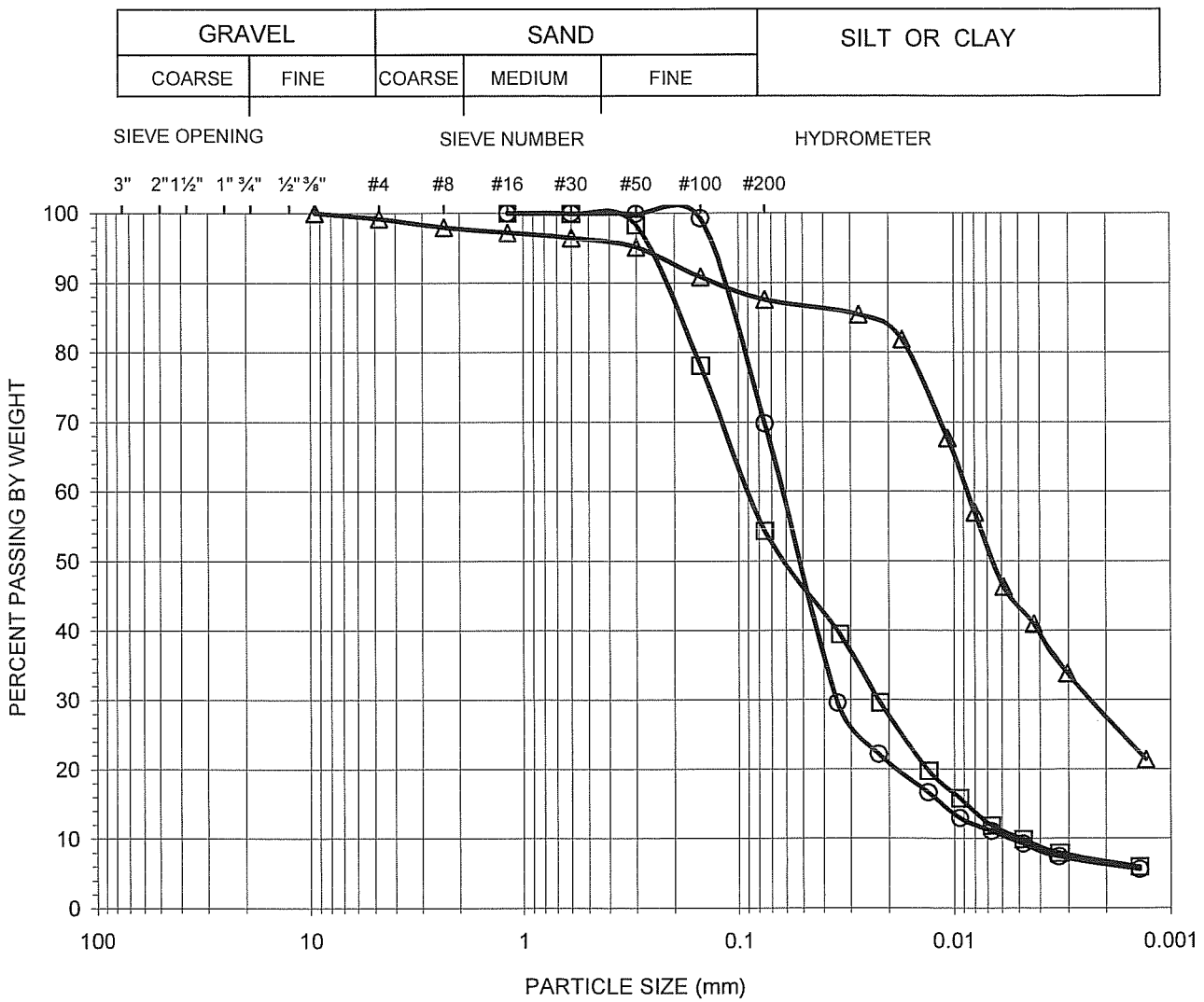


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 206	B6	50-60	0	46	54	N/P	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/27/10

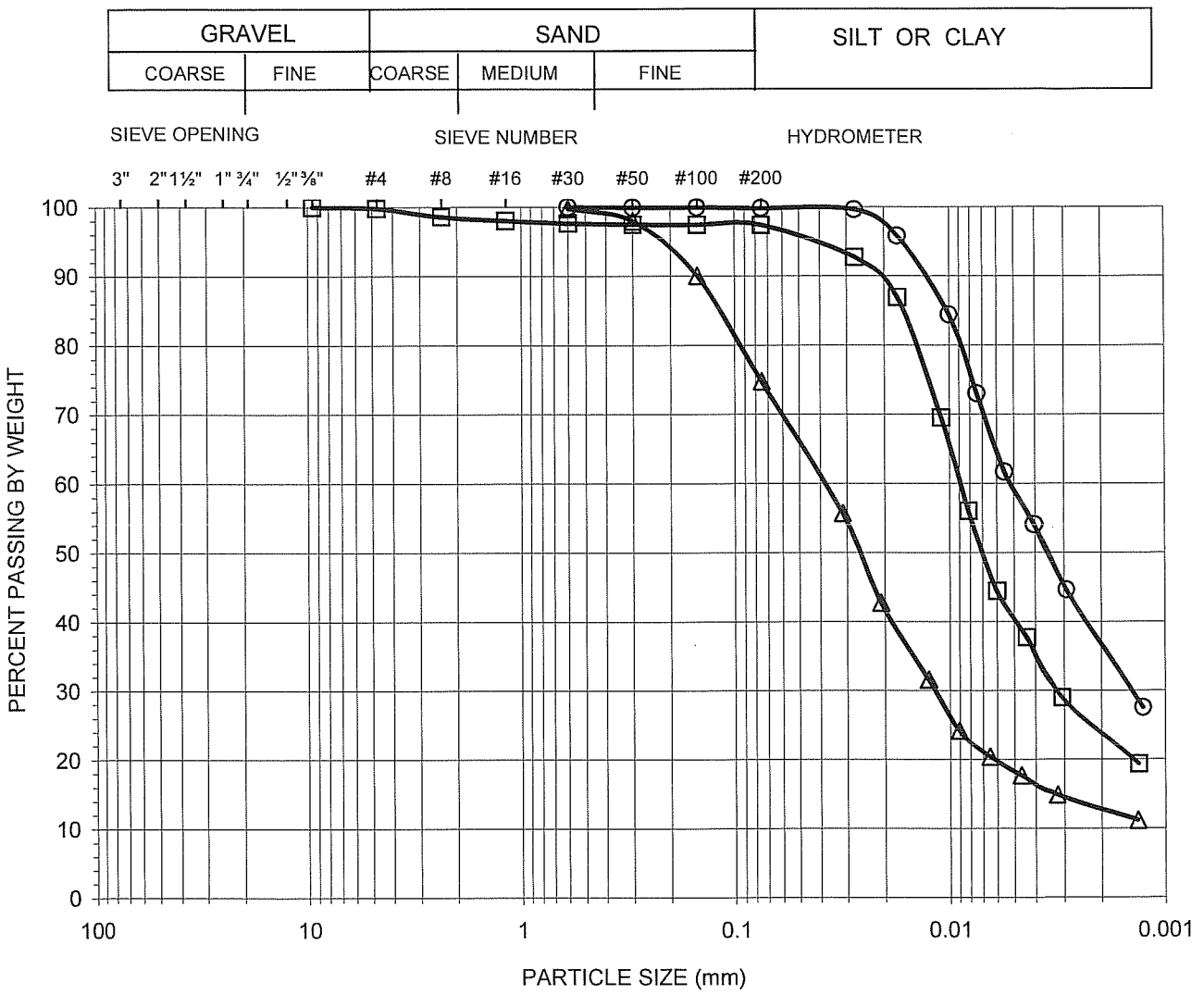


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 206	D2	30	0	30	70	N/P	ML
□	A 10 206	D3	55	0	46	54	N/P	ML
△	A 10 206	D4	65	1	11	88	42:24:18	CL

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/27/10

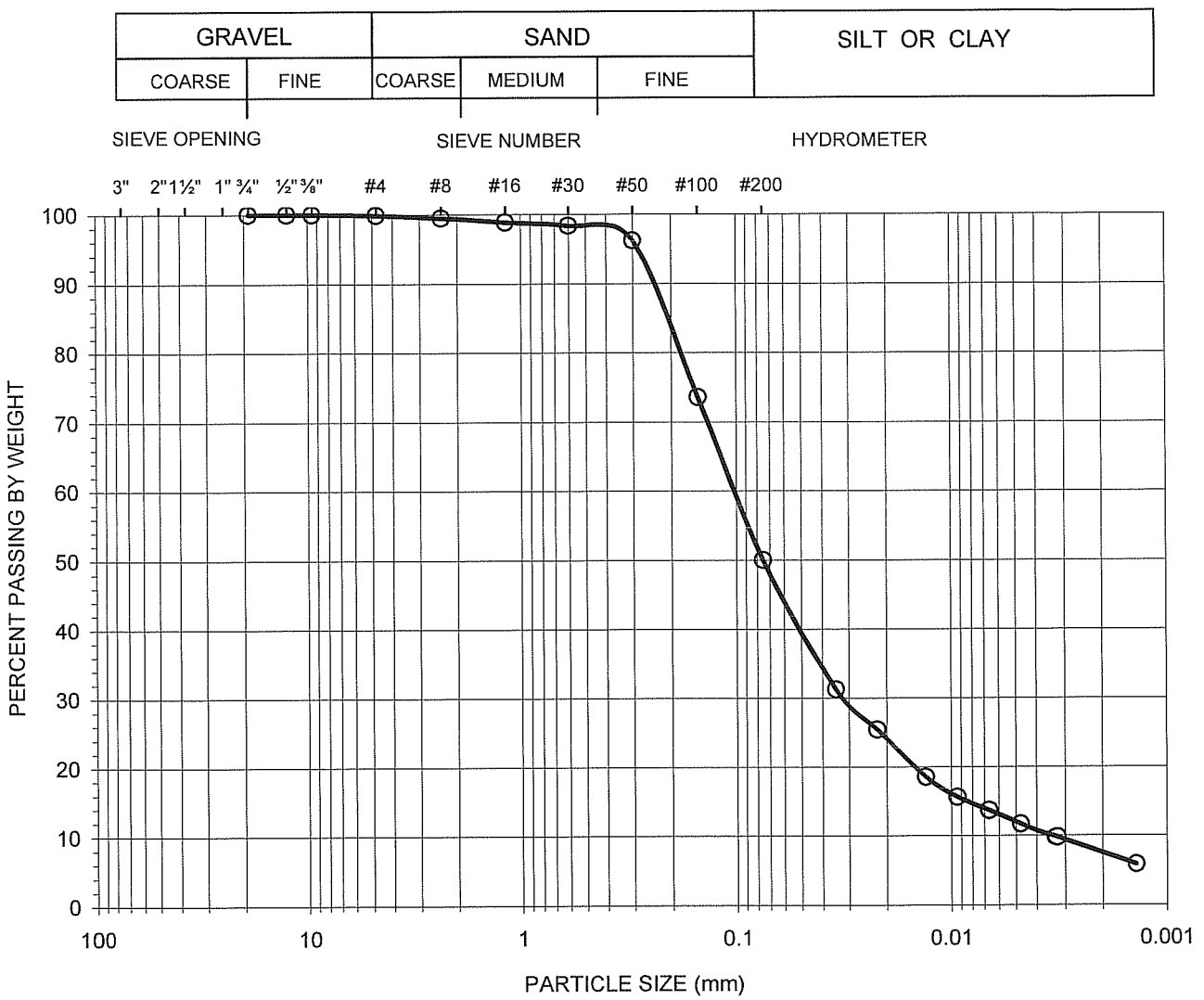


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 207	D4	60	0	0	100	58:26:32	CH
□	A 10 207	D6	75	0	3	97	39:28:11	ML
△	A 10 207	D7	80	0	25	75	N/P	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	Heim Bridge Future Fill DSM	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

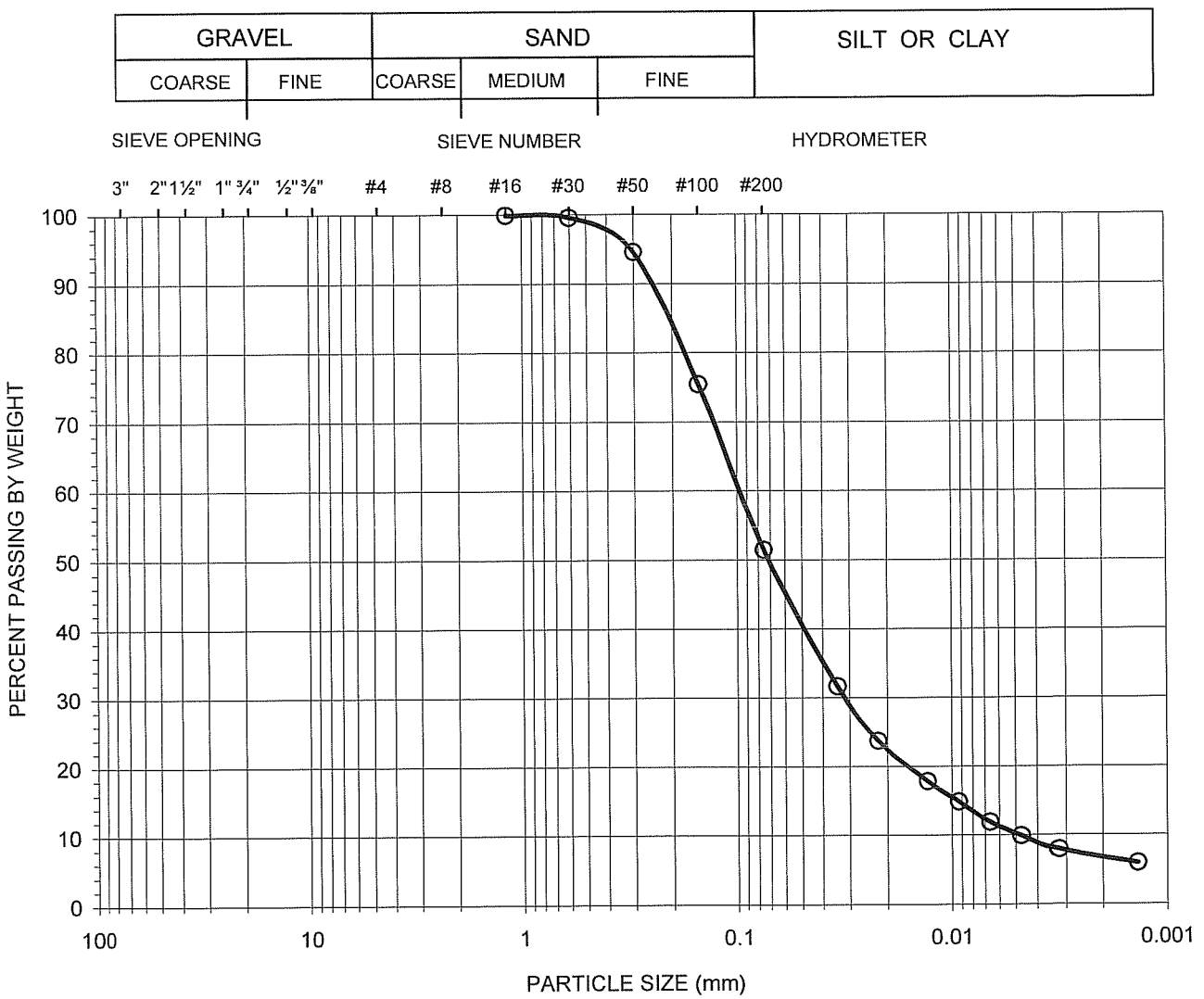


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 208	B6	50	0	50	50	N/P	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	KM	Date:	12/14/10
Project Name:	Heim Bridge Future Fill DSM	Computed by:	KM	Date:	12/16/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

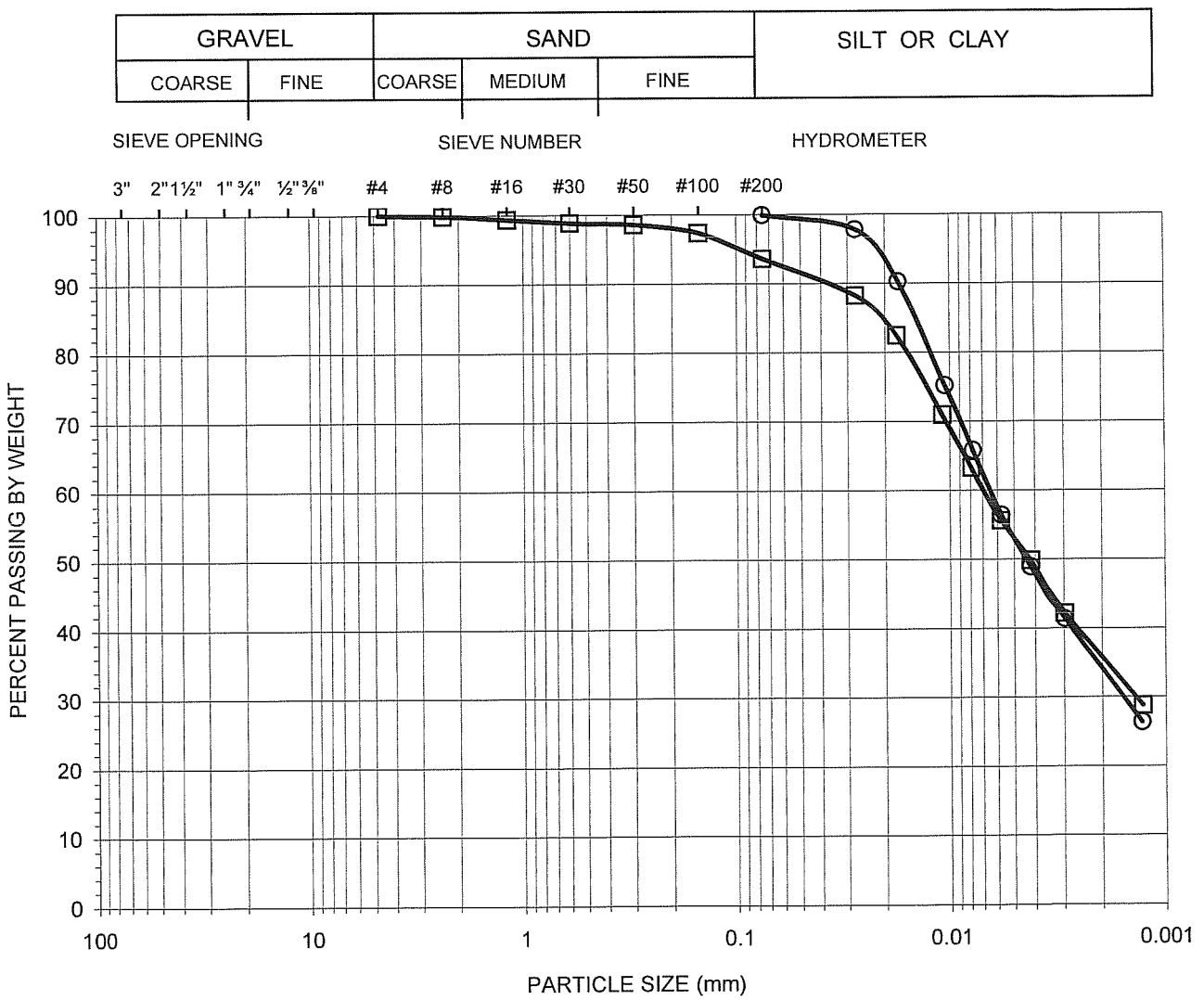


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 209	B4	30-40	0	49	51	N/P	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/21/10

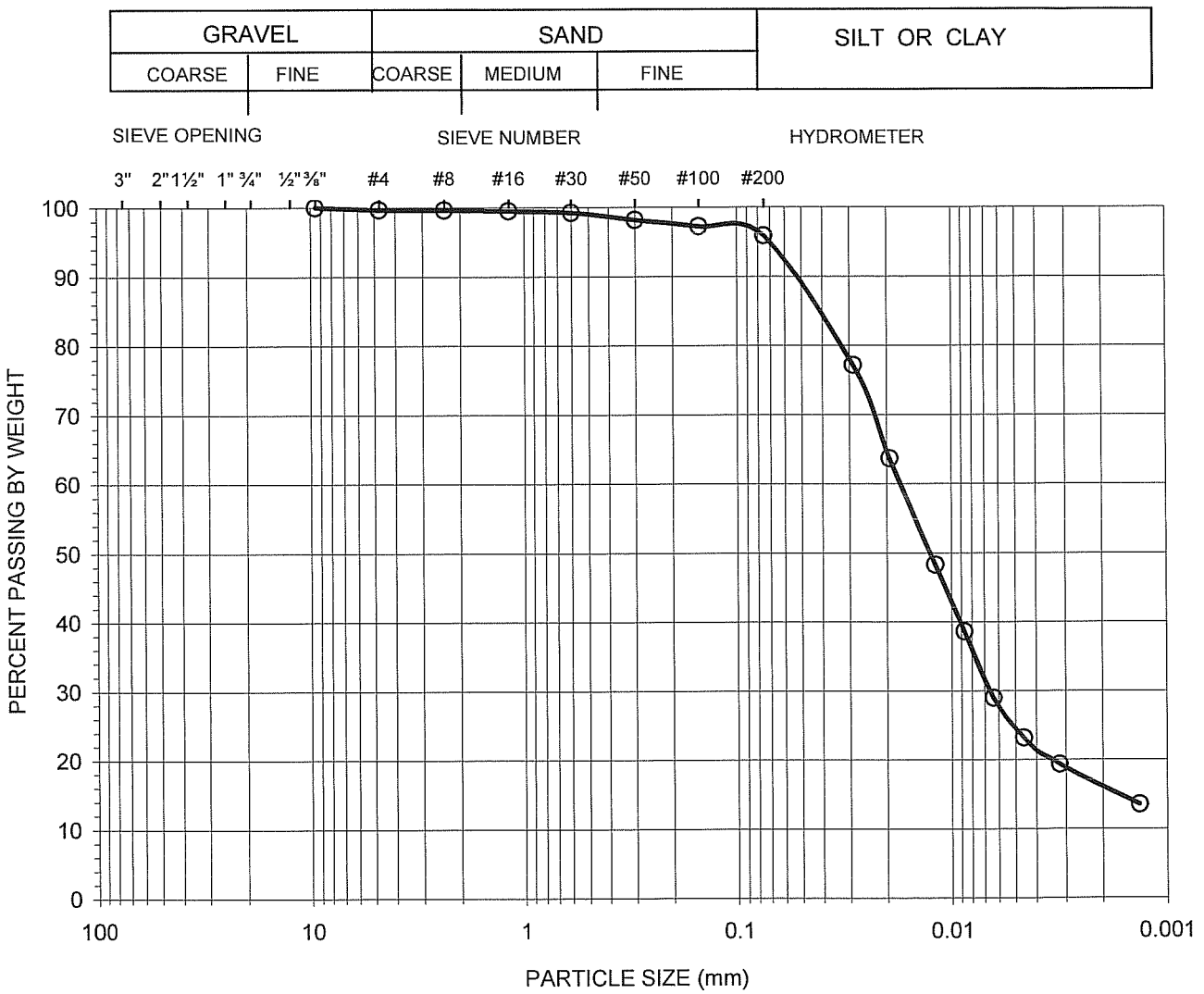


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 209	D2	45	0	0	100	53:24:29	CH
□	A 10 209	D5	60	0	6	94	49:21:28	CL

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/21/10

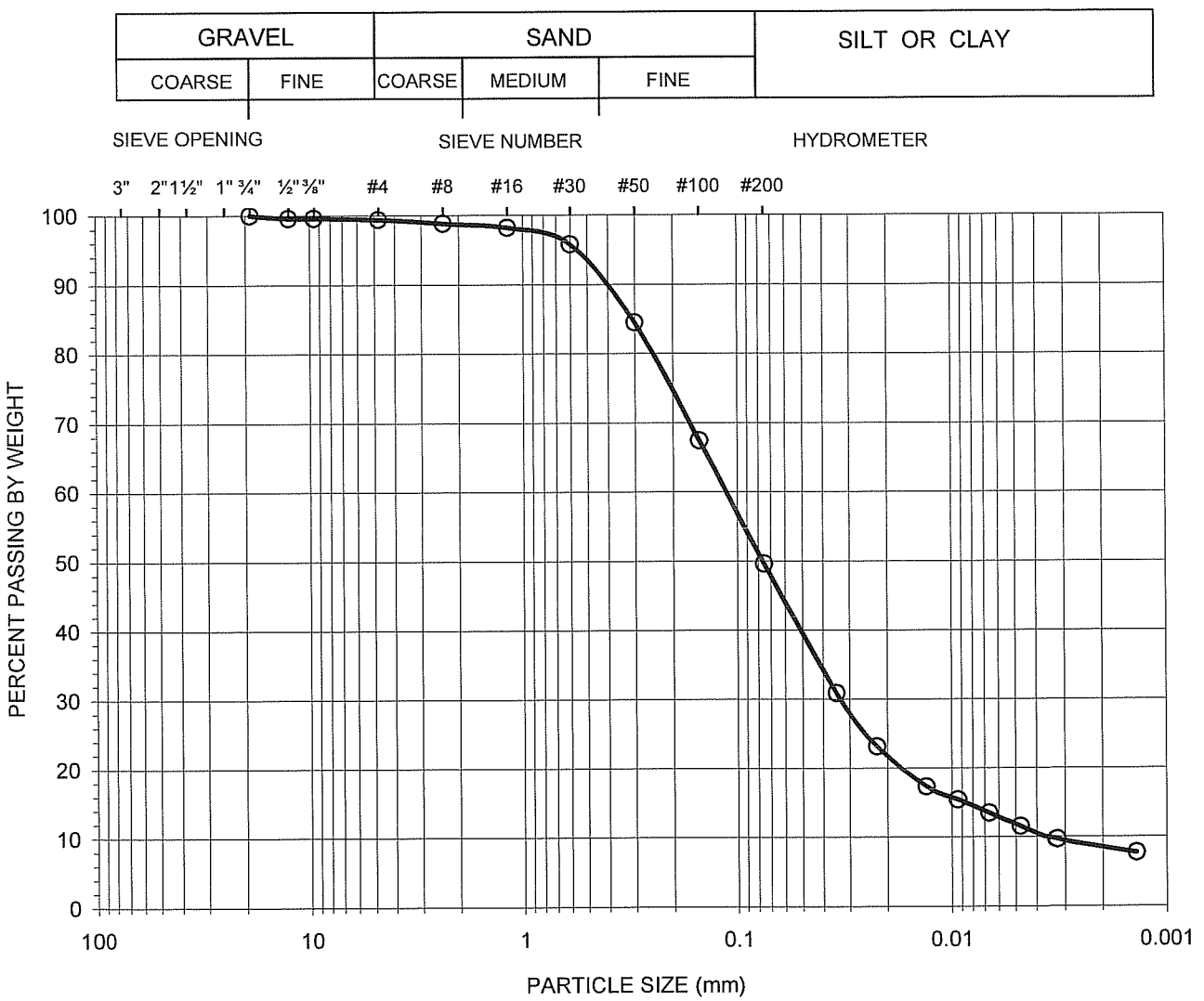


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 210	D1	40	0	4	96	33:27:6	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	Heim Bridge Future Fill DSM	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

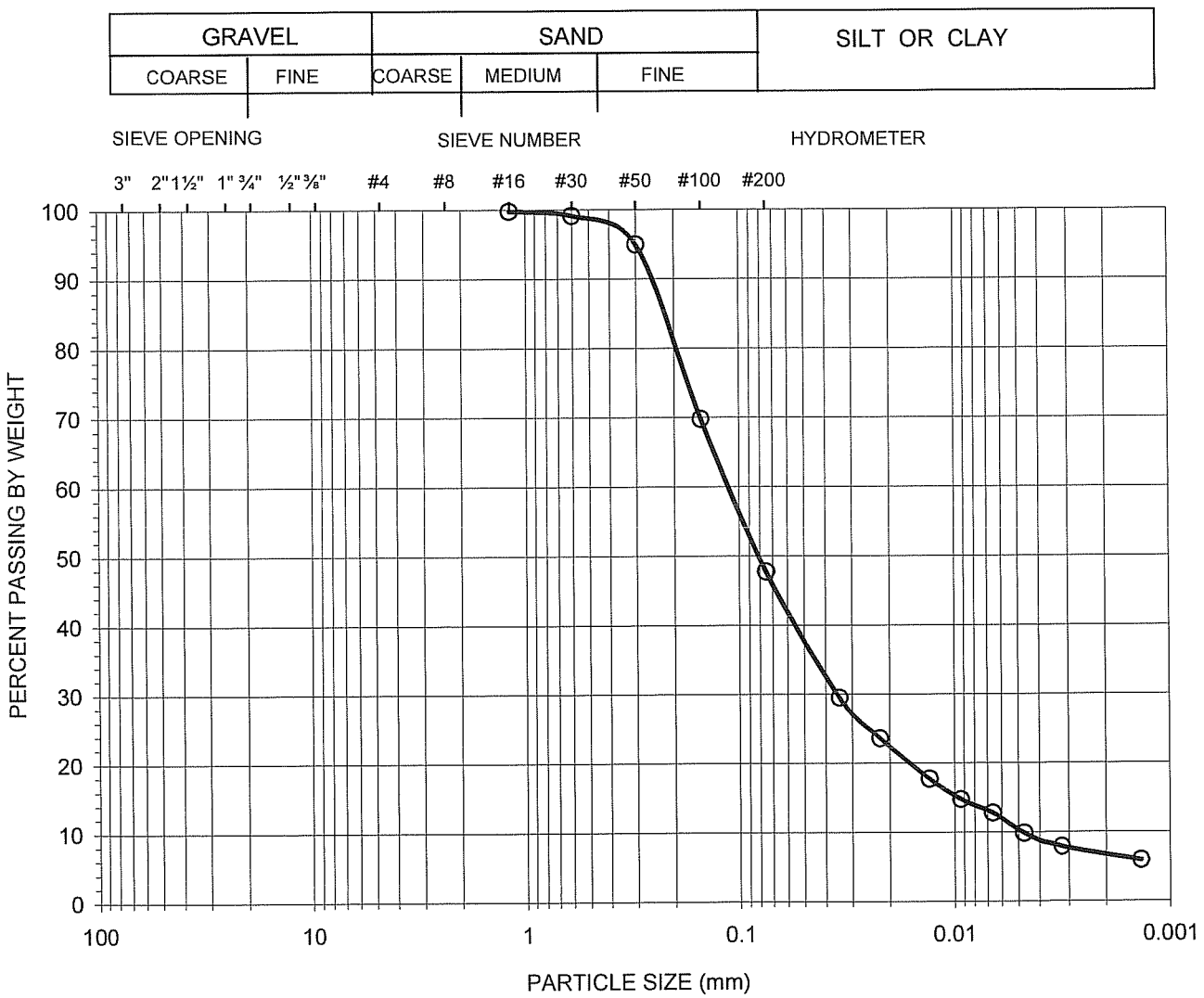


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 210	B6	50	1	49	50	N/P	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	KM	Date:	12/14/10
Project Name:	Heim Bridge Future Fill DSM	Computed by:	KM	Date:	12/16/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

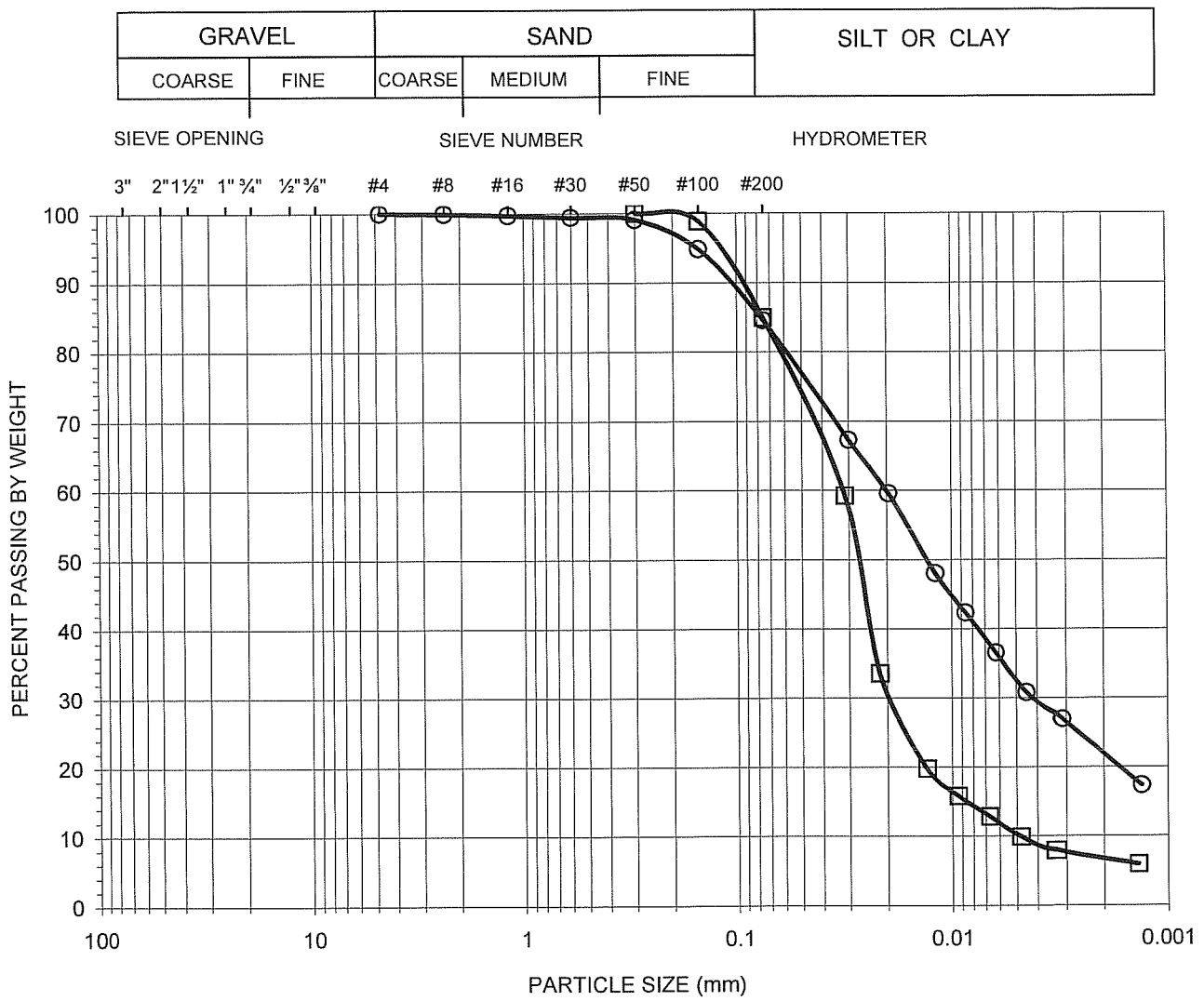


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 211	B5	40-50	0	52	48	N/P	SM

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/27/10

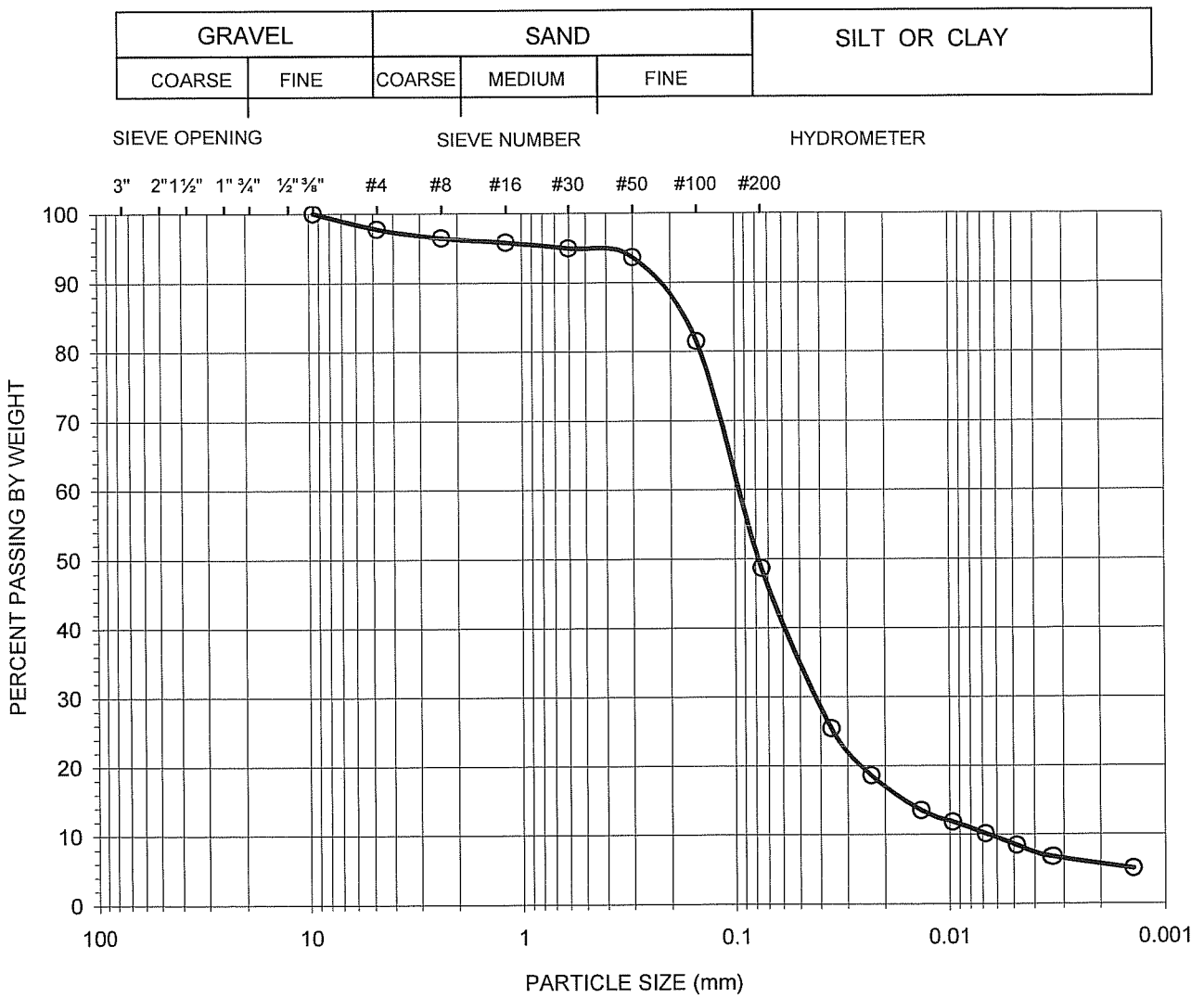


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 211	D2	57	0	15	85	36:22:14	CL
□	A 10 211	D4	60	0	15	85	N/P	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/27/10
Project Name:	Heim Bridge DSM (Soil-Cement)	Computed by:	KM	Date:	12/28/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

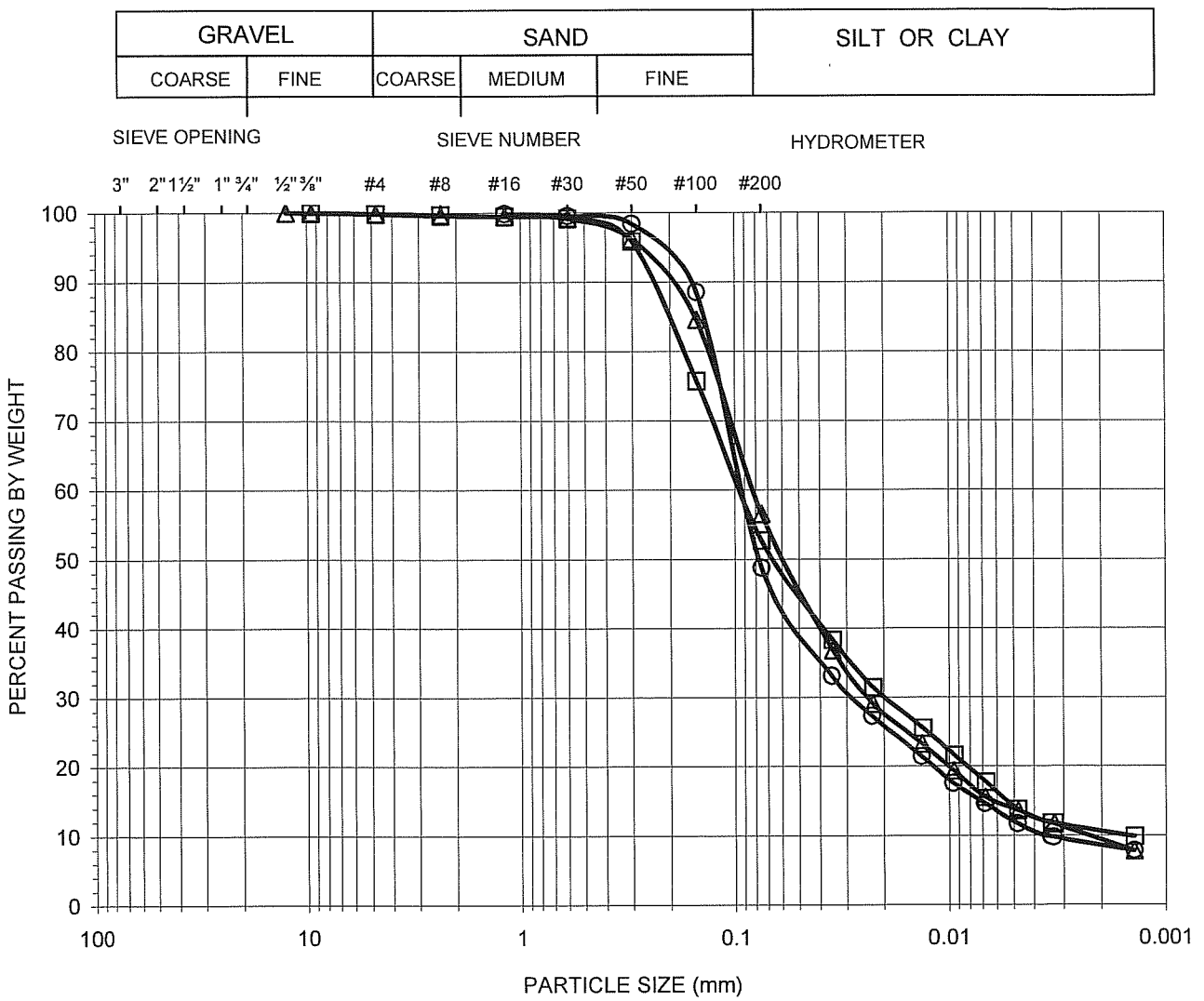


Symbol	Location	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 212	B1	0-10	2	49	49	N/P	SM

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/27/10
Project Name:	Heim Bridge DSM (Soil-Cement)	Computed by:	KM	Date:	12/28/10
Project No.:	06-123	Checked by:	AP	Date:	12/29/10

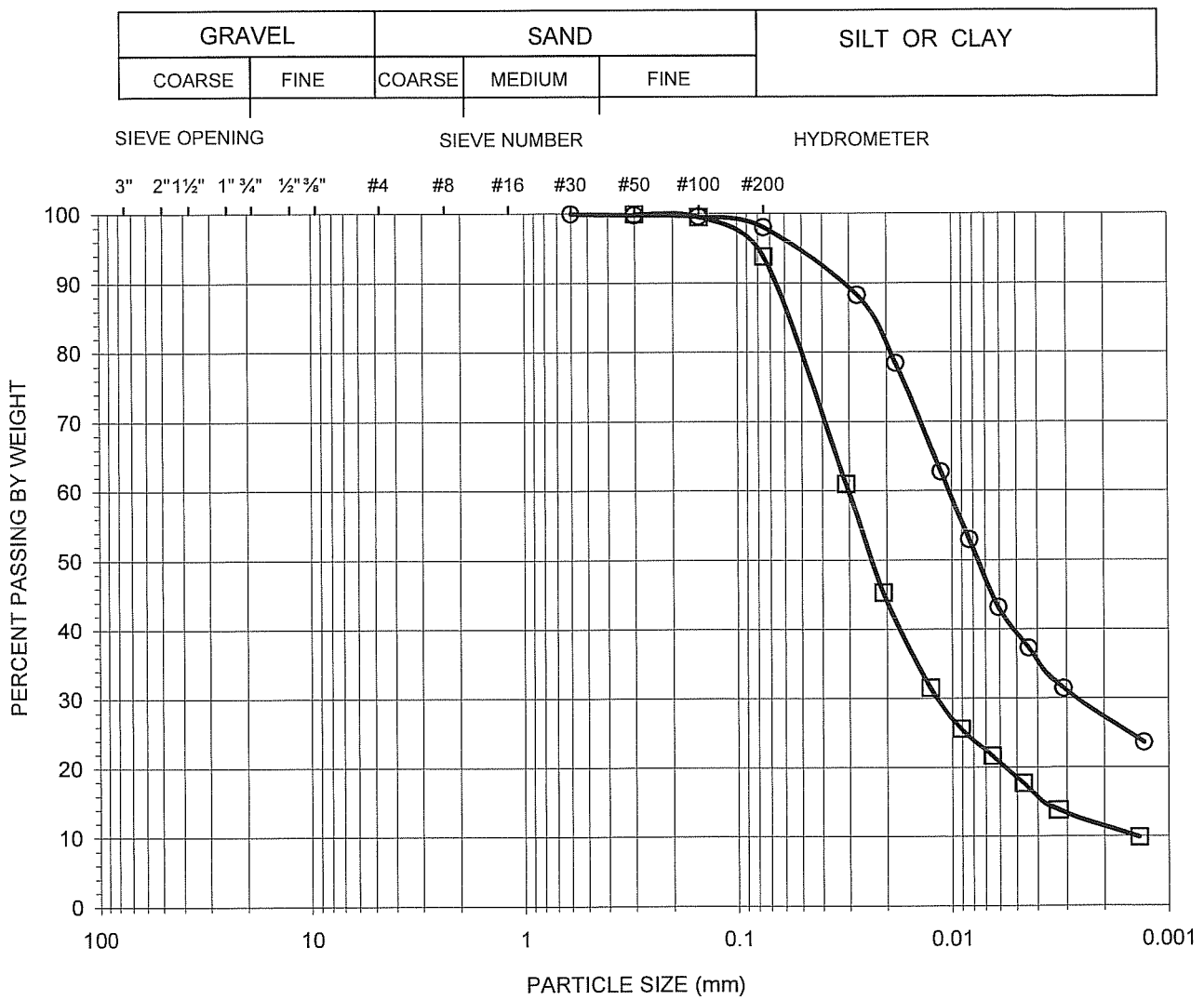


Symbol	Location	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	A 10 212	B3	20-30	0	51	49	N/P	SM
□	A 10 212	B5	40-50	0	47	53	N/P	ML
△	A 10 213	B3	20-30	0	43	57	N/P	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/27/10

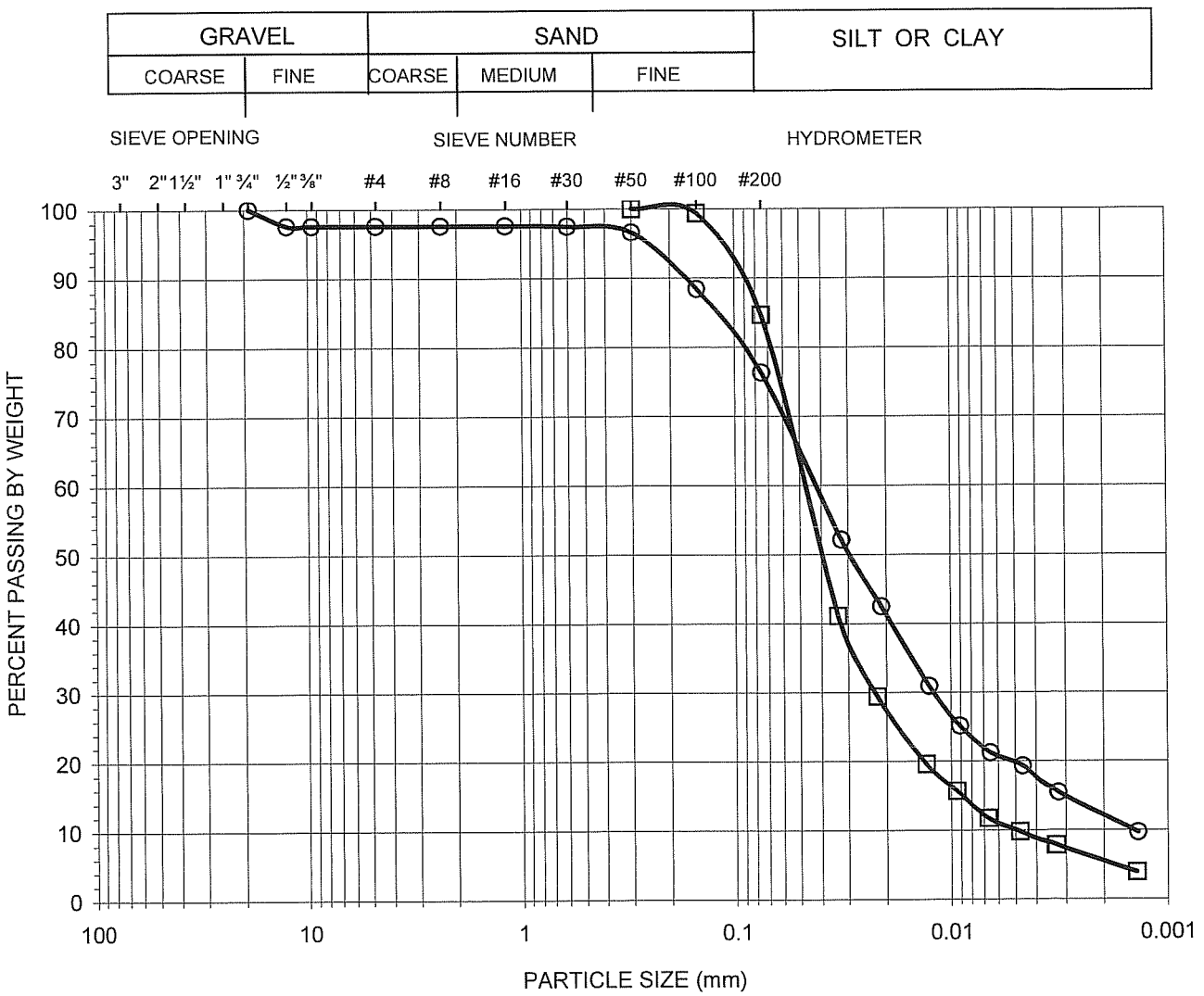


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	R 10 301	D2	10	0	2	98	43:24:19	CL
□	R 10 301	T8	37.5	0	6	94	N/P	ML

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 422

Client Name:	Earth Mechanics, Inc.	Tested by:	ST	Date:	12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fil	Computed by:	KM	Date:	12/21/10
Project No.:	06-123	Checked by:	AP	Date:	12/27/10



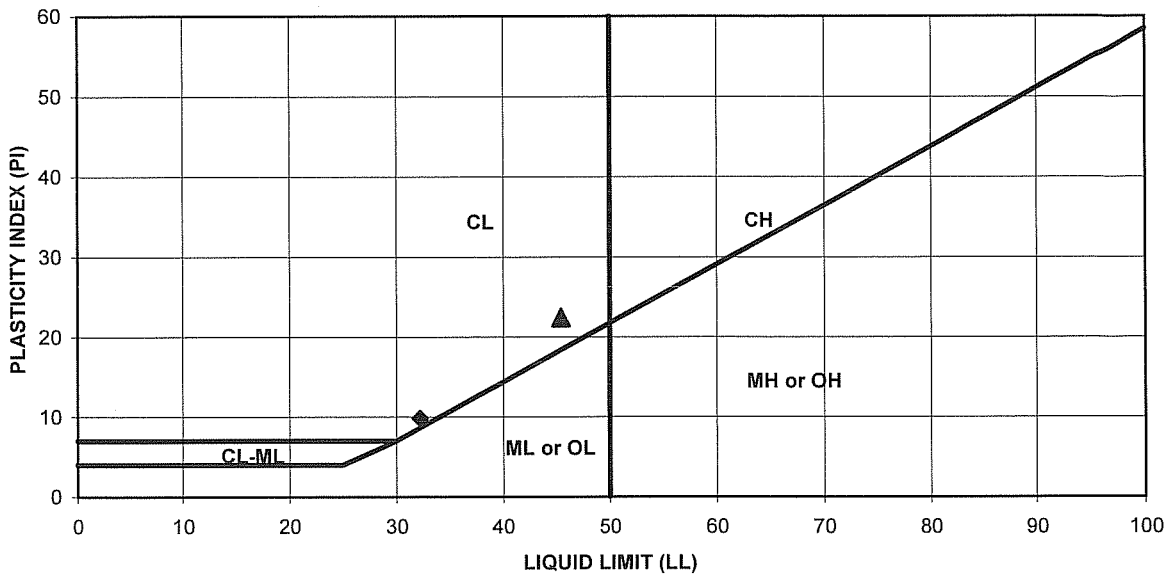
Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Symbol ASTM D 2487
				Gravel	Sand	Fines		
○	R 10 301	T10	45	2	22	76	29:22:7	CL-ML
□	R 10 301	D16	75	0	15	85	N/P	ML

ATTERBERG LIMITS

AP Engineering & Testing, Inc.

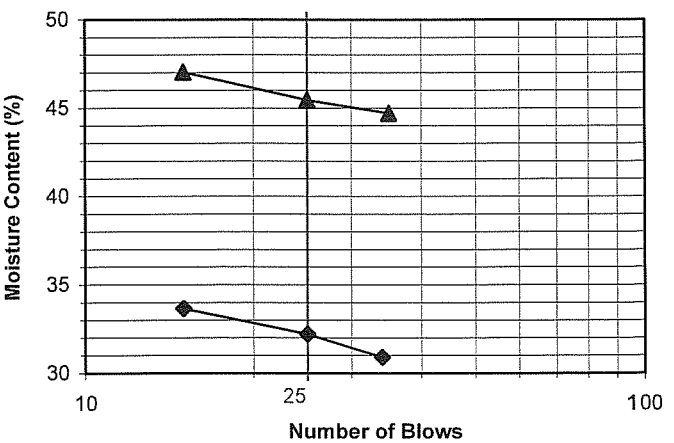
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/21/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



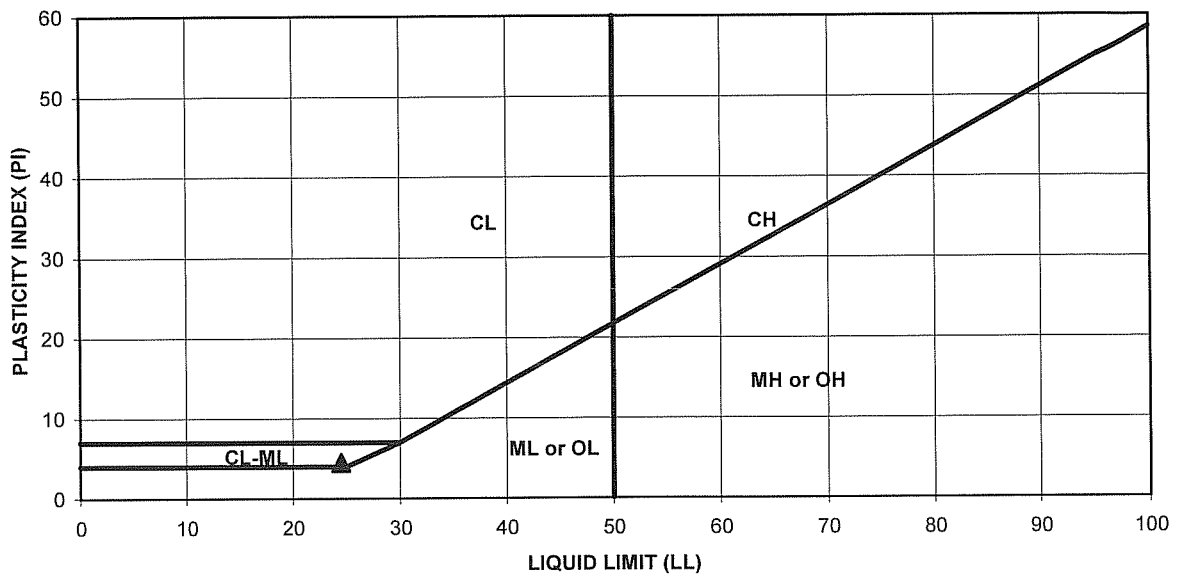
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	A 10 201	D1	35	32	22	10	CL
▲	A 10 201	D2	50	45	23	22	CL

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

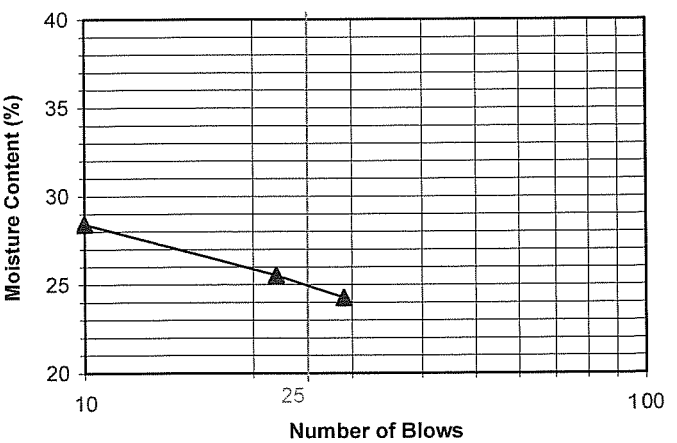
Project Name: ACTA Heim Bridge Replacement
Project No.: 06-123-03

Tested By: AP Date: 12/11/10
Checked By: AP Date: 12/29/10



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test

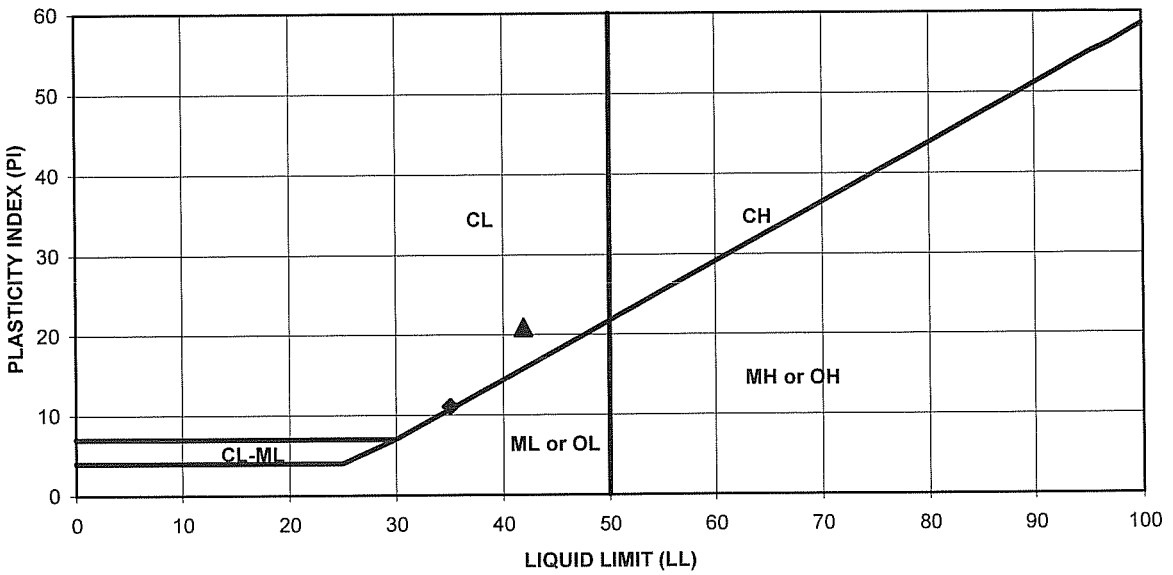


Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A 10 201	B2	10-20	NP	NP	NP	ML
▲	A 10 202	B5	40-50	25	20	5	CL-ML

AP Engineering & Testing, Inc.

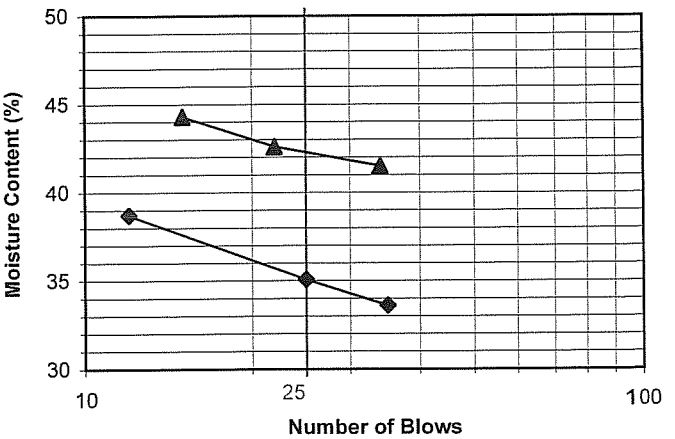
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/21/10



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test



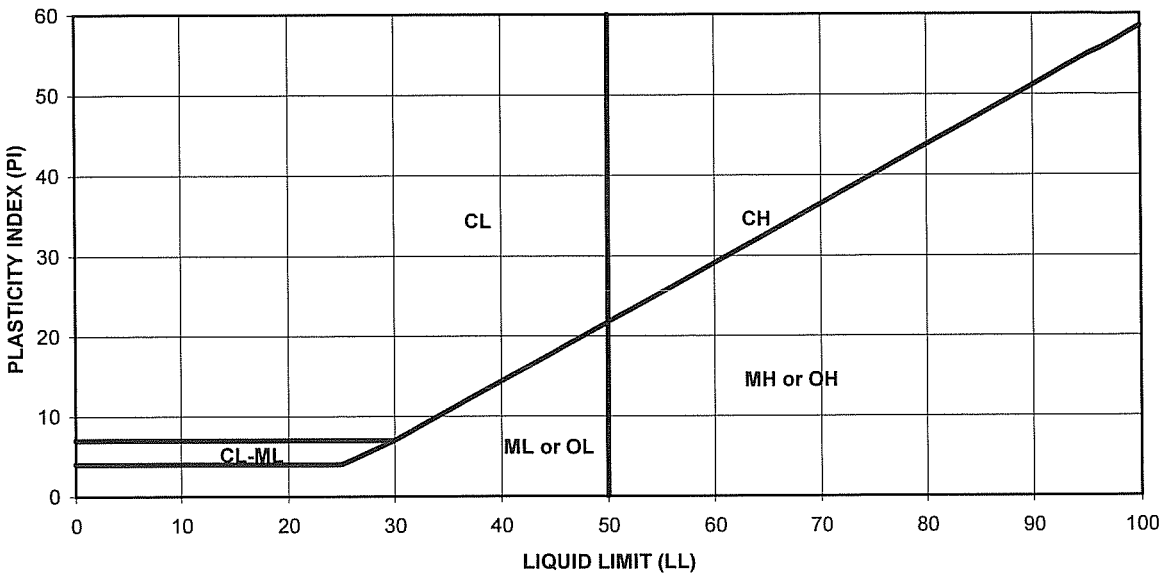
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	A 10 202	D1	35	35	24	11	CL
▲	A 10 202	D2	50	42	21	21	CL

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

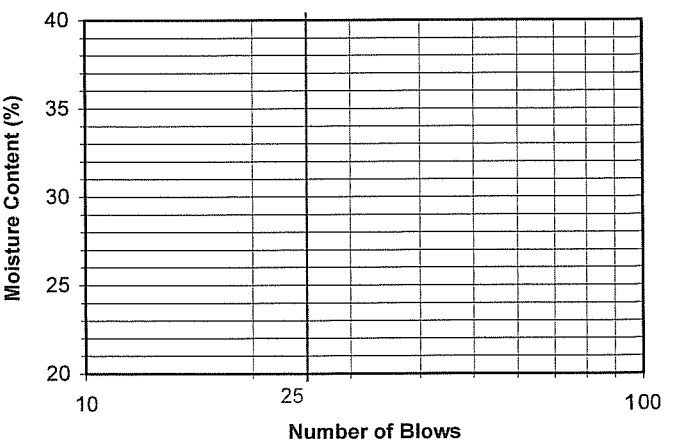
Project Name: ACTA Heim Bridge Replacement
Project No.: 06-123-03

Tested By: AP Date: 12/15/10
Checked By: AP Date: 12/16/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A-10-202	B-6	50-60	NP	NP	NP	ML
	A-10-206	B-5	40-50	NP	NP	NP	ML

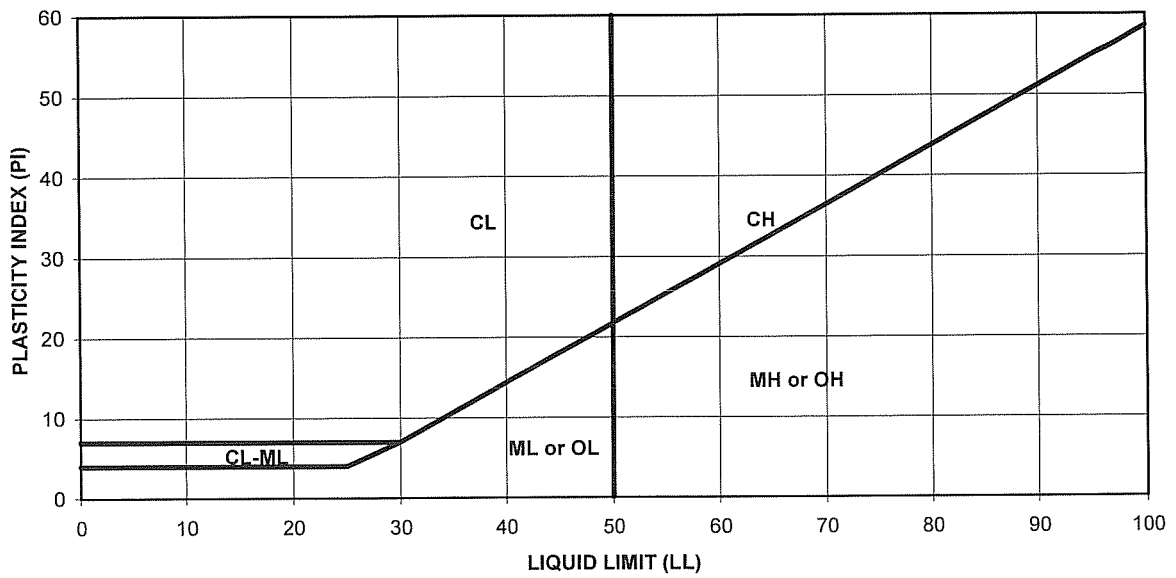
* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

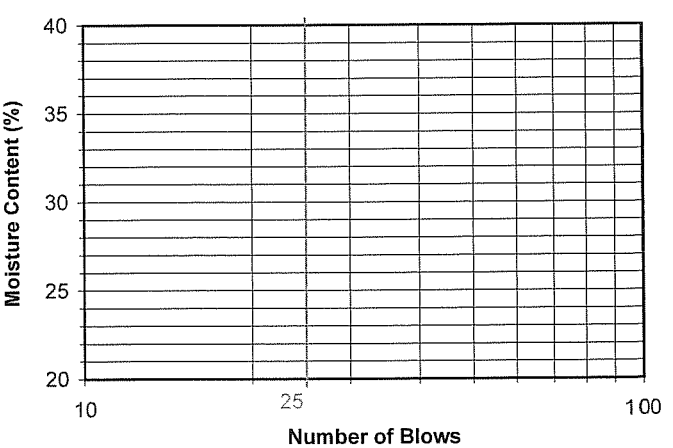
Project Name: ACTA Heim Bridge Replacement
Project No.: 06-123-03

Tested By: KM Date: 12/28/10
Checked By: AP Date: 12/29/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test

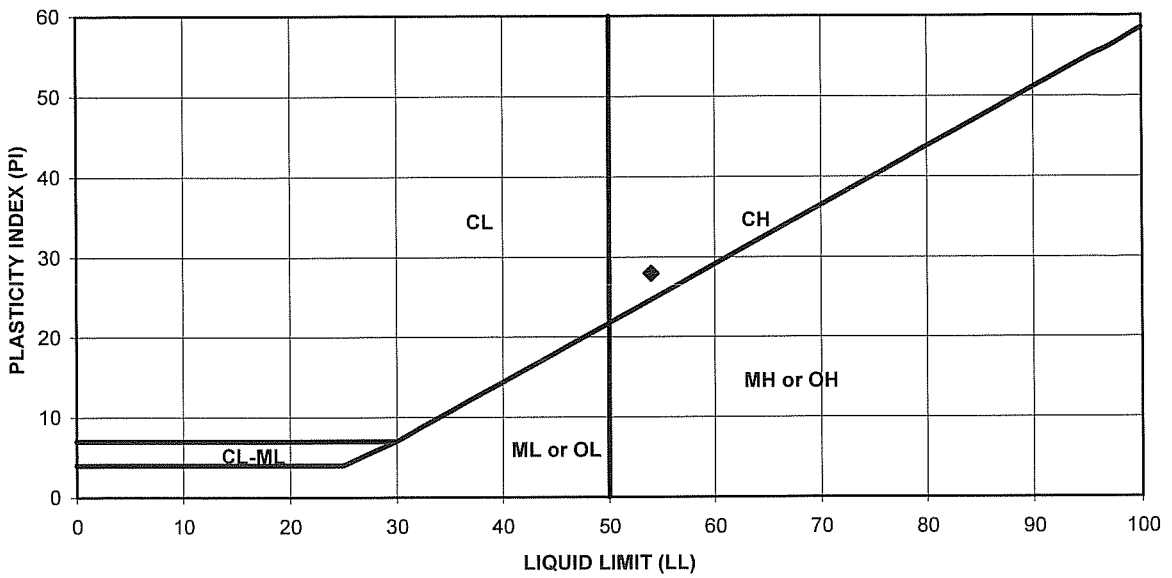


Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A-10-203	B-4	30-40	NP	NP	NP	SM

AP Engineering & Testing, Inc.

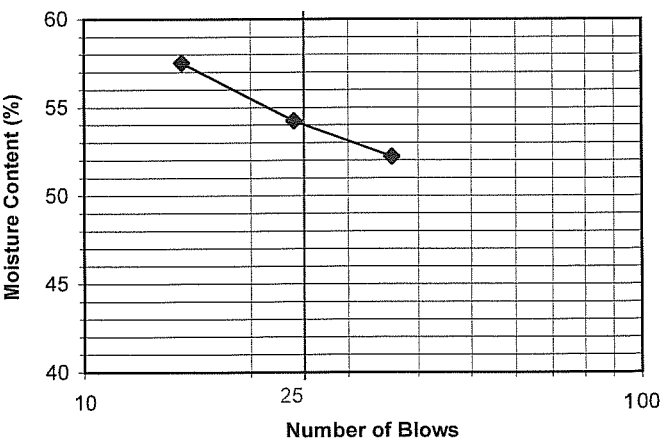
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/21/10



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test



Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
◆	A 10 204	D1	30	54	26	28	CH
	A 10 204	D2	50	NP	NP	NP	

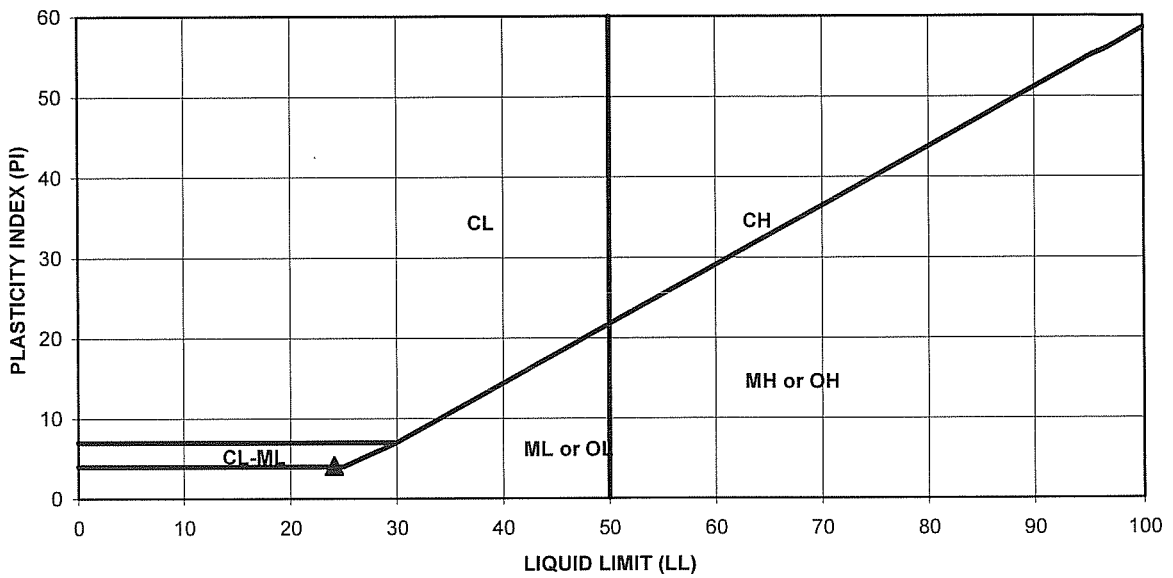
* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

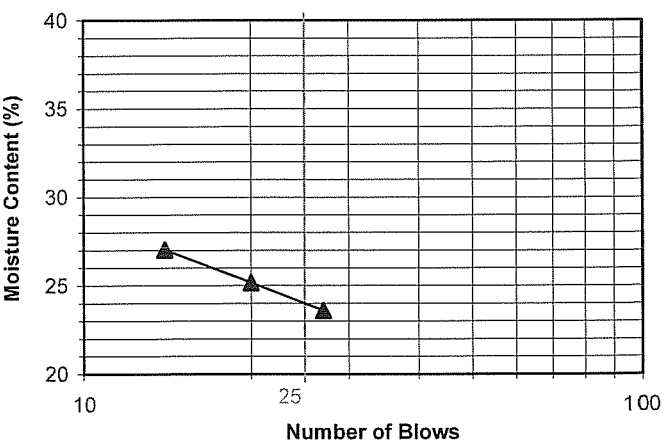
Project Name: ACTA Heim Bridge Replacement
Project No.: 06-123-03

Tested By: AP Date: 12/11/10
Checked By: AP Date: 12/29/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



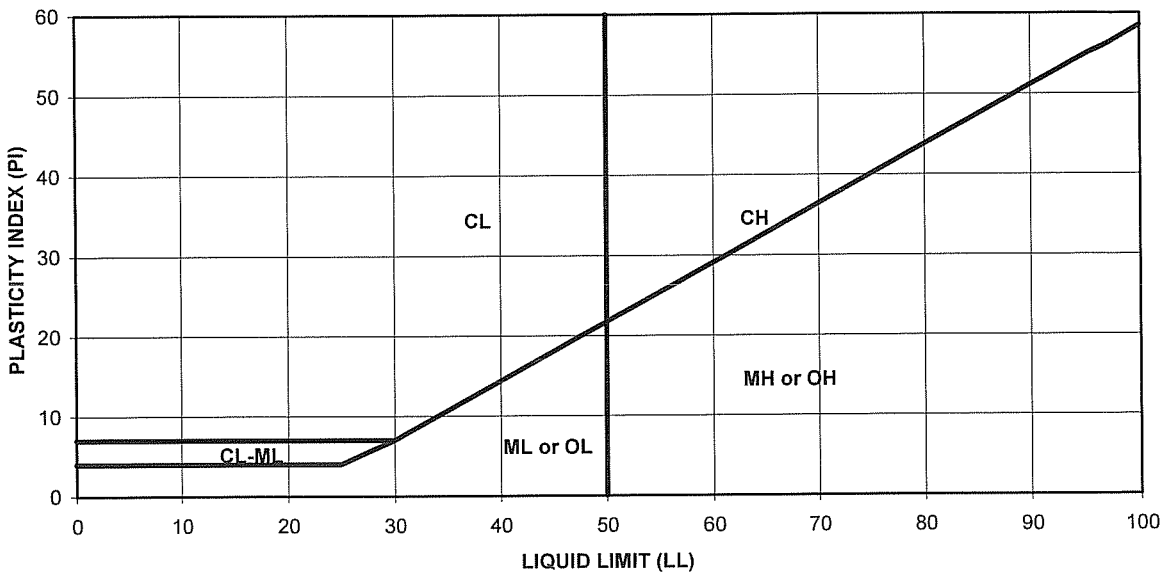
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A 10 204	B5	40-50	NP	NP	NP	ML
▲	A 10 205	B4	30-40	24	20	4	CL-ML

* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

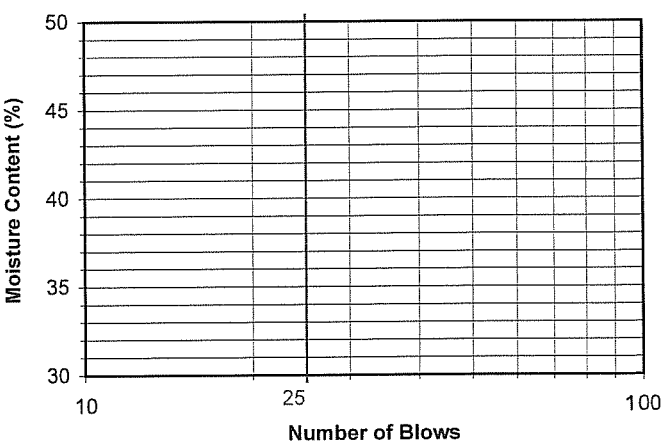
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/21/10



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test



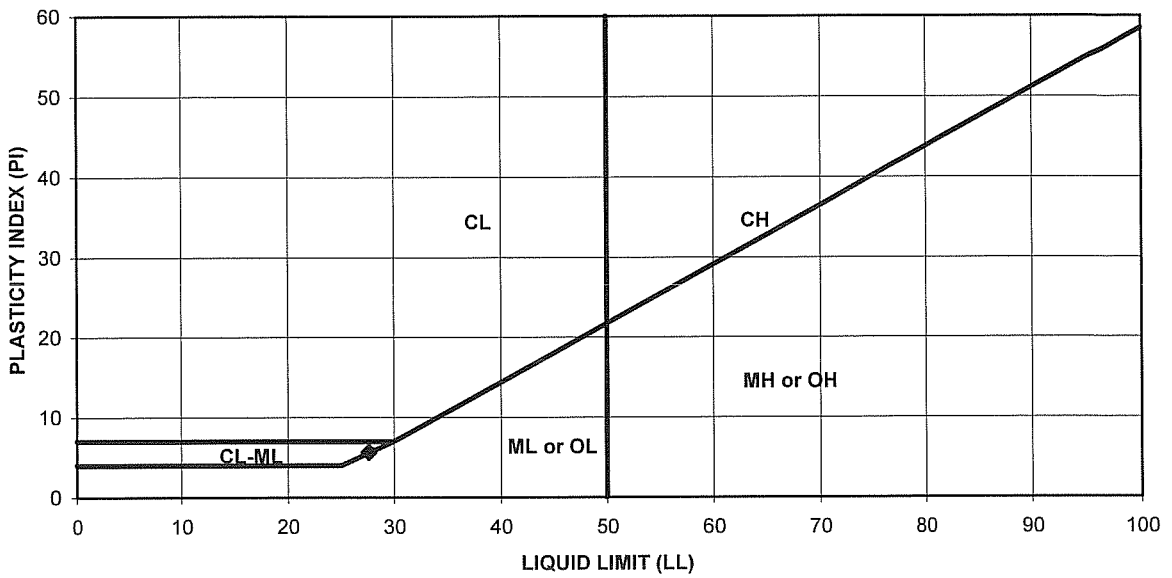
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A 10 205	D1	20	NP	NP	NP	
	A 10 205	D3	50	NP	NP	NP	

* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

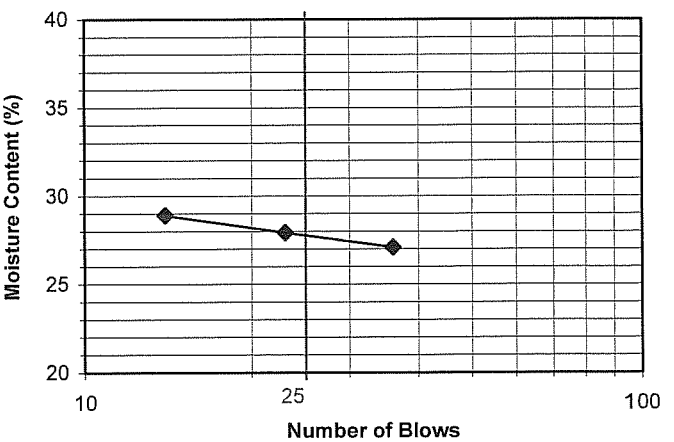
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/21/10



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test



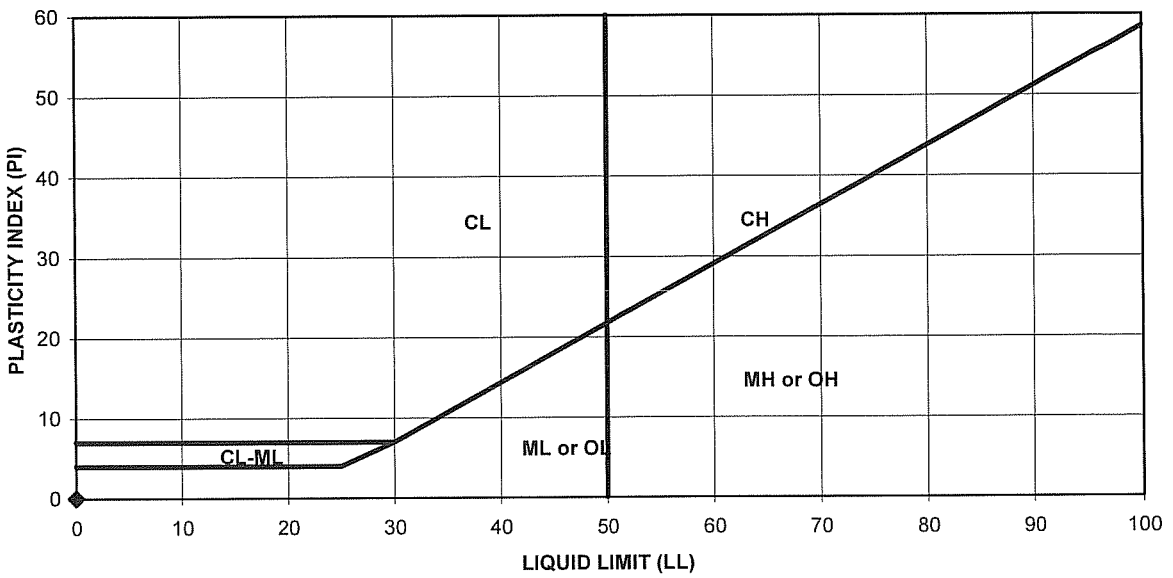
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	A 10 205	D4	60	28	22	6	CL-ML

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

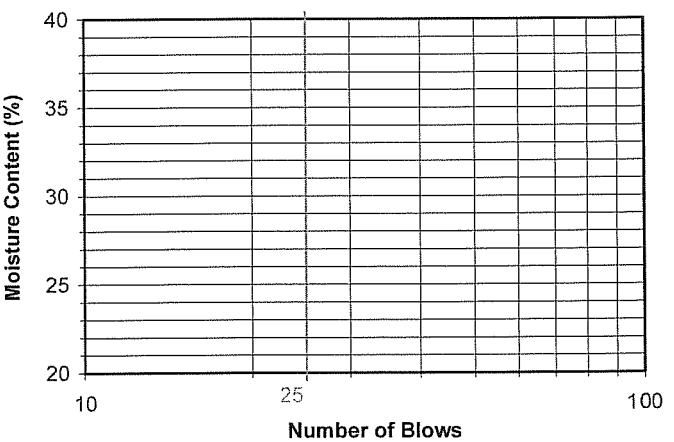
Project Name: ACTA Heim Bridge Replacement
Project No.: 06-123-03

Tested By: AP Date: 12/11/10
Checked By: AP Date: 12/29/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



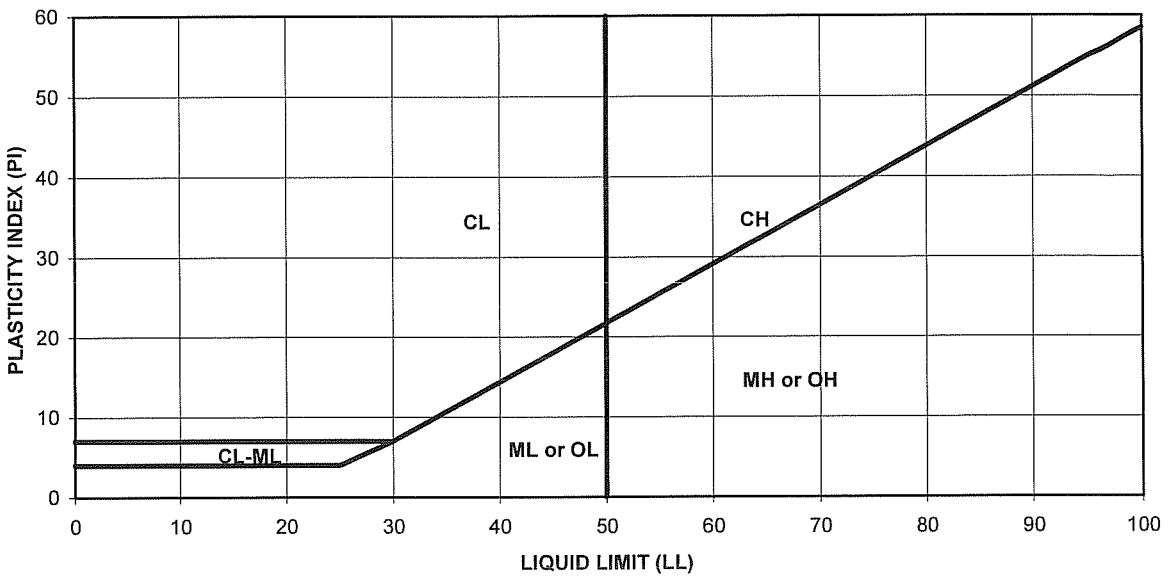
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A 10 206	B2	10-20	NP	NP	NP	ML
	A 10 206	B6	50-60	NP	NP	NP	ML

* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

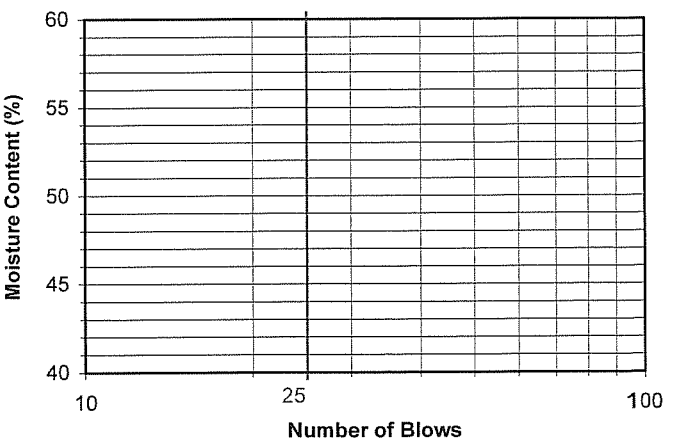
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/21/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



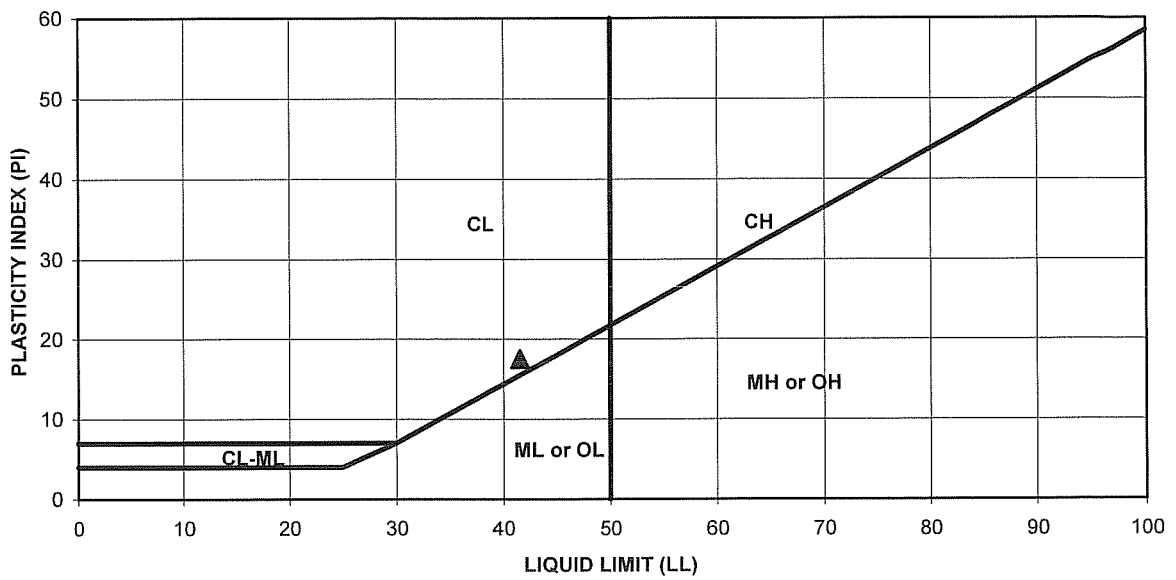
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A 10 206	D1	20	NP	NP	NP	
	A 10 206	D2	30	NP	NP	NP	

* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

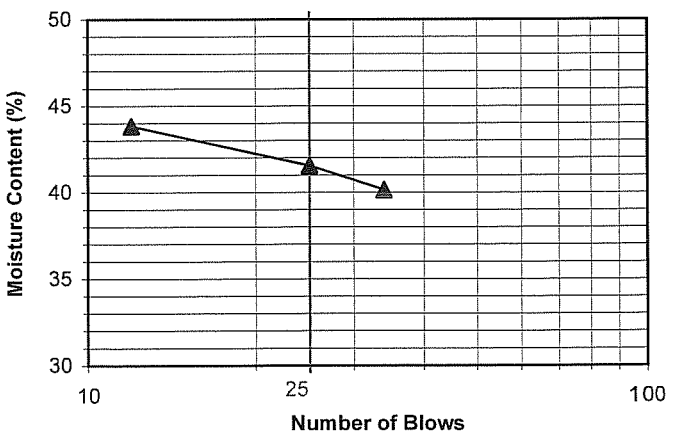
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/21/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



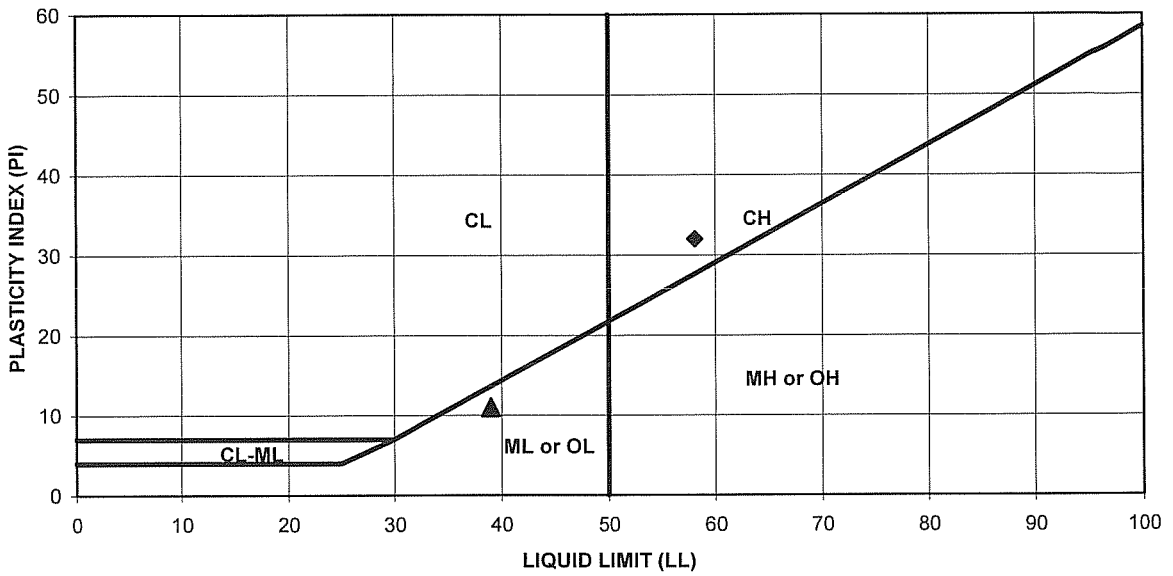
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A 10 206	D3	55	NP	NP	NP	
▲	A 10 206	D4	65	42	24	18	CL

* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

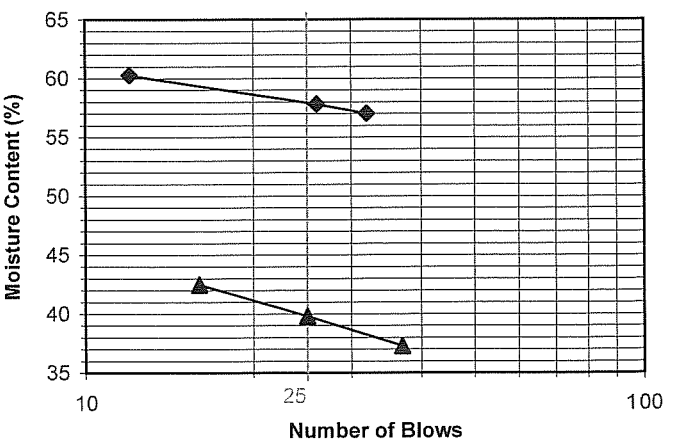
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/23/10



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test

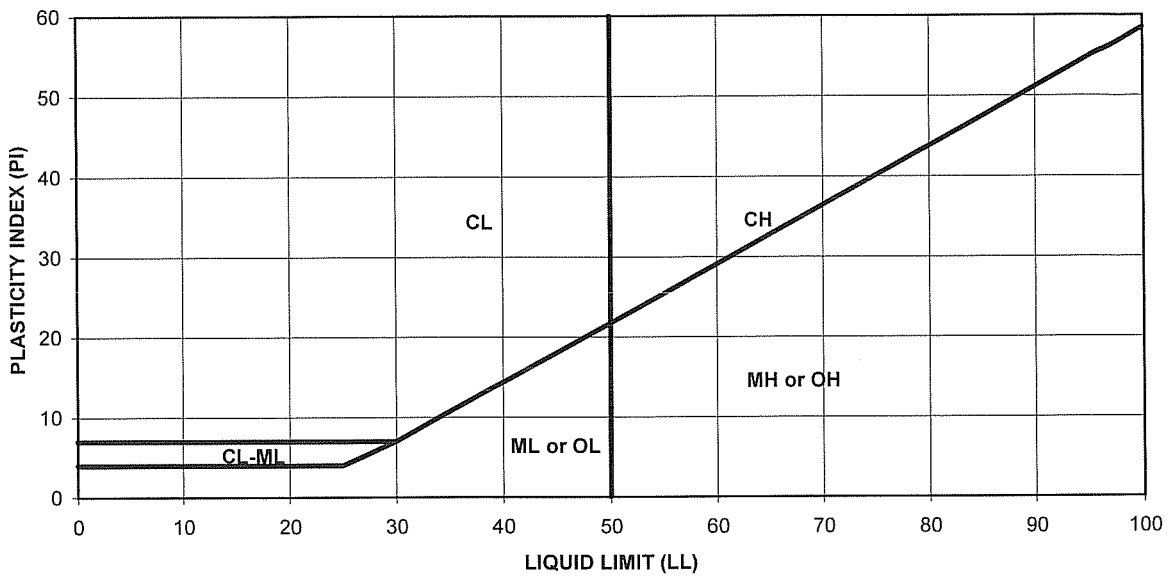


Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	A 10 207	D4	60	58	26	32	CH
▲	A 10 207	D6	75	39	28	11	ML

AP Engineering & Testing, Inc.

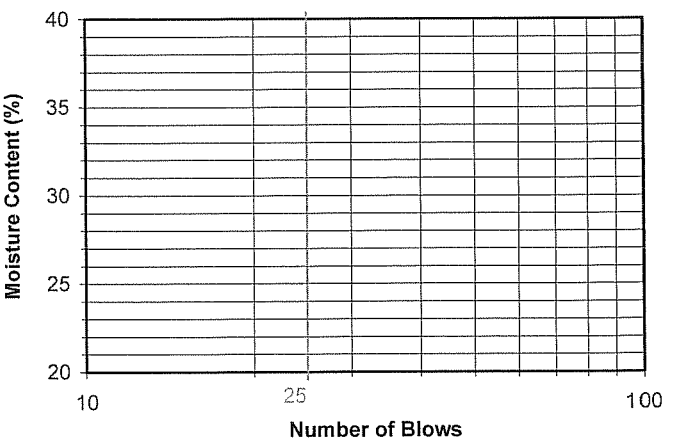
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/23/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A 10 207	D7	80	NP	NP	NP	

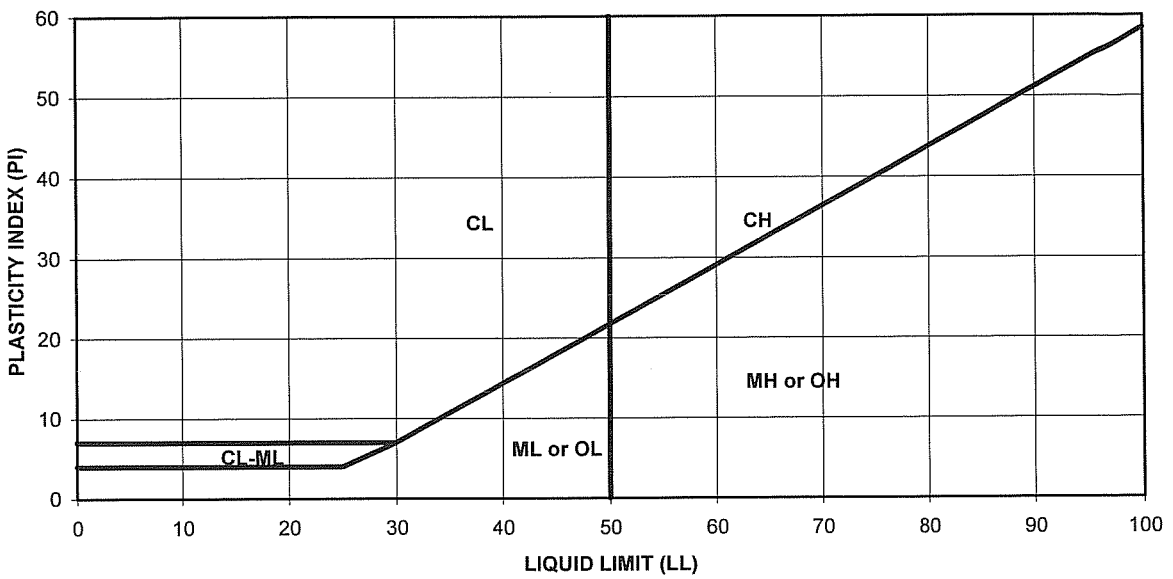
* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

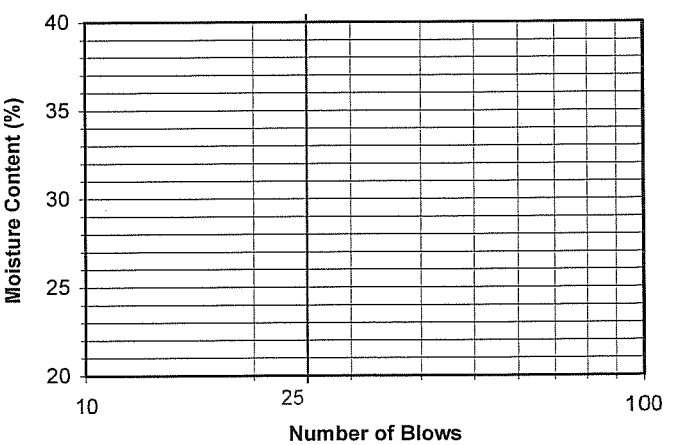
Project Name: ACTA Heim Bridge Replacement
Project No.: 06-123-03

Tested By: AP Date: 12/15/10
Checked By: AP Date: 12/16/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A-10-208	B-5	40-50	NP	NP	NP	ML
	A-10-208	B-7	60-70	NP	NP	NP	ML

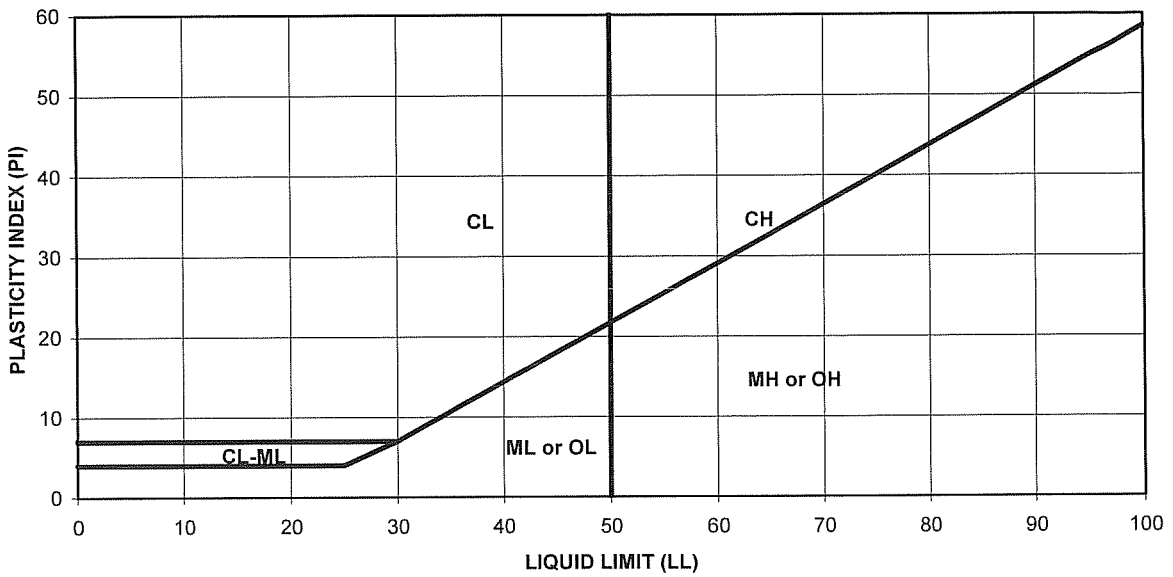
* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

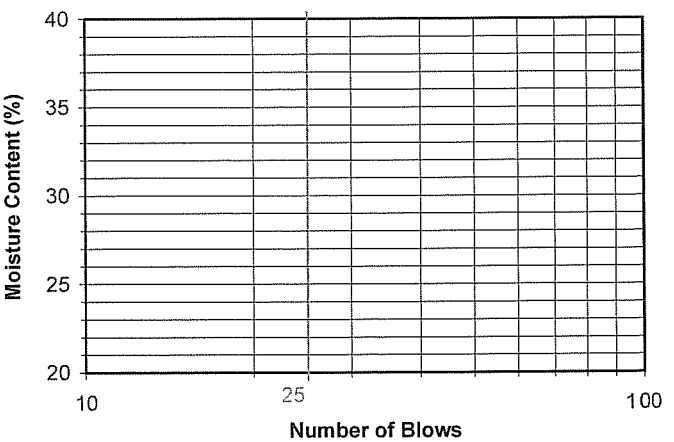
Project Name: ACTA Heim Bridge Soil-Cement
Project No.: 06-123-03

Tested By: AP Date: 12/11/10
Checked By: AP Date: 12/13/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



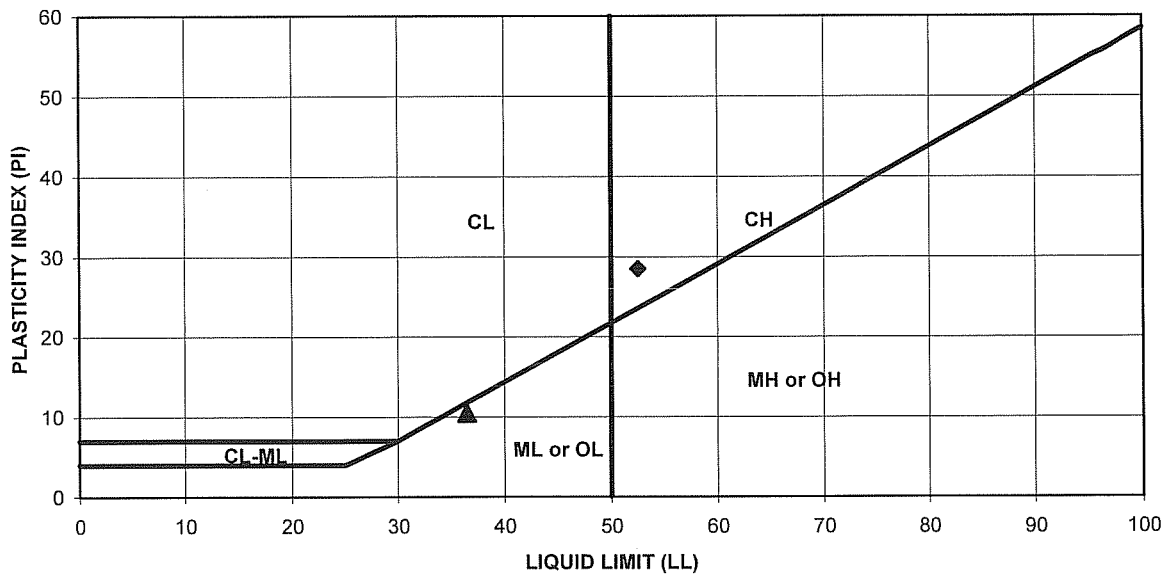
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A-10-208	B-6	50-60	NP	NP	NP	ML
	A-10-209	B-4	30-40	NP	NP	NP	ML

* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

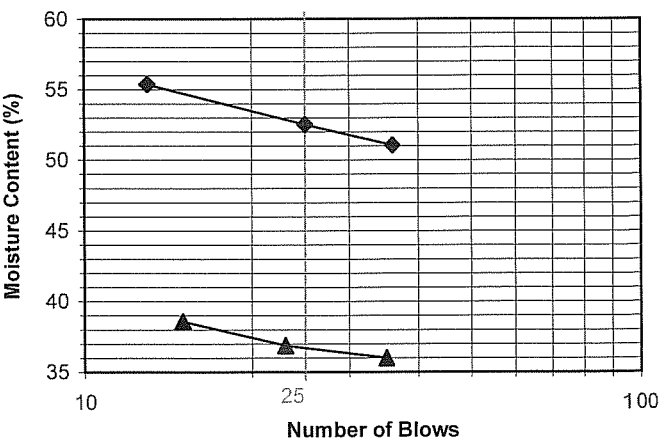
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/23/10



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test

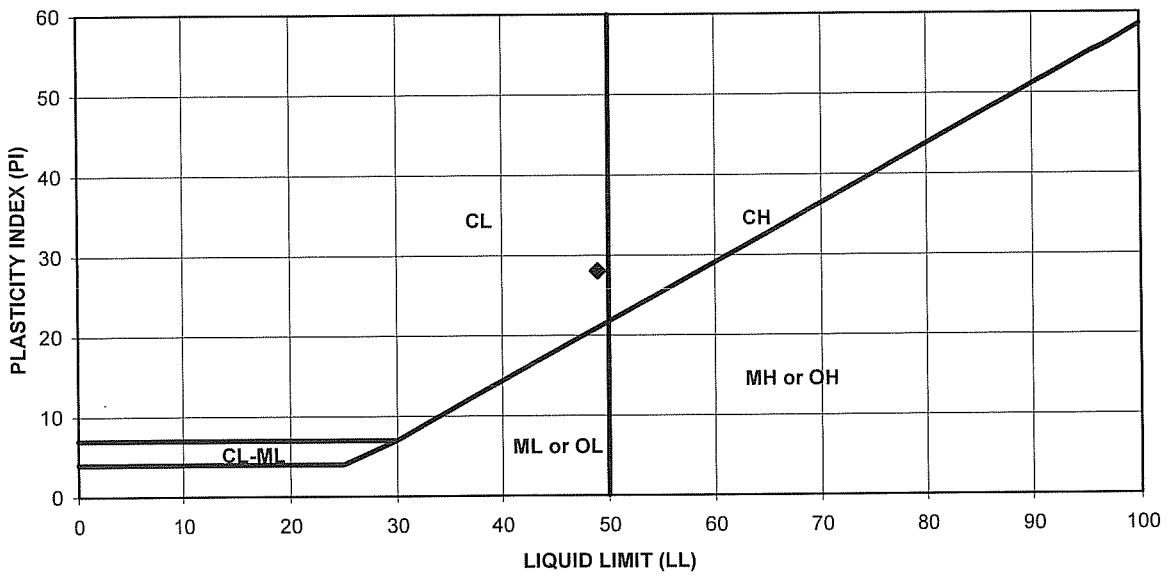


Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	A 10 209	D2	45	53	24	29	CH
▲	A 10 209	D3	50	37	26	11	ML

AP Engineering & Testing, Inc.

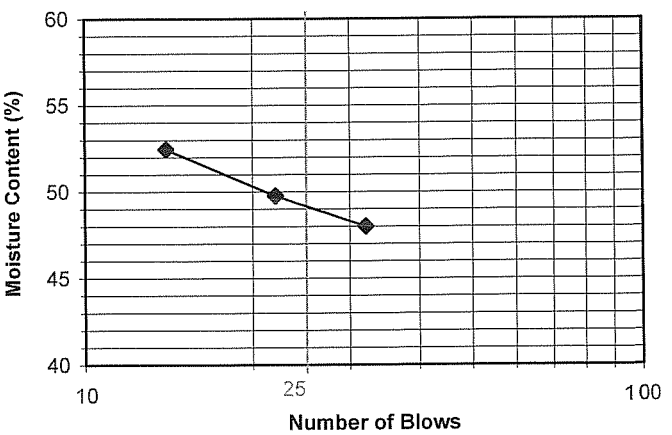
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/23/10



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test

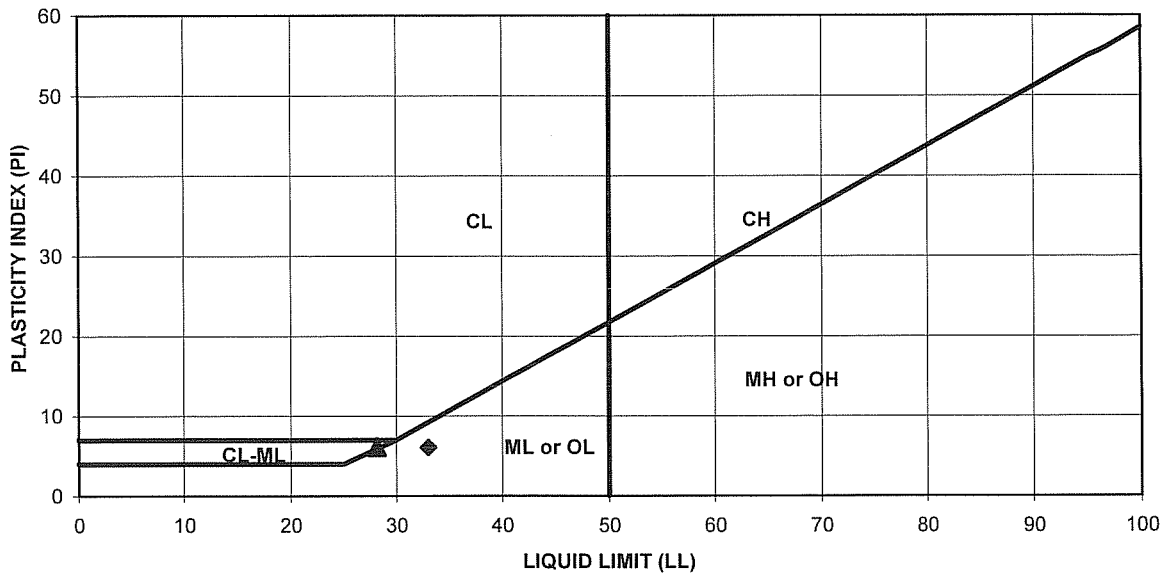


Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	A 10 209	D5	60	49	21	28	CL

AP Engineering & Testing, Inc.

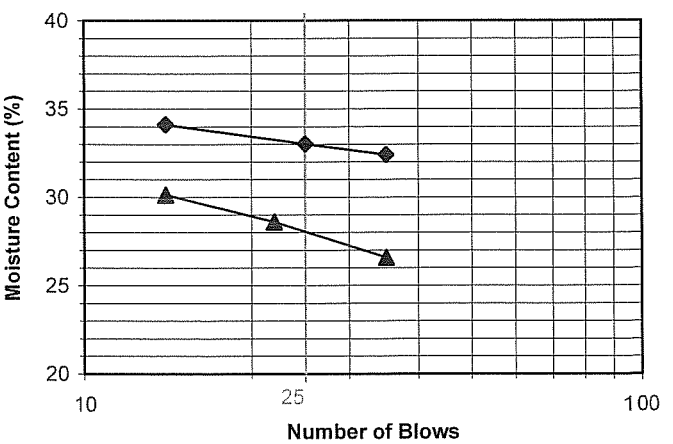
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/23/10



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test



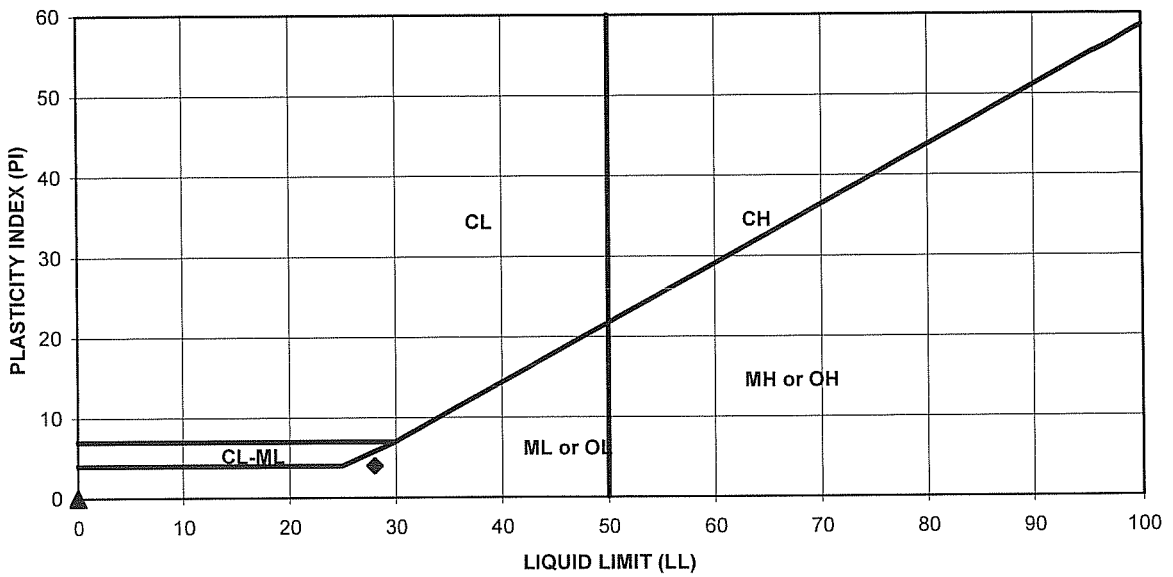
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	A 10 210	D1	40	33	27	6	ML
▲	A 10 210	D2	45	28	22	6	CL-ML

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

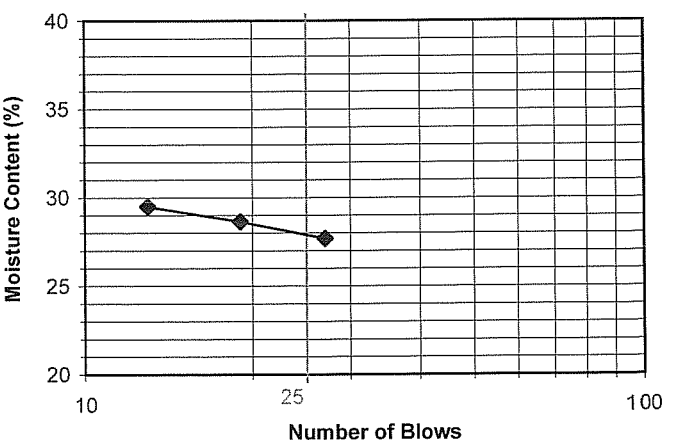
Project Name: ACTA Heim Bridge Soil-Cement
Project No.: 06-123-03

Tested By: AP Date: 12/11/10
Checked By: AP Date: 12/13/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	A-10-210	B-2	10	28	24	4	ML
	A-10-210	B-6	50	NP	NP	NP	ML

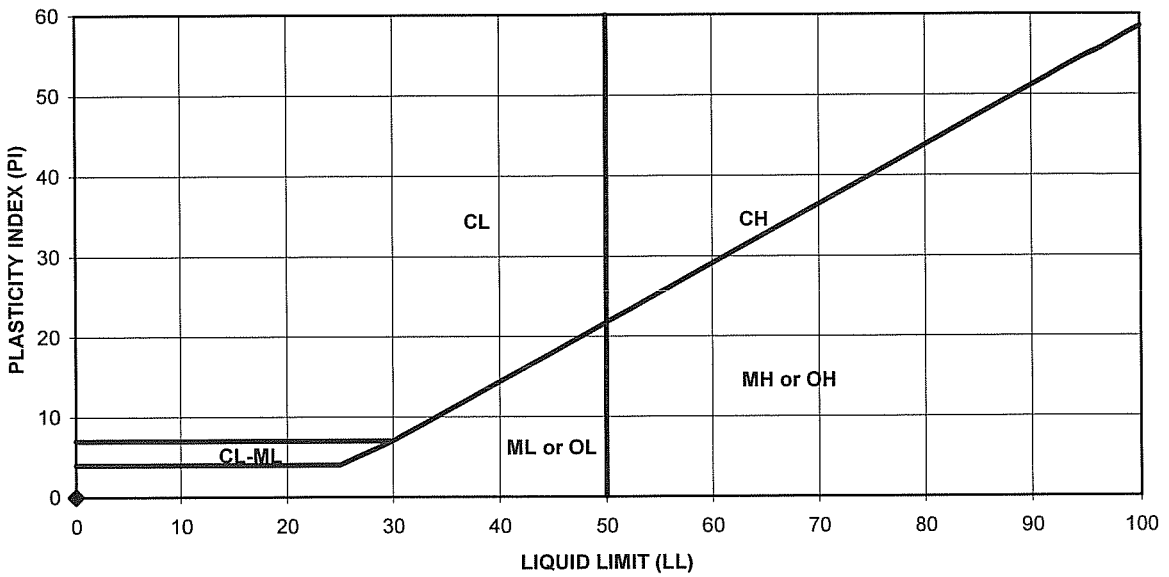
* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

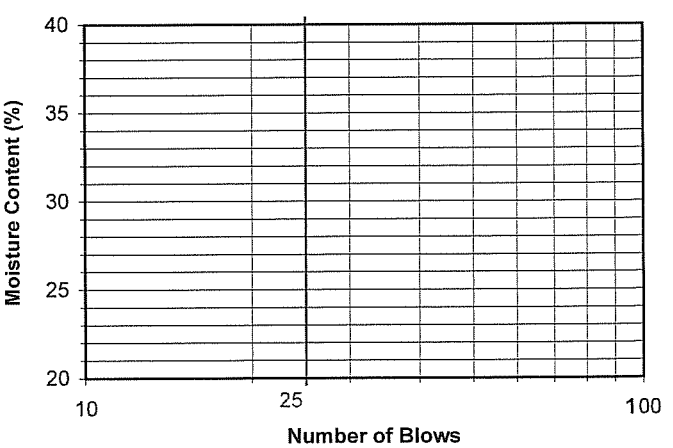
Project Name: ACTA Heim Bridge Replacement
Project No.: 06-123-03

Tested By: AP Date: 12/15/10
Checked By: AP Date: 12/16/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



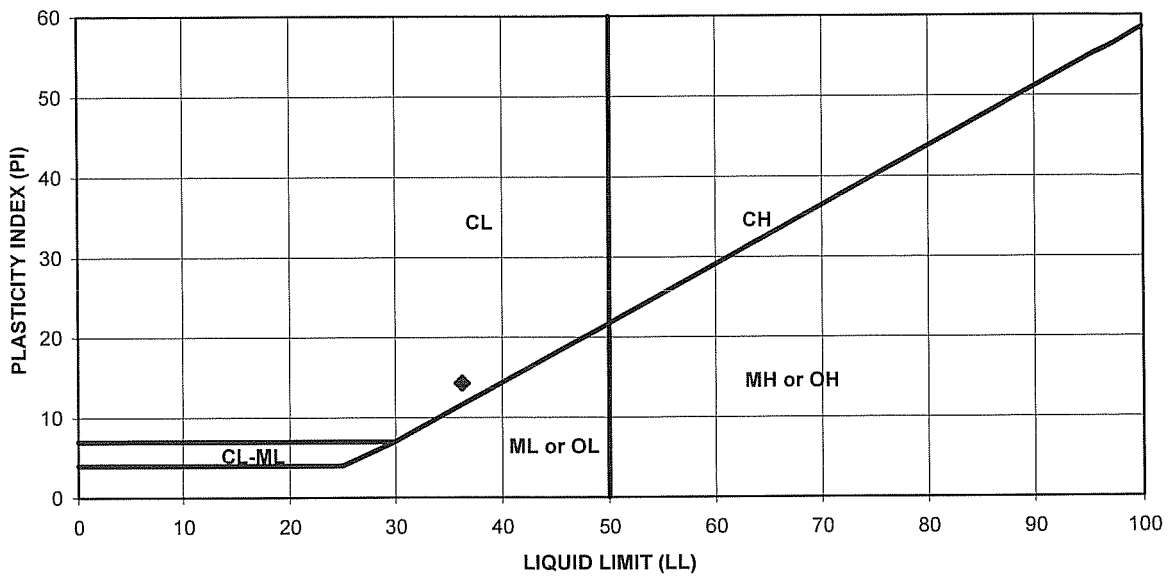
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A-10-210	B-4	30-40	NP	NP	NP	ML
	A-10-212	B-5	40-50	NP	NP	NP	ML

* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

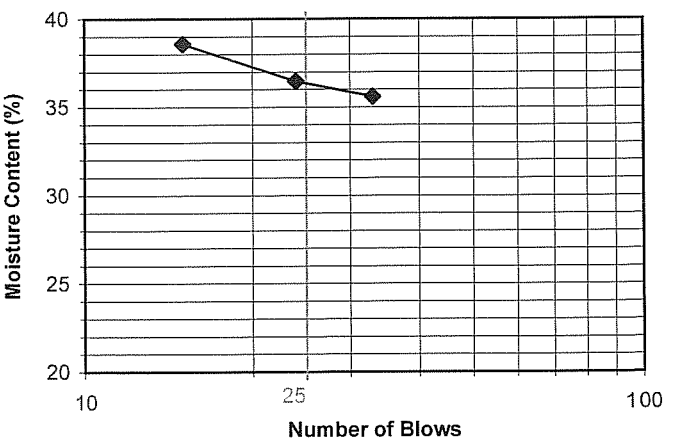
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/23/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	A 10 211	D2	57	36	22	14	CL
	A 10 211	D4	60	NP	NP	NP	

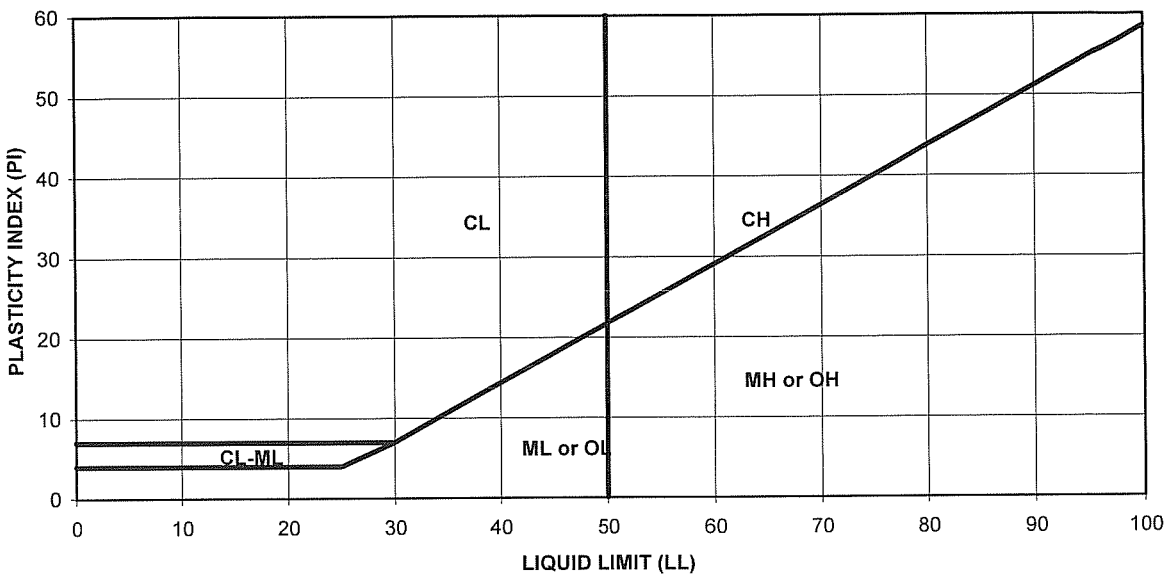
* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

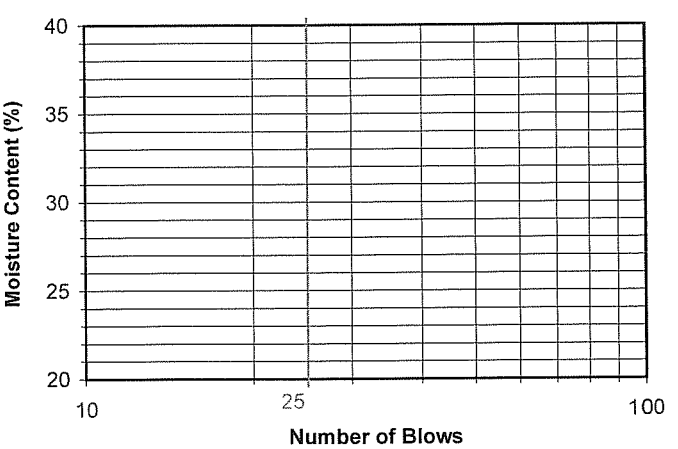
Project Name: ACTA Heim Bridge Soil-Cement
Project No.: 06-123-03

Tested By: AP Date: 12/11/10
Checked By: AP Date: 12/13/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



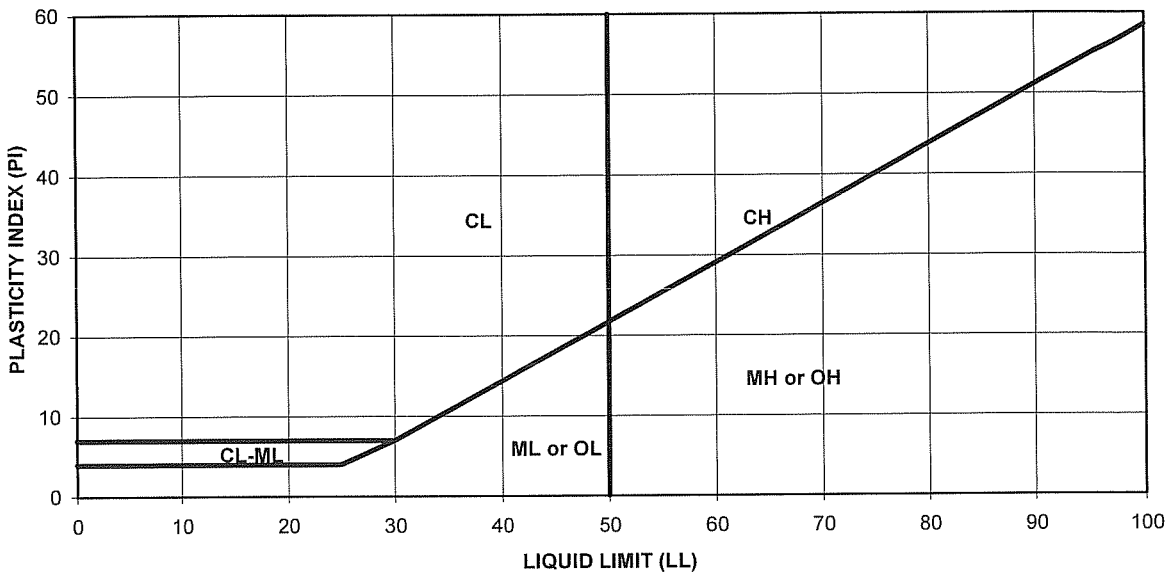
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A-10-211	B-5	40-50	NP	NP	NP	ML

* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

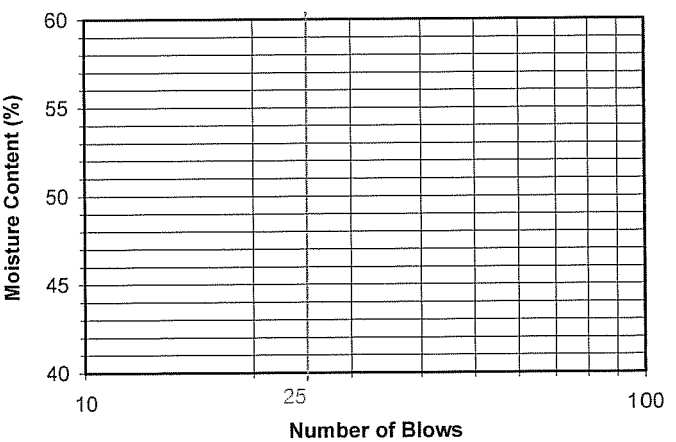
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/29/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A 10 212	B3	20-30	NP	NP	NP	SM
	A 10 212	B5	40-50	NP	NP	NP	ML

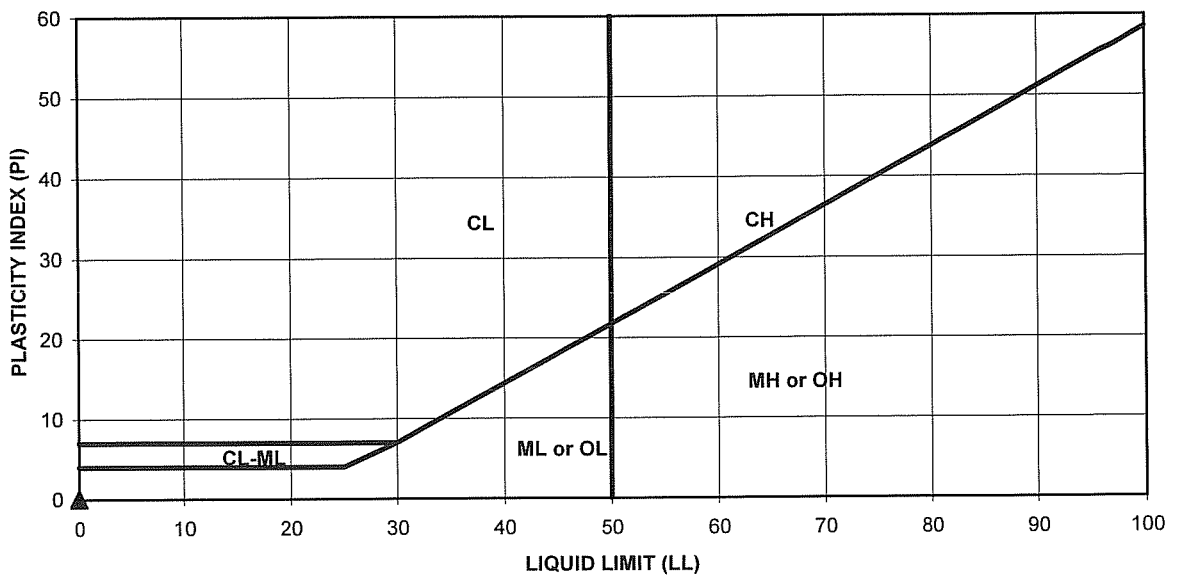
* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

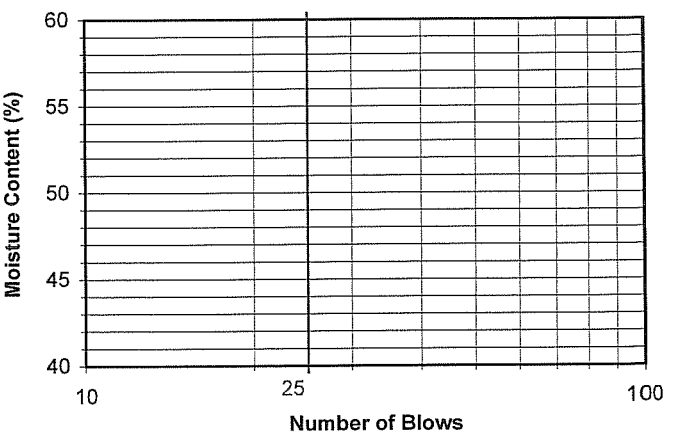
Project Name: ACTA Heim Bridge Replacement
Project No.: 06-123-03

Tested By: AP Date: 12/15/10
Checked By: AP Date: 12/16/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



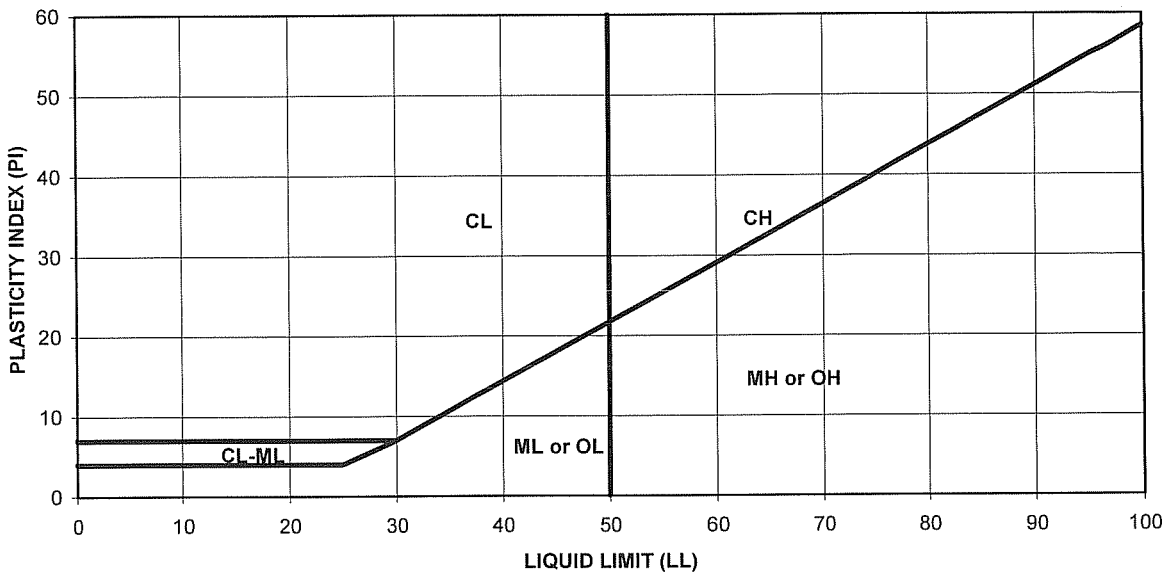
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A-10-213	B-3	20-30	NP	NP	NP	ML
	A-10-213	B-4	30-40	NP	NP	NP	ML

* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

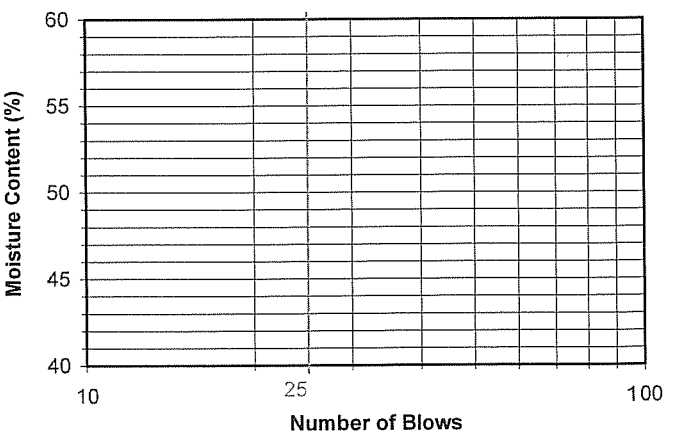
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/23/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



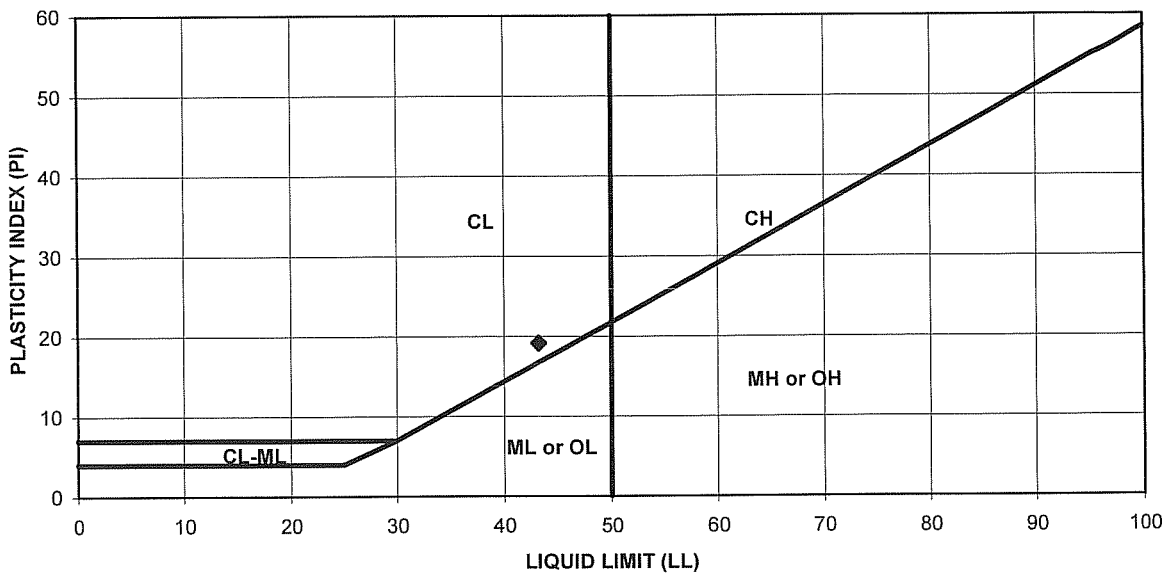
Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	A 10 213	B3	20	NP	NP	NP	
	A 10 213	B6	50	NP	NP	NP	

* NP denotes "non-plastic"

AP Engineering & Testing, Inc.

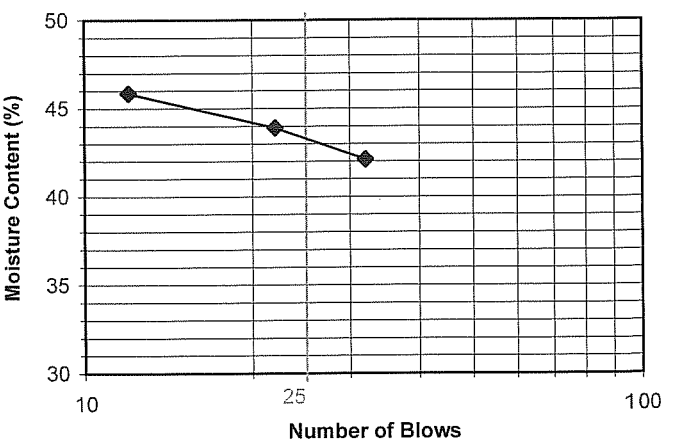
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/23/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test

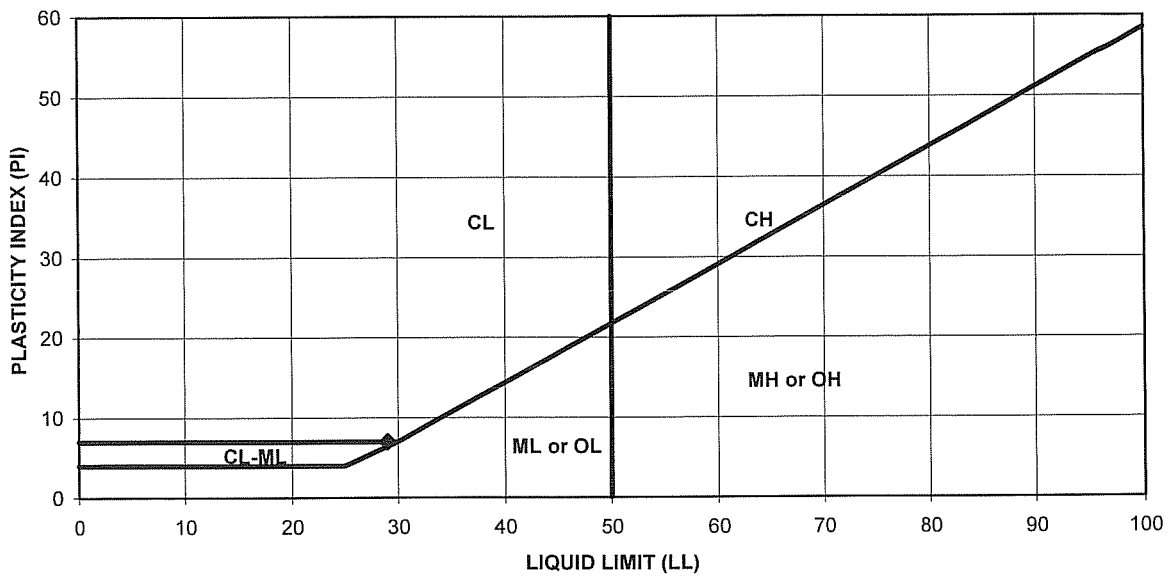


Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	R 10 301	D2	10	43	24	19	CL
	R 10 301	T8	37.5	NP	NP	NP	

AP Engineering & Testing, Inc.

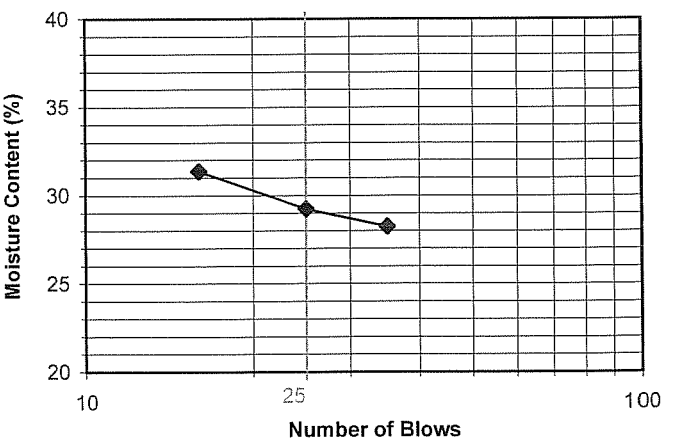
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/23/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test

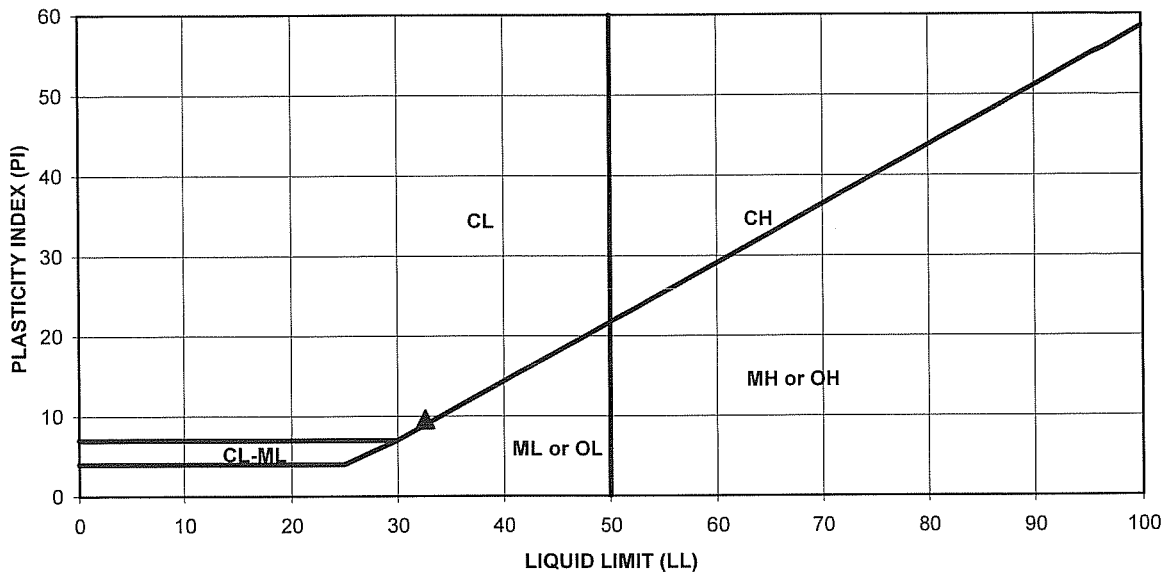


Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
♦	R 10 301	T10	45	29	22	7	CL-ML
	R 10 301	S11	50	NP	NP	NP	

AP Engineering & Testing, Inc.

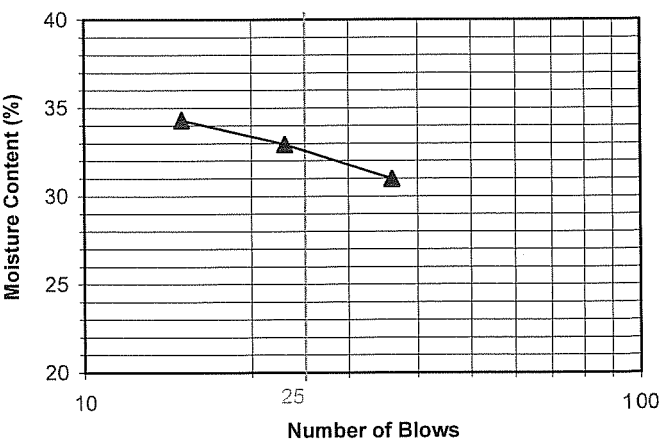
ATTERBERG LIMITS
ASTM D 4318

Project Name: ACTA Schuyler Heim Bridge Future Fill **Tested By:** DK Date: 12/20/10
Project No.: 06-123 **Checked By:** AP Date: 12/23/10



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	U.S.C.S Symbol
	R 10 301	D16	75	NP	NP	NP	
▲	R 10 301	D17	80	33	23	10	CL

ORGANIC CONTENT

AP Engineering & Testing, Inc.

ORGANIC CONTENT TEST RESULTS

ASTM D2974

Client: Earth Mechanics, Inc.
Project Name: Schuyler Heim Bridge Future Fill
Project Number: 06-123

Laboratory No.: 10-1151
Date: 12/21/10

Boring No.	Sample No.	Sample Depth (ft)	Soil Description	Total Organic Content (%)
A 10 201	B2	10-20	Silty Sand	0.5
A 10 202	B5	40-50	Clayey Silt	0.8
A 10 203	B4	30-40	Silty Sand	0.6
A 10 204	B5	40-50	Silt	0.6
A 10 205	B4	30-40	Clayey Silt	0.9
A 10 206	B2	10-20	Silt	0.6
A 10 208	B6	50-60	Silt	0.8
A 10 209	B4	30-40	Silt	1.0
A 10 210	B6	50-60	Silt	0.6
A 10 211	B5	40-50	Silt	0.7
A 10 212	B1	0-10	Silty Sand	0.8
A 10 212	B3	20-30	Silty Sand	1.0
A 10 212	B5	40-50	Silt	0.7
A 10 213	B3	20-30	Silt	0.7

2607 Pomona Boulevard. Pomona, California 91768
Tel. (909) 869-6316, Fax (909) 869-6318

AP Engineering & Testing, Inc.

ORGANIC CONTENT TEST RESULTS

ASTM D2974

Client: Earth Mechanics, Inc.
Project Name: ACTA Heim Bridge Future Fill
Project Number: 06-123-03

Laboratory No.: 10-1151
Date: 12/23/10

Boring No.	Sample No.	Sample Depth (ft)	Soil Description	Total Organic Content (%)
A 10 206	B6	50-60	ML	0.6

2607 Pomona Boulevard. Pomona, California 91768
Tel. (909) 869-6316, Fax (909) 869-6318

DIRECT SHEAR

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST DATA
ASTM D 3080

Project Name: ACTA Schuyler Heim Bridge Future Tested By NV Date: 12/16/10

Boring No.: A 10 207 Checked By AP Date: 12/27/10

Sample No.: D1 Depth (ft): 20

Description: Gray Poorly-Graded Sand w/silt

Sample Type: Cal. Mod.

Test Condition: Inundated

Sample Diameter (in)	2.415
Sample Height (in)	1.00
Total Soil+Ring Weight(g)	584.82
Total Ring Weight (g)	136.83
Wet Density (pcf)	124.19
Dry Density (pcf)	97.74

Moisture Determination	Before Test	After Test
Cont. Weight (g)	49.94	156.73
Wet Soil+Cont. (g)	206.18	559.72
Dry Soil+Cont. (g)	172.91	466.33
Moisture Content (%)	27.1	30.2
Degree Saturation	98.4	109.7

METHOD OF SHEARING

[X] Regular Shearing

[ ] Residual Shearing 5 Passes

Shear Rate (in/min): 0.025

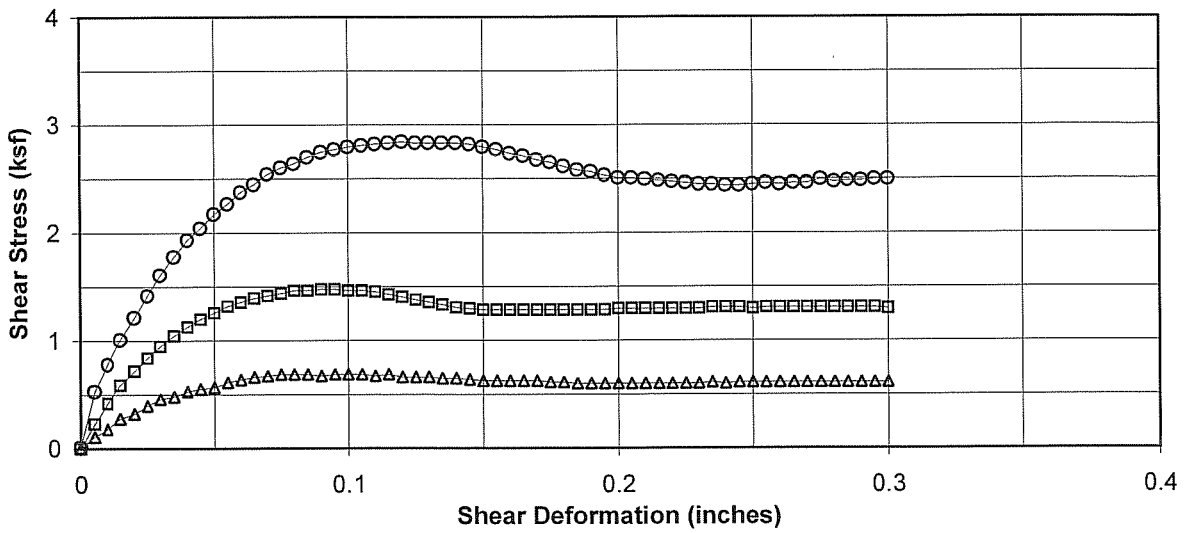
Shear Distance (in): 0.3

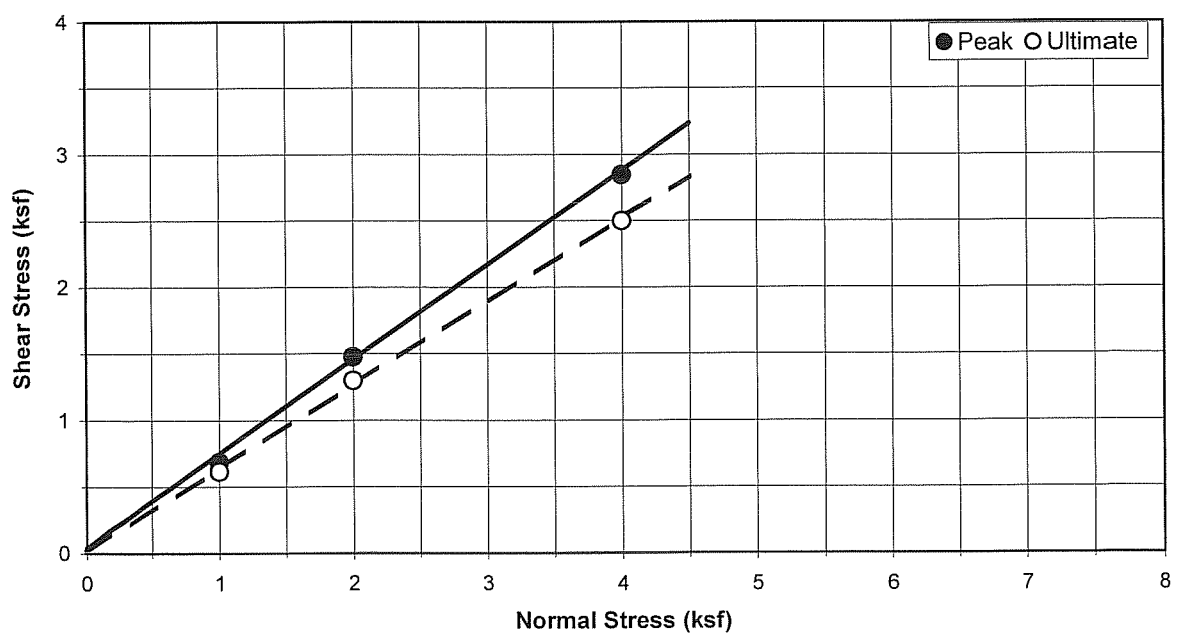
Sample Number	Sample + Ring Wt.	Ring Wt.	Normal Load (ksf)	Max. Shear Reading (psf)	Ultimate Shear Reading (psf)	Remarks
1	195.69	45.71	1.0	684	612	
2	194.72	45.58	2.0	1476	1296	
3	194.41	45.54	4.0	2844	2496	

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	ACTA Schuyler Heim Bridge Future	Initial Dry Density:	97.7	pcf
Boring No.:	A 10 207	Moisture Content (before):	27.1	%
Sample No.:	D1	Moisture Content (after):	30.2	%
Depth (ft):	20			
Sample Type:	Cal. Mod.			
Soil Description:	Gray Poorly-Graded Sand w/silt			
Test Condition:	Inundated			





Strength Parameters	Peak	Ultimate
Cohesion (psf):	50	0
Friction Angle:	35 °	32 °

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST DATA
ASTM D 3080

Project Name: ACTA Schuyler Heim Bridge Future Tested By: ST Date: 12/20/10

Boring No.: R 10 301 Checked By: AP Date: 12/27/10

Sample No.: T3 Depth (ft): 15

Description: Gray Fine Sand w/silt

Sample Type: Cal. Mod.

Test Condition: Inundated

Sample Diameter (in)	2.415
Sample Height (in)	1.00
Total Soil+Ring Weight(g)	553.18
Total Ring Weight (g)	127.25
Wet Density (pcf)	118.07
Dry Density (pcf)	94.63

Moisture Determination	Before Test	After Test
Cont. Weight (g)	149.80	152.33
Wet Soil+Cont. (g)	449.95	567.36
Dry Soil+Cont. (g)	390.36	475.60
Moisture Content (%)	24.8	28.4
Degree Saturation	83.7	95.9

METHOD OF SHEARING

[X] Regular Shearing

[ ] Residual Shearing 5 Passes

Shear Rate (in/min): 0.025

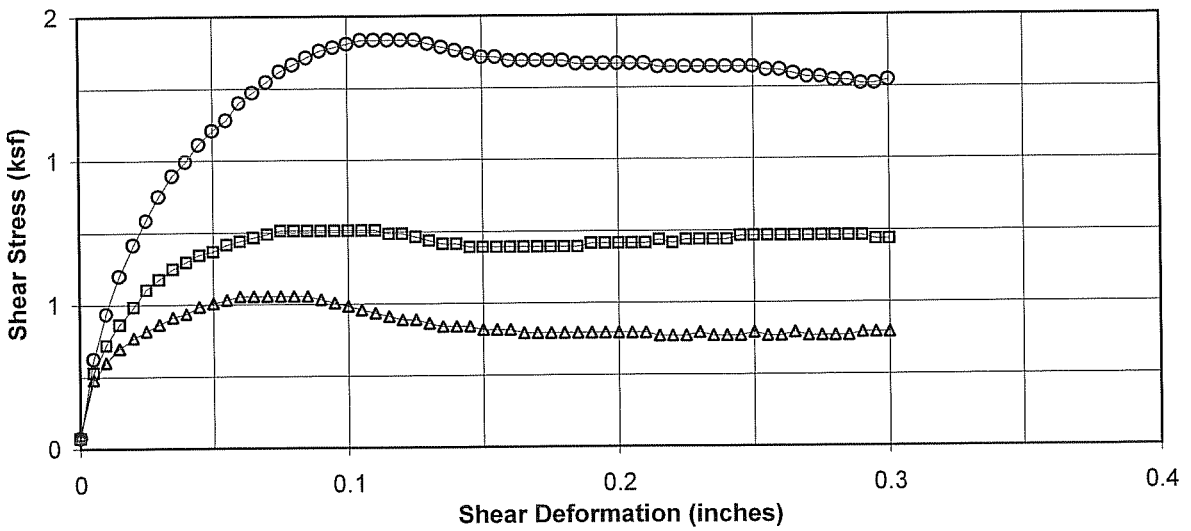
Shear Distance (in): 0.3

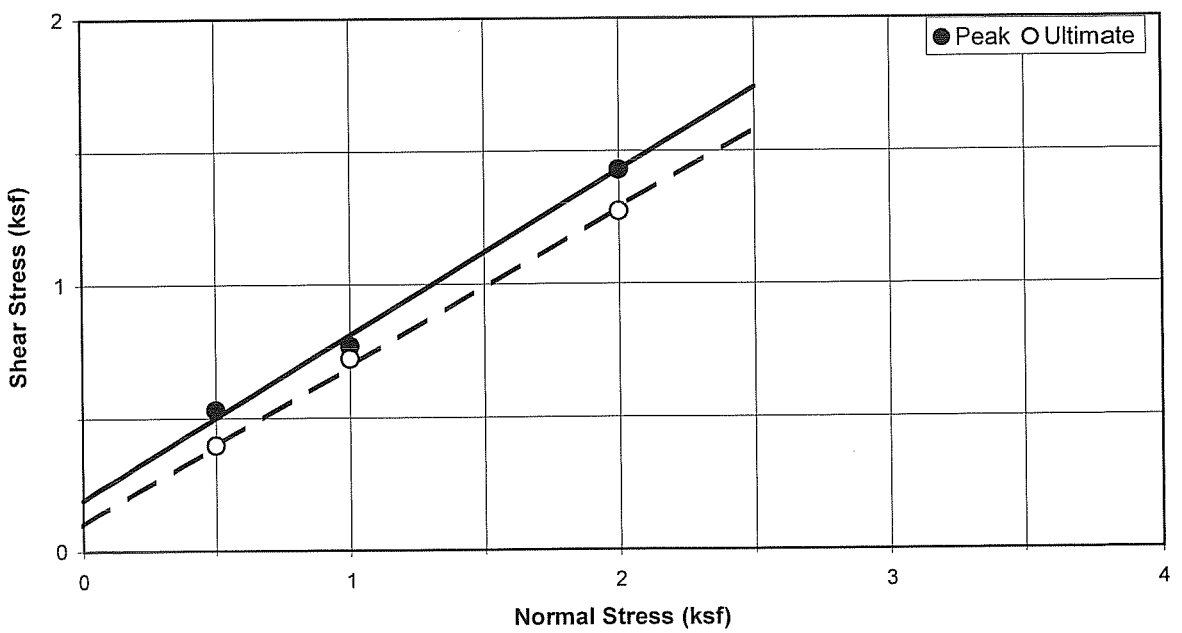
Sample Number	Sample + Ring Wt.	Ring Wt.	Normal Load (ksf)	Max. Shear Reading (psf)	Ultimate Shear Reading (psf)	Remarks
1	186.67	42.45	0.5	528	396	
2	182.69	43.06	1.0	768	720	
3	183.82	41.74	2.0	1428	1272	

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	ACTA Schuyler Heim Bridge Future	Initial Dry Density:	94.6	pcf
Boring No.:	R 10 301	Moisture Content (before):	24.8	%
Sample No.:	T3	Moisture Content (after):	28.4	%
Depth (ft):	15			
Sample Type:	Cal. Mod.			
Soil Description:	Gray Fine Sand w/silt			
Test Condition:	Inundated			





Strength Parameters	Peak	Ultimate
Cohesion (psf):	200	100
Friction Angle:	32 °	31 °

UNCONSOLIDATED UNDRAINED TRIAXIAL

AP Engineering & Testing, Inc.

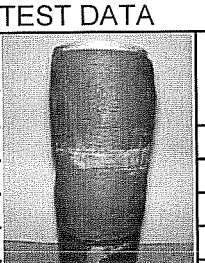
UNCONSOLIDATED UNDRAINED TRIAXIAL TEST (UU,Q)
ASTM D 2850

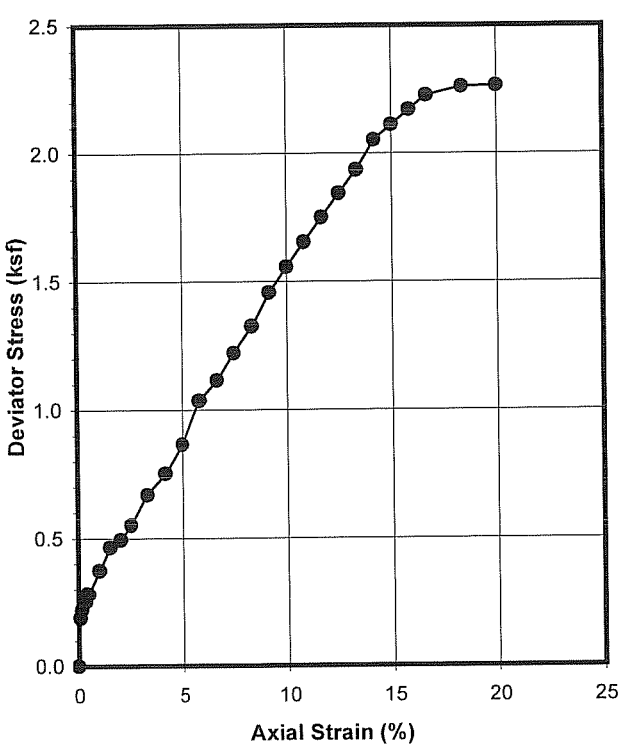
Client Name:	Earth Mechanics, Inc.	Tested By:	ST Date: 12/15/10
Project Name:	ACTA Schuyler Heim Bridge Future Fill	Checked by:	AP Date: 12/29/10
Project No.:	06-123		
Boring No.:	A 10 207		
Sample No.:	D4 Depth (feet): 60		
Soil Description	Light Olive Gray Fat Clay	Sample Type:	Cal. Mod.

Sample Diameter (inch):	2.415	Wet Unit Weight (pcf):	112.4
Sample Hieght (inch):	6.0	Dry Unit Weight (pcf):	79.5
Sample Weight (gms):	811.28	Moisture Content (%):	41.4
Wt. Wet Soil+Container(gms)	960.42	Void Ratio for Gs=2.7:	1.12
Wt. Dry Soil+Container(gms)	723.43	% Saturation:	99.8
Wt. Container (gms)	151.02		

TEST DATA

Cell Pressure (ksf):	2.88
Back Pressure (ksf):	0.0
Eff. Confining Pressure (ksf):	2.88
Shear Rate (%/min):	0.3
Maximum Deviator Stress (ksf):	2.3
Ultimate Deviator Stress (ksf):	2.3
Ultimate Undrained Shear Strength (ksf):	1.1
Axial Strain @ Maximum Stress (%)	20.00





Load (lbs)	Def. (inch)	Area (sq.in)	Deviator Stress (ksf)	Axial Strain (%)
0	0.000	4.58	0.00	0.00
6	0.005	4.58	0.19	0.08
7	0.010	4.59	0.22	0.17
8	0.020	4.60	0.25	0.33
9	0.025	4.60	0.28	0.42
9	0.030	4.60	0.28	0.50
12	0.060	4.63	0.37	1.00
15	0.090	4.65	0.46	1.50
16	0.120	4.67	0.49	2.00
18	0.150	4.70	0.55	2.50
22	0.200	4.74	0.67	3.33
25	0.250	4.78	0.75	4.17
29	0.300	4.82	0.87	5.00
35	0.350	4.86	1.04	5.83
38	0.400	4.91	1.11	6.67
42	0.450	4.95	1.22	7.50
46	0.500	5.00	1.33	8.33
51	0.550	5.04	1.46	9.17
55	0.600	5.09	1.56	10.00
59	0.650	5.14	1.65	10.83
63	0.700	5.19	1.75	11.67
67	0.750	5.24	1.84	12.50
71	0.800	5.29	1.93	13.33
76	0.850	5.34	2.05	14.17
79	0.900	5.39	2.11	15.00
82	0.950	5.44	2.17	15.83
85	1.000	5.50	2.23	16.67
88	1.100	5.61	2.26	18.33
90	1.200	5.73	2.26	20.00

AP Engineering & Testing, Inc.

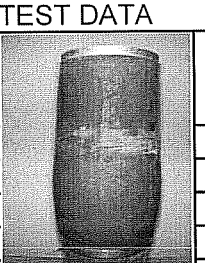
UNCONSOLIDATED UNDRAINED TRIAXIAL TEST (UU,Q)
ASTM D 2850

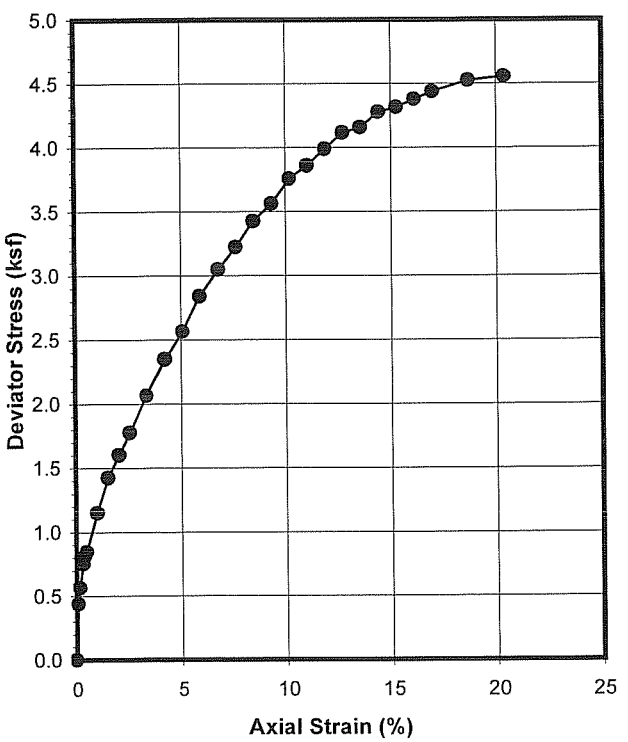
Client Name:	Earth Mechanics, Inc.	Tested By:	ST Date: 12/15/10
Project Name:	ACTA Schuyler Heim Bridge Future Fill	Checked by:	AP Date: 12/29/10
Project No.:	06-123		
Boring No.:	A 10 207		
Sample No.:	D6 Depth (feet): 75		
Soil Description	Light Olive Gray Silt	Sample Type:	Cal. Mod.

Sample Diameter (inch):	2.415	Wet Unit Weight (pcf):	118.3
Sample Hieght (inch):	5.9	Dry Unit Weight (pcf):	88.4
Sample Weight (gms):	838.08	Moisture Content (%):	33.8
Wt. Wet Soil+Container(gms)	989.35	Void Ratio for Gs=2.7:	0.91
Wt. Dry Soil+Container(gms)	777.74	% Saturation:	100.8
Wt. Container (gms)	152.39		

TEST DATA

Cell Pressure (ksf):	3.60
Back Pressure (ksf):	0.0
Eff. Confining Pressure (ksf):	3.60
Shear Rate (%/min):	0.3
Maximum Deviator Stress (ksf):	4.6
Ultimate Deviator Stress (ksf):	4.6
Ultimate Undrained Shear Strength (ksf):	2.3
Axial Strain @ Maximum Stress (%)	20.37





Load (lbs)	Def. (inch)	Area (sq.in)	Deviator Stress (ksf)	Axial Strain (%)
0	0.000	4.58	0.00	0.00
14	0.005	4.58	0.44	0.08
18	0.010	4.59	0.56	0.17
24	0.020	4.60	0.75	0.34
26	0.025	4.60	0.81	0.42
27	0.030	4.60	0.84	0.51
37	0.060	4.63	1.15	1.02
46	0.090	4.65	1.42	1.53
52	0.120	4.68	1.60	2.04
58	0.150	4.70	1.78	2.55
68	0.200	4.74	2.07	3.40
78	0.250	4.78	2.35	4.24
86	0.300	4.83	2.57	5.09
96	0.350	4.87	2.84	5.94
104	0.400	4.91	3.05	6.79
111	0.450	4.96	3.22	7.64
119	0.500	5.01	3.42	8.49
125	0.550	5.05	3.56	9.34
133	0.600	5.10	3.76	10.19
138	0.650	5.15	3.86	11.04
144	0.700	5.20	3.99	11.88
150	0.750	5.25	4.12	12.73
153	0.800	5.30	4.16	13.58
159	0.850	5.35	4.28	14.43
162	0.900	5.41	4.31	15.28
166	0.950	5.46	4.38	16.13
170	1.000	5.52	4.44	16.98
177	1.100	5.63	4.53	18.68
182	1.200	5.75	4.56	20.37

AP Engineering & Testing, Inc.

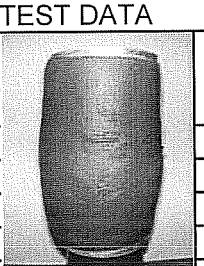
UNCONSOLIDATED UNDRAINED TRIAXIAL TEST (UU,Q)
ASTM D 2850

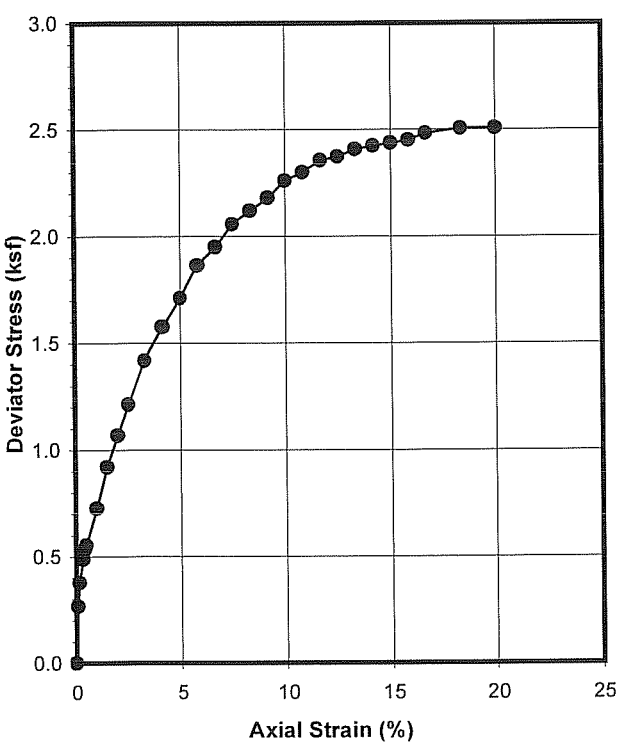
Client Name:	Earth Mechanics, Inc.	Tested By:	ST Date: 12/15/10
Project Name:	ACTA Schuyler Heim Bridge Future Fill	Checked by:	AP Date: 12/29/10
Project No.:	06-123		
Boring No.:	R 10 301		
Sample No.:	T10 Depth (feet): 45		
Soil Description	Gray Clayey Silt	Sample Type:	Shelby Tube

Sample Diameter (inch):	2.872	Wet Unit Weight (pcf):	122.5
Sample Hieght (inch):	6.0	Dry Unit Weight (pcf):	94.1
Sample Weight (gms):	1250.73	Moisture Content (%):	30.2
Wt. Wet Soil+Container(gms)	1398.61	Void Ratio for Gs=2.7:	0.79
Wt. Dry Soil+Container(gms)	1109.06	% Saturation:	103.1
Wt. Container (gms)	149.66		

TEST DATA

Cell Pressure (ksf):	1.73
Back Pressure (ksf):	0.0
Eff. Confining Pressure (ksf):	1.73
Shear Rate (%/min):	0.3
Maximum Deviator Stress (ksf):	2.5
Ultimate Deviator Stress (ksf):	2.5
Ultimate Undrained Shear Strength (ksf):	1.3
Axial Strain @ Maximum Stress (%)	20.00





Load (lbs)	Def. (inch)	Area (sq.in)	Deviator Stress (ksf)	Axial Strain (%)
0	0.000	6.48	0.00	0.00
12	0.005	6.48	0.27	0.08
17	0.010	6.49	0.38	0.17
22	0.020	6.50	0.49	0.33
24	0.025	6.51	0.53	0.42
25	0.030	6.51	0.55	0.50
33	0.060	6.54	0.73	1.00
42	0.090	6.58	0.92	1.50
49	0.120	6.61	1.07	2.00
56	0.150	6.64	1.21	2.50
66	0.200	6.70	1.42	3.33
74	0.250	6.76	1.58	4.17
81	0.300	6.82	1.71	5.00
89	0.350	6.88	1.86	5.83
94	0.400	6.94	1.95	6.67
100	0.450	7.00	2.06	7.50
104	0.500	7.07	2.12	8.33
108	0.550	7.13	2.18	9.17
113	0.600	7.20	2.26	10.00
116	0.650	7.27	2.30	10.83
120	0.700	7.33	2.36	11.67
122	0.750	7.40	2.37	12.50
125	0.800	7.47	2.41	13.33
127	0.850	7.55	2.42	14.17
129	0.900	7.62	2.44	15.00
131	0.950	7.70	2.45	15.83
134	1.000	7.77	2.48	16.67
138	1.100	7.93	2.51	18.33
141	1.200	8.10	2.51	20.00

AP Engineering & Testing, Inc.

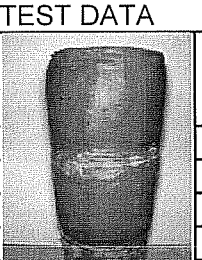
UNCONSOLIDATED UNDRAINED TRIAXIAL TEST (UU,Q)
ASTM D 2850

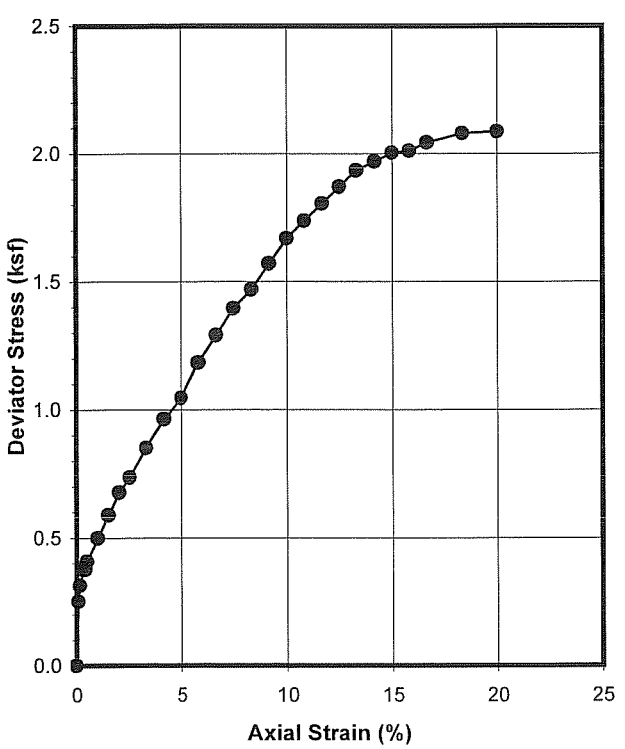
Client Name:	Earth Mechanics, Inc.	Tested By:	ST Date: 12/16/10
Project Name:	ACTA Schuyler Heim Bridge Future Fill	Checked by:	AP Date: 12/29/10
Project No.:	06-123		
Boring No.:	R 10 301		
Sample No.:	D16 Depth (feet): 75		
Soil Description	Gray Silt	Sample Type:	Cal. Mod.

Sample Diameter (inch):	2.415	Wet Unit Weight (pcf):	105.4
Sample Hieght (inch):	6.0	Dry Unit Weight (pcf):	69.0
Sample Weight (gms):	761.10	Moisture Content (%):	52.7
Wt. Wet Soil+Container(gms)	956.98	Void Ratio for Gs=2.7:	1.44
Wt. Dry Soil+Container(gms)	694.52	% Saturation:	98.8
Wt. Container (gms)	196.92		

TEST DATA

Cell Pressure (ksf):	2.88
Back Pressure (ksf):	0.0
Eff. Confining Pressure (ksf):	2.88
Shear Rate (%/min):	0.3
Maximum Deviator Stress (ksf):	2.1
Ultimate Deviator Stress (ksf):	2.1
Ultimate Undrained Shear Strength (ksf):	1.0
Axial Strain @ Maximum Stress (%)	20.00

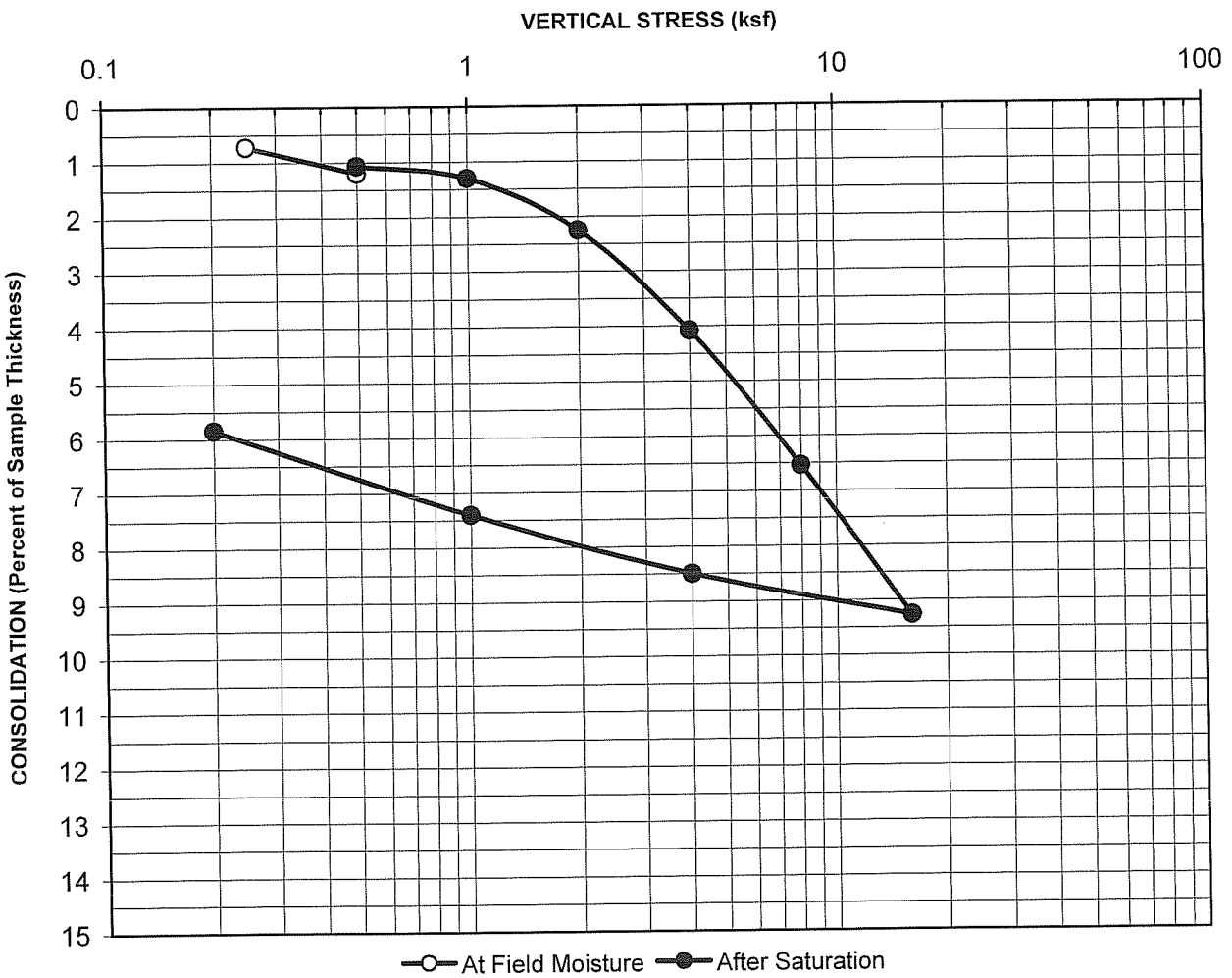




Load (lbs)	Def. (inch)	Area (sq.in)	Deviator Stress (ksf)	Axial Strain (%)
0	0.000	4.58	0.00	0.00
8	0.005	4.58	0.25	0.08
10	0.010	4.59	0.31	0.17
12	0.020	4.60	0.38	0.33
12	0.025	4.60	0.38	0.42
13	0.030	4.60	0.41	0.50
16	0.060	4.63	0.50	1.00
19	0.090	4.65	0.59	1.50
22	0.120	4.67	0.68	2.00
24	0.150	4.70	0.74	2.50
28	0.200	4.74	0.85	3.33
32	0.250	4.78	0.96	4.17
35	0.300	4.82	1.05	5.00
40	0.350	4.86	1.18	5.83
44	0.400	4.91	1.29	6.67
48	0.450	4.95	1.40	7.50
51	0.500	5.00	1.47	8.33
55	0.550	5.04	1.57	9.17
59	0.600	5.09	1.67	10.00
62	0.650	5.14	1.74	10.83
65	0.700	5.19	1.80	11.67
68	0.750	5.24	1.87	12.50
71	0.800	5.29	1.93	13.33
73	0.850	5.34	1.97	14.17
75	0.900	5.39	2.00	15.00
76	0.950	5.44	2.01	15.83
78	1.000	5.50	2.04	16.67
81	1.100	5.61	2.08	18.33
83	1.200	5.73	2.09	20.00

CONSOLIDATION

AP Engineering & Testing, Inc.

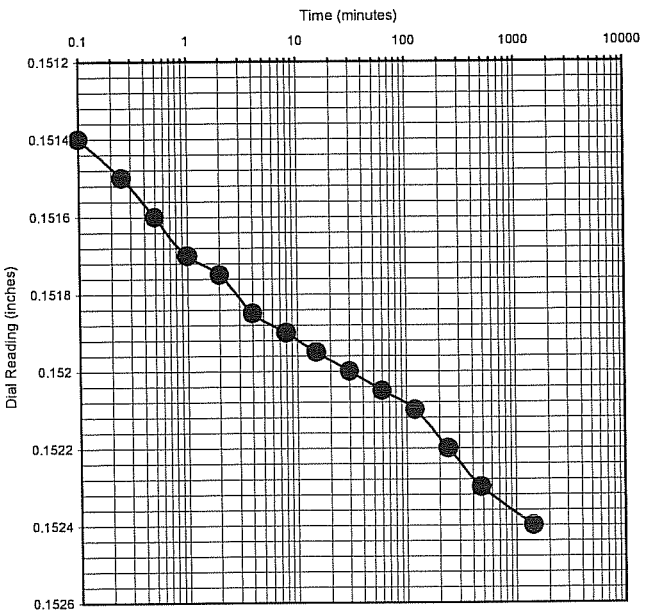


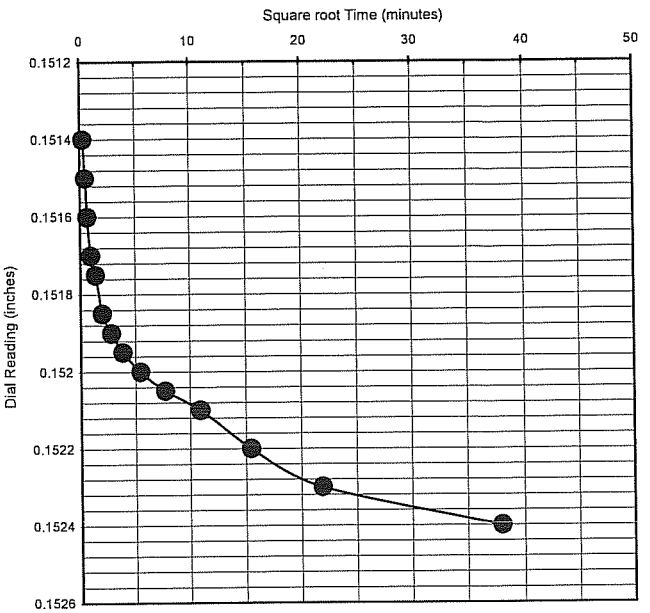
Boring No. :	A 10 201	Initial Dry Unit Weight (pcf):	87.6
Sample No.:	D1	Initial Moisture Content (%):	35.8
Depth (ft.):	35	Final Moisture Content (%):	33.1
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Shelby Tube	Initial Void Ratio:	0.92
Soil Description:	Gray Lean Clay with sand	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 201	Sample Type:	Shelby Tube
Sample No.:	D1	Soil Description:	Gray Lean Clay with sand
Depth (ft.):	35	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

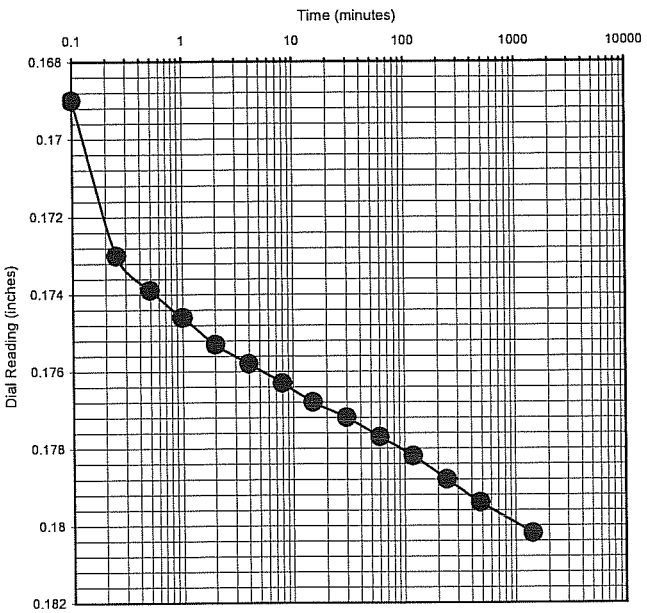
Time (minutes)	Dial Reading (inches)
0.1	0.15140
0.25	0.15150
0.5	0.15160
1	0.15170
2	0.15175
4	0.15185
8	0.15190
15	0.15195
30	0.15200
60	0.15205
120	0.15210
240	0.15220
480	0.15230
1440	0.15240

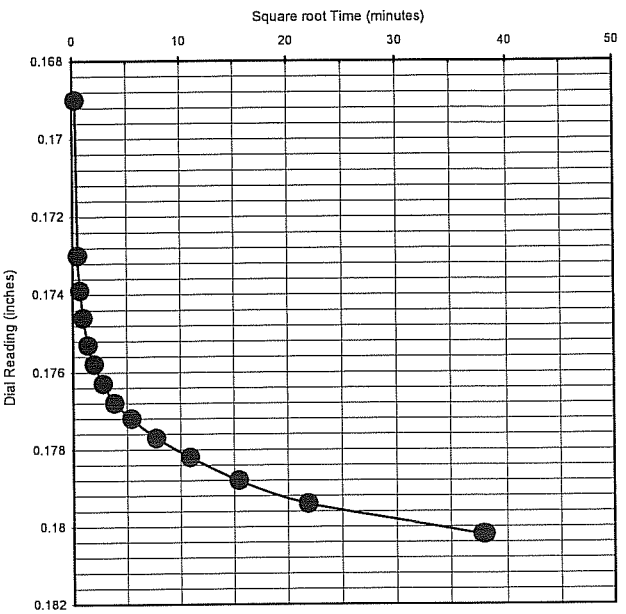
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.15140
0.5000	0.15150
0.7071	0.15160
1.0000	0.15170
1.4142	0.15175
2.0000	0.15185
2.8284	0.15190
3.8730	0.15195
5.4772	0.15200
7.7460	0.15205
10.9545	0.15210
15.4919	0.15220
21.9089	0.15230
37.9473	0.15240

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 201	Sample Type:	Shelby Tube
Sample No.:	D1	Soil Description:	Gray Lean Clay with sand
Depth (ft.):	35	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

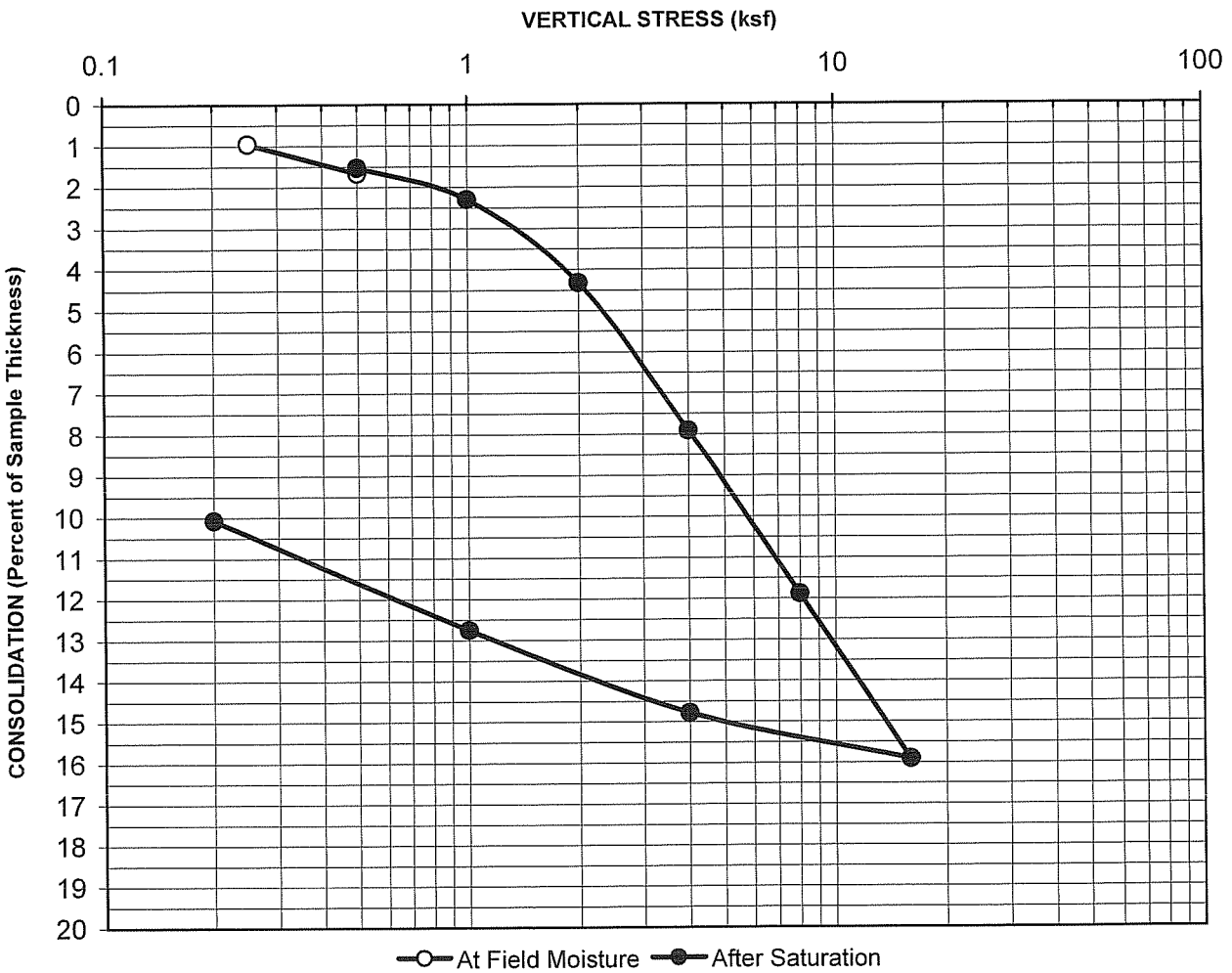
Time (minutes)	Dial Reading (inches)
0.1	0.1690
0.25	0.1730
0.5	0.1739
1	0.1746
2	0.1753
4	0.1758
8	0.1763
15	0.1768
30	0.1772
60	0.1777
120	0.1782
240	0.1788
480	0.1794
1440	0.1802

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.1690
0.5000	0.1730
0.7071	0.1739
1.0000	0.1746
1.4142	0.1753
2.0000	0.1758
2.8284	0.1763
3.8730	0.1768
5.4772	0.1772
7.7460	0.1777
10.9545	0.1782
15.4919	0.1788
21.9089	0.1794
37.9473	0.1802

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:** _____

AP Engineering & Testing, Inc.

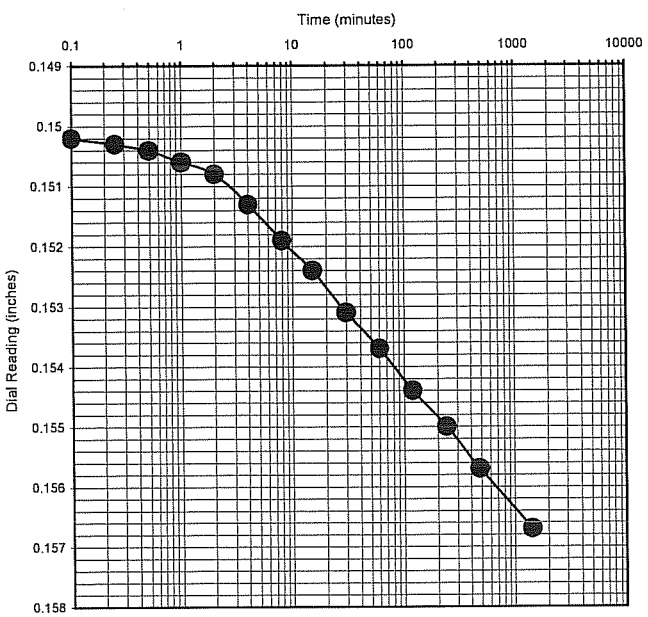


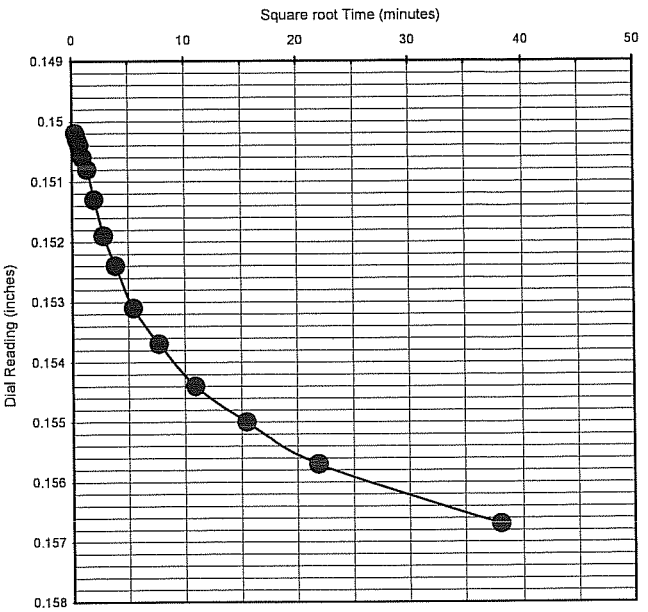
Boring No. :	A 10 202	Initial Dry Unit Weight (pcf):	81.6
Sample No.:	D2	Initial Moisture Content (%):	39.5
Depth (ft.):	50	Final Moisture Content (%):	34.0
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	1.07
Soil Description:	Gray Lean Clay	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 202	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Lean Clay
Depth (ft.):	50	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

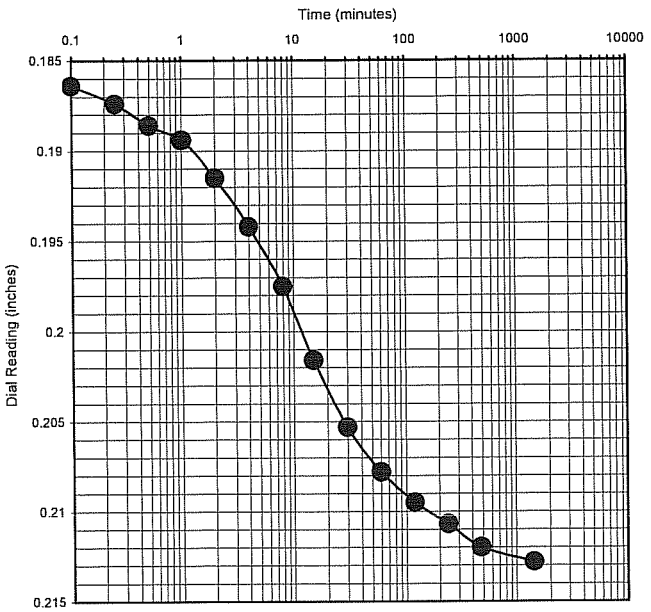
Time (minutes)	Dial Reading (inches)
0.1	0.1502
0.25	0.1503
0.5	0.1504
1	0.1506
2	0.1508
4	0.1513
8	0.1519
15	0.1524
30	0.1531
60	0.1537
120	0.1544
240	0.1550
480	0.1557
1440	0.1567

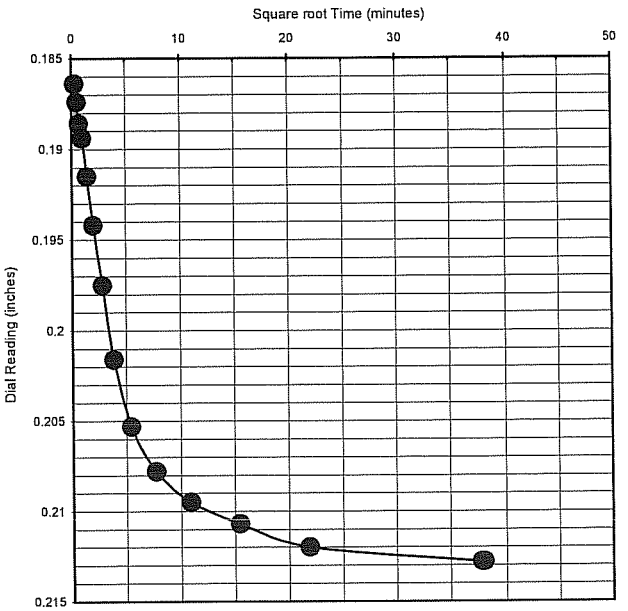
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.1502
0.5000	0.1503
0.7071	0.1504
1.0000	0.1506
1.4142	0.1508
2.0000	0.1513
2.8284	0.1519
3.8730	0.1524
5.4772	0.1531
7.7460	0.1537
10.9545	0.1544
15.4919	0.1550
21.9089	0.1557
37.9473	0.1567

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 202	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Lean Clay
Depth (ft.):	50	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

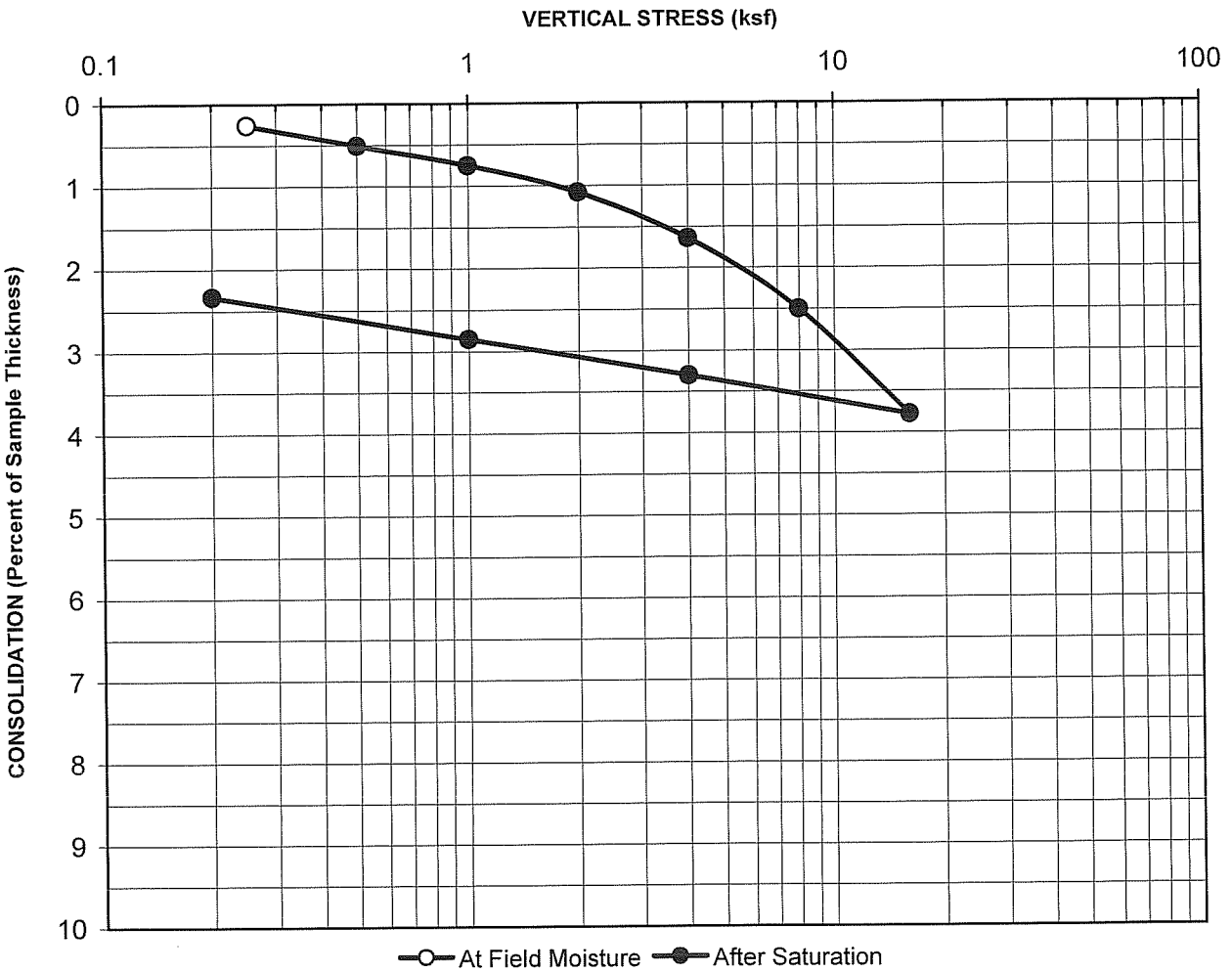
Time (minutes)	Dial Reading (inches)
0.1	0.1864
0.25	0.1874
0.5	0.1886
1	0.1894
2	0.1915
4	0.1942
8	0.1975
15	0.2016
30	0.2053
60	0.2078
120	0.2095
240	0.2107
480	0.2120
1440	0.2128

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.1864
0.5000	0.1874
0.7071	0.1886
1.0000	0.1894
1.4142	0.1915
2.0000	0.1942
2.8284	0.1975
3.8730	0.2016
5.4772	0.2053
7.7460	0.2078
10.9545	0.2095
15.4919	0.2107
21.9089	0.2120
37.9473	0.2128

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:** _____

AP Engineering & Testing, Inc.

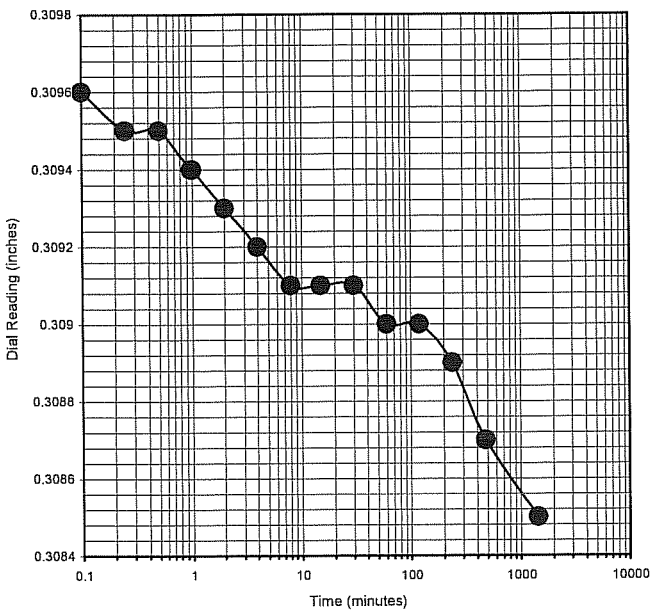


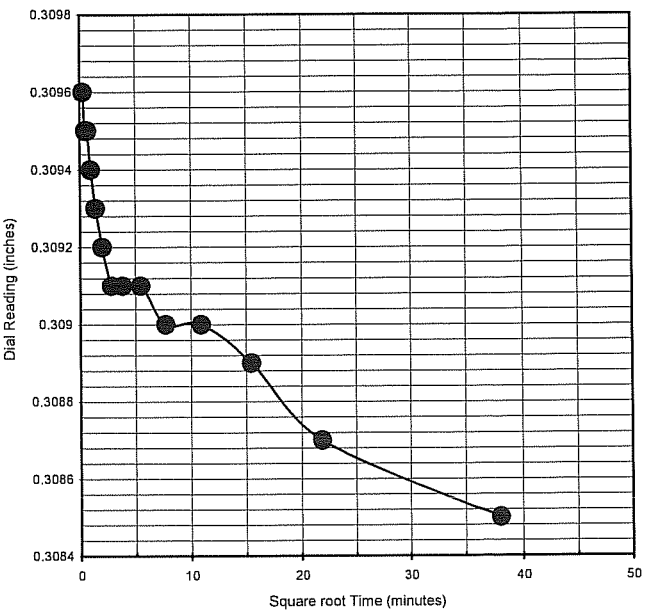
Boring No. :	A 10 204	Initial Dry Unit Weight (pcf):	95.8
Sample No.:	D2	Initial Moisture Content (%):	29.5
Depth (ft.):	50	Final Moisture Content (%):	28.3
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	0.76
Soil Description:	Gray Sand w/silt	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/2010
AP No: 10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 204	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Sand w/silt
Depth (ft.):	50	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

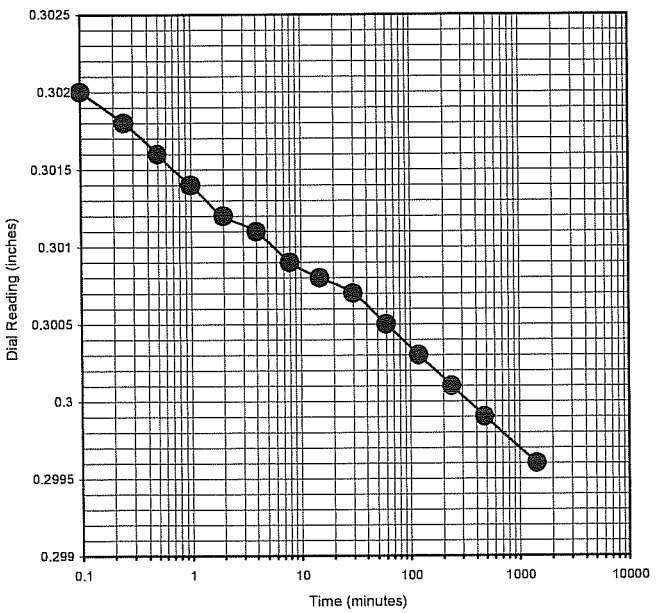
Time (minutes)	Dial Reading (inches)
0.1	0.3096
0.25	0.3095
0.5	0.3095
1	0.3094
2	0.3093
4	0.3092
8	0.3091
15	0.3091
30	0.3091
60	0.3090
120	0.3090
240	0.3089
480	0.3087
1440	0.3085

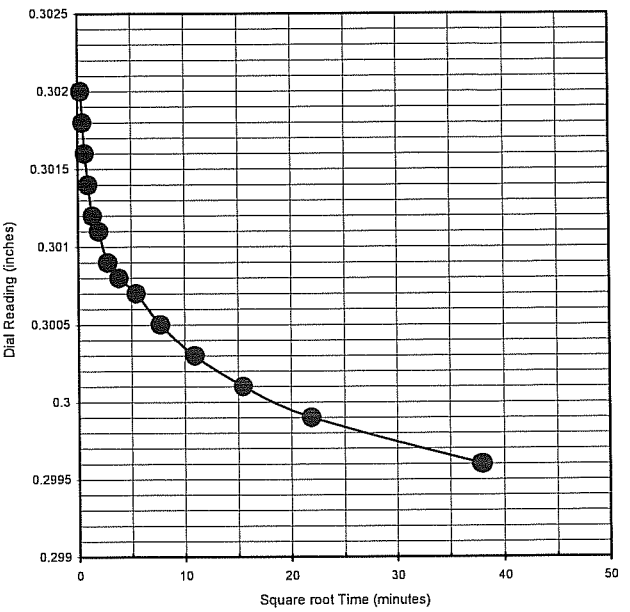
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3096
0.5000	0.3095
0.7071	0.3095
1.0000	0.3094
1.4142	0.3093
2.0000	0.3092
2.8284	0.3091
3.8730	0.3091
5.4772	0.3091
7.7460	0.3090
10.9545	0.3090
15.4919	0.3089
21.9089	0.3087
37.9473	0.3085

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 204	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Sand w/silt
Depth (ft.):	50	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

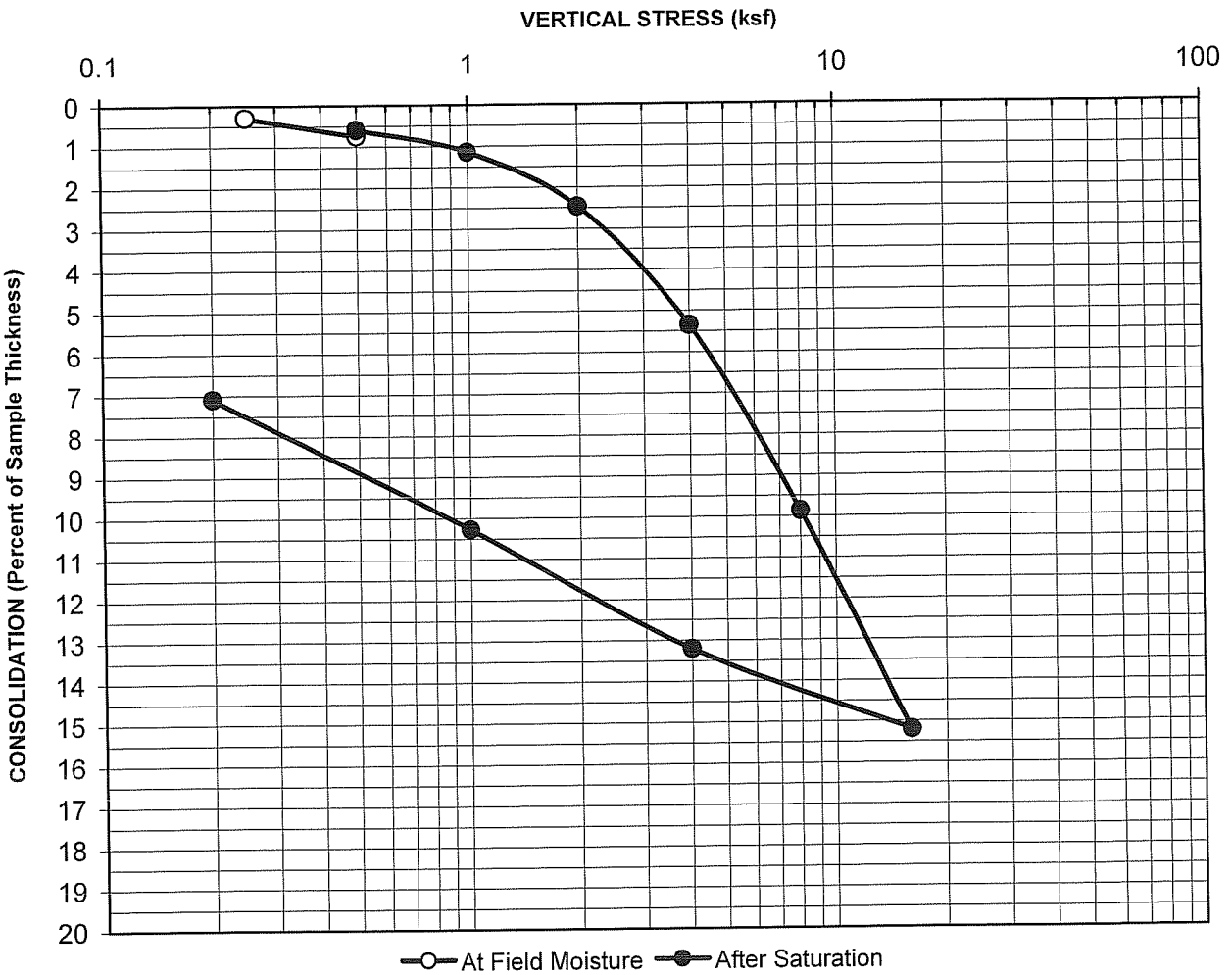
Time (minutes)	Dial Reading (inches)
0.1	0.3020
0.25	0.3018
0.5	0.3016
1	0.3014
2	0.3012
4	0.3011
8	0.3009
15	0.3008
30	0.3007
60	0.3005
120	0.3003
240	0.3001
480	0.2999
1440	0.2996

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3020
0.5000	0.3018
0.7071	0.3016
1.0000	0.3014
1.4142	0.3012
2.0000	0.3011
2.8284	0.3009
3.8730	0.3008
5.4772	0.3007
7.7460	0.3005
10.9545	0.3003
15.4919	0.3001
21.9089	0.2999
37.9473	0.2996

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:**

AP Engineering & Testing, Inc.

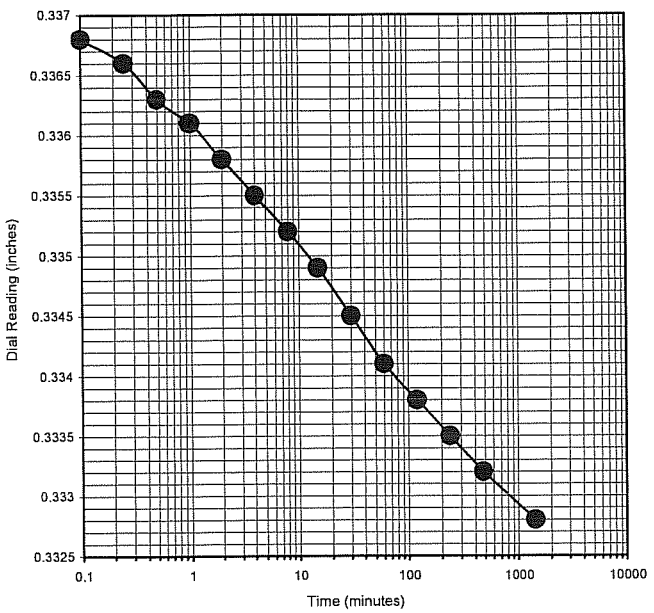


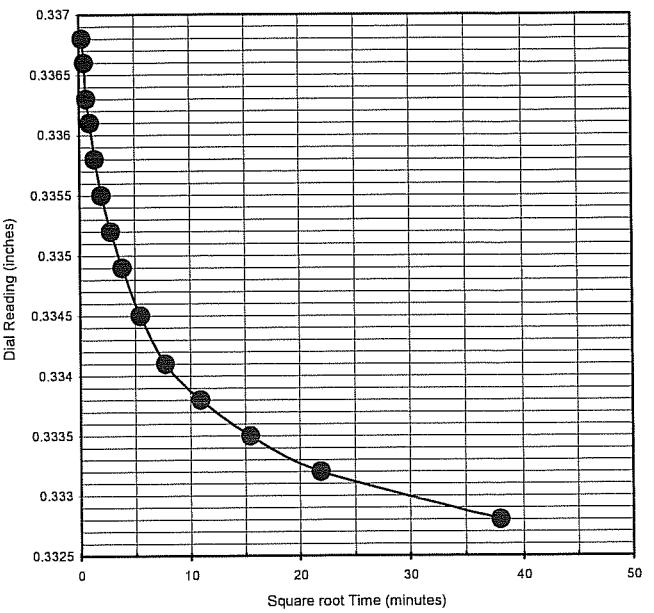
Boring No. :	A 10 205	Initial Dry Unit Weight (pcf):	82.6
Sample No.:	D3	Initial Moisture Content (%):	27.2
Depth (ft.):	50	Final Moisture Content (%):	33.6
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	1.04
Soil Description:	Gray Sandy Silt	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 205	Sample Type:	Cal. Mod.
Sample No.:	D3	Soil Description:	Gray Sandy Silt
Depth (ft.):	50	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

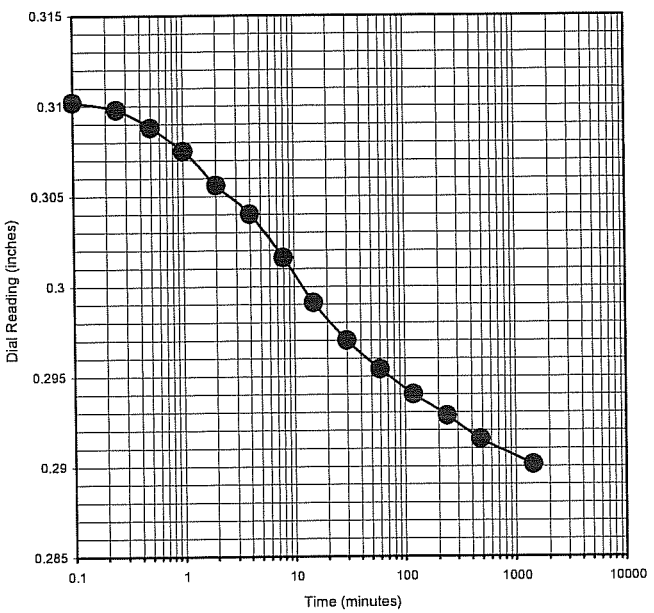
Time (minutes)	Dial Reading (inches)
0.1	0.3368
0.25	0.3366
0.5	0.3363
1	0.3361
2	0.3358
4	0.3355
8	0.3352
15	0.3349
30	0.3345
60	0.3341
120	0.3338
240	0.3335
480	0.3332
1440	0.3328

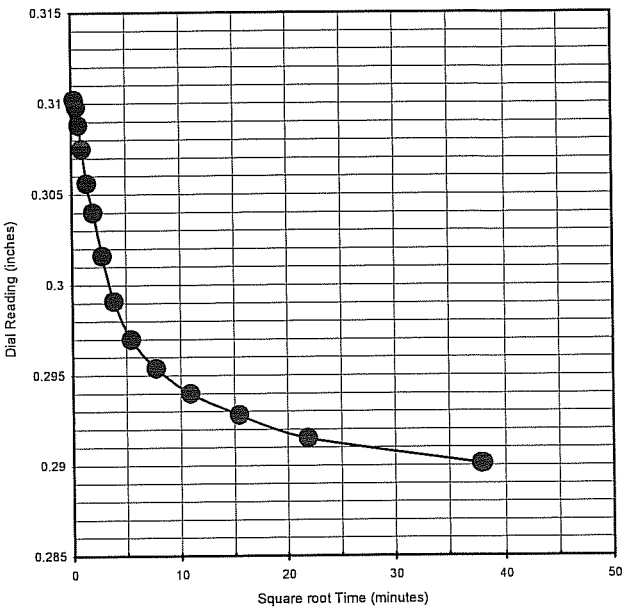
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3368
0.5000	0.3366
0.7071	0.3363
1.0000	0.3361
1.4142	0.3358
2.0000	0.3355
2.8284	0.3352
3.8730	0.3349
5.4772	0.3345
7.7460	0.3341
10.9545	0.3338
15.4919	0.3335
21.9089	0.3332
37.9473	0.3328

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 205	Sample Type:	Cal. Mod.
Sample No.:	D3	Soil Description:	Gray Sandy Silt
Depth (ft.):	50	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

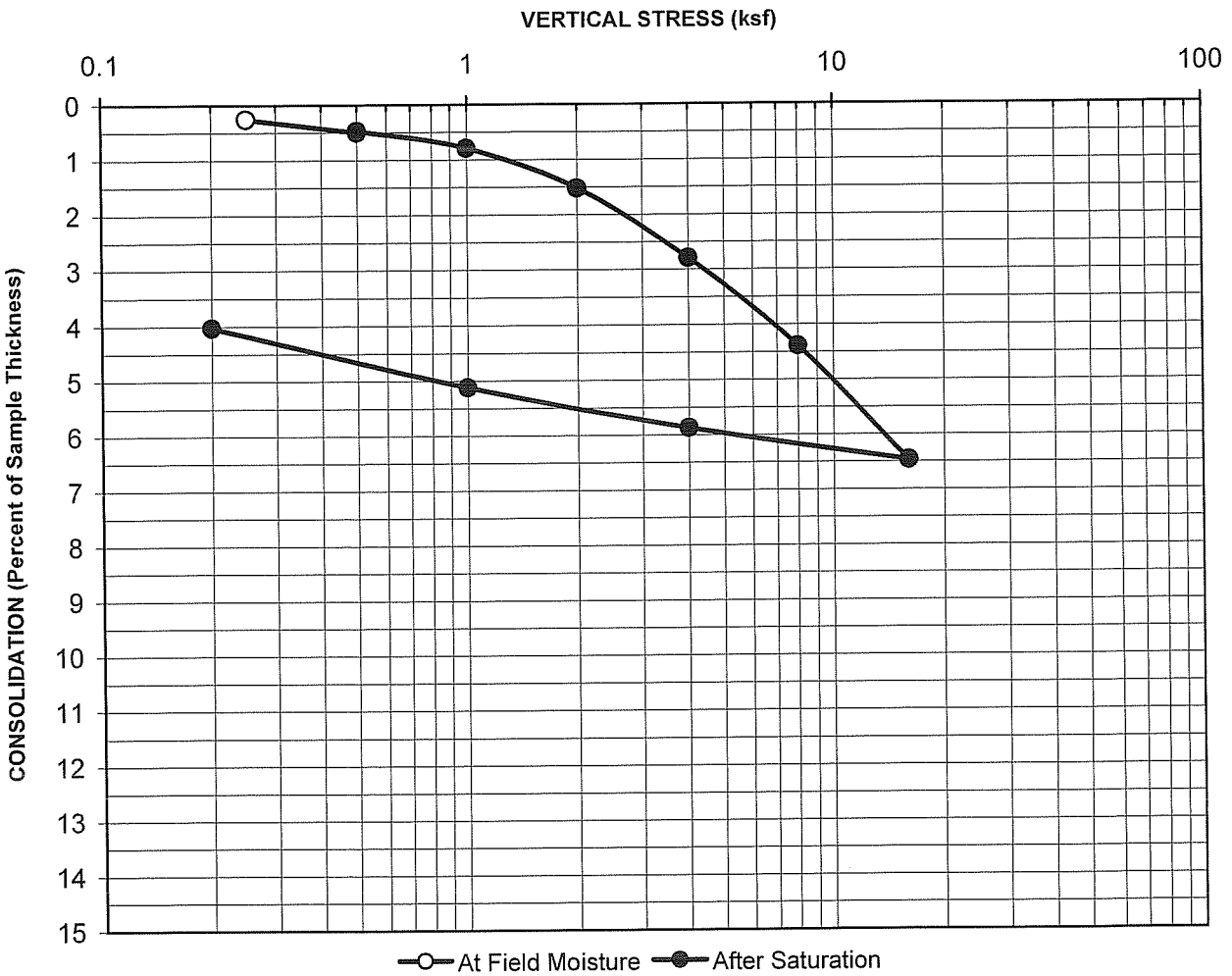
Time (minutes)	Dial Reading (inches)
0.1	0.3102
0.25	0.3098
0.5	0.3088
1	0.3075
2	0.3056
4	0.3040
8	0.3016
15	0.2991
30	0.2970
60	0.2954
120	0.2940
240	0.2928
480	0.2915
1440	0.2901

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3102
0.5000	0.3098
0.7071	0.3088
1.0000	0.3075
1.4142	0.3056
2.0000	0.3040
2.8284	0.3016
3.8730	0.2991
5.4772	0.2970
7.7460	0.2954
10.9545	0.2940
15.4919	0.2928
21.9089	0.2915
37.9473	0.2901

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.

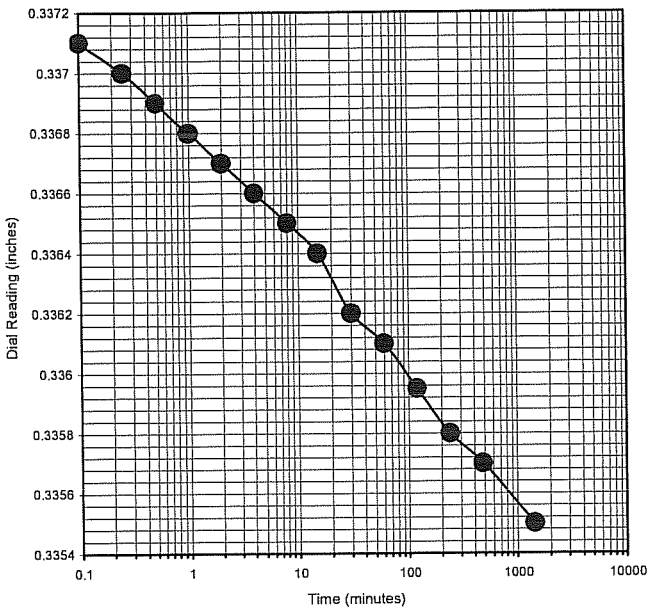


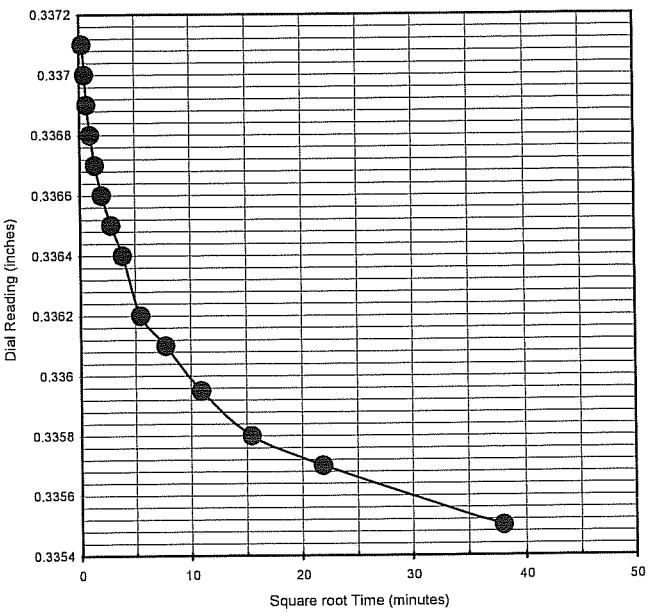
Boring No. :	A 10 206	Initial Dry Unit Weight (pcf):	91.5
Sample No.:	D2	Initial Moisture Content (%):	32.5
Depth (ft.):	30	Final Moisture Content (%):	31.7
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	0.84
Soil Description:	Gray Sandy Silt	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 206	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Sandy Silt
Depth (ft.):	30	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

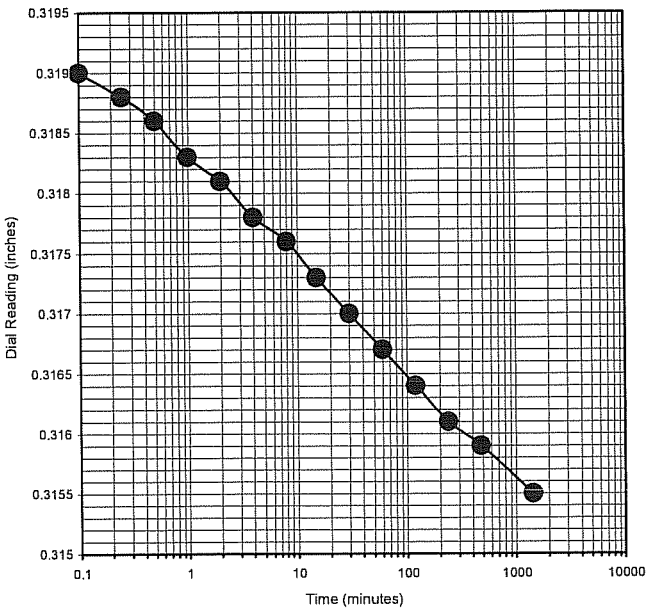
Time (minutes)	Dial Reading (inches)
0.1	0.3371
0.25	0.3370
0.5	0.3369
1	0.3368
2	0.3367
4	0.3366
8	0.3365
15	0.3364
30	0.3362
60	0.3361
120	0.3360
240	0.3358
480	0.3357
1440	0.3355

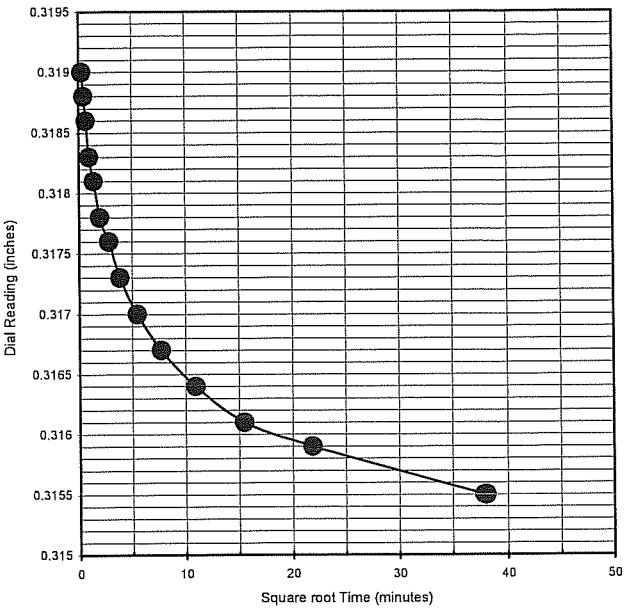
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3371
0.5000	0.3370
0.7071	0.3369
1.0000	0.3368
1.4142	0.3367
2.0000	0.3366
2.8284	0.3365
3.8730	0.3364
5.4772	0.3362
7.7460	0.3361
10.9545	0.3360
15.4919	0.3358
21.9089	0.3357
37.9473	0.3355

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 206	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Sandy Silt
Depth (ft.):	30	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

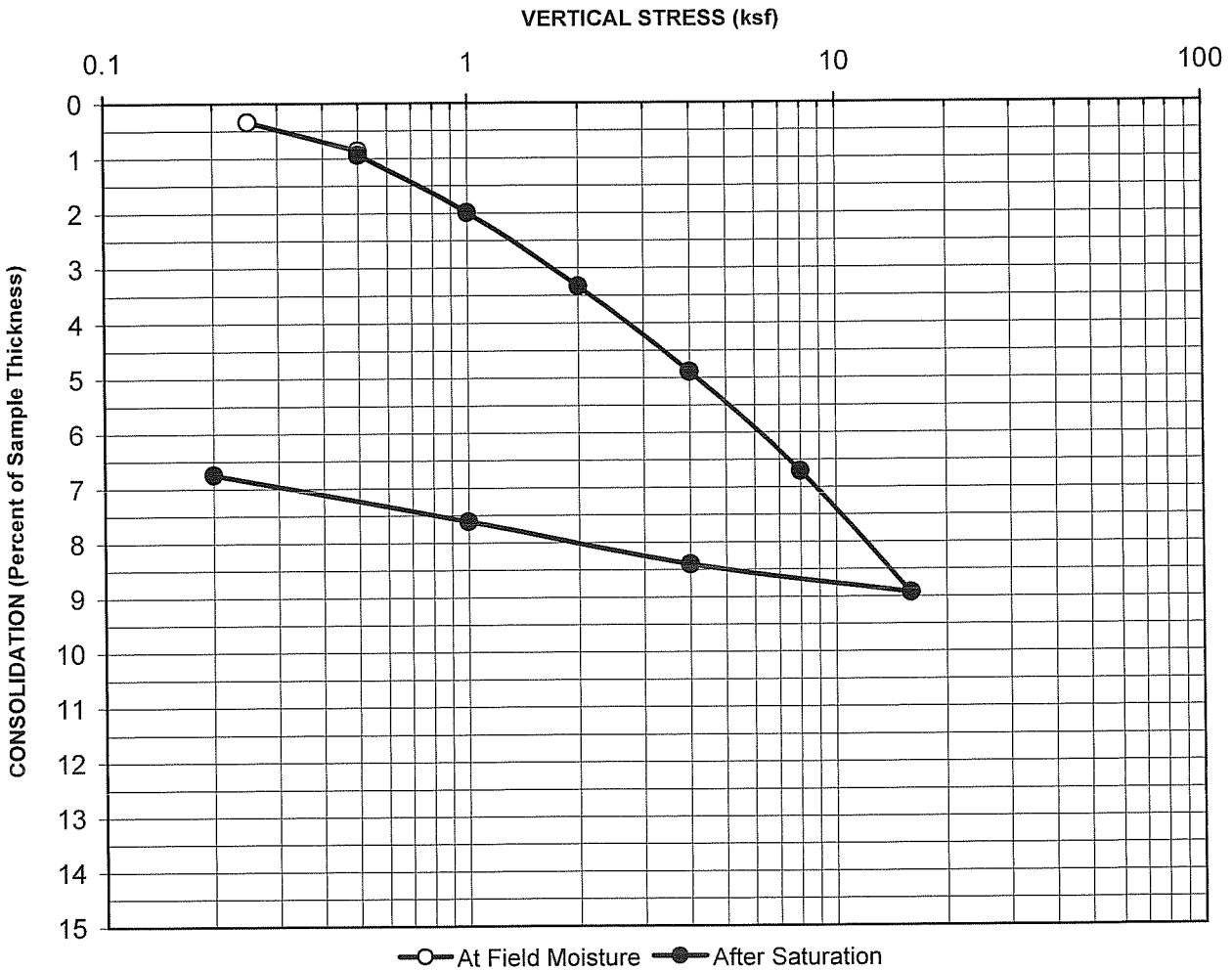
Time (minutes)	Dial Reading (inches)
0.1	0.3190
0.25	0.3188
0.5	0.3186
1	0.3183
2	0.3181
4	0.3178
8	0.3176
15	0.3173
30	0.3170
60	0.3167
120	0.3164
240	0.3161
480	0.3159
1440	0.3155

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3190
0.5000	0.3188
0.7071	0.3186
1.0000	0.3183
1.4142	0.3181
2.0000	0.3178
2.8284	0.3176
3.8730	0.3173
5.4772	0.3170
7.7460	0.3167
10.9545	0.3164
15.4919	0.3161
21.9089	0.3159
37.9473	0.3155

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.

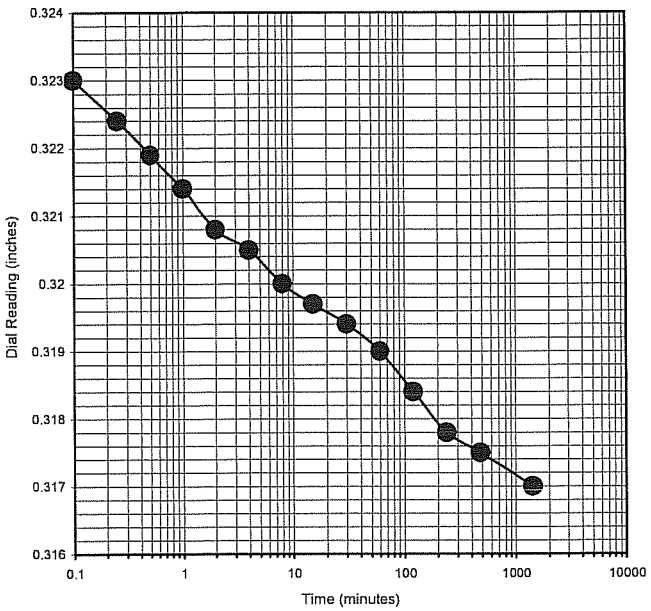


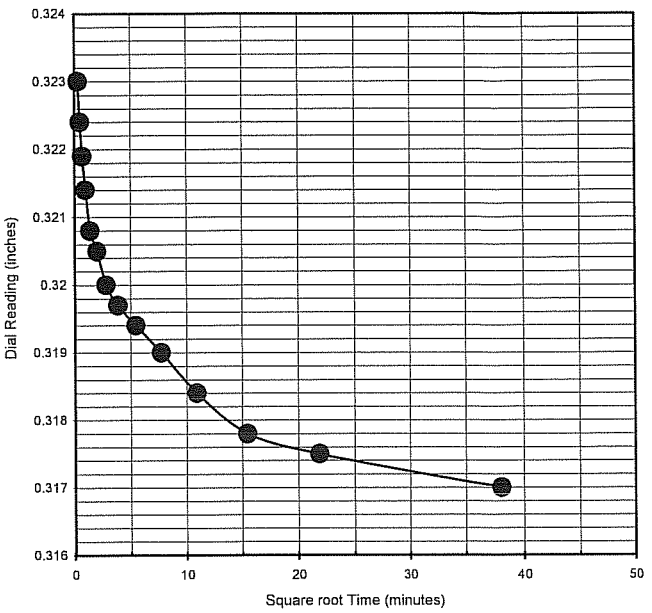
Boring No. :	A 10 206	Initial Dry Unit Weight (pcf):	95.3
Sample No.:	D3	Initial Moisture Content (%):	24.9
Depth (ft.):	55	Final Moisture Content (%):	25.1
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	0.77
Soil Description:	Gray Sandy Silt	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 206	Sample Type:	Cal. Mod.
Sample No.:	D3	Soil Description:	Gray Sandy Silt
Depth (ft.):	55	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

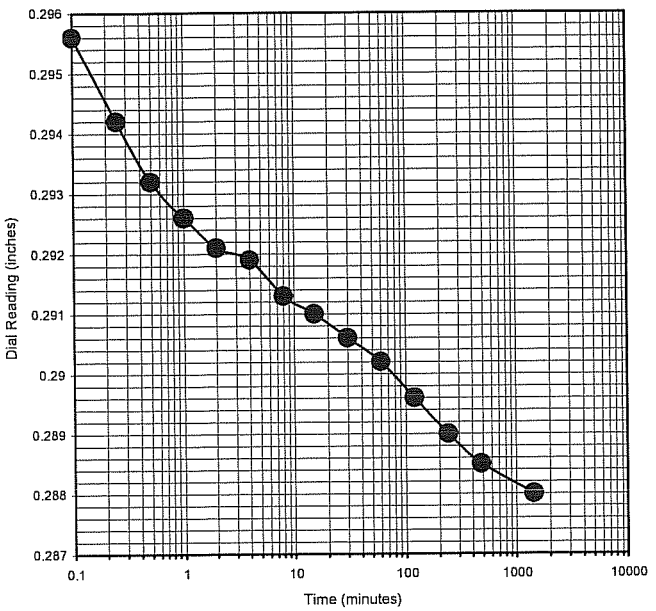
Time (minutes)	Dial Reading (inches)
0.1	0.3230
0.25	0.3224
0.5	0.3219
1	0.3214
2	0.3208
4	0.3205
8	0.3200
15	0.3197
30	0.3194
60	0.3190
120	0.3184
240	0.3178
480	0.3175
1440	0.3170

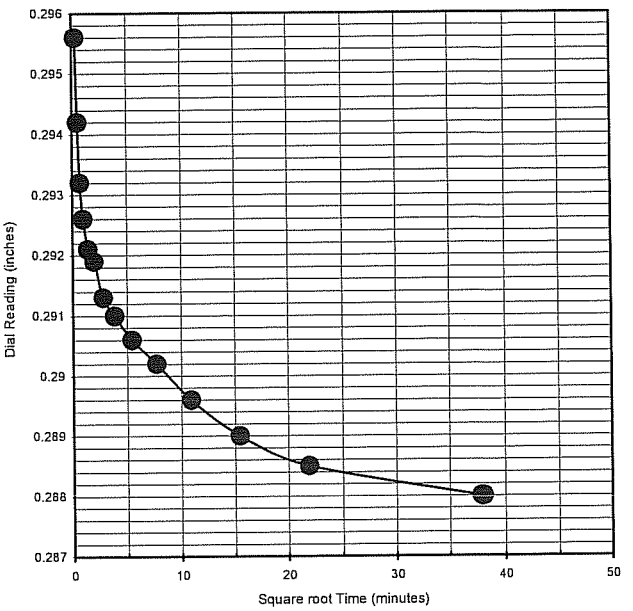
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3230
0.5000	0.3224
0.7071	0.3219
1.0000	0.3214
1.4142	0.3208
2.0000	0.3205
2.8284	0.3200
3.8730	0.3197
5.4772	0.3194
7.7460	0.3190
10.9545	0.3184
15.4919	0.3178
21.9089	0.3175
37.9473	0.3170

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 206	Sample Type:	Cal. Mod.
Sample No.:	D3	Soil Description:	Gray Sandy Silt
Depth (ft.):	55	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

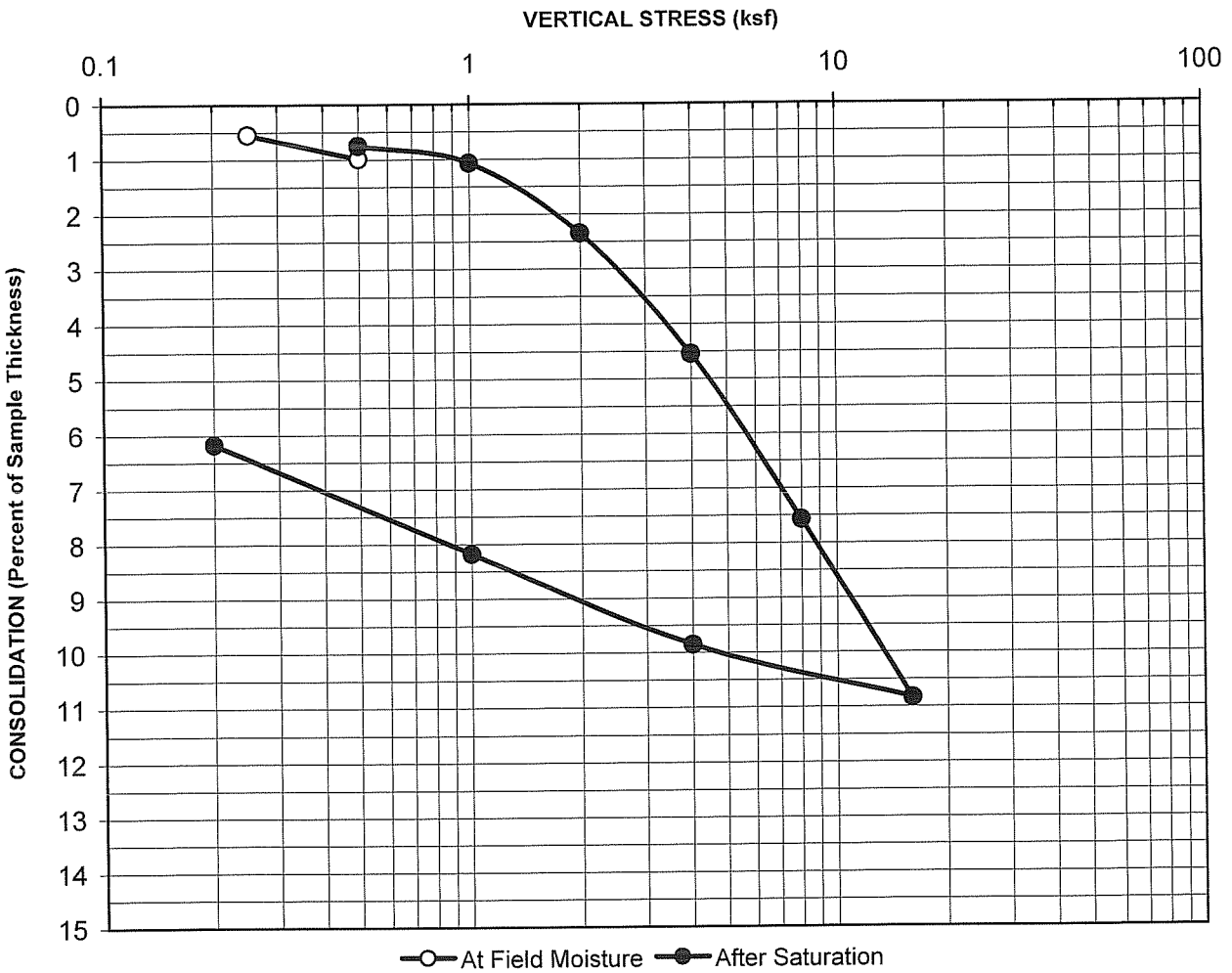
Time (minutes)	Dial Reading (inches)
0.1	0.2956
0.25	0.2942
0.5	0.2932
1	0.2926
2	0.2921
4	0.2919
8	0.2913
15	0.2910
30	0.2906
60	0.2902
120	0.2896
240	0.2890
480	0.2885
1440	0.2880

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.2956
0.5000	0.2942
0.7071	0.2932
1.0000	0.2926
1.4142	0.2921
2.0000	0.2919
2.8284	0.2913
3.8730	0.2910
5.4772	0.2906
7.7460	0.2902
10.9545	0.2896
15.4919	0.2890
21.9089	0.2885
37.9473	0.2880

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.

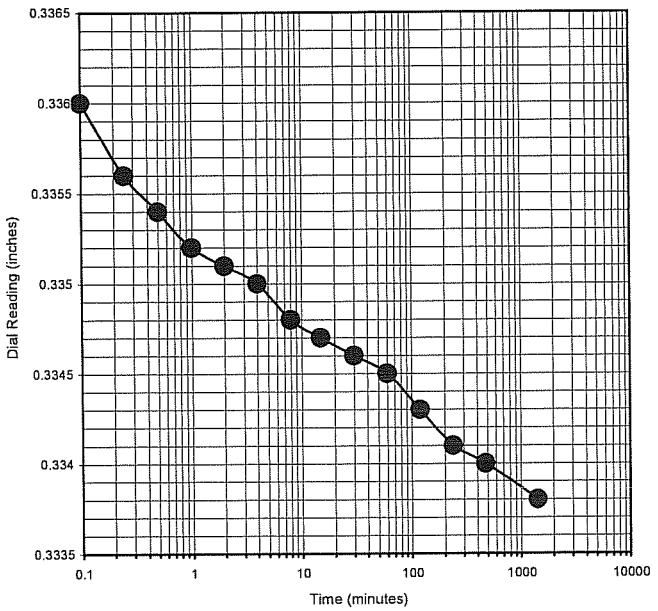


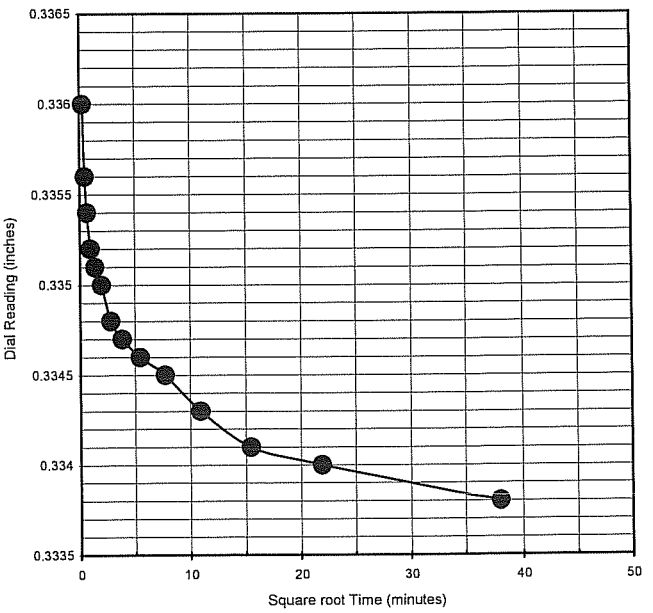
Boring No. :	A 10 206	Initial Dry Unit Weight (pcf):	87.7
Sample No.:	D4	Initial Moisture Content (%):	33.9
Depth (ft.):	65	Final Moisture Content (%):	32.8
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	0.92
Soil Description:	Gray Lean Clay	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 206	Sample Type:	Cal. Mod.
Sample No.:	D4	Soil Description:	Gray Lean Clay
Depth (ft.):	65	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

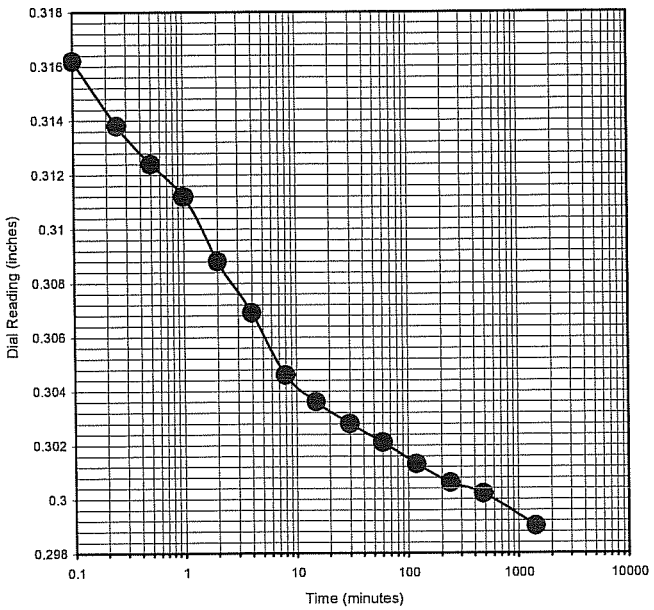
Time (minutes)	Dial Reading (inches)
0.1	0.3360
0.25	0.3356
0.5	0.3354
1	0.3352
2	0.3351
4	0.3350
8	0.3348
15	0.3347
30	0.3346
60	0.3345
120	0.3343
240	0.3341
480	0.3340
1440	0.3338

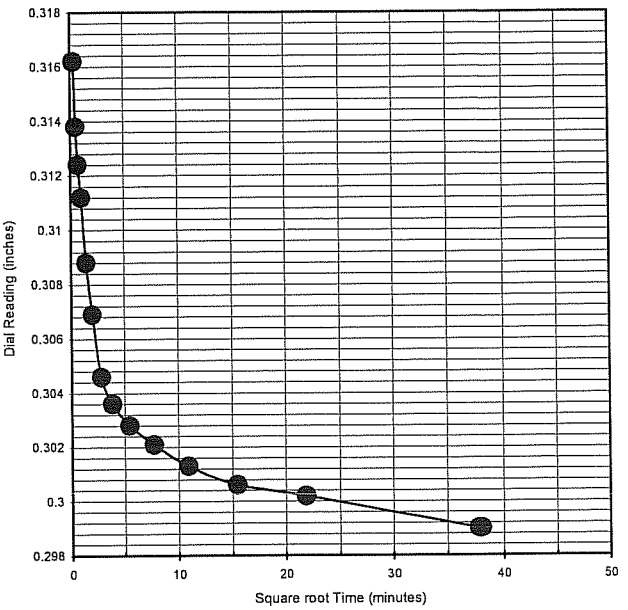
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3360
0.5000	0.3356
0.7071	0.3354
1.0000	0.3352
1.4142	0.3351
2.0000	0.3350
2.8284	0.3348
3.8730	0.3347
5.4772	0.3346
7.7460	0.3345
10.9545	0.3343
15.4919	0.3341
21.9089	0.3340
37.9473	0.3338

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 206	Sample Type:	Cal. Mod.
Sample No.:	D4	Soil Description:	Gray Lean Clay
Depth (ft.):	65	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

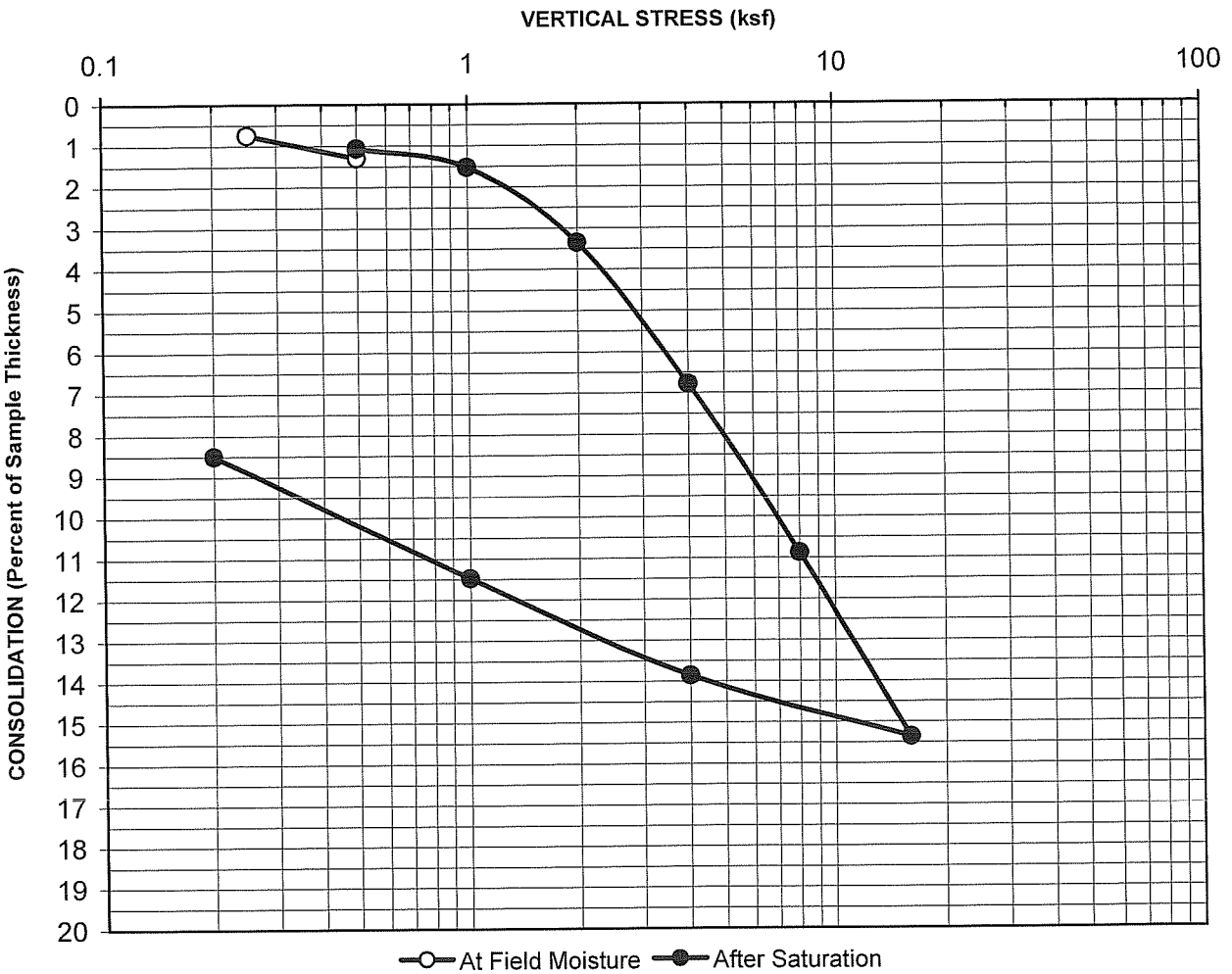
Time (minutes)	Dial Reading (inches)
0.1	0.3162
0.25	0.3138
0.5	0.3124
1	0.3112
2	0.3088
4	0.3069
8	0.3046
15	0.3036
30	0.3028
60	0.3021
120	0.3013
240	0.3006
480	0.3002
1440	0.2990

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3162
0.5000	0.3138
0.7071	0.3124
1.0000	0.3112
1.4142	0.3088
2.0000	0.3069
2.8284	0.3046
3.8730	0.3036
5.4772	0.3028
7.7460	0.3021
10.9545	0.3013
15.4919	0.3006
21.9089	0.3002
37.9473	0.2990

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:** _____

AP Engineering & Testing, Inc.

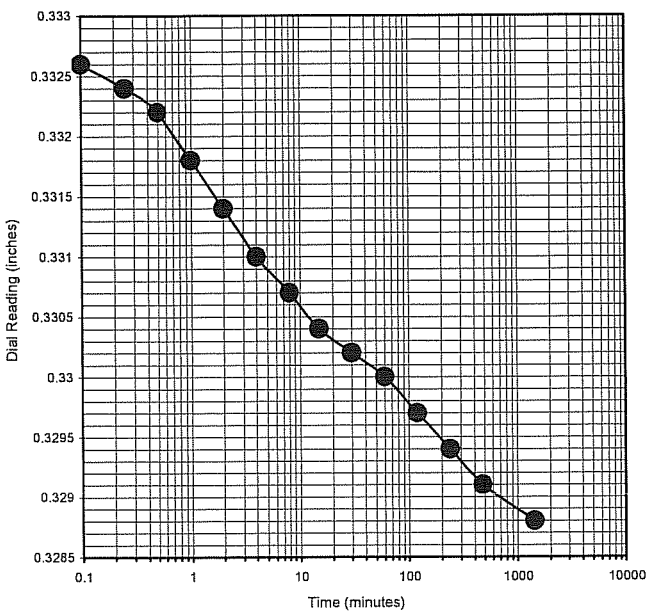


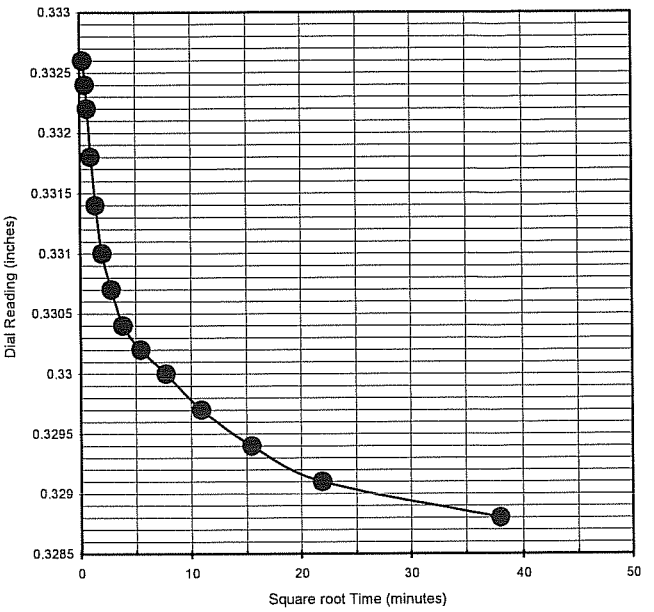
Boring No. :	A 10 207	Initial Dry Unit Weight (pcf):	73.1
Sample No.:	D4	Initial Moisture Content (%):	50.4
Depth (ft.):	60	Final Moisture Content (%):	41.6
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	1.30
Soil Description:	Gray Fat Clay	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 207	Sample Type:	Cal. Mod.
Sample No.:	D4	Soil Description:	Gray Fat Clay
Depth (ft.):	60	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

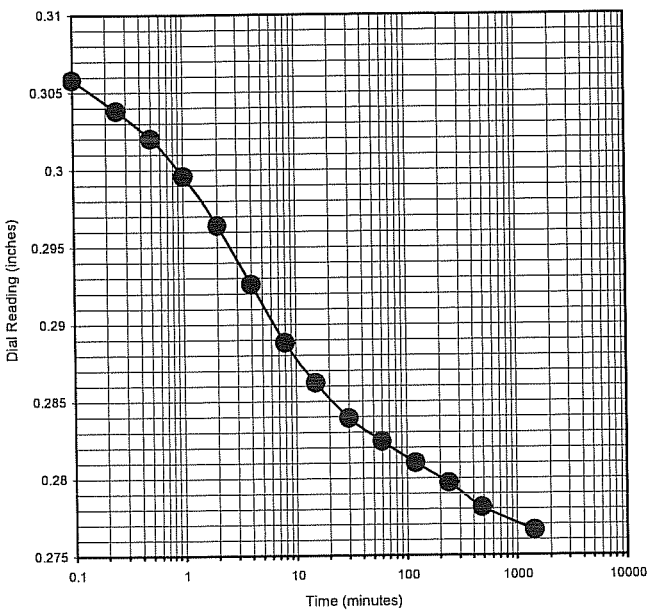
Time (minutes)	Dial Reading (inches)
0.1	0.3326
0.25	0.3324
0.5	0.3322
1	0.3318
2	0.3314
4	0.3310
8	0.3307
15	0.3304
30	0.3302
60	0.3300
120	0.3297
240	0.3294
480	0.3291
1440	0.3288

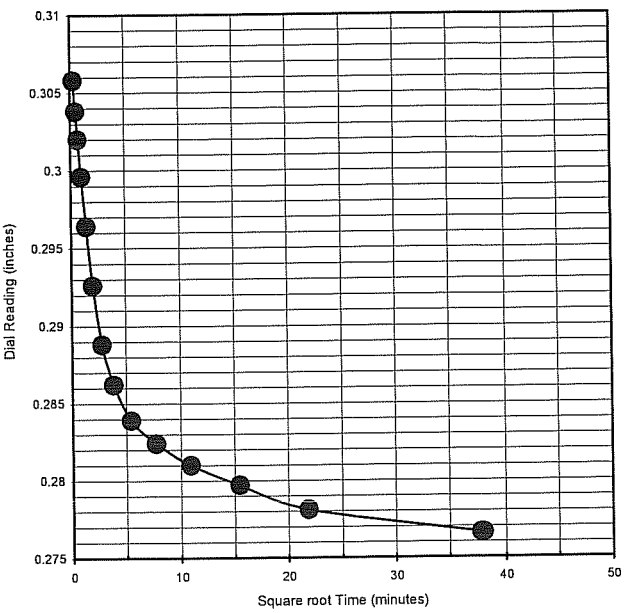
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3326
0.5000	0.3324
0.7071	0.3322
1.0000	0.3318
1.4142	0.3314
2.0000	0.3310
2.8284	0.3307
3.8730	0.3304
5.4772	0.3302
7.7460	0.3300
10.9545	0.3297
15.4919	0.3294
21.9089	0.3291
37.9473	0.3288

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 207	Sample Type:	Cal. Mod.
Sample No.:	D4	Soil Description:	Gray Fat Clay
Depth (ft.):	60	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

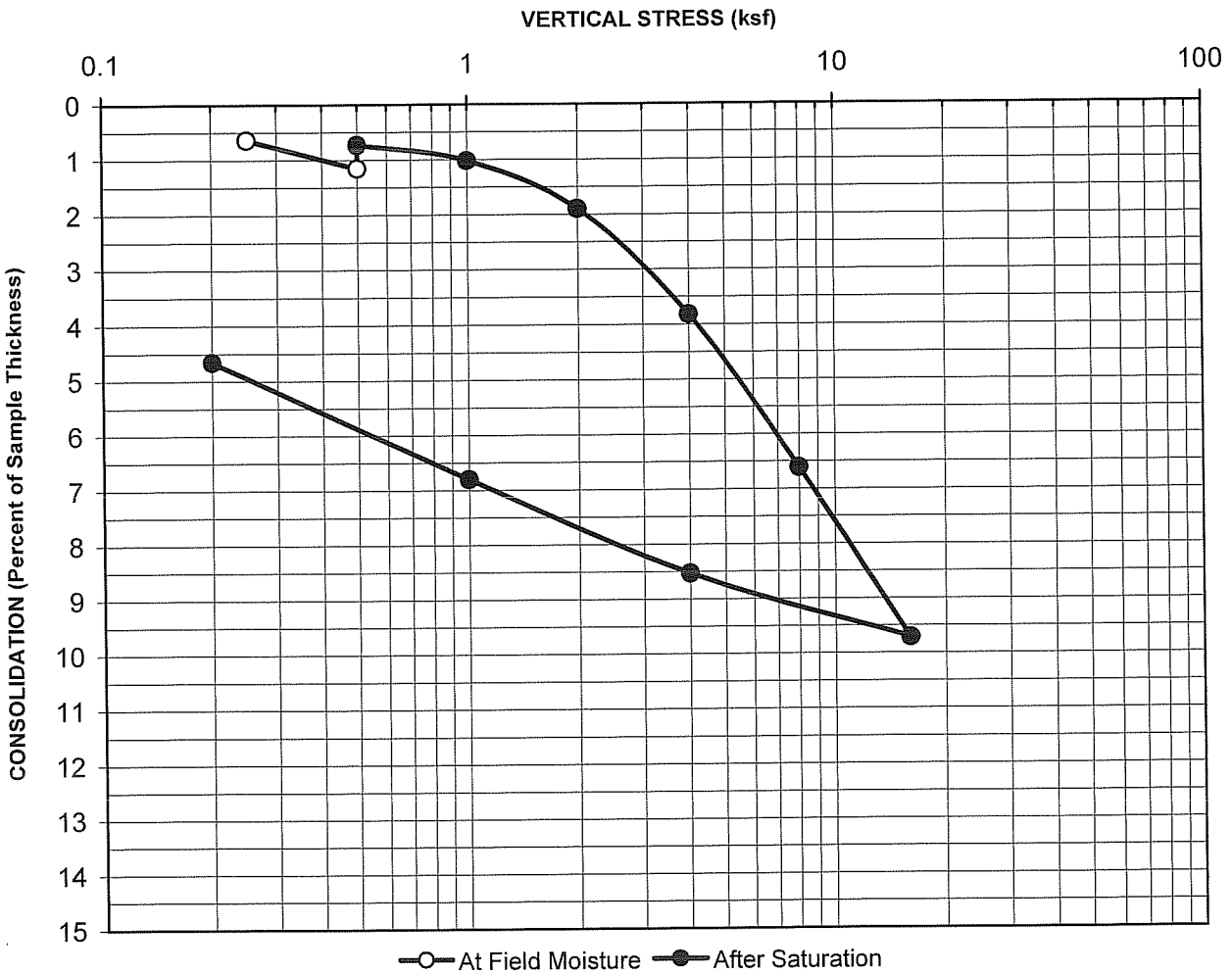
Time (minutes)	Dial Reading (inches)
0.1	0.3058
0.25	0.3038
0.5	0.3020
1	0.2996
2	0.2964
4	0.2926
8	0.2888
15	0.2862
30	0.2839
60	0.2824
120	0.2810
240	0.2797
480	0.2781
1440	0.2766

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3058
0.5000	0.3038
0.7071	0.3020
1.0000	0.2996
1.4142	0.2964
2.0000	0.2926
2.8284	0.2888
3.8730	0.2862
5.4772	0.2839
7.7460	0.2824
10.9545	0.2810
15.4919	0.2797
21.9089	0.2781
37.9473	0.2766

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:** _____

AP Engineering & Testing, Inc.

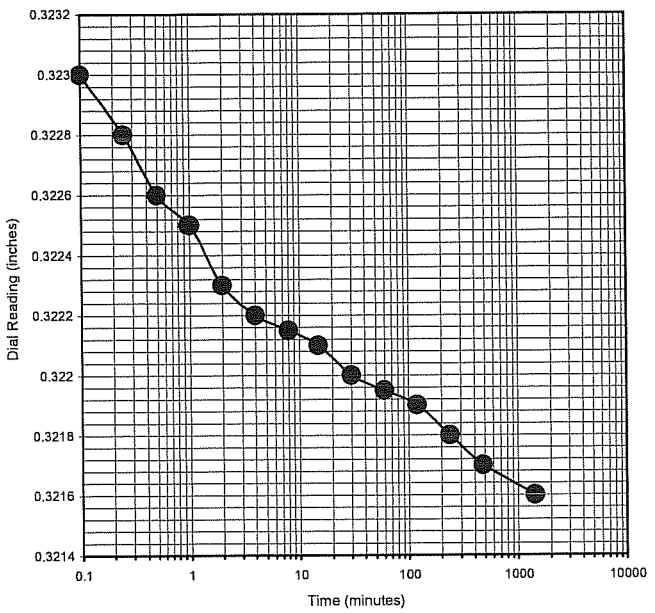


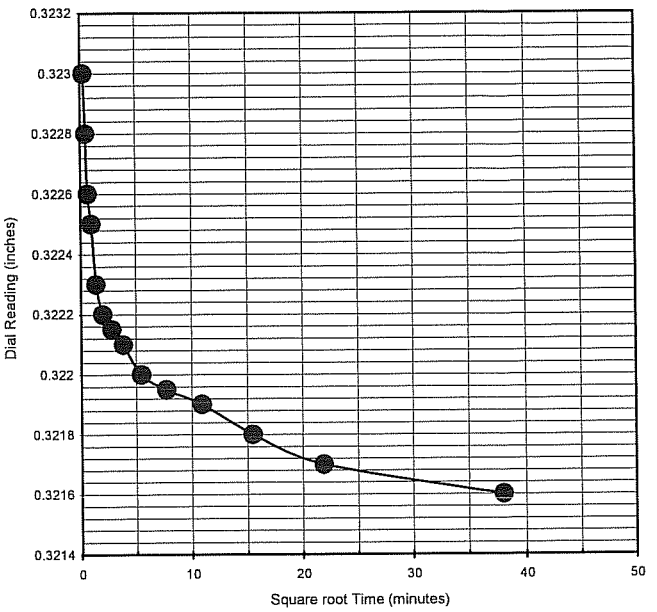
Boring No. :	A 10 207	Initial Dry Unit Weight (pcf):	87.7
Sample No.:	D6	Initial Moisture Content (%):	35.4
Depth (ft.):	75	Final Moisture Content (%):	35.7
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	0.92
Soil Description:	Gray Silt	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 207	Sample Type:	Cal. Mod.
Sample No.:	D6	Soil Description:	Gray Silt
Depth (ft.):	75	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

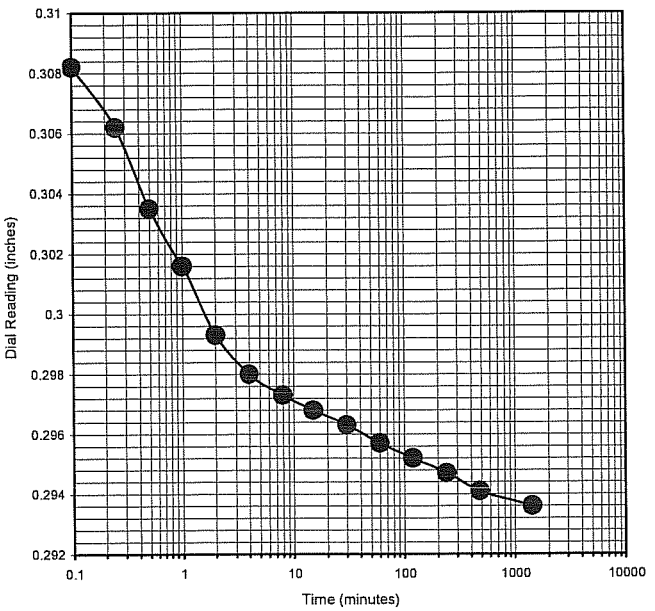
Time (minutes)	Dial Reading (inches)
0.1	0.3230
0.25	0.3228
0.5	0.3226
1	0.3225
2	0.3223
4	0.3222
8	0.3222
15	0.3221
30	0.3220
60	0.3220
120	0.3219
240	0.3218
480	0.3217
1440	0.3216

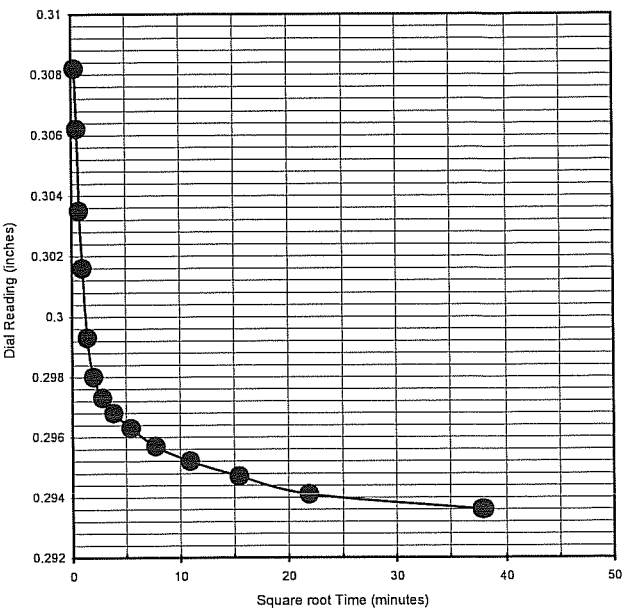
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3230
0.5000	0.3228
0.7071	0.3226
1.0000	0.3225
1.4142	0.3223
2.0000	0.3222
2.8284	0.3222
3.8730	0.3221
5.4772	0.3220
7.7460	0.3220
10.9545	0.3219
15.4919	0.3218
21.9089	0.3217
37.9473	0.3216

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 207	Sample Type:	Cal. Mod.
Sample No.:	D6	Soil Description:	Gray Silt
Depth (ft.):	75	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

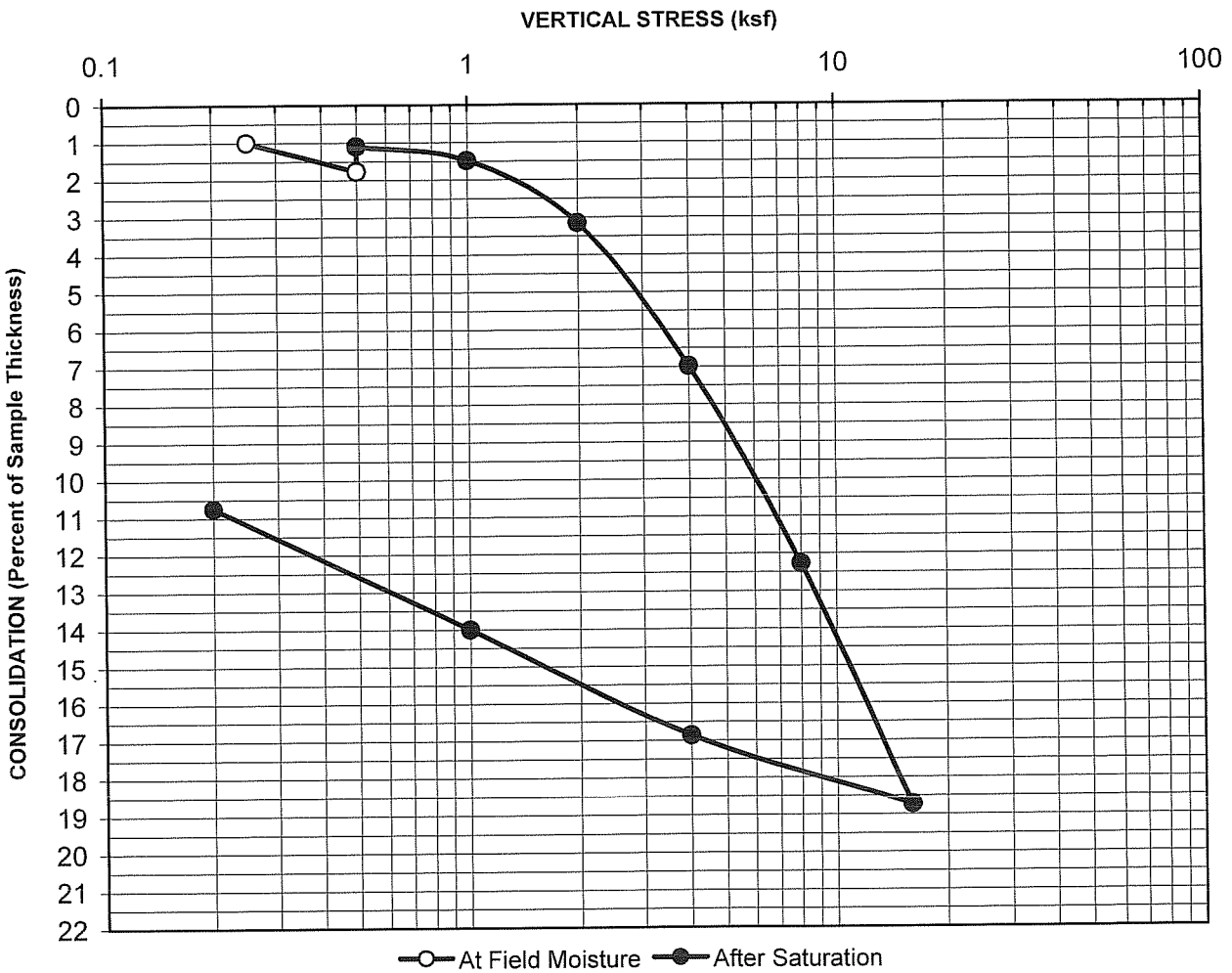
Time (minutes)	Dial Reading (inches)
0.1	0.3082
0.25	0.3062
0.5	0.3035
1	0.3016
2	0.2993
4	0.2980
8	0.2973
15	0.2968
30	0.2963
60	0.2957
120	0.2952
240	0.2947
480	0.2941
1440	0.2936

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3082
0.5000	0.3062
0.7071	0.3035
1.0000	0.3016
1.4142	0.2993
2.0000	0.2980
2.8284	0.2973
3.8730	0.2968
5.4772	0.2963
7.7460	0.2957
10.9545	0.2952
15.4919	0.2947
21.9089	0.2941
37.9473	0.2936

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:** ____

AP Engineering & Testing, Inc.

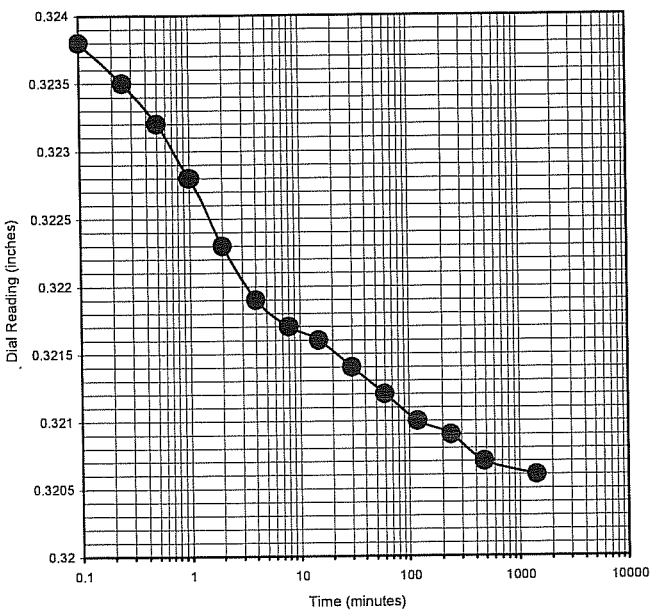


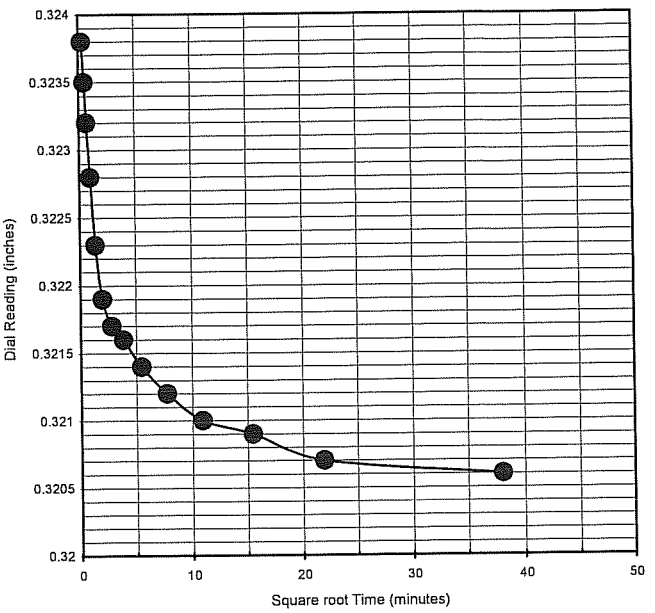
Boring No. :	A 10 209	Initial Dry Unit Weight (pcf):	68.8
Sample No.:	D2	Initial Moisture Content (%):	51.0
Depth (ft.):	45	Final Moisture Content (%):	50.1
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	1.45
Soil Description:	Gray Fat Clay	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 209	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Fat Clay
Depth (ft.):	45	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

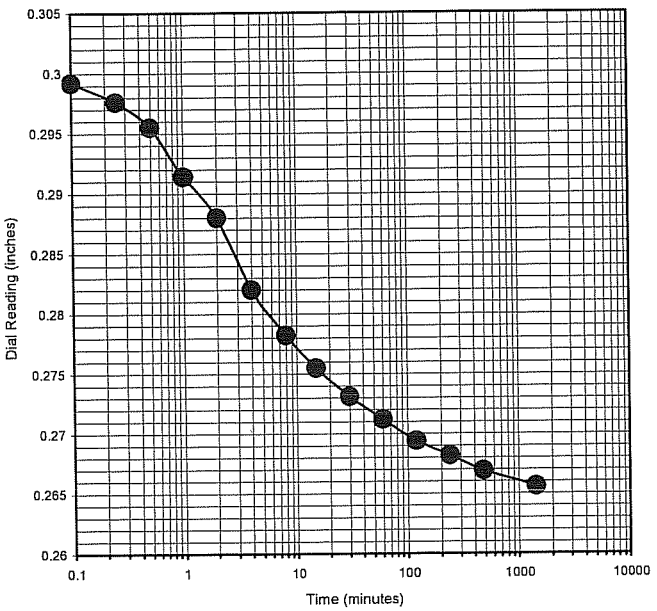
Time (minutes)	Dial Reading (inches)
0.1	0.3238
0.25	0.3235
0.5	0.3232
1	0.3228
2	0.3223
4	0.3219
8	0.3217
15	0.3216
30	0.3214
60	0.3212
120	0.3210
240	0.3209
480	0.3207
1440	0.3206

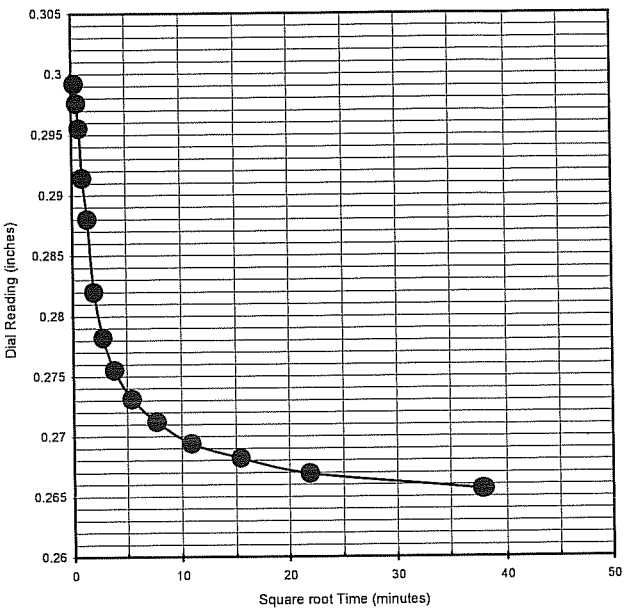
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3238
0.5000	0.3235
0.7071	0.3232
1.0000	0.3228
1.4142	0.3223
2.0000	0.3219
2.8284	0.3217
3.8730	0.3216
5.4772	0.3214
7.7460	0.3212
10.9545	0.3210
15.4919	0.3209
21.9089	0.3207
37.9473	0.3206

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 209	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Fat Clay
Depth (ft.):	45	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

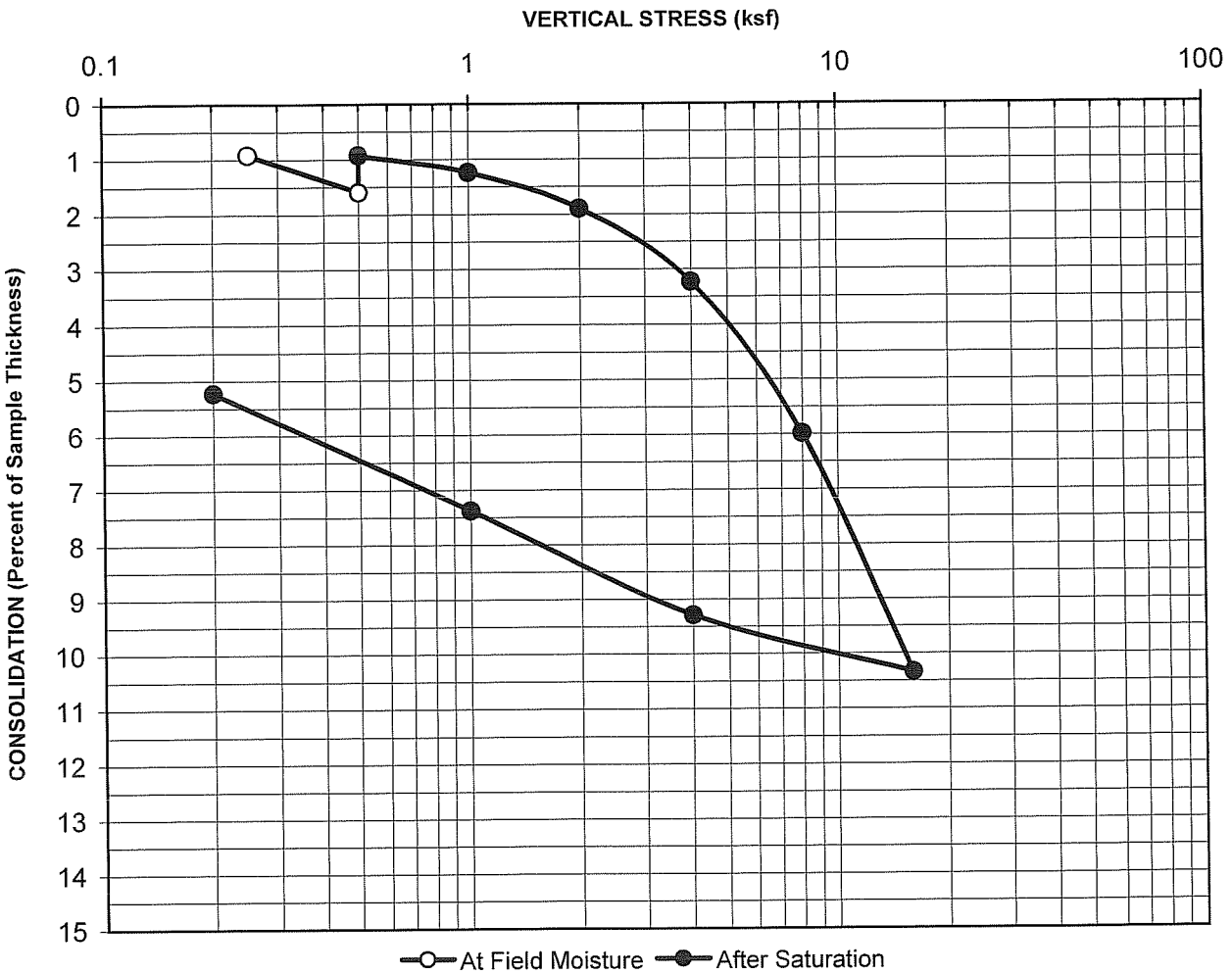
Time (minutes)	Dial Reading (inches)
0.1	0.2992
0.25	0.2976
0.5	0.2955
1	0.2914
2	0.2880
4	0.2820
8	0.2782
15	0.2755
30	0.2731
60	0.2712
120	0.2694
240	0.2682
480	0.2669
1440	0.2656

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.2992
0.5000	0.2976
0.7071	0.2955
1.0000	0.2914
1.4142	0.2880
2.0000	0.2820
2.8284	0.2782
3.8730	0.2755
5.4772	0.2731
7.7460	0.2712
10.9545	0.2694
15.4919	0.2682
21.9089	0.2669
37.9473	0.2656

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:**

AP Engineering & Testing, Inc.

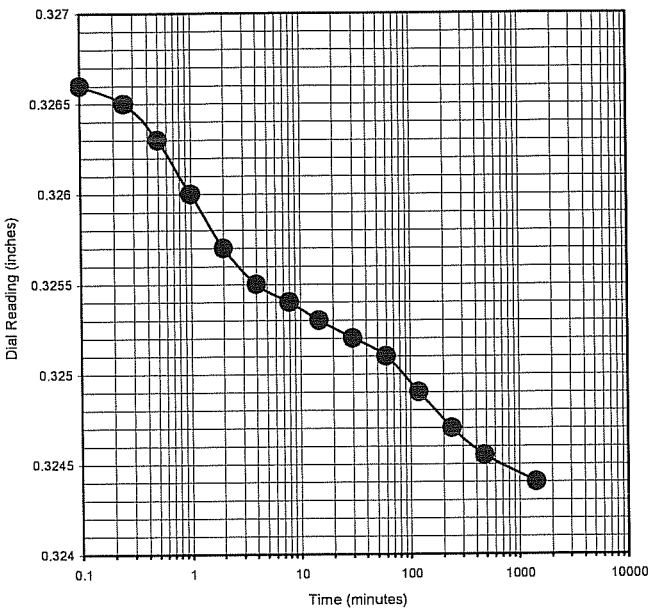


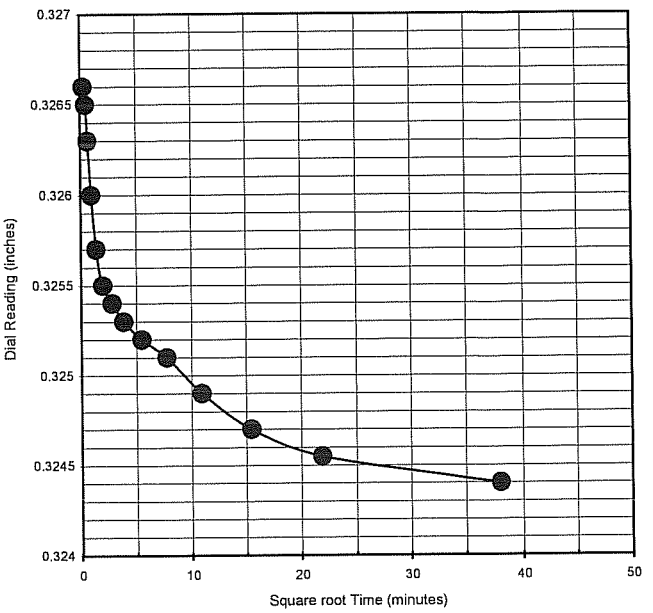
Boring No. :	A 10 209	Initial Dry Unit Weight (pcf):	86.9
Sample No.:	D5	Initial Moisture Content (%):	36.2
Depth (ft.):	60	Final Moisture Content (%):	33.1
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	0.94
Soil Description:	Gray Lean Clay	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 209	Sample Type:	Cal. Mod.
Sample No.:	D5	Soil Description:	Gray Lean Clay
Depth (ft.):	60	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

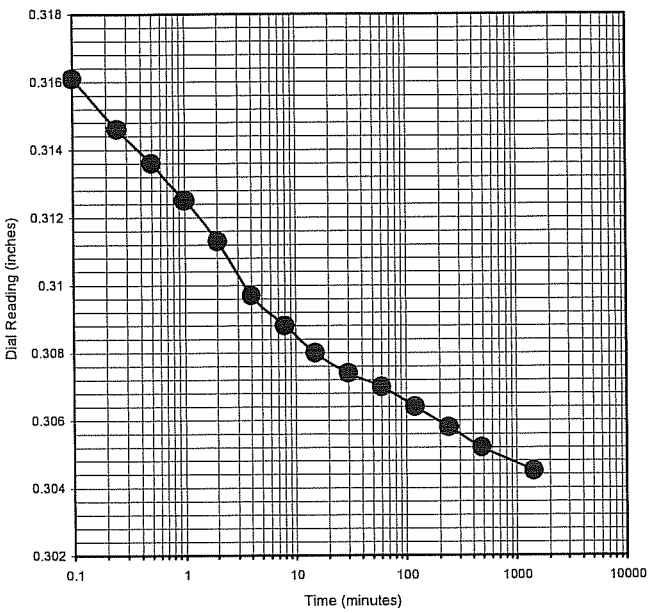
Time (minutes)	Dial Reading (inches)
0.1	0.3266
0.25	0.3265
0.5	0.3263
1	0.3260
2	0.3257
4	0.3255
8	0.3254
15	0.3253
30	0.3252
60	0.3251
120	0.3249
240	0.3247
480	0.3246
1440	0.3244

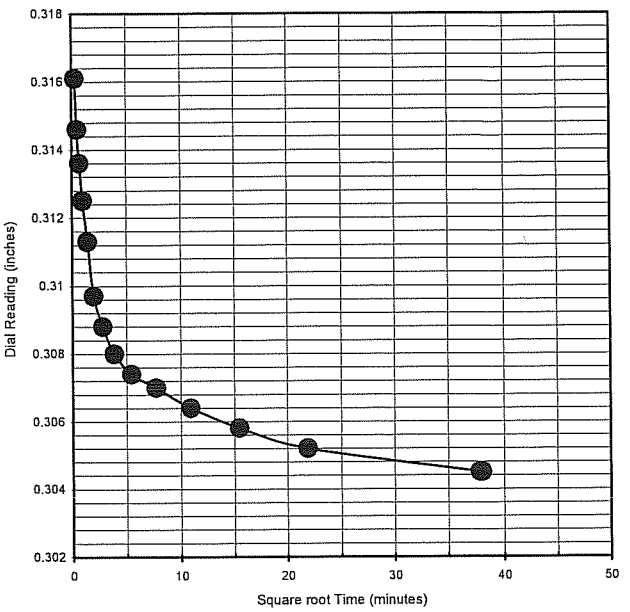
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3266
0.5000	0.3265
0.7071	0.3263
1.0000	0.3260
1.4142	0.3257
2.0000	0.3255
2.8284	0.3254
3.8730	0.3253
5.4772	0.3252
7.7460	0.3251
10.9545	0.3249
15.4919	0.3247
21.9089	0.3246
37.9473	0.3244

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 209	Sample Type:	Cal. Mod.
Sample No.:	D5	Soil Description:	Gray Lean Clay
Depth (ft.):	60	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

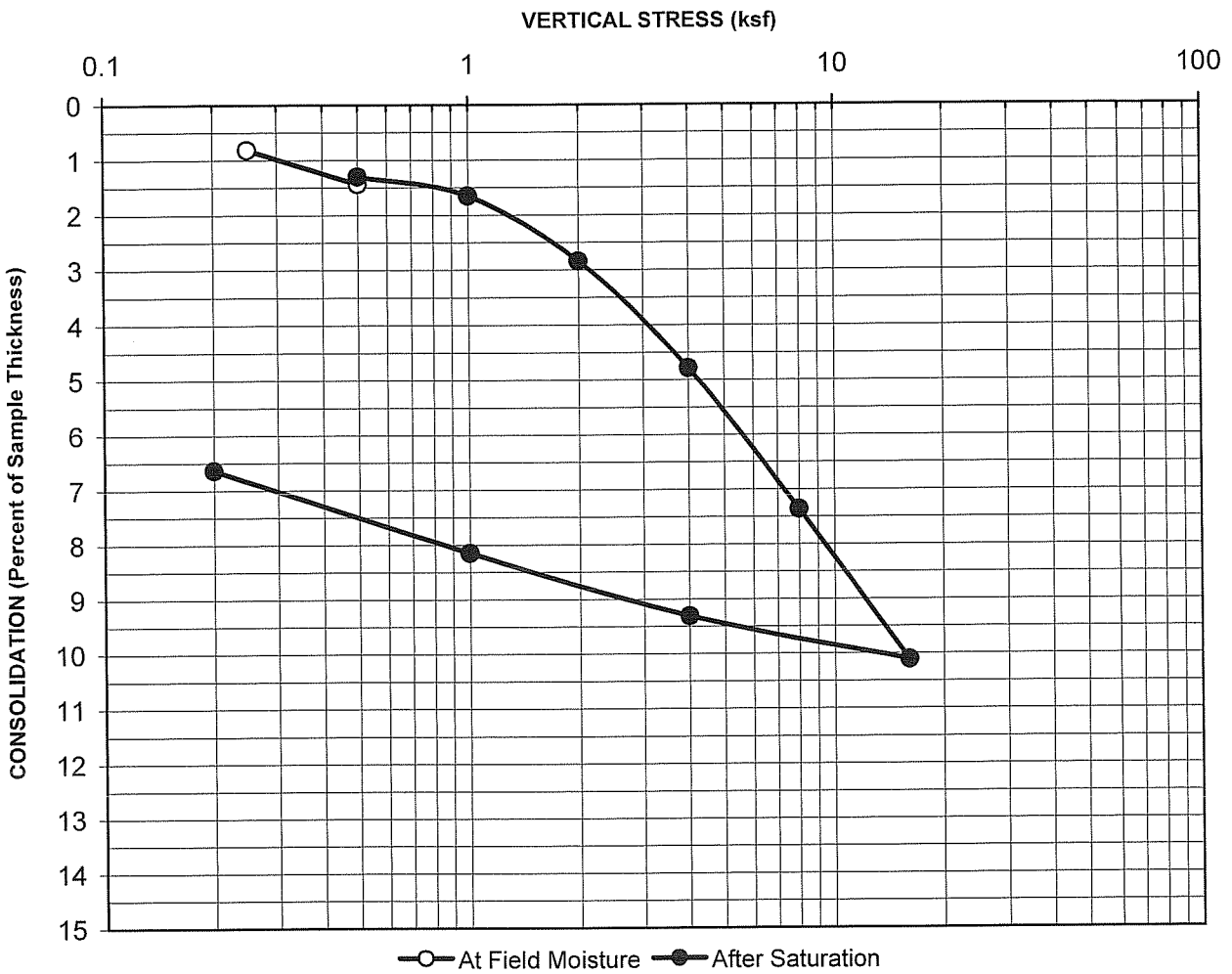
Time (minutes)	Dial Reading (inches)
0.1	0.3161
0.25	0.3146
0.5	0.3136
1	0.3125
2	0.3113
4	0.3097
8	0.3088
15	0.3080
30	0.3074
60	0.3070
120	0.3064
240	0.3058
480	0.3052
1440	0.3045

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3161
0.5000	0.3146
0.7071	0.3136
1.0000	0.3125
1.4142	0.3113
2.0000	0.3097
2.8284	0.3088
3.8730	0.3080
5.4772	0.3074
7.7460	0.3070
10.9545	0.3064
15.4919	0.3058
21.9089	0.3052
37.9473	0.3045

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:**

AP Engineering & Testing, Inc.

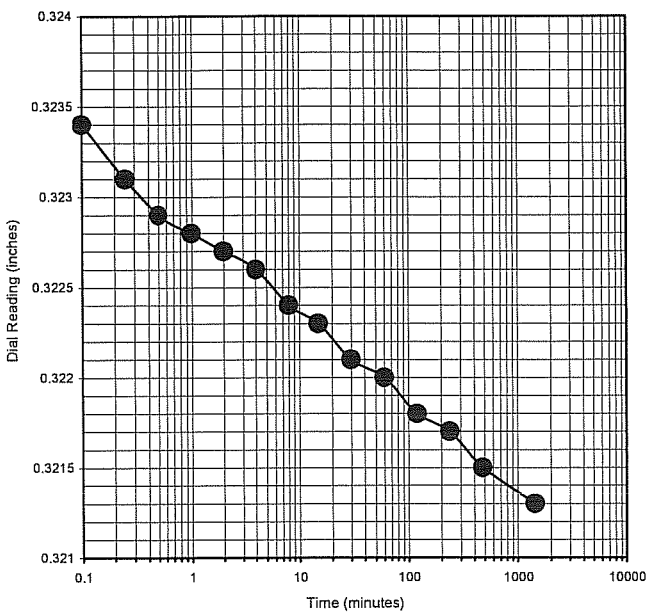


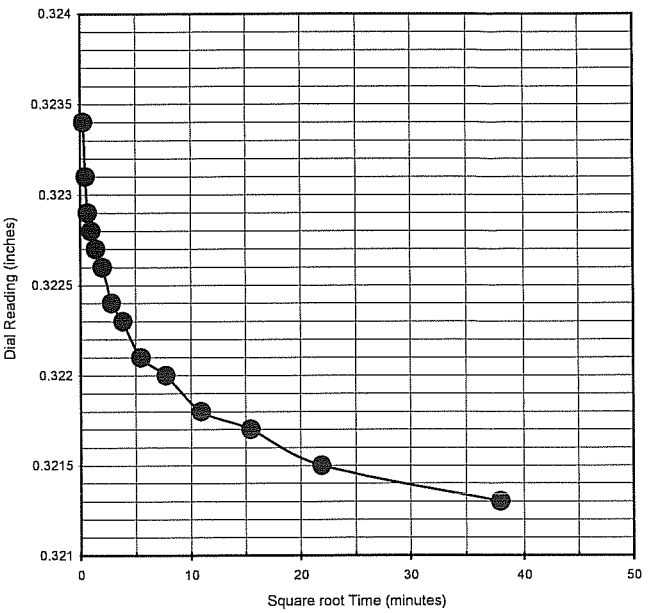
Boring No. :	A 10 210	Initial Dry Unit Weight (pcf):	87.0
Sample No.:	D1	Initial Moisture Content (%):	35.6
Depth (ft.):	40	Final Moisture Content (%):	32.7
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	0.94
Soil Description:	Gray Silt	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 210	Sample Type:	Cal. Mod.
Sample No.:	D1	Soil Description:	Gray Silt
Depth (ft.):	40	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

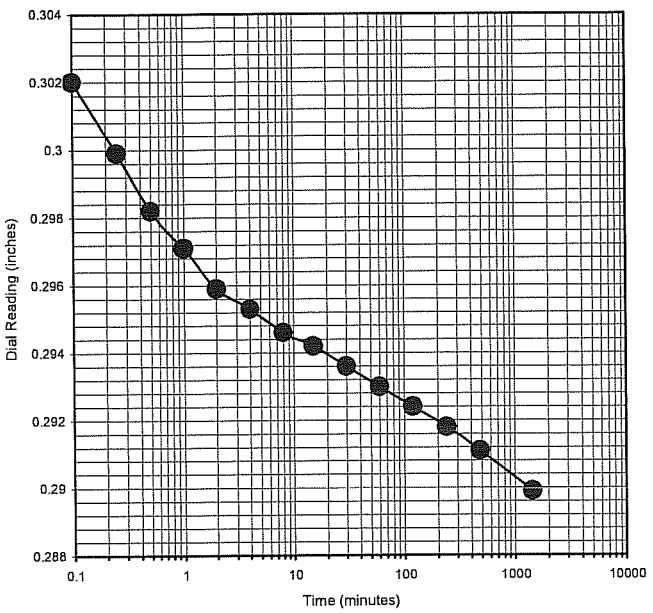
Time (minutes)	Dial Reading (inches)
0.1	0.3234
0.25	0.3231
0.5	0.3229
1	0.3228
2	0.3227
4	0.3226
8	0.3224
15	0.3223
30	0.3221
60	0.3220
120	0.3218
240	0.3217
480	0.3215
1440	0.3213

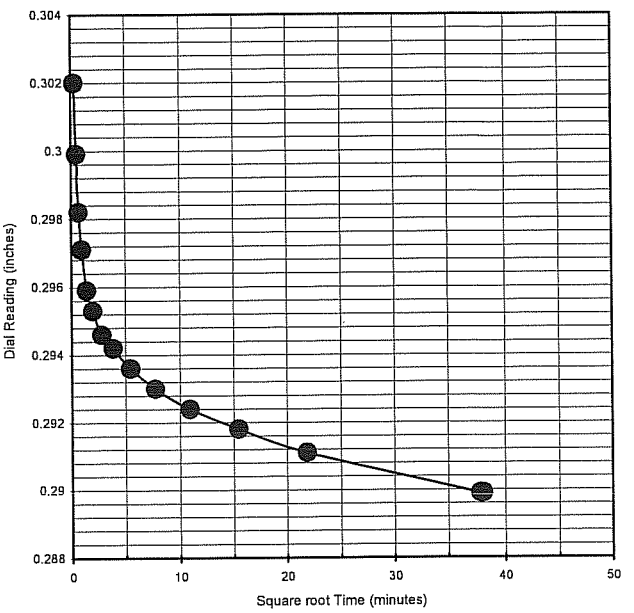
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3234
0.5000	0.3231
0.7071	0.3229
1.0000	0.3228
1.4142	0.3227
2.0000	0.3226
2.8284	0.3224
3.8730	0.3223
5.4772	0.3221
7.7460	0.3220
10.9545	0.3218
15.4919	0.3217
21.9089	0.3215
37.9473	0.3213

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 210	Sample Type:	Cal. Mod.
Sample No.:	D1	Soil Description:	Gray Silt
Depth (ft.):	40	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

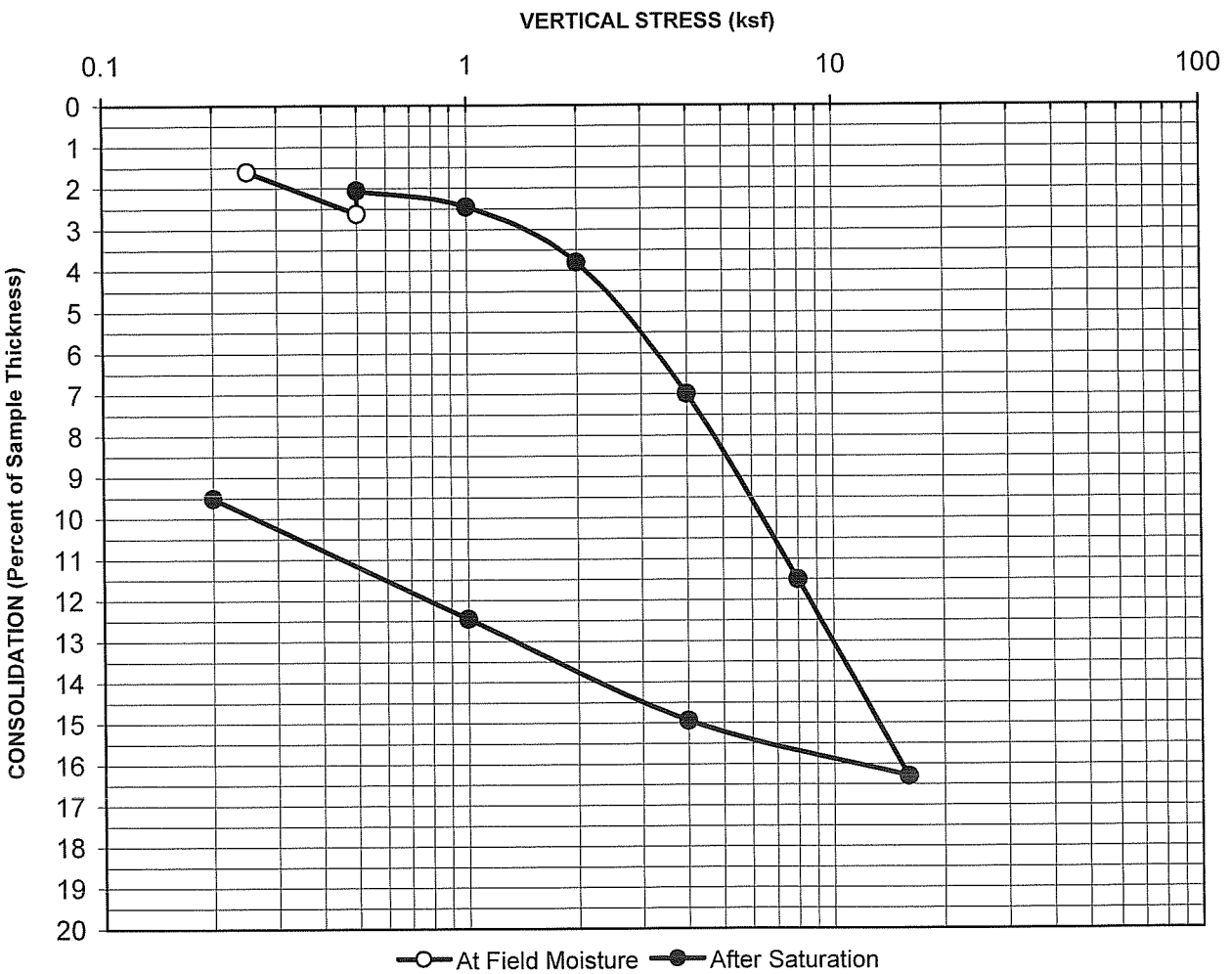
Time (minutes)	Dial Reading (inches)
0.1	0.3020
0.25	0.2999
0.5	0.2982
1	0.2971
2	0.2959
4	0.2953
8	0.2946
15	0.2942
30	0.2936
60	0.2930
120	0.2924
240	0.2918
480	0.2911
1440	0.2899

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3020
0.5000	0.2999
0.7071	0.2982
1.0000	0.2971
1.4142	0.2959
2.0000	0.2953
2.8284	0.2946
3.8730	0.2942
5.4772	0.2936
7.7460	0.2930
10.9545	0.2924
15.4919	0.2918
21.9089	0.2911
37.9473	0.2899

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:**

AP Engineering & Testing, Inc.

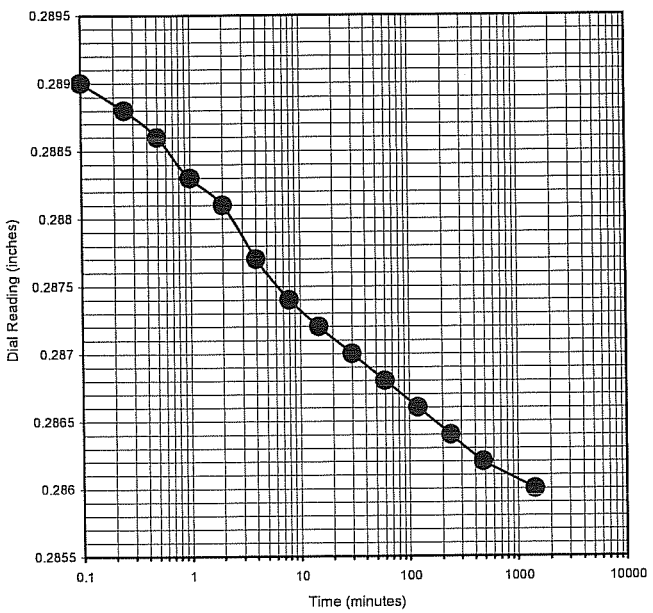


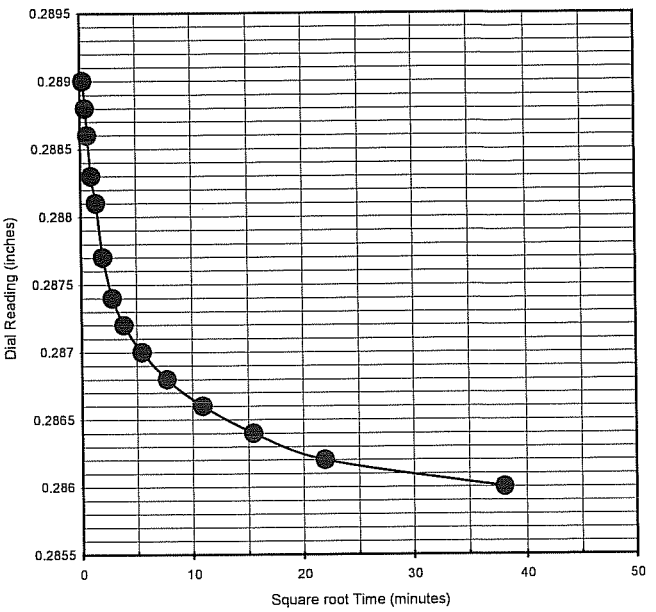
Boring No. :	A 10 211	Initial Dry Unit Weight (pcf):	79.7
Sample No.:	D2	Initial Moisture Content (%):	38.6
Depth (ft.):	57	Final Moisture Content (%):	38.6
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	1.11
Soil Description:	Gray Lean Clay with sand	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	A 10 211	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Lean Clay with sand
Depth (ft.):	57	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

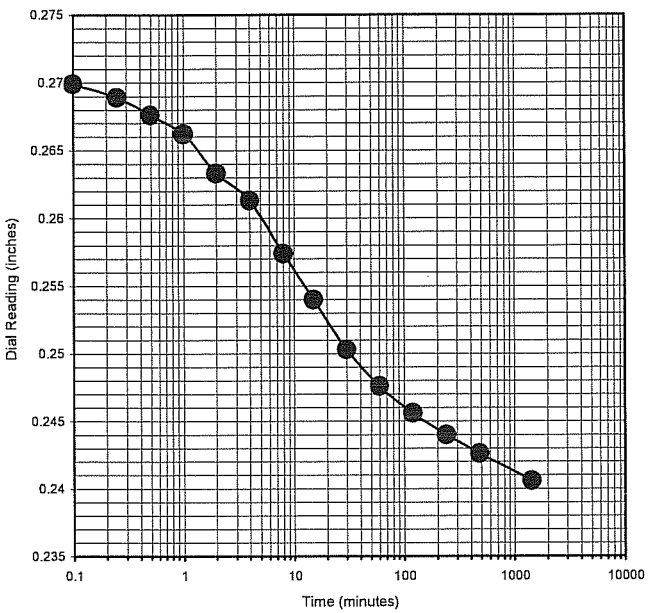
Time (minutes)	Dial Reading (inches)
0.1	0.2890
0.25	0.2888
0.5	0.2886
1	0.2883
2	0.2881
4	0.2877
8	0.2874
15	0.2872
30	0.2870
60	0.2868
120	0.2866
240	0.2864
480	0.2862
1440	0.2860

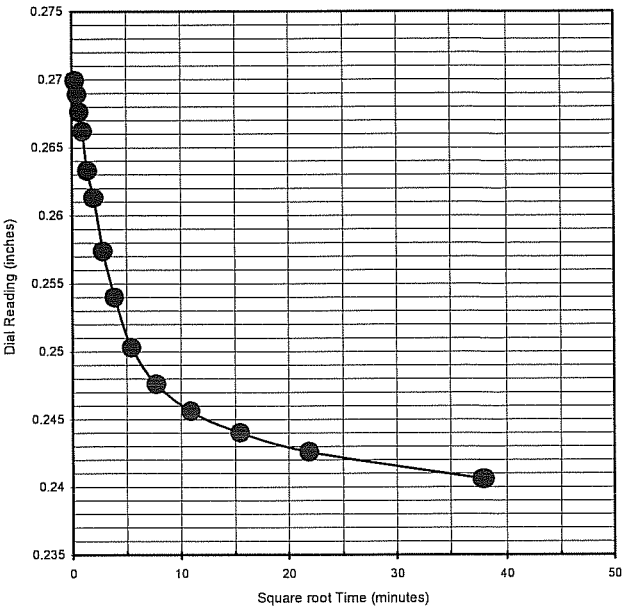
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.2890
0.5000	0.2888
0.7071	0.2886
1.0000	0.2883
1.4142	0.2881
2.0000	0.2877
2.8284	0.2874
3.8730	0.2872
5.4772	0.2870
7.7460	0.2868
10.9545	0.2866
15.4919	0.2864
21.9089	0.2862
37.9473	0.2860

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	A 10 211	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Lean Clay with sand
Depth (ft.):	57	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

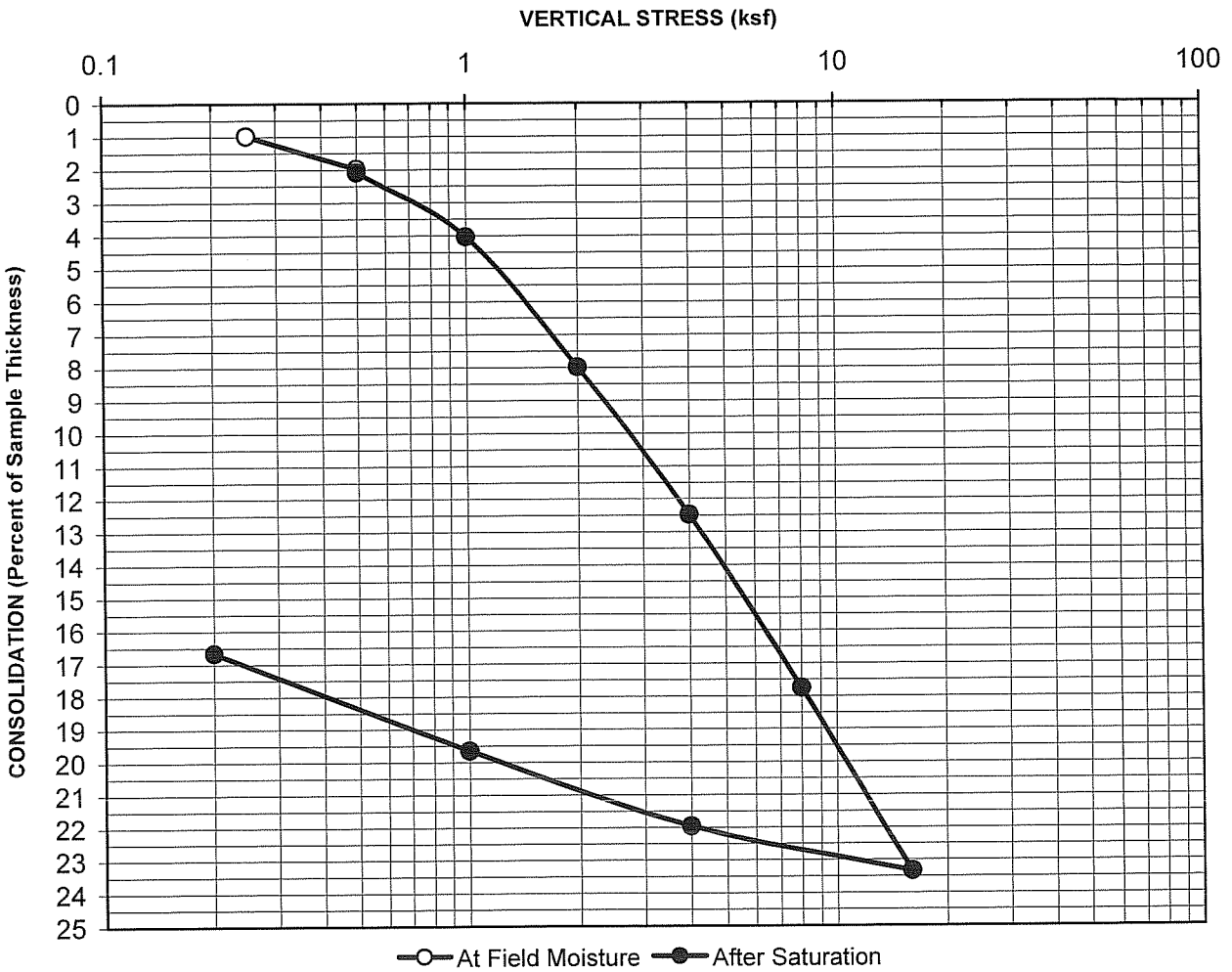
Time (minutes)	Dial Reading (inches)
0.1	0.2699
0.25	0.2689
0.5	0.2676
1	0.2662
2	0.2633
4	0.2613
8	0.2574
15	0.2540
30	0.2503
60	0.2476
120	0.2456
240	0.2440
480	0.2426
1440	0.2406

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.2699
0.5000	0.2689
0.7071	0.2676
1.0000	0.2662
1.4142	0.2633
2.0000	0.2613
2.8284	0.2574
3.8730	0.2540
5.4772	0.2503
7.7460	0.2476
10.9545	0.2456
15.4919	0.2440
21.9089	0.2426
37.9473	0.2406

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:** _____

AP Engineering & Testing, Inc.

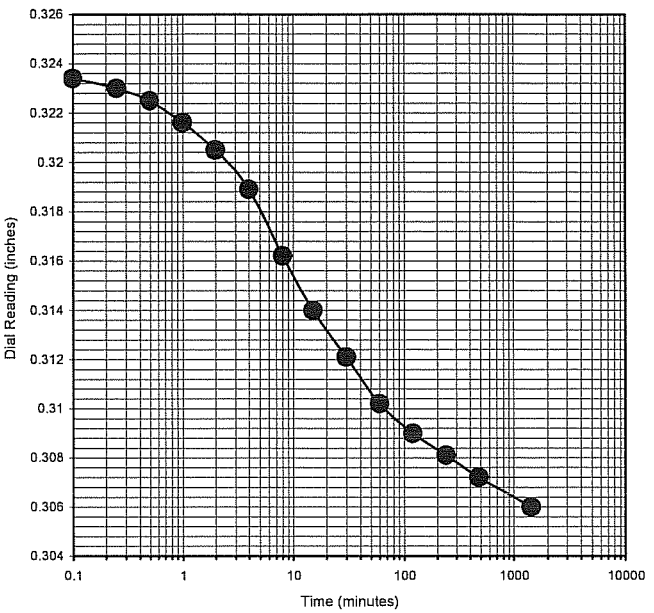


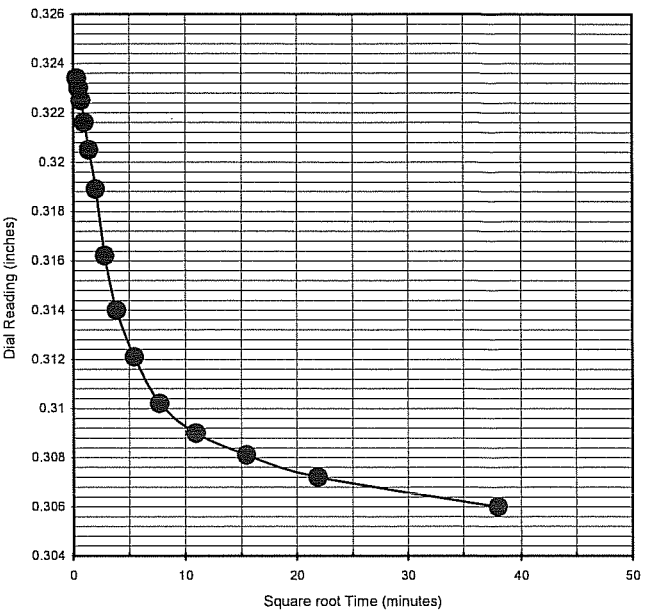
Boring No. :	R 10 301	Initial Dry Unit Weight (pcf):	72.4
Sample No.:	D2	Initial Moisture Content (%):	49.3
Depth (ft.):	10	Final Moisture Content (%):	38.6
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	1.33
Soil Description:	Gray Lean Clay	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	R 10 301	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Lean Clay
Depth (ft.):	10	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

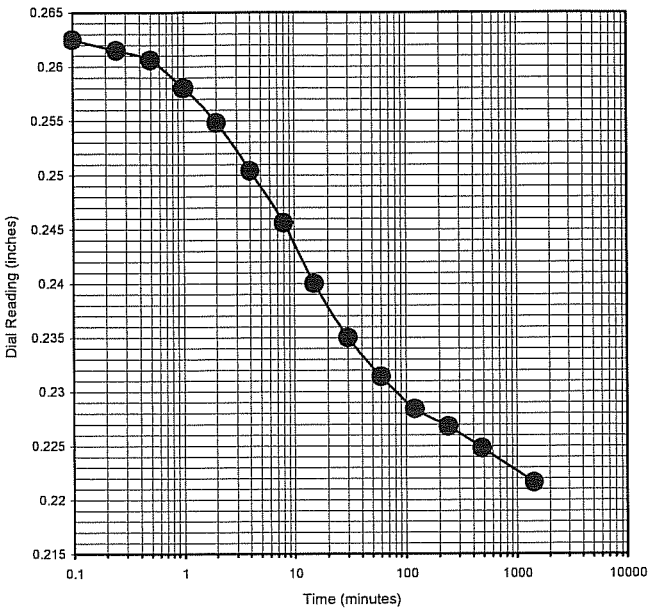
Time (minutes)	Dial Reading (inches)
0.1	0.3234
0.25	0.3230
0.5	0.3225
1	0.3216
2	0.3205
4	0.3189
8	0.3162
15	0.3140
30	0.3121
60	0.3102
120	0.3090
240	0.3081
480	0.3072
1440	0.3060

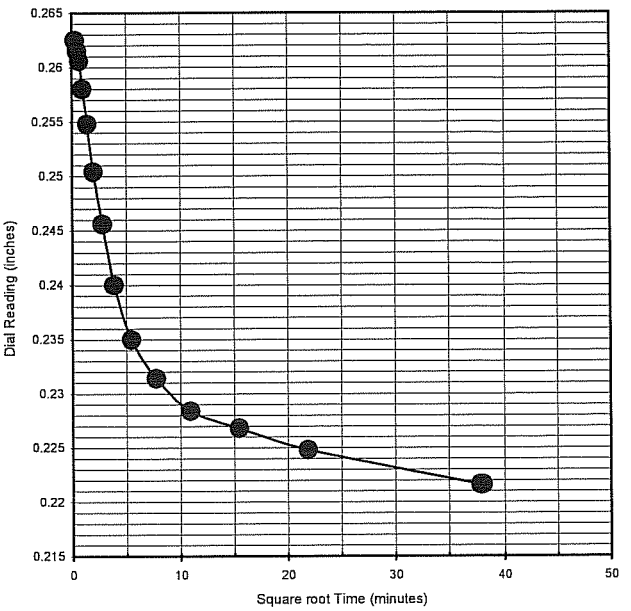
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3234
0.5000	0.3230
0.7071	0.3225
1.0000	0.3216
1.4142	0.3205
2.0000	0.3189
2.8284	0.3162
3.8730	0.3140
5.4772	0.3121
7.7460	0.3102
10.9545	0.3090
15.4919	0.3081
21.9089	0.3072
37.9473	0.3060

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	R 10 301	Sample Type:	Cal. Mod.
Sample No.:	D2	Soil Description:	Gray Lean Clay
Depth (ft.):	10	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

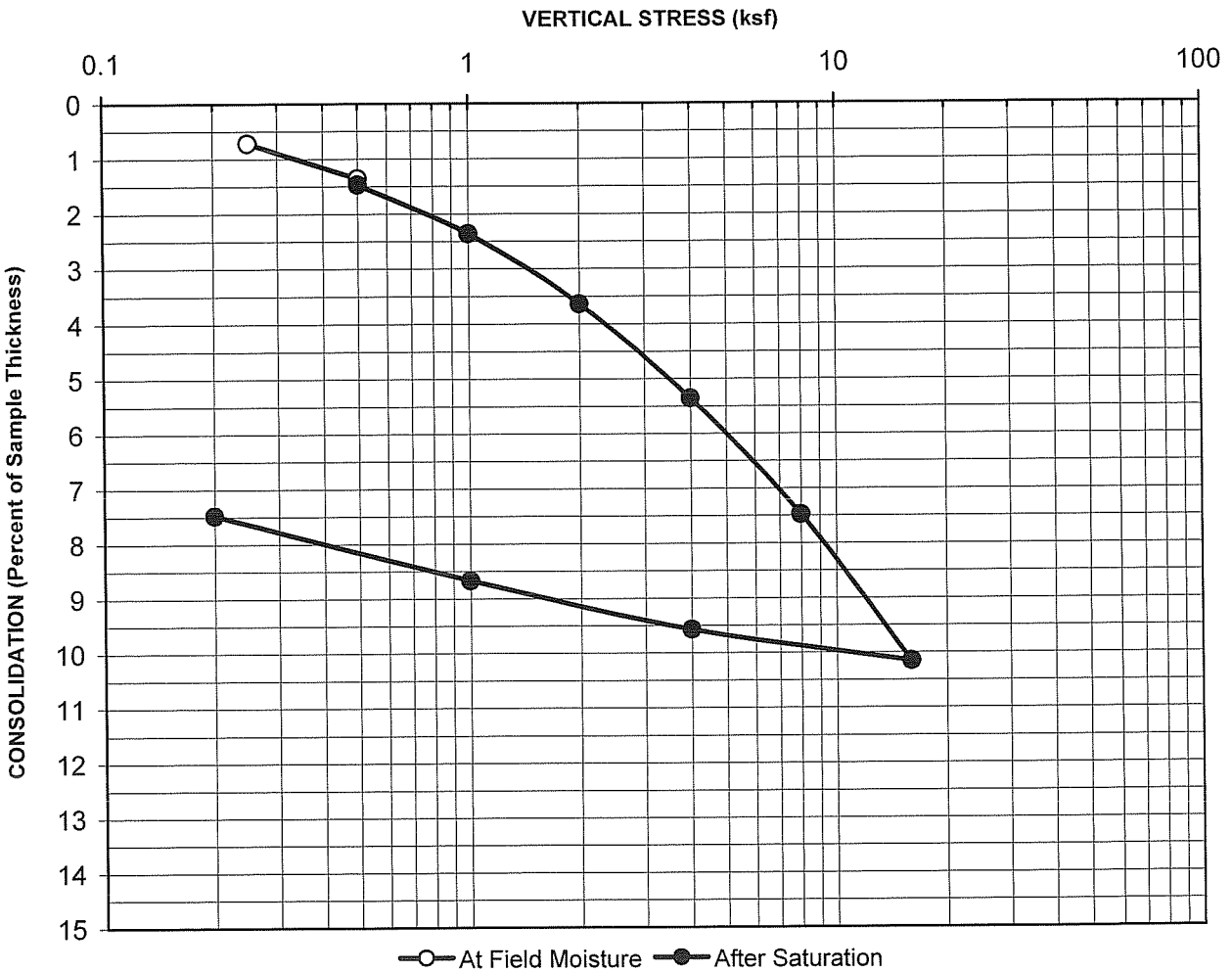
Time (minutes)	Dial Reading (inches)
0.1	0.2625
0.25	0.2615
0.5	0.2606
1	0.2580
2	0.2548
4	0.2504
8	0.2456
15	0.2400
30	0.2350
60	0.2314
120	0.2284
240	0.2268
480	0.2248
1440	0.2216

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.2625
0.5000	0.2615
0.7071	0.2606
1.0000	0.2580
1.4142	0.2548
2.0000	0.2504
2.8284	0.2456
3.8730	0.2400
5.4772	0.2350
7.7460	0.2314
10.9545	0.2284
15.4919	0.2268
21.9089	0.2248
37.9473	0.2216

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:**

AP Engineering & Testing, Inc.

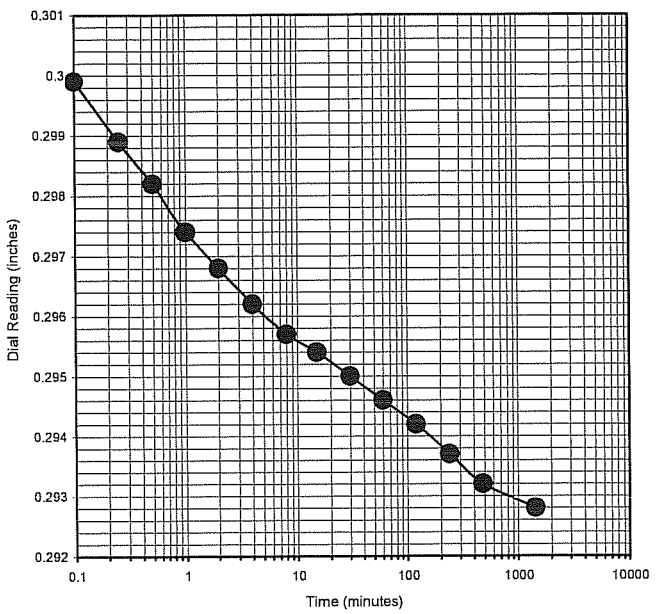


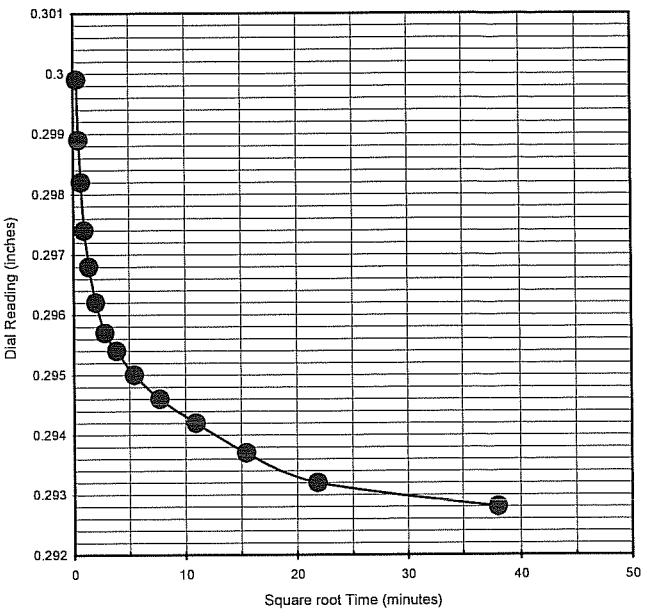
Boring No. :	R 10 301	Initial Dry Unit Weight (pcf):	90.9
Sample No.:	T10	Initial Moisture Content (%):	32.9
Depth (ft.):	45	Final Moisture Content (%):	26.9
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Shelby Tube	Initial Void Ratio:	0.85
Soil Description:	Gray Clayey Silt	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	R 10 301	Sample Type:	Shelby Tube
Sample No.:	T10	Soil Description:	Gray Clayey Silt
Depth (ft.):	45	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

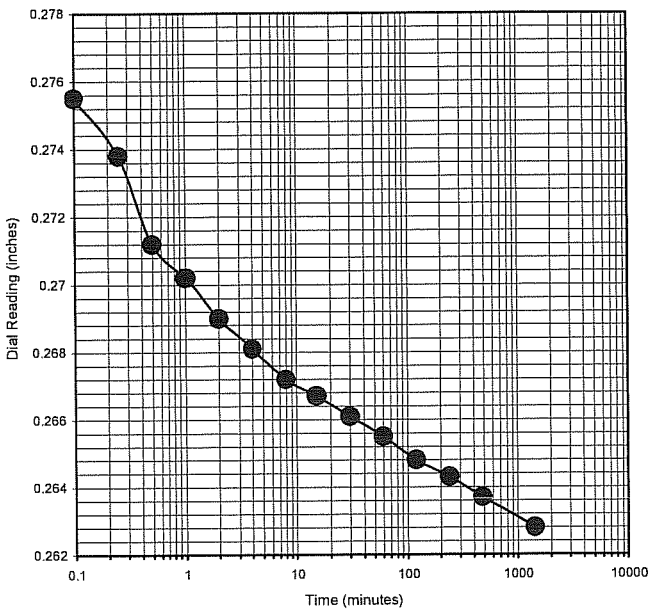
Time (minutes)	Dial Reading (inches)
0.1	0.2999
0.25	0.2989
0.5	0.2982
1	0.2974
2	0.2968
4	0.2962
8	0.2957
15	0.2954
30	0.2950
60	0.2946
120	0.2942
240	0.2937
480	0.2932
1440	0.2928

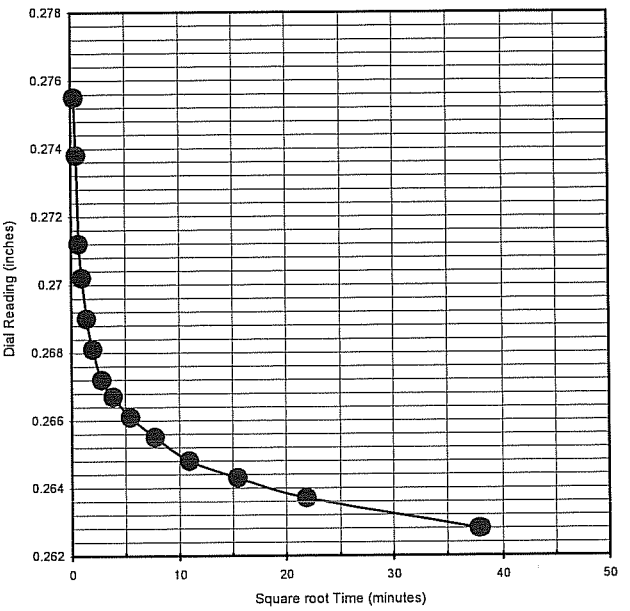
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.2999
0.5000	0.2989
0.7071	0.2982
1.0000	0.2974
1.4142	0.2968
2.0000	0.2962
2.8284	0.2957
3.8730	0.2954
5.4772	0.2950
7.7460	0.2946
10.9545	0.2942
15.4919	0.2937
21.9089	0.2932
37.9473	0.2928

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	R 10 301	Sample Type:	Shelby Tube
Sample No.:	T10	Soil Description:	Gray Clayey Silt
Depth (ft.):	45	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

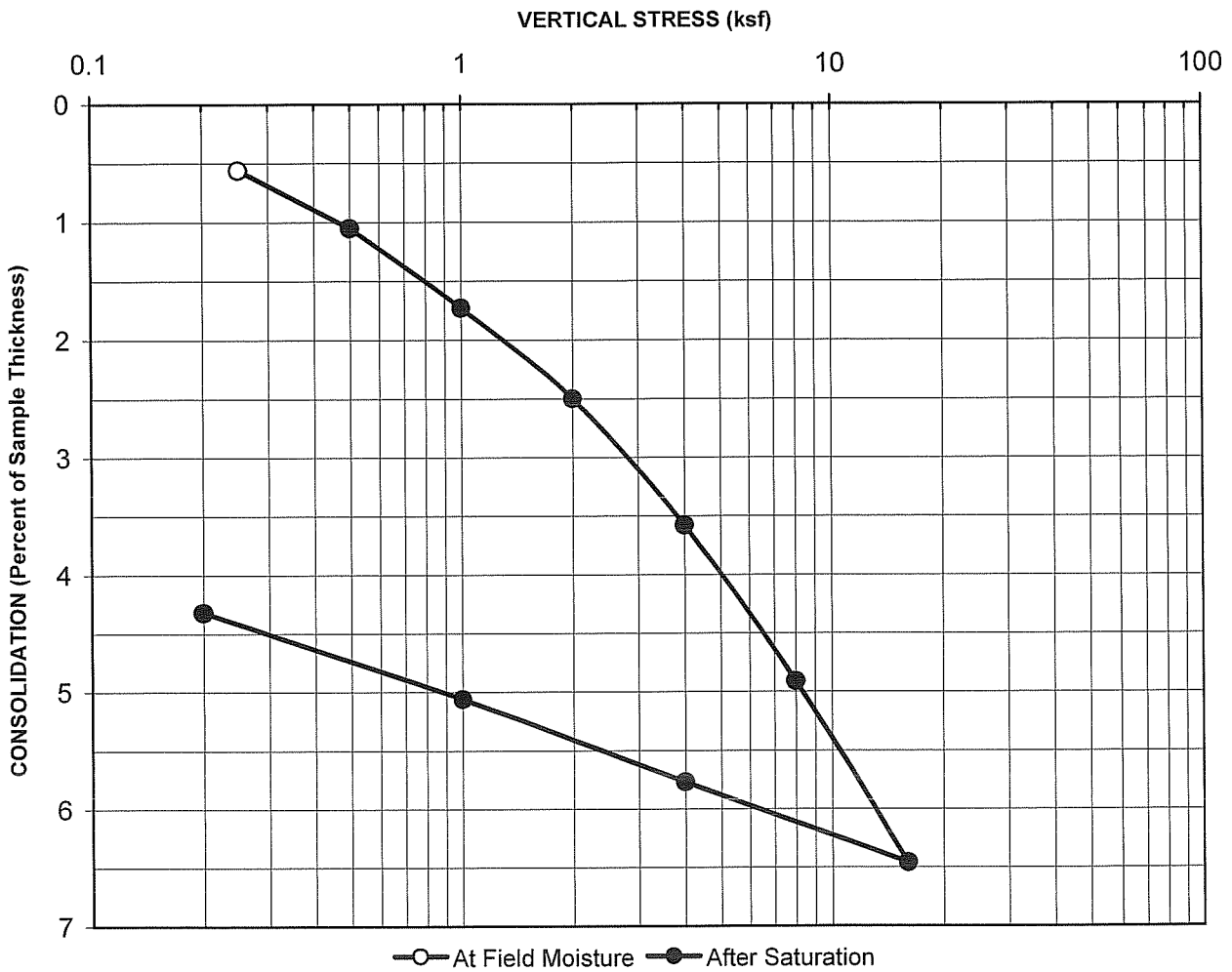
Time (minutes)	Dial Reading (inches)
0.1	0.2755
0.25	0.2738
0.5	0.2712
1	0.2702
2	0.2690
4	0.2681
8	0.2672
15	0.2667
30	0.2661
60	0.2655
120	0.2648
240	0.2643
480	0.2637
1440	0.2628

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.2755
0.5000	0.2738
0.7071	0.2712
1.0000	0.2702
1.4142	0.2690
2.0000	0.2681
2.8284	0.2672
3.8730	0.2667
5.4772	0.2661
7.7460	0.2655
10.9545	0.2648
15.4919	0.2643
21.9089	0.2637
37.9473	0.2628

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:**

AP Engineering & Testing, Inc.

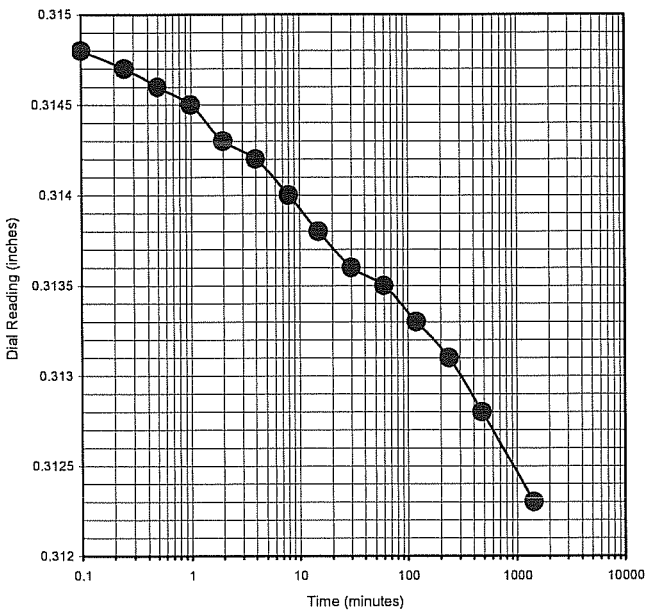


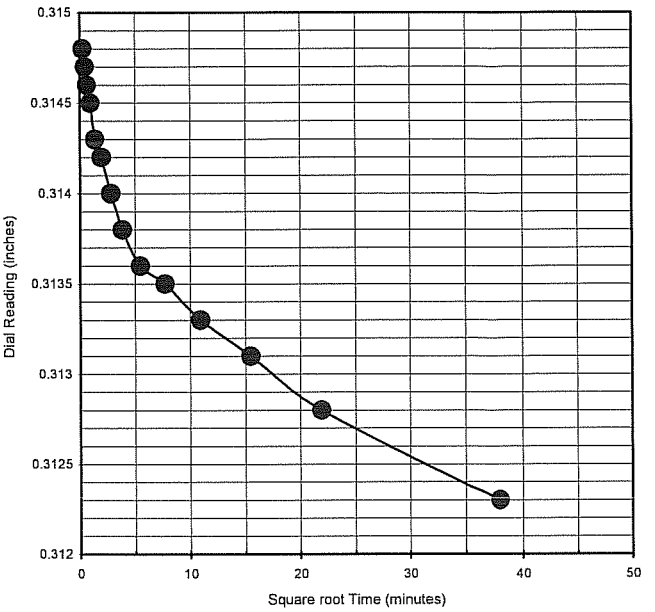
Boring No. :	R 10 301	Initial Dry Unit Weight (pcf):	92.8
Sample No.:	D16	Initial Moisture Content (%):	31.3
Depth (ft.):	75	Final Moisture Content (%):	30.2
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	0.81
Soil Description:	Gray Silt with sand	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.





Boring No. :	R 10 301	Sample Type:	Cal. Mod.
Sample No.:	D16	Soil Description:	Gray Silt with sand
Depth (ft.):	75	Vertical Pressure (ksf):	1
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

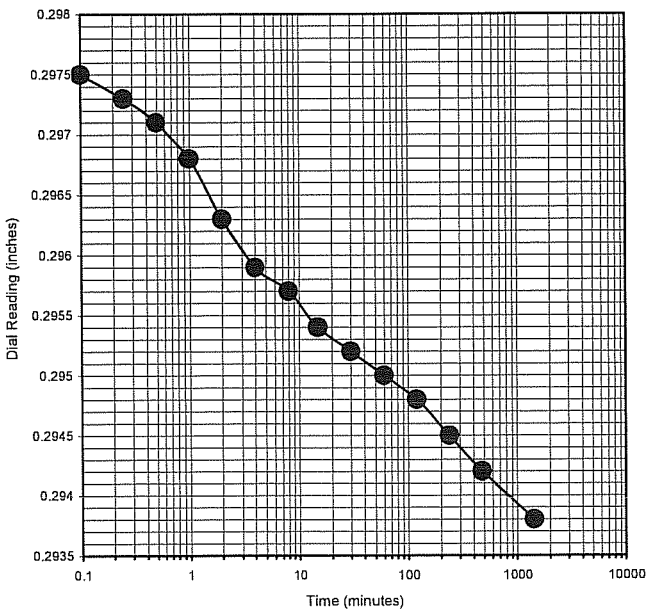
Time (minutes)	Dial Reading (inches)
0.1	0.3148
0.25	0.3147
0.5	0.3146
1	0.3145
2	0.3143
4	0.3142
8	0.3140
15	0.3138
30	0.3136
60	0.3135
120	0.3133
240	0.3131
480	0.3128
1440	0.3123

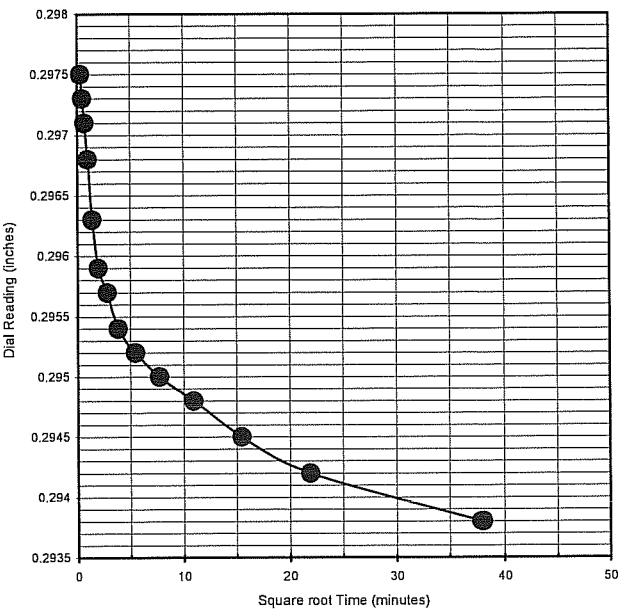
SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.3148
0.5000	0.3147
0.7071	0.3146
1.0000	0.3145
1.4142	0.3143
2.0000	0.3142
2.8284	0.3140
3.8730	0.3138
5.4772	0.3136
7.7460	0.3135
10.9545	0.3133
15.4919	0.3131
21.9089	0.3128
37.9473	0.3123

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/10
AP No:	10-1226 **Figure No:**

AP Engineering & Testing, Inc.





Boring No. :	R 10 301	Sample Type:	Cal. Mod.
Sample No.:	D16	Soil Description:	Gray Silt with sand
Depth (ft.):	75	Vertical Pressure (ksf):	4
Depth Below Mud Line (ft.):	N/A	Test Condition:	Saturated

Time (minutes)	Dial Reading (inches)
0.1	0.2975
0.25	0.2973
0.5	0.2971
1	0.2968
2	0.2963
4	0.2959
8	0.2957
15	0.2954
30	0.2952
60	0.2950
120	0.2948
240	0.2945
480	0.2942
1440	0.2938

SQRT Time (minutes)	Dial Reading (inches)
0.3162	0.2975
0.5000	0.2973
0.7071	0.2971
1.0000	0.2968
1.4142	0.2963
2.0000	0.2959
2.8284	0.2957
3.8730	0.2954
5.4772	0.2952
7.7460	0.2950
10.9545	0.2948
15.4919	0.2945
21.9089	0.2942
37.9473	0.2938

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123
Date: 12/14/10
AP No: 10-1226 **Figure No:**

CORROSION

AP Engineering & Testing, Inc.

CORROSION TEST RESULTS

Client Name: Earth Mechanics, Inc.
Project Name: Heim Bridge Soil Cement
Project No.: 06-123

AP Job No.: 10-1151
Date 12/20/10

Boring No.	Sample No.	Depth (ft)	Soil Type	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
A 10 201	B2	10-20	SM	1371	6.8	43	240
A 10 202	B5	40-50	CL-ML	149	7.3	520	2400
A 10 203	B4	30-40	SM	122	7.3	154	1200
A 10 204	B5	40-50	ML	174	6.9	79	1800
A 10 205	B4	30-40	CL-ML	108	7.0	132	1800
A 10 206	B2	10-20	ML	60	7.3	251	3000
A 10 206	B6	50-60	ML	89	7.0	1051	2400

NOTES: Resistivity Test and pH: California Test Methods 532 and 643
Sulfate Content : California Test Method 417
Chloride Content : California Test Method 422
ND = Not Detectable
NA = Not Sufficient Sample
NR = Not Requested

2607 Pomona Boulevard, Pomona, CA 91768
Tel. (909) 869-6316 Fax. (909)869-6318

AP Engineering & Testing, Inc.

CORROSION TEST RESULTS

Client Name: Earth Mechanics, Inc.
Project Name: Heim Bridge Soil Cement
Project No.: 06-123

AP Job No.: 10-1151
Date 12/20/10

Boring No.	Sample No.	Depth (ft)	Soil Type	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
A 10 208	B6	50-60	ML	159	7.3	965	1800
A 10 209	B4	30-40	ML	115	7.3	1052	4800
A 10 210	B6	50-60	ML	126	6.7	902	1200
A 10 211	B5	40-50	SM	97	7.0	644	2400
A 10 212	B1	0-10	SM	114	7.3	748	5400

NOTES: Resistivity Test and pH: California Test Methods 532 and 643
Sulfate Content : California Test Method 417
Chloride Content : California Test Method 422
ND = Not Detectable
NA = Not Sufficient Sample
NR = Not Requested

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AP Engineering & Testing, Inc.

CORROSION TEST RESULTS

Client Name: Earth Mechanics, Inc.
Project Name: Heim Bridge Soil Cement
Project No.: 06-123

AP Job No.: 10-1151
Date 12/20/10

Boring No.	Sample No.	Depth (ft)	Soil Type	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
A 10 212	B3	20-30	SM	109	7.1	282	1800
A 10 212	B5	40-50	ML	67	7.4	506	1800
A 10 213	B3	20-30	ML	206	7.6	421	1800

NOTES: Resistivity Test and pH: California Test Methods 532 and 643
Sulfate Content : California Test Method 417
Chloride Content : California Test Method 422
ND = Not Detectable
NA = Not Sufficient Sample
NR = Not Requested

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AP Engineering & Testing, Inc.

CORROSION TEST RESULTS

Client Name: Earth Mechanics, Inc.
Project Name: ACTA Schuyler Heim Bridge Future Fill
Project No.: 06-123

AP Job No.: 29-1002
Date 10/01/09

Boring No.	Sample No.	Depth (ft)	Soil Type	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
R 10 301	D2	10	CL	101	7.8	32	2400

NOTES: Resistivity Test and pH: California Test Methods 532 and 643
Sulfate Content : California Test Method 417
Chloride Content : California Test Method 422
ND = Not Detectable
NA = Not Sufficient Sample
NR = Not Requested

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LABORATORY TEST RESULTS FOR SOIL-CEMENT-MIX (CSM) SAMPLES

SOIL-CEMENT-MIX (CSM) SAMPLES FROM PREVIOUS BORINGS

UNCONFINED COMPRESSION

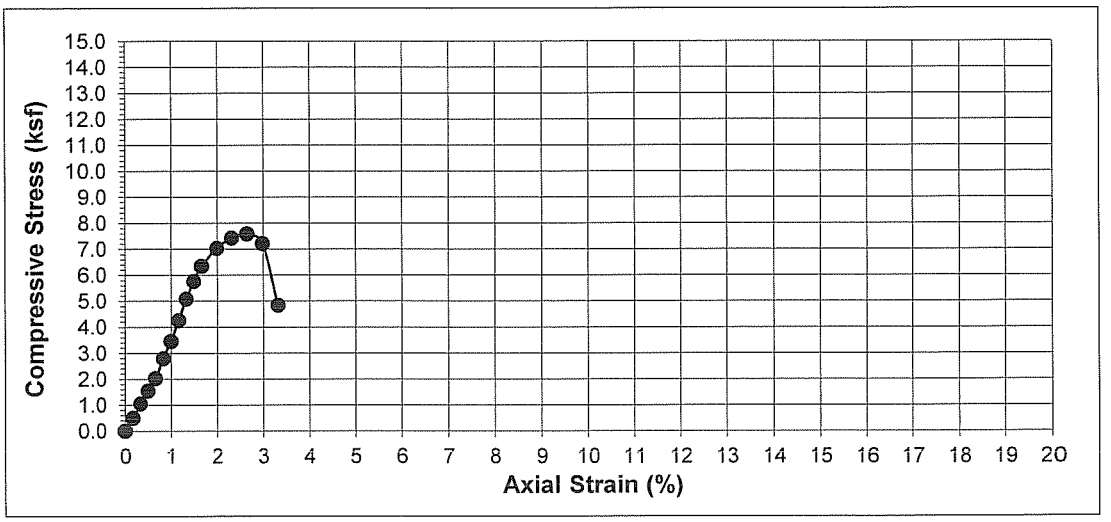
AT NORTH SIDE (PIER A)

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	North Side of Bridge	Dry Density (pcf):	74.8
Sample No.:	N-1	Moisture Content (%):	44.5
Days Cured:	3	Test Date:	11/22/10

Sample Diameter (inch):	3.031	Wt. Wet Soil+Container(gms):	1382.87
Sample Hieght (inch):	6.024	Wt. Dry Soil+Container(gms):	1002.8
Sample Weight (gms):	1234.33	Wt. Container (gms):	149.63



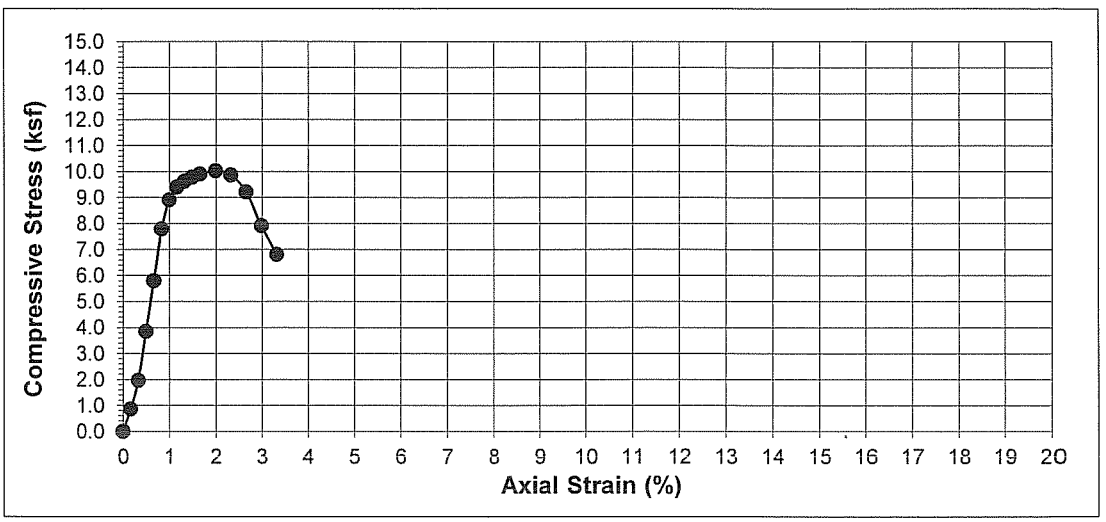
Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
25	0.010	7.23	0.50	0.17
53	0.020	7.24	1.05	0.33
78	0.030	7.25	1.55	0.50
102	0.040	7.26	2.02	0.66
141	0.050	7.28	2.79	0.83
175	0.060	7.29	3.46	1.00
216	0.070	7.30	4.26	1.16
258	0.080	7.31	5.08	1.33
293	0.090	7.32	5.76	1.49
323	0.100	7.34	6.34	1.66
360	0.120	7.36	7.04	1.99
381	0.140	7.39	7.43	2.32
391	0.160	7.41	7.60	2.66
373	0.180	7.44	7.22	2.99
251	0.200	7.46	4.84	3.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	North Side of Bridge	Dry Density (pcf):	72.4
Sample No.:	N-2	Moisture Content (%):	47.7
Days Cured:	7	Test Date:	11/26/10

Sample Diameter (inch):	3.038	Wt. Wet Soil+Container(gms):	1373.75
Sample Hieght (inch):	6.034	Wt. Dry Soil+Container(gms):	978.23
Sample Weight (gms):	1228.61	Wt. Container (gms):	148.89

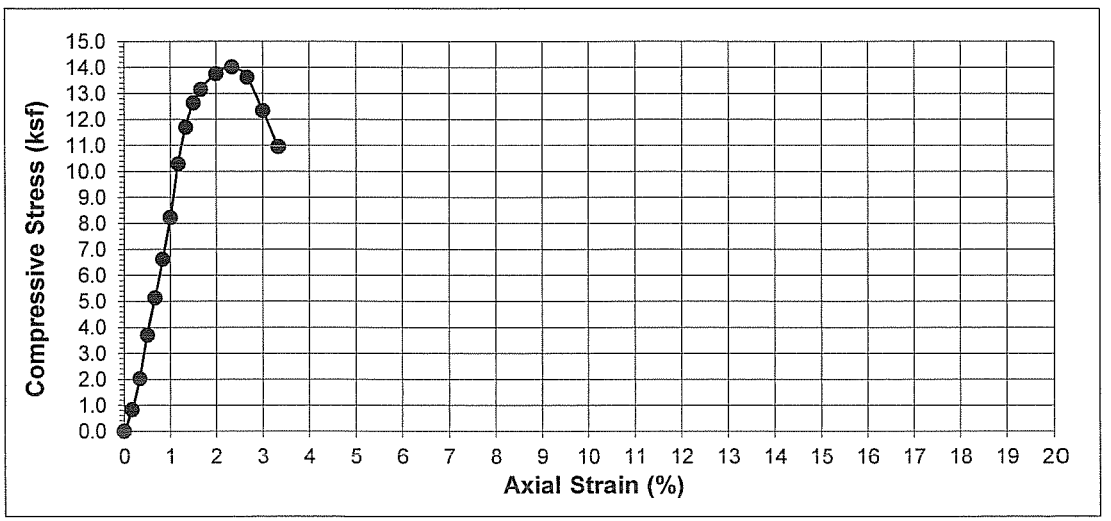


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
44	0.010	7.26	0.87	0.17
99	0.020	7.27	1.96	0.33
195	0.030	7.29	3.85	0.50
294	0.040	7.30	5.80	0.66
396	0.050	7.31	7.80	0.83
453	0.060	7.32	8.91	0.99
479	0.070	7.33	9.41	1.16
491	0.080	7.35	9.62	1.33
500	0.090	7.36	9.78	1.49
507	0.100	7.37	9.90	1.66
515	0.120	7.40	10.03	1.99
509	0.140	7.42	9.88	2.32
477	0.160	7.45	9.22	2.65
411	0.180	7.47	7.92	2.98
355	0.200	7.50	6.82	3.31

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	North Side of Bridge	Dry Density (pcf):	73.3
Sample No.:	N-3	Moisture Content (%):	47.1
Days Cured:	14	Test Date:	12/03/10
Sample Diameter (inch):	3.037	Wt. Wet Soil+Container(gms):	1368.48
Sample Hieght (inch):	5.994	Wt. Dry Soil+Container(gms):	978.22
Sample Weight (gms):	1228.47	Wt. Container (gms):	149.49

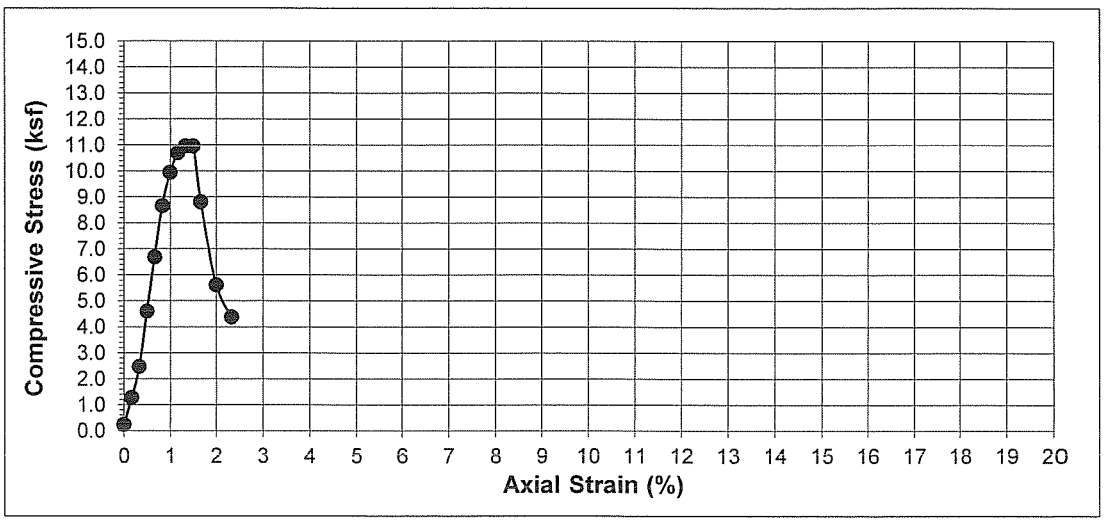


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
42	0.010	7.25	0.83	0.17
102	0.020	7.27	2.02	0.33
187	0.030	7.28	3.70	0.50
260	0.040	7.29	5.14	0.67
336	0.050	7.30	6.63	0.83
418	0.060	7.31	8.23	1.00
524	0.070	7.33	10.30	1.17
596	0.080	7.34	11.69	1.33
645	0.090	7.35	12.63	1.50
673	0.100	7.36	13.16	1.67
706	0.120	7.39	13.76	2.00
722	0.140	7.41	14.02	2.34
704	0.160	7.44	13.63	2.67
640	0.180	7.47	12.34	3.00
570	0.200	7.49	10.96	3.34

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	North Side of Bridge	Dry Density (pcf):	69.3
Sample No.:	N-7	Moisture Content (%):	48.4
Days Cured:	14	Test Date:	12/13/10
Sample Diameter (inch):	3.025	Wt. Wet Soil+Container(gms):	1310.85
Sample Hieght (inch):	6.011	Wt. Dry Soil+Container(gms):	932.13
Sample Weight (gms):	1165.19	Wt. Container (gms):	149.64



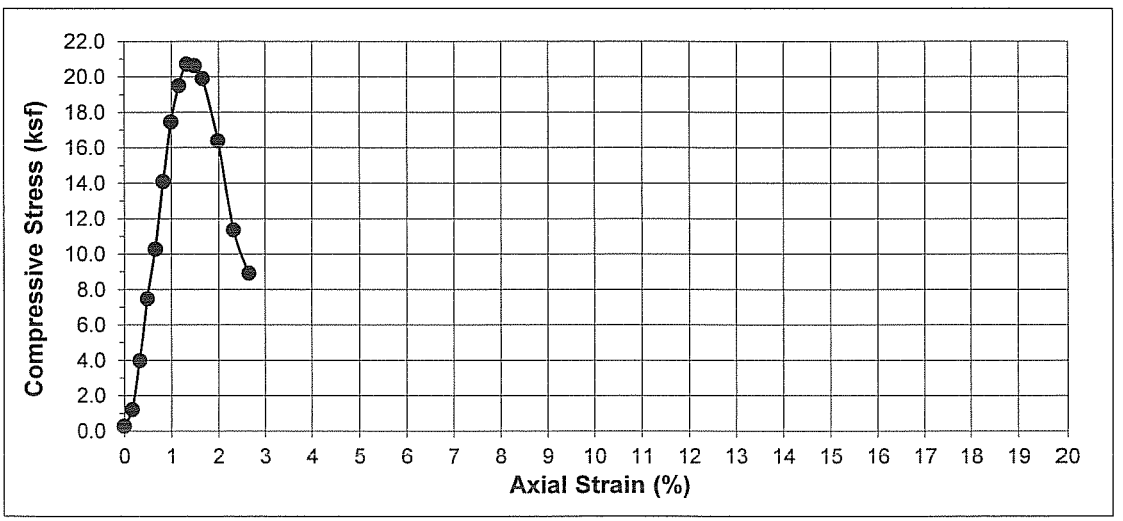
Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
12	0.000	7.18	0.24	0.00
64	0.010	7.20	1.28	0.17
124	0.020	7.21	2.48	0.33
231	0.030	7.22	4.61	0.50
336	0.040	7.23	6.69	0.67
436	0.050	7.24	8.67	0.83
501	0.060	7.26	9.94	1.00
540	0.070	7.27	10.70	1.16
554	0.080	7.28	10.96	1.33
555	0.090	7.29	10.96	1.50
447	0.100	7.31	8.81	1.66
286	0.120	7.33	5.62	2.00
224	0.140	7.36	4.39	2.33

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Schuyler Heim Bridge			Sample Type:	Blend
Project No.:	06-123			Soil Description:	Clay+15%Cement
Mixture:	North Side of Bridge			Dry Density (pcf):	75.9
Sample No.:	N-4			Moisture Content (%):	40.5
Days Cured:	28	Cast Date:	11/19/10	Test Date:	12/17/10

Sample Diameter (inch):	3.043	Wt. Wet Soil+Container(gms):	1383.04
Sample Hieght (inch):	6.032	Wt. Dry Soil+Container(gms):	1028.97
Sample Weight (gms):	1228.57	Wt. Container (gms):	155.15

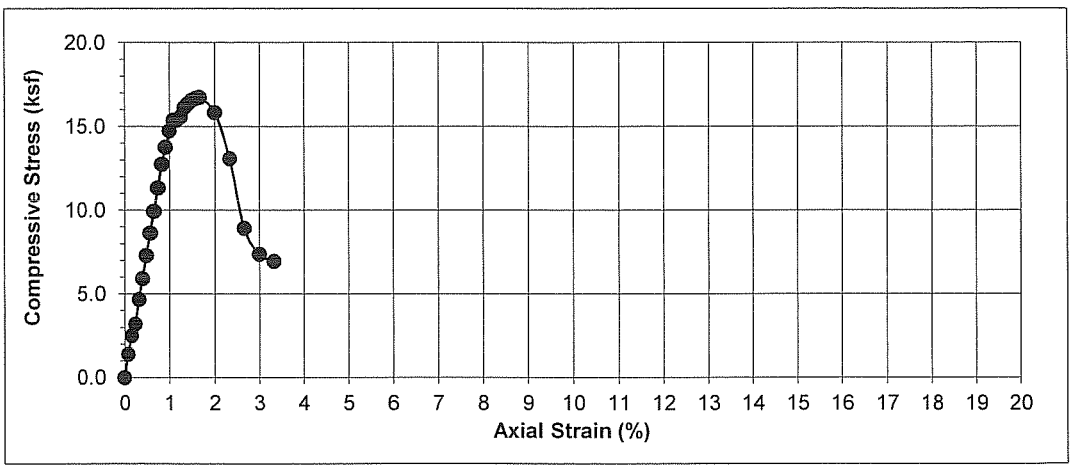


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
14	0.000	7.27	0.28	0.00
62	0.010	7.28	1.23	0.17
202	0.020	7.30	3.99	0.33
380	0.030	7.31	7.49	0.50
523	0.040	7.32	10.29	0.66
718	0.050	7.33	14.10	0.83
891	0.060	7.35	17.47	0.99
997	0.070	7.36	19.51	1.16
1061	0.080	7.37	20.73	1.33
1058	0.090	7.38	20.64	1.49
1022	0.100	7.40	19.90	1.66
845	0.120	7.42	16.40	1.99
588	0.140	7.45	11.37	2.32
463	0.160	7.47	8.92	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	11/29/10
Mixture:	North Side Blend 2	Cure Days:	28
Sample No.:	N-9	Test Date:	12/27/10
Soil Description:	Clayey Silt (CL-ML)	Dry Density (pcf):	65.4
Sample Type:	Soil-Cement	Moisture Content (%):	57.4
Sample Diameter (inches):	3.029	Wt. Wet Soil+Container(gms):	1326.06
Sample Height (inches):	6.007	Wt. Dry Soil+Container(gms):	900.04
Sample Weight (gms):	1169.32	Wt. Container (gms):	157.69

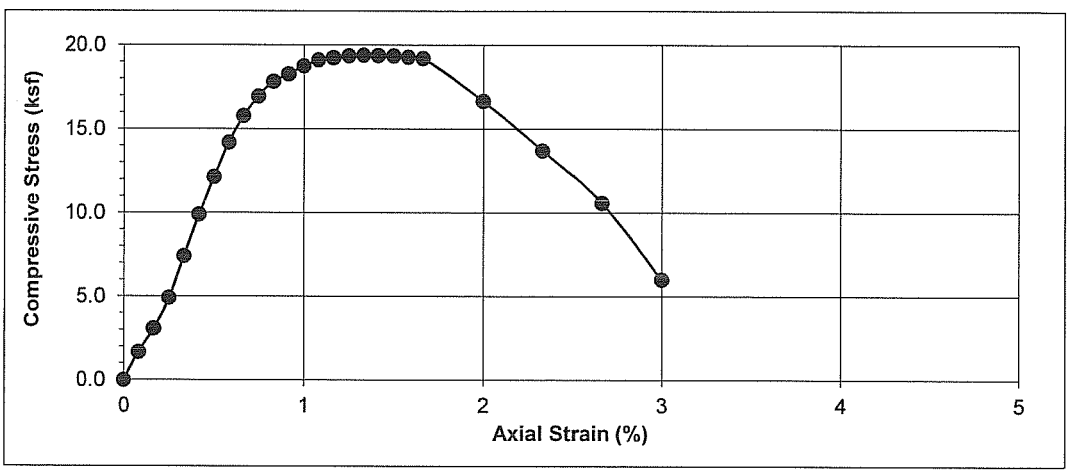


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.20	0.00	0.00
70	0.005	7.21	1.40	0.08
125	0.010	7.22	2.49	0.17
160	0.015	7.22	3.19	0.25
234	0.020	7.23	4.66	0.33
297	0.025	7.23	5.91	0.42
367	0.030	7.24	7.30	0.50
434	0.035	7.25	8.63	0.58
500	0.040	7.25	9.93	0.67
571	0.045	7.26	11.33	0.75
643	0.050	7.26	12.75	0.83
695	0.055	7.27	13.77	0.92
745	0.060	7.28	14.74	1.00
778	0.065	7.28	15.38	1.08
778	0.070	7.29	15.37	1.17
789	0.075	7.29	15.58	1.25
818	0.080	7.30	16.13	1.33
830	0.085	7.31	16.36	1.42
841	0.090	7.31	16.56	1.50
848	0.095	7.32	16.68	1.58
852	0.100	7.33	16.75	1.66
808	0.120	7.35	15.83	2.00
670	0.140	7.38	13.08	2.33
459	0.160	7.40	8.93	2.66
380	0.180	7.43	7.37	3.00
360	0.200	7.45	6.96	3.33

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	11/29/10
Mixture:	North Side Blend 2	Cure Days:	56
Sample No.:	N-11	Test Date:	01/24/11
Soil Description:	Lean Clay (CL)	Dry Density (pcf):	68.9
Sample Type:	Soil-Cement	Moisture Content (%):	49.5
Sample Diameter (inches):	3.028	Wt. Wet Soil+Container(gms):	1320.67
Sample Height (inches):	6.003	Wt. Dry Soil+Container(gms):	934.72
Sample Weight (gms):	1169.66	Wt. Container (gms):	155.70

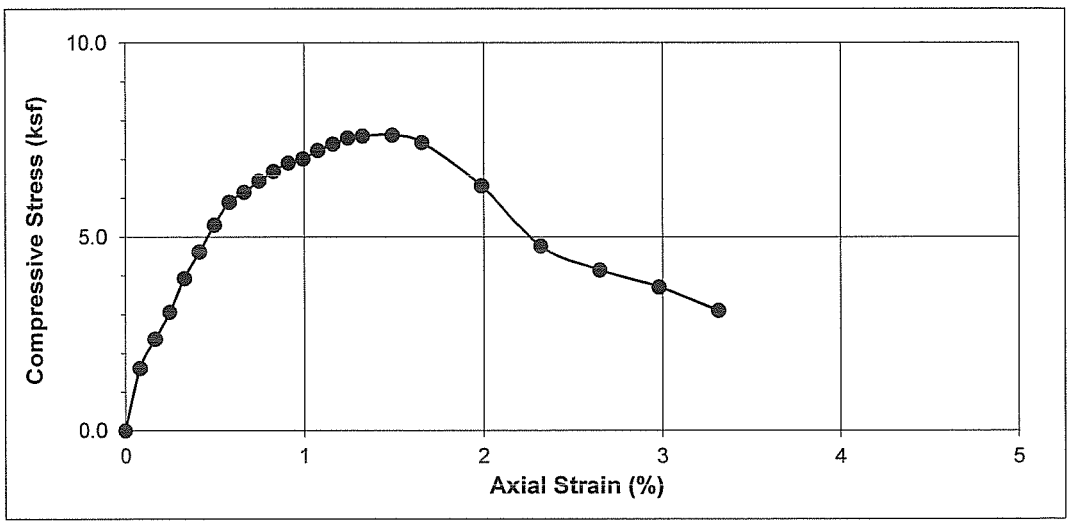


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.20	0.00	0.00
83	0.005	7.20	1.66	0.08
154	0.010	7.21	3.08	0.17
246	0.015	7.22	4.91	0.25
372	0.020	7.22	7.42	0.33
497	0.025	7.23	9.90	0.42
610	0.030	7.23	12.14	0.50
714	0.035	7.24	14.20	0.58
794	0.040	7.25	15.78	0.67
854	0.045	7.25	16.95	0.75
899	0.050	7.26	17.83	0.83
922	0.055	7.27	18.27	0.92
947	0.060	7.27	18.75	1.00
966	0.065	7.28	19.11	1.08
974	0.070	7.28	19.26	1.17
980	0.075	7.29	19.36	1.25
983	0.080	7.30	19.40	1.33
983	0.085	7.30	19.38	1.42
983	0.090	7.31	19.37	1.50
980	0.095	7.31	19.29	1.58
977	0.100	7.32	19.22	1.67
850	0.120	7.35	16.66	2.00
702	0.140	7.37	13.71	2.33
544	0.160	7.40	10.59	2.67
310	0.180	7.42	6.02	3.00

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/30/10
Boring No.:	North Side Clay Blend	Cure Days:	7
Sample No.:	CB-1	Test Date:	01/06/11
Soil Description:	Lean Clay (CL)	Dry Density (pcf):	67.8
Sample Type:	Soil-Cement	Moisture Content (%):	48.7
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1300.49
Sample Height (inches):	6.036	Wt. Dry Soil+Container(gms):	924.32
Sample Weight (gms):	1155.96	Wt. Container (gms):	152.32

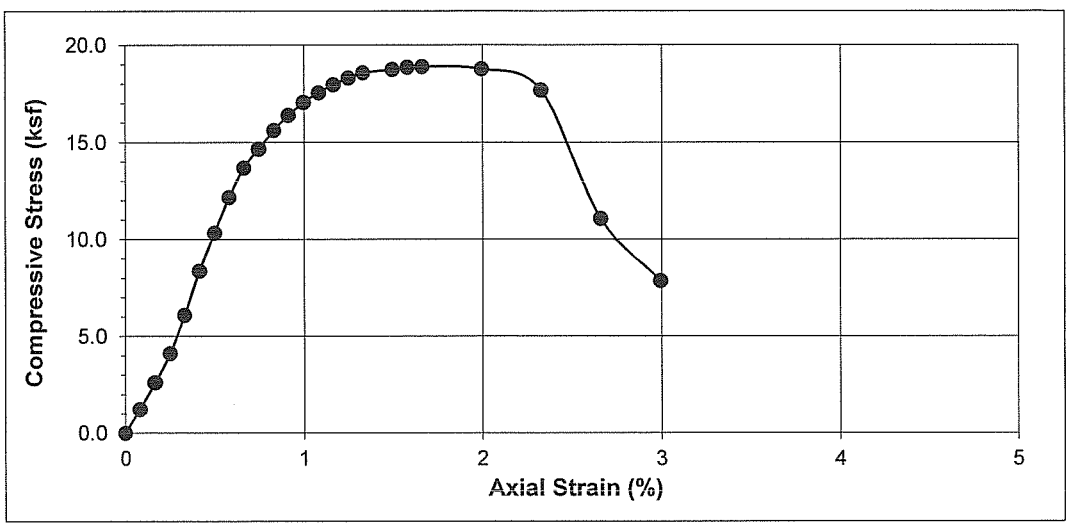


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
81	0.005	7.24	1.61	0.08
119	0.010	7.25	2.36	0.17
154	0.015	7.25	3.06	0.25
198	0.020	7.26	3.93	0.33
233	0.025	7.26	4.62	0.41
268	0.030	7.27	5.31	0.50
298	0.035	7.28	5.90	0.58
311	0.040	7.28	6.15	0.66
326	0.045	7.29	6.44	0.75
339	0.050	7.29	6.69	0.83
350	0.055	7.30	6.90	0.91
356	0.060	7.31	7.02	0.99
367	0.065	7.31	7.23	1.08
376	0.070	7.32	7.40	1.16
384	0.075	7.33	7.55	1.24
387	0.080	7.33	7.60	1.33
389	0.090	7.34	7.63	1.49
380	0.100	7.36	7.44	1.66
324	0.120	7.38	6.32	1.99
245	0.140	7.41	4.76	2.32
214	0.160	7.43	4.15	2.65
192	0.180	7.46	3.71	2.98
161	0.200	7.48	3.10	3.31

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/30/10
Boring No.:	North Side Clay Blend	Cure Days:	28
Sample No.:	CB-3	Test Date:	01/27/11
Soil Description:	Lean Clay (CL)	Dry Density (pcf):	64.4
Sample Type:	Soil-Cement	Moisture Content (%):	57.9
Sample Diameter (inches):	3.031	Wt. Wet Soil+Container(gms):	1352.57
Sample Height (inches):	6.013	Wt. Dry Soil+Container(gms):	928.1
Sample Weight (gms):	1158.47	Wt. Container (gms):	195.28



Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
61	0.005	7.22	1.22	0.08
131	0.010	7.23	2.61	0.17
207	0.015	7.23	4.12	0.25
306	0.020	7.24	6.09	0.33
421	0.025	7.25	8.37	0.42
520	0.030	7.25	10.33	0.50
613	0.035	7.26	12.16	0.58
690	0.040	7.26	13.68	0.67
740	0.045	7.27	14.66	0.75
789	0.050	7.28	15.62	0.83
829	0.055	7.28	16.39	0.91
863	0.060	7.29	17.05	1.00
889	0.065	7.29	17.55	1.08
911	0.070	7.30	17.97	1.16
929	0.075	7.31	18.31	1.25
943	0.080	7.31	18.57	1.33
953	0.090	7.33	18.73	1.50
960	0.095	7.33	18.86	1.58
963	0.100	7.34	18.90	1.66
960	0.120	7.36	18.78	2.00
907	0.140	7.39	17.68	2.33
570	0.160	7.41	11.07	2.66
406	0.180	7.44	7.86	2.99

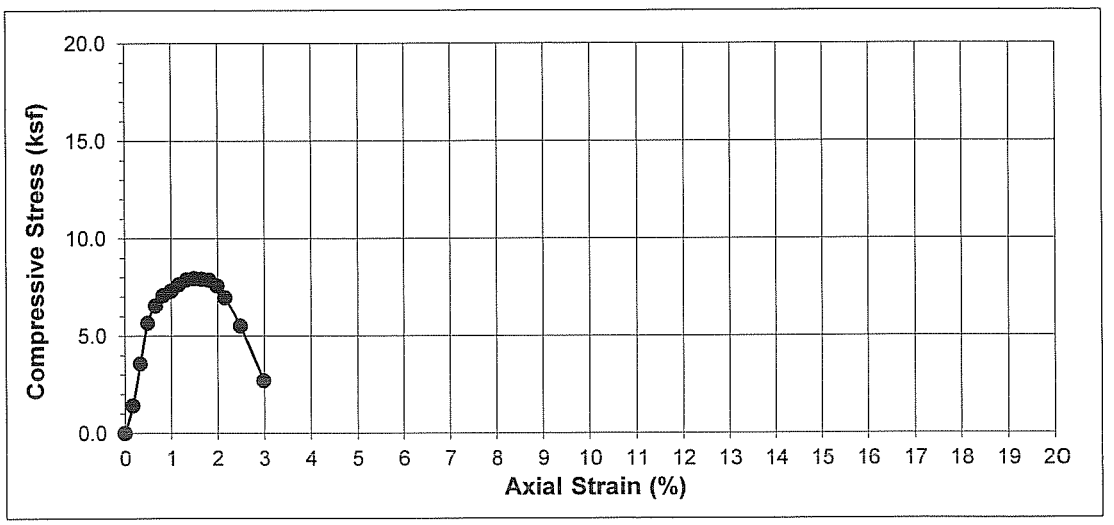
AT SOUTH SIDE (PIER S)

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	South Side of Bridge	Dry Density (pcf):	68.6
Sample No.:	S-1	Moisture Content (%):	52.9
Days Cured:	3	Test Date:	11/20/10

Sample Diameter (inch):	3.034	Wt. Wet Soil+Container(gms):	1348.15
Sample Hieght (inch):	6.023	Wt. Dry Soil+Container(gms):	933.83
Sample Weight (gms):	1199.43	Wt. Container (gms):	150.04

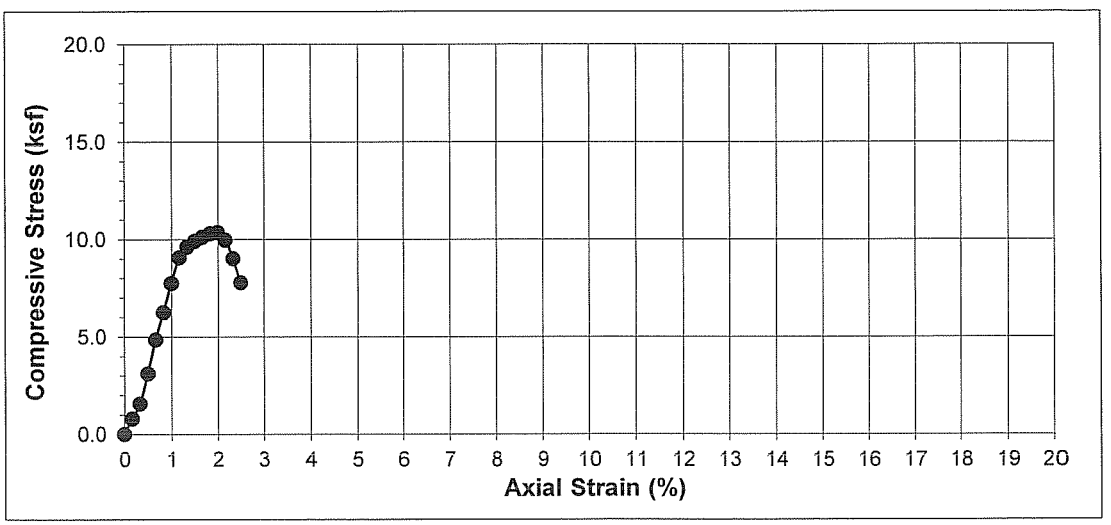


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
71	0.010	7.24	1.41	0.17
180	0.020	7.25	3.57	0.33
286	0.030	7.27	5.67	0.50
331	0.040	7.28	6.55	0.66
358	0.050	7.29	7.07	0.83
371	0.060	7.30	7.32	1.00
388	0.070	7.31	7.64	1.16
401	0.080	7.33	7.88	1.33
405	0.090	7.34	7.95	1.49
404	0.100	7.35	7.91	1.66
402	0.110	7.36	7.86	1.83
388	0.120	7.38	7.57	1.99
357	0.130	7.39	6.96	2.16
284	0.150	7.41	5.52	2.49
140	0.180	7.45	2.71	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	South Side of Bridge	Dry Density (pcf):	68.7
Sample No.:	S-2	Moisture Content (%):	53.2
Days Cured:	7	Test Date:	11/24/10
Sample Diameter (inch):	3.032	Wt. Wet Soil+Container(gms):	1353.79
Sample Hieght (inch):	6.017	Wt. Dry Soil+Container(gms):	937.49
Sample Weight (gms):	1200.25	Wt. Container (gms):	155.25

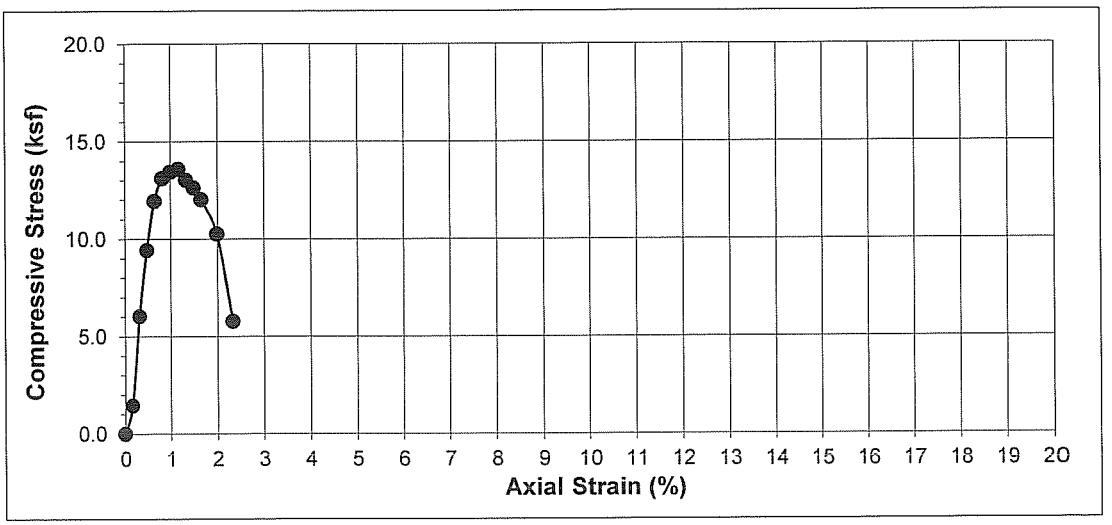


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
40	0.010	7.23	0.80	0.17
79	0.020	7.24	1.57	0.33
157	0.030	7.26	3.12	0.50
245	0.040	7.27	4.85	0.66
316	0.050	7.28	6.25	0.83
393	0.060	7.29	7.76	1.00
460	0.070	7.31	9.07	1.16
488	0.080	7.32	9.60	1.33
504	0.090	7.33	9.90	1.50
516	0.100	7.34	10.12	1.66
526	0.110	7.35	10.30	1.83
530	0.120	7.37	10.36	1.99
511	0.130	7.38	9.97	2.16
463	0.140	7.39	9.02	2.33
400	0.150	7.40	7.78	2.49

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	South Side of Bridge	Dry Density (pcf):	73.7
Sample No.:	S-2 (b)	Moisture Content (%):	43.7
Days Cured:	14	Test Date:	12/01/10
Sample Diameter (inch):	3.034	Wt. Wet Soil+Container(gms):	1356.71
Sample Hieght (inch):	6.027	Wt. Dry Soil+Container(gms):	989.71
Sample Weight (gms):	1211.58	Wt. Container (gms):	149.64



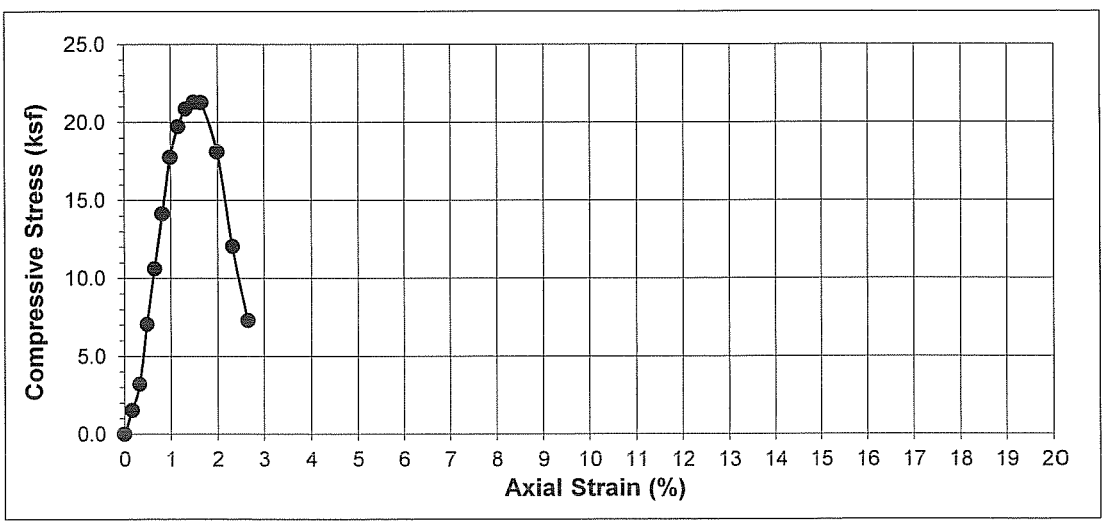
Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
73	0.010	7.24	1.45	0.17
304	0.020	7.25	6.03	0.33
476	0.030	7.27	9.43	0.50
604	0.040	7.28	11.95	0.66
664	0.050	7.29	13.12	0.83
682	0.060	7.30	13.45	1.00
690	0.070	7.31	13.58	1.16
663	0.080	7.33	13.03	1.33
644	0.090	7.34	12.64	1.49
614	0.100	7.35	12.03	1.66
526	0.120	7.38	10.27	1.99
297	0.140	7.40	5.78	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	South Side of Bridge	Dry Density (pcf):	76.0
Sample No.:	S-5	Moisture Content (%):	38.5
Days Cured:	28	Test Date:	12/15/10

Sample Diameter (inch):	3.037	Wt. Wet Soil+Container(gms):	1353.12
Sample Hieght (inch):	6.032	Wt. Dry Soil+Container(gms):	1019.36
Sample Weight (gms):	1207.46	Wt. Container (gms):	151.64

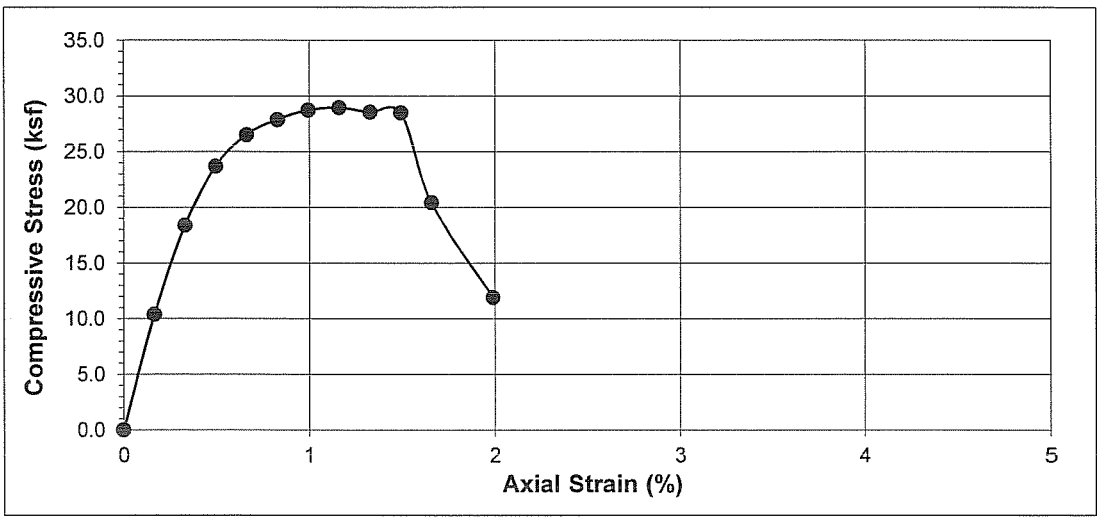


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
77	0.010	7.26	1.53	0.17
162	0.020	7.27	3.21	0.33
357	0.030	7.28	7.06	0.50
538	0.040	7.29	10.62	0.66
718	0.050	7.30	14.15	0.83
903	0.060	7.32	17.77	0.99
1005	0.070	7.33	19.75	1.16
1064	0.080	7.34	20.87	1.33
1088	0.090	7.35	21.31	1.49
1089	0.100	7.37	21.29	1.66
930	0.120	7.39	18.12	1.99
621	0.140	7.42	12.06	2.32
377	0.160	7.44	7.30	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	South Side of Bridge	Dry Density (pcf):	73.3
Sample No.:	S-7	Moisture Content (%):	44.1
Days Cured:	56	Test Date:	01/12/11
Sample Diameter (inch):	3.030	Wt. Wet Soil+Container(gms):	1394.13
Sample Hieght (inch):	6.036	Wt. Dry Soil+Container(gms):	1026.76
Sample Weight (gms):	1207.42	Wt. Container (gms):	193.96



Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
522	0.010	7.22	10.41	0.17
924	0.020	7.23	18.39	0.33
1193	0.030	7.25	23.71	0.50
1337	0.040	7.26	26.52	0.66
1408	0.050	7.27	27.89	0.83
1453	0.060	7.28	28.73	0.99
1467	0.070	7.30	28.96	1.16
1449	0.080	7.31	28.55	1.33
1449	0.090	7.32	28.51	1.49
1041	0.100	7.33	20.44	1.66
609	0.120	7.36	11.92	1.99

UNCONSOLIDATED UNDRAINED TRIAXIAL

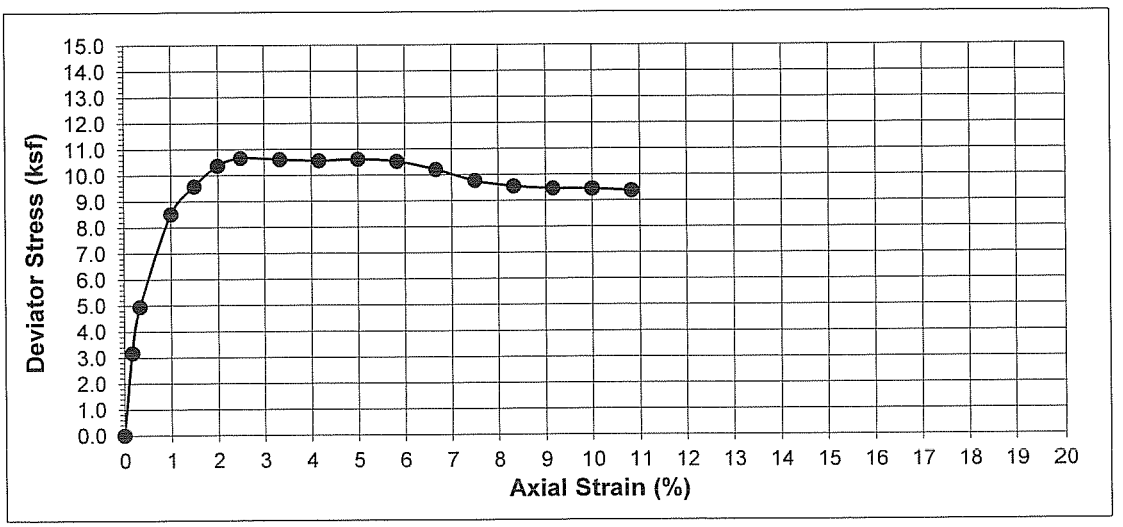
AT NORTH SIDE (PIER A)

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	North Side of Bridge	Dry Density (pcf):	72.4
Sample No.:	N-5	Moisture Content (%):	47.8
Days Cured:	7 Confining Pressure (psi): 13	Test Date:	11/26/10

Sample Diameter (inch):	3.039	Wt. Wet Soil+Container(gms):	1368.19
Sample Hieght (inch):	6.001	Wt. Dry Soil+Container(gms):	974
Sample Weight (gms):	1221.93	Wt. Container (gms):	148.95



Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
160	0.010	7.27	3.17	0.17
250	0.020	7.28	4.95	0.33
433	0.060	7.33	8.51	1.00
490	0.090	7.36	9.58	1.50
533	0.120	7.40	10.37	2.00
551	0.150	7.44	10.67	2.50
553	0.200	7.50	10.61	3.33
555	0.250	7.57	10.56	4.17
563	0.300	7.64	10.62	5.00
563	0.350	7.70	10.52	5.83
551	0.400	7.77	10.21	6.67
532	0.450	7.84	9.77	7.50
525	0.500	7.91	9.55	8.33
525	0.550	7.99	9.47	9.17
529	0.600	8.06	9.45	10.00
530	0.650	8.13	9.38	10.83

AP Engineering & Testing, Inc.

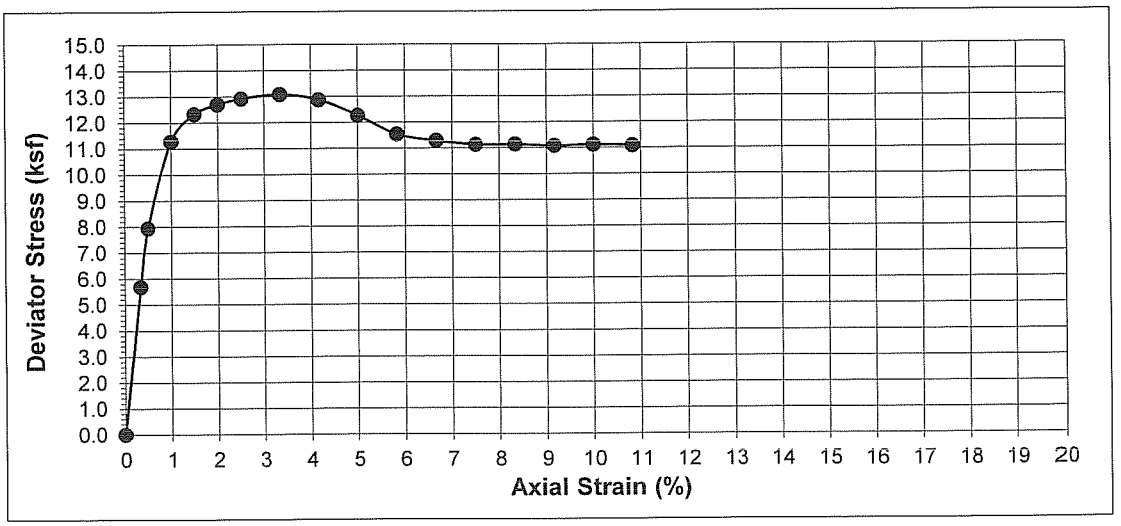
UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS

Project Name: Schuyler Heim Bridge
Project No.: 06-123
Mixture: North Side of Bridge
Sample No.: N-8
Days Cured: 14 Confining Pressure (psi): 15

Sample Type: Blend
Soil Description: Clay+15%Cement
Dry Density (pcf): 75.0
Moisture Content (%): 37.7
Test Date: 12/13/10

Sample Diameter (inch): 3.031
Sample Hieght (inch): 5.998
Sample Weight (gms): 1173.14

Wt. Wet Soil+Container(gms): 1317.49
Wt. Dry Soil+Container(gms): 997.69
Wt. Container (gms): 149.95

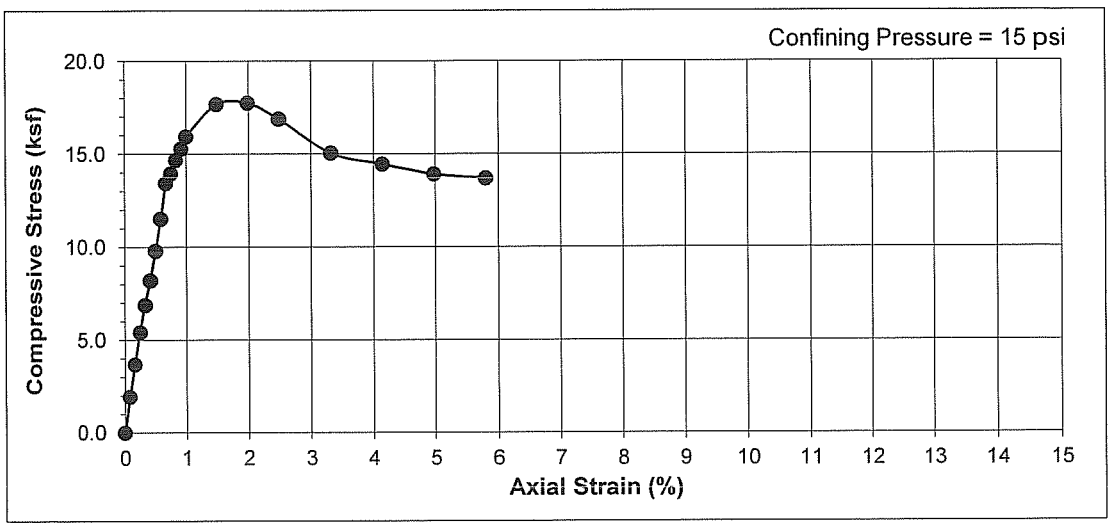


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
286	0.020	7.24	5.69	0.33
400	0.030	7.25	7.94	0.50
571	0.060	7.29	11.28	1.00
627	0.090	7.33	12.33	1.50
649	0.120	7.36	12.69	2.00
664	0.150	7.40	12.92	2.50
678	0.200	7.46	13.08	3.33
673	0.250	7.53	12.87	4.17
647	0.300	7.60	12.27	5.00
614	0.350	7.66	11.54	5.84
606	0.400	7.73	11.29	6.67
603	0.450	7.80	11.13	7.50
609	0.500	7.87	11.14	8.34
611	0.550	7.94	11.08	9.17
619	0.600	8.02	11.12	10.00
623	0.650	8.09	11.09	10.84

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	11/29/10
Boring No.:	North Side Blend 2	Cure Days:	28
Sample No.:	N-9 (b)	Test Date:	12/27/10
Soil Description:	Lean Clay (CL)	Dry Density (pcf):	65.8
Sample Type:	Soil-Cement	Moisture Content (%):	56.6
Sample Diameter (inches):	3.020	Wt. Wet Soil+Container(gms):	1317.19
Sample Height (inches):	6.032	Wt. Dry Soil+Container(gms):	895.29
Sample Weight (gms):	1168.80	Wt. Container (gms):	149.66

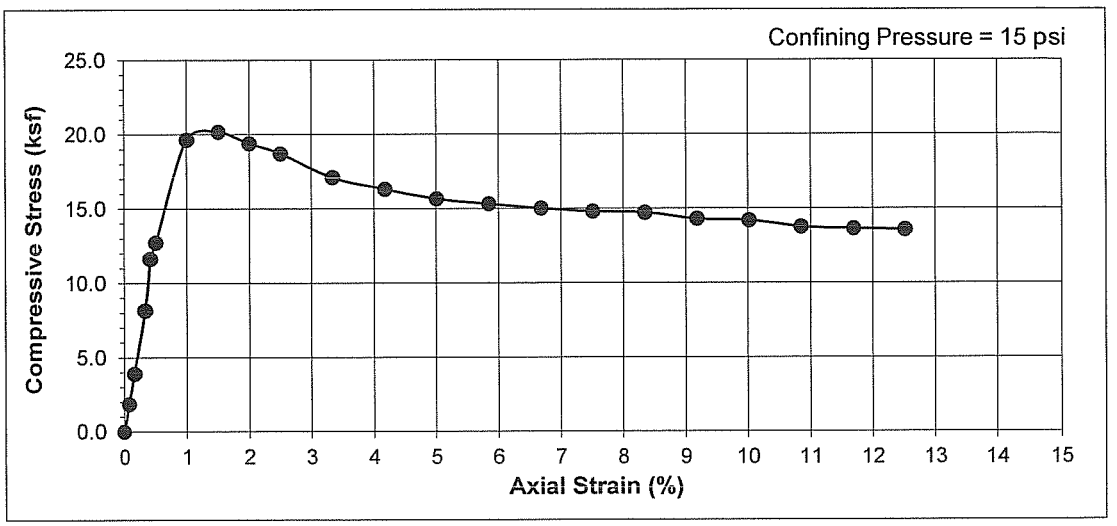


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.16	0.00	0.00
96	0.005	7.17	1.93	0.08
183	0.010	7.18	3.67	0.17
269	0.015	7.18	5.39	0.25
343	0.020	7.19	6.87	0.33
409	0.025	7.19	8.19	0.41
489	0.030	7.20	9.78	0.50
576	0.035	7.20	11.51	0.58
672	0.040	7.21	13.42	0.66
699	0.045	7.22	13.95	0.75
736	0.050	7.22	14.67	0.83
767	0.055	7.23	15.28	0.91
800	0.060	7.24	15.92	0.99
892	0.090	7.27	17.66	1.49
900	0.120	7.31	17.73	1.99
861	0.150	7.35	16.88	2.49
774	0.200	7.41	15.04	3.32
750	0.250	7.47	14.45	4.14
728	0.300	7.54	13.91	4.97
723	0.350	7.60	13.69	5.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	11/29/10
Boring No.:	North Side Blend 2	Cure Days:	56
Sample No.:	N-13	Test Date:	01/24/11
Soil Description:	Lean Clay (CL)	Dry Density (pcf):	70.2
Sample Type:	Soil-Cement	Moisture Content (%):	48.4
Sample Diameter (inches):	3.022	Wt. Wet Soil+Container(gms):	1361.2
Sample Height (inches):	5.987	Wt. Dry Soil+Container(gms):	979.34
Sample Weight (gms):	1175.15	Wt. Container (gms):	190.12

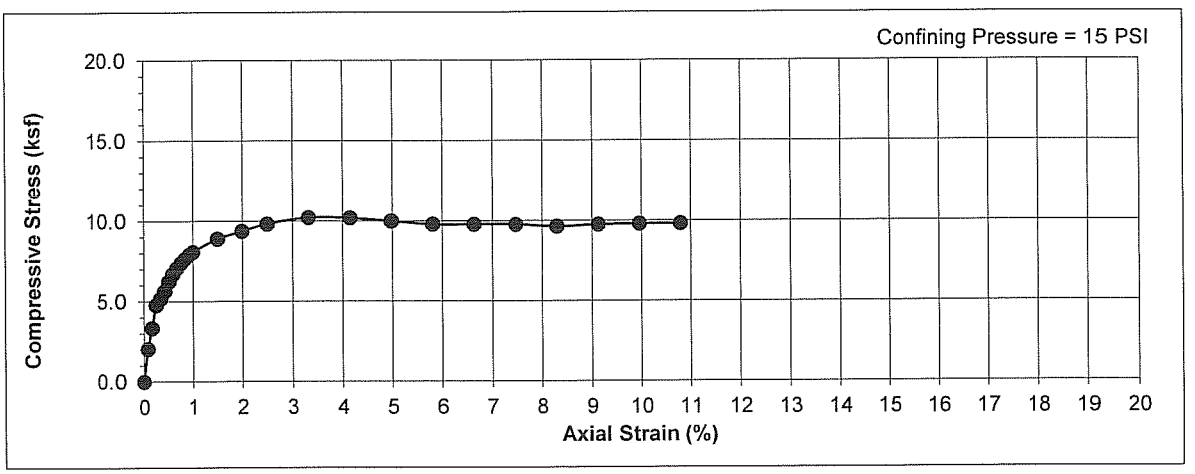


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.17	0.00	0.00
92	0.005	7.18	1.85	0.08
195	0.010	7.18	3.91	0.17
407	0.020	7.20	8.14	0.33
582	0.025	7.20	11.64	0.42
637	0.030	7.21	12.72	0.50
988	0.060	7.25	19.64	1.00
1020	0.090	7.28	20.17	1.50
986	0.120	7.32	19.40	2.00
956	0.150	7.36	18.71	2.51
881	0.200	7.42	17.10	3.34
848	0.250	7.49	16.31	4.18
821	0.300	7.55	15.66	5.01
810	0.350	7.62	15.31	5.85
801	0.400	7.69	15.01	6.68
797	0.450	7.76	14.80	7.52
800	0.500	7.83	14.72	8.35
784	0.550	7.90	14.29	9.19
786	0.600	7.97	14.20	10.02
769	0.650	8.05	13.76	10.86
769	0.700	8.12	13.63	11.69
772	0.750	8.20	13.56	12.53

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/30/10
Boring No.:	North Side Clay Blend	Cure Days:	7
Sample No.:	CB-2	Test Date:	01/06/11
Soil Description:	Clay	Dry Density (pcf):	65.7
Sample Type:	Soil-Cement	Moisture Content (%):	54.9
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1303.57
Sample Height (inches):	6.021	Wt. Dry Soil+Container(gms):	894.32
Sample Weight (gms):	1161.34	Wt. Container (gms):	149.24

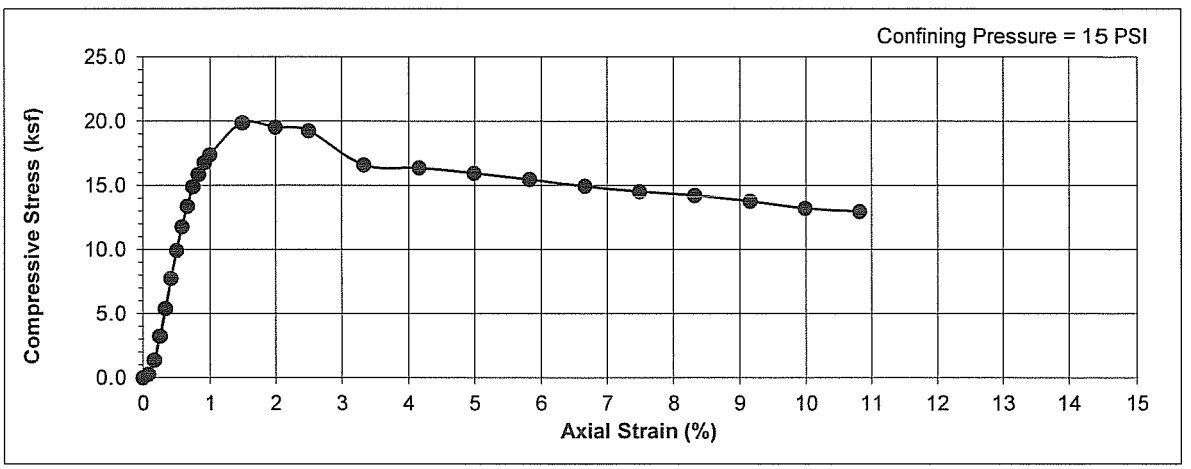


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
102	0.005	7.23	2.03	0.08
167	0.010	7.23	3.33	0.17
240	0.015	7.24	4.77	0.25
259	0.020	7.24	5.15	0.33
284	0.025	7.25	5.64	0.42
314	0.030	7.26	6.23	0.50
338	0.035	7.26	6.70	0.58
357	0.040	7.27	7.07	0.66
373	0.045	7.27	7.38	0.75
387	0.050	7.28	7.65	0.83
399	0.055	7.29	7.88	0.91
409	0.060	7.29	8.08	1.00
453	0.090	7.33	8.90	1.49
479	0.120	7.37	9.36	1.99
505	0.150	7.40	9.82	2.49
530	0.200	7.47	10.22	3.32
533	0.250	7.53	10.19	4.15
527	0.300	7.60	9.99	4.98
521	0.350	7.67	9.79	5.81
525	0.400	7.73	9.78	6.64
529	0.450	7.80	9.76	7.47
527	0.500	7.87	9.64	8.30
538	0.550	7.95	9.75	9.13
545	0.600	8.02	9.79	9.97
551	0.650	8.09	9.80	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/30/10
Boring No.:	North Side Clay Blend	Cure Days:	28
Sample No.:	CB-4	Test Date:	01/27/11
Soil Description:	Lean Clay (CL)	Dry Density (pcf):	65.7
Sample Type:	Soil-Cement	Moisture Content (%):	55.3
Sample Diameter (inches):	3.034	Wt. Wet Soil+Container(gms):	1352.5
Sample Height (inches):	6.008	Wt. Dry Soil+Container(gms):	939.25
Sample Weight (gms):	1163.21	Wt. Container (gms):	192.17



Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
13	0.005	7.24	0.26	0.08
69	0.010	7.24	1.37	0.17
163	0.015	7.25	3.24	0.25
271	0.020	7.25	5.38	0.33
390	0.025	7.26	7.74	0.42
500	0.030	7.27	9.91	0.50
594	0.035	7.27	11.76	0.58
676	0.040	7.28	13.37	0.67
753	0.045	7.28	14.89	0.75
802	0.050	7.29	15.84	0.83
849	0.055	7.30	16.76	0.92
881	0.060	7.30	17.37	1.00
1012	0.090	7.34	19.85	1.50
1000	0.120	7.38	19.52	2.00
991	0.150	7.41	19.25	2.50
862	0.200	7.48	16.60	3.33
857	0.250	7.54	16.36	4.16
843	0.300	7.61	15.95	4.99
824	0.350	7.68	15.46	5.83
803	0.400	7.75	14.93	6.66
788	0.450	7.82	14.52	7.49
779	0.500	7.89	14.22	8.32
761	0.550	7.96	13.77	9.15
737	0.600	8.03	13.21	9.99
730	0.650	8.11	12.97	10.82

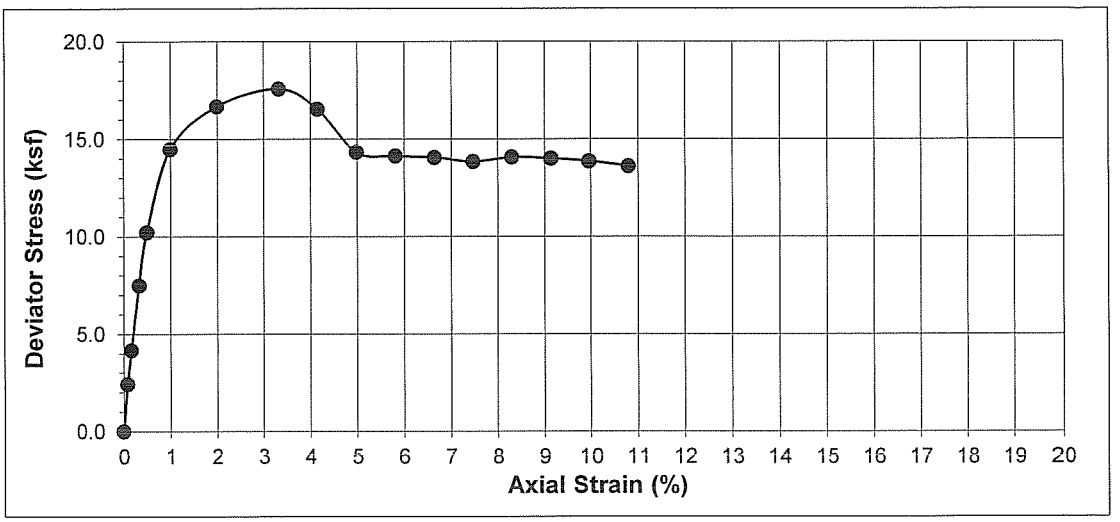
AT SOUTH SIDE (PIER S)

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	South Side of Bridge	Dry Density (pcf):	73.2
Sample No.:	S-4	Moisture Content (%):	43.1
Days Cured:	14 Confining Pressure (psi): 13	Test Date:	12/01/10

Sample Diameter (inch):	3.036	Wt. Wet Soil+Container(gms):	1372.72
Sample Hieght (inch):	6.023	Wt. Dry Soil+Container(gms):	1013.69
Sample Weight (gms):	1198.97	Wt. Container (gms):	179.80



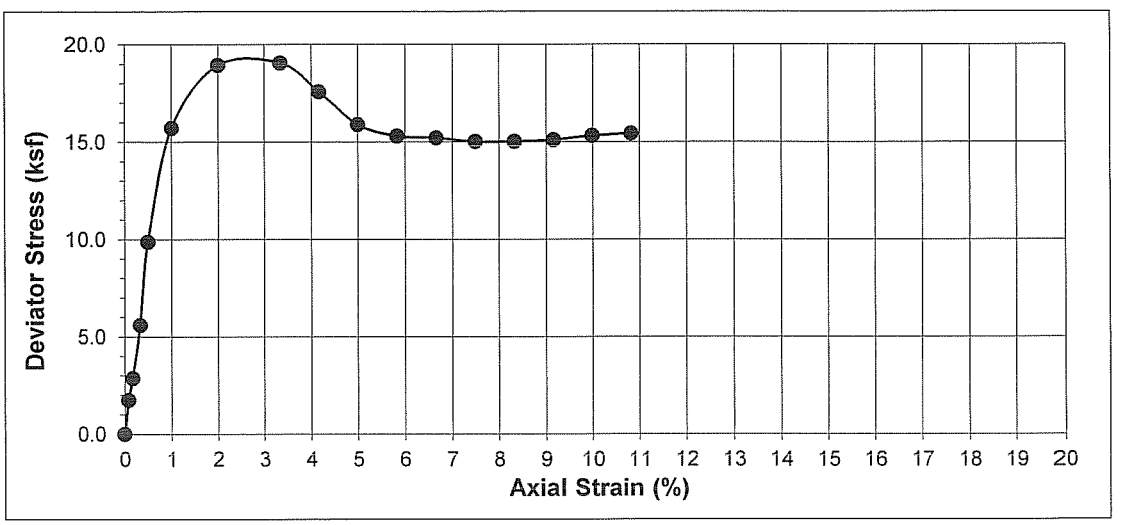
Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
122	0.005	7.25	2.42	0.08
210	0.010	7.25	4.17	0.17
378	0.020	7.26	7.49	0.33
516	0.030	7.28	10.21	0.50
735	0.060	7.31	14.47	1.00
855	0.120	7.39	16.67	1.99
914	0.200	7.49	17.58	3.32
867	0.250	7.55	16.53	4.15
758	0.300	7.62	14.33	4.98
754	0.350	7.69	14.13	5.81
757	0.400	7.75	14.06	6.64
752	0.450	7.82	13.84	7.47
771	0.500	7.89	14.06	8.30
775	0.550	7.97	14.01	9.13
774	0.600	8.04	13.86	9.96
767	0.650	8.12	13.61	10.79

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS

Project Name:	Schuyler Heim Bridge	Sample Type:	Blend
Project No.:	06-123	Soil Description:	Clay+15%Cement
Mixture:	South Side of Bridge	Dry Density (pcf):	77.9
Sample No.:	S-6	Moisture Content (%):	36.7
Days Cured:	28 Confining Pressure (psi): 15	Test Date:	12/15/10

Sample Diameter (inch):	3.025	Wt. Wet Soil+Container(gms):	1355.87
Sample Hieght (inch):	6.008	Wt. Dry Soil+Container(gms):	1032.2
Sample Weight (gms):	1206.97	Wt. Container (gms):	149.64



Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.19	0.00	0.00
87	0.005	7.19	1.74	0.08
143	0.010	7.20	2.86	0.17
280	0.020	7.21	5.59	0.33
495	0.030	7.22	9.87	0.50
792	0.060	7.26	15.71	1.00
964	0.120	7.33	18.93	2.00
984	0.200	7.43	19.06	3.33
915	0.250	7.50	17.57	4.16
835	0.300	7.56	15.90	4.99
811	0.350	7.63	15.30	5.83
813	0.400	7.70	15.21	6.66
810	0.450	7.77	15.01	7.49
818	0.500	7.84	15.03	8.32
830	0.550	7.91	15.11	9.15
849	0.600	7.98	15.31	9.99
864	0.650	8.06	15.44	10.82

SOIL-CEMENT-MIX (CSM) SAMPLES FROM SITE-SPECIFIC BORINGS

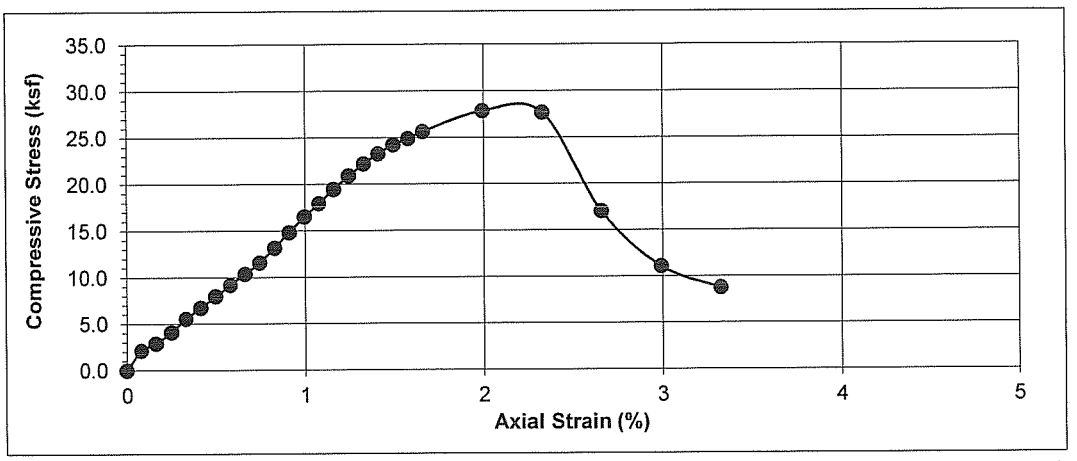
UNCONFINED COMPRESSION

AT NORTH SIDE (PIER A)

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	7
Sample No.:	B6-1	Test Date:	12/22/10
Soil Description:	Sandy Silt	Dry Density (pcf):	91.6
Sample Type:	Soil-Cement	Moisture Content (%):	26.8
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1509.97
Sample Height (inches):	6.017	Wt. Dry Soil+Container(gms):	1229.36
Sample Weight (gms):	1331.65	Wt. Container (gms):	182.73

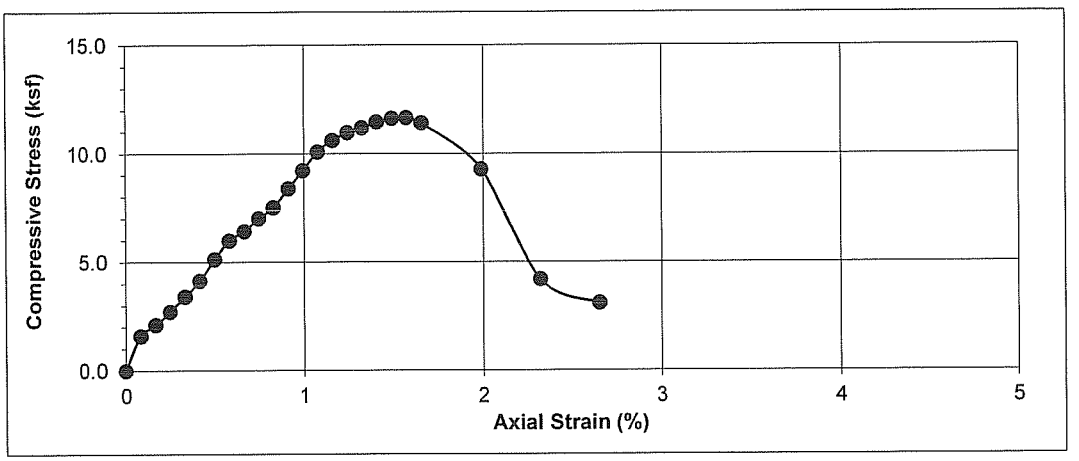


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
107	0.005	7.26	2.12	0.08
146	0.010	7.27	2.89	0.17
208	0.015	7.28	4.12	0.25
280	0.020	7.28	5.54	0.33
340	0.025	7.29	6.72	0.42
403	0.030	7.29	7.96	0.50
466	0.035	7.30	9.19	0.58
525	0.040	7.31	10.35	0.66
588	0.045	7.31	11.58	0.75
668	0.050	7.32	13.14	0.83
754	0.055	7.33	14.82	0.91
840	0.060	7.33	16.50	1.00
913	0.065	7.34	17.92	1.08
991	0.070	7.34	19.43	1.16
1066	0.075	7.35	20.88	1.25
1132	0.080	7.36	22.16	1.33
1189	0.085	7.36	23.26	1.41
1238	0.090	7.37	24.19	1.50
1274	0.095	7.37	24.88	1.58
1313	0.100	7.38	25.62	1.66
1432	0.120	7.41	27.84	1.99
1427	0.140	7.43	27.65	2.33
881	0.160	7.46	17.01	2.66
575	0.180	7.48	11.07	2.99
457	0.200	7.51	8.77	3.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	7
Sample No.:	B6-2	Test Date:	12/22/10
Soil Description:	Sandy Silt	Dry Density (pcf):	88.0
Sample Type:	Soil-Cement	Moisture Content (%):	32.4
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1526.99
Sample Height (inches):	6.032	Wt. Dry Soil+Container(gms):	1200.7
Sample Weight (gms):	1335.78	Wt. Container (gms):	194.06

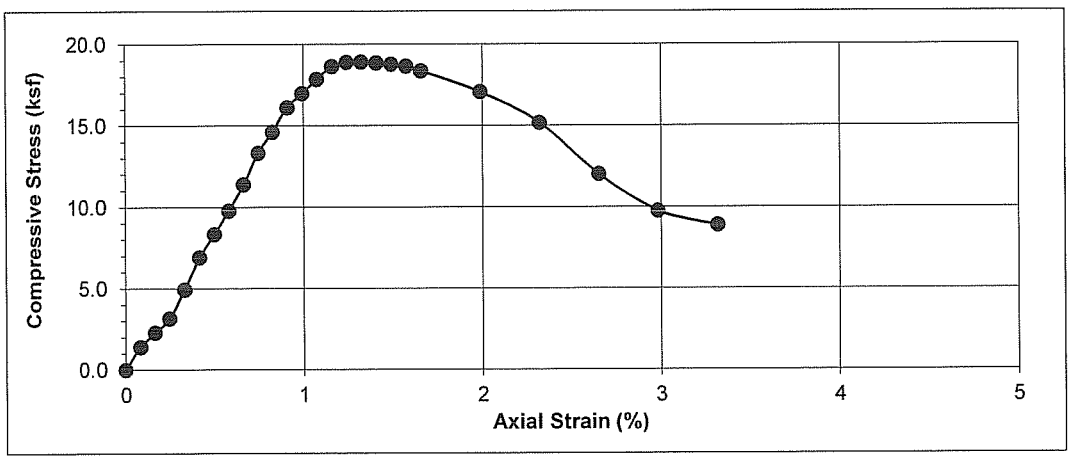


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
80	0.005	7.25	1.59	0.08
106	0.010	7.25	2.11	0.17
137	0.015	7.26	2.72	0.25
172	0.020	7.26	3.41	0.33
209	0.025	7.27	4.14	0.41
259	0.030	7.28	5.13	0.50
303	0.035	7.28	5.99	0.58
325	0.040	7.29	6.42	0.66
355	0.045	7.29	7.01	0.75
381	0.050	7.30	7.52	0.83
426	0.055	7.31	8.40	0.91
468	0.060	7.31	9.22	0.99
512	0.065	7.32	10.07	1.08
540	0.070	7.32	10.62	1.16
558	0.075	7.33	10.96	1.24
570	0.080	7.34	11.19	1.33
584	0.085	7.34	11.45	1.41
593	0.090	7.35	11.62	1.49
595	0.095	7.36	11.65	1.57
583	0.100	7.36	11.40	1.66
476	0.120	7.39	9.28	1.99
216	0.140	7.41	4.20	2.32
160	0.160	7.44	3.10	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	14
Sample No.:	B6-4	Test Date:	12/29/10
Soil Description:	Sandy Silt	Dry Density (pcf):	90.4
Sample Type:	Soil-Cement	Moisture Content (%):	28.3
Sample Diameter (inches):	3.039	Wt. Wet Soil+Container(gms):	1519.84
Sample Height (inches):	6.036	Wt. Dry Soil+Container(gms):	1226.93
Sample Weight (gms):	1333.28	Wt. Container (gms):	192.61

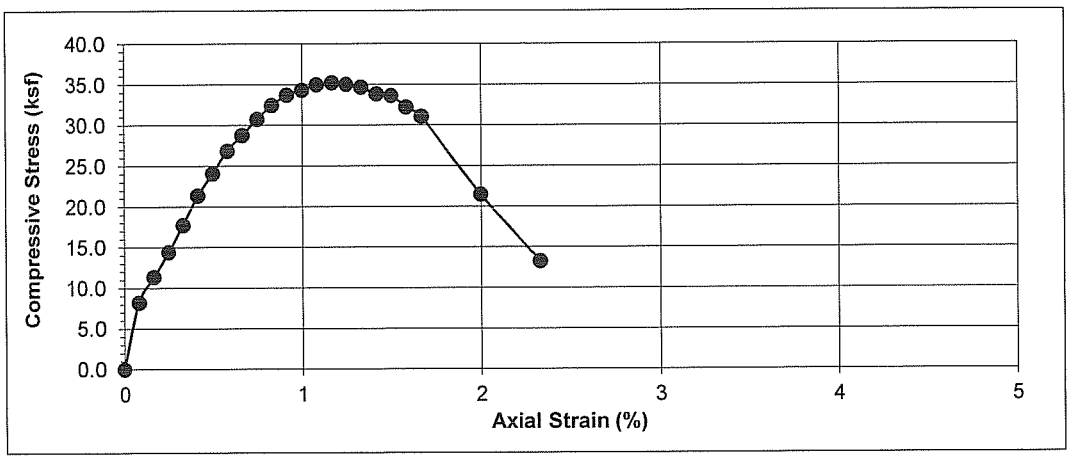


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
70	0.005	7.26	1.39	0.08
115	0.010	7.27	2.28	0.17
159	0.015	7.27	3.15	0.25
249	0.020	7.28	4.93	0.33
349	0.025	7.28	6.90	0.41
421	0.030	7.29	8.32	0.50
495	0.035	7.30	9.77	0.58
577	0.040	7.30	11.38	0.66
676	0.045	7.31	13.32	0.75
742	0.050	7.31	14.61	0.83
819	0.055	7.32	16.11	0.91
863	0.060	7.33	16.96	0.99
908	0.065	7.33	17.83	1.08
949	0.070	7.34	18.62	1.16
963	0.075	7.34	18.88	1.24
965	0.080	7.35	18.90	1.33
963	0.085	7.36	18.85	1.41
960	0.090	7.36	18.77	1.49
954	0.095	7.37	18.64	1.57
940	0.100	7.38	18.35	1.66
877	0.120	7.40	17.06	1.99
783	0.140	7.43	15.18	2.32
622	0.160	7.45	12.02	2.65
506	0.180	7.48	9.75	2.98
462	0.200	7.50	8.87	3.31

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	28
Sample No.:	B6-5	Test Date:	01/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	94.1
Sample Type:	Soil-Cement	Moisture Content (%):	25.5
Sample Diameter (inches):	3.025	Wt. Wet Soil+Container(gms):	1523.44
Sample Height (inches):	6.007	Wt. Dry Soil+Container(gms):	1253.5
Sample Weight (gms):	1338.17	Wt. Container (gms):	192.94

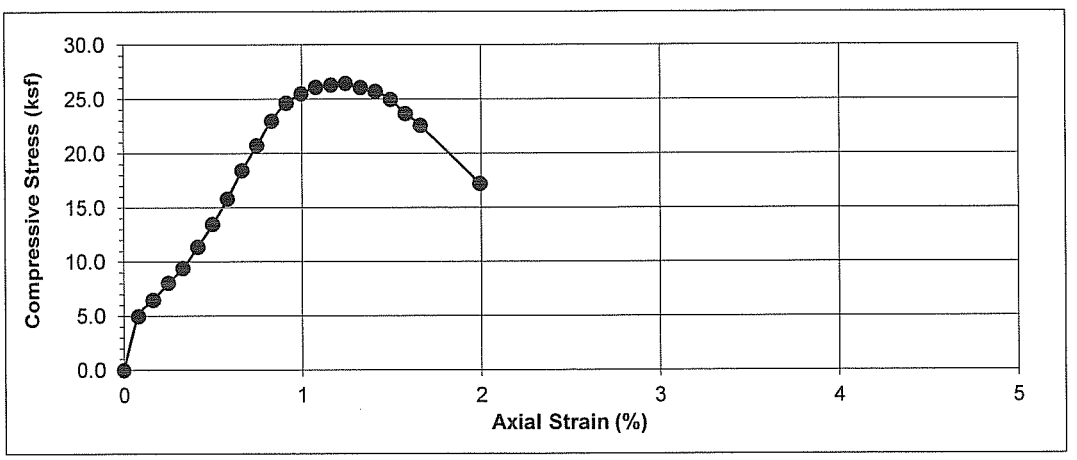


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.19	0.00	0.00
410	0.005	7.19	8.21	0.08
567	0.010	7.20	11.34	0.17
720	0.015	7.20	14.39	0.25
887	0.020	7.21	17.71	0.33
1070	0.025	7.22	21.35	0.42
1207	0.030	7.22	24.06	0.50
1348	0.035	7.23	26.85	0.58
1445	0.040	7.24	28.76	0.67
1547	0.045	7.24	30.76	0.75
1632	0.050	7.25	32.43	0.83
1697	0.055	7.25	33.69	0.92
1729	0.060	7.26	34.30	1.00
1764	0.065	7.27	34.96	1.08
1777	0.070	7.27	35.19	1.17
1769	0.075	7.28	35.00	1.25
1753	0.080	7.28	34.66	1.33
1713	0.085	7.29	33.84	1.42
1703	0.090	7.30	33.61	1.50
1634	0.095	7.30	32.22	1.58
1576	0.100	7.31	31.05	1.66
1094	0.120	7.33	21.48	2.00
677	0.140	7.36	13.25	2.33

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	28
Sample No.:	B6-6	Test Date:	01/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	92.9
Sample Type:	Soil-Cement	Moisture Content (%):	26.6
Sample Diameter (inches):	3.028	Wt. Wet Soil+Container(gms):	1526.27
Sample Height (inches):	6.018	Wt. Dry Soil+Container(gms):	1246.91
Sample Weight (gms):	1337.75	Wt. Container (gms):	195.54

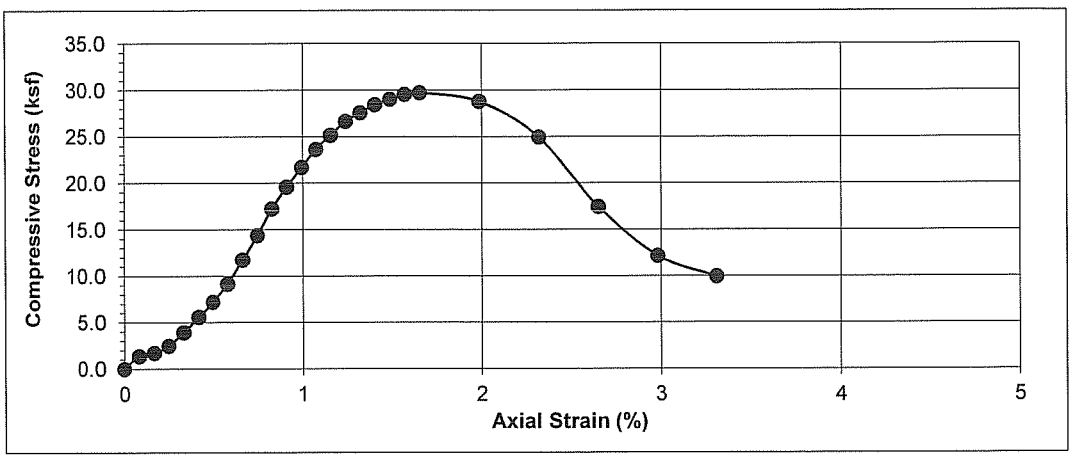


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.20	0.00	0.00
249	0.005	7.21	4.98	0.08
324	0.010	7.21	6.47	0.17
403	0.015	7.22	8.04	0.25
472	0.020	7.23	9.41	0.33
571	0.025	7.23	11.37	0.42
676	0.030	7.24	13.45	0.50
795	0.035	7.24	15.80	0.58
927	0.040	7.25	18.41	0.66
1044	0.045	7.26	20.72	0.75
1159	0.050	7.26	22.98	0.83
1243	0.055	7.27	24.63	0.91
1288	0.060	7.27	25.50	1.00
1319	0.065	7.28	26.09	1.08
1330	0.070	7.29	26.29	1.16
1339	0.075	7.29	26.44	1.25
1320	0.080	7.30	26.04	1.33
1304	0.085	7.30	25.71	1.41
1267	0.090	7.31	24.96	1.50
1201	0.095	7.32	23.64	1.58
1147	0.100	7.32	22.56	1.66
877	0.120	7.35	17.19	1.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	7
Sample No.:	B6-11	Test Date:	12/22/10
Soil Description:	Sandy Silt	Dry Density (pcf):	87.3
Sample Type:	Soil-Cement	Moisture Content (%):	32.6
Sample Diameter (inches):	3.045	Wt. Wet Soil+Container(gms):	1489.88
Sample Height (inches):	6.039	Wt. Dry Soil+Container(gms):	1162.42
Sample Weight (gms):	1336.44	Wt. Container (gms):	156.52

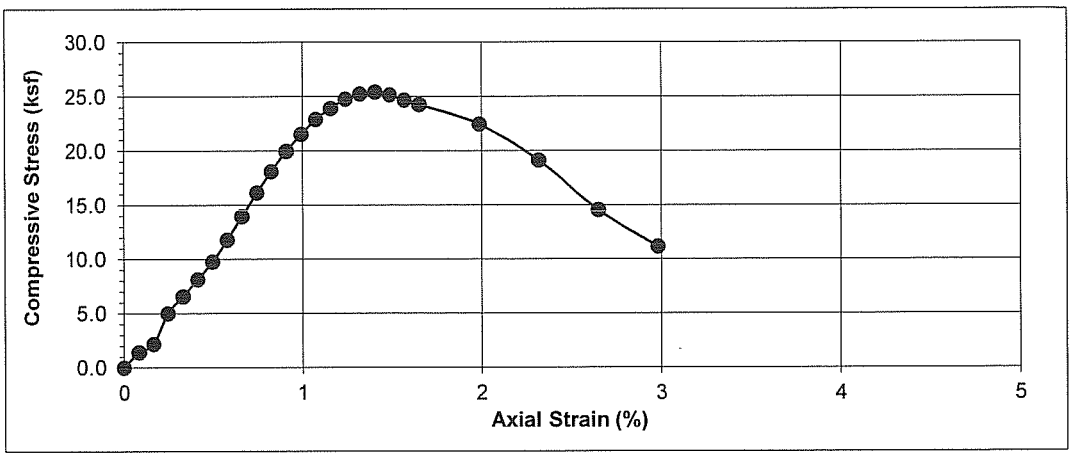


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.28	0.00	0.00
69	0.005	7.29	1.36	0.08
87	0.010	7.29	1.72	0.17
126	0.015	7.30	2.49	0.25
199	0.020	7.31	3.92	0.33
283	0.025	7.31	5.57	0.41
366	0.030	7.32	7.20	0.50
465	0.035	7.32	9.14	0.58
598	0.040	7.33	11.75	0.66
731	0.045	7.34	14.35	0.75
878	0.050	7.34	17.22	0.83
999	0.055	7.35	19.57	0.91
1108	0.060	7.36	21.69	0.99
1207	0.065	7.36	23.61	1.08
1287	0.070	7.37	25.15	1.16
1363	0.075	7.37	26.62	1.24
1413	0.080	7.38	27.57	1.32
1457	0.085	7.39	28.41	1.41
1490	0.090	7.39	29.02	1.49
1518	0.095	7.40	29.54	1.57
1527	0.100	7.40	29.70	1.66
1484	0.120	7.43	28.76	1.99
1291	0.140	7.46	24.94	2.32
906	0.160	7.48	17.44	2.65
634	0.180	7.51	12.16	2.98
520	0.200	7.53	9.94	3.31

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	7
Sample No.:	B6-12	Test Date:	12/22/10
Soil Description:	Sandy Silt	Dry Density (pcf):	90.8
Sample Type:	Soil-Cement	Moisture Content (%):	27.6
Sample Diameter (inches):	3.043	Wt. Wet Soil+Container(gms):	1524.29
Sample Height (inches):	6.036	Wt. Dry Soil+Container(gms):	1236.28
Sample Weight (gms):	1335.30	Wt. Container (gms):	194.54

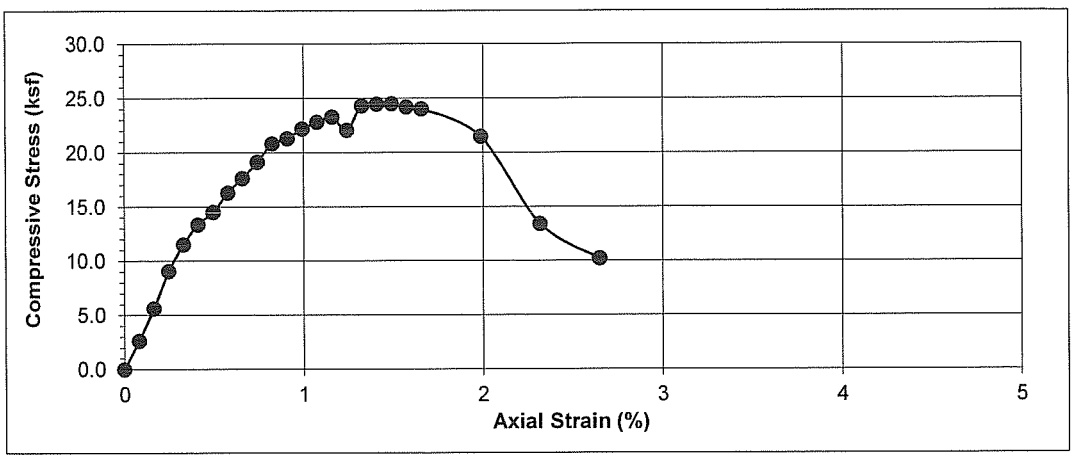


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
71	0.005	7.28	1.40	0.08
111	0.010	7.28	2.19	0.17
253	0.015	7.29	5.00	0.25
333	0.020	7.30	6.57	0.33
413	0.025	7.30	8.14	0.41
495	0.030	7.31	9.75	0.50
598	0.035	7.32	11.77	0.58
708	0.040	7.32	13.93	0.66
820	0.045	7.33	16.12	0.75
921	0.050	7.33	18.08	0.83
1017	0.055	7.34	19.95	0.91
1097	0.060	7.35	21.50	0.99
1168	0.065	7.35	22.88	1.08
1221	0.070	7.36	23.90	1.16
1266	0.075	7.36	24.76	1.24
1291	0.080	7.37	25.22	1.33
1301	0.085	7.38	25.40	1.41
1288	0.090	7.38	25.12	1.49
1266	0.095	7.39	24.67	1.57
1245	0.100	7.40	24.24	1.66
1156	0.120	7.42	22.43	1.99
988	0.140	7.45	19.11	2.32
754	0.160	7.47	14.53	2.65
580	0.180	7.50	11.14	2.98

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	14
Sample No.:	B6-14	Test Date:	12/29/10
Soil Description:	Sandy Silt	Dry Density (pcf):	90.0
Sample Type:	Soil-Cement	Moisture Content (%):	28.9
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1523.76
Sample Height (inches):	6.035	Wt. Dry Soil+Container(gms):	1225.88
Sample Weight (gms):	1333.55	Wt. Container (gms):	194.50

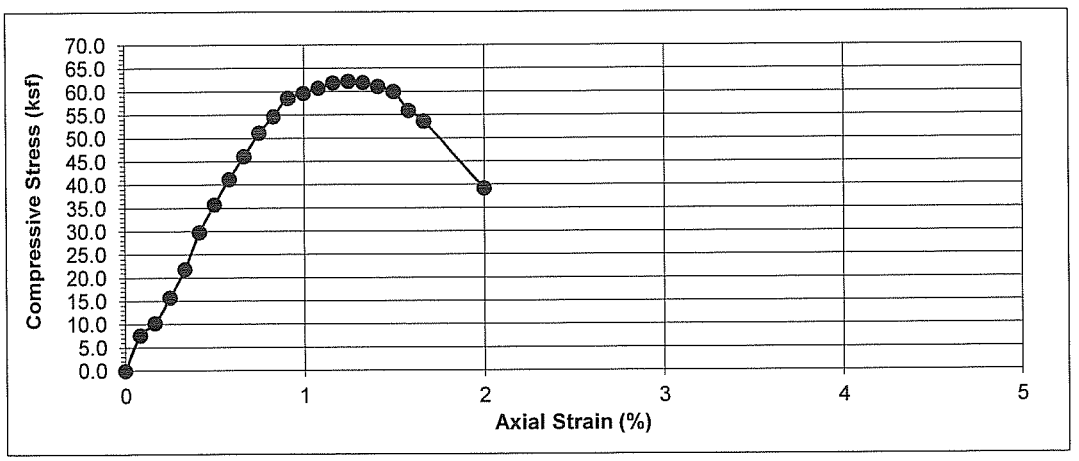


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
132	0.005	7.26	2.62	0.08
284	0.010	7.27	5.63	0.17
457	0.015	7.28	9.04	0.25
582	0.020	7.28	11.51	0.33
676	0.025	7.29	13.36	0.41
734	0.030	7.29	14.49	0.50
826	0.035	7.30	16.29	0.58
893	0.040	7.31	17.60	0.66
971	0.045	7.31	19.12	0.75
1057	0.050	7.32	20.80	0.83
1083	0.055	7.33	21.29	0.91
1129	0.060	7.33	22.18	0.99
1161	0.065	7.34	22.79	1.08
1187	0.070	7.34	23.28	1.16
1126	0.075	7.35	22.06	1.24
1242	0.080	7.36	24.31	1.33
1250	0.085	7.36	24.45	1.41
1253	0.090	7.37	24.49	1.49
1238	0.095	7.37	24.17	1.57
1231	0.100	7.38	24.02	1.66
1103	0.120	7.41	21.45	1.99
692	0.140	7.43	13.41	2.32
529	0.160	7.46	10.22	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	28
Sample No.:	B6-15	Test Date:	01/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	92.4
Sample Type:	Soil-Cement	Moisture Content (%):	28.1
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1525.78
Sample Height (inches):	6.004	Wt. Dry Soil+Container(gms):	1233.42
Sample Weight (gms):	1345.06	Wt. Container (gms):	194.12

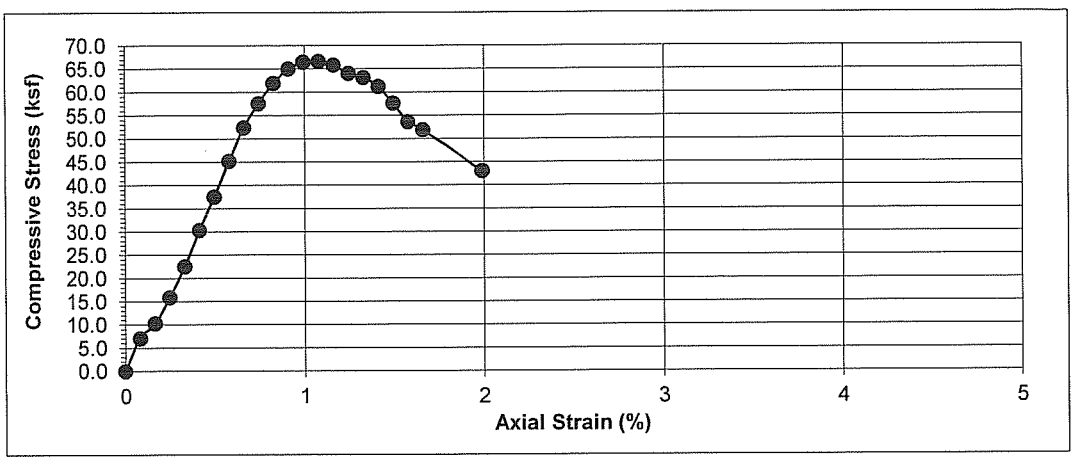


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
380	0.005	7.22	7.58	0.08
512	0.010	7.22	10.21	0.17
789	0.015	7.23	15.72	0.25
1097	0.020	7.23	21.83	0.33
1495	0.025	7.24	29.73	0.42
1797	0.030	7.25	35.71	0.50
2074	0.035	7.25	41.18	0.58
2322	0.040	7.26	46.06	0.67
2577	0.045	7.27	51.08	0.75
2760	0.050	7.27	54.66	0.83
2960	0.055	7.28	58.57	0.92
3014	0.060	7.28	59.59	1.00
3074	0.065	7.29	60.72	1.08
3132	0.070	7.30	61.82	1.17
3153	0.075	7.30	62.18	1.25
3140	0.080	7.31	61.87	1.33
3103	0.085	7.31	61.09	1.42
3048	0.090	7.32	59.96	1.50
2844	0.095	7.33	55.90	1.58
2731	0.100	7.33	53.63	1.67
1999	0.120	7.36	39.12	2.00

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	28
Sample No.:	B6-16	Test Date:	01/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	95.9
Sample Type:	Soil-Cement	Moisture Content (%):	22.9
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1530.09
Sample Height (inches):	6.031	Wt. Dry Soil+Container(gms):	1279.96
Sample Weight (gms):	1347.12	Wt. Container (gms):	188.33

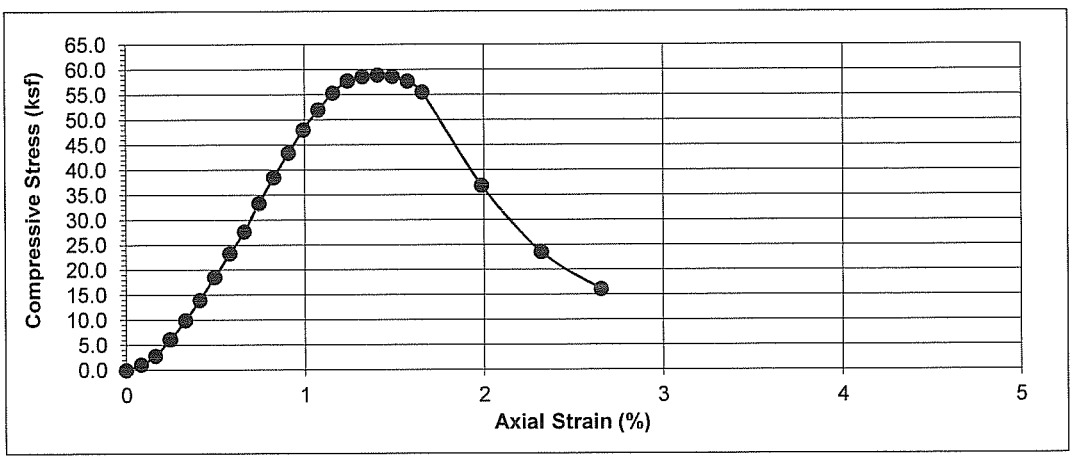


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
354	0.005	7.23	7.05	0.08
515	0.010	7.23	10.25	0.17
799	0.015	7.24	15.90	0.25
1133	0.020	7.24	22.52	0.33
1526	0.025	7.25	30.31	0.41
1888	0.030	7.26	37.47	0.50
2277	0.035	7.26	45.15	0.58
2641	0.040	7.27	52.32	0.66
2908	0.045	7.27	57.56	0.75
3128	0.050	7.28	61.87	0.83
3289	0.055	7.29	65.00	0.91
3366	0.060	7.29	66.46	0.99
3375	0.065	7.30	66.59	1.08
3338	0.070	7.30	65.80	1.16
3251	0.075	7.31	64.03	1.24
3209	0.080	7.32	63.15	1.33
3113	0.085	7.32	61.21	1.41
2931	0.090	7.33	57.58	1.49
2730	0.095	7.34	53.59	1.58
2644	0.100	7.34	51.86	1.66
2200	0.120	7.37	43.00	1.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	56
Sample No.:	B6-19	Test Date:	02/09/11
Soil Description:	Sandy Silt	Dry Density (pcf):	92.3
Sample Type:	Soil-Cement	Moisture Content (%):	26.9
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1494.15
Sample Height (inches):	6.037	Wt. Dry Soil+Container(gms):	1209.8
Sample Weight (gms):	1343.76	Wt. Container (gms):	151.54

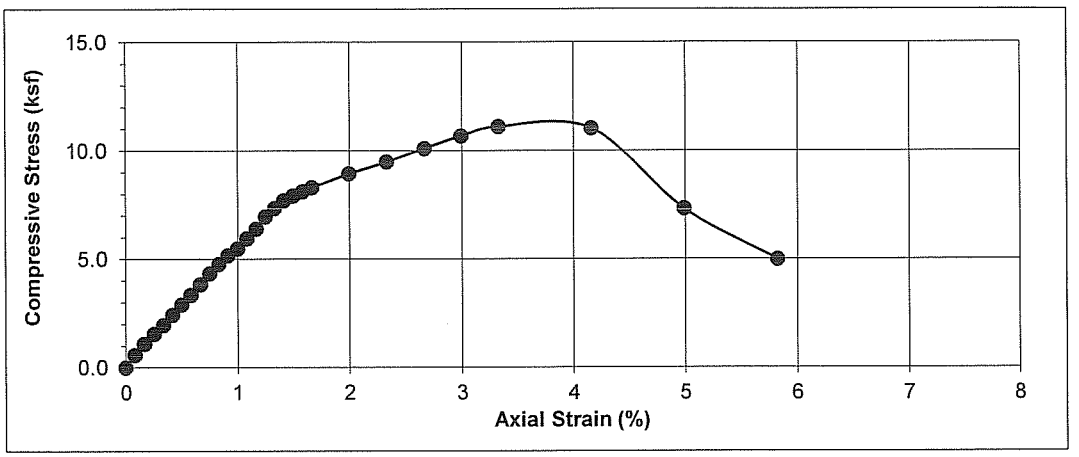


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
53	0.005	7.25	1.05	0.08
142	0.010	7.25	2.82	0.17
308	0.015	7.26	6.11	0.25
499	0.020	7.26	9.89	0.33
706	0.025	7.27	13.99	0.41
936	0.030	7.28	18.53	0.50
1176	0.035	7.28	23.26	0.58
1399	0.040	7.29	27.64	0.66
1685	0.045	7.29	33.27	0.75
1950	0.050	7.30	38.47	0.83
2200	0.055	7.31	43.36	0.91
2437	0.060	7.31	47.99	0.99
2640	0.065	7.32	51.95	1.08
2811	0.070	7.32	55.27	1.16
2939	0.075	7.33	57.73	1.24
2982	0.080	7.34	58.53	1.33
3001	0.085	7.34	58.85	1.41
2991	0.090	7.35	58.61	1.49
2945	0.095	7.36	57.66	1.57
2836	0.100	7.36	55.48	1.66
1888	0.120	7.39	36.81	1.99
1210	0.140	7.41	23.51	2.32
830	0.160	7.44	16.07	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	10
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	7
Sample No.:	B6-21	Test Date:	12/22/10
Soil Description:	Sandy Silt	Dry Density (pcf):	88.2
Sample Type:	Soil-Cement	Moisture Content (%):	31.0
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1506.2
Sample Height (inches):	6.012	Wt. Dry Soil+Container(gms):	1196.11
Sample Weight (gms):	1319.24	Wt. Container (gms):	194.41

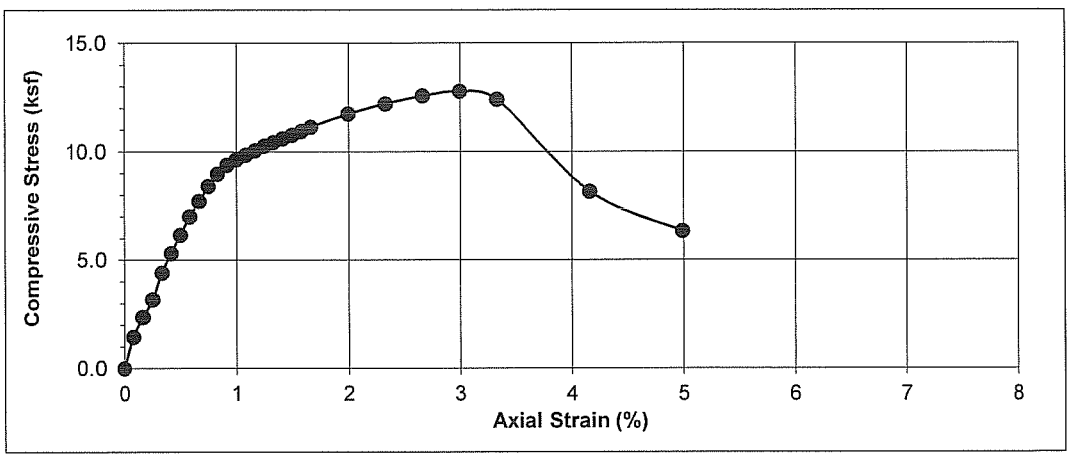


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
29	0.005	7.24	0.58	0.08
55	0.010	7.25	1.09	0.17
78	0.015	7.25	1.55	0.25
98	0.020	7.26	1.94	0.33
122	0.025	7.26	2.42	0.42
146	0.030	7.27	2.89	0.50
169	0.035	7.28	3.34	0.58
194	0.040	7.28	3.84	0.67
219	0.045	7.29	4.33	0.75
241	0.050	7.30	4.76	0.83
262	0.055	7.30	5.17	0.91
278	0.060	7.31	5.48	1.00
302	0.065	7.31	5.95	1.08
325	0.070	7.32	6.39	1.16
354	0.075	7.33	6.96	1.25
374	0.080	7.33	7.35	1.33
392	0.085	7.34	7.69	1.41
404	0.090	7.34	7.92	1.50
414	0.095	7.35	8.11	1.58
424	0.100	7.36	8.30	1.66
458	0.120	7.38	8.93	2.00
488	0.140	7.41	9.49	2.33
521	0.160	7.43	10.09	2.66
553	0.180	7.46	10.68	2.99
577	0.200	7.48	11.10	3.33
578	0.250	7.55	11.03	4.16
387	0.300	7.61	7.32	4.99
266	0.350	7.68	4.99	5.82

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	10
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	14
Sample No.:	B6-22	Test Date:	12/29/10
Soil Description:	Sandy Silt	Dry Density (pcf):	88.1
Sample Type:	Soil-Cement	Moisture Content (%):	31.3
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1473.89
Sample Height (inches):	6.010	Wt. Dry Soil+Container(gms):	1160.1
Sample Weight (gms):	1321.43	Wt. Container (gms):	156.83

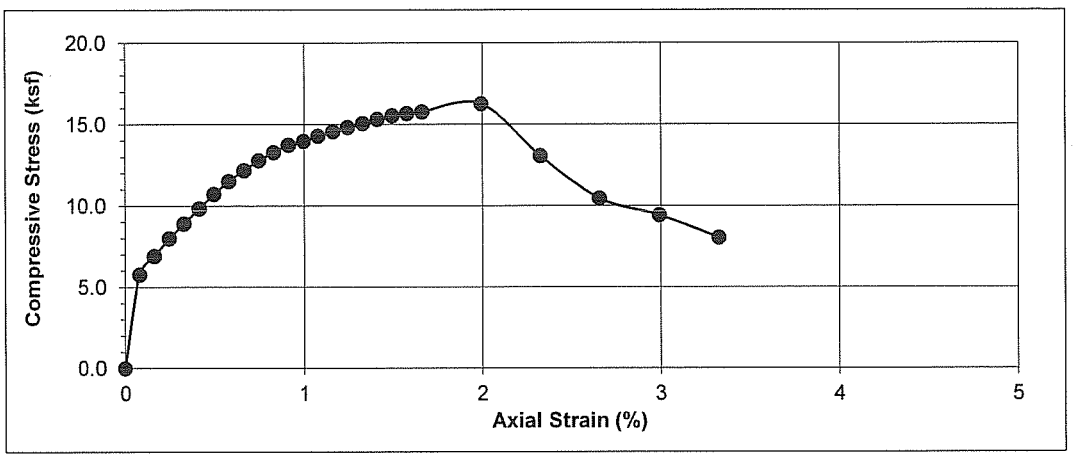


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
73	0.005	7.25	1.45	0.08
119	0.010	7.25	2.36	0.17
160	0.015	7.26	3.17	0.25
222	0.020	7.26	4.40	0.33
268	0.025	7.27	5.31	0.42
311	0.030	7.28	6.16	0.50
354	0.035	7.28	7.00	0.58
390	0.040	7.29	7.71	0.67
426	0.045	7.29	8.41	0.75
455	0.050	7.30	8.98	0.83
476	0.055	7.31	9.38	0.92
489	0.060	7.31	9.63	1.00
500	0.065	7.32	9.84	1.08
511	0.070	7.32	10.05	1.16
522	0.075	7.33	10.25	1.25
531	0.080	7.34	10.42	1.33
540	0.085	7.34	10.59	1.41
549	0.090	7.35	10.76	1.50
559	0.095	7.36	10.94	1.58
569	0.100	7.36	11.13	1.66
602	0.120	7.39	11.74	2.00
628	0.140	7.41	12.20	2.33
649	0.160	7.44	12.57	2.66
662	0.180	7.46	12.77	3.00
645	0.200	7.49	12.40	3.33
428	0.250	7.55	8.16	4.16
335	0.300	7.62	6.33	4.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	10
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	28
Sample No.:	B6-23	Test Date:	01/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	90.8
Sample Type:	Soil-Cement	Moisture Content (%):	28.3
Sample Diameter (inches):	3.024	Wt. Wet Soil+Container(gms):	1489.62
Sample Height (inches):	6.017	Wt. Dry Soil+Container(gms):	1201.16
Sample Weight (gms):	1322.39	Wt. Container (gms):	182.36

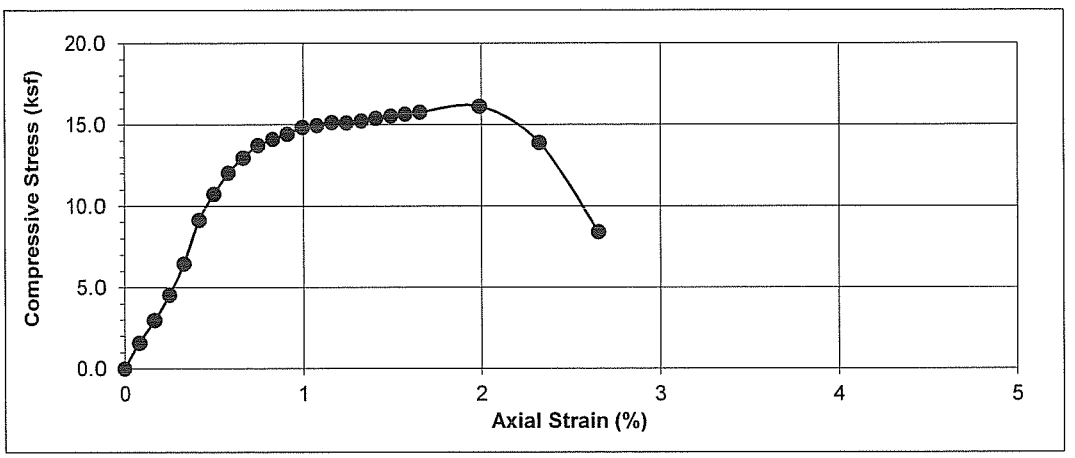


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.18	0.00	0.00
287	0.005	7.19	5.75	0.08
345	0.010	7.19	6.91	0.17
399	0.015	7.20	7.98	0.25
445	0.020	7.21	8.89	0.33
492	0.025	7.21	9.82	0.42
537	0.030	7.22	10.71	0.50
577	0.035	7.22	11.50	0.58
611	0.040	7.23	12.17	0.66
643	0.045	7.24	12.80	0.75
668	0.050	7.24	13.28	0.83
691	0.055	7.25	13.73	0.91
704	0.060	7.25	13.97	1.00
720	0.065	7.26	14.28	1.08
735	0.070	7.27	14.57	1.16
748	0.075	7.27	14.81	1.25
761	0.080	7.28	15.05	1.33
775	0.085	7.29	15.32	1.41
786	0.090	7.29	15.52	1.50
794	0.095	7.30	15.67	1.58
800	0.100	7.30	15.77	1.66
828	0.120	7.33	16.27	1.99
667	0.140	7.35	13.06	2.33
535	0.160	7.38	10.44	2.66
484	0.180	7.40	9.41	2.99
414	0.200	7.43	8.02	3.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	10
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	56
Sample No.:	B6-24	Test Date:	02/09/11
Soil Description:	Sandy Silt	Dry Density (pcf):	89.2
Sample Type:	Soil-Cement	Moisture Content (%):	30.3
Sample Diameter (inches):	3.033	Wt. Wet Soil+Container(gms):	1522.02
Sample Height (inches):	6.026	Wt. Dry Soil+Container(gms):	1213.25
Sample Weight (gms):	1329.08	Wt. Container (gms):	194.02

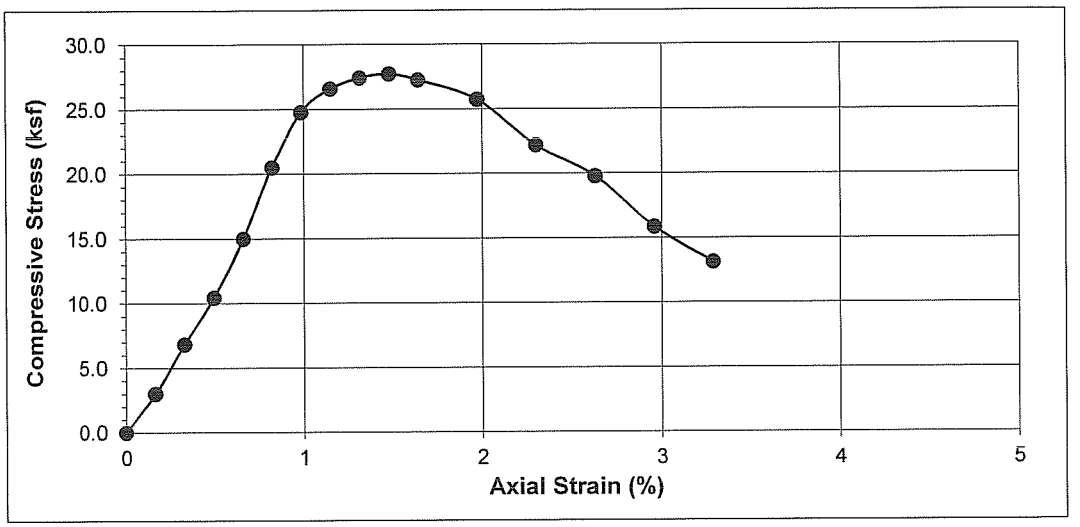


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
79	0.005	7.23	1.57	0.08
149	0.010	7.24	2.96	0.17
228	0.015	7.24	4.53	0.25
325	0.020	7.25	6.46	0.33
460	0.025	7.26	9.13	0.41
541	0.030	7.26	10.73	0.50
607	0.035	7.27	12.03	0.58
655	0.040	7.27	12.97	0.66
694	0.045	7.28	13.73	0.75
714	0.050	7.29	14.11	0.83
730	0.055	7.29	14.42	0.91
752	0.060	7.30	14.84	1.00
759	0.065	7.30	14.96	1.08
768	0.070	7.31	15.13	1.16
768	0.075	7.32	15.12	1.24
775	0.080	7.32	15.24	1.33
783	0.085	7.33	15.39	1.41
791	0.090	7.33	15.53	1.49
798	0.095	7.34	15.65	1.58
804	0.100	7.35	15.76	1.66
825	0.120	7.37	16.12	1.99
714	0.140	7.40	13.90	2.32
433	0.160	7.42	8.40	2.66

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	7
Sample No.:	B4-1	Test Date:	12/17/10
Soil Description:	Sandy Silt	Dry Density (pcf):	87.0
Sample Type:	Soil-Cement	Moisture Content (%):	32.5
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1528.08
Sample Height (inches):	6.080	Wt. Dry Soil+Container(gms):	1200.61
Sample Weight (gms):	1335.85	Wt. Container (gms):	193.89

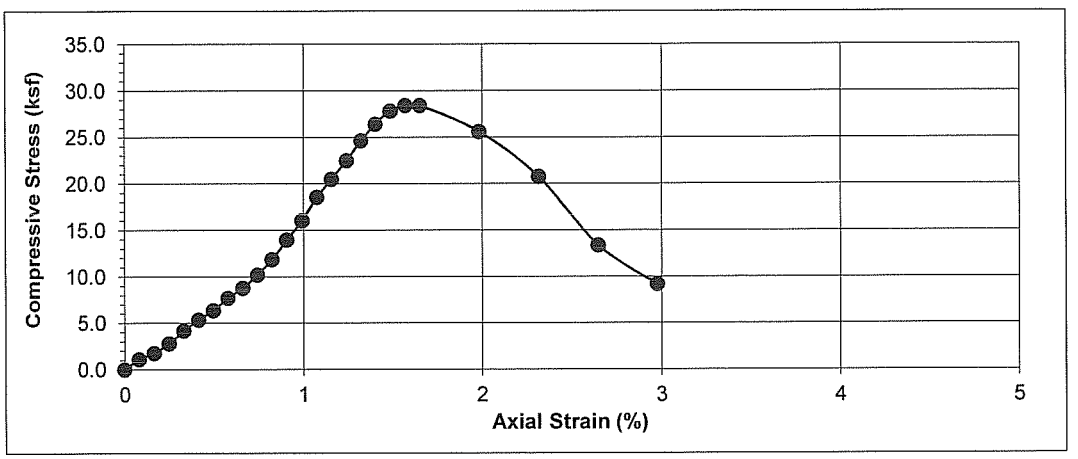


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
151	0.010	7.27	2.99	0.16
345	0.020	7.28	6.82	0.33
529	0.030	7.29	10.44	0.49
760	0.040	7.31	14.98	0.66
1042	0.050	7.32	20.50	0.82
1261	0.060	7.33	24.77	0.99
1355	0.070	7.34	26.57	1.15
1400	0.080	7.36	27.41	1.32
1418	0.090	7.37	27.72	1.48
1396	0.100	7.38	27.24	1.64
1323	0.120	7.40	25.73	1.97
1145	0.140	7.43	22.19	2.30
1024	0.160	7.45	19.78	2.63
824	0.180	7.48	15.86	2.96
684	0.200	7.51	13.12	3.29

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	14
Sample No.:	B4-3	Test Date:	12/24/10
Soil Description:	Sandy Silt	Dry Density (pcf):	86.4
Sample Type:	Soil-Cement	Moisture Content (%):	34.2
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1524.67
Sample Height (inches):	6.048	Wt. Dry Soil+Container(gms):	1184.94
Sample Weight (gms):	1335.89	Wt. Container (gms):	191.13

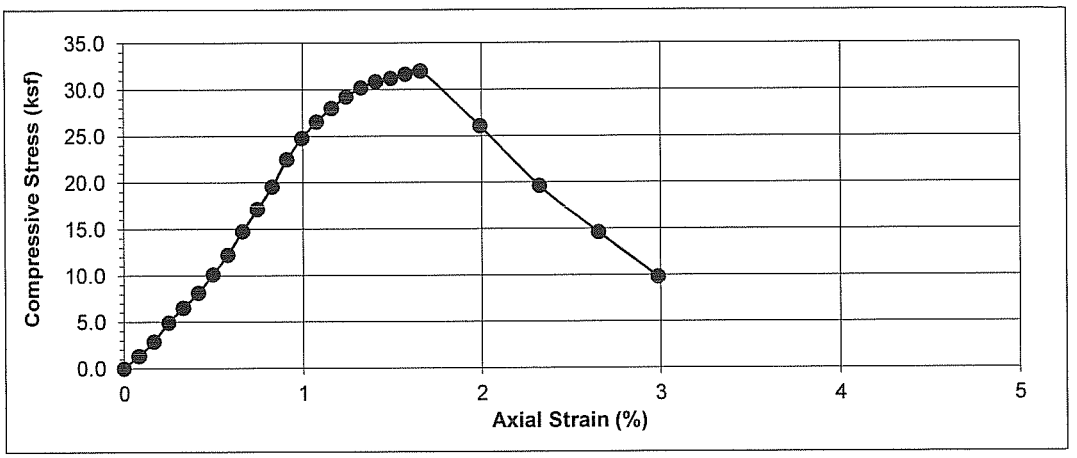


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
56	0.005	7.26	1.11	0.08
89	0.010	7.27	1.76	0.17
141	0.015	7.28	2.79	0.25
211	0.020	7.28	4.17	0.33
270	0.025	7.29	5.33	0.41
322	0.030	7.29	6.36	0.50
390	0.035	7.30	7.69	0.58
445	0.040	7.31	8.77	0.66
517	0.045	7.31	10.18	0.74
601	0.050	7.32	11.82	0.83
709	0.055	7.32	13.94	0.91
816	0.060	7.33	16.03	0.99
945	0.065	7.34	18.55	1.07
1045	0.070	7.34	20.49	1.16
1148	0.075	7.35	22.49	1.24
1257	0.080	7.36	24.61	1.32
1349	0.085	7.36	26.39	1.41
1422	0.090	7.37	27.79	1.49
1454	0.095	7.37	28.39	1.57
1455	0.100	7.38	28.39	1.65
1316	0.120	7.41	25.59	1.98
1071	0.140	7.43	20.76	2.31
692	0.160	7.46	13.37	2.65
476	0.180	7.48	9.16	2.98

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	28
Sample No.:	B4-4	Test Date:	01/07/11
Soil Description:	Sandy Silt	Dry Density (pcf):	87.4
Sample Type:	Soil-Cement	Moisture Content (%):	33.7
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1484.39
Sample Height (inches):	6.025	Wt. Dry Soil+Container(gms):	1147.97
Sample Weight (gms):	1336.63	Wt. Container (gms):	149.83

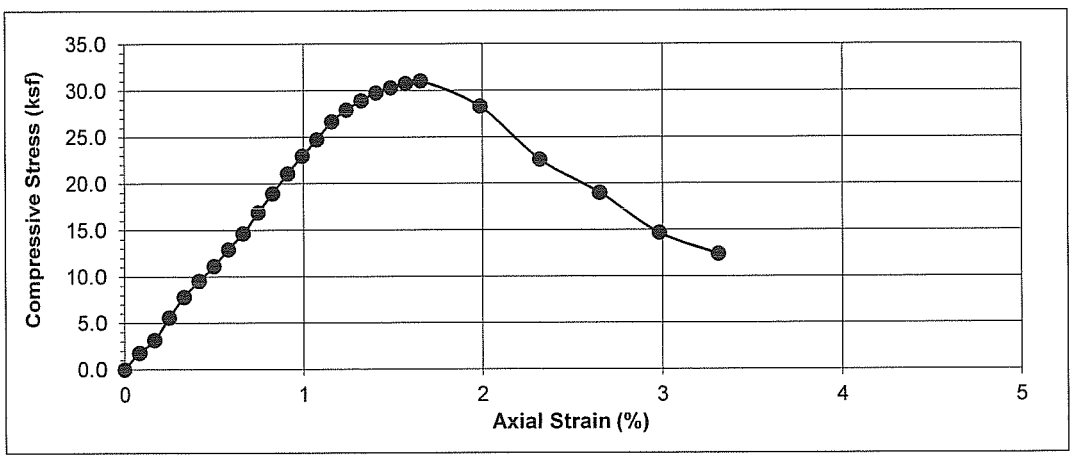


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
68	0.005	7.24	1.35	0.08
146	0.010	7.25	2.90	0.17
249	0.015	7.25	4.94	0.25
328	0.020	7.26	6.51	0.33
411	0.025	7.26	8.15	0.41
510	0.030	7.27	10.10	0.50
618	0.035	7.28	12.23	0.58
745	0.040	7.28	14.73	0.66
866	0.045	7.29	17.11	0.75
990	0.050	7.30	19.54	0.83
1139	0.055	7.30	22.46	0.91
1256	0.060	7.31	24.75	1.00
1347	0.065	7.31	26.52	1.08
1422	0.070	7.32	27.98	1.16
1487	0.075	7.33	29.23	1.24
1537	0.080	7.33	30.19	1.33
1572	0.085	7.34	30.85	1.41
1590	0.090	7.34	31.18	1.49
1615	0.095	7.35	31.64	1.58
1634	0.100	7.36	31.98	1.66
1336	0.120	7.38	26.06	1.99
1009	0.140	7.41	19.62	2.32
753	0.160	7.43	14.59	2.66
507	0.180	7.46	9.79	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	28
Sample No.:	B4-5	Test Date:	01/07/11
Soil Description:	Sandy Silt	Dry Density (pcf):	87.0
Sample Type:	Soil-Cement	Moisture Content (%):	33.8
Sample Diameter (inches):	3.037	Wt. Wet Soil+Container(gms):	1485.36
Sample Height (inches):	6.035	Wt. Dry Soil+Container(gms):	1147.89
Sample Weight (gms):	1336.22	Wt. Container (gms):	150.85

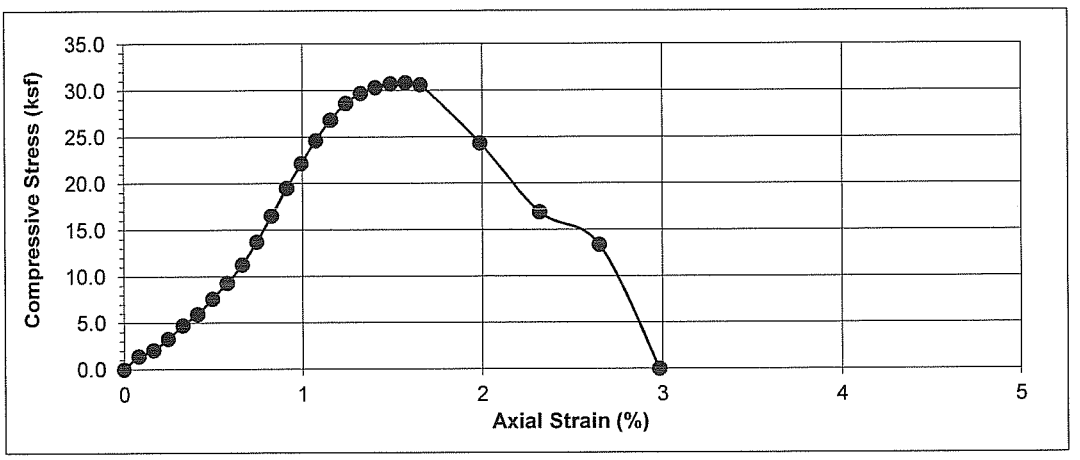


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
90	0.005	7.25	1.79	0.08
159	0.010	7.26	3.16	0.17
282	0.015	7.26	5.59	0.25
394	0.020	7.27	7.81	0.33
481	0.025	7.27	9.52	0.41
561	0.030	7.28	11.10	0.50
654	0.035	7.29	12.93	0.58
741	0.040	7.29	14.63	0.66
856	0.045	7.30	16.89	0.75
960	0.050	7.30	18.93	0.83
1070	0.055	7.31	21.08	0.91
1166	0.060	7.32	22.95	0.99
1257	0.065	7.32	24.72	1.08
1357	0.070	7.33	26.66	1.16
1421	0.075	7.34	27.90	1.24
1474	0.080	7.34	28.91	1.33
1517	0.085	7.35	29.73	1.41
1547	0.090	7.35	30.29	1.49
1571	0.095	7.36	30.74	1.57
1587	0.100	7.37	31.02	1.66
1451	0.120	7.39	28.27	1.99
1163	0.140	7.42	22.58	2.32
982	0.160	7.44	19.00	2.65
761	0.180	7.47	14.68	2.98
645	0.200	7.49	12.40	3.31

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	56
Sample No.:	B4-8	Test Date:	02/04/11
Soil Description:	Sandy Silt	Dry Density (pcf):	87.1
Sample Type:	Soil-Cement	Moisture Content (%):	34.0
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1444.17
Sample Height (inches):	6.032	Wt. Dry Soil+Container(gms):	1104.02
Sample Weight (gms):	1342.56	Wt. Container (gms):	104.44

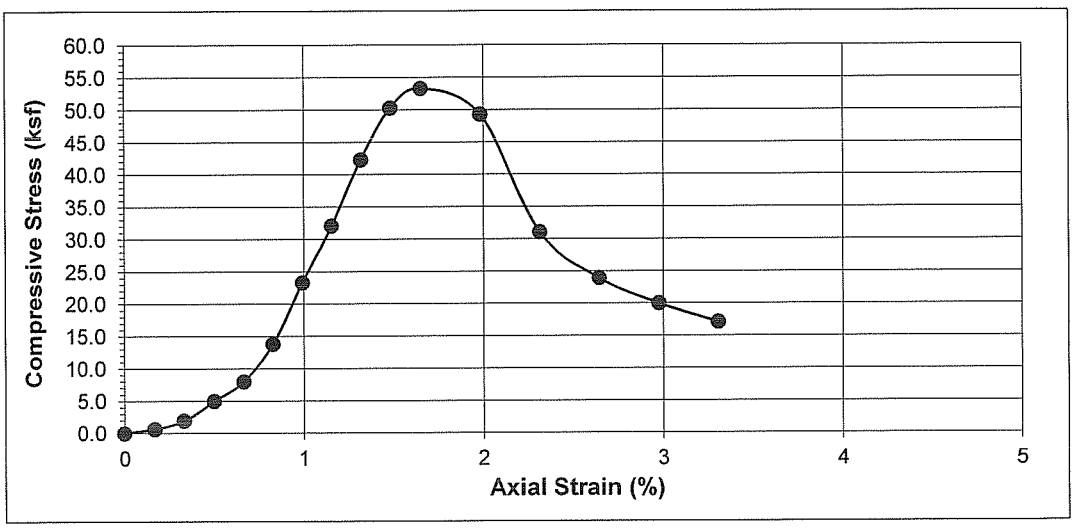


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
70	0.005	7.26	1.39	0.08
104	0.010	7.27	2.06	0.17
165	0.015	7.28	3.27	0.25
239	0.020	7.28	4.73	0.33
301	0.025	7.29	5.95	0.41
385	0.030	7.29	7.60	0.50
471	0.035	7.30	9.29	0.58
571	0.040	7.31	11.25	0.66
696	0.045	7.31	13.71	0.75
839	0.050	7.32	16.51	0.83
991	0.055	7.33	19.48	0.91
1127	0.060	7.33	22.14	0.99
1253	0.065	7.34	24.59	1.08
1366	0.070	7.34	26.79	1.16
1459	0.075	7.35	28.59	1.24
1515	0.080	7.36	29.66	1.33
1548	0.085	7.36	30.28	1.41
1571	0.090	7.37	30.70	1.49
1577	0.095	7.37	30.79	1.57
1568	0.100	7.38	30.59	1.66
1250	0.120	7.41	24.31	1.99
872	0.140	7.43	16.90	2.32
691	0.160	7.46	13.35	2.65
	0.180	7.48	0.00	2.98

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	7
Sample No.:	B4-11	Test Date:	12/17/10
Soil Description:	Sandy Silt	Dry Density (pcf):	89.4
Sample Type:	Soil-Cement	Moisture Content (%):	30.5
Sample Diameter (inches):	3.043	Wt. Wet Soil+Container(gms):	1542.28
Sample Height (inches):	6.049	Wt. Dry Soil+Container(gms):	1227.64
Sample Weight (gms):	1347.88	Wt. Container (gms):	195.18

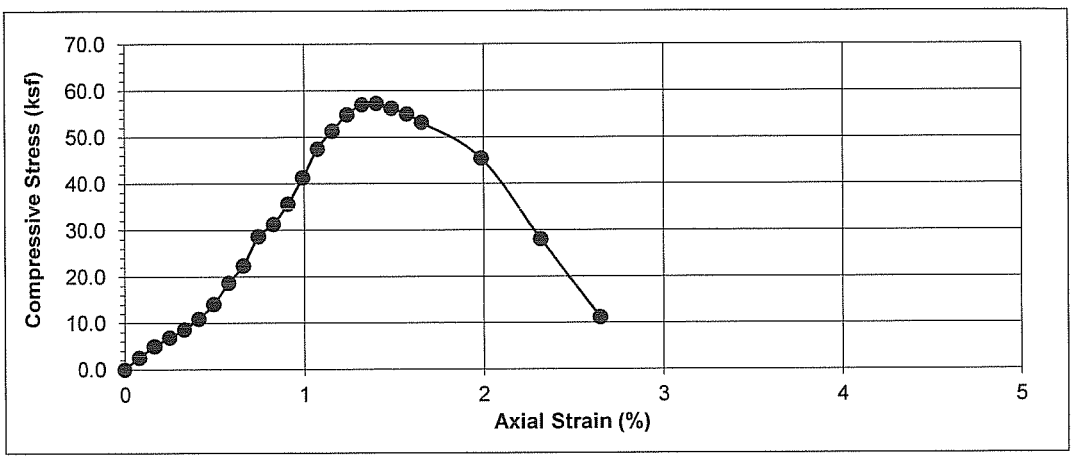


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
33	0.010	7.28	0.65	0.17
97	0.020	7.30	1.91	0.33
251	0.030	7.31	4.95	0.50
405	0.040	7.32	7.97	0.66
702	0.050	7.33	13.78	0.83
1186	0.060	7.35	23.25	0.99
1637	0.070	7.36	32.04	1.16
2165	0.080	7.37	42.30	1.32
2578	0.090	7.38	50.29	1.49
2736	0.100	7.39	53.28	1.65
2538	0.120	7.42	49.26	1.98
1605	0.140	7.44	31.04	2.31
1240	0.160	7.47	23.90	2.65
1040	0.180	7.50	19.98	2.98
893	0.200	7.52	17.10	3.31

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	14
Sample No.:	B4-13	Test Date:	12/24/10
Soil Description:	Sandy Silt	Dry Density (pcf):	88.4
Sample Type:	Soil-Cement	Moisture Content (%):	32.5
Sample Diameter (inches):	3.043	Wt. Wet Soil+Container(gms):	1540.61
Sample Height (inches):	6.042	Wt. Dry Soil+Container(gms):	1209.51
Sample Weight (gms):	1351.71	Wt. Container (gms):	191.32

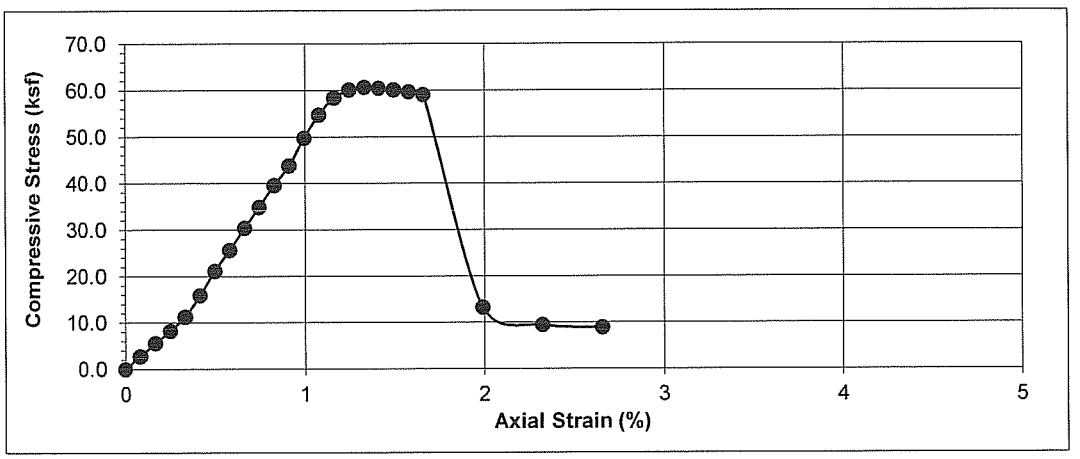


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
129	0.005	7.28	2.55	0.08
253	0.010	7.28	5.00	0.17
350	0.015	7.29	6.91	0.25
437	0.020	7.30	8.62	0.33
554	0.025	7.30	10.92	0.41
713	0.030	7.31	14.05	0.50
946	0.035	7.32	18.62	0.58
1136	0.040	7.32	22.34	0.66
1459	0.045	7.33	28.67	0.74
1592	0.050	7.33	31.26	0.83
1815	0.055	7.34	35.61	0.91
2106	0.060	7.35	41.28	0.99
2423	0.065	7.35	47.46	1.08
2621	0.070	7.36	51.29	1.16
2804	0.075	7.36	54.83	1.24
2916	0.080	7.37	56.97	1.32
2934	0.085	7.38	57.28	1.41
2884	0.090	7.38	56.25	1.49
2820	0.095	7.39	54.96	1.57
2730	0.100	7.40	53.16	1.66
2341	0.120	7.42	45.43	1.99
1451	0.140	7.45	28.06	2.32
581	0.160	7.47	11.20	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	28
Sample No.:	B4-14	Test Date:	01/07/11
Soil Description:	Sandy Silt	Dry Density (pcf):	89.4
Sample Type:	Soil-Cement	Moisture Content (%):	31.4
Sample Diameter (inches):	3.041	Wt. Wet Soil+Container(gms):	1497.33
Sample Height (inches):	6.027	Wt. Dry Soil+Container(gms):	1175.05
Sample Weight (gms):	1350.50	Wt. Container (gms):	148.95

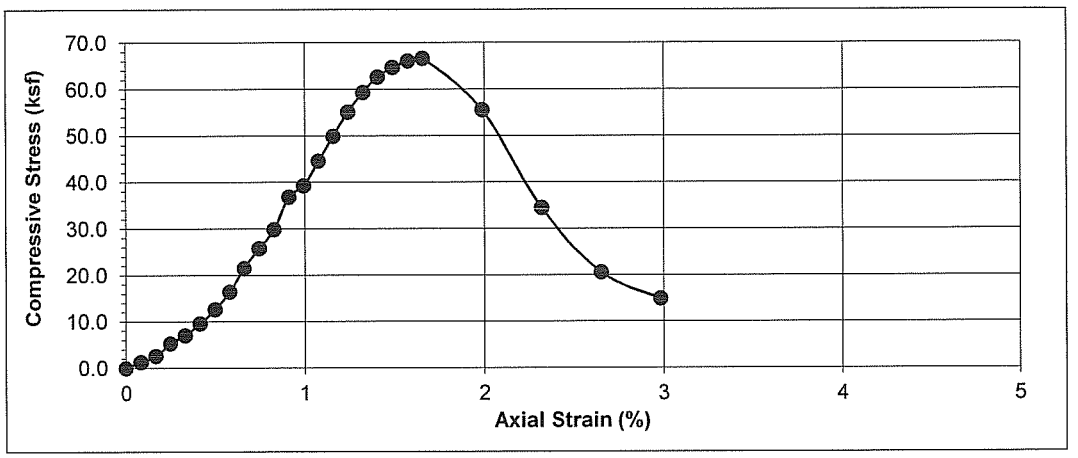


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
137	0.005	7.27	2.71	0.08
281	0.010	7.28	5.56	0.17
414	0.015	7.28	8.19	0.25
570	0.020	7.29	11.26	0.33
805	0.025	7.29	15.89	0.41
1071	0.030	7.30	21.13	0.50
1300	0.035	7.31	25.62	0.58
1541	0.040	7.31	30.35	0.66
1773	0.045	7.32	34.89	0.75
2012	0.050	7.32	39.56	0.83
2230	0.055	7.33	43.81	0.91
2533	0.060	7.34	49.72	1.00
2790	0.065	7.34	54.72	1.08
2978	0.070	7.35	58.36	1.16
3068	0.075	7.35	60.07	1.24
3101	0.080	7.36	60.66	1.33
3092	0.085	7.37	60.44	1.41
3076	0.090	7.37	60.07	1.49
3057	0.095	7.38	59.65	1.58
3028	0.100	7.39	59.04	1.66
681	0.120	7.41	13.23	1.99
489	0.140	7.44	9.47	2.32
461	0.160	7.46	8.90	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	28
Sample No.:	B4-15	Test Date:	01/07/11
Soil Description:	Sandy Silt	Dry Density (pcf):	89.2
Sample Type:	Soil-Cement	Moisture Content (%):	31.7
Sample Diameter (inches):	3.039	Wt. Wet Soil+Container(gms):	1497.42
Sample Height (inches):	6.035	Wt. Dry Soil+Container(gms):	1173.19
Sample Weight (gms):	1349.88	Wt. Container (gms):	151.66

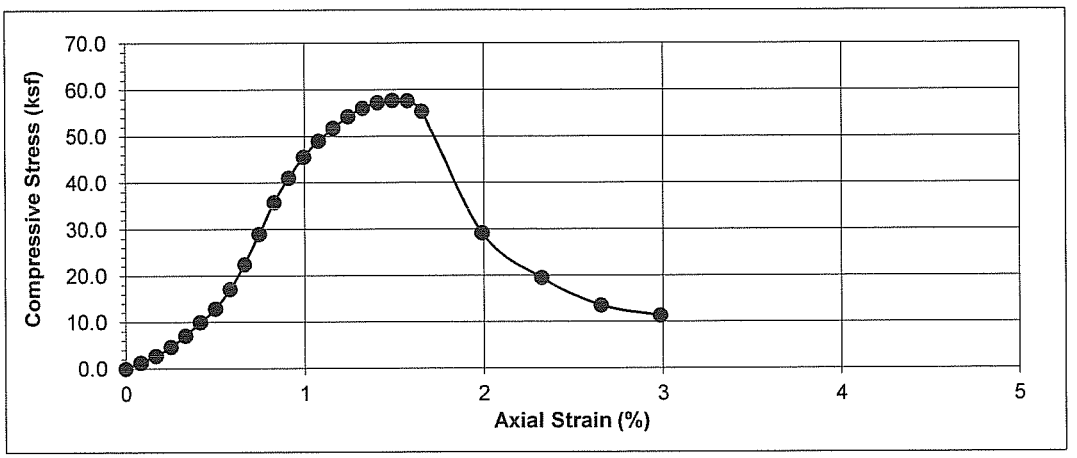


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
66	0.005	7.26	1.31	0.08
132	0.010	7.27	2.62	0.17
266	0.015	7.27	5.27	0.25
356	0.020	7.28	7.04	0.33
485	0.025	7.28	9.59	0.41
638	0.030	7.29	12.60	0.50
831	0.035	7.30	16.40	0.58
1089	0.040	7.30	21.48	0.66
1308	0.045	7.31	25.77	0.75
1515	0.050	7.31	29.83	0.83
1870	0.055	7.32	36.79	0.91
1997	0.060	7.33	39.25	0.99
2267	0.065	7.33	44.52	1.08
2541	0.070	7.34	49.86	1.16
2809	0.075	7.34	55.07	1.24
3026	0.080	7.35	59.28	1.33
3199	0.085	7.36	62.61	1.41
3307	0.090	7.36	64.67	1.49
3380	0.095	7.37	66.04	1.57
3409	0.100	7.38	66.55	1.66
2853	0.120	7.40	55.51	1.99
1777	0.140	7.43	34.46	2.32
1064	0.160	7.45	20.56	2.65
773	0.180	7.48	14.89	2.98

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	56
Sample No.:	B4-18	Test Date:	02/04/11
Soil Description:	Sandy Silt	Dry Density (pcf):	89.7
Sample Type:	Soil-Cement	Moisture Content (%):	32.0
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1463.07
Sample Height (inches):	6.029	Wt. Dry Soil+Container(gms):	1133.85
Sample Weight (gms):	1359.91	Wt. Container (gms):	105.34

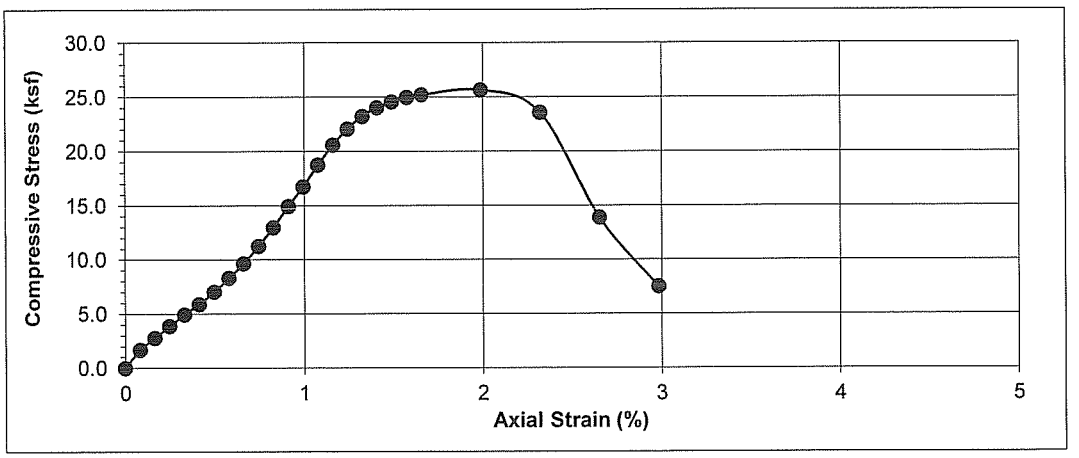


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
64	0.005	7.26	1.27	0.08
139	0.010	7.27	2.75	0.17
236	0.015	7.28	4.67	0.25
359	0.020	7.28	7.10	0.33
506	0.025	7.29	10.00	0.41
653	0.030	7.29	12.89	0.50
869	0.035	7.30	17.14	0.58
1140	0.040	7.31	22.47	0.66
1470	0.045	7.31	28.95	0.75
1818	0.050	7.32	35.77	0.83
2088	0.055	7.33	41.05	0.91
2317	0.060	7.33	45.51	1.00
2495	0.065	7.34	48.97	1.08
2637	0.070	7.34	51.71	1.16
2768	0.075	7.35	54.23	1.24
2862	0.080	7.36	56.03	1.33
2923	0.085	7.36	57.17	1.41
2951	0.090	7.37	57.67	1.49
2950	0.095	7.37	57.60	1.58
2836	0.100	7.38	55.33	1.66
1500	0.120	7.41	29.17	1.99
1004	0.140	7.43	19.46	2.32
701	0.160	7.46	13.54	2.65
588	0.180	7.48	11.32	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	7
Sample No.:	B6-1	Test Date:	12/23/10
Soil Description:	Sandy Silt	Dry Density (pcf):	90.2
Sample Type:	Soil-Cement	Moisture Content (%):	30.9
Sample Diameter (inches):	3.044	Wt. Wet Soil+Container(gms):	1552.13
Sample Height (inches):	6.035	Wt. Dry Soil+Container(gms):	1231.74
Sample Weight (gms):	1361.33	Wt. Container (gms):	196.10

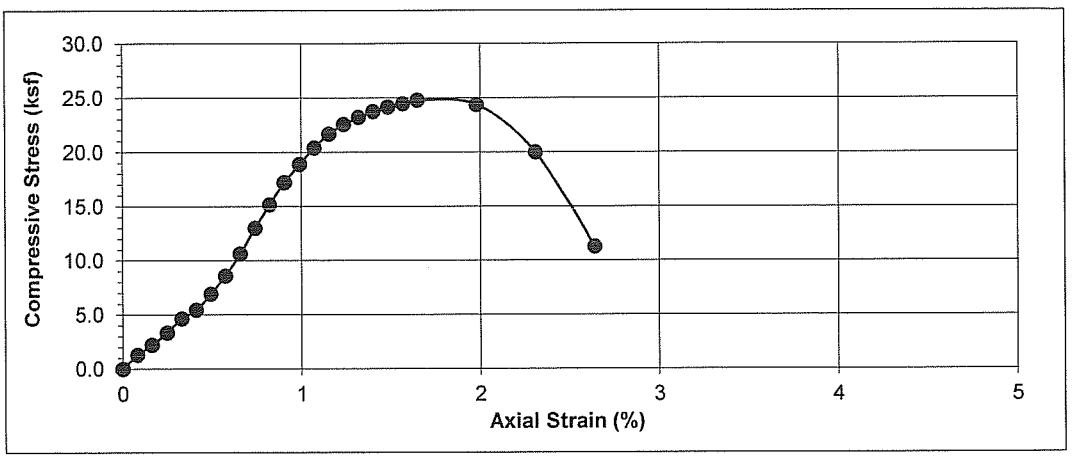


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.28	0.00	0.00
85	0.005	7.28	1.68	0.08
140	0.010	7.29	2.77	0.17
196	0.015	7.30	3.87	0.25
251	0.020	7.30	4.95	0.33
299	0.025	7.31	5.89	0.41
357	0.030	7.31	7.03	0.50
422	0.035	7.32	8.30	0.58
490	0.040	7.33	9.63	0.66
573	0.045	7.33	11.25	0.75
661	0.050	7.34	12.97	0.83
760	0.055	7.34	14.90	0.91
853	0.060	7.35	16.71	0.99
957	0.065	7.36	18.73	1.08
1052	0.070	7.36	20.57	1.16
1129	0.075	7.37	22.06	1.24
1189	0.080	7.38	23.21	1.33
1230	0.085	7.38	24.00	1.41
1259	0.090	7.39	24.54	1.49
1282	0.095	7.39	24.97	1.57
1294	0.100	7.40	25.18	1.66
1322	0.120	7.43	25.64	1.99
1219	0.140	7.45	23.56	2.32
720	0.160	7.48	13.87	2.65
391	0.180	7.50	7.51	2.98

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	7
Sample No.:	B6-2	Test Date:	12/23/10
Soil Description:	Sandy Silt	Dry Density (pcf):	90.5
Sample Type:	Soil-Cement	Moisture Content (%):	30.9
Sample Diameter (inches):	3.039	Wt. Wet Soil+Container(gms):	1512.65
Sample Height (inches):	6.059	Wt. Dry Soil+Container(gms):	1191.59
Sample Weight (gms):	1365.72	Wt. Container (gms):	151.18

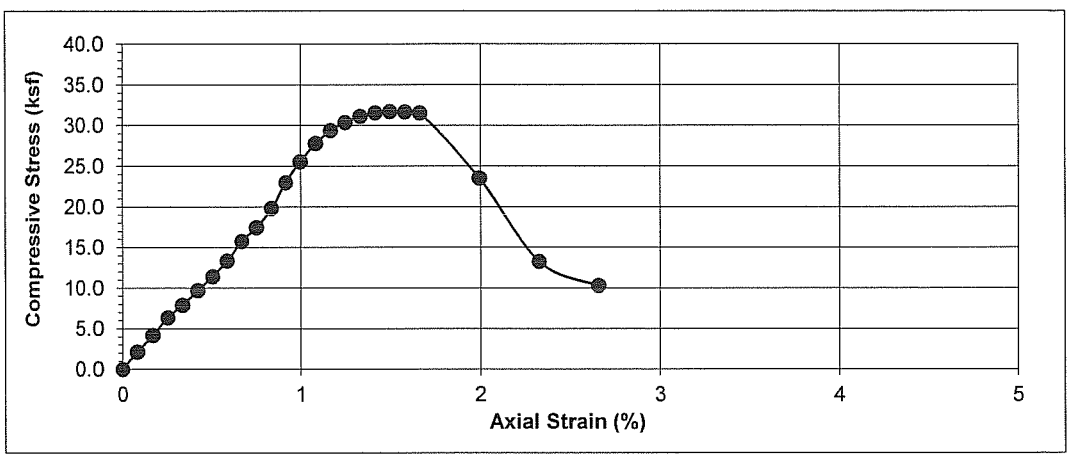


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
65	0.005	7.26	1.29	0.08
111	0.010	7.27	2.20	0.17
169	0.015	7.27	3.35	0.25
234	0.020	7.28	4.63	0.33
275	0.025	7.28	5.44	0.41
350	0.030	7.29	6.91	0.50
435	0.035	7.30	8.59	0.58
539	0.040	7.30	10.63	0.66
659	0.045	7.31	12.99	0.74
769	0.050	7.31	15.14	0.83
874	0.055	7.32	17.19	0.91
960	0.060	7.33	18.87	0.99
1038	0.065	7.33	20.39	1.07
1104	0.070	7.34	21.66	1.16
1150	0.075	7.34	22.55	1.24
1184	0.080	7.35	23.19	1.32
1213	0.085	7.36	23.74	1.40
1235	0.090	7.36	24.15	1.49
1252	0.095	7.37	24.47	1.57
1269	0.100	7.38	24.78	1.65
1252	0.120	7.40	24.36	1.98
1030	0.140	7.43	19.98	2.31
583	0.160	7.45	11.27	2.64

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	14
Sample No.:	B6-4	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	90.3
Sample Type:	Soil-Cement	Moisture Content (%):	31.0
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1543.69
Sample Height (inches):	6.017	Wt. Dry Soil+Container(gms):	1222.95
Sample Weight (gms):	1356.04	Wt. Container (gms):	188.66

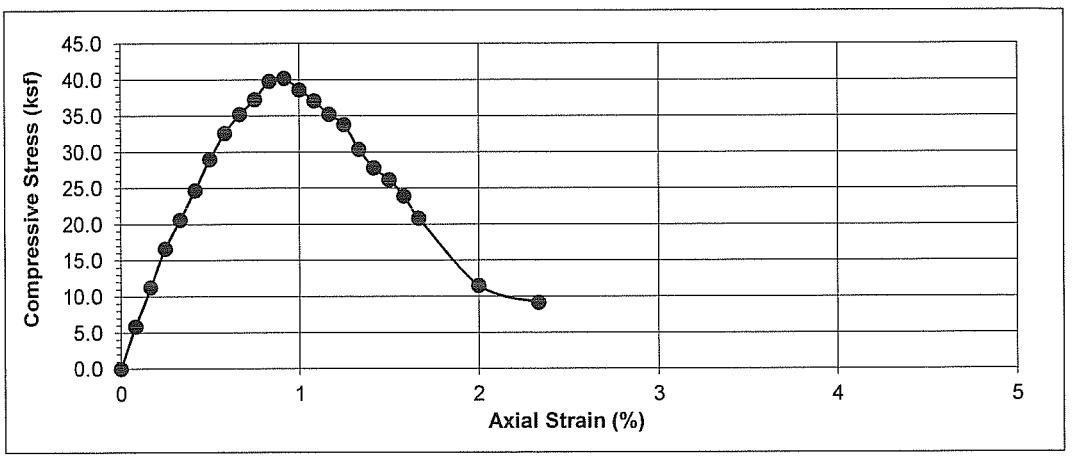


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
107	0.005	7.26	2.12	0.08
211	0.010	7.27	4.18	0.17
321	0.015	7.28	6.35	0.25
399	0.020	7.28	7.89	0.33
490	0.025	7.29	9.68	0.42
578	0.030	7.29	11.41	0.50
675	0.035	7.30	13.31	0.58
799	0.040	7.31	15.75	0.66
886	0.045	7.31	17.45	0.75
1006	0.050	7.32	19.79	0.83
1169	0.055	7.33	22.98	0.91
1300	0.060	7.33	25.53	1.00
1416	0.065	7.34	27.79	1.08
1497	0.070	7.34	29.35	1.16
1550	0.075	7.35	30.37	1.25
1588	0.080	7.36	31.09	1.33
1612	0.085	7.36	31.53	1.41
1622	0.090	7.37	31.70	1.50
1621	0.095	7.37	31.65	1.58
1617	0.100	7.38	31.55	1.66
1210	0.120	7.41	23.53	1.99
684	0.140	7.43	13.25	2.33
533	0.160	7.46	10.29	2.66

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	28
Sample No.:	B6-5	Test Date:	01/13/11
Soil Description:	Sandy Silt	Dry Density (pcf):	94.0
Sample Type:	Soil-Cement	Moisture Content (%):	27.1
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1544.14
Sample Height (inches):	6.000	Wt. Dry Soil+Container(gms):	1255.78
Sample Weight (gms):	1356.93	Wt. Container (gms):	191.56

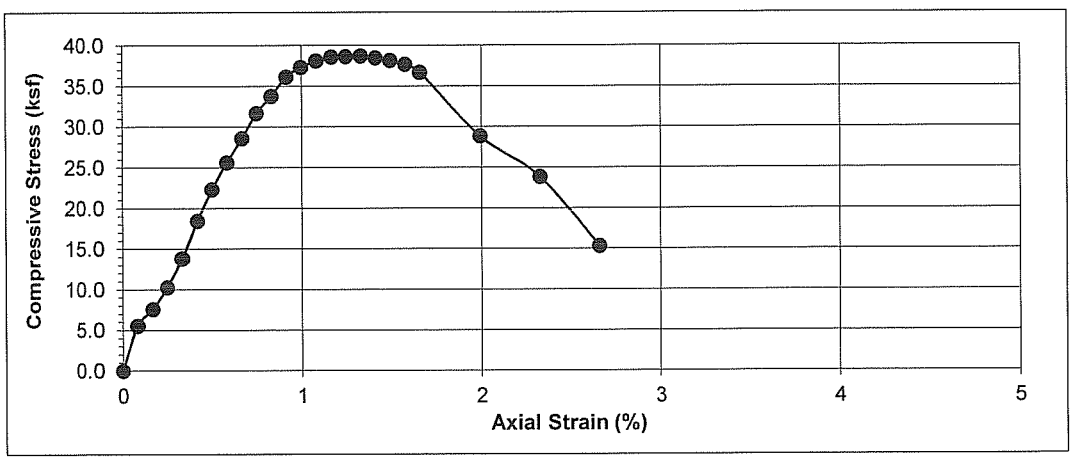


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
294	0.005	7.22	5.87	0.08
566	0.010	7.22	11.28	0.17
833	0.015	7.23	16.59	0.25
1034	0.020	7.23	20.58	0.33
1242	0.025	7.24	24.70	0.42
1459	0.030	7.25	28.99	0.50
1641	0.035	7.25	32.58	0.58
1774	0.040	7.26	35.19	0.67
1879	0.045	7.27	37.24	0.75
2009	0.050	7.27	39.79	0.83
2031	0.055	7.28	40.19	0.92
1952	0.060	7.28	38.59	1.00
1878	0.065	7.29	37.10	1.08
1783	0.070	7.30	35.19	1.17
1713	0.075	7.30	33.78	1.25
1542	0.080	7.31	30.38	1.33
1412	0.085	7.31	27.80	1.42
1330	0.090	7.32	26.16	1.50
1215	0.095	7.33	23.88	1.58
1061	0.100	7.33	20.84	1.67
588	0.120	7.36	11.51	2.00
469	0.140	7.38	9.15	2.33

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	28
Sample No.:	B6-6	Test Date:	01/13/11
Soil Description:	Sandy Silt	Dry Density (pcf):	93.9
Sample Type:	Soil-Cement	Moisture Content (%):	26.8
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1544.75
Sample Height (inches):	6.018	Wt. Dry Soil+Container(gms):	1259.05
Sample Weight (gms):	1357.38	Wt. Container (gms):	192.36

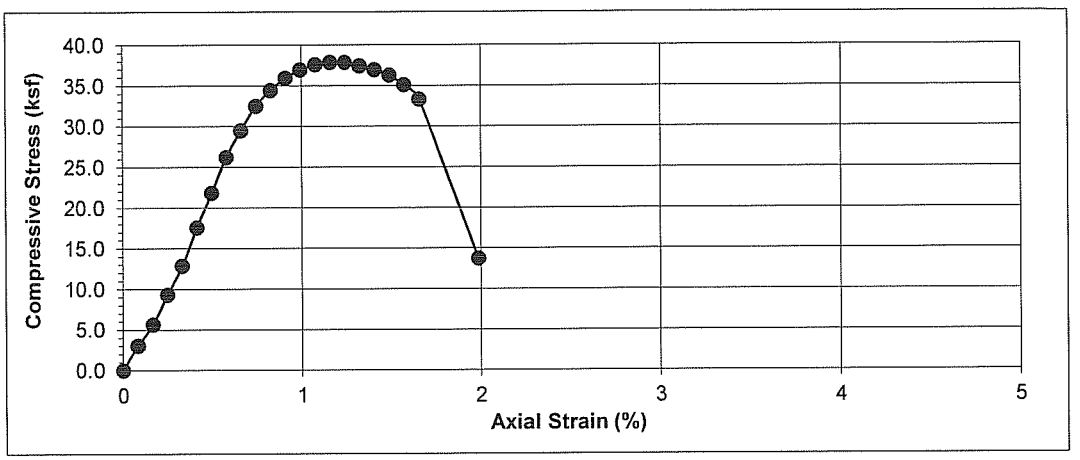


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
276	0.005	7.23	5.50	0.08
381	0.010	7.23	7.59	0.17
516	0.015	7.24	10.27	0.25
695	0.020	7.24	13.82	0.33
928	0.025	7.25	18.43	0.42
1124	0.030	7.26	22.31	0.50
1292	0.035	7.26	25.62	0.58
1442	0.040	7.27	28.57	0.66
1599	0.045	7.27	31.65	0.75
1706	0.050	7.28	33.74	0.83
1828	0.055	7.29	36.12	0.91
1889	0.060	7.29	37.30	1.00
1931	0.065	7.30	38.10	1.08
1956	0.070	7.31	38.56	1.16
1960	0.075	7.31	38.60	1.25
1965	0.080	7.32	38.67	1.33
1955	0.085	7.32	38.44	1.41
1940	0.090	7.33	38.11	1.50
1918	0.095	7.34	37.65	1.58
1870	0.100	7.34	36.68	1.66
1475	0.120	7.37	28.83	1.99
1224	0.140	7.39	23.84	2.33
789	0.160	7.42	15.32	2.66

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	56
Sample No.:	B6-9	Test Date:	02/10/11
Soil Description:	Sandy Silt	Dry Density (pcf):	94.9
Sample Type:	Soil-Cement	Moisture Content (%):	24.8
Sample Diameter (inches):	3.039	Wt. Wet Soil+Container(gms):	1510.05
Sample Height (inches):	6.041	Wt. Dry Soil+Container(gms):	1239.72
Sample Weight (gms):	1362.71	Wt. Container (gms):	148.97

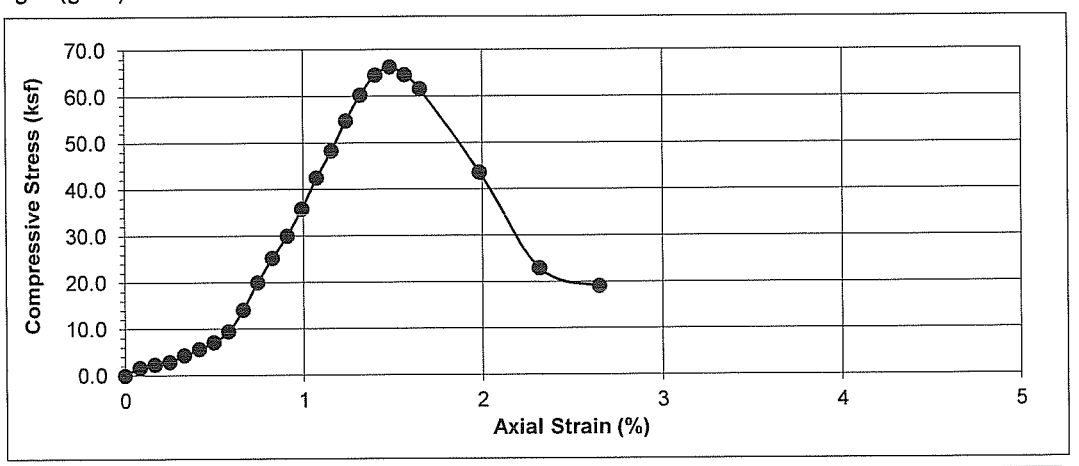


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
152	0.005	7.26	3.02	0.08
284	0.010	7.27	5.63	0.17
469	0.015	7.27	9.29	0.25
650	0.020	7.28	12.86	0.33
888	0.025	7.28	17.56	0.41
1104	0.030	7.29	21.81	0.50
1327	0.035	7.30	26.19	0.58
1495	0.040	7.30	29.48	0.66
1649	0.045	7.31	32.49	0.74
1748	0.050	7.31	34.41	0.83
1825	0.055	7.32	35.90	0.91
1879	0.060	7.33	36.93	0.99
1913	0.065	7.33	37.57	1.08
1929	0.070	7.34	37.85	1.16
1931	0.075	7.34	37.86	1.24
1911	0.080	7.35	37.44	1.32
1888	0.085	7.36	36.95	1.41
1854	0.090	7.36	36.26	1.49
1795	0.095	7.37	35.07	1.57
1706	0.100	7.38	33.31	1.66
706	0.120	7.40	13.74	1.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	7
Sample No.:	B6-11	Test Date:	12/23/10
Soil Description:	Sandy Silt	Dry Density (pcf):	92.1
Sample Type:	Soil-Cement	Moisture Content (%):	29.1
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1564.8
Sample Height (inches):	6.045	Wt. Dry Soil+Container(gms):	1255.99
Sample Weight (gms):	1370.80	Wt. Container (gms):	196.36

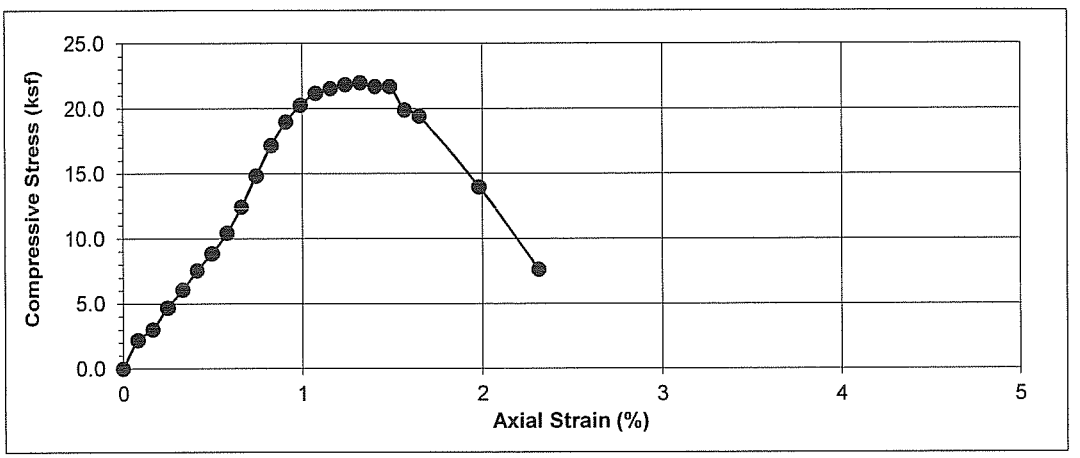


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
84	0.005	7.26	1.67	0.08
119	0.010	7.27	2.36	0.17
146	0.015	7.28	2.89	0.25
218	0.020	7.28	4.31	0.33
284	0.025	7.29	5.61	0.41
361	0.030	7.29	7.13	0.50
477	0.035	7.30	9.41	0.58
715	0.040	7.31	14.09	0.66
1013	0.045	7.31	19.95	0.74
1280	0.050	7.32	25.18	0.83
1524	0.055	7.32	29.96	0.91
1822	0.060	7.33	35.79	0.99
2164	0.065	7.34	42.47	1.08
2461	0.070	7.34	48.26	1.16
2792	0.075	7.35	54.70	1.24
3078	0.080	7.36	60.26	1.32
3297	0.085	7.36	64.49	1.41
3389	0.090	7.37	66.23	1.49
3309	0.095	7.37	64.62	1.57
3155	0.100	7.38	61.56	1.65
2242	0.120	7.41	43.60	1.99
1182	0.140	7.43	22.91	2.32
987	0.160	7.46	19.06	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	7
Sample No.:	B6-12	Test Date:	12/23/10
Soil Description:	Sandy Silt	Dry Density (pcf):	90.8
Sample Type:	Soil-Cement	Moisture Content (%):	30.4
Sample Diameter (inches):	3.033	Wt. Wet Soil+Container(gms):	1511.2
Sample Height (inches):	6.053	Wt. Dry Soil+Container(gms):	1193.88
Sample Weight (gms):	1360.05	Wt. Container (gms):	151.71

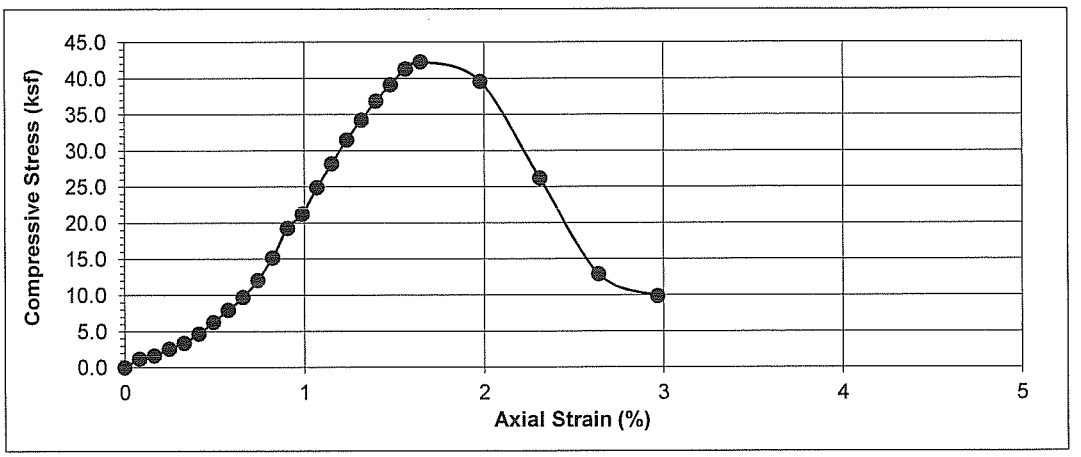


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
110	0.005	7.23	2.19	0.08
151	0.010	7.24	3.00	0.17
236	0.015	7.24	4.69	0.25
305	0.020	7.25	6.06	0.33
380	0.025	7.25	7.54	0.41
446	0.030	7.26	8.85	0.50
527	0.035	7.27	10.44	0.58
628	0.040	7.27	12.43	0.66
749	0.045	7.28	14.82	0.74
869	0.050	7.29	17.18	0.83
960	0.055	7.29	18.96	0.91
1026	0.060	7.30	20.25	0.99
1073	0.065	7.30	21.16	1.07
1093	0.070	7.31	21.53	1.16
1109	0.075	7.32	21.83	1.24
1117	0.080	7.32	21.97	1.32
1103	0.085	7.33	21.68	1.40
1104	0.090	7.33	21.68	1.49
1013	0.095	7.34	19.87	1.57
991	0.100	7.35	19.43	1.65
715	0.120	7.37	13.97	1.98
391	0.140	7.40	7.61	2.31

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	14
Sample No.:	B6-14	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	91.5
Sample Type:	Soil-Cement	Moisture Content (%):	30.0
Sample Diameter (inches):	3.027	Wt. Wet Soil+Container(gms):	1514.28
Sample Height (inches):	6.067	Wt. Dry Soil+Container(gms):	1199.54
Sample Weight (gms):	1364.14	Wt. Container (gms):	151.09

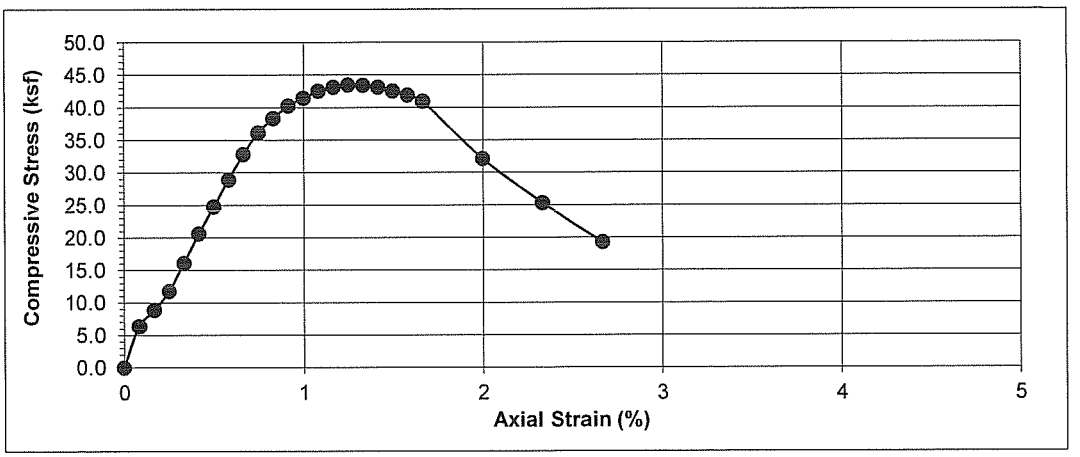


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.20	0.00	0.00
59	0.005	7.20	1.18	0.08
81	0.010	7.21	1.62	0.16
128	0.015	7.21	2.55	0.25
169	0.020	7.22	3.37	0.33
234	0.025	7.23	4.66	0.41
314	0.030	7.23	6.25	0.49
398	0.035	7.24	7.92	0.58
489	0.040	7.24	9.72	0.66
607	0.045	7.25	12.06	0.74
765	0.050	7.26	15.18	0.82
972	0.055	7.26	19.27	0.91
1070	0.060	7.27	21.20	0.99
1258	0.065	7.27	24.90	1.07
1425	0.070	7.28	28.19	1.15
1592	0.075	7.29	31.46	1.24
1734	0.080	7.29	34.24	1.32
1868	0.085	7.30	36.85	1.40
1984	0.090	7.30	39.11	1.48
2097	0.095	7.31	41.30	1.57
2149	0.100	7.32	42.29	1.65
2018	0.120	7.34	39.58	1.98
1341	0.140	7.37	26.21	2.31
663	0.160	7.39	12.92	2.64
508	0.180	7.42	9.86	2.97

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	28
Sample No.:	B6-15	Test Date:	01/13/11
Soil Description:	Sandy Silt	Dry Density (pcf):	96.8
Sample Type:	Soil-Cement	Moisture Content (%):	23.8
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1555.54
Sample Height (inches):	6.007	Wt. Dry Soil+Container(gms):	1294.22
Sample Weight (gms):	1365.00	Wt. Container (gms):	195.93

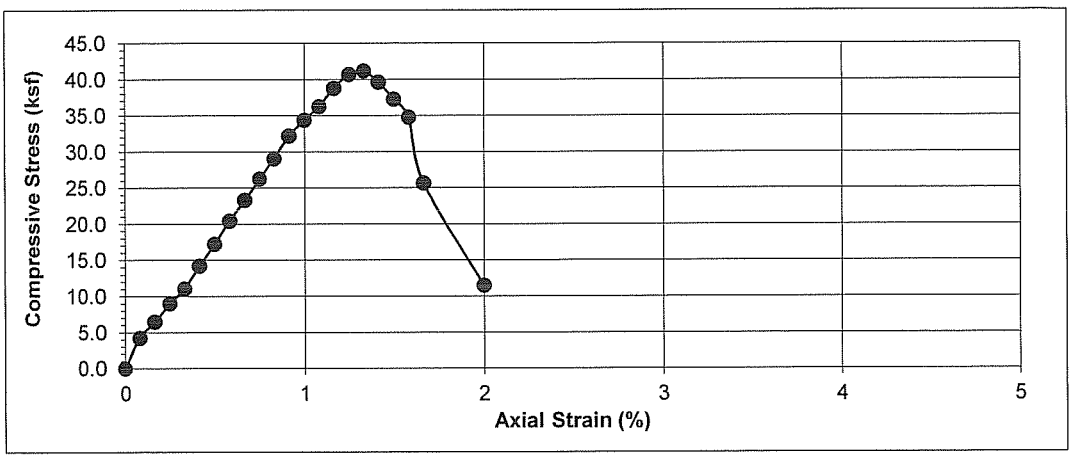


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
319	0.005	7.23	6.36	0.08
445	0.010	7.23	8.86	0.17
593	0.015	7.24	11.80	0.25
809	0.020	7.24	16.08	0.33
1039	0.025	7.25	20.64	0.42
1247	0.030	7.26	24.75	0.50
1457	0.035	7.26	28.89	0.58
1655	0.040	7.27	32.79	0.67
1824	0.045	7.27	36.11	0.75
1938	0.050	7.28	38.33	0.83
2038	0.055	7.29	40.27	0.92
2098	0.060	7.29	41.42	1.00
2155	0.065	7.30	42.51	1.08
2187	0.070	7.31	43.11	1.17
2207	0.075	7.31	43.47	1.25
2206	0.080	7.32	43.41	1.33
2194	0.085	7.32	43.14	1.42
2166	0.090	7.33	42.55	1.50
2135	0.095	7.34	41.91	1.58
2087	0.100	7.34	40.93	1.66
1644	0.120	7.37	32.13	2.00
1300	0.140	7.39	25.32	2.33
992	0.160	7.42	19.26	2.66

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	28
Sample No.:	B6-16	Test Date:	01/13/11
Soil Description:	Sandy Silt	Dry Density (pcf):	94.1
Sample Type:	Soil-Cement	Moisture Content (%):	26.7
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1542.29
Sample Height (inches):	6.002	Wt. Dry Soil+Container(gms):	1258.58
Sample Weight (gms):	1355.11	Wt. Container (gms):	195.87

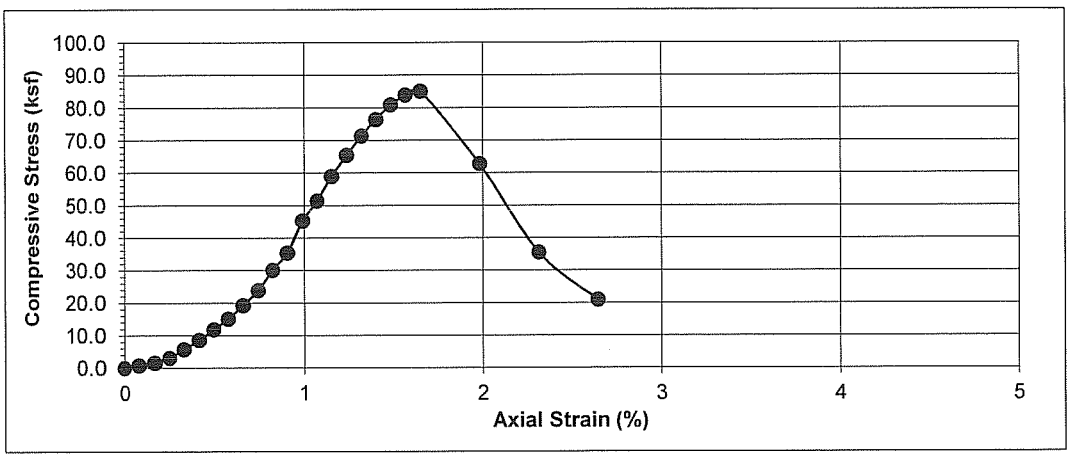


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
211	0.005	7.22	4.21	0.08
324	0.010	7.22	6.46	0.17
451	0.015	7.23	8.98	0.25
556	0.020	7.23	11.07	0.33
715	0.025	7.24	14.22	0.42
867	0.030	7.25	17.23	0.50
1028	0.035	7.25	20.41	0.58
1175	0.040	7.26	23.31	0.67
1324	0.045	7.27	26.24	0.75
1467	0.050	7.27	29.05	0.83
1626	0.055	7.28	32.17	0.92
1738	0.060	7.28	34.36	1.00
1834	0.065	7.29	36.23	1.08
1965	0.070	7.30	38.78	1.17
2063	0.075	7.30	40.68	1.25
2090	0.080	7.31	41.18	1.33
2011	0.085	7.31	39.59	1.42
1894	0.090	7.32	37.26	1.50
1768	0.095	7.33	34.75	1.58
1306	0.100	7.33	25.65	1.67
586	0.120	7.36	11.47	2.00

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	56
Sample No.:	B6-19	Test Date:	02/10/11
Soil Description:	Sandy Silt	Dry Density (pcf):	97.6
Sample Type:	Soil-Cement	Moisture Content (%):	22.1
Sample Diameter (inches):	3.038	Wt. Wet Soil+Container(gms):	1518.51
Sample Height (inches):	6.051	Wt. Dry Soil+Container(gms):	1270.77
Sample Weight (gms):	1371.74	Wt. Container (gms):	148.93

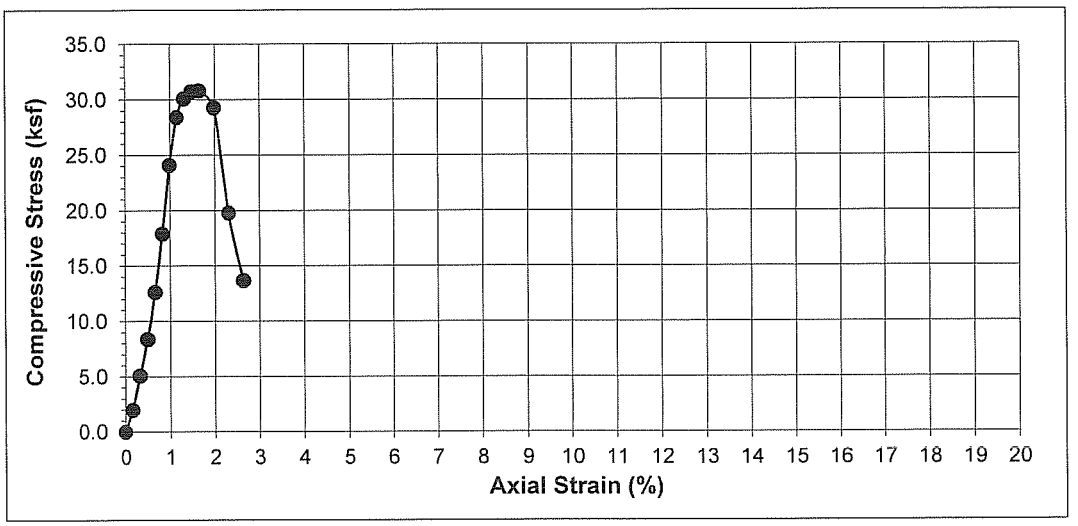


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
36	0.005	7.25	0.71	0.08
76	0.010	7.26	1.51	0.17
152	0.015	7.27	3.01	0.25
289	0.020	7.27	5.72	0.33
430	0.025	7.28	8.51	0.41
596	0.030	7.28	11.78	0.50
763	0.035	7.29	15.07	0.58
976	0.040	7.30	19.26	0.66
1212	0.045	7.30	23.90	0.74
1525	0.050	7.31	30.04	0.83
1800	0.055	7.32	35.43	0.91
2300	0.060	7.32	45.24	0.99
2616	0.065	7.33	51.41	1.07
2998	0.070	7.33	58.87	1.16
3333	0.075	7.34	65.39	1.24
3638	0.080	7.35	71.31	1.32
3897	0.085	7.35	76.33	1.40
4133	0.090	7.36	80.88	1.49
4290	0.095	7.36	83.88	1.57
4352	0.100	7.37	85.03	1.65
3221	0.120	7.40	62.72	1.98
1828	0.140	7.42	35.47	2.31
1080	0.160	7.45	20.89	2.64

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 211	Cure Days:	7
Sample No.:	B5-1	Test Date:	12/17/10
Soil Description:	Silty Sand	Dry Density (pcf):	89.2
Sample Type:	Soil-Cement	Moisture Content (%):	29.4
Sample Diameter (inches):	3.041	Wt. Wet Soil+Container(gms):	1483.52
Sample Height (inches):	6.058	Wt. Dry Soil+Container(gms):	1181.21
Sample Weight (gms):	1332.29	Wt. Container (gms):	151.56

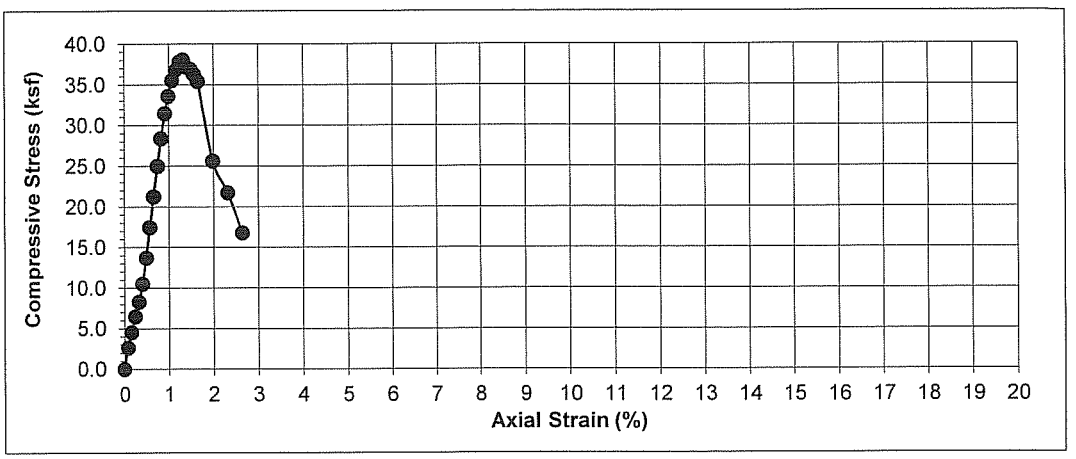


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
99	0.010	7.28	1.96	0.17
256	0.020	7.29	5.06	0.33
424	0.030	7.30	8.36	0.50
641	0.040	7.31	12.62	0.66
910	0.050	7.32	17.89	0.83
1227	0.060	7.34	24.09	0.99
1449	0.070	7.35	28.40	1.16
1538	0.080	7.36	30.09	1.32
1572	0.090	7.37	30.70	1.49
1579	0.100	7.39	30.79	1.65
1506	0.120	7.41	29.27	1.98
1021	0.140	7.43	19.77	2.31
708	0.160	7.46	13.67	2.64

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 211	Cure Days:	14
Sample No.:	B5-3	Test Date:	12/24/10
Soil Description:	Silty Sand	Dry Density (pcf):	87.7
Sample Type:	Soil-Cement	Moisture Content (%):	32.8
Sample Diameter (inches):	3.044	Wt. Wet Soil+Container(gms):	1533.21
Sample Height (inches):	6.038	Wt. Dry Soil+Container(gms):	1201.97
Sample Weight (gms):	1343.09	Wt. Container (gms):	191.50

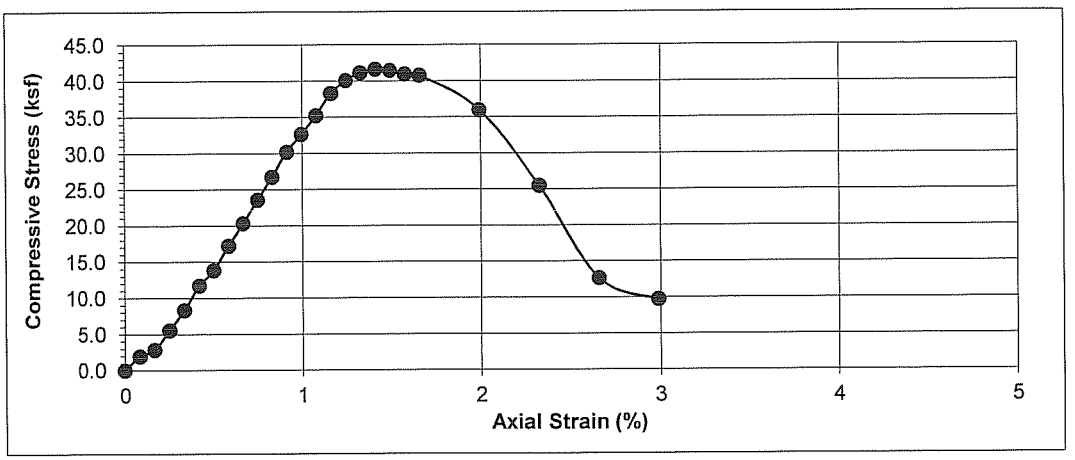


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.28	0.00	0.00
134	0.005	7.28	2.65	0.08
230	0.010	7.29	4.54	0.17
328	0.015	7.30	6.47	0.25
420	0.020	7.30	8.28	0.33
532	0.025	7.31	10.48	0.41
696	0.030	7.31	13.70	0.50
887	0.035	7.32	17.45	0.58
1081	0.040	7.33	21.25	0.66
1272	0.045	7.33	24.98	0.75
1447	0.050	7.34	28.39	0.83
1605	0.055	7.34	31.47	0.91
1715	0.060	7.35	33.60	0.99
1815	0.065	7.36	35.53	1.08
1881	0.070	7.36	36.79	1.16
1933	0.075	7.37	37.77	1.24
1949	0.080	7.38	38.05	1.32
1905	0.085	7.38	37.16	1.41
1893	0.090	7.39	36.90	1.49
1862	0.095	7.39	36.26	1.57
1819	0.100	7.40	35.40	1.66
1320	0.120	7.43	25.60	1.99
1123	0.140	7.45	21.71	2.32
871	0.160	7.48	16.78	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 211	Cure Days:	28
Sample No.:	B5-4	Test Date:	01/07/11
Soil Description:	Silty Sand	Dry Density (pcf):	88.4
Sample Type:	Soil-Cement	Moisture Content (%):	32.5
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1487.84
Sample Height (inches):	6.023	Wt. Dry Soil+Container(gms):	1159.12
Sample Weight (gms):	1340.57	Wt. Container (gms):	149.22

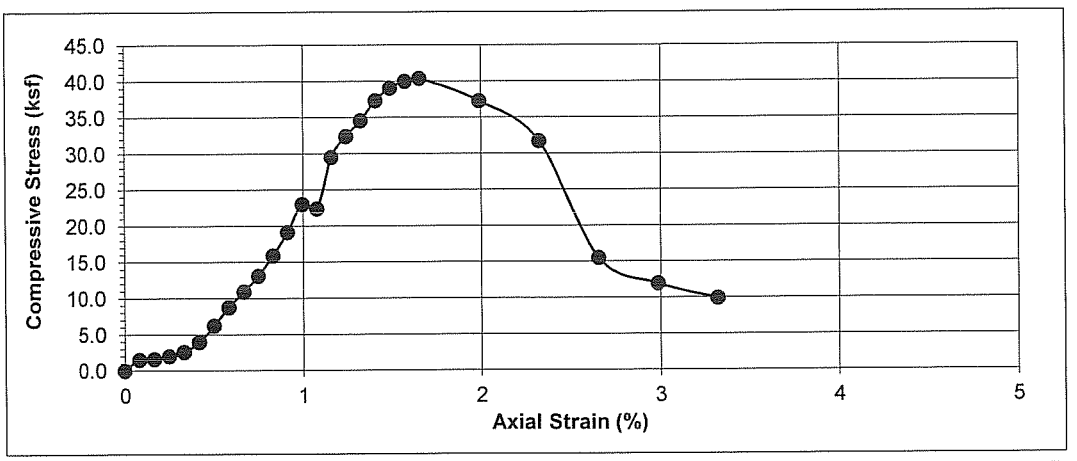


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
97	0.005	7.24	1.93	0.08
143	0.010	7.25	2.84	0.17
280	0.015	7.25	5.56	0.25
421	0.020	7.26	8.35	0.33
590	0.025	7.26	11.69	0.42
699	0.030	7.27	13.84	0.50
870	0.035	7.28	17.22	0.58
1028	0.040	7.28	20.33	0.66
1193	0.045	7.29	23.57	0.75
1355	0.050	7.30	26.75	0.83
1530	0.055	7.30	30.18	0.91
1655	0.060	7.31	32.61	1.00
1789	0.065	7.31	35.23	1.08
1945	0.070	7.32	38.26	1.16
2038	0.075	7.33	40.06	1.25
2094	0.080	7.33	41.13	1.33
2121	0.085	7.34	41.62	1.41
2113	0.090	7.34	41.43	1.49
2089	0.095	7.35	40.92	1.58
2082	0.100	7.36	40.75	1.66
1844	0.120	7.38	35.97	1.99
1310	0.140	7.41	25.47	2.32
652	0.160	7.43	12.63	2.66
503	0.180	7.46	9.71	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 211	Cure Days:	28
Sample No.:	B5-5	Test Date:	01/07/11
Soil Description:	Silty Sand	Dry Density (pcf):	88.1
Sample Type:	Soil-Cement	Moisture Content (%):	32.6
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1484.52
Sample Height (inches):	6.029	Wt. Dry Soil+Container(gms):	1155.92
Sample Weight (gms):	1338.55	Wt. Container (gms):	148.42

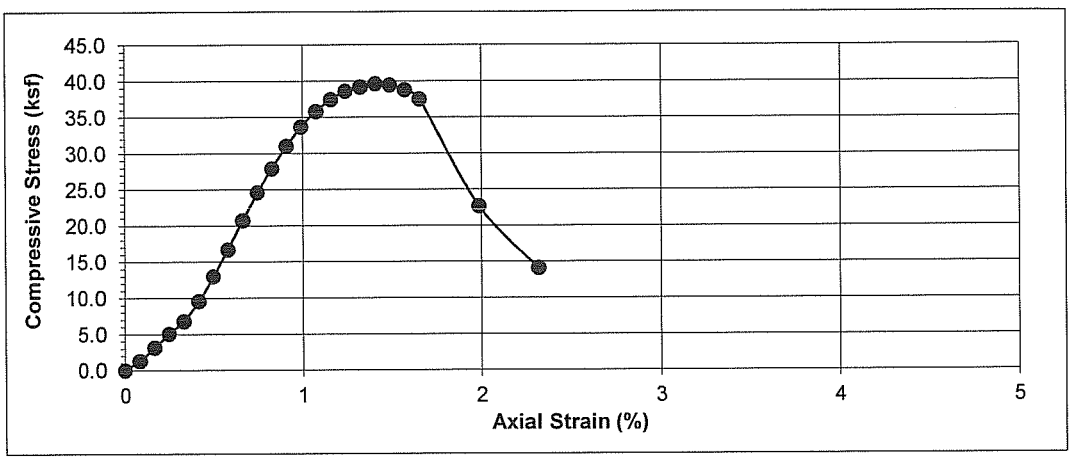


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
75	0.005	7.24	1.49	0.08
80	0.010	7.25	1.59	0.17
101	0.015	7.25	2.01	0.25
128	0.020	7.26	2.54	0.33
199	0.025	7.26	3.94	0.41
313	0.030	7.27	6.20	0.50
442	0.035	7.28	8.75	0.58
552	0.040	7.28	10.91	0.66
663	0.045	7.29	13.10	0.75
805	0.050	7.29	15.89	0.83
969	0.055	7.30	19.11	0.91
1167	0.060	7.31	23.00	1.00
1136	0.065	7.31	22.37	1.08
1499	0.070	7.32	29.49	1.16
1647	0.075	7.33	32.38	1.24
1759	0.080	7.33	34.55	1.33
1901	0.085	7.34	37.31	1.41
1991	0.090	7.34	39.04	1.49
2041	0.095	7.35	39.99	1.58
2062	0.100	7.36	40.36	1.66
1910	0.120	7.38	37.26	1.99
1631	0.140	7.41	31.71	2.32
799	0.160	7.43	15.48	2.65
617	0.180	7.46	11.91	2.99
514	0.200	7.48	9.89	3.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 211	Cure Days:	56
Sample No.:	B5-8	Test Date:	02/04/11
Soil Description:	Silty Sand	Dry Density (pcf):	88.0
Sample Type:	Soil-Cement	Moisture Content (%):	32.3
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1443.17
Sample Height (inches):	6.042	Wt. Dry Soil+Container(gms):	1116.38
Sample Weight (gms):	1340.65	Wt. Container (gms):	105.16

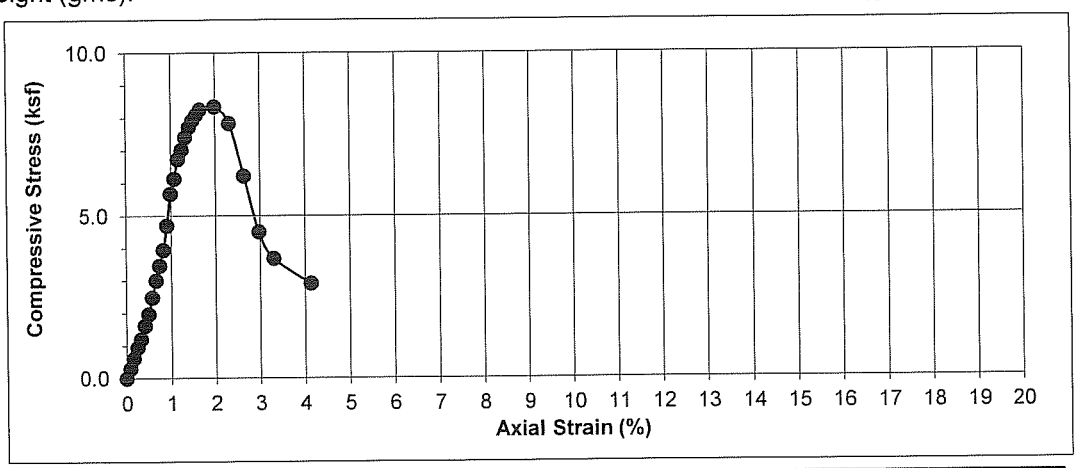


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
64	0.005	7.26	1.27	0.08
159	0.010	7.27	3.15	0.17
255	0.015	7.28	5.05	0.25
343	0.020	7.28	6.78	0.33
484	0.025	7.29	9.56	0.41
658	0.030	7.29	12.99	0.50
846	0.035	7.30	16.69	0.58
1052	0.040	7.31	20.73	0.66
1248	0.045	7.31	24.57	0.74
1417	0.050	7.32	27.88	0.83
1576	0.055	7.33	30.98	0.91
1713	0.060	7.33	33.65	0.99
1824	0.065	7.34	35.80	1.08
1910	0.070	7.34	37.45	1.16
1970	0.075	7.35	38.60	1.24
2001	0.080	7.36	39.17	1.32
2024	0.085	7.36	39.59	1.41
2018	0.090	7.37	39.44	1.49
1986	0.095	7.37	38.78	1.57
1921	0.100	7.38	37.48	1.66
1167	0.120	7.41	22.69	1.99
728	0.140	7.43	14.11	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/14/10
Boring No.:	A 10 212	Cure Days:	7
Sample No.:	B1-1	Test Date:	12/21/10
Soil Description:	Silty Sand	Dry Density (pcf):	81.2
Sample Type:	Soil-Cement	Moisture Content (%):	35.4
Sample Diameter (inches):	3.042	Wt. Wet Soil+Container(gms):	1417.4
Sample Height (inches):	6.050	Wt. Dry Soil+Container(gms):	1085.76
Sample Weight (gms):	1269.65	Wt. Container (gms):	149.29

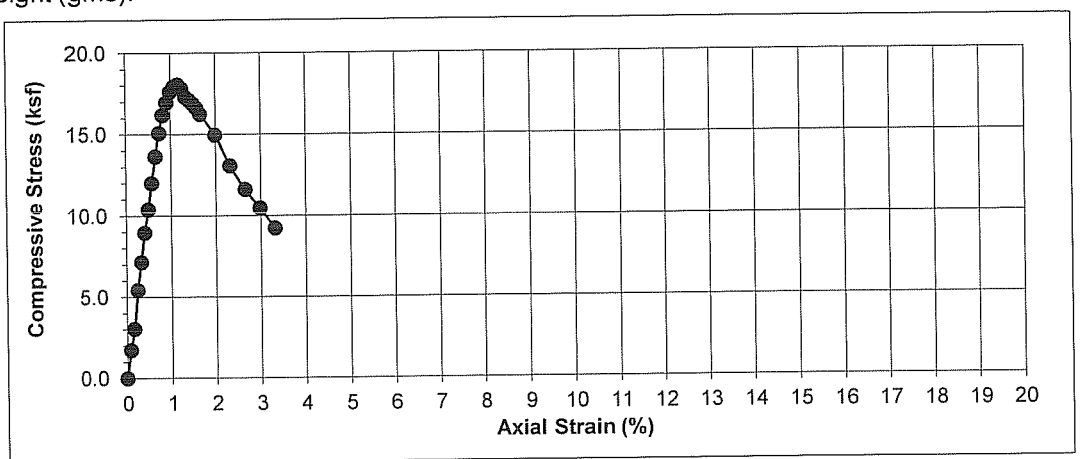


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
15	0.005	7.27	0.30	0.08
31	0.010	7.28	0.61	0.17
48	0.015	7.29	0.95	0.25
61	0.020	7.29	1.20	0.33
82	0.025	7.30	1.62	0.41
100	0.030	7.30	1.97	0.50
126	0.035	7.31	2.48	0.58
153	0.040	7.32	3.01	0.66
176	0.045	7.32	3.46	0.74
201	0.050	7.33	3.95	0.83
239	0.055	7.33	4.69	0.91
289	0.060	7.34	5.67	0.99
313	0.065	7.35	6.13	1.07
344	0.070	7.35	6.74	1.16
359	0.075	7.36	7.02	1.24
379	0.080	7.37	7.41	1.32
395	0.085	7.37	7.72	1.40
406	0.090	7.38	7.92	1.49
415	0.095	7.38	8.09	1.57
424	0.100	7.39	8.26	1.65
430	0.120	7.41	8.35	1.98
405	0.140	7.44	7.84	2.31
322	0.160	7.47	6.21	2.64
234	0.180	7.49	4.50	2.98
192	0.200	7.52	3.68	3.31
153	0.250	7.58	2.91	4.13

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/14/10
Boring No.:	A 10 212	Cure Days:	7
Sample No.:	B1-2	Test Date:	12/21/10
Soil Description:	Silty Sand	Dry Density (pcf):	84.6
Sample Type:	Soil-Cement	Moisture Content (%):	30.2
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1409.66
Sample Height (inches):	6.027	Wt. Dry Soil+Container(gms):	1117.29
Sample Weight (gms):	1265.32	Wt. Container (gms):	148.02

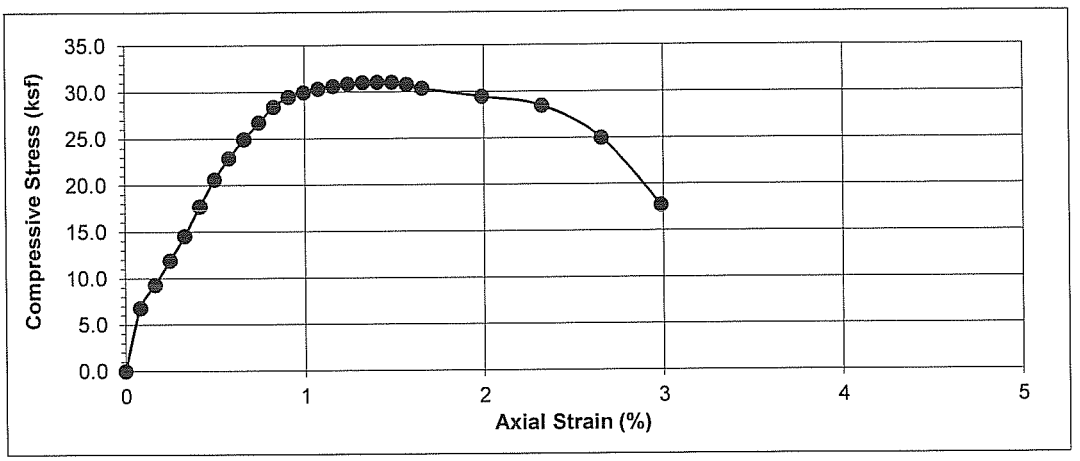


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
87	0.005	7.26	1.72	0.08
153	0.010	7.27	3.03	0.17
274	0.015	7.28	5.42	0.25
361	0.020	7.28	7.14	0.33
453	0.025	7.29	8.95	0.41
526	0.030	7.29	10.38	0.50
608	0.035	7.30	11.99	0.58
692	0.040	7.31	13.64	0.66
766	0.045	7.31	15.08	0.75
822	0.050	7.32	16.17	0.83
862	0.055	7.33	16.95	0.91
897	0.060	7.33	17.62	1.00
914	0.065	7.34	17.94	1.08
921	0.070	7.34	18.06	1.16
911	0.075	7.35	17.85	1.24
884	0.080	7.36	17.31	1.33
875	0.085	7.36	17.11	1.41
864	0.090	7.37	16.89	1.49
851	0.095	7.37	16.62	1.58
832	0.100	7.38	16.23	1.66
769	0.120	7.41	14.95	1.99
674	0.140	7.43	13.06	2.32
601	0.160	7.46	11.61	2.65
543	0.180	7.48	10.45	2.99
480	0.200	7.51	9.21	3.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/14/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B1-3	Test Date:	01/11/11
Soil Description:	Silty Sand	Dry Density (pcf):	84.0
Sample Type:	Soil-Cement	Moisture Content (%):	34.2
Sample Diameter (inches):	3.029	Wt. Wet Soil+Container(gms):	1436.33
Sample Height (inches):	6.026	Wt. Dry Soil+Container(gms):	1109.84
Sample Weight (gms):	1285.83	Wt. Container (gms):	156.11

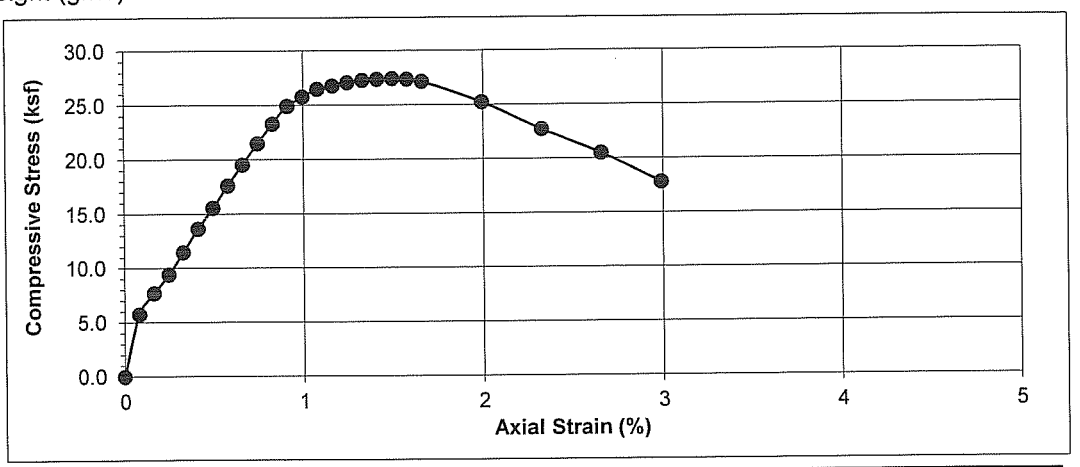


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
340	0.005	7.21	6.79	0.08
466	0.010	7.22	9.30	0.17
597	0.015	7.22	11.90	0.25
730	0.020	7.23	14.54	0.33
890	0.025	7.24	17.71	0.41
1037	0.030	7.24	20.62	0.50
1152	0.035	7.25	22.89	0.58
1256	0.040	7.25	24.93	0.66
1347	0.045	7.26	26.72	0.75
1433	0.050	7.27	28.40	0.83
1488	0.055	7.27	29.46	0.91
1513	0.060	7.28	29.93	1.00
1534	0.065	7.28	30.32	1.08
1550	0.070	7.29	30.61	1.16
1563	0.075	7.30	30.85	1.24
1571	0.080	7.30	30.98	1.33
1574	0.085	7.31	31.01	1.41
1575	0.090	7.32	31.00	1.49
1564	0.095	7.32	30.76	1.58
1544	0.100	7.33	30.34	1.66
1504	0.120	7.35	29.46	1.99
1458	0.140	7.38	28.46	2.32
1284	0.160	7.40	24.98	2.66
914	0.180	7.43	17.72	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/14/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B1-4	Test Date:	01/11/11
Soil Description:	Silty Sand	Dry Density (pcf):	82.8
Sample Type:	Soil-Cement	Moisture Content (%):	34.5
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1420.61
Sample Height (inches):	6.018	Wt. Dry Soil+Container(gms):	1096.69
Sample Weight (gms):	1268.40	Wt. Container (gms):	156.51



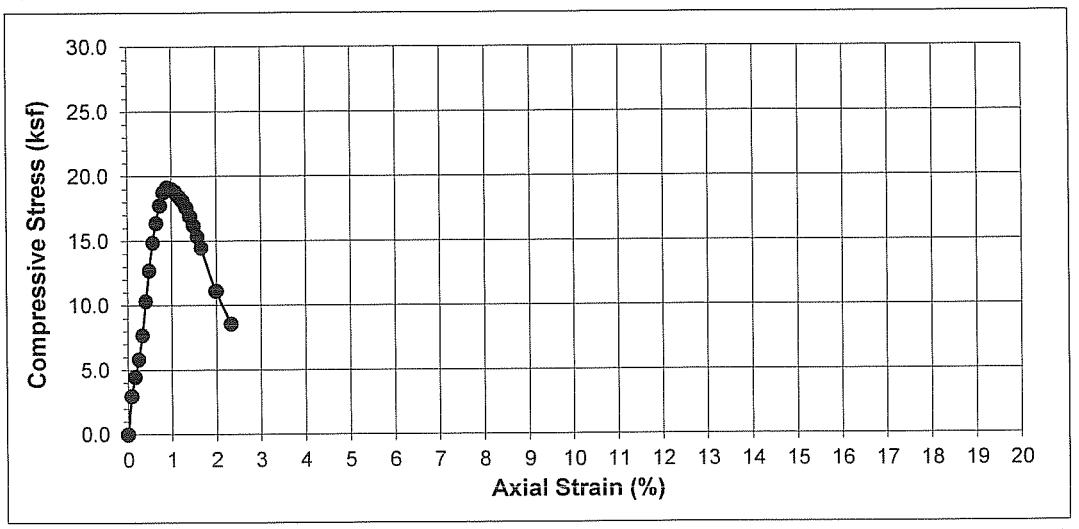
Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
287	0.005	7.22	5.73	0.08
385	0.010	7.22	7.68	0.17
472	0.015	7.23	9.40	0.25
575	0.020	7.23	11.44	0.33
685	0.025	7.24	13.62	0.42
782	0.030	7.25	15.54	0.50
886	0.035	7.25	17.59	0.58
984	0.040	7.26	19.52	0.66
1083	0.045	7.27	21.47	0.75
1175	0.050	7.27	23.27	0.83
1258	0.055	7.28	24.89	0.91
1302	0.060	7.28	25.74	1.00
1340	0.065	7.29	26.47	1.08
1356	0.070	7.30	26.76	1.16
1372	0.075	7.30	27.06	1.25
1384	0.080	7.31	27.27	1.33
1390	0.085	7.31	27.37	1.41
1394	0.090	7.32	27.42	1.50
1392	0.095	7.33	27.36	1.58
1382	0.100	7.33	27.14	1.66
1289	0.120	7.36	25.23	1.99
1164	0.140	7.38	22.70	2.33
1053	0.160	7.41	20.47	2.66
918	0.180	7.43	17.78	2.99

AT SOUTH SIDE (PIER S)

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 201	Cure Days:	7
Sample No.:	B2-1	Test Date:	12/27/10
Soil Description:	Silty Sand	Dry Density (pcf):	90.2
Sample Type:	Soil-Cement	Moisture Content (%):	30.9
Sample Diameter (inches):	3.034	Wt. Wet Soil+Container(gms):	1453.64
Sample Height (inches):	6.026	Wt. Dry Soil+Container(gms):	1135.5
Sample Weight (gms):	1350.51	Wt. Container (gms):	105.10

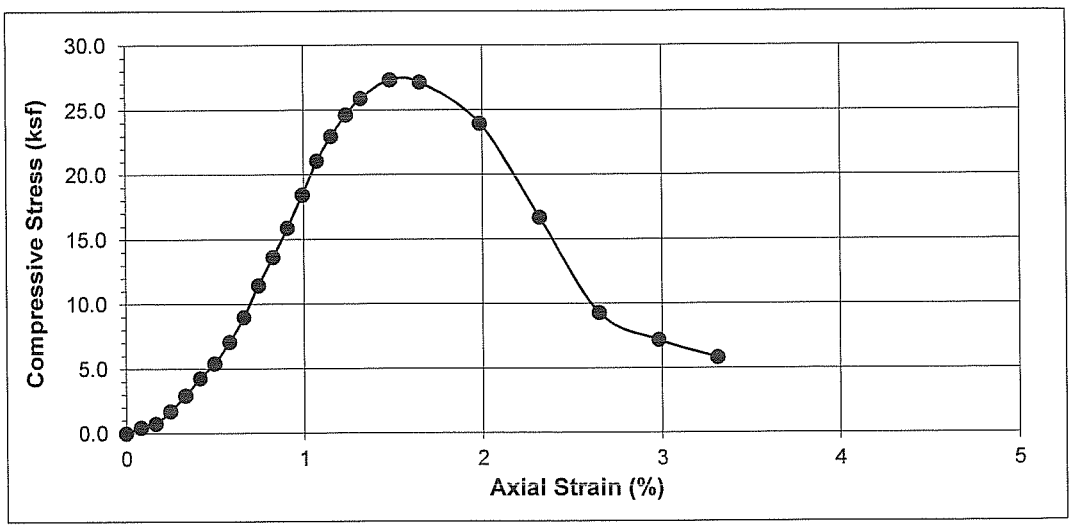


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
149	0.005	7.24	2.97	0.08
224	0.010	7.24	4.45	0.17
294	0.015	7.25	5.84	0.25
387	0.020	7.25	7.68	0.33
520	0.025	7.26	10.31	0.41
641	0.030	7.27	12.70	0.50
751	0.035	7.27	14.87	0.58
828	0.040	7.28	16.38	0.66
898	0.045	7.28	17.75	0.75
950	0.050	7.29	18.76	0.83
969	0.055	7.30	19.12	0.91
964	0.060	7.30	19.01	1.00
954	0.065	7.31	18.80	1.08
936	0.070	7.31	18.43	1.16
921	0.075	7.32	18.12	1.24
895	0.080	7.33	17.59	1.33
860	0.085	7.33	16.89	1.41
824	0.090	7.34	16.17	1.49
782	0.095	7.35	15.33	1.58
739	0.100	7.35	14.47	1.66
569	0.120	7.38	11.11	1.99
440	0.140	7.40	8.56	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 201	Cure Days:	28
Sample No.:	B2-2	Test Date:	01/17/11
Soil Description:	Silty Sand	Dry Density (pcf):	92.0
Sample Type:	Soil-Cement	Moisture Content (%):	28.3
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1457.95
Sample Height (inches):	6.038	Wt. Dry Soil+Container(gms):	1158.95
Sample Weight (gms):	1359.07	Wt. Container (gms):	103.60

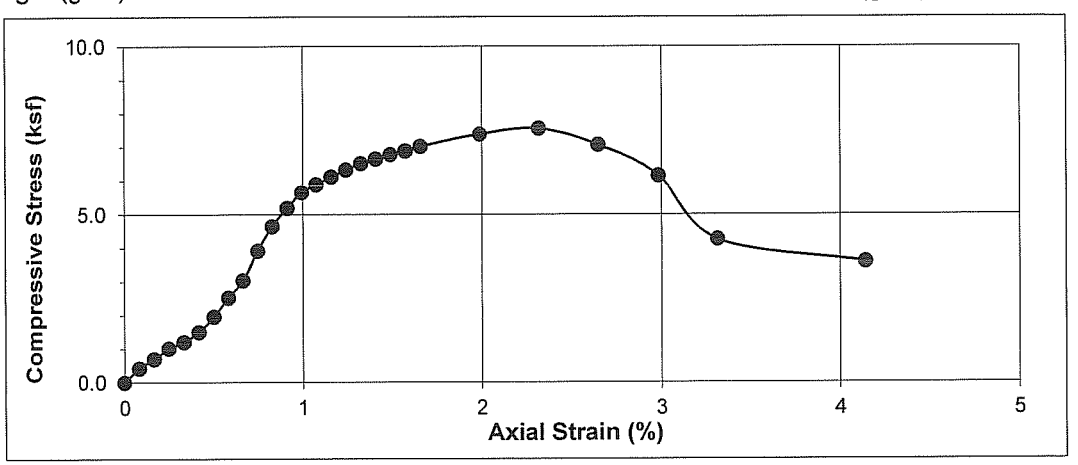


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
23	0.005	7.26	0.46	0.08
38	0.010	7.27	0.75	0.17
86	0.015	7.28	1.70	0.25
148	0.020	7.28	2.93	0.33
216	0.025	7.29	4.27	0.41
274	0.030	7.29	5.41	0.50
359	0.035	7.30	7.08	0.58
456	0.040	7.31	8.99	0.66
581	0.045	7.31	11.44	0.75
692	0.050	7.32	13.62	0.83
808	0.055	7.33	15.88	0.91
939	0.060	7.33	18.44	0.99
1073	0.065	7.34	21.06	1.08
1170	0.070	7.34	22.94	1.16
1256	0.075	7.35	24.61	1.24
1322	0.080	7.36	25.88	1.32
1398	0.090	7.37	27.32	1.49
1391	0.100	7.38	27.14	1.66
1232	0.120	7.41	23.96	1.99
861	0.140	7.43	16.69	2.32
481	0.160	7.46	9.29	2.65
372	0.180	7.48	7.16	2.98
303	0.200	7.51	5.81	3.31

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	10
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	10
Sample No.:	B5-1	Test Date:	12/27/10
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	85.4
Sample Type:	Soil-Cement	Moisture Content (%):	32.6
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1401.27
Sample Height (inches):	6.035	Wt. Dry Soil+Container(gms):	1082.48
Sample Weight (gms):	1302.01	Wt. Container (gms):	105.63

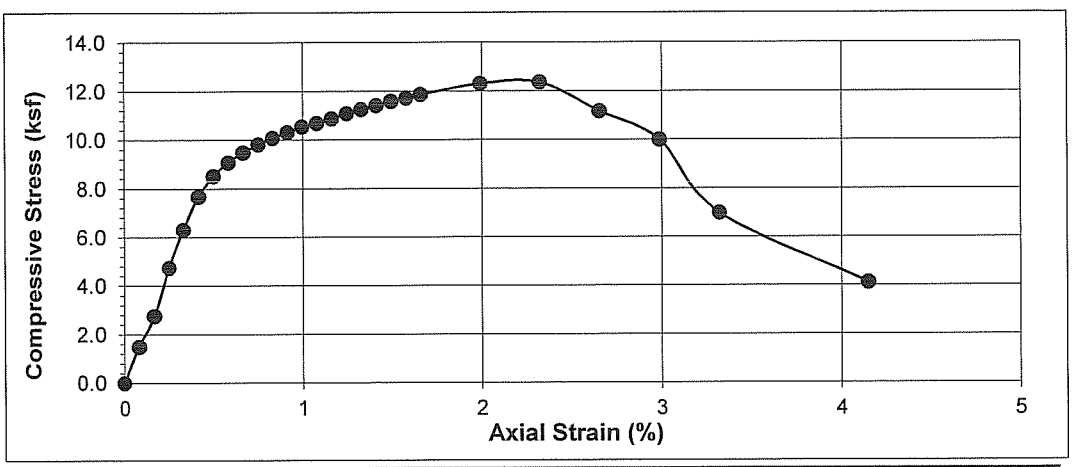


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
21	0.005	7.26	0.42	0.08
35	0.010	7.27	0.69	0.17
51	0.015	7.28	1.01	0.25
61	0.020	7.28	1.21	0.33
76	0.025	7.29	1.50	0.41
99	0.030	7.29	1.95	0.50
128	0.035	7.30	2.52	0.58
154	0.040	7.31	3.03	0.66
199	0.045	7.31	3.92	0.75
236	0.050	7.32	4.64	0.83
264	0.055	7.33	5.19	0.91
288	0.060	7.33	5.66	0.99
300	0.065	7.34	5.89	1.08
312	0.070	7.34	6.12	1.16
323	0.075	7.35	6.33	1.24
333	0.080	7.36	6.52	1.33
340	0.085	7.36	6.65	1.41
347	0.090	7.37	6.78	1.49
353	0.095	7.37	6.89	1.57
360	0.100	7.38	7.02	1.66
380	0.120	7.41	7.39	1.99
390	0.140	7.43	7.56	2.32
366	0.160	7.46	7.07	2.65
320	0.180	7.48	6.16	2.98
222	0.200	7.51	4.26	3.31
189	0.250	7.57	3.59	4.14

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	10
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	28
Sample No.:	B5-2	Test Date:	01/14/11
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	83.8
Sample Type:	Soil-Cement	Moisture Content (%):	36.6
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1458.32
Sample Height (inches):	6.022	Wt. Dry Soil+Container(gms):	1107.8
Sample Weight (gms):	1310.47	Wt. Container (gms):	149.68

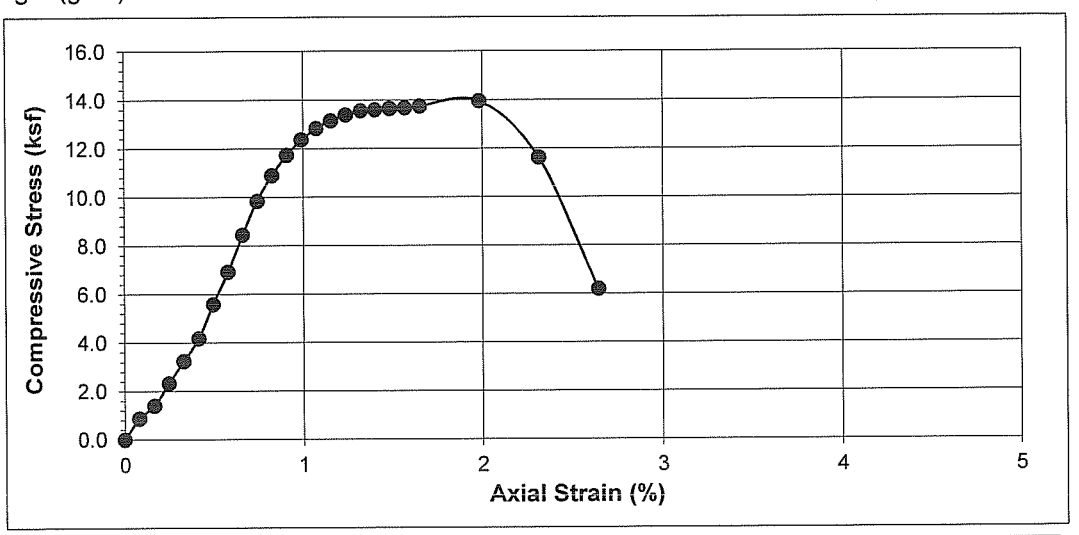


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
75	0.005	7.25	1.49	0.08
139	0.010	7.25	2.76	0.17
239	0.015	7.26	4.74	0.25
318	0.020	7.26	6.30	0.33
387	0.025	7.27	7.67	0.42
430	0.030	7.28	8.51	0.50
459	0.035	7.28	9.08	0.58
480	0.040	7.29	9.48	0.66
497	0.045	7.29	9.81	0.75
511	0.050	7.30	10.08	0.83
523	0.055	7.31	10.31	0.91
535	0.060	7.31	10.54	1.00
543	0.065	7.32	10.68	1.08
553	0.070	7.32	10.87	1.16
564	0.075	7.33	11.08	1.25
573	0.080	7.34	11.25	1.33
582	0.085	7.34	11.41	1.41
591	0.090	7.35	11.58	1.49
598	0.095	7.36	11.71	1.58
606	0.100	7.36	11.85	1.66
631	0.120	7.39	12.30	1.99
636	0.140	7.41	12.36	2.32
577	0.160	7.44	11.17	2.66
518	0.180	7.46	10.00	2.99
363	0.200	7.49	6.98	3.32
216	0.250	7.55	4.12	4.15

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	10
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	56
Sample No.:	B5-3	Test Date:	02/11/11
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	82.3
Sample Type:	Soil-Cement	Moisture Content (%):	37.6
Sample Diameter (inches):	3.042	Wt. Wet Soil+Container(gms):	1454.15
Sample Height (inches):	6.052	Wt. Dry Soil+Container(gms):	1097.61
Sample Weight (gms):	1307.78	Wt. Container (gms):	149.57

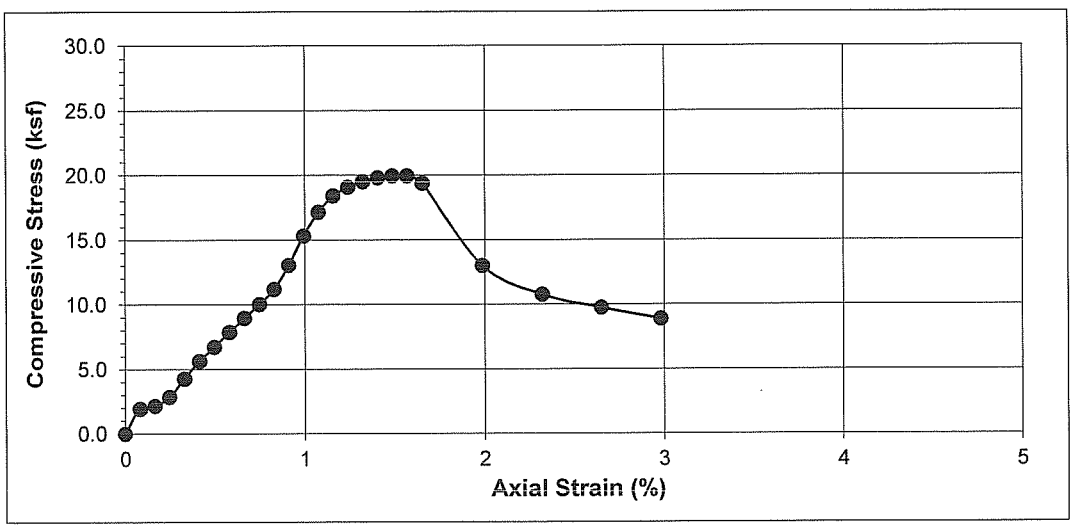


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
44	0.005	7.27	0.87	0.08
71	0.010	7.28	1.40	0.17
118	0.015	7.29	2.33	0.25
164	0.020	7.29	3.24	0.33
212	0.025	7.30	4.18	0.41
283	0.030	7.30	5.58	0.50
351	0.035	7.31	6.91	0.58
429	0.040	7.32	8.44	0.66
500	0.045	7.32	9.83	0.74
554	0.050	7.33	10.89	0.83
597	0.055	7.33	11.72	0.91
630	0.060	7.34	12.36	0.99
654	0.065	7.35	12.82	1.07
671	0.070	7.35	13.14	1.16
684	0.075	7.36	13.38	1.24
693	0.080	7.37	13.55	1.32
696	0.085	7.37	13.60	1.40
699	0.090	7.38	13.64	1.49
701	0.095	7.38	13.67	1.57
705	0.100	7.39	13.74	1.65
718	0.120	7.41	13.94	1.98
600	0.140	7.44	11.61	2.31
321	0.160	7.47	6.19	2.64

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	7
Sample No.:	B5-5	Test Date:	12/24/10
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	86.2
Sample Type:	Soil-Cement	Moisture Content (%):	31.6
Sample Diameter (inches):	3.039	Wt. Wet Soil+Container(gms):	1457.55
Sample Height (inches):	6.038	Wt. Dry Soil+Container(gms):	1145.07
Sample Weight (gms):	1303.31	Wt. Container (gms):	155.30

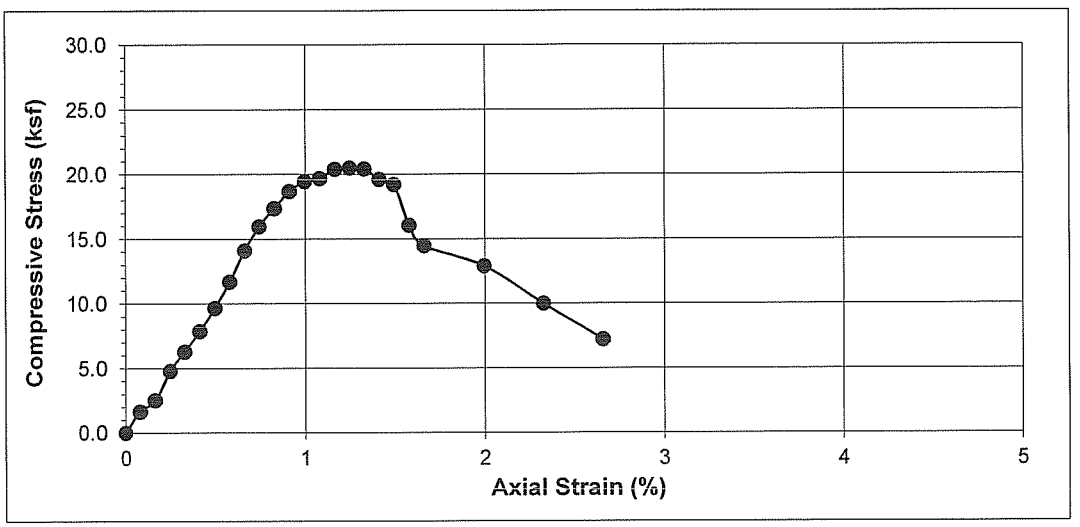


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
98	0.005	7.26	1.94	0.08
109	0.010	7.27	2.16	0.17
144	0.015	7.27	2.85	0.25
216	0.020	7.28	4.27	0.33
285	0.025	7.28	5.63	0.41
340	0.030	7.29	6.72	0.50
399	0.035	7.30	7.88	0.58
454	0.040	7.30	8.95	0.66
509	0.045	7.31	10.03	0.75
568	0.050	7.31	11.18	0.83
664	0.055	7.32	13.06	0.91
779	0.060	7.33	15.31	0.99
873	0.065	7.33	17.14	1.08
938	0.070	7.34	18.41	1.16
973	0.075	7.34	19.08	1.24
995	0.080	7.35	19.49	1.32
1012	0.085	7.36	19.81	1.41
1020	0.090	7.36	19.95	1.49
1021	0.095	7.37	19.95	1.57
993	0.100	7.38	19.39	1.66
668	0.120	7.40	13.00	1.99
555	0.140	7.43	10.76	2.32
504	0.160	7.45	9.74	2.65
461	0.180	7.48	8.88	2.98

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	10
Sample No.:	B5-6	Test Date:	12/27/10
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	83.1
Sample Type:	Soil-Cement	Moisture Content (%):	36.4
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1392.83
Sample Height (inches):	6.013	Wt. Dry Soil+Container(gms):	1048.42
Sample Weight (gms):	1294.96	Wt. Container (gms):	102.98

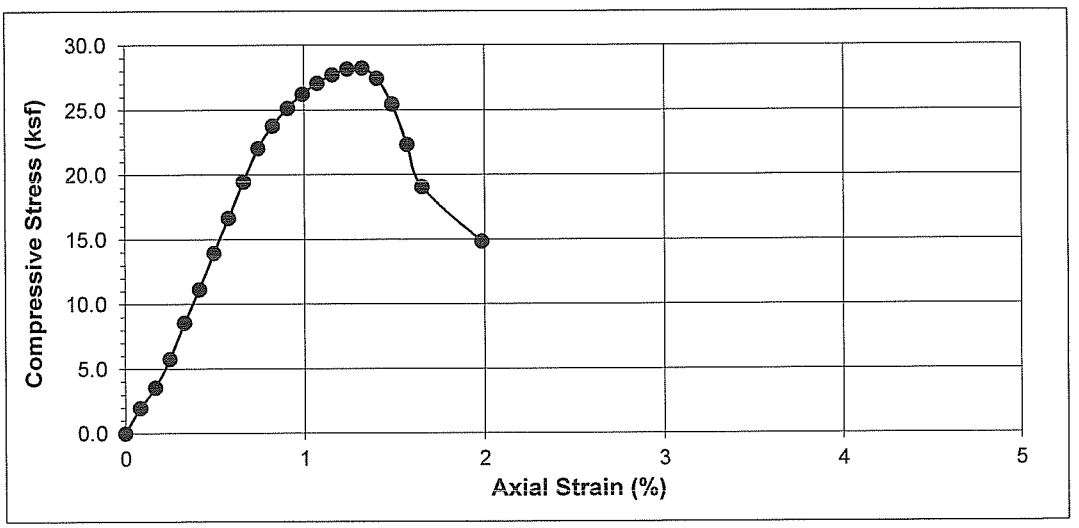


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
82	0.005	7.25	1.63	0.08
127	0.010	7.25	2.52	0.17
241	0.015	7.26	4.78	0.25
317	0.020	7.26	6.28	0.33
397	0.025	7.27	7.86	0.42
487	0.030	7.28	9.64	0.50
591	0.035	7.28	11.69	0.58
713	0.040	7.29	14.09	0.67
808	0.045	7.29	15.95	0.75
881	0.050	7.30	17.38	0.83
948	0.055	7.31	18.68	0.91
988	0.060	7.31	19.46	1.00
1000	0.065	7.32	19.68	1.08
1038	0.070	7.32	20.41	1.16
1043	0.075	7.33	20.49	1.25
1040	0.080	7.34	20.41	1.33
1000	0.085	7.34	19.61	1.41
980	0.090	7.35	19.20	1.50
820	0.095	7.36	16.05	1.58
740	0.100	7.36	14.47	1.66
662	0.120	7.39	12.91	2.00
514	0.140	7.41	9.99	2.33
373	0.160	7.44	7.22	2.66

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	56
Sample No.:	B5-11	Test Date:	02/11/11
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	82.8
Sample Type:	Soil-Cement	Moisture Content (%):	36.9
Sample Diameter (inches):	3.039	Wt. Wet Soil+Container(gms):	1450.89
Sample Height (inches):	6.047	Wt. Dry Soil+Container(gms):	1099.57
Sample Weight (gms):	1305.23	Wt. Container (gms):	147.88

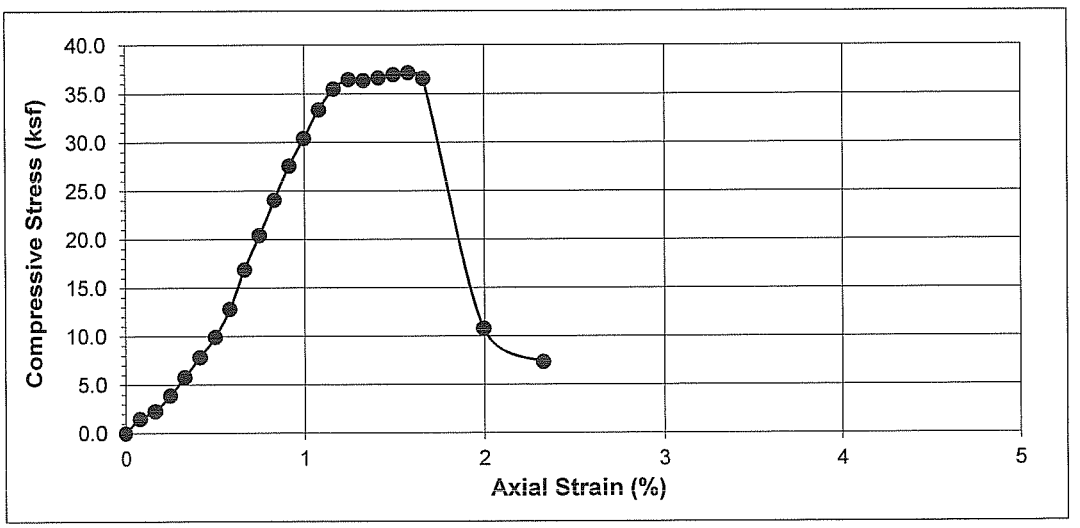


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
99	0.005	7.26	1.96	0.08
179	0.010	7.27	3.55	0.17
291	0.015	7.27	5.76	0.25
432	0.020	7.28	8.55	0.33
564	0.025	7.28	11.15	0.41
706	0.030	7.29	13.95	0.50
844	0.035	7.30	16.66	0.58
986	0.040	7.30	19.44	0.66
1118	0.045	7.31	22.03	0.74
1207	0.050	7.31	23.76	0.83
1278	0.055	7.32	25.14	0.91
1335	0.060	7.33	26.24	0.99
1379	0.065	7.33	27.08	1.07
1412	0.070	7.34	27.71	1.16
1436	0.075	7.34	28.15	1.24
1441	0.080	7.35	28.23	1.32
1402	0.085	7.36	27.44	1.41
1302	0.090	7.36	25.46	1.49
1143	0.095	7.37	22.33	1.57
976	0.100	7.38	19.06	1.65
762	0.120	7.40	14.83	1.98

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	10
Sample No.:	B5-15	Test Date:	12/27/10
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	87.1
Sample Type:	Soil-Cement	Moisture Content (%):	33.0
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1420.53
Sample Height (inches):	6.012	Wt. Dry Soil+Container(gms):	1093.83
Sample Weight (gms):	1318.09	Wt. Container (gms):	104.61

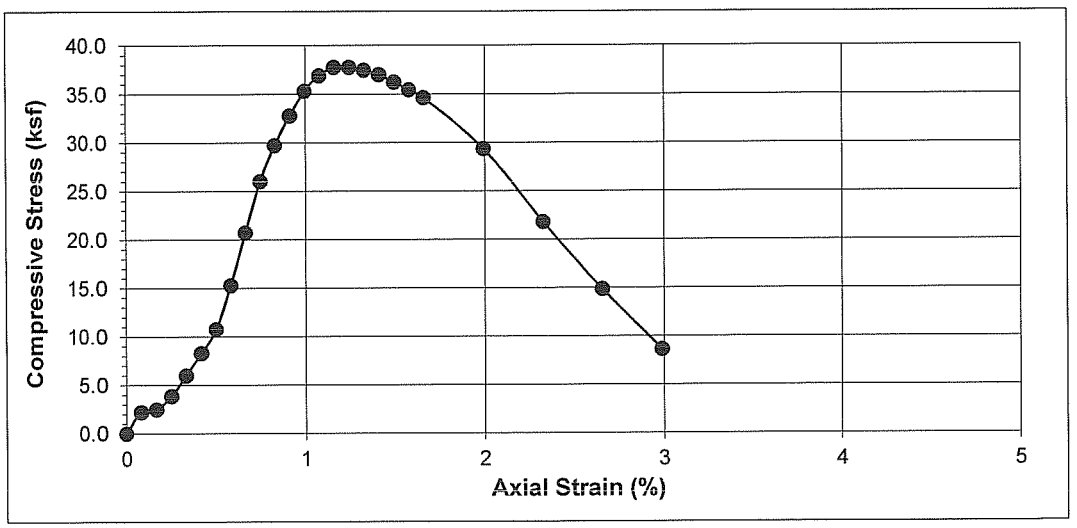


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
74	0.005	7.22	1.48	0.08
115	0.010	7.22	2.29	0.17
195	0.015	7.23	3.88	0.25
290	0.020	7.23	5.77	0.33
394	0.025	7.24	7.84	0.42
499	0.030	7.25	9.92	0.50
644	0.035	7.25	12.79	0.58
851	0.040	7.26	16.88	0.67
1030	0.045	7.27	20.42	0.75
1215	0.050	7.27	24.06	0.83
1392	0.055	7.28	27.54	0.91
1537	0.060	7.28	30.39	1.00
1688	0.065	7.29	33.35	1.08
1799	0.070	7.30	35.51	1.16
1848	0.075	7.30	36.44	1.25
1846	0.080	7.31	36.37	1.33
1861	0.085	7.31	36.64	1.41
1879	0.090	7.32	36.96	1.50
1890	0.095	7.33	37.15	1.58
1862	0.100	7.33	36.57	1.66
551	0.120	7.36	10.78	2.00
376	0.140	7.38	7.33	2.33

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	7
Sample No.:	B5-16	Test Date:	12/24/10
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	89.6
Sample Type:	Soil-Cement	Moisture Content (%):	28.3
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1414.48
Sample Height (inches):	6.022	Wt. Dry Soil+Container(gms):	1125.29
Sample Weight (gms):	1311.56	Wt. Container (gms):	104.89

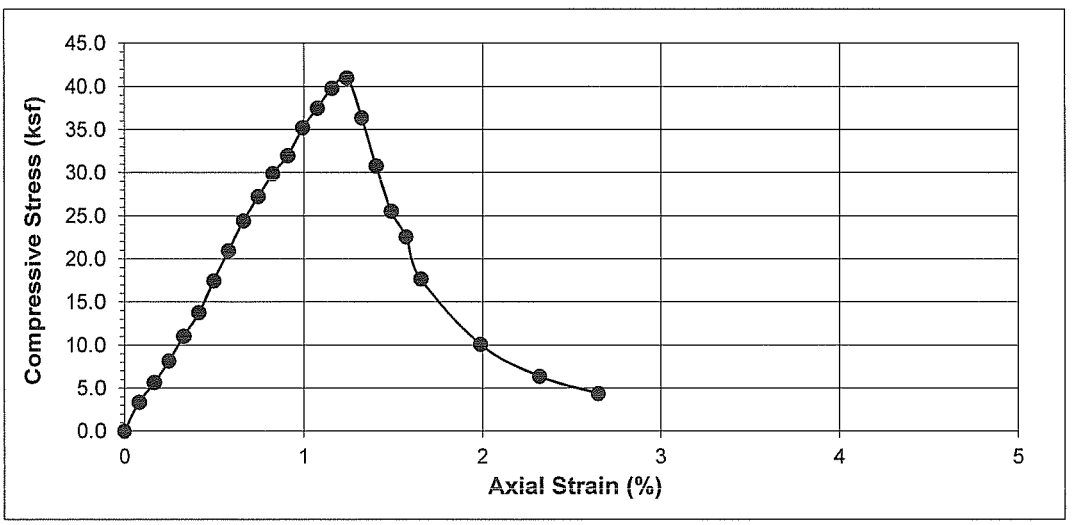


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
111	0.005	7.22	2.21	0.08
124	0.010	7.22	2.47	0.17
194	0.015	7.23	3.86	0.25
301	0.020	7.23	5.99	0.33
417	0.025	7.24	8.29	0.42
541	0.030	7.25	10.75	0.50
770	0.035	7.25	15.29	0.58
1044	0.040	7.26	20.71	0.66
1312	0.045	7.26	26.01	0.75
1500	0.050	7.27	29.71	0.83
1655	0.055	7.28	32.75	0.91
1785	0.060	7.28	35.29	1.00
1868	0.065	7.29	36.90	1.08
1912	0.070	7.30	37.74	1.16
1914	0.075	7.30	37.75	1.25
1900	0.080	7.31	37.44	1.33
1878	0.085	7.31	36.98	1.41
1841	0.090	7.32	36.22	1.49
1802	0.095	7.33	35.42	1.58
1762	0.100	7.33	34.60	1.66
1499	0.120	7.36	29.34	1.99
1118	0.140	7.38	21.81	2.32
764	0.160	7.41	14.85	2.66
445	0.180	7.43	8.62	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	28
Sample No.:	B5-18	Test Date:	01/14/11
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	84.1
Sample Type:	Soil-Cement	Moisture Content (%):	35.7
Sample Diameter (inches):	3.047	Wt. Wet Soil+Container(gms):	1468.05
Sample Height (inches):	6.033	Wt. Dry Soil+Container(gms):	1121.99
Sample Weight (gms):	1317.16	Wt. Container (gms):	152.05

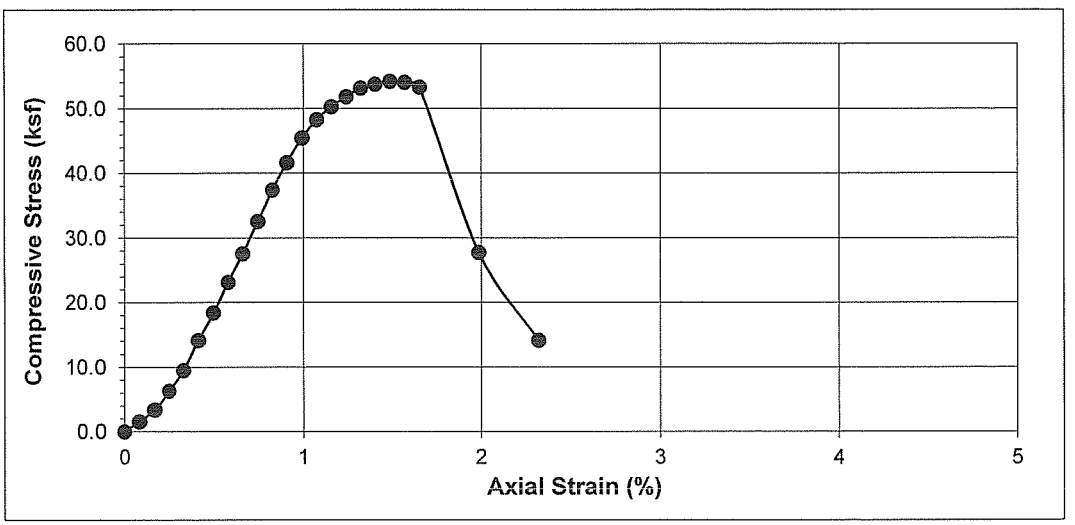


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.29	0.00	0.00
169	0.005	7.30	3.33	0.08
286	0.010	7.30	5.64	0.17
414	0.015	7.31	8.16	0.25
560	0.020	7.32	11.02	0.33
700	0.025	7.32	13.77	0.41
889	0.030	7.33	17.47	0.50
1068	0.035	7.33	20.97	0.58
1244	0.040	7.34	24.40	0.66
1389	0.045	7.35	27.23	0.75
1526	0.050	7.35	29.89	0.83
1634	0.055	7.36	31.97	0.91
1800	0.060	7.37	35.19	0.99
1919	0.065	7.37	37.49	1.08
2039	0.070	7.38	39.80	1.16
2102	0.075	7.38	40.99	1.24
1867	0.080	7.39	36.38	1.33
1581	0.085	7.40	30.78	1.41
1312	0.090	7.40	25.52	1.49
1160	0.095	7.41	22.55	1.57
910	0.100	7.41	17.67	1.66
521	0.120	7.44	10.08	1.99
330	0.140	7.47	6.37	2.32
226	0.160	7.49	4.34	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	56
Sample No.:	B5-21	Test Date:	02/11/11
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	84.7
Sample Type:	Soil-Cement	Moisture Content (%):	36.0
Sample Diameter (inches):	3.033	Wt. Wet Soil+Container(gms):	1467.48
Sample Height (inches):	6.039	Wt. Dry Soil+Container(gms):	1118.35
Sample Weight (gms):	1319.89	Wt. Container (gms):	148.77

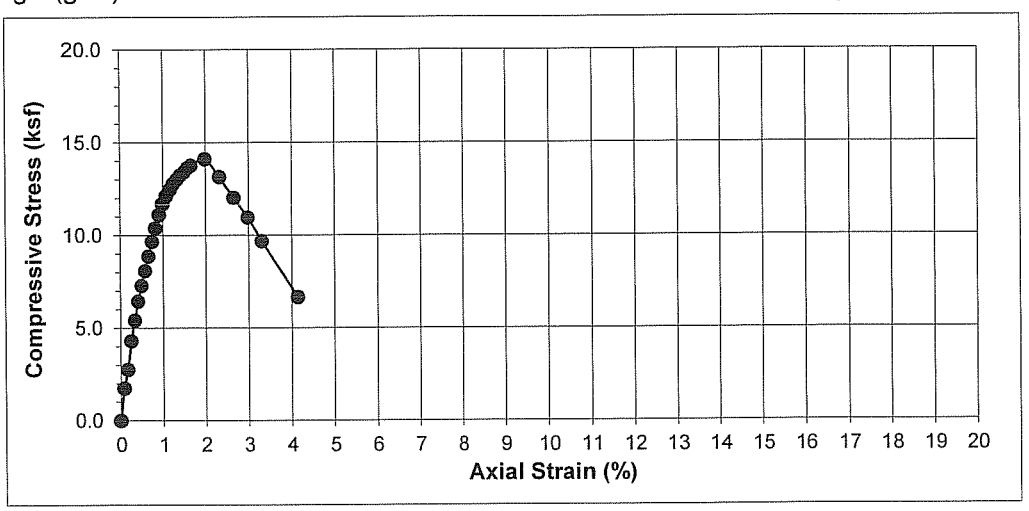


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
78	0.005	7.23	1.55	0.08
169	0.010	7.24	3.36	0.17
316	0.015	7.24	6.28	0.25
476	0.020	7.25	9.46	0.33
713	0.025	7.25	14.15	0.41
927	0.030	7.26	18.38	0.50
1167	0.035	7.27	23.12	0.58
1391	0.040	7.27	27.54	0.66
1645	0.045	7.28	32.54	0.75
1892	0.050	7.29	37.40	0.83
2109	0.055	7.29	41.65	0.91
2303	0.060	7.30	45.44	0.99
2449	0.065	7.30	48.29	1.08
2552	0.070	7.31	50.27	1.16
2633	0.075	7.32	51.83	1.24
2703	0.080	7.32	53.16	1.32
2735	0.085	7.33	53.74	1.41
2759	0.090	7.33	54.17	1.49
2756	0.095	7.34	54.07	1.57
2720	0.100	7.35	53.31	1.66
1421	0.120	7.37	27.76	1.99
727	0.140	7.40	14.15	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A-10-203	Cure Days:	7
Sample No.:	B-4-1	Test Date:	12/29/10
Soil Description:	Silty Sand	Dry Density (pcf):	84.8
Sample Type:	Soil-Cement	Moisture Content (%):	32.1
Sample Diameter (inches):	3.041	Wt. Wet Soil+Container(gms):	1442.9
Sample Height (inches):	6.040	Wt. Dry Soil+Container(gms):	1130.92
Sample Weight (gms):	1289.75	Wt. Container (gms):	158.80

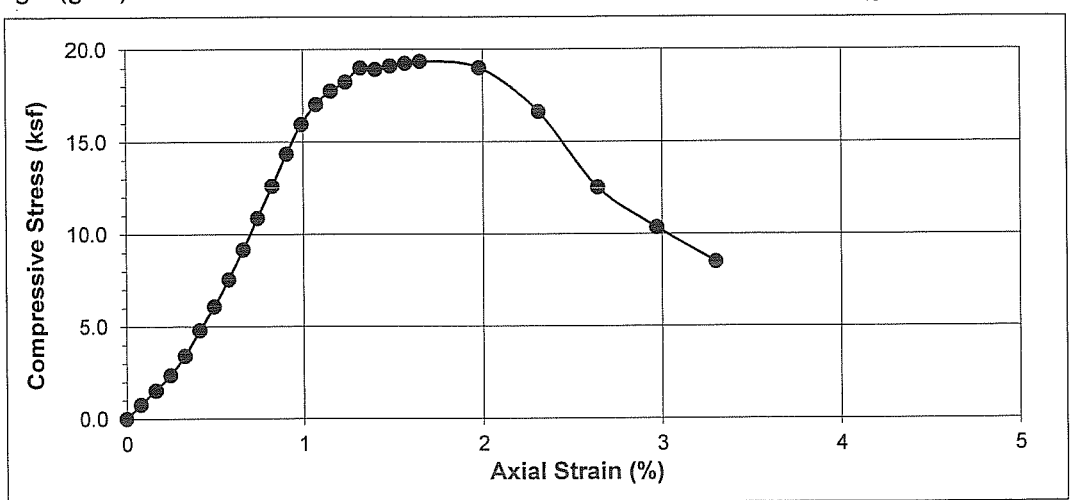


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
88	0.005	7.27	1.74	0.08
139	0.010	7.28	2.75	0.17
217	0.015	7.28	4.29	0.25
274	0.020	7.29	5.41	0.33
326	0.025	7.29	6.44	0.41
369	0.030	7.30	7.28	0.50
410	0.035	7.31	8.08	0.58
450	0.040	7.31	8.86	0.66
491	0.045	7.32	9.66	0.75
528	0.050	7.32	10.38	0.83
565	0.055	7.33	11.10	0.91
595	0.060	7.34	11.68	0.99
618	0.065	7.34	12.12	1.08
636	0.070	7.35	12.46	1.16
653	0.075	7.35	12.79	1.24
665	0.080	7.36	13.01	1.32
677	0.085	7.37	13.23	1.41
686	0.090	7.37	13.40	1.49
698	0.095	7.38	13.62	1.57
706	0.100	7.39	13.77	1.66
726	0.120	7.41	14.11	1.99
679	0.140	7.44	13.15	2.32
623	0.160	7.46	12.02	2.65
570	0.180	7.49	10.96	2.98
505	0.200	7.51	9.68	3.31
350	0.250	7.58	6.65	4.14

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A-10-203	Cure Days:	28
Sample No.:	B-4-3	Test Date:	01/19/11
Soil Description:	Silty Sand	Dry Density (pcf):	83.8
Sample Type:	Soil-Cement	Moisture Content (%):	32.5
Sample Diameter (inches):	3.046	Wt. Wet Soil+Container(gms):	1390.38
Sample Height (inches):	6.060	Wt. Dry Soil+Container(gms):	1075.08
Sample Weight (gms):	1287.64	Wt. Container (gms):	104.32

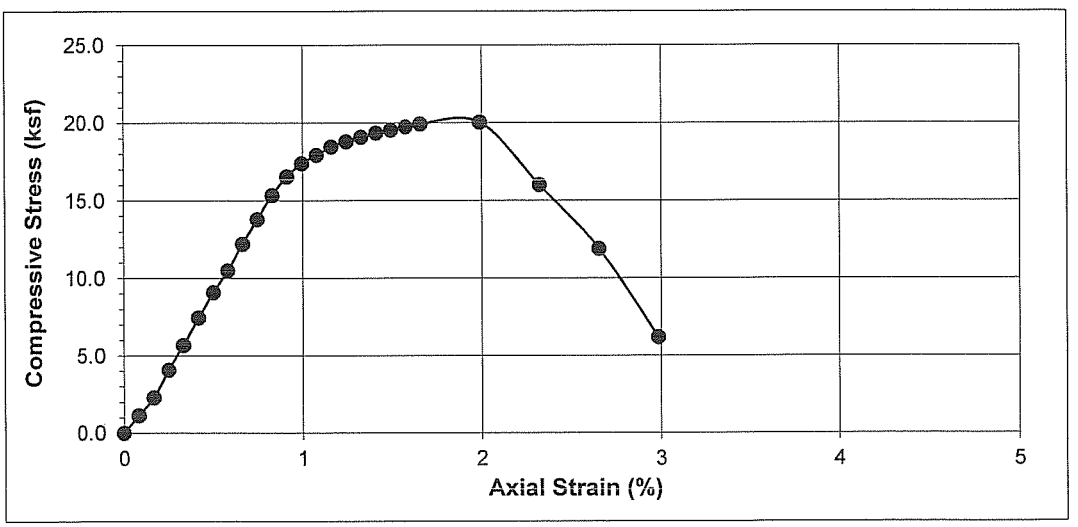


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.29	0.00	0.00
39	0.005	7.29	0.77	0.08
78	0.010	7.30	1.54	0.17
120	0.015	7.31	2.37	0.25
173	0.020	7.31	3.41	0.33
244	0.025	7.32	4.80	0.41
310	0.030	7.32	6.10	0.50
384	0.035	7.33	7.54	0.58
467	0.040	7.34	9.17	0.66
554	0.045	7.34	10.87	0.74
643	0.050	7.35	12.60	0.83
733	0.055	7.35	14.35	0.91
815	0.060	7.36	15.95	0.99
871	0.065	7.37	17.03	1.07
909	0.070	7.37	17.76	1.16
935	0.075	7.38	18.25	1.24
975	0.080	7.38	19.01	1.32
971	0.085	7.39	18.92	1.40
982	0.090	7.40	19.12	1.49
990	0.095	7.40	19.26	1.57
996	0.100	7.41	19.36	1.65
981	0.120	7.43	19.00	1.98
861	0.140	7.46	16.62	2.31
651	0.160	7.48	12.52	2.64
540	0.180	7.51	10.35	2.97
444	0.200	7.54	8.48	3.30

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A-10-203	Cure Days:	28
Sample No.:	B-4-4	Test Date:	01/19/11
Soil Description:	Silty Sand	Dry Density (pcf):	85.4
Sample Type:	Soil-Cement	Moisture Content (%):	31.8
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1392.2
Sample Height (inches):	6.029	Wt. Dry Soil+Container(gms):	1081.37
Sample Weight (gms):	1290.08	Wt. Container (gms):	103.83

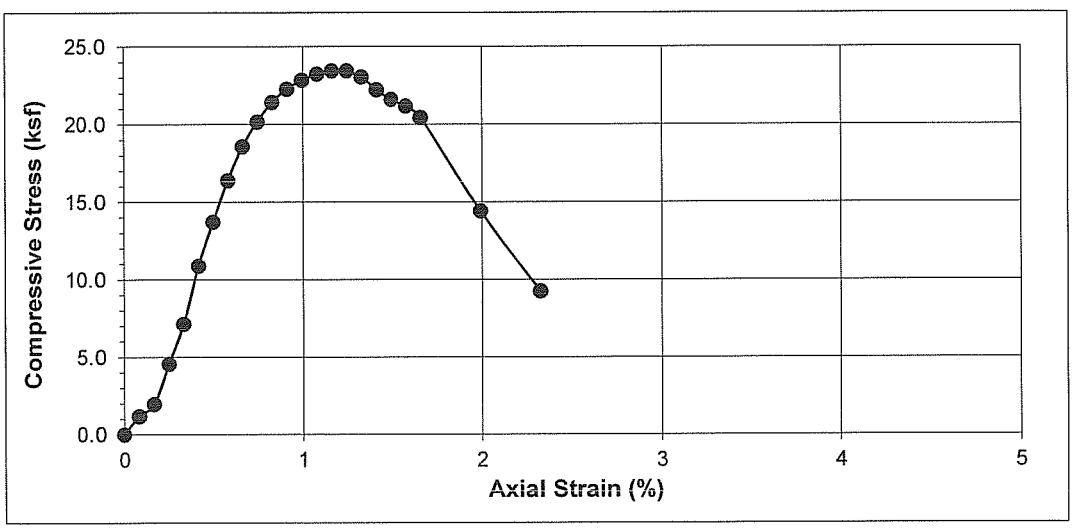


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
57	0.005	7.25	1.13	0.08
116	0.010	7.25	2.30	0.17
205	0.015	7.26	4.07	0.25
286	0.020	7.26	5.67	0.33
376	0.025	7.27	7.45	0.41
459	0.030	7.28	9.08	0.50
530	0.035	7.28	10.48	0.58
617	0.040	7.29	12.19	0.66
699	0.045	7.29	13.80	0.75
778	0.050	7.30	15.35	0.83
839	0.055	7.31	16.54	0.91
883	0.060	7.31	17.39	1.00
911	0.065	7.32	17.93	1.08
939	0.070	7.32	18.46	1.16
957	0.075	7.33	18.80	1.24
972	0.080	7.34	19.08	1.33
987	0.085	7.34	19.36	1.41
997	0.090	7.35	19.54	1.49
1009	0.095	7.36	19.75	1.58
1019	0.100	7.36	19.93	1.66
1028	0.120	7.39	20.04	1.99
824	0.140	7.41	16.01	2.32
614	0.160	7.44	11.89	2.65
320	0.180	7.46	6.18	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A-10-203	Cure Days:	56
Sample No.:	B-4-7	Test Date:	02/16/11
Soil Description:	Silty Sand	Dry Density (pcf):	85.0
Sample Type:	Soil-Cement	Moisture Content (%):	32.5
Sample Diameter (inches):	3.037	Wt. Wet Soil+Container(gms):	1439.43
Sample Height (inches):	6.022	Wt. Dry Soil+Container(gms):	1123.07
Sample Weight (gms):	1289.58	Wt. Container (gms):	150.91

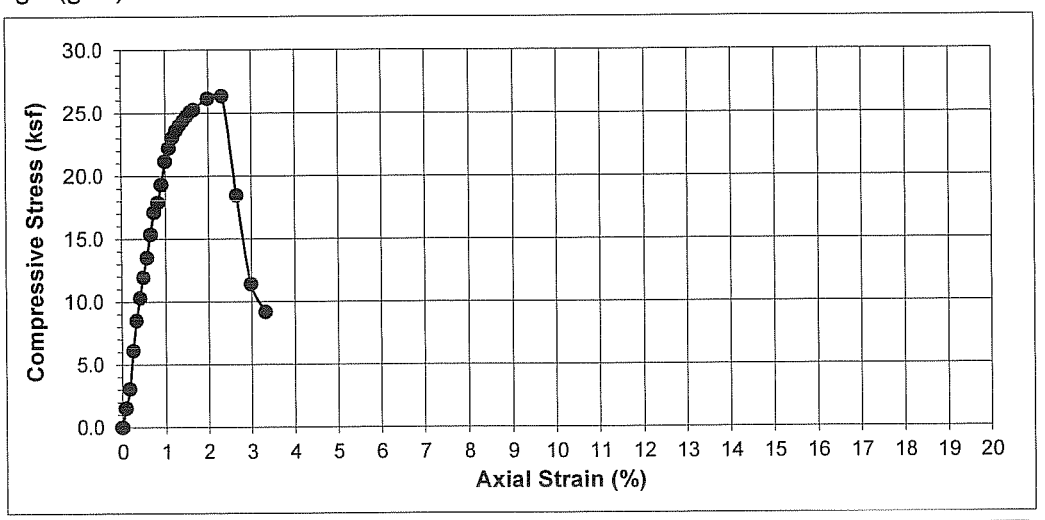


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
59	0.005	7.25	1.17	0.08
99	0.010	7.26	1.96	0.17
229	0.015	7.26	4.54	0.25
360	0.020	7.27	7.13	0.33
549	0.025	7.27	10.87	0.42
693	0.030	7.28	13.71	0.50
829	0.035	7.29	16.38	0.58
940	0.040	7.29	18.56	0.66
1022	0.045	7.30	20.16	0.75
1087	0.050	7.30	21.43	0.83
1131	0.055	7.31	22.28	0.91
1161	0.060	7.32	22.85	1.00
1182	0.065	7.32	23.24	1.08
1193	0.070	7.33	23.44	1.16
1195	0.075	7.34	23.46	1.25
1175	0.080	7.34	23.05	1.33
1134	0.085	7.35	22.22	1.41
1103	0.090	7.35	21.60	1.49
1082	0.095	7.36	21.17	1.58
1045	0.100	7.37	20.43	1.66
740	0.120	7.39	14.42	1.99
476	0.140	7.42	9.24	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A-10-203	Cure Days:	7
Sample No.:	B-4-9	Test Date:	12/29/10
Soil Description:	Silty Sand	Dry Density (pcf):	86.2
Sample Type:	Soil-Cement	Moisture Content (%):	30.6
Sample Diameter (inches):	3.042	Wt. Wet Soil+Container(gms):	1451.16
Sample Height (inches):	6.035	Wt. Dry Soil+Container(gms):	1148.41
Sample Weight (gms):	1296.35	Wt. Container (gms):	158.70

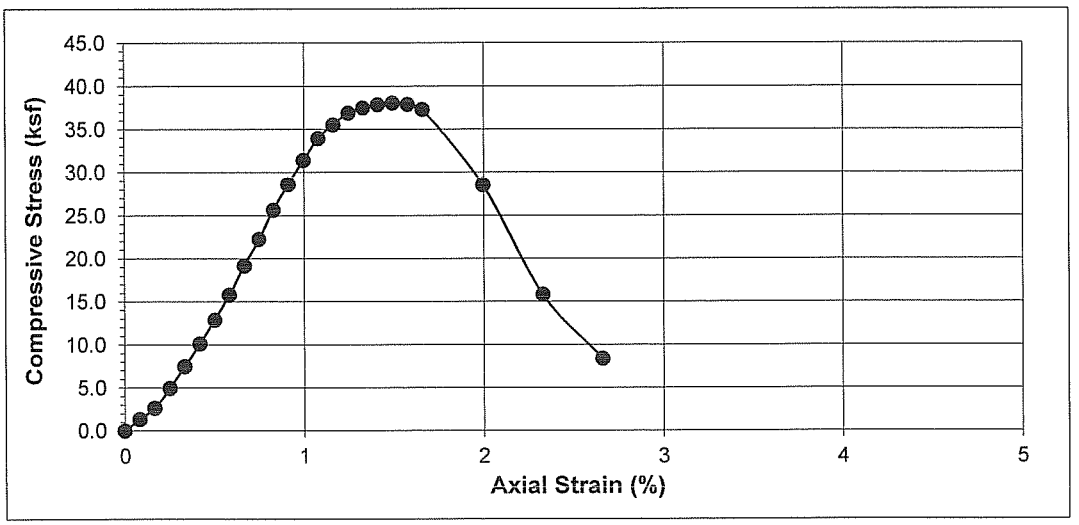


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
78	0.005	7.27	1.54	0.08
155	0.010	7.28	3.07	0.17
310	0.015	7.29	6.13	0.25
431	0.020	7.29	8.51	0.33
523	0.025	7.30	10.32	0.41
606	0.030	7.30	11.95	0.50
686	0.035	7.31	13.51	0.58
781	0.040	7.32	15.37	0.66
871	0.045	7.32	17.13	0.75
910	0.050	7.33	17.88	0.83
984	0.055	7.33	19.32	0.91
1080	0.060	7.34	21.19	0.99
1134	0.065	7.35	22.23	1.08
1177	0.070	7.35	23.05	1.16
1207	0.075	7.36	23.62	1.24
1229	0.080	7.37	24.03	1.33
1249	0.085	7.37	24.40	1.41
1268	0.090	7.38	24.75	1.49
1285	0.095	7.38	25.06	1.57
1296	0.100	7.39	25.25	1.66
1346	0.120	7.42	26.14	1.99
1361	0.140	7.44	26.34	2.32
957	0.160	7.47	18.46	2.65
593	0.180	7.49	11.40	2.98
480	0.200	7.52	9.20	3.31

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A-10-203	Cure Days:	28
Sample No.:	B-4-11	Test Date:	01/19/11
Soil Description:	Silty Sand	Dry Density (pcf):	88.1
Sample Type:	Soil-Cement	Moisture Content (%):	29.2
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1400.78
Sample Height (inches):	6.015	Wt. Dry Soil+Container(gms):	1107.63
Sample Weight (gms):	1297.80	Wt. Container (gms):	103.90

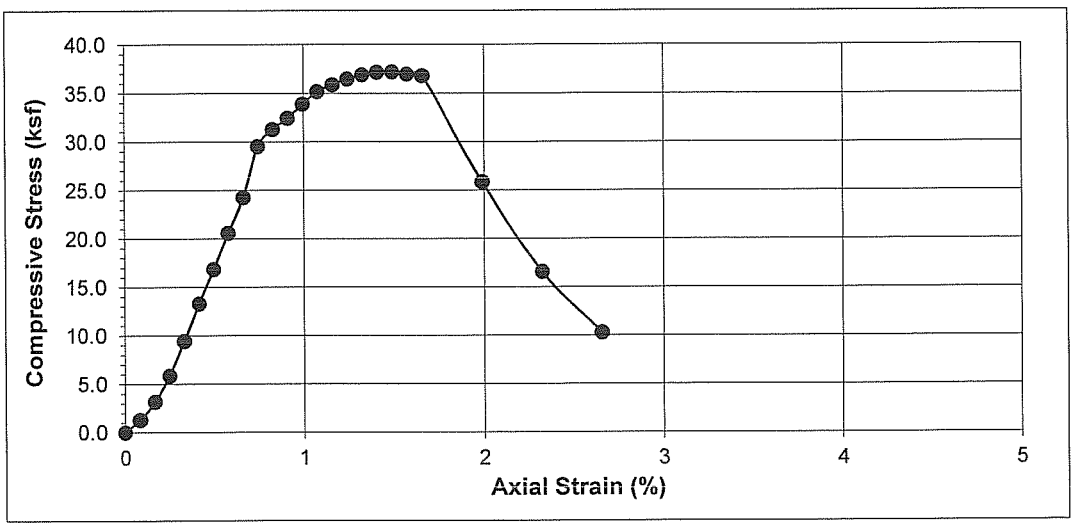


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
67	0.005	7.23	1.34	0.08
132	0.010	7.23	2.63	0.17
248	0.015	7.24	4.93	0.25
377	0.020	7.24	7.49	0.33
509	0.025	7.25	10.11	0.42
649	0.030	7.26	12.88	0.50
795	0.035	7.26	15.76	0.58
968	0.040	7.27	19.18	0.67
1124	0.045	7.27	22.25	0.75
1296	0.050	7.28	25.63	0.83
1449	0.055	7.29	28.63	0.91
1590	0.060	7.29	31.39	1.00
1720	0.065	7.30	33.93	1.08
1802	0.070	7.31	35.52	1.16
1872	0.075	7.31	36.87	1.25
1905	0.080	7.32	37.49	1.33
1926	0.085	7.32	37.87	1.41
1937	0.090	7.33	38.05	1.50
1930	0.095	7.34	37.88	1.58
1901	0.100	7.34	37.28	1.66
1460	0.120	7.37	28.54	2.00
812	0.140	7.39	15.82	2.33
432	0.160	7.42	8.39	2.66

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A-10-203	Cure Days:	28
Sample No.:	B-4-12	Test Date:	01/19/11
Soil Description:	Silty Sand	Dry Density (pcf):	87.2
Sample Type:	Soil-Cement	Moisture Content (%):	30.3
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1444.68
Sample Height (inches):	6.026	Wt. Dry Soil+Container(gms):	1142.94
Sample Weight (gms):	1297.60	Wt. Container (gms):	148.70

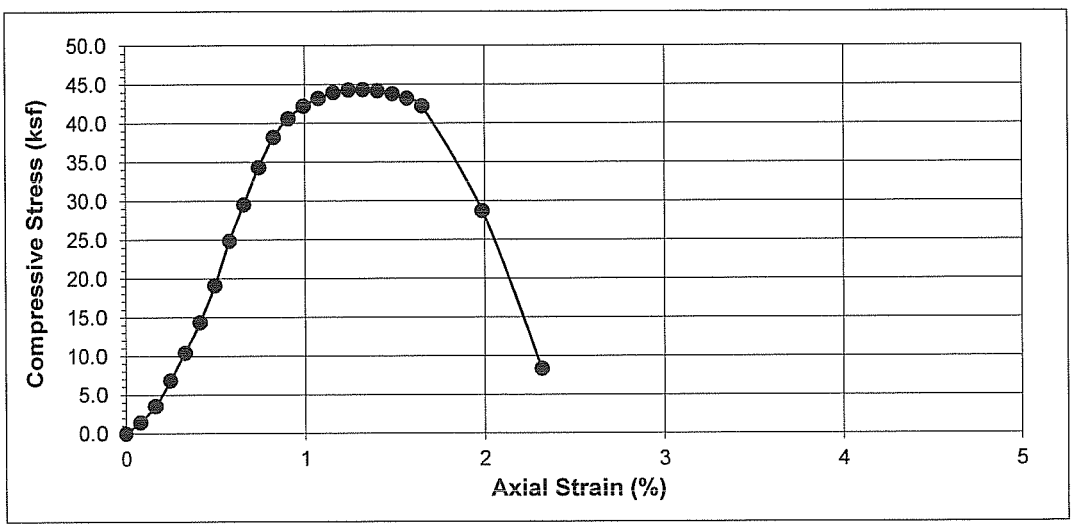


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
64	0.005	7.23	1.28	0.08
159	0.010	7.23	3.17	0.17
295	0.015	7.24	5.87	0.25
474	0.020	7.24	9.42	0.33
670	0.025	7.25	13.31	0.41
848	0.030	7.26	16.83	0.50
1037	0.035	7.26	20.56	0.58
1224	0.040	7.27	24.25	0.66
1490	0.045	7.27	29.49	0.75
1580	0.050	7.28	31.25	0.83
1640	0.055	7.29	32.41	0.91
1715	0.060	7.29	33.86	1.00
1782	0.065	7.30	35.16	1.08
1820	0.070	7.31	35.88	1.16
1851	0.075	7.31	36.46	1.24
1874	0.080	7.32	36.88	1.33
1889	0.085	7.32	37.14	1.41
1893	0.090	7.33	37.19	1.49
1882	0.095	7.34	36.94	1.58
1876	0.100	7.34	36.79	1.66
1321	0.120	7.37	25.82	1.99
850	0.140	7.39	16.56	2.32
530	0.160	7.42	10.29	2.66

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A-10-203	Cure Days:	56
Sample No.:	B-4-15	Test Date:	02/16/11
Soil Description:	Silty Sand	Dry Density (pcf):	85.8
Sample Type:	Soil-Cement	Moisture Content (%):	32.0
Sample Diameter (inches):	3.038	Wt. Wet Soil+Container(gms):	1448.15
Sample Height (inches):	6.039	Wt. Dry Soil+Container(gms):	1132.64
Sample Weight (gms):	1301.37	Wt. Container (gms):	147.53

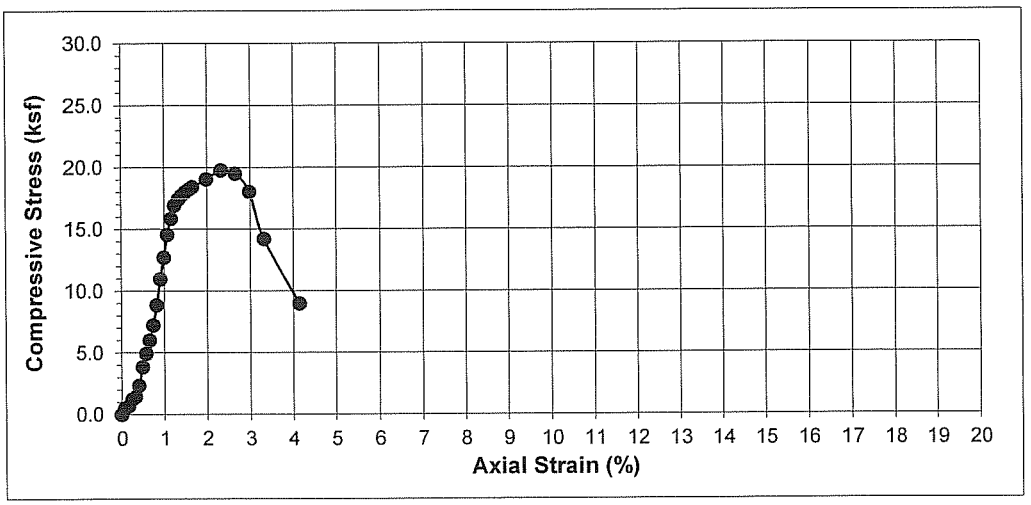


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
72	0.005	7.25	1.43	0.08
179	0.010	7.26	3.55	0.17
346	0.015	7.27	6.86	0.25
527	0.020	7.27	10.43	0.33
725	0.025	7.28	14.34	0.41
967	0.030	7.28	19.11	0.50
1259	0.035	7.29	24.87	0.58
1496	0.040	7.30	29.52	0.66
1740	0.045	7.30	34.31	0.75
1940	0.050	7.31	38.22	0.83
2063	0.055	7.32	40.61	0.91
2146	0.060	7.32	42.21	0.99
2199	0.065	7.33	43.21	1.08
2238	0.070	7.33	43.94	1.16
2257	0.075	7.34	44.28	1.24
2261	0.080	7.35	44.32	1.32
2256	0.085	7.35	44.19	1.41
2239	0.090	7.36	43.82	1.49
2210	0.095	7.36	43.21	1.57
2161	0.100	7.37	42.22	1.66
1475	0.120	7.40	28.72	1.99
430	0.140	7.42	8.34	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 204	Cure Days:	7
Sample No.:	B5-1	Test Date:	12/27/10
Soil Description:	Sandy Silt	Dry Density (pcf):	86.7
Sample Type:	Soil-Cement	Moisture Content (%):	34.1
Sample Diameter (inches):	3.034	Wt. Wet Soil+Container(gms):	1434.07
Sample Height (inches):	6.037	Wt. Dry Soil+Container(gms):	1095.58
Sample Weight (gms):	1332.89	Wt. Container (gms):	103.72

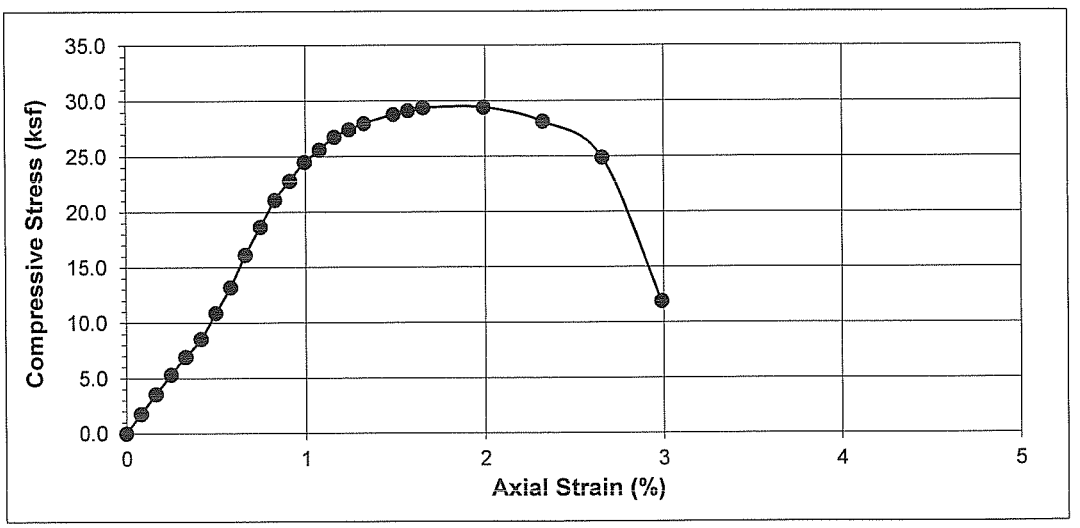


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
25	0.005	7.24	0.50	0.08
34	0.010	7.24	0.68	0.17
61	0.015	7.25	1.21	0.25
72	0.020	7.25	1.43	0.33
117	0.025	7.26	2.32	0.41
193	0.030	7.27	3.83	0.50
249	0.035	7.27	4.93	0.58
303	0.040	7.28	6.00	0.66
365	0.045	7.28	7.22	0.75
447	0.050	7.29	8.83	0.83
555	0.055	7.30	10.95	0.91
644	0.060	7.30	12.70	0.99
738	0.065	7.31	14.54	1.08
805	0.070	7.31	15.85	1.16
859	0.075	7.32	16.90	1.24
885	0.080	7.33	17.39	1.33
902	0.085	7.33	17.71	1.41
916	0.090	7.34	17.97	1.49
928	0.095	7.35	18.19	1.57
940	0.100	7.35	18.41	1.66
974	0.120	7.38	19.01	1.99
1015	0.140	7.40	19.75	2.32
1005	0.160	7.43	19.49	2.65
932	0.180	7.45	18.01	2.98
737	0.200	7.48	14.19	3.31
469	0.250	7.54	8.95	4.14

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 204	Cure Days:	28
Sample No.:	B5-3	Test Date:	01/17/11
Soil Description:	Sandy Silt	Dry Density (pcf):	92.1
Sample Type:	Soil-Cement	Moisture Content (%):	25.0
Sample Diameter (inches):	3.038	Wt. Wet Soil+Container(gms):	1424.48
Sample Height (inches):	6.024	Wt. Dry Soil+Container(gms):	1160.83
Sample Weight (gms):	1320.12	Wt. Container (gms):	105.24

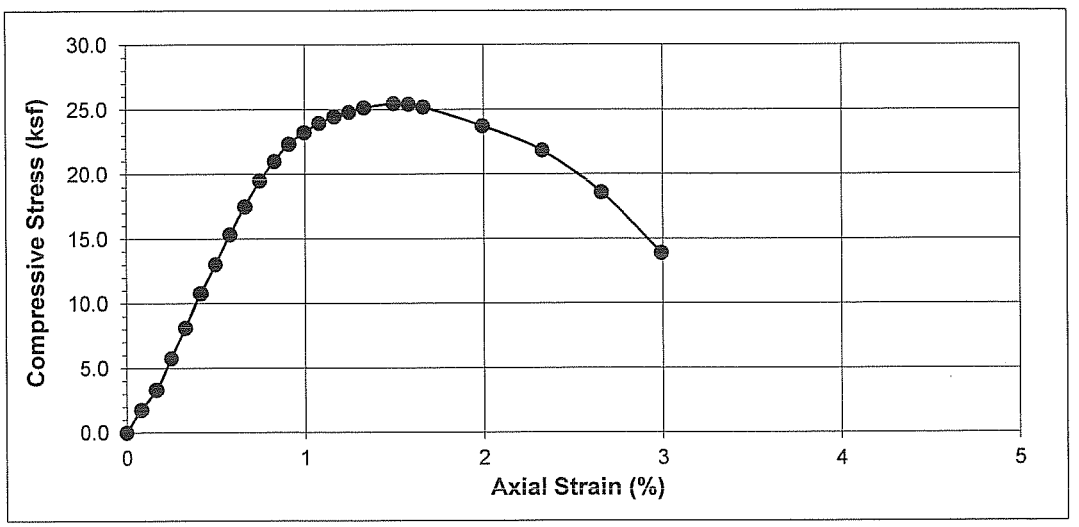


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
89	0.005	7.25	1.77	0.08
180	0.010	7.26	3.57	0.17
269	0.015	7.27	5.33	0.25
349	0.020	7.27	6.91	0.33
432	0.025	7.28	8.55	0.42
550	0.030	7.29	10.87	0.50
669	0.035	7.29	13.21	0.58
817	0.040	7.30	16.12	0.66
946	0.045	7.30	18.65	0.75
1069	0.050	7.31	21.06	0.83
1158	0.055	7.32	22.79	0.91
1245	0.060	7.32	24.49	1.00
1302	0.065	7.33	25.59	1.08
1363	0.070	7.33	26.76	1.16
1397	0.075	7.34	27.41	1.25
1427	0.080	7.35	27.97	1.33
1471	0.090	7.36	28.79	1.49
1490	0.095	7.36	29.13	1.58
1504	0.100	7.37	29.38	1.66
1511	0.120	7.40	29.42	1.99
1450	0.140	7.42	28.14	2.32
1286	0.160	7.45	24.87	2.66
618	0.180	7.47	11.91	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 204	Cure Days:	28
Sample No.:	B5-4	Test Date:	01/17/11
Soil Description:	Sandy Silt	Dry Density (pcf):	93.0
Sample Type:	Soil-Cement	Moisture Content (%):	24.5
Sample Diameter (inches):	3.037	Wt. Wet Soil+Container(gms):	1429.29
Sample Height (inches):	6.016	Wt. Dry Soil+Container(gms):	1168.57
Sample Weight (gms):	1325.40	Wt. Container (gms):	104.95

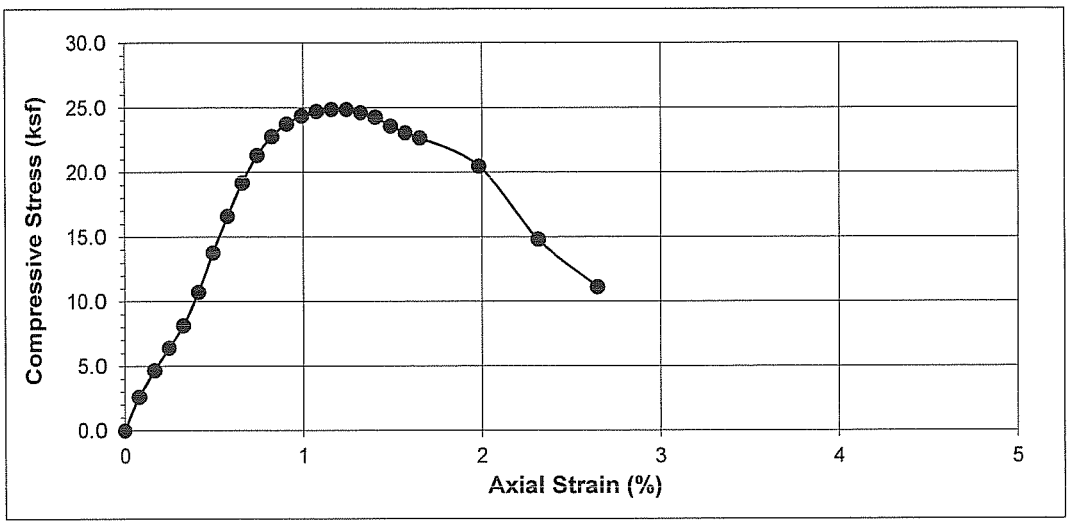


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
89	0.005	7.25	1.77	0.08
168	0.010	7.26	3.33	0.17
290	0.015	7.26	5.75	0.25
410	0.020	7.27	8.12	0.33
545	0.025	7.27	10.79	0.42
659	0.030	7.28	13.03	0.50
776	0.035	7.29	15.34	0.58
886	0.040	7.29	17.50	0.66
988	0.045	7.30	19.49	0.75
1065	0.050	7.30	20.99	0.83
1134	0.055	7.31	22.34	0.91
1180	0.060	7.32	23.22	1.00
1218	0.065	7.32	23.95	1.08
1244	0.070	7.33	24.44	1.16
1263	0.075	7.34	24.79	1.25
1282	0.080	7.34	25.15	1.33
1300	0.090	7.35	25.46	1.50
1299	0.095	7.36	25.41	1.58
1289	0.100	7.37	25.20	1.66
1217	0.120	7.39	23.71	1.99
1124	0.140	7.42	21.82	2.33
961	0.160	7.44	18.60	2.66
721	0.180	7.47	13.90	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 204	Cure Days:	56
Sample No.:	B5-7	Test Date:	02/14/11
Soil Description:	Sandy Silt	Dry Density (pcf):	89.2
Sample Type:	Soil-Cement	Moisture Content (%):	30.0
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1484.48
Sample Height (inches):	6.048	Wt. Dry Soil+Container(gms):	1176.36
Sample Weight (gms):	1336.34	Wt. Container (gms):	148.90

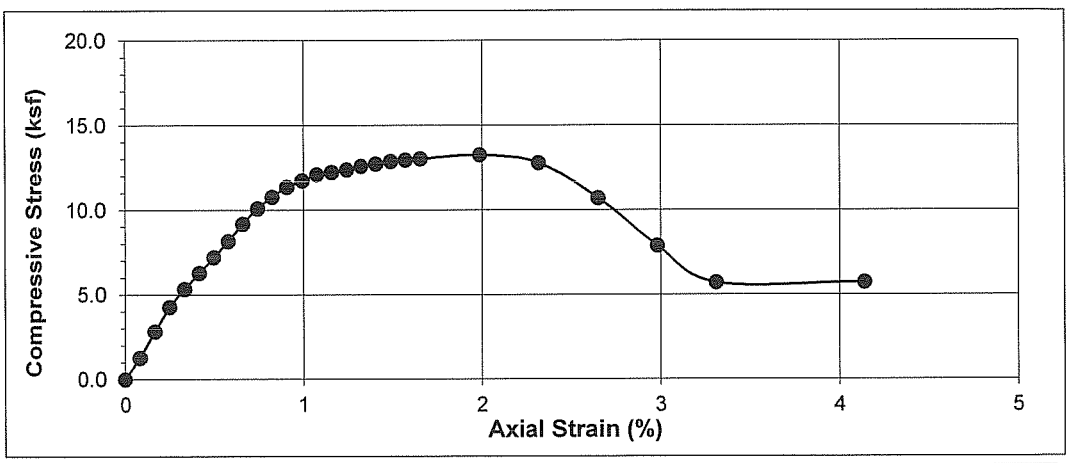


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
131	0.005	7.26	2.60	0.08
236	0.010	7.27	4.67	0.17
323	0.015	7.28	6.39	0.25
412	0.020	7.28	8.15	0.33
543	0.025	7.29	10.73	0.41
698	0.030	7.29	13.78	0.50
841	0.035	7.30	16.59	0.58
973	0.040	7.31	19.18	0.66
1082	0.045	7.31	21.31	0.74
1158	0.050	7.32	22.78	0.83
1208	0.055	7.32	23.75	0.91
1241	0.060	7.33	24.38	0.99
1259	0.065	7.34	24.71	1.07
1268	0.070	7.34	24.86	1.16
1269	0.075	7.35	24.86	1.24
1257	0.080	7.36	24.61	1.32
1241	0.085	7.36	24.27	1.41
1206	0.090	7.37	23.57	1.49
1181	0.095	7.37	23.06	1.57
1161	0.100	7.38	22.65	1.65
1053	0.120	7.41	20.48	1.98
764	0.140	7.43	14.81	2.31
576	0.160	7.46	11.13	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 205	Cure Days:	7
Sample No.:	B4-1	Test Date:	12/27/10
Soil Description:	Silty Clay with Sand	Dry Density (pcf):	82.6
Sample Type:	Soil-Cement	Moisture Content (%):	35.6
Sample Diameter (inches):	3.045	Wt. Wet Soil+Container(gms):	1390.32
Sample Height (inches):	6.038	Wt. Dry Soil+Container(gms):	1053.09
Sample Weight (gms):	1293.49	Wt. Container (gms):	105.47

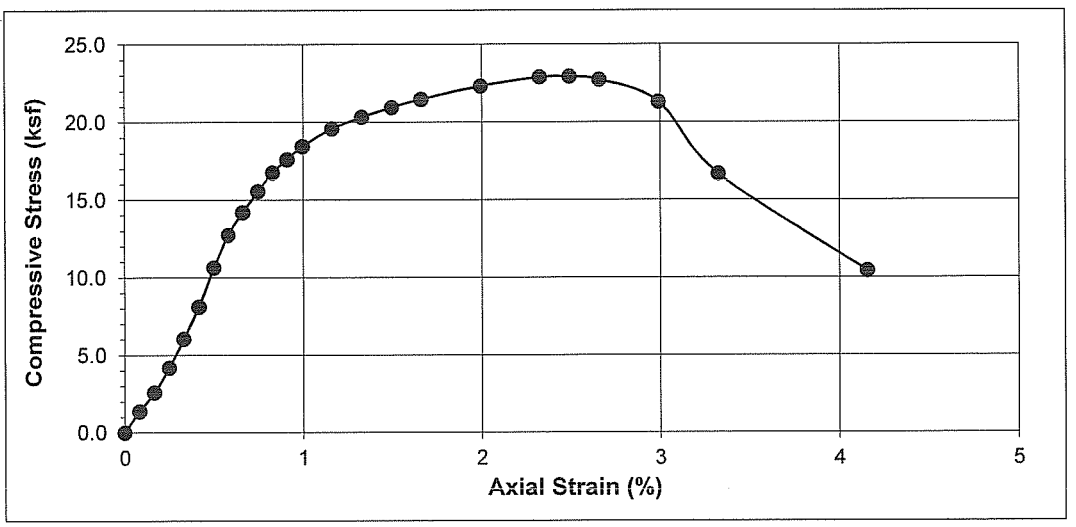


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.28	0.00	0.00
64	0.005	7.29	1.26	0.08
143	0.010	7.29	2.82	0.17
216	0.015	7.30	4.26	0.25
270	0.020	7.31	5.32	0.33
318	0.025	7.31	6.26	0.41
366	0.030	7.32	7.20	0.50
414	0.035	7.32	8.14	0.58
467	0.040	7.33	9.17	0.66
514	0.045	7.34	10.09	0.75
549	0.050	7.34	10.77	0.83
579	0.055	7.35	11.34	0.91
599	0.060	7.36	11.73	0.99
618	0.065	7.36	12.09	1.08
625	0.070	7.37	12.22	1.16
634	0.075	7.37	12.38	1.24
645	0.080	7.38	12.59	1.32
652	0.085	7.39	12.71	1.41
660	0.090	7.39	12.86	1.49
665	0.095	7.40	12.94	1.57
669	0.100	7.40	13.01	1.66
683	0.120	7.43	13.24	1.99
661	0.140	7.46	12.77	2.32
555	0.160	7.48	10.68	2.65
411	0.180	7.51	7.88	2.98
298	0.200	7.53	5.70	3.31
302	0.250	7.60	5.72	4.14

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 205	Cure Days:	28
Sample No.:	B4-3	Test Date:	01/17/11
Soil Description:	Silty Clay with Sand	Dry Density (pcf):	87.4
Sample Type:	Soil-Cement	Moisture Content (%):	29.1
Sample Diameter (inches):	3.027	Wt. Wet Soil+Container(gms):	1381.33
Sample Height (inches):	6.018	Wt. Dry Soil+Container(gms):	1093.68
Sample Weight (gms):	1283.50	Wt. Container (gms):	104.91

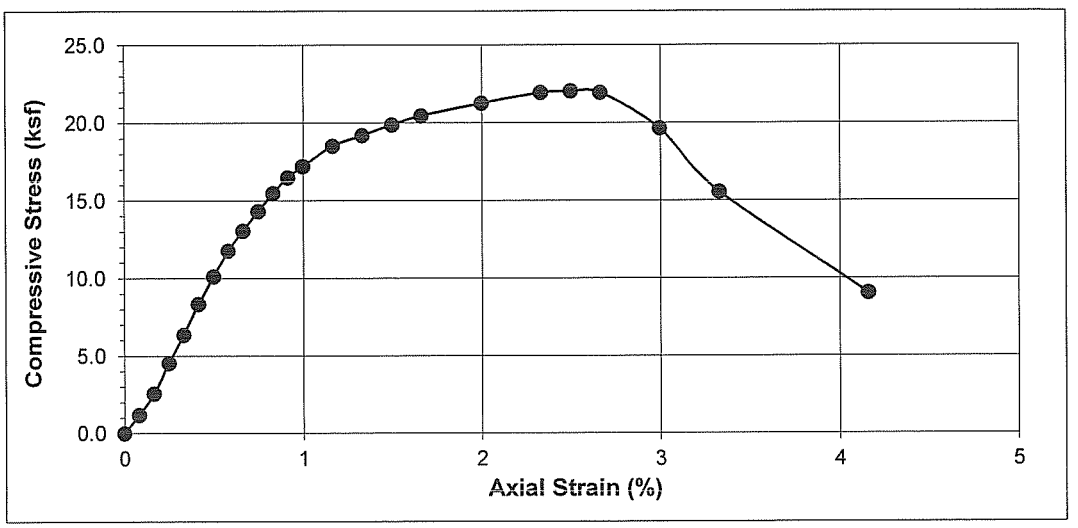


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.20	0.00	0.00
68	0.005	7.20	1.36	0.08
129	0.010	7.21	2.58	0.17
209	0.015	7.21	4.17	0.25
303	0.020	7.22	6.04	0.33
407	0.025	7.23	8.11	0.42
534	0.030	7.23	10.63	0.50
640	0.035	7.24	12.73	0.58
714	0.040	7.24	14.19	0.66
783	0.045	7.25	15.55	0.75
844	0.050	7.26	16.75	0.83
888	0.055	7.26	17.61	0.91
931	0.060	7.27	18.44	1.00
990	0.070	7.28	19.58	1.16
1029	0.080	7.29	20.32	1.33
1063	0.090	7.31	20.95	1.50
1091	0.100	7.32	21.47	1.66
1138	0.120	7.34	22.32	1.99
1171	0.140	7.37	22.89	2.33
1175	0.150	7.38	22.93	2.49
1167	0.160	7.39	22.73	2.66
1097	0.180	7.42	21.29	2.99
861	0.200	7.44	16.66	3.32
543	0.250	7.51	10.41	4.15

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 205	Cure Days:	28
Sample No.:	B4-4	Test Date:	01/17/11
Soil Description:	Silty Clay with Sand	Dry Density (pcf):	80.3
Sample Type:	Soil-Cement	Moisture Content (%):	39.1
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1376.98
Sample Height (inches):	6.009	Wt. Dry Soil+Container(gms):	1019.49
Sample Weight (gms):	1272.84	Wt. Container (gms):	105.39

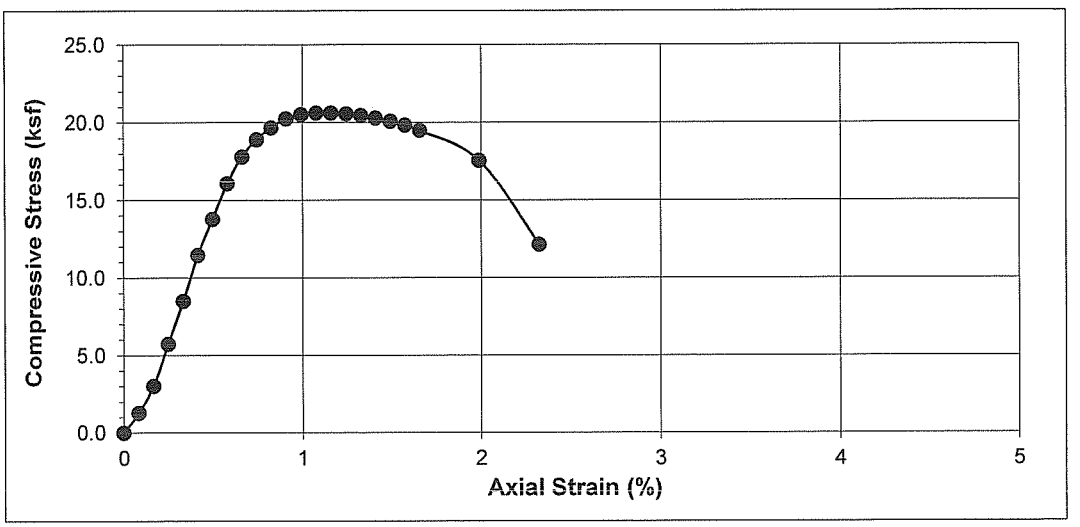


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
59	0.005	7.23	1.18	0.08
129	0.010	7.23	2.57	0.17
228	0.015	7.24	4.54	0.25
319	0.020	7.24	6.34	0.33
419	0.025	7.25	8.32	0.42
509	0.030	7.26	10.10	0.50
593	0.035	7.26	11.76	0.58
659	0.040	7.27	13.06	0.67
723	0.045	7.27	14.31	0.75
782	0.050	7.28	15.47	0.83
834	0.055	7.29	16.48	0.92
871	0.060	7.29	17.20	1.00
939	0.070	7.31	18.51	1.16
975	0.080	7.32	19.19	1.33
1012	0.090	7.33	19.88	1.50
1043	0.100	7.34	20.46	1.66
1088	0.120	7.37	21.27	2.00
1126	0.140	7.39	21.93	2.33
1133	0.150	7.41	22.03	2.50
1130	0.160	7.42	21.94	2.66
1015	0.180	7.44	19.64	3.00
807	0.200	7.47	15.56	3.33
473	0.250	7.53	9.04	4.16

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 205	Cure Days:	56
Sample No.:	B4-7	Test Date:	02/14/11
Soil Description:	Silty Clay with Sand	Dry Density (pcf):	83.7
Sample Type:	Soil-Cement	Moisture Content (%):	35.4
Sample Diameter (inches):	3.034	Wt. Wet Soil+Container(gms):	1445.91
Sample Height (inches):	6.032	Wt. Dry Soil+Container(gms):	1107.11
Sample Weight (gms):	1297.17	Wt. Container (gms):	149.67

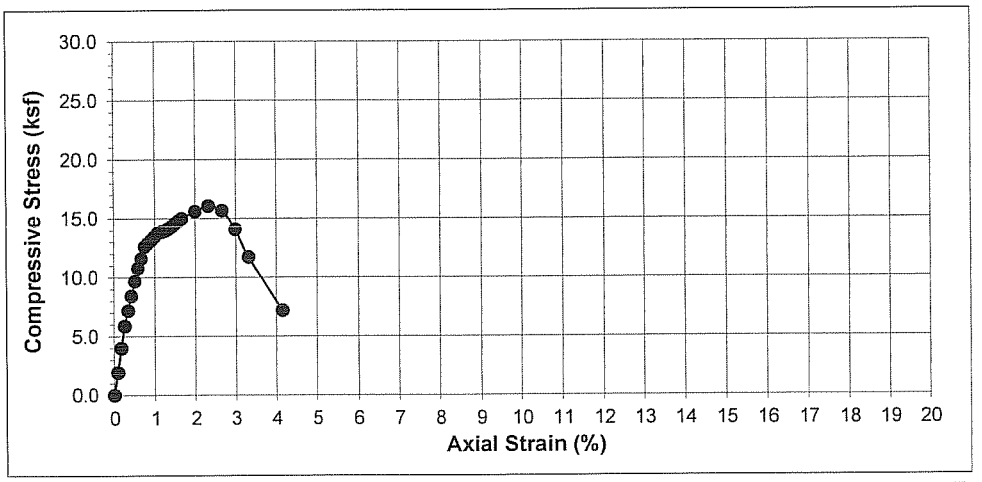


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
64	0.005	7.24	1.27	0.08
152	0.010	7.24	3.02	0.17
288	0.015	7.25	5.72	0.25
428	0.020	7.25	8.50	0.33
578	0.025	7.26	11.46	0.41
695	0.030	7.27	13.77	0.50
811	0.035	7.27	16.06	0.58
899	0.040	7.28	17.79	0.66
956	0.045	7.28	18.90	0.75
996	0.050	7.29	19.67	0.83
1026	0.055	7.30	20.25	0.91
1040	0.060	7.30	20.51	0.99
1046	0.065	7.31	20.61	1.08
1047	0.070	7.31	20.61	1.16
1045	0.075	7.32	20.56	1.24
1041	0.080	7.33	20.46	1.33
1033	0.085	7.33	20.29	1.41
1023	0.090	7.34	20.07	1.49
1012	0.095	7.35	19.84	1.57
995	0.100	7.35	19.49	1.66
899	0.120	7.38	17.55	1.99
624	0.140	7.40	12.14	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/21/10
Boring No.:	A 10 206	Cure Days:	7
Sample No.:	B2-1	Test Date:	12/28/10
Soil Description:	Sandy Silt	Dry Density (pcf):	89.9
Sample Type:	Soil-Cement	Moisture Content (%):	28.0
Sample Diameter (inches):	3.038	Wt. Wet Soil+Container(gms):	1509.47
Sample Height (inches):	6.022	Wt. Dry Soil+Container(gms):	1221.88
Sample Weight (gms):	1318.50	Wt. Container (gms):	193.22

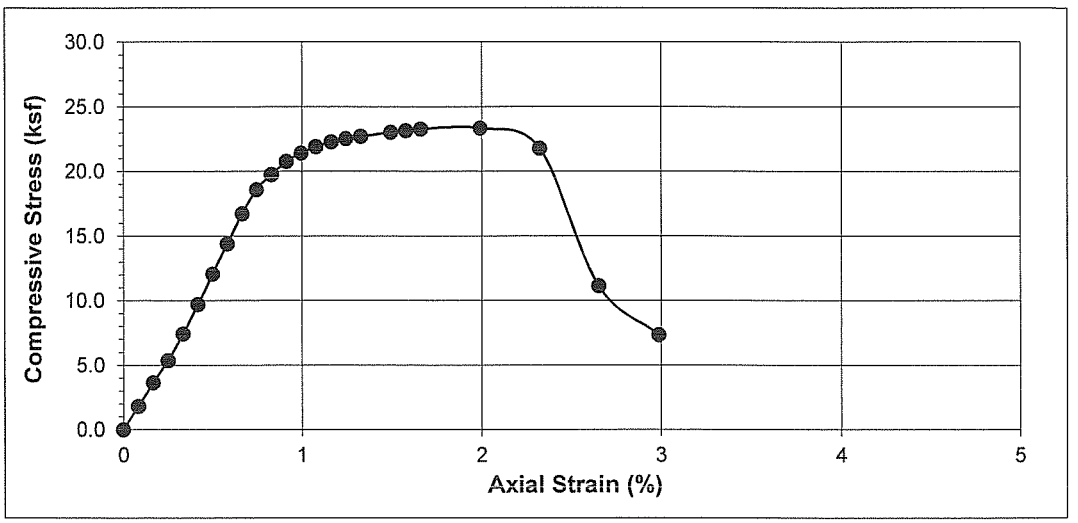


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
98	0.005	7.25	1.95	0.08
201	0.010	7.26	3.99	0.17
297	0.015	7.27	5.89	0.25
363	0.020	7.27	7.19	0.33
426	0.025	7.28	8.43	0.42
490	0.030	7.29	9.69	0.50
546	0.035	7.29	10.78	0.58
588	0.040	7.30	11.60	0.66
640	0.045	7.30	12.62	0.75
654	0.050	7.31	12.88	0.83
669	0.055	7.32	13.17	0.91
684	0.060	7.32	13.45	1.00
701	0.065	7.33	13.78	1.08
707	0.070	7.33	13.88	1.16
711	0.075	7.34	13.95	1.25
720	0.080	7.35	14.11	1.33
731	0.085	7.35	14.32	1.41
744	0.090	7.36	14.56	1.49
757	0.095	7.36	14.80	1.58
767	0.100	7.37	14.98	1.66
801	0.120	7.40	15.60	1.99
827	0.140	7.42	16.05	2.32
810	0.160	7.45	15.66	2.66
730	0.180	7.47	14.07	2.99
610	0.200	7.50	11.72	3.32
378	0.250	7.56	7.20	4.15

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/21/10
Boring No.:	A 10 206	Cure Days:	28
Sample No.:	B2-2	Test Date:	01/18/11
Soil Description:	Sandy Silt	Dry Density (pcf):	88.3
Sample Type:	Soil-Cement	Moisture Content (%):	29.2
Sample Diameter (inches):	3.042	Wt. Wet Soil+Container(gms):	1412.26
Sample Height (inches):	6.028	Wt. Dry Soil+Container(gms):	1116.51
Sample Weight (gms):	1311.91	Wt. Container (gms):	102.79

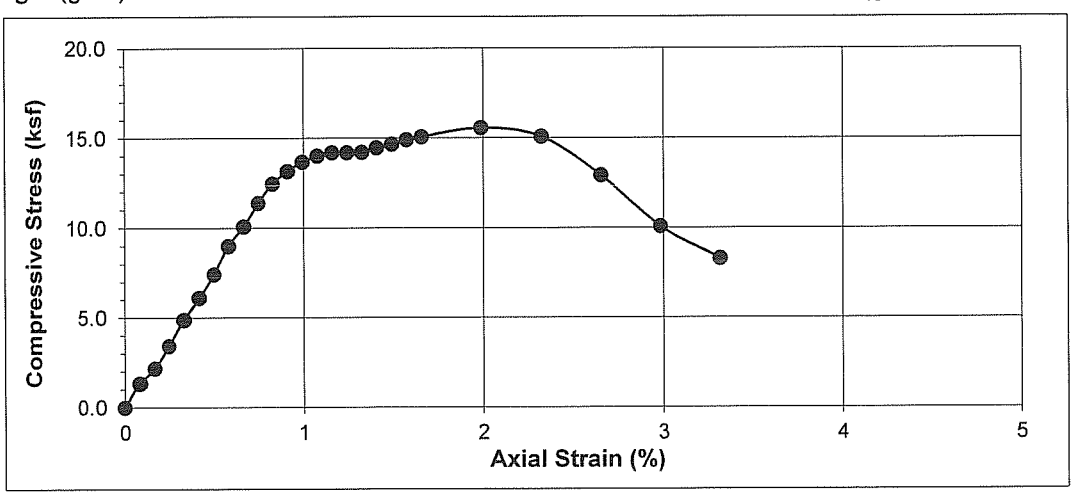


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
91	0.005	7.27	1.80	0.08
184	0.010	7.28	3.64	0.17
271	0.015	7.29	5.36	0.25
376	0.020	7.29	7.43	0.33
492	0.025	7.30	9.71	0.41
612	0.030	7.30	12.07	0.50
731	0.035	7.31	14.40	0.58
850	0.040	7.32	16.73	0.66
945	0.045	7.32	18.58	0.75
1005	0.050	7.33	19.75	0.83
1058	0.055	7.33	20.77	0.91
1092	0.060	7.34	21.42	1.00
1118	0.065	7.35	21.91	1.08
1138	0.070	7.35	22.29	1.16
1152	0.075	7.36	22.54	1.24
1161	0.080	7.37	22.70	1.33
1180	0.090	7.38	23.03	1.49
1187	0.095	7.38	23.15	1.58
1195	0.100	7.39	23.28	1.66
1202	0.120	7.42	23.34	1.99
1126	0.140	7.44	21.79	2.32
578	0.160	7.47	11.15	2.65
382	0.180	7.49	7.34	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	9
Sample No.:	B6-1	Test Date:	12/27/10
Soil Description:	Sandy Silt	Dry Density (pcf):	84.0
Sample Type:	Soil-Cement	Moisture Content (%):	35.0
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1397.61
Sample Height (inches):	6.032	Wt. Dry Soil+Container(gms):	1062.47
Sample Weight (gms):	1294.94	Wt. Container (gms):	105.88

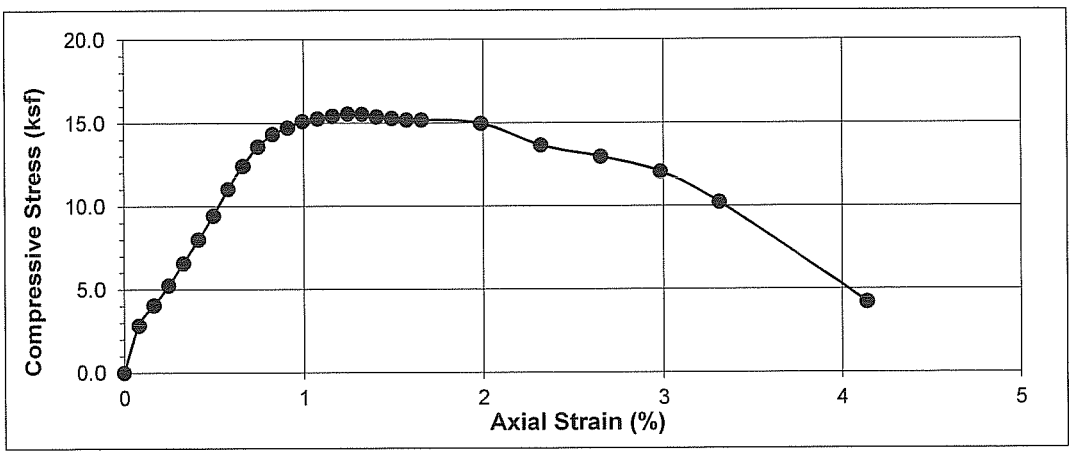


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
67	0.005	7.22	1.34	0.08
109	0.010	7.22	2.17	0.17
172	0.015	7.23	3.43	0.25
245	0.020	7.23	4.88	0.33
307	0.025	7.24	6.11	0.41
373	0.030	7.25	7.41	0.50
453	0.035	7.25	8.99	0.58
508	0.040	7.26	10.08	0.66
574	0.045	7.26	11.38	0.75
629	0.050	7.27	12.46	0.83
665	0.055	7.28	13.16	0.91
691	0.060	7.28	13.66	0.99
709	0.065	7.29	14.01	1.08
719	0.070	7.30	14.19	1.16
719	0.075	7.30	14.18	1.24
721	0.080	7.31	14.21	1.33
734	0.085	7.31	14.45	1.41
745	0.090	7.32	14.66	1.49
758	0.095	7.33	14.90	1.57
767	0.100	7.33	15.06	1.66
795	0.120	7.36	15.56	1.99
773	0.140	7.38	15.08	2.32
665	0.160	7.41	12.93	2.65
520	0.180	7.43	10.07	2.98
429	0.200	7.46	8.28	3.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	7
Sample No.:	B6-2	Test Date:	12/25/10
Soil Description:	Sandy Silt	Dry Density (pcf):	82.9
Sample Type:	Soil-Cement	Moisture Content (%):	36.6
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1393.4
Sample Height (inches):	6.032	Wt. Dry Soil+Container(gms):	1047.45
Sample Weight (gms):	1294.12	Wt. Container (gms):	103.52

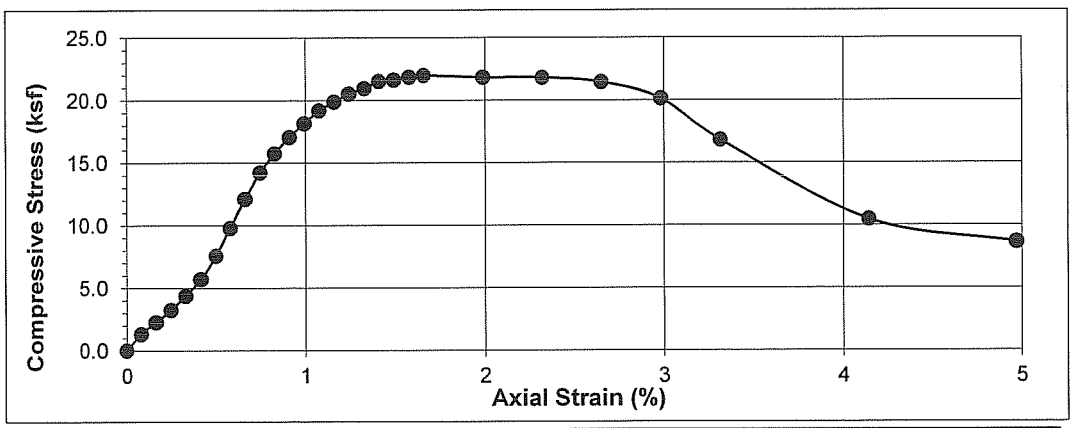


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
142	0.005	7.22	2.83	0.08
203	0.010	7.22	4.05	0.17
263	0.015	7.23	5.24	0.25
330	0.020	7.23	6.57	0.33
402	0.025	7.24	7.99	0.41
475	0.030	7.25	9.44	0.50
556	0.035	7.25	11.04	0.58
626	0.040	7.26	12.42	0.66
685	0.045	7.26	13.58	0.75
723	0.050	7.27	14.32	0.83
744	0.055	7.28	14.72	0.91
764	0.060	7.28	15.11	0.99
772	0.065	7.29	15.25	1.08
781	0.070	7.30	15.42	1.16
788	0.075	7.30	15.54	1.24
788	0.080	7.31	15.53	1.33
781	0.085	7.31	15.38	1.41
776	0.090	7.32	15.27	1.49
772	0.095	7.33	15.17	1.57
773	0.100	7.33	15.18	1.66
765	0.120	7.36	14.97	1.99
700	0.140	7.38	13.65	2.32
667	0.160	7.41	12.97	2.65
622	0.180	7.43	12.05	2.98
529	0.200	7.46	10.21	3.32
220	0.250	7.52	4.21	4.14

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	28
Sample No.:	B6-4	Test Date:	01/15/11
Soil Description:	Sandy Silt	Dry Density (pcf):	81.8
Sample Type:	Soil-Cement	Moisture Content (%):	37.1
Sample Diameter (inches):	3.038	Wt. Wet Soil+Container(gms):	1391.39
Sample Height (inches):	6.035	Wt. Dry Soil+Container(gms):	1043.33
Sample Weight (gms):	1288.62	Wt. Container (gms):	105.03

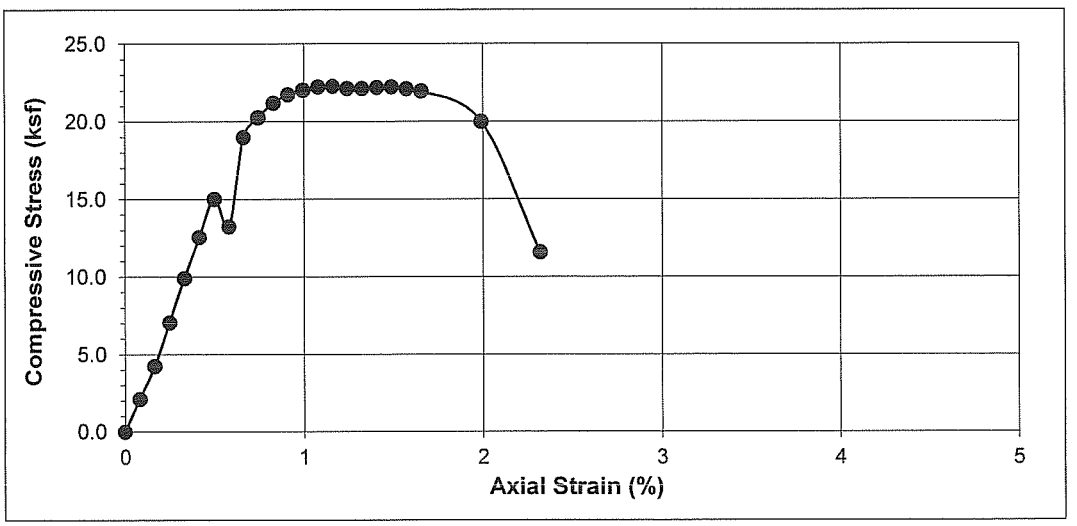


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
66	0.005	7.25	1.31	0.08
115	0.010	7.26	2.28	0.17
164	0.015	7.27	3.25	0.25
221	0.020	7.27	4.38	0.33
289	0.025	7.28	5.72	0.41
383	0.030	7.29	7.57	0.50
496	0.035	7.29	9.80	0.58
615	0.040	7.30	12.14	0.66
721	0.045	7.30	14.22	0.75
799	0.050	7.31	15.74	0.83
866	0.055	7.32	17.05	0.91
923	0.060	7.32	18.15	0.99
976	0.065	7.33	19.18	1.08
1012	0.070	7.33	19.87	1.16
1046	0.075	7.34	20.52	1.24
1069	0.080	7.35	20.95	1.33
1098	0.085	7.35	21.50	1.41
1105	0.090	7.36	21.62	1.49
1118	0.095	7.36	21.86	1.57
1125	0.100	7.37	21.98	1.66
1121	0.120	7.40	21.83	1.99
1124	0.140	7.42	21.81	2.32
1109	0.160	7.45	21.45	2.65
1044	0.180	7.47	20.12	2.98
876	0.200	7.50	16.83	3.31
550	0.250	7.56	10.47	4.14
459	0.300	7.63	8.66	4.97

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	56
Sample No.:	B6-7	Test Date:	02/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	82.2
Sample Type:	Soil-Cement	Moisture Content (%):	37.8
Sample Diameter (inches):	3.037	Wt. Wet Soil+Container(gms):	1446.79
Sample Height (inches):	6.028	Wt. Dry Soil+Container(gms):	1090.55
Sample Weight (gms):	1298.87	Wt. Container (gms):	149.24

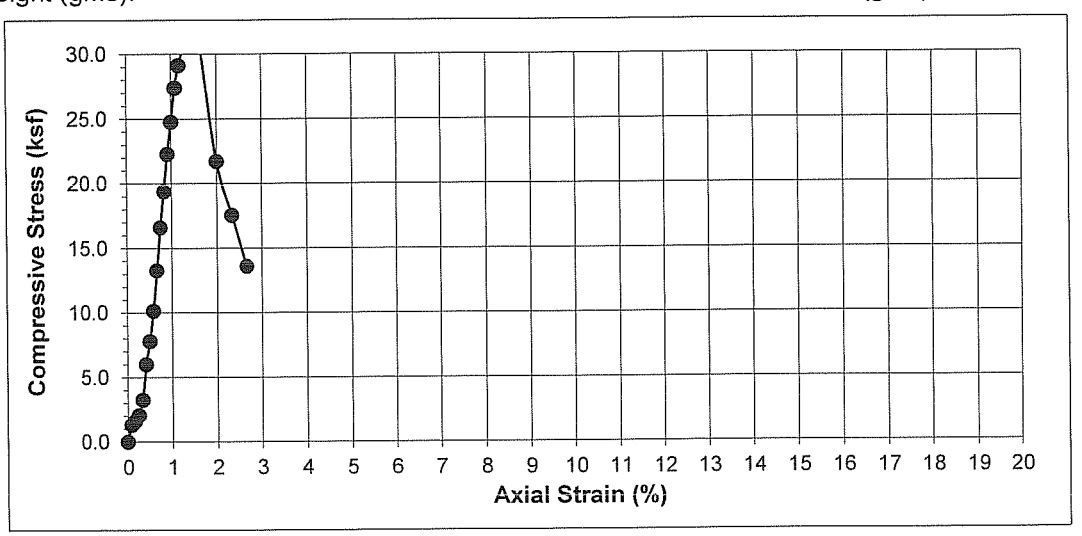


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
106	0.005	7.25	2.11	0.08
214	0.010	7.26	4.25	0.17
356	0.015	7.26	7.06	0.25
500	0.020	7.27	9.91	0.33
634	0.025	7.27	12.55	0.41
759	0.030	7.28	15.01	0.50
670	0.035	7.29	13.24	0.58
961	0.040	7.29	18.98	0.66
1027	0.045	7.30	20.26	0.75
1075	0.050	7.30	21.19	0.83
1103	0.055	7.31	21.73	0.91
1119	0.060	7.32	22.02	1.00
1130	0.065	7.32	22.22	1.08
1133	0.070	7.33	22.26	1.16
1127	0.075	7.34	22.12	1.24
1128	0.080	7.34	22.13	1.33
1132	0.085	7.35	22.19	1.41
1135	0.090	7.35	22.23	1.49
1130	0.095	7.36	22.11	1.58
1123	0.100	7.37	21.95	1.66
1026	0.120	7.39	19.99	1.99
596	0.140	7.42	11.57	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	7
Sample No.:	B6-11	Test Date:	12/25/10
Soil Description:	Silt	Dry Density (pcf):	86.2
Sample Type:	Soil-Cement	Moisture Content (%):	31.3
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1394.23
Sample Height (inches):	6.011	Wt. Dry Soil+Container(gms):	1087.38
Sample Weight (gms):	1289.48	Wt. Container (gms):	105.76

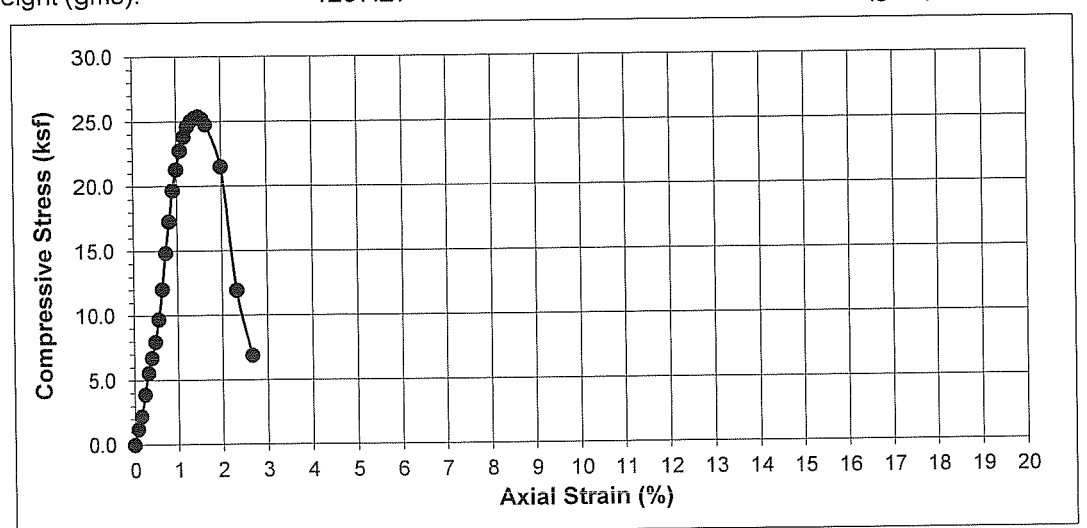


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
66	0.005	7.23	1.32	0.08
81	0.010	7.23	1.61	0.17
104	0.015	7.24	2.07	0.25
164	0.020	7.24	3.26	0.33
302	0.025	7.25	6.00	0.42
393	0.030	7.26	7.80	0.50
512	0.035	7.26	10.15	0.58
670	0.040	7.27	13.27	0.67
839	0.045	7.27	16.61	0.75
980	0.050	7.28	19.38	0.83
1127	0.055	7.29	22.27	0.91
1254	0.060	7.29	24.76	1.00
1388	0.065	7.30	27.38	1.08
1478	0.070	7.31	29.13	1.16
1532	0.075	7.31	30.17	1.25
1571	0.080	7.32	30.92	1.33
1585	0.085	7.32	31.16	1.41
1580	0.090	7.33	31.04	1.50
1554	0.095	7.34	30.50	1.58
1534	0.100	7.34	30.09	1.66
1111	0.120	7.37	21.72	2.00
901	0.140	7.39	17.55	2.33
701	0.160	7.42	13.61	2.66

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	9
Sample No.:	B6-12	Test Date:	12/27/10
Soil Description:	Sandy Silt	Dry Density (pcf):	82.7
Sample Type:	Soil-Cement	Moisture Content (%):	37.4
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1399.1
Sample Height (inches):	6.033	Wt. Dry Soil+Container(gms):	1047.24
Sample Weight (gms):	1297.27	Wt. Container (gms):	105.20

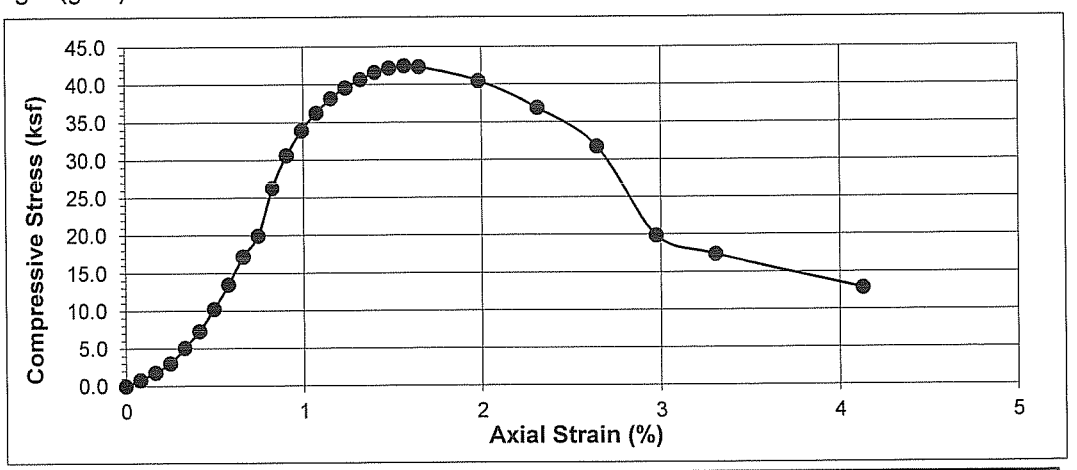


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
61	0.005	7.22	1.22	0.08
111	0.010	7.22	2.21	0.17
195	0.015	7.23	3.88	0.25
279	0.020	7.23	5.55	0.33
338	0.025	7.24	6.72	0.41
401	0.030	7.25	7.97	0.50
489	0.035	7.25	9.71	0.58
606	0.040	7.26	12.02	0.66
748	0.045	7.26	14.83	0.75
872	0.050	7.27	17.27	0.83
994	0.055	7.28	19.67	0.91
1077	0.060	7.28	21.29	0.99
1152	0.065	7.29	22.76	1.08
1207	0.070	7.30	23.82	1.16
1248	0.075	7.30	24.61	1.24
1270	0.080	7.31	25.03	1.33
1283	0.085	7.31	25.26	1.41
1290	0.090	7.32	25.38	1.49
1281	0.095	7.33	25.18	1.57
1261	0.100	7.33	24.77	1.66
1099	0.120	7.36	21.51	1.99
612	0.140	7.38	11.94	2.32
355	0.160	7.41	6.90	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	28
Sample No.:	B6-14	Test Date:	01/15/11
Soil Description:	Sandy Silt	Dry Density (pcf):	82.0
Sample Type:	Soil-Cement	Moisture Content (%):	37.6
Sample Diameter (inches):	3.039	Wt. Wet Soil+Container(gms):	1389.88
Sample Height (inches):	6.050	Wt. Dry Soil+Container(gms):	1039.32
Sample Weight (gms):	1299.70	Wt. Container (gms):	105.78

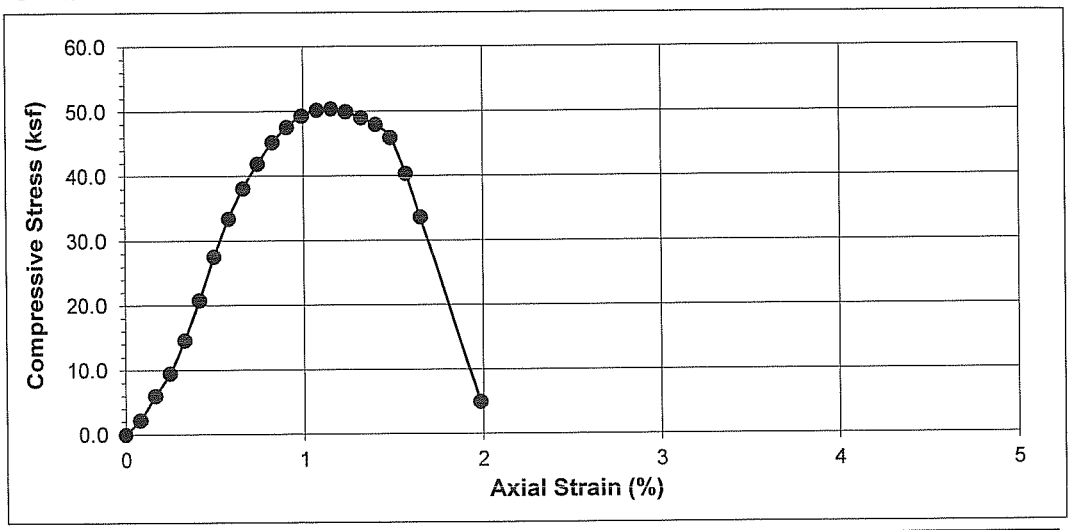


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
40	0.005	7.26	0.79	0.08
91	0.010	7.27	1.80	0.17
153	0.015	7.27	3.03	0.25
256	0.020	7.28	5.07	0.33
369	0.025	7.28	7.30	0.41
518	0.030	7.29	10.23	0.50
682	0.035	7.30	13.46	0.58
872	0.040	7.30	17.20	0.66
1012	0.045	7.31	19.94	0.74
1334	0.050	7.31	26.26	0.83
1555	0.055	7.32	30.59	0.91
1724	0.060	7.33	33.89	0.99
1845	0.065	7.33	36.23	1.07
1944	0.070	7.34	38.15	1.16
2018	0.075	7.34	39.57	1.24
2077	0.080	7.35	40.69	1.32
2126	0.085	7.36	41.61	1.40
2157	0.090	7.36	42.18	1.49
2172	0.095	7.37	42.44	1.57
2169	0.100	7.38	42.35	1.65
2080	0.120	7.40	40.47	1.98
1901	0.140	7.43	36.87	2.31
1640	0.160	7.45	31.70	2.64
1032	0.180	7.48	19.88	2.98
904	0.200	7.50	17.35	3.31
673	0.250	7.57	12.81	4.13

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	56
Sample No.:	B6-17	Test Date:	02/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	81.8
Sample Type:	Soil-Cement	Moisture Content (%):	38.1
Sample Diameter (inches):	3.034	Wt. Wet Soil+Container(gms):	1442.78
Sample Height (inches):	6.043	Wt. Dry Soil+Container(gms):	1086.04
Sample Weight (gms):	1295.86	Wt. Container (gms):	148.76



Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
112	0.005	7.24	2.23	0.08
302	0.010	7.24	6.01	0.17
478	0.015	7.25	9.50	0.25
734	0.020	7.25	14.57	0.33
1048	0.025	7.26	20.79	0.41
1389	0.030	7.27	27.53	0.50
1686	0.035	7.27	33.39	0.58
1924	0.040	7.28	38.07	0.66
2119	0.045	7.28	41.89	0.74
2288	0.050	7.29	45.19	0.83
2409	0.055	7.30	47.55	0.91
2499	0.060	7.30	49.28	0.99
2547	0.065	7.31	50.18	1.08
2558	0.070	7.31	50.36	1.16
2537	0.075	7.32	49.90	1.24
2492	0.080	7.33	48.98	1.32
2441	0.085	7.33	47.94	1.41
2339	0.090	7.34	45.89	1.49
2059	0.095	7.35	40.37	1.57
1714	0.100	7.35	33.57	1.65
254	0.120	7.38	4.96	1.99

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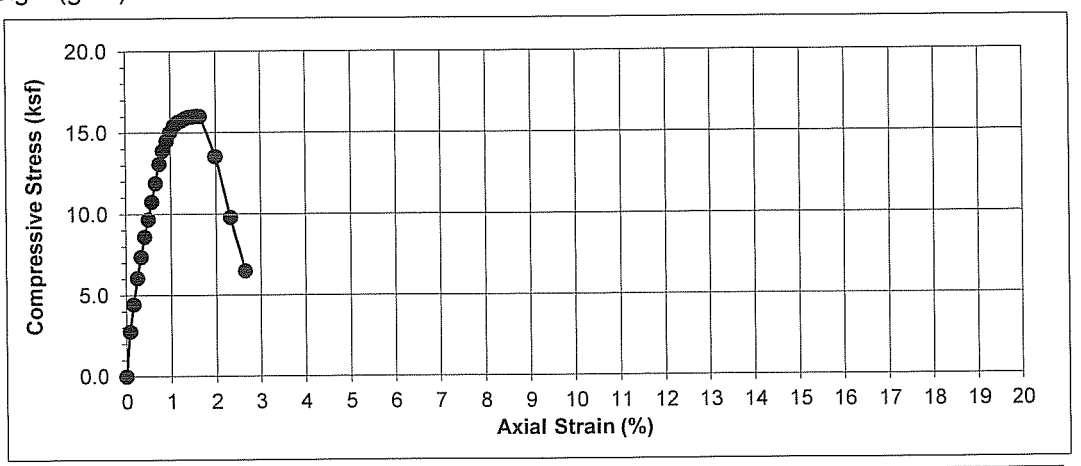
AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A 10 212	Cure Days:	7
Sample No.:	B3-1	Test Date:	12/29/10
Soil Description:	Silty Sand	Dry Density (pcf):	87.5
Sample Type:	Soil-Cement	Moisture Content (%):	30.2
Sample Diameter (inches):	3.042	Wt. Wet Soil+Container(gms):	1463.22
Sample Height (inches):	6.034	Wt. Dry Soil+Container(gms):	1160.23
Sample Weight (gms):	1311.50	Wt. Container (gms):	155.78

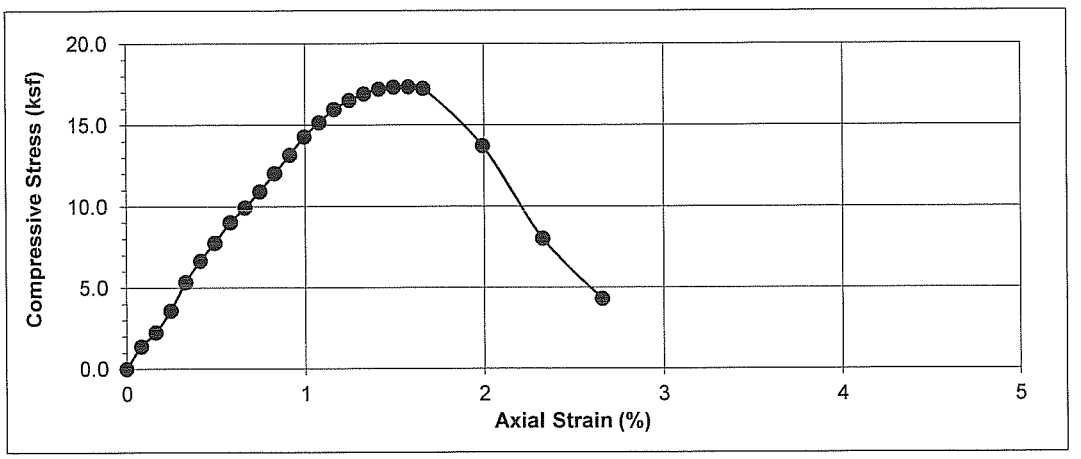


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
139	0.005	7.27	2.75	0.08
224	0.010	7.28	4.43	0.17
306	0.015	7.29	6.05	0.25
373	0.020	7.29	7.37	0.33
436	0.025	7.30	8.60	0.41
490	0.030	7.30	9.66	0.50
546	0.035	7.31	10.76	0.58
605	0.040	7.32	11.91	0.66
665	0.045	7.32	13.08	0.75
707	0.050	7.33	13.89	0.83
739	0.055	7.33	14.51	0.91
766	0.060	7.34	15.03	0.99
787	0.065	7.35	15.42	1.08
799	0.070	7.35	15.65	1.16
805	0.075	7.36	15.75	1.24
813	0.080	7.37	15.89	1.33
817	0.085	7.37	15.96	1.41
819	0.090	7.38	15.98	1.49
822	0.095	7.38	16.03	1.57
821	0.100	7.39	16.00	1.66
697	0.120	7.42	13.54	1.99
506	0.140	7.44	9.79	2.32
336	0.160	7.47	6.48	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A 10 212	Cure Days:	14
Sample No.:	B3-2	Test Date:	01/05/11
Soil Description:	Silty Sand	Dry Density (pcf):	85.0
Sample Type:	Soil-Cement	Moisture Content (%):	34.5
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1455.39
Sample Height (inches):	6.022	Wt. Dry Soil+Container(gms):	1120.27
Sample Weight (gms):	1308.60	Wt. Container (gms):	149.62

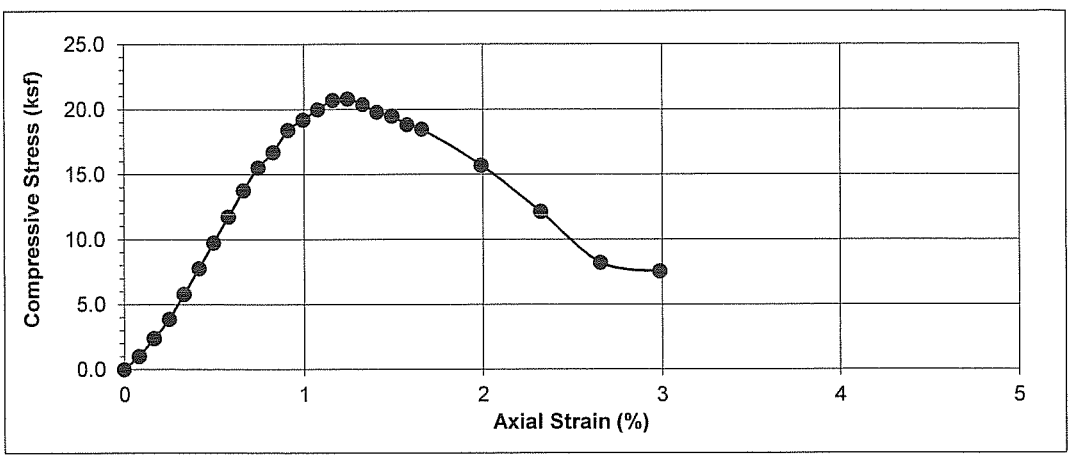


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
69	0.005	7.25	1.37	0.08
113	0.010	7.25	2.24	0.17
181	0.015	7.26	3.59	0.25
270	0.020	7.26	5.35	0.33
336	0.025	7.27	6.66	0.42
392	0.030	7.28	7.76	0.50
456	0.035	7.28	9.02	0.58
502	0.040	7.29	9.92	0.66
553	0.045	7.29	10.92	0.75
610	0.050	7.30	12.03	0.83
668	0.055	7.31	13.17	0.91
725	0.060	7.31	14.28	1.00
770	0.065	7.32	15.15	1.08
812	0.070	7.32	15.96	1.16
841	0.075	7.33	16.52	1.25
862	0.080	7.34	16.92	1.33
878	0.085	7.34	17.22	1.41
884	0.090	7.35	17.32	1.49
886	0.095	7.36	17.35	1.58
882	0.100	7.36	17.25	1.66
703	0.120	7.39	13.71	1.99
412	0.140	7.41	8.00	2.32
222	0.160	7.44	4.30	2.66

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B3-3	Test Date:	01/19/11
Soil Description:	Silty Sand	Dry Density (pcf):	86.9
Sample Type:	Soil-Cement	Moisture Content (%):	30.9
Sample Diameter (inches):	3.038	Wt. Wet Soil+Container(gms):	1406.66
Sample Height (inches):	6.026	Wt. Dry Soil+Container(gms):	1098.99
Sample Weight (gms):	1304.92	Wt. Container (gms):	104.08

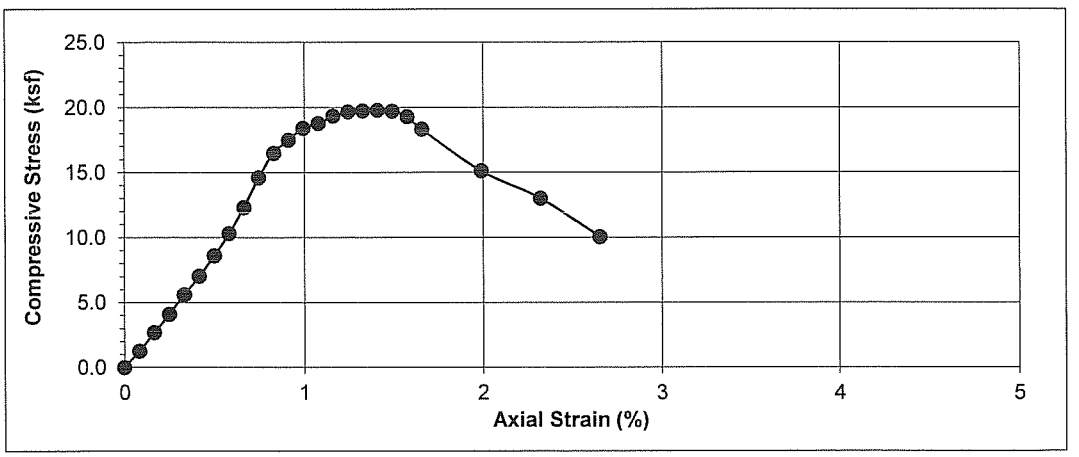


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
51	0.005	7.25	1.01	0.08
120	0.010	7.26	2.38	0.17
195	0.015	7.27	3.86	0.25
292	0.020	7.27	5.78	0.33
393	0.025	7.28	7.77	0.41
493	0.030	7.29	9.74	0.50
594	0.035	7.29	11.73	0.58
698	0.040	7.30	13.77	0.66
787	0.045	7.30	15.52	0.75
848	0.050	7.31	16.71	0.83
935	0.055	7.32	18.40	0.91
976	0.060	7.32	19.20	1.00
1017	0.065	7.33	19.99	1.08
1054	0.070	7.33	20.69	1.16
1060	0.075	7.34	20.80	1.24
1040	0.080	7.35	20.39	1.33
1010	0.085	7.35	19.78	1.41
996	0.090	7.36	19.49	1.49
963	0.095	7.36	18.83	1.58
946	0.100	7.37	18.48	1.66
806	0.120	7.40	15.69	1.99
625	0.140	7.42	12.13	2.32
425	0.160	7.45	8.22	2.66
391	0.180	7.47	7.54	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B3-4	Test Date:	01/19/11
Soil Description:	Silty Sand	Dry Density (pcf):	87.3
Sample Type:	Soil-Cement	Moisture Content (%):	30.4
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1407.33
Sample Height (inches):	6.030	Wt. Dry Soil+Container(gms):	1104.05
Sample Weight (gms):	1308.34	Wt. Container (gms):	105.55

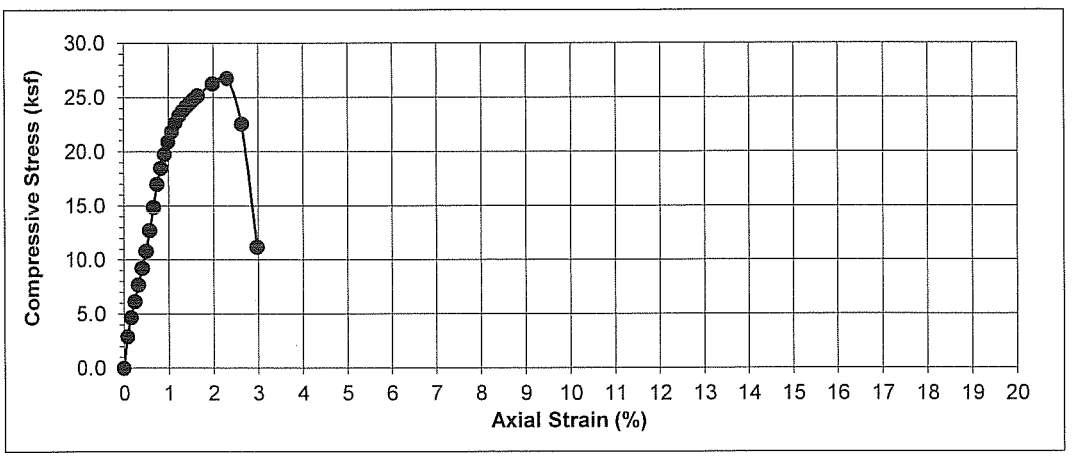


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
63	0.005	7.26	1.25	0.08
135	0.010	7.27	2.67	0.17
207	0.015	7.28	4.10	0.25
283	0.020	7.28	5.60	0.33
355	0.025	7.29	7.01	0.41
436	0.030	7.29	8.61	0.50
523	0.035	7.30	10.32	0.58
624	0.040	7.31	12.30	0.66
742	0.045	7.31	14.61	0.75
838	0.050	7.32	16.49	0.83
890	0.055	7.33	17.50	0.91
937	0.060	7.33	18.40	1.00
956	0.065	7.34	18.76	1.08
986	0.070	7.34	19.33	1.16
1003	0.075	7.35	19.65	1.24
1008	0.080	7.36	19.73	1.33
1011	0.085	7.36	19.77	1.41
1009	0.090	7.37	19.72	1.49
988	0.095	7.37	19.29	1.58
939	0.100	7.38	18.32	1.66
777	0.120	7.41	15.11	1.99
671	0.140	7.43	13.00	2.32
520	0.160	7.46	10.04	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	7
Sample No.:	B5-1	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	86.2
Sample Type:	Soil-Cement	Moisture Content (%):	33.0
Sample Diameter (inches):	3.037	Wt. Wet Soil+Container(gms):	1423.55
Sample Height (inches):	6.047	Wt. Dry Soil+Container(gms):	1096.23
Sample Weight (gms):	1319.58	Wt. Container (gms):	105.62

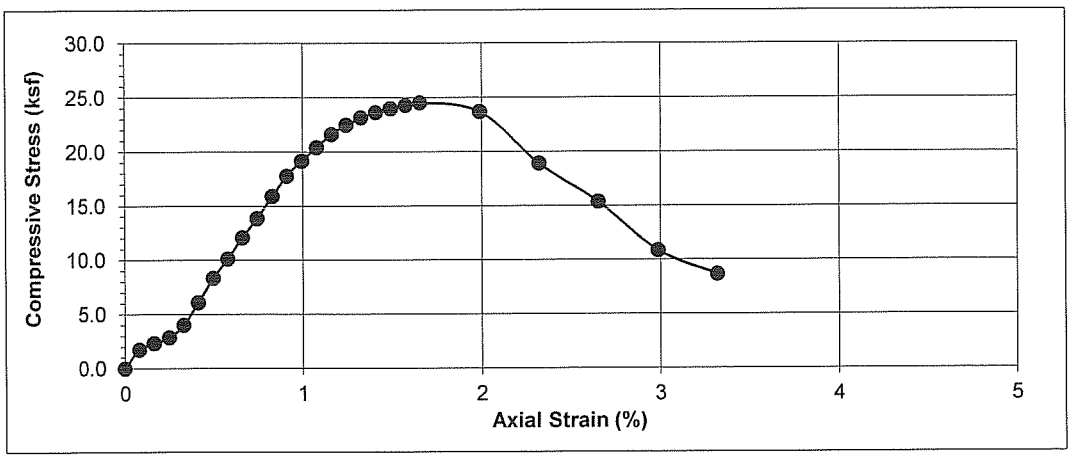


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
145	0.005	7.25	2.88	0.08
236	0.010	7.26	4.68	0.17
310	0.015	7.26	6.15	0.25
388	0.020	7.27	7.69	0.33
466	0.025	7.27	9.23	0.41
546	0.030	7.28	10.80	0.50
644	0.035	7.29	12.73	0.58
752	0.040	7.29	14.85	0.66
861	0.045	7.30	16.99	0.74
937	0.050	7.30	18.47	0.83
1002	0.055	7.31	19.74	0.91
1062	0.060	7.32	20.90	0.99
1111	0.065	7.32	21.85	1.07
1153	0.070	7.33	22.65	1.16
1187	0.075	7.34	23.30	1.24
1211	0.080	7.34	23.75	1.32
1233	0.085	7.35	24.17	1.41
1251	0.090	7.35	24.50	1.49
1270	0.095	7.36	24.85	1.57
1287	0.100	7.37	25.16	1.65
1347	0.120	7.39	26.24	1.98
1378	0.140	7.42	26.76	2.32
1165	0.160	7.44	22.55	2.65
580	0.180	7.47	11.19	2.98

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	14
Sample No.:	B5-3	Test Date:	01/06/11
Soil Description:	Sandy Silt	Dry Density (pcf):	88.5
Sample Type:	Soil-Cement	Moisture Content (%):	31.1
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1473.89
Sample Height (inches):	6.028	Wt. Dry Soil+Container(gms):	1159.25
Sample Weight (gms):	1329.67	Wt. Container (gms):	148.76

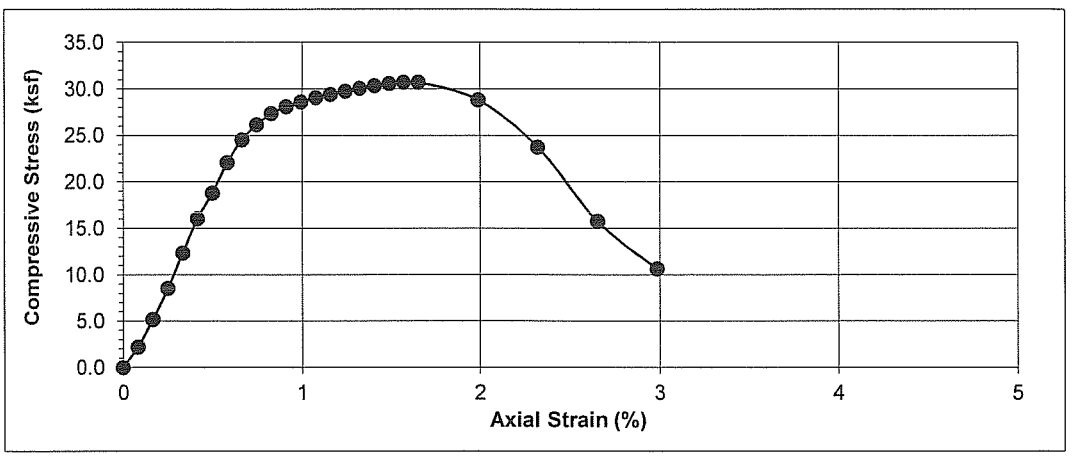


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
88	0.005	7.25	1.75	0.08
117	0.010	7.25	2.32	0.17
144	0.015	7.26	2.86	0.25
202	0.020	7.26	4.00	0.33
307	0.025	7.27	6.08	0.41
421	0.030	7.28	8.33	0.50
512	0.035	7.28	10.13	0.58
611	0.040	7.29	12.07	0.66
702	0.045	7.29	13.86	0.75
805	0.050	7.30	15.88	0.83
901	0.055	7.31	17.76	0.91
972	0.060	7.31	19.14	1.00
1036	0.065	7.32	20.39	1.08
1099	0.070	7.32	21.61	1.16
1143	0.075	7.33	22.45	1.24
1180	0.080	7.34	23.16	1.33
1205	0.085	7.34	23.63	1.41
1224	0.090	7.35	23.98	1.49
1240	0.095	7.36	24.28	1.58
1253	0.100	7.36	24.51	1.66
1214	0.120	7.39	23.67	1.99
973	0.140	7.41	18.90	2.32
793	0.160	7.44	15.36	2.65
563	0.180	7.46	10.86	2.99
451	0.200	7.49	8.67	3.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B5-4	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	86.5
Sample Type:	Soil-Cement	Moisture Content (%):	33.8
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1518.65
Sample Height (inches):	6.031	Wt. Dry Soil+Container(gms):	1183.78
Sample Weight (gms):	1325.63	Wt. Container (gms):	193.81

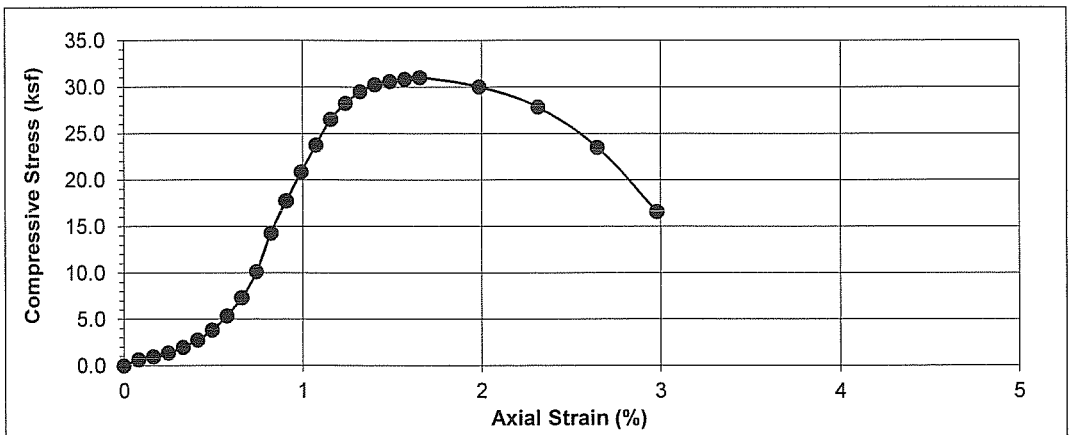


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
111	0.005	7.24	2.21	0.08
260	0.010	7.25	5.17	0.17
429	0.015	7.25	8.52	0.25
622	0.020	7.26	12.34	0.33
808	0.025	7.26	16.02	0.41
948	0.030	7.27	18.78	0.50
1115	0.035	7.28	22.06	0.58
1240	0.040	7.28	24.52	0.66
1323	0.045	7.29	26.14	0.75
1385	0.050	7.29	27.34	0.83
1424	0.055	7.30	28.09	0.91
1451	0.060	7.31	28.59	0.99
1475	0.065	7.31	29.04	1.08
1493	0.070	7.32	29.37	1.16
1513	0.075	7.33	29.74	1.24
1530	0.080	7.33	30.05	1.33
1546	0.085	7.34	30.34	1.41
1559	0.090	7.34	30.57	1.49
1567	0.095	7.35	30.70	1.58
1568	0.100	7.36	30.69	1.66
1477	0.120	7.38	28.81	1.99
1220	0.140	7.41	23.72	2.32
812	0.160	7.43	15.73	2.65
550	0.180	7.46	10.62	2.98

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B5-5	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	85.8
Sample Type:	Soil-Cement	Moisture Content (%):	34.5
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1517.74
Sample Height (inches):	6.042	Wt. Dry Soil+Container(gms):	1178.54
Sample Weight (gms):	1324.03	Wt. Container (gms):	194.58

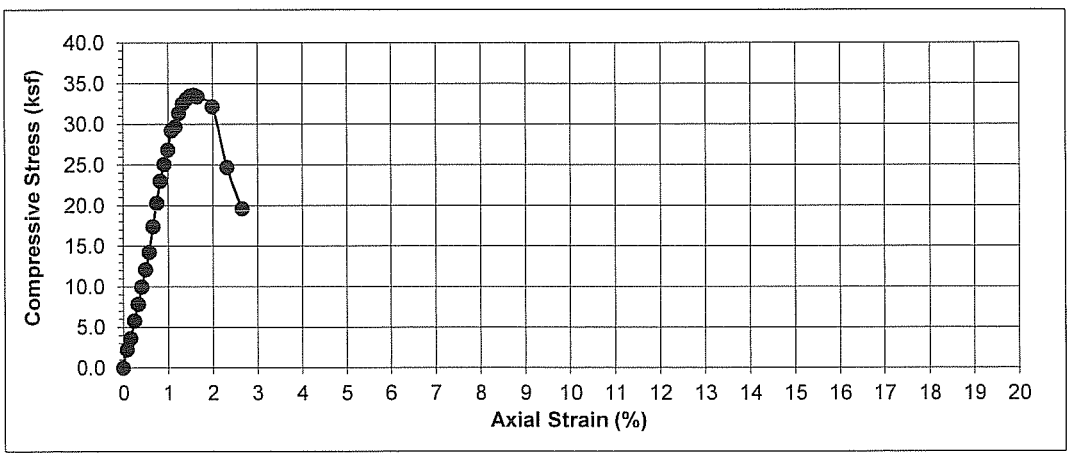


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
32	0.005	7.24	0.64	0.08
48	0.010	7.25	0.95	0.17
69	0.015	7.25	1.37	0.25
99	0.020	7.26	1.96	0.33
139	0.025	7.26	2.76	0.41
193	0.030	7.27	3.82	0.50
270	0.035	7.28	5.34	0.58
370	0.040	7.28	7.32	0.66
511	0.045	7.29	10.10	0.74
723	0.050	7.29	14.27	0.83
900	0.055	7.30	17.75	0.91
1059	0.060	7.31	20.87	0.99
1207	0.065	7.31	23.77	1.08
1348	0.070	7.32	26.52	1.16
1437	0.075	7.33	28.25	1.24
1501	0.080	7.33	29.48	1.32
1542	0.085	7.34	30.26	1.41
1561	0.090	7.34	30.61	1.49
1575	0.095	7.35	30.86	1.57
1585	0.100	7.36	31.03	1.66
1539	0.120	7.38	30.02	1.99
1431	0.140	7.41	27.82	2.32
1212	0.160	7.43	23.49	2.65
858	0.180	7.46	16.57	2.98

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	7
Sample No.:	B5-9	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	87.8
Sample Type:	Soil-Cement	Moisture Content (%):	32.4
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1433.64
Sample Height (inches):	6.030	Wt. Dry Soil+Container(gms):	1108.68
Sample Weight (gms):	1329.08	Wt. Container (gms):	106.72

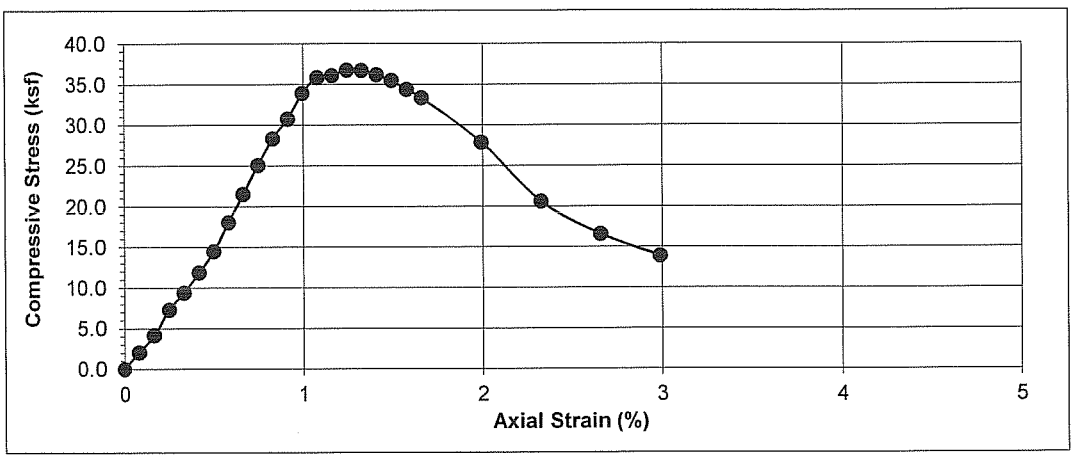


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
113	0.005	7.23	2.25	0.08
182	0.010	7.23	3.62	0.17
292	0.015	7.24	5.81	0.25
394	0.020	7.24	7.83	0.33
503	0.025	7.25	9.99	0.41
610	0.030	7.26	12.11	0.50
719	0.035	7.26	14.26	0.58
878	0.040	7.27	17.39	0.66
1024	0.045	7.27	20.27	0.75
1164	0.050	7.28	23.02	0.83
1269	0.055	7.29	25.08	0.91
1360	0.060	7.29	26.85	1.00
1480	0.065	7.30	29.20	1.08
1505	0.070	7.31	29.67	1.16
1592	0.075	7.31	31.36	1.24
1652	0.080	7.32	32.51	1.33
1682	0.085	7.32	33.07	1.41
1703	0.090	7.33	33.46	1.49
1712	0.095	7.34	33.61	1.58
1703	0.100	7.34	33.40	1.66
1646	0.120	7.37	32.17	1.99
1268	0.140	7.39	24.70	2.32
1010	0.160	7.42	19.61	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	14
Sample No.:	B5-11	Test Date:	01/06/11
Soil Description:	Sandy Silt	Dry Density (pcf):	89.3
Sample Type:	Soil-Cement	Moisture Content (%):	30.5
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1479.22
Sample Height (inches):	6.021	Wt. Dry Soil+Container(gms):	1168.66
Sample Weight (gms):	1332.92	Wt. Container (gms):	152.04

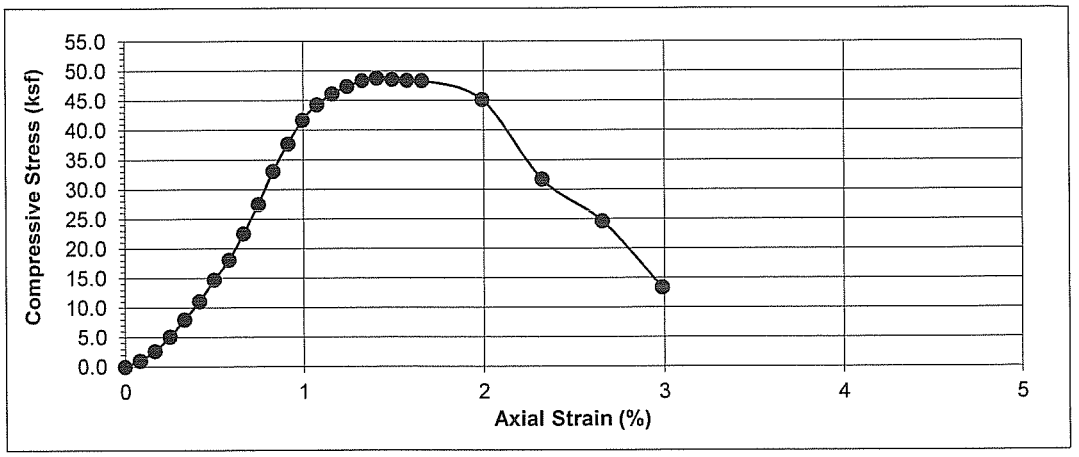


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
103	0.005	7.24	2.05	0.08
209	0.010	7.25	4.15	0.17
368	0.015	7.25	7.31	0.25
473	0.020	7.26	9.38	0.33
598	0.025	7.26	11.85	0.42
730	0.030	7.27	14.46	0.50
911	0.035	7.28	18.03	0.58
1087	0.040	7.28	21.49	0.66
1269	0.045	7.29	25.07	0.75
1436	0.050	7.30	28.35	0.83
1559	0.055	7.30	30.75	0.91
1720	0.060	7.31	33.89	1.00
1820	0.065	7.31	35.84	1.08
1833	0.070	7.32	36.06	1.16
1870	0.075	7.33	36.76	1.25
1870	0.080	7.33	36.73	1.33
1844	0.085	7.34	36.19	1.41
1809	0.090	7.34	35.47	1.49
1754	0.095	7.35	34.36	1.58
1703	0.100	7.36	33.33	1.66
1429	0.120	7.38	27.88	1.99
1059	0.140	7.41	20.59	2.33
855	0.160	7.43	16.57	2.66
720	0.180	7.46	13.90	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B5-12	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	87.2
Sample Type:	Soil-Cement	Moisture Content (%):	32.7
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1519.26
Sample Height (inches):	6.024	Wt. Dry Soil+Container(gms):	1192.58
Sample Weight (gms):	1325.48	Wt. Container (gms):	194.41

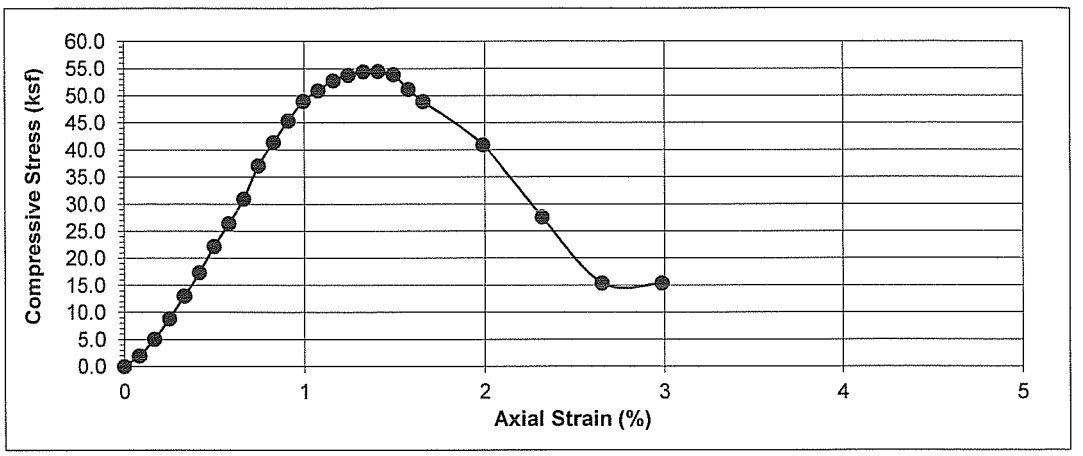


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
52	0.005	7.25	1.03	0.08
134	0.010	7.25	2.66	0.17
255	0.015	7.26	5.06	0.25
402	0.020	7.26	7.97	0.33
557	0.025	7.27	11.03	0.42
742	0.030	7.28	14.69	0.50
912	0.035	7.28	18.04	0.58
1138	0.040	7.29	22.49	0.66
1390	0.045	7.29	27.44	0.75
1674	0.050	7.30	33.02	0.83
1912	0.055	7.31	37.69	0.91
2116	0.060	7.31	41.67	1.00
2251	0.065	7.32	44.29	1.08
2347	0.070	7.32	46.14	1.16
2412	0.075	7.33	47.38	1.25
2465	0.080	7.34	48.38	1.33
2487	0.085	7.34	48.77	1.41
2479	0.090	7.35	48.57	1.49
2472	0.095	7.36	48.40	1.58
2473	0.100	7.36	48.38	1.66
2315	0.120	7.39	45.13	1.99
1632	0.140	7.41	31.71	2.32
1270	0.160	7.44	24.59	2.66
692	0.180	7.46	13.35	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B5-13	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	88.1
Sample Type:	Soil-Cement	Moisture Content (%):	31.7
Sample Diameter (inches):	3.037	Wt. Wet Soil+Container(gms):	1512.4
Sample Height (inches):	6.027	Wt. Dry Soil+Container(gms):	1194.66
Sample Weight (gms):	1329.16	Wt. Container (gms):	190.91

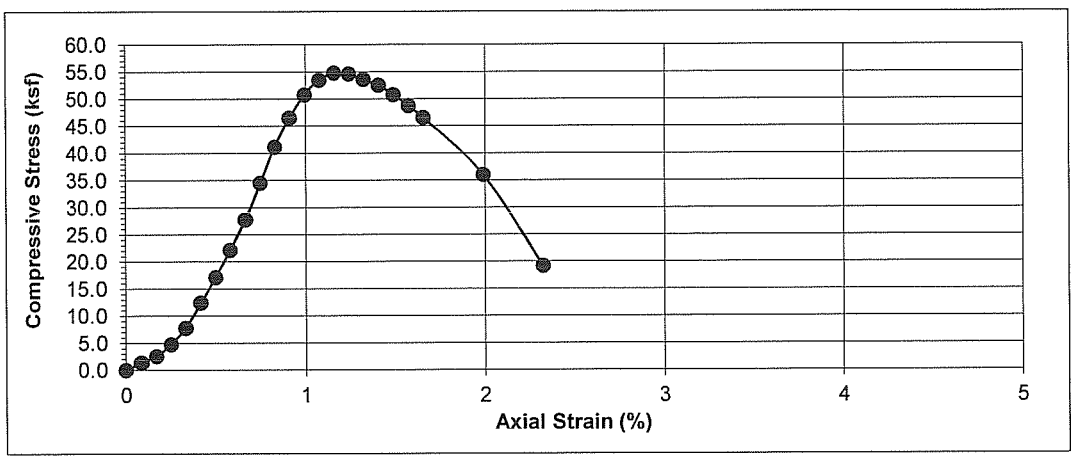


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
98	0.005	7.25	1.95	0.08
254	0.010	7.26	5.04	0.17
444	0.015	7.26	8.80	0.25
656	0.020	7.27	13.00	0.33
876	0.025	7.27	17.34	0.41
1121	0.030	7.28	22.17	0.50
1336	0.035	7.29	26.40	0.58
1568	0.040	7.29	30.96	0.66
1877	0.045	7.30	37.03	0.75
2098	0.050	7.30	41.36	0.83
2302	0.055	7.31	45.34	0.91
2488	0.060	7.32	48.97	1.00
2590	0.065	7.32	50.93	1.08
2686	0.070	7.33	52.77	1.16
2738	0.075	7.34	53.75	1.24
2774	0.080	7.34	54.41	1.33
2778	0.085	7.35	54.44	1.41
2750	0.090	7.35	53.85	1.49
2613	0.095	7.36	51.12	1.58
2501	0.100	7.37	48.89	1.66
2100	0.120	7.39	40.91	1.99
1420	0.140	7.42	27.57	2.32
796	0.160	7.44	15.40	2.65
797	0.180	7.47	15.37	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	56
Sample No.:	B5-16	Test Date:	02/17/11
Soil Description:	Sandy Silt	Dry Density (pcf):	93.9
Sample Type:	Soil-Cement	Moisture Content (%):	23.5
Sample Diameter (inches):	3.043	Wt. Wet Soil+Container(gms):	1482.2
Sample Height (inches):	6.029	Wt. Dry Soil+Container(gms):	1228.4
Sample Weight (gms):	1334.78	Wt. Container (gms):	148.53

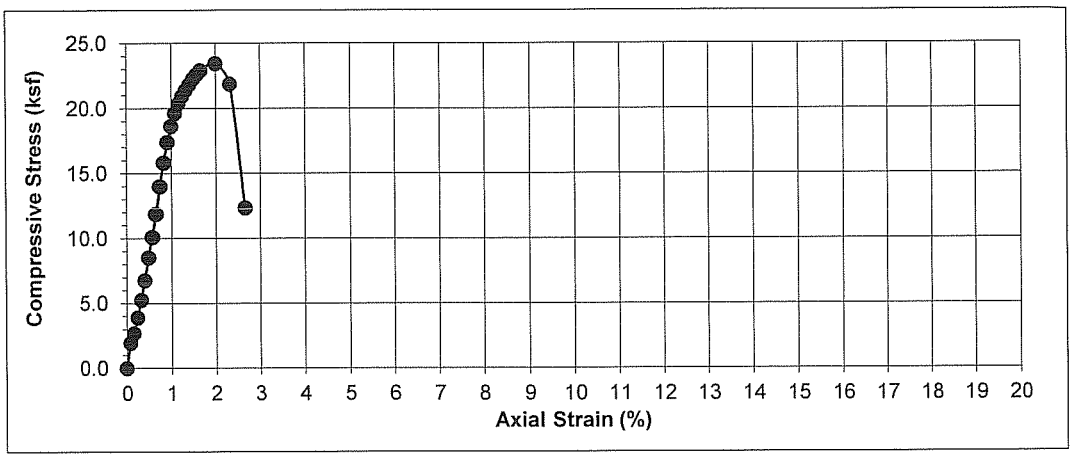


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
69	0.005	7.28	1.37	0.08
128	0.010	7.28	2.53	0.17
240	0.015	7.29	4.74	0.25
392	0.020	7.30	7.74	0.33
629	0.025	7.30	12.40	0.41
869	0.030	7.31	17.12	0.50
1125	0.035	7.32	22.15	0.58
1410	0.040	7.32	27.73	0.66
1757	0.045	7.33	34.53	0.75
2096	0.050	7.33	41.16	0.83
2368	0.055	7.34	46.46	0.91
2588	0.060	7.35	50.73	1.00
2731	0.065	7.35	53.49	1.08
2797	0.070	7.36	54.74	1.16
2791	0.075	7.36	54.57	1.24
2741	0.080	7.37	53.55	1.33
2691	0.085	7.38	52.53	1.41
2600	0.090	7.38	50.71	1.49
2501	0.095	7.39	48.74	1.58
2390	0.100	7.40	46.54	1.66
1854	0.120	7.42	35.98	1.99
990	0.140	7.45	19.15	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	7
Sample No.:	B3-1	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	84.2
Sample Type:	Soil-Cement	Moisture Content (%):	35.9
Sample Diameter (inches):	3.034	Wt. Wet Soil+Container(gms):	1497.43
Sample Height (inches):	6.013	Wt. Dry Soil+Container(gms):	1153.29
Sample Weight (gms):	1305.60	Wt. Container (gms):	194.57

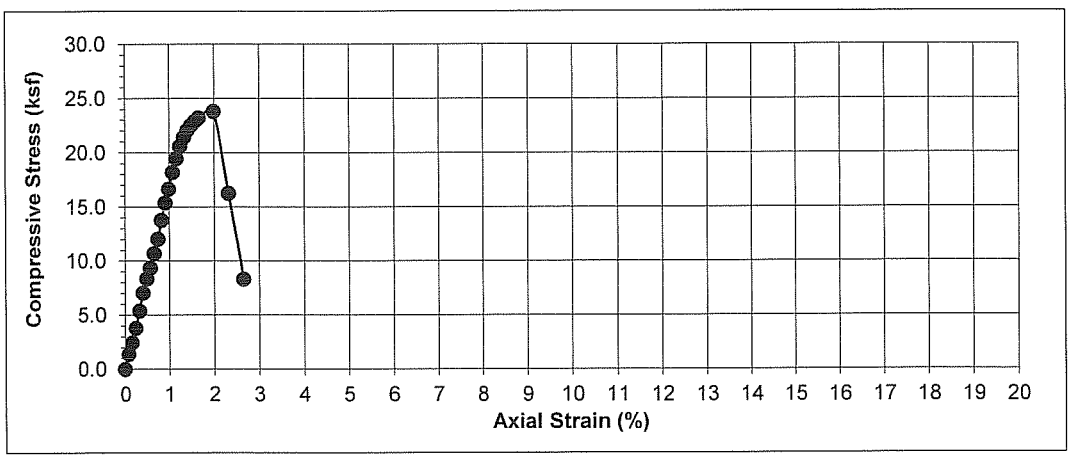


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
97	0.005	7.24	1.93	0.08
135	0.010	7.24	2.68	0.17
196	0.015	7.25	3.89	0.25
264	0.020	7.25	5.24	0.33
341	0.025	7.26	6.76	0.42
429	0.030	7.27	8.50	0.50
509	0.035	7.27	10.08	0.58
599	0.040	7.28	11.85	0.67
708	0.045	7.28	14.00	0.75
801	0.050	7.29	15.82	0.83
881	0.055	7.30	17.39	0.91
944	0.060	7.30	18.61	1.00
995	0.065	7.31	19.60	1.08
1034	0.070	7.31	20.36	1.16
1063	0.075	7.32	20.91	1.25
1087	0.080	7.33	21.36	1.33
1111	0.085	7.33	21.82	1.41
1134	0.090	7.34	22.25	1.50
1152	0.095	7.35	22.58	1.58
1169	0.100	7.35	22.90	1.66
1201	0.120	7.38	23.44	2.00
1123	0.140	7.40	21.85	2.33
636	0.160	7.43	12.33	2.66

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	7
Sample No.:	B3-2	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	84.5
Sample Type:	Soil-Cement	Moisture Content (%):	35.5
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1465.53
Sample Height (inches):	6.034	Wt. Dry Soil+Container(gms):	1121.98
Sample Weight (gms):	1312.59	Wt. Container (gms):	155.12

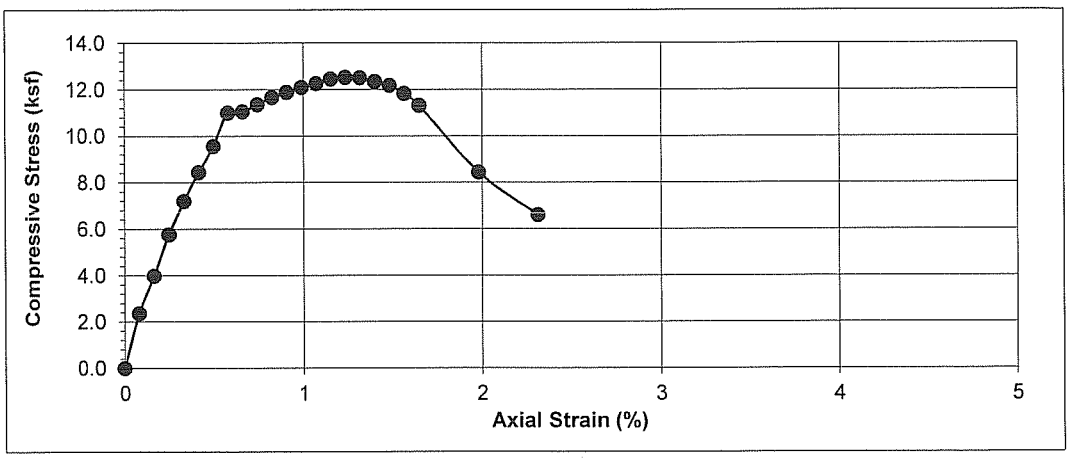


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
70	0.005	7.25	1.39	0.08
124	0.010	7.25	2.46	0.17
191	0.015	7.26	3.79	0.25
272	0.020	7.26	5.39	0.33
355	0.025	7.27	7.03	0.41
422	0.030	7.28	8.35	0.50
473	0.035	7.28	9.35	0.58
541	0.040	7.29	10.69	0.66
608	0.045	7.29	12.00	0.75
698	0.050	7.30	13.77	0.83
780	0.055	7.31	15.37	0.91
845	0.060	7.31	16.64	0.99
923	0.065	7.32	18.16	1.08
989	0.070	7.32	19.44	1.16
1047	0.075	7.33	20.57	1.24
1091	0.080	7.34	21.41	1.33
1125	0.085	7.34	22.06	1.41
1149	0.090	7.35	22.51	1.49
1170	0.095	7.36	22.91	1.57
1186	0.100	7.36	23.20	1.66
1221	0.120	7.39	23.80	1.99
836	0.140	7.41	16.24	2.32
429	0.160	7.44	8.31	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	14
Sample No.:	B3-4	Test Date:	01/06/11
Soil Description:	Sandy Silt	Dry Density (pcf):	86.0
Sample Type:	Soil-Cement	Moisture Content (%):	32.3
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1456.07
Sample Height (inches):	6.053	Wt. Dry Soil+Container(gms):	1137.34
Sample Weight (gms):	1308.91	Wt. Container (gms):	149.68

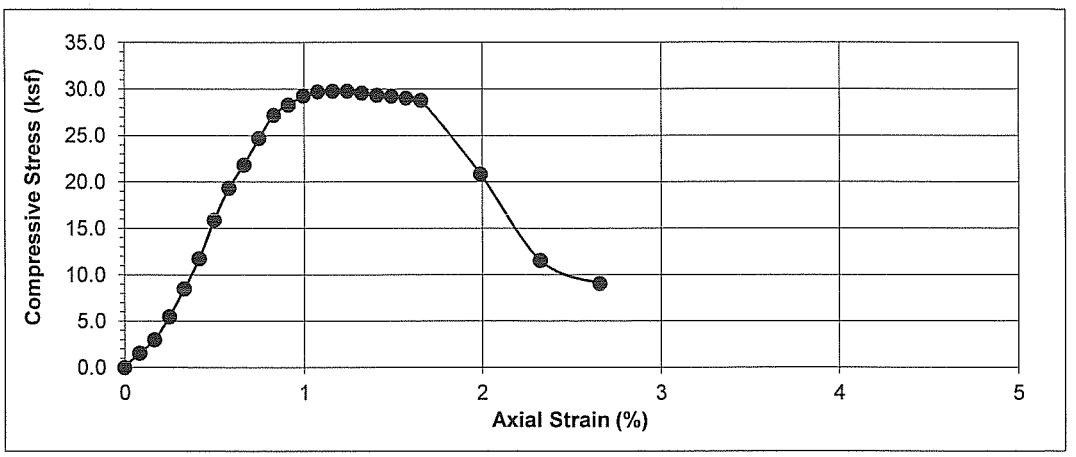


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
119	0.005	7.25	2.37	0.08
200	0.010	7.25	3.97	0.17
290	0.015	7.26	5.75	0.25
363	0.020	7.26	7.20	0.33
426	0.025	7.27	8.44	0.41
483	0.030	7.28	9.56	0.50
556	0.035	7.28	11.00	0.58
559	0.040	7.29	11.05	0.66
575	0.045	7.29	11.35	0.74
591	0.050	7.30	11.66	0.83
603	0.055	7.31	11.89	0.91
614	0.060	7.31	12.09	0.99
623	0.065	7.32	12.26	1.07
633	0.070	7.32	12.45	1.16
637	0.075	7.33	12.51	1.24
637	0.080	7.34	12.50	1.32
629	0.085	7.34	12.34	1.40
621	0.090	7.35	12.17	1.49
604	0.095	7.35	11.83	1.57
578	0.100	7.36	11.31	1.65
433	0.120	7.39	8.44	1.98
340	0.140	7.41	6.61	2.31

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	28
Sample No.:	B3-5	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	84.2
Sample Type:	Soil-Cement	Moisture Content (%):	36.1
Sample Diameter (inches):	3.028	Wt. Wet Soil+Container(gms):	1493.79
Sample Height (inches):	6.028	Wt. Dry Soil+Container(gms):	1148.45
Sample Weight (gms):	1305.71	Wt. Container (gms):	191.29

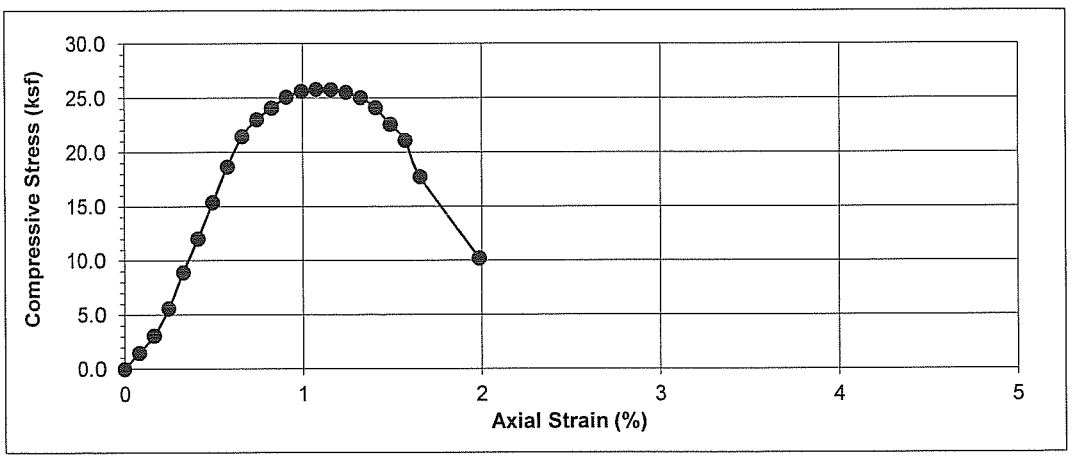


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.20	0.00	0.00
78	0.005	7.21	1.56	0.08
150	0.010	7.21	2.99	0.17
274	0.015	7.22	5.47	0.25
425	0.020	7.23	8.47	0.33
590	0.025	7.23	11.75	0.41
799	0.030	7.24	15.90	0.50
972	0.035	7.24	19.32	0.58
1099	0.040	7.25	21.83	0.66
1244	0.045	7.26	24.69	0.75
1371	0.050	7.26	27.19	0.83
1428	0.055	7.27	28.29	0.91
1477	0.060	7.27	29.24	1.00
1501	0.065	7.28	29.69	1.08
1506	0.070	7.29	29.77	1.16
1507	0.075	7.29	29.76	1.24
1498	0.080	7.30	29.56	1.33
1488	0.085	7.30	29.34	1.41
1484	0.090	7.31	29.23	1.49
1474	0.095	7.32	29.01	1.58
1463	0.100	7.32	28.77	1.66
1063	0.120	7.35	20.83	1.99
591	0.140	7.37	11.54	2.32
464	0.160	7.40	9.03	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	28
Sample No.:	B3-6	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	84.0
Sample Type:	Soil-Cement	Moisture Content (%):	36.0
Sample Diameter (inches):	3.026	Wt. Wet Soil+Container(gms):	1456.22
Sample Height (inches):	6.038	Wt. Dry Soil+Container(gms):	1111.76
Sample Weight (gms):	1302.92	Wt. Container (gms):	154.40

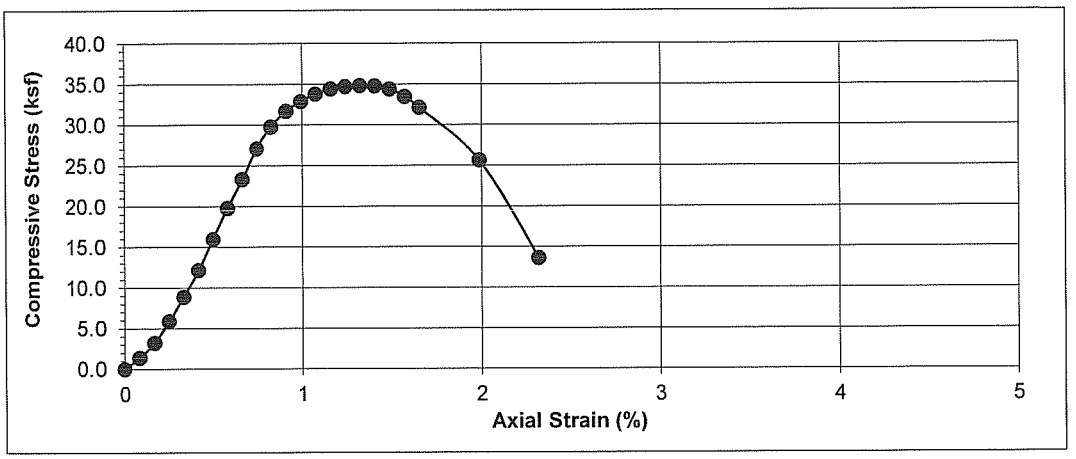


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.19	0.00	0.00
74	0.005	7.20	1.48	0.08
154	0.010	7.20	3.08	0.17
280	0.015	7.21	5.59	0.25
446	0.020	7.22	8.90	0.33
603	0.025	7.22	12.02	0.41
771	0.030	7.23	15.36	0.50
937	0.035	7.23	18.65	0.58
1078	0.040	7.24	21.44	0.66
1157	0.045	7.25	22.99	0.75
1212	0.050	7.25	24.07	0.83
1263	0.055	7.26	25.06	0.91
1292	0.060	7.26	25.61	0.99
1302	0.065	7.27	25.79	1.08
1302	0.070	7.28	25.77	1.16
1290	0.075	7.28	25.51	1.24
1266	0.080	7.29	25.01	1.32
1220	0.085	7.29	24.08	1.41
1143	0.090	7.30	22.55	1.49
1070	0.095	7.31	21.09	1.57
901	0.100	7.31	17.74	1.66
520	0.120	7.34	10.21	1.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	56
Sample No.:	B3-9	Test Date:	02/17/11
Soil Description:	Sandy Silt	Dry Density (pcf):	88.1
Sample Type:	Soil-Cement	Moisture Content (%):	29.3
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1456.17
Sample Height (inches):	6.036	Wt. Dry Soil+Container(gms):	1160.23
Sample Weight (gms):	1306.96	Wt. Container (gms):	151.61

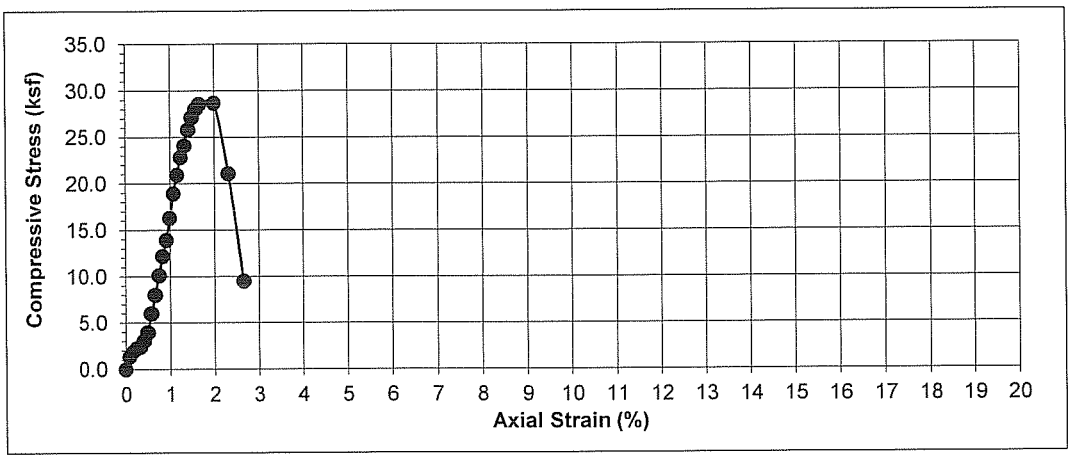


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
69	0.005	7.24	1.37	0.08
162	0.010	7.25	3.22	0.17
296	0.015	7.25	5.88	0.25
447	0.020	7.26	8.87	0.33
612	0.025	7.26	12.13	0.41
805	0.030	7.27	15.94	0.50
999	0.035	7.28	19.77	0.58
1179	0.040	7.28	23.31	0.66
1371	0.045	7.29	27.09	0.75
1508	0.050	7.29	29.77	0.83
1607	0.055	7.30	31.70	0.91
1669	0.060	7.31	32.89	0.99
1716	0.065	7.31	33.79	1.08
1749	0.070	7.32	34.41	1.16
1765	0.075	7.33	34.70	1.24
1773	0.080	7.33	34.82	1.33
1772	0.085	7.34	34.77	1.41
1754	0.090	7.34	34.39	1.49
1709	0.095	7.35	33.48	1.57
1641	0.100	7.36	32.12	1.66
1315	0.120	7.38	25.65	1.99
700	0.140	7.41	13.61	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	7
Sample No.:	B3-11	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	83.2
Sample Type:	Soil-Cement	Moisture Content (%):	37.2
Sample Diameter (inches):	3.031	Wt. Wet Soil+Container(gms):	1460.46
Sample Height (inches):	6.031	Wt. Dry Soil+Container(gms):	1107.07
Sample Weight (gms):	1303.71	Wt. Container (gms):	156.88

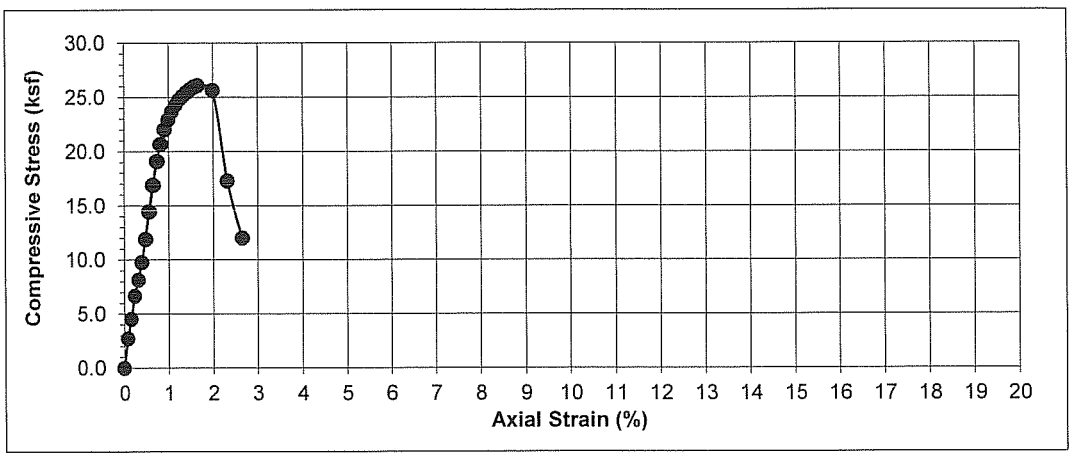


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
67	0.005	7.22	1.34	0.08
93	0.010	7.23	1.85	0.17
112	0.015	7.23	2.23	0.25
121	0.020	7.24	2.41	0.33
153	0.025	7.25	3.04	0.41
199	0.030	7.25	3.95	0.50
303	0.035	7.26	6.01	0.58
404	0.040	7.26	8.01	0.66
511	0.045	7.27	10.12	0.75
616	0.050	7.28	12.19	0.83
704	0.055	7.28	13.92	0.91
825	0.060	7.29	16.30	0.99
958	0.065	7.29	18.91	1.08
1061	0.070	7.30	20.93	1.16
1158	0.075	7.31	22.82	1.24
1223	0.080	7.31	24.08	1.33
1311	0.085	7.32	25.80	1.41
1379	0.090	7.32	27.11	1.49
1425	0.095	7.33	27.99	1.58
1454	0.100	7.34	28.54	1.66
1466	0.120	7.36	28.68	1.99
1081	0.140	7.39	21.07	2.32
489	0.160	7.41	9.50	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	7
Sample No.:	B3-12	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	83.6
Sample Type:	Soil-Cement	Moisture Content (%):	36.6
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1460.46
Sample Height (inches):	6.030	Wt. Dry Soil+Container(gms):	1111.29
Sample Weight (gms):	1305.18	Wt. Container (gms):	156.47

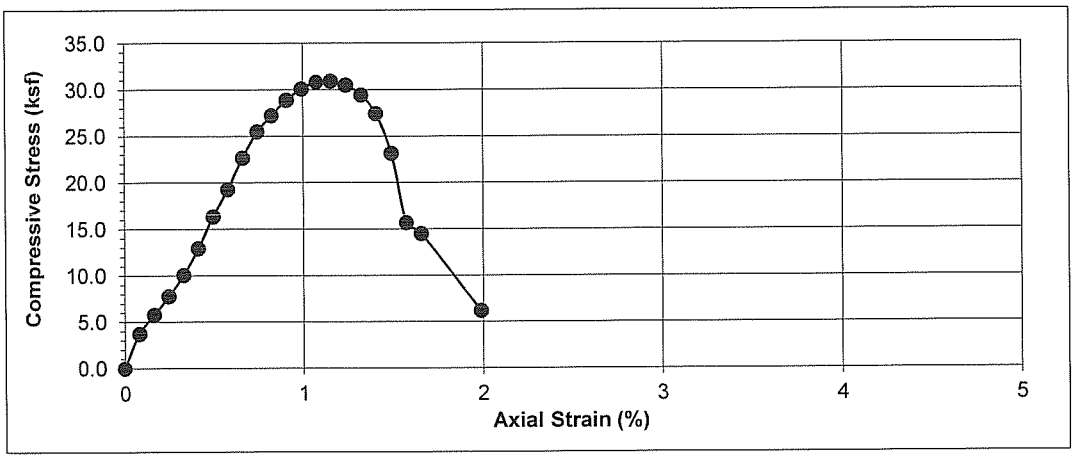


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
136	0.005	7.23	2.71	0.08
227	0.010	7.23	4.52	0.17
335	0.015	7.24	6.66	0.25
409	0.020	7.24	8.13	0.33
491	0.025	7.25	9.75	0.41
600	0.030	7.26	11.91	0.50
729	0.035	7.26	14.45	0.58
853	0.040	7.27	16.90	0.66
965	0.045	7.27	19.10	0.75
1044	0.050	7.28	20.65	0.83
1114	0.055	7.29	22.02	0.91
1162	0.060	7.29	22.94	1.00
1200	0.065	7.30	23.67	1.08
1231	0.070	7.31	24.27	1.16
1256	0.075	7.31	24.74	1.24
1276	0.080	7.32	25.11	1.33
1293	0.085	7.32	25.42	1.41
1308	0.090	7.33	25.70	1.49
1322	0.095	7.34	25.95	1.58
1330	0.100	7.34	26.09	1.66
1312	0.120	7.37	25.65	1.99
888	0.140	7.39	17.30	2.32
618	0.160	7.42	12.00	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	14
Sample No.:	B3-14	Test Date:	01/06/11
Soil Description:	Sandy Silt	Dry Density (pcf):	87.2
Sample Type:	Soil-Cement	Moisture Content (%):	31.5
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1460.8
Sample Height (inches):	6.033	Wt. Dry Soil+Container(gms):	1146.89
Sample Weight (gms):	1314.11	Wt. Container (gms):	149.42

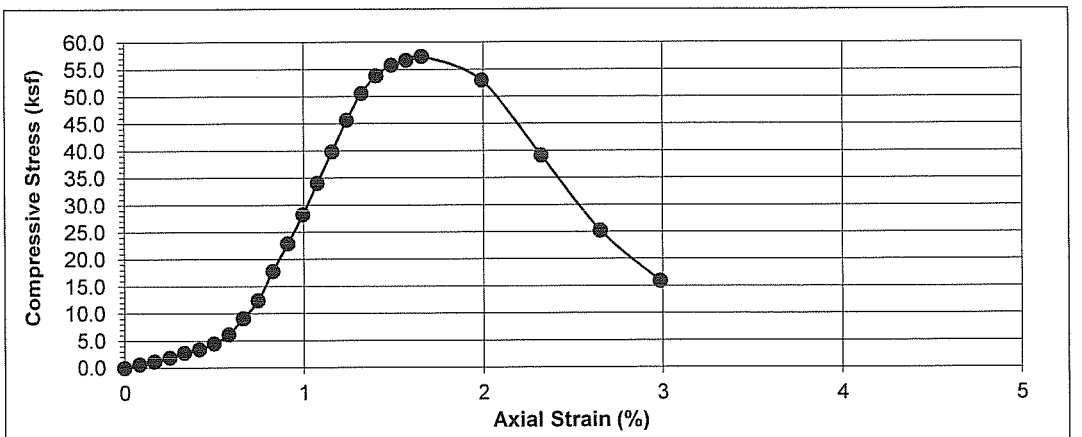


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
188	0.005	7.25	3.74	0.08
290	0.010	7.25	5.76	0.17
391	0.015	7.26	7.76	0.25
507	0.020	7.26	10.05	0.33
652	0.025	7.27	12.92	0.41
825	0.030	7.28	16.33	0.50
975	0.035	7.28	19.28	0.58
1146	0.040	7.29	22.64	0.66
1290	0.045	7.29	25.47	0.75
1379	0.050	7.30	27.20	0.83
1464	0.055	7.31	28.86	0.91
1528	0.060	7.31	30.09	0.99
1566	0.065	7.32	30.81	1.08
1572	0.070	7.32	30.91	1.16
1552	0.075	7.33	30.49	1.24
1500	0.080	7.34	29.44	1.33
1399	0.085	7.34	27.44	1.41
1180	0.090	7.35	23.12	1.49
800	0.095	7.36	15.66	1.57
742	0.100	7.36	14.51	1.66
316	0.120	7.39	6.16	1.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	28
Sample No.:	B3-15	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	85.0
Sample Type:	Soil-Cement	Moisture Content (%):	35.1
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1413.18
Sample Height (inches):	6.025	Wt. Dry Soil+Container(gms):	1073.32
Sample Weight (gms):	1312.06	Wt. Container (gms):	105.57

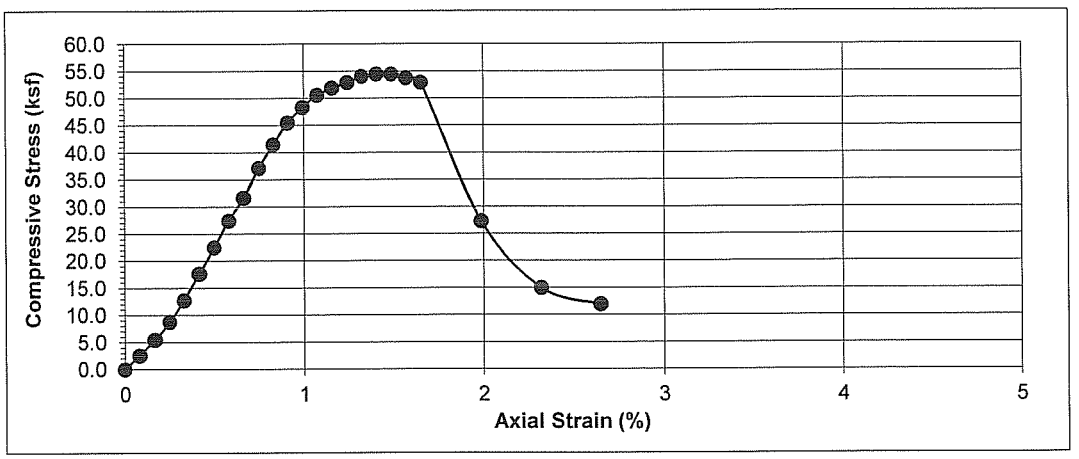


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
32	0.005	7.23	0.64	0.08
57	0.010	7.23	1.13	0.17
93	0.015	7.24	1.85	0.25
138	0.020	7.24	2.74	0.33
171	0.025	7.25	3.40	0.41
225	0.030	7.26	4.47	0.50
310	0.035	7.26	6.15	0.58
458	0.040	7.27	9.07	0.66
627	0.045	7.27	12.41	0.75
899	0.050	7.28	17.78	0.83
1158	0.055	7.29	22.88	0.91
1429	0.060	7.29	28.22	1.00
1724	0.065	7.30	34.01	1.08
2022	0.070	7.31	39.86	1.16
2318	0.075	7.31	45.65	1.24
2569	0.080	7.32	50.56	1.33
2736	0.085	7.32	53.80	1.41
2838	0.090	7.33	55.76	1.49
2887	0.095	7.34	56.67	1.58
2926	0.100	7.34	57.39	1.66
2710	0.120	7.37	52.97	1.99
2010	0.140	7.39	39.16	2.32
1300	0.160	7.42	25.24	2.66
821	0.180	7.44	15.88	2.99

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	28
Sample No.:	B3-16	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	84.4
Sample Type:	Soil-Cement	Moisture Content (%):	35.1
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1402.79
Sample Height (inches):	6.038	Wt. Dry Soil+Container(gms):	1066.05
Sample Weight (gms):	1307.59	Wt. Container (gms):	105.36

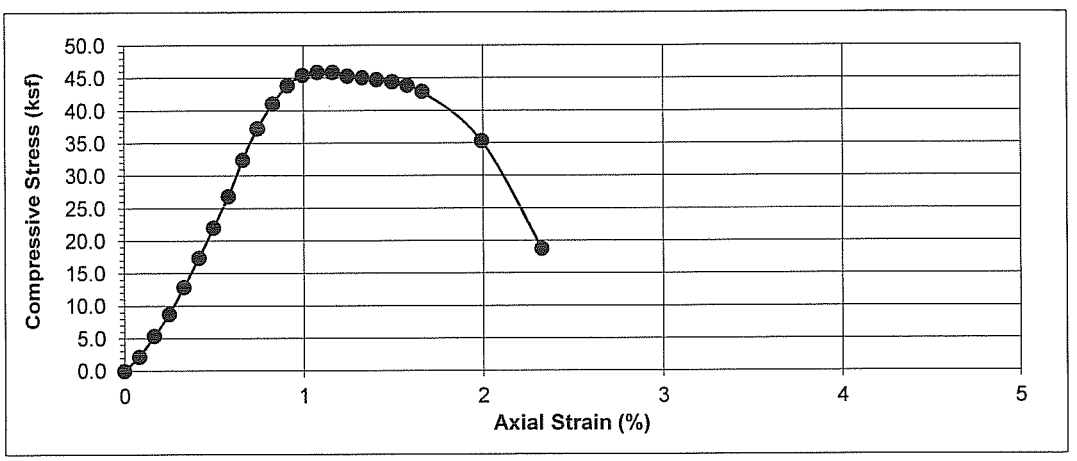


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
128	0.005	7.24	2.55	0.08
274	0.010	7.25	5.44	0.17
440	0.015	7.25	8.74	0.25
640	0.020	7.26	12.70	0.33
890	0.025	7.26	17.64	0.41
1136	0.030	7.27	22.50	0.50
1386	0.035	7.28	27.43	0.58
1599	0.040	7.28	31.62	0.66
1879	0.045	7.29	37.12	0.75
2098	0.050	7.29	41.41	0.83
2304	0.055	7.30	45.44	0.91
2450	0.060	7.31	48.28	0.99
2567	0.065	7.31	50.55	1.08
2636	0.070	7.32	51.86	1.16
2690	0.075	7.33	52.88	1.24
2749	0.080	7.33	53.99	1.32
2773	0.085	7.34	54.42	1.41
2774	0.090	7.34	54.39	1.49
2740	0.095	7.35	53.68	1.57
2701	0.100	7.36	52.87	1.66
1400	0.120	7.38	27.31	1.99
770	0.140	7.41	14.97	2.32
617	0.160	7.43	11.96	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	56
Sample No.:	B3-19	Test Date:	02/17/11
Soil Description:	Sandy Silt	Dry Density (pcf):	89.2
Sample Type:	Soil-Cement	Moisture Content (%):	27.9
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1453.33
Sample Height (inches):	6.025	Wt. Dry Soil+Container(gms):	1169.12
Sample Weight (gms):	1305.68	Wt. Container (gms):	149.53

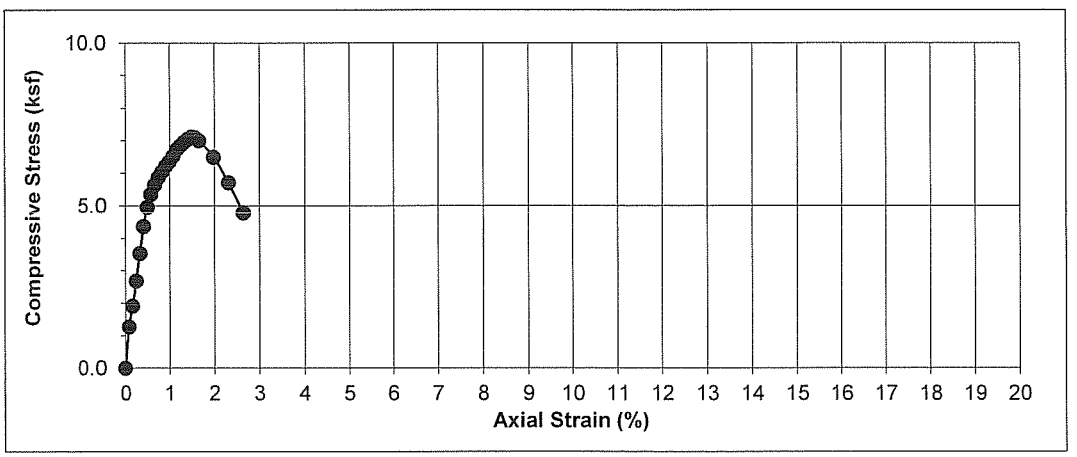


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
109	0.005	7.24	2.17	0.08
269	0.010	7.25	5.35	0.17
439	0.015	7.25	8.72	0.25
648	0.020	7.26	12.86	0.33
875	0.025	7.26	17.34	0.41
1111	0.030	7.27	22.00	0.50
1356	0.035	7.28	26.83	0.58
1639	0.040	7.28	32.41	0.66
1886	0.045	7.29	37.26	0.75
2079	0.050	7.30	41.04	0.83
2223	0.055	7.30	43.84	0.91
2306	0.060	7.31	45.44	1.00
2330	0.065	7.31	45.88	1.08
2333	0.070	7.32	45.90	1.16
2305	0.075	7.33	45.31	1.24
2294	0.080	7.33	45.05	1.33
2281	0.085	7.34	44.76	1.41
2264	0.090	7.34	44.39	1.49
2238	0.095	7.35	43.84	1.58
2192	0.100	7.36	42.91	1.66
1811	0.120	7.38	35.33	1.99
965	0.140	7.41	18.76	2.32

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	10
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	7
Sample No.:	B3-21	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	81.9
Sample Type:	Soil-Cement	Moisture Content (%):	37.6
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1438.94
Sample Height (inches):	6.038	Wt. Dry Soil+Container(gms):	1086.81
Sample Weight (gms):	1291.96	Wt. Container (gms):	149.72

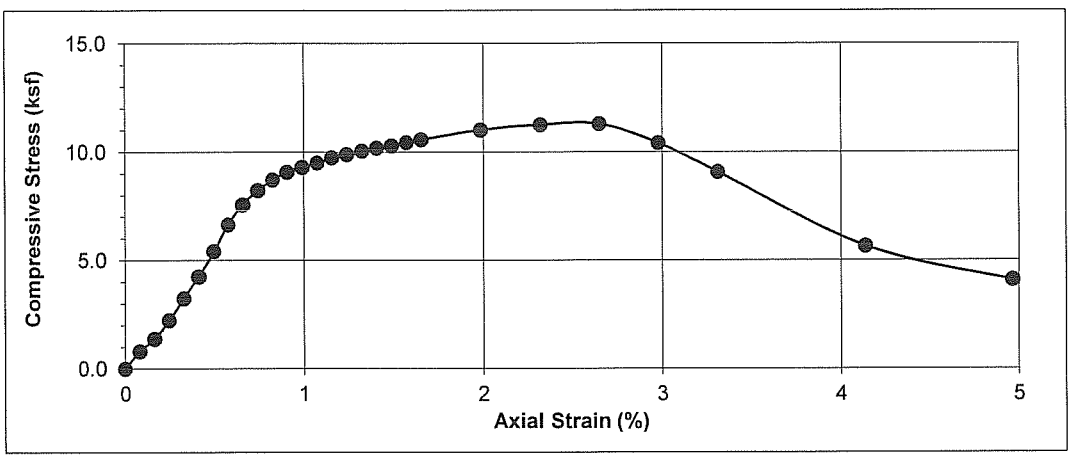


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
64	0.005	7.24	1.27	0.08
96	0.010	7.25	1.91	0.17
135	0.015	7.25	2.68	0.25
178	0.020	7.26	3.53	0.33
220	0.025	7.26	4.36	0.41
250	0.030	7.27	4.95	0.50
270	0.035	7.28	5.34	0.58
285	0.040	7.28	5.64	0.66
297	0.045	7.29	5.87	0.75
306	0.050	7.29	6.04	0.83
315	0.055	7.30	6.21	0.91
322	0.060	7.31	6.35	0.99
331	0.065	7.31	6.52	1.08
342	0.070	7.32	6.73	1.16
348	0.075	7.33	6.84	1.24
354	0.080	7.33	6.95	1.32
359	0.085	7.34	7.05	1.41
363	0.090	7.34	7.12	1.49
362	0.095	7.35	7.09	1.57
358	0.100	7.36	7.01	1.66
333	0.120	7.38	6.50	1.99
294	0.140	7.41	5.72	2.32
247	0.160	7.43	4.79	2.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	10
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	28
Sample No.:	B3-22	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	83.1
Sample Type:	Soil-Cement	Moisture Content (%):	37.3
Sample Diameter (inches):	3.033	Wt. Wet Soil+Container(gms):	1494.89
Sample Height (inches):	6.043	Wt. Dry Soil+Container(gms):	1141.6
Sample Weight (gms):	1307.92	Wt. Container (gms):	194.69



Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
40	0.005	7.23	0.80	0.08
69	0.010	7.24	1.37	0.17
112	0.015	7.24	2.23	0.25
163	0.020	7.25	3.24	0.33
214	0.025	7.25	4.25	0.41
273	0.030	7.26	5.41	0.50
335	0.035	7.27	6.64	0.58
382	0.040	7.27	7.56	0.66
416	0.045	7.28	8.23	0.74
441	0.050	7.29	8.72	0.83
459	0.055	7.29	9.07	0.91
471	0.060	7.30	9.29	0.99
482	0.065	7.30	9.50	1.08
494	0.070	7.31	9.73	1.16
502	0.075	7.32	9.88	1.24
511	0.080	7.32	10.05	1.32
518	0.085	7.33	10.18	1.41
524	0.090	7.33	10.29	1.49
532	0.095	7.34	10.44	1.57
539	0.100	7.35	10.56	1.65
564	0.120	7.37	11.02	1.99
578	0.140	7.40	11.25	2.32
582	0.160	7.42	11.29	2.65
538	0.180	7.45	10.40	2.98
471	0.200	7.47	9.08	3.31
296	0.250	7.54	5.66	4.14
216	0.300	7.60	4.09	4.96

UNCONSOLIDATED UNDRAINED TRIAXIAL

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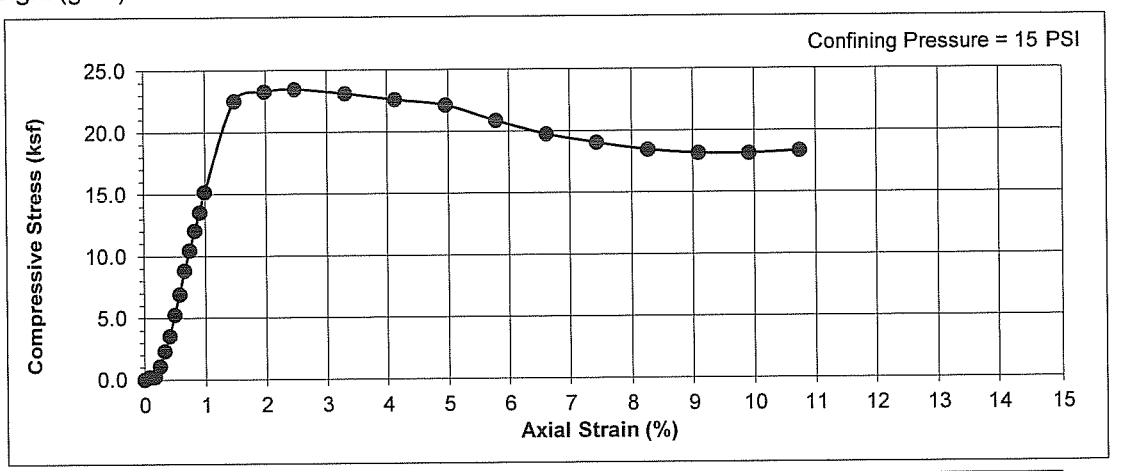
AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	7
Sample No.:	B6-3	Test Date:	12/22/10
Soil Description:	Sandy Silt	Dry Density (pcf):	87.5
Sample Type:	Soil-Cement	Moisture Content (%):	32.9
Sample Diameter (inches):	3.032	Wt. Wet Soil+Container(gms):	1478.01
Sample Height (inches):	6.049	Wt. Dry Soil+Container(gms):	1148.54
Sample Weight (gms):	1332.98	Wt. Container (gms):	147.73

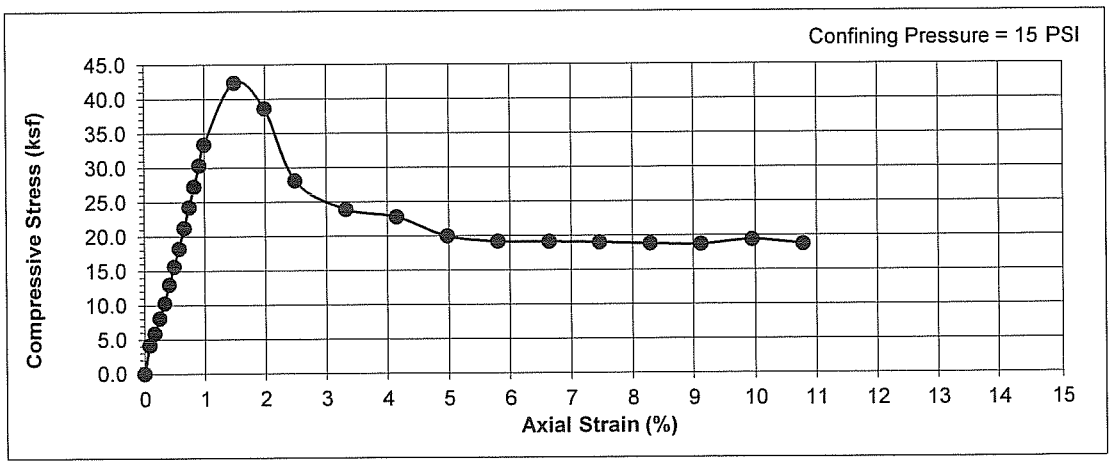


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
11	0.005	7.23	0.22	0.08
12	0.010	7.23	0.24	0.17
55	0.015	7.24	1.09	0.25
116	0.020	7.24	2.31	0.33
178	0.025	7.25	3.54	0.41
264	0.030	7.26	5.24	0.50
348	0.035	7.26	6.90	0.58
446	0.040	7.27	8.84	0.66
529	0.045	7.27	10.47	0.74
609	0.050	7.28	12.05	0.83
685	0.055	7.29	13.54	0.91
769	0.060	7.29	15.18	0.99
1147	0.090	7.33	22.54	1.49
1191	0.120	7.37	23.28	1.98
1207	0.150	7.40	23.48	2.48
1198	0.200	7.47	23.10	3.31
1182	0.250	7.53	22.60	4.13
1168	0.300	7.60	22.14	4.96
1110	0.350	7.66	20.86	5.79
1061	0.400	7.73	19.76	6.61
1032	0.450	7.80	19.05	7.44
1009	0.500	7.87	18.46	8.27
1002	0.550	7.94	18.17	9.09
1010	0.600	8.02	18.15	9.92
1030	0.650	8.09	18.33	10.75

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	28
Sample No.:	B6-7	Test Date:	01/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	92.4
Sample Type:	Soil-Cement	Moisture Content (%):	27.3
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1490.87
Sample Height (inches):	6.030	Wt. Dry Soil+Container(gms):	1204.61
Sample Weight (gms):	1342.74	Wt. Container (gms):	154.26

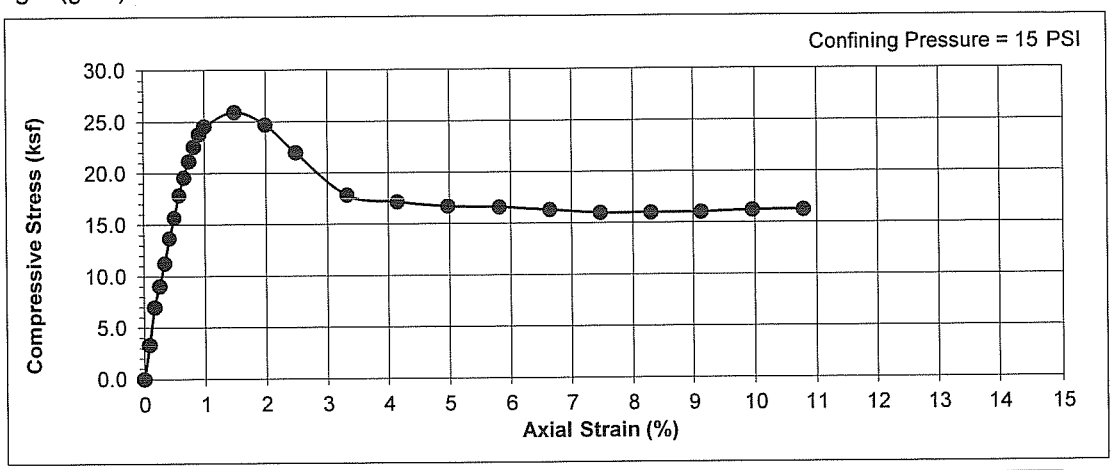


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
208	0.005	7.22	4.15	0.08
296	0.010	7.22	5.90	0.17
406	0.015	7.23	8.09	0.25
517	0.020	7.23	10.29	0.33
655	0.025	7.24	13.03	0.41
786	0.030	7.25	15.62	0.50
919	0.035	7.25	18.25	0.58
1070	0.040	7.26	21.23	0.66
1224	0.045	7.26	24.26	0.75
1376	0.050	7.27	27.25	0.83
1535	0.055	7.28	30.37	0.91
1689	0.060	7.28	33.39	1.00
2154	0.090	7.32	42.37	1.49
1973	0.120	7.36	38.62	1.99
1444	0.150	7.39	28.12	2.49
1239	0.200	7.46	23.92	3.32
1190	0.250	7.52	22.78	4.15
1052	0.300	7.59	19.96	4.98
1019	0.350	7.65	19.17	5.80
1026	0.400	7.72	19.13	6.63
1028	0.450	7.79	19.00	7.46
1026	0.500	7.86	18.79	8.29
1030	0.550	7.93	18.69	9.12
1076	0.600	8.01	19.35	9.95
1051	0.650	8.08	18.73	10.78

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	28
Sample No.:	B6-8	Test Date:	01/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	90.2
Sample Type:	Soil-Cement	Moisture Content (%):	30.2
Sample Diameter (inches):	3.028	Wt. Wet Soil+Container(gms):	1481.52
Sample Height (inches):	6.025	Wt. Dry Soil+Container(gms):	1172.27
Sample Weight (gms):	1338.13	Wt. Container (gms):	149.34

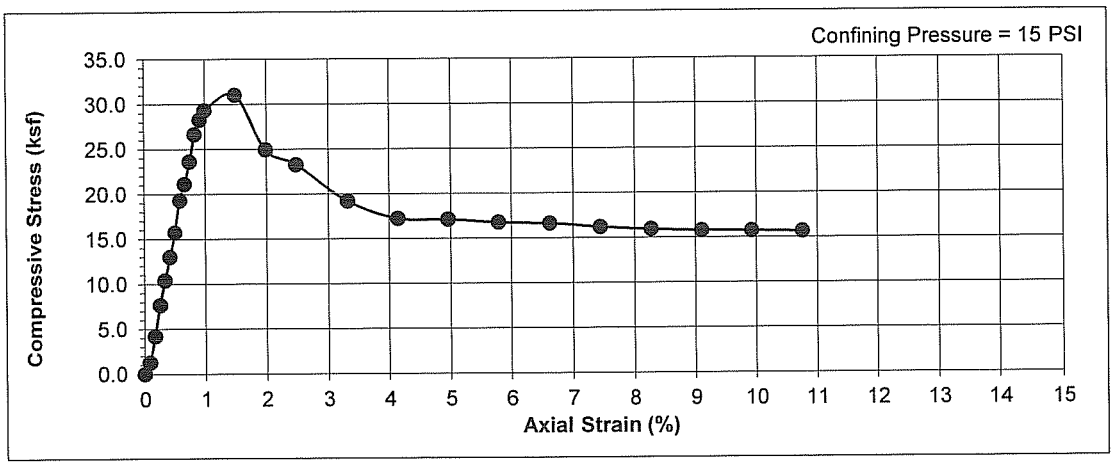


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.20	0.00	0.00
167	0.005	7.21	3.34	0.08
350	0.010	7.21	6.99	0.17
454	0.015	7.22	9.06	0.25
565	0.020	7.23	11.26	0.33
687	0.025	7.23	13.68	0.41
789	0.030	7.24	15.70	0.50
899	0.035	7.24	17.87	0.58
986	0.040	7.25	19.59	0.66
1067	0.045	7.26	21.18	0.75
1139	0.050	7.26	22.59	0.83
1201	0.055	7.27	23.80	0.91
1239	0.060	7.27	24.53	1.00
1316	0.090	7.31	25.92	1.49
1260	0.120	7.35	24.69	1.99
1127	0.150	7.39	21.98	2.49
922	0.200	7.45	17.83	3.32
895	0.250	7.51	17.15	4.15
879	0.300	7.58	16.70	4.98
881	0.350	7.65	16.59	5.81
873	0.400	7.71	16.30	6.64
865	0.450	7.78	16.01	7.47
873	0.500	7.85	16.01	8.30
882	0.550	7.92	16.03	9.13
901	0.600	8.00	16.22	9.96
911	0.650	8.07	16.25	10.79

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	7
Sample No.:	B6-13	Test Date:	12/22/10
Soil Description:	Sandy Silt	Dry Density (pcf):	88.0
Sample Type:	Soil-Cement	Moisture Content (%):	32.2
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1486.83
Sample Height (inches):	6.045	Wt. Dry Soil+Container(gms):	1160.9
Sample Weight (gms):	1340.34	Wt. Container (gms):	149.05

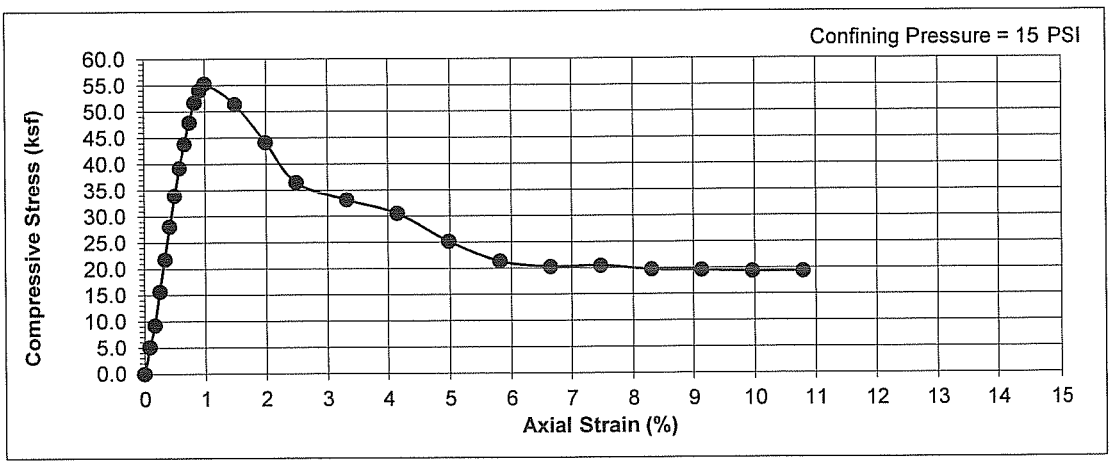


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
65	0.005	7.26	1.29	0.08
213	0.010	7.27	4.22	0.17
388	0.015	7.28	7.68	0.25
528	0.020	7.28	10.44	0.33
660	0.025	7.29	13.04	0.41
797	0.030	7.29	15.73	0.50
980	0.035	7.30	19.33	0.58
1072	0.040	7.31	21.13	0.66
1201	0.045	7.31	23.65	0.74
1355	0.050	7.32	26.66	0.83
1438	0.055	7.32	28.27	0.91
1492	0.060	7.33	29.31	0.99
1588	0.090	7.37	31.04	1.49
1283	0.120	7.41	24.95	1.99
1203	0.150	7.44	23.27	2.48
1001	0.200	7.51	19.20	3.31
907	0.250	7.57	17.25	4.14
908	0.300	7.64	17.12	4.96
897	0.350	7.70	16.77	5.79
897	0.400	7.77	16.62	6.62
883	0.450	7.84	16.21	7.44
876	0.500	7.91	15.94	8.27
875	0.550	7.98	15.78	9.10
880	0.600	8.06	15.73	9.93
885	0.650	8.13	15.67	10.75

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	28
Sample No.:	B6-17	Test Date:	01/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	90.7
Sample Type:	Soil-Cement	Moisture Content (%):	29.6
Sample Diameter (inches):	3.033	Wt. Wet Soil+Container(gms):	1512.59
Sample Height (inches):	6.023	Wt. Dry Soil+Container(gms):	1208.22
Sample Weight (gms):	1342.83	Wt. Container (gms):	179.95

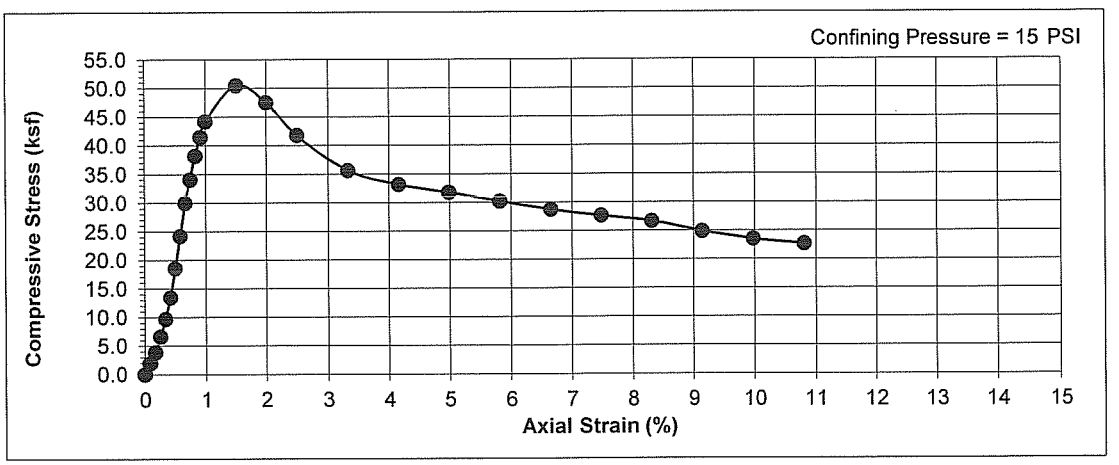


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
256	0.005	7.23	5.10	0.08
465	0.010	7.24	9.25	0.17
787	0.015	7.24	15.65	0.25
1098	0.020	7.25	21.81	0.33
1416	0.025	7.26	28.11	0.42
1712	0.030	7.26	33.95	0.50
1981	0.035	7.27	39.25	0.58
2212	0.040	7.27	43.79	0.66
2423	0.045	7.28	47.93	0.75
2616	0.050	7.29	51.71	0.83
2737	0.055	7.29	54.05	0.91
2804	0.060	7.30	55.33	1.00
2618	0.090	7.33	51.40	1.49
2260	0.120	7.37	44.15	1.99
1876	0.150	7.41	36.46	2.49
1720	0.200	7.47	33.14	3.32
1597	0.250	7.54	30.51	4.15
1329	0.300	7.60	25.17	4.98
1137	0.350	7.67	21.34	5.81
1090	0.400	7.74	20.28	6.64
1109	0.450	7.81	20.45	7.47
1079	0.500	7.88	19.72	8.30
1080	0.550	7.95	19.56	9.13
1078	0.600	8.02	19.35	9.96
1089	0.650	8.10	19.36	10.79

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	28
Sample No.:	B6-18	Test Date:	01/12/11
Soil Description:	Sandy Silt	Dry Density (pcf):	93.7
Sample Type:	Soil-Cement	Moisture Content (%):	26.2
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1474.7
Sample Height (inches):	6.015	Wt. Dry Soil+Container(gms):	1199.08
Sample Weight (gms):	1345.89	Wt. Container (gms):	146.90

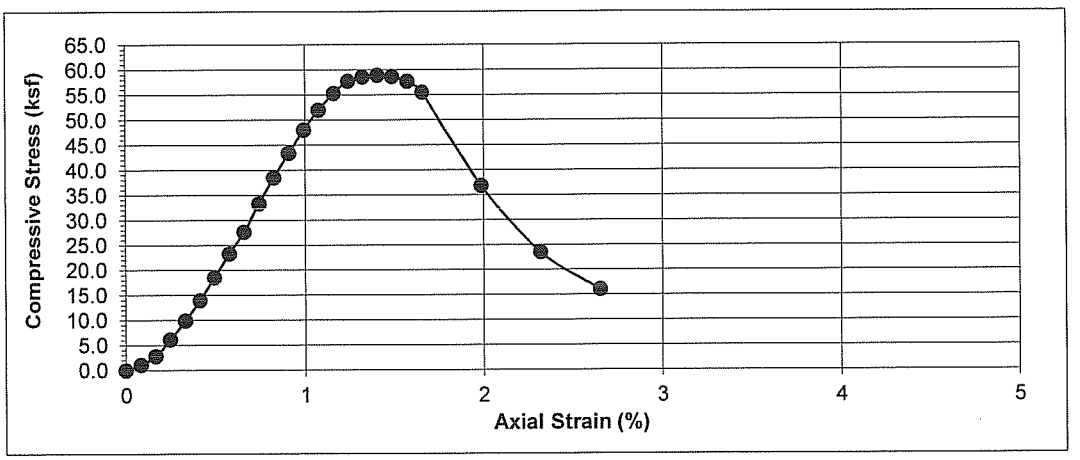


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
98	0.005	7.22	1.96	0.08
193	0.010	7.22	3.85	0.17
331	0.015	7.23	6.59	0.25
487	0.020	7.23	9.69	0.33
676	0.025	7.24	13.44	0.42
934	0.030	7.25	18.56	0.50
1219	0.035	7.25	24.20	0.58
1509	0.040	7.26	29.93	0.67
1718	0.045	7.27	34.05	0.75
1929	0.050	7.27	38.20	0.83
2096	0.055	7.28	41.48	0.91
2236	0.060	7.28	44.21	1.00
2567	0.090	7.32	50.50	1.50
2429	0.120	7.36	47.54	2.00
2145	0.150	7.40	41.77	2.49
1846	0.200	7.46	35.64	3.33
1732	0.250	7.52	33.15	4.16
1673	0.300	7.59	31.74	4.99
1605	0.350	7.66	30.19	5.82
1541	0.400	7.72	28.73	6.65
1496	0.450	7.79	27.64	7.48
1456	0.500	7.86	26.66	8.31
1371	0.550	7.94	24.88	9.14
1307	0.600	8.01	23.50	9.98
1272	0.650	8.08	22.66	10.81

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS (ASTM D 2166)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/15/10
Boring No.:	A 10 208	Cure Days:	56
Sample No.:	B6-19	Test Date:	02/09/11
Soil Description:	Sandy Silt	Dry Density (pcf):	92.3
Sample Type:	Soil-Cement	Moisture Content (%):	26.9
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1494.15
Sample Height (inches):	6.037	Wt. Dry Soil+Container(gms):	1209.8
Sample Weight (gms):	1343.76	Wt. Container (gms):	151.54

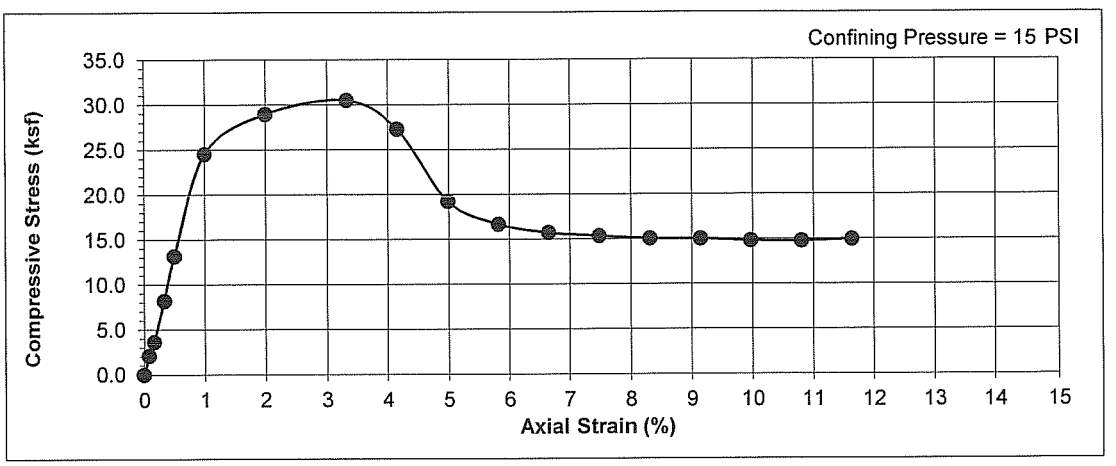


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
53	0.005	7.25	1.05	0.08
142	0.010	7.25	2.82	0.17
308	0.015	7.26	6.11	0.25
499	0.020	7.26	9.89	0.33
706	0.025	7.27	13.99	0.41
936	0.030	7.28	18.53	0.50
1176	0.035	7.28	23.26	0.58
1399	0.040	7.29	27.64	0.66
1685	0.045	7.29	33.27	0.75
1950	0.050	7.30	38.47	0.83
2200	0.055	7.31	43.36	0.91
2437	0.060	7.31	47.99	0.99
2640	0.065	7.32	51.95	1.08
2811	0.070	7.32	55.27	1.16
2939	0.075	7.33	57.73	1.24
2982	0.080	7.34	58.53	1.33
3001	0.085	7.34	58.85	1.41
2991	0.090	7.35	58.61	1.49
2945	0.095	7.36	57.66	1.57
2836	0.100	7.36	55.48	1.66
1888	0.120	7.39	36.81	1.99
1210	0.140	7.41	23.51	2.32
830	0.160	7.44	16.07	2.65

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	7
Sample No.:	B4-2	Test Date:	12/17/10
Soil Description:	Sandy Silt	Dry Density (pcf):	89.7
Sample Type:	Soil-Cement	Moisture Content (%):	30.7
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1528.19
Sample Height (inches):	6.016	Wt. Dry Soil+Container(gms):	1214.79
Sample Weight (gms):	1340.39	Wt. Container (gms):	192.80

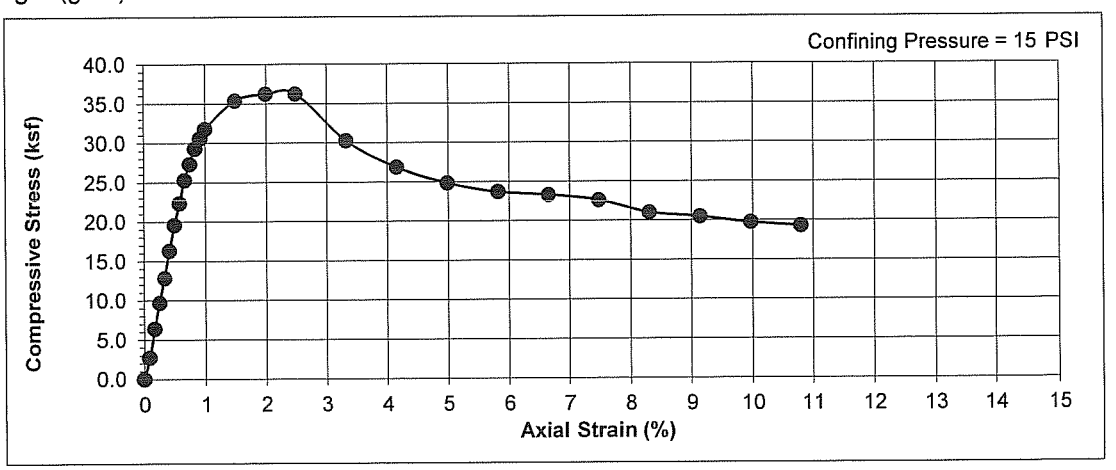


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
106	0.005	7.25	2.11	0.08
184	0.010	7.25	3.65	0.17
415	0.020	7.26	8.23	0.33
665	0.030	7.28	13.16	0.50
1246	0.060	7.31	24.54	1.00
1485	0.120	7.39	28.95	1.99
1585	0.200	7.49	30.48	3.32
1430	0.250	7.55	27.26	4.16
1018	0.300	7.62	19.24	4.99
890	0.350	7.69	16.67	5.82
847	0.400	7.75	15.73	6.65
834	0.450	7.82	15.35	7.48
826	0.500	7.90	15.06	8.31
832	0.550	7.97	15.04	9.14
827	0.600	8.04	14.81	9.97
833	0.650	8.12	14.78	10.80
852	0.700	8.19	14.98	11.64

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	28
Sample No.:	B4-6	Test Date:	01/07/11
Soil Description:	Sandy Silt	Dry Density (pcf):	87.4
Sample Type:	Soil-Cement	Moisture Content (%):	33.4
Sample Diameter (inches):	3.043	Wt. Wet Soil+Container(gms):	1487.1
Sample Height (inches):	6.018	Wt. Dry Soil+Container(gms):	1152.32
Sample Weight (gms):	1338.94	Wt. Container (gms):	149.91

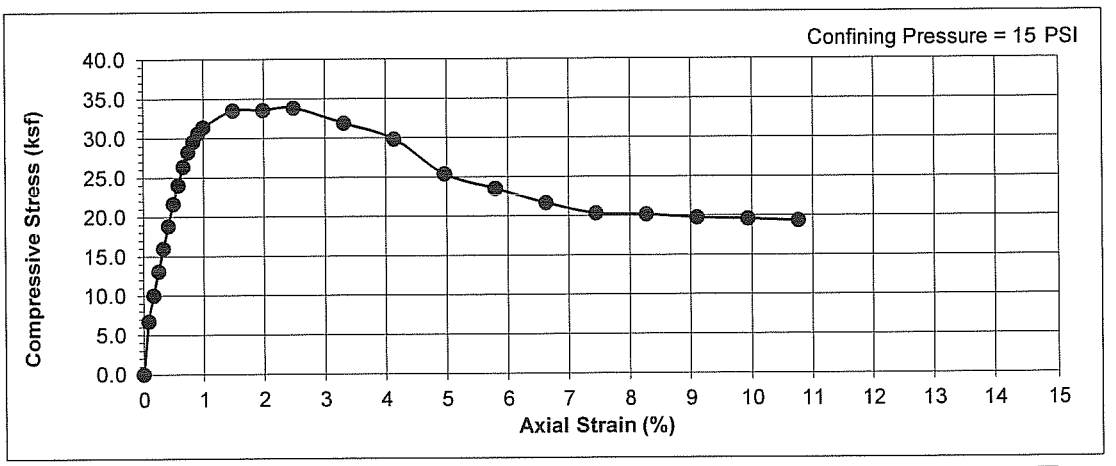


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
138	0.005	7.28	2.73	0.08
325	0.010	7.28	6.42	0.17
491	0.015	7.29	9.70	0.25
652	0.020	7.30	12.87	0.33
827	0.025	7.30	16.31	0.42
995	0.030	7.31	19.60	0.50
1135	0.035	7.32	22.34	0.58
1286	0.040	7.32	25.29	0.66
1390	0.045	7.33	27.32	0.75
1492	0.050	7.33	29.30	0.83
1559	0.055	7.34	30.59	0.91
1622	0.060	7.35	31.80	1.00
1814	0.090	7.38	35.38	1.50
1866	0.120	7.42	36.21	1.99
1877	0.150	7.46	36.24	2.49
1582	0.200	7.52	30.28	3.32
1416	0.250	7.59	26.87	4.15
1321	0.300	7.65	24.85	4.99
1270	0.350	7.72	23.68	5.82
1261	0.400	7.79	23.31	6.65
1234	0.450	7.86	22.61	7.48
1158	0.500	7.93	21.02	8.31
1139	0.550	8.00	20.49	9.14
1107	0.600	8.08	19.73	9.97
1093	0.650	8.15	19.30	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	28
Sample No.:	B4-7	Test Date:	01/07/11
Soil Description:	Sandy Silt	Dry Density (pcf):	87.5
Sample Type:	Soil-Cement	Moisture Content (%):	33.4
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1489.92
Sample Height (inches):	6.040	Wt. Dry Soil+Container(gms):	1155.06
Sample Weight (gms):	1339.35	Wt. Container (gms):	152.06

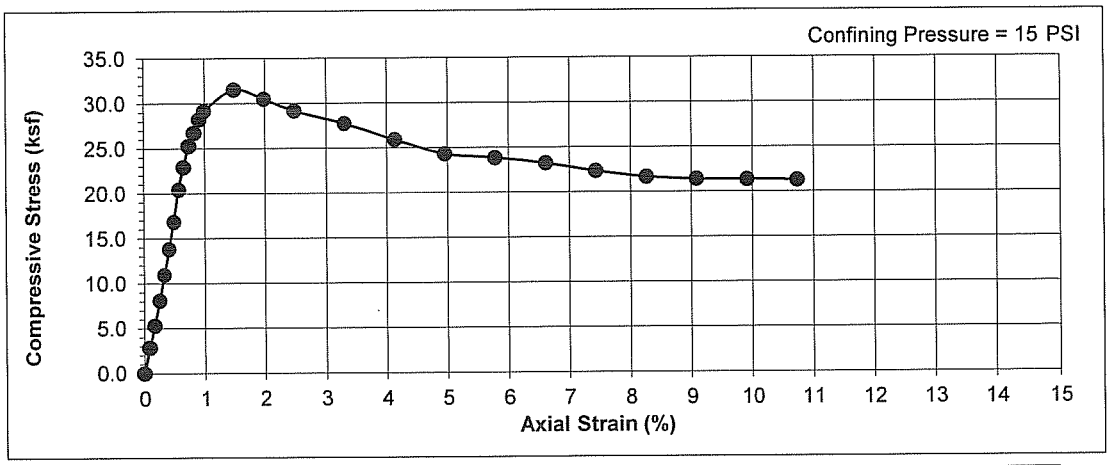


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
338	0.005	7.24	6.72	0.08
505	0.010	7.25	10.04	0.17
660	0.015	7.25	13.10	0.25
807	0.020	7.26	16.01	0.33
951	0.025	7.26	18.85	0.41
1094	0.030	7.27	21.67	0.50
1215	0.035	7.28	24.04	0.58
1334	0.040	7.28	26.38	0.66
1430	0.045	7.29	28.25	0.75
1496	0.050	7.29	29.53	0.83
1551	0.055	7.30	30.59	0.91
1592	0.060	7.31	31.37	0.99
1708	0.090	7.34	33.49	1.49
1720	0.120	7.38	33.56	1.99
1743	0.150	7.42	33.83	2.48
1656	0.200	7.48	31.87	3.31
1564	0.250	7.55	29.84	4.14
1342	0.300	7.61	25.39	4.97
1254	0.350	7.68	23.51	5.79
1166	0.400	7.75	21.67	6.62
1103	0.450	7.82	20.32	7.45
1104	0.500	7.89	20.16	8.28
1091	0.550	7.96	19.74	9.11
1092	0.600	8.03	19.58	9.93
1088	0.650	8.11	19.33	10.76

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	66
Sample No.:	B4-10	Test Date:	02/14/11
Soil Description:	Sandy Silt	Dry Density (pcf):	87.2
Sample Type:	Soil-Cement	Moisture Content (%):	33.1
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1488.5
Sample Height (inches):	6.053	Wt. Dry Soil+Container(gms):	1155.11
Sample Weight (gms):	1339.72	Wt. Container (gms):	149.24

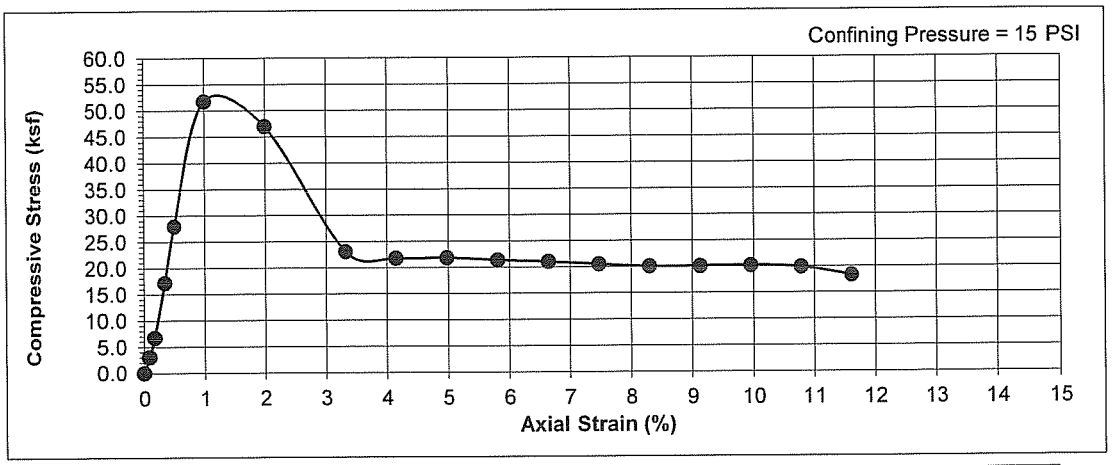


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
144	0.005	7.26	2.85	0.08
269	0.010	7.27	5.33	0.17
409	0.015	7.28	8.09	0.25
554	0.020	7.28	10.95	0.33
699	0.025	7.29	13.81	0.41
854	0.030	7.29	16.86	0.50
1036	0.035	7.30	20.43	0.58
1163	0.040	7.31	22.92	0.66
1284	0.045	7.31	25.28	0.74
1359	0.050	7.32	26.74	0.83
1436	0.055	7.32	28.23	0.91
1484	0.060	7.33	29.15	0.99
1612	0.090	7.37	31.51	1.49
1567	0.120	7.41	30.47	1.98
1508	0.150	7.44	29.18	2.48
1445	0.200	7.51	27.72	3.30
1362	0.250	7.57	25.90	4.13
1290	0.300	7.64	24.32	4.96
1276	0.350	7.70	23.85	5.78
1254	0.400	7.77	23.23	6.61
1216	0.450	7.84	22.33	7.43
1191	0.500	7.91	21.68	8.26
1187	0.550	7.98	21.41	9.09
1195	0.600	8.06	21.36	9.91
1202	0.650	8.13	21.29	10.74

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	7
Sample No.:	B4-12	Test Date:	12/17/10
Soil Description:	Sandy Silt	Dry Density (pcf):	89.4
Sample Type:	Soil-Cement	Moisture Content (%):	31.9
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1552.11
Sample Height (inches):	6.026	Wt. Dry Soil+Container(gms):	1223.95
Sample Weight (gms):	1349.86	Wt. Container (gms):	194.72

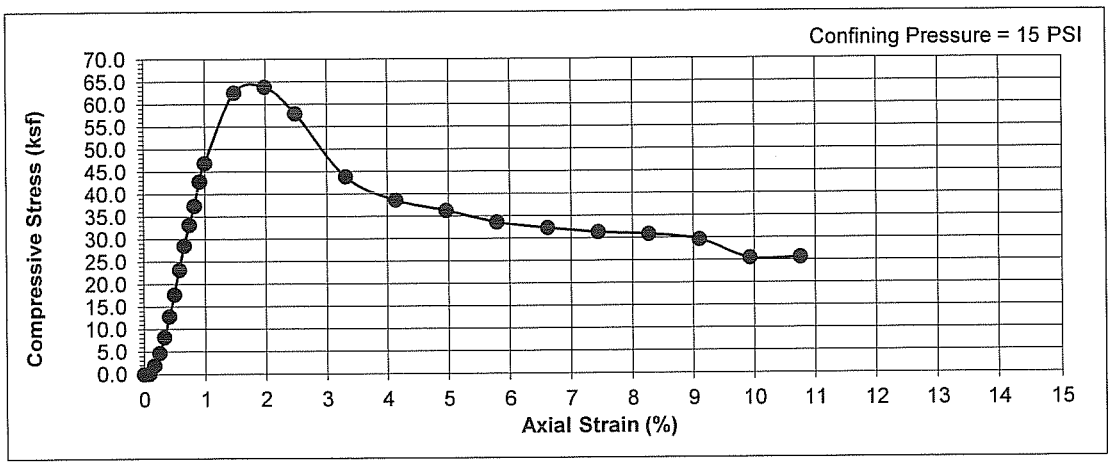


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
154	0.005	7.25	3.06	0.08
340	0.010	7.25	6.75	0.17
866	0.020	7.26	17.17	0.33
1414	0.030	7.28	27.99	0.50
2628	0.060	7.31	51.75	1.00
2412	0.120	7.39	47.02	1.99
1200	0.200	7.49	23.08	3.32
1143	0.250	7.55	21.79	4.15
1157	0.300	7.62	21.87	4.98
1140	0.350	7.69	21.36	5.81
1133	0.400	7.75	21.04	6.64
1114	0.450	7.82	20.50	7.47
1100	0.500	7.89	20.07	8.30
1112	0.550	7.97	20.10	9.13
1129	0.600	8.04	20.22	9.96
1120	0.650	8.11	19.88	10.79
1042	0.700	8.19	18.32	11.62

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	28
Sample No.:	B4-16	Test Date:	01/07/11
Soil Description:	Sandy Silt	Dry Density (pcf):	89.1
Sample Type:	Soil-Cement	Moisture Content (%):	31.3
Sample Diameter (inches):	3.043	Wt. Wet Soil+Container(gms):	1485.36
Sample Height (inches):	6.044	Wt. Dry Soil+Container(gms):	1167.02
Sample Weight (gms):	1350.23	Wt. Container (gms):	149.29

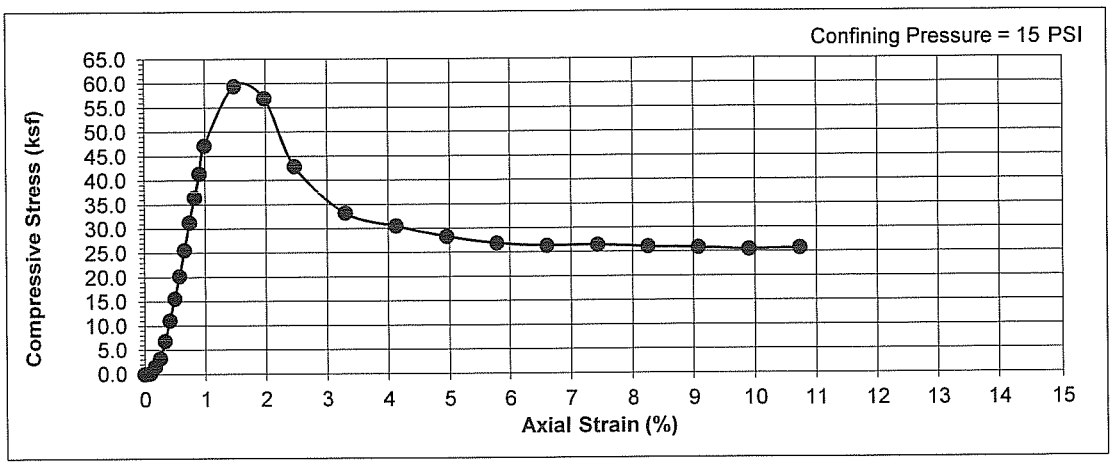


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
5	0.005	7.28	0.10	0.08
99	0.010	7.28	1.96	0.17
237	0.015	7.29	4.68	0.25
415	0.020	7.30	8.19	0.33
650	0.025	7.30	12.82	0.41
897	0.030	7.31	17.67	0.50
1180	0.035	7.32	23.23	0.58
1451	0.040	7.32	28.54	0.66
1690	0.045	7.33	33.21	0.74
1904	0.050	7.33	37.39	0.83
2183	0.055	7.34	42.83	0.91
2393	0.060	7.35	46.91	0.99
3208	0.090	7.38	62.57	1.49
3289	0.120	7.42	63.83	1.99
3000	0.150	7.46	57.93	2.48
2290	0.200	7.52	43.84	3.31
2034	0.250	7.59	38.61	4.14
1929	0.300	7.65	36.30	4.96
1803	0.350	7.72	33.63	5.79
1748	0.400	7.79	32.32	6.62
1710	0.450	7.86	31.34	7.45
1698	0.500	7.93	30.84	8.27
1647	0.550	8.00	29.64	9.10
1429	0.600	8.07	25.49	9.93
1450	0.650	8.15	25.62	10.75

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 209	Cure Days:	28
Sample No.:	B4-17	Test Date:	01/07/11
Soil Description:	Sandy Silt	Dry Density (pcf):	89.0
Sample Type:	Soil-Cement	Moisture Content (%):	31.3
Sample Diameter (inches):	3.038	Wt. Wet Soil+Container(gms):	1492.92
Sample Height (inches):	6.056	Wt. Dry Soil+Container(gms):	1172.55
Sample Weight (gms):	1346.28	Wt. Container (gms):	149.56

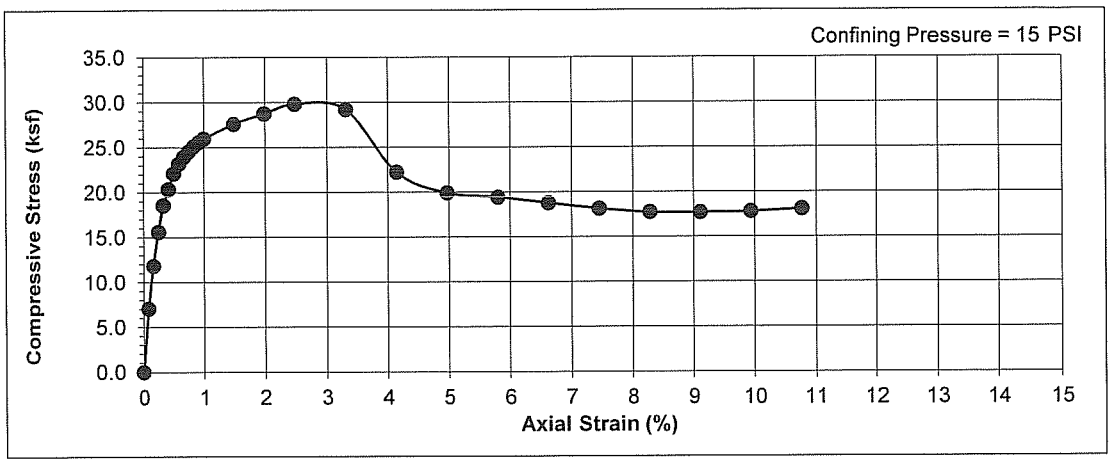


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
6	0.005	7.25	0.12	0.08
77	0.010	7.26	1.53	0.17
164	0.015	7.27	3.25	0.25
345	0.020	7.27	6.83	0.33
560	0.025	7.28	11.08	0.41
789	0.030	7.28	15.60	0.50
1023	0.035	7.29	20.20	0.58
1296	0.040	7.30	25.58	0.66
1586	0.045	7.30	31.27	0.74
1847	0.050	7.31	36.39	0.83
2100	0.055	7.32	41.34	0.91
2397	0.060	7.32	47.15	0.99
3035	0.090	7.36	59.40	1.49
2920	0.120	7.40	56.86	1.98
2210	0.150	7.43	42.81	2.48
1728	0.200	7.50	33.19	3.30
1600	0.250	7.56	30.47	4.13
1499	0.300	7.63	28.30	4.95
1435	0.350	7.69	26.86	5.78
1420	0.400	7.76	26.35	6.61
1439	0.450	7.83	26.46	7.43
1428	0.500	7.90	26.03	8.26
1431	0.550	7.97	25.85	9.08
1422	0.600	8.05	25.45	9.91
1449	0.650	8.12	25.70	10.73

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	7
Sample No.:	B6-3	Test Date:	12/23/10
Soil Description:	Sandy Silt	Dry Density (pcf):	89.9
Sample Type:	Soil-Cement	Moisture Content (%):	31.6
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1535.73
Sample Height (inches):	6.037	Wt. Dry Soil+Container(gms):	1209.85
Sample Weight (gms):	1360.88	Wt. Container (gms):	178.42

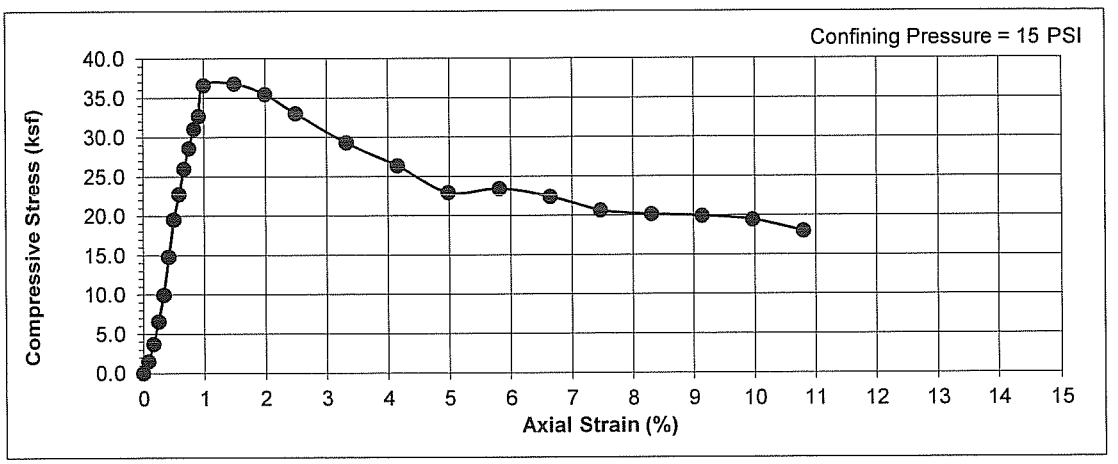


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
356	0.005	7.26	7.06	0.08
596	0.010	7.27	11.80	0.17
789	0.015	7.28	15.61	0.25
939	0.020	7.28	18.57	0.33
1030	0.025	7.29	20.35	0.41
1120	0.030	7.29	22.11	0.50
1174	0.035	7.30	23.16	0.58
1216	0.040	7.31	23.96	0.66
1245	0.045	7.31	24.52	0.75
1276	0.050	7.32	25.11	0.83
1300	0.055	7.33	25.56	0.91
1321	0.060	7.33	25.95	0.99
1412	0.090	7.37	27.60	1.49
1478	0.120	7.41	28.74	1.99
1541	0.150	7.44	29.81	2.48
1523	0.200	7.51	29.21	3.31
1170	0.250	7.57	22.25	4.14
1057	0.300	7.64	19.93	4.97
1040	0.350	7.71	19.44	5.80
1014	0.400	7.77	18.78	6.63
988	0.450	7.84	18.14	7.45
975	0.500	7.91	17.74	8.28
982	0.550	7.99	17.71	9.11
996	0.600	8.06	17.80	9.94
1022	0.650	8.13	18.09	10.77

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	28
Sample No.:	B6-7	Test Date:	01/13/11
Soil Description:	Sandy Silt	Dry Density (pcf):	92.3
Sample Type:	Soil-Cement	Moisture Content (%):	30.4
Sample Diameter (inches):	3.027	Wt. Wet Soil+Container(gms):	1518.47
Sample Height (inches):	6.019	Wt. Dry Soil+Container(gms):	1199.47
Sample Weight (gms):	1369.03	Wt. Container (gms):	149.80

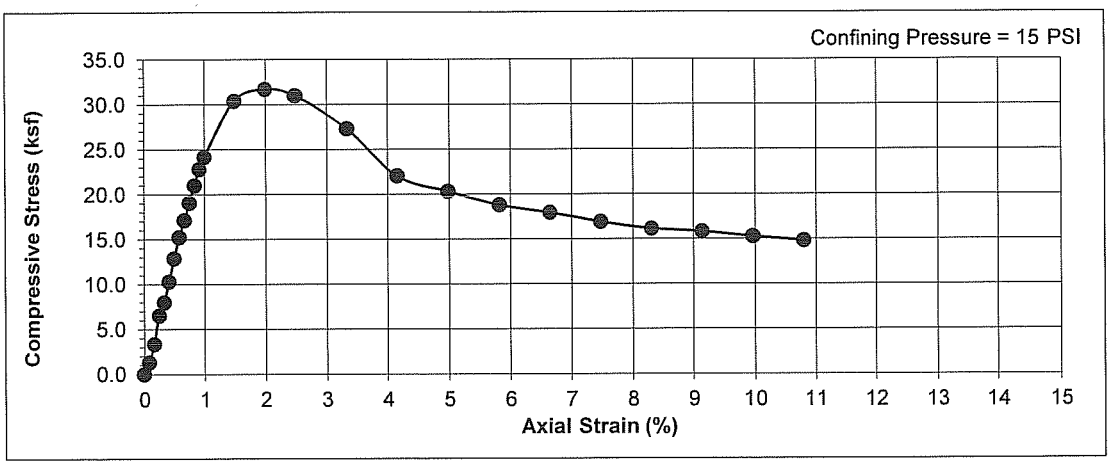


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.20	0.00	0.00
75	0.005	7.20	1.50	0.08
186	0.010	7.21	3.72	0.17
329	0.015	7.21	6.57	0.25
500	0.020	7.22	9.97	0.33
743	0.025	7.23	14.81	0.42
982	0.030	7.23	19.55	0.50
1145	0.035	7.24	22.78	0.58
1307	0.040	7.24	25.98	0.66
1441	0.045	7.25	28.62	0.75
1564	0.050	7.26	31.04	0.83
1649	0.055	7.26	32.69	0.91
1847	0.060	7.27	36.59	1.00
1867	0.090	7.31	36.80	1.50
1808	0.120	7.34	35.46	1.99
1692	0.150	7.38	33.01	2.49
1514	0.200	7.44	29.29	3.32
1375	0.250	7.51	26.37	4.15
1207	0.300	7.57	22.95	4.98
1243	0.350	7.64	23.43	5.81
1200	0.400	7.71	22.42	6.65
1116	0.450	7.78	20.66	7.48
1098	0.500	7.85	20.15	8.31
1096	0.550	7.92	19.93	9.14
1079	0.600	7.99	19.44	9.97
1008	0.650	8.07	17.99	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	28
Sample No.:	B6-8	Test Date:	01/13/11
Soil Description:	Sandy Silt	Dry Density (pcf):	90.7
Sample Type:	Soil-Cement	Moisture Content (%):	31.6
Sample Diameter (inches):	3.029	Wt. Wet Soil+Container(gms):	1506.82
Sample Height (inches):	6.019	Wt. Dry Soil+Container(gms):	1180.45
Sample Weight (gms):	1359.70	Wt. Container (gms):	147.60

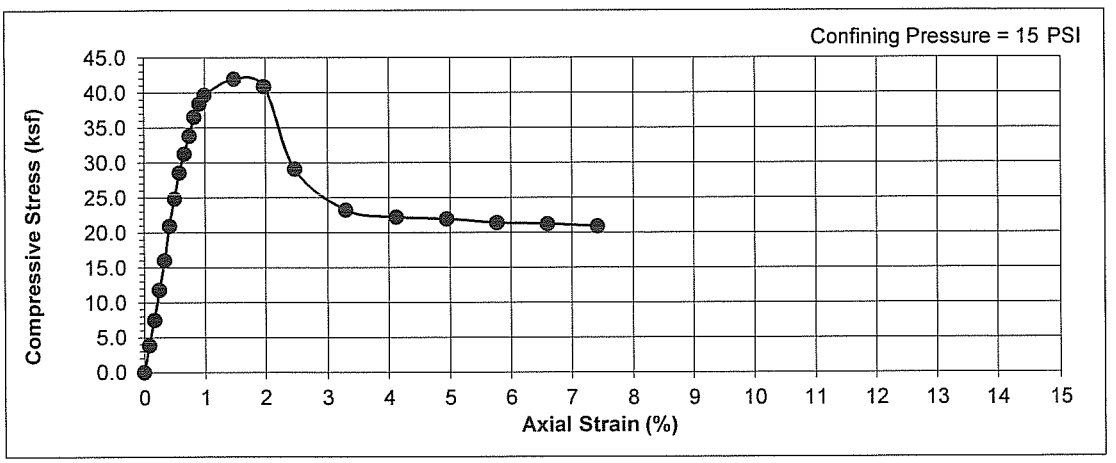


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
66	0.005	7.21	1.32	0.08
168	0.010	7.22	3.35	0.17
327	0.015	7.22	6.52	0.25
401	0.020	7.23	7.99	0.33
519	0.025	7.24	10.33	0.42
649	0.030	7.24	12.90	0.50
767	0.035	7.25	15.24	0.58
863	0.040	7.25	17.13	0.66
961	0.045	7.26	19.06	0.75
1059	0.050	7.27	20.99	0.83
1152	0.055	7.27	22.81	0.91
1222	0.060	7.28	24.18	1.00
1544	0.090	7.32	30.39	1.50
1618	0.120	7.35	31.69	1.99
1590	0.150	7.39	30.98	2.49
1413	0.200	7.45	27.30	3.32
1151	0.250	7.52	22.05	4.15
1070	0.300	7.58	20.32	4.98
999	0.350	7.65	18.80	5.81
962	0.400	7.72	17.95	6.65
915	0.450	7.79	16.92	7.48
881	0.500	7.86	16.14	8.31
871	0.550	7.93	15.82	9.14
849	0.600	8.00	15.27	9.97
832	0.650	8.08	14.83	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	7
Sample No.:	B6-13	Test Date:	12/23/10
Soil Description:	Sandy Silt	Dry Density (pcf):	90.8
Sample Type:	Soil-Cement	Moisture Content (%):	30.1
Sample Diameter (inches):	3.041	Wt. Wet Soil+Container(gms):	1555.7
Sample Height (inches):	6.066	Wt. Dry Soil+Container(gms):	1239.91
Sample Weight (gms):	1366.90	Wt. Container (gms):	192.51

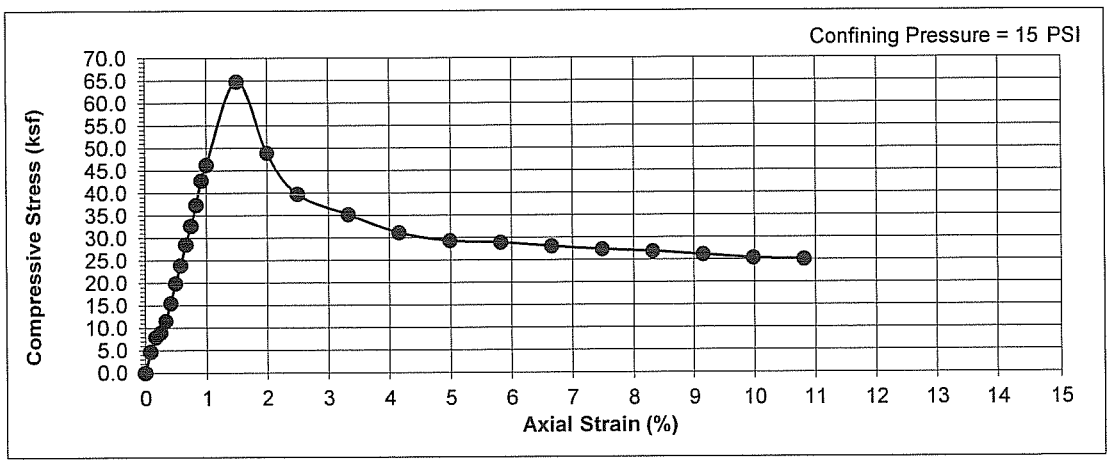


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
195	0.005	7.27	3.86	0.08
378	0.010	7.28	7.48	0.16
596	0.015	7.28	11.79	0.25
810	0.020	7.29	16.01	0.33
1060	0.025	7.29	20.93	0.41
1258	0.030	7.30	24.82	0.49
1449	0.035	7.31	28.56	0.58
1587	0.040	7.31	31.26	0.66
1718	0.045	7.32	33.81	0.74
1857	0.050	7.32	36.51	0.82
1956	0.055	7.33	38.43	0.91
2020	0.060	7.34	39.65	0.99
2148	0.090	7.37	41.95	1.48
2104	0.120	7.41	40.89	1.98
1505	0.150	7.45	29.10	2.47
1212	0.200	7.51	23.24	3.30
1168	0.250	7.58	22.20	4.12
1164	0.300	7.64	21.94	4.95
1146	0.350	7.71	21.41	5.77
1146	0.400	7.78	21.22	6.59
1137	0.450	7.85	20.87	7.42

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	28
Sample No.:	B6-17	Test Date:	01/13/11
Soil Description:	Sandy Silt	Dry Density (pcf):	99.3
Sample Type:	Soil-Cement	Moisture Content (%):	21.2
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1517.9
Sample Height (inches):	6.010	Wt. Dry Soil+Container(gms):	1278.79
Sample Weight (gms):	1369.43	Wt. Container (gms):	148.55

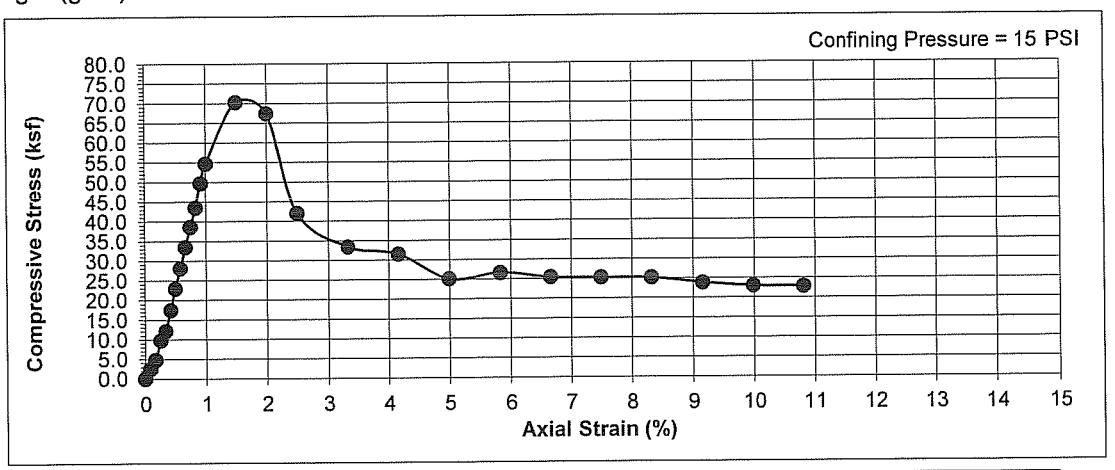


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
237	0.005	7.22	4.73	0.08
399	0.010	7.22	7.95	0.17
450	0.015	7.23	8.96	0.25
580	0.020	7.23	11.54	0.33
779	0.025	7.24	15.49	0.42
1002	0.030	7.25	19.91	0.50
1206	0.035	7.25	23.94	0.58
1440	0.040	7.26	28.57	0.67
1650	0.045	7.27	32.70	0.75
1884	0.050	7.27	37.31	0.83
2160	0.055	7.28	42.74	0.92
2340	0.060	7.28	46.26	1.00
3293	0.090	7.32	64.78	1.50
2500	0.120	7.36	48.93	2.00
2041	0.150	7.40	39.74	2.50
1824	0.200	7.46	35.21	3.33
1628	0.250	7.52	31.16	4.16
1546	0.300	7.59	29.33	4.99
1539	0.350	7.66	28.94	5.82
1506	0.400	7.72	28.07	6.66
1481	0.450	7.79	27.36	7.49
1468	0.500	7.87	26.88	8.32
1440	0.550	7.94	26.13	9.15
1411	0.600	8.01	25.37	9.98
1409	0.650	8.09	25.10	10.82

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/16/10
Boring No.:	A 10 210	Cure Days:	28
Sample No.:	B6-18	Test Date:	01/13/11
Soil Description:	Sandy Silt	Dry Density (pcf):	96.8
Sample Type:	Soil-Cement	Moisture Content (%):	24.0
Sample Diameter (inches):	3.033	Wt. Wet Soil+Container(gms):	1508.67
Sample Height (inches):	6.009	Wt. Dry Soil+Container(gms):	1245.88
Sample Weight (gms):	1368.26	Wt. Container (gms):	149.58

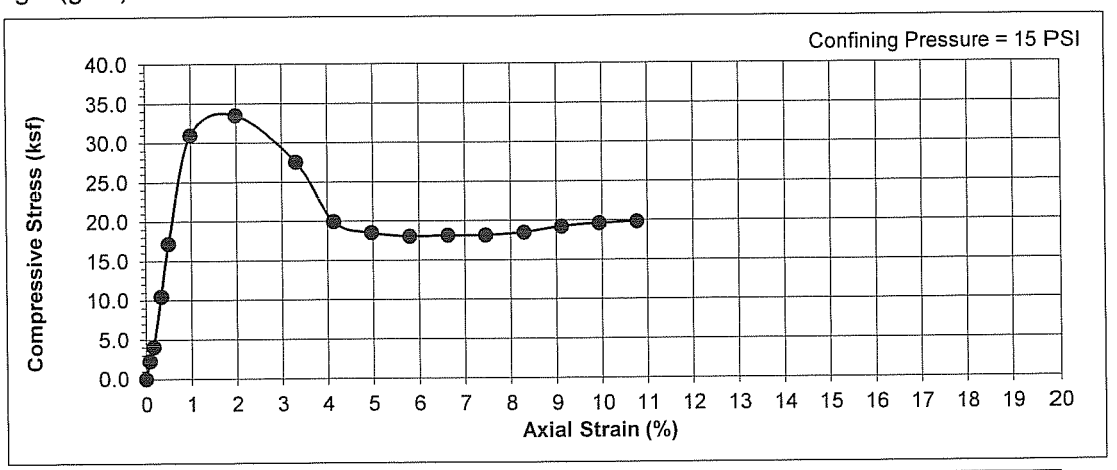


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
127	0.005	7.23	2.53	0.08
244	0.010	7.24	4.86	0.17
494	0.015	7.24	9.82	0.25
612	0.020	7.25	12.16	0.33
880	0.025	7.26	17.47	0.42
1158	0.030	7.26	22.96	0.50
1415	0.035	7.27	28.04	0.58
1688	0.040	7.27	33.42	0.67
1952	0.045	7.28	38.61	0.75
2200	0.050	7.29	43.48	0.83
2517	0.055	7.29	49.71	0.92
2770	0.060	7.30	54.66	1.00
3579	0.090	7.33	70.26	1.50
3452	0.120	7.37	67.43	2.00
2164	0.150	7.41	42.05	2.50
1734	0.200	7.47	33.41	3.33
1649	0.250	7.54	31.50	4.16
1326	0.300	7.60	25.11	4.99
1419	0.350	7.67	26.63	5.82
1370	0.400	7.74	25.49	6.66
1372	0.450	7.81	25.30	7.49
1379	0.500	7.88	25.20	8.32
1318	0.550	7.95	23.86	9.15
1283	0.600	8.03	23.02	9.99
1284	0.650	8.10	22.82	10.82

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 211	Cure Days:	7
Sample No.:	B5-2	Test Date:	12/17/10
Soil Description:	Silty Sand	Dry Density (pcf):	88.8
Sample Type:	Soil-Cement	Moisture Content (%):	32.0
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1540.13
Sample Height (inches):	6.036	Wt. Dry Soil+Container(gms):	1214.33
Sample Weight (gms):	1344.07	Wt. Container (gms):	196.55

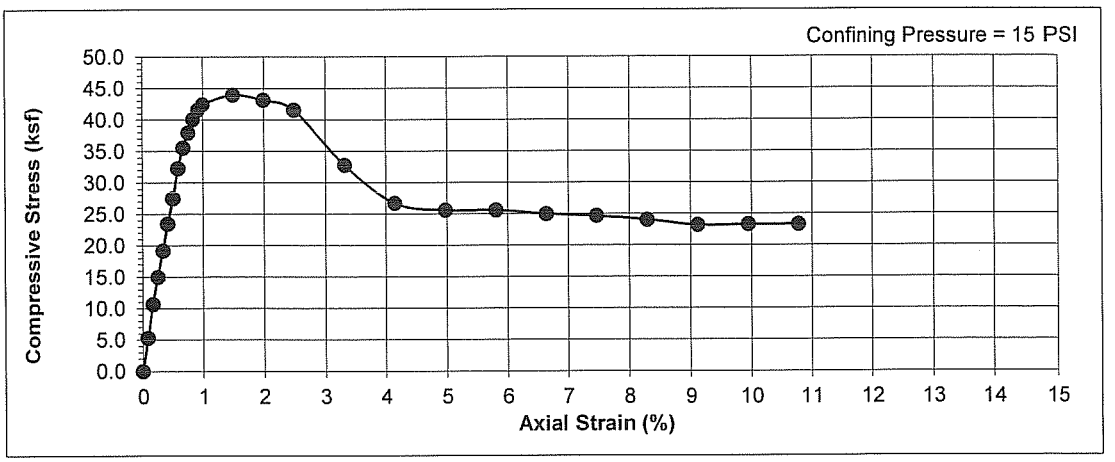


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
114	0.005	7.25	2.27	0.08
206	0.010	7.25	4.09	0.17
528	0.020	7.26	10.47	0.33
868	0.030	7.28	17.18	0.50
1572	0.060	7.31	30.96	0.99
1719	0.120	7.39	33.51	1.99
1431	0.200	7.49	27.52	3.31
1046	0.250	7.55	19.94	4.14
979	0.300	7.62	18.51	4.97
963	0.350	7.68	18.04	5.80
977	0.400	7.75	18.15	6.63
986	0.450	7.82	18.15	7.46
1014	0.500	7.89	18.50	8.28
1064	0.550	7.97	19.24	9.11
1096	0.600	8.04	19.63	9.94
1118	0.650	8.11	19.84	10.77

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/10/10
Boring No.:	A 10 211	Cure Days:	28
Sample No.:	B5-6	Test Date:	01/07/11
Soil Description:	Silty Sand	Dry Density (pcf):	87.9
Sample Type:	Soil-Cement	Moisture Content (%):	32.4
Sample Diameter (inches):	3.042	Wt. Wet Soil+Container(gms):	1477.82
Sample Height (inches):	6.030	Wt. Dry Soil+Container(gms):	1153.18
Sample Weight (gms):	1338.03	Wt. Container (gms):	149.97



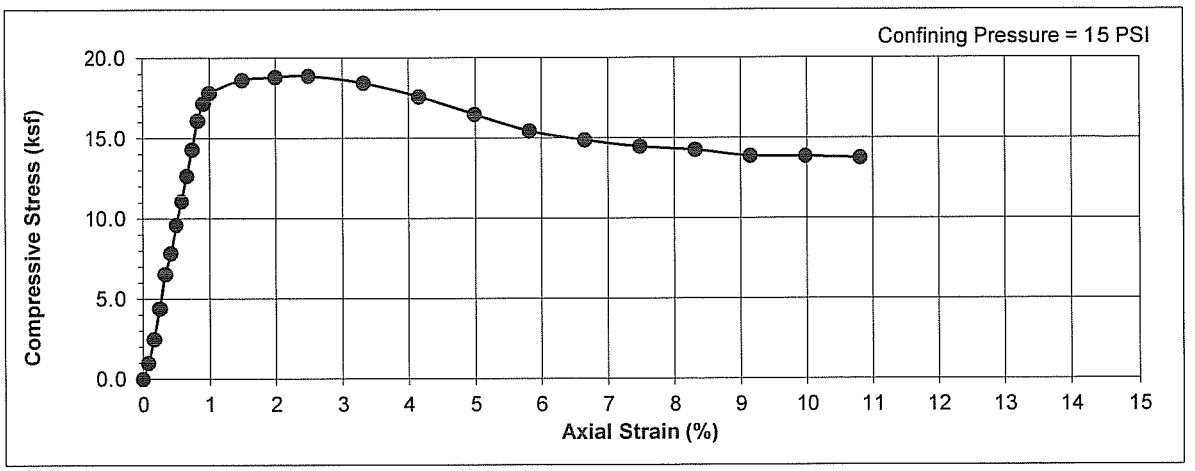
Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
267	0.005	7.27	5.29	0.08
538	0.010	7.28	10.64	0.17
759	0.015	7.29	15.00	0.25
970	0.020	7.29	19.15	0.33
1190	0.025	7.30	23.48	0.41
1395	0.030	7.30	27.50	0.50
1638	0.035	7.31	32.27	0.58
1806	0.040	7.32	35.55	0.66
1930	0.045	7.32	37.95	0.75
2040	0.050	7.33	40.08	0.83
2116	0.055	7.33	41.54	0.91
2162	0.060	7.34	42.41	1.00
2252	0.090	7.38	43.95	1.49
2221	0.120	7.42	43.13	1.99
2150	0.150	7.45	41.54	2.49
1712	0.200	7.52	32.80	3.32
1408	0.250	7.58	26.74	4.15
1360	0.300	7.65	25.61	4.98
1372	0.350	7.72	25.61	5.80
1351	0.400	7.78	24.99	6.63
1345	0.450	7.85	24.66	7.46
1323	0.500	7.93	24.04	8.29
1288	0.550	8.00	23.19	9.12
1305	0.600	8.07	23.28	9.95
1319	0.650	8.15	23.32	10.78

AT SOUTH SIDE (PIER S)

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	10
Sample No.:	B5-7	Test Date:	12/27/10
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	83.4
Sample Type:	Soil-Cement	Moisture Content (%):	35.8
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1438.88
Sample Height (inches):	6.013	Wt. Dry Soil+Container(gms):	1098.67
Sample Weight (gms):	1294.96	Wt. Container (gms):	149.44

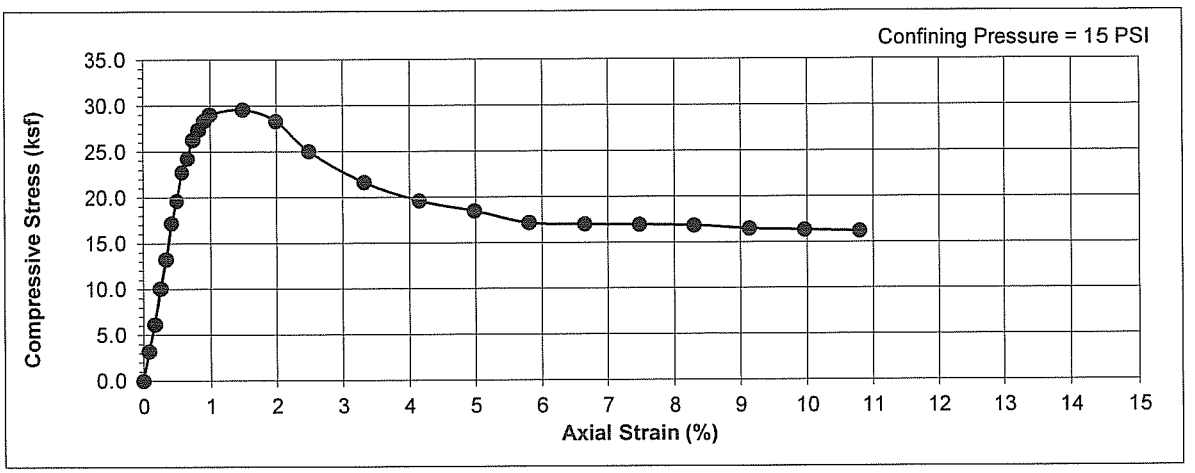


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
50	0.005	7.25	0.99	0.08
125	0.010	7.25	2.48	0.17
221	0.015	7.26	4.39	0.25
330	0.020	7.26	6.54	0.33
395	0.025	7.27	7.82	0.42
485	0.030	7.28	9.60	0.50
560	0.035	7.28	11.07	0.58
640	0.040	7.29	12.65	0.67
724	0.045	7.29	14.29	0.75
816	0.050	7.30	16.10	0.83
870	0.055	7.31	17.15	0.91
904	0.060	7.31	17.80	1.00
950	0.090	7.35	18.61	1.50
964	0.120	7.39	18.79	2.00
973	0.150	7.42	18.87	2.49
958	0.200	7.49	18.42	3.33
922	0.250	7.55	17.58	4.16
872	0.300	7.62	16.48	4.99
824	0.350	7.69	15.44	5.82
801	0.400	7.76	14.87	6.65
786	0.450	7.82	14.46	7.48
781	0.500	7.90	14.24	8.32
768	0.550	7.97	13.88	9.15
773	0.600	8.04	13.84	9.98
775	0.650	8.12	13.75	10.81

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	28
Sample No.:	B5-9	Test Date:	01/14/11
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	83.3
Sample Type:	Soil-Cement	Moisture Content (%):	36.7
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1480.67
Sample Height (inches):	6.022	Wt. Dry Soil+Container(gms):	1131.58
Sample Weight (gms):	1303.90	Wt. Container (gms):	179.98

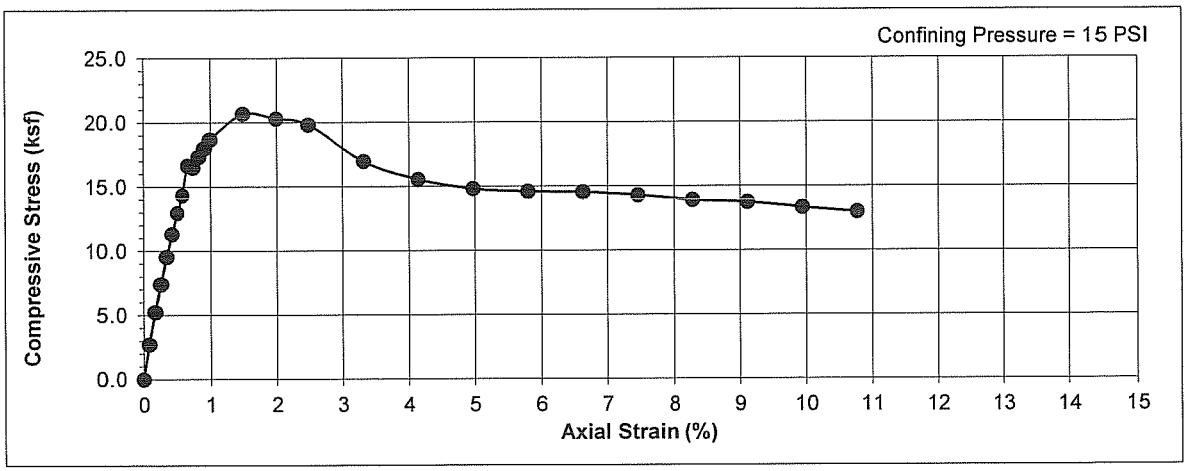


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
161	0.005	7.25	3.20	0.08
310	0.010	7.25	6.16	0.17
507	0.015	7.26	10.06	0.25
669	0.020	7.26	13.26	0.33
867	0.025	7.27	17.17	0.42
992	0.030	7.28	19.63	0.50
1150	0.035	7.28	22.74	0.58
1226	0.040	7.29	24.23	0.66
1330	0.045	7.29	26.26	0.75
1386	0.050	7.30	27.34	0.83
1437	0.055	7.31	28.32	0.91
1475	0.060	7.31	29.05	1.00
1508	0.090	7.35	29.55	1.49
1452	0.120	7.39	28.31	1.99
1290	0.150	7.42	25.02	2.49
1124	0.200	7.49	21.62	3.32
1028	0.250	7.55	19.60	4.15
977	0.300	7.62	18.47	4.98
916	0.350	7.69	17.16	5.81
915	0.400	7.75	16.99	6.64
920	0.450	7.82	16.93	7.47
923	0.500	7.89	16.84	8.30
912	0.550	7.97	16.48	9.13
912	0.600	8.04	16.33	9.96
913	0.650	8.12	16.20	10.79

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	28
Sample No.:	B5-10	Test Date:	01/14/11
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	82.5
Sample Type:	Soil-Cement	Moisture Content (%):	37.1
Sample Diameter (inches):	3.033	Wt. Wet Soil+Container(gms):	1442.24
Sample Height (inches):	6.034	Wt. Dry Soil+Container(gms):	1092.39
Sample Weight (gms):	1294.64	Wt. Container (gms):	149.39

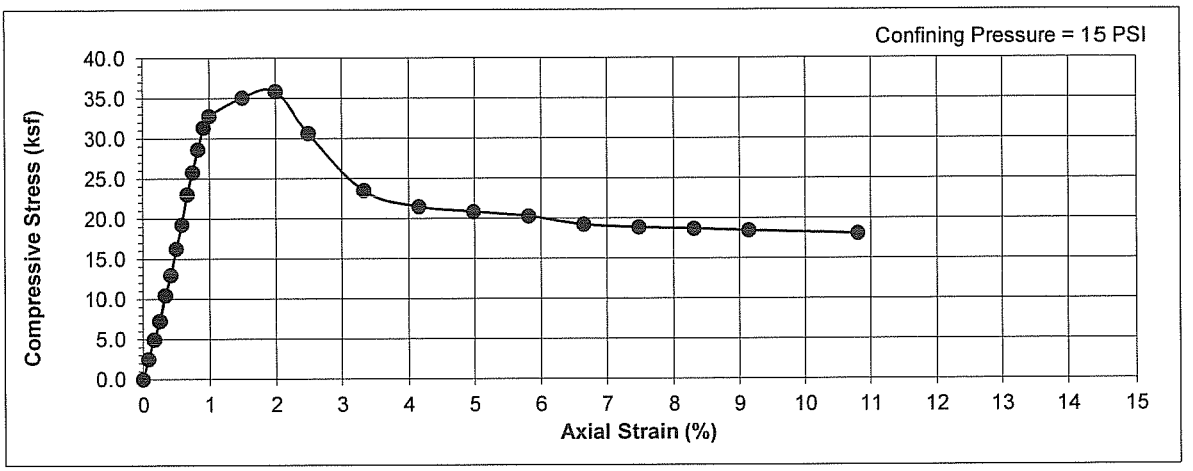


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
136	0.005	7.23	2.71	0.08
264	0.010	7.24	5.25	0.17
373	0.015	7.24	7.42	0.25
480	0.020	7.25	9.54	0.33
570	0.025	7.26	11.31	0.41
654	0.030	7.26	12.97	0.50
724	0.035	7.27	14.35	0.58
840	0.040	7.27	16.63	0.66
834	0.045	7.28	16.50	0.75
876	0.050	7.29	17.31	0.83
911	0.055	7.29	17.99	0.91
946	0.060	7.30	18.67	0.99
1052	0.090	7.33	20.65	1.49
1039	0.120	7.37	20.30	1.99
1020	0.150	7.41	19.82	2.49
880	0.200	7.47	16.96	3.31
814	0.250	7.54	15.55	4.14
782	0.300	7.60	14.81	4.97
777	0.350	7.67	14.59	5.80
781	0.400	7.74	14.53	6.63
775	0.450	7.81	14.29	7.46
761	0.500	7.88	13.91	8.29
759	0.550	7.95	13.75	9.12
743	0.600	8.02	13.34	9.94
730	0.650	8.10	12.98	10.77

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	10
Sample No.:	B5-17	Test Date:	12/27/10
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	85.0
Sample Type:	Soil-Cement	Moisture Content (%):	35.0
Sample Diameter (inches):	3.039	Wt. Wet Soil+Container(gms):	1460.23
Sample Height (inches):	6.017	Wt. Dry Soil+Container(gms):	1120.92
Sample Weight (gms):	1314.71	Wt. Container (gms):	150.89

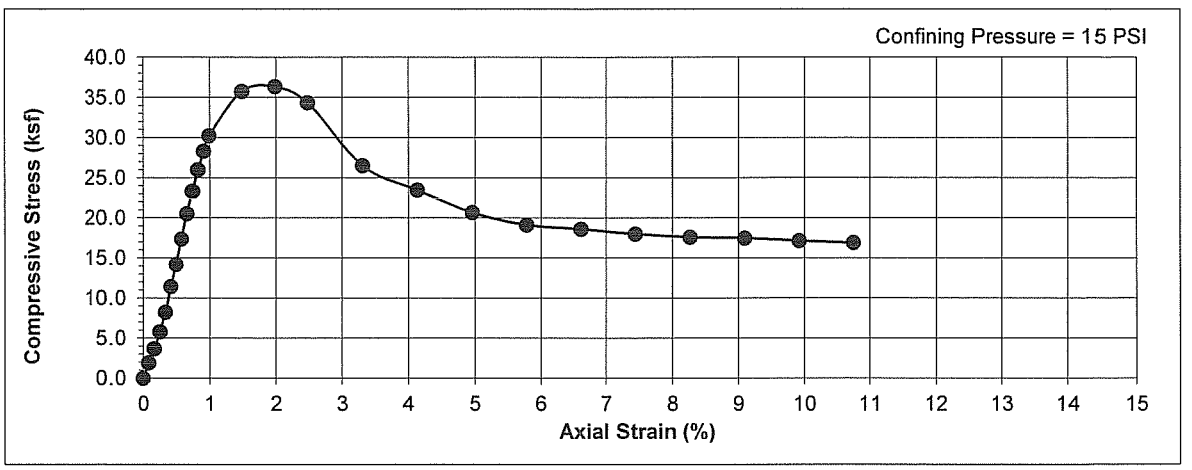


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
127	0.005	7.26	2.52	0.08
249	0.010	7.27	4.94	0.17
367	0.015	7.27	7.27	0.25
529	0.020	7.28	10.47	0.33
657	0.025	7.28	12.99	0.42
824	0.030	7.29	16.28	0.50
976	0.035	7.30	19.26	0.58
1167	0.040	7.30	23.01	0.66
1309	0.045	7.31	25.79	0.75
1453	0.050	7.31	28.61	0.83
1593	0.055	7.32	31.34	0.91
1667	0.060	7.33	32.76	1.00
1793	0.090	7.36	35.06	1.50
1844	0.120	7.40	35.88	1.99
1582	0.150	7.44	30.62	2.49
1224	0.200	7.50	23.49	3.32
1129	0.250	7.57	21.48	4.15
1105	0.300	7.63	20.84	4.99
1084	0.350	7.70	20.27	5.82
1038	0.400	7.77	19.24	6.65
1028	0.450	7.84	18.88	7.48
1026	0.500	7.91	18.68	8.31
1023	0.550	7.98	18.45	9.14
1020	0.650	8.13	18.06	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	28
Sample No.:	B5-19	Test Date:	01/14/11
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	84.1
Sample Type:	Soil-Cement	Moisture Content (%):	35.4
Sample Diameter (inches):	3.040	Wt. Wet Soil+Container(gms):	1446.21
Sample Height (inches):	6.048	Wt. Dry Soil+Container(gms):	1107.2
Sample Weight (gms):	1312.64	Wt. Container (gms):	148.73

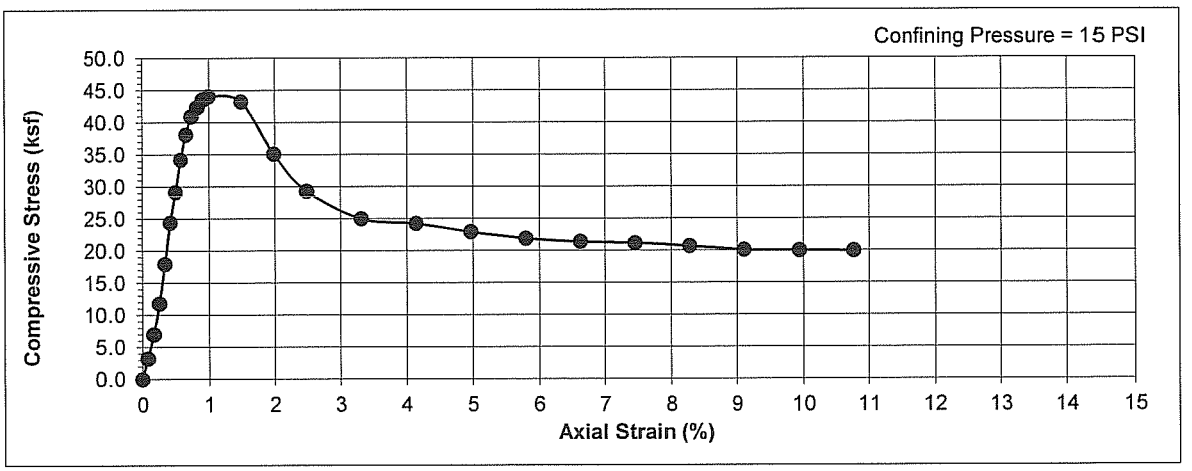


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
96	0.005	7.26	1.90	0.08
186	0.010	7.27	3.68	0.17
293	0.015	7.28	5.80	0.25
417	0.020	7.28	8.25	0.33
578	0.025	7.29	11.42	0.41
719	0.030	7.29	14.19	0.50
880	0.035	7.30	17.36	0.58
1040	0.040	7.31	20.50	0.66
1184	0.045	7.31	23.31	0.74
1320	0.050	7.32	25.97	0.83
1440	0.055	7.32	28.31	0.91
1538	0.060	7.33	30.21	0.99
1829	0.090	7.37	35.75	1.49
1868	0.120	7.41	36.32	1.98
1775	0.150	7.44	34.34	2.48
1382	0.200	7.51	26.51	3.31
1234	0.250	7.57	23.47	4.13
1096	0.300	7.64	20.67	4.96
1023	0.350	7.70	19.12	5.79
1004	0.400	7.77	18.60	6.61
980	0.450	7.84	18.00	7.44
967	0.500	7.91	17.60	8.27
969	0.550	7.98	17.48	9.09
960	0.600	8.06	17.16	9.92
954	0.650	8.13	16.89	10.75

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/17/10
Boring No.:	A 10 202	Cure Days:	28
Sample No.:	B5-20	Test Date:	01/14/11
Soil Description:	Sandy Silty Clay	Dry Density (pcf):	84.2
Sample Type:	Soil-Cement	Moisture Content (%):	35.7
Sample Diameter (inches):	3.046	Wt. Wet Soil+Container(gms):	1466.27
Sample Height (inches):	6.037	Wt. Dry Soil+Container(gms):	1120.9
Sample Weight (gms):	1318.73	Wt. Container (gms):	152.34

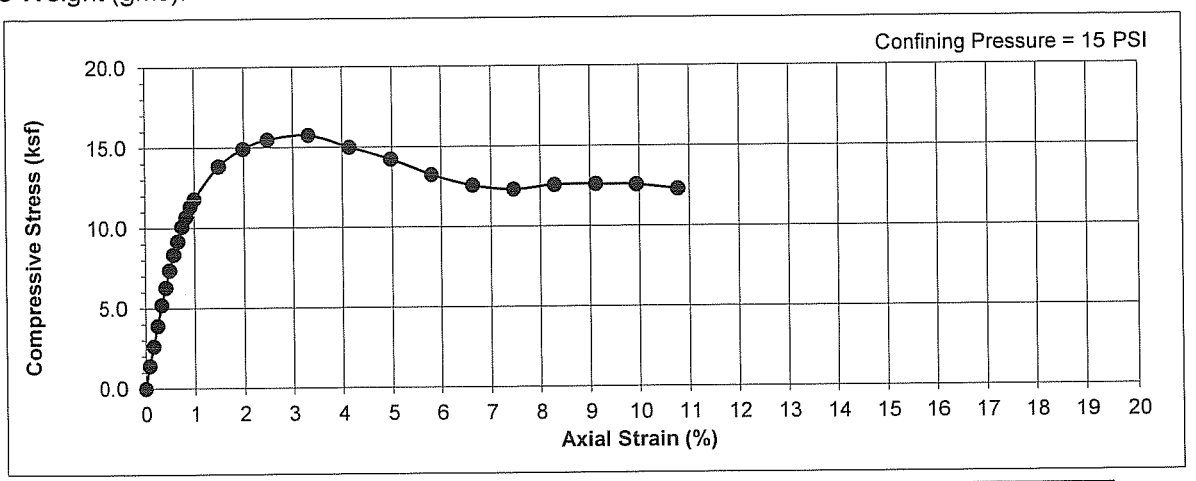


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.29	0.00	0.00
164	0.005	7.29	3.24	0.08
355	0.010	7.30	7.00	0.17
597	0.015	7.31	11.77	0.25
911	0.020	7.31	17.94	0.33
1240	0.025	7.32	24.40	0.41
1482	0.030	7.32	29.14	0.50
1740	0.035	7.33	34.19	0.58
1940	0.040	7.34	38.08	0.66
2086	0.045	7.34	40.91	0.75
2159	0.050	7.35	42.31	0.83
2222	0.055	7.35	43.51	0.91
2250	0.060	7.36	44.02	0.99
2221	0.090	7.40	43.24	1.49
1810	0.120	7.43	35.06	1.99
1520	0.150	7.47	29.29	2.48
1307	0.200	7.54	24.97	3.31
1278	0.250	7.60	24.21	4.14
1220	0.300	7.67	22.91	4.97
1175	0.350	7.74	21.87	5.80
1158	0.400	7.80	21.37	6.63
1156	0.450	7.87	21.14	7.45
1141	0.500	7.95	20.68	8.28
1117	0.550	8.02	20.06	9.11
1123	0.600	8.09	19.99	9.94
1129	0.650	8.17	19.91	10.77

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A 10 203	Cure Days:	7
Sample No.:	B4-2	Test Date:	12/29/10
Soil Description:	Silty Sand	Dry Density (pcf):	83.6
Sample Type:	Soil-Cement	Moisture Content (%):	33.0
Sample Diameter (inches):	3.048	Wt. Wet Soil+Container(gms):	1434.84
Sample Height (inches):	6.032	Wt. Dry Soil+Container(gms):	1116.88
Sample Weight (gms):	1283.85	Wt. Container (gms):	152.26

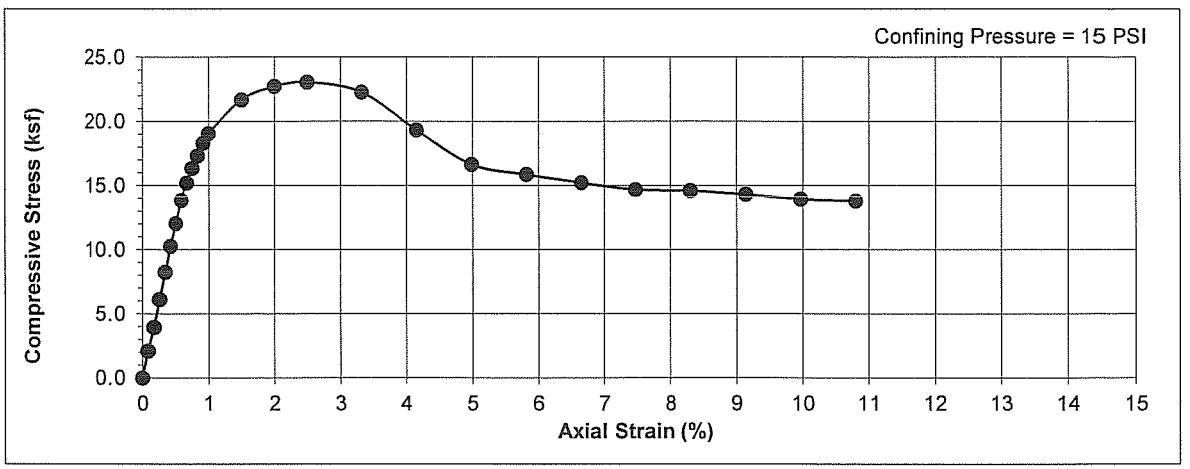


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.30	0.00	0.00
72	0.005	7.30	1.42	0.08
134	0.010	7.31	2.64	0.17
199	0.015	7.31	3.92	0.25
265	0.020	7.32	5.21	0.33
320	0.025	7.33	6.29	0.41
375	0.030	7.33	7.36	0.50
426	0.035	7.34	8.36	0.58
468	0.040	7.35	9.17	0.66
515	0.045	7.35	10.09	0.75
546	0.050	7.36	10.69	0.83
579	0.055	7.36	11.32	0.91
604	0.060	7.37	11.80	0.99
711	0.090	7.41	13.82	1.49
771	0.120	7.44	14.91	1.99
804	0.150	7.48	15.47	2.49
825	0.200	7.55	15.74	3.32
793	0.250	7.61	15.00	4.14
759	0.300	7.68	14.23	4.97
713	0.350	7.75	13.25	5.80
682	0.400	7.81	12.57	6.63
674	0.450	7.88	12.31	7.46
695	0.500	7.96	12.58	8.29
703	0.550	8.03	12.61	9.12
707	0.600	8.10	12.56	9.95
698	0.650	8.18	12.29	10.78

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A 10 203	Cure Days:	28
Sample No.:	B4-5	Test Date:	01/19/11
Soil Description:	Silty Sand	Dry Density (pcf):	82.8
Sample Type:	Soil-Cement	Moisture Content (%):	35.3
Sample Diameter (inches):	3.039	Wt. Wet Soil+Container(gms):	1428.88
Sample Height (inches):	6.019	Wt. Dry Soil+Container(gms):	1094.72
Sample Weight (gms):	1283.99	Wt. Container (gms):	149.42

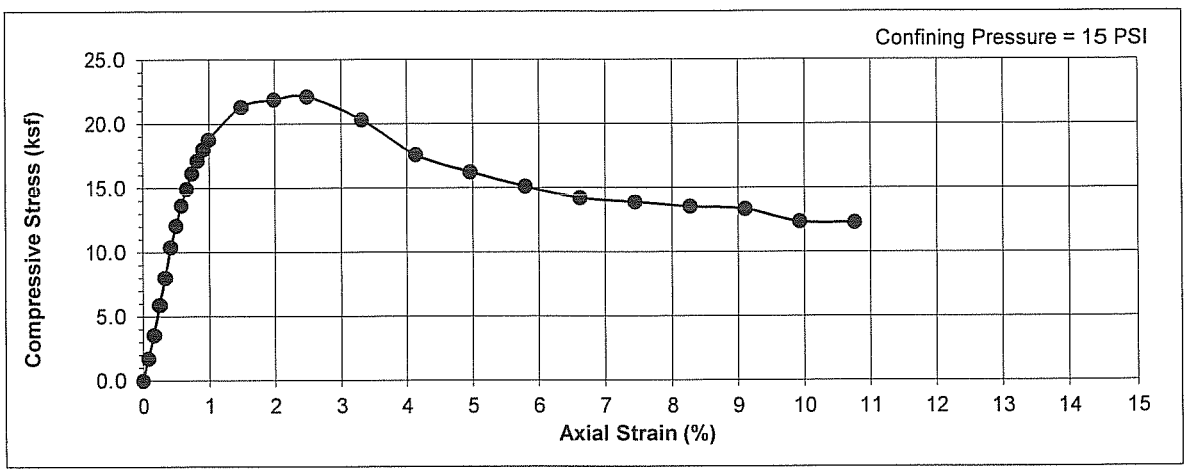


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
105	0.005	7.26	2.08	0.08
199	0.010	7.27	3.94	0.17
309	0.015	7.27	6.12	0.25
417	0.020	7.28	8.25	0.33
519	0.025	7.28	10.26	0.42
610	0.030	7.29	12.05	0.50
701	0.035	7.30	13.84	0.58
770	0.040	7.30	15.18	0.66
829	0.045	7.31	16.33	0.75
880	0.050	7.31	17.32	0.83
930	0.055	7.32	18.29	0.91
969	0.060	7.33	19.05	1.00
1108	0.090	7.36	21.67	1.50
1167	0.120	7.40	22.71	1.99
1190	0.150	7.44	23.04	2.49
1160	0.200	7.50	22.26	3.32
1015	0.250	7.57	19.31	4.15
882	0.300	7.63	16.64	4.98
848	0.350	7.70	15.86	5.81
821	0.400	7.77	15.22	6.65
799	0.450	7.84	14.68	7.48
801	0.500	7.91	14.58	8.31
793	0.550	7.98	14.30	9.14
780	0.600	8.06	13.94	9.97
779	0.650	8.13	13.79	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A 10 203	Cure Days:	28
Sample No.:	B4-6	Test Date:	01/19/11
Soil Description:	Silty Sand	Dry Density (pcf):	81.3
Sample Type:	Soil-Cement	Moisture Content (%):	38.0
Sample Diameter (inches):	3.037	Wt. Wet Soil+Container(gms):	1433.52
Sample Height (inches):	6.043	Wt. Dry Soil+Container(gms):	1079.72
Sample Weight (gms):	1288.97	Wt. Container (gms):	148.46

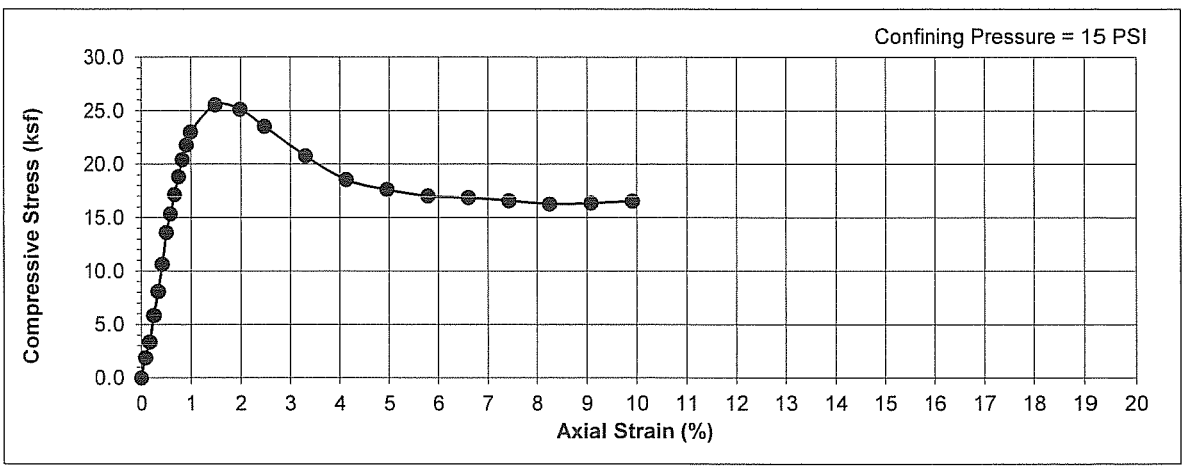


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
86	0.005	7.25	1.71	0.08
178	0.010	7.26	3.53	0.17
297	0.015	7.26	5.89	0.25
405	0.020	7.27	8.02	0.33
525	0.025	7.27	10.39	0.41
610	0.030	7.28	12.07	0.50
690	0.035	7.29	13.64	0.58
756	0.040	7.29	14.93	0.66
818	0.045	7.30	16.14	0.74
869	0.050	7.30	17.13	0.83
914	0.055	7.31	18.00	0.91
954	0.060	7.32	18.78	0.99
1089	0.090	7.35	21.33	1.49
1123	0.120	7.39	21.88	1.99
1141	0.150	7.43	22.12	2.48
1057	0.200	7.49	20.32	3.31
923	0.250	7.56	17.59	4.14
860	0.300	7.62	16.25	4.96
807	0.350	7.69	15.11	5.79
766	0.400	7.76	14.22	6.62
755	0.450	7.83	13.89	7.45
742	0.500	7.90	13.53	8.27
738	0.550	7.97	13.34	9.10
690	0.600	8.04	12.35	9.93
693	0.650	8.12	12.29	10.76

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A 10 203	Cure Days:	7
Sample No.:	B4-10	Test Date:	12/29/10
Soil Description:	Silty Sand	Dry Density (pcf):	87.5
Sample Type:	Soil-Cement	Moisture Content (%):	28.7
Sample Diameter (inches):	3.038	Wt. Wet Soil+Container(gms):	1488.68
Sample Height (inches):	6.054	Wt. Dry Soil+Container(gms):	1200.19
Sample Weight (gms):	1297.01	Wt. Container (gms):	194.15

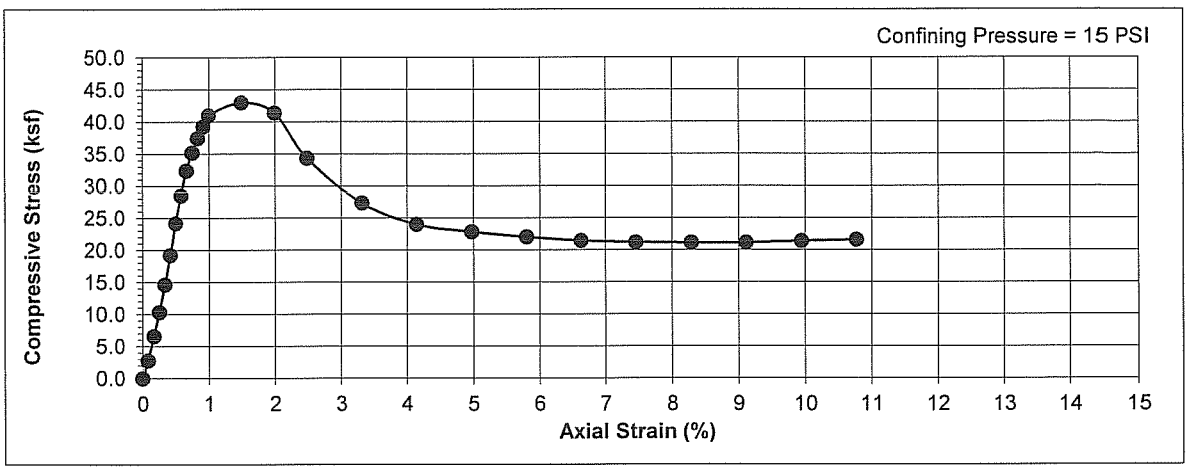


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
94	0.005	7.25	1.87	0.08
169	0.010	7.26	3.35	0.17
295	0.015	7.27	5.85	0.25
409	0.020	7.27	8.10	0.33
538	0.025	7.28	10.64	0.41
689	0.030	7.28	13.62	0.50
777	0.035	7.29	15.35	0.58
869	0.040	7.30	17.15	0.66
955	0.045	7.30	18.83	0.74
1036	0.050	7.31	20.41	0.83
1108	0.055	7.32	21.81	0.91
1169	0.060	7.32	22.99	0.99
1305	0.090	7.36	25.54	1.49
1291	0.120	7.40	25.14	1.98
1215	0.150	7.43	23.54	2.48
1082	0.200	7.50	20.78	3.30
974	0.250	7.56	18.55	4.13
933	0.300	7.63	17.62	4.96
910	0.350	7.69	17.03	5.78
909	0.400	7.76	16.86	6.61
902	0.450	7.83	16.59	7.43
894	0.500	7.90	16.29	8.26
906	0.550	7.97	16.36	9.08
925	0.600	8.05	16.55	9.91

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A 10 203	Cure Days:	28
Sample No.:	B4-13	Test Date:	01/19/11
Soil Description:	Silty Sand	Dry Density (pcf):	82.4
Sample Type:	Soil-Cement	Moisture Content (%):	37.0
Sample Diameter (inches):	3.037	Wt. Wet Soil+Container(gms):	1439.44
Sample Height (inches):	6.034	Wt. Dry Soil+Container(gms):	1090.67
Sample Weight (gms):	1296.12	Wt. Container (gms):	148.22

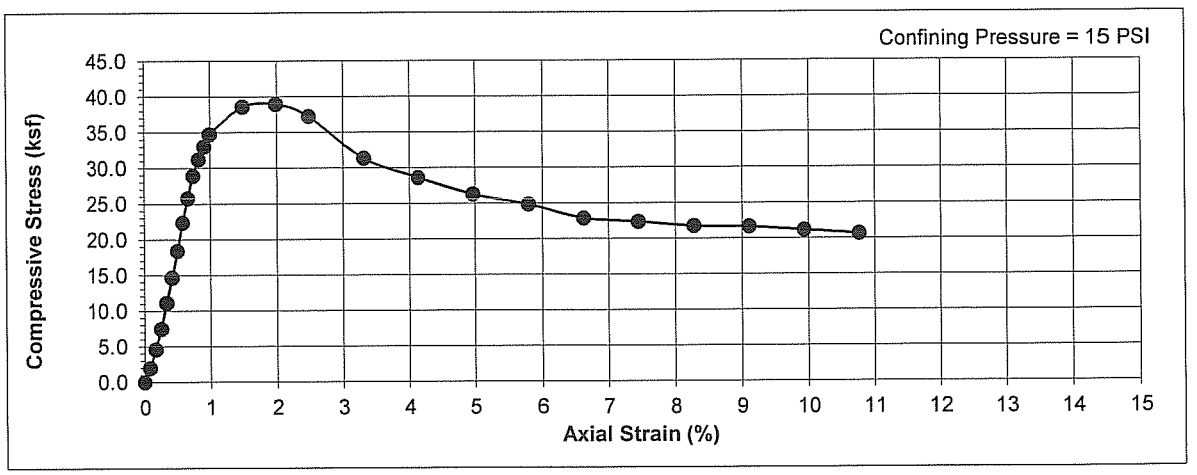


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
140	0.005	7.25	2.78	0.08
333	0.010	7.26	6.61	0.17
520	0.015	7.26	10.31	0.25
738	0.020	7.27	14.62	0.33
971	0.025	7.27	19.22	0.41
1222	0.030	7.28	24.17	0.50
1442	0.035	7.29	28.50	0.58
1639	0.040	7.29	32.36	0.66
1783	0.045	7.30	35.18	0.75
1898	0.050	7.30	37.42	0.83
1991	0.055	7.31	39.22	0.91
2082	0.060	7.32	40.98	0.99
2194	0.090	7.35	42.96	1.49
2124	0.120	7.39	41.38	1.99
1770	0.150	7.43	34.31	2.49
1421	0.200	7.49	27.31	3.31
1259	0.250	7.56	23.99	4.14
1208	0.300	7.62	22.82	4.97
1176	0.350	7.69	22.02	5.80
1155	0.400	7.76	21.44	6.63
1152	0.450	7.83	21.19	7.46
1159	0.500	7.90	21.13	8.29
1169	0.550	7.97	21.12	9.12
1195	0.600	8.04	21.39	9.94
1216	0.650	8.12	21.57	10.77

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/22/10
Boring No.:	A 10 203	Cure Days:	28
Sample No.:	B4-14	Test Date:	01/19/11
Soil Description:	Silty Sand	Dry Density (pcf):	82.7
Sample Type:	Soil-Cement	Moisture Content (%):	36.4
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1468.71
Sample Height (inches):	6.039	Wt. Dry Soil+Container(gms):	1124.39
Sample Weight (gms):	1295.34	Wt. Container (gms):	179.52

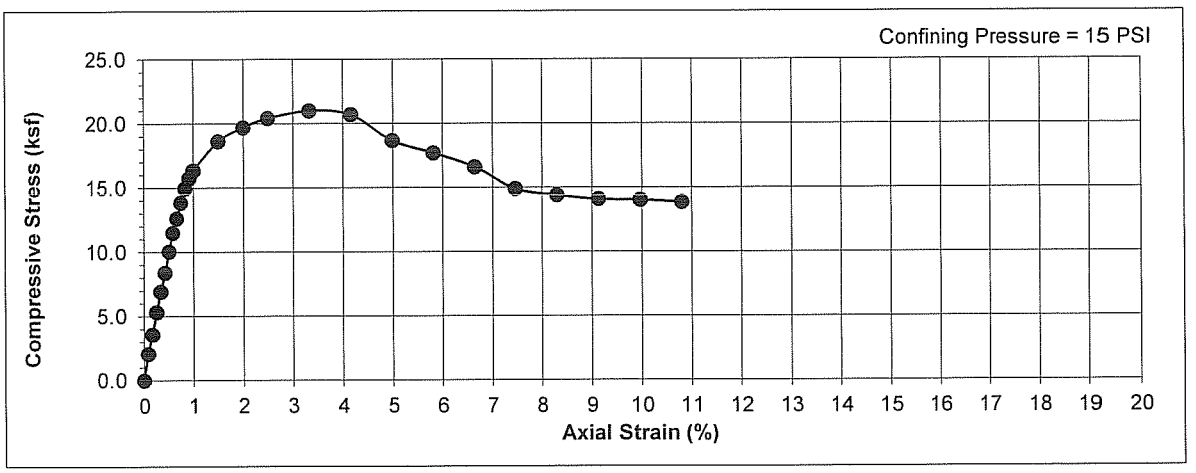


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
98	0.005	7.25	1.95	0.08
230	0.010	7.25	4.57	0.17
375	0.015	7.26	7.44	0.25
559	0.020	7.26	11.08	0.33
740	0.025	7.27	14.66	0.41
928	0.030	7.28	18.37	0.50
1130	0.035	7.28	22.35	0.58
1304	0.040	7.29	25.77	0.66
1464	0.045	7.29	28.90	0.75
1583	0.050	7.30	31.23	0.83
1674	0.055	7.31	33.00	0.91
1763	0.060	7.31	34.72	0.99
1969	0.090	7.35	38.58	1.49
1998	0.120	7.39	38.95	1.99
1919	0.150	7.42	37.22	2.48
1630	0.200	7.49	31.35	3.31
1501	0.250	7.55	28.62	4.14
1389	0.300	7.62	26.26	4.97
1324	0.350	7.68	24.81	5.80
1231	0.400	7.75	22.86	6.62
1215	0.450	7.82	22.37	7.45
1191	0.500	7.89	21.73	8.28
1195	0.550	7.96	21.61	9.11
1180	0.600	8.04	21.14	9.94
1162	0.650	8.11	20.63	10.76

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 204	Cure Days:	7
Sample No.:	B5-2	Test Date:	12/27/10
Soil Description:	Sandy Silt	Dry Density (pcf):	88.5
Sample Type:	Soil-Cement	Moisture Content (%):	32.0
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1478.73
Sample Height (inches):	6.018	Wt. Dry Soil+Container(gms):	1156.91
Sample Weight (gms):	1330.16	Wt. Container (gms):	149.85

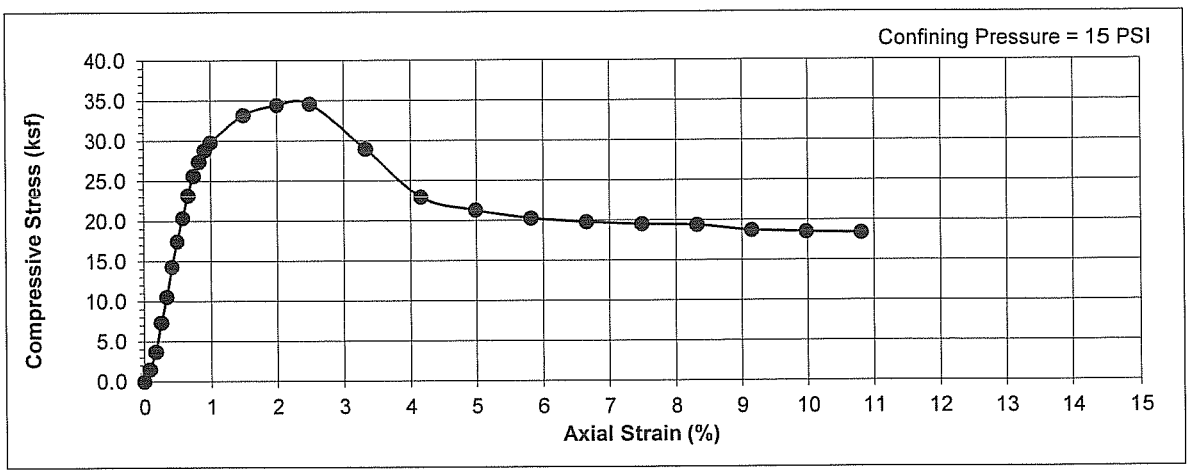


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
104	0.005	7.22	2.08	0.08
179	0.010	7.22	3.57	0.17
267	0.015	7.23	5.32	0.25
348	0.020	7.23	6.93	0.33
422	0.025	7.24	8.39	0.42
505	0.030	7.25	10.03	0.50
579	0.035	7.25	11.50	0.58
636	0.040	7.26	12.62	0.66
698	0.045	7.27	13.84	0.75
754	0.050	7.27	14.93	0.83
796	0.055	7.28	15.75	0.91
827	0.060	7.28	16.35	1.00
946	0.090	7.32	18.61	1.50
1006	0.120	7.36	19.69	1.99
1048	0.150	7.40	20.41	2.49
1087	0.200	7.46	20.99	3.32
1081	0.250	7.52	20.69	4.15
984	0.300	7.59	18.67	4.99
941	0.350	7.66	17.70	5.82
890	0.400	7.72	16.59	6.65
806	0.450	7.79	14.89	7.48
786	0.500	7.86	14.39	8.31
776	0.550	7.94	14.08	9.14
779	0.600	8.01	14.01	9.97
777	0.650	8.08	13.84	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 204	Cure Days:	28
Sample No.:	B5-5	Test Date:	01/17/11
Soil Description:	Sandy Silt	Dry Density (pcf):	91.1
Sample Type:	Soil-Cement	Moisture Content (%):	27.2
Sample Diameter (inches):	3.031	Wt. Wet Soil+Container(gms):	1425.67
Sample Height (inches):	6.013	Wt. Dry Soil+Container(gms):	1143.98
Sample Weight (gms):	1319.45	Wt. Container (gms):	106.70

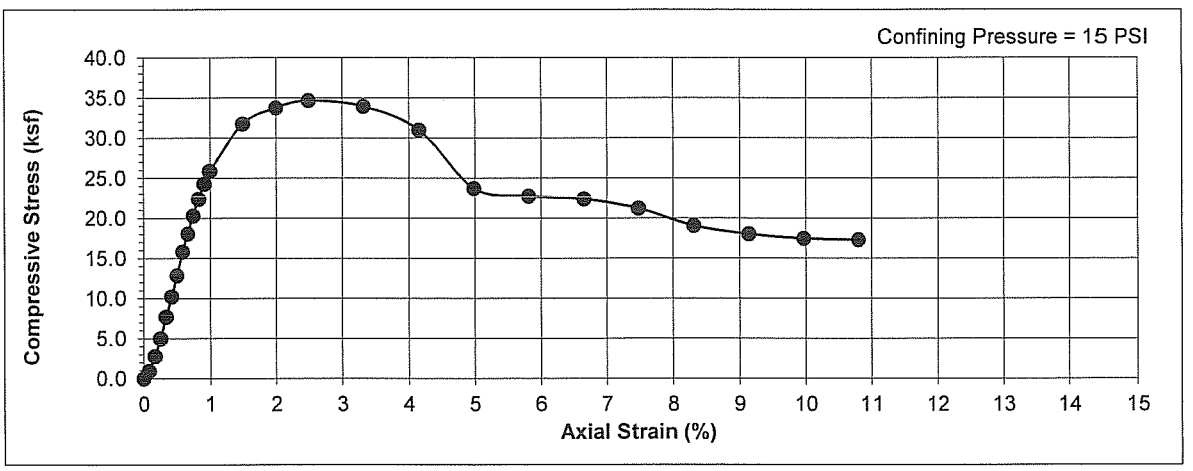


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
76	0.005	7.22	1.52	0.08
187	0.010	7.23	3.73	0.17
370	0.015	7.23	7.37	0.25
530	0.020	7.24	10.54	0.33
720	0.025	7.25	14.31	0.42
880	0.030	7.25	17.47	0.50
1028	0.035	7.26	20.40	0.58
1169	0.040	7.26	23.17	0.67
1294	0.045	7.27	25.63	0.75
1383	0.050	7.28	27.37	0.83
1458	0.055	7.28	28.83	0.91
1507	0.060	7.29	29.78	1.00
1688	0.090	7.33	33.18	1.50
1760	0.120	7.36	34.42	2.00
1777	0.150	7.40	34.58	2.49
1501	0.200	7.46	28.96	3.33
1200	0.250	7.53	22.95	4.16
1123	0.300	7.59	21.29	4.99
1079	0.350	7.66	20.28	5.82
1063	0.400	7.73	19.80	6.65
1056	0.450	7.80	19.50	7.48
1059	0.500	7.87	19.38	8.32
1032	0.550	7.94	18.71	9.15
1031	0.600	8.02	18.52	9.98
1032	0.650	8.09	18.37	10.81

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 204	Cure Days:	28
Sample No.:	B5-6	Test Date:	01/17/11
Soil Description:	Sandy Silt	Dry Density (pcf):	91.5
Sample Type:	Soil-Cement	Moisture Content (%):	26.7
Sample Diameter (inches):	3.031	Wt. Wet Soil+Container(gms):	1424.33
Sample Height (inches):	6.018	Wt. Dry Soil+Container(gms):	1146.39
Sample Weight (gms):	1322.38	Wt. Container (gms):	106.47

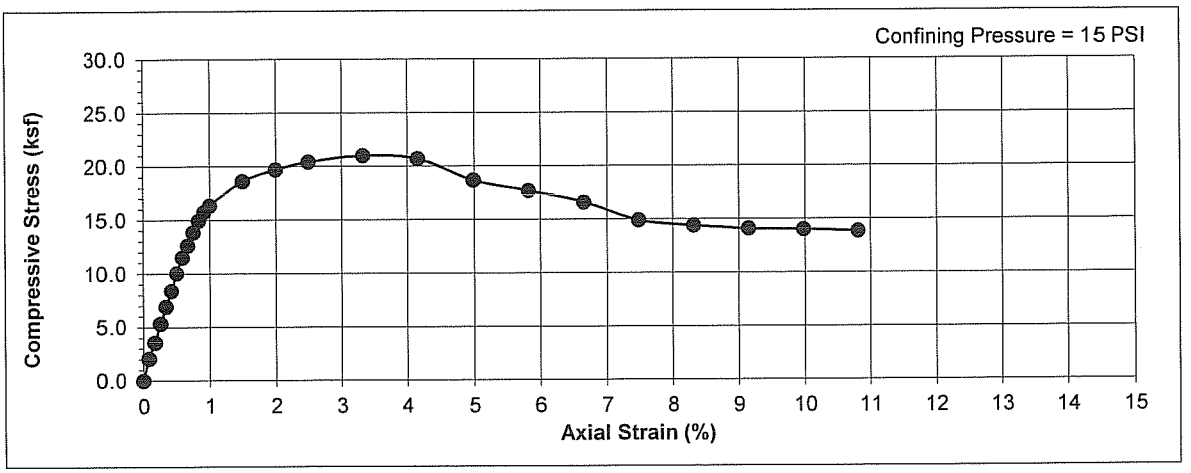


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
47	0.005	7.22	0.94	0.08
139	0.010	7.23	2.77	0.17
250	0.015	7.23	4.98	0.25
388	0.020	7.24	7.72	0.33
515	0.025	7.25	10.24	0.42
647	0.030	7.25	12.85	0.50
797	0.035	7.26	15.81	0.58
912	0.040	7.26	18.08	0.66
1026	0.045	7.27	20.32	0.75
1131	0.050	7.28	22.38	0.83
1226	0.055	7.28	24.24	0.91
1310	0.060	7.29	25.88	1.00
1614	0.090	7.32	31.73	1.50
1726	0.120	7.36	33.76	1.99
1781	0.150	7.40	34.66	2.49
1759	0.200	7.46	33.94	3.32
1620	0.250	7.53	30.99	4.15
1251	0.300	7.59	23.72	4.99
1210	0.350	7.66	22.74	5.82
1202	0.400	7.73	22.39	6.65
1150	0.450	7.80	21.23	7.48
1042	0.500	7.87	19.07	8.31
994	0.550	7.94	18.02	9.14
973	0.600	8.01	17.48	9.97
971	0.650	8.09	17.29	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 205	Cure Days:	7
Sample No.:	B4-2	Test Date:	12/27/10
Soil Description:	Silty Clay with Sand	Dry Density (pcf):	84.6
Sample Type:	Soil-Cement	Moisture Content (%):	32.8
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1426.93
Sample Height (inches):	6.014	Wt. Dry Soil+Container(gms):	1111.15
Sample Weight (gms):	1279.37	Wt. Container (gms):	149.77

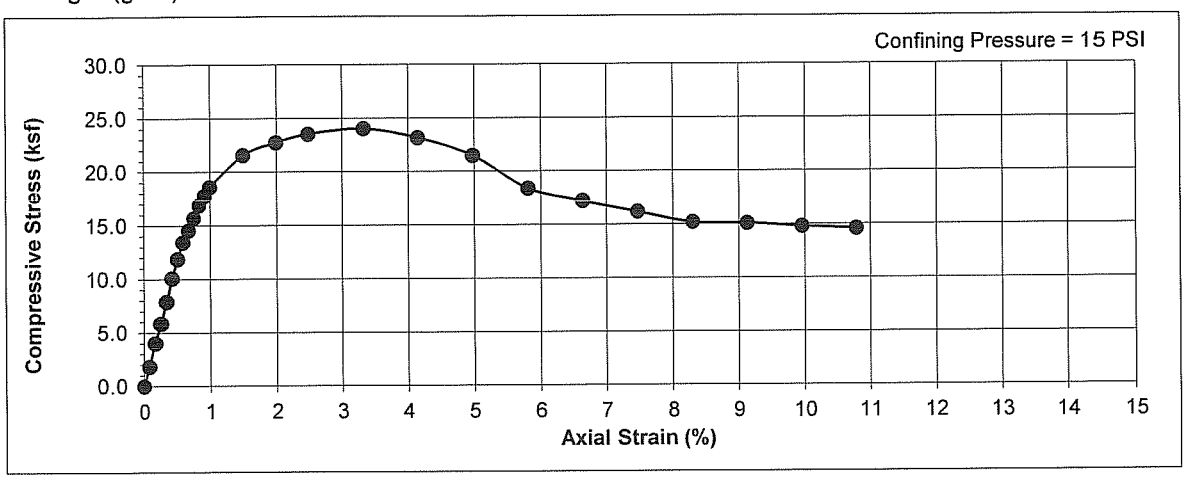


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
104	0.005	7.22	2.08	0.08
179	0.010	7.22	3.57	0.17
267	0.015	7.23	5.32	0.25
348	0.020	7.23	6.93	0.33
422	0.025	7.24	8.39	0.42
505	0.030	7.25	10.03	0.50
579	0.035	7.25	11.50	0.58
636	0.040	7.26	12.62	0.67
698	0.045	7.27	13.84	0.75
754	0.050	7.27	14.93	0.83
796	0.055	7.28	15.75	0.91
827	0.060	7.28	16.35	1.00
946	0.090	7.32	18.61	1.50
1006	0.120	7.36	19.69	2.00
1048	0.150	7.40	20.41	2.49
1087	0.200	7.46	20.99	3.33
1081	0.250	7.52	20.69	4.16
984	0.300	7.59	18.67	4.99
941	0.350	7.66	17.70	5.82
890	0.400	7.72	16.59	6.65
806	0.450	7.79	14.89	7.48
786	0.500	7.86	14.39	8.31
776	0.550	7.94	14.08	9.15
779	0.600	8.01	14.00	9.98
777	0.650	8.08	13.84	10.81

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 205	Cure Days:	28
Sample No.:	B4-5	Test Date:	01/17/11
Soil Description:	Silty Clay with Sand	Dry Density (pcf):	83.4
Sample Type:	Soil-Cement	Moisture Content (%):	33.7
Sample Diameter (inches):	3.033	Wt. Wet Soil+Container(gms):	1383.14
Sample Height (inches):	6.025	Wt. Dry Soil+Container(gms):	1061.16
Sample Weight (gms):	1274.77	Wt. Container (gms):	105.64

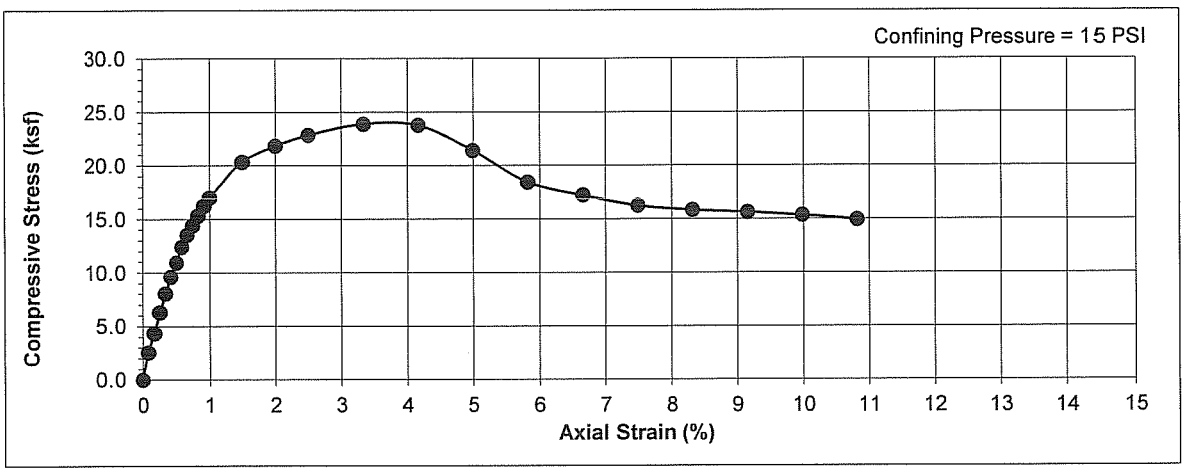


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
92	0.005	7.23	1.83	0.08
201	0.010	7.24	4.00	0.17
294	0.015	7.24	5.85	0.25
396	0.020	7.25	7.87	0.33
507	0.025	7.26	10.06	0.41
598	0.030	7.26	11.86	0.50
677	0.035	7.27	13.41	0.58
735	0.040	7.27	14.55	0.66
793	0.045	7.28	15.69	0.75
854	0.050	7.29	16.88	0.83
898	0.055	7.29	17.73	0.91
941	0.060	7.30	18.57	1.00
1098	0.090	7.33	21.56	1.49
1164	0.120	7.37	22.74	1.99
1210	0.150	7.41	23.52	2.49
1246	0.200	7.47	24.01	3.32
1212	0.250	7.54	23.15	4.15
1134	0.300	7.60	21.48	4.98
979	0.350	7.67	18.38	5.81
924	0.400	7.74	17.19	6.64
877	0.450	7.81	16.17	7.47
831	0.500	7.88	15.19	8.30
833	0.550	7.95	15.09	9.13
824	0.600	8.02	14.79	9.96
820	0.650	8.10	14.58	10.79

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/20/10
Boring No.:	A 10 205	Cure Days:	28
Sample No.:	B4-6	Test Date:	01/17/11
Soil Description:	Silty Clay with Sand	Dry Density (pcf):	83.4
Sample Type:	Soil-Cement	Moisture Content (%):	34.3
Sample Diameter (inches):	3.030	Wt. Wet Soil+Container(gms):	1375.62
Sample Height (inches):	6.010	Wt. Dry Soil+Container(gms):	1051.02
Sample Weight (gms):	1273.10	Wt. Container (gms):	103.32

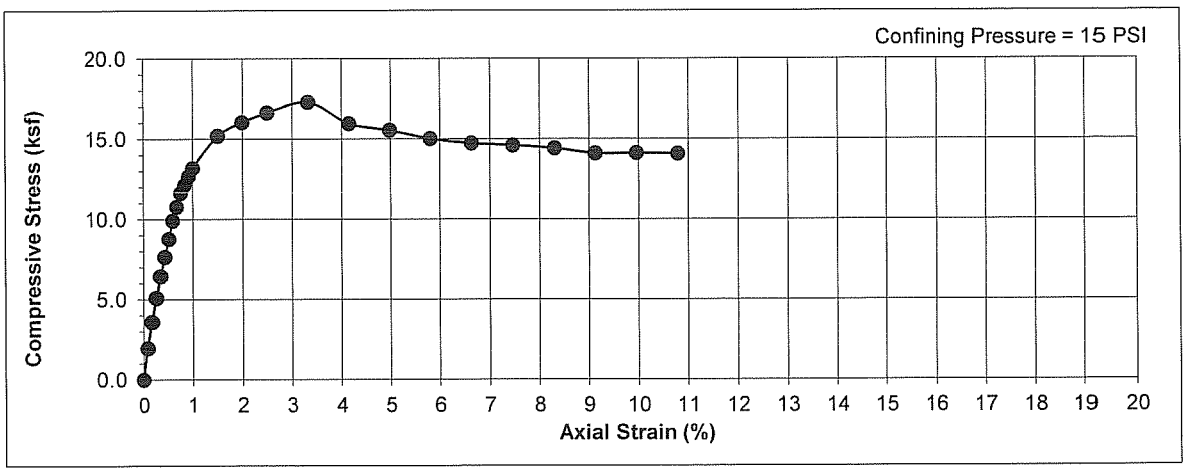


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
127	0.005	7.22	2.53	0.08
218	0.010	7.22	4.35	0.17
316	0.015	7.23	6.29	0.25
405	0.020	7.23	8.06	0.33
484	0.025	7.24	9.63	0.42
551	0.030	7.25	10.95	0.50
625	0.035	7.25	12.41	0.58
681	0.040	7.26	13.51	0.67
726	0.045	7.27	14.39	0.75
774	0.050	7.27	15.33	0.83
821	0.055	7.28	16.25	0.92
860	0.060	7.28	17.00	1.00
1034	0.090	7.32	20.34	1.50
1115	0.120	7.36	21.82	2.00
1173	0.150	7.40	22.84	2.50
1237	0.200	7.46	23.88	3.33
1242	0.250	7.52	23.77	4.16
1129	0.300	7.59	21.42	4.99
981	0.350	7.66	18.45	5.82
924	0.400	7.72	17.22	6.66
879	0.450	7.79	16.24	7.49
864	0.500	7.87	15.82	8.32
861	0.550	7.94	15.62	9.15
853	0.600	8.01	15.33	9.98
838	0.650	8.09	14.93	10.82

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	9
Sample No.:	B6-3	Test Date:	12/27/10
Soil Description:	Sandy Silt	Dry Density (pcf):	84.0
Sample Type:	Soil-Cement	Moisture Content (%):	34.7
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1471.53
Sample Height (inches):	6.024	Wt. Dry Soil+Container(gms):	1138.57
Sample Weight (gms):	1296.01	Wt. Container (gms):	180.05

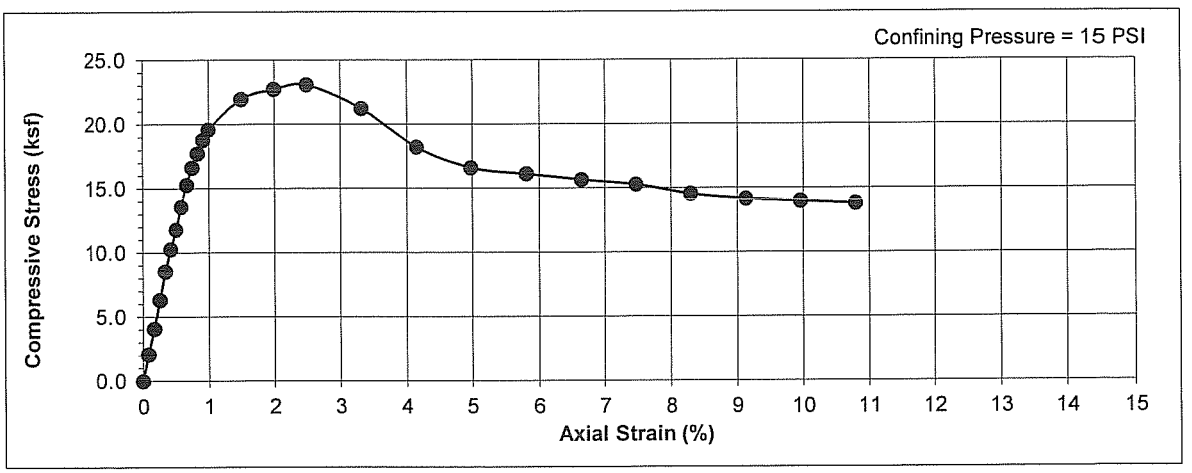


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
98	0.005	7.25	1.95	0.08
181	0.010	7.25	3.59	0.17
257	0.015	7.26	5.10	0.25
325	0.020	7.26	6.44	0.33
386	0.025	7.27	7.65	0.42
443	0.030	7.28	8.77	0.50
501	0.035	7.28	9.91	0.58
545	0.040	7.29	10.77	0.66
589	0.045	7.29	11.63	0.75
615	0.050	7.30	12.13	0.83
643	0.055	7.31	12.67	0.91
669	0.060	7.31	13.17	1.00
775	0.090	7.35	15.19	1.49
822	0.120	7.39	16.03	1.99
857	0.150	7.42	16.62	2.49
899	0.200	7.49	17.29	3.32
837	0.250	7.55	15.96	4.15
822	0.300	7.62	15.54	4.98
801	0.350	7.69	15.01	5.81
793	0.400	7.75	14.73	6.64
793	0.450	7.82	14.60	7.47
790	0.500	7.89	14.41	8.30
780	0.550	7.97	14.10	9.13
788	0.600	8.04	14.11	9.96
793	0.650	8.11	14.07	10.79

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	28
Sample No.:	B6-5	Test Date:	01/15/11
Soil Description:	Sandy Silt	Dry Density (pcf):	81.2
Sample Type:	Soil-Cement	Moisture Content (%):	37.9
Sample Diameter (inches):	3.044	Wt. Wet Soil+Container(gms):	1390.17
Sample Height (inches):	6.024	Wt. Dry Soil+Container(gms):	1037.18
Sample Weight (gms):	1289.15	Wt. Container (gms):	105.49

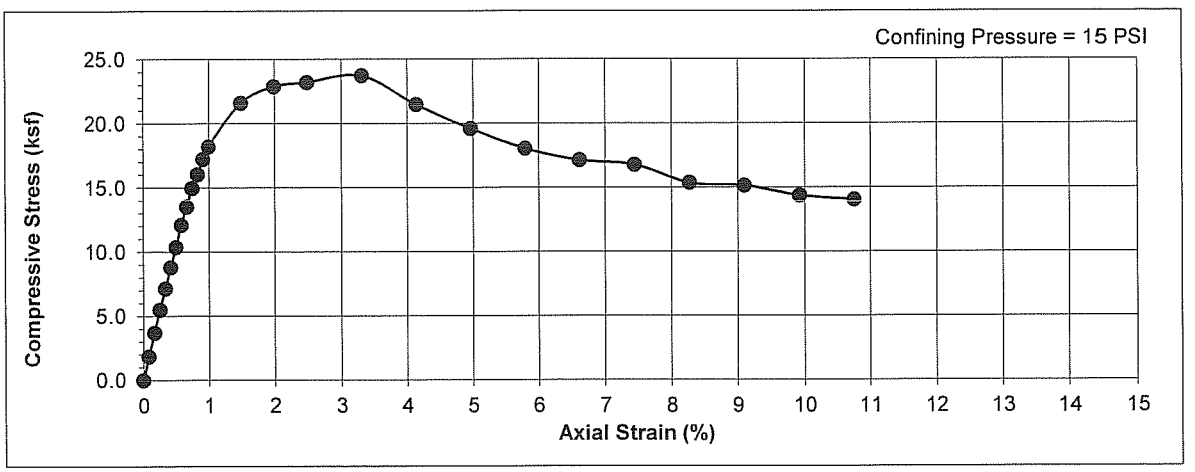


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.28	0.00	0.00
104	0.005	7.28	2.06	0.08
206	0.010	7.29	4.07	0.17
320	0.015	7.30	6.32	0.25
433	0.020	7.30	8.54	0.33
521	0.025	7.31	10.27	0.42
599	0.030	7.31	11.79	0.50
689	0.035	7.32	13.55	0.58
777	0.040	7.33	15.27	0.66
846	0.045	7.33	16.61	0.75
903	0.050	7.34	17.72	0.83
957	0.055	7.34	18.76	0.91
999	0.060	7.35	19.57	1.00
1126	0.090	7.39	21.95	1.49
1171	0.120	7.43	22.71	1.99
1195	0.150	7.46	23.06	2.49
1109	0.200	7.53	21.22	3.32
961	0.250	7.59	18.23	4.15
883	0.300	7.66	16.60	4.98
864	0.350	7.73	16.10	5.81
847	0.400	7.80	15.65	6.64
834	0.450	7.86	15.27	7.47
801	0.500	7.94	14.53	8.30
787	0.550	8.01	14.15	9.13
784	0.600	8.08	13.97	9.96
781	0.650	8.16	13.79	10.79

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	28
Sample No.:	B6-6	Test Date:	01/15/11
Soil Description:	Sandy Silt	Dry Density (pcf):	81.9
Sample Type:	Soil-Cement	Moisture Content (%):	37.9
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1399.74
Sample Height (inches):	6.044	Wt. Dry Soil+Container(gms):	1044.06
Sample Weight (gms):	1296.01	Wt. Container (gms):	105.05

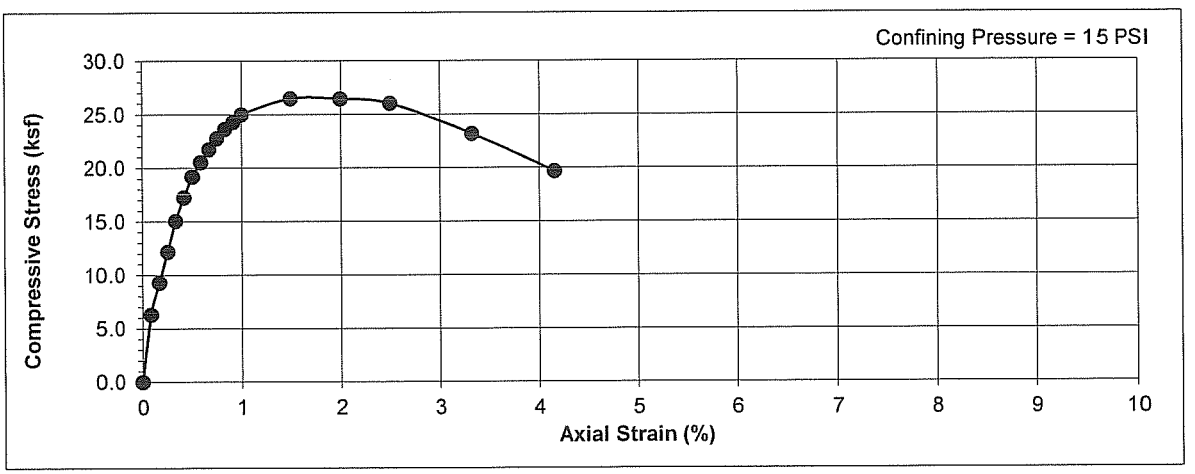


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
93	0.005	7.24	1.85	0.08
186	0.010	7.25	3.70	0.17
277	0.015	7.25	5.50	0.25
360	0.020	7.26	7.14	0.33
444	0.025	7.26	8.80	0.41
523	0.030	7.27	10.36	0.50
611	0.035	7.28	12.09	0.58
684	0.040	7.28	13.52	0.66
757	0.045	7.29	14.96	0.74
812	0.050	7.29	16.03	0.83
873	0.055	7.30	17.22	0.91
923	0.060	7.31	18.19	0.99
1101	0.090	7.34	21.59	1.49
1172	0.120	7.38	22.87	1.99
1195	0.150	7.42	23.20	2.48
1232	0.200	7.48	23.71	3.31
1125	0.250	7.55	21.47	4.14
1036	0.300	7.61	19.60	4.96
962	0.350	7.68	18.04	5.79
922	0.400	7.75	17.14	6.62
910	0.450	7.82	16.76	7.45
841	0.500	7.89	15.35	8.27
837	0.550	7.96	15.14	9.10
801	0.600	8.03	14.36	9.93
791	0.650	8.11	14.05	10.75

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	9
Sample No.:	B6-13	Test Date:	12/27/10
Soil Description:	Sandy Silt	Dry Density (pcf):	83.8
Sample Type:	Soil-Cement	Moisture Content (%):	35.8
Sample Diameter (inches):	3.031	Wt. Wet Soil+Container(gms):	1472.51
Sample Height (inches):	6.016	Wt. Dry Soil+Container(gms):	1131.52
Sample Weight (gms):	1296.57	Wt. Container (gms):	179.26

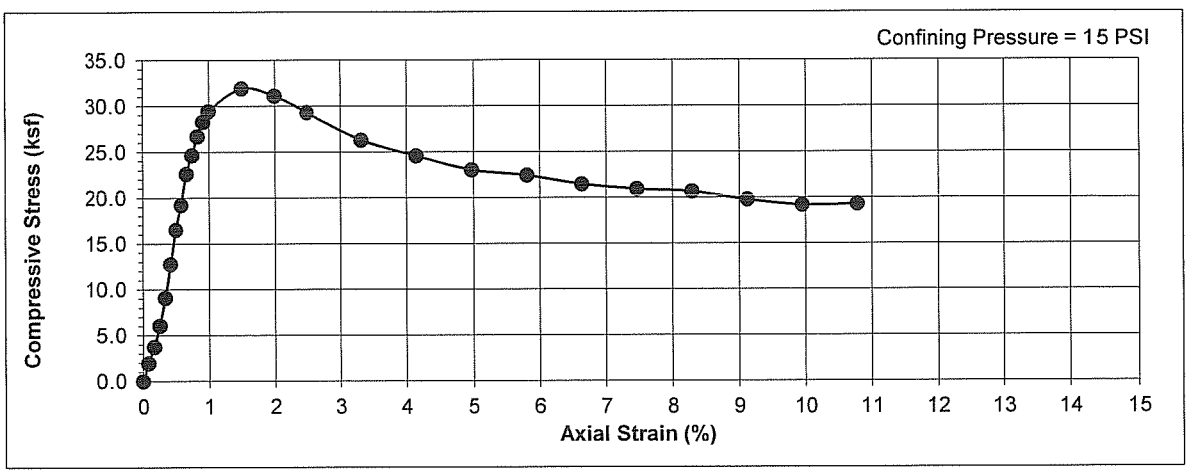


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
315	0.005	7.22	6.28	0.08
466	0.010	7.23	9.28	0.17
612	0.015	7.23	12.18	0.25
757	0.020	7.24	15.06	0.33
867	0.025	7.25	17.23	0.42
966	0.030	7.25	19.18	0.50
1035	0.035	7.26	20.54	0.58
1097	0.040	7.26	21.75	0.66
1149	0.045	7.27	22.76	0.75
1194	0.050	7.28	23.63	0.83
1228	0.055	7.28	24.28	0.91
1264	0.060	7.29	24.97	1.00
1347	0.090	7.33	26.48	1.50
1352	0.120	7.36	26.44	1.99
1337	0.150	7.40	26.02	2.49
1202	0.200	7.46	23.19	3.32
1028	0.250	7.53	19.66	4.16

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	28
Sample No.:	B6-15	Test Date:	01/15/11
Soil Description:	Sandy Silt	Dry Density (pcf):	81.6
Sample Type:	Soil-Cement	Moisture Content (%):	38.1
Sample Diameter (inches):	3.041	Wt. Wet Soil+Container(gms):	1399.2
Sample Height (inches):	6.030	Wt. Dry Soil+Container(gms):	1041.79
Sample Weight (gms):	1295.59	Wt. Container (gms):	103.64

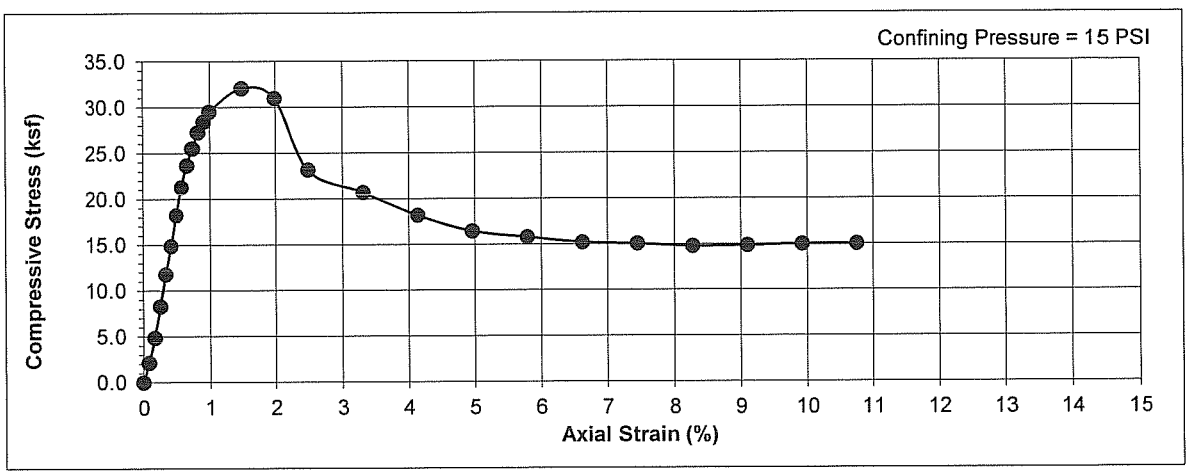


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
98	0.005	7.27	1.94	0.08
189	0.010	7.28	3.74	0.17
306	0.015	7.28	6.05	0.25
460	0.020	7.29	9.09	0.33
646	0.025	7.29	12.75	0.41
836	0.030	7.30	16.49	0.50
975	0.035	7.31	19.22	0.58
1148	0.040	7.31	22.61	0.66
1252	0.045	7.32	24.64	0.75
1357	0.050	7.32	26.68	0.83
1439	0.055	7.33	28.27	0.91
1499	0.060	7.34	29.42	1.00
1634	0.090	7.37	31.91	1.49
1601	0.120	7.41	31.11	1.99
1515	0.150	7.45	29.29	2.49
1371	0.200	7.51	26.28	3.32
1292	0.250	7.58	24.55	4.15
1222	0.300	7.64	23.02	4.98
1200	0.350	7.71	22.41	5.80
1159	0.400	7.78	21.45	6.63
1140	0.450	7.85	20.92	7.46
1135	0.500	7.92	20.64	8.29
1096	0.550	7.99	19.75	9.12
1073	0.600	8.07	19.16	9.95
1090	0.650	8.14	19.28	10.78

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Schuyler Heim Bridge Future Fill	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/18/10
Boring No.:	A 10 206	Cure Days:	28
Sample No.:	B6-16	Test Date:	01/15/11
Soil Description:	Sandy Silt	Dry Density (pcf):	81.8
Sample Type:	Soil-Cement	Moisture Content (%):	38.4
Sample Diameter (inches):	3.033	Wt. Wet Soil+Container(gms):	1401.86
Sample Height (inches):	6.044	Wt. Dry Soil+Container(gms):	1042.28
Sample Weight (gms):	1297.66	Wt. Container (gms):	105.62



Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
106	0.005	7.23	2.11	0.08
244	0.010	7.24	4.86	0.17
416	0.015	7.24	8.27	0.25
594	0.020	7.25	11.80	0.33
749	0.025	7.25	14.87	0.41
918	0.030	7.26	18.21	0.50
1073	0.035	7.27	21.26	0.58
1195	0.040	7.27	23.66	0.66
1289	0.045	7.28	25.50	0.74
1379	0.050	7.29	27.26	0.83
1439	0.055	7.29	28.42	0.91
1495	0.060	7.30	29.50	0.99
1632	0.090	7.33	32.04	1.49
1584	0.120	7.37	30.94	1.99
1191	0.150	7.41	23.15	2.48
1073	0.200	7.47	20.68	3.31
951	0.250	7.54	18.17	4.14
868	0.300	7.60	16.44	4.96
840	0.350	7.67	15.77	5.79
816	0.400	7.74	15.19	6.62
815	0.450	7.81	15.03	7.45
807	0.500	7.88	14.75	8.27
818	0.550	7.95	14.82	9.10
834	0.600	8.02	14.97	9.93
843	0.650	8.10	14.99	10.75

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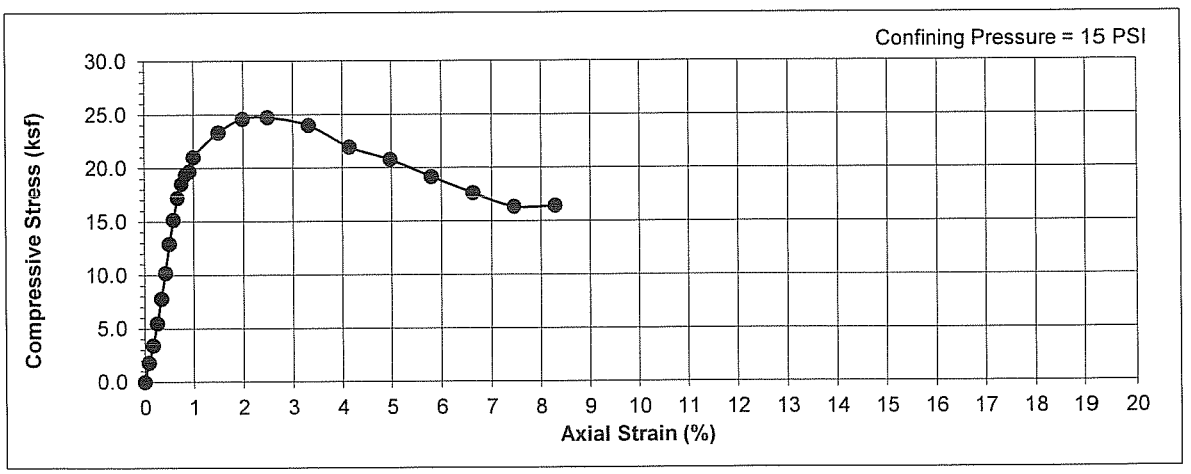
AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	7
Sample No.:	B5-2	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	86.3
Sample Type:	Soil-Cement	Moisture Content (%):	34.0
Sample Diameter (inches):	3.038	Wt. Wet Soil+Container(gms):	1508.06
Sample Height (inches):	6.031	Wt. Dry Soil+Container(gms):	1171.96
Sample Weight (gms):	1327.55	Wt. Container (gms):	182.70

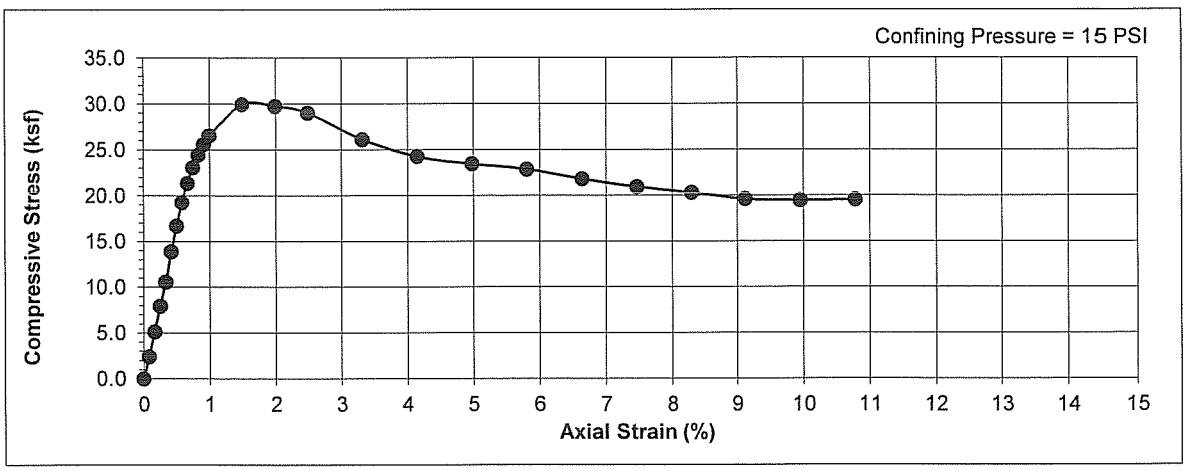


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
90	0.005	7.25	1.79	0.08
172	0.010	7.26	3.41	0.17
276	0.015	7.27	5.47	0.25
393	0.020	7.27	7.78	0.33
515	0.025	7.28	10.19	0.41
653	0.030	7.29	12.91	0.50
768	0.035	7.29	15.17	0.58
872	0.040	7.30	17.21	0.66
940	0.045	7.30	18.53	0.75
985	0.050	7.31	19.41	0.83
1000	0.055	7.32	19.68	0.91
1069	0.060	7.32	21.02	0.99
1192	0.090	7.36	23.33	1.49
1263	0.120	7.40	24.59	1.99
1277	0.150	7.43	24.74	2.49
1249	0.200	7.50	23.99	3.32
1152	0.250	7.56	21.94	4.15
1100	0.300	7.63	20.76	4.97
1024	0.350	7.70	19.16	5.80
950	0.400	7.76	17.62	6.63
889	0.450	7.83	16.34	7.46
902	0.500	7.90	16.43	8.29

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B5-6	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	86.3
Sample Type:	Soil-Cement	Moisture Content (%):	34.0
Sample Diameter (inches):	3.034	Wt. Wet Soil+Container(gms):	1511.56
Sample Height (inches):	6.028	Wt. Dry Soil+Container(gms):	1177.12
Sample Weight (gms):	1323.22	Wt. Container (gms):	192.83

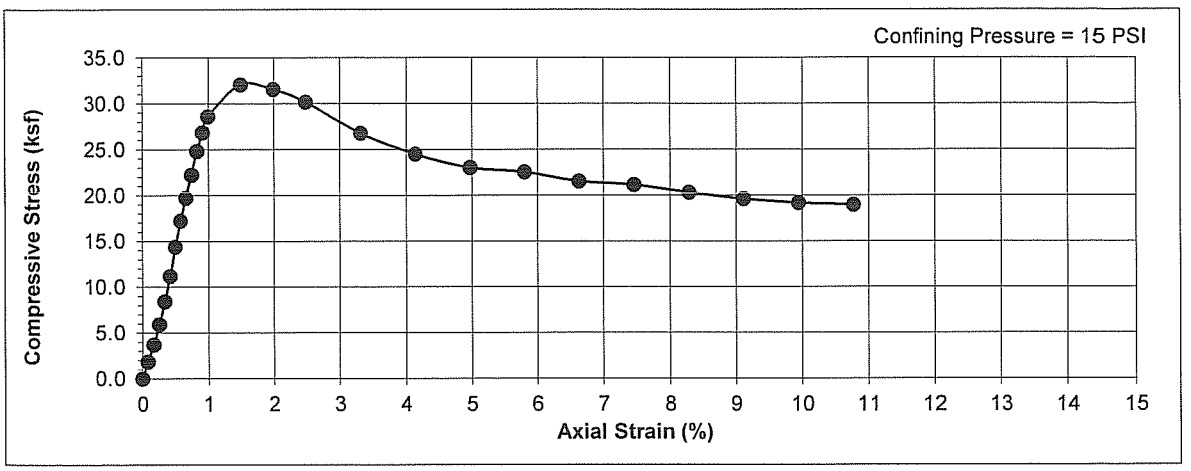


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
120	0.005	7.24	2.39	0.08
259	0.010	7.24	5.15	0.17
400	0.015	7.25	7.95	0.25
531	0.020	7.25	10.54	0.33
699	0.025	7.26	13.86	0.41
842	0.030	7.27	16.69	0.50
972	0.035	7.27	19.25	0.58
1078	0.040	7.28	21.33	0.66
1166	0.045	7.28	23.05	0.75
1236	0.050	7.29	24.41	0.83
1296	0.055	7.30	25.58	0.91
1345	0.060	7.30	26.52	1.00
1526	0.090	7.34	29.94	1.49
1524	0.120	7.38	29.75	1.99
1493	0.150	7.41	29.00	2.49
1356	0.200	7.48	26.11	3.32
1269	0.250	7.54	24.23	4.15
1238	0.300	7.61	23.43	4.98
1218	0.350	7.68	22.85	5.81
1172	0.400	7.74	21.79	6.64
1135	0.450	7.81	20.92	7.47
1111	0.500	7.88	20.29	8.29
1082	0.550	7.96	19.58	9.12
1085	0.600	8.03	19.46	9.95
1098	0.650	8.10	19.51	10.78

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B5-7	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	86.7
Sample Type:	Soil-Cement	Moisture Content (%):	33.6
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1514.88
Sample Height (inches):	6.034	Wt. Dry Soil+Container(gms):	1181.29
Sample Weight (gms):	1327.89	Wt. Container (gms):	188.27

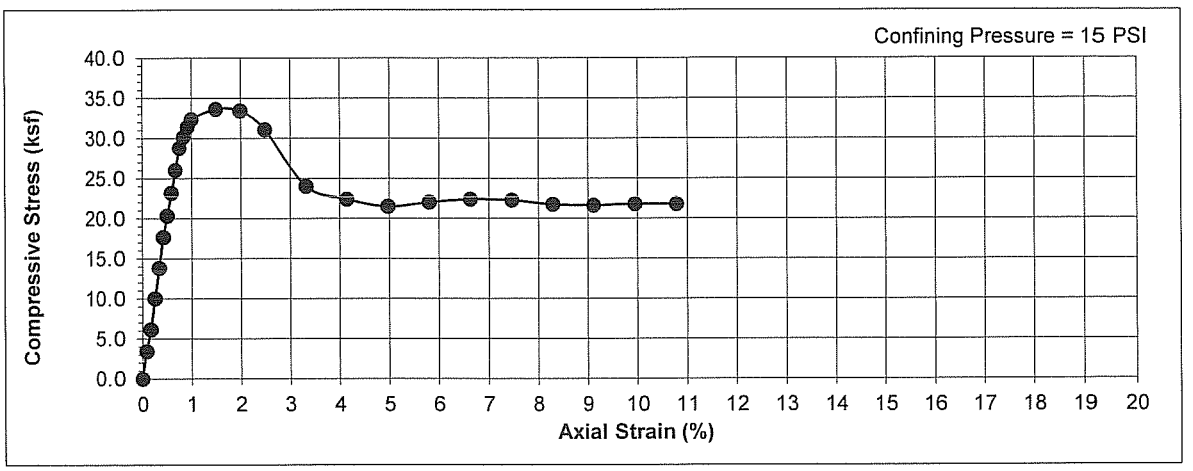


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
92	0.005	7.24	1.83	0.08
187	0.010	7.25	3.72	0.17
297	0.015	7.25	5.90	0.25
424	0.020	7.26	8.41	0.33
565	0.025	7.26	11.20	0.41
726	0.030	7.27	14.38	0.50
869	0.035	7.28	17.20	0.58
996	0.040	7.28	19.69	0.66
1125	0.045	7.29	22.23	0.75
1256	0.050	7.29	24.79	0.83
1361	0.055	7.30	26.84	0.91
1450	0.060	7.31	28.57	0.99
1635	0.090	7.34	32.06	1.49
1617	0.120	7.38	31.55	1.99
1554	0.150	7.42	30.16	2.49
1391	0.200	7.48	26.77	3.31
1283	0.250	7.55	24.48	4.14
1217	0.300	7.61	23.02	4.97
1201	0.350	7.68	22.52	5.80
1158	0.400	7.75	21.52	6.63
1147	0.450	7.82	21.13	7.46
1112	0.500	7.89	20.30	8.29
1083	0.550	7.96	19.59	9.12
1069	0.600	8.03	19.16	9.94
1068	0.650	8.11	18.97	10.77

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	7
Sample No.:	B5-10	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	87.9
Sample Type:	Soil-Cement	Moisture Content (%):	33.0
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1528.1
Sample Height (inches):	6.029	Wt. Dry Soil+Container(gms):	1197.16
Sample Weight (gms):	1339.11	Wt. Container (gms):	194.65

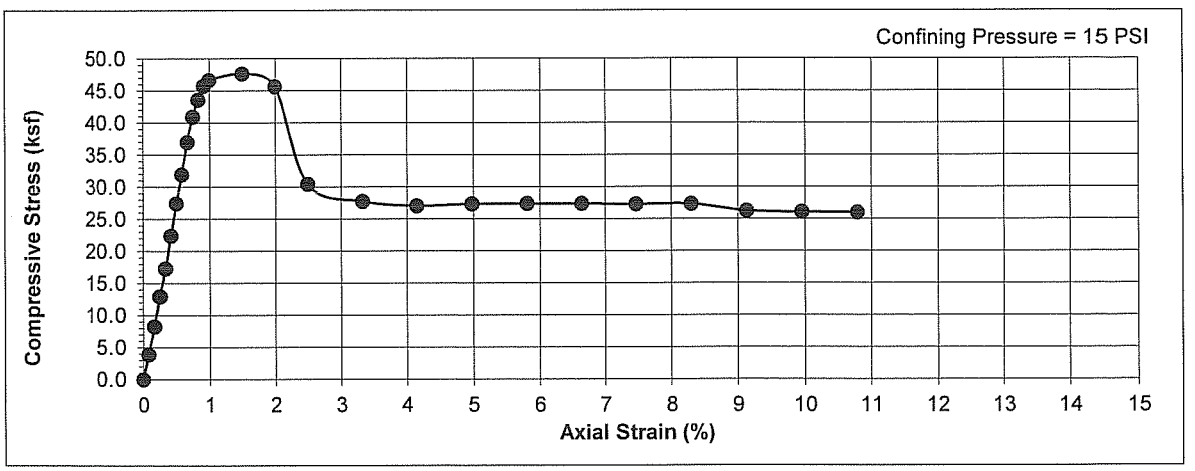


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
173	0.005	7.25	3.44	0.08
309	0.010	7.25	6.14	0.17
506	0.015	7.26	10.04	0.25
697	0.020	7.26	13.82	0.33
891	0.025	7.27	17.65	0.41
1028	0.030	7.28	20.35	0.50
1173	0.035	7.28	23.20	0.58
1316	0.040	7.29	26.00	0.66
1458	0.045	7.29	28.79	0.75
1528	0.050	7.30	30.14	0.83
1593	0.055	7.31	31.40	0.91
1643	0.060	7.31	32.36	1.00
1716	0.090	7.35	33.62	1.49
1714	0.120	7.39	33.42	1.99
1602	0.150	7.42	31.07	2.49
1250	0.200	7.49	24.04	3.32
1175	0.250	7.55	22.40	4.15
1137	0.300	7.62	21.49	4.98
1175	0.350	7.69	22.02	5.81
1205	0.400	7.75	22.38	6.63
1210	0.450	7.82	22.27	7.46
1192	0.500	7.89	21.74	8.29
1197	0.550	7.97	21.64	9.12
1217	0.600	8.04	21.80	9.95
1228	0.650	8.11	21.79	10.78

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B5-14	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	87.9
Sample Type:	Soil-Cement	Moisture Content (%):	32.8
Sample Diameter (inches):	3.039	Wt. Wet Soil+Container(gms):	1519.33
Sample Height (inches):	6.027	Wt. Dry Soil+Container(gms):	1188.6
Sample Weight (gms):	1340.00	Wt. Container (gms):	179.95

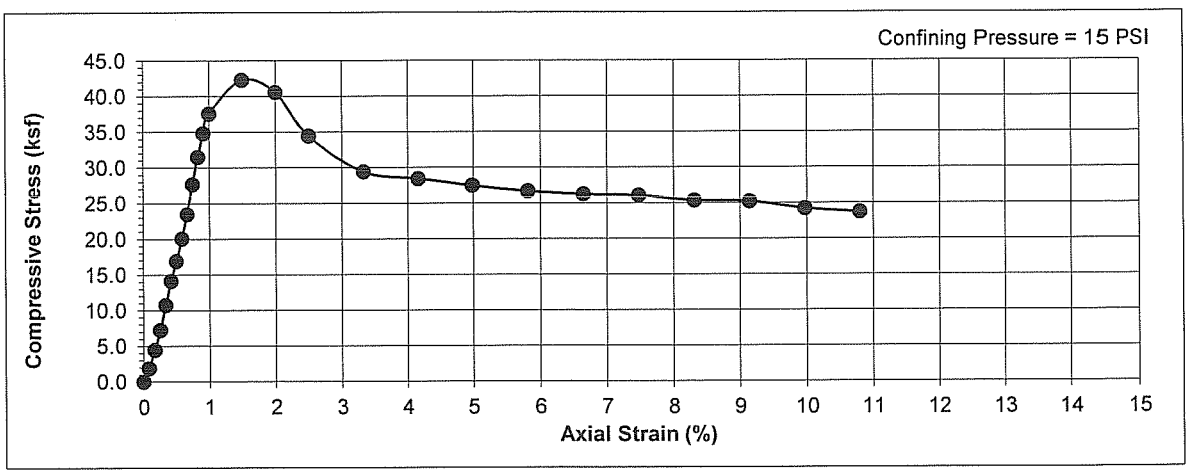


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
196	0.005	7.26	3.89	0.08
415	0.010	7.27	8.23	0.17
653	0.015	7.27	12.93	0.25
873	0.020	7.28	17.27	0.33
1131	0.025	7.28	22.36	0.41
1388	0.030	7.29	27.42	0.50
1617	0.035	7.30	31.91	0.58
1875	0.040	7.30	36.98	0.66
2078	0.045	7.31	40.95	0.75
2213	0.050	7.31	43.57	0.83
2324	0.055	7.32	45.72	0.91
2373	0.060	7.33	46.64	1.00
2435	0.090	7.36	47.62	1.49
2344	0.120	7.40	45.61	1.99
1572	0.150	7.44	30.43	2.49
1445	0.200	7.50	27.73	3.32
1421	0.250	7.57	27.04	4.15
1450	0.300	7.63	27.35	4.98
1463	0.350	7.70	27.36	5.81
1477	0.400	7.77	27.38	6.64
1484	0.450	7.84	27.26	7.47
1501	0.500	7.91	27.33	8.30
1455	0.550	7.98	26.25	9.13
1458	0.600	8.06	26.06	9.96
1468	0.650	8.13	26.00	10.78

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 212	Cure Days:	28
Sample No.:	B5-15	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	88.8
Sample Type:	Soil-Cement	Moisture Content (%):	32.6
Sample Diameter (inches):	3.036	Wt. Wet Soil+Container(gms):	1492.12
Sample Height (inches):	6.017	Wt. Dry Soil+Container(gms):	1161.66
Sample Weight (gms):	1346.89	Wt. Container (gms):	146.88

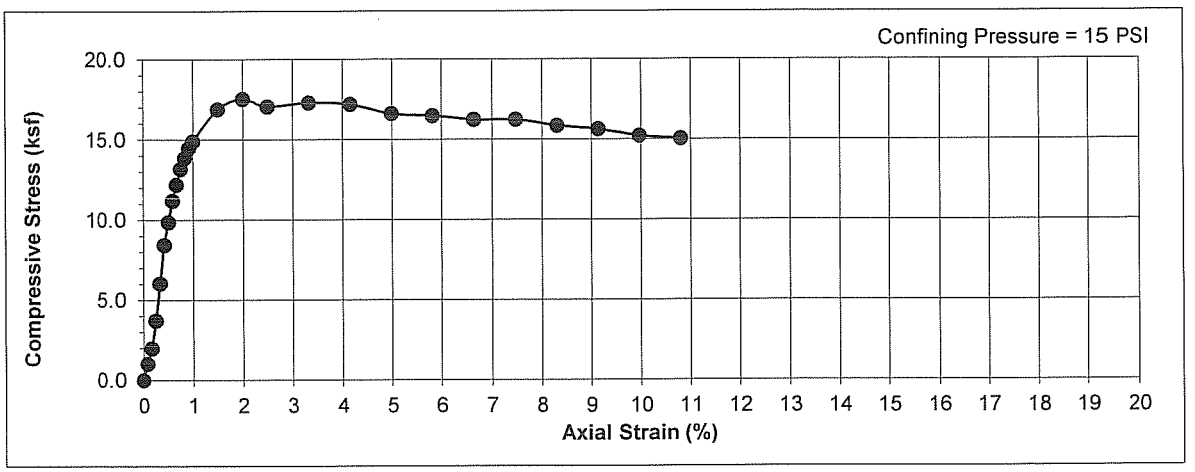


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
94	0.005	7.25	1.87	0.08
224	0.010	7.25	4.45	0.17
365	0.015	7.26	7.24	0.25
541	0.020	7.26	10.73	0.33
713	0.025	7.27	14.12	0.42
853	0.030	7.28	16.88	0.50
1014	0.035	7.28	20.05	0.58
1189	0.040	7.29	23.49	0.66
1401	0.045	7.29	27.66	0.75
1596	0.050	7.30	31.48	0.83
1766	0.055	7.31	34.81	0.91
1907	0.060	7.31	37.55	1.00
2158	0.090	7.35	42.28	1.50
2081	0.120	7.39	40.57	1.99
1777	0.150	7.42	34.47	2.49
1530	0.200	7.49	29.42	3.32
1491	0.250	7.55	28.43	4.15
1453	0.300	7.62	27.46	4.99
1423	0.350	7.69	26.66	5.82
1412	0.400	7.75	26.22	6.65
1414	0.450	7.82	26.02	7.48
1389	0.500	7.90	25.33	8.31
1394	0.550	7.97	25.19	9.14
1352	0.600	8.04	24.21	9.97
1335	0.650	8.12	23.69	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	7
Sample No.:	B3-3	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	83.6
Sample Type:	Soil-Cement	Moisture Content (%):	36.2
Sample Diameter (inches):	3.035	Wt. Wet Soil+Container(gms):	1449.26
Sample Height (inches):	6.017	Wt. Dry Soil+Container(gms):	1103.23
Sample Weight (gms):	1301.81	Wt. Container (gms):	147.76

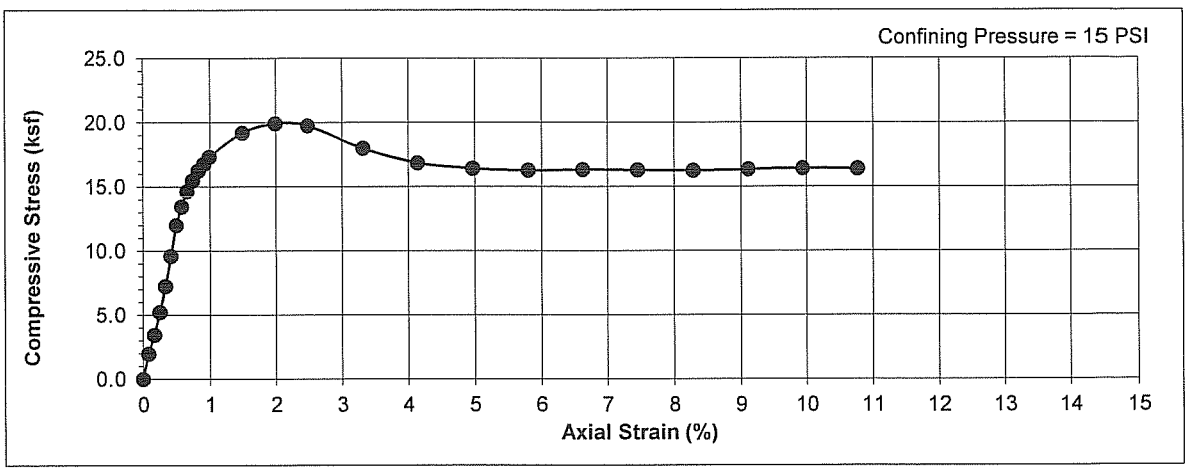


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.23	0.00	0.00
51	0.005	7.24	1.01	0.08
99	0.010	7.25	1.97	0.17
187	0.015	7.25	3.71	0.25
304	0.020	7.26	6.03	0.33
425	0.025	7.26	8.42	0.42
497	0.030	7.27	9.84	0.50
566	0.035	7.28	11.20	0.58
617	0.040	7.28	12.20	0.66
667	0.045	7.29	13.18	0.75
702	0.050	7.30	13.86	0.83
734	0.055	7.30	14.48	0.91
756	0.060	7.31	14.90	1.00
861	0.090	7.34	16.88	1.50
899	0.120	7.38	17.54	1.99
879	0.150	7.42	17.06	2.49
899	0.200	7.48	17.30	3.32
901	0.250	7.55	17.19	4.15
878	0.300	7.61	16.60	4.99
879	0.350	7.68	16.48	5.82
874	0.400	7.75	16.24	6.65
881	0.450	7.82	16.22	7.48
869	0.500	7.89	15.86	8.31
864	0.550	7.96	15.63	9.14
849	0.600	8.04	15.21	9.97
847	0.650	8.11	15.04	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	28
Sample No.:	B3-7	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	84.3
Sample Type:	Soil-Cement	Moisture Content (%):	35.3
Sample Diameter (inches):	3.033	Wt. Wet Soil+Container(gms):	1498.62
Sample Height (inches):	6.035	Wt. Dry Soil+Container(gms):	1158.07
Sample Weight (gms):	1306.40	Wt. Container (gms):	193.90

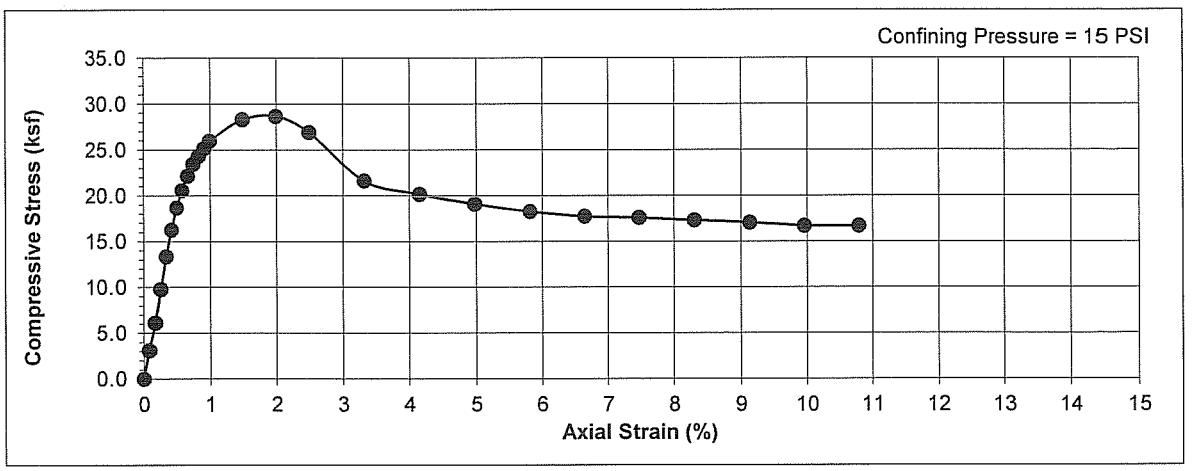


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
99	0.005	7.23	1.97	0.08
173	0.010	7.24	3.44	0.17
263	0.015	7.24	5.23	0.25
365	0.020	7.25	7.25	0.33
483	0.025	7.26	9.59	0.41
604	0.030	7.26	11.98	0.50
678	0.035	7.27	13.43	0.58
740	0.040	7.27	14.65	0.66
782	0.045	7.28	15.47	0.75
821	0.050	7.29	16.23	0.83
849	0.055	7.29	16.77	0.91
878	0.060	7.30	17.33	0.99
977	0.090	7.33	19.18	1.49
1019	0.120	7.37	19.91	1.99
1016	0.150	7.41	19.75	2.49
933	0.200	7.47	17.98	3.31
882	0.250	7.54	16.85	4.14
867	0.300	7.60	16.42	4.97
866	0.350	7.67	16.26	5.80
877	0.400	7.74	16.32	6.63
883	0.450	7.81	16.29	7.46
889	0.500	7.88	16.25	8.29
902	0.550	7.95	16.34	9.11
915	0.600	8.02	16.42	9.94
921	0.650	8.10	16.38	10.77

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	15
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	28
Sample No.:	B3-8	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	83.7
Sample Type:	Soil-Cement	Moisture Content (%):	36.1
Sample Diameter (inches):	3.031	Wt. Wet Soil+Container(gms):	1478.92
Sample Height (inches):	6.024	Wt. Dry Soil+Container(gms):	1135.24
Sample Weight (gms):	1299.95	Wt. Container (gms):	182.18

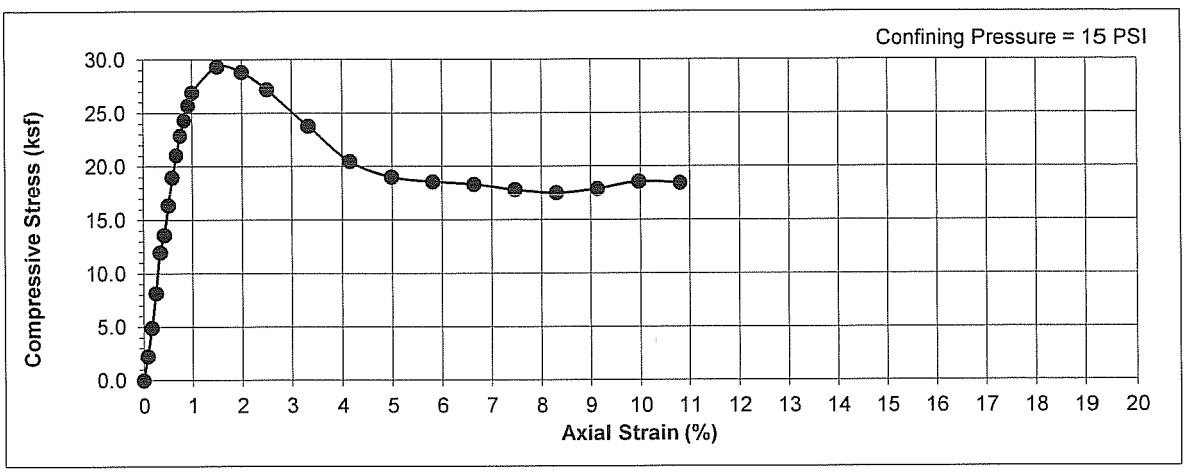


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
156	0.005	7.22	3.11	0.08
307	0.010	7.23	6.12	0.17
491	0.015	7.23	9.77	0.25
671	0.020	7.24	13.35	0.33
818	0.025	7.25	16.26	0.42
941	0.030	7.25	18.69	0.50
1036	0.035	7.26	20.56	0.58
1117	0.040	7.26	22.14	0.66
1183	0.045	7.27	23.43	0.75
1229	0.050	7.28	24.32	0.83
1272	0.055	7.28	25.15	0.91
1313	0.060	7.29	25.94	1.00
1439	0.090	7.32	28.29	1.49
1465	0.120	7.36	28.65	1.99
1382	0.150	7.40	26.89	2.49
1120	0.200	7.46	21.61	3.32
1054	0.250	7.53	20.16	4.15
1006	0.300	7.59	19.08	4.98
971	0.350	7.66	18.25	5.81
951	0.400	7.73	17.72	6.64
952	0.450	7.80	17.58	7.47
945	0.500	7.87	17.29	8.30
940	0.550	7.94	17.05	9.13
929	0.600	8.01	16.69	9.96
936	0.650	8.09	16.66	10.79

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	7
Sample No.:	B3-13	Test Date:	12/30/10
Soil Description:	Sandy Silt	Dry Density (pcf):	84.3
Sample Type:	Soil-Cement	Moisture Content (%):	36.3
Sample Diameter (inches):	3.031	Wt. Wet Soil+Container(gms):	1452.96
Sample Height (inches):	6.018	Wt. Dry Soil+Container(gms):	1105.85
Sample Weight (gms):	1309.84	Wt. Container (gms):	149.08

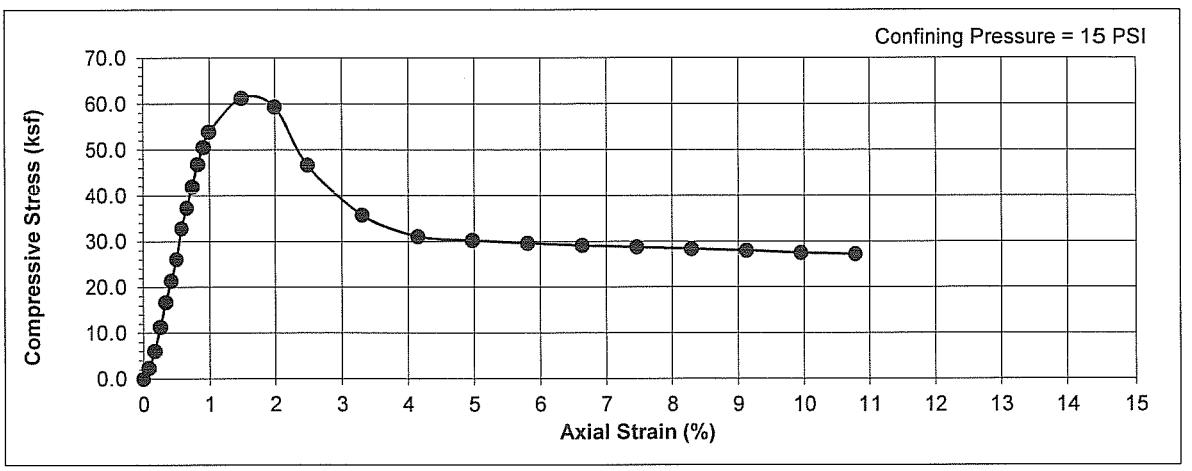


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.22	0.00	0.00
113	0.005	7.22	2.25	0.08
246	0.010	7.23	4.90	0.17
409	0.015	7.23	8.14	0.25
601	0.020	7.24	11.95	0.33
683	0.025	7.25	13.57	0.42
825	0.030	7.25	16.38	0.50
956	0.035	7.26	18.97	0.58
1061	0.040	7.26	21.03	0.66
1155	0.045	7.27	22.88	0.75
1229	0.050	7.28	24.32	0.83
1299	0.055	7.28	25.69	0.91
1361	0.060	7.29	26.89	1.00
1492	0.090	7.32	29.33	1.50
1473	0.120	7.36	28.81	1.99
1397	0.150	7.40	27.19	2.49
1233	0.200	7.46	23.79	3.32
1071	0.250	7.53	20.49	4.15
1003	0.300	7.59	19.02	4.99
988	0.350	7.66	18.57	5.82
983	0.400	7.73	18.31	6.65
964	0.450	7.80	17.80	7.48
957	0.500	7.87	17.51	8.31
987	0.550	7.94	17.90	9.14
1033	0.600	8.01	18.56	9.97
1035	0.650	8.09	18.42	10.80

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	28
Sample No.:	B3-17	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	85.1
Sample Type:	Soil-Cement	Moisture Content (%):	34.9
Sample Diameter (inches):	3.027	Wt. Wet Soil+Container(gms):	1491.93
Sample Height (inches):	6.029	Wt. Dry Soil+Container(gms):	1156.24
Sample Weight (gms):	1307.71	Wt. Container (gms):	195.46

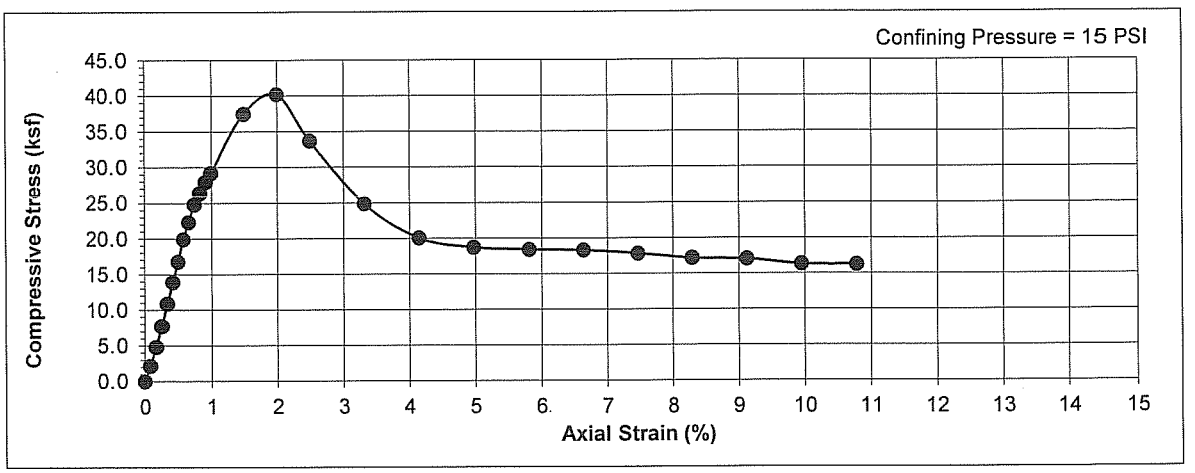


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.20	0.00	0.00
117	0.005	7.20	2.34	0.08
303	0.010	7.21	6.05	0.17
567	0.015	7.21	11.32	0.25
839	0.020	7.22	16.73	0.33
1074	0.025	7.23	21.40	0.41
1309	0.030	7.23	26.06	0.50
1650	0.035	7.24	32.82	0.58
1876	0.040	7.24	37.29	0.66
2110	0.045	7.25	41.91	0.75
2358	0.050	7.26	46.79	0.83
2549	0.055	7.26	50.54	0.91
2718	0.060	7.27	53.85	1.00
3106	0.090	7.31	61.22	1.49
3026	0.120	7.34	59.35	1.99
2390	0.150	7.38	46.63	2.49
1846	0.200	7.44	35.71	3.32
1620	0.250	7.51	31.07	4.15
1588	0.300	7.57	30.19	4.98
1570	0.350	7.64	29.59	5.81
1557	0.400	7.71	29.09	6.63
1551	0.450	7.78	28.72	7.46
1545	0.500	7.85	28.35	8.29
1539	0.550	7.92	27.99	9.12
1525	0.600	7.99	27.48	9.95
1524	0.650	8.07	27.21	10.78

AP Engineering & Testing, Inc.

UNCONSOLIDATED UNDRAINED (UU) TEST RESULTS (ASTM D 2850)

Project Name:	Heim Bridge DSM (Soil-Cement)	Percent Cement:	20
Project No.:	06-123	Cast Date:	12/23/10
Boring No.:	A 10 213	Cure Days:	28
Sample No.:	B3-18	Test Date:	01/20/11
Soil Description:	Sandy Silt	Dry Density (pcf):	83.9
Sample Type:	Soil-Cement	Moisture Content (%):	36.1
Sample Diameter (inches):	3.029	Wt. Wet Soil+Container(gms):	1498.77
Sample Height (inches):	6.029	Wt. Dry Soil+Container(gms):	1153.15
Sample Weight (gms):	1301.50	Wt. Container (gms):	194.99



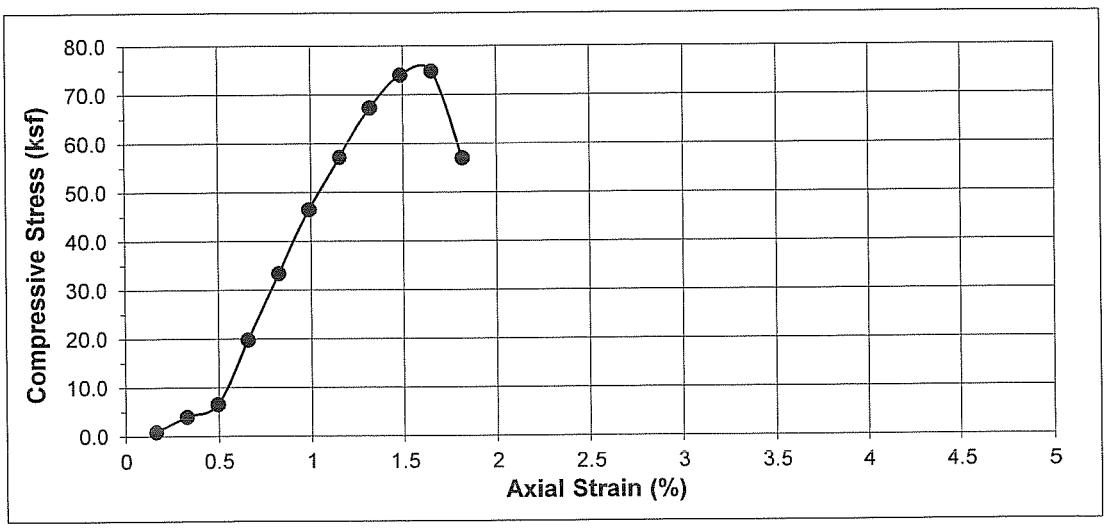
Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.21	0.00	0.00
107	0.005	7.21	2.14	0.08
240	0.010	7.22	4.79	0.17
387	0.015	7.22	7.71	0.25
545	0.020	7.23	10.85	0.33
699	0.025	7.24	13.91	0.41
844	0.030	7.24	16.78	0.50
1002	0.035	7.25	19.91	0.58
1124	0.040	7.25	22.31	0.66
1249	0.045	7.26	24.77	0.75
1330	0.050	7.27	26.36	0.83
1411	0.055	7.27	27.94	0.91
1476	0.060	7.28	29.20	1.00
1904	0.090	7.32	37.48	1.49
2052	0.120	7.35	40.19	1.99
1729	0.150	7.39	33.69	2.49
1286	0.200	7.45	24.85	3.32
1046	0.250	7.52	20.04	4.15
986	0.300	7.58	18.72	4.98
977	0.350	7.65	18.39	5.81
980	0.400	7.72	18.28	6.63
963	0.450	7.79	17.81	7.46
936	0.500	7.86	17.15	8.29
937	0.550	7.93	17.02	9.12
906	0.600	8.00	16.30	9.95
911	0.650	8.08	16.24	10.78

SOIL-CEMENT-MIX (CSM) SAMPLES FROM OTHER PROJECTS

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Conoco Berth 148-151	Sample Type:	Bucket
Project No.:	08-117	Soil Description:	Silty Sand+15%Cement
Boring No.:	10LH2	Dry Density (pcf):	99.1
Sample No.:	B-2-1	Moisture Content (%):	22.9
Days Cured:	7	Test Date:	11/18/10
Sample Diameter (inch):	3.036	Wt. Wet Soil+Container(gms):	1582.2
Sample Hieght (inch):	6.055	Wt. Dry Soil+Container(gms):	1320.94
Sample Weight (gms):	1402.07	Wt. Container (gms):	181.34

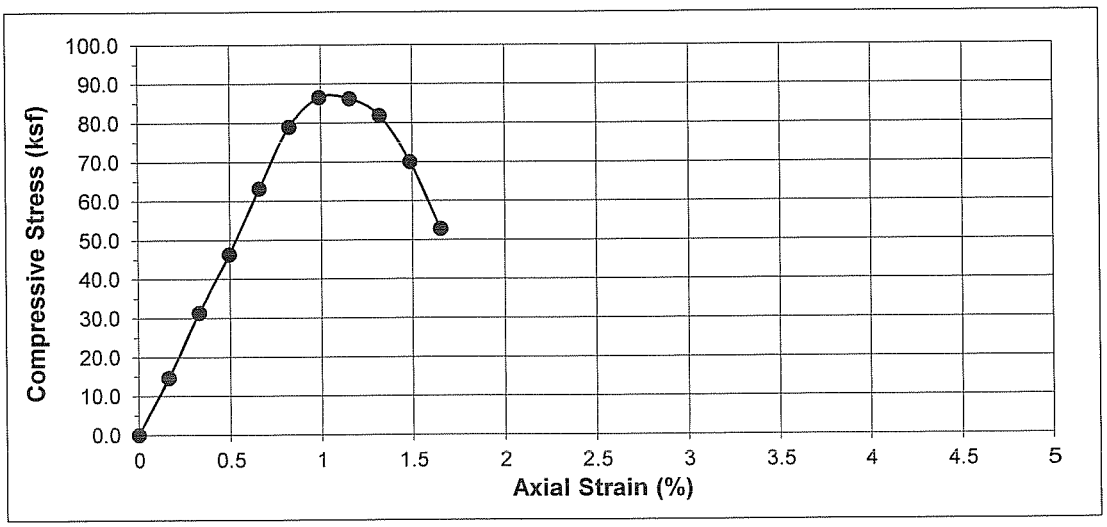


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.24	0.00	0.00
43	0.010	7.25	0.85	0.17
200	0.020	7.26	3.97	0.33
330	0.030	7.28	6.53	0.50
1000	0.040	7.29	19.76	0.66
1692	0.050	7.30	33.38	0.83
2360	0.060	7.31	46.48	0.99
2910	0.070	7.32	57.22	1.16
3430	0.080	7.34	67.33	1.32
3777	0.090	7.35	74.01	1.49
3826	0.100	7.36	74.85	1.65
2920	0.110	7.37	57.03	1.82

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Conoco Berth 148-151	Sample Type:	Bucket
Project No.:	08-117	Soil Description:	Silty Sand+15%Cement
Boring No.:	10LH2	Dry Density (pcf):	97.0
Sample No.:	B-2-2	Moisture Content (%):	24.3
Days Cured:	14	Test Date:	11/25/10
Sample Diameter (inch):	3.042	Wt. Wet Soil+Container(gms):	1565.82
Sample Hieght (inch):	6.045	Wt. Dry Soil+Container(gms):	1295.12
Sample Weight (gms):	1390.66	Wt. Container (gms):	179.91

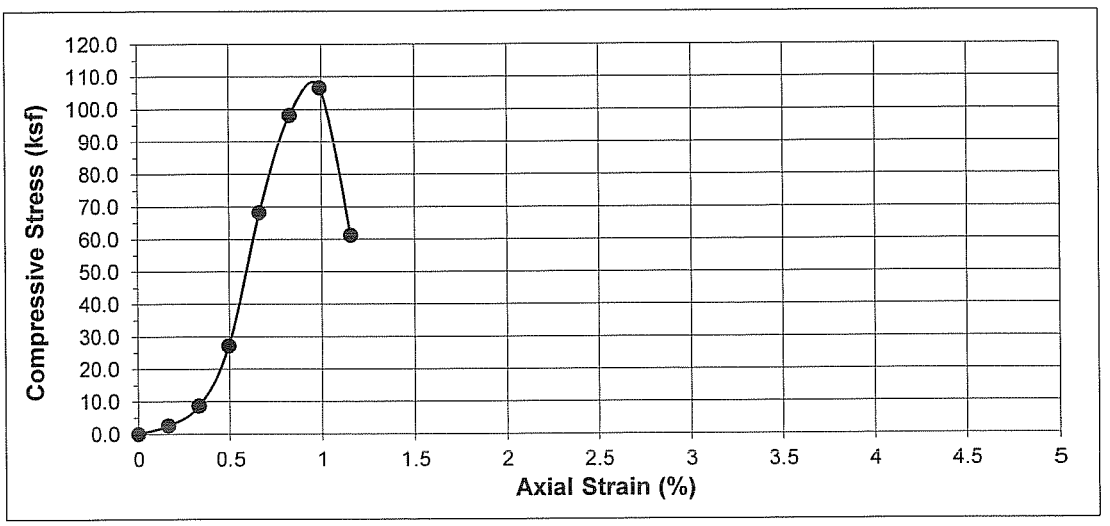


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.27	0.00	0.00
742	0.010	7.28	14.68	0.17
1590	0.020	7.29	31.40	0.33
2350	0.030	7.30	46.33	0.50
3210	0.040	7.32	63.18	0.66
4019	0.050	7.33	78.97	0.83
4410	0.060	7.34	86.51	0.99
4403	0.070	7.35	86.23	1.16
4186	0.080	7.37	81.84	1.32
3588	0.090	7.38	70.03	1.49
2710	0.100	7.39	52.81	1.65

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Conoco Berth 148-151	Sample Type:	Bucket
Project No.:	08-117	Soil Description:	Silty Sand+15%Cement
Boring No.:	10LH2	Dry Density (pcf):	106.3
Sample No.:	B-2-3	Moisture Content (%):	14.5
Days Cured:	28	Test Date:	12/09/10
Sample Diameter (inch):	3.041	Wt. Wet Soil+Container(gms):	1551.93
Sample Hieght (inch):	6.050	Wt. Dry Soil+Container(gms):	1374
Sample Weight (gms):	1403.65	Wt. Container (gms):	149.65

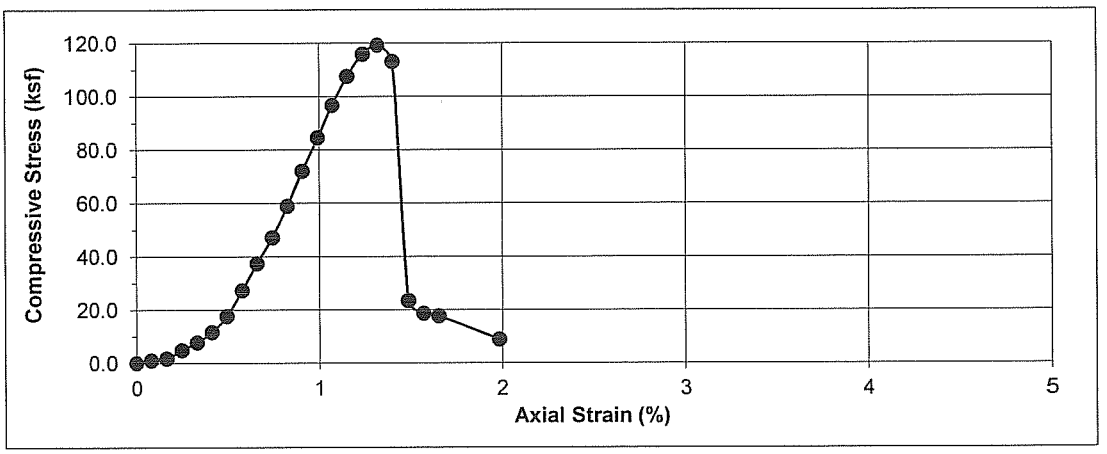


Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.26	0.00	0.00
129	0.010	7.27	2.55	0.17
440	0.020	7.28	8.70	0.33
1375	0.030	7.30	27.13	0.50
3462	0.040	7.31	68.21	0.66
4989	0.050	7.32	98.13	0.83
5430	0.060	7.33	106.62	0.99
3122	0.070	7.35	61.20	1.16

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS

Project Name:	Conoco Berth 148-151	Sample Type:	Bucket
Project No.:	08-117	Soil Description:	Silty Sand+15%Cement
Boring No.:	10LH2	Dry Density (pcf):	98.8
Sample No.:	B-2-4	Moisture Content (%):	23.7
Days Cured:	81	Test Date:	01/31/11
Sample Diameter (inch):	3.039	Wt. Wet Soil+Container(gms):	1589.28
Sample Hieght (inch):	6.049	Wt. Dry Soil+Container(gms):	1321.62
Sample Weight (gms):	1408.79	Wt. Container (gms):	194.56



Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	7.25	0.00	0.00
49	0.005	7.26	0.97	0.08
87	0.010	7.27	1.72	0.17
247	0.015	7.27	4.89	0.25
393	0.020	7.28	7.78	0.33
588	0.025	7.28	11.62	0.41
891	0.030	7.29	17.60	0.50
1379	0.035	7.30	27.22	0.58
1895	0.040	7.30	37.37	0.66
2393	0.045	7.31	47.15	0.74
2990	0.050	7.31	58.87	0.83
3660	0.055	7.32	72.00	0.91
4299	0.060	7.33	84.50	0.99
4922	0.065	7.33	96.66	1.07
5481	0.070	7.34	107.55	1.16
5909	0.075	7.34	115.85	1.24
6084	0.080	7.35	119.18	1.32
5775	0.085	7.36	113.04	1.41
1200	0.090	7.36	23.47	1.49
950	0.095	7.37	18.56	1.57
900	0.100	7.38	17.57	1.65
453	0.120	7.40	8.81	1.98

ATTACHMENT 3

FINITE ELEMENT ANALYSES OF CEMENT-DEEP-SOIL-MIX GROUND IMPROVEMENT

FOR PILE FOUNDATIONS

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

TECHNICAL MEMORANDUM

DATE: February 17, 2011 **EMI PROJECT NO:** 06-123-06

PREPARED FOR: Haitao Liu, P.E. / Caltrans

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SUBJECT: ACTA Schuyler Heim Bridge Replacement Project
Los Angeles and Long Beach, CA
Revised Finite Element Analysis of Cement-Deep-Soil-Mix Ground Improvement at Pile Foundations

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Introduction

This memorandum summarizes Finite Element (FE) analyses which were conducted in order to evaluate Cement-Deep-Soil-Mix (CDSM) ground improvement strategies for minimizing adverse effects associated with placing up to 19 feet of fill beneath the proposed Schuyler Heim Bridge (Replacement).

We understand that during or after construction of the proposed Schuyler Heim Bridge (Replacement), the existing grade underneath the bridge will be raised by as much as 19 ft. Raising grade will cause settlement of the underlying soils. In particular, the fine-grained soil layers at the site are expected to experience cumulative settlement on the order of six inches or more due to consolidation. If these settlements are allowed to occur in the soil surrounding the Schuyler Heim Bridge and the associated on and off ramp bridge foundation piles, these piles will experience significant downdrag forces. Protection of the piles using CDSM is being proposed in order to mitigate potentially adverse effects associated with raising the existing grade.

Due to the complexity involved in analyzing this soil-structure-interaction problem, advanced analysis methods are required. The commercially available FE program Plaxis (2004) is an appropriate tool for this task, and was selected for performing the analyses. The remainder of this memorandum first describes the subsurface conditions and the anticipated settlements in the affected areas. Results from laboratory tests performed on CDSM samples are summarized next. Finally, modeling configurations, procedures and results are presented, and conclusions and recommendations are provided.

Subsurface Conditions and Estimated Settlement

Three representative soil profiles were developed for settlement analysis based on the subsurface information provided in the Schuyler Heim Bridge Foundation Report (EMI, 2010). Locations with the thickest, weakest fine-grained soil layers, and those extending to the lowest elevations, were conservatively selected for these profiles. Due to the presence of relatively uniform conditions along the affected areas on the north side of the Cerritos Channel, one soil profile was developed for these locations (North Side). The subsurface conditions varied more noticeably along the length of the affected bents on the south side of the Cerritos Channel. Accordingly, two soil profiles were developed to represent the range of conditions along the south side (South Side Bents 5-8, and South Side Bents 9-11). A general description of these three soil profiles is included in Table 1.

Standard procedures were used to evaluate free-field consolidation settlement (i.e. away from pile foundations) of the underlying foundation soils due to the proposed fill placement. Consolidation settlement is directly related to the depth of fill placed over compressible soil and the thickness of compressible soil layers. The maximum expected fill depth at any location (19 ft) was conservatively used in the settlement evaluations. As mentioned, the soil profiles (Table 1) for the analyses were conservatively developed for locations with the thickest compressible soil layers. The estimated consolidation settlements are included in Table 1. The immediate settlement is not included in the values listed in Table 1, as it is accounted for in the FE model simulations (discussed later) according to the assigned stiffness parameters.

Table 1 shows that total ground settlements of more than 6 inches are anticipated on both the north and south sides of the channel. According to NAVFAC (1986) and FHWA (1996), relative downward movement of about 0.5 to 0.6 inches in the soil surrounding a pile is sufficient to mobilize downward skin friction. The magnitude of this downward skin friction is proportional to the effective vertical stress in the adjacent soil. Consequently, important factors affecting the total downdrag force caused by ground settlement for a given soil profile include:

1) The depth at which ground settlement reaches a level which is adequate to mobilize downward skin friction; and

2) The effective vertical stress in the soil surrounding the pile.

In order to reduce the level of downdrag force caused by adding fill in the areas surrounding the bridge, CDSM ground improvement has been proposed. The CDSM ground improvement has been designed to reduce the levels of ground settlement and effective stress that reach the pile foundation after addition of the fill, and to transfer much of the increase in overburden down to a deep, competent soil layer. The FE simulations were performed in order to further investigate these effects.

Lab Testing of CDSM

Several unconfined compression (UC) and unconsolidated undrained (UU) triaxial tests were performed on field samples mixed with different percentages of cement to determine relevant

material properties. Selected results from these tests are summarized in Table 2, Table 3 and Figure 1.

FE Analysis Using Plaxis 2D

The commercially available software Plaxis 2D (2004) was used to conduct the FE analyses. For the pile downdrag problem, the analyses were simplified by focusing on an individual bridge pile. Two separate sets of pile analyses were conducted based on the location (Figure 2):

1) Considering the 12 ft CIDH piles on the North Side of the Cerritos Channel (Pier A area); and

2) Considering the 10 ft CIDH piles on the South Side of the Cerritos Channel (Pier S area).

General modeling aspects are described in the following sections. Next, the analyses are addressed separately for the North Side, and the South Side of the Cerritos Channel.

Axis-Symmetric Configuration

Plaxis 2D offers both axis-symmetric and plane strain model configurations. Axis-symmetric modeling is generally used for analysis of cylindrical structures (such as a circular pile) with a uniform radial cross section and loading scheme around a central axis (Plaxis, 2004). Under this configuration, the deformations and stress states are essentially identical in any radial direction (Plaxis, 2004). Considering each pile individually, the problem being addressed is essentially axis-symmetric about the center of the pile (Figure 3). Accordingly, the axis-symmetric mode was used for the conducted analyses.

Finite Element Mesh

Plaxis automatically generates the FE mesh, with the option of using either 6-node or 15-node triangular elements. For these analyses, the 15-node elements were selected. Simulations were initially run using a coarse mesh setting. The mesh was then refined through an iterative process until convergence of the relevant results was achieved.

Material Models and Parameter Selection

The Plaxis (2004) Mohr-Coulomb model was used to approximate the behavior of the soil layers and the CDSM treated soil zones. This model follows the Mohr-Coulomb failure rule and uses a bilinear stress-strain relationship (elastic-perfectly plastic). The linear-elastic model was used for elements representing the CIDH pile.

Shear strength parameters for the soil layers were based on the soil profiles in the FFR. Shear strength parameters for the CDSM zones were based on results from the conducted UU tests (Table 3). The shear strength parameters for the CDSM zones include a reduction to account for the Area Replacement Ratio (ARR).

Young's Modulus values for the non-consolidating soil layers were based on the nearest shear wave velocity measurements included in the FFR. For layers near the ground surface, a modulus reduction factor of 50% was also applied. For the deeper, very dense soil layers which are not expected to undergo significant strains, a modulus reduction factor was not applied.

Young's Modulus values for the consolidating soil layers were reduced to yield settlements matching those listed in Table 1 under the applied vertical surcharge load of 2.28 ksf (19 ft of fill height).

The Young's modulus values for the CDSM zones were based on the results from the conducted UC and UU tests and recommendations by Porbaha et al. (2000). Porbaha et al. (2000) explained how the modulus is underestimated by a factor of 2 to 4 (or more) in the lab due to the method of taking external strain measurements. For the our analyses, we conservatively considered a factor of 2 from the low end of this range. The Young's Modulus values for the CDSM zones also include a reduction to account for the ARR.

Interface Elements

Soil-structure interaction interface elements were included along the edges of the pile and the CDSM treated soil zones. Interface elements are assigned elastic-plastic behavior, with adhesion and friction taken as a fraction (ratio) of the adjacent soil cohesion and friction. With this configuration, slip may occur when the shear stress on the interface exceeds the assigned ratio value times the shear strength of the surrounding soil. The following interface ratios were used: 0.7 along the edge of the concrete CIDH pile, 0.4 along the edge of the CIDH pile where permanent steel casings are proposed; and 0.95 along the edges of the CDSM treated zones.

Boundary Conditions

Standard fixities (Plaxis, 2004) were used as the boundary conditions in all of the simulations. Standard fixities consist of horizontal fixity along the left and right vertical boundaries, and full fixity along the bottom horizontal boundary.

Loading Sequence

Two simulations were run for each model considered in the analyses. The first simulation was run in order to assess the level of ground settlement that occurs inside the innermost CDSM treated soil zone, according to the model. As mentioned above, this ground settlement has a direct impact on the level of downdrag force that may be transferred to the CIDH pile. A conservative (high) assessment of the settlement is provided by not including the CIDH pile in this model run. The analyses were performed using sequentially applied construction stages as follows:

Stage 1A: Apply gravity.

Stage 2A: Reset displacements to zero, then activate the CDSM improved soil zones.

Stage 3A: Apply the vertical surcharge load of 2.28 ksf due to 19 ft of 120 pcf fill.

The second simulation was run in order to assess the level of stresses that occur between the CIDH pile and the innermost CDSM treated soil zone, according to the model. As mentioned above, the vertical effective stresses in this location have a direct impact on the level of downdrag force that may be transferred to the CIDH pile. A conservative (high) assessment of the vertical effective stress in this location is provided by including the CIDH pile in this model run. The applied construction stages are as follows:

Stage 1B: Apply gravity.

Stage 2B: Activate the CIDH pile.

Stage 3B: Reset displacements to zero, then activate the CDSM improved soil zones.

Stage 4B: Apply the vertical surcharge load of 2.28 ksf due to 19 ft of 120 pcf fill.

Analysis of the North Side of the Cerritos Channel (Pier A)

Analyses were conducted first using the north side soil profile (Table 1) and a 12 ft CIDH pile diameter. In order to first optimize the mitigation plan, several different configurations of CDSM were considered in the analyses.

When comparing the results, factors related to the cost of the improvement, such as ease of construction and volume of improved soil are weighed, in addition to the level of reduction of settlement and vertical effective stresses near the location of the CIDH pile. Results from the overall most favorable configuration are used in a separate addendum to evaluate the CIDH pile performance after addition of the CDSM and the fill.

CDSM Configurations for the North Side

Results from simulations considering the following three different CDSM configurations are presented, as described schematically in Figure 4:

Scenario 1: Two circular rings of overlapping CDSM treated soil cylinders, with widths of 3 ft, separated by a radial clear distance of 12 ft and connected by intermittent radial spokes, with an ARR of about 90%. The approximate total CDSM column area for Scenario 1 is 820 ft^2 (larger area equates to larger volume which generally leads to higher cost).

Scenario 2: One circular ring of CDSM treated soil with a width of 8 ft and an ARR of about 75%. The approximate total CDSM column area for Scenario 2 is 550 ft^2.

Scenario 3: Two circular rings of CDSM treated soil with widths of 4 ft separated by a radial clear distance of 2 ft with an ARR of about 75%. The approximate total CDSM column area for Scenario 3 is 575 ft^2.

Cross sections of Scenarios 1-3 are included in Figures 5-7, respectively. These cross sections start at the location of the center of the CIDH pile on the left hand side, and extend radially outward towards the right hand side, as illustrated in Figure 3. The axis-symmetric models for the Plaxis FE analyses are based on these cross sections. Parameters used in the models are listed

in Table 4. Locations of the Soil Layers and Zones referred to in Table 4 are shown in Figures 5-7.

Simulation Results from North Side Analysis

The deformed mesh after application of the surcharge load without the CIDH pile (Stage 3A) is shown in Figures 8-10 for Scenarios 1-3, respectively. Figures 8-10 also include the settlement profile along a vertical section in two locations: 1) in the free field; and 2) inside the CDSM ring (in the soil elements near the location of the edge of the CIDH pile). These figures illustrate how the CDSM improved soil zones create a barrier which prevents the majority of the soil settlement from reaching the inner area near the pile. Figure 11 directly compares the settlement profiles from Scenarios 1-3.

The deformed mesh after application of the surcharge load including the CIDH pile (Stage 4B) is shown in Figures 12-14 for Scenarios 1-3, respectively. Figures 12-14 also include vertical effective stress profiles along a vertical section in two locations: 1) in the free field (before and after addition of the fill surcharge); and 2) inside the CDSM ring (in the soil elements near the edge of the model CIDH pile). These figures illustrate how the barrier created by the CDSM improved soil zones also prevents much of the increase in overburden pressure from reaching the inner area near the pile. Figure 15 directly compares the vertical effective stress profiles from Scenarios 1-3.

Based on Figures 8-15, all 3 of the investigated scenarios provide a substantial reduction in the level of adverse effects which reach the CIDH pile due to addition of the fill. From Figure 11, Scenario 1 allows the lowest level of settlement to reach the soil near the CIDH pile. However, the small margin of improvement between Scenario 1 and Scenarios 2 and 3 is far outweighed in terms of cost, due in part to the fact that it requires more than 40% greater volume of improved soil (Figure 4). In addition, Scenarios 2 and 3 are more favorable than Scenario 1 in terms of constructability, since the overall geometry has a more simple shape (see Figure 4), and there is no specific requirement for the DSM treated soil zones to overlap one another.

Due in part to the lower predicted settlements (Figure 11) with only about 5% greater required volume of improved soil (Figure 4), Scenario 3 is preferable over Scenario 2. In addition, having the two separate rings of CDSM in Scenario 3 intuitively gives an added level of security compared to having just one wider ring in Scenario 2 (Figure 4). Based on the results of these analyses and the economic and constructability considerations, CDSM mitigation Scenario 3 is recommended.

Additional Scenario 3 Analysis with Reduced CDSM Strength

In order to test the sensitivity to CDSM shear strength in the analysis, Scenario 3 was re-run after reducing the strength from c = 7.5 ksf (Table 4) to c = 5.4 ksf in the Plaxis model, with all other parameters remaining the same. The settlement and vertical effective stress profiles from these c = 7.5 ksf and c = 5.4 ksf runs were essentially identical, confirming that the lower shear strength was also adequate for achieving the desired effects.

Additional Scenario 3 Analyses with Reduced Soil Layer and CDSM Zone Modulus Values

Based on comments provided by Caltrans and new lab test data, Scenario 3 was re-run with lower modulus values in some soil layers and CDSM zones in order to test the sensitivity to these parameters. The following 3 additional FE model simulations were conducted, where all model aspects were the same as Scenario 3 except for the noted changes (see Table 4 for the original baseline parameters):

Scenario 3-A: Modulus for Soil Layer 4 reduced to E = 2000 ksf.

Scenario 3-B: Modulus for Soil Layer 4 reduced to E = 2000 ksf, and modulus for Soil Layer 1 reduced to E = 100 ksf.

Scenario 3-C: Modulus for Soil Layer 4 reduced to E = 2000 ksf, modulus reduced for CDSM Zone 1 to E = 7250 ksf and for CDSM Zone 2 to 5250 ksf (these CDSM Zone modulus values include a 25% reduction to account for an ARR of 75%).

Results from these additional simulations are shown in Figures 11a and 15a.

Analysis of the South Side of the Cerritos Channel (Pier S)

Analyses were conducted next using both of the south side soil profiles (Table 1) and a 10 ft CIDH pile diameter. The most conservative results considering the Bents 5-8 and Bents 9-11 profiles were used in a separate addendum to analyze the conditions at all of the affected Schuyler Heim Bridge foundation piles on the south side.

Based on the results of the analyses performed for the north side and the economic considerations described above, the CDSM configuration of Scenario 3 was also adopted for the south side.

Cross sections for the Bents 5-8 and the Bents 9-11 soil profiles are shown in Figures 16 and 17, respectively. Similar to those of the north side, these cross sections start at the location of the center of the CIDH pile on the left hand side, and extend radially outward towards the right hand side. The Plaxis models for the FE analyses are based on these cross sections. Parameters used in the models are listed in Table 5 and Table 6. Locations of the Soil Layers and Zones referred to in Table 5 and Table 6 are shown in Figures 16 and 17.

Simulation Results from South Side Analysis

The deformed mesh after application of the surcharge load without the CIDH pile (Stage 3A) is shown in Figures 18 and 19 for the Bents 5-8 and Bents 9-11 soil profile models, respectively. Similar to the results from the north side, Figures 18 and 19 include the settlement profile along a vertical section in two locations: 1) in the free field; and 2) inside the innermost CDSM ring. As expected based on the results from the North Side, these figures illustrate how the CDSM improved soil zones help to prevent the majority of the soil settlement from reaching the inner area near the pile. Figure 20 directly compares the settlement profiles from the Bents 5-8 and Bents 9-11 soil profile models.

The deformed mesh after application of the surcharge load including the CIDH pile (Stage 4B) is shown in Figures 21 and 22 for the Bents 5-8 and Bents 9-11 soil profile models, respectively. Figures 21 and 22 also include vertical effective stress profiles along a vertical section in two locations: 1) in the free field (before and after addition of the fill surcharge); and 2) inside the CDSM ring. Again, these figures illustrate how the CDSM improved soil zone helps to prevent much of the increase in overburden pressure from reaching the inner area near the pile. Figure 23 directly compares the vertical effective stress profiles from the Bents 5-8 and Bents 9-11 soil profile models.

Based on Figures 20 and 23, the Bents 5-8 soil profile experiences larger settlements and higher average stresses near the location of the CIDH pile. Consequently the Bent 5-8 soil profile is adopted for the south side in order to consider the most conservative results for use in analysis of the CIDH pile downdrag forces.

Conclusions

FE model simulations were conducted in order to evaluate CDSM ground improvement methods for mitigating adverse impacts on the Schuyler Heim Bridge foundation piles due to addition of up to 19 ft of fill. Results from this investigation suggest the following conclusions:

1) By installing CDSM rings around each individual bridge pile, the level of ground settlement and increase in vertical effective stress near the pile due to fill placement will be significantly reduced. This will minimize the level of pile downdrag force caused by the settlement.

2) Of the scenarios considered, Scenario 3 (Figure 4) is recommended due to its effectiveness, constructability, and economic efficiency.

3) Figures 24 and 25 provide recommended settlements and stresses based on the conducted analyses for use in assessment of the Schuyler Heim Bridge pile performance after installation of the Scenario 3 CDSM treatment and addition of up to 19 ft of fill.

4) For the north side of the Cerritos Channel, additional simulations were conducted in order to consider the effects of lower stiffness in soil layers and CDSM zones. Results from these simulations are provided in Figures 11a and 15a. These results can also be used in order to make a more conservative assessment of the bridge pile performance.

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Table 1. Soil profiles considered for the analyses

Approximate Elevation (ft)	Predominant Soil Type	Estimated Consolidation Settlement due to 19 ft of Added Fill (inches) [1, 2]
North Side of Cerritos Channel		
Existing grade to -31	Loose to Medium-Dense Silty Sand, Soft to Very Stiff Sandy Silt	< 0.1
-31 to -47	Soft to Very Stiff Sandy Silt	2.0
-47 to -57	Soft to Very Stiff Silty Clay and Clay	4.2
-57 to -85	Very Stiff to Hard Sandy Silt, Silt, Silty Clay and Clay	< 0.1
Below -85	Dense to Very Dense Sand with Silt (Gaspur Formation)	< 0.1
South Side of Cerritos Channel, Bents 5-8		
Existing grade to -29	Loose to Dense Silty Sand, Sand with Silt	< 0.1
-29 to -44	Soft to Stiff Clayey Silt and Clay	1.6
-44 to -59	Very Soft to Stiff Clay and Clayey Silt	5.6
-59 to -75	Very Stiff to Hard Sandy Silt and Clayey Silt	< 0.1
Below -75	Dense to Very Dense Sand with Silt (Gaspur Formation)	< 0.1
South Side of Cerritos Channel, Bents 9-11		
Existing grade to -12	Loose to Medium-Dense Silty Sand and Sand with Silt	< 0.1
-12 to -36	Very Soft to Medium Stiff Sandy Silt and Clay	5.6
-36 to -52	Loose to Dense Silty Sand and Sandy Silt	< 0.1
-52 to -59	Soft to Stiff Sandy Silt and Clay	1.1
-59 to -75	Very Stiff to Hard Sandy Silt	< 0.1
Below -75	Dense to Very Dense Sand with Silt (Gaspur Formation)	< 0.1

Notes:

[1] Does not include the immediate settlement under the added fill.

[2] These estimates are only to be used for the purpose of developing soil profiles for the FE analyses.

Table 2. Summary of the Laboratory Unconfined Compression (UC) Tests for Cement-Soil Mix Samples

FROM PREVIOUS SOIL BORINGS AND OTHER LOCAL PROJECT											
Boring No.	**Sample No.**	**Sample Depth (ft)**	**Soil Type**	**Test Date**	**Cement Content (%)**	**Days Cured**	**Dry Density (pcf)**	**Moisture (%)**	**UC (ksf)**	**Emax (ksf)**	**Emax/ UC**
Prev. North Side Borings	N-4	NA	CL	11/17/2010	15	28	75.9	40.5	20.7	2,300	111
	N-9	NA	CL	12/27/2010	15	28	65.4	57.4	16.7	1,768	106
	N-11	NA	CL	1/24/2011	15	56	68.9	49.5	19.4	3,011	155
Prev. South Side Borings	S-5	NA	CL	12/15/2010	15	28	76.0	38.5	21.3	2,323	109
	S-7	NA	CL	1/12/2011	15	56	73.3	44.1	29.0	6,282	217
Prev. North Side Borings	CB-3	NA	CL	1/27/2011	20	28	64.4	57.9	18.9	2,742	145
POLA COP	B 2-3	NA	SM	12/9/2010	15	28	106.3	14.5	106.6	24,847	233
	B 2-4	NA	SM	1/31/2011	15	81	98.8	23.7	119.2	15,886	133
FROM SITE-SPECIFIC SOIL BORINGS AT SOUTH SIDE											
Boring No.	**Sample No.**	**Sample Depth (ft)**	**Soil Type**	**Test Date**	**Cement Content (%)**	**Days Cured**	**Dry Density (pcf)**	**Moisture (%)**	**UC (ksf)**	**Emax (ksf)**	**Emax/ UC**
A-10-201	B2-2	10	SM	1/17/2011	15	28	92.0	28.3	27.3	3,157	116
A-10-202	B5-2	40	CL-ML	1/14/2011	10	28	83.8	36.6	12.4	2,387	193
A-10-202	B5-3	40	CL-ML	2/11/2011	10	56	82.3	37.6	13.9	1,851	133
A-10-202	B5-11	40	CL-ML	2/11/2011	15	56	82.8	36.9	28.2	3,381	120
A-10-202	B5-18	40	CL-ML	1/14/2011	20	28	84.1	35.7	41.0	4,467	109
A-10-202	B5-21	40	CL-ML	2/11/2011	20	56	84.7	36.0	54.2	6,041	112
A-10-203	B4-3	30	SM	1/19/2011	15	28	83.8	32.5	19.4	2,123	110
A-10-203	B4-4	30	SM	1/19/2011	15	28	85.4	31.8	20.0	2,144	107
A-10-203	B4-11	30	SM	1/19/2011	20	28	88.1	29.2	38.1	4,107	108
A-10-203	B4-12	30	SM	1/19/2011	20	28	87.2	30.3	37.2	6,322	170
A-10-204	B5-3	40	ML	1/17/2011	15	28	92.1	25.0	29.4	3,505	119
A-10-204	B5-4	40	ML	1/17/2011	15	28	93.0	24.5	25.5	3,207	126
A-10-204	B5-7	40	ML	2/14/2011	15	56	89.2	30.0	24.9	3,690	148
A-10-205	B4-3	41.5	CL-ML	1/17/2011	15	28	87.4	29.1	22.9	3,035	132
A-10-205	B4-4	41.5	CL-ML	1/17/2011	15	28	80.3	39.1	22.0	2,381	108
A-10-205	B4-7	41.5	CL-ML	2/14/2011	15	56	83.7	35.4	20.6	3,581	174
A-10-206	B2-2	10	ML	1/18/2011	15	28	88.3	29.2	23.3	2,842	122
A-10-206	B6-4	50	ML	1/15/2011	15	28	81.8	37.1	22.0	2,825	129
A-10-206	B6-7	50	ML	2/12/2011	15	56	82.2	37.8	22.3	3,432	154
A-10-206	B6-14	50	ML	1/15/2011	20	28	82.0	37.6	42.4	7,651	180
A-10-206	B6-17	50	ML	2/12/2011	20	56	81.8	38.1	50.4	8,147	162

Table 2 Continued on the Next Page

Table 2 (Continued). Summary of the Laboratory Unconfined Compression (UC) Tests for Cement-Soil Mix Samples

FROM SITE-SPECIFIC SOIL BORINGS AT NORTH SIDE											
Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Test Date	Cement Content (%)	Days Cured	Dry Density (pcf)	Moisture (%)	UC (ksf)	Emax (ksf)	Emax/ UC
A-10-208	B6-5	50	ML	1/12/2011	15	28	94.1	25.5	35.2	9,861	280
A-10-208	B6-6	50	ML	1/12/2011	15	28	92.9	26.6	26.4	5,988	226
A-10-208	B6-15	50	ML	1/12/2011	20	28	92.4	28.1	62.2	9,483	153
A-10-208	B6-16	50	ML	1/12/2011	20	28	95.9	22.9	66.6	9,392	141
A-10-208	B6-19	50	ML	2/9/2011	20	56	92.3	26.9	58.9	6,790	115
A-10-208	B6-23	50	ML	1/12/2011	10	28	90.8	28.3	16.3	6,919	425
A-10-208	B6-24	50	ML	2/9/2011	10	56	89.2	30.3	16.1	3,223	200
A-10-209	B4-4	30	ML	1/7/2011	15	28	87.4	33.7	32.0	3,521	110
A-10-209	B4-5	30	ML	1/7/2011	15	28	87.0	33.8	31.0	2,941	95
A-10-209	B4-8	30	ML	2/4/2011	15	56	87.1	34.0	30.8	3,588	117
A-10-209	B4-14	30	ML	1/7/2011	20	28	89.4	31.3	60.7	7,125	117
A-10-209	B4-15	30	ML	1/7/2011	20	28	89.2	31.7	66.6	8,399	126
A-10-209	B4-18	30	ML	2/4/2011	20	56	89.7	32.0	57.7	8,227	143
A-10-210	B6-5	50	ML	1/13/2011	15	28	94.0	27.1	40.2	7,040	175
A-10-210	B6-6	50	ML	1/13/2011	15	28	93.9	26.8	38.7	6,620	171
A-10-210	B6-9	50	ML	2/10/2011	15	56	94.9	24.8	37.9	5,672	150
A-10-210	B-6-15	50	ML	1/13/2011	20	28	96.8	23.8	43.5	7,637	176
A-10-210	B-6-16	50	ML	1/13/2011	20	28	94.1	26.7	41.2	5,054	123
A-10-210	B-6-19	50	ML	2/10/2011	20	56	97.6	22.1	85.0	11,866	140
A-10-211	B5-4	40	SM	1/7/2011	15	28	88.4	32.5	41.6	4,131	99
A-10-211	B5-5	40	SM	1/7/2011	15	28	88.1	32.6	40.4	8,589	213
A-10-211	B5-8	40	SM	2/4/2011	15	56	88.0	32.3	39.6	4,889	123
A-10-212	B1-3	0	SM	1/11/2011	15	28	84.0	34.2	31.0	8,182	264
A-10-212	B1-4	0	SM	1/11/2011	15	28	82.8	34.5	27.4	6,893	251

Table 3. Summary of the Laboratory Unconsolidated Undrained (UU) Triaxial Tests for Cement-Soil Mix Samples

FROM PREVIOUS SOIL BORINGS AND OTHER LOCAL PROJECT													
Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date	Cement Content (%)	Days Cured	Dry Density (pcf)	Moisture (%)	Confining Stress (psi)	Max Dev. Stress (ksf)	Su (ksf)	Emax (ksf)	Emax/Max. Dev. Stress
Prev. North Side Borings	N-9 (b)	NA	CL	12/27/2010	15	28	65.8	56.6	15	17.7	8.9	2,326	131
	N-13	NA	CL	1/24/2011	15	56	70.2	48.4	15	20.2	10.1	4,181	207
Prev. South Side Boring	S-6	NA	CL	12/15/2010	15	28	77.9	36.7	15	19.0	9.5	2,570	135
Prev. North Side Boring	CB-4	NA	CL	1/27/2011	20	28	65.7	55.3	15	19.9	9.9	2,831	143
FROM SITE-SPECIFIC SOIL BORINGS AT SOUTH SIDE													
Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date	Cement Content (%)	Days Cured	Dry Density (pcf)	Moisture (%)	Confining Stress (psi)	Max Dev. Stress (ksf)	Su (ksf)	Emax (ksf)	Emax/Max. Dev. Stress
A-10-202	B5-9	40	CL-ML	1/14/2011	15	28	83.3	36.7	15	29.5	14.8	4,711	159
A-10-202	B5-10	40	CL-ML	1/14/2011	15	28	82.5	37.1	15	20.7	10.3	3,268	158
A-10-202	B5-19	40	CL-ML	1/14/2011	20	28	84.1	35.4	15	36.3	18.2	3,839	106
A-10-202	B5-20	40	CL-ML	1/14/2011	20	28	84.2	35.7	15	44.0	22.0	7,799	177
A-10-203	B4-5	30	SM	1/19/2011	15	28	82.8	35.3	15	23.0	11.5	2,618	114
A-10-203	B4-6	30	SM	1/19/2011	15	28	81.3	38.0	15	22.1	11.1	2,863	129
A-10-203	B4-13	30	SM	1/19/2011	20	28	82.4	37.0	15	43.0	21.5	5,972	139
A-10-203	B4-14	30	SM	1/19/2011	20	28	82.7	36.4	15	39.0	19.5	4,806	123
A-10-204	B5-5	40	ML	1/17/2011	15	28	91.1	27.2	15	34.6	17.3	4,531	131
A-10-204	B5-6	40	ML	1/17/2011	15	28	91.5	26.7	15	34.7	17.3	3,569	103
A-10-205	B4-5	41.5	CL-ML	1/17/2011	15	28	83.4	33.7	15	24.0	12.0	2,647	110
A-10-205	B4-6	41.5	CL-ML	1/17/2011	15	28	83.4	34.3	15	23.9	11.9	3,046	128
A-10-206	B6-5	50	ML	1/15/2011	15	28	81.2	37.9	15	23.1	11.5	2,707	117
A-10-206	B6-6	50	ML	1/15/2011	15	28	81.9	37.9	15	23.7	11.9	2,236	94
A-10-206	B6-15	50	ML	1/15/2011	20	28	81.6	38.1	15	31.9	16.0	4,508	141
A-10-206	B6-16	50	ML	1/15/2011	20	28	81.8	38.4	15	32.0	16.0	4,266	133

Table 3 Continued on the Next Page

Table 3 (Continued). Summary of the Laboratory Unconsolidated Undrained (UU) Triaxial Tests for Cement-Soil Mix Samples

FROM SITE-SPECIFIC SOIL BORINGS AT NORTH SIDE													
Boring No.	Sample No.	Sample Depth (ft)	Soil Type	Date	Cement Content (%)	Days Cured	Dry Density (pcf)	Moisture (%)	Confining Stress (psi)	Max Dev. Stress (ksf)	Su (ksf)	Emax (ksf)	Emax/Max. Dev. Stress
A-10-208	B6-7	50	ML	1/12/2011	15	28	92.4	27.3	15	42.4	21.2	5,005	118
A-10-208	B6-8	50	ML	1/12/2011	15	28	90.2	30.2	15	25.9	13.0	4,399	170
A-10-208	B6-17	50	ML	1/12/2011	20	28	90.7	29.6	15	55.3	27.7	7,702	139
A-10-208	B6-18	50	ML	1/12/2011	20	28	93.7	26.2	15	50.5	25.2	6,896	137
A-10-209	B4-6	30	ML	1/7/2011	15	28	87.4	33.4	15	36.2	18.1	4,446	123
A-10-209	B4-7	30	ML	1/7/2011	15	28	87.5	33.4	15	33.8	16.9	8,120	240
A-10-209	B4-10	30	ML	2/14/2011	15	66	87.2	33.1	15	31.5	15.8	4,329	137
A-10-209	B4-16	30	ML	1/7/2011	20	28	89.1	31.3	15	63.8	31.9	6,716	105
A-10-209	B4-17	30	ML	1/7/2011	20	28	89.0	31.3	15	59.4	29.7	7,034	118
A-10-210	B6-7	50	ML	1/13/2011	15	28	92.3	30.4	15	36.8	18.4	5,819	158
A-10-210	B6-8	50	ML	1/13/2011	15	28	90.7	31.6	15	31.7	15.8	3,812	120
A-10-210	B6-17	50	ML	1/13/2011	20	28	99.3	21.2	15	64.8	32.4	6,527	101
A-10-210	B6-18	50	ML	1/13/2011	20	28	96.8	24.0	15	70.3	35.1	7,480	106
A-10-211	B5-6	40	SM	1/7/2011	15	28	87.9	32.4	15	44.0	22.0	6,459	147
A-10-211	B5-7	40	SM	1/7/2011	15	28	88.2	32.3	15	33.8	16.9	3,873	115

Table 4. Plaxis Model Input Parameters (North Side)

Layer/Zone	Material Model	Unit Wt. (pcf)	ϕ (deg)	c (ksf)	E (ksf)	Poisson's Ratio, ν
Soil Layer 1	M-C [1]	120	30	0.1	940 [2]	0.3
Soil Layer 2	M-C [1]	120	0	0.65	256 [3]	0.2
Soil Layer 3	M-C [1]	120	0	0.8	65 [3]	0.2
Soil Layer 4	M-C [1]	120	0	3	5000	0.3
Soil Layer 5	M-C [1]	125	38	0	20000	0.3
CDSM Zone 1	M-C [1]	130	0	9 [4], 7.5 [5]	16200 [4], 13500 [5]	0.2
CDSM Zone 2	M-C [1]	130	0	9 [4], 7.5 [5]	10800 [4], 9000 [5]	0.2
CDSM Zone 3	M-C [1]	130	0	9 [4], 7.5 [5]	5400 [4], 4500 [5]	0.2
CDSM Zone 4	M-C [1]	130	0	9 [4], 7.5 [5]	6750 [4], 5625 [5]	0.2
Drilled Shaft	L-E [6]	150	NA	NA	520000	0.2

Notes:
[1] Mohr-Coulomb (perfect plasticity) Model (Plaxis, 2004).
[2] Based on shear wave velocity profile with a 50% reduction.
[3] Calibrated (reduced) to allow consolidating layers to undergo settlement matching hand calculation.
[4] Includes a 10% reduction to account for an Area Replacement Ratio (ARR) of 90% for Scenario 1.
[5] Includes a 25% reduction to account for an ARR of 75% for Scenarios 2 and 3.
[6] Linear Elastic Model (Plaxis, 2004).

Table 5. Plaxis Model Input Parameters (South Side, Bents 5-8)

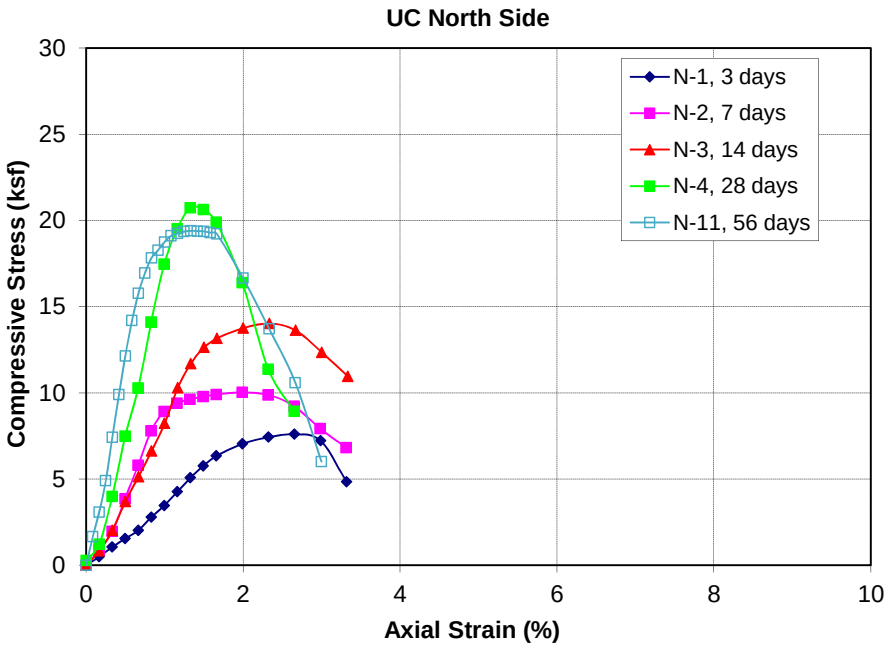
Layer/Zone	Material Model	Unit Wt. (pcf)	ϕ (deg)	c (ksf)	E (ksf)	Poisson's Ratio, ν
Soil Layer 1	M-C [1]	120	32	0.1	1200 [2]	0.3
Soil Layer 2	M-C [1]	120	0	1.5	235 [3]	0.2
Soil Layer 3	M-C [1]	120	0	1	66 [3]	0.2
Soil Layer 4	M-C [1]	120	0	3	5000	0.3
Soil Layer 5	M-C [1]	125	38	0	20000	0.3
CDSM Zone 1	M-C [1]	130	0	7.5 [4]	13500 [4]	0.2
CDSM Zone 2	M-C [1]	130	0	7.5 [4]	5250 [4]	0.2
CDSM Zone 3	M-C [1]	130	0	7.5 [4]	5250 [4]	0.2
CDSM Zone 4	M-C [1]	130	0	7.5 [4]	7500 [4]	0.2
Drilled Shaft	L-E [5]	150	NA	NA	520000	0.2

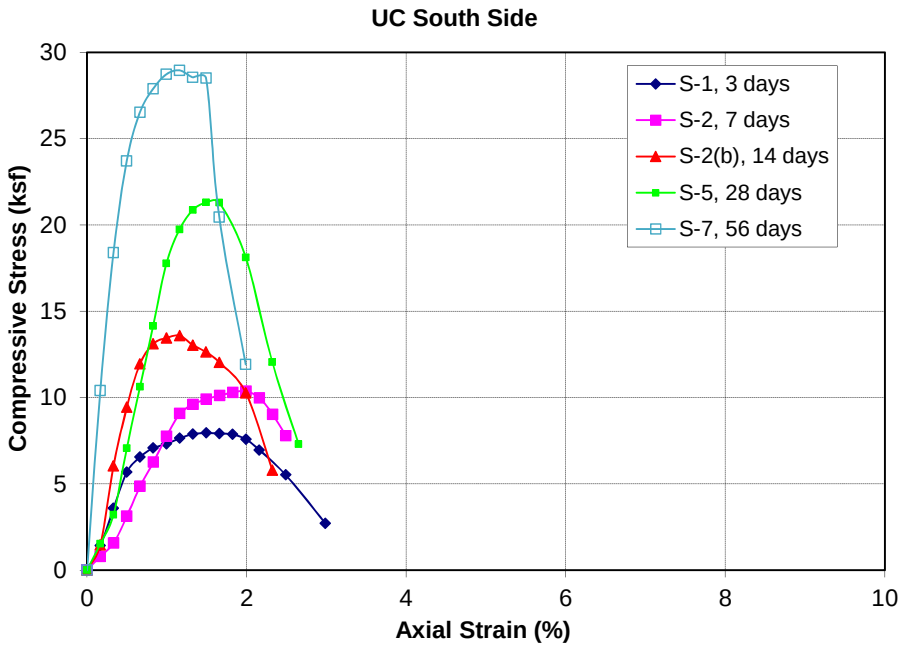
Notes:
[1] Mohr-Coulomb (perfect plasticity) Model (Plaxis, 2004).
[2] Based on shear wave velocity profile with a 50% reduction.
[3] Calibrated (reduced) to allow consolidating layers to undergo settlement matching hand calculation.
[4] Includes a 25% reduction to account for an Area Replacement Ratio (ARR) of 75%.
[5] Linear Elastic Model (Plaxis, 2004).

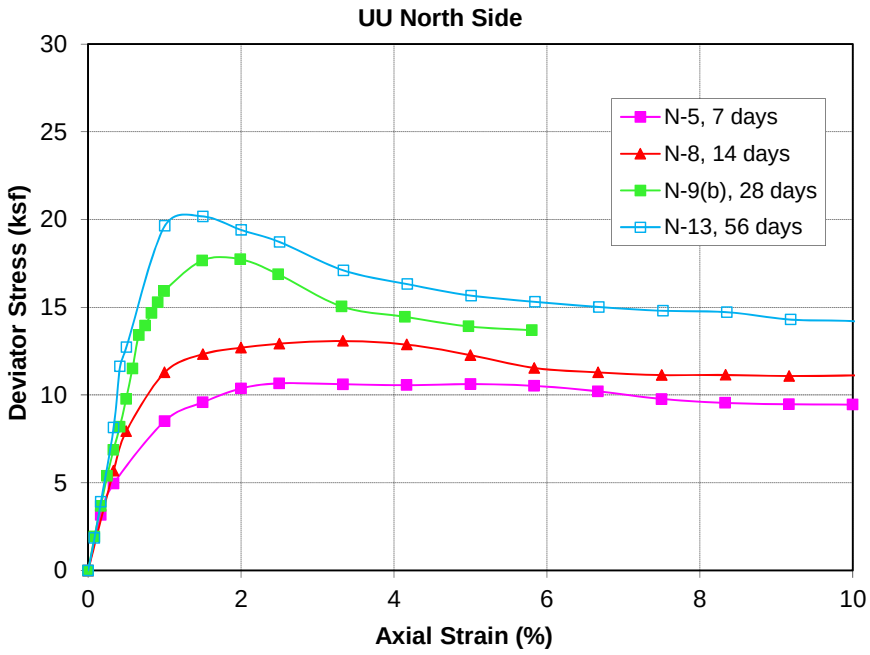
Table 6. Plaxis Model Input Parameters (South Side, Bents 9-11)

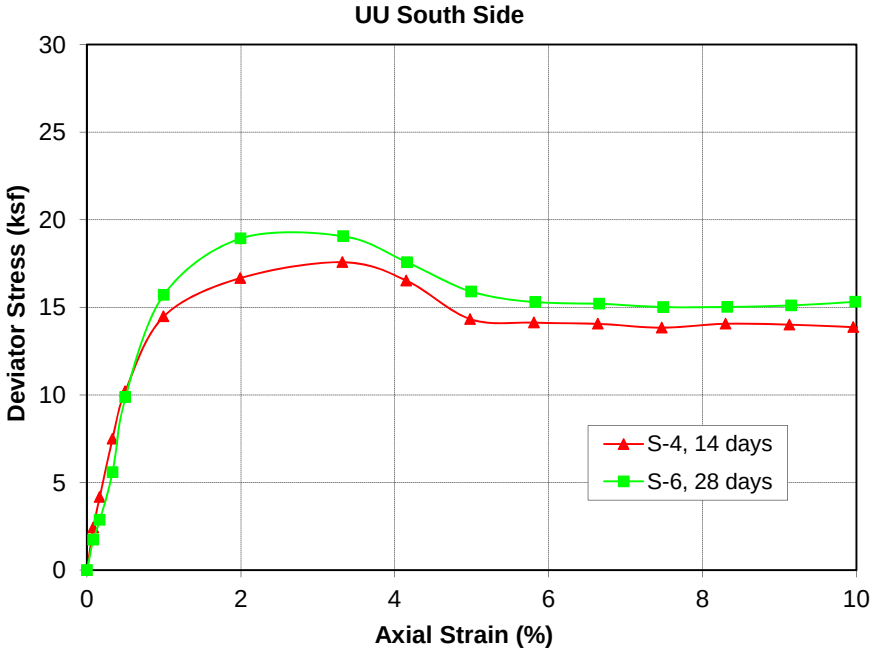
Layer/Zone	Material Model	Unit Wt. (pcf)	ϕ (deg)	c (ksf)	E (ksf)	Poisson's Ratio, ν
Soil Layer 1	M-C [1]	120	32	0.1	800 [2]	0.3
Soil Layer 2	M-C [1]	120	0	0.5	150 [3]	0.2
Soil Layer 3	M-C [1]	120	32	0.1	1750 [2]	0.3
Soil Layer 4	M-C [1]	120	0	1.0	150 [3]	0.2
Soil Layer 5	M-C [1]	120	0	2.5	5000	0.3
Soil Layer 6	M-C [1]	125	38	0	20000	0.3
CDSM Zone 1	M-C [1]	130	0	7.5 [4]	13500 [4]	0.2
CDSM Zone 2	M-C [1]	130	0	7.5 [4]	5625 [4]	0.2
CDSM Zone 3	M-C [1]	130	0	7.5 [4]	11250 [4]	0.2
CDSM Zone 4	M-C [1]	130	0	7.5 [4]	5625 [4]	0.2
CDSM Zone 5	M-C [1]	130	0	7.5 [4]	9000 [4]	0.2
Drilled Shaft	L-E [5]	150	NA	NA	520000	0.2

Notes:
[1] Mohr-Coulomb (perfect plasticity) Model (Plaxis, 2004).
[2] Based on shear wave velocity profile with a 50% reduction.
[3] Calibrated (reduced) to allow consolidating layers to undergo settlement matching hand calculation.
[4] Includes a 25% reduction to account for an Area Replacement Ratio (ARR) of 75%.
[5] Linear Elastic Model (Plaxis, 2004).









Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

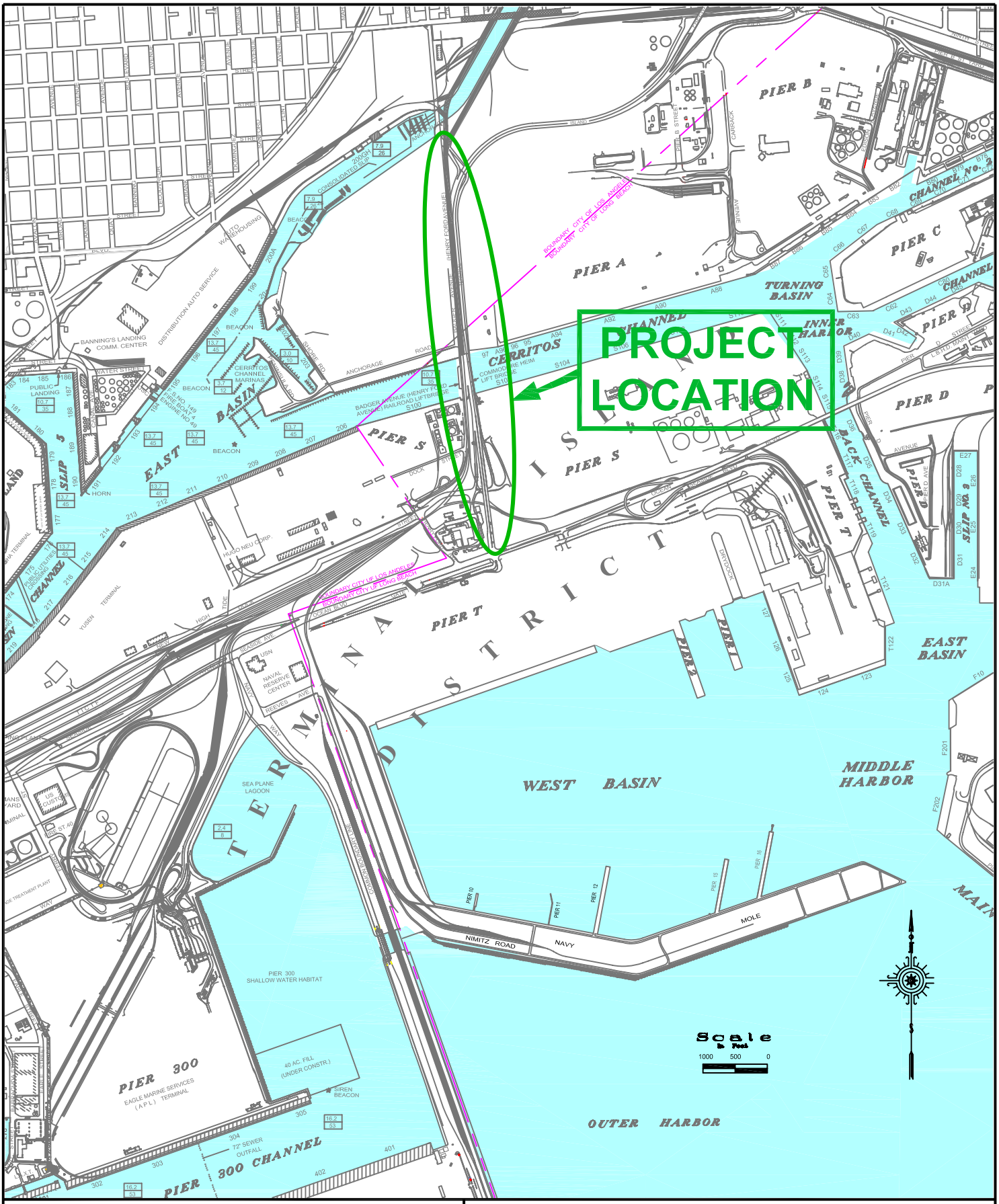
SCHUYLER HEIM BRIDGE REPLACEMET ANALYSIS OF FILL PLACEMENT

Project No. 06-123

Date: 2-17-11

Results from Selected CDSM Lab UC and UU Tests on Clayey Soils with 15% Cement

Figure 1



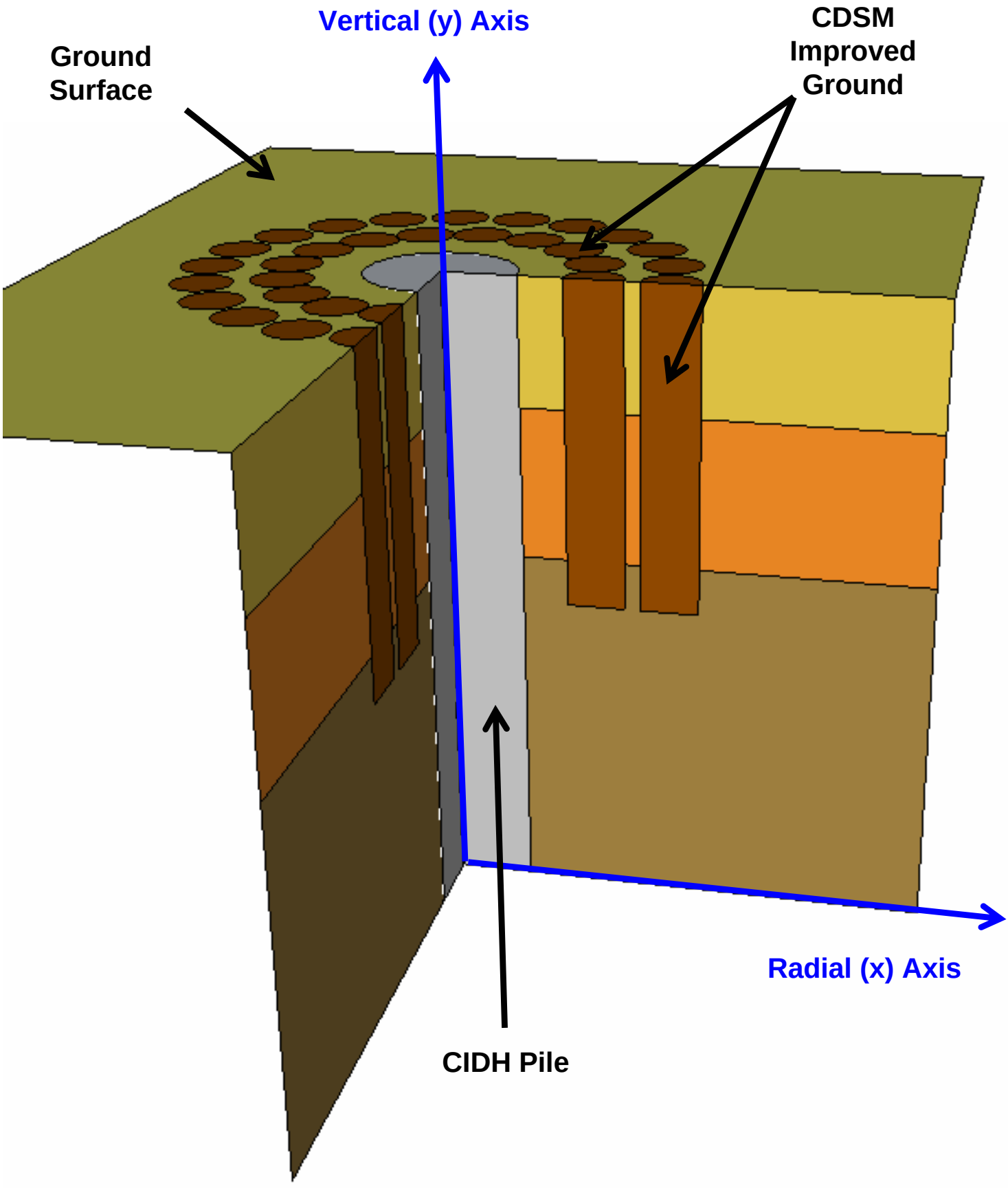
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

Project Location Map

Figure 2

Project No. 06-123	Date: 12-20-10



*Not to Scale

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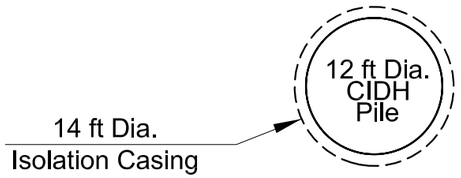
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

Schematic Description of Axis-Symmetric Modeling Configuration

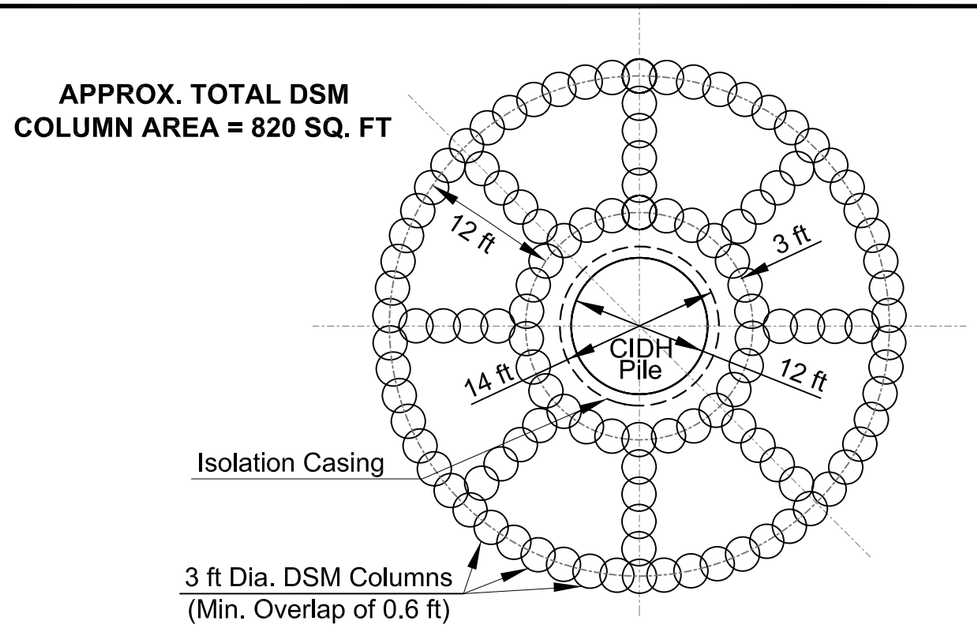
Figure 3

Project No. 06-123

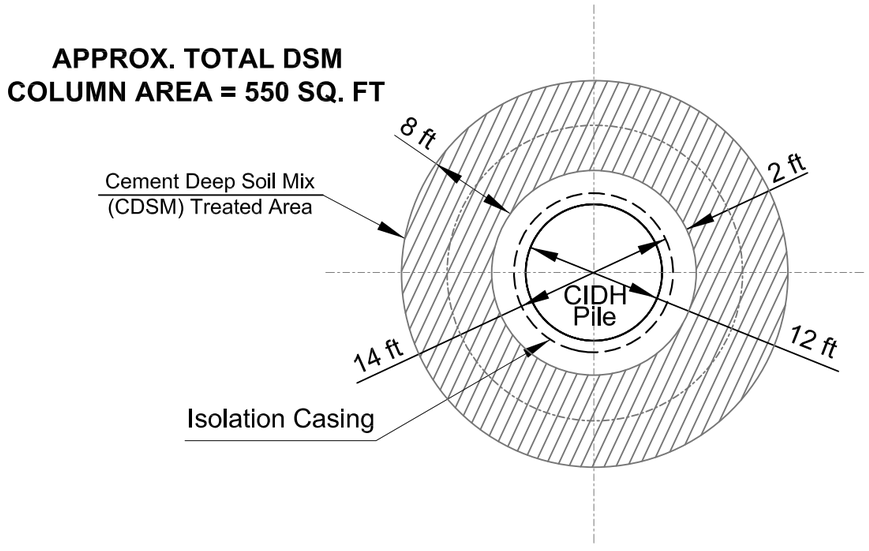
Date: 12-20-10



NO MITIGATION SCENARIO

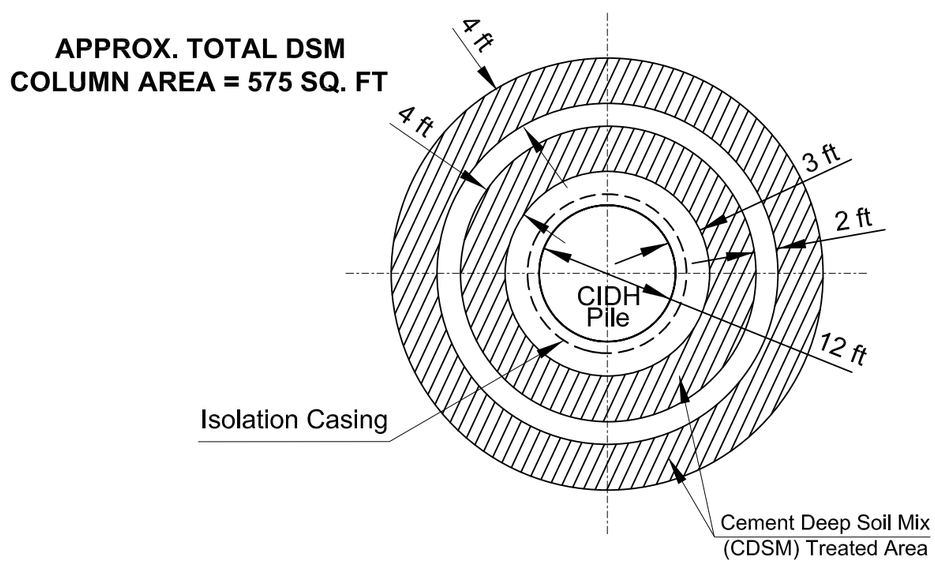


SCENARIO - 1



Requirement: At least 75% of the hatched areas shall be treated with CDSM.

SCENARIO - 2



Requirement: At least 75% of the hatched areas shall be treated with CDSM.

SCENARIO - 3

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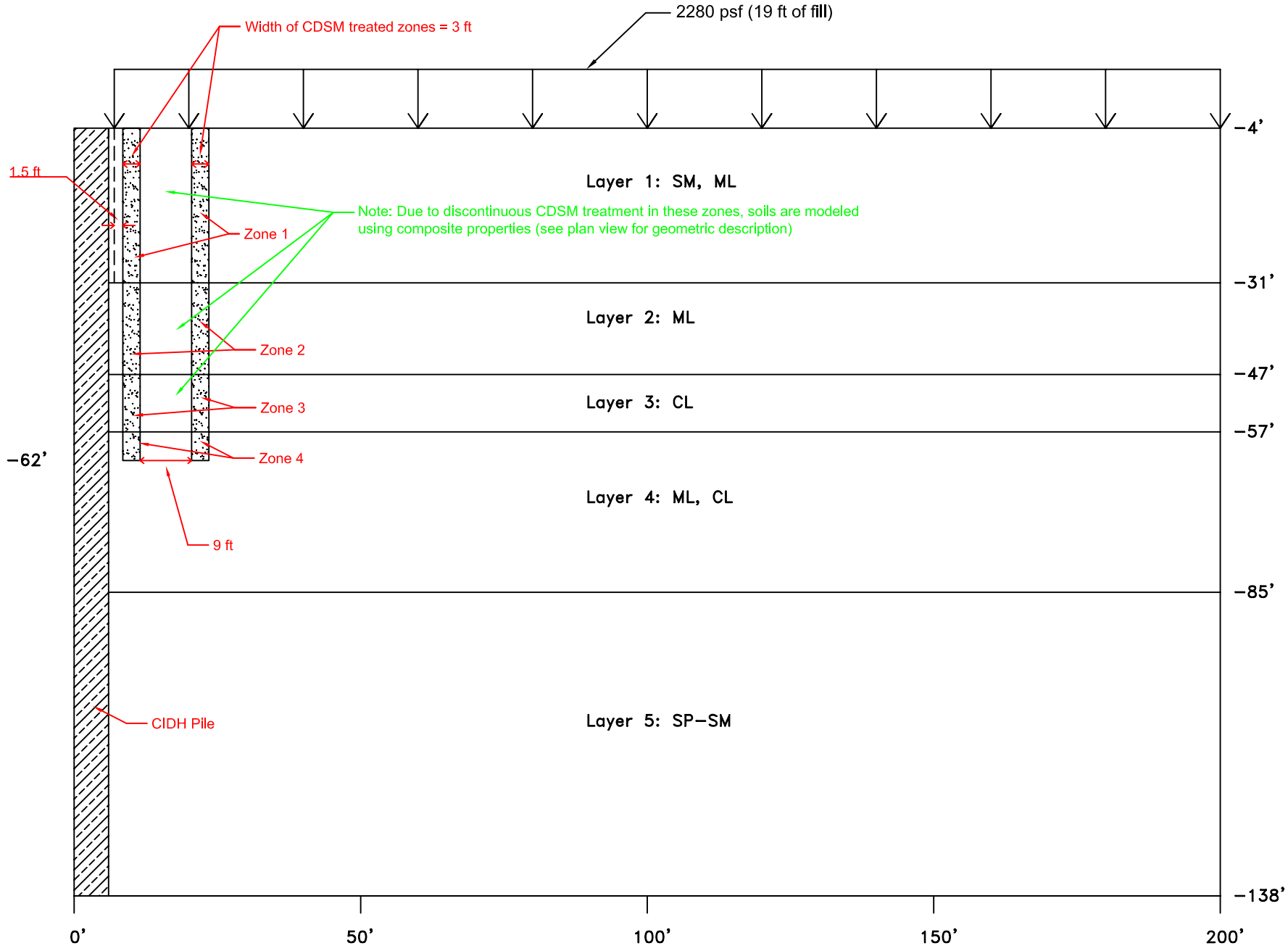
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT - ANALYSIS OF FILL PLACEMENT

EMI Project No. 06-123 | Date: 12-20-10

Plan View of DSM Treatment for Different Scenarios (North Side)

Figure 4



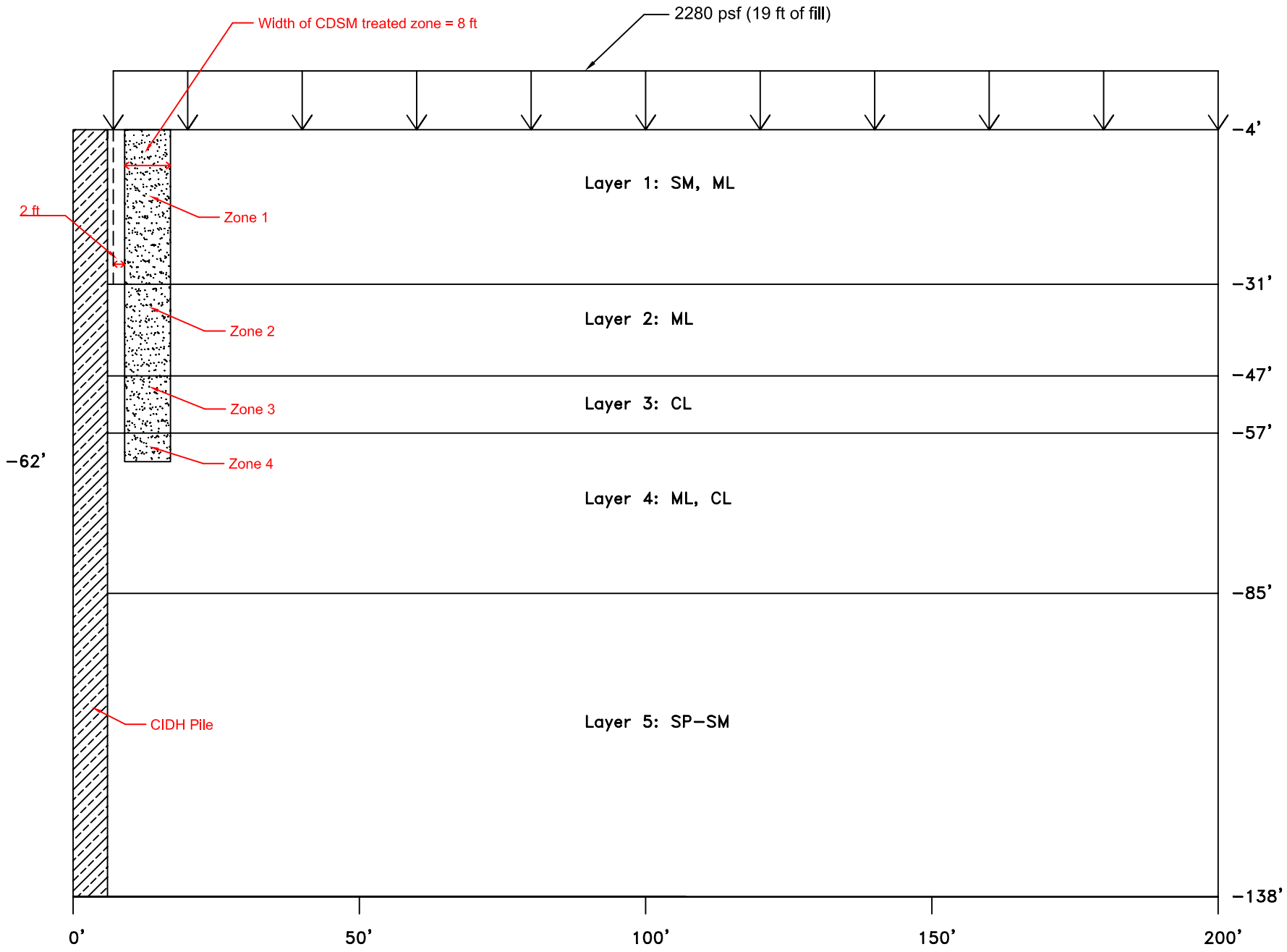
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

Project No. 06-123 | Date: 12/20/10

North Side of Cerritos Channel
Scenario 1 Cross Section

Figure 5



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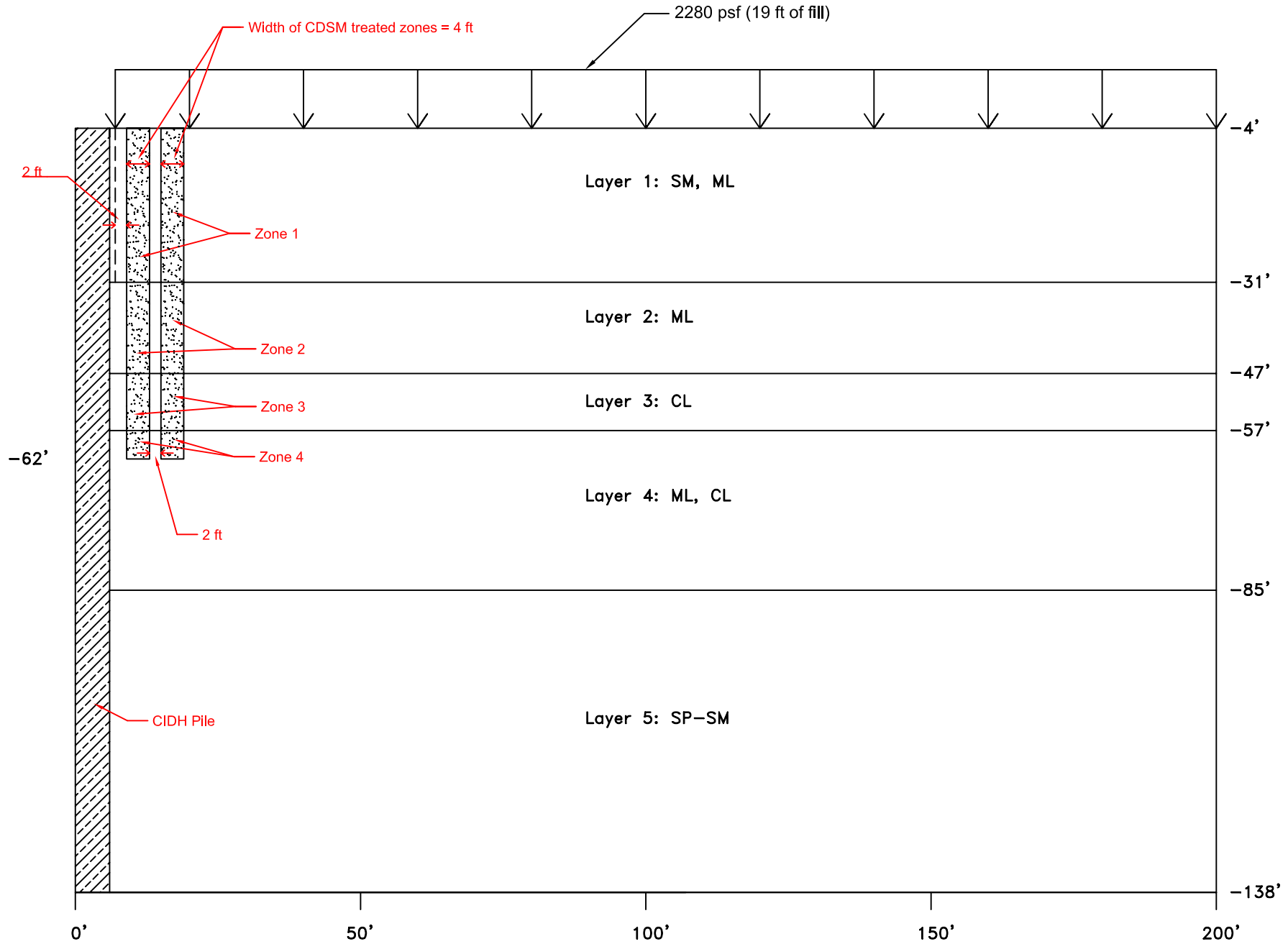
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

Project No. 06-123 | Date: 12/20/10

North Side of Cerritos Channel
Scenario 2 Cross Section

Figure 6



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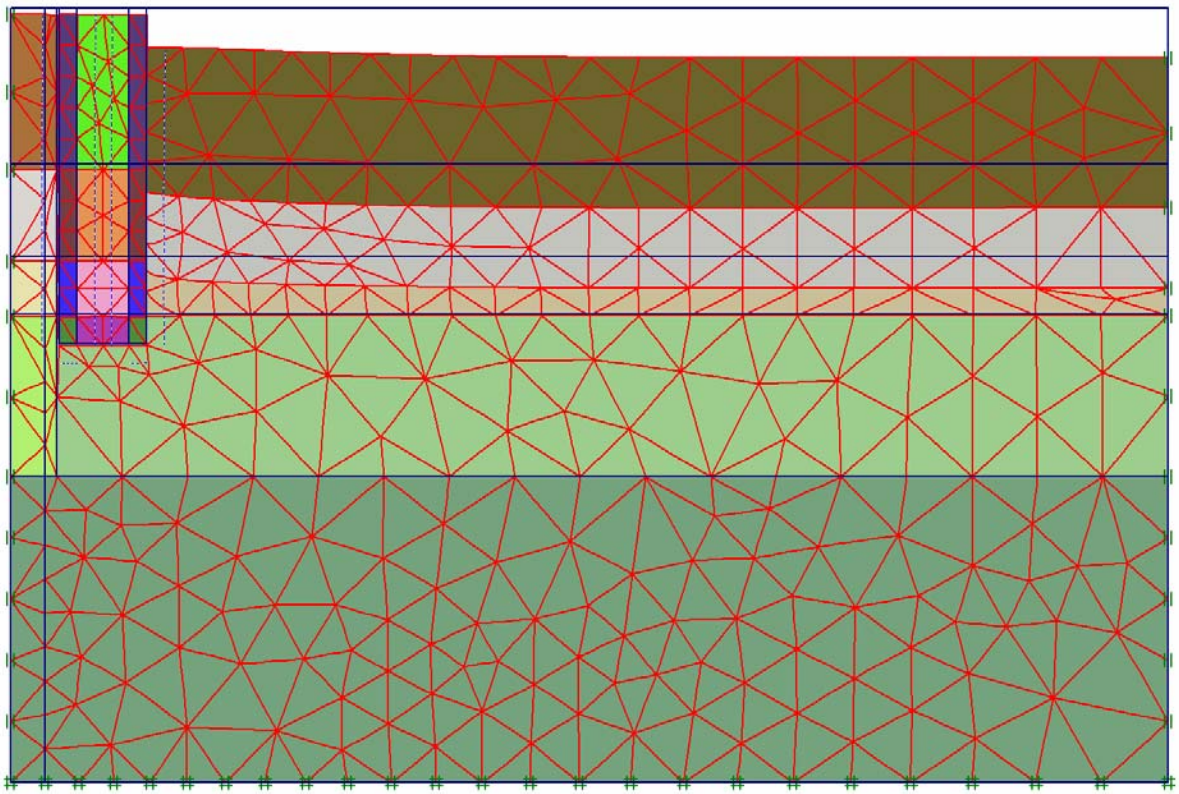
Geotechnical and Earthquake Engineering

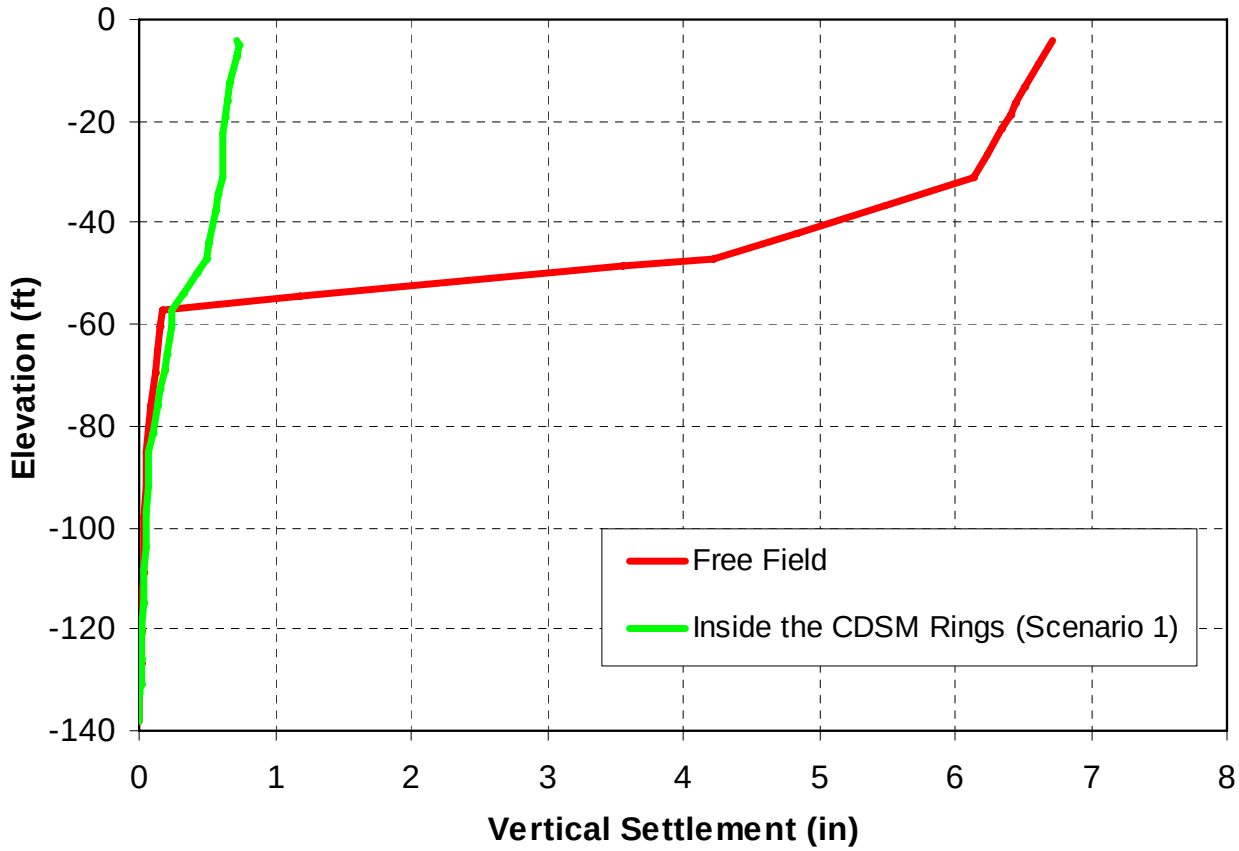
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

Project No. 06-123 | Date: 12/20/10

North Side of Cerritos Channel
Scenario 3 Cross Section

Figure 7





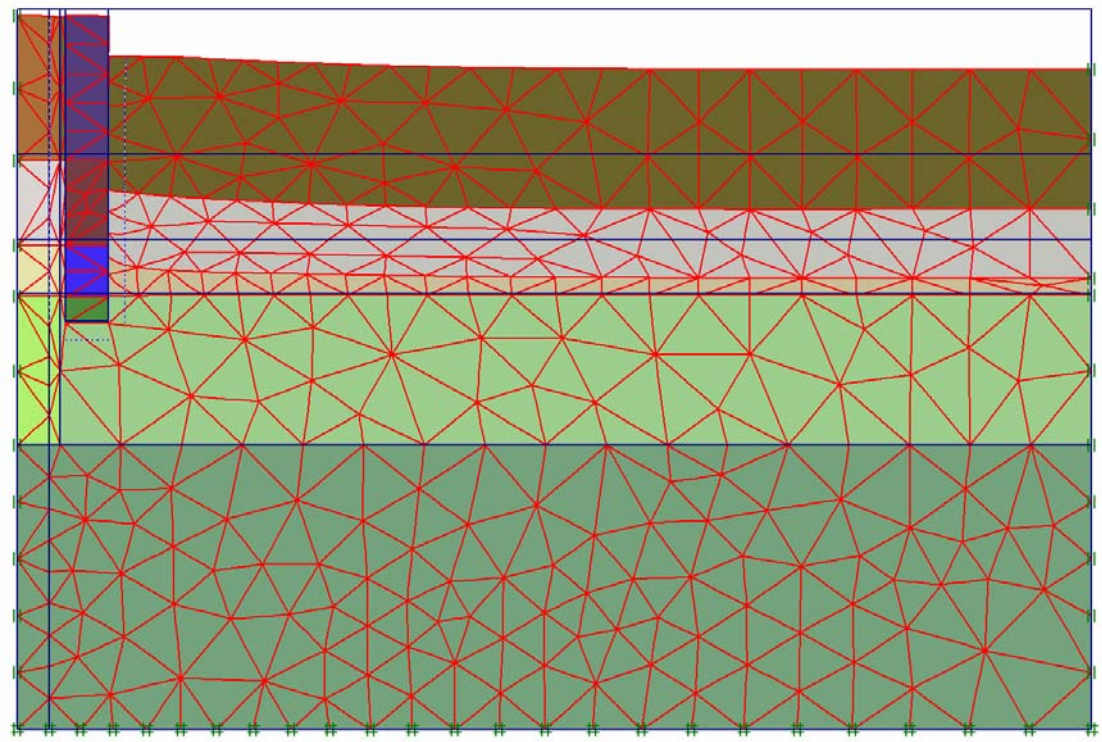
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

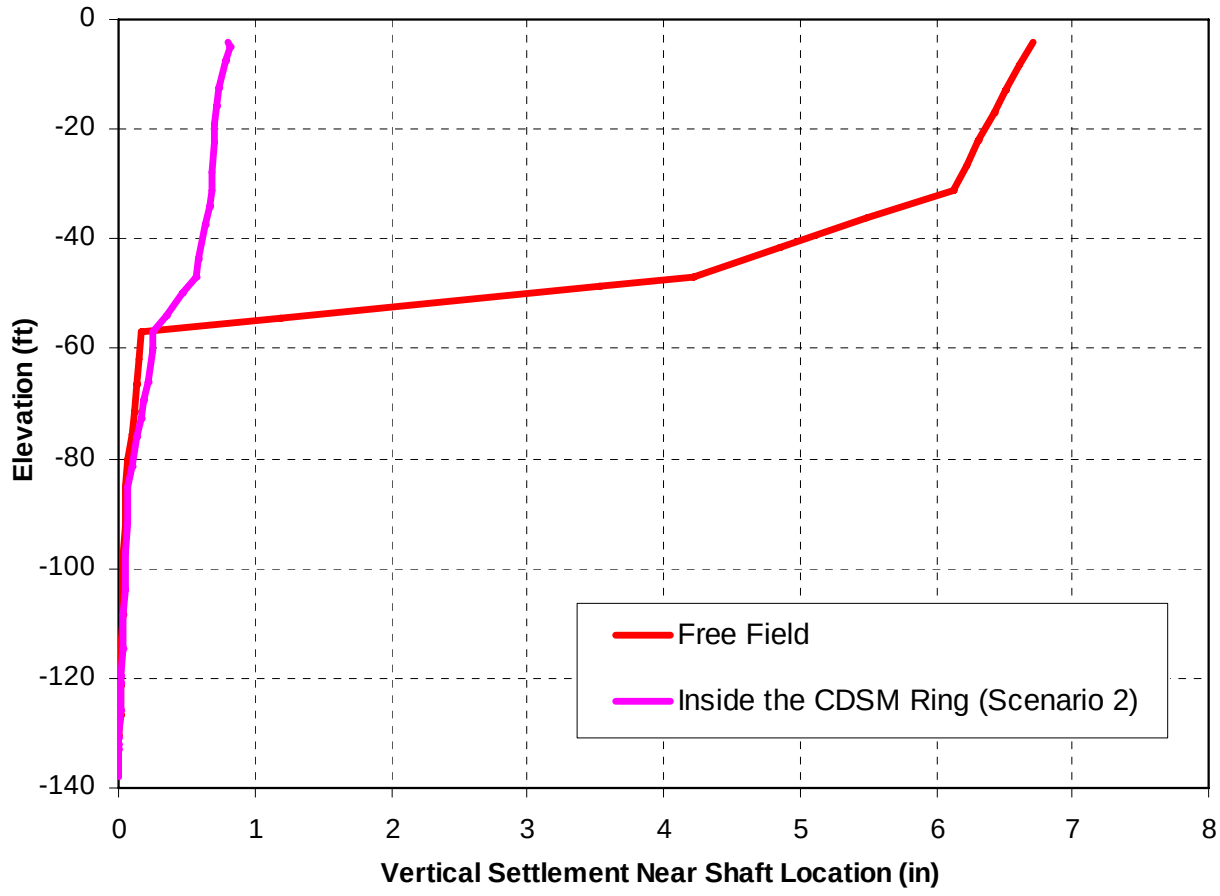
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

North Side Scenario 1 Results: Settlement

Project No. 06-123 | Date: 12-20-10

Figure 8





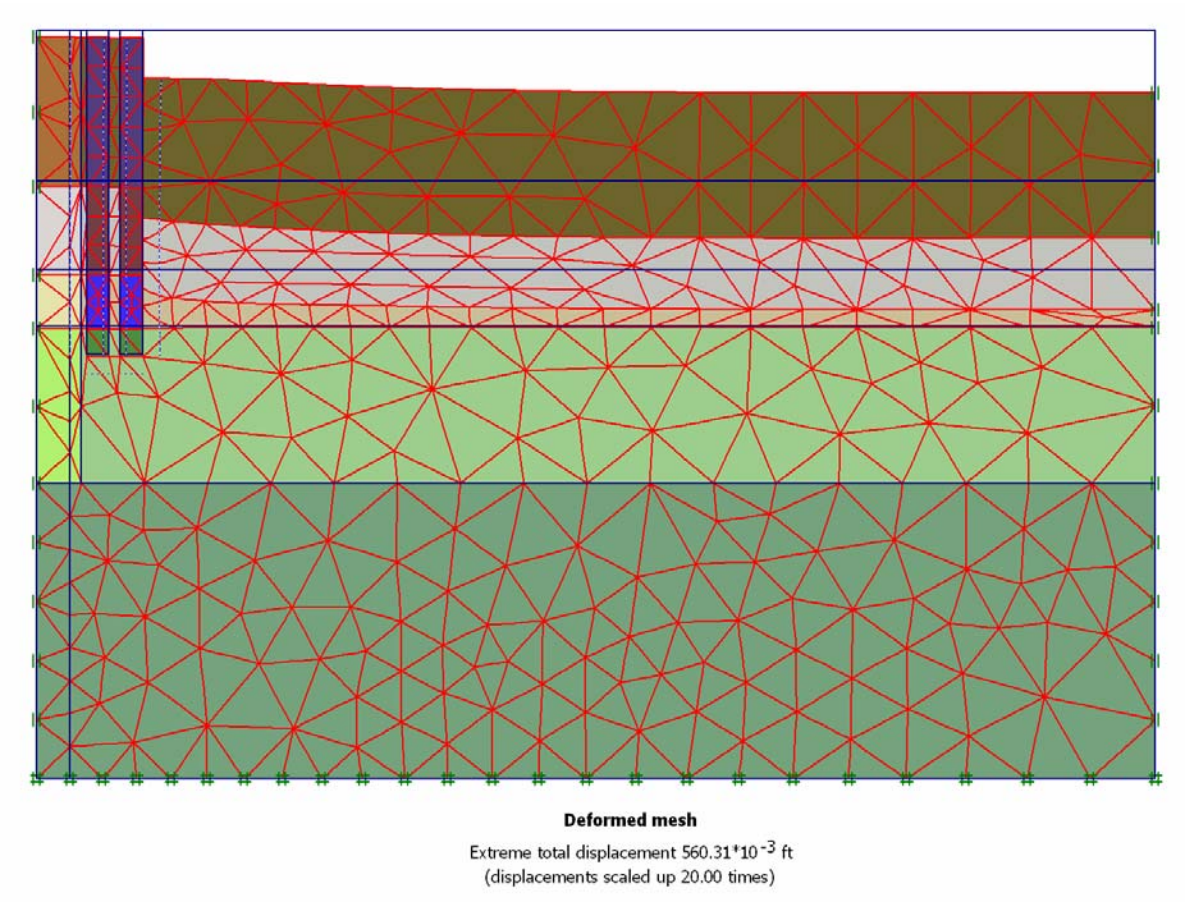
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

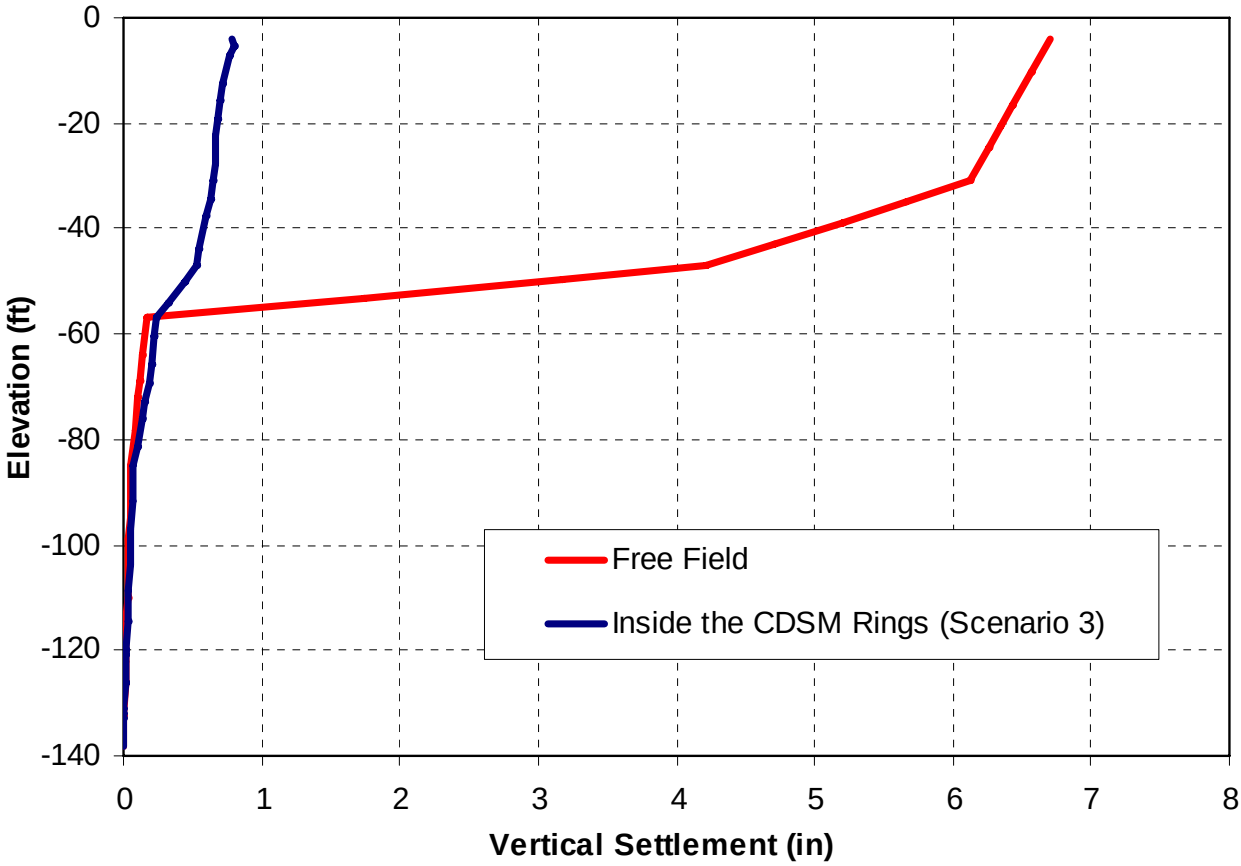
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

North Side Scenario 2 Results: Settlement

Project No. 06-123 | Date: 12-20-10

Figure 9





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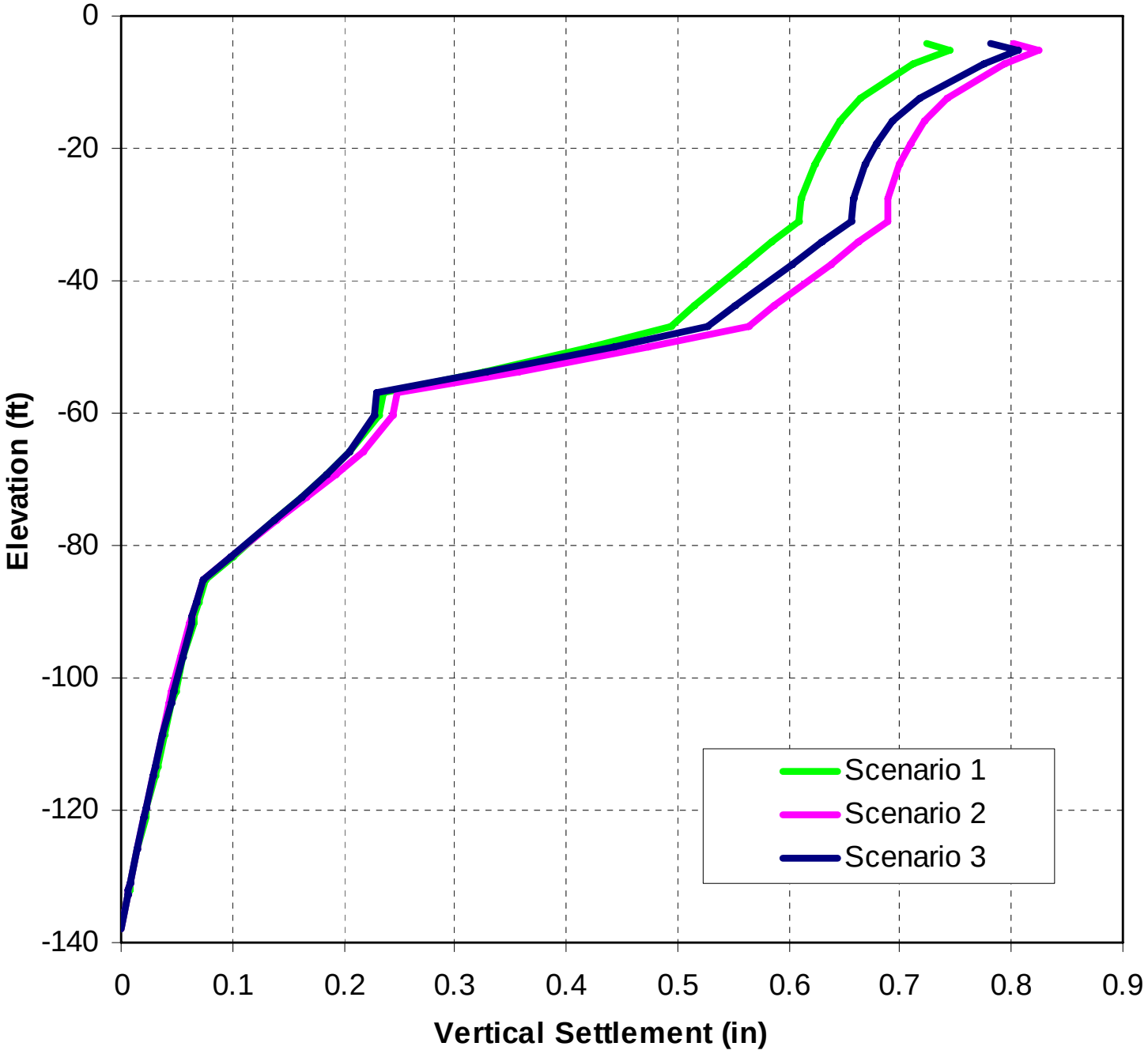
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

North Side Scenario 3 Results: Settlement

Project No. 06-123 | Date: 12-20-10

Figure 10



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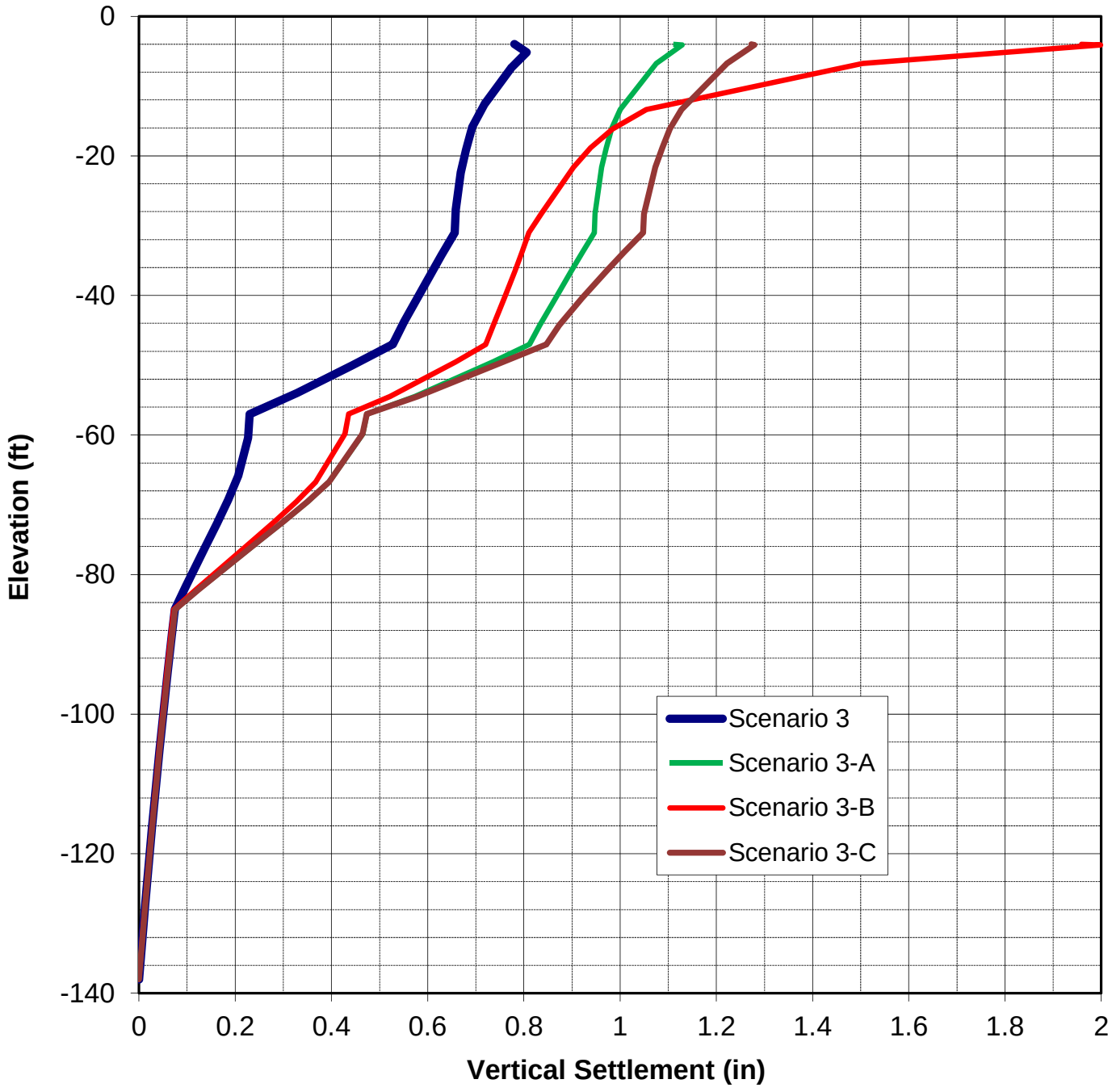
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

North Side Scenarios 1-3 Results: Settlement

Project No. 06-123 | Date: 12-20-10

Figure 11



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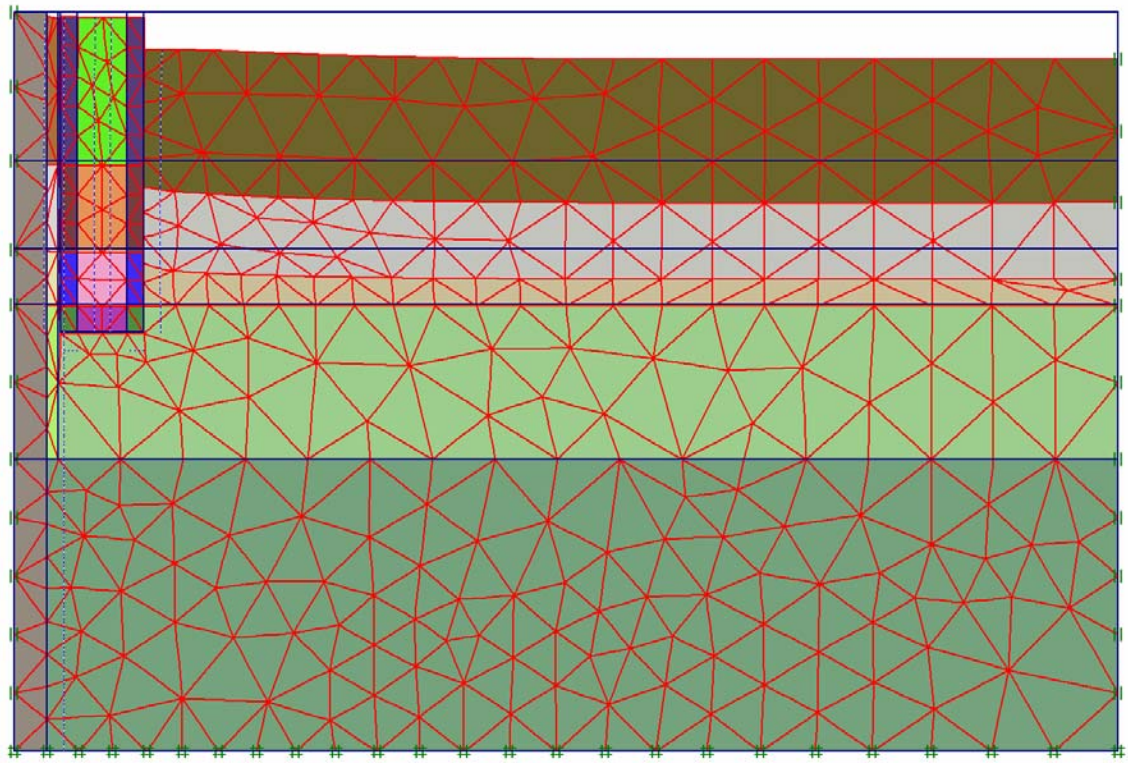
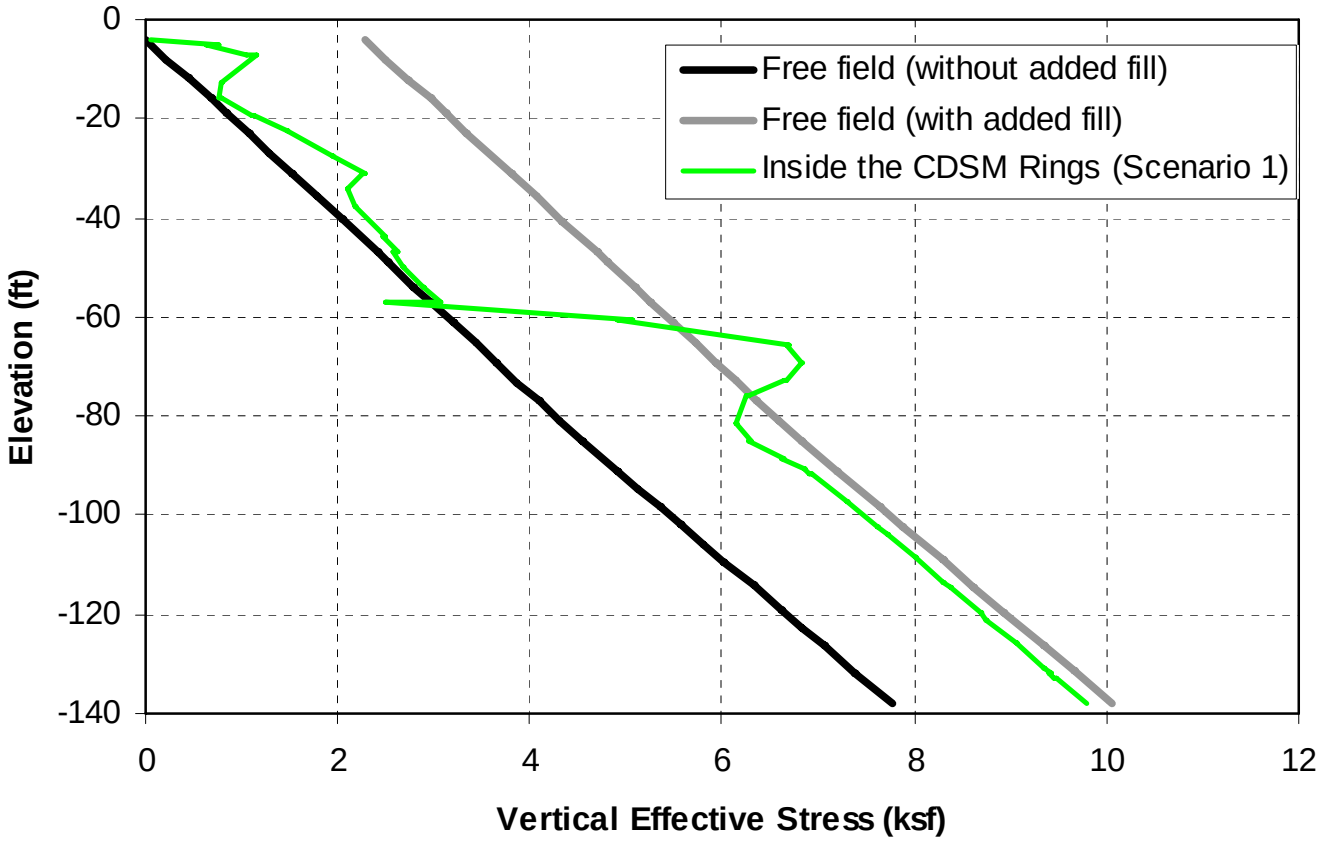
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

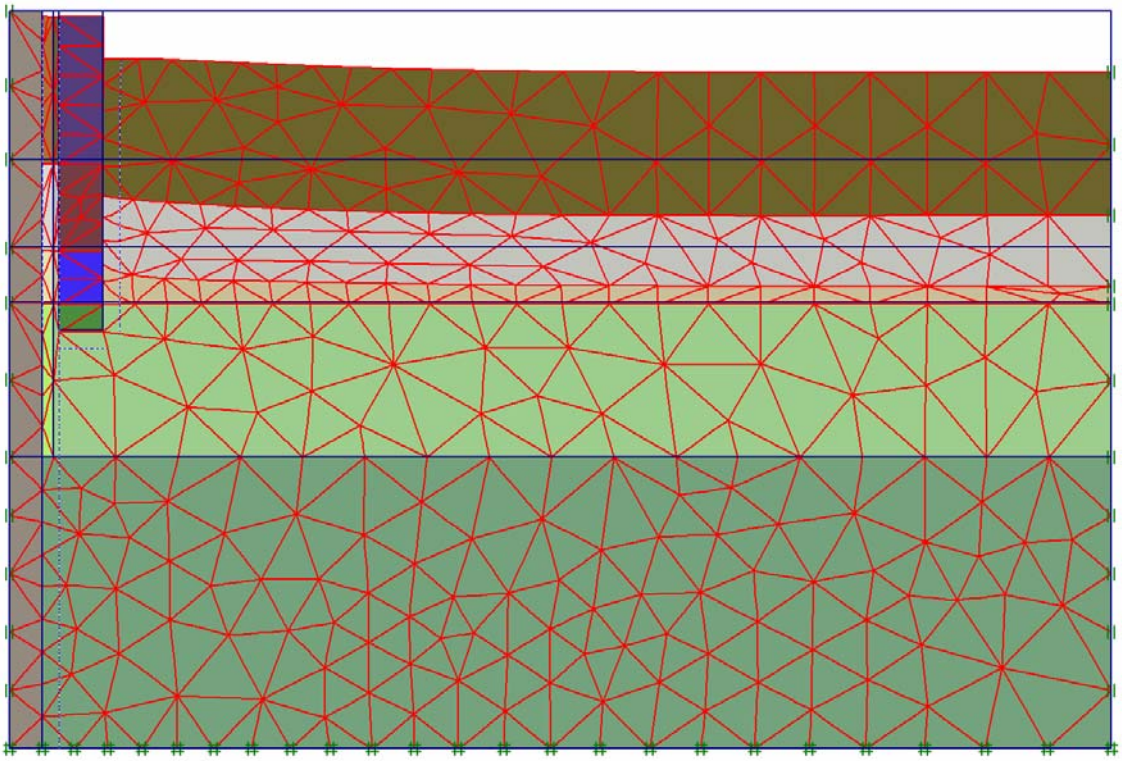
North Side Scenarios 3, 3-A, 3-B, and 3-C
Results: Settlement

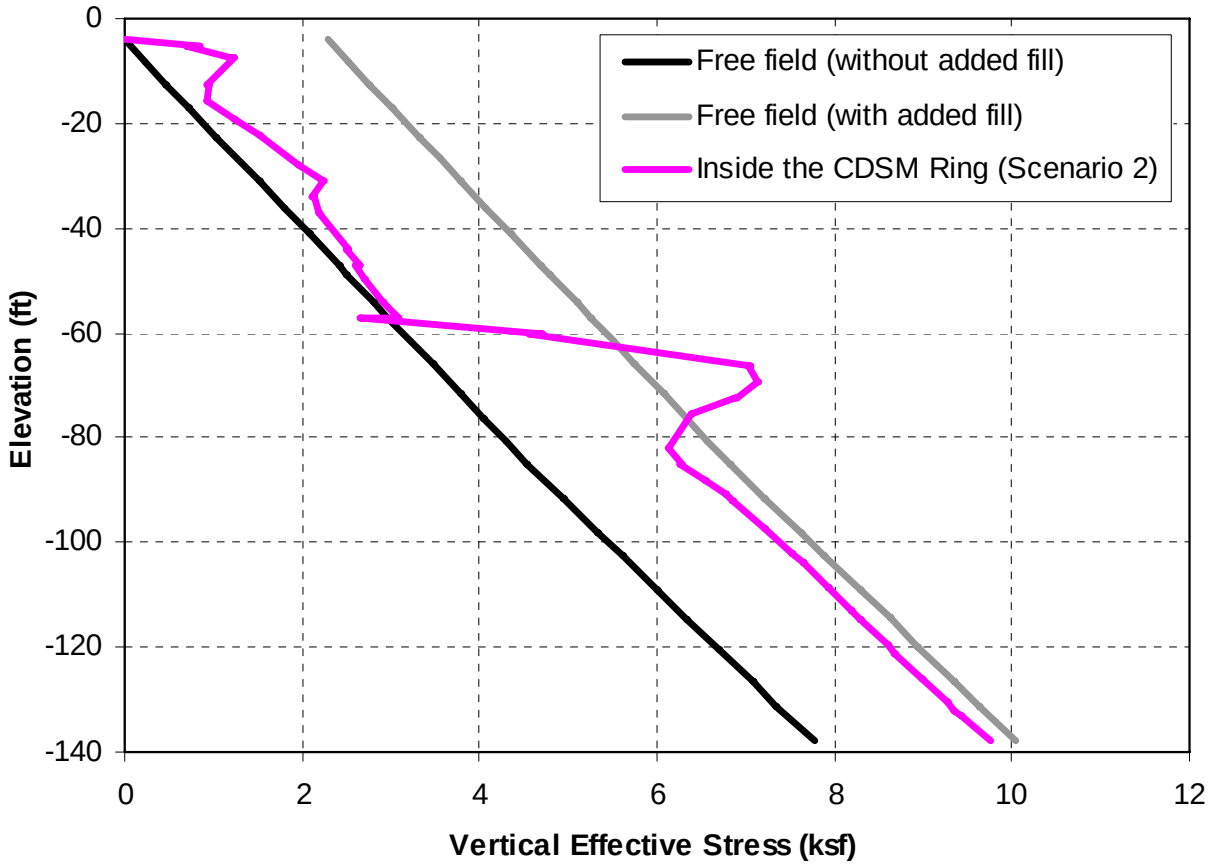
Project No. 06-123 | Date: 2-17-11 | Figure 11a





Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
		North Side Scenario 1 Results: Stress
Project No. 06-123	Date: 12-20-10	Figure 12





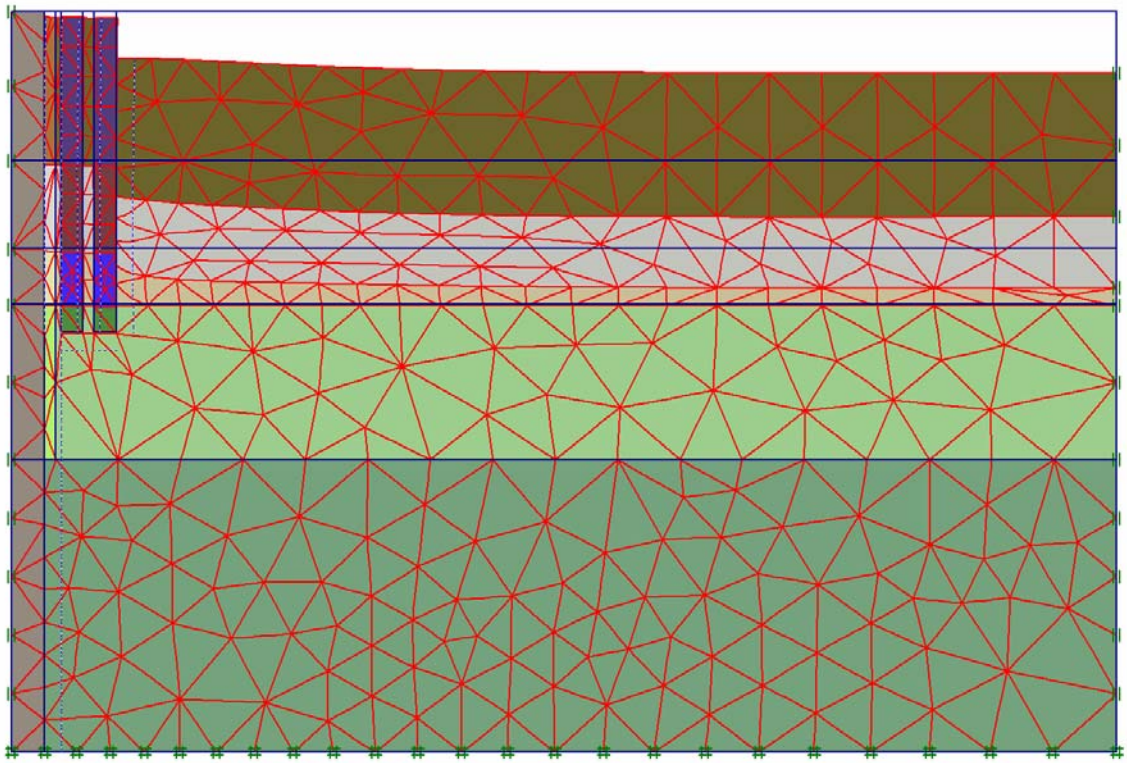
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

North Side Scenario 2 Results: Stress

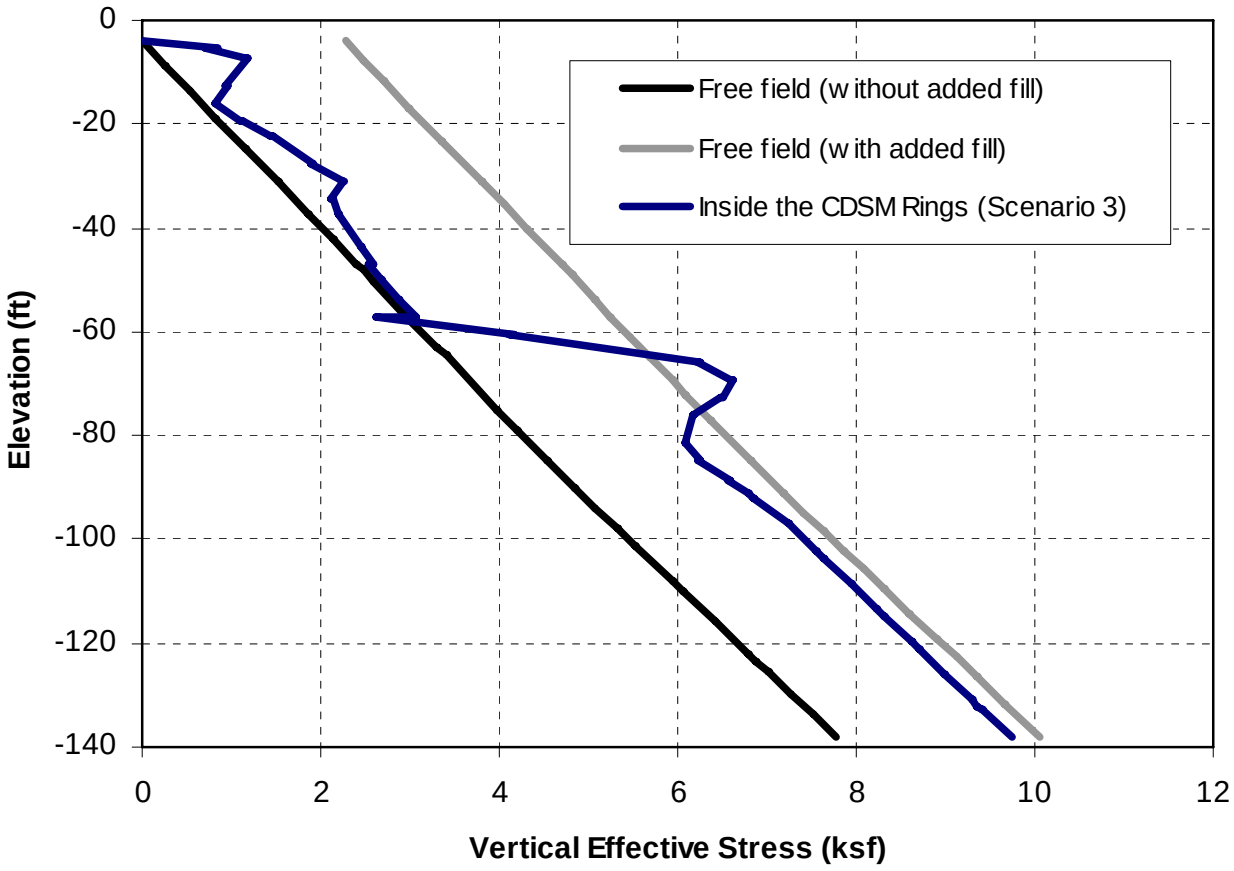
Project No. 06-123 | Date: 12-20-10

Figure 13

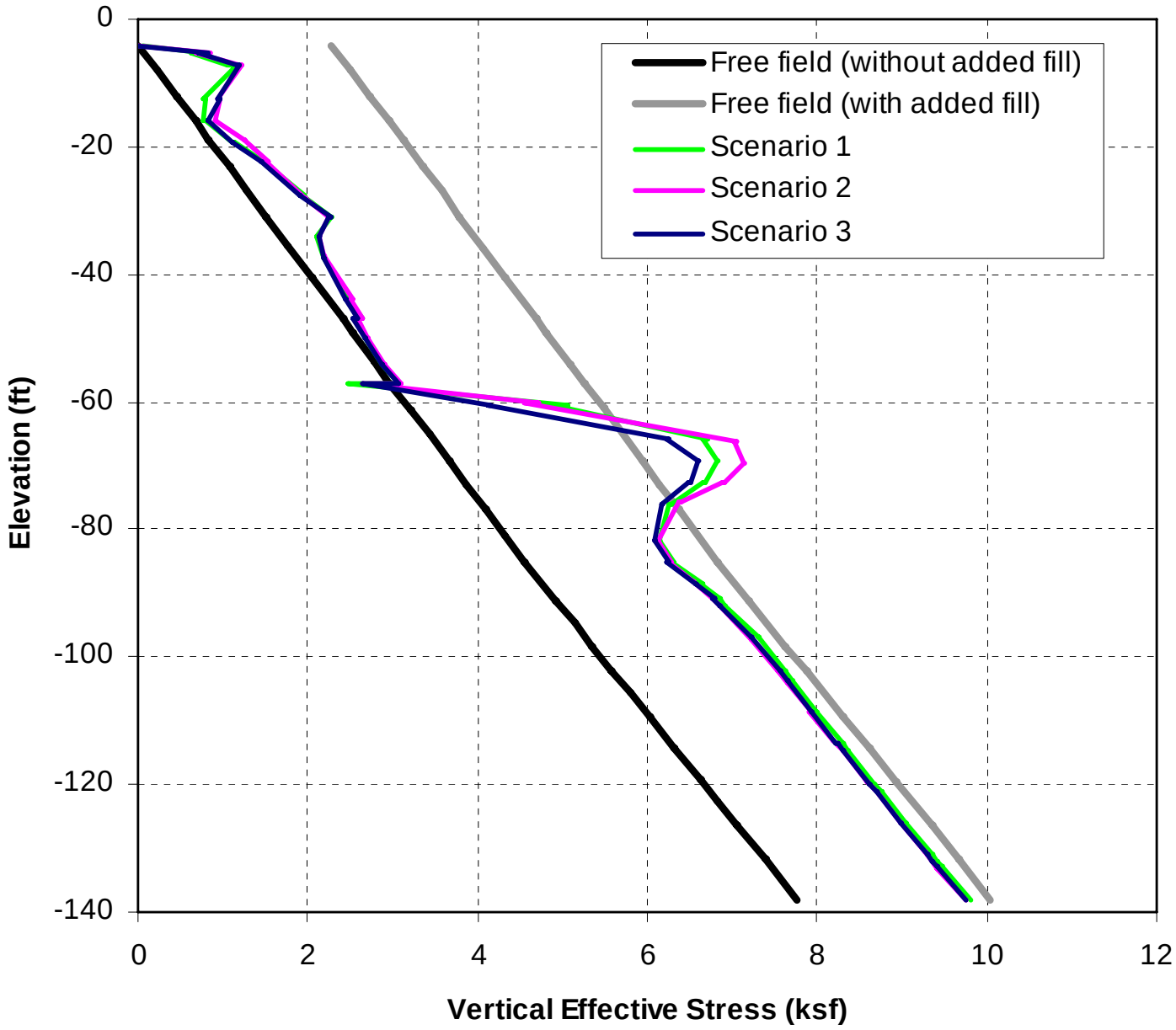


Deformed mesh

Extreme total displacement 560.32*10^{-3} ft
(displacements scaled up 20.00 times)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
		North Side Scenario 3 Results: Stress
Project No. 06-123	Date: 12-20-10	Figure 14



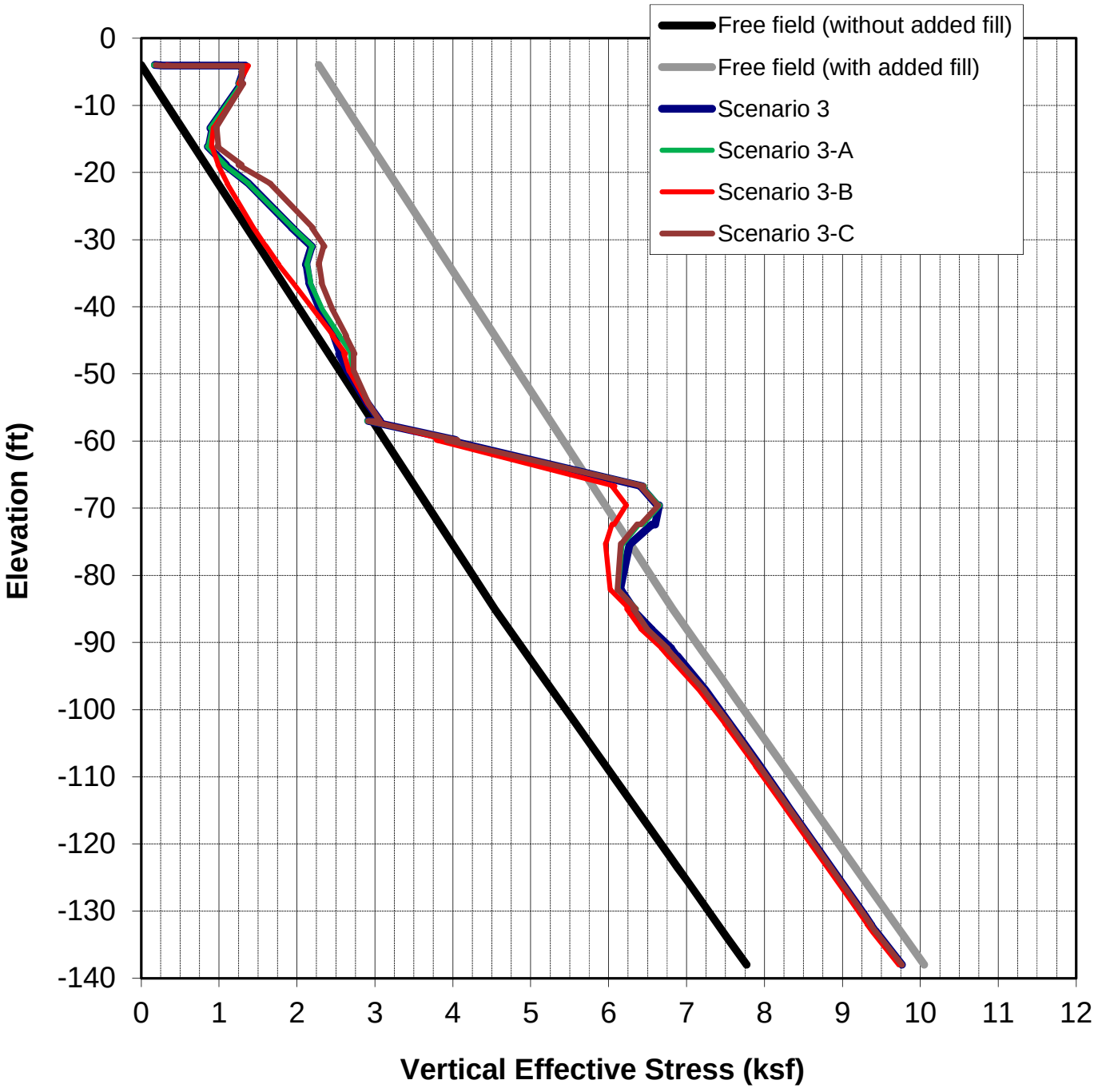
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

North Side Scenarios 1-3 Results: Stress

Project No. 06-123 | Date: 12-20-10

Figure 15

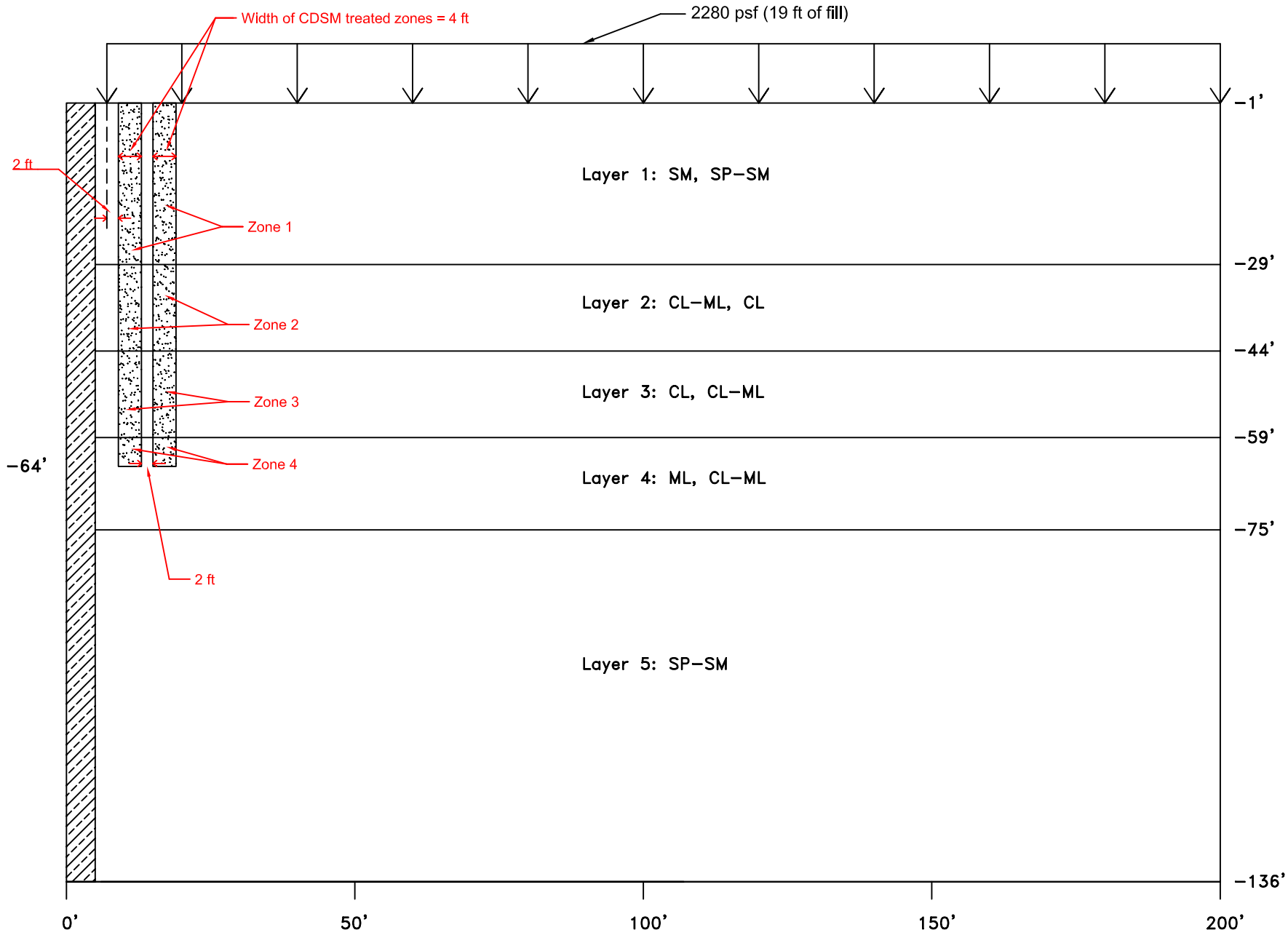


Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

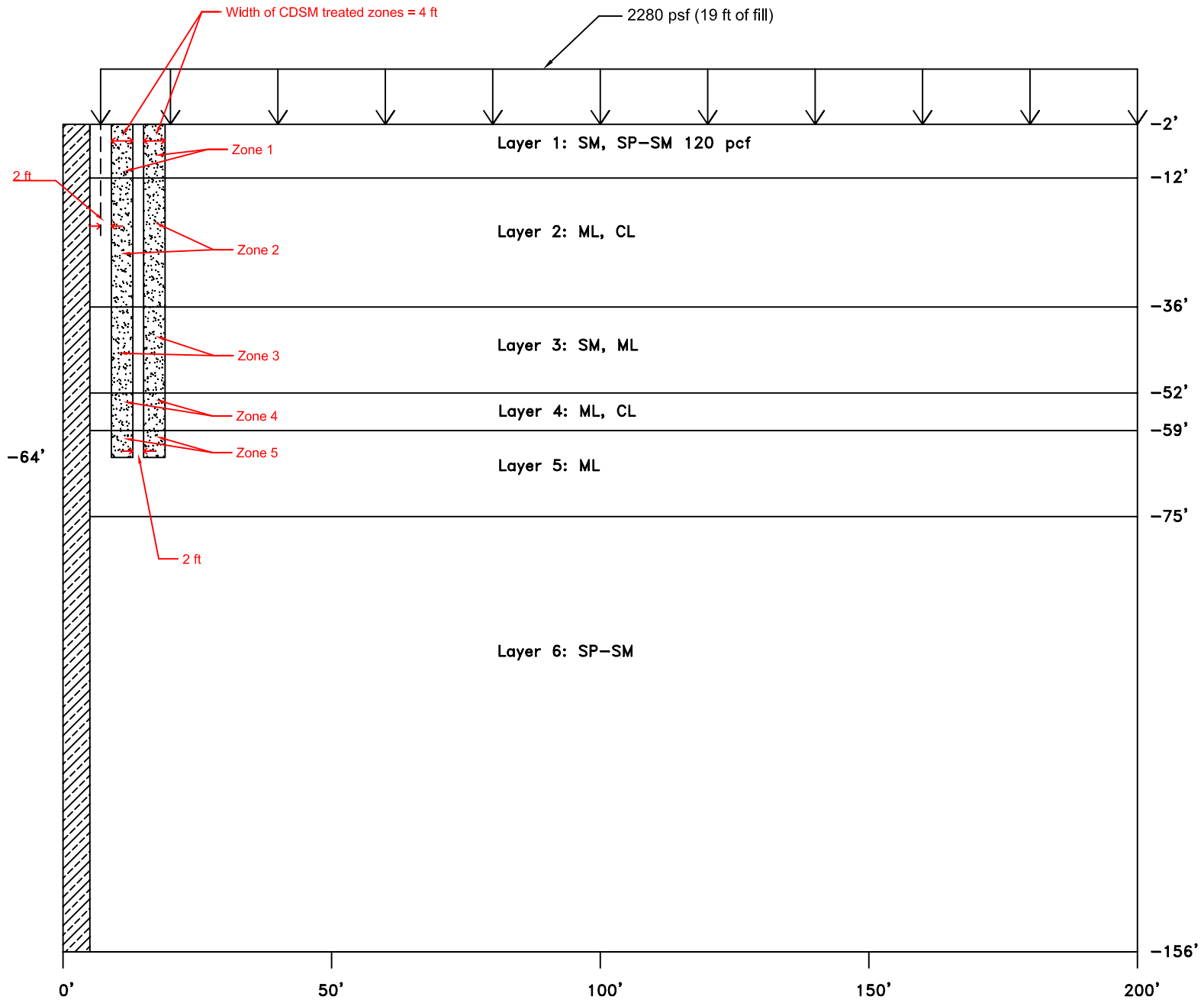
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

North Side Scenarios 3, 3-A, 3-B, and 3-C
Results: Stress

Project No. 06-123 | Date: 2-17-11 | Figure 15a



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT	South Side of Cerritos Channel Bents 5-8 Cross Section
	Project No. 06-123 / Date: 12/20/10	Figure 16



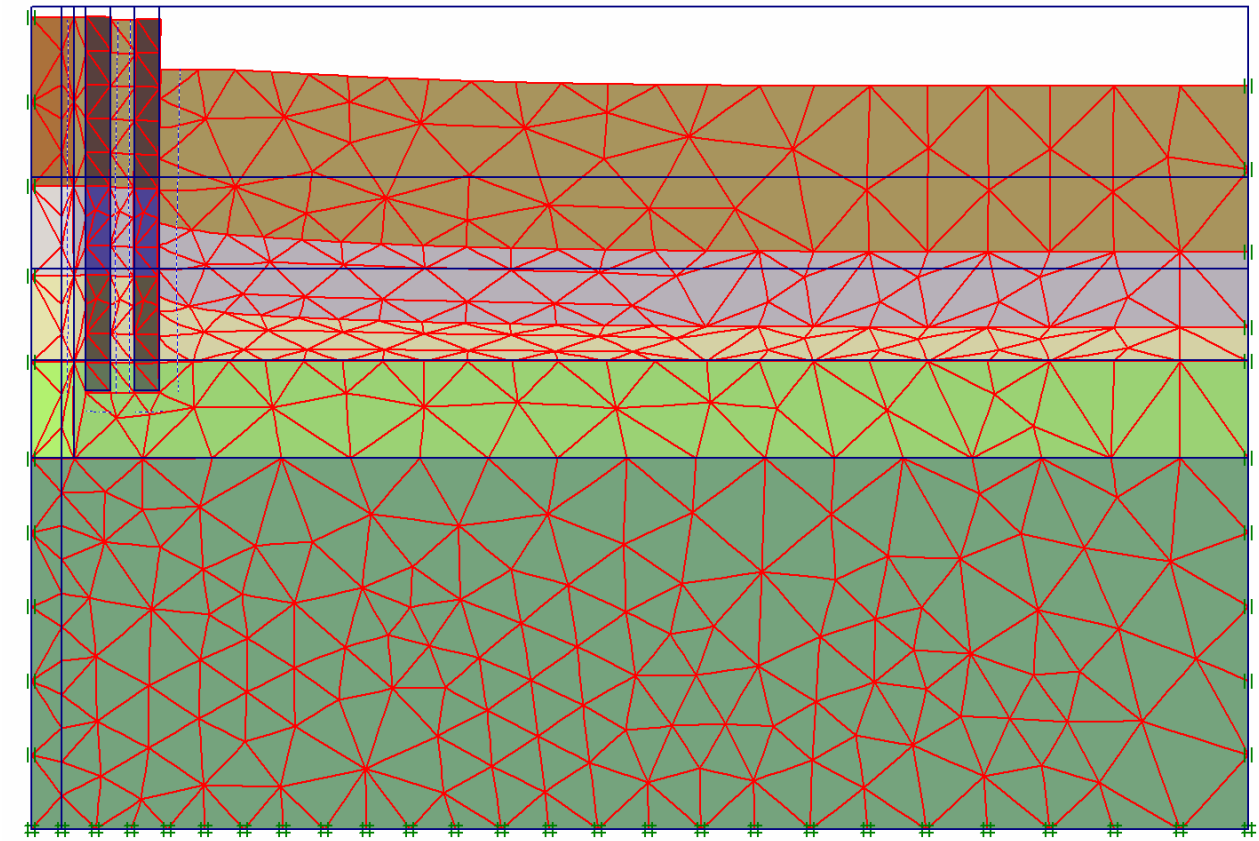
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

Project No. 06-123 | Date: 12/20/10

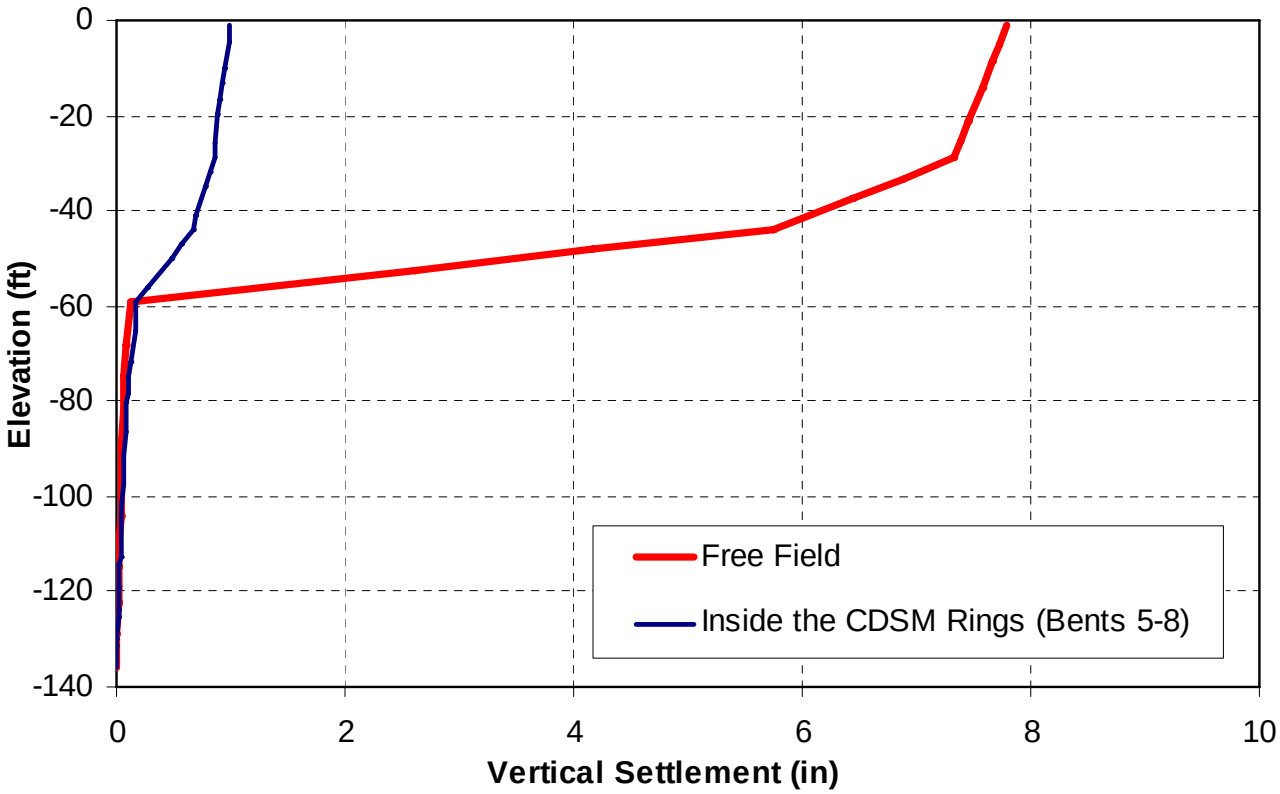
South Side of Cerritos Channel
Bents 9-11 Cross Section

Figure 17



Deformed mesh

Extreme total displacement $649.61*10^{-3}$ ft
(displacements scaled up 20.00 times)



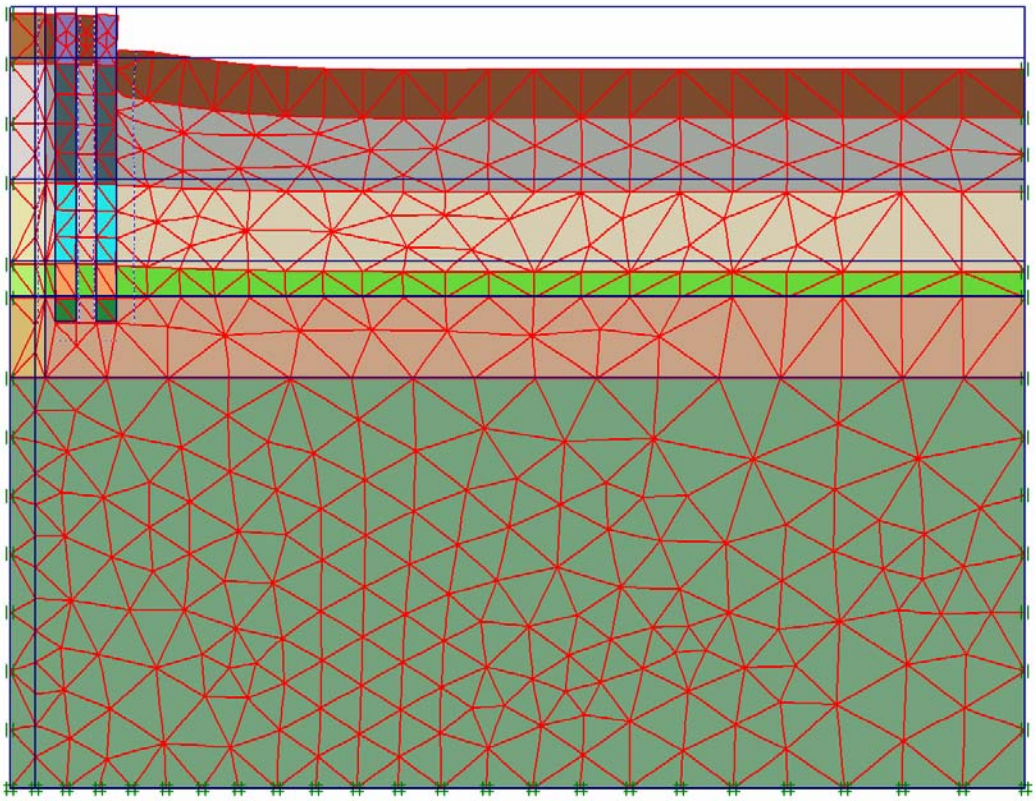
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

South Side Bents 5-8 Results: Settlement

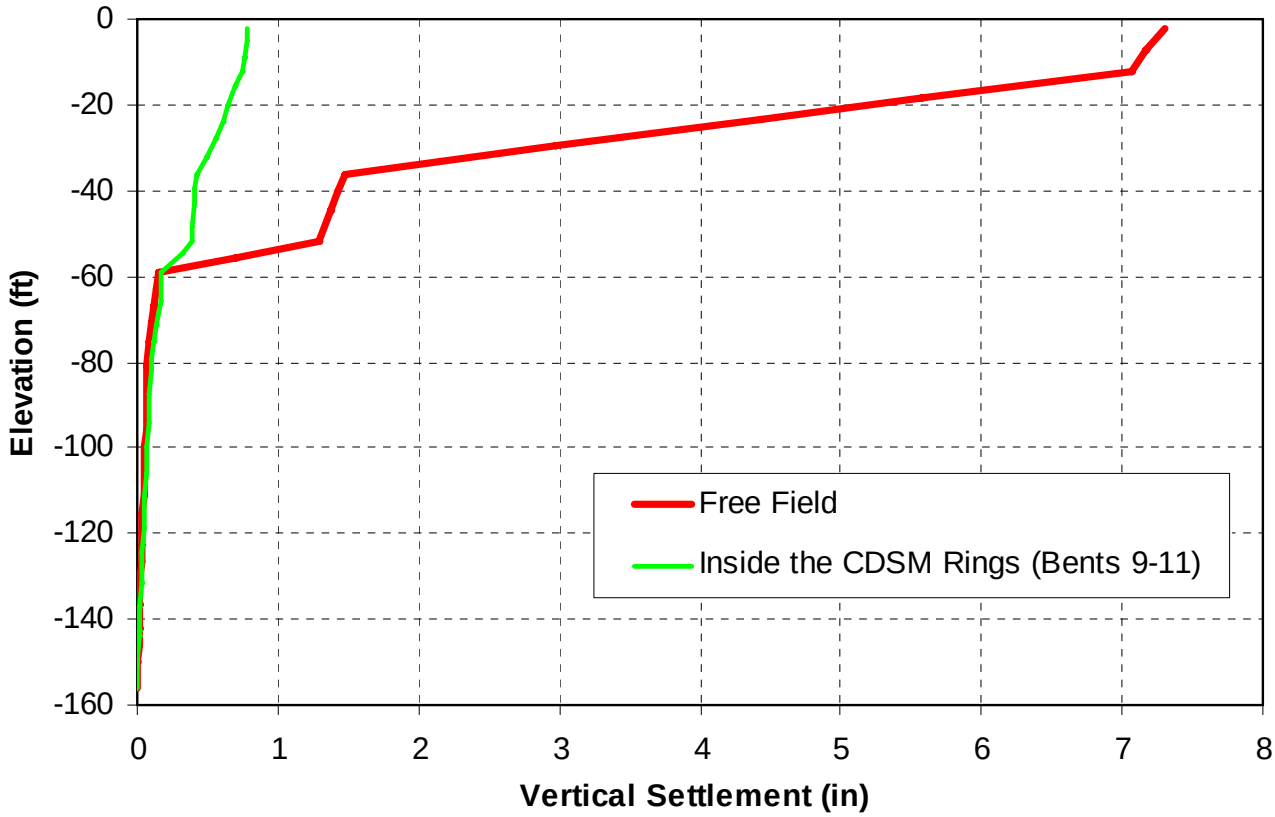
Project No. 06-123 | Date: 12-20-10

Figure 18

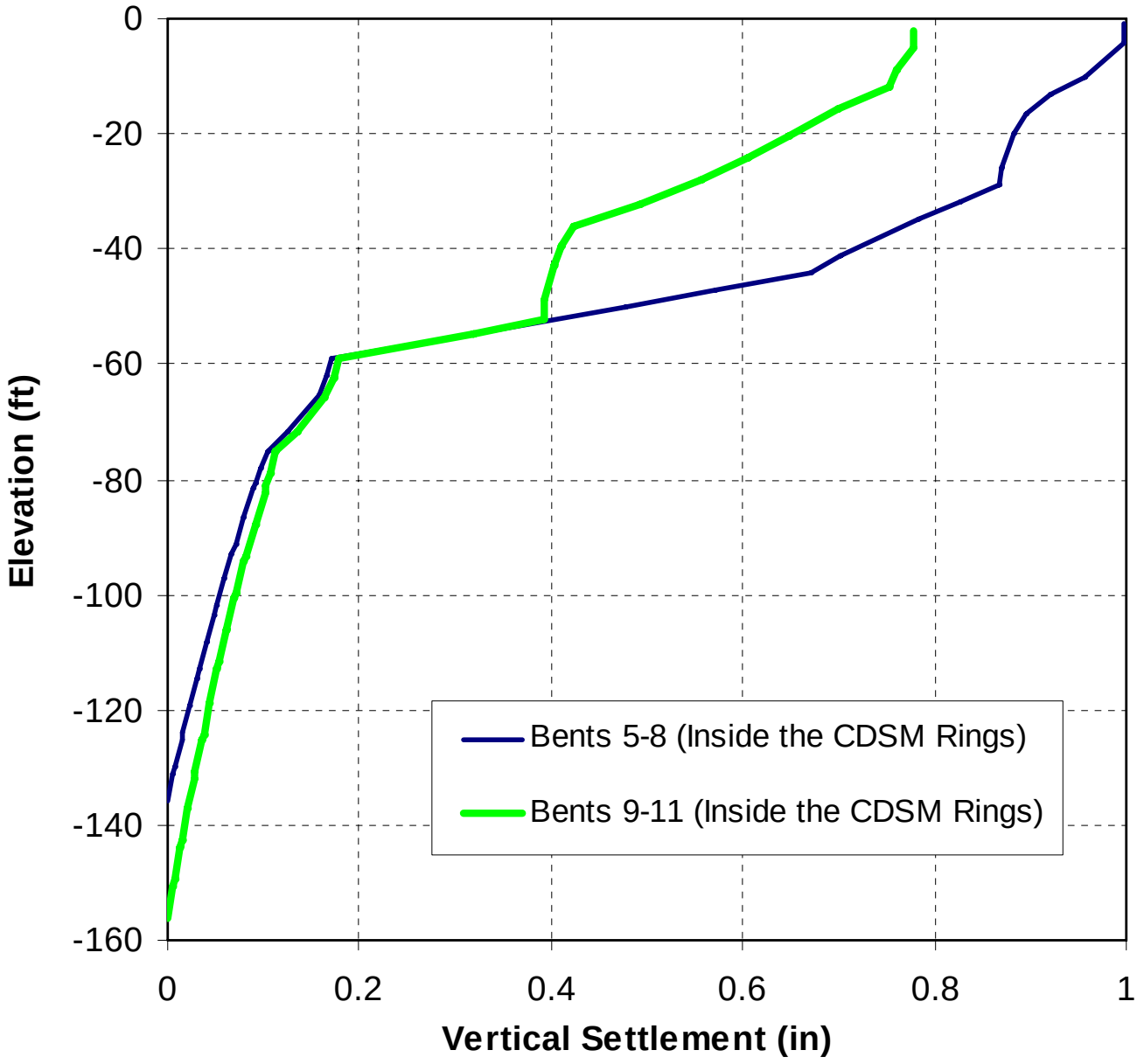


Deformed mesh

Extreme total displacement 615.55*10^{-3} ft
(displacements scaled up 20.00 times)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
Project No. 06-123	Date: 12-20-10	South Side Bents 9-11 Results: Settlement Figure 19

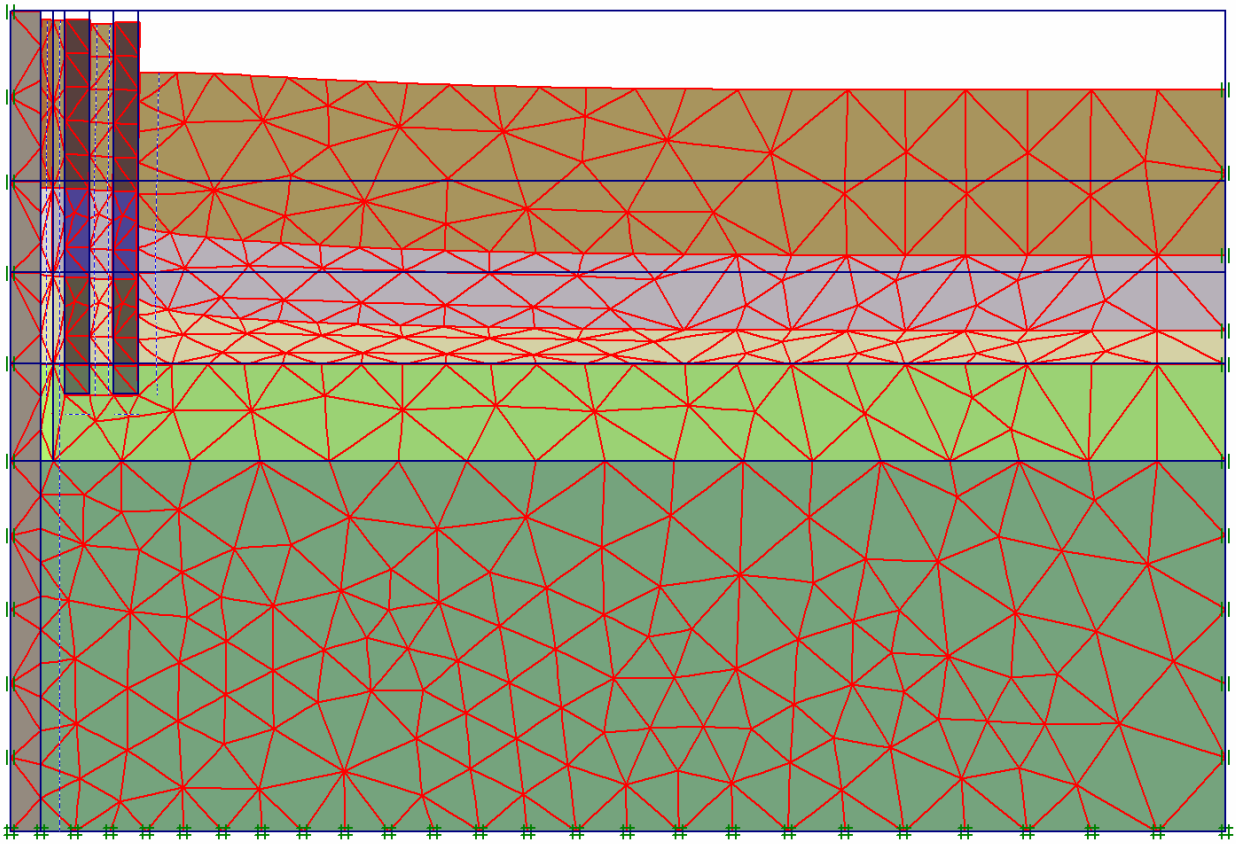


Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

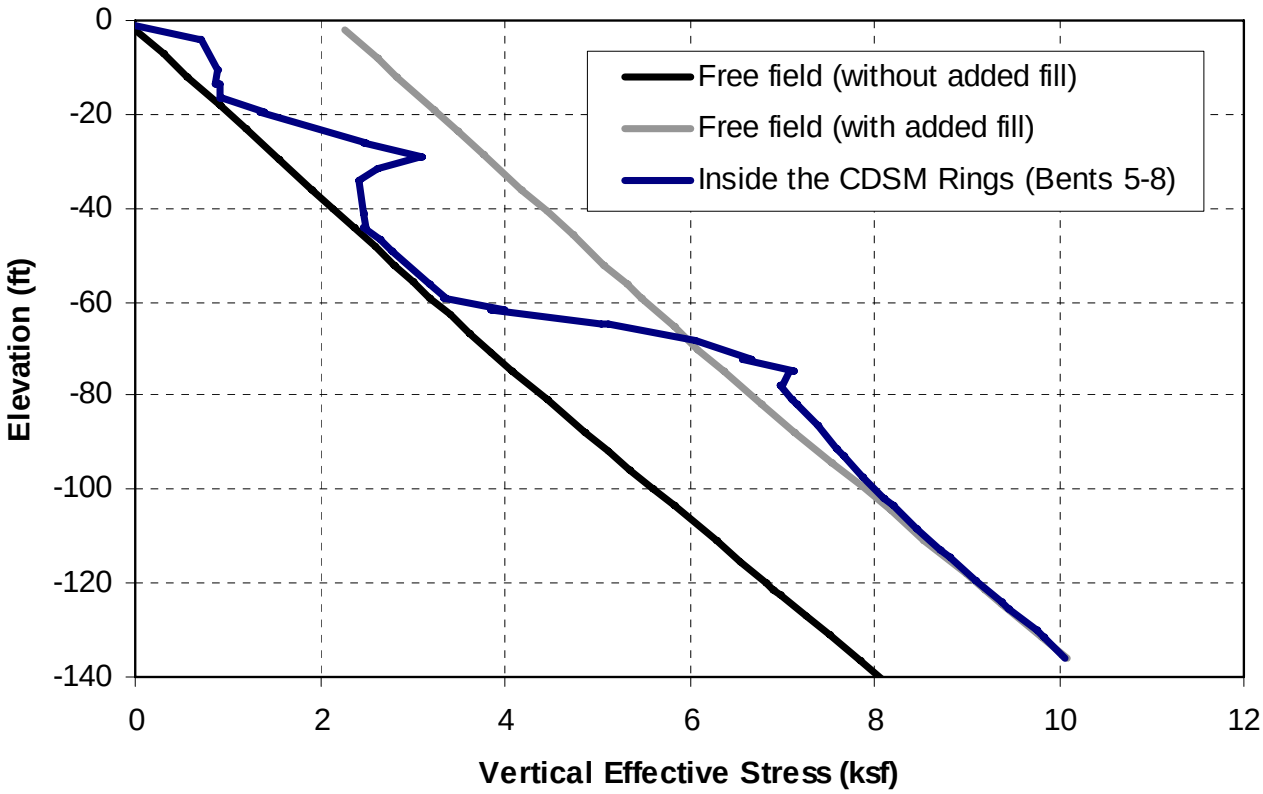
South Side Bents 5-8 and 9-11 Results:
Settlement

Project No. 06-123 | Date: 12-20-10 | Figure 20

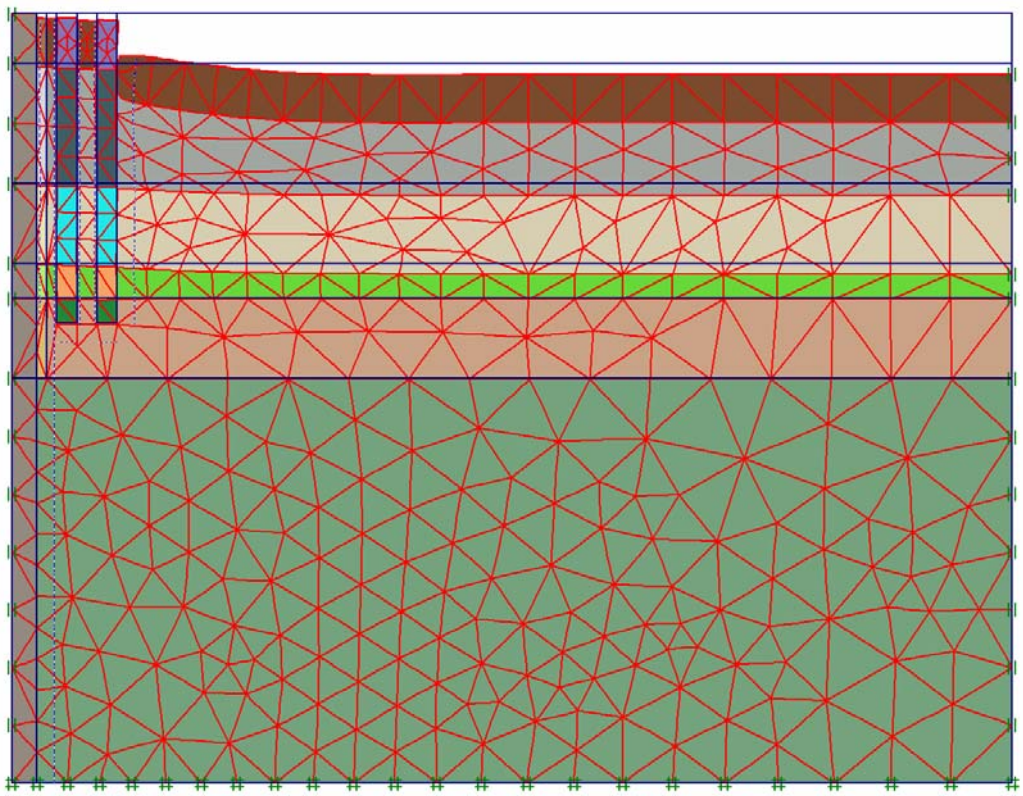


Deformed mesh

Extreme total displacement 649.66*10^{-3} ft
(displacements scaled up 20.00 times)

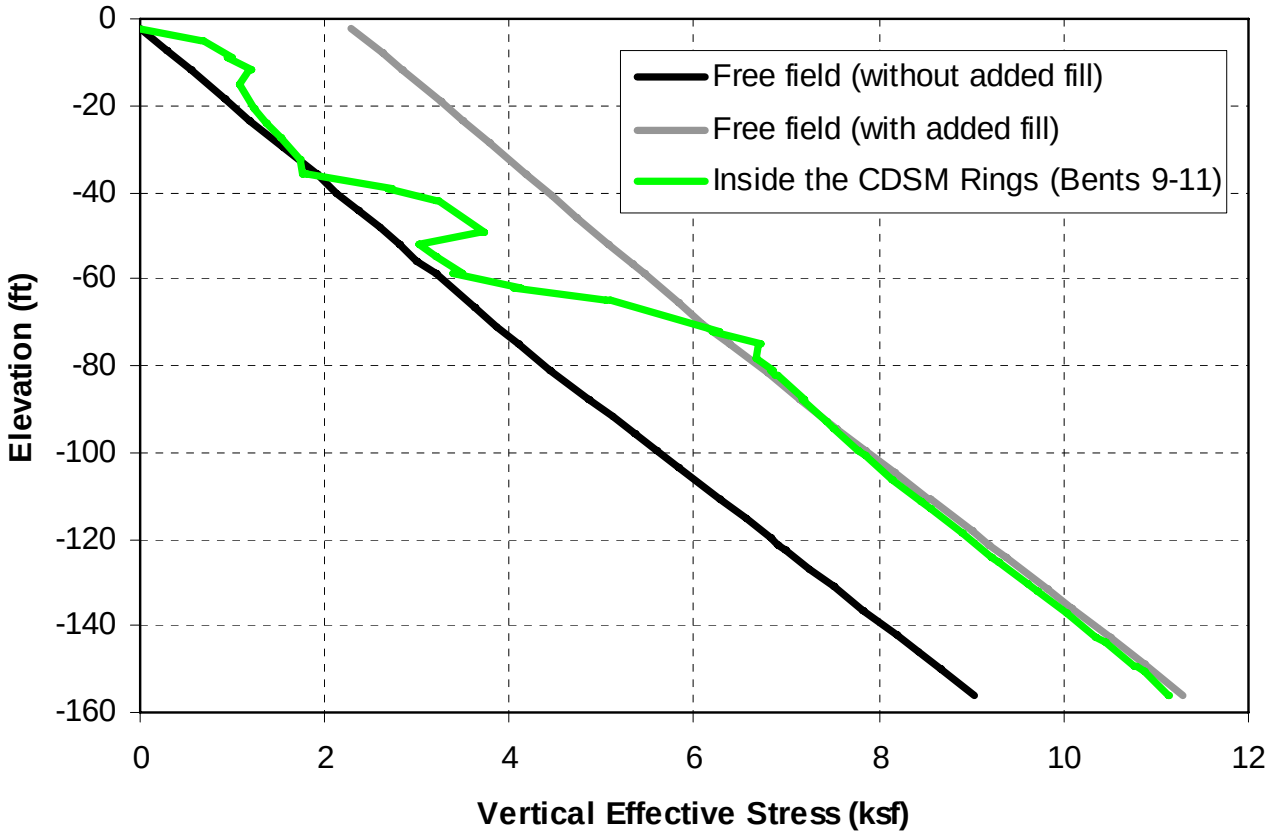


Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
		South Side Bents 5-8 Results: Stress
Project No. 06-123	Date: 12-20-10	Figure 21

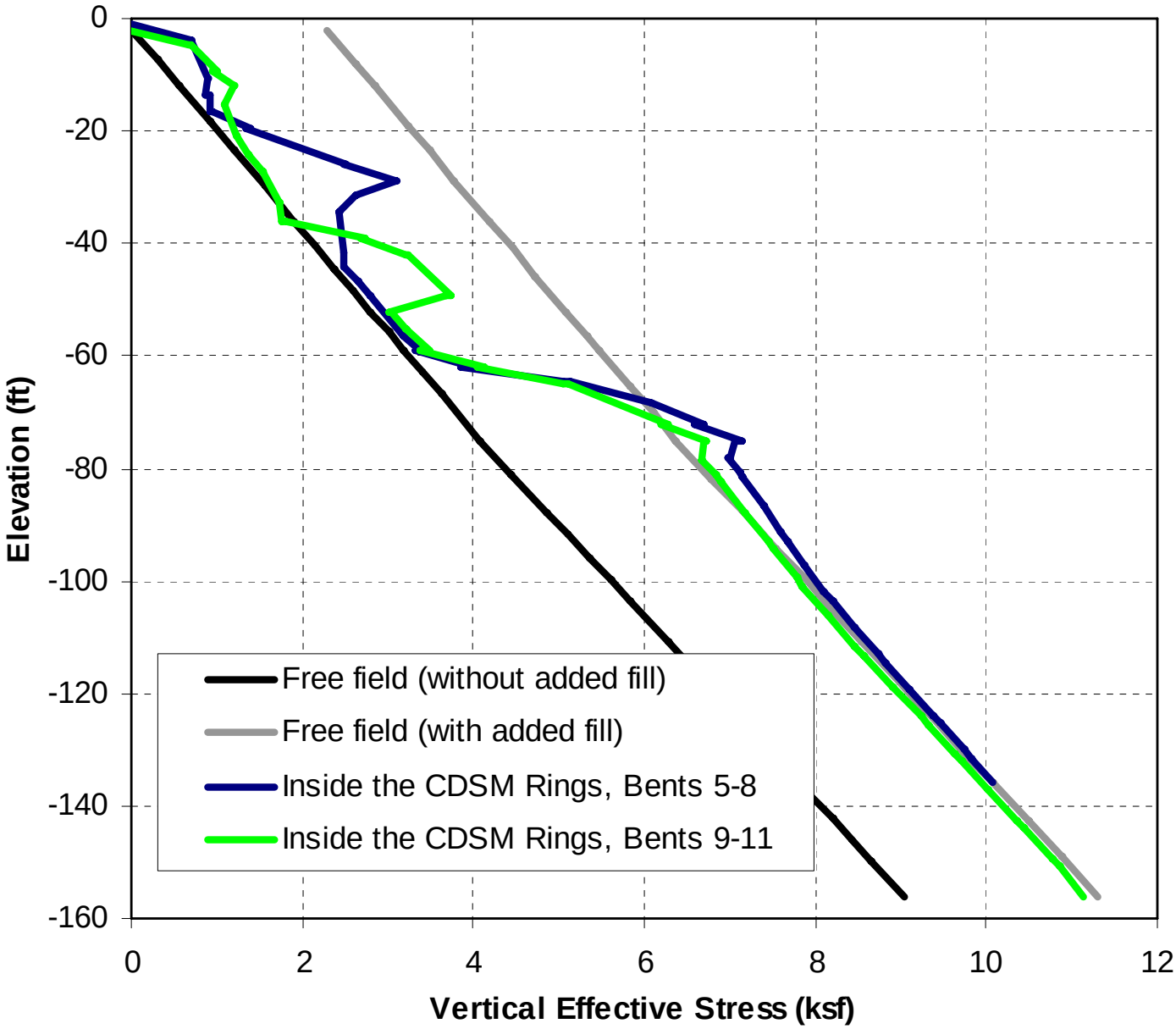


Deformed mesh

Extreme total displacement $615.38*10^{-3}$ ft
(displacements scaled up 20.00 times)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
		South Side Bents 9-11 Results: Stress
Project No. 06-123	Date: 12-20-10	Figure 22



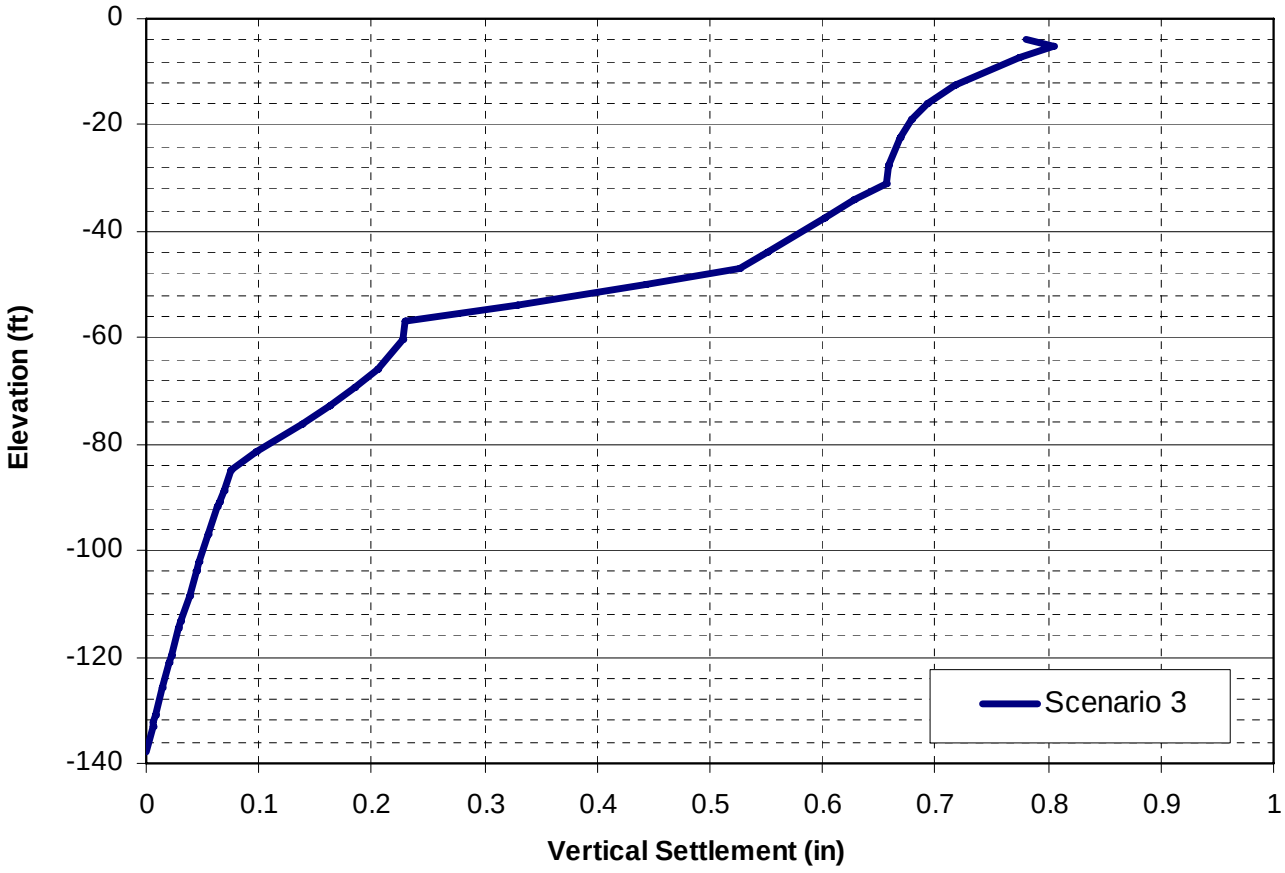
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

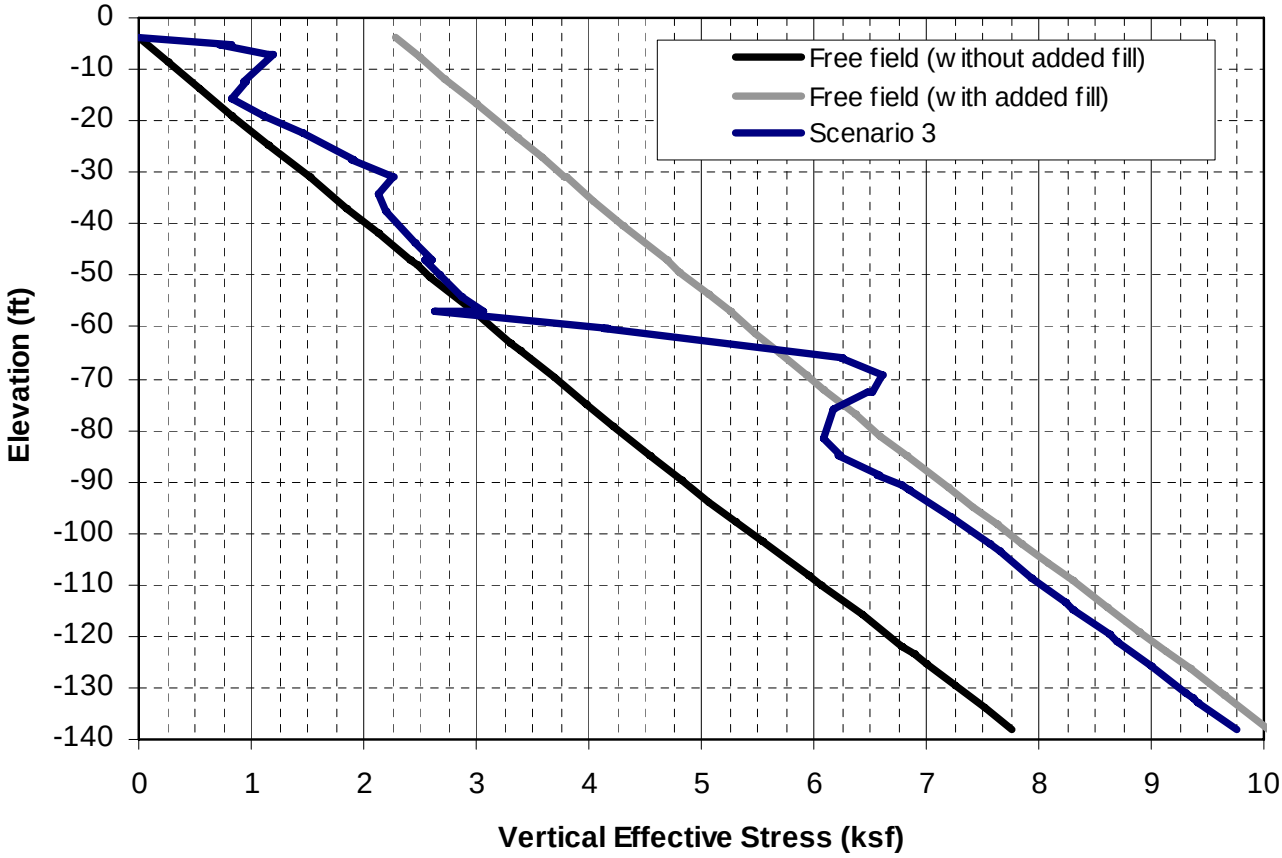
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

South Side Bents 5-8 and 9-11 Results: Stress

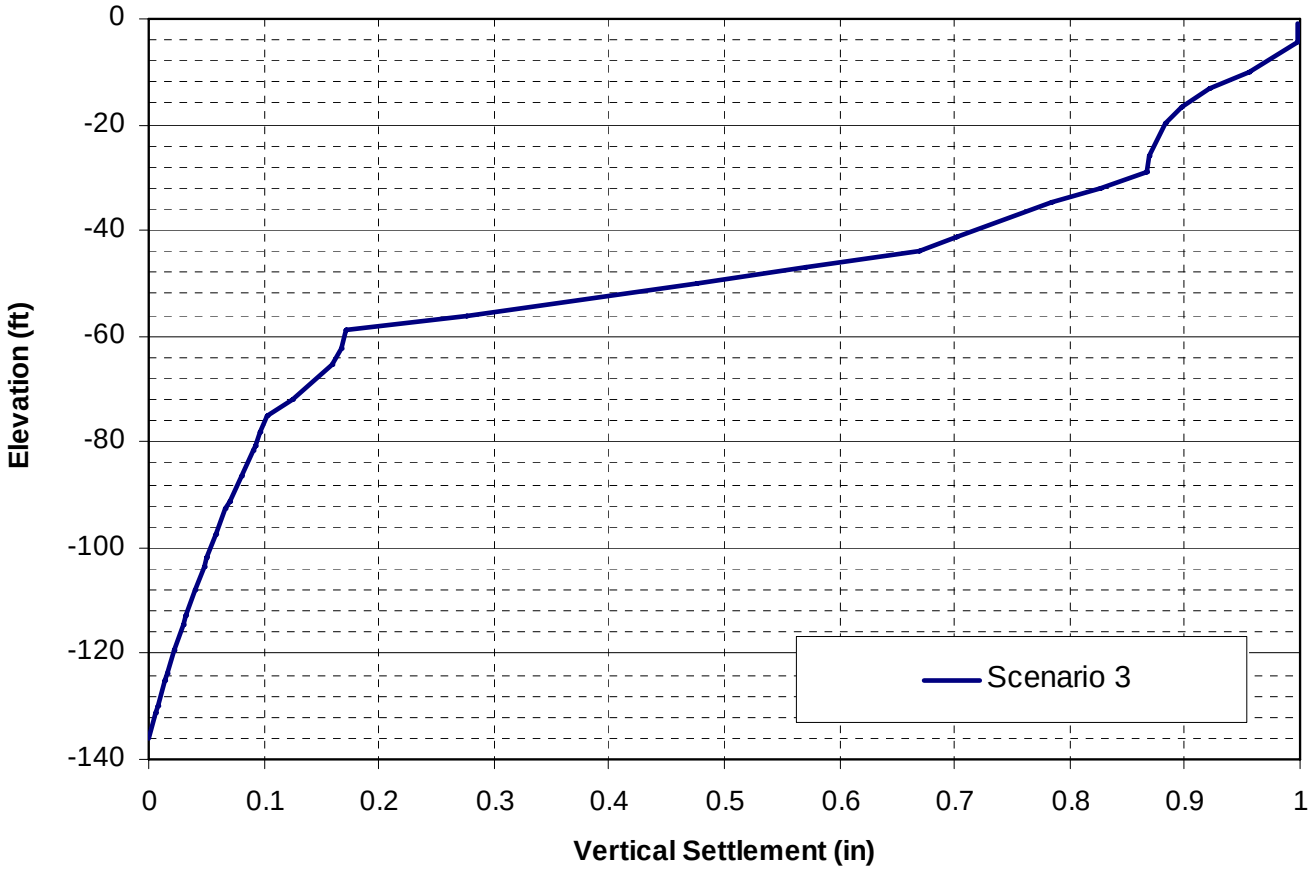
Project No. 06-123 | Date: 12-20-10

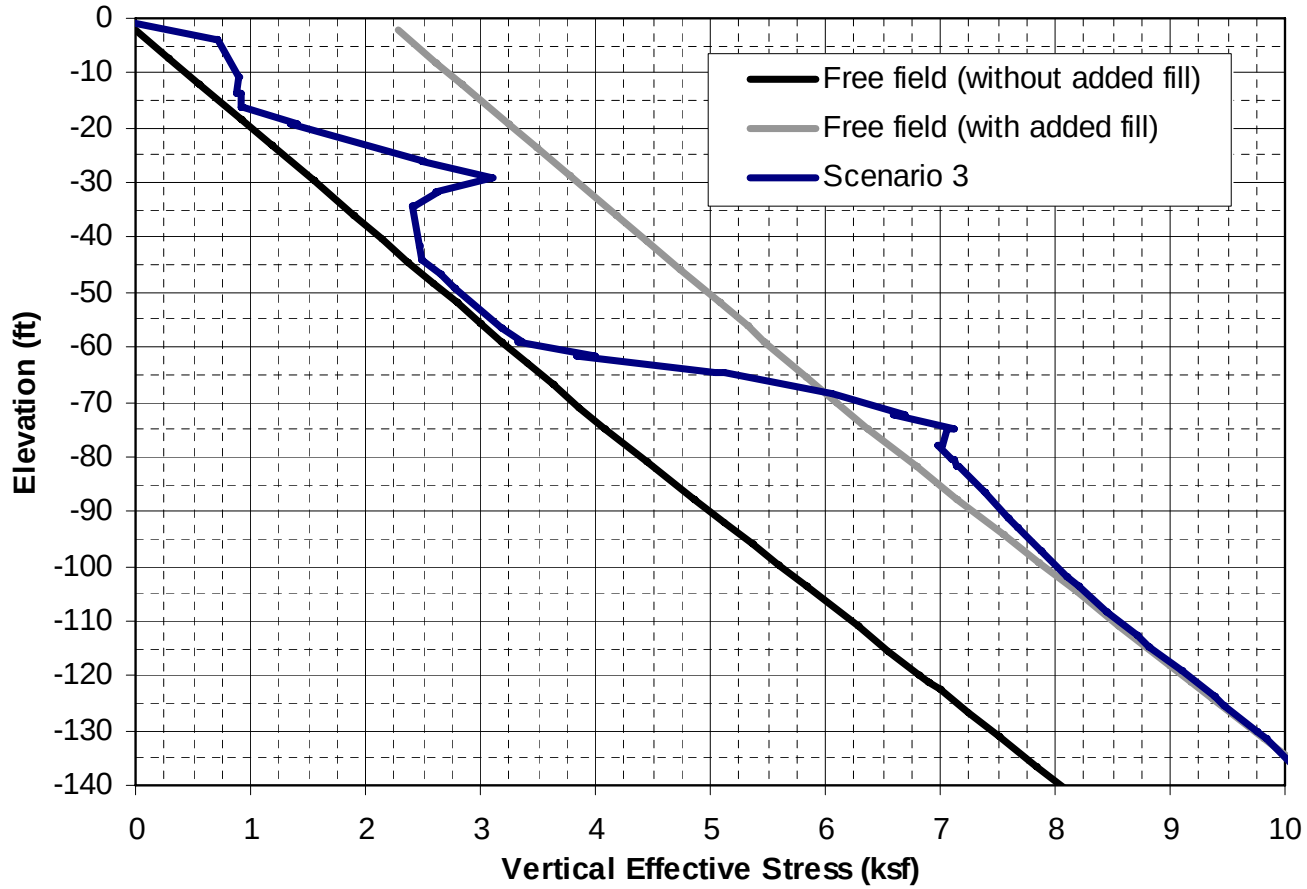
Figure 23





Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
Project No. 06-123	Date: 12-20-10	Final FE Results from the North Side of the Cerritos Channel Figure 24





Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
Project No. 06-123	Date: 12-20-10	Final FE Results from the South Side of the Cerritos Channel Figure 25

FOR ACTA TRACKS

NEXT TO EXISTING WEST MSE WALL

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

TECHNICAL MEMORANDUM

DATE: February 18, 2011 **EMI PROJECT NO:** 06-123-06

PREPARED FOR: Haitao Liu, P.E. / Caltrans

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Foued Zayati, P.E. / Caltrans

PREPARED BY: Patrick R. Wilson, (Arul) K. Arulmoli and (Ranjan) G.J. Gunaranjan / Earth Mechanics, Inc. (EMI)

SUBJECT: ACTA Schuyler Heim Bridge Replacement Project
Los Angeles and Long Beach, CA
Revised Finite Element Analysis of Cement-Deep-Soil-Mix Ground Improvement at Existing MSE Wall

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Introduction

This memorandum summarizes Finite Element (FE) analyses which were conducted in order to evaluate Cement-Deep-Soil-Mix (CDSM) ground improvement as a strategy for minimizing adverse effects associated with raising grade on the east side of an existing north-south trending MSE wall and the existing ACTA rail lines, located west of the MSE wall.

It is our understanding that during or after construction of the proposed Schuyler Heim Bridge (Replacement), the existing grade underneath the bridge and extending west to the north-south trending MSE wall will be raised by as much as 19 ft. Raising grade will cause settlement of the underlying soils. In particular, the fine-grained soil layers underneath the MSE wall and the rail lines are expected to experience cumulative settlement on the order of 3 inches.

Figure 1 shows the project location and the approximate alignment of the existing MSE wall, rail lines, and Schuyler Heim Bridge Replacement. It is our understanding that the grade elevation on the east side of the MSE wall (toe side) will be raised, and the grade elevation on the west side (heel side), where the ACTA rail lines are located, will not be changed. This change is expected to improve the wall stability, or possibly even render the wall unnecessary. Consequently, the MSE wall performance after fill placement is not a concern.

However, it is our understanding that settlement underneath the existing ACTA rail lines is a concern. In order to help reduce this settlement, a CDSM ground improvement strategy is being proposed. FE analyses of the proposed CDSM configuration are presented in this memo in order to address the settlement of the existing rail lines.

Subsurface Conditions and Estimated Settlement

One representative soil profile was developed for the settlement analyses based on the subsurface information provided in Addendum 2 to the Schuyler Heim Bridge Foundation Report (EMI, 2011a). Locations with the thickest, weakest fine-grained soil layers, and those extending to the lowest elevations, were conservatively selected for the profile. A general description of the soil profile is included in Table 1.

Standard procedures were used to evaluate consolidation settlement of the soils underlying the rail lines due to the proposed fill. In this process, the geometry of the problem was taken into account including the location of the rail lines, existing MSE wall and backfill and the location where the new fill we be placed. Consolidation settlement is directly related to the depth of fill and the thickness of compressible soil layers. The maximum expected fill depth at any location was conservatively used in the settlement evaluations. As mentioned, the soil profile (Table 1) for the analyses was conservatively developed with the thickest compressible soil layers. The estimated consolidation settlements at the location of the center of the eastern-most rail line (closest to the fill) are included in Table 1. The immediate settlement is not included in the values listed in Table 1, as it is accounted for in the FE model simulations (discussed later) according to the assigned stiffness parameters.

Table 1 shows that total ground settlements on the order of 3 inches are anticipated to occur beneath the center of the eastern-most rail line. In order to reduce this settlement, one row of CDSM ground improvement, 4 ft in width with an Area Replacement Ratio (ARR) of 75%, extending down to El. -62 ft, has been proposed to be installed along the length of the existing MSE wall, on its east side (Figure 1).

Lab Testing of CDSM

Several unconfined compression (UC) and unconsolidated undrained (UU) triaxial tests were performed on field samples mixed with different percentages of cement to determine relevant material properties. Selected test results are included in a separate technical memorandum (EMI, 2011b).

FE Analysis Using Plaxis 2D

Similar to the analyses performed regarding the pile foundations (EMI, 2011b), the commercially available software Plaxis 2D (2004) was used to conduct the FE analyses presented in this memo. The modeling details are the same as those provided in EMI (2011b), with a few exceptions which are discussed below.

Figure 2 shows the cross section used for the analyses. The parameters used in the model are listed in Table 2. Figure 2 also shows the locations of the Soil Layers and Zones referred to in Table 2.

Plane Strain Configuration

Plaxis 2D offers both axis-symmetric and plane strain model configurations. Plane strain modeling is generally used when the problem geometry has a more or less uniform cross section, loading scheme and state of stress over a certain length (Plaxis, 2004). Taking a conservative soil profile and using the tallest fill height (19 ft) along the length of the MSE wall, a plane strain model is capable of providing a view of the conservative response at a cross section perpendicular to the wall. Accordingly, the plane strain modeling mode was used for the conducted analyses.

Loading Sequence

The analyses were performed considering two situations:

1) Raising grade on the east side of the MSE wall without performing CDSM ground improvement; and

2) Performing CDSM ground improvement first, then raising grade on the east side of the MSE wall.

Sequentially applied construction stages were used for these scenarios as follows:

Stage 1: Apply gravity assuming a level-ground configuration (before the existing MSE wall was built).

Stage 2: Add the MSE wall and backfill.

Stage 3: Reset the displacements to zero. For the second situation only, activate the CDSM treated soil zones.

Stage 4: Raise the grade elevation on the east side of the MSE wall.

Simulation Results

Figures 3-5 describe the overall model configurations and results. Figure 3 shows the model configurations. The deformed mesh from after raising grade elevation on the east side of the MSE wall (Stage 4), with and without the CDSM ground improvement, is shown in Figure 4 (with displacements scaled up by a factor of 10). By visual comparison of the two situations shown in Figure 4, it can be seen that the CDSM ground improvement allows the ground surface behind the MSE wall to remain much more level and undergo noticeably less settlement, as compared to the non-mitigated case.

Figure 5 shows the settlement profile along a vertical section below the eastern edge of the rail lines (at the location where the largest settlement under the rail lines occurs). From Figure 5, the model predicts that the ground settlement at this location is reduced from greater than 3 inches to less than 1 inch by performing the CDSM ground improvement prior to raising grade. ACTA considers that settlements of less than 1 inch for the rail lines are acceptable, as they can be accommodated by re-ballasting the tracks.

Additional Analyses with Reduced Soil Layer and CDSM Zone Modulus Values

Based on comments provided by Caltrans and new lab test data, additional simulations were run with lower modulus values in some soil layers and CDSM zones in order to test the sensitivity to these parameters. The following 2 additional FE model simulations were conducted, where all model aspects were the same as those for the baseline model discussed above except for the following noted changes (see Table 2 for the original baseline parameters):

Scenario 1: The modulus values for Soil Layers 1, 3, 5 and 6 were reduced by 50% (the modulus values for Soil Layers 2 and 4 are already very low due to reduction to account for consolidation settlement and so they were not further reduced for this scenario).

Scenario 2: The modulus values of Scenario 1 were adopted for the soil layers. In addition, the modulus values for CDSM Zones 1, 3 and 4 were reduced to E = 7250 ksf.

Results from these additional simulations are shown in Figure 6.

Conclusions

FE model simulations were conducted considering a range of stiffness parameters in order to evaluate the proposed CDSM ground improvement configuration for mitigating adverse impacts on the rail line located west of an existing north-south trending MSE wall due to raising the existing grade by up to 19 ft. Results from this investigation suggest that by installing a single row of CDSM ground improvement, 4 ft in width with an ARR of 75% extending down to El. -62 ft, prior to raising the grade, the ground settlement that will occur beneath the existing rail lines will be reduced to less than about 1 inch (for the full range of investigated stiffness parameters), which is a level that can be reasonably accommodated.

References

Earth Mechanics, Inc. (EMI), 2011a, “Revised Addendum 2 to the Final Foundation Report, Schuyler Heim Bridge (Replace), Bridge No. 53-3032, Los Angeles County, California,” Report prepared for Alameda Corridor Transportation Authority, Carson, California, Under Preparation.

EMI, 2011b, “Revised Finite Element Analysis of Cement-Deep-Soil-Mix Ground Improvement at Pile Foundations,” Technical Memorandum prepared for Caltrans, Sacramento, California, February 17, 2011.

Plaxis b.v., 2004, Plaxis 2D - Version 8 Reference Manual, A.A. Balkema Publishers.

Table 1. Soil profile considered for the analyses

Approximate Elevation (ft)	Predominant Soil Type	Estimated Consolidation Settlement under the Centerline of the Eastern-Most Rail Line due to 19 ft of Added Fill (inches) [1, 2]
Existing grade to -7	Loose to Medium-Dense Clayey Sand, Silty Sand	< 0.1
-7 to -22	Soft to Stiff Sandy Clay, Sandy Silt	0.9
-22 to -32	Medium Dense to Dense Silty Sand	< 0.1
-32 to -55	Medium Stiff to Stiff Sandy Silt, Sandy Clay, Medium Dense Silty Sand	1.6
-55 to -72	Very Dense Sand with Silt	< 0.1
-72 to -79	Very Stiff to Hard Sandy Silt	< 0.1
Below -89	Dense to Very Dense Sand with Silt (Gaspur Formation)	< 0.1

Notes:

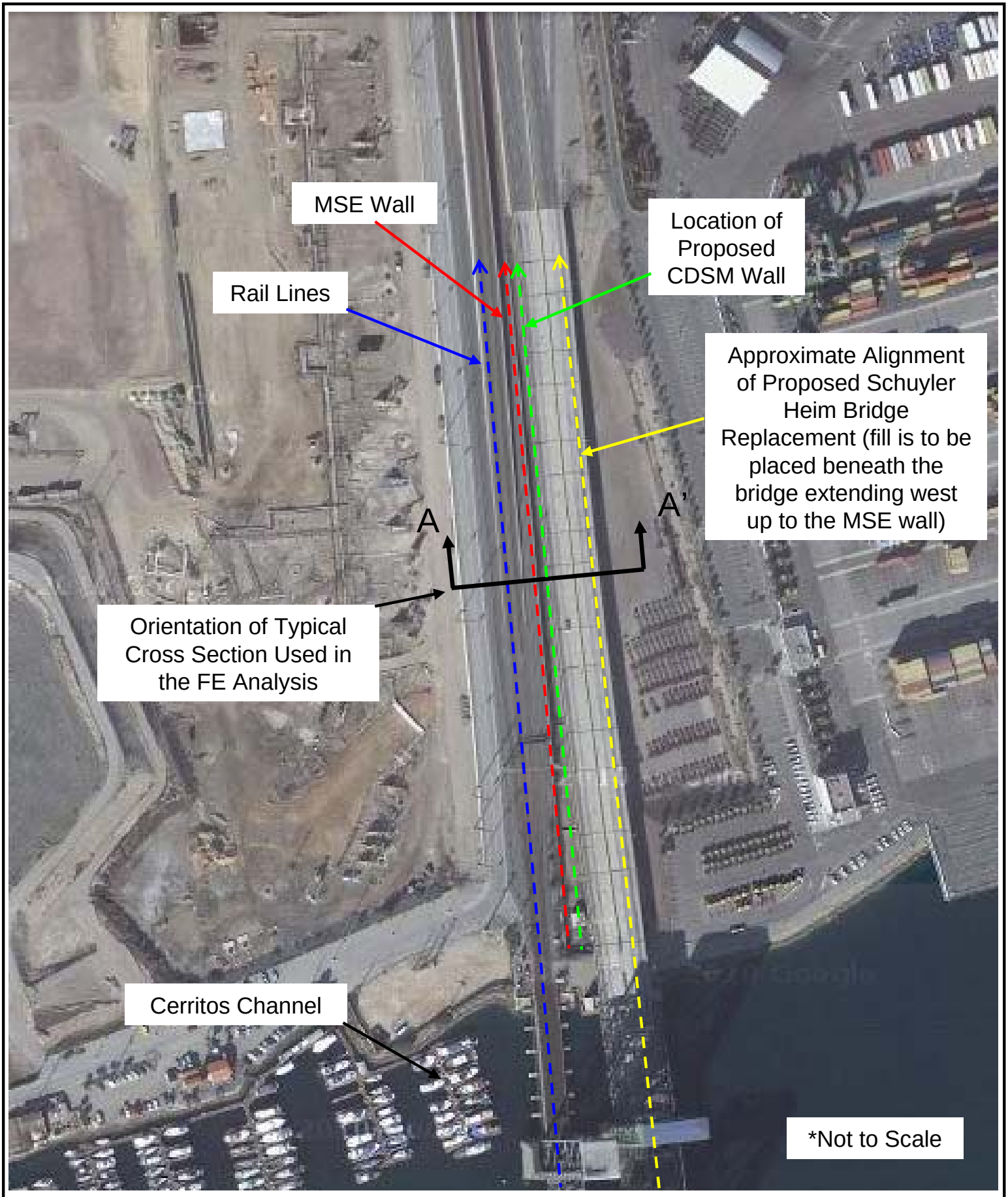
[1] Does not include the immediate settlement under the added fill.

[2] These estimates are only to be used for the purpose of developing soil profiles for the FE analyses.

Table 2. Plaxis Model Input Parameters

Layer/Zone	Material Model	Unit Wt. (pcf)	ϕ (deg)	c (ksf)	E (ksf)	Poisson's Ratio, ν
Soil Layer 1	M-C [1]	120	32	0.1	1000 [2]	0.3
Soil Layer 2	M-C [1]	120	0	0.6	75 [3]	0.2
Soil Layer 3	M-C [1]	120	33	0	2000 [2]	0.3
Soil Layer 4	M-C [1]	120	0	1.25	100 [3]	0.2
Soil Layer 5	M-C [1]	120	36	0	4000	0.3
Soil Layer 6	M-C [1]	120	0	3	5000	0.3
Soil Layer 7	M-C [1]	125	38	0	20000	0.3
CDSM Zone 1	M-C [1]	130	0	7.5 [4]	13500 [4]	0.2
CDSM Zone 2	M-C [1]	130	0	7.5 [4]	5625 [4]	0.2
CDSM Zone 3	M-C [1]	130	0	7.5 [4]	13500 [4]	0.2
CDSM Zone 4	M-C [1]	130	0	7.5 [4]	9000 [4]	0.2
CDSM Zone 5	M-C [1]	130	0	7.5 [4]	13500 [4]	0.2
MSE Wall/Soil	L-E [5]	130	NA	NA	1000	0.3

Notes:
[1] Mohr-Coulomb (perfect plasticity) Model (Plaxis, 2004).
[2] Based on shear wave velocity profile with a 50% reduction.
[3] Calibrated (reduced) to allow consolidating layers to undergo settlement matching hand calculation at the location of the rail line.
[4] Includes a 25% reduction to account for an Area Replacement Ratio (ARR) of 75%.
[5] Linear Elastic Model (Plaxis, 2004).



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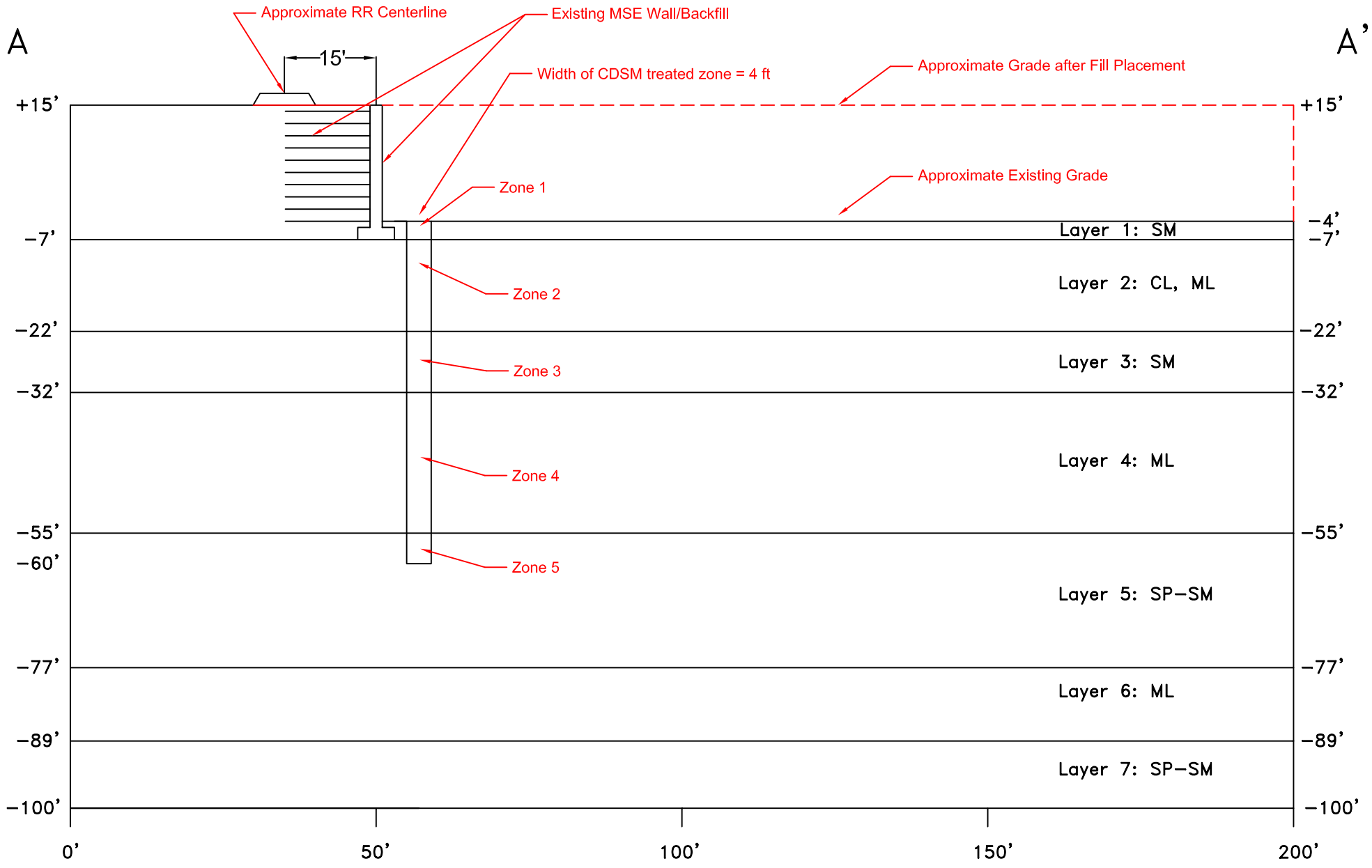
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

Project Location Map

Project No. 06-123 | Date: 12-29-10 | Figure 1



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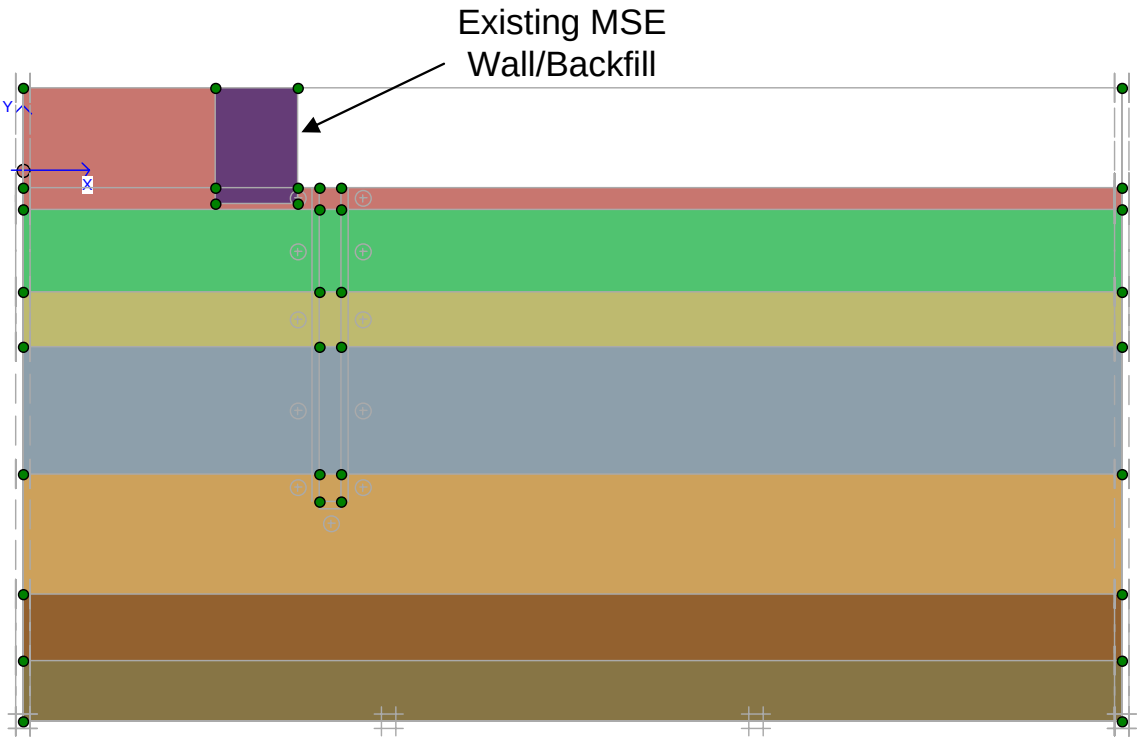
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

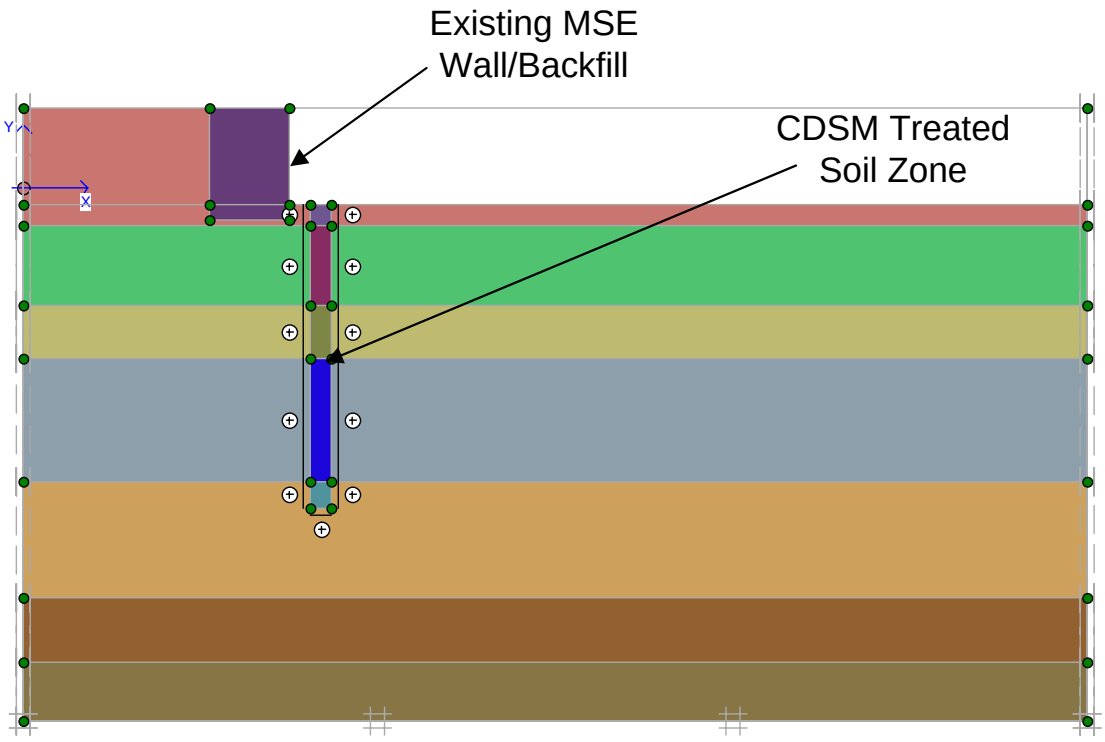
Project No. 06-123 | Date: 12/29/10

MSE Wall Cross Section for FE Analysis

Figure 2

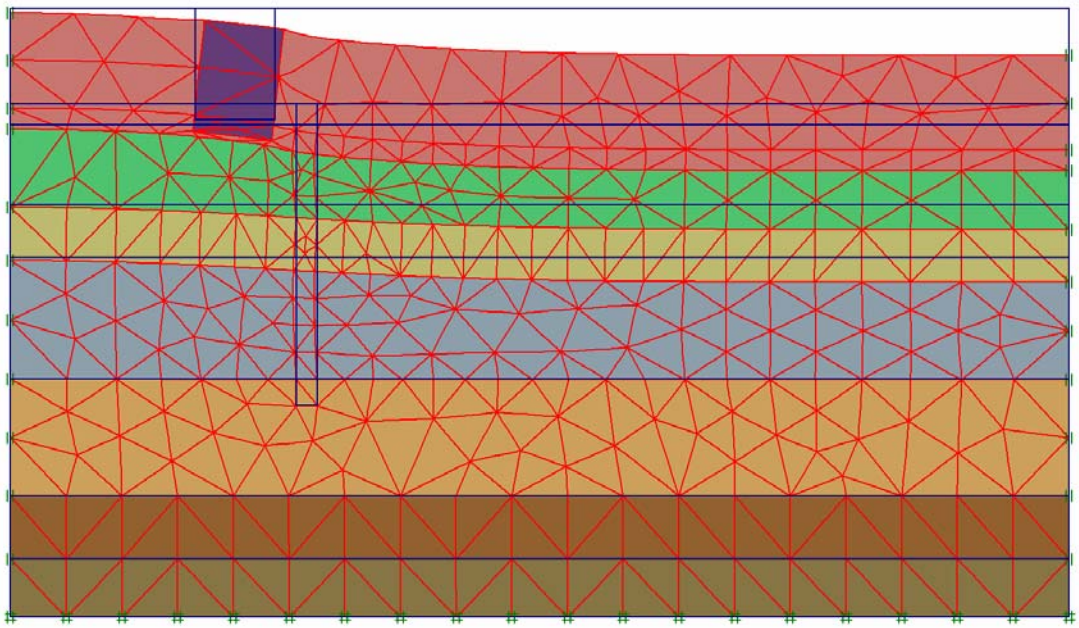


Non-Mitigated Case

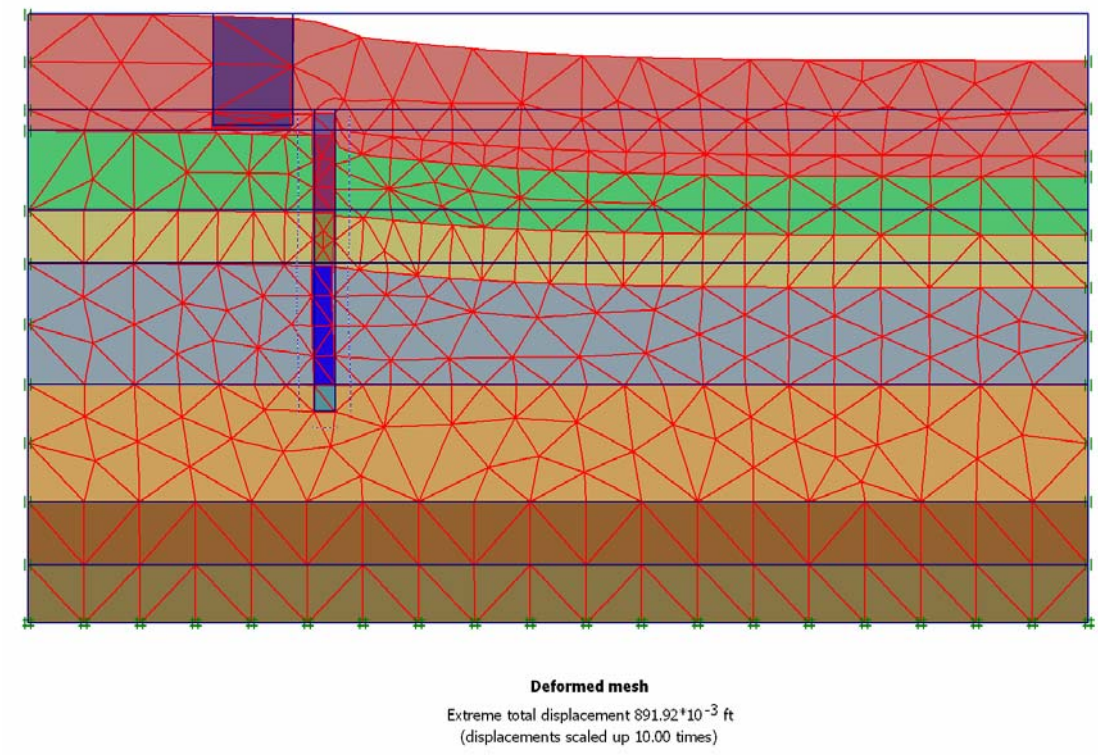


1 Row of CDSM Treated Soil Installed on the East Side of the MSE Wall

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
		MSE Wall FE Analysis: Before Fill Placement
Project No. 06-123	Date: 12-29-10	Figure 3

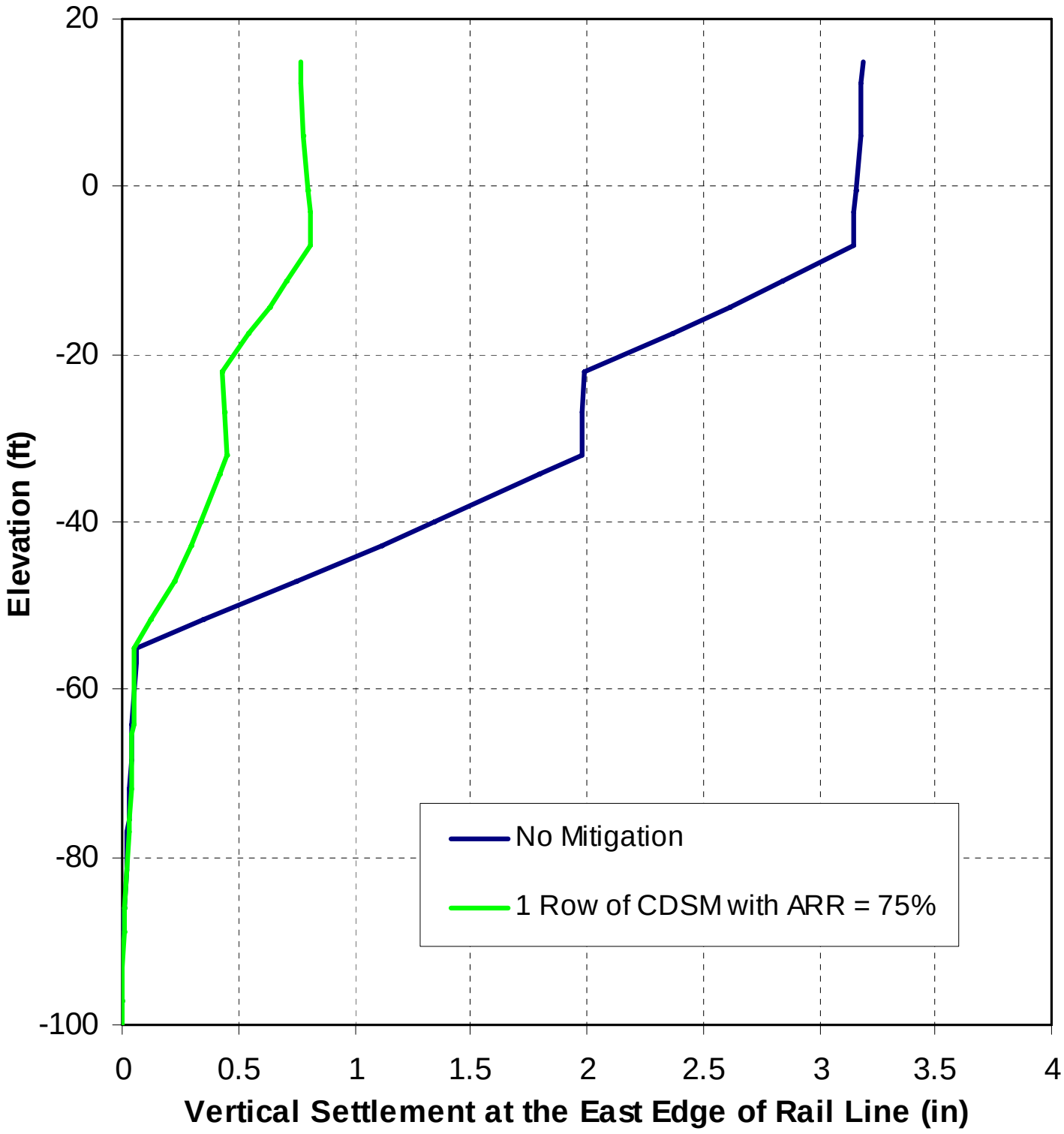


Non-Mitigated Case



1 Row of CDSM Treated Soil Installed on the East Side of the MSE Wall

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
		MSE Wall FE Analysis: After Fill Placement
Project No. 06-123	Date: 12-29-10	Figure 4



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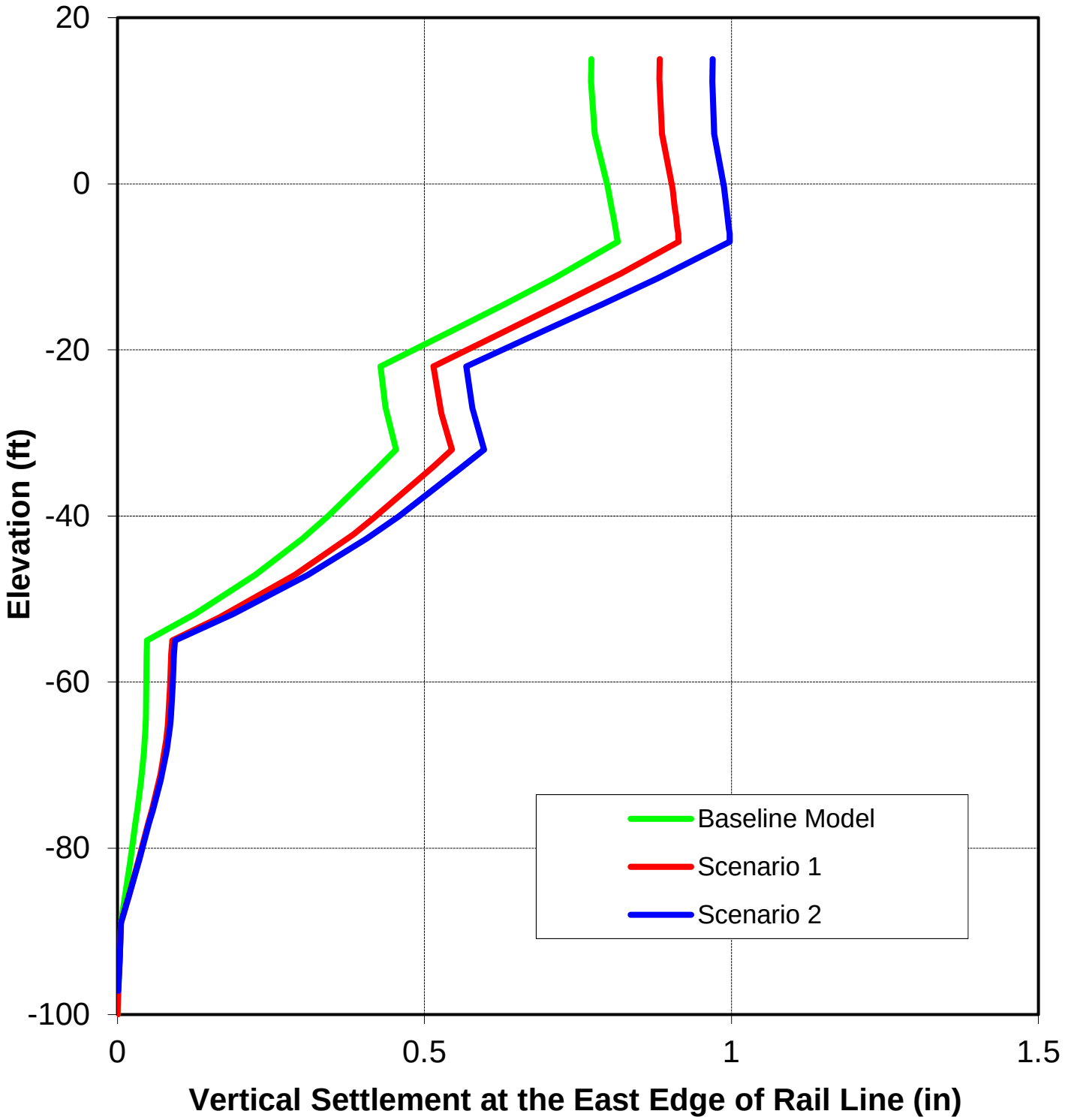
SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

MSE Wall FE Analysis Results: Settlement

Project No. 06-123 | Date: 12-29-10

Figure 5



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SCHUYLER HEIM BRIDGE REPLACEMENT
ANALYSIS OF FILL PLACEMENT

MSE Wall FE Analysis Results For Additional Analysis Scenarios

Figure 6

Project No. 06-123

Date: 2-18-11

ATTACHMENT 4

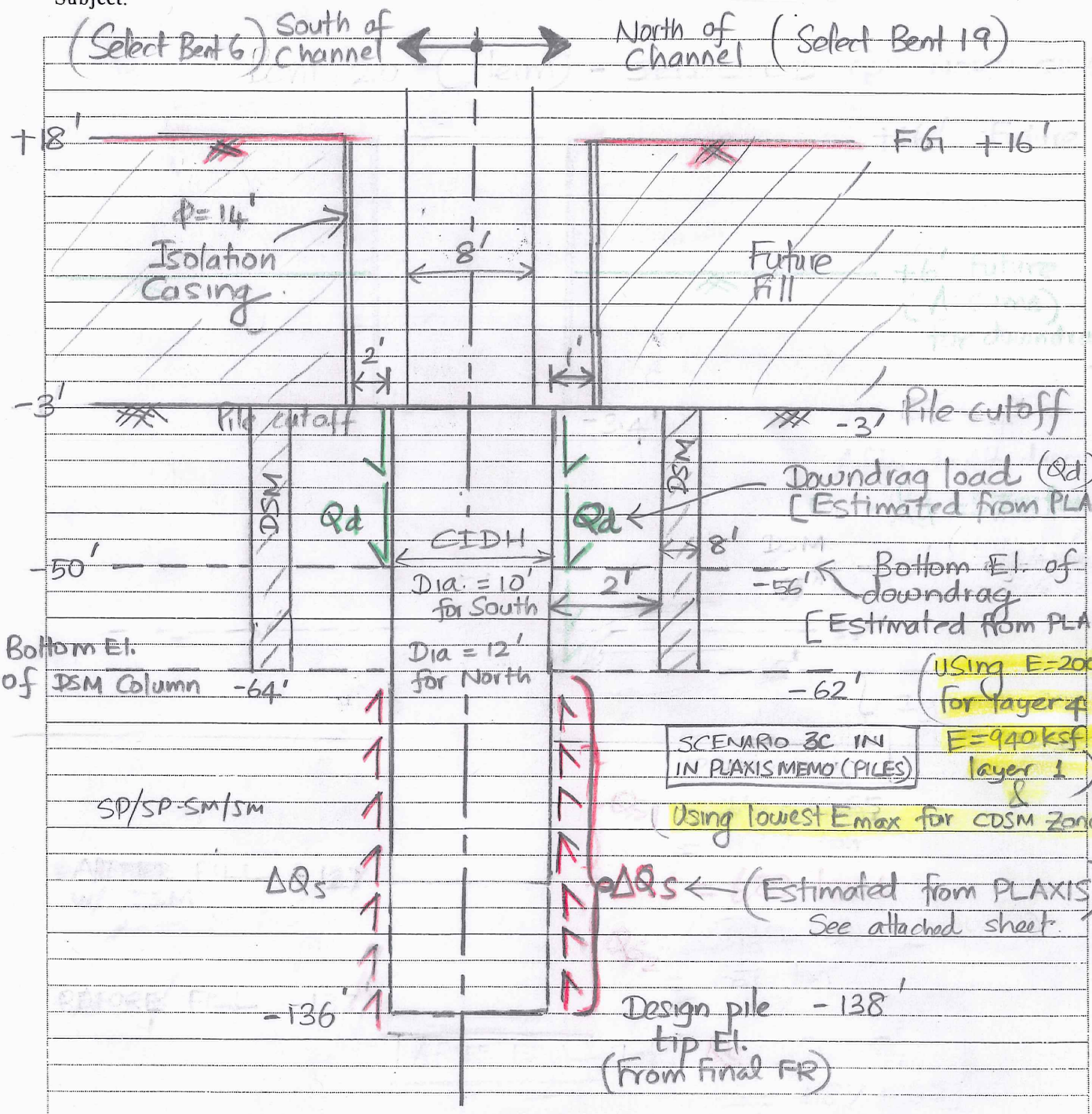
SAMPLE AXIAL PILE DOWNDRAG CALCULATIONS WITH CDSM

FOR BENTS 17 THROUGH 23 OF SCHUYLER HEIM BRIDGE (BRIDGE NO. 53-3032)

USING REVISED FINITE ELEMENT ANALYSES

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

Project: Schuyler Heim Bridge Replacement Project No.: 06-123
By: Ranjan(88) Date: 02/14/11 Checked By: Arul Date: 02/14/11 Sheet: 1 of 4
Subject:



Main Steps

AXIAL PILE CALCULATIONS USING PLAXIS RESULTS

(1) Estimate the bottom El. of the potential downdrag layer (cutoff settlement of 0.5")
(2) Estimate the down drag load using vertical stress (Qd)
(3) Estimate the increase in skin friction below DSM column (ΔQs)

17660 Newhope Street, Suite E, Fountain Valley, CA 92708 Tel: (714) 751-3826 Fax: (714) 751-3928

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

Project: Schuyler Heim Bridge Replacement Project No.: 06-123
By: Ranjan (RG) Date: 02/14/11 Checked By: Arul Date: 02/15/11 Sheet: 2 of 4
Subject:

PLAXIS ANALYSIS SUMMARY (NORTH SIDE)

(A) As mentioned in our responses to Caltrans comments on Addendum No. 2,

The most conservative scenario (i.e., Scenario 3C) with E = 940 ksf for soil layer 1 and reduced E = 2000 ksf for soil layer 4 was selected. - (CONSERVATIVE) (See Plaxis memo for piles for further details).

(B) Based on the 56-day UC test results, the lowest Emax were selected for CDSM Zones 1, 2, & 3 using SM, ML, & CL results, respectively (See attached plot.) : (CONSERVATIVE)
The lowest Emax for SM, ML, & CL are 1889, 3588, & 3011 ksf, respectively based on 56-day UU and UC test results

(C) Per Ground Improvement paper by Porbaha et al. (1999),
Average External - Internal measurement factor ≈ 3 (for confining pressure of 15 psi)
However, a factor of 2 was used in our analyses (CONSERVATIVE).
See attached table containing the Emax values used in PLAXIS analyses.

The Emax values used in PLAXIS analyses for CDSM Zones 1 (SM), 2 (ML), & 3 (CL) are 7,250, 5,250, & 4,500 ksf, respectively.

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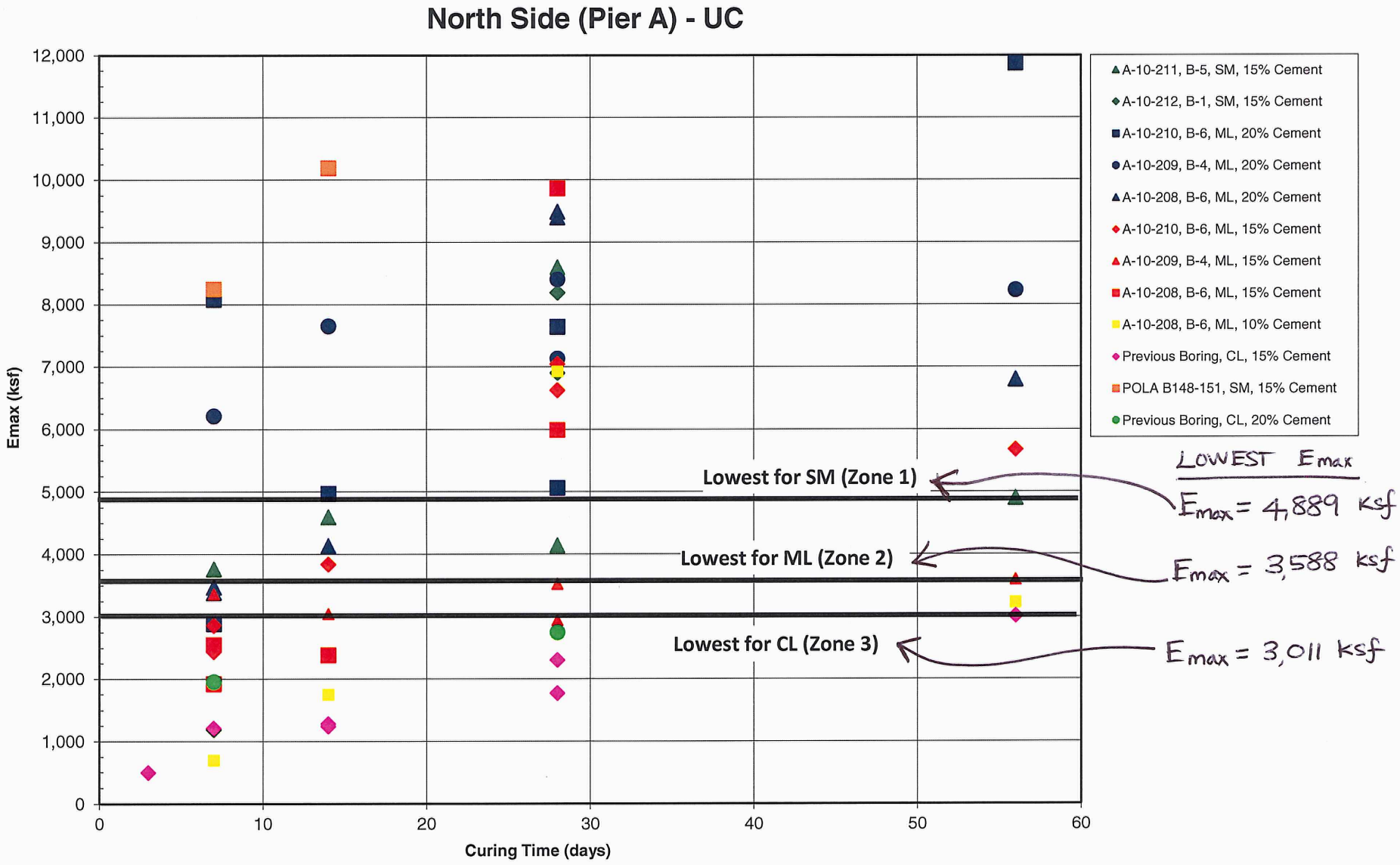
North Side (Pier A) - UC
Emax (ksf)
Curing Time (days)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
0
10
20
30
40
50
60
A-10-211, B-5, SM, 15% Cement
A-10-212, B-1, SM, 15% Cement
A-10-210, B-6, ML, 20% Cement
A-10-209, B-4, ML, 20% Cement
A-10-208, B-6, ML, 20% Cement
A-10-210, B-6, ML, 15% Cement
A-10-209, B-4, ML, 15% Cement
A-10-208, B-6, ML, 15% Cement
A-10-208, B-6, ML, 10% Cement
Previous Boring, CL, 15% Cement
POLA B148-151, SM, 15% Cement
Previous Boring, CL, 20% Cement
Lowest for SM (Zone 1)
Lowest for ML (Zone 2)
Lowest for CL (Zone 3)
LOWEST Emax
Emax = 4,889 ksf
Emax = 3,588 ksf
Emax = 3,011 ksf

Emax Requirments for CDSM Zones (NORTH SIDE) - Using 56-day Test Results Only					
CDSM Zone	Lowest Emax in Lab (ksf)	Modified Emax for Ext.-Int Measurement Factor of 2 (ksf)	Modified Emax for ARR of 75% (ksf)	Approx. Emax To Be Used (ksf)	Emax Used in PLAXIS Memo (ksf)
1 (Using SM)	4,889	9,778	7,334	7,250	13,500
2 (Using ML)	3,588	7,176	5,382	5,250	9,000
3 (Using CL)	3,011	6,022	4,517	4,500	4,500

USED

Emax Requirments for CDSM Zones (NORTH SIDE) - Using 56-day Test Results Only					
CDSM Zone	Lowest Emax in Lab (ksf)	Modified Emax for Ext.-Int Measurement Factor of 3 (ksf)	Modified Emax for ARR of 75% (ksf)	Approx. Emax To Be Used (ksf)	Emax Used in PLAXIS Memo (ksf)
1 (Using SM)	4,889	14,667	11,000	11,000	13,500
2 (Using ML)	3,588	10,764	8,073	8,000	9,000
3 (Using CL)	3,011	9,033	6,775	6,750	4,500

State of the art in deep mixing technology. Part III: geomaterial characterization

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The main properties necessary for the geomaterial design of stabilized ground are strength (compressive, shear and tensile), modulus, permeability, compressibility and dynamically measured properties such as shear modulus and damping at different strain levels. This paper, in conjunction with the previous ones in this series, aims to characterize the geomaterial behaviour of deep mixing (DM) under various loading and environmental conditions using laboratory testing methods. These testing methods include unconfined and triaxial compression tests; direct shear tests; tensile tests using uniaxial and split cylinders; consolidation and permeability tests; and resonant-column, cyclic torsional simple shear and cyclic triaxial tests. The effects of soil type, stabilizing reagent, age, water content, curing temperature, strain at failure, confining pressure, scale and drainage condition on the shear strength of cement-treated soil are discussed along with a framework for selection of the design strength. The relationships, correlation factors, practical ranges and tendencies in the behaviour of treated soil under the various testing conditions presented here reflect important considerations in geomaterial design for DM.

Keywords: bearing capacity; deep soil mixing; testing

Les principales propriétés nécessaires au calcul géomatériel d'un sol stabilisé sont la résistance (à la compression, au cisaillement et à la traction), le module, la perméabilité, la compressibilité et des propriétés mesurées dynamiquement comme le module de cisaillement et l'amortissement pour différents niveaux de déformation. Cet exposé, en conjonction avec les précédents, a pour but de caractériser le comportement géomatériel d'un mixage profond (DM) dans différentes conditions de charge et d'environnement en utilisant des méthodes d'essai en laboratoire. Ces méthodes sont les suivantes: essais de compression non confinée et triaxiale, essai de cisaillement direct, essais de traction utilisant un cylindre uniaxial et fendu, essais de consolidation et de perméabilité, essai de colonne résonnante, essai de cisaillement simple en torsion cyclique et essais cycliques triaxiaux. Nous examinons l'effet du type de sol, du réactif de stabilisation, de l'âge, de la teneur en eau, de la température de cuisson, de la déformation à la rupture, de la pression de confinement, de l'effet d'échelle et de la condition de drainage sur la force de cisaillement des sols traités au ciment; nous étudions aussi un cadre pour la sélection de la résistance nominale. Les relations, facteurs de corrélation, gammes pratiques et tendances dans les comportements des sols traités dans les diverses conditions d'essai présentées ici, reflètent d'importantes considérations dans le calcul géomatériel du DM.

Introduction

The previous papers in this series (Porbaha, 1998; Porbaha *et al.*, 1998) examined the basic concepts, definitions, classifications, historical developments and various application areas coupled with many case histories from different countries of the world.

The objectives of mixing a stabilizing reagent with soil are to improve the stress–strain strength properties, hydraulic characteristics and durability by reduction of void spaces and by bonding particles together. Accordingly, the aim of this paper is to present various factors involved and laboratory methods to characterize strength, deformation modulus (or stiffness), permeability (or hydraulic conductivity), compressibility and dynamically measured properties. The reactions involved in the stabilization process affect the mechanical properties of the treated soil, as discussed in the following section.

(GI 061) Paper received 30 September 1998; accepted 15 December 1999.

Hardening mechanism

In the process of mixing a stabilizer with soil, three major categories of reactions are expected to happen, as discussed by Diamond and Kinter (1965) and Assarson *et al.* (1974):

(*a*) dehydration process
(*b*) ion exchange (flocculation)
(*c*) pozzolanic reaction.

In the dehydration process, water in the mixture is consumed by the stabilizer and as a result calcium hydroxide, $Ca(OH)_2$, is produced. Dissociation of calcium hydroxide in water increases the electrolytic concentration and pH of the

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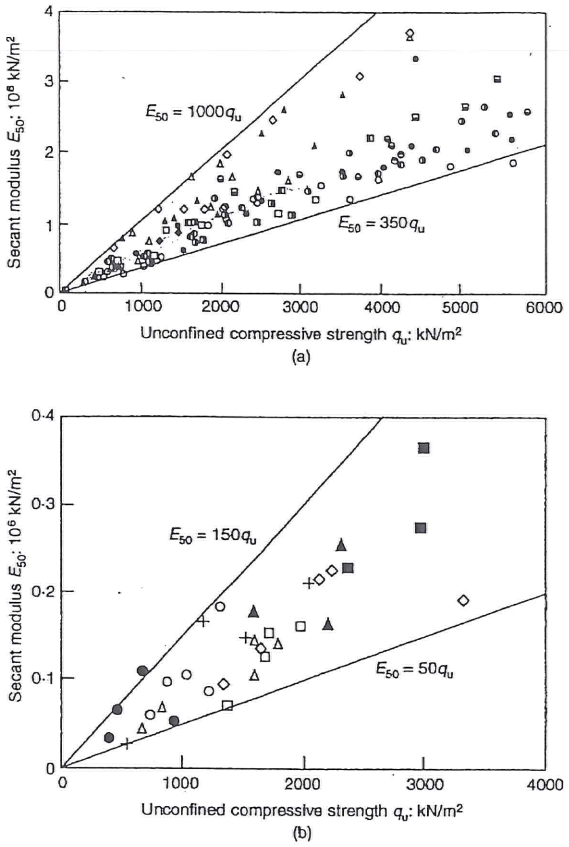

Fig. 24. Relationship between secant modulus and unconfined compression test: (a) Japanese soils; (b) Boston blue clay (USA)

ditionally, the true modulus of a geomaterial is a function of strain measurement, as is discussed in the next section.

Table 1 summarizes relationships between the modulus and the unconfined compressive strength reported by several investigators for different soils.

Effect of strain measurement

While in most conventional triaxial tests axial strain is measured externally (the modulus in this case is denoted as $E_{initial}$), as shown in Fig. 25, Goto *et al.* (1991) used local deformation transducers (LDTs) to measure the stiffness of soil–cement in the linear elastic range of less than 0·01%, which is expected to occur in the field at working loads (the modulus in this case is denoted as E_{max}). The results show that the modulus is largely underestimated using conventional axial-strain measurement. From a comparative study of $E_{initial}$ and E_{max}, as shown in Fig. 26 (Shibuya *et al.*, 1992),

*Table 1. Relationships between modulus and unconfined compressive strength**

Relationship	Reference
$350q_u < E_{50} < 1000q_u$	Saitoh *et al.* (1980)
$750q_u < E_{max} < 1000q_u$	Tatsuoka and Shibuya (1991)
$100q_u < E_{50} < 250q_u$	Futaki *et al.* (1996)
$140q_u < E_{50} < 500q_u$	Asano *et al.* (1996)
$50q_u < E_{50} < 150q_u$	GeoTesting Express (1996)
$150q_u < E_{50} < 400q_u$	Goh *et al.* (1999)

* E_{max} is the modulus at very small strain.

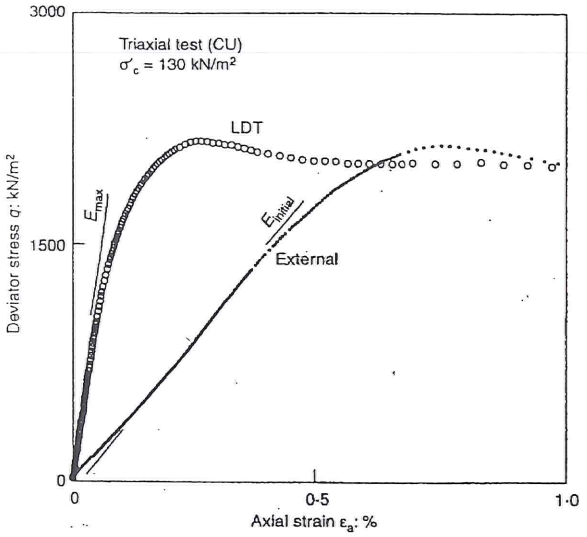

Fig. 25. Effect of strain measurement on secant modulus

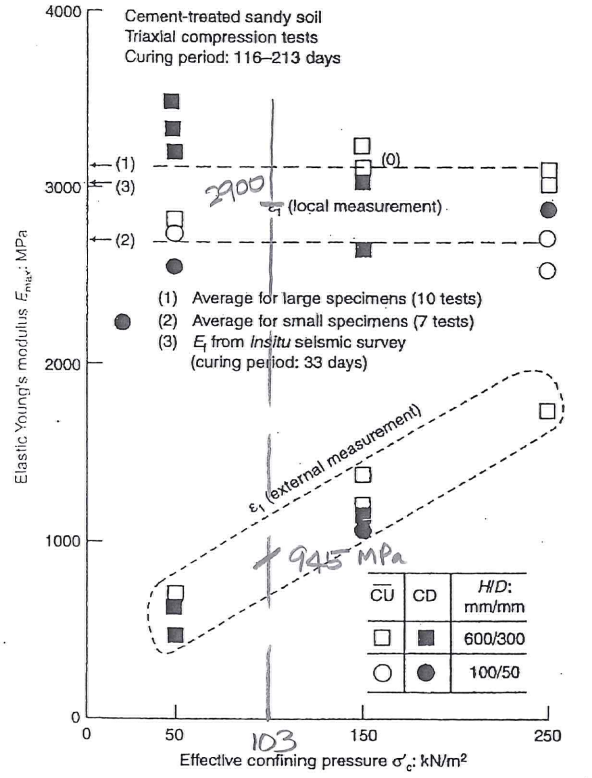

Fig. 26. Variation of initial modulus with confining pressure (*H*, height; *D*, diameter)

15 psi ≡ 103 kN/m²

it was found that the modulus at small strain (E_{max}) was not a function of confining pressure.

Consolidation characteristics

The consolidation characteristics are used for settlement analysis of cement-treated ground. Figure 27 (Endo, 1976)

Fig 26, External - Local Measurement factor

$= \frac{2900}{945} \approx 3$ //

Project: Schuyler Heim Bridge Replacement Project No.: 06-123
By: Ranjan (RJ) Date: 02/14/11 Checked By: Arul Date: 02/15/11 Sheet: 3 of 4
Subject:

AXIAL PILE CALCULATION CHECK

STEPS

(1) Estimate downdrag layer Bottom El. (cutoff settlement of 0.5")

Using vertical settlement plot from PLAXIS (attached),

∴ The downdrag bottom El. = -56 ft

(2) Estimate downdrag load (Q_d)

Using vertical Effective Stress plot from PLAXIS (attached), the vertical stresses between -4' and -56' were used. (σ_v')

Average unit skin (f_s) = $K_H \sigma_v' \tan\delta \times$ perimeter $\times$ 1'

Assume $K_H = 0.5$

$\delta = \frac{3}{4}\phi = 24^\circ$.

(perimeter = $\pi \times 12'$)

∴ Total downdrag (Q_d) = $\sum_{-4'}^{-56'} f_s$

= 447 tons // (See attached spread sheet)

(3) Lost skin resistance in downdrag zone (Q_s)

For steel casing, Q_{s_1} = 97 tons using API Method.

For CIDH pile, Q_{s_2} = 238 tons using SHAFT

∴ Q_s = 97 + 238 = 335 tons // (See attached results)

∴ Total Load = $Q_d + Q_s$

= 447 + 335 = 782 tons.

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Project: Schuyler Heim Bridge Replacement Project No.: 06-123
By: Ranjan (RB) Date: 02/14/11 Checked By: Arul Date: 02/15/11 Sheet: 4 of 4
Subject:

(4) Increase in pile skin resistance (ΔQ_s)

Using vertical effective stress plot from PLAXIS (attached), the stress increases ($\Delta\sigma_v'$) between -62' and -138' were used.

$$\Delta Q_s = \sum \Delta f_s$$

$$\Delta f_s = K_H \Delta\sigma_v' \times \tan\delta \times (\text{Perimeter}) \times 1'$$

$K_H = 0.5$

$\delta = \frac{2}{3}\phi = 28^\circ$

$\Delta Q_s = 784.6$ tons // (See attached spread sheet)

$\therefore$ Total Load ($Q_d + Q_s$) < Increase in pile skin resistance (ΔQ_s)

CHECK SATISFIED

Note: Increase in end bearing due to future fill was not considered in this analyses (CONSERVATIVE).

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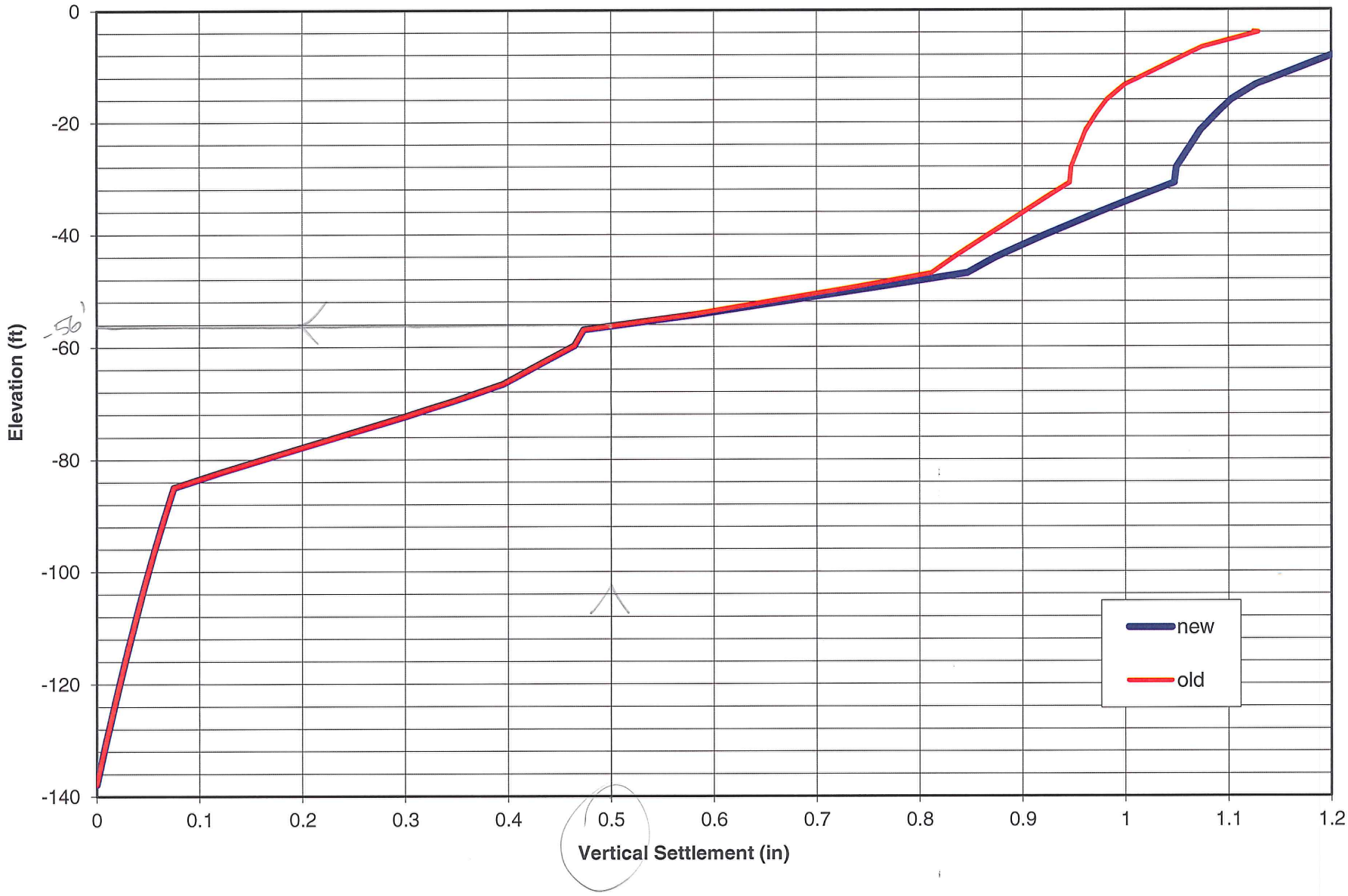
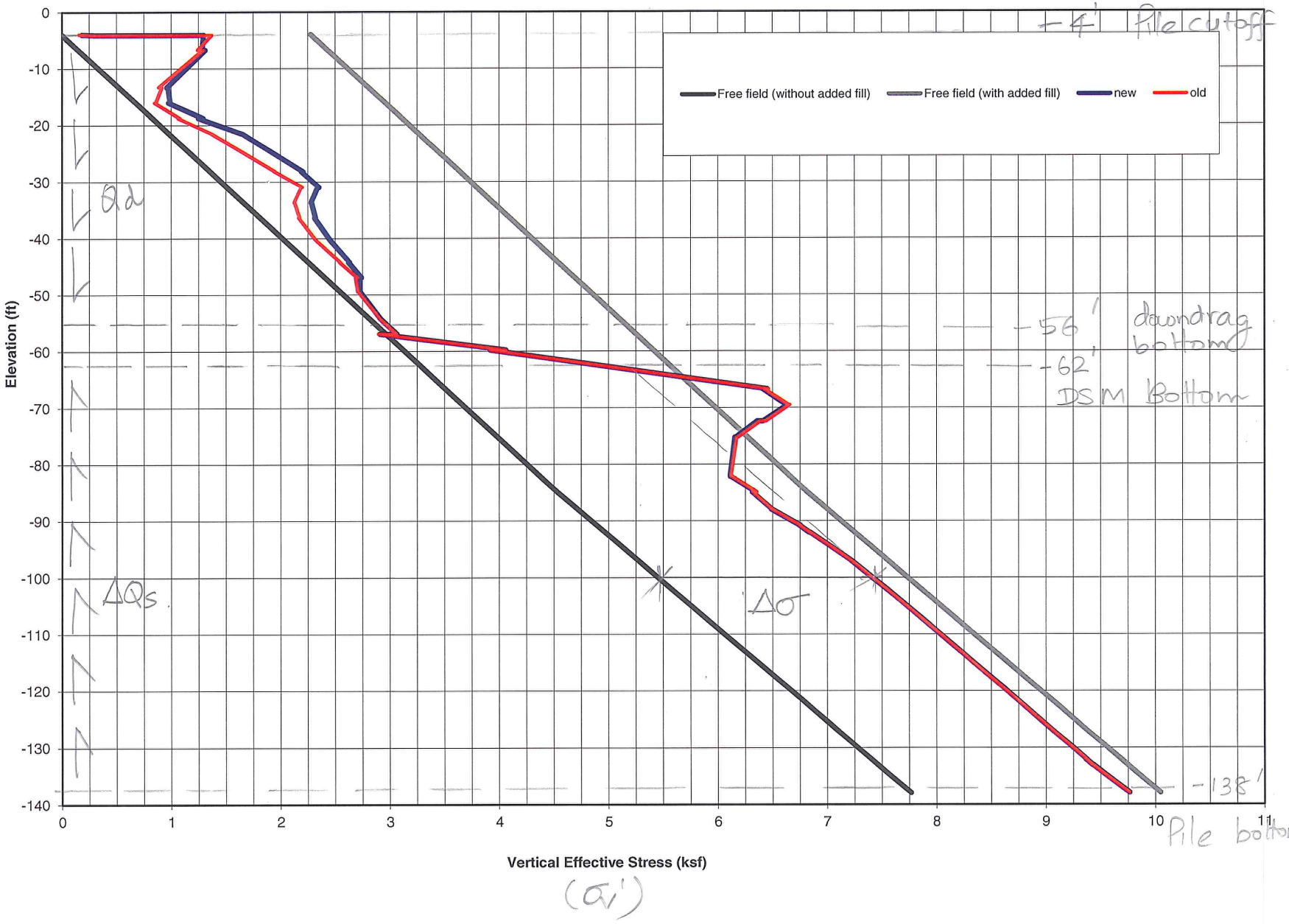

0
-20
-40
-60
-80
-100
-120
-140
Elevation (ft)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
Vertical Settlement (in)
new
old


Free field (without added fill)
Free field (with added fill)
new
old
Elevation (ft)
Vertical Effective Stress (ksf)
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
0
1
2
3
4
5
6
7
8
9
10
11
-4' Pile cutoff
-56' downdrag bottom
-62' DSM Bottom
-138'
Pile bottom
Δσ
(σv')

AXIAL PILE CAPACITY CALCULATIONS - NORTH SIDE PILES
Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan EMI Pro 06-123

SKIN FRICTION IN SAND
Qs = Ks x tan (d x Ø) x (P x L) x Svo

WHERE:
- Svo = average effective overburden pressure
- P = pile perimeter (feet)
- L = pile length in soil layer (ft)
- Ks = Coefficient of horizontal soil stress
- Ø = friction angle of the soil
- d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)

	CIDH 12-ft Dia	
Perim (feet)	37.70	
Area (sq. ft)	113.10	
Ks	0.5	
d	0.75	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb
Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs
Qs = alpha x c x P x L

WHERE:
- alpha = adhesion factor (See chart below)
- c = cohesion (tons/sq. feet)
- P = pile perimeter (feet)
- L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha
0.10	1.00
0.25	1.00
0.50	0.75
0.75	0.50
1.00	0.50
2.00	0.50
7.00	0.50

For 0 < c < 0.25 tsf , alpha = 1.0
For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
For c > 0.75 tsf, alpha = 0.5

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb
Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:
1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

-3.9 ft = top of pile el. -3.9 ft = top of ground el. -3.9 ft = water table el.

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N_{SPT})	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	Soil Vertical Street/ Stress Increase	DEPTH FROM GROUND TO PILE BASE (ft.)	12' CIDH LAYER SKIN FRIC Qsn (tons)	12' CIDH CUM SKIN FRIC Qs min (tons)	
-4.0	-3.9	-4.0	SM	120		32	0.00	0.1	0.1	**0.18**	0.1	0.1	0.1	
-6.7	-4.0	-6.7	SM	120		32	0.00	2.7	1.5	**1.28**	2.8	14.5	14.6	
-13.4	-6.7	-13.4	SM	120		32	0.00	6.7	6.2	**0.96**	9.5	27.0	41.6	
-16.1	-13.4	-16.1	SM	120		32	0.00	2.7	10.9	**0.98**	12.2	11.2	52.7	
-18.9	-16.1	-18.9	SM	120		32	0.00	2.7	13.6	**1.29**	15.0	14.9	67.6	
-21.6	-18.9	-21.6	SM	120		32	0.00	2.7	16.3	**1.66**	17.7	18.9	86.6	
-28.3	-21.6	-28.3	SM	120		32	0.00	6.7	21.0	**2.19**	24.4	61.2	147.8	
-33.7	-28.3	-33.7	SM	120		32	0.00	5.4	27.1	**2.28**	29.8	52.1	199.9	
-36.4	-33.7	-36.4	SM	120		32	0.00	2.7	31.2	**2.31**	32.5	26.2	226.1	
-44.3	-36.4	-44.3	SM	120		32	0.00	7.9	36.4	**2.62**	40.4	86.8	312.9	
-47.0	-44.3	-47.0	SM	120		32	0.00	2.7	41.7	**2.73**	43.1	31.1	343.9	
-49.5	-47.0	-49.5	SM	120		32	0.00	2.5	44.4	**2.73**	45.6	28.6	372.5	
-56.0	-49.5	-56.0	SM	120		32	0.00	6.5	48.9	**2.73**	52.1	74.4	447.0	**Total Downdrag (Qd) = 447 tons**
-62		-62.0		120		38	0.00				58.1			
-66.7	-62.0	-66.7	SP/SM	120		38	0.00	4.7	54.5	**2.84**	62.8	68.6	68.6	
-69.6	-66.7	-69.6	SP/SM	120		38	0.00	2.8	58.3	**2.86**	65.7	41.7	110.3	
-72.4	-69.6	-72.4	SP/SM	120		38	0.00	2.8	61.1	**2.47**	68.5	35.7	146.0	
-75.3	-72.4	-75.3	SP/SM	120		38	0.00	2.9	63.9	**2.06**	71.4	30.3	176.3	
-82.2	-75.3	-82.2	SP/SM	120		38	0.00	6.9	68.8	**1.61**	78.3	56.7	233.1	
-85.0	-82.2	-85.0	SP/SM	120		38	0.00	2.8	73.7	**1.68**	81.1	24.5	257.6	
-90.9	-85.0	-90.9	SP/SM	120		38	0.00	5.9	78.0	**1.75**	87	52.4	310.0	
-97.1	-90.9	-97.1	SP/SM	120		38	0.00	6.2	84.1	**1.86**	93.2	59.4	369.4	
-102.1	-97.1	-102.1	SP/SM	120		38	0.00	5.0	89.7	**1.90**	98.2	48.8	418.2	
-108.5	-102.1	-108.5	SP/SM	120		38	0.00	6.4	95.4	**1.92**	105	62.9	481.1	
-114.7	-108.5	-114.7	SP/SM	120		38	0.00	6.2	101.7	**1.94**	111	61.6	542.7	
-119.7	-114.7	-119.7	SP/SM	120		38	0.00	5.0	107.3	**1.96**	116	50.2	592.9	
-138.0	-119.7	-138.0	SP/SM	120		38	0.00	18.3	119.0	**2.05**	134	191.6	784.6	**Increase in Skin (ΔQs) = 784.6 tons**

TOTAL DOWNDRAG FORCE

INCREASE IN SKIN FRICTION ALONG PORTION OF THE CIDH PILE BELOW THE CDSM.

LOST SKIN FRICTION IN DOWNDRAG ZONE

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING

Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan

EMI Project No: 06-123-03

SKIN FRICTION IN SAND

Qs = Ks x tan (d x Ø) x (P x L) x Svo

WHERE: Svo = average effective overburden pressure
P = pile perimeter (feet)
L = pile length in soil layer (ft)
Ks = Coefficient of horizontal soil stress
Ø = friction angle of the soil
d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)	Case 1 Steel Casing 13" x 1"	Case 2 Steel Casing
Perim (feet)	41.36	
Area (sq. ft)	3.43	
Ks	0.8	
d	0.6	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb

Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

Qs = alpha x c x P x L

WHERE: alpha = adhesion factor (See chart below)
c = cohesion (tons/sq. feet)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf , alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1988)

END BEARING IN CLAY, Qb

Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:

1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

-3.8 ft = top of pile el. -3.8 ft = top of ground el. -3.8 ft = water table el.

(Case 1) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

(Case 2) SKIN FRICTION ON OUTER SURFACE STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N1)60	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	13" x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-4	-3.8	-4	SM/ML-1	120		30	0.05	0.2	0.1	0.00	0.2	0.2	0.01	21.	0.0	7.0	0.0	0.4	171.3	0	0	0
-5	-4	-5	SM/ML-1	120		30	0.05	1	0.7	0.02	1.2	1.2	0.03	21	0.2	35.2	0.2	2.5	171.3	3	1	0
-6	-5	-6	SM/ML-1	120		30	0.05	1	1.7	0.05	2.2	2.2	0.06	21	0.5	35.2	0.7	4.6	171.3	5	3	0
-7	-6	-7	SM/ML-1	120		30	0.05	1	2.7	0.08	3.2	3.2	0.09	21	0.8	35.2	1.6	6.6	171.3	8	4	1
-8	-7	-8	SM/ML-1	120		30	0.05	1	3.7	0.11	4.2	4.2	0.12	21	1.1	35.2	2.7	8.7	171.3	11	6	2
-9	-8	-9	SM/ML-1	120		30	0.05	1	4.7	0.14	5.2	5.2	0.15	21	1.5	35.2	4.2	10.8	171.3	15	7	2
-10	-9	-10	SM/ML-1	120		30	0.05	1	5.7	0.16	6.2	6.2	0.18	21	1.8	35.2	6.0	12.8	171.3	19	9	3
-11	-10	-11	SM/ML-1	120		30	0.05	1	6.7	0.19	7.2	7.2	0.21	21	2.1	35.2	8.0	14.9	171.3	23	11	4
-12	-11	-12	SM/ML-1	120		30	0.05	1	7.7	0.22	8.2	8.2	0.24	21	2.4	35.2	10.4	17.0	171.3	27	14	6
-13	-12	-13	SM/ML-1	120		30	0.05	1	8.7	0.25	9.2	9.2	0.26	21	2.7	35.2	13.1	19.1	171.3	32	16	7
-14	-13	-14	SM/ML-1	120		30	0.05	1	9.7	0.28	10.2	10.2	0.29	21	3.0	35.2	16.1	21.1	171.3	37	19	9
-15	-14	-15	SM/ML-1	120		30	0.05	1	10.7	0.31	11.2	11.2	0.32	21	3.3	35.2	19.4	23.2	171.3	43	21	11
-16	-15	-16	SM/ML-1	120		30	0.05	1	11.7	0.34	12.2	12.2	0.35	21	3.6	35.2	23.0	25.3	171.3	48	24	13
-17	-16	-17	SM/ML-1	120		30	0.05	1	12.7	0.37	13.2	13.2	0.38	21	3.9	35.2	27.0	27.3	171.3	54	27	15
-18	-17	-18	SM/ML-1	120		30	0.05	1	13.7	0.39	14.2	14.2	0.41	21	4.2	35.2	31.2	29.4	171.3	61	30	17
-19	-18	-19	SM/ML-1	120		30	0.05	1	14.7	0.42	15.2	15.2	0.44	21	4.6	35.2	35.8	31.5	171.3	67	34	20
-20	-19	-20	SM/ML-1	120		30	0.05	1	15.7	0.45	16.2	16.2	0.47	21	4.9	35.2	40.6	33.6	171.3	74	37	23
-21	-20	-21	SM/ML-2	120		30	0.05	1	16.7	0.48	17.2	17.2	0.50	21	5.2	35.2	45.8	35.6	171.3	81	41	26
-22	-21	-22	SM/ML-2	120		30	0.05	1	17.7	0.51	18.2	18.2	0.52	21	5.5	35.2	51.3	37.7	171.3	89	44	29
-23	-22	-23	SM/ML-2	120		30	0.05	1	18.7	0.54	19.2	19.2	0.55	21	5.8	35.2	57.1	39.8	171.3	97	48	32
-24	-23	-24	SM/ML-2	120		30	0.05	1	19.7	0.57	20.2	20.2	0.58	21	6.1	35.2	63.2	41.8	171.3	105	53	35
-25	-24	-25	SM/ML-2	120		30	0.05	1	20.7	0.60	21.2	21.2	0.61	21	6.4	35.2	69.6	43.9	171.3	114	57	39
-26	-25	-26	SM/ML-2	120		30	0.05	1	21.7	0.62	22.2	22.2	0.64	21	6.7	35.2	76.3	46.0	171.3	122	61	43
-27	-26	-27	SM/ML-2	120		30	0.05	1	22.7	0.65	23.2	23.2	0.67	21	7.0	35.2	83.3	48.1	171.3	131	66	47
-28	-27	-28	SM/ML-2	120		30	0.05	1	23.7	0.68	24.2	24.2	0.70	21	7.3	35.2	90.7	50.1	171.3	141	70	51
-28.8	-28	-28.8	SM/ML-2	120		30	0.05	0.8	24.6	0.71	25	25	0.72	21	6.1	28.1	96.8	51.8	171.3	149	74	54
-29	-28.8	-29	SM/ML-2	120		30	0.05	0.2	25.1	0.72	25.2	25.2	0.73	21	1.6	7.0	98.3	52.2	171.3	151	75	55
-30	-29	-30	SM/ML-2	120		30	0.05	1	25.7	0.74	26.2	26.2	0.75	21	8.0	35.2	106.3	54.3	171.3	161	80	60
-31	-30	-31	SM/ML-2	120		30	0.05	1	26.7	0.77	27.2	27.2	0.78	21	8.3	35.2	114.5	56.3	171.3	171	85	64
-32	-31	-32	ML	120		0	0.33	1	27.7	0.80	28.2	28.2	0.81	9	12.4	12.4	127.0	10.0	10.0	137	69	74
-33	-32	-33	ML	120		0	0.33	1	28.7	0.83	29.2	29.2	0.84	9	12.4	12.4	139.4	10.0	10.0	149	75	84
-34	-33	-34	ML	120		0	0.33	1	29.7	0.86	30.2	30.2	0.87	9	12.4	12.4	151.9	10.0	10.0	162	81	94

Qs = 97 tons.

VERTICALLY LOADED DRILLED SHAFT ANALYSIS PROGRAM SHAFT
VERSION 6 (C)COPYRIGHT ENSOFT,INC.1989,1995,1998,2001,2003,2007

Heim Bridge Project - Bent 19

TOTAL LOAD = 3000.0 TONS

EG = -4'

NUMBER OF LAYERS = 8

WATER TABLE DEPTH = 0.0 FT.

FACTOR OF SAFETY APPLIED TO THE TOTAL ULTIMATE CAPACITY = 1.43

FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE CAPACITY = 2.22

SOIL INFORMATION

LAYER NO 1----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.200E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.200E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.160E+02

LAYER NO 2----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.384E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.600E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.160E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.319E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.600E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.270E+02

LAYER NO 3----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.870E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.650E+03
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.270E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.650E+03
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.330E+02

LAYER NO 4----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.300E+01
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.330E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.300E+01
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.430E+02

LAYER NO 5----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.800E+03
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.430E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.800E+03
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.530E+02

LAYER NO 6----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.517E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00

BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.150E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.530E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.472E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.150E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.580E+02

LAYER NO 7----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.300E+04
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.580E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.300E+04
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.810E+02

LAYER NO 8----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.285E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.810E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.200E+03

DRILLED SHAFT INFORMATION

DIAMETER OF STEM	=	12.000	FT.
DIAMETER OF BASE	=	12.000	FT.
END OF STEM TO BASE	=	0.000	FT.
ANGLE OF BELL	=	0.000	DEG.
IGNORED TOP PORTION	=	25.000	FT.
IGNORED BOTTOM PORTION	=	0.000	FT.
AREA OF ONE PERCENT STEEL	=	162.881	SQ.IN.
ELASTIC MODULUS, Ec	=	0.360E+07	LB/SQ IN

VOLUME OF UNDERREAM = 0.000 CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (FOR UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
QBD = TOTAL ALLOWABLE LOAD USING A FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE RESISTANCE;
QDN = TOTAL ALLOWABLE LOAD USING FACTORS OF SAFETY APPLIED TO THE ULTIMATE SIDE RESISTANCE AND THE ULTIMATE BASE RESISTANCE.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	QBD (TONS)	QDN (TONS)	QU/VOLUME (TONS/CU.YDS)
26.0	108.92	9.17	146.18	155.34	74.95	72.20	1.43
27.0	113.11	18.53	154.05	172.58	87.85	82.29	1.53
28.0	117.30	25.27	163.72	188.99	98.94	91.36	1.61
29.0	121.49	32.01	175.17	207.18	110.84	101.24	1.71
30.0	125.68	38.75	182.23	220.98	120.75	109.13	1.76
31.0	129.87	45.49	190.95	236.44	131.42	117.77	1.82
32.0	134.06	52.23	199.37	251.60	141.94	126.28	1.88
33.0	138.25	58.97	207.51	266.48	152.35	134.66	1.93
34.0	142.44	68.20	214.07	282.27	164.53	144.07	1.98
35.0	146.63	77.70	252.54	330.24	191.34	168.03	2.25
36.0	150.82	87.47	290.65	378.12	218.26	192.02	2.51
37.0	155.01	97.52	328.40	425.92	245.30	216.04	2.75
38.0	159.19	107.83	365.81	473.64	272.45	240.10	2.98
39.0	163.38	118.42	402.87	521.29	299.71	264.18	3.19
40.0	167.57	129.28	439.58	568.86	327.09	288.31	3.39
41.0	171.76	140.41	475.95	616.36	354.59	312.47	3.59
42.0	175.95	151.81	512.98	664.79	382.65	337.11	3.78
43.0	180.14	163.48	550.63	714.12	411.27	362.22	3.96
44.0	184.33	171.78	590.37	762.15	437.44	385.91	4.13
45.0	188.52	180.07	632.15	812.22	464.54	410.52	4.31
46.0	192.71	188.37	675.96	864.32	492.55	436.04	4.49
47.0	196.90	196.66	716.41	913.07	519.05	460.05	4.64
48.0	201.09	204.96	753.50	958.46	544.04	482.55	4.77
49.0	205.28	213.25	787.25	1000.50	567.51	503.54	4.87
50.0	209.47	221.55	817.64	1039.18	589.48	523.02	4.96
51.0	213.66	229.84	844.67	1074.51	609.94	540.99	5.03
52.0	217.85	238.14	868.35	1106.49	628.89	557.45	5.08
53.0	222.03	246.43	888.67	1135.10	646.34	572.41	5.11
54.0	226.22	276.22	904.90	1181.12	683.42	600.56	5.22
55.0	230.41	306.01	917.05	1223.06	718.68	626.88	5.31
56.0	234.60	335.79	925.13	1260.92	752.10	651.36	5.37
57.0	238.79	365.55	929.17	1294.71	783.67	674.01	5.42
58.0	242.98	395.27	923.67	1318.93	810.92	692.34	5.43
59.0	247.17	426.37	918.39	1344.76	839.65	711.73	5.44
60.0	251.36	457.48	913.34	1370.81	868.48	731.24	5.45
61.0	255.55	488.58	908.54	1397.12	897.42	750.85	5.47
62.0	259.74	519.69	904.00	1423.69	926.49	770.58	5.48
63.0	263.93	550.79	899.76	1450.55	955.69	790.45	5.50
64.0	268.12	581.90	895.81	1477.71	985.02	810.45	5.51
65.0	272.31	613.01	892.19	1505.19	1014.49	830.59	5.53
66.0	276.50	644.11	888.90	1533.01	1044.12	850.88	5.54
67.0	280.69	675.22	885.97	1561.18	1073.90	871.34	5.56
68.0	284.87	706.32	883.41	1589.73	1103.86	891.96	5.58
69.0	289.06	737.43	881.23	1618.66	1133.99	912.76	5.60
70.0	293.25	768.54	880.35	1648.88	1164.69	934.13	5.62
71.0	297.44	799.64	880.70	1680.34	1195.96	956.06	5.65
72.0	301.63	830.75	882.23	1712.98	1227.75	978.53	5.68
73.0	305.82	861.85	884.89	1746.74	1260.05	1001.50	5.71
74.0	310.01	892.96	888.63	1781.59	1292.84	1024.95	5.75
75.0	314.20	924.06	893.39	1817.46	1326.09	1048.87	5.78
76.0	318.39	955.17	899.13	1854.30	1359.78	1073.23	5.82
77.0	322.58	986.28	905.79	1892.06	1393.88	1098.00	5.87
78.0	326.77	1017.38	913.31	1930.69	1428.37	1123.16	5.91
79.0	330.96	1048.49	921.66	1970.14	1463.23	1148.69	5.95
80.0	335.15	1079.59	930.76	2010.35	1498.44	1174.56	6.00
81.0	339.34	1110.70	940.58	2051.28	1533.96	1200.75	6.04
82.0	343.53	1135.44	950.40	2085.84	1563.12	1222.49	6.07
83.0	347.71	1159.83	960.22	2120.05	1591.93	1243.98	6.10
84.0	351.90	1183.87	970.04	2153.90	1620.38	1265.22	6.12
85.0	356.09	1207.53	979.86	2187.39	1648.47	1286.21	6.14

USING E = 5000 KSF

USING E = 2000 KSF

Q_{s_1} from steel casing = 97 tons

(Using E = 2000 KSF & 940 KSF) Q_{s_2} = 238 tons

Total Q_s = 238 + 97 = 335 tons

TOTAL LOST IN SKIN FRICTION WITHIN DOWNDRAG ZONE.

86.0	360.28	1231.00	989.67	2220.67	1676.35	1307.05	6.16
87.0	364.47	1254.76	999.49	2254.25	1704.53	1328.10	6.18
88.0	368.66	1278.81	1009.31	2288.12	1733.00	1349.36	6.21
89.0	372.85	1303.16	1019.13	2322.29	1761.77	1370.82	6.23
90.0	377.04	1327.80	1028.95	2356.75	1790.83	1392.49	6.25
91.0	381.23	1352.74	1038.77	2391.51	1820.19	1414.37	6.27
92.0	385.42	1377.98	1048.59	2426.56	1849.84	1436.45	6.30
93.0	389.61	1403.51	1058.41	2461.91	1879.79	1458.74	6.32
94.0	393.80	1429.33	1068.22	2497.56	1910.03	1481.23	6.34
95.0	397.99	1455.45	1078.04	2533.49	1940.57	1503.94	6.37
96.0	402.18	1481.86	1087.86	2569.73	1971.40	1526.84	6.39
97.0	406.37	1508.57	1097.25	2605.82	2002.34	1549.76	6.41
98.0	410.55	1535.58	1106.18	2641.76	2033.36	1572.69	6.43
99.0	414.74	1562.88	1114.64	2677.52	2064.47	1595.60	6.46
100.0	418.93	1590.47	1122.61	2713.08	2095.65	1618.51	6.48
101.0	423.12	1618.36	1130.08	2748.44	2126.90	1641.39	6.50
102.0	427.31	1646.55	1137.03	2783.57	2158.21	1664.25	6.51
103.0	431.50	1675.03	1143.43	2818.46	2189.57	1687.07	6.53
104.0	435.69	1703.80	1149.28	2853.08	2220.98	1709.84	6.55
105.0	439.88	1732.87	1154.56	2887.43	2252.42	1732.56	6.56
106.0	444.07	1762.24	1159.24	2921.48	2283.90	1755.23	6.58
107.0	448.26	1791.90	1163.31	2955.21	2315.39	1777.82	6.59
108.0	452.45	1821.85	1166.76	2988.61	2346.89	1800.34	6.61
109.0	456.64	1852.10	1169.63	3021.73	2378.44	1822.81	6.62
110.0	460.83	1882.65	1171.98	3054.63	2410.04	1845.25	6.63
111.0	465.02	1913.49	1173.86	3087.35	2441.73	1867.68	6.64
112.0	469.21	1944.62	1175.33	3119.95	2473.52	1890.13	6.65
113.0	473.39	1976.05	1176.42	3152.47	2505.44	1912.63	6.66
114.0	477.58	2007.78	1177.21	3184.98	2537.52	1935.19	6.67
115.0	481.77	2039.80	1177.73	3217.52	2569.77	1957.84	6.68
116.0	485.96	2072.11	1178.04	3250.15	2602.23	1980.60	6.69
117.0	490.15	2104.72	1178.20	3282.92	2634.91	2003.50	6.70
118.0	494.34	2137.63	1178.25	3315.88	2667.84	2026.55	6.71
119.0	498.53	2170.83	1178.25	3349.08	2701.04	2049.79	6.72
120.0	502.72	2204.32	1178.25	3382.57	2734.54	2073.24	6.73
121.0	506.91	2238.11	1178.25	3416.36	2768.33	2096.89	6.74
122.0	511.10	2272.20	1178.25	3450.45	2802.41	2120.75	6.75
123.0	515.29	2306.58	1178.25	3484.83	2836.79	2144.82	6.76
124.0	519.48	2341.25	1178.25	3519.50	2871.47	2169.09	6.78
125.0	523.67	2376.23	1178.25	3554.48	2906.44	2193.57	6.79
126.0	527.86	2411.49	1178.25	3589.74	2941.70	2218.26	6.80
127.0	532.05	2447.05	1178.25	3625.30	2977.26	2243.15	6.81
128.0	536.23	2482.91	1178.25	3661.16	3013.12	2268.25	6.83
129.0	540.42	2519.06	1178.25	3697.31	3049.27	2293.56	6.84
130.0	544.61	2555.50	1178.25	3733.75	3085.72	2319.07	6.86
131.0	548.80	2592.24	1178.25	3770.49	3122.46	2344.79	6.87
132.0	552.99	2629.28	1178.25	3807.53	3159.49	2370.71	6.89
133.0	557.18	2666.61	1178.25	3844.86	3196.82	2396.84	6.90
134.0	561.37	2704.24	1178.25	3882.49	3234.45	2423.18	6.92
135.0	565.56	2742.16	1178.25	3920.41	3272.37	2449.72	6.93
136.0	569.75	2780.37	1178.25	3958.62	3310.59	2476.48	6.95
137.0	573.94	2818.88	1178.25	3997.13	3349.10	2503.43	6.96
138.0	578.13	2857.69	1178.25	4035.94	3387.90	2530.60	6.98
139.0	582.32	2896.79	1178.25	4075.04	3427.00	2557.97	7.00
140.0	586.51	2936.19	1178.25	4114.44	3466.40	2585.55	7.02
141.0	590.70	2975.88	1178.25	4154.13	3506.09	2613.33	7.03
142.0	594.89	3015.86	1178.25	4194.11	3546.08	2641.32	7.05
143.0	599.07	3056.14	1178.25	4234.40	3586.36	2669.52	7.07
144.0	603.26	3096.72	1178.25	4274.97	3626.93	2697.92	7.09
145.0	607.45	3137.59	1178.25	4315.84	3667.81	2726.53	7.10
146.0	611.64	3178.76	1178.25	4357.01	3708.97	2755.35	7.12
147.0	615.83	3220.22	1178.25	4398.47	3750.43	2784.37	7.14
148.0	620.02	3261.98	1178.25	4440.23	3792.19	2813.60	7.16
149.0	624.21	3304.03	1178.25	4482.28	3834.24	2843.03	7.18
150.0	628.40	3346.37	1178.25	4524.62	3876.59	2872.68	7.20
151.0	632.59	3389.01	1178.25	4567.27	3919.23	2902.53	7.22
152.0	636.78	3431.95	1178.25	4610.20	3962.16	2932.58	7.24
153.0	640.97	3475.18	1178.25	4653.43	4005.40	2962.84	7.26
154.0	645.16	3518.71	1178.25	4696.96	4048.92	2993.31	7.28
155.0	649.35	3562.53	1178.25	4740.78	4092.74	3023.99	7.30

RESULT FROM TREND (AVERAGED) LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.1069E+00	0.1418E-04	0.2864E-02	0.1000E-04
0.5346E+00	0.7088E-04	0.1432E-01	0.5000E-04
0.1069E+01	0.1418E-03	0.2864E-01	0.1000E-03

0.5346E+02	0.7088E-02	0.1432E+01	0.5000E-02
0.8018E+02	0.1063E-01	0.2148E+01	0.7500E-02
0.1069E+03	0.1418E-01	0.2864E+01	0.1000E-01
0.2673E+03	0.3544E-01	0.7160E+01	0.2500E-01
0.5348E+03	0.7089E-01	0.1432E+02	0.5000E-01
0.8025E+03	0.1063E+00	0.2148E+02	0.7500E-01
0.1070E+04	0.1418E+00	0.2864E+02	0.1000E+00
0.2189E+04	0.3382E+00	0.7160E+02	0.2500E+00
0.3065E+04	0.6266E+00	0.1432E+03	0.5000E+00
0.3902E+04	0.1609E+01	0.4065E+03	0.1440E+01
0.4167E+04	0.3789E+01	0.7541E+03	0.3600E+01
0.4600E+04	0.7417E+01	0.1196E+04	0.7200E+01

RESULT FROM UPPER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.1520E+00	0.1584E-04	0.4091E-02	0.1000E-04
0.7598E+00	0.7919E-04	0.2046E-01	0.5000E-04
0.1520E+01	0.1584E-03	0.4091E-01	0.1000E-03
0.7598E+02	0.7919E-02	0.2046E+01	0.5000E-02
0.1140E+03	0.1188E-01	0.3068E+01	0.7500E-02
0.1520E+03	0.1584E-01	0.4091E+01	0.1000E-01
0.3799E+03	0.3959E-01	0.1023E+02	0.2500E-01
0.7606E+03	0.7920E-01	0.2046E+02	0.5000E-01
0.1141E+04	0.1188E+00	0.3068E+02	0.7500E-01
0.1521E+04	0.1584E+00	0.4091E+02	0.1000E+00
0.2889E+04	0.3667E+00	0.1023E+03	0.2500E+00
0.3652E+04	0.6533E+00	0.2046E+03	0.5000E+00
0.4239E+04	0.1626E+01	0.5656E+03	0.1440E+01
0.4496E+04	0.3805E+01	0.8955E+03	0.3600E+01
0.4873E+04	0.7429E+01	0.1273E+04	0.7200E+01

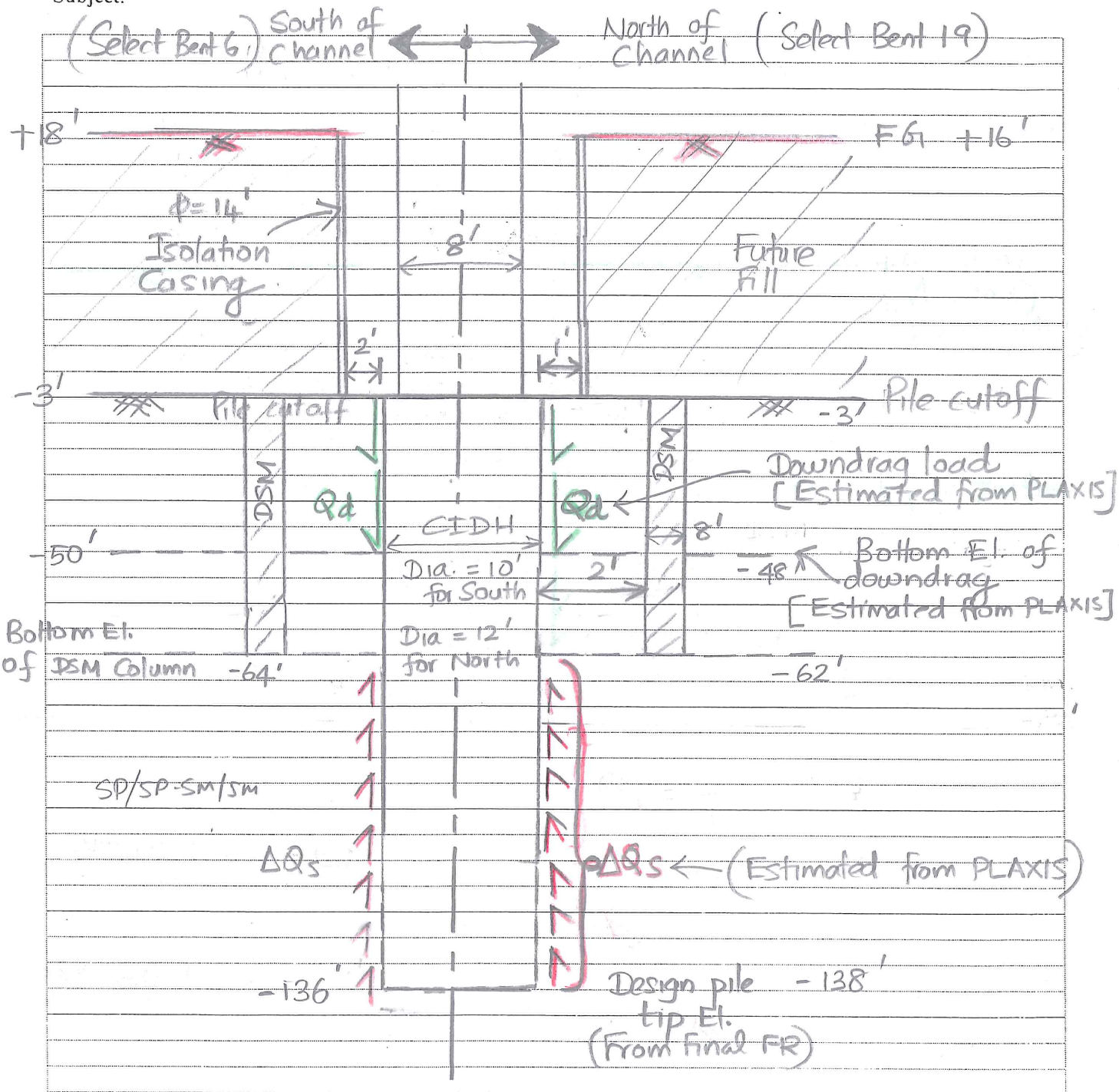
RESULT FROM LOWER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.6507E-01	0.1260E-04	0.1636E-02	0.1000E-04
0.3254E+00	0.6299E-04	0.8182E-02	0.5000E-04
0.6507E+00	0.1260E-03	0.1636E-01	0.1000E-03
0.3254E+02	0.6299E-02	0.8182E+00	0.5000E-02
0.4880E+02	0.9448E-02	0.1227E+01	0.7500E-02
0.6507E+02	0.1260E-01	0.1636E+01	0.1000E-01
0.1627E+03	0.3149E-01	0.4091E+01	0.2500E-01
0.3254E+03	0.6299E-01	0.8182E+01	0.5000E-01
0.4881E+03	0.9449E-01	0.1227E+02	0.7500E-01
0.6510E+03	0.1260E+00	0.1636E+02	0.1000E+00
0.1486E+04	0.3097E+00	0.4091E+02	0.2500E+00
0.2404E+04	0.5980E+00	0.8182E+02	0.5000E+00
0.3565E+04	0.1592E+01	0.2474E+03	0.1440E+01
0.3837E+04	0.3773E+01	0.6127E+03	0.3600E+01
0.4327E+04	0.7404E+01	0.1119E+04	0.7200E+01

USING PREVIOUS FINITE ELEMENT ANALYSES

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

Project: Schuyler Heim Bridge Replacement Project No.: 06-123
By: Ranjan(RS) Date: 12/13/10 Checked By: Arul Date: 12/14/10 Sheet: 1 of 2
Subject:



Main Steps

AXIAL PILE CALCULATIONS USING PLAXIS RESULTS

(1) Estimate the bottom El. of the potential downdrag layer (cutoff settlement of 0.5")
(2) Estimate the downdrag load using vertical stress (Q_d)
(3) Estimate the increase in skin friction below DSM column (ΔQ_s)

17660 Newhope Street, Suite E, Fountain Valley, CA 92708 Tel: (714) 751-3826 Fax: (714) 751-3928

Project: Schuyler Heim Bridge Replacement Project No.: 06-128
By: Ranjan(RB) Date: 12/13/10 Checked By: Arul Date: 12/14/10 Sheet: 2 of 2
Subject:

NORTH OF CHANNEL (Select Bent 19)

Step(2) Downdrag Calculation (Q_d)

From PLAXIS, Consider the downdrag layer between -3' and -48'

@ mid point; $\sigma_{v_1}' = 1.9$ ksf (From PLAXIS)
-25.5'

Average Unit skin $f_s = K_H \sigma_{v_1}' \tan\delta \times$ perimeter $\times 1'$

Assume $K_H = 0.5$

$\delta = \frac{3}{4}\phi = 24^\circ$

$f_s = 0.5 \times 1.9 \times \tan 24^\circ \times (\pi \times 12)$

$= 16.0$ kips/ft

Total downdrag (Q_d) $= f_s \times H$

$= 16 \times 45' = 720$ kips

$= 360$ tons //

Total skin above El -48', $Q_s = 172 + 97 = 269$ tons //
(From SHAFT (See attached); From Steel casing)

Step(3) Skin friction increase (ΔQ_s) (Between -62' and -138')

$\Delta Q_s = \Delta f_s \times H$ $\Delta\sigma_v' = 2$ ksf from PLAXIS

At midpoint @ -100',

$\Delta f_s = K_H \Delta\sigma_v' \tan\delta \times$ (perimeter) $\times 1'$

$= 0.5 \times 2.0 \times \tan 28 \times (\pi \times 12)$

$= 20$ kips/ft

$\Delta Q_s = 20 \times 76' = 1520$ kips $= 760$ tons //

$\therefore (Q_d + Q_s) < \Delta Q_s$ CHECK SATISFIED
360 + 269 < 760

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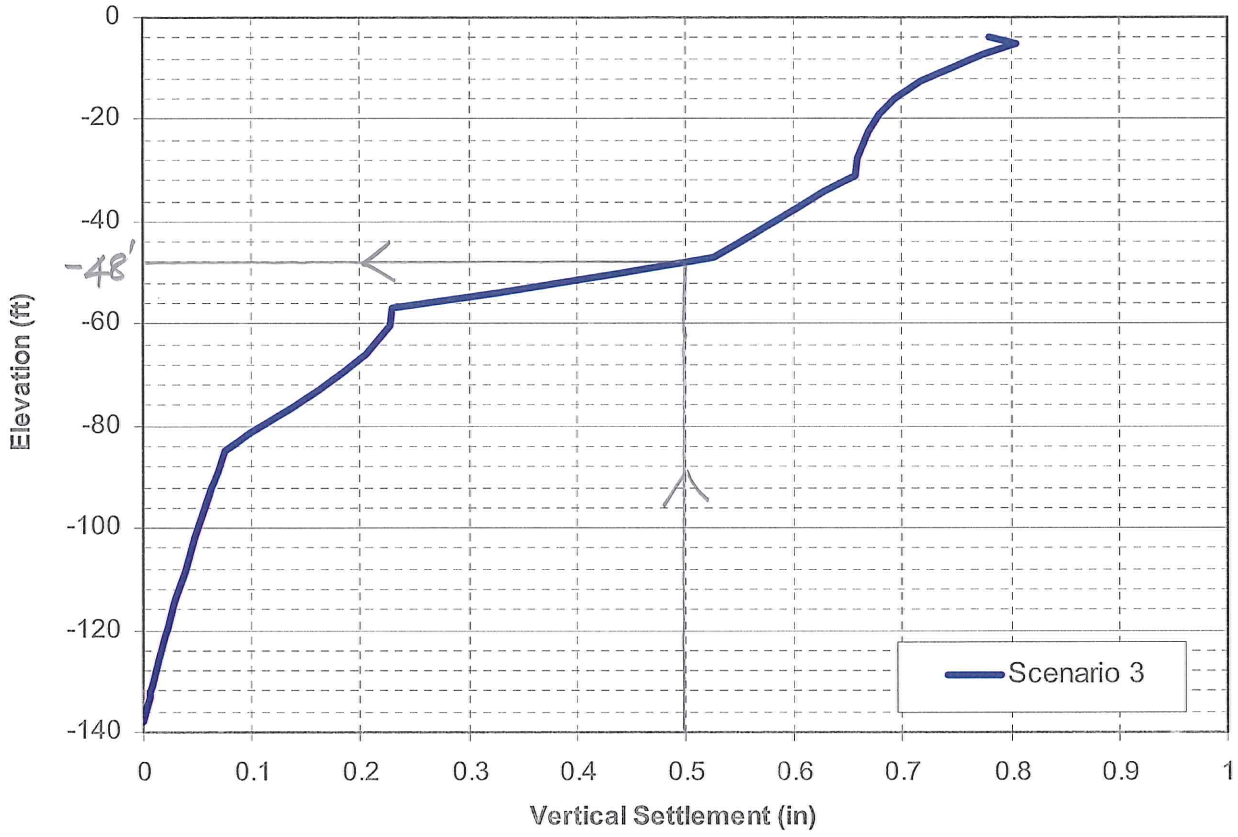
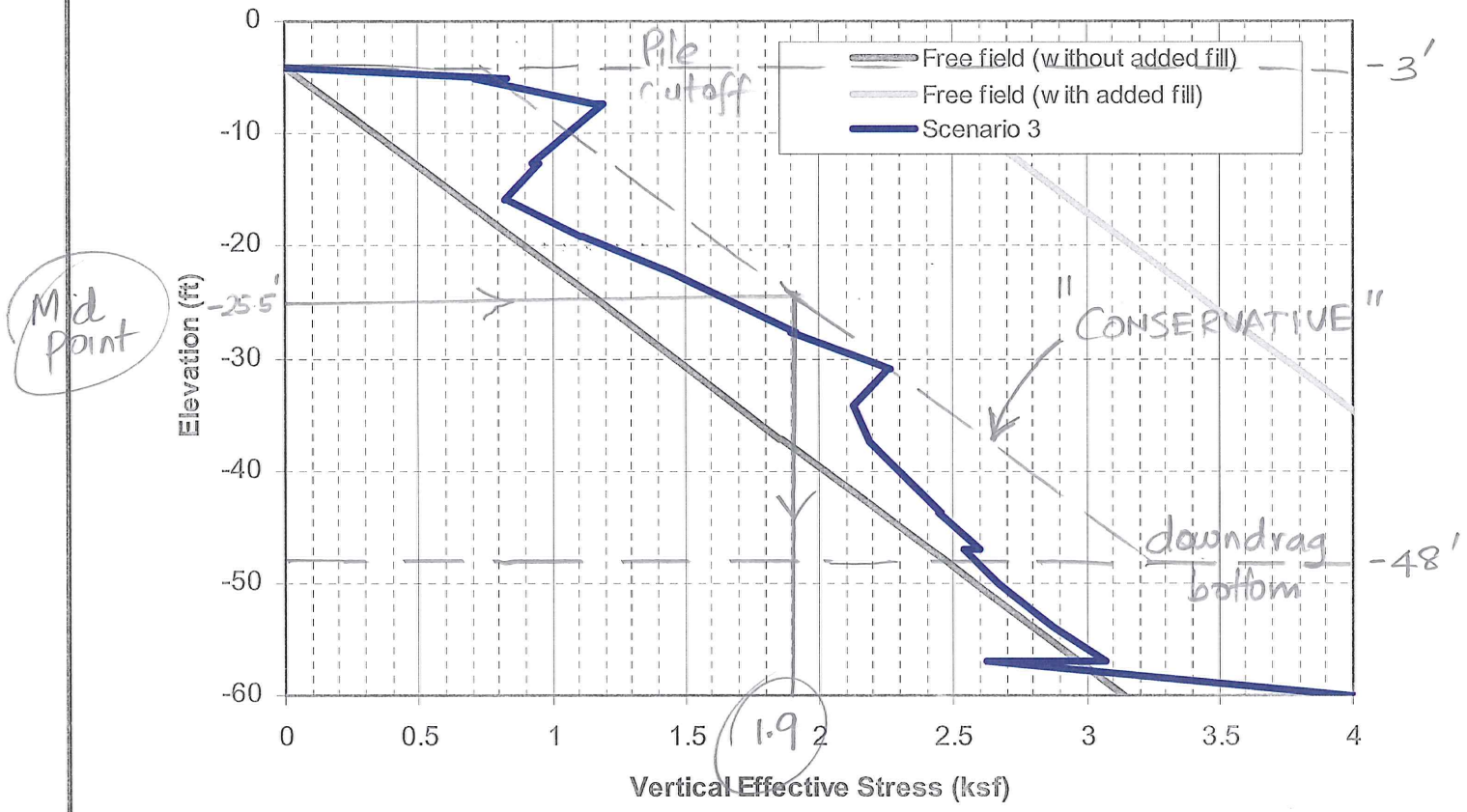
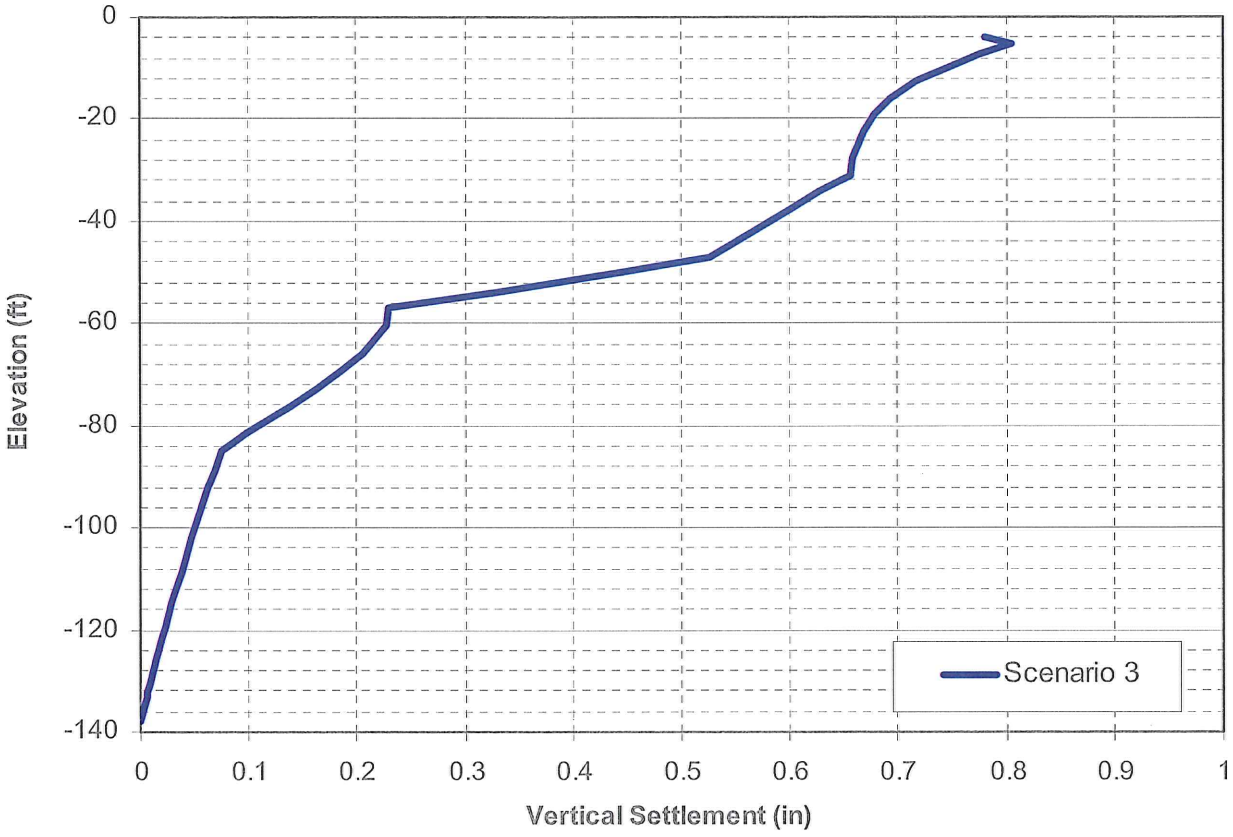
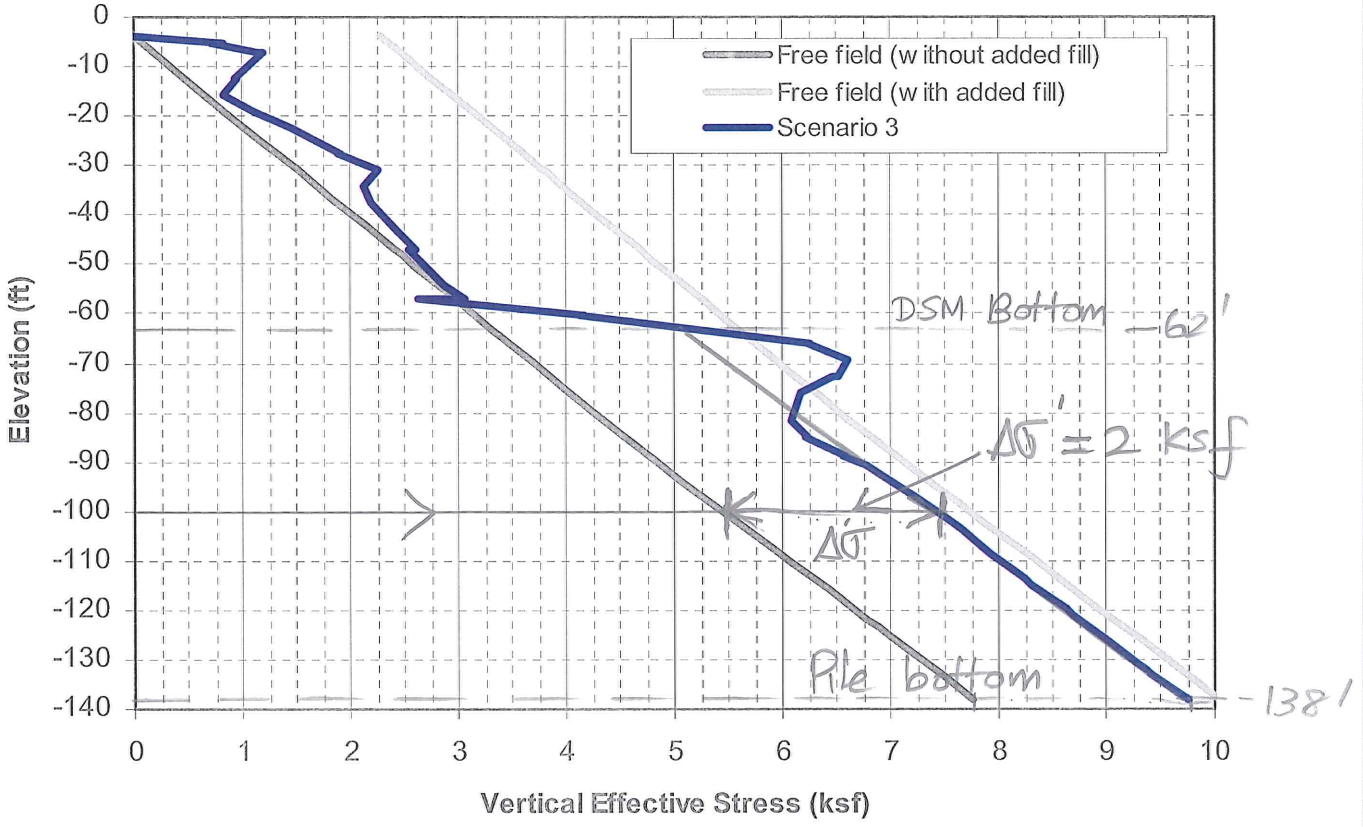




Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
Project No. 06-123	Date: 12-20-10	Summary of FE Results from the North Side of the Cerritos Channel Figure ?





Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
Project No. 06-123 | Date: 12-20-10	Summary of FE Results from the North Side of the Cerritos Channel Figure ?

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING

Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan

EMI Project No: 06-123-03

SKIN FRICTION IN SAND

Qs = Ks x tan (d x Ø) x (P x L) x Svo

WHERE: Svo = average effective overburden pressure
P = pile perimeter (feet)
L = pile length in soil layer (ft)
Ks = Coefficient of horizontal soil stress
Ø = friction angle of the soil
d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)

	Case 1 Steel Casing 13" x 1"	Case 2 Steel Casing
Perim (feet)	41.36	
Area (sq. ft)	3.43	
Ks	0.8	
d	0.8	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb

Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

Qs = alpha x c x P x L

WHERE: alpha = adhesion factor (See chart below)
c = cohesion (tons/sq. feet)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf , alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1988)

END BEARING IN CLAY, Qb

Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:
1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

-3.8 ft = top of pile el. -3.8 ft = top of ground el. -3.8 ft = water table el.

(Case 1)
SKIN FRICTION ON OUTER SURFACE
STEEL AREA END BEARING

(Case 2)
SKIN FRICTION ON OUTER SURFACE
STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N1)60	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	13" x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-4	-3.8	-4	SM/ML-1	120		30	0.05	0.2	0.1	0.00	0.2	0.2	0.01	21	0.0	7.0	0.0	0.4	171.3	0	0	0
-5	-4	-5	SM/ML-1	120		30	0.05	1	0.7	0.02	1.2	1.2	0.03	21	0.2	35.2	0.2	2.5	171.3	3	1	0
-6	-5	-6	SM/ML-1	120		30	0.05	1	1.7	0.05	2.2	2.2	0.06	21	0.5	35.2	0.7	4.6	171.3	5	3	0
-7	-6	-7	SM/ML-1	120		30	0.05	1	2.7	0.08	3.2	3.2	0.09	21	0.8	35.2	1.6	6.6	171.3	8	4	1
-8	-7	-8	SM/ML-1	120		30	0.05	1	3.7	0.11	4.2	4.2	0.12	21	1.1	35.2	2.7	8.7	171.3	11	6	2
-9	-8	-9	SM/ML-1	120		30	0.05	1	4.7	0.14	5.2	5.2	0.15	21	1.5	35.2	4.2	10.8	171.3	15	7	2
-10	-9	-10	SM/ML-1	120		30	0.05	1	5.7	0.16	6.2	6.2	0.18	21	1.8	35.2	6.0	12.8	171.3	19	9	3
-11	-10	-11	SM/ML-1	120		30	0.05	1	6.7	0.19	7.2	7.2	0.21	21	2.1	35.2	8.0	14.9	171.3	23	11	4
-12	-11	-12	SM/ML-1	120		30	0.05	1	7.7	0.22	8.2	8.2	0.24	21	2.4	35.2	10.4	17.0	171.3	27	14	6
-13	-12	-13	SM/ML-1	120		30	0.05	1	8.7	0.25	9.2	9.2	0.26	21	2.7	35.2	13.1	19.1	171.3	32	16	7
-14	-13	-14	SM/ML-1	120		30	0.05	1	9.7	0.28	10.2	10.2	0.29	21	3.0	35.2	16.1	21.1	171.3	37	19	9
-15	-14	-15	SM/ML-1	120		30	0.05	1	10.7	0.31	11.2	11.2	0.32	21	3.3	35.2	19.4	23.2	171.3	43	21	11
-16	-15	-16	SM/ML-1	120		30	0.05	1	11.7	0.34	12.2	12.2	0.35	21	3.6	35.2	23.0	25.3	171.3	48	24	13
-17	-16	-17	SM/ML-1	120		30	0.05	1	12.7	0.37	13.2	13.2	0.38	21	3.9	35.2	27.0	27.3	171.3	54	27	15
-18	-17	-18	SM/ML-1	120		30	0.05	1	13.7	0.39	14.2	14.2	0.41	21	4.2	35.2	31.2	29.4	171.3	61	30	17
-19	-18	-19	SM/ML-1	120		30	0.05	1	14.7	0.42	15.2	15.2	0.44	21	4.6	35.2	35.8	31.5	171.3	67	34	20
-20	-19	-20	SM/ML-1	120		30	0.05	1	15.7	0.45	16.2	16.2	0.47	21	4.9	35.2	40.6	33.6	171.3	74	37	23
-21	-20	-21	SM/ML-2	120		30	0.05	1	16.7	0.48	17.2	17.2	0.50	21	5.2	35.2	45.8	35.6	171.3	81	41	26
-22	-21	-22	SM/ML-2	120		30	0.05	1	17.7	0.51	18.2	18.2	0.52	21	5.5	35.2	51.3	37.7	171.3	89	44	29
-23	-22	-23	SM/ML-2	120		30	0.05	1	18.7	0.54	19.2	19.2	0.55	21	5.8	35.2	57.1	39.8	171.3	97	48	32
-24	-23	-24	SM/ML-2	120		30	0.05	1	19.7	0.57	20.2	20.2	0.58	21	6.1	35.2	63.2	41.8	171.3	105	53	35
-25	-24	-25	SM/ML-2	120		30	0.05	1	20.7	0.60	21.2	21.2	0.61	21	6.4	35.2	69.6	43.9	171.3	114	57	39
-26	-25	-26	SM/ML-2	120		30	0.05	1	21.7	0.62	22.2	22.2	0.64	21	6.7	35.2	76.3	46.0	171.3	122	61	43
-27	-26	-27	SM/ML-2	120		30	0.05	1	22.7	0.65	23.2	23.2	0.67	21	7.0	35.2	83.3	48.1	171.3	131	66	47
-28	-27	-28	SM/ML-2	120		30	0.05	1	23.7	0.68	24.2	24.2	0.70	21	7.3	35.2	90.7	50.1	171.3	141	70	51
-28.8	-28	-28.8	SM/ML-2	120		30	0.05	0.8	24.6	0.71	25	25	0.72	21	6.1	28.1	96.8	51.8	171.3	149	74	54
-29	-28.8	-29	SM/ML-2	120		30	0.05	0.2	25.1	0.72	25.2	25.2	0.73	21	1.6	7.0	98.3	52.2	171.3	151	75	55
-30	-29	-30	SM/ML-2	120		30	0.05	1	25.7	0.74	26.2	26.2	0.75	21	8.0	35.2	106.3	54.3	171.3	161	80	60
-31	-30	-31	SM/ML-2	120		30	0.05	1	26.7	0.77	27.2	27.2	0.78	21	8.3	35.2	114.5	56.3	171.3	171	85	64
-32	-31	-32	ML	120		0	0.33	1	27.7	0.80	28.2	28.2	0.81	9	12.4	12.4	127.0	10.0	10.0	137	69	74
-33	-32	-33	ML	120		0	0.33	1	28.7	0.83	29.2	29.2	0.84	9	12.4	12.4	139.4	10.0	10.0	149	75	84
-34	-33	-34	ML	120		0	0.33	1	29.7	0.86	30.2	30.2	0.87	9	12.4	12.4	151.9	10.0	10.0	162	81	94

Qs = 97 tons.

VERTICALLY LOADED DRILLED SHAFT ANALYSIS PROGRAM SHAFT
VERSION 6 (C)COPYRIGHT ENSOFT,INC.1989,1995,1998,2001,2003,2007

Heim Bridge Project - Bent 19

TOTAL LOAD = 3000.0 TONS

EG = -4'

NUMBER OF LAYERS = 8

WATER TABLE DEPTH = 0.0 FT.

FACTOR OF SAFETY APPLIED TO THE TOTAL ULTIMATE CAPACITY = 1.43

FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE CAPACITY = 2.22

SOIL INFORMATION

LAYER NO 1----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.200E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.200E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.160E+02

LAYER NO 2----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.384E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.600E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.160E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.319E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.600E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.270E+02

LAYER NO 3----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.870E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.650E+03
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.270E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.650E+03
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.330E+02

LAYER NO 4----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.300E+01
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.330E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.300E+01
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.430E+02

LAYER NO 5----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.800E+03
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.430E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.800E+03
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.530E+02

LAYER NO 6----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.517E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00

BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.150E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.530E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.472E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.150E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.580E+02

LAYER NO 7----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.300E+04
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.580E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA = 0.550E+00
END BEARING COEFFICIENT-Nc = 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.300E+04
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.810E+02

LAYER NO 8----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.285E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.810E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.200E+03

DRILLED SHAFT INFORMATION

DIAMETER OF STEM = 12.000 FT.
DIAMETER OF BASE = 12.000 FT.
END OF STEM TO BASE = 0.000 FT.
ANGLE OF BELL = 0.000 DEG.
IGNORED TOP PORTION = 25.000 FT.
IGNORED BOTTOM PORTION = 0.000 FT.
AREA OF ONE PERCENT STEEL = 162.881 SQ.IN.
ELASTIC MODULUS, Ec = 0.360E+07 LB/SQ IN

VOLUME OF UNDERREAM = 0.000 CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (FOR UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
QBD = TOTAL ALLOWABLE LOAD USING A FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE RESISTANCE;
QDN = TOTAL ALLOWABLE LOAD USING FACTORS OF SAFETY APPLIED TO THE ULTIMATE SIDE RESISTANCE AND THE ULTIMATE BASE RESISTANCE.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	QBD (TONS)	QDN (TONS)	QU/VOLUME (TONS/CU.YDS)
26.0	108.92	9.17	146.18	155.34	74.95	72.20	1.43
27.0	113.11	18.53	154.05	172.58	87.85	82.29	1.53
28.0	117.30	25.27	163.72	188.99	98.94	91.36	1.61
29.0	121.49	32.01	175.17	207.18	110.84	101.24	1.71
30.0	125.68	38.75	182.23	220.98	120.75	109.13	1.76
31.0	129.87	45.49	190.95	236.44	131.42	117.77	1.82
32.0	134.06	52.23	199.37	251.60	141.94	126.28	1.88
33.0	138.25	58.97	207.51	266.48	152.35	134.66	1.93
34.0	142.44	68.20	214.07	282.27	164.53	144.07	1.98
35.0	146.63	77.70	252.54	330.24	191.34	168.03	2.25
36.0	150.82	87.47	290.65	378.12	218.26	192.02	2.51
37.0	155.01	97.52	328.40	425.92	245.30	216.04	2.75
38.0	159.19	107.83	365.81	473.64	272.45	240.10	2.98
39.0	163.38	118.42	402.87	521.29	299.71	264.18	3.19
40.0	167.57	129.28	439.58	568.86	327.09	288.31	3.39
41.0	171.76	140.41	475.95	616.36	354.59	312.47	3.59
42.0	175.95	151.81	512.98	664.79	382.65	337.11	3.78
43.0	180.14	163.48	550.63	714.12	411.27	362.22	3.96
44.0	184.33	171.78	590.37	762.15	437.44	385.91	4.13
45.0	188.52	180.07	632.15	812.22	464.54	410.52	4.31
46.0	192.71	188.37	675.96	864.32	492.55	436.04	4.49
47.0	196.90	196.66	716.41	913.07	519.05	460.05	4.64
48.0	201.09	204.96	753.50	958.46	544.04	482.55	4.77
49.0	205.28	213.25	787.25	1000.50	567.51	503.54	4.87
50.0	209.47	221.55	817.64	1039.18	589.48	523.02	4.96
51.0	213.66	229.84	844.67	1074.51	609.94	540.99	5.03
52.0	217.85	238.14	868.35	1106.49	628.89	557.45	5.08
53.0	222.03	246.43	888.67	1135.10	646.34	572.41	5.11
54.0	226.22	276.22	904.90	1181.12	683.42	600.56	5.22
55.0	230.41	306.01	917.05	1223.06	718.68	626.88	5.31
56.0	234.60	335.79	925.13	1260.92	752.10	651.36	5.37
57.0	238.79	365.55	929.17	1294.71	783.67	674.01	5.42
58.0	242.98	395.27	923.67	1318.93	810.92	692.34	5.43
59.0	247.17	426.37	918.39	1344.76	839.65	711.73	5.44
60.0	251.36	457.48	913.34	1370.81	868.48	731.24	5.45
61.0	255.55	488.58	908.54	1397.12	897.42	750.85	5.47
62.0	259.74	519.69	904.00	1423.69	926.49	770.58	5.48
63.0	263.93	550.79	899.76	1450.55	955.69	790.45	5.50
64.0	268.12	581.90	895.81	1477.71	985.02	810.45	5.51
65.0	272.31	613.01	892.19	1505.19	1014.49	830.59	5.53
66.0	276.50	644.11	888.90	1533.01	1044.12	850.88	5.54
67.0	280.69	675.22	885.97	1561.18	1073.90	871.34	5.56
68.0	284.87	706.32	883.41	1589.73	1103.86	891.96	5.58
69.0	289.06	737.43	881.23	1618.66	1133.99	912.76	5.60
70.0	293.25	768.54	880.35	1648.88	1164.69	934.13	5.62
71.0	297.44	799.64	880.70	1680.34	1195.96	956.06	5.65
72.0	301.63	830.75	882.23	1712.98	1227.75	978.53	5.68
73.0	305.82	861.85	884.89	1746.74	1260.05	1001.50	5.71
74.0	310.01	892.96	888.63	1781.59	1292.84	1024.95	5.75
75.0	314.20	924.06	893.39	1817.46	1326.09	1048.87	5.78
76.0	318.39	955.17	899.13	1854.30	1359.78	1073.23	5.82
77.0	322.58	986.28	905.79	1892.06	1393.88	1098.00	5.87
78.0	326.77	1017.38	913.31	1930.69	1428.37	1123.16	5.91
79.0	330.96	1048.49	921.66	1970.14	1463.23	1148.69	5.95
80.0	335.15	1079.59	930.76	2010.35	1498.44	1174.56	6.00
81.0	339.34	1110.70	940.58	2051.28	1533.96	1200.75	6.04
82.0	343.53	1135.44	950.40	2085.84	1563.12	1222.49	6.07
83.0	347.71	1159.83	960.22	2120.05	1591.93	1243.98	6.10
84.0	351.90	1183.87	970.04	2153.90	1620.38	1265.22	6.12
85.0	356.09	1207.53	979.86	2187.39	1648.47	1286.21	6.14

Q_s = 172 tons

Q_s from steel casing = 97 tons

Total Q_s = 172 + 97 = 269 tons

86.0	360.28	1231.00	989.67	2220.67	1676.35	1307.05	6.16
87.0	364.47	1254.76	999.49	2254.25	1704.53	1328.10	6.18
88.0	368.66	1278.81	1009.31	2288.12	1733.00	1349.36	6.21
89.0	372.85	1303.16	1019.13	2322.29	1761.77	1370.82	6.23
90.0	377.04	1327.80	1028.95	2356.75	1790.83	1392.49	6.25
91.0	381.23	1352.74	1038.77	2391.51	1820.19	1414.37	6.27
92.0	385.42	1377.98	1048.59	2426.56	1849.84	1436.45	6.30
93.0	389.61	1403.51	1058.41	2461.91	1879.79	1458.74	6.32
94.0	393.80	1429.33	1068.22	2497.56	1910.03	1481.23	6.34
95.0	397.99	1455.45	1078.04	2533.49	1940.57	1503.94	6.37
96.0	402.18	1481.86	1087.86	2569.73	1971.40	1526.84	6.39
97.0	406.37	1508.57	1097.25	2605.82	2002.34	1549.76	6.41
98.0	410.55	1535.58	1106.18	2641.76	2033.36	1572.69	6.43
99.0	414.74	1562.88	1114.64	2677.52	2064.47	1595.60	6.46
100.0	418.93	1590.47	1122.61	2713.08	2095.65	1618.51	6.48
101.0	423.12	1618.36	1130.08	2748.44	2126.90	1641.39	6.50
102.0	427.31	1646.55	1137.03	2783.57	2158.21	1664.25	6.51
103.0	431.50	1675.03	1143.43	2818.46	2189.57	1687.07	6.53
104.0	435.69	1703.80	1149.28	2853.08	2220.98	1709.84	6.55
105.0	439.88	1732.87	1154.56	2887.43	2252.42	1732.56	6.56
106.0	444.07	1762.24	1159.24	2921.48	2283.90	1755.23	6.58
107.0	448.26	1791.90	1163.31	2955.21	2315.39	1777.82	6.59
108.0	452.45	1821.85	1166.76	2988.61	2346.89	1800.34	6.61
109.0	456.64	1852.10	1169.63	3021.73	2378.44	1822.81	6.62
110.0	460.83	1882.65	1171.98	3054.63	2410.04	1845.25	6.63
111.0	465.02	1913.49	1173.86	3087.35	2441.73	1867.68	6.64
112.0	469.21	1944.62	1175.33	3119.95	2473.52	1890.13	6.65
113.0	473.39	1976.05	1176.42	3152.47	2505.44	1912.63	6.66
114.0	477.58	2007.78	1177.21	3184.98	2537.52	1935.19	6.67
115.0	481.77	2039.80	1177.73	3217.52	2569.77	1957.84	6.68
116.0	485.96	2072.11	1178.04	3250.15	2602.23	1980.60	6.69
117.0	490.15	2104.72	1178.20	3282.92	2634.91	2003.50	6.70
118.0	494.34	2137.63	1178.25	3315.88	2667.84	2026.55	6.71
119.0	498.53	2170.83	1178.25	3349.08	2701.04	2049.79	6.72
120.0	502.72	2204.32	1178.25	3382.57	2734.54	2073.24	6.73
121.0	506.91	2238.11	1178.25	3416.36	2768.33	2096.89	6.74
122.0	511.10	2272.20	1178.25	3450.45	2802.41	2120.75	6.75
123.0	515.29	2306.58	1178.25	3484.83	2836.79	2144.82	6.76
124.0	519.48	2341.25	1178.25	3519.50	2871.47	2169.09	6.78
125.0	523.67	2376.23	1178.25	3554.48	2906.44	2193.57	6.79
126.0	527.86	2411.49	1178.25	3589.74	2941.70	2218.26	6.80
127.0	532.05	2447.05	1178.25	3625.30	2977.26	2243.15	6.81
128.0	536.23	2482.91	1178.25	3661.16	3013.12	2268.25	6.83
129.0	540.42	2519.06	1178.25	3697.31	3049.27	2293.56	6.84
130.0	544.61	2555.50	1178.25	3733.75	3085.72	2319.07	6.86
131.0	548.80	2592.24	1178.25	3770.49	3122.46	2344.79	6.87
132.0	552.99	2629.28	1178.25	3807.53	3159.49	2370.71	6.89
133.0	557.18	2666.61	1178.25	3844.86	3196.82	2396.84	6.90
134.0	561.37	2704.24	1178.25	3882.49	3234.45	2423.18	6.92
135.0	565.56	2742.16	1178.25	3920.41	3272.37	2449.72	6.93
136.0	569.75	2780.37	1178.25	3958.62	3310.59	2476.48	6.95
137.0	573.94	2818.88	1178.25	3997.13	3349.10	2503.43	6.96
138.0	578.13	2857.69	1178.25	4035.94	3387.90	2530.60	6.98
139.0	582.32	2896.79	1178.25	4075.04	3427.00	2557.97	7.00
140.0	586.51	2936.19	1178.25	4114.44	3466.40	2585.55	7.02
141.0	590.70	2975.88	1178.25	4154.13	3506.09	2613.33	7.03
142.0	594.89	3015.86	1178.25	4194.11	3546.08	2641.32	7.05
143.0	599.07	3056.14	1178.25	4234.40	3586.36	2669.52	7.07
144.0	603.26	3096.72	1178.25	4274.97	3626.93	2697.92	7.09
145.0	607.45	3137.59	1178.25	4315.84	3667.81	2726.53	7.10
146.0	611.64	3178.76	1178.25	4357.01	3708.97	2755.35	7.12
147.0	615.83	3220.22	1178.25	4398.47	3750.43	2784.37	7.14
148.0	620.02	3261.98	1178.25	4440.23	3792.19	2813.60	7.16
149.0	624.21	3304.03	1178.25	4482.28	3834.24	2843.03	7.18
150.0	628.40	3346.37	1178.25	4524.62	3876.59	2872.68	7.20
151.0	632.59	3389.01	1178.25	4567.27	3919.23	2902.53	7.22
152.0	636.78	3431.95	1178.25	4610.20	3962.16	2932.58	7.24
153.0	640.97	3475.18	1178.25	4653.43	4005.40	2962.84	7.26
154.0	645.16	3518.71	1178.25	4696.96	4048.92	2993.31	7.28
155.0	649.35	3562.53	1178.25	4740.78	4092.74	3023.99	7.30

RESULT FROM TREND (AVERAGED) LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.1069E+00	0.1418E-04	0.2864E-02	0.1000E-04
0.5346E+00	0.7088E-04	0.1432E-01	0.5000E-04
0.1069E+01	0.1418E-03	0.2864E-01	0.1000E-03

0.5346E+02	0.7088E-02	0.1432E+01	0.5000E-02
0.8018E+02	0.1063E-01	0.2148E+01	0.7500E-02
0.1069E+03	0.1418E-01	0.2864E+01	0.1000E-01
0.2673E+03	0.3544E-01	0.7160E+01	0.2500E-01
0.5348E+03	0.7089E-01	0.1432E+02	0.5000E-01
0.8025E+03	0.1063E+00	0.2148E+02	0.7500E-01
0.1070E+04	0.1418E+00	0.2864E+02	0.1000E+00
0.2189E+04	0.3382E+00	0.7160E+02	0.2500E+00
0.3065E+04	0.6266E+00	0.1432E+03	0.5000E+00
0.3902E+04	0.1609E+01	0.4065E+03	0.1440E+01
0.4167E+04	0.3789E+01	0.7541E+03	0.3600E+01
0.4600E+04	0.7417E+01	0.1196E+04	0.7200E+01

RESULT FROM UPPER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.1520E+00	0.1584E-04	0.4091E-02	0.1000E-04
0.7598E+00	0.7919E-04	0.2046E-01	0.5000E-04
0.1520E+01	0.1584E-03	0.4091E-01	0.1000E-03
0.7598E+02	0.7919E-02	0.2046E+01	0.5000E-02
0.1140E+03	0.1188E-01	0.3068E+01	0.7500E-02
0.1520E+03	0.1584E-01	0.4091E+01	0.1000E-01
0.3799E+03	0.3959E-01	0.1023E+02	0.2500E-01
0.7606E+03	0.7920E-01	0.2046E+02	0.5000E-01
0.1141E+04	0.1188E+00	0.3068E+02	0.7500E-01
0.1521E+04	0.1584E+00	0.4091E+02	0.1000E+00
0.2889E+04	0.3667E+00	0.1023E+03	0.2500E+00
0.3652E+04	0.6533E+00	0.2046E+03	0.5000E+00
0.4239E+04	0.1626E+01	0.5656E+03	0.1440E+01
0.4496E+04	0.3805E+01	0.8955E+03	0.3600E+01
0.4873E+04	0.7429E+01	0.1273E+04	0.7200E+01

RESULT FROM LOWER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.6507E-01	0.1260E-04	0.1636E-02	0.1000E-04
0.3254E+00	0.6299E-04	0.8182E-02	0.5000E-04
0.6507E+00	0.1260E-03	0.1636E-01	0.1000E-03
0.3254E+02	0.6299E-02	0.8182E+00	0.5000E-02
0.4880E+02	0.9448E-02	0.1227E+01	0.7500E-02
0.6507E+02	0.1260E-01	0.1636E+01	0.1000E-01
0.1627E+03	0.3149E-01	0.4091E+01	0.2500E-01
0.3254E+03	0.6299E-01	0.8182E+01	0.5000E-01
0.4881E+03	0.9449E-01	0.1227E+02	0.7500E-01
0.6510E+03	0.1260E+00	0.1636E+02	0.1000E+00
0.1486E+04	0.3097E+00	0.4091E+02	0.2500E+00
0.2404E+04	0.5980E+00	0.8182E+02	0.5000E+00
0.3565E+04	0.1592E+01	0.2474E+03	0.1440E+01
0.3837E+04	0.3773E+01	0.6127E+03	0.3600E+01
0.4327E+04	0.7404E+01	0.1119E+04	0.7200E+01

FOR BENTS 5 THROUGH 11 OF SCHUYLER HEIM BRIDGE (BRIDGE NO. 53-3032),

&

FOR BENTS 7 AND 8 OF NEW DOCK ON-RAMP (BRIDGE NO. 53-3033),

&

FOR BENTS 7 AND 8 OF NEW DOCK OFF-RAMP (BRIDGE NO. 53-3031)

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

Project: Schuyler Heim Bridge Replacement Project No.: 06-123
By: Ranjan(RD) Date: 12/13/10 Checked By: Arul Date: 12/14/10 Sheet: 1 of 2
Subject:

SOUTH OF CHANNEL (Select Bent 6)

Step(2) Downdrag Calculation (Q_d)

From PLAXIS, consider the downdrag layer between -3' and -50'.

@ mid point of downdrag @ El. -25.5'

$\sigma_v' = 2.9$ ksf (from PLAXIS)

Avg unit skin $f_s = K_H \sigma_v' \tan\delta \times$ perimeter $\times 1'$

Assume $K_H = 0.5$

$\delta = 24°$

$f_s = 0.5 \times 2.0 \times \tan 24° \times (\pi \times 10) \times 1$

$= 14.0$ kips / ft

Total downdrag (Q_d) $= f_s \times H$

$= 14.0 \times 47'$

$= 658$ kips

$= 329$ tons //

From SHAFT Analyses, (See attached)

Total skin above El -50' = 265 tons (Q_{s1})

Total skin, from steel casings = 102 tons (Q_{s2})

Total skin $Q_s = 265 + 102$

$= 367$ tons //

17660 Newhope Street, Suite E, Fountain Valley, CA 92708 Tel: (714) 751-3826 Fax: (714) 751-3928

Project: Schuyler Heim Bridge Replacement Project No.: 06-123
By: Ranjan(RS) Date: 12/13/10 Checked By: Arul Date: 12/14/10 Sheet: 2 of 2
Subject:

Step(3) Skin friction Increase (ΔQ_s) (Between $-64'$ and $-136'$)

$\Delta Q_s = \Delta f_s \times H$

@ Mid point $-100'$, $\Delta\sigma_v' = 2.25$ ksf from PLAXIS.

$\therefore \Delta f_s = K_H \Delta\sigma_v' \times \tan\delta \times (\text{perimeter}) \times 1'$

$= 0.5 \times 2.5 \times \tan 28 \times (\pi \times 10) \times 1$

$= 20.9$ kips / ft.

$\Delta Q_s = 20.9 \times 72' = 1503$ kips

$= 752$ tons //

CHECK

Total load $= Q_d + Q_s$

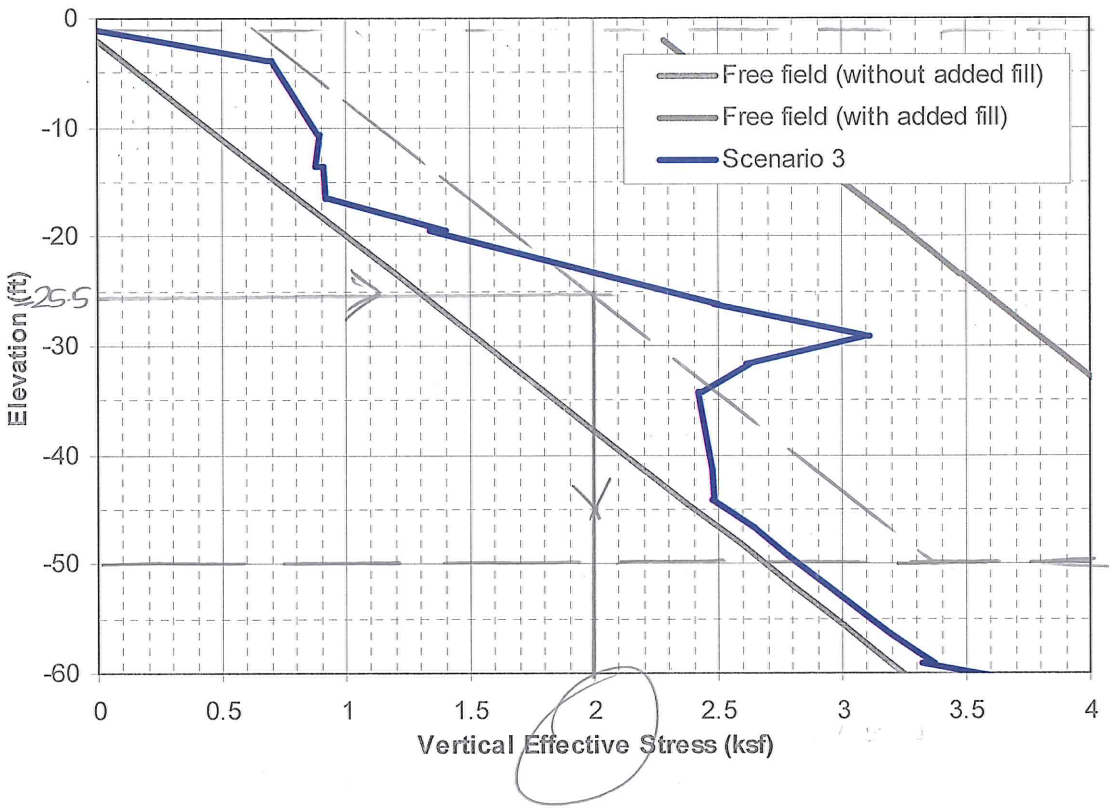
$= 329 + 367$

$= 696$ tons

Increase in skin resistance (ΔQ_s) $= 752$ tons

$\therefore \Delta Q_s > (Q_d + Q_s)$

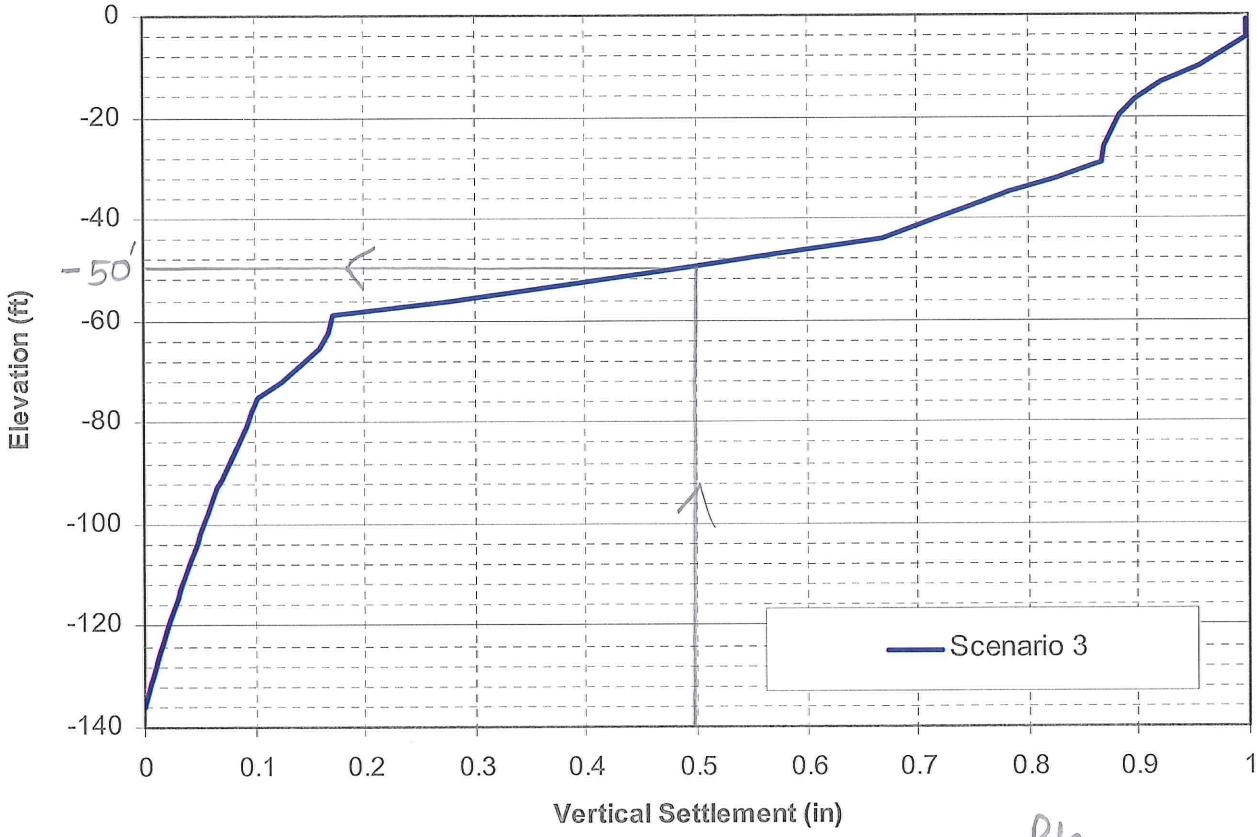
SATISFIED

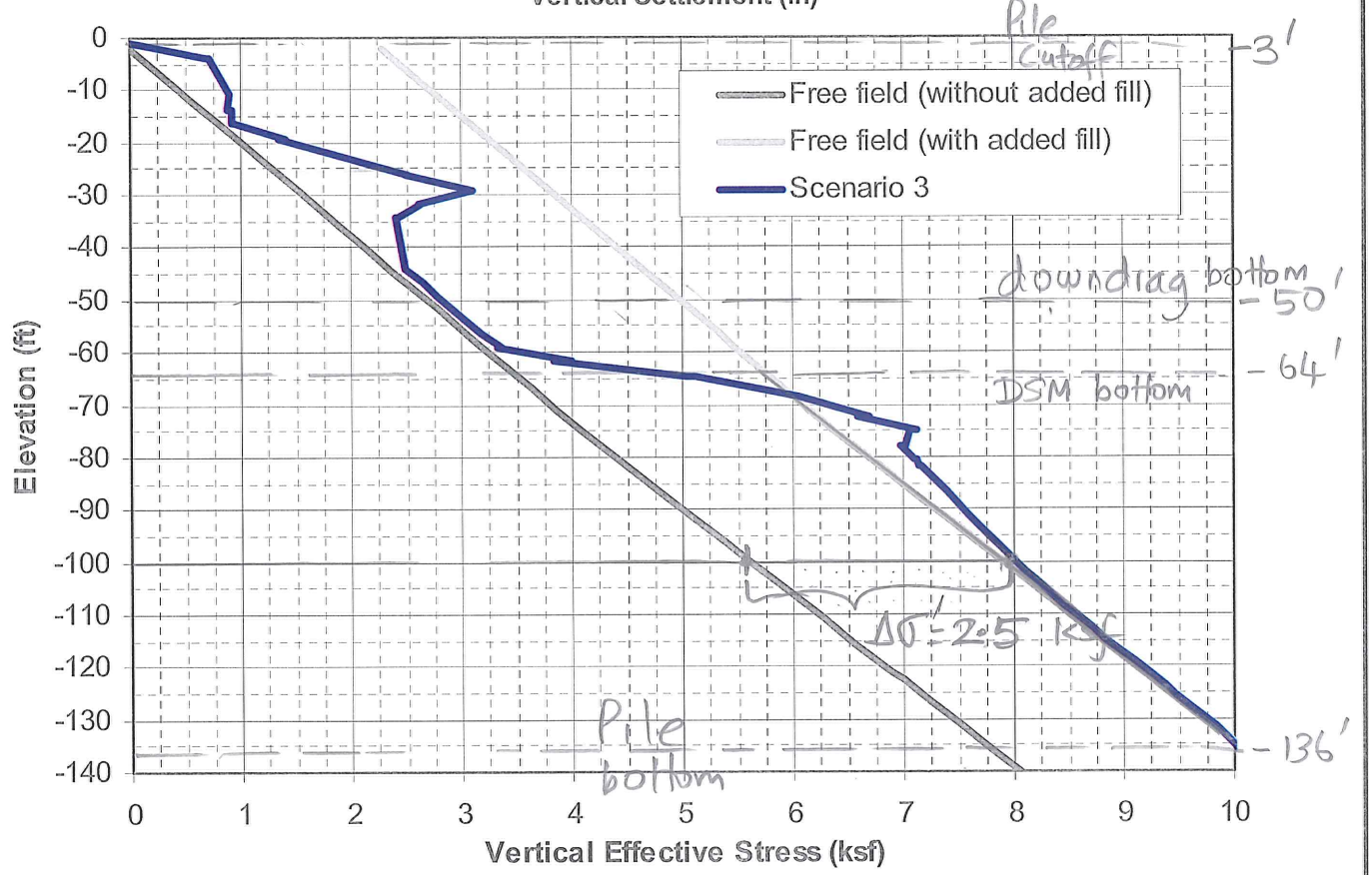


Pile cutoff

Mid point

downdrag bottom





Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
Project No. 06-123	Date: 12-20-10	Summary of FE Results from the South Side of the Cerritos Channel Figure ?

DRIVEN PILE CAPACITY CALCULATIONS - PERMANENT STEEL CASING
Schuyler Heim Bridge Replacement Project

Prepared By: Ranjan

EMI Project No: 06-123-03

SKIN FRICTION IN SAND
Qs = Ks x tan (d x Ø) x (P x L) x Svo

WHERE: Svo = average affective overburden pressure
P = pile perimeter (feet)
L = pile length in soil layer (ft)
Ks = Coefficient of horizontal soil stress
Ø = friction angle of the soil
d = ratio of interface angle of friction to soil angle of friction (for smooth concrete/soil or smooth steel/soil interface)

Pile Size (inches)

	Case 1	Case 2
	Steel Casing	Steel Casing
	11" x 1"	
Perim (feet)	35.08	
Area (sq. ft)	2.90	
Ks	0.8	
d	0.8	

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb
Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = affective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION/ END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs
Qs = alpha x c x P x L

WHERE: alpha = adhesion factor (See chart below)
c = cohesion (tons/sq. feet)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf , alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb
Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf)
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:
1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagonal)
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and silts
3) Design procedure follows API Recommended Practice, 2000.

-3 ft = top of pile el. -1 ft = top of ground el. -1 ft = water table el.

(Case 1)
SKIN FRICTION ON OUTER SURFACE
STEEL AREA END BEARING

(Case 2)
SKIN FRICTION ON OUTER SURFACE
STEEL AREA END BEARING

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N1)60	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	11" x 1" STEEL CASING: LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
-4	-1	-4	SM/SP-SM/SF	120		32	0.05	3	1.5	0.04	3	1	0.09	30	0.0	95.8	0.0	0.0	203.1	0	0	0
-5	-4	-5	SM/SP-SM/SF	120		32	0.05	1	3.5	0.10	4	2	0.12	30	1.0	31.9	1.0	10.1	203.1	11	6	1
-6	-5	-6	SM/SP-SM/SF	120		32	0.05	1	4.5	0.13	5	3	0.14	30	1.3	31.9	2.3	12.7	203.1	15	7	1
-7	-6	-7	SM/SP-SM/SF	120		32	0.05	1	5.5	0.16	6	4	0.17	30	1.5	31.9	3.8	15.2	203.1	19	10	2
-8	-7	-8	SM/SP-SM/SF	120		32	0.05	1	6.5	0.19	7	5	0.20	30	1.8	31.9	5.6	17.7	203.1	23	12	3
-9	-8	-9	SM/SP-SM/SF	120		32	0.05	1	7.5	0.22	8	6	0.23	30	2.1	31.9	7.7	20.3	203.1	28	14	4
-10	-9	-10	SM/SP-SM/SF	120		32	0.05	1	8.5	0.24	9	7	0.26	30	2.4	31.9	10.1	22.8	203.1	33	16	6
-11	-10	-11	SM/SP-SM/SF	120		32	0.05	1	9.5	0.27	10	8	0.29	30	2.7	31.9	12.8	25.3	203.1	38	19	7
-12	-11	-12	SM/SP-SM/SF	120		32	0.05	1	10.5	0.30	11	9	0.32	30	3.0	31.9	15.8	27.9	203.1	44	22	9
-13	-12	-13	SM/SP-SM/SF	120		32	0.05	1	11.5	0.33	12	10	0.35	30	3.2	31.9	19.0	30.4	203.1	49	25	11
-14	-13	-14	SM/SP-SM/SF	120		32	0.05	1	12.5	0.36	13	11	0.37	30	3.5	31.9	22.5	33.0	203.1	55	28	13
-15	-14	-15	SM/SP-SM/SF	120		32	0.05	1	13.5	0.39	14	12	0.40	30	3.8	31.9	26.3	35.5	203.1	62	31	15
-16	-15	-16	SM/SP-SM/SF	120		32	0.05	1	14.5	0.42	15	13	0.43	30	4.1	31.9	30.4	38.0	203.1	68	34	17
-17	-16	-17	SM/SP-SM/SF	120		32	0.05	1	15.5	0.45	16	14	0.46	30	4.4	31.9	34.8	40.6	203.1	75	38	19
-18	-17	-18	SM/SP-SM/SF	120		32	0.05	1	16.5	0.48	17	15	0.49	30	4.6	31.9	39.4	43.1	203.1	82	41	22
-19	-18	-19	SM/SP-SM/SF	120		32	0.05	1	17.5	0.50	18	16	0.52	30	4.9	31.9	44.3	45.6	203.1	90	45	25
-20	-19	-20	SM/SP-SM/SF	120		32	0.05	1	18.5	0.53	19	17	0.55	30	5.2	31.9	49.5	48.2	203.1	98	49	28
-21	-20	-21	SM/SP-SM/SF	120		32	0.05	1	19.5	0.56	20	18	0.58	30	5.5	31.9	55.0	50.7	203.1	106	53	31
-22	-21	-22	SM/SP-SM/SF	120		32	0.05	1	20.5	0.59	21	19	0.60	30	5.8	31.9	60.8	53.2	203.1	114	57	34
-23	-22	-23	SM/SP-SM/SF	120		32	0.05	1	21.5	0.62	22	20	0.63	30	6.1	31.9	66.8	55.8	203.1	123	61	37
-24	-23	-24	SM/SP-SM/SF	120		32	0.05	1	22.5	0.65	23	21	0.66	30	6.3	31.9	73.2	58.3	203.1	131	66	41
-25	-24	-25	SM/SP-SM/SF	120		32	0.05	1	23.5	0.68	24	22	0.69	30	6.6	31.9	79.8	60.8	203.1	141	70	45
-26	-25	-26	SM/SP-SM/SF	120		32	0.05	1	24.5	0.71	25	23	0.72	30	6.9	31.9	86.7	63.4	203.1	150	75	49
-27	-26	-27	SM/SP-SM/SF	120		32	0.05	1	25.5	0.73	26	24	0.75	30	7.2	31.9	93.9	65.9	203.1	160	80	53
-28	-27	-28	SM/SP-SM/SF	120		32	0.05	1	26.5	0.76	27	25	0.78	30	7.5	31.9	101.3	68.4	203.1	170	85	57
-29	-28	-29	SM/SP-SM/SF	120		32	0.05	1	27.5	0.79	28	26	0.81	30	7.7	31.9	109.1	71.0	203.1	180	90	61
-30	-29	-30	ML/CL-ML/CH	120		0	0.75	1	28.5	0.82	29	27	0.84	9	13.2	13.2	122.2	19.6	19.6	142	71	72
-31	-30	-31	ML/CL-ML/CH	120		0	0.75	1	29.5	0.85	30	28	0.86	9	13.2	13.2	135.4	19.6	19.6	155	77	82
-32	-31	-32	ML/CL-ML/CH	120		0	0.75	1	30.5	0.88	31	29	0.89	9	13.2	13.2	148.5	19.6	19.6	168	84	93
-33	-32	-33	ML/CL-ML/CH	120		0	0.75	1	31.5	0.91	32	30	0.92	9	13.2	13.2	161.7	19.6	19.6	181	91	103
-34	-33	-34	ML/CL-ML/CH	120		0	0.75	1	32.5	0.94	33	31	0.95	9	13.2	13.2	174.8	19.6	19.6	194	97	114
-35	-34	-35	ML/CL-ML/CH	120		0	0.75	1	33.5	0.96	34	32	0.98	9	13.2	13.2	188.0	19.6	19.6	208	104	124

Q_{s_1} = 102 tons

VERTICALLY LOADED DRILLED SHAFT ANALYSIS PROGRAM SHAFT
VERSION 6 (C)COPYRIGHT ENSOFT,INC.1989,1995,1998,2001,2003,2007

Heim Bridge Project - Bent 6

TOTAL LOAD = 3000.0 TONS

EG -1'

Pile cutoff El. -3'

NUMBER OF LAYERS = 6

WATER TABLE DEPTH = 0.0 FT.

FACTOR OF SAFETY APPLIED TO THE TOTAL ULTIMATE CAPACITY = 1.43

FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE CAPACITY = 2.22

SOIL INFORMATION

LAYER NO 1----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.120E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.120E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.826E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.120E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.120E+02

LAYER NO 2----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.964E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.140E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.120E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.733E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.140E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.280E+02

LAYER NO 3----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.150E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.280E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.150E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.430E+02

LAYER NO 4----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.430E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.570E+02

LAYER NO 5----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.300E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.570E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.300E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.740E+02

LAYER NO 6----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.339E+00

UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.740E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.200E+03

DRILLED SHAFT INFORMATION

DIAMETER OF STEM	= 10.000	FT.
DIAMETER OF BASE	= 10.000	FT.
END OF STEM TO BASE	= 0.000	FT.
ANGLE OF BELL	= 0.000	DEG.
IGNORED TOP PORTION	= 27.000	FT.
IGNORED BOTTOM PORTION	= 0.000	FT.
AREA OF ONE PERCENT STEEL	= 113.112	SQ.IN.
ELASTIC MODULUS, Ec	= 0.360E+07	LB/SQ IN
VOLUME OF UNDERREAM	= 0.000	CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (FOR UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
QBD = TOTAL ALLOWABLE LOAD USING A FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE RESISTANCE;
QDN = TOTAL ALLOWABLE LOAD USING FACTORS OF SAFETY APPLIED TO THE ULTIMATE SIDE RESISTANCE AND THE ULTIMATE BASE RESISTANCE.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	QBD (TONS)	QDN (TONS)	QU/VOLUME (TONS/CU.YDS)
28.0	81.46	18.58	382.36	400.93	190.64	185.07	4.92
29.0	84.37	31.54	372.99	404.53	199.38	189.92	4.79
30.0	87.28	44.50	363.50	408.00	208.07	194.72	4.67
31.0	90.19	57.46	353.86	411.32	216.70	199.46	4.56
32.0	93.10	70.42	344.05	414.47	225.24	204.12	4.45
33.0	96.01	83.38	334.03	417.41	233.70	208.68	4.35
34.0	98.91	96.34	325.08	421.43	242.63	213.73	4.26
35.0	101.82	109.30	317.19	426.49	252.04	219.25	4.19
36.0	104.73	122.26	310.31	432.58	261.91	225.23	4.13
37.0	107.64	135.23	304.43	439.66	272.22	231.65	4.08
38.0	110.55	148.19	322.01	470.20	293.09	248.64	4.25
39.0	113.46	161.15	341.64	502.79	314.89	266.54	4.43
40.0	116.37	174.11	363.33	537.43	337.60	285.37	4.62
41.0	119.28	187.07	387.06	574.13	361.24	305.12	4.81
42.0	122.19	200.03	412.84	612.87	385.81	325.80	5.02
43.0	125.10	212.99	440.67	653.66	411.29	347.40	5.23
44.0	128.01	221.63	469.57	691.21	432.94	366.45	5.40
45.0	130.92	230.27	499.55	729.82	455.07	385.99	5.57
46.0	133.83	238.91	530.59	769.50	477.68	406.01	5.75
47.0	136.74	247.55	562.71	810.26	500.77	426.51	5.93
48.0	139.64	256.19	591.61	847.80	522.42	445.56	6.07
49.0	142.55	264.83	617.30	882.13	542.62	463.17	6.19
50.0	145.46	273.47	639.78	913.26	561.38	479.33	6.28
51.0	148.37	282.11	659.05	941.16	578.69	494.05	6.34
52.0	151.28	290.75	675.11	965.86	594.55	507.33	6.38
53.0	154.19	299.40	687.95	987.35	608.97	519.16	6.40
54.0	157.10	308.04	697.59	1005.62	621.95	529.54	6.40
55.0	160.01	316.68	705.58	1022.26	634.19	539.19	6.39

Q_S = 265 tons
downdrag
bottom El. = -50'
Total $Q_S = Q_{S1} + Q_{S2}$
= 102 + 265
= 367 tons

56.0	162.92	325.32	710.97	1036.29	645.25	547.66	6.36
57.0	165.83	333.96	713.77	1047.73	655.16	554.97	6.32
58.0	168.74	359.88	717.23	1077.11	682.63	574.67	6.38
59.0	171.65	385.80	721.37	1107.17	710.42	594.68	6.45
60.0	174.56	411.72	726.21	1137.93	738.52	615.00	6.52
61.0	177.46	437.64	731.78	1169.42	766.94	635.65	6.59
62.0	180.37	463.56	738.10	1201.67	795.71	656.64	6.66
63.0	183.28	489.49	745.21	1234.69	824.83	677.98	6.74
64.0	186.19	515.41	753.12	1268.52	854.31	699.69	6.81
65.0	189.10	541.33	761.56	1302.89	884.03	721.63	6.89
66.0	192.01	567.25	770.45	1337.70	913.96	743.78	6.97
67.0	194.92	593.17	779.73	1372.90	944.05	766.10	7.04
68.0	197.83	619.09	789.31	1408.40	974.28	788.55	7.12
69.0	200.74	645.02	799.12	1444.13	1004.62	811.11	7.19
70.0	203.65	670.94	809.08	1480.01	1035.02	833.74	7.27
71.0	206.56	696.86	819.12	1515.98	1065.46	856.40	7.34
72.0	209.47	722.78	829.16	1551.94	1095.90	879.07	7.41
73.0	212.38	748.70	839.13	1587.83	1126.31	901.70	7.48
74.0	215.29	774.62	848.94	1623.57	1156.65	924.26	7.54
75.0	218.19	797.10	858.76	1655.87	1183.55	944.42	7.59
76.0	221.10	819.37	868.58	1687.96	1210.24	964.43	7.63
77.0	224.01	841.42	878.40	1719.82	1236.70	984.28	7.68
78.0	226.92	863.24	888.22	1751.46	1262.94	1003.97	7.72
79.0	229.83	884.81	898.04	1782.85	1288.93	1023.49	7.76
80.0	232.74	906.12	907.86	1813.98	1314.66	1042.82	7.79
81.0	235.65	927.17	917.15	1844.32	1339.89	1061.74	7.83
82.0	238.56	947.94	925.88	1873.82	1364.59	1080.20	7.85
83.0	241.47	968.41	934.04	1902.45	1388.73	1098.21	7.88
84.0	244.38	988.59	941.59	1930.18	1412.31	1115.73	7.90
85.0	247.29	1008.45	948.52	1956.97	1435.28	1132.75	7.91
86.0	250.20	1028.14	954.79	1982.93	1457.80	1149.35	7.93
87.0	253.11	1048.08	960.37	2008.45	1480.25	1165.82	7.94
88.0	256.01	1068.26	965.26	2033.52	1502.63	1182.15	7.94
89.0	258.92	1088.69	969.41	2058.10	1524.93	1198.32	7.95
90.0	261.83	1109.36	972.81	2082.18	1547.13	1214.32	7.95
91.0	264.74	1130.28	975.53	2105.82	1569.27	1230.19	7.95
92.0	267.65	1151.45	977.65	2129.10	1591.39	1245.96	7.95
93.0	270.56	1172.86	979.23	2152.09	1613.52	1261.66	7.95
94.0	273.47	1194.52	980.36	2174.89	1635.68	1277.33	7.95
95.0	276.38	1216.42	981.12	2197.54	1657.93	1293.00	7.95
96.0	279.29	1238.57	981.57	2220.15	1680.28	1308.71	7.95
97.0	282.20	1260.97	981.80	2242.77	1702.78	1324.49	7.95
98.0	285.11	1283.61	981.88	2265.49	1725.45	1340.37	7.95
99.0	288.02	1306.50	981.88	2288.37	1748.34	1356.39	7.95
100.0	290.93	1329.63	981.88	2311.51	1771.47	1372.59	7.95
101.0	293.84	1353.01	981.88	2334.88	1794.85	1388.95	7.95
102.0	296.74	1376.63	981.88	2358.51	1818.48	1405.49	7.95
103.0	299.65	1400.50	981.88	2382.38	1842.35	1422.20	7.95
104.0	302.56	1424.62	981.88	2406.50	1866.47	1439.08	7.95
105.0	305.47	1448.98	981.88	2430.86	1890.83	1456.13	7.96
106.0	308.38	1473.59	981.88	2455.47	1915.44	1473.36	7.96
107.0	311.29	1498.45	981.88	2480.32	1940.29	1490.76	7.97
108.0	314.20	1523.55	981.88	2505.42	1965.39	1508.33	7.97
109.0	317.11	1548.89	981.88	2530.77	1990.74	1526.07	7.98
110.0	320.02	1574.48	981.88	2556.36	2016.33	1543.98	7.99
111.0	322.93	1600.32	981.88	2582.20	2042.16	1562.07	8.00
112.0	325.84	1626.40	981.88	2608.28	2068.25	1580.33	8.00
113.0	328.75	1652.73	981.88	2634.61	2094.58	1598.76	8.01
114.0	331.66	1679.31	981.88	2661.18	2121.15	1617.36	8.02
115.0	334.56	1706.13	981.88	2688.00	2147.97	1636.14	8.03
116.0	337.47	1733.20	981.88	2715.07	2175.04	1655.08	8.05
117.0	340.38	1760.51	981.88	2742.38	2202.35	1674.20	8.06
118.0	343.29	1788.07	981.88	2769.94	2229.91	1693.49	8.07
119.0	346.20	1815.87	981.88	2797.75	2257.72	1712.96	8.08
120.0	349.11	1843.92	981.88	2825.80	2285.77	1732.59	8.09
121.0	352.02	1872.22	981.88	2854.09	2314.06	1752.40	8.11
122.0	354.93	1900.76	981.88	2882.63	2342.60	1772.38	8.12
123.0	357.84	1929.55	981.88	2911.42	2371.39	1792.53	8.14
124.0	360.75	1958.58	981.88	2940.46	2400.43	1812.85	8.15
125.0	363.66	1987.86	981.88	2969.74	2429.70	1833.35	8.17
126.0	366.57	2017.39	981.88	2999.26	2459.23	1854.02	8.18
127.0	369.48	2047.16	981.88	3029.03	2489.00	1874.86	8.20
128.0	372.39	2077.17	981.88	3059.05	2519.02	1895.87	8.21
129.0	375.29	2107.44	981.88	3089.31	2549.28	1917.05	8.23
130.0	378.20	2137.95	981.88	3119.82	2579.79	1938.41	8.25
131.0	381.11	2168.70	981.88	3150.58	2610.55	1959.94	8.27
132.0	384.02	2199.70	981.88	3181.58	2641.55	1981.64	8.28
133.0	386.93	2230.95	981.88	3212.82	2672.79	2003.51	8.30
134.0	389.84	~~2262.44~~	981.88	3244.31	2704.28	2025.55	8.32
135.0	392.75	2294.18	981.88	3276.05	2736.02	2047.77	8.34

136.0	395.66	2326.16	981.88	3308.04	2768.01	2070.16	8.36
137.0	398.57	2358.39	981.88	3340.27	2800.24	2092.72	8.38
138.0	401.48	2390.87	981.88	3372.74	2832.71	2115.45	8.40
139.0	404.39	2423.59	981.88	3405.46	2865.43	2138.36	8.42
140.0	407.30	2456.56	981.88	3438.43	2898.40	2161.44	8.44
141.0	410.21	2489.77	981.88	3471.65	2931.61	2184.69	8.46
142.0	413.11	2523.23	981.88	3505.10	2965.07	2208.11	8.48
143.0	416.02	2556.94	981.88	3538.81	2998.78	2231.70	8.51
144.0	418.93	2590.89	981.88	3572.76	3032.73	2255.47	8.53
145.0	421.84	2625.08	981.88	3606.96	3066.93	2279.40	8.55
146.0	424.75	2659.53	981.88	3641.40	3101.37	2303.51	8.57
147.0	427.66	2694.21	981.88	3676.09	3136.06	2327.80	8.60
148.0	430.57	2729.15	981.88	3711.02	3170.99	2352.25	8.62
149.0	433.48	2764.33	981.88	3746.20	3206.17	2376.88	8.64
150.0	436.39	2799.75	981.88	3781.63	3241.60	2401.67	8.67
151.0	439.30	2835.43	981.88	3817.30	3277.27	2426.64	8.69
152.0	442.21	2871.34	981.88	3853.22	3313.19	2451.79	8.71
153.0	445.12	2907.51	981.88	3889.38	3349.35	2477.10	8.74
154.0	448.03	2943.92	981.88	3925.79	3385.76	2502.59	8.76
155.0	450.94	2980.57	981.88	3962.45	3422.42	2528.25	8.79
156.0	453.84	3017.47	981.88	3999.35	3459.32	2554.08	8.81
157.0	456.75	3054.62	981.88	4036.50	3496.46	2580.08	8.84
158.0	459.66	3092.01	981.88	4073.89	3533.86	2606.26	8.86
159.0	462.57	3129.65	981.88	4111.53	3571.50	2632.60	8.89
160.0	465.48	3167.54	981.88	4149.41	3609.38	2659.12	8.91
161.0	468.39	3205.67	981.88	4187.54	3647.51	2685.81	8.94
162.0	471.30	3244.04	981.88	4225.92	3685.89	2712.68	8.97
163.0	474.21	3282.67	981.88	4264.54	3724.51	2739.71	8.99
164.0	477.12	3321.53	981.88	4303.41	3763.38	2766.92	9.02
165.0	480.03	3360.65	981.88	4342.52	3802.49	2794.30	9.05
166.0	482.94	3400.01	981.88	4381.88	3841.85	2821.85	9.07
167.0	485.85	3439.61	981.88	4421.49	3881.46	2849.58	9.10
168.0	488.76	3479.47	981.88	4461.34	3921.31	2877.47	9.13
169.0	491.66	3519.56	981.88	4501.44	3961.41	2905.54	9.16
170.0	494.57	3559.91	981.88	4541.78	4001.75	2933.78	9.18
171.0	497.48	3600.50	981.88	4582.37	4042.34	2962.19	9.21
172.0	500.39	3641.33	981.88	4623.21	4083.17	2990.78	9.24
173.0	503.30	3682.41	981.88	4664.29	4124.26	3019.53	9.27

RESULT FROM TREND (AVERAGED) LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.1501E+00	0.1858E-04	0.2864E-02	0.1000E-04
0.7506E+00	0.9292E-04	0.1432E-01	0.5000E-04
0.1501E+01	0.1858E-03	0.2864E-01	0.1000E-03
0.7506E+02	0.9292E-02	0.1432E+01	0.5000E-02
0.1126E+03	0.1394E-01	0.2148E+01	0.7500E-02
0.1501E+03	0.1858E-01	0.2864E+01	0.1000E-01
0.3755E+03	0.4647E-01	0.7160E+01	0.2500E-01
0.7518E+03	0.9297E-01	0.1432E+02	0.5000E-01
0.1127E+04	0.1395E+00	0.2148E+02	0.7500E-01
0.1451E+04	0.1846E+00	0.2864E+02	0.1000E+00
0.2725E+04	0.4172E+00	0.7160E+02	0.2500E+00
0.3488E+04	0.7227E+00	0.1432E+03	0.5000E+00
0.4120E+04	0.1475E+01	0.3387E+03	0.1200E+01
0.4337E+04	0.3303E+01	0.6284E+03	0.3000E+01
0.4695E+04	0.6339E+01	0.9966E+03	0.6000E+01

RESULT FROM UPPER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.2204E+00	0.2218E-04	0.4091E-02	0.1000E-04
0.1102E+01	0.1109E-03	0.2046E-01	0.5000E-04
0.2204E+01	0.2218E-03	0.4091E-01	0.1000E-03
0.1102E+03	0.1109E-01	0.2046E+01	0.5000E-02
0.1653E+03	0.1663E-01	0.3068E+01	0.7500E-02
0.2204E+03	0.2218E-01	0.4091E+01	0.1000E-01
0.5519E+03	0.5548E-01	0.1023E+02	0.2500E-01
0.1105E+04	0.1110E+00	0.2046E+02	0.5000E-01
0.1635E+04	0.1662E+00	0.3068E+02	0.7500E-01
0.2043E+04	0.2174E+00	0.4091E+02	0.1000E+00
0.3436E+04	0.4652E+00	0.1023E+03	0.2500E+00
0.4054E+04	0.7630E+00	0.2046E+03	0.5000E+00
0.4439E+04	0.1500E+01	0.4713E+03	0.1200E+01

0.4651E+04	0.3326E+01	0.7462E+03	0.3000E+01
0.4965E+04	0.6358E+01	0.1060E+04	0.6000E+01

RESULT FROM LOWER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.8864E-01	0.1528E-04	0.1636E-02	0.1000E-04
0.4432E+00	0.7642E-04	0.8182E-02	0.5000E-04
0.8864E+00	0.1528E-03	0.1636E-01	0.1000E-03
0.4432E+02	0.7642E-02	0.8182E+00	0.5000E-02
0.6648E+02	0.1146E-01	0.1227E+01	0.7500E-02
0.8864E+02	0.1528E-01	0.1636E+01	0.1000E-01
0.2216E+03	0.3821E-01	0.4091E+01	0.2500E-01
0.4435E+03	0.7643E-01	0.8182E+01	0.5000E-01
0.6655E+03	0.1147E+00	0.1227E+02	0.7500E-01
0.8830E+03	0.1528E+00	0.1636E+02	0.1000E+00
0.1907E+04	0.3660E+00	0.4091E+02	0.2500E+00
0.2902E+04	0.6816E+00	0.8182E+02	0.5000E+00
0.3801E+04	0.1451E+01	0.2062E+03	0.1200E+01
0.4022E+04	0.3279E+01	0.5106E+03	0.3000E+01
0.4425E+04	0.6321E+01	0.9328E+03	0.6000E+01

ATTACHMENT 5

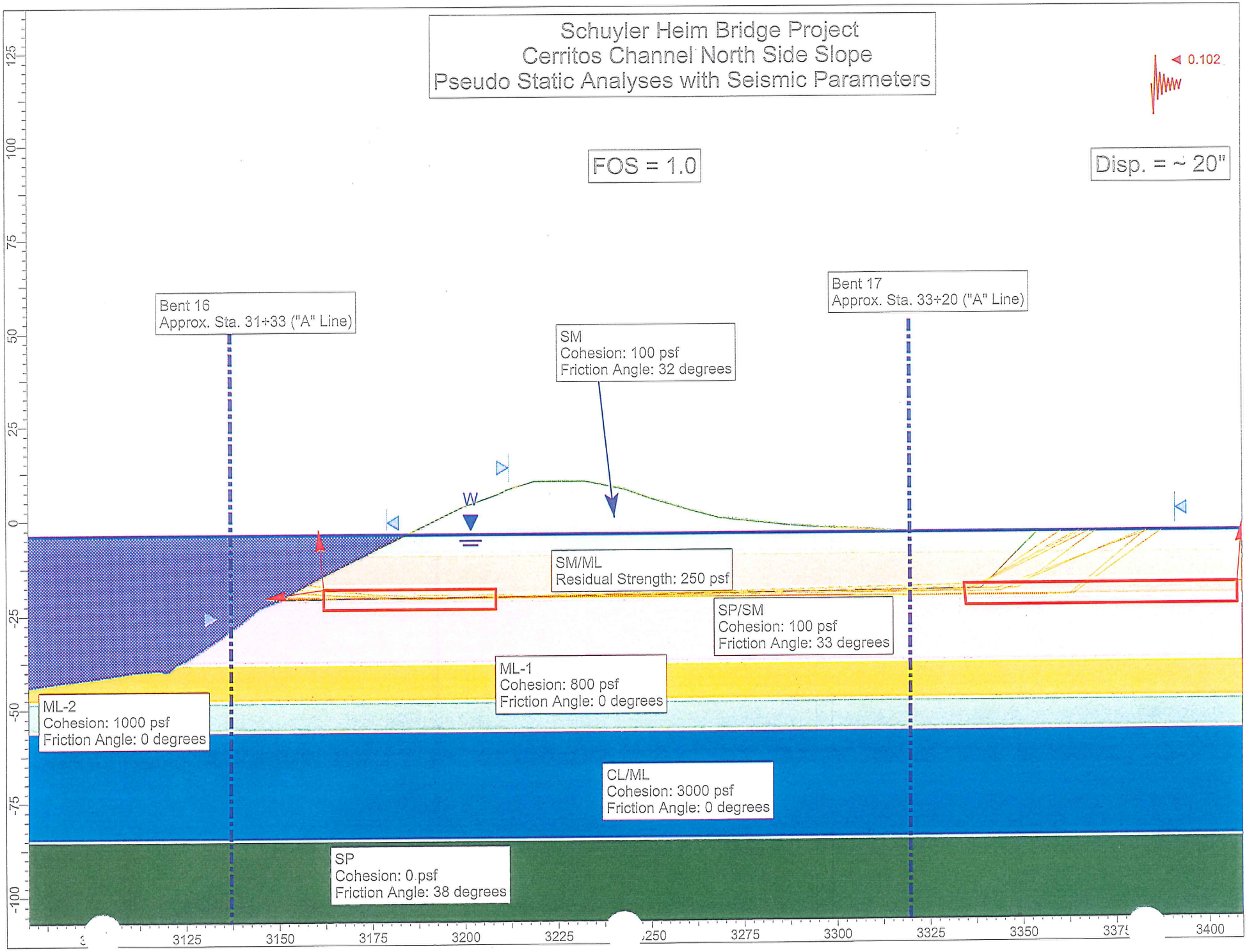
KINEMATIC ANALYSES WITH CDSM

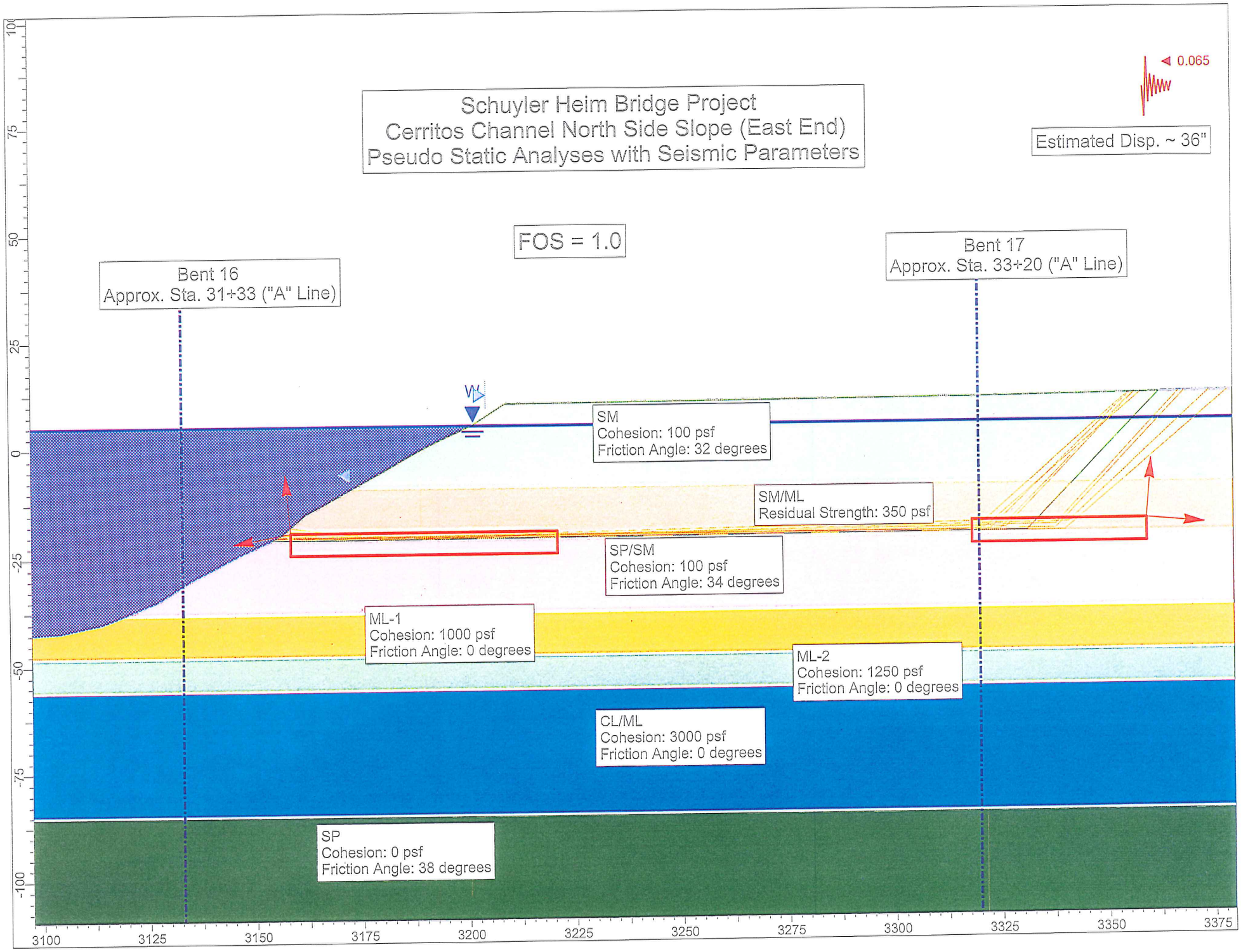
AT BENT 17 (HEIM BRIDGE; 53-3032)

SLOPE ANALYSES USING EXISTING CONDITIONS

(NO FILL & NO CDSM)

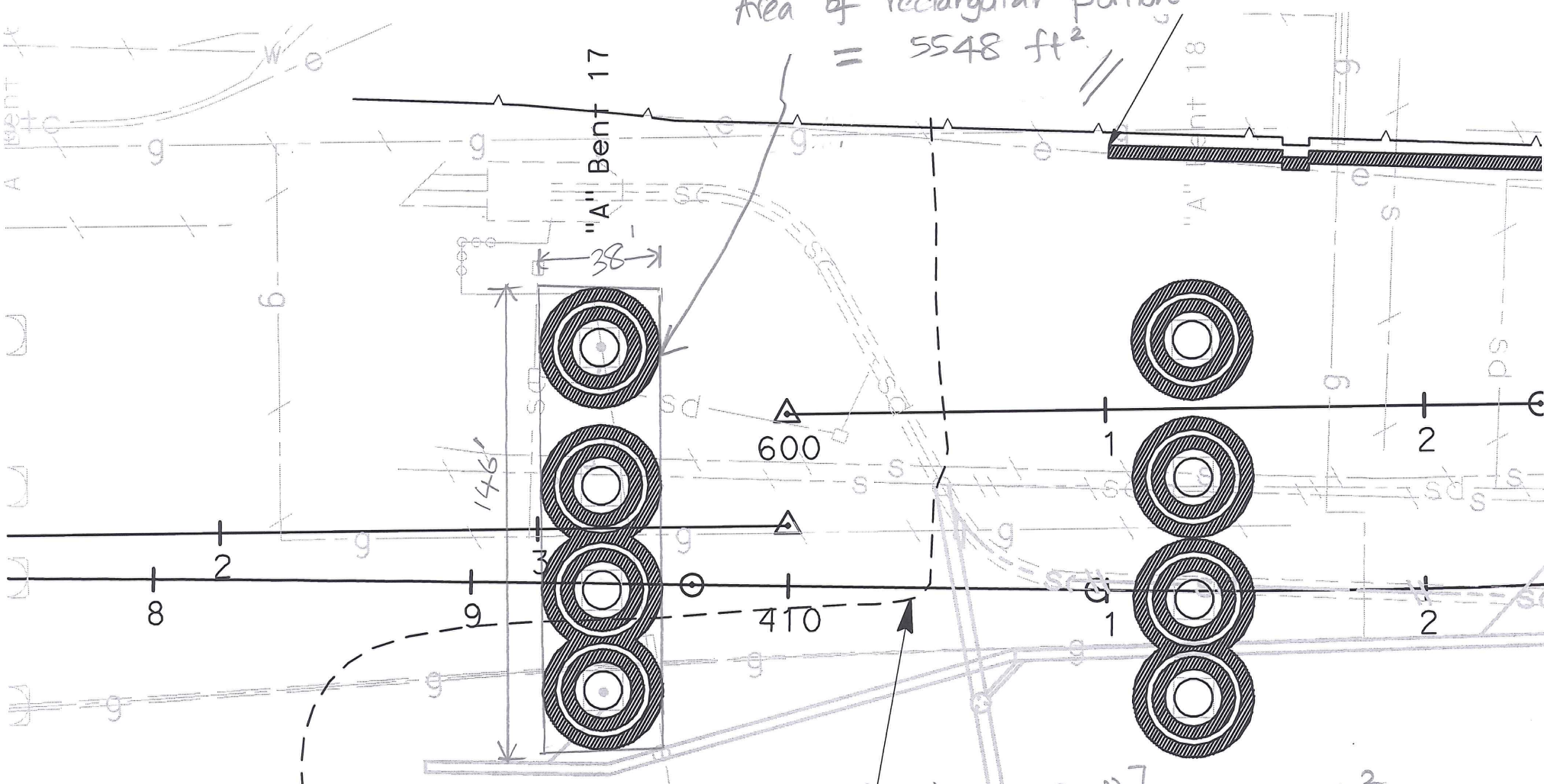
(FROM FINAL FOUNDATION REPORT, DATED MAY 10, 2010)


Schuyler Heim Bridge Project
Cerritos Channel North Side Slope
Pseudo Static Analyses with Seismic Parameters
0.102
FOS = 1.0
Disp. = ~ 20"
Bent 16
Approx. Sta. 31+33 ("A" Line)
Bent 17
Approx. Sta. 33+20 ("A" Line)
SM
Cohesion: 100 psf
Friction Angle: 32 degrees
W
SM/ML
Residual Strength: 250 psf
SP/SM
Cohesion: 100 psf
Friction Angle: 33 degrees
ML-1
Cohesion: 800 psf
Friction Angle: 0 degrees
ML-2
Cohesion: 1000 psf
Friction Angle: 0 degrees
CL/ML
Cohesion: 3000 psf
Friction Angle: 0 degrees
SP
Cohesion: 0 psf
Friction Angle: 38 degrees
125
100
75
50
25
0
-25
-50
-75
-100
3125
3150
3175
3200
3225
3250
3275
3300
3325
3350
3375
3400


Schuyler Heim Bridge Project
Cerritos Channel North Side Slope (East End)
Pseudo Static Analyses with Seismic Parameters
0.065
Estimated Disp. ~ 36"
FOS = 1.0
Bent 16
Approx. Sta. 31+33 ("A" Line)
Bent 17
Approx. Sta. 33+20 ("A" Line)
SM
Cohesion: 100 psf
Friction Angle: 32 degrees
SM/ML
Residual Strength: 350 psf
SP/SM
Cohesion: 100 psf
Friction Angle: 34 degrees
ML-1
Cohesion: 1000 psf
Friction Angle: 0 degrees
ML-2
Cohesion: 1250 psf
Friction Angle: 0 degrees
CL/ML
Cohesion: 3000 psf
Friction Angle: 0 degrees
SP
Cohesion: 0 psf
Friction Angle: 38 degrees
100
75
50
25
0
-25
-50
-75
-100
3100
3125
3150
3175
3200
3225
3250
3275
3300
3325
3350
3375

SLOPE ANALYSES AFTER FILL PLACEMENT

(WITH FILL & WITH CDSM GROUND IMPROVEMENT)



At Bent 17,

Area of rectangular portion = 5548 ft²

Area of each CDSM Improvement = $\pi/4\left[(38^2-30^2)+(26^2-18^2)\right] = 704\ ft^2$

Using ARR of 75%, Effective Area = $704 \times 0.75 = 528\ ft^2$

∴ Total Effective Area of CDSM $= 528 \times 4 = 2112\ ft^2$.

SEE NO
(TYD)

Project: Schuyler Heim Bridge Replacement Project No.: 06-123
By: Ranjan(SB) Date: 12/29/10 Checked By: Arul Date: 12/29/10 Sheet: 1 of 1
Subject:

For North side of Channel,

Shear Strength of CDSM treated soil (S_u) = 7200 psf

At Bent 17, ARR of the Rectangular area = Eff. Area of CDSM / Total Area = 2112 / 5548

= 0.38

∴ Equivalent S_u of CDSM within rectangular area = 7200 × 0.381

≈ 2750 psf //

Average S_u of soil within rectangular area = (250 + 1000 + 1250)/3

= 833 psf

Area Ratio of the soil = 0.62

Equivalent S_u of soil = 516 psf

Select S_u = 500 psf //

Total S_u of CDSM treated area = 2750 + 500

= 3250 psf //

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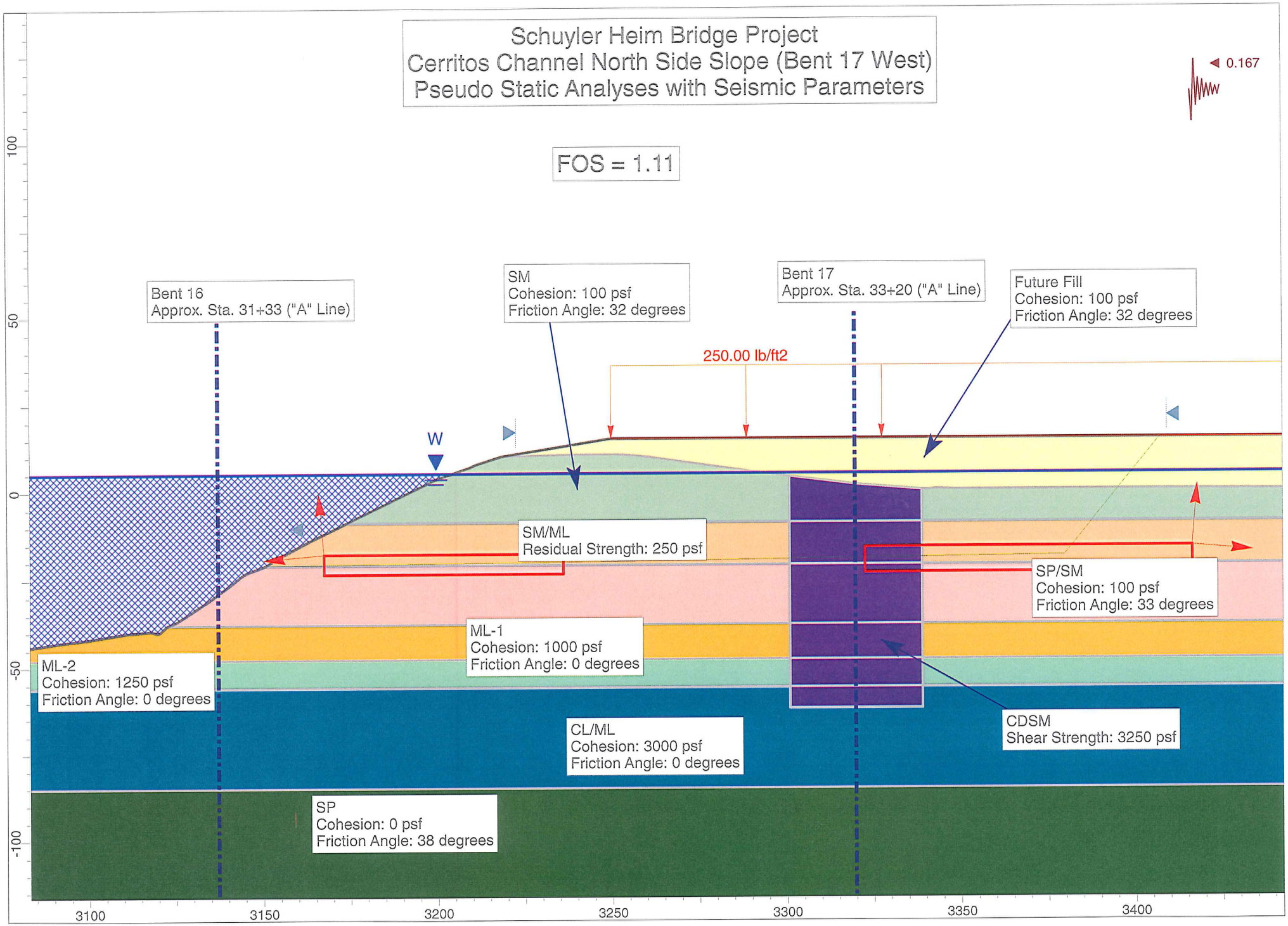
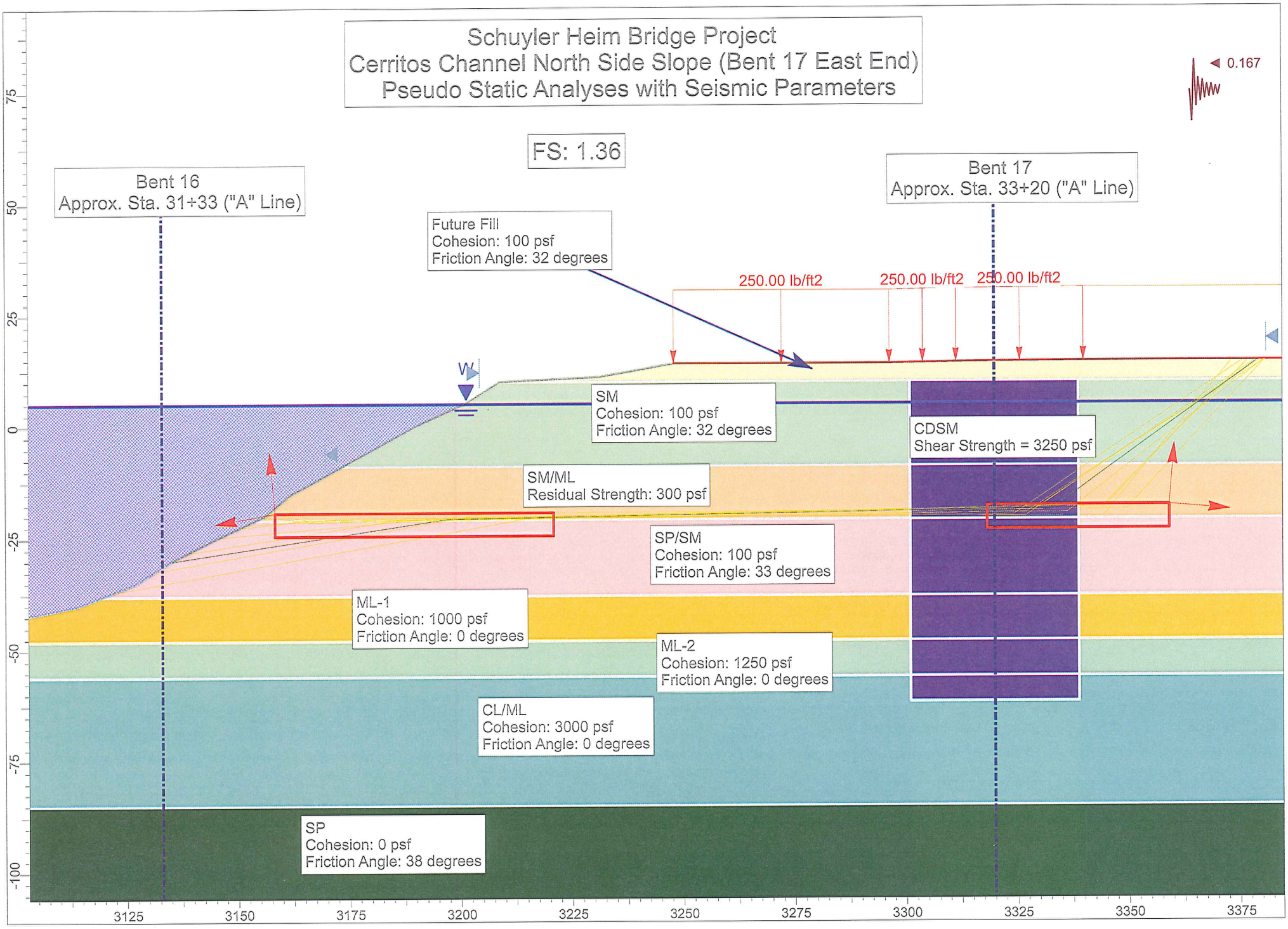

Schuyler Heim Bridge Project
Cerritos Channel North Side Slope (Bent 17 West)
Pseudo Static Analyses with Seismic Parameters
FOS = 1.11
0.167
Bent 16
Approx. Sta. 31+33 ("A" Line)
SM
Cohesion: 100 psf
Friction Angle: 32 degrees
Bent 17
Approx. Sta. 33+20 ("A" Line)
Future Fill
Cohesion: 100 psf
Friction Angle: 32 degrees
250.00 lb/ft2
W
SM/ML
Residual Strength: 250 psf
SP/SM
Cohesion: 100 psf
Friction Angle: 33 degrees
ML-1
Cohesion: 1000 psf
Friction Angle: 0 degrees
ML-2
Cohesion: 1250 psf
Friction Angle: 0 degrees
CL/ML
Cohesion: 3000 psf
Friction Angle: 0 degrees
CDSM
Shear Strength: 3250 psf
SP
Cohesion: 0 psf
Friction Angle: 38 degrees
100
50
0
-50
-100
3100
3150
3200
3250
3300
3350
3400


Schuyler Heim Bridge Project
Cerritos Channel North Side Slope (Bent 17 East End)
Pseudo Static Analyses with Seismic Parameters
0.167
FS: 1.36
Bent 16
Approx. Sta. 31+33 ("A" Line)
Bent 17
Approx. Sta. 33+20 ("A" Line)
Future Fill
Cohesion: 100 psf
Friction Angle: 32 degrees
250.00 lb/ft2
250.00 lb/ft2
250.00 lb/ft2
W
SM
Cohesion: 100 psf
Friction Angle: 32 degrees
CDSM
Shear Strength = 3250 psf
SM/ML
Residual Strength: 300 psf
SP/SM
Cohesion: 100 psf
Friction Angle: 33 degrees
ML-1
Cohesion: 1000 psf
Friction Angle: 0 degrees
ML-2
Cohesion: 1250 psf
Friction Angle: 0 degrees
CL/ML
Cohesion: 3000 psf
Friction Angle: 0 degrees
SP
Cohesion: 0 psf
Friction Angle: 38 degrees
75
50
25
0
-25
-50
-75
-100
3125
3150
3175
3200
3225
3250
3275
3300
3325
3350
3375

ATTACHMENT 6

UTILITY SETTLEMENTS DUE TO PROPOSED FILL

NORTH SIDE OF CERRITOS CHANNEL

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

TECHNICAL MEMORANDUM

DATE: December 31, 2010 **EMI PROJECT NO:** 06-123-06

TO: Lucien Hersh / Alameda Corridor Engineering Team (ACET)

COPY: Richard Norton / URS Corporation (URS)

FROM: Eric Brown / Earth Mechanics, Inc. (EMI)
Arul Arulmoli / EMI
Ranjan Gunaranjan / EMI

SUBJECT: Schuyler Heim Bridge Replacement Project, Geotechnical Memorandum for Settlement Estimates Below Utility Lines Due to Placement of Future Fill to Approximate El. +15 ft at North Side of Cerritos Channel.

Earth Mechanics, Inc. (EMI) prepared this memorandum to provide settlement estimates below utilities due to the placement of future fill to approximate El. +15 ft at north side of Cerritos Channel as a part of the potential future Pier A improvements by Port of Long Beach (POLB).

Project Description

As a part of the future Pier A improvements, POLB is expected to raise existing grade to about El. +15 ft at north side of Cerritos Channel underneath the Schuyler Heim Bridge (Figure 1). Based on the most current grading and utility drawings provided by URS, the future fill is expected to be placed from Bents 17 through 23 between approximate Sta. 408+40 and Sta. 420+70 (“E” Line). The approximate limits of future fill are shown in Figure 2.

It is our understanding that most, if not all of the existing utilities beneath the proposed fill will be abandoned or removed prior to fill placement; however, some of the proposed drainage improvements will be tied into existing drainage system surrounding the proposed fill area. Due to the abundance of compressible fine-grained soils throughout the subsurface profile, existing utilities within the footprint and near the perimeter of the proposed fill as well as any proposed utilities constructed prior to fill placement are expected to experience settlement.

Existing grade beneath the Schuyler Heim Bridge on the north side of Cerritos Channel lies between about elevation -2.0 ft and +2 ft MLLW with grade rising via sloped embankments to about elevation +12 to +15 ft on both sides (east and west) of the proposed bridge. While utilities within the footprint of the proposed fill are anticipated to experience the greatest magnitude of settlement, any utilities normal to the face of the existing sloped embankments on either side of the proposed bridge (Pier A embankment to the east, railroad embankment to the west) are expected to experience the greatest differential settlement.

Settlement Estimates

Standard settlement evaluation procedures were used to evaluate ground settlement due to the proposed fill. Generally, fills induce immediate and long-term consolidation settlement of underlying soils. Immediate settlement occurs during grading and consolidation settlement occurs over varying time periods. Consolidation settlement (magnitude and time period) is directly related to the depth of fill placed over compressible soil and configuration (thicknesses and locations) of fine-grained soil layers.

A generalized idealized soil profile was developed for the area where the fill is proposed based on site-specific soil borings, Cone Penetration Test (CPT) soundings and laboratory test results [See the foundation report for Schuyler Heim Bridge for logs and laboratory test results (EMI, 2010)]. An average grade elevation of +0 ft and a design groundwater elevation of +0 ft was used in the analysis.

Consolidation parameters were estimated using laboratory test data. The compression index (C_c) was determined by measuring the slope of the virgin portion of the consolidation curves developed from laboratory consolidation tests. The Casagrande procedure was used to estimate the pre-consolidation pressure (σ_p). And, Taylor's square-root-of-time method and Casagrande's logarithm-of-time method were used to estimate the coefficient of consolidation (C_v). The methods for determining the compression index, recompression index, the pre-consolidation pressure, and the coefficient of consolidation are described in Holtz and Kovacs (2004).

Settlement Magnitude**:** As described above, the largest settlement magnitudes are anticipated near the proposed bridge where the tallest fill heights are proposed while the largest differential settlements are anticipated for any utilities normal to the face of the existing sloped embankments. A generalized cross-section (Section A-A, Figure 2) was selected to evaluate the potential settlement beneath the existing Pier A embankment and beneath the proposed fill based on an average 17 ft of fill placed adjacent to an existing 17 ft tall sloped embankment graded at an inclination of 2.5:1 (Horizontal:Vertical).

Based on our calculations, the maximum settlement of soils underlying the proposed fill is estimated to be about 8 inches. The maximum settlement beneath the slope of the existing Pier A embankment varies from about 3 inches to 8 inches. Settlement analyses and calculations are provided in Attachment 1.

Differential Settlement: Differential settlements on the order of 5 inches over 20 ft are anticipated for any utility normal to the face of the existing Pier A embankment. Differential settlements on the order of 2 inches over 50 ft are anticipated for any utility parallel to the face of the existing Pier A embankment. The estimated settlement profile of an existing utility or a proposed utility constructed prior to fill placement normal to the face of the existing Pier A embankment (Section A-A, Figure 2) is provided in Figure 3.

Mitigation for Existing Utilities

Three potential mitigation measures can be considered to reduce the total and differential settlements of existing utilities that will not be abandoned, if the estimated settlements are not acceptable for the proposed pipes.

(1) Improve the ground below the existing utilities using deep soil mixing (DSM): DSM should extend down to El. -65 ft. Based on our preliminary estimates, the width of the DSM zone is approximately 8 ft with an approximate area replacement ratio of not less than 90 percent. As a result of the DSM improvement, total settlement below the pipe inverts is expected to be on the order of 0.5 inch and differential settlement (over a distance of 50 ft of the pipes) is expected to be on the order of 0.25 inch.

(2) Support utilities on piles: Piles (either cast-in-drilled-hole or driven) should be extended down to approximate El. -95 ft. Center-to-center spacing of piles should be at least three diameters. If the utilities are supported on piles, total settlement below the pipe inverts is expected to be on the order of 0.25 inch and differential settlement (over a distance of 50 ft of the pipes) is expected to be on the order of 1/8 inch.

(3) Use light-weight fill as backfill material: Light-weight fill as backfill material for the future fill instead of soil above water table could also be used to mitigate the settlement effects. As a result of using light-weight fill as backfill material, total settlement below the pipe inverts is expected to be on the order of 2 inches and differential settlement (over a distance of 50 ft of the pipes) is expected to be on the order of 1 inch.

Depending on the allowable total and differential settlements, cost, and schedule, one of the settlement mitigation measures can be chosen. Detailed soil investigation, laboratory testing, and engineering analyses should be performed to finalize the design of selected mitigation measure.

Embankment Surcharge and Settlement Period

Due to the magnitude of the anticipated settlement beneath the proposed fill, we recommend proposed utilities and drainage improvements tied in to existing drainage systems be constructed after the proposed fill is placed and the anticipated settlements have been reduced to be within tolerable limits of the proposed improvements.

The settlement period for the proposed fill is estimated to be about 6 months to reduce the remaining long-term settlement to less than ½-inch. If a 5-ft embankment surcharge is applied, the settlement period is reduced to about 3 months. For a 10-ft embankment surcharge, the settlement periods is reduced to about 2.5 months.

The surcharge heights referred to in these recommendations are measured relative to the finished grade of the proposed fill. Settlement periods with surcharge begin once the full surcharge height is completed. Waiting periods without surcharge begin once the project grade is constructed to the top of the finished subgrade.

Settlement of the embankment fill should be verified by the Engineer prior to installation of proposed utilities.

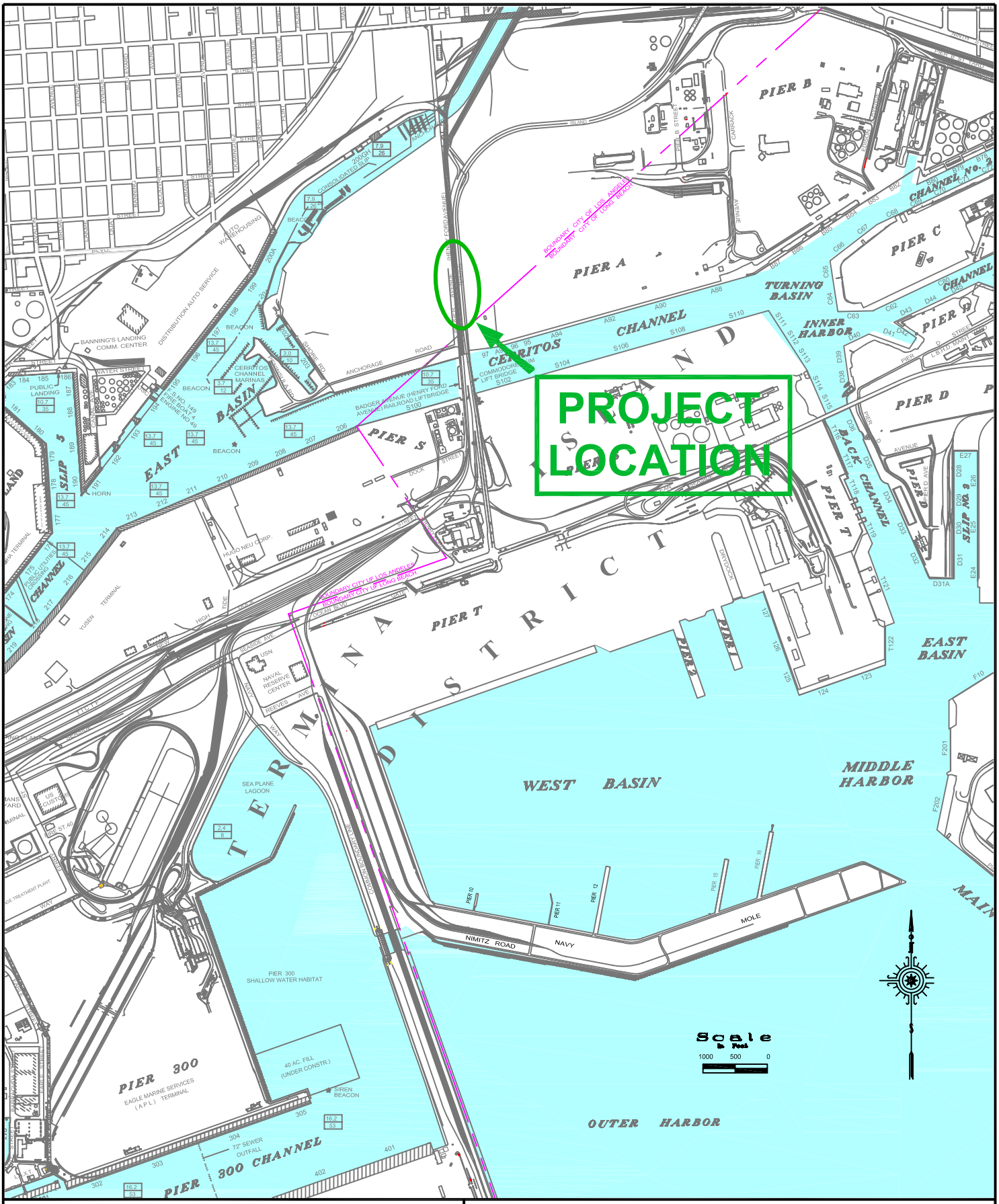
Closure

We appreciate the opportunity to work with you on this project to provide geotechnical recommendations for the project. If you have any questions, please do not hesitate to call us.

References

Earth Mechanics, Inc. (EMI), 2010, "Final Foundation Report, Schuyler Heim Bridge, Bridge No. 53-3032," EMI Project No. 06-123, May 10.

Holtz, R.D. and Kovacs, W.D., 2004, "An Introduction to Geotechnical Engineering", Prentice Hall Civil Engineering and Engineering Mechanics Series, September.



Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

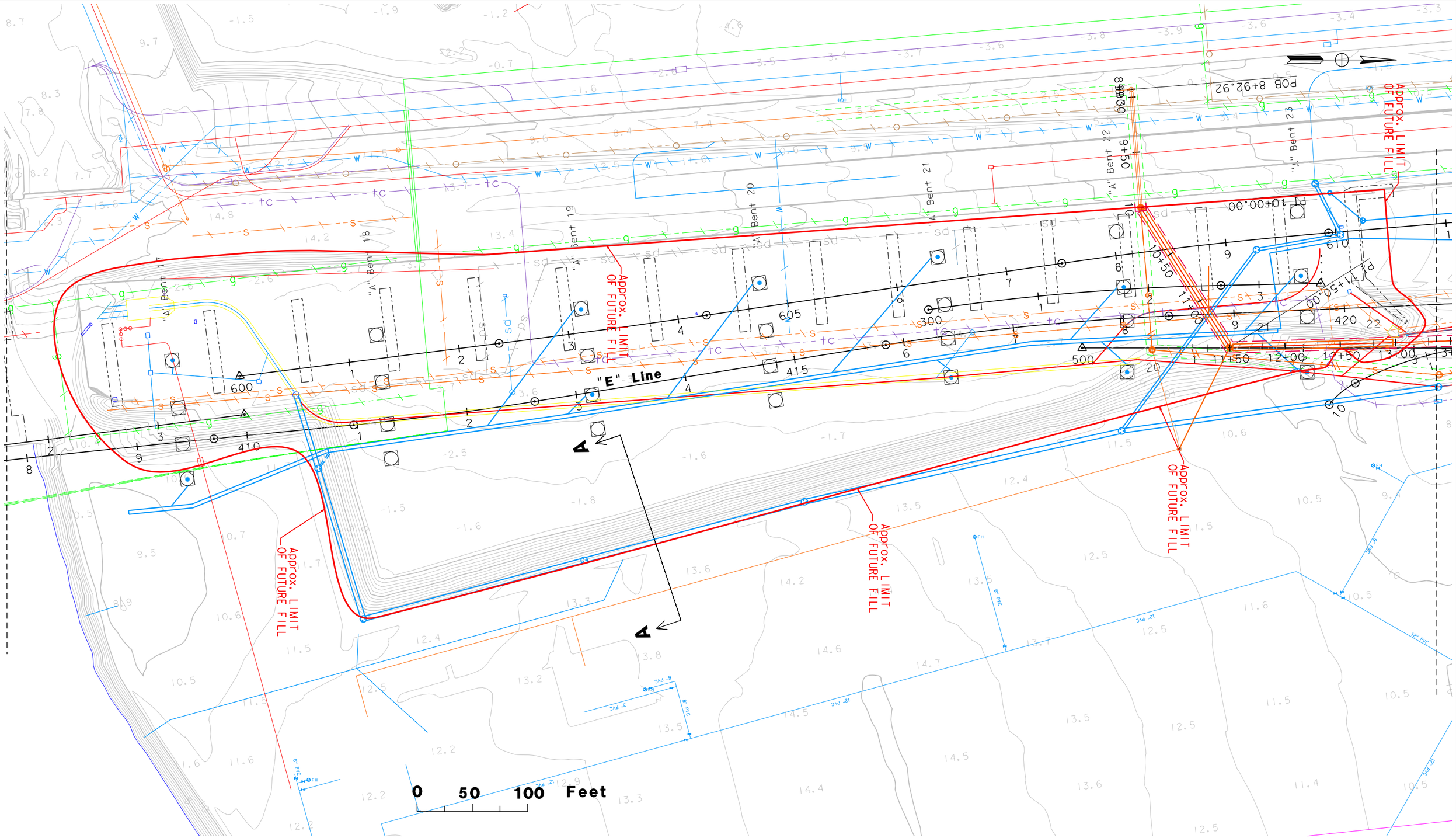
ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project Location Map

Figure 1

Project No. 06-123

Date: 12-30-10



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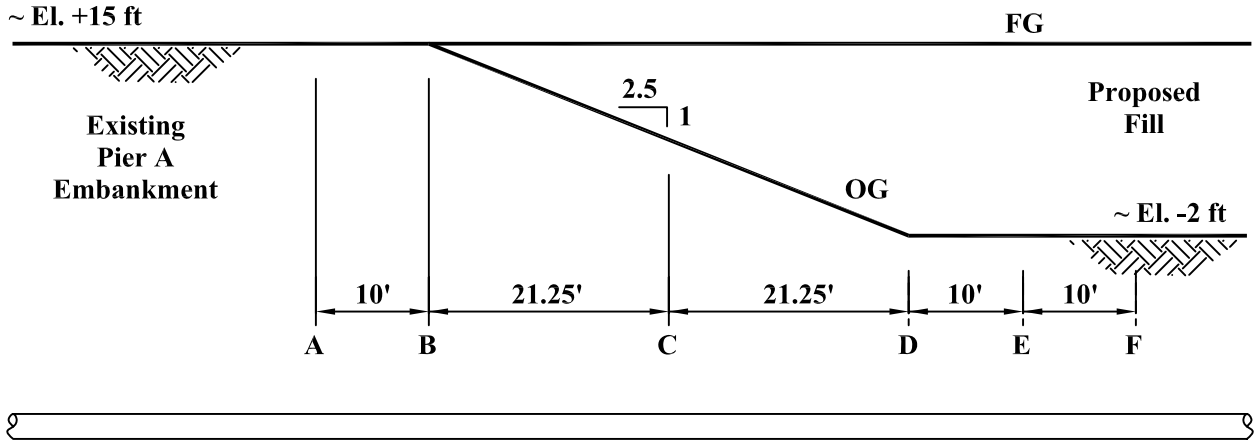
ACTA HEIM BRIDGE PROJECT

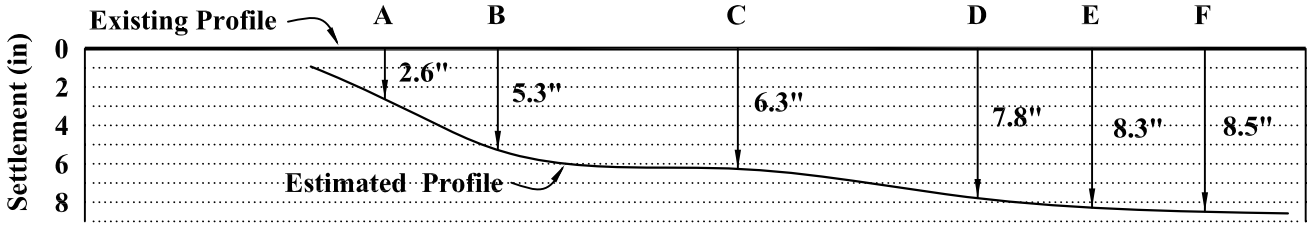
Project No.: 06-123 **Date:** 12-31-10

Approximate Limits of Future Fill Under Heim Bridge Proposed by the Port of Long Beach

Figure 2



GENERALIZED CROSS SECTION A-A
(SEE FIGURE 2)



ESTIMATED SETTLEMENT PROFILE

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT	
Project No. 06-123 | Date: 12-30-10	Utility Settlement Profile	Figure 3

Attachment 1 – Analyses and Calculations

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

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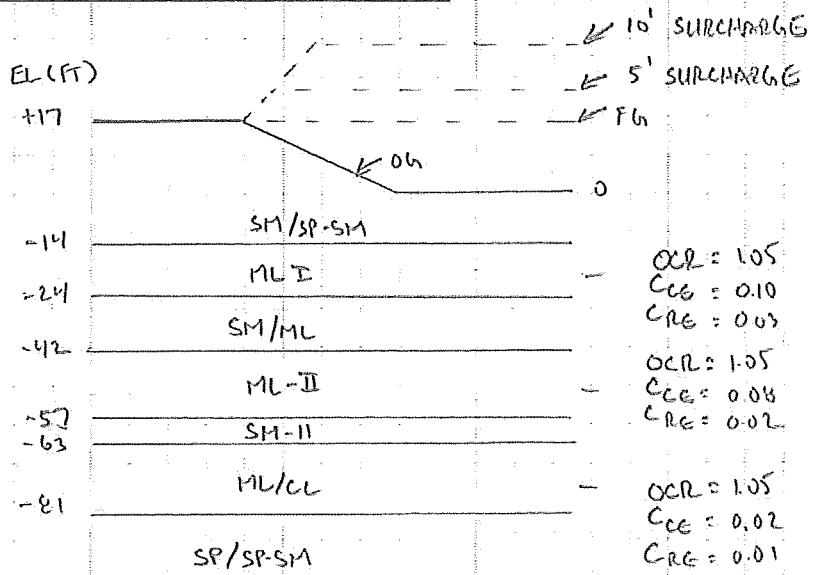
(714) 751-3826, Fax (714) 751-3928

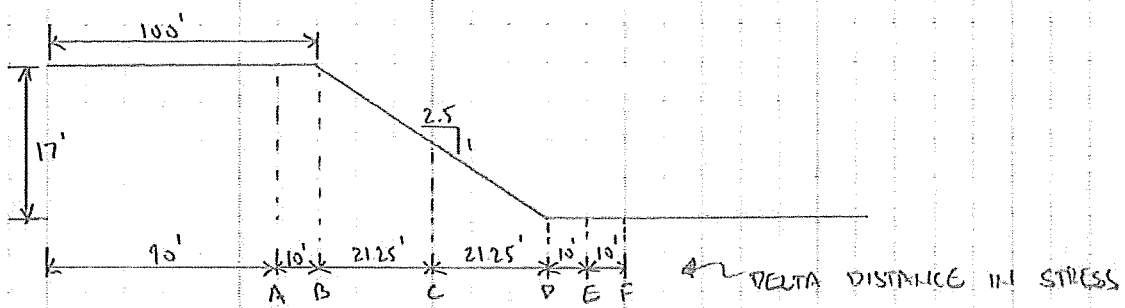
Project SCHUYLER HEIM BRIDGE Project No. 06-123

By ECB Date 12/30 Checked By 8 J Date 12/30 Sheet 1 of

SETTLEMENT ESTIMATE UNDER PROPOSED FILL



- EMBANKMENT STRESS CALCULATION SPREADSHEET



- FOR 5' SURCHARGE, ASSUME FILL IS PLACED @ 100 PCF

$$((17\text{ FT})(120\text{ PCF}) + (5\text{ FT})(100\text{ PCF}))/120\text{ PCF} = 21.17\text{ FT}$$ (EQ 120 PCF EMBANKMENT)

- FOR 10' SURCHARGE, ASSUME FILL IS PLACED @ 100 PCF

$$((17\text{ FT})(120\text{ PCF}) + (10\text{ FT})(100\text{ PCF}))/120\text{ PCF} = 25.33\text{ FT}$$ (EQ. 120 PCF EMBANKMENT)

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

17660 Newhope Street, Suite E, Fountain Valley, CA 92708
(714) 751-3626, Fax (714) 751-3928

Project SEAL BEACH BLVD. BRIDGE Project No. 06-123

By ECD Date 12/30 Checked By SS Date 12/30 Sheet 2 of

SETTLEMENT FROM ATTACHED SPREADSHEETS (IN.)

	PT B	PT D	PT E	@ PT E % CONSOL W/ 0.5" RESIDUAL		TIME FACTOR T
PROPOSED	5.3"	7.8"	8.5"	$\frac{8.5" - 0.5"}{8.5"}$	= 0.94	1.055
5' SURCHARGE	5.8"	9.1"	9.5"	$\frac{8.5" - 0.5"}{9.5"}$	= 0.82	0.61
10' SURCHARGE	6.2"	10.2"	11.0"	$\frac{8.5" - 0.5"}{11.0"}$	= 0.73	0.44

TIME RATE

FOR NO SURCHARGE $t = \frac{T H_{DR}^2}{C_v}$

$t = \frac{(1.055)(7.5\ FT)^2}{0.35\ FT^2/DAY} = 170$ DAYS

USE 6 MONTHS

5 FT SURCHARGE $t = \frac{(0.61)(7.5\ FT)^2}{0.35\ FT^2/DAY} = 96$ DAYS

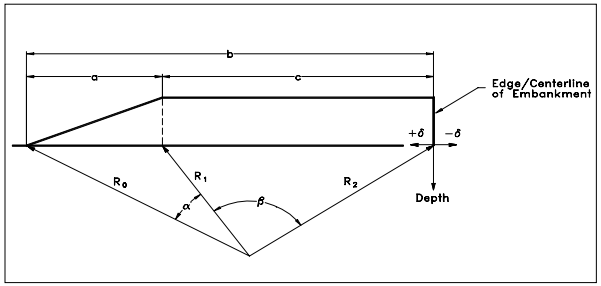
USE 3 MONTHS

10 FT SURCHARGE $t = \frac{(0.45)(7.5\ FT)^2}{0.35\ FT^2/DAY} = 70$ DAYS

USE 2.5 MONTHS

Stress at Various Points Below an Earth Embankment

Equation of Stress Given Below (Poulos & Davis P. 40):



Variables Defined in Adjacent Figure
Soil Unit Weight = 120 PCF

NOTE: ONLY CHANGE VARIABLES IN HIGHLIGHTED CELLS

Embankment Height =	17	a =	42.5
Embankment Width (Top) =	100	b =	142.5
Side Slope Ratio (x:1) =	2.5	c =	100

Delta 90

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	91.5	0.721422	1.93434	1.949927	
21.5	92.53243	0.746754	1.771655	1.896178	
44.5	100.4004	0.646639	1.33265	1.64205	
49.5	102.7144	0.615464	1.26729	1.590805	
54.5	105.2153	0.585241	1.20777	1.541428	
66	111.6065	0.521592	1.088419	1.434819	
72	115.2562	0.492028	1.034061	1.382903	
78	119.0966	0.464918	0.984215	1.333412	

Delta 100

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	101.3521	1.200473	1.40727	1.797647	
21.5	102.2851	1.102454	1.35902	1.731806	
44.5	109.4543	0.762414	1.152108	1.484397	
49.5	111.5807	0.709458	1.111157	1.440391	
54.5	113.887	0.662312	1.0718	1.398902	
66	119.8165	0.572103	0.987423	1.311214	
72	123.2234	0.53324	0.946773	1.268962	
78	126.8227	0.498897	0.90837	1.228718	

Delta 121.25

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	122.3675	1.821136	0.524976	1.018933	
21.5	123.1414	1.559101	0.615751	1.017675	
44.5	129.1581	0.891018	0.77354	1.001621	
49.5	130.9649	0.811002	0.777699	0.995539	
54.5	132.9354	0.743553	0.776595	0.988513	
66	138.0491	0.622977	0.760828	0.968982	
72	141.0162	0.573982	0.747946	0.957112	
78	144.172	0.531962	0.733165	0.944255	

Delta 142.5

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	143.4521	1.200473	0.255047	0.239809	
21.5	144.1128	1.102454	0.318595	0.302672	
44.5	149.2866	0.762414	0.505698	0.513138	
49.5	150.8526	0.709458	0.52701	0.543493	
54.5	152.5664	0.662312	0.543193	0.569381	
66	157.0422	0.572103	0.564951	0.614484	
72	159.6567	0.53324	0.569707	0.631309	
78	162.4508	0.498897	0.571078	0.644324	

Delta 152.5

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	153.39	0.721422	0.196733	0.086969	
21.5	154.0081	0.746754	0.248629	0.137116	
44.5	158.86	0.646639	0.41919	0.348018	
49.5	160.3325	0.615464	0.442134	0.383748	
54.5	161.946	0.585241	0.460856	0.415621	
66	166.1693	0.521592	0.490385	0.475436	
72	168.6424	0.492028	0.499657	0.499974	
78	171.29	0.464918	0.505583	0.520525	

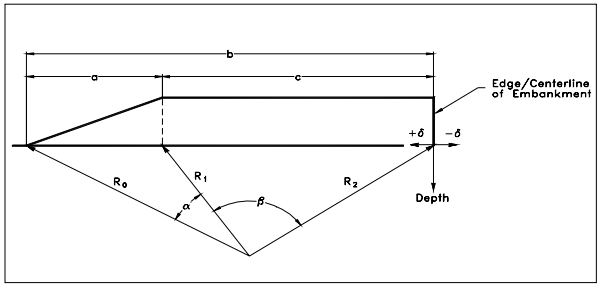
Delta 162.5

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	163.3355	0.431689	0.156919	0.035243	
21.5	163.9161	0.490207	0.199776	0.064365	
44.5	168.4829	0.529675	0.351441	0.23177	
49.5	169.872	0.516968	0.374158	0.265994	
54.5	171.3957	0.501954	0.393533	0.297918	
66	175.3917	0.463933	0.426829	0.361786	
72	177.7365	0.443936	0.438831	0.389798	
78	180.2505	0.42452	0.447754	0.41435	

SIGMA 1

Stress at Various Points Below an Earth Embankment

Equation of Stress Given Below (Poulos & Davis P. 40):



Variables Defined in Adjacent Figure
Soil Unit Weight = 120 PCF

NOTE: ONLY CHANGE VARIABLES IN HIGHLIGHTED CELLS

Embankment Height =	17	a =	42.5
Embankment Width (Top) =	200	b =	242.5
Side Slope Ratio (x:1) =	2.5	c =	200

Delta 90

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	91.5	0.041112	2.811383	2.036548	
21.5	92.53243	0.052961	2.714077	2.03254	
44.5	100.4004	0.100499	2.297981	1.984359	
49.5	102.7144	0.108993	2.215896	1.967051	
54.5	105.2153	0.116773	2.137094	1.947525	
66	111.6065	0.131972	1.968424	1.895361	
72	115.2562	0.138459	1.887288	1.864885	
78	119.0966	0.144015	1.810701	1.832722	

Delta 100

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	101.3521	0.04825	2.814539	2.036984	
21.5	102.2851	0.062028	2.71804	2.033458	
44.5	109.4543	0.116003	2.304216	1.990013	
49.5	111.5807	0.125311	2.222313	1.974067	
54.5	113.887	0.133705	2.1436	1.955912	
66	119.8165	0.149631	1.974847	1.906685	
72	123.2234	0.156174	1.893547	1.877518	
78	126.8227	0.161606	1.81674	1.846464	

Delta 121.25

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	122.3675	0.071284	2.799805	2.036877	
21.5	123.1414	0.091025	2.699577	2.033239	
44.5	129.1581	0.162599	2.275498	1.988854	
49.5	130.9649	0.173567	2.192833	1.972691	
54.5	132.9354	0.182954	2.113788	1.954343	
66	138.0491	0.199062	1.945571	1.904807	
72	141.0162	0.204793	1.865082	1.87556	
78	144.172	0.208963	1.789329	1.84448	

Delta 142.5

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	143.4521	0.115921	2.746869	2.034993	
21.5	144.1128	0.146041	2.634028	2.029338	
44.5	149.2866	0.239942	2.180277	1.967135	
49.5	150.8526	0.251131	2.096493	1.94634	
54.5	152.5664	0.259623	2.017682	1.923518	
66	157.0422	0.270743	1.853735	1.865023	
72	159.6567	0.27288	1.776841	1.832094	
78	162.4508	0.273125	1.705221	1.798086	

Delta 152.5

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	153.39	0.153009	2.699487	2.032764	
21.5	154.0081	0.190546	2.576492	2.024834	
44.5	158.86	0.293608	2.104872	1.945157	
49.5	160.3325	0.303171	2.021718	1.920379	
54.5	161.946	0.309424	1.944443	1.893898	
66	166.1693	0.314224	1.786172	1.828641	
72	168.6424	0.312876	1.712871	1.793189	
78	171.29	0.309713	1.645003	1.75733	

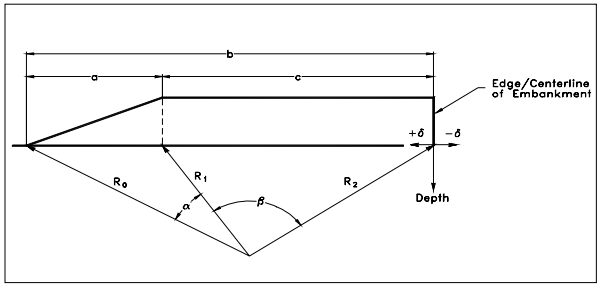
Delta 162.5

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	163.3355	0.211109	2.625894	2.028432	
21.5	163.9161	0.258034	2.489468	2.016376	
44.5	168.4829	0.362929	2.003742	1.910163	
49.5	169.872	0.368372	1.923443	1.880263	
54.5	171.3957	0.370089	1.849877	1.849348	
66	175.3917	0.364301	1.701691	1.776677	
72	177.7365	0.357806	1.63389	1.738819	
78	180.2505	0.349911	1.571421	1.701429	

SIGMA 2

Stress at Various Points Below an Earth Embankment

Equation of Stress Given Below (Poulos & Davis P. 40):



Variables Defined in Adjacent Figure
Soil Unit Weight = 120 PCF

NOTE: ONLY CHANGE VARIABLES IN HIGHLIGHTED CELLS

Embankment Height =	4.17	a =	4.17
Embankment Width (Top) =	100	b =	104.17
Side Slope Ratio (x:1) =	1	c =	100

Delta 114.17

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
	16.5	115.3561	0.16471	0.717695	0.07395
	21.5	116.1768	0.147371	0.801936	0.10041
	44.5	122.5359	0.087228	0.890865	0.162476
	49.5	124.4389	0.079469	0.882888	0.168405
	54.5	126.511	0.0729	0.871058	0.172822
	66	131.8741	0.061115	0.83516	0.178697
	72	134.977	0.056316	0.813831	0.179985
	78	138.2707	0.052197	0.791734	0.180363

Delta 104.17

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	105.4687	0.247544	1.166163	0.210361
21.5	106.3656	0.191575	1.175686	0.218798
44.5	113.2768	0.093435	1.07364	0.228554
49.5	115.3327	0.084044	1.043153	0.227902
54.5	117.5655	0.076365	1.01241	0.226684
66	123.3182	0.063098	0.942953	0.222207
72	126.6309	0.057852	0.908164	0.219156
78	130.136	0.053411	0.874668	0.21574

Delta 82.92

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	84.54571	0.1079	2.177044	0.464833
21.5	85.66199	0.108222	1.988425	0.443262
44.5	94.1062	0.079028	1.444732	0.360633
49.5	96.5711	0.073242	1.364873	0.346953
54.5	99.22689	0.068077	1.293034	0.334323
66	105.9798	0.058256	1.151763	0.308353
72	109.8168	0.054074	1.088687	0.296154
78	113.8408	0.050409	1.031535	0.284714

Delta 61.67

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	63.83916	0.036173	2.473666	0.492503
21.5	65.31033	0.042845	2.294952	0.484611
44.5	76.04892	0.051368	1.656777	0.422867
49.5	79.07869	0.050558	1.553336	0.407248
54.5	82.3009	0.049373	1.459979	0.391737
66	90.32823	0.045952	1.277646	0.357563
72	94.80079	0.04404	1.197472	0.340925
78	99.43434	0.042145	1.12576	0.325225

Delta 51.67

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	54.24057	0.024485	2.503498	0.49402
21.5	55.96462	0.02988	2.328713	0.487339
44.5	68.19119	0.041053	1.686449	0.429708
49.5	71.55445	0.041362	1.580283	0.414225
54.5	75.10019	0.041241	1.484217	0.39864
66	83.81998	0.039904	1.296272	0.363809
72	88.62161	0.038865	1.213635	0.346698
78	93.56168	0.037709	1.139786	0.330502

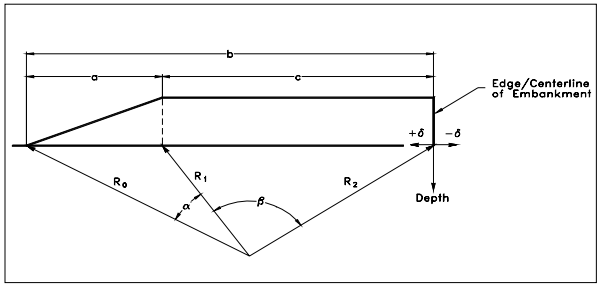
Delta 41.67

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	44.81784	0.01756	2.488896	0.492881
21.5	46.88965	0.021822	2.312118	0.48528
44.5	60.96424	0.032972	1.671658	0.42445
49.5	64.70424	0.033848	1.566829	0.40885
54.5	68.60495	0.034338	1.472102	0.393311
66	78.05376	0.034382	1.286948	0.358972
72	83.18887	0.033991	1.205541	0.342223
78	88.43296	0.033417	1.132761	0.326407

SIGMA 3

Stress at Various Points Below an Earth Embankment

Equation of Stress Given Below (Poulos & Davis P. 40):



Variables Defined in Adjacent Figure
Soil Unit Weight = 120 PCF

NOTE: ONLY CHANGE VARIABLES IN HIGHLIGHTED CELLS

Embankment Height =	8.33	a =	8.33
Embankment Width (Top) =	100	b =	108.33
Side Slope Ratio (x:1) =	1	c =	100

Delta 118.33

Depth (ratio of h)	Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	119.4748	0.293027	0.594358	0.120708	
21.5	120.2674	0.270624	0.685084	0.170576	
44.5	126.4209	0.169684	0.820359	0.301041	
49.5	128.2663	0.155309	0.819949	0.314849	
54.5	130.2775	0.142978	0.814737	0.325522	
66	135.4917	0.120529	0.791113	0.34104	
72	138.5135	0.111282	0.774886	0.345341	
78	141.725	0.103302	0.757187	0.347674	

Delta 108.33

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	109.5794	0.467519	0.952127	0.350314
21.5	110.4429	0.369634	1.005241	0.380606
44.5	117.1138	0.185049	0.99598	0.428736
49.5	119.1035	0.166721	0.975468	0.430653
54.5	121.2668	0.15167	0.953008	0.430974
66	126.8518	0.125548	0.898055	0.427121
72	130.0746	0.115182	0.869019	0.423187
78	133.4893	0.106392	0.840367	0.418268

Delta 87.08

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	88.62943	0.246261	2.047843	0.909675
21.5	89.69491	0.238447	1.869841	0.862541
44.5	97.79149	0.162941	1.380937	0.700577
49.5	100.1657	0.150187	1.309218	0.675174
54.5	102.7287	0.139009	1.244345	0.651851
66	109.2654	0.118176	1.115556	0.604042
72	112.9908	0.109436	1.057466	0.581553
78	116.9056	0.10183	1.004497	0.5604

Delta 65.83

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	67.86633	0.079534	2.446149	0.982473
21.5	69.252	0.093276	2.264297	0.965785
44.5	79.45967	0.107577	1.631208	0.841287
49.5	82.36406	0.105269	1.530245	0.810627
54.5	85.4625	0.102296	1.439296	0.780319
66	93.21796	0.094374	1.261837	0.713791
72	97.55813	0.090132	1.183771	0.681428
78	102.0666	0.086003	1.11388	0.650862

Delta 55.83

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	58.21717	0.052994	2.496728	0.987169
21.5	59.82674	0.064307	2.321003	0.974167
44.5	71.39495	0.08601	1.679526	0.86196
49.5	74.61393	0.086244	1.57398	0.831709
54.5	78.02076	0.085623	1.478538	0.801194
66	86.44645	0.082179	1.291898	0.732748
72	91.10976	0.079767	1.209837	0.698991
78	95.92179	0.07717	1.136489	0.666956

Delta 45.83

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
16.5	48.70974	0.037557	2.500345	0.986638
21.5	50.62251	0.04651	2.325119	0.97319
44.5	63.87988	0.068972	1.683211	0.85925
49.5	67.45842	0.070538	1.577334	0.828898
54.5	71.20842	0.071307	1.481559	0.798371
66	80.35166	0.070897	1.294224	0.73012
72	85.34863	0.069873	1.211857	0.696534
78	90.46761	0.068506	1.138242	0.664688

SIGMA 4

Schuyler Heim Bridge (Replace)

Utility Settlement Normal to Existing Embankment

North of Cerritos Channel - Proposed Condition

Ground Surface El. = 0

Groundwater El. = 0

	Top of Layer El. (ft)	Bot of Layer El. (ft)	Cre	Cce	OCR
Silt I	-14	-24	0.03	0.10	1.05
Silt II	-42	-57	0.02	0.08	1.05
Clayey Silt	-63	-81	0.01	0.02	1.05

	El. (ft)	Depth (ft)	Layer H (ft)	Sigma 0 (ksf)	Point A - Stress Increments Sigma 1 (ksf)	Point A - Stress Increments Sigma 2 (ksf)	Point B - Stress Increments Sigma 1 (ksf)	Point B - Stress Increments Sigma 2 (ksf)	Point C - Stress Increments Sigma 1 (ksf)	Point C - Stress Increments Sigma 2 (ksf)	Point D - Stress Increments Sigma 1 (ksf)	Point D - Stress Increments Sigma 2 (ksf)	Point E - Stress Increments Sigma 1 (ksf)	Point E - Stress Increments Sigma 2 (ksf)	Point F - Stress Increments Sigma 1 (ksf)	Point F - Stress Increments Sigma 2 (ksf)	Settlement of Each Sub Layer (in) A	B	C	D	E	F
Silt I	-16.5	16.5	5	0.95	1.95	2.04	1.80	2.04	1.02	2.04	0.24	2.03	0.09	2.03	0.04	2.03	0.02	1.36	1.76	2.51	2.74	2.82
Silt II	-21.5	21.5	5	1.24	1.90	2.03	1.73	2.03	1.02	2.03	0.30	2.03	0.14	2.02	0.06	2.02	0.03	1.27	1.59	2.10	2.27	2.35
Silt II	-44.5	44.5	5	2.56	1.64	1.98	1.48	1.99	1.00	1.99	0.51	1.97	0.35	1.95	0.23	1.91	0.73	0.76	0.85	0.95	0.99	1.01
Silt II	-49.5	49.5	5	2.85	1.59	1.97	1.44	1.97	1.00	1.97	0.54	1.95	0.38	1.92	0.27	1.88	0.69	0.71	0.79	0.87	0.90	0.91
Silt II	-54.5	54.5	5	3.14	1.54	1.95	1.40	1.96	0.99	1.95	0.57	1.92	0.42	1.89	0.30	1.85	0.65	0.67	0.73	0.79	0.81	0.82
Clay III	-66	66	6	3.80	1.43	1.90	1.31	1.91	0.97	1.90	0.61	1.87	0.48	1.83	0.36	1.78	0.18	0.18	0.19	0.21	0.21	0.21
Clay III	-72	72	6	4.15	1.38	1.86	1.27	1.88	0.96	1.88	0.63	1.83	0.50	1.79	0.39	1.74	0.17	0.17	0.18	0.19	0.19	0.19
Clay III	-78	78	6	4.49	1.33	1.83	1.23	1.85	0.94	1.84	0.64	1.80	0.52	1.76	0.41	1.70	0.16	0.16	0.17	0.17	0.17	0.17
Total Settlement (in):																	2.62	5.28	6.26	7.79	8.28	8.48

Schuyler Heim Bridge (Replace)

Utility Settlement Normal to Existing Embankment

North of Cerritos Channel - 5 ft Surcharge Condition

Ground Surface El. = 0

Groundwater El. = 0

	Top of Layer El. (ft)	Bot of Layer El. (ft)	Cre	Cce	OCR
Silt I	-14	-24	0.03	0.10	1.05
Silt II	-42	-57	0.02	0.08	1.05
Clayey Silt	-63	-81	0.01	0.02	1.05

	El. (ft)	Depth (ft)	Layer H (ft)	Sigma 0 (ksf)	Point A - Stress Increments Sigma 1 (ksf)	Point A - Stress Increments Sigma 2 + Sigma 3 (ksf)	Point B - Stress Increments Sigma 1 (ksf)	Point B - Stress Increments Sigma 2 + Sigma 3 (ksf)	Point C - Stress Increments Sigma 1 (ksf)	Point C - Stress Increments Sigma 2 + Sigma 3 (ksf)	Point D - Stress Increments Sigma 1 (ksf)	Point D - Stress Increments Sigma 2 + Sigma 3 (ksf)	Point E - Stress Increments Sigma 1 (ksf)	Point E - Stress Increments Sigma 2 + Sigma 3 (ksf)	Point F - Stress Increments Sigma 1 (ksf)	Point F - Stress Increments Sigma 2 + Sigma 3 (ksf)	Settlement of Each Sub Layer (in) A	B	C	D	E	F
Silt I	-16.5	16.5	5	0.95	1.95	2.11	1.80	2.25	1.02	2.50	0.24	2.53	0.09	2.53	0.04	2.52	1.34	1.47	2.05	2.88	3.13	3.22
Silt II	-21.5	21.5	5	1.24	1.90	2.13	1.73	2.25	1.02	2.48	0.30	2.51	0.14	2.51	0.06	2.50	1.26	1.38	1.84	2.43	2.62	2.70
Silt II	-44.5	44.5	5	2.56	1.64	2.15	1.48	2.22	1.00	2.35	0.51	2.39	0.35	2.37	0.23	2.33	0.78	0.83	0.98	1.12	1.17	1.19
Silt II	-49.5	49.5	5	2.85	1.59	2.14	1.44	2.20	1.00	2.32	0.54	2.35	0.38	2.33	0.27	2.29	0.74	0.79	0.91	1.02	1.06	1.07
Silt II	-54.5	54.5	5	3.14	1.54	2.12	1.40	2.18	0.99	2.29	0.57	2.32	0.42	2.29	0.30	2.24	0.70	0.74	0.84	0.93	0.96	0.97
Clay III	-66	66	6	3.80	1.43	2.07	1.31	2.13	0.97	2.21	0.61	2.22	0.48	2.19	0.36	2.14	0.19	0.20	0.22	0.24	0.24	0.24
Clay III	-72	72	6	4.15	1.38	2.04	1.27	2.10	0.96	2.17	0.63	2.17	0.50	2.14	0.39	2.08	0.18	0.19	0.21	0.22	0.22	0.22
Clay III	-78	78	6	4.49	1.33	2.01	1.23	2.06	0.94	2.13	0.64	2.12	0.52	2.09	0.41	2.03	0.17	0.18	0.19	0.20	0.20	0.20
												Total Settlement (in):					5.37	5.78	7.24	9.05	9.60	9.82

Schuyler Heim Bridge (Replace)

Utility Settlement Normal to Existing Embankment

North of Cerritos Channel - 10 ft Surcharge Condition

Ground Surface El. = 0

Groundwater El. = 0

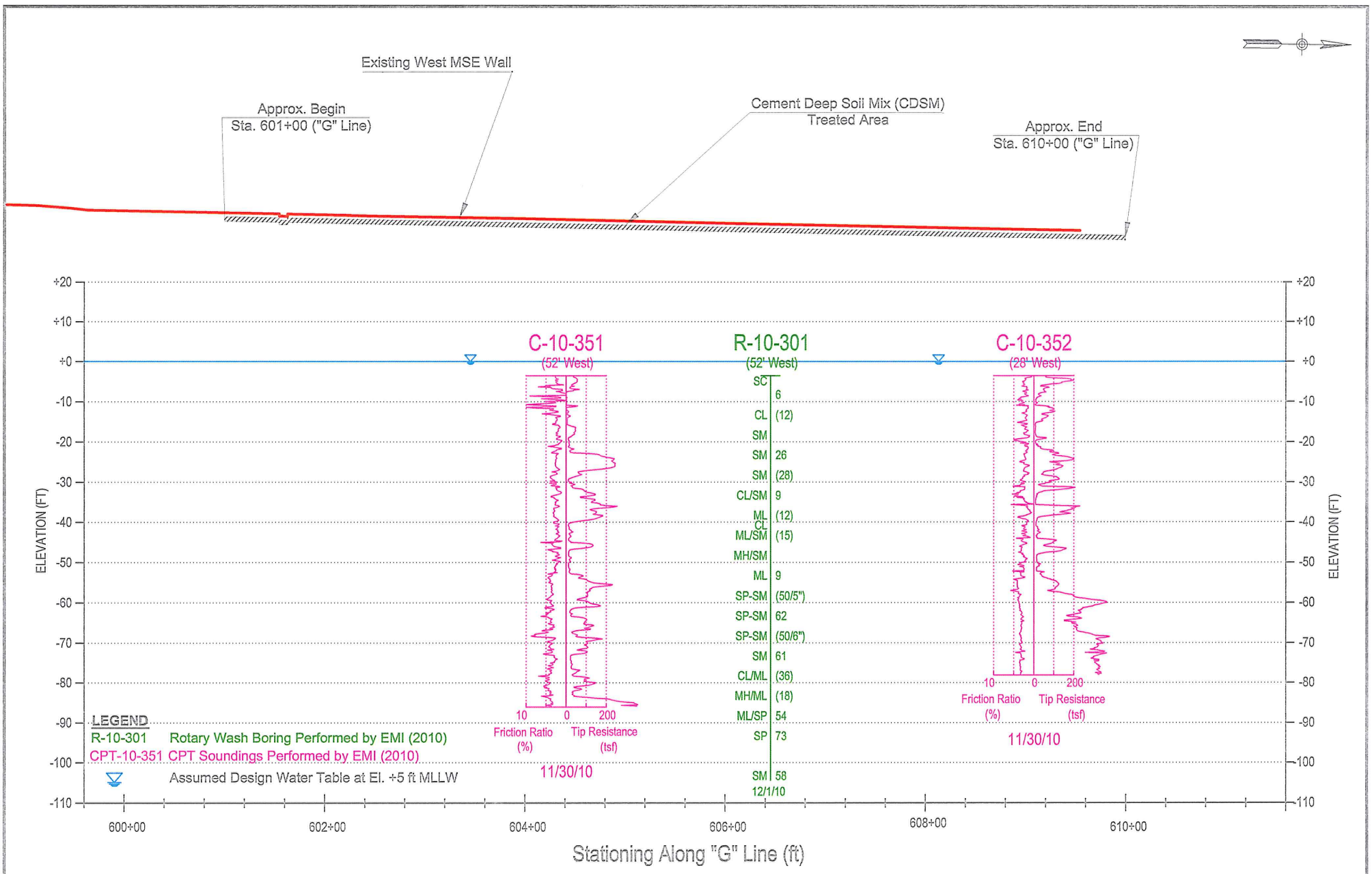
	Top of Layer El. (ft)	Bot of Layer El. (ft)	Cre	Cce	OCR
Silt I	-14	-24	0.03	0.10	1.05
Silt II	-42	-57	0.02	0.08	1.05
Clayey Silt	-63	-81	0.01	0.02	1.05

	El. (ft)	Depth (ft)	Layer H (ft)	Sigma 0 (ksf)	Point A - Stress Increments Sigma 1 (ksf)	Point A - Stress Increments Sigma 2 + Sigma 4 (ksf)	Point B - Stress Increments Sigma 1 (ksf)	Point B - Stress Increments Sigma 2 + Sigma 4 (ksf)	Point C - Stress Increments Sigma 1 (ksf)	Point C - Stress Increments Sigma 2 + Sigma 4 (ksf)	Point D - Stress Increments Sigma 1 (ksf)	Point D - Stress Increments Sigma 2 + Sigma 4 (ksf)	Point E - Stress Increments Sigma 1 (ksf)	Point E - Stress Increments Sigma 2 + Sigma 4 (ksf)	Point F - Stress Increments Sigma 1 (ksf)	Point F - Stress Increments Sigma 2 + Sigma 4 (ksf)	Settlement of Each Sub Layer (in) A	B	C	D	E	F
Silt I	-16.5	16.5	5	0.95	1.95	2.16	1.80	2.39	1.02	2.95	0.24	3.02	0.09	3.02	0.04	3.02	1.36	1.54	2.29	3.20	3.46	3.56
Silt II	-21.5	21.5	5	1.24	1.90	2.20	1.73	2.41	1.02	2.90	0.30	3.00	0.14	3.00	0.06	2.99	1.30	1.46	2.06	2.72	2.93	3.02
Silt II	-44.5	44.5	5	2.56	1.64	2.29	1.48	2.42	1.00	2.69	0.51	2.81	0.35	2.81	0.23	2.77	0.83	0.90	1.10	1.28	1.33	1.36
Silt II	-49.5	49.5	5	2.85	1.59	2.28	1.44	2.40	1.00	2.65	0.54	2.76	0.38	2.75	0.27	2.71	0.79	0.85	1.02	1.16	1.21	1.23
Silt II	-54.5	54.5	5	3.14	1.54	2.27	1.40	2.39	0.99	2.61	0.57	2.70	0.42	2.70	0.30	2.65	0.75	0.80	0.94	1.07	1.10	1.11
Clay III	-66	66	6	3.80	1.43	2.24	1.31	2.33	0.97	2.51	0.61	2.58	0.48	2.56	0.36	2.51	0.21	0.22	0.25	0.27	0.28	0.28
Clay III	-72	72	6	4.15	1.38	2.21	1.27	2.30	0.96	2.46	0.63	2.51	0.50	2.49	0.39	2.44	0.20	0.21	0.23	0.25	0.25	0.25
Clay III	-78	78	6	4.49	1.33	2.18	1.23	2.26	0.94	2.40	0.64	2.45	0.52	2.42	0.41	2.37	0.18	0.19	0.21	0.23	0.23	0.23
											Total Settlement (in):						5.61	6.18	8.11	10.18	10.79	11.04

ATTACHMENT 7

SETTLEMENT CALCULATIONS DUE TO PROPOSED FILL

FOR ACTA TRACKS NEXT TO EXISTING WEST MSE WALL



Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

SCHUYLER HEIM BRIDGE REPLACEMENT - ANALYSIS OF FILL PLACEMENT

EMI Project No. 06-123

Date: 12-14-10

Soil Profile Along Existing West MSE Wall at North Side of the Channel (Using Site-Specific Explorations)

Figure 1

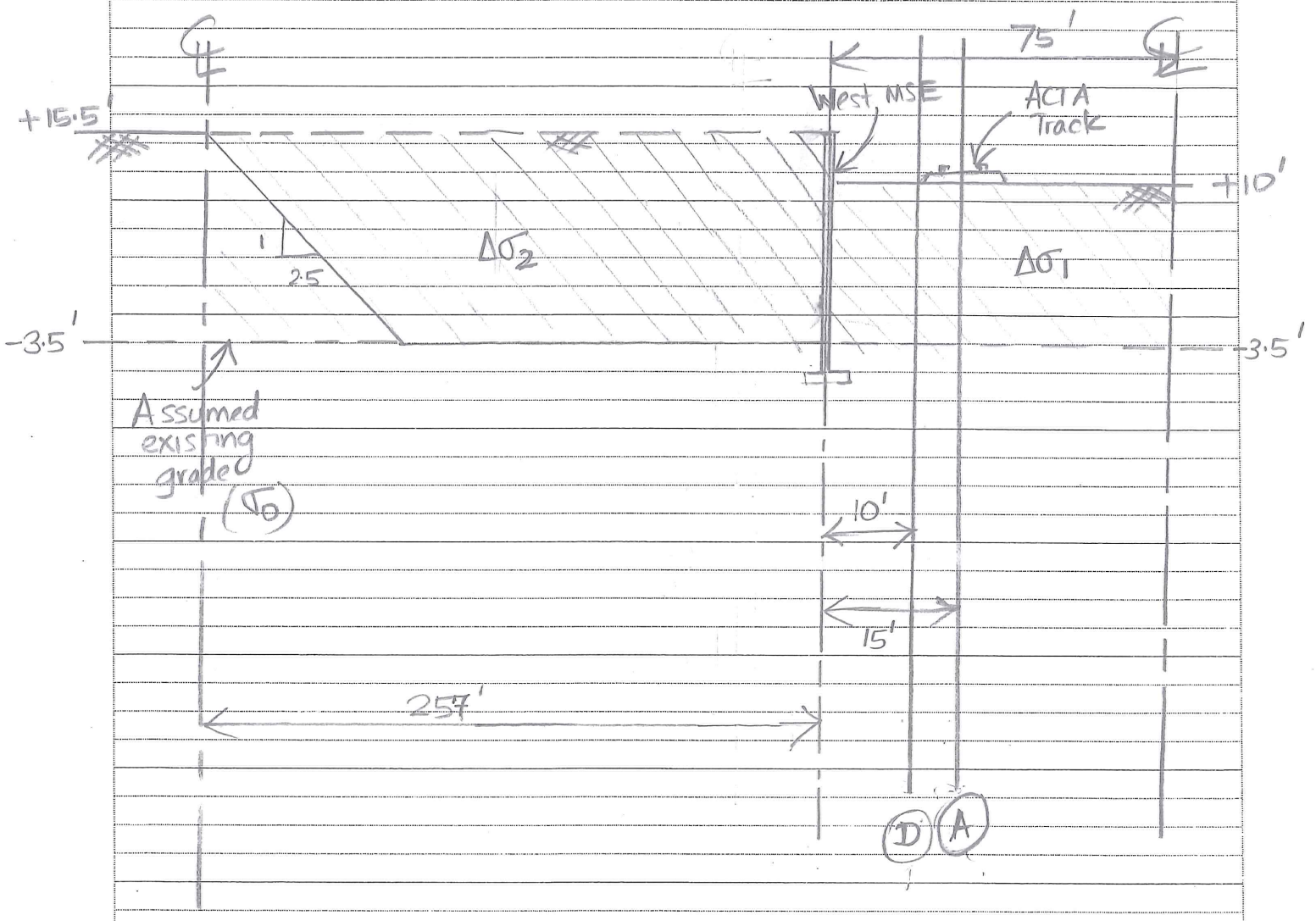
SETTLEMENT ESTIMATES

(WITHOUT CDSM)

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

Project: Schuyler Heim Bridge Replacement Project No.: 06-123
By: Ranjan(RB) Date: 12/13/10 Checked By: Arul Date: 12/14/10 Sheet: 1 of 1
Subject:

Consol. Settlement Estimates for ACTA tracks (next to west MSE)



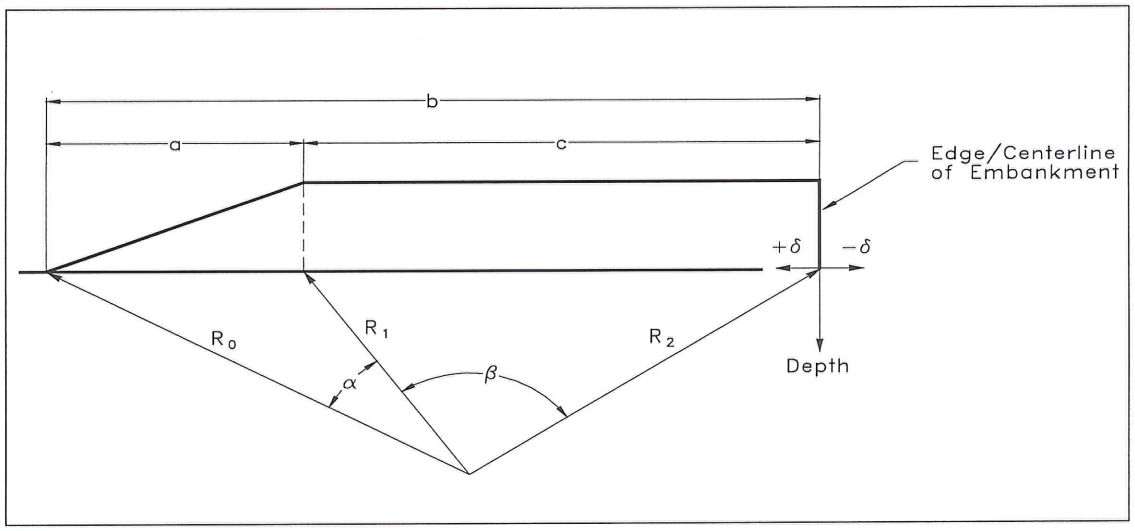
$\Delta\sigma_1$ = Stress increase due to existing west embankment

$\Delta\sigma_2$ = Stress increase due to future fill east of MSE Wall

17660 Newhope Street, Suite E, Fountain Valley, CA 92708 Tel: (714) 751-3826 Fax: (714) 751-3928

Stress at Various Points Below an Earth Embankment

Equation of Stress Given Below (Poulos & Davis P. 40):



Variables Defined in Adjacent Figure
Soil Unit Weight = 120 PCF

NOTE: ONLY CHANGE VARIABLES IN HIGHLIGHTED CELLS

Embankment Height =	13	a =	0
Embankment Width (Top)	75	b =	75
Side Slope Ratio (x:1) =	0.000	c =	75

Point A

Delta 60

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
7	60.4	3.3E-06	2.58882	**1.53**
14.5	61.7	4.3E-06	2.13602	**1.42**
34.5	69.2	3.2E-06	1.45909	**1.12**
46	75.6	2.6E-06	1.23193	**1.00**
72.5	94.1	1.7E-06	0.89535	**0.79**
81	101	1.6E-06	0.82066	**0.73**

Point D

Delta 65

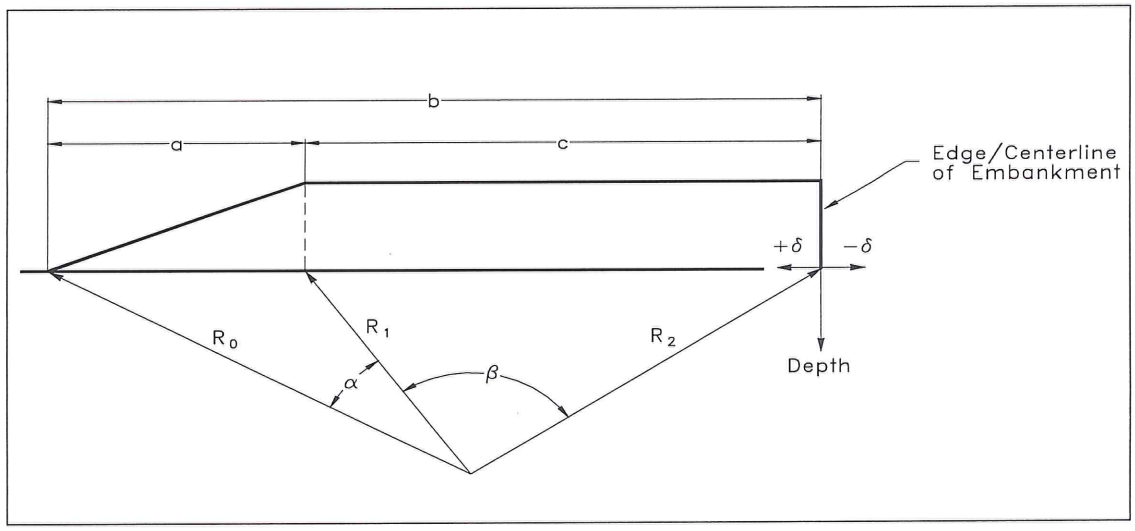
Actual Depth (feet)	R2 (feet)	alpha (radians)	beta radians	SigmaZ (ksf)
7	65.38	6.1E-06	2.424	**1.49**
14.5	66.6	6.1E-06	1.955	**1.31**
34.5	73.59	3.5E-06	1.365	**1.02**
46	79.63	2.7E-06	1.169	**0.92**
72.5	97.37	1.8E-06	0.868	**0.75**
81	103.9	1.6E-06	0.799	**0.70**

Point A (Final) SigmaZ (ksf)	**Point D (Final)** SigmaZ (ksf)
1.53	**1.49**
1.42	**1.31**
1.12	**1.02**
1.00	**0.92**
0.79	**0.75**
0.73	**0.70**

$(\Delta\sigma_1)$

Stress at Various Points Below an Earth Embankment

Equation of Stress Given Below (Poulos & Davis P. 40):



Variables Defined in Adjacent Figure
Soil Unit Weight = 120 PCF

NOTE: ONLY CHANGE VARIABLES IN HIGHLIGHTED CELLS

Embankment Height =	19	a =	0
Embankment Width (Top)	257	b =	257
Side Slope Ratio (x:1) =	0.000	c =	257

Point A

Delta 272

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
7	272	4.9E-06	0.4109	**0.04**
14.5	272	6.3E-06	0.71519	**0.19**
34.5	274	4.6E-06	1.0345	**0.58**
46	276	3.7E-06	1.08805	**0.70**
72.5	281	2.5E-06	1.10629	**0.84**
81	284	2.3E-06	1.09825	**0.87**

Point D

Delta 267

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta radians	SigmaZ (ksf)
7	267.1	8.9E-06	0.585	**0.10**
14.5	267.4	8.9E-06	0.913	**0.36**
34.5	269.2	5.1E-06	1.16	**0.74**
46	270.9	3.9E-06	1.186	**0.83**
72.5	276.7	2.6E-06	1.169	**0.93**
81	279	2.3E-06	1.153	**0.95**

Point A (Final) SigmaZ (ksf)	**Point D (Final)** SigmaZ (ksf)
0.04	**0.10**
0.19	**0.36**
0.58	**0.74**
0.70	**0.83**
0.84	**0.93**
0.87	**0.95**

$(\Delta\sigma_2)$

Schuyler Heim Bridge Replacement Project
West Side MSE Wall with Full Fill at Pier A
Consolidation Settlement

Prepared By: Ranjan

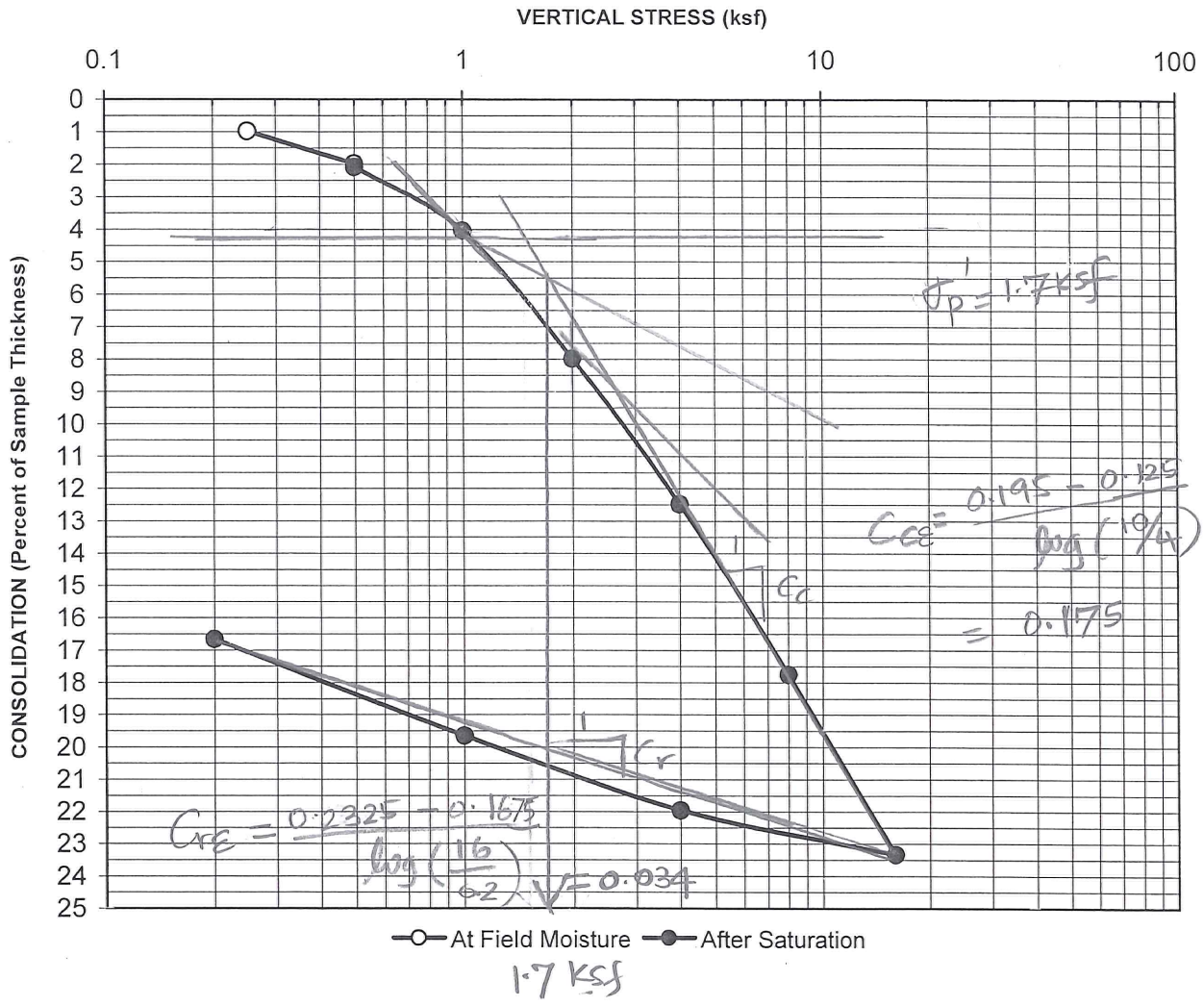
Ground Surface El. = -3.5 ft
Groundwater El. = -3.5 ft

Top of Layer El. (ft)	Bot of Layer El. (ft)	Cre	Cce	Sigma P (ksf)
-7	-22	0.034	0.175	1.70
-32	-55	0.014	0.095	3.50
-72	-89	0.010	0.075	7.00

} See attached Consolidation test results

Soil Layer	Mid Layer El. (ft)	Mid Layer Depth (ft)	Layer Thickness (ft)	Initial Stress Sigma 0 (ksf)	Point A Delta Sig 1 (ksf)	Point A Delta Sig 2 (ksf)	Point A Delta Sig 1+2 (ksf)	Point D Delta Sig 1 (ksf)	Point D Delta Sig 2 (ksf)	Point D Delta Sig 1+2 (ksf)	Estimated Settlements Point A (in)	Estimated Settlements Point D (in)
CL/ML	-10.5	7	7	0.403	1.53	0.04	1.57	1.49	0.10	1.59	0.13	0.34
CL/ML	-18	14.5	8	0.835	1.42	0.19	1.62	1.31	0.36	1.67	0.60	1.14
ML 1	-38	34.5	12	1.987	1.12	0.58	1.70	1.02	0.74	1.76	0.41	0.53
ML 1	-49.5	46	11	2.650	1.00	0.70	1.69	0.92	0.83	1.75	0.95	1.14
ML 2	-76	72.5	8	4.176	0.79	0.84	1.63	0.75	0.93	1.68	0.07	0.07
ML 2	-84.5	81	9	4.666	0.73	0.87	1.60	0.70	0.95	1.65	0.07	0.08
										Total Settlement (in):	2.2	3.3

AP Engineering & Testing, Inc.

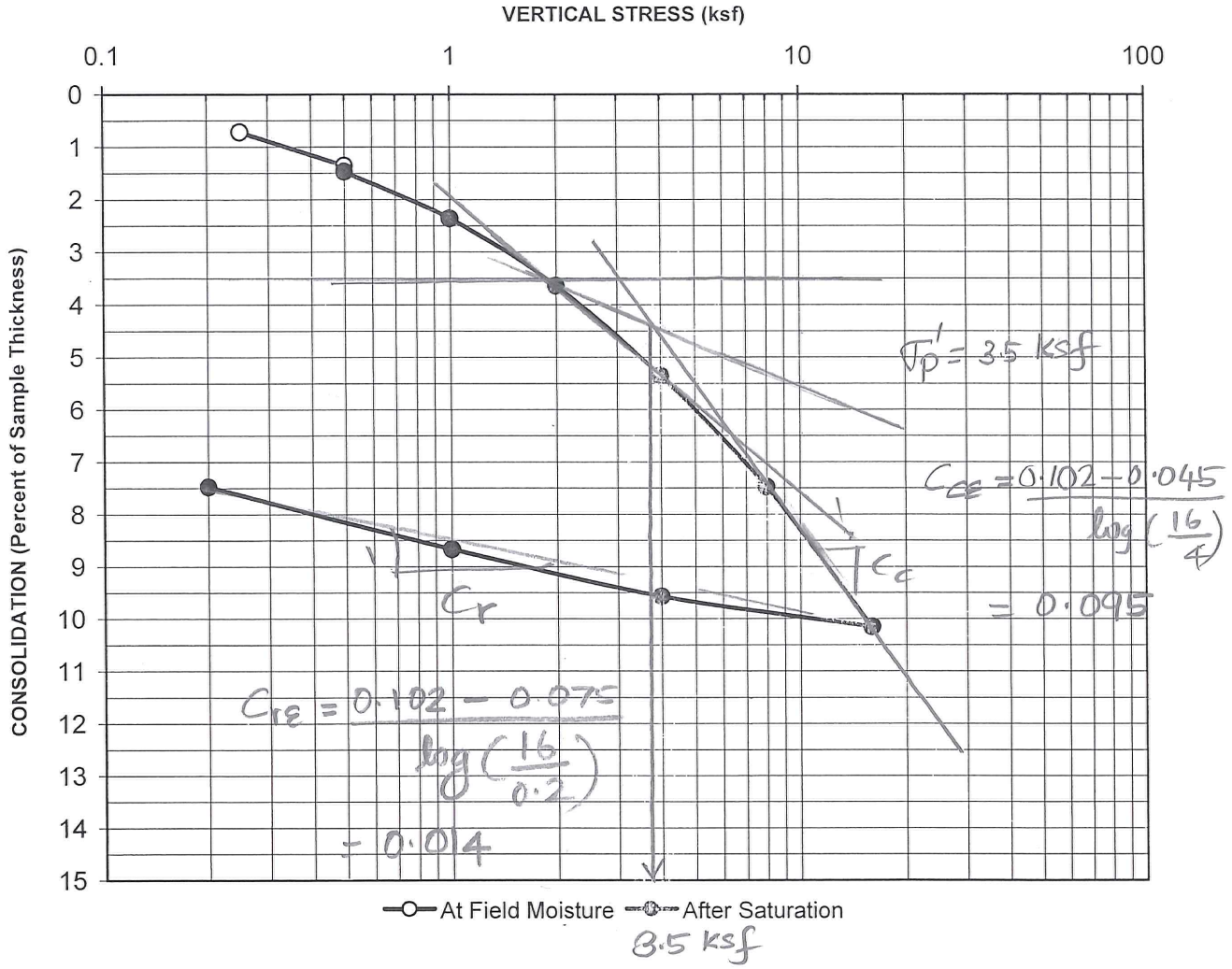


Boring No. :	R 10 301	Initial Dry Unit Weight (pcf):	72.4
Sample No.:	D2	Initial Moisture Content (%):	49.3
Depth (ft.):	10	Final Moisture Content (%):	38.6
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	1.33
Soil Description:	Gray Lean Clay	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.

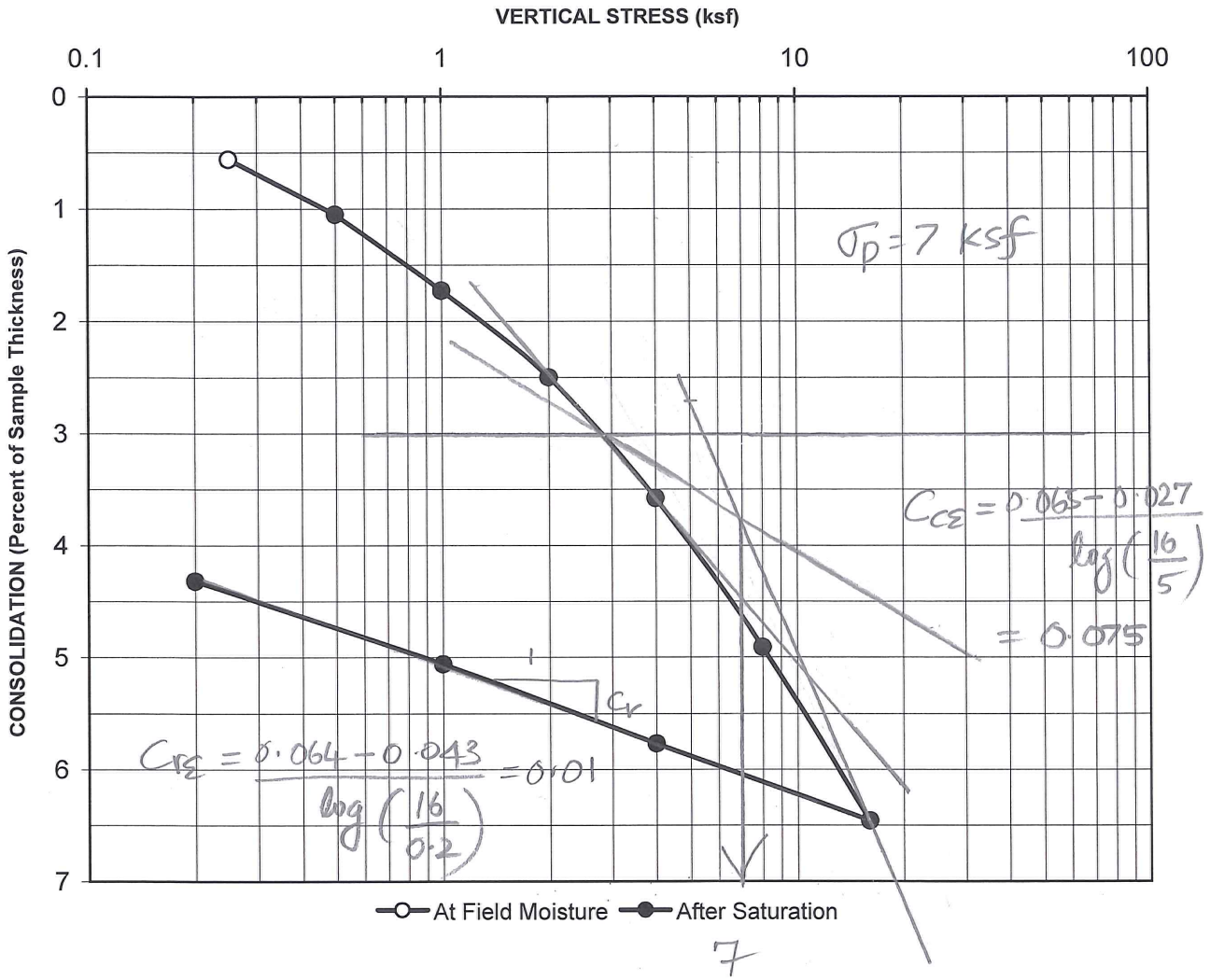


Boring No. :	R 10 301	Initial Dry Unit Weight (pcf):	90.9
Sample No.:	T10	Initial Moisture Content (%):	32.9
Depth (ft.):	45	Final Moisture Content (%):	26.9
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Shelby Tube	Initial Void Ratio:	0.85
Soil Description:	Gray Clayey Silt	Remarks:	

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

AP Engineering & Testing, Inc.



Boring No. :	R 10 301	Initial Dry Unit Weight (pcf):	92.8
Sample No.:	D16	Initial Moisture Content (%):	31.3
Depth (ft.):	75	Final Moisture Content (%):	30.2
Depth Below Mud Line (ft.):	N/A	Assumed Specific Gravity:	2.7
Sample Type:	Cal. Mod.	Initial Void Ratio:	0.81
Soil Description:	Gray Silt with sand	Remarks:	

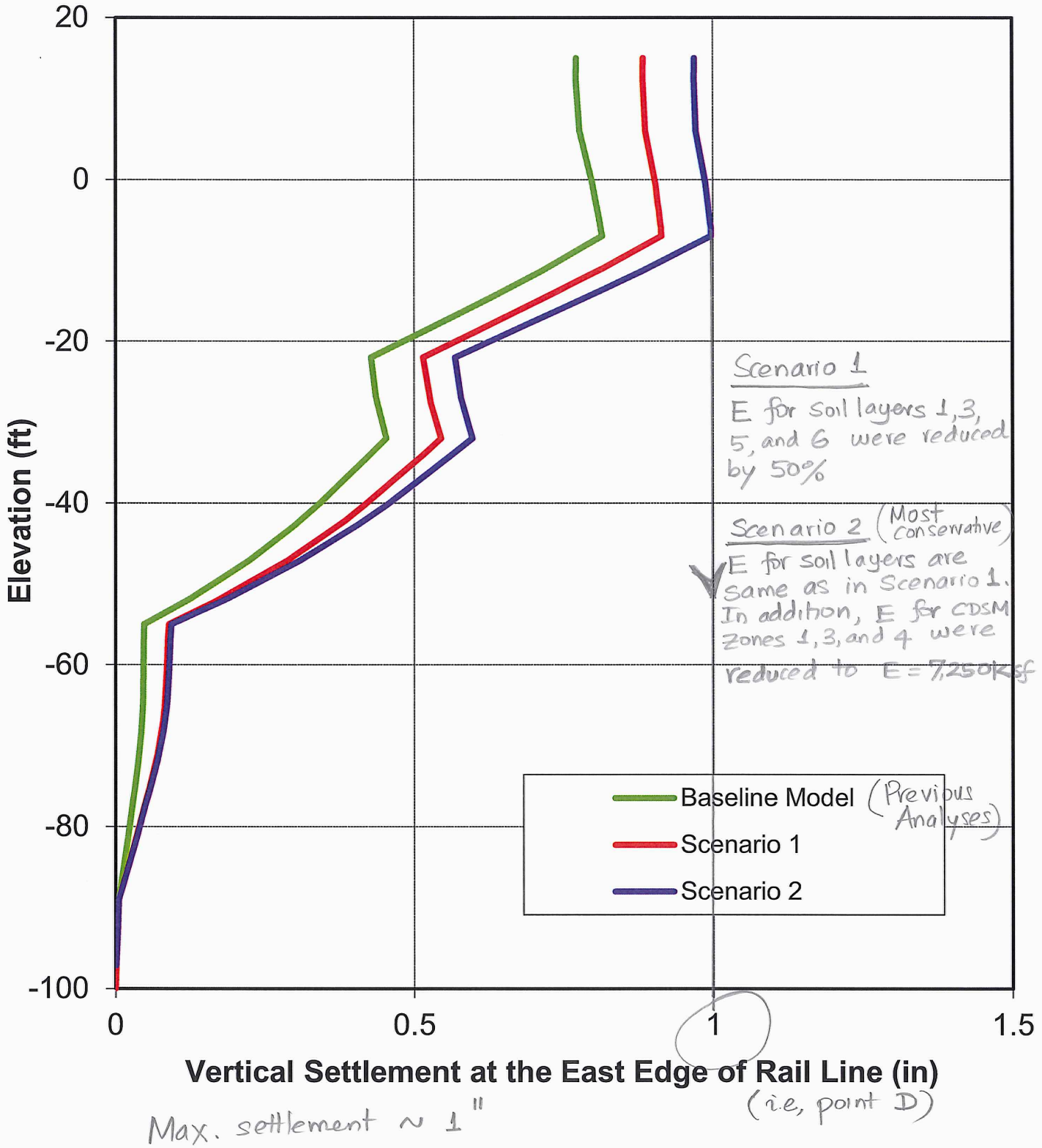
CONSOLIDATION CURVE
ASTM D 2435

Project Name:	ACTA Schuyler Heim Bridge Future Fill
Project No.:	06-123
Date:	12/14/2010
AP No:	10-1226

SETTLEMENT ESTIMATES USING PLAXIS

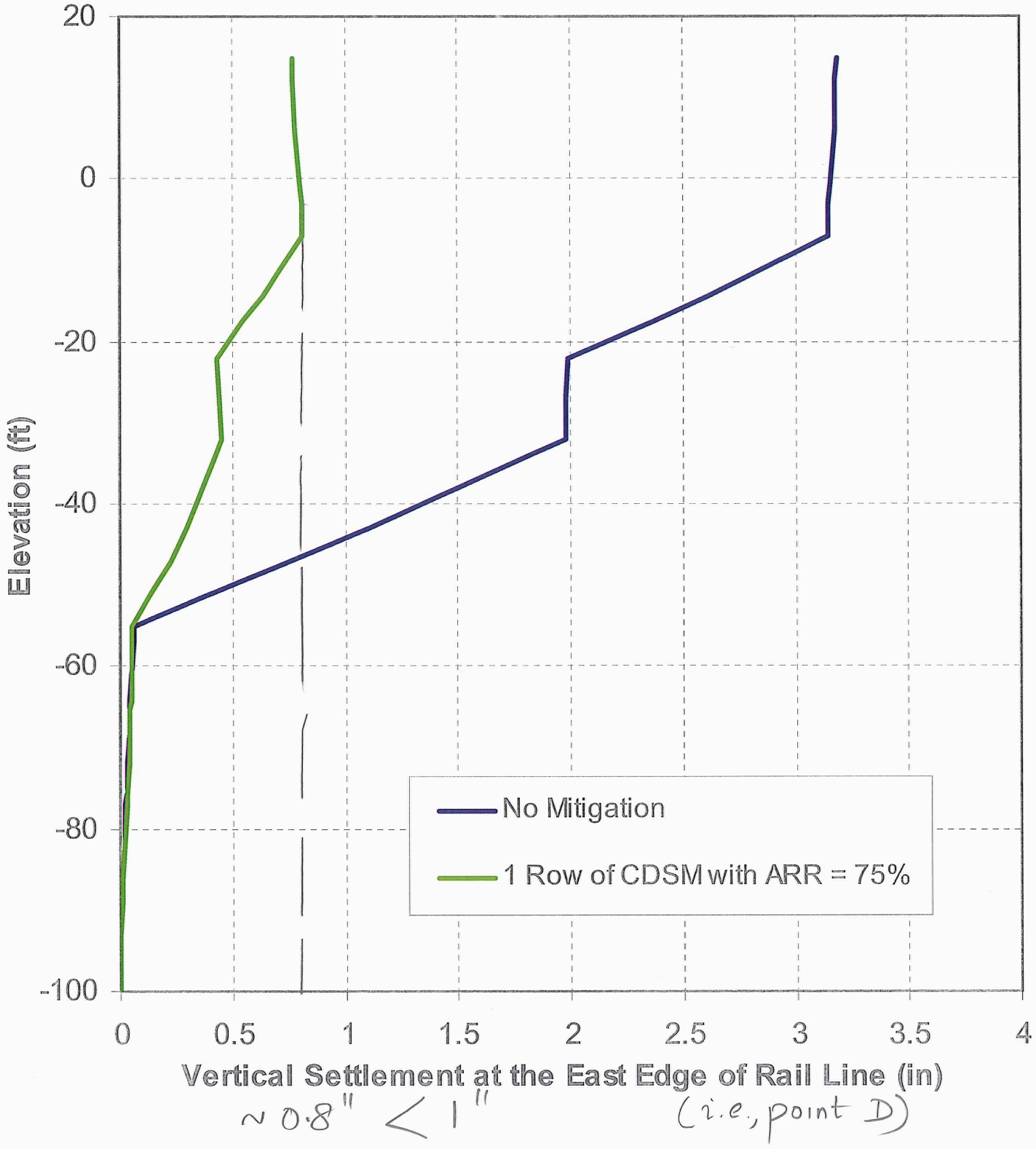
(WITH CDSM)

USING REVISED PLAXIS RESULTS.



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
Project No. 06-123	Date: 2-18-11	MSE Wall FE Analysis Results For Additional Analysis Scenarios Figure 6

USING PREVIOUS PLAXIS RESULTS.



~0.8" < 1" (i.e., point D)

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		SCHUYLER HEIM BRIDGE REPLACEMENT ANALYSIS OF FILL PLACEMENT
		MSE Wall FE Analysis Results: Settlement
Project No. 06-123	Date: 12-29-10	Figure 5

ATTACHMENT 8

EMI RESPONSES TO CALTRANS COMMENTS ON ADDENDUM NO. 2, DATED JANUARY 4, 2011, TO FINAL FOUNDATION REPORT FOR SCHUYLER HEIM BRIDGE

January 24, 2011

EMI Response to Review Comments on Addendum #2 to the Final Foundation Report for Schuyler Heim Bridge (Replace), Bridge No. 53-3032

Caltrans provided review comments by email on January 19, 2011. These comments are listed below (in blue italics) along with EMI responses. In addition, based on Caltrans review comments, EMI ran further FE analyses in order to test the sensitivity of the model to the selected stiffness parameters. These analyses are discussed after the review comments and responses.

Caltrans Comment No. 1: Please quote the reference borings to be used to generate soil profiles and parameters for all analysis in the addendum.

EMI Response: We used a large amount of the relevant available and new subsurface information to generate soil profiles and associated parameters along the affected areas of the project site. The reference borings, CPT soundings, and shear wave velocity measurements used to generate each of the soil profiles and parameters for the analyses are listed below.

North Side of the Cerritos Channel:
- Rotary Wash Borings: R-09-022 through R-09-029
- CPT Soundings: C-09-085 through C-09-092
- Suspension PS Velocities at Borings: R-09-022, R-09-025 and R-09-028

South Side of the Cerritos Channel (Bents 5-8):
- Rotary Wash Borings: R-09-07 through R-09-014
- CPT Soundings: C-09-064, C-09-065, and C-09-074 through C-09-079
- Suspension PS Velocities at Borings: R-09-007 and R-09-014

South Side of the Cerritos Channel (Bents 9-11):
- Rotary Wash Borings: R-09-017 through R-09-020
- CPT Soundings: C-09-080 through C-09-083
- Suspension PS Velocities at Borings R-09-014 and R-09-021

MSE Wall
- Rotary Wash Borings: R-10-301
- CPT Soundings: C-10-351, C-10-352
- Suspension PS Velocities at Borings: R-09-022, R-09-025 and R-09-028

Caltrans Comment No. 2: Please provide the technical source for the modulus value used in FE analysis.

EMI Response: Below we describe the bases that were used for selecting the modulus values for the analyses which are presented in the EMI technical memorandum entitled "Finite Element analysis of Cement-Deep-Soil-Mix Ground Improvement at Pile Foundations." In addition, we have performed new analyses in order to address the model's sensitivity to the modulus values.

The modulus values used in the FE analyses for soil layers near the ground surface were determined by using the nearest shear wave velocity (V_s) measurements to get the small-strain shear modulus (G_{max}) and applying a reduction factor of 0.5. Kramer (1996) explained that the use of measured shear wave velocities is generally the most reliable means of evaluating the in situ value of G_{max} (the full reference

for Kramer's book is listed below). Based on our experience, we believe that using site the specific shear wave velocity measurements as suggested by Kramer (1996) is the preferred method over using blowcount correlations to evaluate modulus values for use in the FE models. We have completed several reviewer-approved projects in the past, in which we conducted FE model simulations using stiffness parameters based on shear wave velocity measurements with an applied reduction factor.

In this process, we used the relationship $G_{max} = \rho V_s^2$ to get the small strain shear modulus from the V_s data, where ρ is the soil density. We used the relationship $E = 2G(1+\nu)$ from the theory of elasticity to get young's modulus from the shear modulus, assuming Poisson's ratio $\nu = 0.3$. The modulus values used in the analyses for soils near the surface were reduced by a factor of 0.5 to account for degradation due to soil strains.

As discussed in the memo, young's modulus vales for the layers that are expected to undergo significant consolidation settlement (e.g. Layer 2 and Layer 3 on the North Side of the Cerritos Channel) were reduced to yield settlements matching the hand calculations shown in Table 1 of the memo.

For the deeper soil layers, the shear wave velocity measurements were used as a guide for developing the modulus values. Engineering judgment, knowledge of site geology, and numerical modeling experience were also used to select the modulus values for the deeper layers.

Modulus values for the CDSM zones in the model were based on our lab testing program and recommendations by Porbaha (2000), as discussed in the memo.

Reference:

Kramer, S. (1996). *Geotechnical Earthquake Engineering.* Prentice Hall, Upper Saddle River, New Jersey.

Caltrans Comment No. 3: Technical Memo for FE analysis of CDSM around CIDH piles:

Please verify the "E" value for Soil Layer No.1 in Table 4. Based on Table C10.4.6.3-1 of AASHTO LRDF BDS (2007), the blowcount correlated "E" value is an order of magnitude lower the value used in FE analysis. The previous experience shows that the settlement for 30' of loose to medium dense SM/ML (R-09-022 to R-09-28) under 19 feet compacted surcharge could be more than few inches, rather than 0.5" as presented in FE analysis results (Figures 8 to 10),

EMI Response: As discussed in response to comment #2, we decided to use the E value based on shear wave velocity measurements(with a 50% reduction in this layer), as it is considered more reliable than blow count-based correlations. However we recognize that determining the best E value is an area of uncertainty. In order to address this uncertainty, we conducted additional analyses in which we reduced the E value for Soil Layer 1 by an order of magnitude (from 940 ksf to 100 ksf). These additional analyses are discussed at the end of the review comments below. From the additional analyses, it was concluded that the proposed mitigation plan remains viable according to the model with E = 100 ksf for Soil Layer 1.

Please verify the "E" value for Soil Layer No.4 in Table 4. Based on Table

C10.4.6.3-1 of AASHTO LRDF BDS (2007), the modulus value used in FE analysis is few times higher than suggested (for stiff to very stiff CL/ML), which may create less conservative results for the analysis.

EMI Response: As discussed above, we used the shear wave velocity measurements as a guide along with our engineering judgment to develop the E value for this layer. However, in order to address potential uncertainty in the actual stiffness achieved in the field, we conducted additional analyses in which we reduced the E value for Soil Layer 4 from 5000 ksf to 2000 ksf. These additional analyses are discussed at the end of the review comments below. From the additional analyses, it was concluded that the proposed mitigation plan and configuration remain appropriate according to the model with E = 2000 ksf for Soil Layer 4. This holds true whether E = 100 ksf or E = 940 ksf for Soil Layer 1.

Caltrans Comment No 4: Please also verify the soil parameter used for the analysis of CDSM near MSE wall.

EMI Response: The soil parameters used for the analysis of CDSM near the MSE wall were selected according to the same logic that was used for the soil profiles along the bridge, as described above.

As discussed in the EMI technical memorandum entitled "Finite Element Analysis of Cement-Deep-Soil-Mix at Existing MSE Wall," the primary purpose of the ground improvement along the MSE wall is to limit the settlement that will occur beneath the rail lines located to the west of the wall. These rail lines are founded on ballast material, so settlement can easily be dealt with by adding ballast to maintain a level line configuration as settlement occurs slowly over time. As such, it is not critical to fully eliminate the potential for soil settlement at this location.

In addition, the soil layers directly beneath the rail line are likely much more competent than the similar soil layers on the east side of the wall, due to the 15 to 20 ft of additional overburden that already exists on the west side. In other words, the soil was likely improved by the placement of the fill behind the wall. We conservatively did not take this into account in our original analyses which were presented in the memo. However, in order to address the comment on soil parameters used for the analysis of CDSM near the MSE wall, we ran additional simulations considering reduced (by 50%) modulus values. Results of these analyses are presented further below. From the additional analyses with reduced modulus values, the results indicate that the settlement under the rail line will be less than 1 inch.

Additional Analyses Performed by EMI Considering Reduced Modulus Values for the North Side of the Cerritos Channel

In order to consider the uncertainty in selecting appropriate model parameters, two additional FE simulations were conducted and compared with the results presented in the memo for the recommended mitigation scheme (Scenario 3) for the analysis of North Side of the Cerritos Channel. Fill placement on the South Side has been cancelled, so further analyses were not conducted considering the South Side.

The stiffness parameters used in Soil Layer 1 and Soil Layer 4 were varied in these analyses. All other parameters remain the same in all three cases. The three cases which are compared are described below:

Case 1: Scenario 3 from the submitted memo, where E = 940 ksf for Soil Layer 1, and E = 5000 ksf for Soil Layer 4.

Case 2: Scenario 3 from the submitted memo with E = 940 ksf for Soil Layer 1, and reduced E = 2000 ksf for Soil Layer 4.

Case 3: Scenario 3 from the submitted memo with reduced E = 100 ksf for Soil Layer 1, and a reduced E = 2000 ksf for Soil Layer 4.

Next, axial pile capacity calculations were performed using the most conservative results from Cases 1-3.

Analysis Results

The settlement and vertical effective stress near the modeled Schuyler Heim Bridge pile are shown in Figures 1 and 2, similar to the results provided in the memo. The blue lines in Figures 1 and 2 (Case 1) are the original results provided for Scenario 3 in the memo (Scenario 3 was the recommended CDSM mitigation scenario).

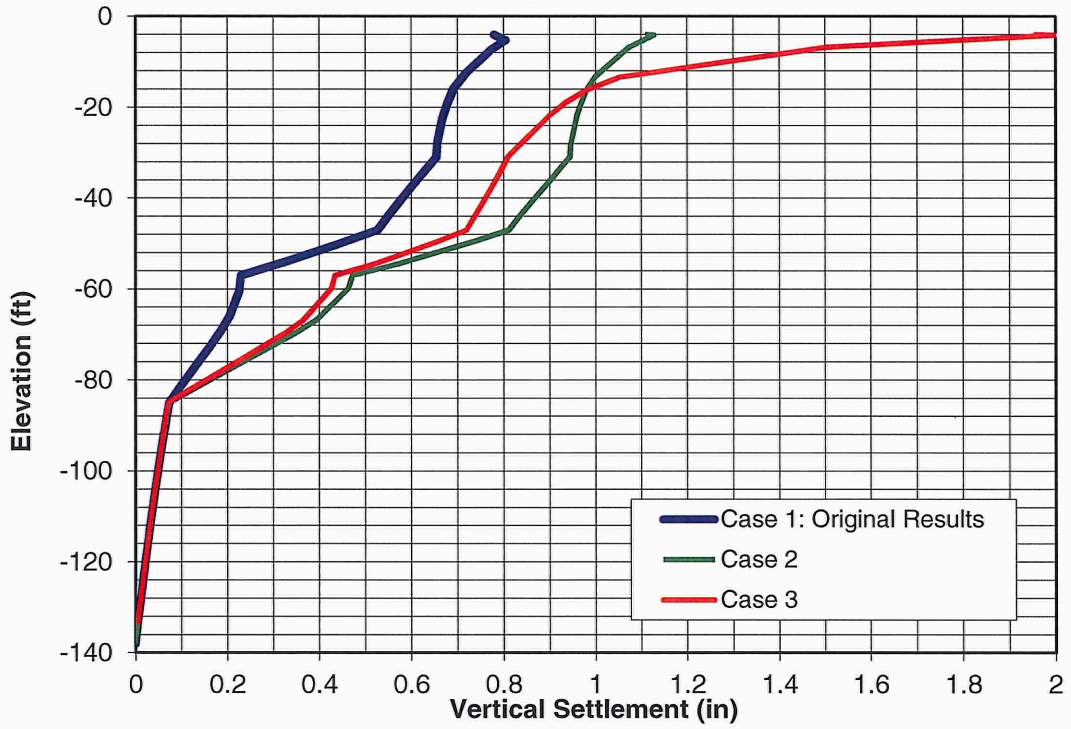


Figure 1. Settlement near the Schuyler Heim Bridge CIDH pile considering Cases 1-3

As expected, Figure 1 shows that the settlement is higher when the stiffness parameters are reduced in Cases 2 and 3. In Case 2, when the soil modulus was reduced only in Layer 4 (Elevation -57 ft to -85 ft), the increase in settlement essentially occurs only in this layer. In Case 3, when the soil modulus was reduced in Layer 1 (Elevation -4 ft to -31 ft) and Layer 4, the predicted settlement increases substantially in both of those layers. The increase in settlement is quite large in Layer 1 due to the soil modulus being decreased by a full order of magnitude.

As discussed in Addendum #2, the downdrag force is expected to be mobilized when the amount of soil settlement reaches 0.5 inches. From Figure 1, Case 2 provides the worst-case-scenario for depth to mobilization of downdrag force at about El. -56 ft. Although Case 3 is predicted to yield the largest amount of total settlement at the ground surface, the settlement reaches 0.5 inches at a shallower elevation than in Case 2.

Figure 2 shows that the stresses near the pile are very similar for Cases 1 and 2, which leads to similar levels of skin friction acting on the pile. However, with the much lower modulus value in the Layer 1 for Case 3, the stress near the pile in this layer are much lower, which leads to lower levels of skin friction acting downwards on the pile. Based on Figures 1 and 2, Case 2 gives the most conservative results, which were selected for use in analyzing the pile capacity under the downdrag condition.

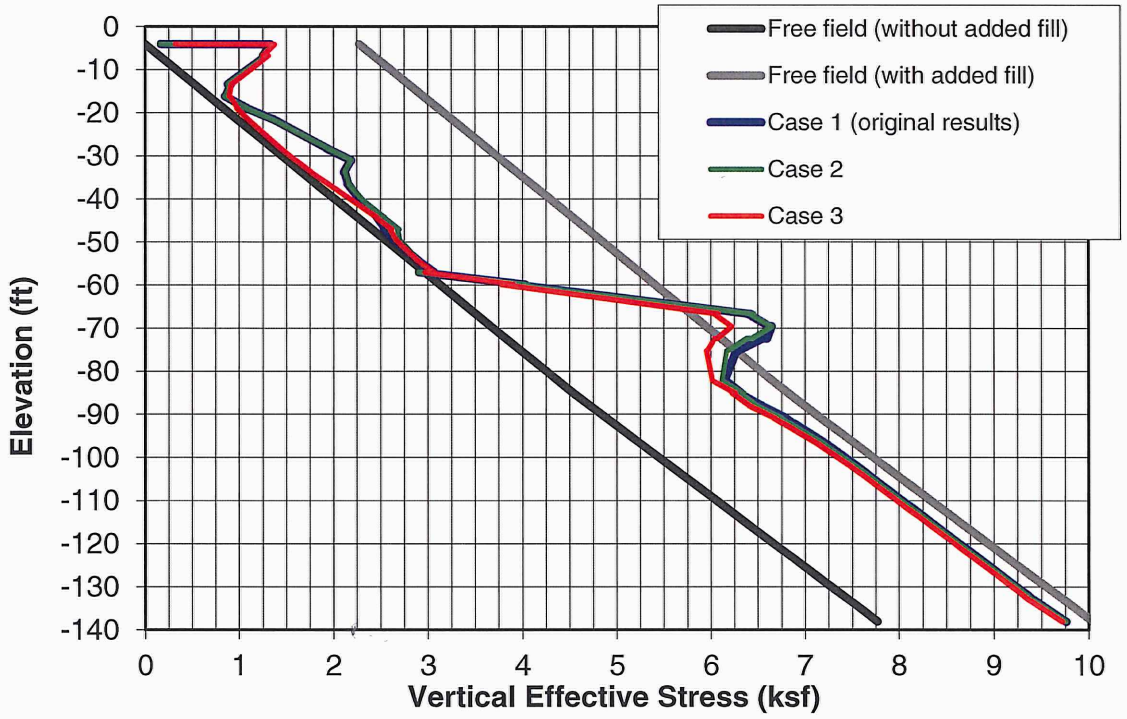


Figure 2. Vertical effective stress near the Schuyler Heim Bridge CIDH pile considering Cases 1-3

Pile Capacity Calculations

The pile capacity was analyzed under the downdrag condition based on the FE simulation results from Case 2 (most conservative results), as summarized below. In the calculations, we show that the increase in skin resistance that is gained due to the increase in overburden below the CDSM, is greater than the sum of the skin resistance that is lost in the downdrag zone and the downdrag force:

Increase in pile skin resistance > downdrag force + lost skin resistance in downdrag zone.

Satisfying this criterion leads to an overall increase in the pile stability. The supporting calculations are included after the end of the text. The analysis is summarized as follows:

Downdrag elevation: -56 ft (lowest elevation where 0.5 inches of settlement occurs according to Figure 1)

Amount of skin resistance lost due to downdrag condition occurring down to El. -56 ft: 97 tons (steel casing section) + 238 tons (CIDH pile section) = 335 tons.

Amount of downdrag force occurring down to El. -56 ft based on FE model effective vertical stress results (Figure 2): 437 tons.

Increase in skin friction based on the increase in vertical effective stress from FE model results (Figure 2): 779 tons.

779 tons > 437 + 335 = 772 tons (the criterion is satisfied)

Based on the calculations, the increase in pile capacity below the bottom of the CDSM that occurs due to the increase in overburden after placement of the fill is greater than the loss of capacity plus the downdrag load down to El. – 56 ft. As such, the proposed mitigation scheme outlined in Addendum #2 remains adequate for maintaining the design pile tip elevations, with a wide range of stiffness values considered in the FE analyses.

Additional Analyses Performed by EMI Considering Reduced Modulus Values for the MSE Wall

In order to consider the uncertainty in selecting appropriate model parameters, one additional FE simulation was conducted and compared with the results presented in the memo for the recommended mitigation scheme for the analysis of the existing MSE Wall. In this simulation, the modulus values for Soil Layers 1, 3, 5 and 6 were reduced by 50% (the modulus values for Soil Layers 2 and 4 are already very low due to reduction to account for consolidation settlement). Due to the fact that the effect of the 15 to 20 ft of overburden on these layers was conservatively not taken into account when developing the original modulus values for these layers as discussed above, it is not necessary to consider a full order of magnitude reduction.

Analysis Results

Figure 3 shows the settlement at the east edge of the rail line based on the results that were originally submitted in the memo in addition to the model with reduced modulus values. From Figure 3, with the modulus values reduced by 50%, settlement of the rail line remains below a tolerable level of 1 inch.

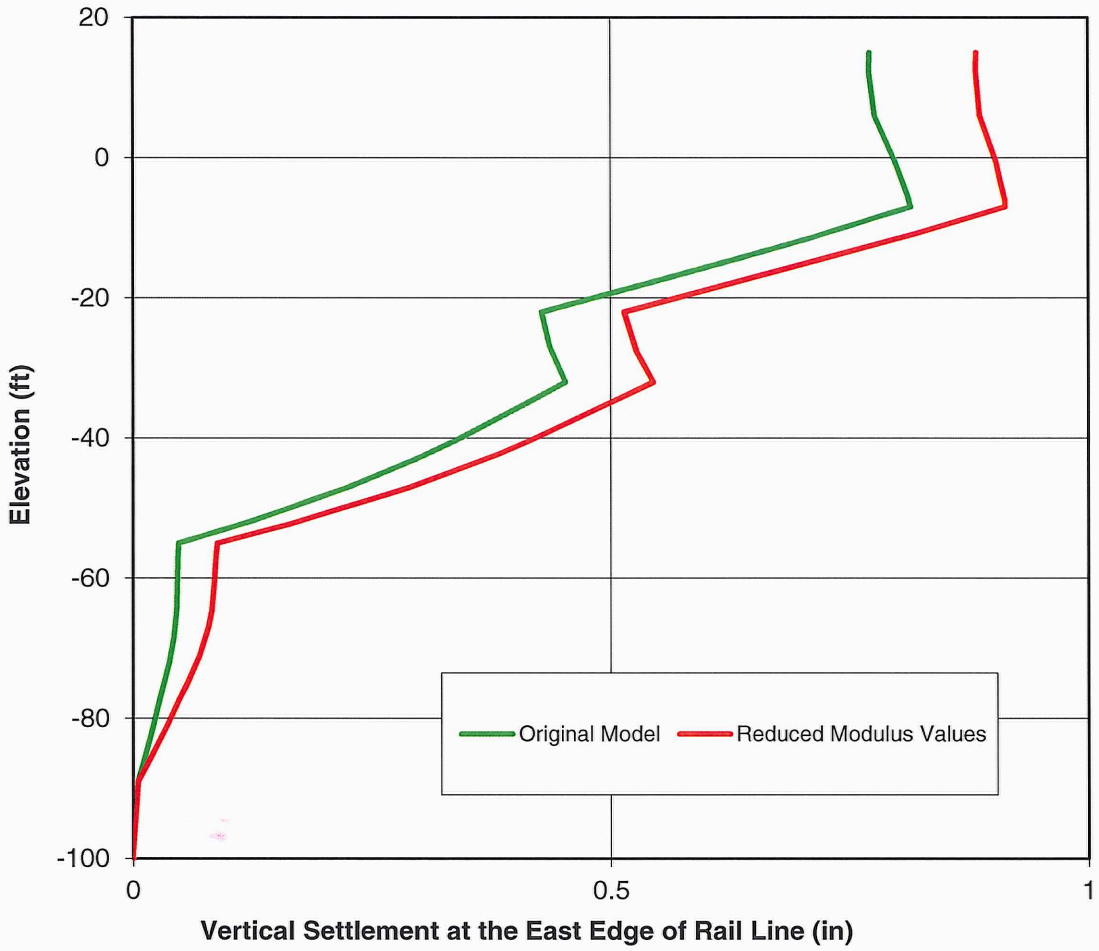


Figure 3. Settlement under the rail line according to the FE model

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

July 1, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum to "Final Foundation Report, NB SR 103 Off-Ramp, Dated May 7, 2010", Bridge No. 53-3034K, Los Angeles County, California, 7-LA-47, PM 0.01, EA 138201

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Foundation Report for the subject bridge, dated February 8, 2010, to Caltrans for review and comments. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the report and provided its comments in an email dated March 23, 2010. EMI incorporated the responses to Caltrans OGDS-1 comments into the Final Foundation Report, dated May 7, 2010 and submitted it to Caltrans. Caltrans OGDS-1 reviewed the Final Foundation Report and provided its comments in an email dated June 17, 2010.

EMI developed its responses to Caltrans comments, which were reviewed and accepted by OGDS-1. Caltrans review comments and EMI responses are included in Attachment 1.

Based on Caltrans review comments, the following change has been made to Settlement Monitoring Recommendation in Section 5.7.1 (Static Settlement) of the Final Foundation Report:

(1) The "Settlement Monitoring Recommendation" provided in the fourth paragraph of Section 5.7.1 (Static Settlement) in the Final Foundation Report has been revised as follows:

"Settlement Monitoring Recommendations: Based on our past experience, calculated settlements and settlement periods are usually approximations of actual field observations. Due to the variability of subsurface conditions and the thinly layered nature of deposits, it is recommended that settlement monitoring be conducted at the abutment. Surface settlement monuments, constructed in accordance with Caltrans Standard Plan Sheet A74 or equivalent, should be placed near the proposed abutment location and two other points selected by the Engineer. The settlement monuments should be installed in a timely manner upon completion of embankment construction. Special care should be exercised in the field to survey and protect these settlement devices. The monuments should be monitored at the time of installation, on a weekly basis for a month, and then once every 2 weeks thereafter until it has been verified by the Engineer that the remaining settlement for the embankment is acceptable. Settlement of the

embankment fill should be verified by the Engineer prior to installation of abutment piles to prevent a reduction in axial pile capacity due to downdrag loads being applied to the piles. The installation of abutment pile should not begin until the long-term residual settlement becomes ½-inch or less. However, waiting period for the installation of abutment piles can be modified based on field settlement measurements upon Engineer's approval."

This addendum should be attached to the front of the Final Foundation Report for the subject bridge, dated May 7, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.

Patrick Wilson, PhD
Staff Engineer

Eric Brown, GE
Senior Engineer

(Arul) K. Arulmoli, PhD, GE
Project Manager

ATTACHMENT

Attachment 1. Caltrans Comments and EMI Responses to Caltrans Comments on the Final Foundation Report for NB SR 103 Off-Ramp (Bridge No. 53-3034K), Dated May 7, 2010

ATTACHMENT 1

Caltrans Comments and EMI Responses to Caltrans Comments on the Final Foundation Report for NB SR 103 Off-Ramp (Bridge No. 53-3034K), Dated May 7, 2010

Subject: Review Comments for Ramp Structures
From: Haitao Liu <haitao_liu@dot.ca.gov>
Date: Thu, 17 Jun 2010 20:47:43 -0400
To: Arul Arulmoli <arulmoli@earthmech.com>
CC: Ranjan Gunaranjan <ranjan@earthmech.com>, Ae F Tern <ae_f_tern@dot.ca.gov>, Eric Brown <e.brown@earthmech.com>, Pat Wilson <P.Wilson@earthmech.com>

Hi Arul,

Just few minor items to discuss with you for those reports.

For all foundation reports (FR):

1) If possible, please update the final calculation volume, delete the unnecessary calculation/information.
2) If possible, please include in your future submittal or addendum, the L-Pile outputs and calculations for the lateral controlled pile tip.
3) Same comment as the one we made for the main bridge, for the abutments of all ramp structures, use end bearing to develop up to 20% of required axial resistance under extreme event (controlling limit state) in pile design. If design pile length reaches 30D limit, try to increase that percentage.
4) This item is just for your information only. For abutments, the group effect (or “shielding effect”) can be applied to reduce the effective down-drag load on each individual pile within pile group. The above load should be combined directly with the effective service load (group effect considered) for piles under group condition, instead of being divided by the group factor again to its original value.

For FR for SB SR-103 On-Ramp (BR53-3035S):

1) At Bent 25, the depth to steel cutoff is 43 ft according to calculation sheet "Revised Axial Pile Capacity for Strength limit State". However, in Shaft analysis, 39 ft was used as the "Ignored Top Portion", which is equivalent to the depth from FG to steel cut-off. Please revise the pile axial analysis, and the pile data table if necessary.

For FR for New Dock St. Off-Ramp (BR53-3031):

1) Please present settlement analysis in the calculation volume. The one shown in the report is for the on-ramp structure.

Please let me know if you have any question.

Best Regards,

Haitao Liu, P.E.

Transportation Engineer - Civil
Office of Geotechnical Design South - 1
Division of Engineering Services
Department of Transportation, California

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NB SR 103 Off Ramp (Bridge No. 53-3034K)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 0.01	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
1			1) For the driving resistance of permanent casing, I think still it could be a good idea to include end bearing of the steel shell and friction resistance inside the casing as part of the nominal driving resistance. The rule of thumb estimate for the friction inside is usually 30% of outside friction. But this number could be off for quite a bit, considering the variation of the casing diameter and soil property (This comment was made on the Final Foundation Report for Schuyler Heim Bridge, which also applies to this structure).	Patrick Wilson (PW), Eric Brown (EB), K. Arul Arulmoli (KA)	A	Based on the latest plans provided, approximately 25-ft long permanent driven steel casings are proposed from the pile cut-off at the bents. However, the means and methods for installation of these permanent casings to be performed by the contractor are not specified in the plans. The installation of the steel casings is expected to be performed using center-relief driving method which would eliminate inside friction and undermine end bearing of the steel casings. Therefore, it is recommended to keep the lower-bound value of required nominal driving resistance for steel casings by estimating the resistance using outside skin friction only. It should be noted that the specified tip elevations for steel casings are not controlled by the nominal driving resistance estimated since the specified tip elevations shall not be raised as noted in the Pile Data Table (PDT). It was agreed that no changes will be made to the required nominal driving resistance for steel casings shown in the current PDT.	6/30/2010	
2			2) Section 5.7.1 (Settlement Monitoring Recommendation): Since the long-term residual settlement for the embankment could be a very difficult value to guess during construction, I would suggest using waiting period to control the timing for pile installation. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to leave some maneuverable space to whoever handle the issue (This comment was made on the Final Foundation Report for Schuyler Heim Bridge, which also applies to this structure).	PW / EB / KA	A	Will comply. EMI will incorporate the comment on the Settlement Monitoring Recommendation into the subject Final Foundation Report. The fourth paragraph in Section 5.7.1 (Static Settlement) of the Final Foundation Report will be revised. The above change to Section 5.7.1 will be documented in the Addendum to the Final Foundation Report for NB SR 103 Off-Ramp Bridge.	6/30/2010	
3			3) If possible, please update the final calculation volume; delete the unnecessary calculation/information.	PW / EB / KA	A	Will comply. The necessary changes will be made to the Final Calculation Volume, Dated May 7, 2010 and the PDF copy of the Revised Final Calculation Volume will be submitted.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

NB SR 103 Off Ramp (Bridge No. 53-3034K)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 0.01	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
4			4) If possible, please include in your future submittal or addendum, the L-Pile outputs and calculations for the lateral controlled pile tip.	PW / EB / KA	A	Will comply. LPILE output files and calculations for design lateral controlled pile tip elevations will be provided and also be included in the Revised Final Calculation Volume. It should be noted that LPILE analyses were performed at selected abutment and bents to represent the entire project. The lateral controlled pile tip elevation can be estimated in several ways. Details of the procedure that was followed for estimating lateral pile tip elevations in this project and sample calculations will be included in the Revised Final Calculation Volume. A follow up comment was made by Caltrans OGDS-1 on June 22, 2010 regarding the procedure for estimating lateral controlled pile tip elevation. It was suggested that the lateral controlled pile tip elevation be estimated using plastic moment (or moment capacity) and corresponding maximum shear force at the bottom of the column. EMI will coordinate with Caltrans Structural Engineers to obtain necessary information and perform the requested analyses. Since the lateral controlled pile tip elevations do not control the design, it was agreed that no changes will be made to the design lateral controlled pile tip elevations shown in the current PDT.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

NB SR 103 Off Ramp (Bridge No. 53-3034K)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 0.01	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
5			5) Same comment as the one we made for the main bridge, for the abutments of all ramp structures, use end bearing to develop up to 20% of required axial resistance under extreme event (controlling limit state) in pile design. If design pile length reaches 30D limit, try to increase that percentage.	PW / EB / KA	A	Will comply. Based on our discussion, it was agreed that pile settlement is not considered to be a design issue during a design earthquake (extreme event) and since the abutment piles are small-diameter piles (i.e., 2.5-ft diameter piles), much higher percentage of end bearing is expected to be mobilized under extreme event. Therefore, the axial pile capacity of the abutment pile will be revised under extreme event condition by limiting only 25% of the required axial pile resistance for end bearing. For extreme event limit state, the required axial pile resistance is estimated by adding the negative skin friction (downdrag load) due to seismic settlement to the permanent load per pile under service limit state, considering pile group effects. The revised axial pile capacity calculation of the abutment pile under extreme event condition will be included in the Revised Final Calculation Volume. It should be noted that the design tip elevations for the abutment pile, presented in the current PDT, remain the same.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

Earth Mechanics, Inc.

Geotechnical & Earthquake Engineering

December 21, 2010

EMI Project No. 06-123-06

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum 2 to "Final Foundation Report, NB SR 103 Off-Ramp, Dated May 7, 2010", Bridge No. 53-3034K, Los Angeles County, California, 7-LA-47, PM 0.01, EA 238501

Dear Mr. Hersh:

As you are aware, Earth Mechanics, Inc. (EMI) submitted the Final Foundation Report for the subject bridge dated May 7, 2010. An addendum to the Final Foundation Report was prepared dated July 1, 2010 describing minor revisions to the report necessitated by a second round of review comments received from Caltrans. The subject Addendum has been prepared to address revisions to the Final Foundation Report necessitated due to project development after Addendum 1 was issued.

As part of the Port of Long Beach (POLB) future development plans, the Pier A Backland will be expanded below the proposed NB SR 103 Off-Ramp. The expansion will include placement of up to 4.5 ft of fill near Bents 25 to 26 to provide a level backland at about elevation +15 ft to the south of the subject structure. The proposed fill plan in the vicinity of the subject structure is shown in Figure 1.

As a result of fill placement, consolidation settlement of the foundation soils is anticipated that will induce downdrag loading on the foundation piles and impact existing utilities. It is our understanding that as part of the easement agreement between Caltrans and POLB, the subject structure is required to be designed to accommodate the future POLB development plans; therefore, the pile lengths need to be adjusted to account for the potential down drag loads imposed on the bridge foundation during the future development. Additionally, utilities in place prior to fill placement should be evaluated for differential settlement.

The subject Addendum is provided to describe the revisions that have been made to the axial pile calculations and specified pile tip elevations and also includes the revised Pile Data Table to be included on the Foundation Plan. Settlement estimates are also provided for existing and proposed utilities located within the footprint of the proposed fill.

Methodology: Since the future development is currently in preliminary design, the details of the development are subject to change as the design progresses. Since the magnitude of downdrag

load at each support can only be accurately determined when the configuration of the proposed fill is finalized, the largest anticipated downdrag load was estimated. Of the two bent locations, Bent 25 was found to be subject to the greatest downdrag loading because it has the highest pile cutoff elevation and therefore the greatest length of pile embedded in settling soil. The pile embedment at each bent is recommended to be increased by an amount that would accommodate the maximum estimated downdrag load plus a few additional feet (6 ft) to provide an allowance for changes in the proposed development plan that would potentially impose a larger downdrag load on the piles.

Settlement Analysis: Standard procedures were used to evaluate ground settlement of the underlying foundation soils due to fill placement. Generally, fills induce immediate and consolidation settlement of underlying soils. Immediate settlement occurs during grading and consolidation settlement occurs over varying time periods. Consolidation settlement (magnitude and time period) is directly related to the depth of fill placed over compressible soil and the thickness of compressible soil layers. Immediate settlement which is estimated to be negligible in this case occurs during grading or shortly thereafter, while consolidation settlement occurs over varying time periods.

Based on the future fill plans provided by POLB, between 3.5 and 4.0 ft of fill will be placed around Bents 25 to 26 of the subject structure. Using the idealized soil profile shown in Table 4 of the report, settlement analysis was performed assuming that a uniform fill with a height of 5 ft will be placed. Based on our calculations, the anticipated settlement of soils underlying the proposed fill is estimated to be about 2 inches and will extend down to about elevation -25 ft.

Static Downdrag: As described above, based on the site-specific soil borings, consolidation settlement of foundation soils is anticipated to extend down to about elevation -25 ft. Each 12 ft diameter CIDH pile supporting Bents 25 and 26 is proposed to have a permanent steel casing driven to between elevation -25 and -28 ft. The magnitude of the downdrag load between the pile cutoff elevation and elevation -25 ft was calculated according to recommendations by Tomlinson (1987) and API (2000).

Axial Pile Analysis: Driven steel shell capacities were calculated according to recommendations by Tomlinson (1987) and API (2000) for the portions of the pile between elevation -25 ft and the bottom of the steel casing. Axial CIDH pile analyses were performed using the computer program SHAFT 6.0 (Ensoft 2007).

The revised axial pile capacity calculation for Bent 25 is included in Attachment 1.

Recommendations: Based on the results of the above described evaluation, a maximum static downdrag load of approximately 380 kips is expected to be imposed on each pile. To support the downdrag load, an additional 10 ft of pile is required to obtain the required Nominal Resistance for the controlling limit state (Strength-1 Limit State). As described above, to provide for an allowance for design changes that could increase the static downdrag loads imposed on the piles, an additional 6 ft of pile embedment is recommended. The total pile length increase at each support is recommended to be 16 ft. The revised Foundation Recommendations for Bents (Table

9) and Pile Data Table (Table 10) in the Final Foundation Report is provided on the following page.

TABLE 9. FOUNDATION RECOMMENDATIONS FOR BENTS

Location	Pile Type	Cut-off El. (ft)	Service-I Limit State Load (kips) per Column	Total Permissible Support Settlement (inch)	Required Factored Nominal Resistance (kips)				Design Tip El. (ft)	Specified Tip El (ft)	Steel Casing Specified Tip El. (ft)	Steel Casing Nominal Driving Resistance Required (kips)
					Strength Limit		Extreme Event					
					Comp (φ= 0.7)	Tension (φ= 0.7)	Comp (φ= 1.0)	Tension (φ= 1.0)				
Bent 25	12 ft CIDH	0.0	3,278	1	4,545	0	2,460	0	-133 (a-I) -95 (a-II) -70 (c) -80 (d)	-133	-25	520
Bent 26	12 ft CIDH	-3.0	2,550	1	3,566	0	1,905	0	-118 (a-I) -95 (a-II) -77 (c) -83 (d)	-118	-28	510

Notes: 1. Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (a-II) Compression (Extreme Event Limit), (b) Tension, (c) Settlement, (d) Lateral Load.

2. The specified tip elevation shall not be raised.

3. Maximum static downdrag load is estimated to be 380 kips at El. -25 ft.

TABLE 10. PILE DATA TABLE

Support	Pile Type	Nominal Resistance (kip)		Nominal Resistance (Driven Steel Shell) (kip)		Steel Casing Specified Tip Elevation (ft)	CIDH Design Tip Elevation (ft)	CIDH Specified Tip Elevation (ft)	Steel Casing Nominal Driving Resistance Required (kips)
		Comp	Tens	Comp	Tens				
Bent 25	12 ft CIDH	6,490	0	520	0	-25	-133 (a) -70 (c) -80 (d)	-133	520
Bent 26	12 ft CIDH	5,090	0	510	0	-28	-118 (a) -77 (c) -83 (d)	-118	510
Abut 27	2.5 ft CIDH	460	0	NA	NA	NA	-74 (a) -56 (c) -49 (d)	-74	NA

Notes: 1. Design Tip Elevations are controlled by the following demands: (a) Compression, (b) Tension, (c) Settlement, and (d) Lateral Load.

2. The specified tip elevation shall not be raised.

3. Nominal Resistance for Bents 25-26 does NOT include the geotechnical (pile) resistance against 380 kips of static downdrag loading at El. -25 ft.

4. Compressive tip elevations for Bents 25 to 26 are controlled by Nominal Resistance plus the required geotechnical (pile) resistance against 380 kips of static downdrag loading at El. -25 ft.

Utilities: There are two existing storm drains near the proposed ramp structure and several storm drains proposed as part of the project that lie within the footprint of the future fill. Consolidation settlements up to 2 inches are estimated beneath a 5 ft tall embankment. Based upon fill plans provided by URS on December 16, 2010, the side slopes of the embankments are proposed to be inclined at a gradient of about 3:1 (Horizontal:Vertical). For utilities near the edge of the proposed fill crossing normal to the face of the embankment, differential settlement of about 1 inch over a length of about 25 ft are estimated.

This addendum should be attached to the front of the Final Foundation Report for the subject bridge, dated May 7, 2010.

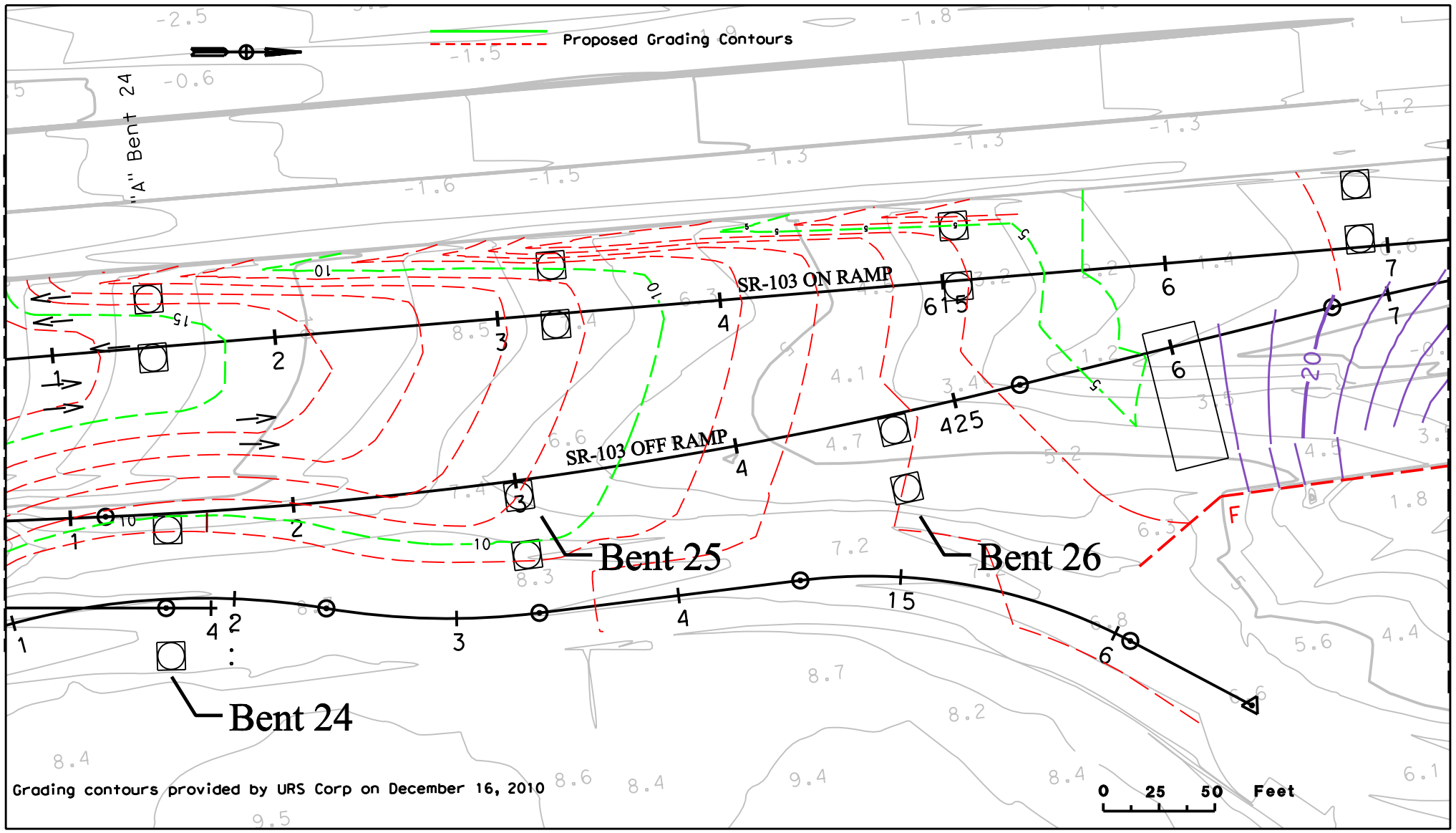
We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.

Patrick Wilson, PhD
Staff Engineer

Eric Brown, GE
Senior Engineer

(Arul) K. Arulmoli, PhD, GE
Project Manager



Earth Mechanics, Inc. Geotechnical & Earthquake Engineering	ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT	POLB Future Development Proposed Fill Plan SR-103 Street Off-Ramp
	Project No.: 06-123-03 Date: 12-15-10	Figure 1

ATTACHMENT

Analyses and Calculations

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

17660 Newhope Street, Suite E, Fountain Valley, CA 92708
(714) 751-3826, Fax (714) 751-3928

Project SR-103 OFF-RAMP - SOIL DEVELOPMENT Project No. 06-123

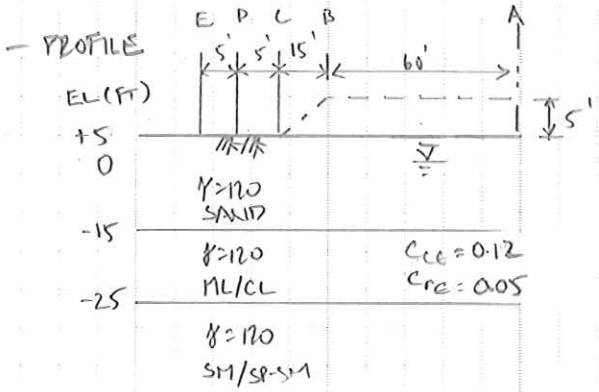
By ECR Date 12/13/10 Checked By _____ Date _____ Sheet 1 of 2

- BENEATH SR-103, FUTURE FILL TO BE PLACED AS PART OF POLB DEVELOPMENT
- APPX HEIGHT OF FILL AT EACH SUPPORT BASED ON GRADING PLANS AS SHOWN BELOW IN TABLE

	APPX EXIST GRADE (FT)		APPROX FUTURE GRADE (FT)		APPROX FILL HT (FT)	
	L	R	L	R	L	R
BENT 25	7	8	11	9.5	4	1.5
BENT 26	4.5	6	7	7	3.5	1

- MAX ANTICIPATED FILL HT @ BENT 25: 4 FT
- PERFORM SETTLEMENT CALCS BASED ON 5 FT OF FILL @ BENT 25
- EMBANKMENT SIDE SLOPES @ 3:1 (H:V)

- PROFILE



- SEE ATTACHED SPREADSHEETS FOR SETTLEMENT CALCS

Schuyler Heim Bridge Replacement Project

Prepared By: EB

SR-103 Off-Ramp

Utility Settlement - Future Fill

Ground Surface El. = 5 ft

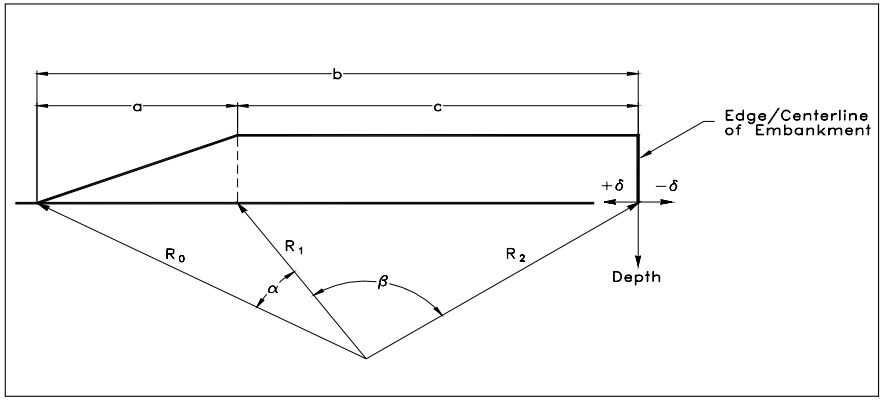
Groundwater El. = 0 ft

Top of Layer El. (ft)	Bot of Layer El. (ft)	Cre	Cce	OCR
-15	-25	0.01	0.10	1.05

Soil Layer	Mid Layer El. (ft)	Mid Layer Depth (ft)	Layer Thickness (ft)	Initial Stress Sigma 0 (ksf)	σ_p' (ksf)	Point A Delta Sig (ksf)	Point B Delta Sig (ksf)	Point C Delta Sig (ksf)	Point D Delta Sig (ksf)	Point E Delta Sig (ksf)		Estimated Settlements Below Pt A (in)	Below Pt B (in)	Below Pt C (in)	Below Pt D (in)	Below Pt E (in)
CL/ML	-17.5	22.5	5	1.608	1.688	0.592	0.412	0.187	0.128	0.086	#	0.70	0.48	0.17	0.09	0.02
CL/ML	-22.5	27.5	5	1.896	1.991	0.585	0.394	0.204	0.151	0.109	#	0.59	0.38	0.15	0.08	0.03
									Total Settlement (in):			1.29	0.86	0.32	0.17	0.05

Stress at Various Points Below an Earth Embankment

Equation of Stress Given Below (Poulos & Davis P. 40):



Variables Defined in Adjacent Figure
Soil Unit Weight = 120 PCF

NOTE: ONLY CHANGE VARIABLES IN HIGHLIGHTED CELLS

Embankment Height =	5	a =	15
Embankment Width (Top) =	60	b =	75
Side Slope Ratio (x:1) =	3	c =	60

Point A — Delta = 0

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
22.5	22.5	0.067314	1.212026	**0.29576**
27.5	27.5	0.078317	1.141034	**0.292709**

Point B — Delta = 60

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
22.5	64.08003	0.588003	1.212026	**0.40657**
27.5	66.00189	0.499347	1.141034	**0.385629**

Point C — Delta = 75

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
22.5	78.3023	0.588003	0.691337	**0.184601**
27.5	79.88273	0.499347	0.720005	**0.19924**

Point D — Delta = 80

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
22.5	83.10385	0.507973	0.569987	**0.126298**
27.5	84.59462	0.448943	0.610904	**0.146807**

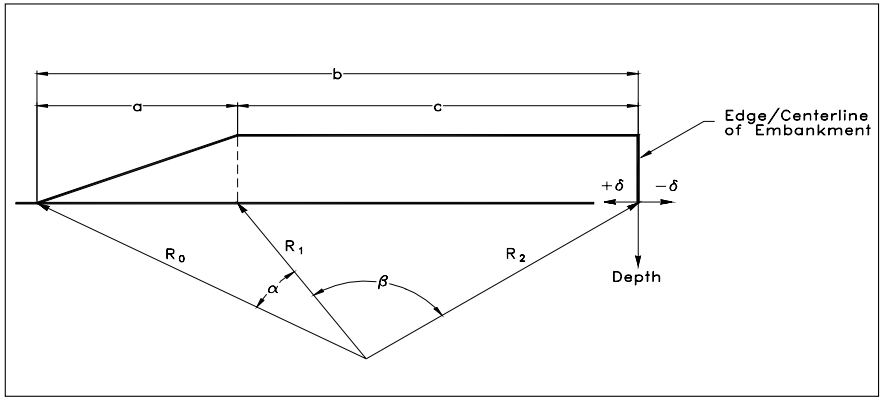
Point E — Delta = 85

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
22.5	87.92753	0.419757	0.474044	**0.084335**
27.5	89.33784	0.389044	0.52008	**0.105728**

SPREADSHEET # 1

Stress at Various Points Below an Earth Embankment

Equation of Stress Given Below (Poulos & Davis P. 40):



Variables Defined in Adjacent Figure
Soil Unit Weight = 120 PCF

NOTE: ONLY CHANGE VARIABLES IN HIGHLIGHTED CELLS

Embankment Height =	5	a =	15
Embankment Width (Top) =	60	b =	75
Side Slope Ratio (x:1) =	3	c =	60

Point A — Delta 0

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
22.5	22.5	0.067314	1.212026	**0.29576**
27.5	27.5	0.078317	1.141034	**0.292709**

Point B — Delta -60

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
22.5	64.08003	0.020199	0.173423	**0.005051**
27.5	66.00189	0.024323	0.204485	**0.008522**

Point C — Delta -75

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
22.5	78.3023	0.016259	0.126308	**0.00261**
27.5	79.88273	0.019634	0.150491	**0.004512**

Point D — Delta -80

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
22.5	83.10385	0.015197	0.114816	**0.002143**
27.5	84.59462	0.018367	0.137137	**0.003725**

Point E — Delta -85

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
22.5	87.92753	0.014236	0.104826	**0.001777**
27.5	89.33784	0.017217	0.125472	**0.003103**

SPREADSHEET # 1

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

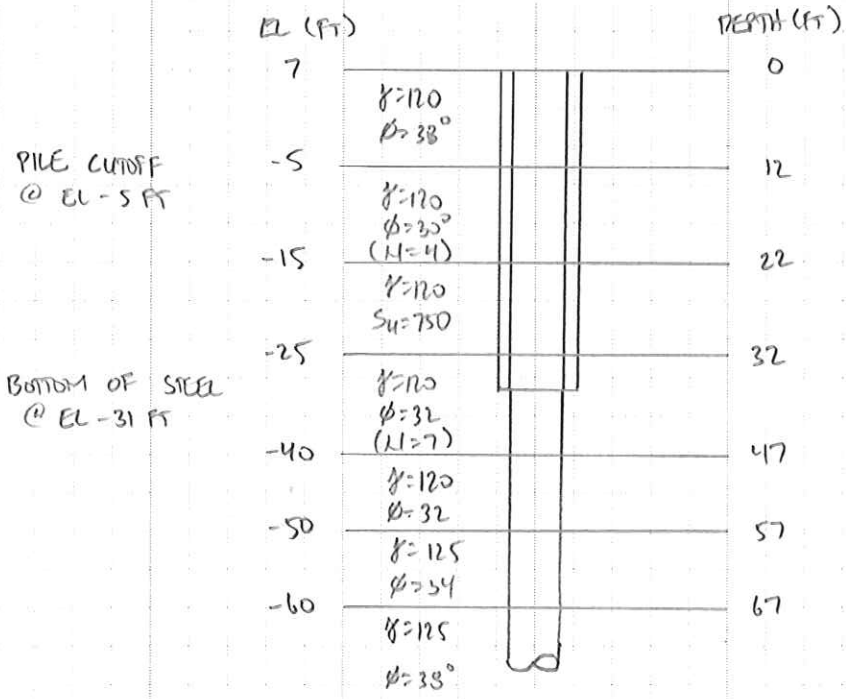
17660 Newhope Street, Suite E, Fountain Valley, CA 92708
(714) 751-3826, Fax (714) 751-3928

Project SR-103 OFF-RAMP - STATIC DOWNDRAG Project No. 06-123

By ECB Date 12/10/10 Checked By _____ Date _____ Sheet 2 of 2

- MOST CONSERVATIVE PROFILE IS AT BENT 25 WHICH HAS HIGHEST CUTOFF ELEV, THEREFORE GREATEST DOWNDRAG

- BENT 25 PROFILE



* NOTE - USE EXISTING GRADE FOR NEW CALCS SO DRIVEN STEEL AND SHAFT CALCS CAN BE SAME FROM PREVIOUS RUN, ALSO WILL BE CONSERVATIVE

- FROM DRIVEN PIPE CALCS, Q_s @ EL -25 FT = 187^T

- NOMINAL DEMAND FROM STRUCTURAL DESIGNERS = 2273^T

- REQ'D NOMINAL PILE RESISTANCE = $2273^T/0.7 + 187^T = 3434^T$

- MAX TIP RESISTANCE (20% OF STRUCTURAL DEMAND) = $0.2 \times 2273^T/0.7 = 649^T$

- SKIN FROM STEEL (FROM EL -25 FT TO -31 FT) = $260^T - 187^T = 73^T$

- REQ'D SKIN FROM SHAFT OUTPUT = $3434^T - 649^T - 73^T = 2712^T$

- REQ'D CIDH PILE LENGTH FROM SHAFT OUTPUT = 134 FT = 122 FT LONG PILE

- REQ'D PILE LENGTH FROM PREVIOUS CALC NOT CONSIDERING FILL & STATIC DOWNDRAG = 112 FT

- ADD'L PILE LENGTH REQ'D DUE TO STATIC DOWNDRAG = 10 FT

- CONSERVATIVELY ADD 16 FT OF PILE @ EACH BENT FROM PREVIOUS LENGTH

DRIVEN STEEL CASING DRIVING RESISTANCE CALCULATIONS
Schuyler Heim Bridge Project - SR-103 Off-Ramp Bent 25

E.Brown

12/21/2010 2:23 PM

06-123-03

FILE NAME: Axial.xls

BORING PROFILE:

SKIN FRICTION IN SAND

Qs = Ks x tan (d x Ø) x (P x L) x Sv

WHERE: Svo = average effective overburden pressure
P = pile perimeter (feet)
L = pile length in soil layer (ft
Ks = Coefficient of horizontal soil stres
Ø = friction angle of the soi
d = ratio of interface angle of friction to soi angle of friction (for smooth concrete/soi or smooth steel/soil interface

Pile Size (inches)

	Steel Casing 13' x 1" thick		
Perim (feet)	40.84		
Area (sq. ft)	3.38		
Ks	0.8		
d	0.6		

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb

Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION, END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

Qs = alpha x c x P x L

WHERE: alpha = adhesion factor (See chart below
c = cohesion (tons/sq. feet)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf , alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb

Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:

1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagon
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and s
3) Design procedure follows API Recommended Practice, 200

-5 ft = top of pile el. 7 ft = top of ground el. 5 ft = water table el.

12' Diameter Steel Casing

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N_{SPT})	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
5	7	5	SAND	120		33	0.0	2	1.0	0.06	2	-10	0.12	35	0.0	76.8	0.0	0.0	270.4	0	0	0
3	5	3	SAND	120		33	0.0	2	3.0	0.15	4	-8	0.18	35	0.0	76.8	0.0	0.0	270.4	0	0	0
1	3	1	SAND	120		33	0.0	2	5.0	0.21	6	-6	0.24	35	0.0	76.8	0.0	0.0	270.4	0	0	0
-1	1	-1	SAND	120		33	0.0	2	7.0	0.26	8	-4	0.29	35	0.0	76.8	0.0	0.0	270.4	0	0	0
-3	-1	-3	SAND	120		33	0.0	2	9.0	0.32	10	-2	0.35	35	0.0	76.8	0.0	0.0	270.4	0	0	0
-5	-3	-5	SAND	120		33	0.0	2	11.0	0.38	12	0	0.41	35	0.0	76.8	0.0	0.0	270.4	0	0	0
-8	-5	-8	SAND	120		30	0.0	3	13.5	0.45	15	3	0.49	21	14.4	104.1	14.4	35.1	169.0	49	25	8
-10	-8	-10	SAND	120		30	0.0	2	16.0	0.52	17	5	0.55	21	11.1	69.4	25.5	39.2	169.0	65	32	14
-12	-10	-12	SAND	120		30	0.0	2	18.0	0.58	19	7	0.61	21	12.3	69.4	37.8	43.3	169.0	81	41	21
-13	-12	-13	SAND	120		30	0.0	1	19.5	0.62	20	8	0.64	21	6.6	34.7	44.4	45.3	169.0	90	45	25
-14	-13	-14	SAND	120		30	0.0	1	20.5	0.65	21	9	0.67	21	6.9	34.7	51.4	47.4	169.0	99	49	29
-15	-14	-15	SAND	120		30	0.0	1	21.5	0.68	22	10	0.70	21	7.2	34.7	58.6	49.4	169.0	108	54	33
-16	-15	-16	CLAY	120		0	0.4	1	22.5	0.71	23	11	0.72	9	12.9	12.9	71.5	10.6	10.6	82	41	43
-17	-16	-17	CLAY	120		0	0.4	1	23.5	0.74	24	12	0.75	9	12.9	12.9	84.3	10.6	10.6	95	47	53
-18	-17	-18	CLAY	120		0	0.4	1	24.5	0.77	25	13	0.78	9	12.9	12.9	97.2	10.6	10.6	108	54	64
-19	-18	-19	CLAY	120		0	0.4	1	25.5	0.80	26	14	0.81	9	12.9	12.9	110.1	10.6	10.6	121	60	74
-20	-19	-20	CLAY	120		0	0.4	1	26.5	0.83	27	15	0.84	9	12.9	12.9	122.9	10.6	10.6	134	67	84
-21	-20	-21	CLAY	120		0	0.4	1	27.5	0.85	28	16	0.87	9	12.9	12.9	135.8	10.6	10.6	146	73	95
-22	-21	-22	CLAY	120		0	0.4	1	28.5	0.88	29	17	0.90	9	12.9	12.9	148.7	10.6	10.6	159	80	105
-23	-22	-23	CLAY	120		0	0.4	1	29.5	0.91	30	18	0.93	9	12.9	12.9	161.5	10.6	10.6	172	86	115
-24	-23	-24	CLAY	120		0	0.4	1	30.5	0.94	31	19	0.96	9	12.9	12.9	174.4	10.6	10.6	185	93	125
-25	-24	-25	CLAY	120		0	0.4	1	31.5	0.97	32	20	0.98	9	12.9	12.9	187.2	10.6	10.6	198	99	136
-26	-25	-26	SAND	120		32	0.0	1	32.5	1.00	33	21	1.01	30	11.4	37.2	198.6	103.8	236.6	302	151	142
-27	-26	-27	SAND	120		32	0.0	1	33.5	1.03	34	22	1.04	30	11.7	37.2	210.3	106.8	236.6	317	159	149
-28	-27	-28	SAND	120		32	0.0	1	34.5	1.06	35	23	1.07	30	12.0	37.2	222.3	109.7	236.6	332	166	155
-29	-28	-29	SAND	120		32	0.0	1	35.5	1.08	36	24	1.10	30	12.3	37.2	234.6	112.7	236.6	347	174	162
-30	-29	-30	SAND	120		32	0.0	1	36.5	1.11	37	25	1.13	30	12.7	37.2	247.3	115.7	236.6	363	181	169
-31	**-30**	**-31**	**SAND**	**120**		**32**	**0.0**	**1**	**37.5**	**1.14**	**38**	**26**	**1.16**	**30**	**13.0**	**37.2**	**260.3**	**118.6**	**236.6**	**379**	**189**	**177**
-32	-31	-32	SAND	120		32	0.0	1	38.5	1.17	39	27	1.19	30	13.3	37.2	273.6	121.6	236.6	395	198	184
-33	-32	-33	SAND	120		32	0.0	1	39.5	1.20	40	28	1.21	30	13.7	37.2	287.3	124.5	236.6	412	206	192

VERTICALLY LOADED DRILLED SHAFT ANALYSIS PROGRAM SHAFT
VERSION 6 (C)COPYRIGHT ENSOFT,INC.1989,1995,1998,2001,2003,2007

SR-103 Off-Ramp, Bent - Strength Limit State

PROPOSED DEPTH = 180.0 FT

NUMBER OF LAYERS = 7

WATER TABLE DEPTH = 3.0 FT.

FACTOR OF SAFETY APPLIED TO THE TOTAL ULTIMATE CAPACITY = 1.43

FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE CAPACITY = 2.22

SOIL INFORMATION

LAYER NO 1----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.120E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.330E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.103E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.330E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.120E+02

LAYER NO 2----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.275E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.400E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.120E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.400E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.220E+02

LAYER NO 3----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.820E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.700E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.220E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.700E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.320E+02

LAYER NO 4----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.344E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.700E+01
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.320E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.268E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.700E+01
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.470E+02

LAYER NO 5----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.574E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.180E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.470E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.481E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.180E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.570E+02

LAYER NO 6----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.481E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.400E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.570E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.395E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.400E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.670E+02

LAYER NO 7----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.395E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.700E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.670E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.700E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.300E+03

DRILLED SHAFT INFORMATION

DIAMETER OF STEM = 12.000 FT.
DIAMETER OF BASE = 12.000 FT.
END OF STEM TO BASE = 0.000 FT.
ANGLE OF BELL = 0.000 DEG.
IGNORED TOP PORTION = 38.000 FT.
IGNORED BOTTOM PORTION = 0.000 FT.
AREA OF ONE PERCENT STEEL = 162.881 SQ.IN.
ELASTIC MODULUS, Ec = 0.361E+07 LB/SQ IN

VOLUME OF UNDERREAM = 0.000 CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (FOR UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
QBD = TOTAL ALLOWABLE LOAD USING A FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE RESISTANCE;
QDN = TOTAL ALLOWABLE LOAD USING FACTORS OF SAFETY APPLIED TO THE ULTIMATE SIDE RESISTANCE AND THE ULTIMATE BASE RESISTANCE.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	QBD (TONS)	QDN (TONS)	QU/VOLUME (TONS/CU.YDS)
39.0	163.38	12.88	251.79	264.67	126.18	122.32	1.63
40.0	167.57	26.08	274.11	300.20	149.43	141.61	1.79
41.0	171.76	39.29	296.44	335.72	172.68	160.90	1.95
42.0	175.95	52.59	318.96	371.55	196.12	180.35	2.11
43.0	180.14	65.99	341.69	407.68	219.75	199.95	2.26
44.0	184.33	79.46	382.38	461.84	251.54	227.70	2.51
45.0	188.52	93.02	424.24	517.25	283.93	256.02	2.74
46.0	192.71	106.64	465.49	572.13	316.11	284.12	2.97
47.0	196.90	120.32	506.11	626.43	348.07	311.97	3.18
48.0	201.09	149.76	546.63	696.39	395.74	350.81	3.46
49.0	205.28	179.29	587.04	766.33	443.46	389.67	3.73
50.0	209.47	208.90	627.32	836.22	491.20	428.52	3.99
51.0	213.66	238.58	667.47	906.05	538.94	467.36	4.24
52.0	217.85	268.31	707.47	975.77	586.67	506.17	4.48
53.0	222.03	298.07	747.30	1045.37	634.36	544.93	4.71
54.0	226.22	327.86	786.96	1114.81	681.99	583.63	4.93
55.0	230.41	357.65	826.42	1184.07	729.54	622.24	5.14
56.0	234.60	387.43	862.85	1250.28	775.71	659.48	5.33
57.0	238.79	417.18	896.18	1313.37	820.47	695.31	5.50
58.0	242.98	446.95	927.70	1374.65	864.42	730.33	5.66
59.0	247.17	476.70	957.36	1434.06	907.52	764.50	5.80
60.0	251.36	506.43	985.15	1491.58	949.75	797.81	5.93
61.0	255.55	536.11	1011.02	1547.13	991.08	830.24	6.05
62.0	259.74	565.74	1034.95	1600.69	1031.47	861.74	6.16
63.0	263.93	595.29	1056.91	1652.20	1070.91	892.31	6.26
64.0	268.12	624.76	1076.86	1701.62	1109.35	921.91	6.35
65.0	272.31	654.12	1094.77	1748.89	1146.77	950.53	6.42
66.0	276.50	683.36	1110.62	1793.98	1183.15	978.13	6.49
67.0	280.69	712.47	1124.37	1836.84	1218.44	1004.69	6.54
68.0	284.87	741.43	1138.11	1879.54	1253.59	1031.15	6.60
69.0	289.06	770.23	1151.86	1922.08	1288.57	1057.49	6.65
70.0	293.25	798.84	1165.60	1964.45	1323.37	1083.71	6.70
71.0	297.44	827.27	1179.35	2006.62	1357.98	1109.79	6.75
72.0	301.63	855.48	1193.10	2048.58	1392.38	1135.73	6.79
73.0	305.82	883.48	1206.84	2090.32	1426.56	1161.51	6.84
74.0	310.01	911.24	1220.59	2131.82	1460.51	1187.12	6.88
75.0	314.20	938.74	1234.34	2173.08	1494.20	1212.56	6.92
76.0	318.39	965.99	1248.08	2214.07	1527.63	1237.82	6.95
77.0	322.58	992.95	1261.83	2254.78	1560.78	1262.88	6.99
78.0	326.77	1019.62	1275.57	2295.20	1593.64	1287.73	7.02
79.0	330.96	1045.99	1289.32	2335.31	1626.19	1312.38	7.06
80.0	335.15	1072.03	1303.07	2375.10	1658.42	1336.79	7.09
81.0	339.34	1097.74	1316.81	2414.56	1690.32	1360.98	7.12
82.0	343.53	1123.11	1330.56	2453.67	1721.87	1384.92	7.14
83.0	347.71	1148.11	1344.31	2492.42	1753.06	1408.61	7.17
84.0	351.90	1172.75	1358.05	2530.80	1783.87	1432.03	7.19
85.0	356.09	1196.99	1371.80	2568.79	1814.30	1455.19	7.21
86.0	360.28	1221.02	1385.54	2606.56	1844.52	1478.20	7.23
87.0	364.47	1245.34	1399.29	2644.63	1875.03	1501.41	7.26
88.0	368.66	1269.96	1413.04	2683.00	1905.84	1524.83	7.28
89.0	372.85	1294.88	1426.78	2721.66	1936.94	1548.46	7.30
90.0	377.04	1320.09	1440.53	2760.62	1968.33	1572.29	7.32
91.0	381.23	1345.59	1454.28	2799.87	2000.02	1596.33	7.34
92.0	385.42	1371.39	1468.02	2839.41	2032.01	1620.57	7.37
93.0	389.61	1397.49	1481.77	2879.26	2064.29	1645.02	7.39
94.0	393.80	1423.88	1495.51	2919.39	2096.87	1669.68	7.41
95.0	397.99	1450.56	1509.26	2959.82	2129.74	1694.55	7.44
96.0	402.18	1477.54	1523.01	3000.55	2162.90	1719.62	7.46
97.0	406.37	1504.82	1536.14	3040.96	2196.09	1744.62	7.48
98.0	410.55	1532.39	1548.65	3081.03	2229.29	1769.55	7.50
99.0	414.74	1560.25	1560.49	3120.75	2262.48	1794.38	7.52
100.0	418.93	1588.41	1571.65	3160.07	2295.67	1819.12	7.54
101.0	423.12	1616.87	1582.11	3198.98	2328.83	1843.74	7.56
102.0	427.31	1645.62	1591.84	3237.45	2361.95	1868.24	7.58
103.0	431.50	1674.66	1600.80	3275.47	2395.03	1892.61	7.59
104.0	435.69	1704.00	1608.99	3313.00	2428.06	1916.83	7.60
105.0	439.88	1733.64	1616.38	3350.02	2461.02	1940.90	7.62
106.0	444.07	1763.57	1622.93	3386.51	2493.90	1964.80	7.63
107.0	448.26	1793.80	1628.64	3422.43	2526.69	1988.53	7.63
108.0	452.45	1824.32	1633.46	3457.78	2559.38	2012.06	7.64
109.0	456.64	1855.13	1637.49	3492.62	2592.01	2035.44	7.65
110.0	460.83	1886.24	1640.78	3527.02	2624.60	2058.70	7.65
111.0	465.02	1917.65	1643.41	3561.06	2657.19	2081.87	7.66
112.0	469.21	1949.35	1645.46	3594.80	2689.81	2104.98	7.66
113.0	473.39	1981.34	1646.99	3628.34	2722.50	2128.07	7.66
114.0	477.58	2013.63	1648.09	3661.72	2755.28	2151.16	7.67
115.0	481.77	2046.22	1648.82	3695.04	2788.20	2174.30	7.67
116.0	485.96	2079.10	1649.26	3728.36	2821.27	2197.52	7.67
117.0	490.15	2112.28	1649.48	3761.75	2854.55	2220.84	7.67
118.0	494.34	2145.75	1649.55	3795.30	2888.05	2244.30	7.68
119.0	498.53	2179.51	1649.55	3829.06	2921.82	2267.93	7.68
120.0	502.72	2213.57	1649.55	3863.12	2955.88	2291.78	7.68
121.0	506.91	2247.93	1649.55	3897.48	2990.24	2315.82	7.69
122.0	511.10	2282.58	1649.55	3932.13	3024.89	2340.08	7.69
123.0	515.29	2317.53	1649.55	3967.08	3059.83	2364.54	7.70
124.0	519.48	2352.77	1649.55	4002.32	3095.07	2389.21	7.70

125.0	523.67	2388.30	1649.55	4037.85	3130.61	2414.08	7.71
126.0	527.86	2424.14	1649.55	4073.69	3166.44	2439.17	7.72
127.0	532.05	2460.26	1649.55	4109.81	3202.57	2464.45	7.72
128.0	536.23	2496.68	1649.55	4146.23	3238.99	2489.95	7.73
129.0	540.42	2533.40	1649.55	4182.95	3275.70	2515.65	7.74
130.0	544.61	2570.41	1649.55	4219.96	3312.72	2541.56	7.75
131.0	548.80	2607.72	1649.55	4257.27	3350.02	2567.67	7.76
132.0	552.99	2645.32	1649.55	4294.87	3387.62	2593.99	7.77
133.0	557.18	2683.21	1649.55	4332.76	3425.52	2620.52	7.78
134.0	561.37	2721.41	1649.55	4370.96	3463.71	2647.25	7.79
135.0	565.56	2759.89	1649.55	4409.44	3502.20	2674.19	7.80
136.0	569.75	2798.67	1649.55	4448.22	3540.98	2701.34	7.81
137.0	573.94	2837.75	1649.55	4487.30	3580.05	2728.69	7.82
138.0	578.13	2877.12	1649.55	4526.67	3619.43	2756.25	7.83
139.0	582.32	2916.79	1649.55	4566.34	3659.09	2784.02	7.84
140.0	586.51	2956.75	1649.55	4606.30	3699.05	2811.99	7.85
141.0	590.70	2997.01	1649.55	4646.56	3739.31	2840.17	7.87
142.0	594.89	3037.56	1649.55	4687.11	3779.86	2868.55	7.88
143.0	599.07	3078.40	1649.55	4727.95	3820.71	2897.15	7.89
144.0	603.26	3119.55	1649.55	4769.10	3861.85	2925.94	7.91
145.0	607.45	3160.98	1649.55	4810.53	3903.29	2954.95	7.92
146.0	611.64	3202.71	1649.55	4852.26	3945.02	2984.16	7.93
147.0	615.83	3244.74	1649.55	4894.29	3987.05	3013.58	7.95
148.0	620.02	3287.06	1649.55	4936.61	4029.37	3043.20	7.96
149.0	624.21	3329.68	1649.55	4979.23	4071.98	3073.03	7.98
150.0	628.40	3372.59	1649.55	5022.14	4114.90	3103.07	7.99
151.0	632.59	3415.80	1649.55	5065.35	4158.10	3133.32	8.01
152.0	636.78	3459.30	1649.55	5108.85	4201.61	3163.77	8.02
153.0	640.97	3503.10	1649.55	5152.65	4245.40	3194.42	8.04
154.0	645.16	3547.19	1649.55	5196.74	4289.49	3225.29	8.05
155.0	649.35	3591.58	1649.55	5241.13	4333.88	3256.36	8.07
156.0	653.54	3636.26	1649.55	5285.81	4378.56	3287.64	8.09
157.0	657.73	3681.24	1649.55	5330.79	4423.54	3319.12	8.10
158.0	661.91	3726.51	1649.55	5376.06	4468.81	3350.81	8.12
159.0	666.10	3772.08	1649.55	5421.63	4514.38	3382.70	8.14
160.0	670.29	3817.94	1649.55	5467.49	4560.24	3414.81	8.16
161.0	674.48	3864.09	1649.55	5513.64	4606.40	3447.12	8.17
162.0	678.67	3910.55	1649.55	5560.10	4652.85	3479.63	8.19
163.0	682.86	3957.29	1649.55	5606.84	4699.60	3512.36	8.21
164.0	687.05	4004.34	1649.55	5653.89	4746.64	3545.28	8.23
165.0	691.24	4051.67	1649.55	5701.22	4793.98	3578.42	8.25
166.0	695.43	4099.31	1649.55	5748.86	4841.61	3611.76	8.27
167.0	699.62	4147.23	1649.55	5796.78	4889.54	3645.31	8.29
168.0	703.81	4195.46	1649.55	5845.01	4937.76	3679.07	8.30
169.0	708.00	4243.97	1649.55	5893.52	4986.28	3713.03	8.32
170.0	712.19	4292.79	1649.55	5942.34	5035.09	3747.20	8.34
171.0	716.38	4341.89	1649.55	5991.44	5084.20	3781.57	8.36
172.0	720.57	4391.30	1649.55	6040.85	5133.60	3816.15	8.38
173.0	724.75	4440.99	1649.55	6090.54	5183.30	3850.94	8.40
174.0	728.94	4490.99	1649.55	6140.54	5233.29	3885.93	8.42
175.0	733.13	4541.27	1649.55	6190.82	5283.58	3921.13	8.44
176.0	737.32	4591.86	1649.55	6241.41	5334.16	3956.54	8.46
177.0	741.51	4642.73	1649.55	6292.28	5385.04	3992.15	8.49
178.0	745.70	4693.91	1649.55	6343.46	5436.21	4027.97	8.51
179.0	749.89	4745.38	1649.55	6394.92	5487.68	4064.00	8.53
180.0	754.08	4797.14	1649.55	6446.69	5539.44	4100.23	8.55

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

July 1, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum to "Final Foundation Report, New Dock Street Off-Ramp, Dated May 7, 2010", Bridge No. 53-3031, Los Angeles County, California, 7-LA-47, PM 3.74, EA 138201

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Foundation Report for the subject bridge, dated February 8, 2010, to Caltrans for review and comments. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the report and provided its comments in an email dated March 23, 2010. EMI incorporated the responses to Caltrans OGDS-1 comments into the Final Foundation Report, dated May 7, 2010 and submitted it to Caltrans. Caltrans OGDS-1 reviewed the Final Foundation Report and provided its comments in an email dated June 17, 2010.

EMI developed its responses to Caltrans comments, which were reviewed and accepted by OGDS-1. Caltrans review comments and EMI responses are included in Attachment 1.

Based on Caltrans review comments, the following change has been made to Settlement Monitoring Recommendation in Section 5.7.1 (Static Settlement) of the Final Foundation Report:

(1) The "Settlement Monitoring Recommendation" provided in the fourth paragraph of Section 5.7.1 (Static Settlement) in the Final Foundation Report has been revised as follows:

"Settlement Monitoring Recommendations: Based on our past experience, calculated settlements and settlement periods are usually approximations of actual field observations. Due to the variability of subsurface conditions and the thinly layered nature of deposits, it is recommended that settlement monitoring be conducted at the abutment. Surface settlement monuments, constructed in accordance with Caltrans Standard Plan Sheet A74 or equivalent, should be placed near the proposed abutment location and two other points selected by the Engineer. The settlement monuments should be installed in a timely manner upon completion of embankment construction. Special care should be exercised in the field to survey and protect these settlement devices. The monuments should be monitored at the time of installation, on a weekly basis for a month, and then once every 2 weeks thereafter until it has been verified by the Engineer that the remaining settlement for the embankment is acceptable. Settlement of the

embankment fill should be verified by the Engineer prior to installation of abutment piles to prevent a reduction in axial pile capacity due to downdrag loads being applied to the piles. The installation of abutment pile should not begin until the long-term residual settlement becomes ½-inch or less. However, waiting period for the installation of abutment piles can be modified based on field settlement measurements upon Engineer's approval."

This addendum should be attached to the front of the Final Foundation Report for the subject bridge, dated May 7, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.

Patrick Wilson, PhD
Staff Engineer

Eric Brown, GE
Senior Engineer

(Arul) K. Arulmoli, PhD, GE
Project Manager

ATTACHMENT

Attachment 1. Caltrans Comments and EMI Responses to Caltrans Comments on the Final Foundation Report for New Dock Street Off-Ramp (Bridge No. 53-3031), Dated May 7, 2010

ATTACHMENT 1

Caltrans Comments and EMI Responses to Caltrans Comments on the Final Foundation Report for New Dock Street Off-Ramp (Bridge No. 53-3031), Dated May 7, 2010

Subject: Review Comments for Ramp Structures
From: Haitao Liu <haitao_liu@dot.ca.gov>
Date: Thu, 17 Jun 2010 20:47:43 -0400
To: Arul Arulmoli <arulmoli@earthmech.com>
CC: Ranjan Gunaranjan <ranjan@earthmech.com>, Ae F Tern <ae_f_tern@dot.ca.gov>, Eric Brown <e.brown@earthmech.com>, Pat Wilson <P.Wilson@earthmech.com>

Hi Arul,

Just few minor items to discuss with you for those reports.

For all foundation reports (FR):

1) If possible, please update the final calculation volume, delete the unnecessary calculation/information.
2) If possible, please include in your future submittal or addendum, the L-Pile outputs and calculations for the lateral controlled pile tip.
3) Same comment as the one we made for the main bridge, for the abutments of all ramp structures, use end bearing to develop up to 20% of required axial resistance under extreme event (controlling limit state) in pile design. If design pile length reaches 30D limit, try to increase that percentage.
4) This item is just for your information only. For abutments, the group effect (or “shielding effect”) can be applied to reduce the effective down-drag load on each individual pile within pile group. The above load should be combined directly with the effective service load (group effect considered) for piles under group condition, instead of being divided by the group factor again to its original value.

For FR for SB SR-103 On-Ramp (BR53-3035S):

1) At Bent 25, the depth to steel cutoff is 43 ft according to calculation sheet "Revised Axial Pile Capacity for Strength limit State". However, in Shaft analysis, 39 ft was used as the "Ignored Top Portion", which is equivalent to the depth from FG to steel cut-off. Please revise the pile axial analysis, and the pile data table if necessary.

For FR for New Dock St. Off-Ramp (BR53-3031):

1) Please present settlement analysis in the calculation volume. The one shown in the report is for the on-ramp structure.

Please let me know if you have any question.

Best Regards,

Haitao Liu, P.E.

Transportation Engineer - Civil
Office of Geotechnical Design South - 1
Division of Engineering Services
Department of Transportation, California

5900 Folsom Blvd.
Sacramento, CA 95819
Office phone: (916) 227-0992
Cell phone: (916) 704-6519

New Dock Street Off Ramp (Bridge No. 53-3031)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 3.74	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
1			1) For the driving resistance of permanent casing, I think still it could be a good idea to include end bearing of the steel shell and friction resistance inside the casing as part of the nominal driving resistance. The rule of thumb estimate for the friction inside is usually 30% of outside friction. But this number could be off for quite a bit, considering the variation of the casing diameter and soil property (This comment was made on the Final Foundation Report for Schuyler Heim Bridge, which also applies to this structure).	Patrick Wilson (PW), Eric Brown (EB), K. Arul Arulmoli (KA)	A	Based on the latest plans provided, approximately 25-ft long permanent driven steel casings are proposed from the pile cut-off at the bents. However, the means and methods for installation of these permanent casings to be performed by the contractor are not specified in the plans. The installation of the steel casings is expected to be performed using center-relief driving method which would eliminate inside friction and undermine end bearing of the steel casings. Therefore, it is recommended to keep the lower-bound value of required nominal driving resistance for steel casings by estimating the resistance using outside skin friction only. It should be noted that the specified tip elevations for steel casings are not controlled by the nominal driving resistance estimated since the specified tip elevations shall not be raised as noted in the Pile Data Table (PDT). It was agreed that no changes will be made to the required nominal driving resistance for steel casings shown in the current PDT.	6/30/2010	
2			2) Section 5.7.1 (Settlement Monitoring Recommendation): Since the long-term residual settlement for the embankment could be a very difficult value to guess during construction, I would suggest using waiting period to control the timing for pile installation. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to leave some maneuverable space to whoever handle the issue (This comment was made on the Final Foundation Report for Schuyler Heim Bridge, which also applies to this structure).	PW / EB / KA	A	Will comply. EMI will incorporate the comment on the Settlement Monitoring Recommendation into the subject Final Foundation Report. The fourth paragraph in Section 5.7.1 (Static Settlement) of the Final Foundation Report will be revised. The above change to Section 5.7.1 will be documented in the Addendum to the Final Foundation Report for New Dock Street Off-Ramp Bridge.	6/30/2010	
3			3) If possible, please update the final calculation volume; delete the unnecessary calculation/information.	PW / EB / KA	A	Will comply. The necessary changes will be made to the Final Calculation Volume, Dated May 7, 2010 and the PDF copy of the Revised Final Calculation Volume will be submitted.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

New Dock Street Off Ramp (Bridge No. 53-3031)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 3.74	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
4			4) If possible, please include in your future submittal or addendum, the L-Pile outputs and calculations for the lateral controlled pile tip.	PW / EB / KA	A	Will comply. LPILE output files and calculations for design lateral controlled pile tip elevations will be provided and also be included in the Revised Final Calculation Volume. It should be noted that LPILE analyses were performed at selected abutment and bents to represent the entire project. The lateral controlled pile tip elevation can be estimated in several ways. Details of the procedure that was followed for estimating lateral pile tip elevations in this project and sample calculations will be included in the Revised Final Calculation Volume. A follow up comment was made by Caltrans OGDS-1 on June 22, 2010 regarding the procedure for estimating lateral controlled pile tip elevation. It was suggested that the lateral controlled pile tip elevation be estimated using plastic moment (or moment capacity) and corresponding maximum shear force at the bottom of the column. EMI will coordinate with Caltrans Structural Engineers to obtain necessary information and perform the requested analyses. Since the lateral controlled pile tip elevations do not control the design, it was agreed that no changes will be made to the design lateral controlled pile tip elevations shown in the current PDT.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

New Dock Street Off Ramp (Bridge No. 53-3031)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 3.74	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
5			5) Same comment as the one we made for the main bridge, for the abutments of all ramp structures, use end bearing to develop up to 20% of required axial resistance under extreme event (controlling limit state) in pile design. If design pile length reaches 30D limit, try to increase that percentage.	PW / EB / KA	A	Will comply. Based on our discussion, it was agreed that pile settlement is not considered to be a design issue during a design earthquake (extreme event) and since the abutment piles are small-diameter piles (i.e., 2.5-ft diameter piles), much higher percentage of end bearing is expected to be mobilized under extreme event. Therefore, the axial pile capacity of the abutment pile will be revised under extreme event condition by limiting only 20% of the required axial pile resistance for end bearing. For extreme event limit state, the required axial pile resistance is estimated by adding the negative skin friction (downdrag load) due to seismic settlement to the permanent load per pile under service limit state, considering pile group effects. The revised axial pile capacity calculation of the abutment pile under extreme event condition will be included in the Revised Final Calculation Volume. It should be noted that the design tip elevations for the abutment pile, presented in the current PDT, remain the same.	6/30/2010	
6			6) Please present settlement analysis in the calculation volume. The one shown in the report is for the on-ramp structure.	PW / EB / KA	A	Will comply. The settlement analysis for New Dock Street Off-Ramp structure will be included in the Revised Final Calculation Volume.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

July 1, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum to "Final Foundation Report, New Dock Street On-Ramp, Dated May 7, 2010", Bridge No. 53-3033, Los Angeles County, California, 7-LA-47, PM 3.74, EA 138201

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Foundation Report for the subject bridge, dated February 8, 2010, to Caltrans for review and comments. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the report and provided its comments in an email dated March 23, 2010. EMI incorporated the responses to Caltrans OGDS-1 comments into the Final Foundation Report, dated May 7, 2010 and submitted it to Caltrans. Caltrans OGDS-1 reviewed the Final Foundation Report and provided its comments in an email dated June 17, 2010.

EMI developed its responses to Caltrans comments, which were reviewed and accepted by OGDS-1. Caltrans review comments and EMI responses are included in Attachment 1.

Based on Caltrans review comments, the following change has been made to Settlement Monitoring Recommendation in Section 5.7.1 (Static Settlement) of the Final Foundation Report:

(1) The "Settlement Monitoring Recommendation" provided in the fourth paragraph of Section 5.7.1 (Static Settlement) in the Final Foundation Report has been revised as follows:

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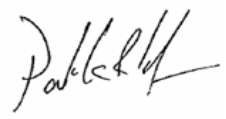
This addendum should be attached to the front of the Final Foundation Report for the subject bridge, dated May 7, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.



Patrick Wilson, PhD
Staff Engineer

Eric Brown, GE
Senior Engineer

(Arul) K. Arulmoli, PhD, GE
Project Manager

ATTACHMENT

Attachment 1. Caltrans Comments and EMI Responses to Caltrans Comments on the Final Foundation Report for New Dock Street On-Ramp (Bridge No. 53-3033), Dated May 7, 2010

ATTACHMENT 1

Caltrans Comments and EMI Responses to Caltrans Comments on the Final Foundation Report for New Dock Street On-Ramp (Bridge No. 53-3033), Dated May 7, 2010

Subject: Review Comments for Ramp Structures
From: Haitao Liu <haitao_liu@dot.ca.gov>
Date: Thu, 17 Jun 2010 20:47:43 -0400
To: Arul Arulmoli <arulmoli@earthmech.com>
CC: Ranjan Gunaranjan <ranjan@earthmech.com>, Ae F Tern <ae_f_tern@dot.ca.gov>, Eric Brown <e.brown@earthmech.com>, Pat Wilson <P.Wilson@earthmech.com>

Hi Arul,

Just few minor items to discuss with you for those reports.

For all foundation reports (FR):

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2) If possible, please include in your future submittal or addendum, the L-Pile outputs and calculations for the lateral controlled pile tip.
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4) This item is just for your information only. For abutments, the group effect (or “shielding effect”) can be applied to reduce the effective down-drag load on each individual pile within pile group. The above load should be combined directly with the effective service load (group effect considered) for piles under group condition, instead of being divided by the group factor again to its original value.

For FR for SB SR-103 On-Ramp (BR53-3035S):

1) At Bent 25, the depth to steel cutoff is 43 ft according to calculation sheet "Revised Axial Pile Capacity for Strength limit State". However, in Shaft analysis, 39 ft was used as the "Ignored Top Portion", which is equivalent to the depth from FG to steel cut-off. Please revise the pile axial analysis, and the pile data table if necessary.

For FR for New Dock St. Off-Ramp (BR53-3031):

1) Please present settlement analysis in the calculation volume. The one shown in the report is for the on-ramp structure.

Please let me know if you have any question.

Best Regards,

Haitao Liu, P.E.

Transportation Engineer - Civil
Office of Geotechnical Design South - 1
Division of Engineering Services
Department of Transportation, California

5900 Folsom Blvd.
Sacramento, CA 95819
Office phone: (916) 227-0992
Cell phone: (916) 704-6519

New Dock Street On Ramp (Bridge No. 53-3033)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 3.74	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
1			1) For the driving resistance of permanent casing, I think still it could be a good idea to include end bearing of the steel shell and friction resistance inside the casing as part of the nominal driving resistance. The rule of thumb estimate for the friction inside is usually 30% of outside friction. But this number could be off for quite a bit, considering the variation of the casing diameter and soil property (This comment was made on the Final Foundation Report for Schuyler Heim Bridge, which also applies to this structure).	Patrick Wilson (PW), Eric Brown (EB), K. Arul Arulmoli (KA)	A	Based on the latest plans provided, approximately 25-ft long permanent driven steel casings are proposed from the pile cut-off at the bents. However, the means and methods for installation of these permanent casings to be performed by the contractor are not specified in the plans. The installation of the steel casings is expected to be performed using center-relief driving method which would eliminate inside friction and undermine end bearing of the steel casings. Therefore, it is recommended to keep the lower-bound value of required nominal driving resistance for steel casings by estimating the resistance using outside skin friction only. It should be noted that the specified tip elevations for steel casings are not controlled by the nominal driving resistance estimated since the specified tip elevations shall not be raised as noted in the Pile Data Table (PDT). It was agreed that no changes will be made to the required nominal driving resistance for steel casings shown in the current PDT.	6/30/2010	
2			2) Section 5.7.1 (Settlement Monitoring Recommendation): Since the long-term residual settlement for the embankment could be a very difficult value to guess during construction, I would suggest using waiting period to control the timing for pile installation. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to leave some maneuverable space to whoever handle the issue (This comment was made on the Final Foundation Report for Schuyler Heim Bridge, which also applies to this structure).	PW / EB / KA	A	Will comply. EMI will incorporate the comment on the Settlement Monitoring Recommendation into the subject Final Foundation Report. The fourth paragraph in Section 5.7.1 (Static Settlement) of the Final Foundation Report will be revised. The above change to Section 5.7.1 will be documented in the Addendum to the Final Foundation Report for New Dock Street On-Ramp Bridge.	6/30/2010	
3			3) If possible, please update the final calculation volume; delete the unnecessary calculation/information.	PW / EB / KA	A	Will comply. The necessary changes will be made to the Final Calculation Volume, Dated May 7, 2010 and the PDF copy of the Revised Final Calculation Volume will be submitted.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

New Dock Street On Ramp (Bridge No. 53-3033)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 3.74	Reviewing Agency:	Caltrans		
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)		
Milestone:	Final Foundation Report	Review Date:	June 17, 2010		
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010		

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
4			4) If possible, please include in your future submittal or addendum, the L-Pile outputs and calculations for the lateral controlled pile tip.	PW / EB / KA	A	Will comply. LPILE output files and calculations for design lateral controlled pile tip elevations will be provided and also be included in the Revised Final Calculation Volume. It should be noted that LPILE analyses were performed at selected abutment and bents to represent the entire project. The lateral controlled pile tip elevation can be estimated in several ways. Details of the procedure that was followed for estimating lateral pile tip elevations in this project and sample calculations will be included in the Revised Final Calculation Volume. A follow up comment was made by Caltrans OGDS-1 on June 22, 2010 regarding the procedure for estimating lateral controlled pile tip elevation. It was suggested that the lateral controlled pile tip elevation be estimated using plastic moment (or moment capacity) and corresponding maximum shear force at the bottom of the column. EMI will coordinate with Caltrans Structural Engineers to obtain necessary information and perform the requested analyses. Since the lateral controlled pile tip elevations do not control the design, it was agreed that no changes will be made to the design lateral controlled pile tip elevations shown in the current PDT.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

New Dock Street On Ramp (Bridge No. 53-3033)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 3.74	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
5			5) Same comment as the one we made for the main bridge, for the abutments of all ramp structures, use end bearing to develop up to 20% of required axial resistance under extreme event (controlling limit state) in pile design. If design pile length reaches 30D limit, try to increase that percentage	PW / EB / KA	A	Will comply. Based on our discussion, it was agreed that pile settlement is not considered to be a design issue during a design earthquake (extreme event) and since the abutment piles are small-diameter piles (i.e., 2.5-ft diameter piles), much higher percentage of end bearing is expected to be mobilized under extreme event. Therefore, the axial pile capacity of the abutment pile will be revised under extreme event condition by limiting only 25% of the required axial pile resistance for end bearing. For extreme event limit state, the required axial pile resistance is estimated by adding the negative skin friction (downdrag load) due to seismic settlement to the permanent load per pile under service limit state, considering pile group effects. The revised axial pile capacity calculation of the abutment pile under extreme event condition will be included in the Revised Final Calculation Volume. It should be noted that the design tip elevations for the abutment pile, presented in the current PDT, remain the same.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

July 1, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum to "Final Foundation Report, SB SR 103 On-Ramp, Dated May 7, 2010", Bridge No. 53-3035S, Los Angeles County, California, 7-LA-47, PM 0.01, EA 138201

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Foundation Report for the subject bridge, dated February 8, 2010, to Caltrans for review and comments. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the report and provided its comments in an email dated March 23, 2010. EMI incorporated the responses to Caltrans OGDS-1 comments into the Final Foundation Report, dated May 7, 2010 and submitted it to Caltrans. Caltrans OGDS-1 reviewed the Final Foundation Report and provided its comments in an email dated June 17, 2010.

EMI developed its responses to Caltrans comments, which were reviewed and accepted by OGDS-1. Caltrans review comments and EMI responses are included in Attachment 1.

Based on Caltrans review comments, the following changes have been made to Settlement Monitoring Recommendation in Section 5.7.1 (Static Settlement) and Table 10 (Pile Data Table) of the Final Foundation Report:

(1) The "Settlement Monitoring Recommendation" provided in the fourth paragraph of Section 5.7.1 (Static Settlement) in the Final Foundation Report has been revised as follows:

"Settlement Monitoring Recommendations: Based on our past experience, calculated settlements and settlement periods are usually approximations of actual field observations. Due to the variability of subsurface conditions and the thinly layered nature of deposits, it is recommended that settlement monitoring be conducted at the abutment. Surface settlement monuments, constructed in accordance with Caltrans Standard Plan Sheet A74 or equivalent, should be placed near the proposed abutment location and two other points selected by the Engineer. The settlement monuments should be installed in a timely manner upon completion of embankment construction. Special care should be exercised in the field to survey and protect these settlement devices. The monuments should be monitored at the time of installation, on a weekly basis for a month, and then once every 2 weeks thereafter until it has been verified by the Engineer that the remaining settlement for the embankment is acceptable. Settlement of the

embankment fill should be verified by the Engineer prior to installation of abutment piles to prevent a reduction in axial pile capacity due to downdrag loads being applied to the piles. The installation of abutment pile should not begin until the long-term residual settlement becomes ½-inch or less. However, waiting period for the installation of abutment piles can be modified based on field settlement measurements upon Engineer's approval."

(2) Table 10 (Pile Data Table) in the Final Foundation Report has been revised as follows:

TABLE 10. PILE DATA TABLE

Support	Pile Type	Nominal Resistance (kip)		Nominal Resistance (Driven Steel Shell) (kip)		Steel Casing Specified Tip Elevation (ft)	CIDH Design Tip Elevation (ft)	CIDH Specified Tip Elevation (ft)	Steel Casing Nominal Driving Resistance Required (kips)
		Comp	Tens	Comp	Tens				
Bent 24	12 ft CIDH	8,070	0	690	0	-31	-135 (a) -85 (c) -86 (d)	-135	690
Bent 25	12 ft CIDH	5,780	0	660	0	-35	-114(a) -93 (c) -90 (d)	-114	660
Bent 26	12 ft CIDH	5,700	0	640	0	-41	-112 (a) -109 (c) -96 (d)	-112	640
Bent 27	12 ft CIDH	5,660	0	620	0	-44	-111 (a) -101 (c) -98 (d)	-111	620
Abut 28	2.5 ft CIDH	440	0	NA	NA	NA	-67 (a) -45 (c) -47 (d)	-67	NA

Notes: 1. Design Tip Elevations are controlled by the following demands: (a) Compression, (b) Tension, (c) Settlement, and (d) Lateral Load.

2. The specified tip elevation shall not be raised.

This addendum should be attached to the front of the Final Foundation Report for the subject bridge, dated May 7, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.

Patrick Wilson, PhD
Staff Engineer

Eric Brown, GE
Senior Engineer

(Arul) K. Arulmoli, PhD, GE
Project Manager

ATTACHMENT

Attachment 1. Caltrans Comments and EMI Responses to Caltrans Comments on the Final Foundation Report for SB SR 103 On-Ramp (Bridge No. 53-3035S), Dated May 7, 2010

ATTACHMENT 1

Caltrans Comments and EMI Responses to Caltrans Comments on the Final Foundation Report for SB SR 103 On-Ramp (Bridge No. 53-3035S), Dated May 7, 2010

Subject: Review Comments for Ramp Structures
From: Haitao Liu <haitao_liu@dot.ca.gov>
Date: Thu, 17 Jun 2010 20:47:43 -0400
To: Arul Arulmoli <arulmoli@earthmech.com>
CC: Ranjan Gunaranjan <ranjan@earthmech.com>, Ae F Tern <ae_f_tern@dot.ca.gov>, Eric Brown <e.brown@earthmech.com>, Pat Wilson <P.Wilson@earthmech.com>

Hi Arul,

Just few minor items to discuss with you for those reports.

For all foundation reports (FR):

1) If possible, please update the final calculation volume, delete the unnecessary calculation/information.
2) If possible, please include in your future submittal or addendum, the L-Pile outputs and calculations for the lateral controlled pile tip.
3) Same comment as the one we made for the main bridge, for the abutments of all ramp structures, use end bearing to develop up to 20% of required axial resistance under extreme event (controlling limit state) in pile design. If design pile length reaches 30D limit, try to increase that percentage.
4) This item is just for your information only. For abutments, the group effect (or “shielding effect”) can be applied to reduce the effective down-drag load on each individual pile within pile group. The above load should be combined directly with the effective service load (group effect considered) for piles under group condition, instead of being divided by the group factor again to its original value.

For FR for SB SR-103 On-Ramp (BR53-3035S):

1) At Bent 25, the depth to steel cutoff is 43 ft according to calculation sheet "Revised Axial Pile Capacity for Strength limit State". However, in Shaft analysis, 39 ft was used as the "Ignored Top Portion", which is equivalent to the depth from FG to steel cut-off. Please revise the pile axial analysis, and the pile data table if necessary.

For FR for New Dock St. Off-Ramp (BR53-3031):

1) Please present settlement analysis in the calculation volume. The one shown in the report is for the on-ramp structure.

Please let me know if you have any question.

Best Regards,

Haitao Liu, P.E.

Transportation Engineer - Civil
Office of Geotechnical Design South - 1
Division of Engineering Services
Department of Transportation, California

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SB SR 103 On Ramp (Bridge No. 53-3035S)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 0.01	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
1			1) For the driving resistance of permanent casing, I think still it could be a good idea to include end bearing of the steel shell and friction resistance inside the casing as part of the nominal driving resistance. The rule of thumb estimate for the friction inside is usually 30% of outside friction. But this number could be off for quite a bit, considering the variation of the casing diameter and soil property (This comment was made on the Final Foundation Report for Schuyler Heim Bridge, which also applies to this structure).	Patrick Wilson (PW), Eric Brown (EB), K. Arul Arulmoli (KA)	A	Based on the latest plans provided, approximately 25-ft long permanent driven steel casings are proposed from the pile cut-off at the bents. However, the means and methods for installation of these permanent casings to be performed by the contractor are not specified in the plans. The installation of the steel casings is expected to be performed using center-relief driving method which would eliminate inside friction and undermine end bearing of the steel casings. Therefore, it is recommended to keep the lower-bound value of required nominal driving resistance for steel casings by estimating the resistance using outside skin friction only. It should be noted that the specified tip elevations for steel casings are not controlled by the nominal driving resistance estimated since the specified tip elevations shall not be raised as noted in the Pile Data Table (PDT). It was agreed that no changes will be made to the required nominal driving resistance for steel casings shown in the current PDT.	6/30/2010	
2			2) Section 5.7.1 (Settlement Monitoring Recommendation): Since the long-term residual settlement for the embankment could be a very difficult value to guess during construction, I would suggest using waiting period to control the timing for pile installation. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to leave some maneuverable space to whoever handle the issue (This comment was made on the Final Foundation Report for Schuyler Heim Bridge, which also applies to this structure).	PW / EB / KA	A	Will comply. EMI will incorporate the comment on the Settlement Monitoring Recommendation into the subject Final Foundation Report. The fourth paragraph in Section 5.7.1 (Static Settlement) of the Final Foundation Report will be revised. The above change to Section 5.7.1 will be documented in the Addendum to the Final Foundation Report for SB SR 103 On-Ramp Bridge.	6/30/2010	
3			3) If possible, please update the final calculation volume; delete the unnecessary calculation/information.	PW / EB / KA	A	Will comply. The necessary changes will be made to the Final Calculation Volume, Dated May 7, 2010 and the PDF copy of the Revised Final Calculation Volume will be submitted.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

SB SR 103 On Ramp (Bridge No. 53-3035S)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 0.01	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
4			4) If possible, please include in your future submittal or addendum, the L-Pile outputs and calculations for the lateral controlled pile tip.	PW / EB / KA	A	Will comply. LPILE output files and calculations for design lateral controlled pile tip elevations will be provided and also be included in the Revised Final Calculation Volume. It should be noted that LPILE analyses were performed at selected abutment and bents to represent the entire project. The lateral controlled pile tip elevation can be estimated in several ways. Details of the procedure that was followed for estimating lateral pile tip elevations in this project and sample calculations will be included in the Revised Final Calculation Volume. A follow up comment was made by Caltrans OGDS-1 on June 22, 2010 regarding the procedure for estimating lateral controlled pile tip elevation. It was suggested that the lateral controlled pile tip elevation be estimated using plastic moment (or moment capacity) and corresponding maximum shear force at the bottom of the column. EMI will coordinate with Caltrans Structural Engineers to obtain necessary information and perform the requested analyses. Since the lateral controlled pile tip elevations do not control the design, it was agreed that no changes will be made to the design lateral controlled pile tip elevations shown in the current PDT.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

SB SR 103 On Ramp (Bridge No. 53-3035S)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 0.01	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 17, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	June 30, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
5			5) Same comment as the one we made for the main bridge, for the abutments of all ramp structures, use end bearing to develop up to 20% of required axial resistance under extreme event (controlling limit state) in pile design. If design pile length reaches 30D limit, try to increase that percentage.	PW / EB / KA	A	Will comply. Based on our discussion, it was agreed that pile settlement is not considered to be a design issue during a design earthquake (extreme event) and since the abutment piles are small-diameter piles (i.e., 2.5-ft diameter piles), much higher percentage of end bearing is expected to be mobilized under extreme event. Therefore, the axial pile capacity of the abutment pile will be revised under extreme event condition by limiting only 20% of the required axial pile resistance for end bearing. For extreme event limit state, the required axial pile resistance is estimated by adding the negative skin friction (downdrag load) due to seismic settlement to the permanent load per pile under service limit state, considering pile group effects. The revised axial pile capacity calculation of the abutment pile under extreme event condition will be included in the Revised Final Calculation Volume. The revised PDT will be included in the Addendum to the Final Foundation Report for SB SR 103 On-Ramp Bridge.	6/30/2010	
6			6) At Bent 25, the depth to steel cutoff is 43 ft according to calculation sheet "Revised Axial Pile Capacity for Strength limit State". However, in Shaft analysis, 39 ft was used as the "Ignored Top Portion", which is equivalent to the depth from FG to steel cut-off. Please revise the pile axial analysis, and the pile data table if necessary.	PW / EB / KA	A	Will comply. The revised axial pile capacity calculation for Bent 25 will be included in the Revised Final Calculation Volume. The revised PDT will be included in the Addendum to the Final Foundation Report for SB SR 103 On-Ramp Bridge.	6/30/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

December 21, 2010

EMI Project No. 06-123-06

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum 2 to "Final Foundation Report, SB SR 103 On-Ramp, Dated May 7, 2010", Bridge No. 53-3035S, Los Angeles County, California, 7-LA-47, PM 0.01, EA 238501

Dear Mr. Hersh:

As you are aware, Earth Mechanics, Inc. (EMI) submitted the Final Foundation Report for the subject bridge dated May 7, 2010. An addendum to the Final Foundation Report was prepared dated July 1, 2010 describing minor revisions to the report necessitated by a second round of review comments received from Caltrans. The subject Addendum has been prepared to address revisions to the Final Foundation Report necessitated due to project development after Addendum 1 was issued.

As part of the Port of Long Beach (POLB) future development plans, the Pier A Backland will be expanded below the proposed SB SR 103 On-Ramp. The expansion will include placement of up to 4.5 ft of fill near Bents 24 to 27 to provide a level backland at about elevation +15 ft to the south of the subject structure. The proposed fill plan in the vicinity of the subject structure is shown in Figure 1.

As a result of fill placement, consolidation settlement of the foundation soils is anticipated that will induce downdrag loading on the foundation piles. It is our understanding that as part of the easement agreement between Caltrans and POLB, the subject structure is required to be designed to accommodate the future POLB development plans; therefore, the pile lengths need to be adjusted to account for the potential down drag loads imposed on the bridge foundation during the future development. Additionally, utilities in place prior to fill placement should be evaluated for differential settlement.

The subject Addendum is provided to describe the revisions that have been made to the axial pile calculations and specified pile tip elevations and also includes the revised Pile Data Table to be included on the Foundation Plan. Settlement estimates are also provided for existing and proposed utilities located within the footprint of the proposed fill.

Methodology: Since the future development is currently in preliminary design, the details of the development are subject to change as the design progresses. Since the magnitude of downdrag

load at each support can only be accurately determined when the configuration of the proposed fill is finalized, the largest anticipated downdrag load was estimated. Of the four bent locations, Bent 24 was found to be subject to the greatest downdrag loading because it has the highest pile cutoff elevation and therefore the greatest length of pile embedded in settling soil. The pile embedment at each bent is recommended to be increased by an amount that would accommodate the maximum estimated downdrag load plus a few additional feet (5 ft) to provide an allowance for changes in the proposed development plan that would potentially impose a larger downdrag load on the piles.

Settlement Analysis: Standard procedures were used to evaluate ground settlement of the underlying foundation soils due to fill placement. Generally, fills induce immediate and consolidation settlement of underlying soils. Immediate settlement occurs during grading and consolidation settlement occurs over varying time periods. Consolidation settlement (magnitude and time period) is directly related to the depth of fill placed over compressible soil and the thickness of compressible soil layers. Immediate settlement which is estimated to be negligible in this case occurs during grading or shortly thereafter, while consolidation settlement occurs over varying time periods.

Based on the future fill plans provided by POLB, between 2.5 and 4.5 ft of fill will be placed around Bents 24 to 27 of the subject structure. Using the idealized soil profile shown in Table 4 of the report, settlement analysis was performed assuming that a uniform fill with a height of 5 ft will be placed. Based on our calculations, the anticipated settlement of soils underlying the proposed fill is estimated to be about 3 inches and will extend down to about elevation -23 ft.

Static Downdrag: As described above, based on the site-specific soil borings, consolidation settlement of foundation soils is anticipated to extend down to about elevation -23 ft. Each 12 ft diameter CIDH pile supporting Bents 24 to 27 is proposed to have a permanent steel casing driven to between elevation -31 and -44 ft. The magnitude of the downdrag load between the pile cutoff elevation and elevation -23 ft was calculated according to recommendations by Tomlinson (1987) and API (2000).

Axial Pile Analysis: Driven steel shell capacities were calculated according to recommendations by Tomlinson (1987) and API (2000) for the portions of the pile between elevation -23 ft and the bottom of the steel casing. Axial CIDH pile analyses were performed using the computer program SHAFT 6.0 (Ensoft 2007).

The revised axial pile capacity calculation for Bent 24 is included in Attachment 1.

Recommendations: Based on the results of the above described evaluation, a maximum static downdrag load of approximately 460 kips is expected to be imposed on each pile. To support the downdrag load, an additional 11 ft of pile is required to obtain the required Nominal Resistance for the controlling limit state (Strength-1 Limit State). As described above, to provide for an allowance for design changes that could increase the static downdrag loads imposed on the piles, an additional 5 ft of pile embedment is recommended. The total pile length increase at each support is recommended to be 16 ft. The revised Foundation Recommendations for Bents (Table

9) and Pile Data Table (Table 10) in the Final Foundation Report is provided on the following page.

TABLE 9. FOUNDATION RECOMMENDATIONS FOR BENTS

Location	Pile Type	Cut-off El. (ft)	Service-I Limit State Load (kips) per Column	Total Permissible Support Settlement (inch)	Required Factored Nominal Resistance (kips)				Design Tip El. (ft)	Specified Tip El (ft)	Steel Casing Specified Tip El. (ft)	Steel Casing Nominal Driving Resistance Required (kips)
					Strength Limit		Extreme Event					
					Comp (φ= 0.7)	Tension (φ= 0.7)	Comp (φ= 1.0)	Tension (φ= 1.0)				
Bent 24	12 ft CIDH	-5.5	4,092	1	5,650	0	3,107	0	-151 (a-I) -110 (a-II) -85 (c) -86 (d)	-151	-31	690
Bent 25	12 ft CIDH	-9.5	2,915	1	4,049	0	2,189	0	-130 (a-I) -103 (a-II) -93 (c) -90 (d)	-130	-35	660
Bent 26	12 ft CIDH	-15.5	2,882	1	3,991	0	2,189	0	-128 (a-I) -106 (a-II) -109 (c) -96 (d)	-128	-41	640
Bent 27	12 ft CIDH	-18.3	2,823	1	3,959	0	2,088	0	-127 (a-I) -107 (a-II) -101 (c) -98 (d)	-127	-44	620

Notes: 1. Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (a-II) Compression (Extreme Event Limit), (b) Tension, (c) Settlement, (d) Lateral Load.

2. The specified tip elevation shall not be raised.

3. Maximum static downdrag load is estimated to be 460 kips at El. -23 ft.

TABLE 10. PILE DATA TABLE

Support	Pile Type	Nominal Resistance (kip)		Nominal Resistance (Driven Steel Shell) (kip)		Steel Casing Specified Tip Elevation (ft)	CIDH Design Tip Elevation (ft)	CIDH Specified Tip Elevation (ft)	Steel Casing Nominal Driving Resistance Required (kips)
		Comp	Tens	Comp	Tens				
Bent 24	12 ft CIDH	8,070	0	690	0	-31	-151 (a) -85 (c) -86 (d)	-151	690
Bent 25	12 ft CIDH	5,780	0	660	0	-35	-130 (a) -93 (c) -90 (d)	-130	660
Bent 26	12 ft CIDH	5,700	0	640	0	-41	-128 (a) -109 (c) -96 (d)	-128	640
Bent 27	12 ft CIDH	5,660	0	620	0	-44	-127 (a) -101 (c) -98 (d)	-127	620
Abut 28	2.5 ft CIDH	440	0	NA	NA	NA	-67 (a) -45 (c) -47 (d)	-67	NA

Notes: 1. Design Tip Elevations are controlled by the following demands: (a) Compression, (b) Tension, (c) Settlement, and (d) Lateral Load.

2. The specified tip elevation shall not be raised.

3. Nominal Resistance for Bents 24-27 does NOT include the geotechnical (pile) resistance against 460 kips of static downdrag loading at El. -23 ft.

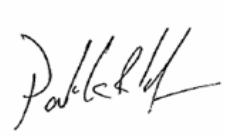
4. Compressive tip elevations for Bents 24 to 27 are controlled by Nominal Resistance plus the required geotechnical (pile) resistance against 460 kips of static downdrag loading at El. -23 ft.

Utilities: There are two existing storm drains near the proposed ramp structure and several storm drains proposed as part of the project that lie within the footprint of the future fill. Consolidation settlements up to about 3 inches are estimated beneath a 5 ft tall embankment. Based upon fill plans provided by URS on December 16, 2010, the side slopes of the embankments are proposed to be inclined at a gradient of about 3:1 (Horizontal:Vertical). For utilities near the edge of the proposed fill crossing normal to the face of the embankment, differential settlement of about 1.5 inches over a length of about 25 ft are estimated.

This addendum should be attached to the front of the Final Foundation Report for the subject bridge, dated May 7, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

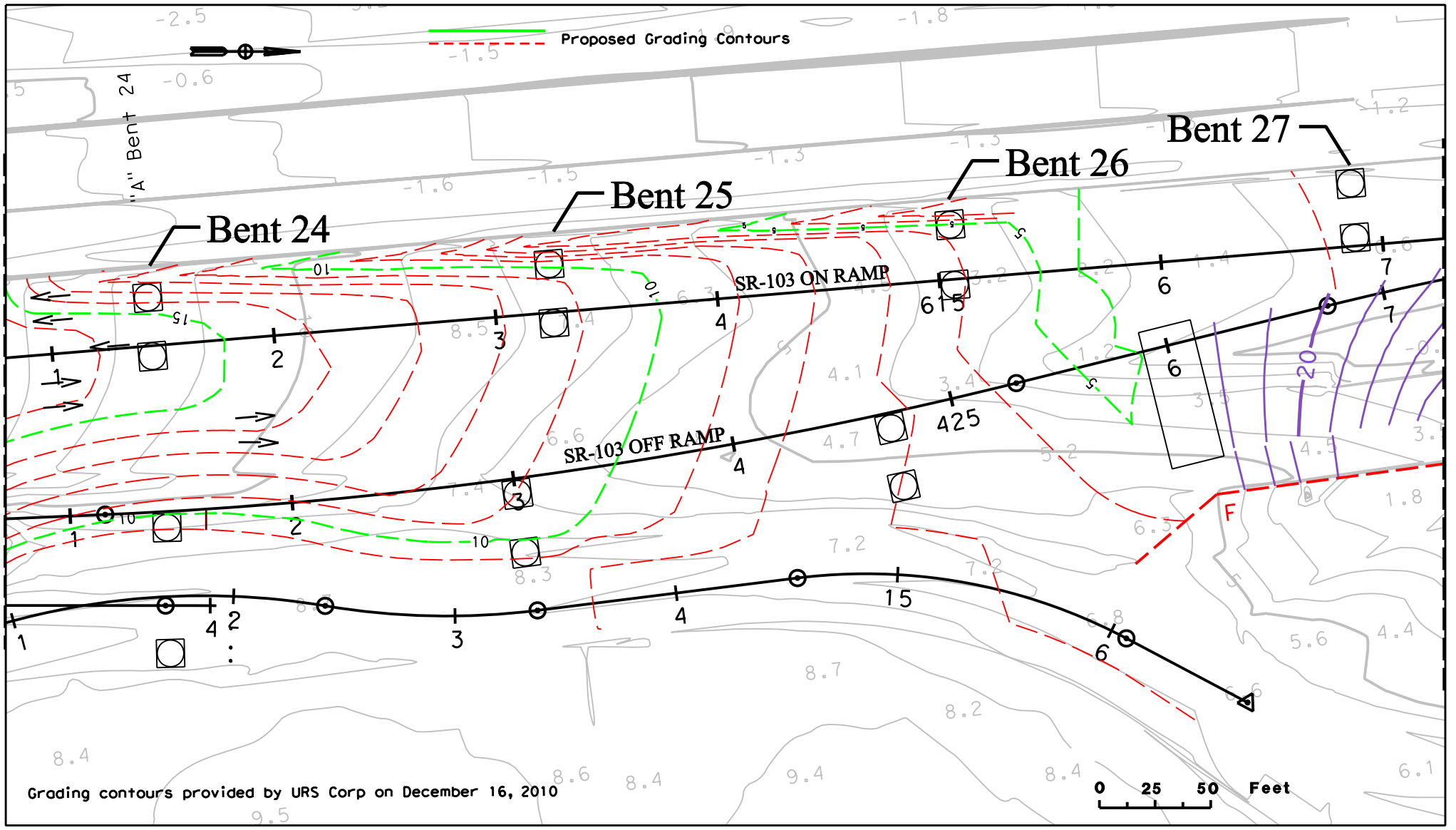
Sincerely,
EARTH MECHANICS, INC.



Patrick Wilson, PhD
Staff Engineer

Eric Brown, GE
Senior Engineer

(Arul) K. Arulmoli, PhD, GE
Project Manager



Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

ACTA SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT

Project No.: 06-123-03 | Date: 12-15-10

POLB Future Development
Proposed Fill Plan
SR-103 On-Ramp

Figure 1

ATTACHMENT 1

Analyses and Calculations

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

17660 Newhope Street, Suite E, Fountain Valley, CA 92708
(714) 751-3826, Fax (714) 751-3928

Project SR-103 ON-RAMP STATIC SETTLEMENT Project No. 06123

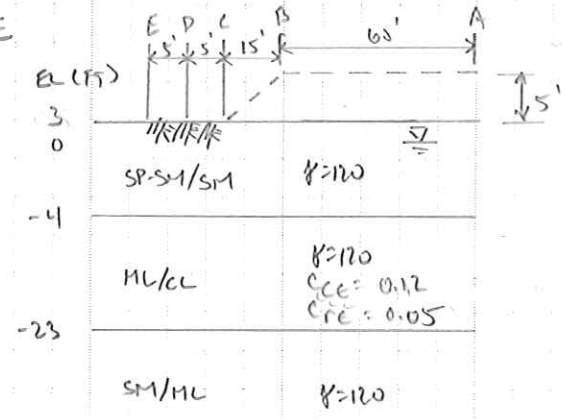
By EEB Date 12/10/10 Checked By _____ Date _____ Sheet 1 of 2

- BENEATH SR-103, FUTURE FILL TO BE PLACED AS PART OF POLB DEVELOPMENT
- APPROX. HEIGHT OF FILL AT EACH SUPPORT BASED ON GRADING PLANS AS SHOWN BELOW IN TABLE

	APPROX. EXIST GRADE (FT)		APPROX PROP GRADE (FT)		APPROX. FILL HT (FT)	
	L	R	L	R	L	R
BENT 24	11.5	11.5	14	15.5	2.5	4.0
BENT 25	7.5	7.5	11.5	10.0	4.0	2.5
BENT 26	3.0	3.0	6.5	5.5	3.5	2.5
BENT 27	0.5	0.5	5.0	4.5	4.5	4.0

- MAX ANTICIPATED FILL HT = 4.5 FT @ BENT 27
- PERFORM SETTLEMENT CALC BASED ON 5 FT OF FILL @ BENT 27

- PROFILE



- SEE ATTACHED SPREADSHEETS FOR SETTLEMENT CALCS

Schuyler Heim Bridge Replacement Project

Prepared By: EB

SR-103 On-Ramp

Utility Settlement - Future Fill

Ground Surface El. = 3 ft

Groundwater El. = 0 ft

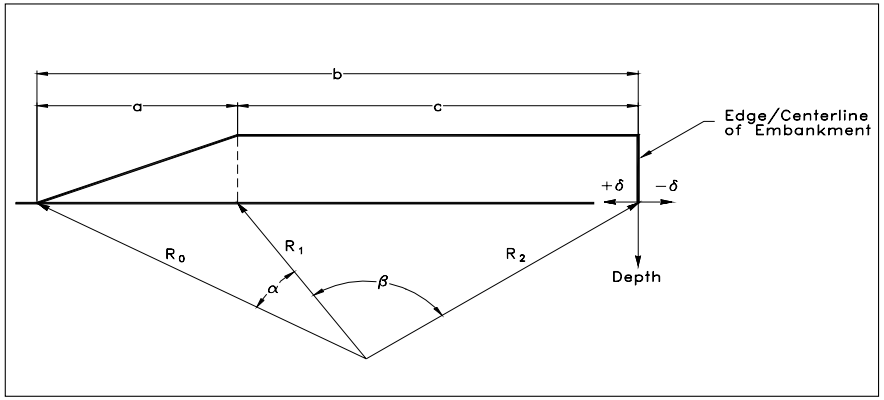
Top of Layer El. (ft)	Bot of Layer El. (ft)	Cre	Cce	OCR
-4	-23	0.01	0.10	1.05

Soil Layer	Mid Layer El. (ft)	Mid Layer Depth (ft)	Layer Thickness (ft)	Initial Stress Sigma 0 (ksf)	σ_p' (ksf)	Point A Delta Sig (ksf)	Point B Delta Sig (ksf)	Point C Delta Sig (ksf)	Point D Delta Sig (ksf)	Point E Delta Sig (ksf)		Estimated Settlements Below Pt A (in)	Below Pt B (in)	Below Pt C (in)	Below Pt D (in)	Below Pt E (in)
CL/ML	-10.75	13.75	4.75	0.979	1.028	0.598	0.458	0.142	0.075	0.040	#	1.07	0.84	0.23	0.08	-0.01
CL/ML	-17.875	20.875	4.75	1.390	1.459	0.593	0.418	0.181	0.120	0.078	#	0.77	0.54	0.19	0.10	0.03
CL/ML	-25	28	4.75	1.800	1.890	0.585	0.393	0.205	0.152	0.111	#	0.59	0.38	0.16	0.09	0.04
CL/ML	-32.125	35.125	4.75	2.210	2.321	0.573	0.375	0.221	0.176	0.137	#	0.46	0.28	0.13	0.08	0.04
										Total Settlement (in):		2.89	2.04	0.71	0.34	0.10

SR-103 On-Ramp

Stress at Various Points Below an Earth Embankment

Equation of Stress Given Below (Poulos & Davis P. 40):



Variables Defined in Adjacent Figure
Soil Unit Weight = 120 PCF

NOTE: ONLY CHANGE VARIABLES IN HIGHLIGHTED CELLS

Embankment Height =	5	a =	15
Embankment Width (Top) =	60	b =	75
Side Slope Ratio (x:1) =	3	c =	60

Point A — Delta = 0

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
13.75	13.75	0.043957	1.34552	**0.298951**
20.88	20.875	0.063355	1.235979	**0.296554**
28	28	0.079318	1.134169	**0.292354**
35.13	35.125	0.091633	1.041169	**0.286351**

Point B — Delta = 60

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
13.75	61.55536	0.828849	1.34552	**0.456858**
20.875	63.52768	0.623076	1.235979	**0.414326**
28	66.21178	0.491809	1.134169	**0.383727**
35.125	69.52529	0.403603	1.041169	**0.3592**

Point C — Delta = 75

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
13.75	76.25	0.828849	0.560627	**0.140947**
20.875	77.85092	0.623076	0.676258	**0.178491**
28	80.05623	0.491809	0.721678	**0.20041**
35.125	82.81766	0.403603	0.729199	**0.212622**

Point D — Delta = 80

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
13.75	81.17304	0.619738	0.432075	**0.07495**
20.875	82.67869	0.528903	0.551556	**0.118327**
28	84.75848	0.443541	0.613872	**0.148554**
35.125	87.37142	0.376213	0.639463	**0.16848**

Point E — Delta = 85

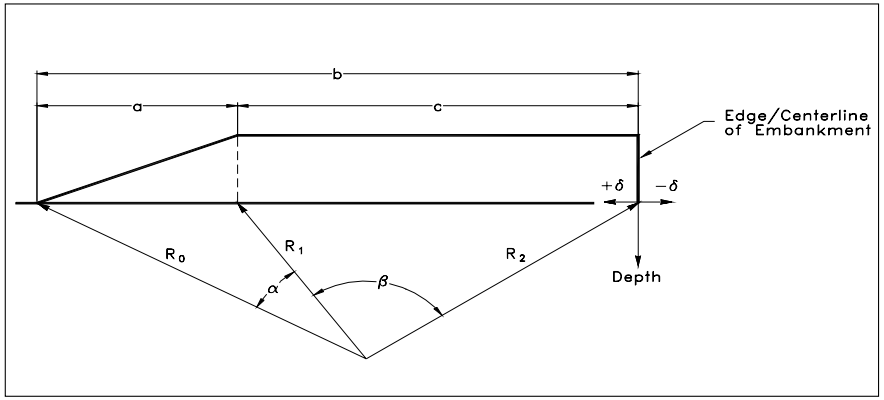
Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
13.75	86.10495	0.439157	0.342468	**0.039598**
20.875	87.5258	0.428334	0.454899	**0.076578**
28	89.49302	0.385831	0.523725	**0.107653**
35.125	91.97155	0.341205	0.560368	**0.13099**

SPREADSHEET # 1

SR-103 On-Ramp

Stress at Various Points Below an Earth Embankment

Equation of Stress Given Below (Poulos & Davis P. 40):



Variables Defined in Adjacent Figure
Soil Unit Weight = 120 PCF

NOTE: ONLY CHANGE VARIABLES IN HIGHLIGHTED CELLS

Embankment Height =	5	a =	15
Embankment Width (Top) =	60	b =	75
Side Slope Ratio (x:1) =	3	c =	60

Point A

Delta 0

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
13.75	13.75	0.043957	1.34552	**0.298951**
20.88	20.875	0.063355	1.235979	**0.296554**
28	28	0.079318	1.134169	**0.292354**
35.13	35.125	0.091633	1.041169	**0.286351**

Point B

Delta -60

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
13.75	61.55536	0.012584	0.111191	**0.001282**
20.875	63.52768	0.01882	0.162583	**0.004128**
28	66.21178	0.024724	0.207395	**0.008919**
35.125	69.52529	0.030212	0.244874	**0.01543**

Point C

Delta -75

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
13.75	76.25	0.010091	0.079818	**0.00064**
20.875	77.85092	0.015136	0.118048	**0.002118**
28	80.05623	0.019965	0.152801	**0.004734**
35.125	82.81766	0.024519	0.183453	**0.00851**

Point D

Delta -80

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
13.75	81.17304	0.009422	0.072312	**0.000522**
20.875	82.67869	0.014145	0.107229	**0.001736**
28	84.75848	0.018678	0.139279	**0.003911**
35.125	87.37142	0.02297	0.167902	**0.007096**

Point E

Delta -85

Actual Depth (feet)	R2 (feet)	alpha (radians)	beta (radians)	SigmaZ (ksf)
13.75	86.10495	0.008818	0.065831	**0.00043**
20.875	87.5258	0.013247	0.097839	**0.001437**
28	89.49302	0.01751	0.127461	**0.00326**
35.125	91.97155	0.02156	0.154201	**0.005961**

SPREADSHEET # 1

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

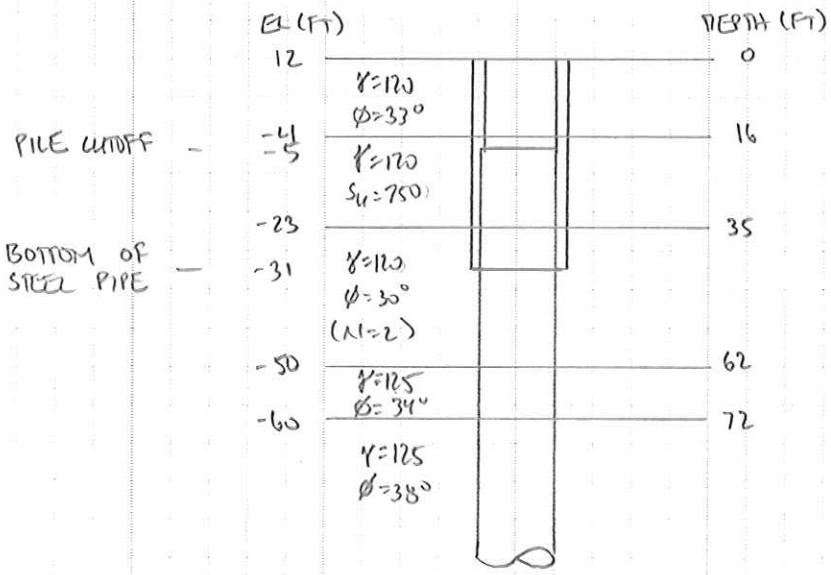
17660 Newhope Street, Suite E, Fountain Valley, CA 92708
(714) 751-3826, Fax (714) 751-3928

Project SR-103 ON-RAMP - STATIC DOWNDRAG Project No. 06-123

By ECB Date 12/10/10 Checked By _____ Date _____ Sheet 2 of 2

- MOST CONSERVATIVE PROFILE WILL BE AT BENT 24 WHICH HAS HIGHEST CUTOFF ELEV, THEREFORE GREATEST DOWNDRAG LOAD

- BENT 24 PROFILE



* NOTE - USE EXISTING GRADE FOR NEW CALCS SO DRIVEN STEEL & SHAFT CALCS CAN BE SAME FROM PREVIOUS RUN, ALSO WILL BE CONSERVATIVE

- FROM DRIVEN PIPE CALCS, Q_s @ EL -23 FT = 227.8^T
  - NOMINAL DEMAND FROM STRUCTURAL = 2825^T
  - REQ'D PILE NOMINAL RESISTANCE = $2825^T/_{0.7}$ + 228^T = 4264^T
  - MAX TIP RESISTANCE (20% OF STRUCTURAL DEMAND) = 0.20 x $2825^T/_{0.7}$ = 807^T
  - SKIN FROM STEEL (FROM EL -23 FT TO EL -31 FT) = 347^T - 228^T = 119^T
  - REQ'D SKIN FROM SHAFT OUTPUT = 4264^T - 807^T - 119^T = 3343^T
  - USING SAME SHAFT OUTPUT W/ ORIGINAL GROUND LINE (CONSERVATIVE), REQ'D CIDH PILE LENGTH = 157 FT
  - ACTUAL PILE LENGTH = 140 FT
  - REQ'D PILE LENGTH FROM PREVIOUS CALC NOT CONSIDERING FILL & STATIC DOWNDRAG = 129 FT
  - ADD'L PILE LENGTH REQ'D DUE TO STATIC DOWNDRAG = 11 FT
  - CONSERVATIVELY ADD 16 FT OF PILE @ EACH BENT FROM PREVIOUS LENGTH

DRIVEN STEEL CASING DRIVING RESISTANCE CALCULATIONS
Schuyler Heim Bridge Project - SR-103 On-Ramp Bent 24

E.Brown

12/21/2010 2:14 PM

06-123-03

FILE NAME: Axial.xls

BORING PROFILE:

SKIN FRICTION IN SAND

Qs = Ks x tan (d x Ø) x (P x L) x Sv

WHERE: Svo = average effective overburden pressure
P = pile perimeter (feet)
L = pile length in soil layer (ft
Ks = Coefficient of horizontal soil stres
Ø = friction angle of the soi
d = ratio of interface angle of friction to soi angle of friction (for smooth concrete/soi or smooth steel/soil interface

Pile Size (inches)

	Steel Casing 13' x 1" thick		
Perim (feet)	40.84		
Area (sq. ft)	3.38		
Ks	0.8		
d	0.6		

Where: Area = Area of the pile tip
Perim = Perimeter of the pile

END BEARING IN SAND, Qb

Qb = (Nq*)(Svb)Ab

WHERE: Ab = area of pile base (sq. ft.)
Svb = effective overburden pressure at base
Nq* = Use interpolated values from NAVFAC 7.2, Page 7.2-194 (see below)

Ø	Nq
28	15
30	21
33	35
35	50
36	62
37	77
38	86
39	120
40	145

Reference: NAVFAC 7.02, Page7.2-194

LIMITING SKIN FRICTION AND END BEARING VALUES FOR COHESIONLESS SOILS

Ø	Limiting Skin Friction (tsf)	Limiting End Bearing (tsf)
0	0	0
20	0.50	20
25	0.70	30
30	0.85	50
35	1.00	100
40	1.20	125

Reference: API-RP2A (1993)

SKIN FRICTION IN CLAY, Qs

Qs = alpha x c x P x L

WHERE: alpha = adhesion factor (See chart below
c = cohesion (tons/sq. feet)
P = pile perimeter (feet)
L = depth in clay layer (feet)

Values of alpha as a function of cohesion

cohesion (tsf)	alpha	
0.10	1.00	For 0 < c < 0.25 tsf , alpha = 1.0
0.25	1.00	For 0.25 < c < 0.75 tsf, alpha = 1.25 - c
0.50	0.75	
0.75	0.50	For c > 0.75 tsf, alpha = 0.5
1.00	0.50	
2.00	0.50	
7.00	0.50	

Reference: API-RP2A (1986)

END BEARING IN CLAY, Qb

Qb = Nc x Cb x Ab

WHERE: Ab = area of pile base (sq. ft.)
Cb = cohesion at pile tip (tsf
Generally, Nc = 9, thus

Qb = 9 x Cb x Ab

NOTES:

1) This spreadsheet valid only for symmetrical "driven" piles (i.e. square, round, or octagona
2) Drained conditions are assumed in sands, undrained conditions are assumed in clays and s
3) Design procedure follows API Recommended Practice, 2000

-5 ft = top of pile el. 12 ft = top of ground el. 5 ft = water table el.

12' Diameter Steel Casing

ELEV BASE OF PILE (ft.)	TOP OF LAYER ELEV (ft.)	BOTTOM OF LAYER ELEV (ft.)	SOIL TYPE	TOTAL UNIT WT (pcf)	CORR SPT BLOW COUNT (N_{SPT})	FRICTION ANGLE (deg.)	COHESION (tsf)	LAYER THICK. L (ft.)	LAYER AVE. DEPTH BELOW GROUND (ft.)	LAYER AVE. EFF OVERBURD PRESS (tsf)	DEPTH FROM GROUND TO PILE BASE (ft.)	DRIVEN PILE LENGTH (ft.)	EFF OVERBUR PRESS AT BASE Svb (tsf)	Nq*/Nc	LAYER SKIN FRIC Qsn (tons)	LIMITING LAYER SKIN FRIC Qsn lim (tons)	CUM SKIN FRIC Qs min (tons)	END BEAR Qb (tons)	LIMITING END BEAR Qb lim (tons)	Qu = minimum Qs + Qb (tons)	Qa FOR FS = 2 (tons)	ULTIMATE UPLIFT (tons)
6	12	6	SAND	120		33	0.0	6	3.0	0.18	6	-11	0.36	35	0.0	230.3	0.0	0.0	270.4	0	0	0
4	6	4	SAND	120		33	0.0	2	7.0	0.39	8	-9	0.42	35	0.0	76.8	0.0	0.0	270.4	0	0	0
2	4	2	SAND	120		33	0.0	2	9.0	0.45	10	-7	0.48	35	0.0	76.8	0.0	0.0	270.4	0	0	0
0	2	0	SAND	120		33	0.0	2	11.0	0.50	12	-5	0.53	35	0.0	76.8	0.0	0.0	270.4	0	0	0
-2	0	-2	SAND	120		33	0.0	2	13.0	0.56	14	-3	0.59	35	0.0	76.8	0.0	0.0	270.4	0	0	0
-4	-2	-4	SAND	120		33	0.0	2	15.0	0.62	16	-1	0.65	35	0.0	76.8	0.0	0.0	270.4	0	0	0
-6	-4	-6	CLAY	120		0	0.4	2	17.0	0.68	18	1	0.71	9	0.0	26.8	0.0	0.0	11.4	0	0	0
-8	-6	-8	CLAY	120		0	0.4	2	19.0	0.73	20	3	0.76	9	26.8	26.8	26.8	11.4	11.4	38	19	21
-10	-8	-10	CLAY	120		0	0.4	2	21.0	0.79	22	5	0.82	9	26.8	26.8	53.6	11.4	11.4	65	33	43
-11	-10	-11	CLAY	120		0	0.4	1	22.5	0.84	23	6	0.85	9	13.4	13.4	67.0	11.4	11.4	78	39	54
-12	-11	-12	CLAY	120		0	0.4	1	23.5	0.86	24	7	0.88	9	13.4	13.4	80.4	11.4	11.4	92	46	64
-13	-12	-13	CLAY	120		0	0.4	1	24.5	0.89	25	8	0.91	9	13.4	13.4	93.8	11.4	11.4	105	53	75
-14	-13	-14	CLAY	120		0	0.4	1	25.5	0.92	26	9	0.94	9	13.4	13.4	107.2	11.4	11.4	119	59	86
-15	-14	-15	CLAY	120		0	0.4	1	26.5	0.95	27	10	0.96	9	13.4	13.4	120.6	11.4	11.4	132	66	96
-16	-15	-16	CLAY	120		0	0.4	1	27.5	0.98	28	11	0.99	9	13.4	13.4	134.0	11.4	11.4	145	73	107
-17	-16	-17	CLAY	120		0	0.4	1	28.5	1.01	29	12	1.02	9	13.4	13.4	147.4	11.4	11.4	159	79	118
-18	-17	-18	CLAY	120		0	0.4	1	29.5	1.04	30	13	1.05	9	13.4	13.4	160.8	11.4	11.4	172	86	129
-19	-18	-19	CLAY	120		0	0.4	1	30.5	1.07	31	14	1.08	9	13.4	13.4	174.2	11.4	11.4	186	93	139
-20	-19	-20	CLAY	120		0	0.4	1	31.5	1.09	32	15	1.11	9	13.4	13.4	187.6	11.4	11.4	199	100	150
-21	-20	-21	CLAY	120		0	0.4	1	32.5	1.12	33	16	1.14	9	13.4	13.4	201.0	11.4	11.4	212	106	161
-22	-21	-22	CLAY	120		0	0.4	1	33.5	1.15	34	17	1.17	9	13.4	13.4	214.4	11.4	11.4	226	113	172
-23	-22	-23	CLAY	120		0	0.4	1	34.5	1.18	35	18	1.20	9	13.4	13.4	227.8	11.4	11.4	239	120	182
-24	-23	-24	SAND	120		32	0.0	1	35.5	1.21	36	19	1.22	30	13.8	37.2	241.6	125.5	236.6	367	184	190
-25	-24	-25	SAND	120		32	0.0	1	36.5	1.24	37	20	1.25	30	14.1	37.2	255.7	128.4	236.6	384	192	198
-26	-25	-26	SAND	120		32	0.0	1	37.5	1.27	38	21	1.28	30	14.4	37.2	270.1	131.4	236.6	401	201	206
-27	-26	-27	SAND	120		32	0.0	1	38.5	1.30	39	22	1.31	30	14.7	37.2	284.8	134.4	236.6	419	210	214
-28	-27	-28	SAND	120		32	0.0	1	39.5	1.32	40	23	1.34	30	15.1	37.2	299.9	137.3	236.6	437	219	223
-29	-28	-29	SAND	120		32	0.0	1	40.5	1.35	41	24	1.37	30	15.4	37.2	315.3	140.3	236.6	456	228	231
-30	-29	-30	SAND	120		32	0.0	1	41.5	1.38	42	25	1.40	30	15.7	37.2	331.0	143.2	236.6	474	237	240
-31	**-30**	**-31**	**SAND**	**120**		**32**	**0.0**	**1**	**42.5**	**1.41**	**43**	**26**	**1.43**	**30**	**16.1**	**37.2**	**347.1**	**146.2**	**236.6**	**493**	**247**	**249**

VERTICALLY LOADED DRILLED SHAFT ANALYSIS PROGRAM SHAFT
VERSION 6 (C)COPYRIGHT ENSOFT,INC.1989,1995,1998,2001,2003,2007

SR-103 On-Ramp, Bent 24 - Strength

PROPOSED DEPTH = 200.0 FT

NUMBER OF LAYERS = 5

WATER TABLE DEPTH = 7.0 FT.

FACTOR OF SAFETY APPLIED TO THE TOTAL ULTIMATE CAPACITY = 1.43

FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE CAPACITY = 2.22

SOIL INFORMATION

LAYER NO 1----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.120E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.330E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.250E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.960E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.330E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.250E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.160E+02

LAYER NO 2----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.760E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.750E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.160E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.750E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.350E+02

LAYER NO 3----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.200E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.350E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.200E+01
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.620E+02

LAYER NO 4----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.437E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.400E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.620E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.354E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.400E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.720E+02

LAYER NO 5----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA = 0.354E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.720E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA = 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT = 0.000E+00
INTERNAL FRICTION ANGLE, DEG. = 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST = 0.500E+02
SOIL UNIT WEIGHT, LB/CU FT = 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT = 0.100E+11
DEPTH, FT = 0.300E+03

DRILLED SHAFT INFORMATION

DIAMETER OF STEM = 12.000 FT.
DIAMETER OF BASE = 12.000 FT.
END OF STEM TO BASE = 0.000 FT.
ANGLE OF BELL = 0.000 DEG.
IGNORED TOP PORTION = 43.000 FT.
IGNORED BOTTOM PORTION = 0.000 FT.
AREA OF ONE PERCENT STEEL = 162.881 SQ.IN.
ELASTIC MODULUS, Ec = 0.361E+07 LB/SQ IN
VOLUME OF UNDERREAM = 0.000 CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (FOR UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
QBD = TOTAL ALLOWABLE LOAD USING A FACTOR OF SAFETY APPLIED TO THE ULTIMATE BASE RESISTANCE;
QDN = TOTAL ALLOWABLE LOAD USING FACTORS OF SAFETY APPLIED TO THE ULTIMATE SIDE RESISTANCE AND THE ULTIMATE BASE RESISTANCE.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	QBD (TONS)	QDN (TONS)	QU/VOLUME (TONS/CU.YDS)
44.0	184.33	11.67	164.61	176.28	85.75	82.25	0.97
45.0	188.52	24.16	194.27	218.43	111.58	104.34	1.16
46.0	192.71	36.65	223.93	260.58	137.42	126.42	1.35
47.0	196.90	49.41	254.85	304.25	164.09	149.27	1.55
48.0	201.09	62.44	287.03	349.47	191.60	172.87	1.74
49.0	205.28	75.74	326.86	402.60	222.83	200.11	1.96
50.0	209.47	89.31	368.32	457.63	255.06	228.27	2.18
51.0	213.66	103.16	408.10	511.26	286.81	255.86	2.39
52.0	217.85	117.27	446.17	563.44	318.05	282.87	2.59
53.0	222.03	131.66	482.48	614.15	348.78	309.29	2.77
54.0	226.22	146.32	517.01	663.33	378.98	335.09	2.93
55.0	230.41	161.25	549.71	710.96	408.63	360.26	3.09
56.0	234.60	176.45	580.55	757.01	437.71	384.78	3.23
57.0	238.79	191.93	609.50	801.43	466.20	408.63	3.36
58.0	242.98	207.67	636.51	844.18	494.11	431.81	3.47
59.0	247.17	223.69	661.55	885.24	521.39	454.29	3.58
60.0	251.36	239.98	684.59	924.57	548.05	476.06	3.68
61.0	255.55	256.54	704.57	961.10	573.60	496.64	3.76
62.0	259.74	273.37	721.43	994.80	598.02	516.02	3.83
63.0	263.93	302.72	737.65	1040.37	634.67	543.86	3.94
64.0	268.12	331.99	753.19	1085.18	670.93	571.34	4.05
65.0	272.31	361.16	768.05	1129.21	706.78	598.45	4.15
66.0	276.50	390.21	782.23	1172.44	742.21	625.17	4.24
67.0	280.69	419.13	795.70	1214.83	777.20	651.48	4.33
68.0	284.87	447.91	808.47	1256.37	811.72	677.36	4.41
69.0	289.06	476.53	820.51	1297.03	845.76	702.82	4.49
70.0	293.25	504.97	831.82	1336.79	879.29	727.82	4.56
71.0	297.44	533.22	842.39	1375.61	912.30	752.35	4.62

72.0	301.63	561.27	852.21	1413.48	944.77	776.41	4.69
73.0	305.82	589.10	862.03	1451.13	977.02	800.31	4.75
74.0	310.01	616.70	871.85	1488.55	1009.03	824.05	4.80
75.0	314.20	644.05	881.67	1525.72	1040.80	847.61	4.86
76.0	318.39	671.14	891.49	1562.63	1072.31	870.99	4.91
77.0	322.58	697.96	901.31	1599.26	1103.55	894.18	4.96
78.0	326.77	724.48	911.12	1635.61	1134.49	917.17	5.01
79.0	330.96	750.71	920.94	1671.65	1165.14	939.95	5.05
80.0	335.15	776.61	930.76	1707.38	1195.46	962.50	5.09
81.0	339.34	802.19	940.58	1742.77	1225.46	984.83	5.14
82.0	343.53	827.43	950.40	1777.83	1255.11	1006.91	5.18
83.0	347.71	852.30	960.22	1812.52	1284.41	1028.75	5.21
84.0	351.90	876.81	970.04	1846.85	1313.33	1050.32	5.25
85.0	356.09	900.93	979.86	1880.79	1341.87	1071.63	5.28
86.0	360.28	924.85	989.67	1914.52	1370.20	1092.78	5.31
87.0	364.47	949.05	999.49	1948.55	1398.83	1114.15	5.35
88.0	368.66	973.56	1009.31	1982.87	1427.75	1135.72	5.38
89.0	372.85	998.35	1019.13	2017.48	1456.97	1157.49	5.41
90.0	377.04	1023.44	1028.95	2052.39	1486.48	1179.48	5.44
91.0	381.23	1048.83	1038.77	2087.60	1516.28	1201.67	5.48
92.0	385.42	1074.51	1048.59	2123.10	1546.38	1224.07	5.51
93.0	389.61	1100.49	1058.41	2158.90	1576.78	1246.67	5.54
94.0	393.80	1126.76	1068.22	2194.99	1607.47	1269.48	5.57
95.0	397.99	1153.33	1078.04	2231.37	1638.45	1292.50	5.61
96.0	402.18	1180.19	1087.86	2268.05	1669.73	1315.72	5.64
97.0	406.37	1207.35	1097.25	2304.59	1701.11	1338.95	5.67
98.0	410.55	1234.80	1106.18	2340.98	1732.59	1362.19	5.70
99.0	414.74	1262.55	1114.64	2377.19	1764.14	1385.42	5.73
100.0	418.93	1290.59	1122.61	2413.20	1795.77	1408.64	5.76
101.0	423.12	1318.93	1130.08	2449.01	1827.47	1431.84	5.79
102.0	427.31	1347.56	1137.03	2484.59	1859.23	1455.01	5.81
103.0	431.50	1376.49	1143.43	2519.92	1891.04	1478.14	5.84
104.0	435.69	1405.71	1149.28	2554.99	1922.89	1501.23	5.86
105.0	439.88	1435.23	1154.56	2589.79	1954.78	1524.27	5.89
106.0	444.07	1465.04	1159.24	2624.28	1986.70	1547.24	5.91
107.0	448.26	1495.15	1163.31	2658.46	2018.65	1570.15	5.93
108.0	452.45	1525.55	1166.76	2692.31	2050.60	1592.99	5.95
109.0	456.64	1556.25	1169.63	2725.88	2082.59	1615.77	5.97
110.0	460.83	1587.24	1171.98	2759.22	2114.64	1638.52	5.99
111.0	465.02	1618.53	1173.86	2792.39	2146.77	1661.27	6.00
112.0	469.21	1650.11	1175.33	2825.44	2179.01	1684.04	6.02
113.0	473.39	1681.99	1176.42	2858.41	2211.39	1706.85	6.04
114.0	477.58	1714.16	1177.21	2891.37	2243.91	1729.72	6.05
115.0	481.77	1746.63	1177.73	2924.36	2276.61	1752.69	6.07
116.0	485.96	1779.39	1178.04	2957.44	2309.52	1775.76	6.09
117.0	490.15	1812.45	1178.20	2990.65	2342.65	1798.97	6.10
118.0	494.34	1845.80	1178.25	3024.06	2376.02	1822.35	6.12
119.0	498.53	1879.45	1178.25	3057.70	2409.67	1845.90	6.13
120.0	502.72	1913.40	1178.25	3091.65	2443.61	1869.66	6.15
121.0	506.91	1947.63	1178.25	3125.88	2477.85	1893.63	6.17
122.0	511.10	1982.17	1178.25	3160.42	2512.39	1917.80	6.18
123.0	515.29	2017.00	1178.25	3195.25	2547.21	1942.19	6.20
124.0	519.48	2052.12	1178.25	3230.37	2582.34	1966.77	6.22
125.0	523.67	2087.54	1178.25	3265.79	2617.75	1991.57	6.24
126.0	527.86	2123.25	1178.25	3301.50	2653.47	2016.57	6.25
127.0	532.05	2159.26	1178.25	3337.51	2689.48	2041.77	6.27
128.0	536.23	2195.56	1178.25	3373.81	2725.78	2067.19	6.29
129.0	540.42	2232.16	1178.25	3410.41	2762.38	2092.81	6.31
130.0	544.61	2269.05	1178.25	3447.30	2799.27	2118.63	6.33
131.0	548.80	2306.24	1178.25	3484.49	2836.46	2144.67	6.35
132.0	552.99	2343.73	1178.25	3521.98	2873.94	2170.91	6.37
133.0	557.18	2381.50	1178.25	3559.75	2911.72	2197.35	6.39
134.0	561.37	2419.58	1178.25	3597.83	2949.80	2224.01	6.41
135.0	565.56	2457.95	1178.25	3636.20	2988.16	2250.87	6.43
136.0	569.75	2496.61	1178.25	3674.86	3026.83	2277.93	6.45
137.0	573.94	2535.57	1178.25	3713.82	3065.79	2305.20	6.47
138.0	578.13	2574.82	1178.25	3753.07	3105.04	2332.68	6.49
139.0	582.32	2614.37	1178.25	3792.62	3144.59	2360.37	6.51
140.0	586.51	2654.21	1178.25	3832.46	3184.43	2388.26	6.53
141.0	590.70	2694.35	1178.25	3872.60	3224.57	2416.36	6.56
142.0	594.89	2734.79	1178.25	3913.04	3265.00	2444.66	6.58
143.0	599.07	2775.52	1178.25	3953.77	3305.73	2473.18	6.60
144.0	603.26	2816.54	1178.25	3994.79	3346.76	2501.89	6.62
145.0	607.45	2857.86	1178.25	4036.11	3388.08	2530.82	6.64
146.0	611.64	2899.47	1178.25	4077.72	3429.69	2559.95	6.67
147.0	615.83	2941.38	1178.25	4119.63	3471.60	2589.29	6.69
148.0	620.02	2983.59	1178.25	4161.84	3513.80	2618.83	6.71
149.0	624.21	3026.08	1178.25	4204.33	3556.30	2648.58	6.74
150.0	628.40	3068.88	1178.25	4247.13	3599.10	2678.54	6.76
151.0	632.59	3111.97	1178.25	4290.22	3642.19	2708.70	6.78
152.0	636.78	3155.35	1178.25	4333.60	3685.57	2739.07	6.81
153.0	640.97	3199.03	1178.25	4377.28	3729.25	2769.65	6.83
154.0	645.16	3243.00	1178.25	4421.25	3773.22	2800.43	6.85
155.0	649.35	3287.27	1178.25	4465.52	3817.49	2831.42	6.88
156.0	653.54	3331.84	1178.25	4510.09	3862.06	2862.62	6.90
157.0	657.73	3376.70	1178.25	4554.95	3906.92	2894.02	6.93
158.0	661.91	3421.85	1178.25	4600.10	3952.07	2925.63	6.95
159.0	666.10	3467.30	1178.25	4645.55	3997.52	2957.45	6.97
160.0	670.29	3513.05	1178.25	4691.30	4043.26	2989.47	7.00
161.0	674.48	3559.08	1178.25	4737.33	4089.30	3021.70	7.02
162.0	678.67	3605.42	1178.25	4783.67	4135.64	3054.14	7.05
163.0	682.86	3652.05	1178.25	4830.30	4182.27	3086.78	7.07
164.0	687.05	3698.97	1178.25	4877.22	4229.19	3119.63	7.10
165.0	691.24	3746.19	1178.25	4924.44	4276.41	3152.68	7.12
166.0	695.43	3793.71	1178.25	4971.96	4323.93	3185.95	7.15
167.0	699.62	3841.52	1178.25	5019.77	4371.73	3219.41	7.18
168.0	703.81	3889.62	1178.25	5067.87	4419.84	3253.09	7.20
169.0	708.00	3938.02	1178.25	5116.27	4468.24	3286.97	7.23
170.0	712.19	3986.72	1178.25	5164.97	4516.93	3321.06	7.25
171.0	716.38	4035.71	1178.25	5213.96	4565.92	3355.35	7.28
172.0	720.57	4084.99	1178.25	5263.24	4615.21	3389.85	7.30
173.0	724.75	4134.57	1178.25	5312.82	4664.79	3424.56	7.33
174.0	728.94	4184.45	1178.25	5362.70	4714.66	3459.48	7.36
175.0	733.13	4234.62	1178.25	5412.87	4764.83	3494.60	7.38
176.0	737.32	4285.08	1178.25	5463.33	4815.30	3529.92	7.41
177.0	741.51	4335.84	1178.25	5514.09	4866.06	3565.46	7.44

178.0	745.70	4386.90	1178.25	5565.15	4917.11	3601.20	7.46
179.0	749.89	4438.25	1178.25	5616.50	4968.46	3637.14	7.49
180.0	754.08	4489.89	1178.25	5668.14	5020.11	3673.30	7.52
181.0	758.27	4541.83	1178.25	5720.08	5072.05	3709.66	7.54
182.0	762.46	4594.06	1178.25	5772.31	5124.28	3746.22	7.57
183.0	766.65	4646.60	1178.25	5824.85	5176.81	3783.00	7.60
184.0	770.84	4699.42	1178.25	5877.67	5229.64	3819.98	7.63
185.0	775.03	4752.54	1178.25	5930.79	5282.76	3857.16	7.65
186.0	779.22	4805.96	1178.25	5984.21	5336.17	3894.55	7.68
187.0	783.41	4859.67	1178.25	6037.92	5389.88	3932.15	7.71
188.0	787.59	4913.67	1178.25	6091.92	5443.89	3969.96	7.73
189.0	791.78	4967.97	1178.25	6146.22	5498.19	4007.97	7.76
190.0	795.97	5022.57	1178.25	6200.82	5552.78	4046.19	7.79
191.0	800.16	5077.46	1178.25	6255.71	5607.67	4084.62	7.82
192.0	804.35	5132.64	1178.25	6310.89	5662.86	4123.25	7.85
193.0	808.54	5188.12	1178.25	6366.37	5718.34	4162.09	7.87
194.0	812.73	5243.90	1178.25	6422.15	5774.12	4201.13	7.90
195.0	816.92	5299.97	1178.25	6478.22	5830.19	4240.38	7.93
196.0	821.11	5356.33	1178.25	6534.58	5886.55	4279.84	7.96
197.0	825.30	5413.00	1178.25	6591.25	5943.21	4319.50	7.99
198.0	829.49	5469.95	1178.25	6648.20	6000.17	4359.37	8.01
199.0	833.68	5527.20	1178.25	6705.45	6057.42	4399.45	8.04
200.0	837.87	5584.75	1178.25	6763.00	6114.96	4439.74	8.07

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

July 2, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum to "Final Foundation Report, Retaining Wall A1 (Bridge No. 53E0147), Dated May 10, 2010", Los Angeles County, California, 7-LA-47, PM 3.55, EA 138201

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Foundation Report for the subject retaining wall, dated February 10, 2010, to Caltrans for review and comments. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the report and provided its comments in an email dated April 12, 2010. EMI incorporated the responses to Caltrans OGDS-1 comments into the Final Foundation Report, dated May 10, 2010 and submitted it to Caltrans. Caltrans OGDS-1 reviewed the Final Foundation Report and provided its comment in an email dated June 29, 2010.

EMI developed its response to the Caltrans comment, which was reviewed and accepted by OGDS-1. The Caltrans review comment and EMI response are included in Attachment 1.

Based on the Caltrans review comment, the following change has been made to Settlement Monitoring Recommendation in Section 5.4.3 (Settlement) of the Final Foundation Report:

(1) The "Settlement Monitoring Recommendation" provided in the fifth and sixth paragraphs of Section 5.4.3 (Settlement) in the Final Foundation Report have been revised into one paragraph as follows:

"Settlement Monitoring Recommendations: Based on our experience, the calculated settlements and settlement periods are approximations of actual field observations. Due to the variability of subsurface conditions and the thinly layered nature of soil deposits, settlement monitoring is recommended. A settlement monitoring program should be implemented for the proposed MSE wall. Surface monuments should be placed on the face of the MSE wall to measure any vertical or lateral movement. In addition, surface settlement monuments, constructed in accordance with Caltrans Standard Plan Sheet A74 or equivalent (Caltrans, 2006b), should be placed at the maximum wall heights and at every 100 ft along the length of the MSE wall. The settlement monuments should be installed in a timely manner upon completion of wall construction. Special care should be exercised in the field to survey and protect these settlement devices. The monuments should be monitored at the time of installation, on a weekly

basis for a month, and then once every 2 weeks thereafter until it has been verified by the Engineer that the remaining settlement for the embankment is acceptable. The uppermost levels of wall facing, coping, roadway pavement, hardscape, and any other improvements should not be constructed until the remaining settlement is within acceptable limits (i.e., ½-inch or less). However, waiting period for the above-mentioned improvements can be modified based on field settlement measurements upon Engineer's approval."

This addendum should be attached to the front of the Final Foundation Report for the subject wall, dated May 10, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.

(Pratheep) K. Pratheepan
Staff Engineer

(Ranjan) G.J. Gunaranjan, PE
Senior Staff Engineer

(Arul) K. Arulmoli, PhD, GE
Project Manager

ATTACHMENT

Attachment 1. Caltrans Comment and EMI Response to Caltrans Comment on the Final Foundation Report for Retaining Wall A1 (Bridge No. 53E0147), Dated May 10, 2010

ATTACHMENT 1

Caltrans Comment and EMI Response to Caltrans Comment on the Final Foundation Report for Retaining Wall A1 (Bridge No. 53E0147), Dated May 10, 2010

Subject: Review Comment for Retaining Walls A1, C1, E1, E2, H1, G1, and G2
From: Haitao Liu <haitao_liu@dot.ca.gov>
Date: Tue, 29 Jun 2010 20:58:50 -0400
To: Arul Arulmoli <arulmoli@earthmech.com>
CC: Ranjan Gunaranjan <ranjan@earthmech.com>, Ae F Tern <ae_f_tern@dot.ca.gov>, Eric Brown <e.brown@earthmech.com>, Pat Wilson <P.Wilson@earthmech.com>

Dear Arul,

Your Final Foundation Reports, dated May 10 2010, for the subject retaining walls have been reviewed. All review comments for the previous version of reports have been clarified, and report modifications have been made when applicable. However there is still one more comment we want to add before conclusion of our work.

Section 5.4.3 Settlement (Settlement Monitoring Recommendation):
Since the value of long-term residual settlement for the MSE walls could be a hard guess out in the field, we would suggest using waiting period to control the timing for subsequent wall construction. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to maintain certain flexibility for decision making during construction.

Please let me know if you have any question.

Best regards,

Haitao Liu, P.E.

Transportation Engineer - Civil
Office of Geotechnical Design South - 1
Division of Engineering Services
Department of Transportation, California

5900 Folsom Blvd.
Sacramento, CA 95819
Office phone: (916) 227-0992
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.

Retaining Wall A1 (Bridge No. 53E0147)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 3.55	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 29, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	July 1, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
1			1) Section 5.4.3 Settlement (Settlement Monitoring Recommendation): Since the value of long-term residual settlement for the MSE walls could be a hard guess out in the field, we would suggest using waiting period to control the timing for subsequent wall construction. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to maintain certain flexibility for decision making during construction.	Kadiah Pratheepan (KP), Ranjan Gunaranjan (RG), K. Arul Arulmoli (KA)	A	Will comply. EMI will incorporate the comment on the Settlement Monitoring Recommendation into the subject Final Foundation Report. The fifth and sixth paragraphs in Section 5.4.3 (Settlement) of the Final Foundation Report will be replaced by the revised "Settlement Monitoring Recommendation" paragraph. The above change to Section 5.4.3 will be documented in the Addendum to the Final Foundation Report for Retaining Wall A1.	7/1/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

July 2, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum to "Final Foundation Report, Retaining Wall C1 (Bridge No. 53E0148), Dated May 10, 2010", Los Angeles County, California, 7-LA-47, PM 3.72, EA 138201

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Foundation Report for the subject retaining wall, dated February 10, 2010, to Caltrans for review and comments. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the report and provided its comments in an email dated April 12, 2010. EMI incorporated the responses to Caltrans OGDS-1 comments into the Final Foundation Report, dated May 10, 2010 and submitted it to Caltrans. Caltrans OGDS-1 reviewed the Final Foundation Report and provided its comment in an email dated June 29, 2010.

EMI developed its response to the Caltrans comment, which was reviewed and accepted by OGDS-1. The Caltrans review comment and EMI response are included in Attachment 1.

Based on the Caltrans review comment, the following change has been made to Settlement Monitoring Recommendation in Section 5.4.3 (Settlement) of the Final Foundation Report:

(1) The "Settlement Monitoring Recommendation" provided in the fourth and fifth paragraphs of Section 5.4.3 (Settlement) in the Final Foundation Report have been revised into one paragraph as follows:

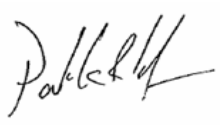
"Settlement Monitoring Recommendations: Based on our experience, the calculated settlements and settlement periods are approximations of actual field observations. Due to the variability of subsurface conditions and the thinly layered nature of soil deposits, settlement monitoring is recommended. A settlement monitoring program should be implemented for the proposed MSE wall. Surface monuments should be placed on the face of the MSE wall to measure any vertical or lateral movement. In addition, surface settlement monuments, constructed in accordance with Caltrans Standard Plan Sheet A74 or equivalent (Caltrans, 2006b), should be placed at the maximum wall heights and at every 100 ft along the length of the MSE wall. The settlement monuments should be installed in a timely manner upon completion of wall construction. Special care should be exercised in the field to survey and protect these settlement devices. The monuments should be monitored at the time of installation, on a weekly

basis for a month, and then once every 2 weeks thereafter until it has been verified by the Engineer that the remaining settlement for the embankment is acceptable. The uppermost levels of wall facing, coping, roadway pavement, hardscape, and any other improvements should not be constructed until the remaining settlement is within acceptable limits (i.e., ½-inch or less). However, waiting period for the above-mentioned improvements can be modified based on field settlement measurements upon Engineer's approval."

This addendum should be attached to the front of the Final Foundation Report for the subject wall, dated May 10, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.



Patrick Wilson, PhD
Staff Engineer

Eric Brown, GE
Senior Engineer

(Arul) K. Arulmoli, PhD, GE
Project Manager

ATTACHMENT

Attachment 1. Caltrans Comment and EMI Response to Caltrans Comment on the Final Foundation Report for Retaining Wall C1 (Bridge No. 53E0148), Dated May 10, 2010

ATTACHMENT 1

Caltrans Comment and EMI Response to Caltrans Comment on the Final Foundation Report for Retaining Wall C1 (Bridge No. 53E0148), Dated May 10, 2010

Subject: Review Comment for Retaining Walls A1, C1, E1, E2, H1, G1, and G2
From: Haitao Liu <haitao_liu@dot.ca.gov>
Date: Tue, 29 Jun 2010 20:58:50 -0400
To: Arul Arulmoli <arulmoli@earthmech.com>
CC: Ranjan Gunaranjan <ranjan@earthmech.com>, Ae F Tern <ae_f_tern@dot.ca.gov>, Eric Brown <e.brown@earthmech.com>, Pat Wilson <P.Wilson@earthmech.com>

Dear Arul,

Your Final Foundation Reports, dated May 10 2010, for the subject retaining walls have been reviewed. All review comments for the previous version of reports have been clarified, and report modifications have been made when applicable. However there is still one more comment we want to add before conclusion of our work.

Section 5.4.3 Settlement (Settlement Monitoring Recommendation):
Since the value of long-term residual settlement for the MSE walls could be a hard guess out in the field, we would suggest using waiting period to control the timing for subsequent wall construction. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to maintain certain flexibility for decision making during construction.

Please let me know if you have any question.

Best regards,

Haitao Liu, P.E.

Transportation Engineer - Civil
Office of Geotechnical Design South - 1
Division of Engineering Services
Department of Transportation, California

5900 Folsom Blvd.
Sacramento, CA 95819
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Cell phone: (916) 704-6519

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Retaining Wall C1 (Bridge No. 53E0148)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 3.72	Reviewing Agency:	Caltrans
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)
Milestone:	Final Foundation Report	Review Date:	June 29, 2010
Consultant:	Earth Mechanics, Inc.	Submission Date:	July 1, 2010

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
1			1) Section 5.4.3 Settlement (Settlement Monitoring Recommendation): Since the value of long-term residual settlement for the MSE walls could be a hard guess out in the field, we would suggest using waiting period to control the timing for subsequent wall construction. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to maintain certain flexibility for decision making during construction.	Patrick Wilson (PW), Eric Brown (EB), K. Arul Arulmoli (KA)	A	Will comply. EMI will incorporate the comment on the Settlement Monitoring Recommendation into the subject Final Foundation Report. The fourth and fifth paragraphs in Section 5.4.3 (Settlement) of the Final Foundation Report will be replaced by the revised "Settlement Monitoring Recommendation" paragraph. The above change to Section 5.4.3 will be documented in the Addendum to the Final Foundation Report for Retaining Wall C1.	7/1/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

July 2, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum to "Final Foundation Report, Retaining Wall E1 (Bridge No. 53E0149) and Retaining Wall E2 (Bridge No. 53E0150), Dated May 17, 2010", Los Angeles County, California, 7-LA-47, PM 0.10, EA 138201

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Foundation Report for the subject retaining walls, dated February 10, 2010, to Caltrans for review and comments. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the report and provided its comments in an email dated April 12, 2010. EMI incorporated the responses to Caltrans OGDS-1 comments into the Final Foundation Report, dated May 17, 2010 and submitted it to Caltrans. Caltrans OGDS-1 reviewed the Final Foundation Report and provided its comment in an email dated June 29, 2010.

EMI developed its response to the Caltrans comment, which was reviewed and accepted by OGDS-1. The Caltrans review comment and EMI response are included in Attachment 1.

Based on the Caltrans review comment, the following change has been made to Settlement Monitoring Recommendation in Section 5.4.3 (Settlement) of the Final Foundation Report:

(1) The "Settlement Monitoring Recommendation" provided in the fifth and sixth paragraphs of Section 5.4.3 (Settlement) in the Final Foundation Report have been revised into one paragraph as follows:

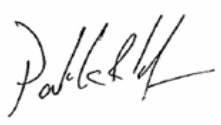
"Settlement Monitoring Recommendations: Based on our experience, the calculated settlements and settlement periods are approximations of actual field observations. Due to the variability of subsurface conditions and the thinly layered nature of soil deposits, settlement monitoring is recommended. A settlement monitoring program should be implemented for the proposed MSE wall. Surface monuments should be placed on the face of the MSE wall to measure any vertical or lateral movement. In addition, surface settlement monuments, constructed in accordance with Caltrans Standard Plan Sheet A74 or equivalent (Caltrans, 2006b), should be placed at the maximum wall heights and at every 100 ft along the length of the MSE wall. The settlement monuments should be installed in a timely manner upon completion of wall construction. Special care should be exercised in the field to survey and protect these settlement devices. The monuments should be monitored at the time of installation, on a weekly

basis for a month, and then once every 2 weeks thereafter until it has been verified by the Engineer that the remaining settlement for the embankment is acceptable. The uppermost levels of wall facing, coping, roadway pavement, hardscape, and any other improvements should not be constructed until the remaining settlement is within acceptable limits (i.e., ½-inch or less). However, waiting period for the above-mentioned improvements can be modified based on field settlement measurements upon Engineer's approval."

This addendum should be attached to the front of the Final Foundation Report for the subject walls, dated May 17, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.



Patrick Wilson, PhD
Staff Engineer

Eric Brown, GE
Senior Engineer

(Arul) K. Arulmoli, PhD, GE
Project Manager

ATTACHMENT

Attachment 1. Caltrans Comment and EMI Response to Caltrans Comment on the Final Foundation Report for Retaining Wall E1 (Bridge No. 53E0149) and Retaining Wall E2 (Bridge No. 53E0150), Dated May 17, 2010

ATTACHMENT 1

Caltrans Comment and EMI Response to Caltrans Comment on the Final Foundation Report for Retaining Wall E1 (Bridge No. 53E0149) and Retaining Wall E2 (Bridge No. 53E0150), Dated May 17, 2010

Subject: Review Comment for Retaining Walls A1, C1, E1, E2, H1, G1, and G2
From: Haitao Liu <haitao_liu@dot.ca.gov>
Date: Tue, 29 Jun 2010 20:58:50 -0400
To: Arul Arulmoli <arulmoli@earthmech.com>
CC: Ranjan Gunaranjan <ranjan@earthmech.com>, Ae F Tern <ae_f_tern@dot.ca.gov>, Eric Brown <e.brown@earthmech.com>, Pat Wilson <P.Wilson@earthmech.com>

Dear Arul,

Your Final Foundation Reports, dated May 10 2010, for the subject retaining walls have been reviewed. All review comments for the previous version of reports have been clarified, and report modifications have been made when applicable. However there is still one more comment we want to add before conclusion of our work.

Section 5.4.3 Settlement (Settlement Monitoring Recommendation):
Since the value of long-term residual settlement for the MSE walls could be a hard guess out in the field, we would suggest using waiting period to control the timing for subsequent wall construction. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to maintain certain flexibility for decision making during construction.

Please let me know if you have any question.

Best regards,

Haitao Liu, P.E.

Transportation Engineer - Civil
Office of Geotechnical Design South - 1
Division of Engineering Services
Department of Transportation, California

5900 Folsom Blvd.
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Office phone: (916) 227-0992
Cell phone: (916) 704-6519

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Retaining Wall E1 (Bridge No. 53E0149) and Retaining Wall E2 (Bridge No. 53E0150)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 0.10	Reviewing Agency:	Caltrans		
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)		
Milestone:	Final Foundation Report	Review Date:	June 29, 2010		
Consultant:	Earth Mechanics, Inc.	Submission Date:	July 1, 2010		

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
1			1) Section 5.4.3 Settlement (Settlement Monitoring Recommendation): Since the value of long-term residual settlement for the MSE walls could be a hard guess out in the field, we would suggest using waiting period to control the timing for subsequent wall construction. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to maintain certain flexibility for decision making during construction.	Patrick Wilson (PW), Eric Brown (EB), K. Arul Arulmoli (KA)	A	Will comply. EMI will incorporate the comment on the Settlement Monitoring Recommendation into the subject Final Foundation Report. The fifth and sixth paragraphs in Section 5.4.3 (Settlement) of the Final Foundation Report will be replaced by the revised "Settlement Monitoring Recommendation" paragraph. The above change to Section 5.4.3 will be documented in the Addendum to the Final Foundation Report for Retaining Walls E1 and E2.	7/1/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

July 2, 2010

EMI Project No. 06-123-03

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, California 90745

ATTENTION: Mr. Lucien Hersh, P.E.
Project Manager

SUBJECT: Addendum to "Final Foundation Report, Retaining Wall G1 (Bridge No. 53E0151) and Retaining Wall G2 (Bridge No. 53-RWG2), Dated May 10, 2010", Los Angeles County, California, 7-LA-47, PM 0.17, EA 138201

Dear Mr. Hersh:

Earth Mechanics, Inc. (EMI) submitted the Foundation Report for the subject retaining walls, dated February 10, 2010, to Caltrans for review and comments. Caltrans Office of Geotechnical Design South 1 (OGDS-1) reviewed the report and provided its comments in an email dated April 12, 2010. EMI incorporated the responses to Caltrans OGDS-1 comments into the Final Foundation Report, dated May 10, 2010 and submitted it to Caltrans. Caltrans OGDS-1 reviewed the Final Foundation Report and provided its comment in an email dated June 29, 2010.

EMI developed its response to the Caltrans comment, which was reviewed and accepted by OGDS-1. The Caltrans review comment and EMI response are included in Attachment 1.

Based on the Caltrans review comment, the following change has been made to Settlement Monitoring Recommendation in Section 5.4.3 (Settlement) of the Final Foundation Report:

(1) The "Settlement Monitoring Recommendation" provided in the fifth and sixth paragraphs of Section 5.4.3 (Settlement) in the Final Foundation Report have been revised into one paragraph as follows:

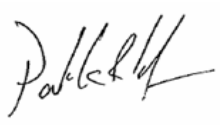
"Settlement Monitoring Recommendations: Based on our experience, the calculated settlements and settlement periods are approximations of actual field observations. Due to the variability of subsurface conditions and the thinly layered nature of soil deposits, settlement monitoring is recommended. A settlement monitoring program should be implemented for the proposed MSE wall. Surface monuments should be placed on the face of the MSE wall to measure any vertical or lateral movement. In addition, surface settlement monuments, constructed in accordance with Caltrans Standard Plan Sheet A74 or equivalent (Caltrans, 2006b), should be placed at the maximum wall heights and at every 100 ft along the length of the MSE wall. The settlement monuments should be installed in a timely manner upon completion of wall construction. Special care should be exercised in the field to survey and protect these settlement devices. The monuments should be monitored at the time of installation, on a weekly

basis for a month, and then once every 2 weeks thereafter until it has been verified by the Engineer that the remaining settlement for the embankment is acceptable. The uppermost levels of wall facing, coping, roadway pavement, hardscape, and any other improvements should not be constructed until the remaining settlement is within acceptable limits (i.e., ½-inch or less). However, waiting period for the above-mentioned improvements can be modified based on field settlement measurements upon Engineer's approval."

This addendum should be attached to the front of the Final Foundation Report for the subject walls, dated May 10, 2010.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to call us.

Sincerely,
EARTH MECHANICS, INC.



Patrick Wilson, PhD
Staff Engineer

Eric Brown, GE
Senior Engineer

(Arul) K. Arulmoli, PhD, GE
Project Manager

ATTACHMENT

Attachment 1. Caltrans Comment and EMI Response to Caltrans Comment on the Final Foundation Report for Retaining Wall G1 (Bridge No. 53E0151) and Retaining Wall E2 (Bridge No. 53-RWG2), Dated May 10, 2010

ATTACHMENT 1

Caltrans Comment and EMI Response to Caltrans Comment on the Final Foundation Report for Retaining Wall G1 (Bridge No. 53E0151) and Retaining Wall G2 (Bridge No. 53-RWG2), Dated May 10, 2010

Subject: Review Comment for Retaining Walls A1, C1, E1, E2, H1, G1, and G2
From: Haitao Liu <haitao_liu@dot.ca.gov>
Date: Tue, 29 Jun 2010 20:58:50 -0400
To: Arul Arulmoli <arulmoli@earthmech.com>
CC: Ranjan Gunaranjan <ranjan@earthmech.com>, Ae F Tern <ae_f_tern@dot.ca.gov>, Eric Brown <e.brown@earthmech.com>, Pat Wilson <P.Wilson@earthmech.com>

Dear Arul,

Your Final Foundation Reports, dated May 10 2010, for the subject retaining walls have been reviewed. All review comments for the previous version of reports have been clarified, and report modifications have been made when applicable. However there is still one more comment we want to add before conclusion of our work.

Section 5.4.3 Settlement (Settlement Monitoring Recommendation):
Since the value of long-term residual settlement for the MSE walls could be a hard guess out in the field, we would suggest using waiting period to control the timing for subsequent wall construction. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to maintain certain flexibility for decision making during construction.

Please let me know if you have any question.

Best regards,

Haitao Liu, P.E.

Transportation Engineer - Civil
Office of Geotechnical Design South - 1
Division of Engineering Services
Department of Transportation, California

5900 Folsom Blvd.
Sacramento, CA 95819
Office phone: (916) 227-0992
Cell phone: (916) 704-6519

.

Retaining Wall G1 (Bridge No. 53E0151) and Retaining Wall G2 (Bridge No. 53-RWG2)

SUBMITTAL REVIEW COMMENTS FORM

District-Co-Rte-PM:	07-LA-47-PM 0.17	Reviewing Agency:	Caltrans		
EA No.:	138201	Functional Unit:	Office of Geotechnical Design South - 1 (OGDS-1)		
Milestone:	Final Foundation Report	Review Date:	June 29, 2010		
Consultant:	Earth Mechanics, Inc.	Submission Date:	July 1, 2010		

NO.	DWG NO./ SPEC NO./ SECTION NO., ETC.	Reviewed By:	COMMENTS	RESPONSE BY:	ACTION REQ'D	RESPONSE	DATE	CURRENT STATUS (OPEN / CLOSED)
1			1) Section 5.4.3 Settlement (Settlement Monitoring Recommendation): Since the value of long-term residual settlement for the MSE walls could be a hard guess out in the field, we would suggest using waiting period to control the timing for subsequent wall construction. The language, such as, "waiting period can be reduced based on settlement measurement upon Engineer's approval" can be used to maintain certain flexibility for decision making during construction.	Patrick Wilson (PW), Eric Brown (EB), K. Arul Arulmoli (KA)	A	Will comply. EMI will incorporate the comment on the Settlement Monitoring Recommendation into the subject Final Foundation Report. The fifth and sixth paragraphs in Section 5.4.3 (Settlement) of the Final Foundation Report will be replaced by the revised "Settlement Monitoring Recommendation" paragraph. The above change to Section 5.4.3 will be documented in the Addendum to the Final Foundation Report for Retaining Walls G1 and G2.	7/1/2010	

RESPONSES FOR ACTION REQ'D
A: AGREE FULLY WILL COMPLY.
B: AGREE PARTLY SEE NOTED EXCEPTIONS.
C: DISAGREE. REASONS ARE NOTED.
D: COMMENT HAS BEEN SUPERCEDED BY DESIGN DEVELOPMENT.
E: QUESTION ONLY. ANSWER THE QUESTION.

DEPARTMENT OF TRANSPORTATION
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March 17, 2010

United States Coast Guard, Bridge Administration
Eleventh Coast Guard District
Attn: Carl Hausner
Building 50-2
Coast Guard Island
Alameda, CA 94501-5100

SUBJECT: SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT, LOS ANGELES COUNTY, CA -- RESPONSE TO QUESTIONS ON BRIDGE PERMIT APPLICATION

Dear Mr. Hausner,

We are in receipt of your letter of February 18, 2010 regarding our Bridge Permit Application to the Coast Guard for the construction of the Schuyler Heim Bridge Replacement Project in San Pedro Harbor. The Project will replace the existing Schuyler Heim lift bridge with a new fixed-span bridge to meet the current seismic criteria.

We are aware that the 401, Water Quality Certification and the State Coastal Zone Management Consistency Certification must be issued prior to the Coast Guard issuing a bridge permit for the subject project. Caltrans has applied to the appropriate agencies to obtain both certifications. Copies of those applications where submitted with our original submittal and we anticipate obtaining both those certifications by April 30, 2010. We trust that your review of our Bridge Permit Application can proceed in parallel with the other approval processes and that the final issuance of your permit would follow receipt of the above mentioned certifications.

With regards to the temporary construction trestles, we indicated in our submittal that the use of this approach would be dependent upon the means and methods selected by the contractor. Furthermore, we did not mean to imply that these trestles would span the entire channel. In fact, Figure 3, included with the original bridge permit application, clearly shows two separate trestle configurations extending from the two shorelines with an open navigable channel left between the two temporary trestles. Selection of the construction means and methods would be left to the contractor. In addition, we will include language in the construction contract to preclude the contractor from blocking the navigable opening with any construction support facilities utilized during the construction process. Since the trestles will not obstruct the navigable channel, it is our understanding that no bridge permit will be required for those structures. We acknowledge that we did confuse the matter in the text of Attachment 1 to our Bridge Permit Application by referring to the trestle system as a trestle bridge, and with the

statement that the trestle extends across the entire channel. We have revised the conflicting section of Attachment 1 to clarify this point and are resubmitting the revised section with this transmittal.

Finally, based upon your discussion with Mr. Foued Zayati on March 3, 2010, we have revised the structural plans and profiles to show only the pertinent parameters outlined in Appendix E of the Coast Guard Bridge Permit Application Guide. We are submitting four (4) sets of 8-1/2" x11" copies of these updated drawings for your use in the review process of our bridge permit application.

Please review the enclosed material at your earliest convenience and contact me at (213) 897-2923 or by e-mail at [Hamid_R_Toossi@dot.ca.gov] with any questions that you may have. We appreciate your attention to this matter.

Sincerely,

Hamid R. Toossi, P.E.
Senior Transportation Engineer
Office of Design D

Attachment 1
Coast Guard Bridge Permit Application

PROJECT DESCRIPTION

A Final Environmental Impact Statement / Environmental Impact Report (FEIS/FEIR) was prepared for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project (Caltrans 2009[1]). The EIS/EIR identified six proposed project alternatives. "Alternative 1 (Bridge Replacement and SR-47 Expressway)" was selected as the preferred alternative. Alternative 1 combined the Schuyler Heim Bridge Replacement Project and the Alameda Corridor Expressway Project to create a grade-separated expressway that will be a high-capacity alternate route between Terminal Island and Alameda Street / Pacific Coast Highway. This alternative involved replacement of the Schuyler Heim Bridge; construction of a limited-access expressway that begins at Ocean Boulevard, crosses the Cerritos Channel, and extends northward for a distance of approximately 1.7 mi (2.7 km); and construction of the proposed 5,084-ft (1,550-m) flyover (see Figure 2-1 within Caltrans 2009). However, Alternative 1 could not be completely funded at this time. As a consequence, only a portion of Alternative 1; construction of a replacement Schuyler Heim Bridge and demolition of the existing bridge will be completed at this time by Caltrans (hereafter referred to as the Project). Complete implementation of the SR-47 Expressway portion of Alternative 1 may be constructed following the Project, depending upon the availability of funding. The remaining SR-47 Expressway portion of Alternative 1 will obtain separate discretionary approvals as necessary prior to implementation. The Project does not include adverse impacts to common or special status species[2] or other biological resources[3] associated with the construction of the SR-47 Expressway Project (Figure 1).

The Project is intended to provide a structurally sound vehicular connection between Terminal Island and the mainland that complies with the State's current bridge seismic design criteria. The Schuyler Heim Bridge was built by the Navy in 1946 per existing federal bridge design standards of that time. The existing bridge does not meet current seismic design requirements. In the event of a major earthquake, the bridge is projected to be severely damaged and non-operable. The Project will conform to current seismic criteria by replacing the existing Schuyler Heim Bridge with a fixed-span bridge along and east of the existing bridge alignment (Figure 1). The Project will also reconstruct the northerly and southerly approaches to the bridge and maintain connectivity to State Route (SR) 103 and Ocean Boulevard. In addition, existing connections to Henry Ford Avenue and New Dock Street will be maintained.

As previously stated, the Project includes replacing the existing Schuyler Heim Bridge with a fixed-span bridge east of the existing bridge alignment. The estimated total temporary and permanent disturbance area associated with the Project is approximately 92 acres (37 ha), which includes the permanent disturbance footprint as well as a 250-ft (76.2 m) buffer to accommodate temporary structures (i.e., trestles or piers, lay down areas on Pier A West and Pier S, access and egress routes, etc.). The proposed fixed-span structure will be approximately 4,800 ft (1,463 m) long and with an average width of 120 ft (36.6 m). The proposed bridge is 43 ft (13 m) wider than the existing lift bridge due to a new southbound auxiliary lane, standard 12 feet (3.6 m) wide lanes, and standard 10 foot (3.0 m) shoulders. In the northbound direction, the replacement

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[1] Caltrans. 2009. Schuyler Heim Bridge Replacement and SR-47 Expressway Project. Final Environmental Impact Statement/Environmental Impact Report and Section 4(f) Evaluation. SCH No. 20021009. April 2009.

[2] For the purposes of this analysis, "special-status species" include any species that has been afforded special recognition by federal, state, or local resources agencies (e.g., U.S. Fish and Wildlife Service [USFWS], California Department of Fish and Game [CDFG], etc.) and/or resource conservation organizations (e.g., California Native Plant Society [CNPS]). The term "special-status species" excludes those avian species solely identified under Section 10 of the Migratory Bird Treaty Act (MBTA) for federal protection. Nonetheless, MBTA Section 10 protected species are afforded avoidance and minimization measures per state and federal requirements.

[3] For the purposes of this document, "biological resources" include the plants, wildlife, and habitats that occur, or have the potential to occur, within the Project area.

bridge will include three 12-ft (3.6-m) wide through traffic lanes, and 10-ft (3.0-m) shoulders. In the southbound direction, the replacement bridge will include three 12-ft (3.6-m) wide traffic lanes, one 12-ft (3.6-m) auxiliary lane, and 10-ft (3.0-m) shoulders. The proposed alignment for the new fixed-span bridge is located primarily within, and partially east of, the existing bridge's right-of-way. The proposed alignment design avoids conflicting with current and future development of Pier A and Pier S.

The centerline of the proposed fixed-span bridge is shifted to the east of the centerline of the existing bridge to avoid impacts to the Alameda Corridor Transportation Authority (ACTA) tracks - located on the Badger Bridge immediately west of the existing Schuyler Heim Bridge (See Figure 4 within the attached Jurisdictional Determination Report), and to accommodate construction sequencing and maintain traffic flows during Project construction and demolition activities. Existing and proposed northbound bridge cross sections are shown in Figure 2-5 of the FEIR/FEIS (Caltrans 2009).

The vertical clearance of the proposed fixed-span bridge will be 47 ft (14.3 m) over the Cerritos Channel mean high water line (MHWL) of 4.7 ft (1.43 m). This profile will accommodate a 45-ft (13.7-m) fireboat. The width of the navigable channel (distance between bridge-support columns and fenders) will be 180 ft (54.9 m), the same as the existing width. The bridge replacement will retain access to a southbound off-ramp and northbound on-ramp at New Dock Street on Terminal Island, as well as a northbound off-ramp and southbound on-ramp at Henry Ford Avenue on the mainland (north) side of the bridge. The New Dock Street southbound off-ramp will be elevated to clear the existing industry tracks that join the Badger Bridge rail alignment from east of SR-47. The new alignment of the off-ramp will eliminate one of the two at-grade rail crossings at SR-47/ New Dock Street. New Dock Street will be realigned to accommodate the realigned on-ramp and off-ramp.

Construction of the Project is expected to take approximately 2 to 3 years, beginning in the winter of 2010. This schedule assumes the use of multiple crews working over the course of a two-shift workday, typically for a 5-day workweek. This schedule also assumes that interfering utilities will have been removed prior to construction. The construction schedule for replacement of the Schuyler Heim Bridge involves the following major types of activities:

- Demolition;
- Grading/excavation;
- Foundation and bridge abutment/column construction; and
- Bridge construction.

Construction of the Project will require temporary structures, or "falsework" that will be built to support the new bridge and then be removed once construction is complete. The falsework required to construct the new bridge within the channel will temporarily restrict the available horizontal clearance to 75 ft (22.9 m) and the vertical clearance to 43 ft (13.1 m) openings required for U.S. Coast Guard emergency and security vessels. The Cerritos Channel clearance restrictions are projected for a period of 12 to 24 months during construction of the eastern deck, sections of the new bridge, demolition of the existing steel lift bridge and construction of the western deck sections of the new bridge. The channel will be closed completely to large marine vessels for a period of approximately 1 year to erect the new bridge and remove the mid-span truss of the old lift bridge. With the exception of these periods of restriction and closure, the channel will be open for navigation during bridge construction.

The Project involves utilizing shafts[4] that are cast-in-drilled-hole (CIDH) over land and cast-in-drilled-hole (CIDH) with a permanent steel casing in the upper portion of the pier for those shafts

[4] The term "shafts" refers to the underground foundation that supports the roadway structure, through "bent" or "pier columns". Bents are found over land, while piers are located in water.

located within the Cerritos Channel. The difference between the CIDH shaft with permanent casing and the cast-in-steel-shell (CISS) concept is that for the CISS shaft the steel casing extends for the full depth of the shaft. Also, typically for the CISS shaft, the soil is not removed from the lower portion of the shaft and only the upper portion of the shaft is filled with concrete. For the Bridge Replacement project all of the shafts will be of the standard CIDH construction, as CIDH shafts can carry vertical and lateral loads through the deep, liquefiable soil layers. None of the CIDH shafts or the CIDH shafts with steel casing will require pile caps and, therefore, will minimize right-of-way takes, utility relocations and effects to biological resources. The major difference between the two types of CIDH shafts is the permanent steel casing in the upper portion of the shafts, which will only be used in the Cerritos Channel.

The Project will demolish the existing Schuyler Heim Bridge by first removing the lift span and then removing the remaining steel approach structures. Construction of the new fixed-span bridge will be phased to minimize the required bridge closure time (estimated to be several night closures that transition traffic from the existing bridge approaches onto the new bridge). The first phase constructs the easterly portion of the new fixed-span bridge east of the existing bridge. Once built, traffic from the existing bridge approaches will be routed onto the recently constructed bridge. In the second phase, the existing Schuyler Heim Bridge will be demolished. The final phase constructs the westerly portion of the new fixed-span bridge over the footprint of the recently demolished bridge.

The eastern side of the new fixed-span bridge will be constructed east of the existing lift bridge. The south ends of the new bridge approach will tie-in to Ocean Boulevard. On the north, the new bridge approach will tie in the existing SR-103 and Henry Ford Avenue. The connection to Ocean Boulevard and SR-103 are expected to occur at night without closing the SR-47 to traffic. Following completion of the tie-ins, traffic on the existing bridge will be diverted to the eastern side of the new bridge, and the existing bridge will be demolished.

Following demolition, the western side of the new bridge will be constructed over the footprint of the existing bridge. The new bridge then will be open to traffic. Total period of closure of the Cerritos Channel crossing during construction is expected to be approximately 30 days, which includes approximately 5 days of closure to remove the mid-span truss.

Construction of the portion of the new bridge that is directly over the Cerritos Channel will require access from both sides of the channel. Pier S and Pier A West will serve as local construction staging and materials storage areas (Figure 2). Per the contract's specifications, the contractor will be allowed to choose their method and means to erect the bridge over the Cerritos Channel. Two potential methods to construct the portion of the bridge over the Cerritos Channel would be to use multiple barges or a temporary trestle system (Figure 3). If the contractor elects to use multiple barges to construct the new bridge, a temporary pier composed of individual concrete column footings spaced every 20 ft (6 m), timber posts, cross tie beams and a wooden deck would be constructed from Pier S. The temporary pier would be required to dock the construction barges that supply construction materials, falsework, equipment and workers from the Pier S staging area. The temporary pier will extend approximately 150 ft (46 m) beyond the Pier S channel embankment to allow barges to dock. The temporary pier would be approximately 40 ft (12 m) wide to simultaneously accommodate a haul truck, front loader and construction workers. The temporary pier would also be utilized in constructing the eastern half of the new bridge, demolishing of the existing Schuyler Heim Bridge and constructing the western half of the new bridge. Upon completion of this work, the temporary pier would be completely removed from the channel. The pier will have an estimated temporary in-channel impact of 0.0023 ac (0.0009 ha) - based on 26 column footings that are approximately 4 sq ft (0.37 sq m) each. Barge access to the contractor's construction staging area within Pier A (west) will not require a temporary pier be erected in the Cerritos Channel. Due to the amount of goods movement activity on Pier A (east) and the fully developed Anchorage marina, construction materials, falsework, equipment and workers from Pier will be transported to an existing barge dock on the northern shore of the Dominguez Channel, west of Henry Ford Avenue. As result, the construction barges will travel

about a mile southwest on the Dominguez Channel before intersecting the Cerritos Channel and traveling east to access the construction site.

The contractor could also elect to build a temporary trestle structure to construct the Project. This approach would require a timber trestle erected on concrete column footings, or short steel driven piles spaced every 20 ft (6 m) to span 300 ft (91.4 m) into the channel from the north bank and 385 ft (117.3 m) into the channel from the south bank, leaving an open, navigable waterway in the center of the channel. The two segments of the temporary structure would be placed just east of the eastern half of the new bridge to load and unload construction materials, falsework, equipment and workers from the Pier A and Pier S construction staging areas. The total length of the temporary structure would be approximately 685 ft (208.7- m) long and 40 ft (12 m) wide. The trestle structure will have a temporary in-channel impact of 0.0110 ac (0.0044 ha) - based on 120 column footings that are approximately 4 sq ft (0.37 sq m) each. Openings within the temporary trestle to accommodate U.S. Coast Guard emergency and security vessels will be provided by the contractor. Once the eastern half of the new bridge is completed, the temporary trestle would be removed. After demolition of the existing Schuyler Heim Bridge, another pair of temporary trestles would be constructed just west of the second half of the new bridge to supply construction materials, falsework, equipment and workers from the Pier A and Pier S construction staging areas. The second pair of temporary structures would also be approximately 685 ft (208.7 m) combined total length and 40 ft (12 m) wide. Once the western half of the new bridge is completed, the temporary trestle would be removed. Similar to the eastern side, this trestle structure will have a temporary in-channel impact of 0.0110 ac (0.0044 ha) - based on 120 column footings that are approximately 4 sq ft (0.37 sq m) each.

For both scenarios, the contractor will first construct the eastern half of the new bridge that does not impact the existing traffic operations of SR-47. The new eastern half of the bridge will require the contractor to install two CIDH shafts with permanent steel casing at each of the four bents within the Cerritos Channel for a total of eight CIDH piles. After demolition of the existing Schuyler Heim Bridge, the contractor will install the remaining eight piers for a grand total of 16 CIDH piles constructed within the Cerritos Channel. All CIDH piles within the channel that support the new Schuyler Heim Bridge have a 12-foot (3.65-m) diameter. Drilling for the 16 CIDH piles will produce 2,513 cubic yards (1,922 cubic meters) of excavated material to be removed from the channel. Subsequently, the same volume of concrete and steel reinforcing bars will be placed into the channel to permanently fill the drilled CIDH piles. In order to provide a dry workspace to join the bridge's columns to the steel reinforcing bars in the CIDH piles, the contractor will construct a watertight coffer dam at each bent. Dewatering will occur once steel piles along with interlocking corrugated metal sheets are driven around the bridge bents to form a dry workspace. Water removed from the coffer dams will be analyzed to identify if it is contaminated, classified, and treated if required before it is disposed of according to the applicable approved methods. The area within the coffer dam will be utilized to construct the bridge's CIDH piles and later the bridge columns. Four coffer dams, each 90 ft (27 m) long and 40 ft (12 m) wide, will be utilized to construct the eastern section of the new bridge's footings. Construction materials, equipment, and laborers will be supplied by barge or trestle. All excavated material will be analyzed to identify if it is contaminated, then classified, and if it is clean it will either be used for fill in upland areas within Project limits or transported for disposal in an approved landfill; or if it is contaminated, it will be transported for disposal in an approved landfill. Once the first half of the bridge's columns has been constructed, the coffer dams will be removed. After the existing bridge has been demolished, the next four coffer dams will be erected to construct the second set of CIDH piers and bridge columns. The four additional coffer dams will be removed after the new bridge's columns have been completed. The eight coffer dams will have a temporary in-channel impact of 5.7 ac (2.3 ha).

Falsework for the new Schuyler Heim Bridge will require driven steel pipe columns, 24 inches (610 mm) in diameter, to be installed at 20 ft (6 m) center-to-center spacing for additional temporary support. The driven steel pipe columns will have a temporary impact of 0.127 ac (0.051 ha) – based on 440 driven steel pipes. Once the steel pipes are in place, wooden timber

posts with "X" bracing lumber cross ties will support structural steel "I" beams to form a temporary heavy timber deck. The temporary deck will be employed for constructing the Cast-in-Place (CIP)/Post Tensioned (PS) girders as well as the final concrete deck between spans. During erection and dismantling of the bridge falsework, marine traffic will not be allowed to pass.

During the anticipated 3-year construction period, marine traffic in Cerritos Channel will be limited, as temporary navigation openings will be a maximum 75 ft (22.9-m) wide and 43 ft (13.1-m) high. In addition, the channel could be closed for periods up to 30 days for falsework erection, girder casting, lift bridge span demolition and falsework dismantling. During periods when the channel will be open, marine traffic would be directed through temporary openings.

Bridge construction will occur in phases. The construction schedule balances speed of construction with maintaining traffic on SR-47 and also minimizes bridge closures during construction. During construction, security fencing will be installed; followed by rough grading. Grading will occur on the north and south sides of the Cerritos Channel within the right-of-way to build the access ramps and approaches for the new higher bridge. It is expected that cut and fill will be balanced for this activity. This grading phase is estimated to require approximately 1 month to complete.

Since pile caps are not required for the bents on land or piers within the Cerritos Channel, once the pile is cast up to the construction joint, the column's reinforcing steel cage will be tied to the pile's exposed steel bars before final casting occurs. Pile casting will be completed after the column's reinforcing steel bar cages have been installed, the vertical column forms have been erected, and the structural concrete has been poured. Concrete will be brought on site in ready-mix trucks and pumped into the forms. After the specified curing period, the column forms will be removed. The columns will be spaced approximately 154 ft to 246 ft (47 m to 75 m) apart to support the fixed-span bridge. Each column will be approximately 7 to 9 ft (2.1 m to 2.7 m) in diameter. A total of 120 columns will be installed and will have a permanent impact of 0.078 ac (0.032 ha).

The existing fender piles in the channel will be pulled out with a crane. A total of 144 fender piles will be removed, each having a diameter of 1.2 ft (0.36 m) for a total area of 0.0013 ac (0.0005-ha). The new fender system will be constructed integrally with the top of the CIDH piles on either side of the navigational channel in accordance with the attached drawings. On this basis, the permanent impact of new fender system is estimated to be 0.085 ac (0.035 ha).

After column installation is complete in the channel, wood forms supported by steel and wood falsework will be erected for support of the integral cap beam, bridge box girders and projecting deck slab between each pair of columns. Falsework will consist of large heavy timbers designed to support the overhead installation of reinforcing steel, and subsequent concrete pouring to form integral bent caps, bridge's box girders and projecting deck slab to connect of the columns in each bent. During this phase, warning signs and night lighting will be utilized on the falsework - as necessary, to alert marine traffic of the presence of construction structures.

When the falsework for the approach span is completed, installation will begin by constructing the bridge support structure (i.e., bents tying the four columns together) with steel and reinforced concrete. Overhead bridge deck forms will be placed; then concrete will be poured and cured. The forms will be removed as the final step.

With a substantial portion of the falsework in place, installation of the main-span superstructure will begin. This will consist of the casting the bents with the girders to connect the pairs of columns, and subsequently the bridge support structure. Just as in other poured-in-place installations, overhead forms will be installed around each section of the superstructure, concrete will be poured and cured, and forms will be removed. This phase will complete of the structural section of the main span.

The existing bridge superstructure and piers will also need to be removed. A small portion of the existing main-span footing will be removed to allow placement of several CIDH piles in the channel. The balance of the existing pile caps, footings, and piles will be cut 2 ft (0.6 m) below the channel invert per a 2005 meeting with the U.S. Coast Guard, and the hard-bottom substrate will naturally revert back to native earth bottom. Prior to existing substructure removal, four coffer dams will be erected to provide dry workspaces. The two coffer dam in the center of the channel will be approximately 140 ft (43 m) in length while the outside coffer dams by the shore will be 80 ft (24 m) in width and the other two will be approximately 140 ft (43 m) in length and 51 ft (16 m) in width. The four coffer dams will have a temporary in-channel impact of 0.488 ac (0.197 ha). If the bridge is not sold for reuse in an alternate location, provided they are cut off and appropriately as-built marked. The superstructure, if sold, will be salvaged. Otherwise it will be sent to a scrap metal exporting terminal. While there is no steel recycling mill operating in the Port of Long Beach (POLB) or Port of Los Angeles (POLA), there are several scrap metal exporting terminals at both ports. Because lead paint is likely to be encountered on the old superstructure, special measures will be employed during demolition to prevent lead contamination. A lead-based paint and asbestos survey will be conducted. If lead and/or asbestos are encountered at levels higher than the mandated thresholds, these materials will be removed from the steel for disposal prior to recycling.

Once the approach and main-span decks have been completed, construction of the deck barriers and joints will begin. The deck barriers will consist of forms and reinforced concrete to provide vehicle protection along both the outside portions of the structure and the center divider. Joints will consist of forms and reinforced concrete to tie together each segment of the bridge and expressway structure, and allow for expansion and contraction of the road surface.

At the close of construction, the bridge surface will be striped for the prescribed number of traffic lanes, and lighting fixtures and signage will be installed. Additionally, prior to the close of Project construction a fence will be incorporated on both sides of the new bridge with a height of 14 ft (4.27 m). After this step, the bridge will be open for service. Overall, the Project will have a temporary in-channel impact of 6.36 ac (2.57 ha). Although the Project will require the permanent placement of 0.02 ac (0.01 ha) of CIDH piles within the Cerritos Channel, the Project will remove 0.49 ac (0.20 ha) of existing piles and footings which will result in a net gain in open water habitat of 0.48 ac (0.18 ha).

In addition to the information provided above, dewatering activities will include coffer dams or similar structures within the Cerritos Channel. Barge mounted vibratory pile drivers will be use to vibrate sheet piles for the coffer dams into the ground. The coffer dams will be equipped with pumps for dewatering. Water that enters the coffer dams will be removed by pump and placed in a baker storage tank for testing and treatment. Pumped water will be allowed to settle in the baker tanks. If foreign material enters the water it will be disposed of according the requirements of the Clean Water Act Section 402 National Pollution Discharge Elimination System Permit, Industrial Water Permit, or profiled for disposal at an acceptance facility. Clean water will be returned to the Cerritos Channel. Sediments from the baker tanks will be placed on a barge and taken to shore for processing and disposal with other spoils. Water will remain flowing during construction around the coffer dams within the Cerritos Channel. The coffer dams will be removed using the barge mounted vibratory pile drivers upon completion of construction. . The Project will not disrupt the tidally-influenced hydrological regime within the Cerritos Channel. The channel will maintain its tidally-influenced hydrologic regime during Project construction to avoid or minimize adverse impacts to fish or other biological resources and localized water-chemistry (e.g., turbidity, salinity, Ph, water temperature, dissolved oxygen, etc.).

The Project includes the following general avoidance and minimization measures:

- Preconstruction surveys of potential California least tern breeding sites (which may include any area of bare ground in the vicinity of the Project) will be conducted within 1,500 ft (456 m) of construction activities. If breeding special status birds are present,

then construction activities within 1,500 ft (456 m) on the nest sites will be delayed until after the February to July breeding season;

- A new peregrine falcon nest site will be established for the resident pair of falcons in close proximity to the Project by placing a nesting box on a tower of the Badger Avenue Bridge or another elevated locale. The local peregrine falcon population will be monitored to determine whether the resident pair nests in the new nesting box. A falcon relocation plan, detailing the relocation means and methods will be approved by the resource agencies and implemented prior to Project construction;

- To avoid or minimize vehicle caused bird mortality, a fence will be incorporated on both sides of the new Schuyler Heim Bridge over the Cerritos Channel with a height of 14 ft (4.27 m).

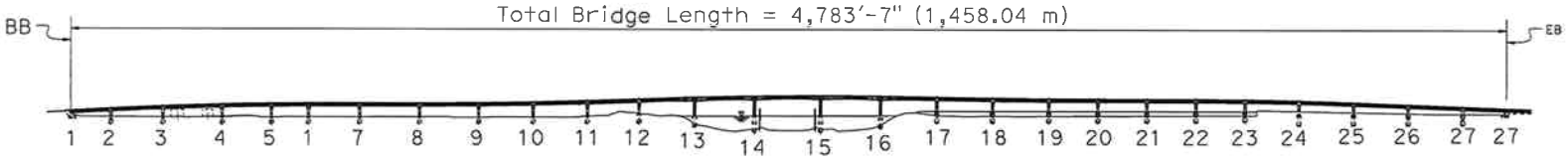
- Limiting the area to be disturbed by Project activities will minimize impacts to biological and aquatic communities. This includes the sediment in the channel to be directly affected by the Project, as well as other aquatic activities that may assist in the distribution of suspended sediments.

- A plan to reduce pile driving sound will be developed as well; the final resource agency approved plan is likely to include a contained air bubble curtain on larger pile installations and dewatering casings for smaller piles. Performance criteria for sound attenuation will be developed to achieve maximum practicable reductions in underwater sound levels;

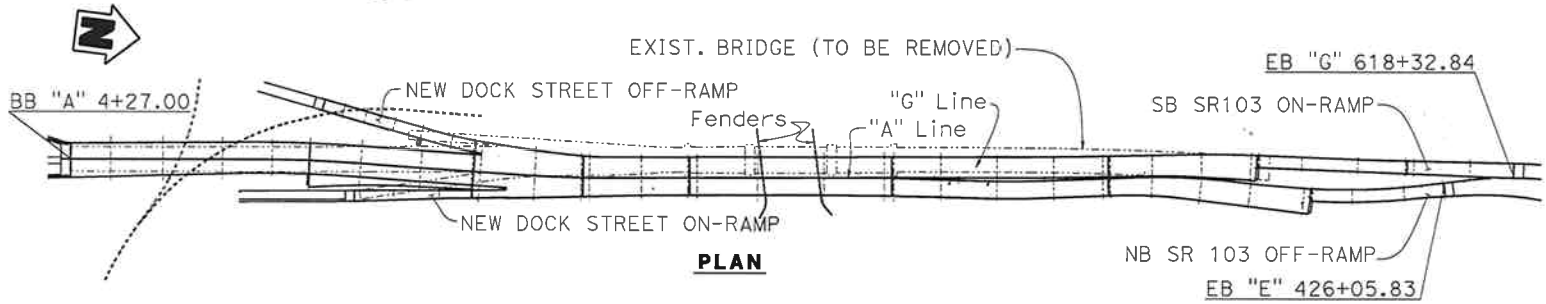
- A hydroacoustic monitoring plan will be developed, which would include appropriate sampling point locations, frequency, and methods to be implemented during pile driving. The results of the hydroacoustic monitoring would be analyzed real time to identify appropriate safety isopleths and monitoring zones for sensitive biological resources; and

- Construction would require the adoption of the following Best Management Practices (BMPs) for protection of water quality. The following BMPs will limit stormwater runoff, soil erosion, implement water conservation practices, and maintain the water quality of the receiving waters during construction:
  1. Channel bank work would include bank protection (riprap, concrete walls) to eliminate the possibility of enhanced bank erosion.
  2. Sediment re-suspension would be minimized by adherence to CIDH with steel casing designed for all in-water piles, whereby the outer shell would act as a coffer dam during construction and contain re-suspended sediment onsite until it is removed from within the shell prior to concrete pile installation.
  3. Cofferdams and sand blasting mats may be used during sand blasting operations.
  4. Erect shrouds around working areas and suspend nets and tarps below bridges to catch debris from abrasive removal of old paint, where wind conditions permit.
  5. Use vacuum or suction shrouds on blast heads to capture grit and old paint.
  6. Use barges and booms to capture fugitive floating paint chips, and custom-built enclosures to confine and capture the abrasives, old paint chips, and paint.
  7. Anchor tarps to barges below and enclose the bridge above to confine debris, where the bridge deck is not too far above water level.
  8. Perform lead-based paint removal.
  9. Turbidity curtains that are constructed of a permeable material allowing water to flow through the membrane while trapping suspended sediment should be used. Use of these permeable membranes allows the barrier to extend from the water surface to the bottom, providing effective containment and filtering of suspended sediments.
  10. Tires on construction equipment will be washed before the equipment enters and leaves the Project.
  11. Construction equipment will be cleaned as necessary to minimize the volume of decontamination wash water and prevent transport of contaminants from the Project.

12. Designated locations will be provided for servicing, washing, and refueling equipment, away from temporary channels or swales that would quickly convey runoff to the drainage system and into the Cerritos Channel.
13. Contaminated material (e.g., oil, lubricants) will be kept at a safe from an entry into a receiving water body. Temporary barriers and containers will be used to confine any contaminated materials. Upon completion of construction, all contaminated material on the proposed project will be removed and disposed of in accordance with federal, regional, and local regulations.
14. A temporary spill containment system will be installed and maintained within Project limits during construction. The contractor will be responsible for the containment plan and the execution of spill containment during the course of construction.
15. During Project construction, as appropriate, the contractor will:
    - Provide stabilized entrances and exits
    - Regularly water the non-paved surfaces
    - Regularly sweep and vacuum paved surfaces
    - Install silt fences at the toe of excavation and embankment slopes
    - Install sand or gravel bag berms along the top of slopes
    - Install slope protection such as geotextiles, plastic covers, soil binders, and erosion control blankets/mats
    - Install slope interruption devices such as fiber rolls and slope drains
    - Install permanent erosion control seeding, landscape planting, or slope/rock paving
    - Protect storm drain inlets with inserts or linear interrupters such as gravel bag and/or sand bag berms
    - Manage stockpiles against wind and water erosion
16. Monitor and report BMP performance and conditions before and immediately after the completion of work, in accordance with SWPPP specifications.



ELEVATION



PLAN

MARCH 16 2010

CHIEF ENGINEER

BRIDGE ENGINEER

0 200 400 600 800 1000 2000 FT

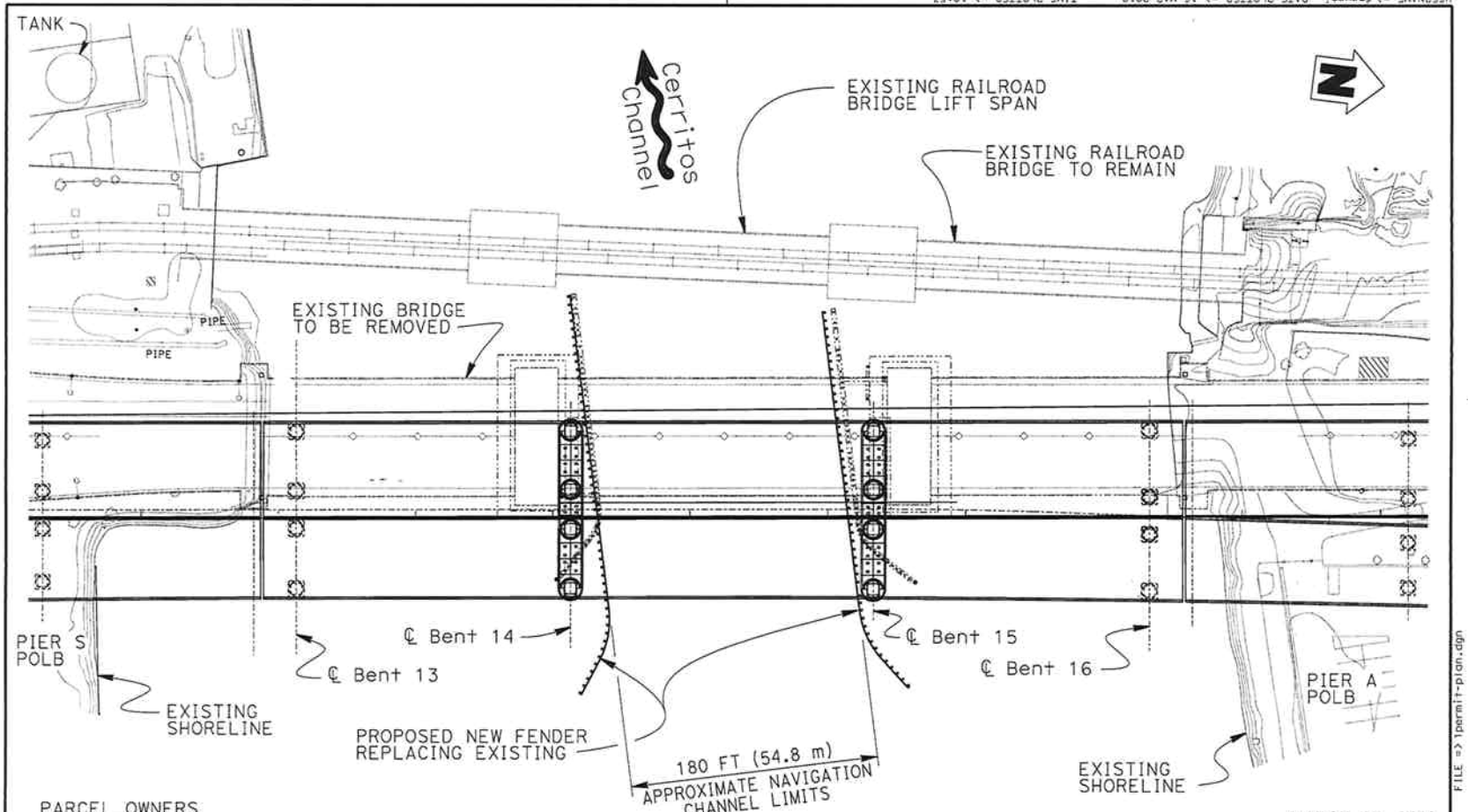
STATE OF
CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CERRITOS CHANNEL BRIDGE REPLACEMENT
LOS ANGELES COUNTY

SCHUYLER HEIM BRIDGE (REPLACE)
CERRITOS CHANNEL MILE 3.8 (6.12 KM)

GENERAL PLAN

SHEET	OF
1	3



PARCEL OWNERS

① Alameda Corridor Transit Authority
② Port of Long Beach (Pier S)
③ Port of Long Beach (Pier A)

NOTES:

1. Datum - NAVD 88
2. MLW = -0.38, MHW = + 4.33

0 50 100 150 200 400 FT

PLAN

CHIEF ENGINEER

BRIDGE ENGINEER

MARCH 16, 2010

STATE OF
CALIFORNIA
DEPARTMENT OF TRANSPORTATION

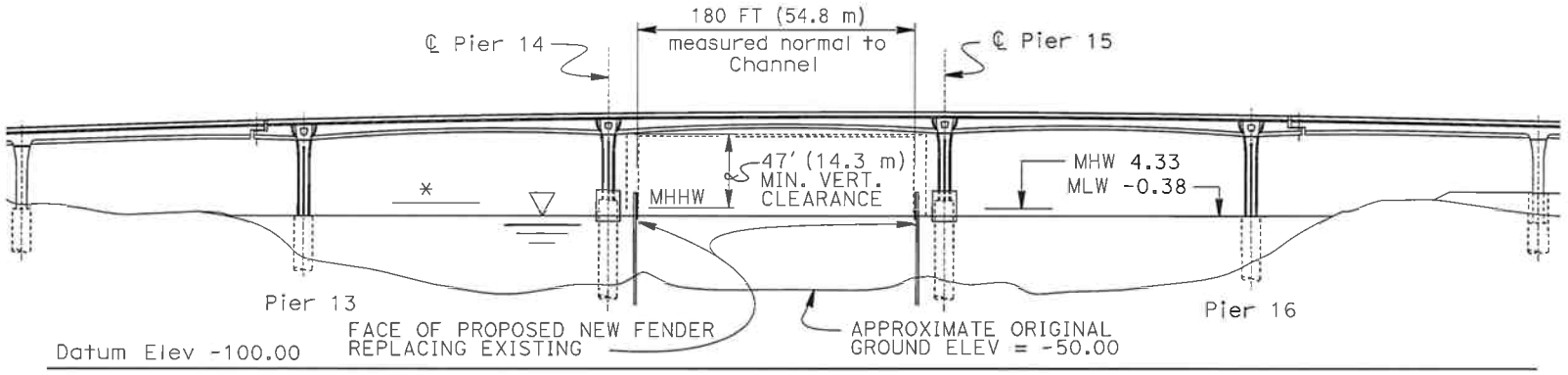
CERRITOS CHANNEL BRIDGE REPLACEMENT
LOS ANGELES COUNTY

SCHUYLER HEIM BRIDGE (REPLACE)
CERRITOS CHANNEL MILE 3.8 (6.12 KM)

KEY PLAN

SHEET	OF
2	3

USERNAME => fzqy01 DATE PLOTTED => 16-MAR-2010 TIME PLOTTED => 10:53
FILE => \permit-plan.dgn

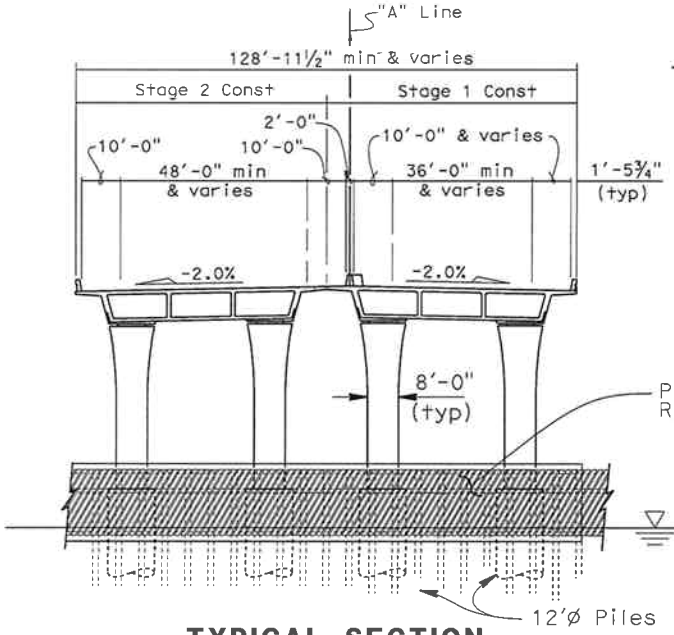


ELEVATION

* – 100 YEAR FLOOD ELEV = 8.00
NET PERMANENT FILL = -0.47 acres

NOTE: Datum - NAVD 88

0 50 100 150 200 400 FT



TYPICAL SECTION

0 20 40 60 80 100 200 FT

CHIEF ENGINEER

BRIDGE ENGINEER

MARCH 16, 2010

STATE OF
CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CERRITOS CHANNEL BRIDGE REPLACEMENT
LOS ANGELES COUNTY

SCHUYLER HEIM BRIDGE (REPLACE)
CERRITOS CHANNEL MILE 3.8 (6.12 KM)

KEY ELEVATION

SHEET	OF
3	3

STATE OF CALIFORNIA
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
MINING AND TUNNELING UNIT
6150 VAN NUYS BOULEVARD, SUITE 310
VAN NUYS, CA 91401-3333
(818) 901-5420 FAX (818) 901-5579

January 4, 2011

California Department of Transportation
100 S. Main Street, M.S. 12
Office of Design D
Los Angeles, CA 90012

Attention: Hamid Toossi
Senior Transportation Engineer

Subject: Underground Classification Numbers: C050-037-11T to C054-037-11T
EA 07-138204 – Schuyler Heim Bridge Replacement Project

Dear Mr. Toossi:

The information provided to this office regarding the above project has been reviewed. On the basis of this analysis, an Underground Classification of "Potentially Gassy" has been assigned to the CIDH shaft excavations identified in your submittal. Please provide true and accurate copies of the Classifications to the Boring/Excavation/Construction Contractor and insure that copies of the Classifications are posted at the job site.

Kindly insure that the Sub-Contractor notify this office to schedule the mandated Pre-job Safety Conference with the Division prior to commencing any activity associated with the project.

Also, be advised that, whenever an employee enters any bore or shaft being constructed under 30-inches in diameter, the Mining and Tunneling Unit then has immediate jurisdiction over that job. Please contact us prior to entering such spaces.

If you have any questions, please contact this office at your earliest convenience.

Sincerely,

James Wittry
District Manager

c: File

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

C050-037-11T

Van Nuys Office R5D2

Underground Classification

Schuyler Heim Bridge Replacement Project
California Department of Transportation
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of California Department of Transportation
100 S. Main Street., MS-12, Los Angeles CA 90012
(MAILING ADDRESS)

at State Route 47 at New Dock Street Off Ramp Bridge (Br No: 53-3031)
City Long Beach, California
(LOCATION)

has been classified as *** POTENTIALLY GASSY ***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

Cast in Drilled Hole (CIDH) pile excavations on State Route 47 at Bridge No: 53-3031 (New Dock Street Off-Ramp Bridge), City of Long Beach, Los Angeles County.

December 21, 2010

Reference: 1) Underground Classification Request & Submital from Caltrans dated 12/15/10.
2) Log of Test Borings prepared by Earth Mechanics, Inc. (Eric Brown) dated 10/11/10

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

C052-037-11T

Van Nuys Office R5D2

Underground Classification

Schuyler Heim Bridge Replacement Project
California Department of Transportation
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of California Department of Transportation
100 S. Main Street., MS-12, Los Angeles CA 90012
(MAILING ADDRESS)

at State Route 47 at New Dock Street On Ramp Bridge (Br No: 53-3033)
City Long Beach, California
(LOCATION)

has been classified as *** POTENTIALLY GASSY ***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

Cast in Drilled Hole (CIDH) pile excavations on State Route 47 at Bridge No: 53-3033 (New Dock Street On-Ramp Bridge), City of Long Beach, Los Angeles County.

December 21, 2010

Reference: 1) Underground Classification Request & Submital from Caltrans dated 12/15/10.
2) Log of Test Borings prepared by Earth Mechanics, Inc. (Eric Brown) dated 10/11/10

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

C053-037-11T

Van Nuys Office R5D2

Underground Classification

Schuyler Heim Bridge Replacement Project
California Department of Transportation
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of California Department of Transportation
100 S. Main Street., MS-12, Los Angeles CA 90012
(MAILING ADDRESS)

at State Route 47 at North Bound SR-103 Off Ramp Bridge (Br No: 53-3034K)
City Los Angeles, California
(LOCATION)

has been classified as *** POTENTIALLY GASSY ***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

Cast in Drilled Hole (CIDH) pile excavations on State Route 47 at Bridge No: 53-3034K (NB SR-103 Off-Ramp Bridge), City of Los Angeles, Los Angeles County.

January 4, 2011

Reference: 1) Underground Classification Request & Submittal from Caltrans dated 12/15/10.
2) Log of Test Borings prepared by Earth Mechanics, Inc. (Eric Brown) dated 10/11/10

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

C054-037-11T

Van Nuys Office R5D2

Underground Classification

Schuyler Heim Bridge Replacement Project
California Department of Transportation
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of California Department of Transportation
100 S. Main Street., MS-12, Los Angeles CA 90012
(MAILING ADDRESS)

at State Route 47 at North Bound SR-103 On Ramp Bridge (Br No: 53-3035S)
City Los Angeles, California
(LOCATION)

has been classified as *** POTENTIALLY GASSY ***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

Cast in Drilled Hole (CIDH) pile excavations on State Route 47 at Bridge No: 53-3035S (NB SR-103 On-Ramp Bridge), City of Los Angeles.

January 4, 2011

Reference: 1) Underground Classification Request & Submittal from Caltrans dated 12/15/10.
2) Log of Test Borings prepared by Earth Mechanics, Inc. (Eric Brown) dated 10/11/10

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

C051-037-11T

Van Nuys Office R5D2

Underground Classification

Schuyler Heim Bridge Replacement Project
California Department of Transportation
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of California Department of Transportation
100 S. Main Street., MS-12, Los Angeles CA 90012
(MAILING ADDRESS)

at State Route 47 at Schuyler Heim Bridge (Br No: 53-3032)
City of Long Beach, California
(LOCATION)

has been classified as *** POTENTIALLY GASSY ***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

Cast in Drilled Hole (CIDH) pile excavations on State Route 47 at Bridge No: 53-3032 (Schuyler Heim Bridge), City of Long Beach, Los Angeles County.

December 21, 2010

Reference: 1) Underground Classification Request & Submital from Caltrans dated 12/15/10.
2) Log of Test Borings prepared by Earth Mechanics, Inc, (G. J. Gunaranian) 10/11/10

INDEX OF PLANS

SHEET No.	DESCRIPTION
1	TITLE AND LOCATION MAP
2-3	LAYOUTS
4-5	TEMPORARY WATER POLLUTION CONTROL AND DETAILS
6	SUMMARY OF QUANTITIES
7	REVISED STANDARD PLANS
	STRUCTURE PLANS
8-19	SCHUYLER HEIM BRIDGE Br. No. 53-2618

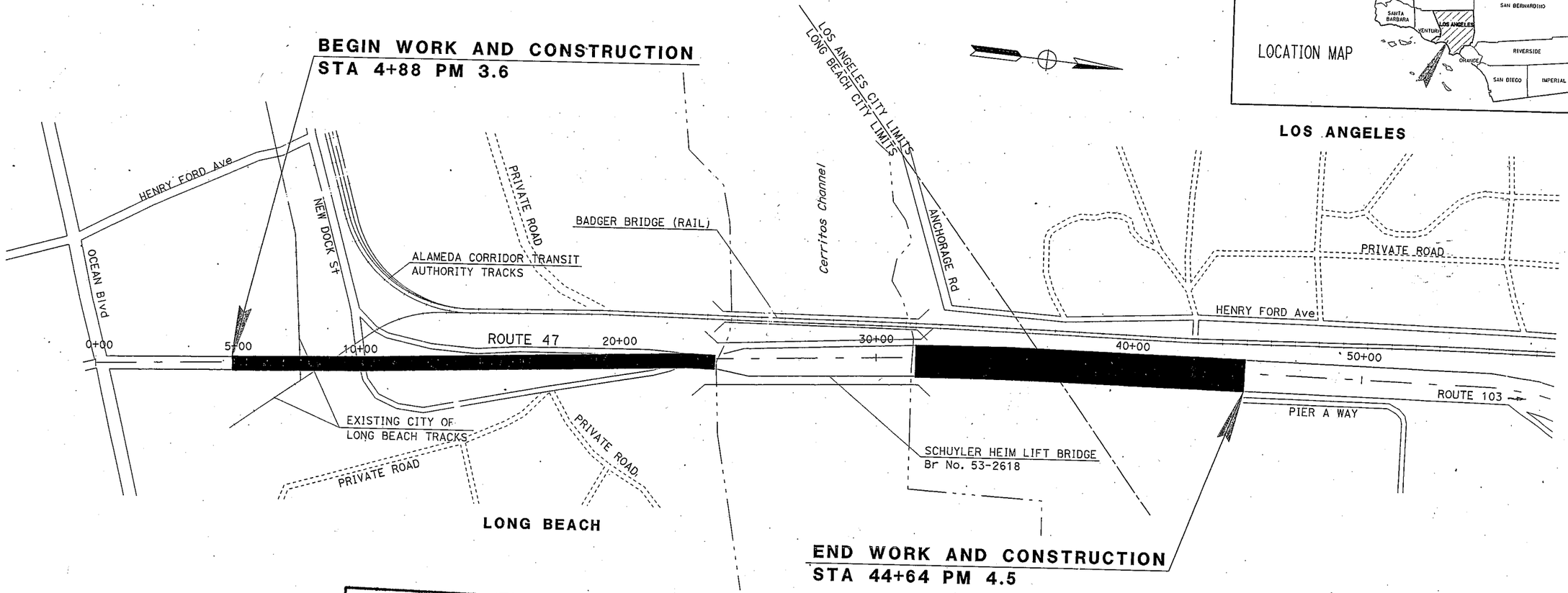
THE STANDARD PLANS LIST APPLICABLE TO THIS CONTRACT IS INCLUDED IN THE NOTICE TO CONTRACTORS AND SPECIAL PROVISIONS BOOK.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN LOS ANGELES COUNTY
IN LONG BEACH AND LOS ANGELES
FROM 0.1 MILE NORTH OF OCEAN BOULEVARD
TO 0.1 MILE SOUTH OF ROUTE 103

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	47	3.6/4.5	1	19



PROJECT MANAGER: JAMES HSU

DESIGN ENGINEER: ANTHONY W.H. NG

AS BUILT
CORRECTIONS BY A. CHEN
CONTRACT NO. 07-265004
DATE 12/15/09

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO CONTRACTORS."

NO SCALE

10-26-07
PROJECT ENGINEER / REGISTERED CIVIL ENGINEER — DATE

REGISTERED PROFESSIONAL ENGINEER — ANTHONY W.H. NG — No. 62683 — Exp. 06/30/08 — CIVIL — STATE OF CALIFORNIA

April 14, 2008
PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.

DATE PLOTTED => 16-APR-2008 13:28

BORDER LAST REVISED 11/1/2006 | CALTRANS WEB SITE IS: HTTP//WWW.DOT.CA.GOV/ | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => tmike-i DGN FILE => 72650 3b001.dgn

CONTRACT No. 07-265(

CU 07271 EA

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	47	3.6/4.5	2	19

10-26-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — ANTHONY W.H. NG — No. 62683 — Exp. 06/30/08 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.

NOTE: FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA, SEE RIGHT OF WAY RECORD MAPS AT DISTRICT OFFICE.

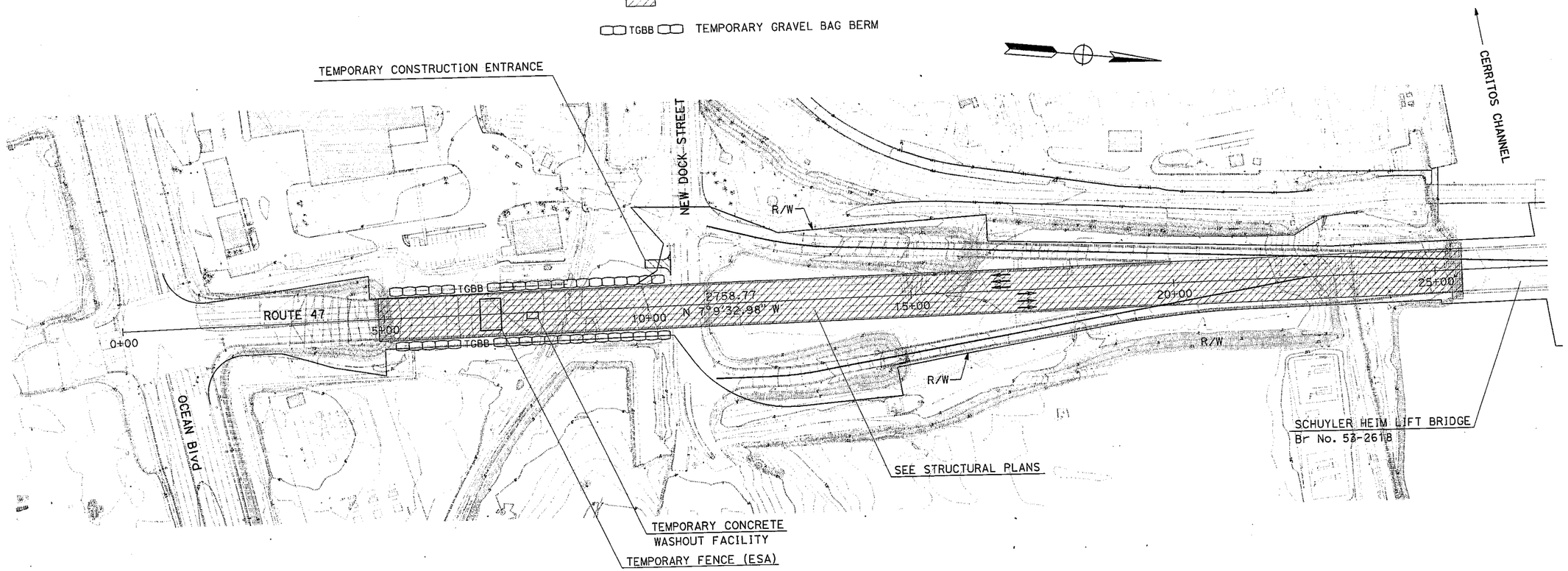
NOTE:

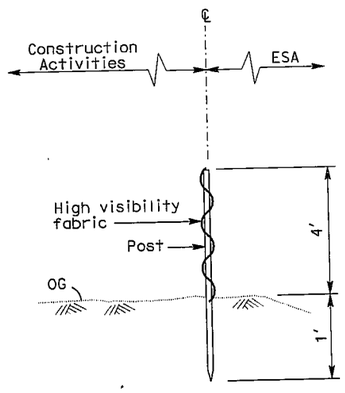
LOCATIONS OF TEMPORARY CONCRETE WASHOUT FACILITIES, TEMPORARY FENCE (ESA), TEMPORARY CONSTRUCTION ENTRANCE, AND TEMPORARY GRAVEL BAG BERMS ARE APPROXIMATE. EXACT LOCATIONS WILL BE DETERMINED BY THE ENGINEER.

LEGEND

AREA OF WORK

TGBB TEMPORARY GRAVEL BAG BERM

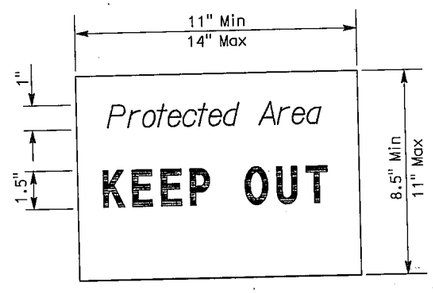




SECTION

TEMPORARY FENCE (TYPE ESA)

NO SCALE



SIGN DETAIL

NO SCALE

LAYOUT

SCALE: 1"=100' **L-1**

LAST REVISION: 00-00-00
DATE PLOTTED => 16-APR-2008
TIME PLOTTED => 13:28

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY: ANTHONY W.H. NG
CHECKED BY: HAMID R. TOOSSI
SUPERVISING ENGINEER: HAMID R. TOOSSI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans OFFICE OF DESIGN D

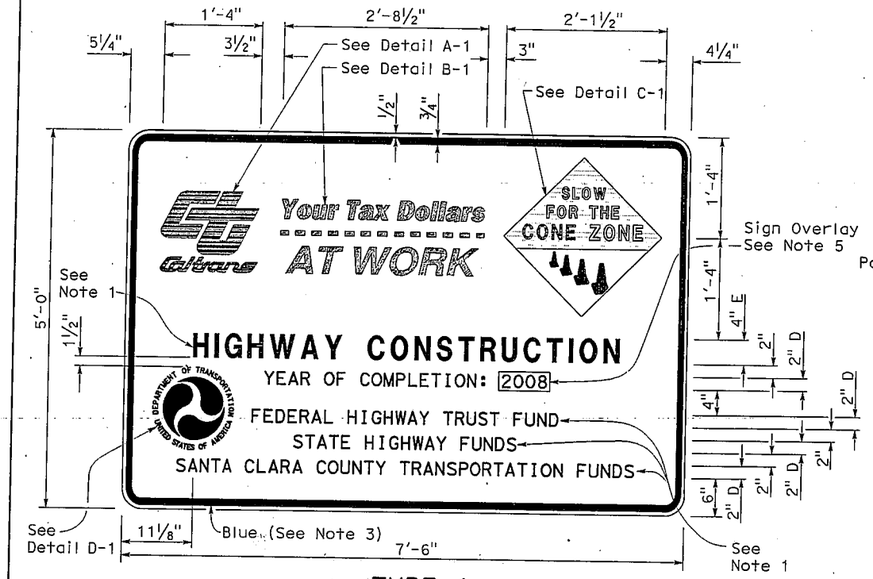
BORDER LAST REVISED 11/1/2006

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

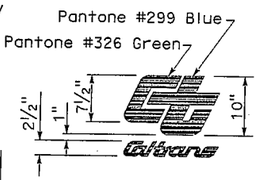
USERNAME => trmikesl
DGN FILE => 726500ea001.dgn

CU 07271

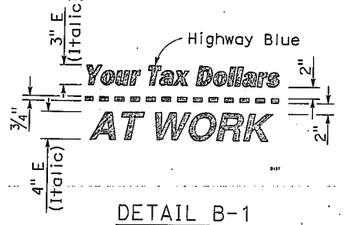
EA 265001



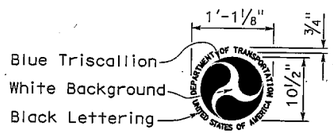
TYPE 1



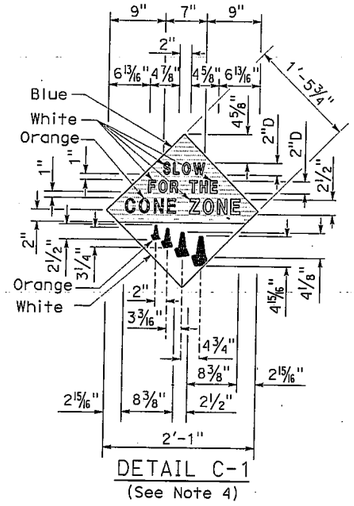
DETAIL A-1



DETAIL B-1
(See Note 3)



DETAIL D-1
(See Note 6)



DETAIL C-1
(See Note 4)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	47	3.6/4.5	7	19

REGISTERED CIVIL ENGINEER

Greg W. Edwards
No. C36386
Exp. 6-30-08
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

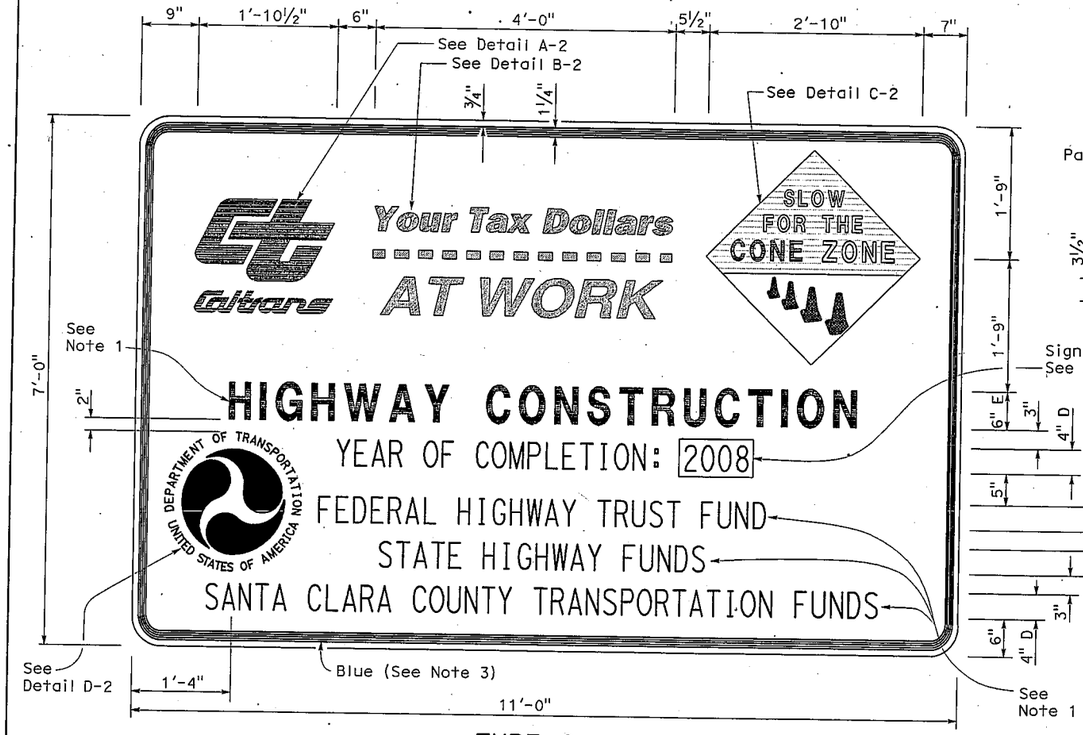
November 17, 2006
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

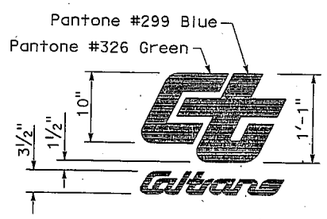
To accompany plans dated 4-14-08

NOTES:

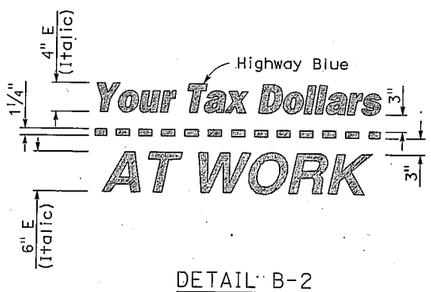
1. The sign messages shown for type of project and fund types are examples only. See the Special Provisions for the applicable type of project and fund type messages to be used.
2. Except as otherwise shown, the legend of sign shall be black on a white background (non-reflective).
3. The border of the signs and details "B-1" and "B-2" shall be blue (non-reflective).
4. The diamond in details "C-1" and "C-2" shall be blue for the background of message, " SLOW FOR THE CONE ZONE", and white background for the orange cones. The color and type of font for the "SLOW FOR THE CONE ZONE" message shall be: "SLOW" white D; "FOR THE" white D; "CONE" orange Arial font; "ZONE" white Arial font.
5. Year of completion of project construction shown on the overlay is an example only. See the Special Provisions.
6. Use when the Project involves Federal Highway Trust Fund.



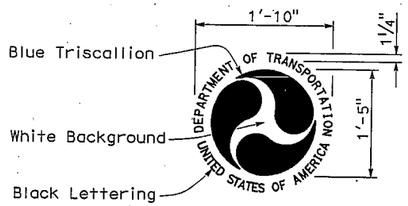
TYPE 2



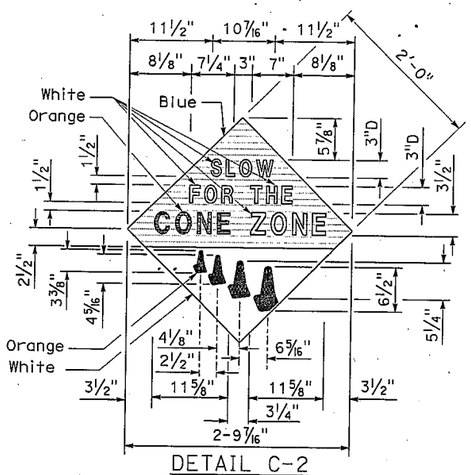
DETAIL A-2



DETAIL B-2
(See Note 3)



DETAIL D-2
(See Note 6)



DETAIL C-2
(See Note 4)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CONSTRUCTION PROJECT FUNDING IDENTIFICATION SIGNS

NO SCALE

RSP T7 DATED NOVEMBER 17, 2006 SUPERSEDES STANDARD PLAN T7 DATED MAY 1, 2006 - PAGE 217 OF THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED STANDARD PLAN RSP T7

9-7-06

2006 REVISED STANDARD PLAN RSP T7

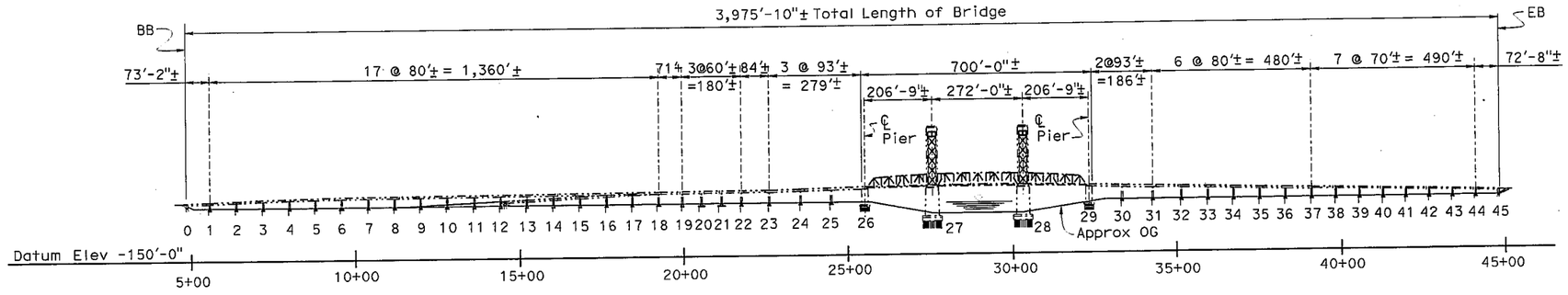
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	8	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
FOUED ZAYATI
No. C 57046
Exp. 06-30-09
CIVIL
STATE OF CALIFORNIA

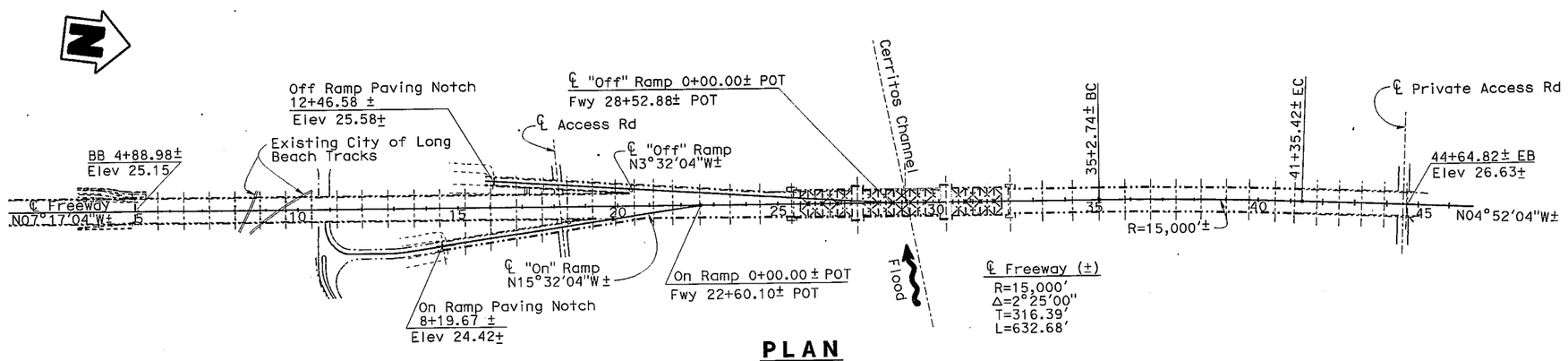
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.



ELEVATION
1" = 200'

QUANTITIES

BRIDGE REMOVAL (PORTION)	LUMP SUM
REMOVE RIVET	2,032 EA
STRUCTURAL CONCRETE, BRIDGE	262 CY
DRILL AND BOND DOWEL	60 LF
BAR REINFORCING STEEL (BRIDGE)	44,000 LB
STRUCTURAL STEEL (BRIDGE)	95,500 LB
CLEAN AND PAINT STRUCTURAL STEEL	LUMP SUM
SPOT BLAST CLEAN AND PAINT UNDERCOAT	2,076 SQFT
MISCELLANEOUS METAL (RESTRAINER - CABLE TYPE)(MODIFIED)	20,100 LB



PLAN
1" = 200'

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

"NO AS BUILT CHANGES" RM

X Ronald J. Bromenschenkel DESIGN ENGINEER	DESIGN	BY R. Bromenschenkel	CHECKED F. Zayati	LOAD FACTOR DESIGN	LIVE LOADING: HS20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD		
	DETAILS	BY M. Johnson	CHECKED R. Bromenschenkel	LAYOUT	BY R. Bromenschenkel	CHECKED F. Zayati	
	QUANTITIES	BY R. Bromenschenkel	CHECKED F. Zayati	SPECIFICATIONS	BY D. Klein	PLANS AND SPECS COMPARED F. Zayati	

STRUCTURES DESIGN GENERAL PLAN SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

CU 07
EA 265001

FILE => 53-2618-01gp.dgn

BRIDGE NO.	53-2618
POST MILE	3.5/4.5

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES: 10-11-06 | 10-13-06 | 12-22-06 | 01-04-07 | 01-05-07 | 05-17-07 | 05-18-07 | 06-21-07

SHEET 1 OF 12

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
GENERAL PLAN

USERNAME => tirlendrd DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 08:47

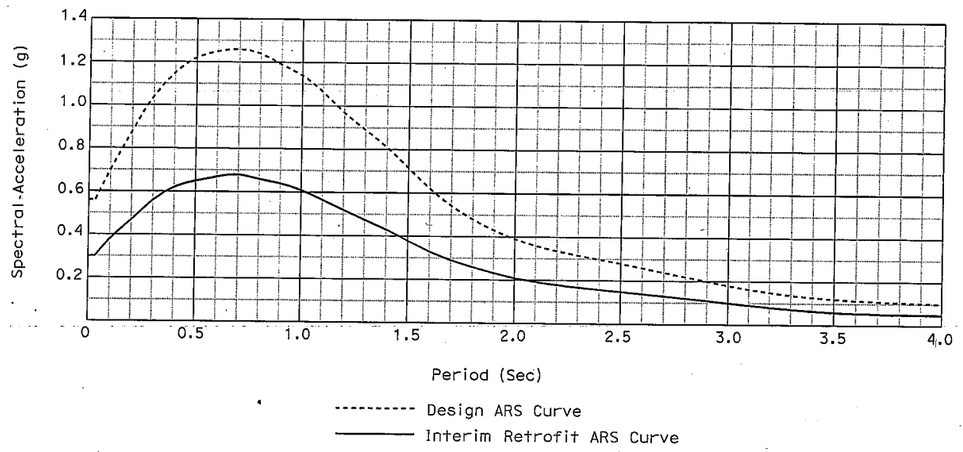
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	9	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — FOUED ZAYATI No. C 57046 Exp. 06-30-09 CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.



MODIFIED ACCELERATION RESPONSE SPECTRA

No Scale

GENERAL NOTES
LOAD FACTOR DESIGN

DESIGN: BRIDGE DESIGN SPECIFICATIONS
(1983 AASHTO with Interims and Revisions by CALTRANS
Caltrans Seismic design Criteria (SDC) Version 1.3, Febuary 2004)

SEISMIC LOADING: 0.3g Site Specific ARS Curve

REINFORCED CONCRETE:

(New)	(Existing Assumed for Retrofit)
f_y = 60,000 psi	f_y = 40,000 psi
f'_c = 3,600 psi	f_c = 5,000 psi
n = 9	

STRUCTURAL STEEL: ASTM A-36
f_y = 36,000 psi

INDEX TO PLANS

Sheet No.	Title
1	GENERAL PLAN
2	GENERAL NOTES
3	STRUCTURE PLAN NO. 1
4	STRUCTURE PLAN NO. 2
5	STRUCTURE PLAN NO. 3
6	STRUCTURE PLAN NO. 4
7	ABUTMENT RETROFIT DETAILS
8	COLUMN BEARING RETROFIT DETAILS
9	HINGE RETROFIT DETAILS NO. 1
10	HINGE RETROFIT DETAILS NO. 2
11	HINGE RETROFIT DETAILS NO. 3
12	RAILROAD CLEARANCE DETAILS

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

"No As Built Changes" R.M.

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	K. Kubo	R. Bromenschenkel
QUANTITIES	R. Bromenschenkel	F. Zayati

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

BRIDGE NO. 53-2618
POST MILE 3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
GENERAL NOTES

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07
EA 265001

DISREGARD PRINTS BEARING EARLIER REVISION DATES →
REVISION DATES: 09-30-06 | 10-31-06 | 12-22-06 | 4-4-07 | 05-31-07 | 06-21-07

SHEET 2 OF 12

FILE => 53-2618-02gn.dgn

USERNAME => frienard DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 08:47

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO	TOTAL SHEETS
07	LA	47	3.6/4.5	10	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
FOUED ZAYATI
No. C 57046
Exp. 06-30-09
CIVIL
STATE OF CALIFORNIA

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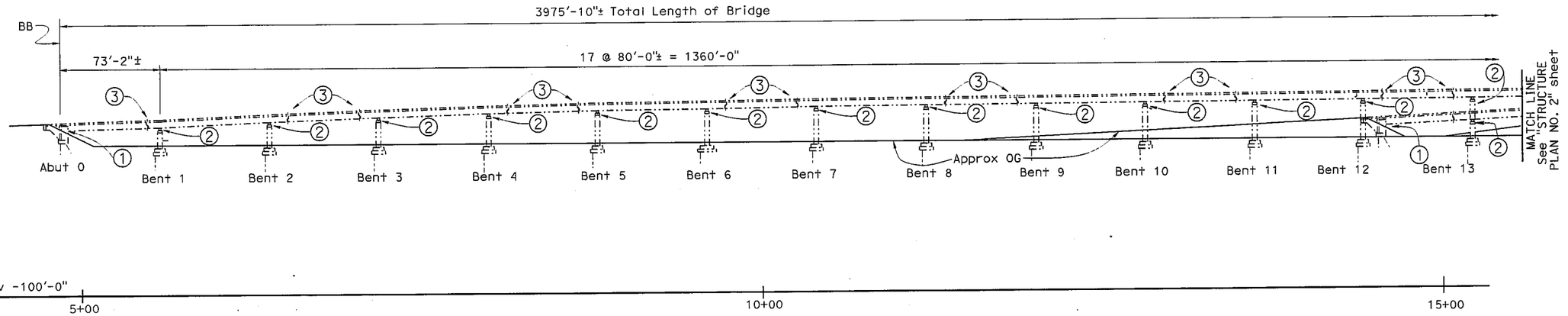
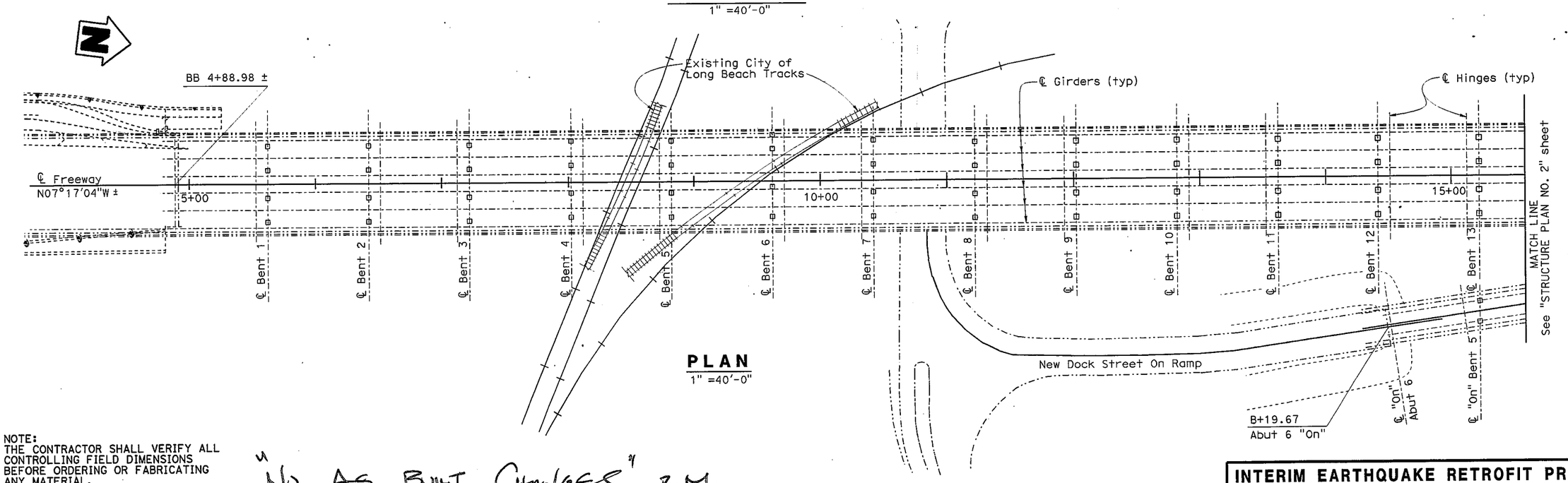
RETROFIT LEGEND

1. Abutment Retrofit
2. Column Bearing Retrofit
3. Hinge Retrofit
- ▫ Denotes Column Location



ELEVATION
1" =40'-0"



PLAN
1" =40'-0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

"NO AS BUILT CHANGES" R.M.

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	M. Johnson	R. Bromenschenkel
QUANTITIES	R. Bromenschenkel	F. Zayati

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

BRIDGE NO.	53-2618
POST MILE	3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
STRUCTURE PLAN NO. 1

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07
EA 265001

FILE => 53-2618-03sp1.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES →
REVISION DATES: 01-04-07 | 03-05-01 | 03-14-01 | 05-14-01 | 06-21-07 | 10-10-06 | 10-11-06 | 12-22-06 | 12-26-06

SHEET 3 OF 12

USERNAME => trmikesl DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 13:29

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	11	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER
FOUED ZAYATI
No. C 57046
Exp. 06-30-09
CIVIL
STATE OF CALIFORNIA

RETROFIT LEGEND

1. Abutment Retrofit
2. Column Bearing Retrofit
3. Hinge Retrofit
- ▫ Denotes Column Location

3975'-10"± Total Length of Bridge

17 @ 80'-0"± = 1360'-0"± | 71'-0"± | 3 @ 60'-0"± = 180'-0"± | 84'-0"± | 3 @ 93'-0"± = 279'-0"±

MATCH LINE See "STRUCTURE PLAN NO. 1" sheet

Bent 14 Bent 15 Bent 16 Bent 17 Bent 18 Bent 19 Bent 20 Bent 21 Bent 22 Bent 23 Bent 24 Bent 25 Pier 26

Approx OG

NOTE: Main Span not shown, See "STRUCTURE PLAN NO. 3" sheet for continuation of Retrofit

Datum Elev -100.00'

20+00 25+00

ELEVATION
1" =40'-0"

Abut 5 "Off" 12+43.91±
℄ Access Rd
℄ "Off" Abut 5
℄ "Off" Bent 4
℄ "Off" Bent 3
℄ "Off" Bent 2
℄ "Off" Bent 1
℄ Girders (typ)
℄ Hinges (typ)
℄ "Off" Ramp N03°32'04"W±
℄ "On" Ramp N15°32'04"W±
'On' Ramp 0+00.00± POT
Fwy 22+60.10± POT

MATCH LINE See "STRUCTURE PLAN NO. 1" sheet

℄ "On" Bent 4 ℄ "On" Bent 3 ℄ "On" Bent 2 ℄ "On" Bent 1 ℄ Bent 14 ℄ Bent 15 ℄ Bent 16 ℄ Bent 17 ℄ Bent 18 ℄ Bent 19 ℄ Bent 20 ℄ Bent 21 ℄ Bent 22 ℄ Bent 23 ℄ Bent 24 ℄ Bent 25 ℄ Bent 26

PLAN
1" =40'-0"

NOTE: Main Span not shown, See "STRUCTURE PLAN NO. 3" sheet for continuation of Retrofit

NOTE: THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

"No As Built Changes" R.M.

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	M. Johnson	R. Bromenschenkel
QUANTITIES	R. Bromenschenkel	F. Zayati

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

BRIDGE NO. 53-2618
POST MILE 3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
STRUCTURE PLAN NO. 2

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07
EA 265001

FILE => 53-2618-04sp2.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES: 06-21-07 | 6-12-06 | 09-19-06 | 10-18-06 | 10-31-06 | 12-21-06 | 12-28-06 | 03-15-07 | 05-31-07

SHEET 4 OF 12

USERNAME => trienord DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 08:48

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	12	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
FOUED ZAYATI
No. C 57046
Exp. 06-30-09
CIVIL
STATE OF CALIFORNIA

4-14-08
PLANS APPROVAL DATE

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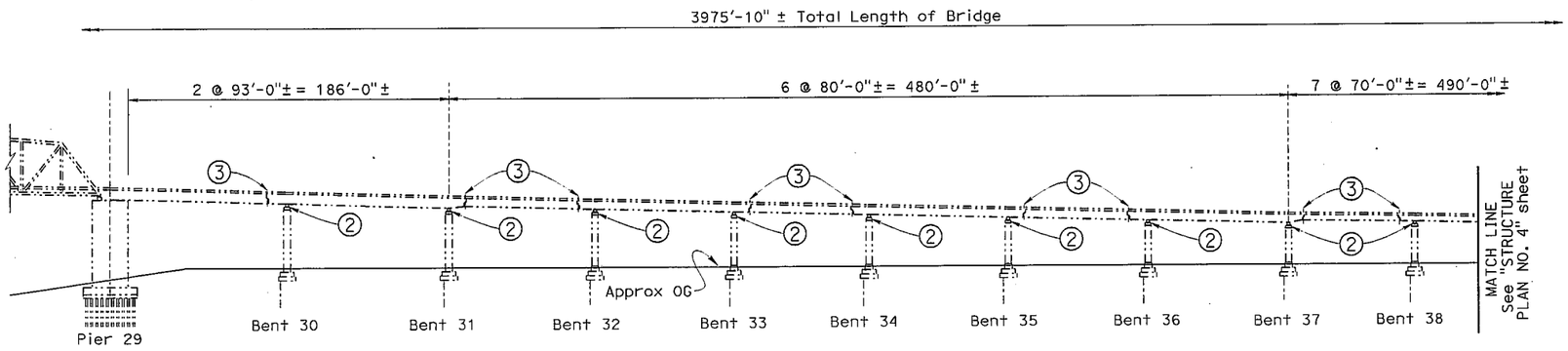
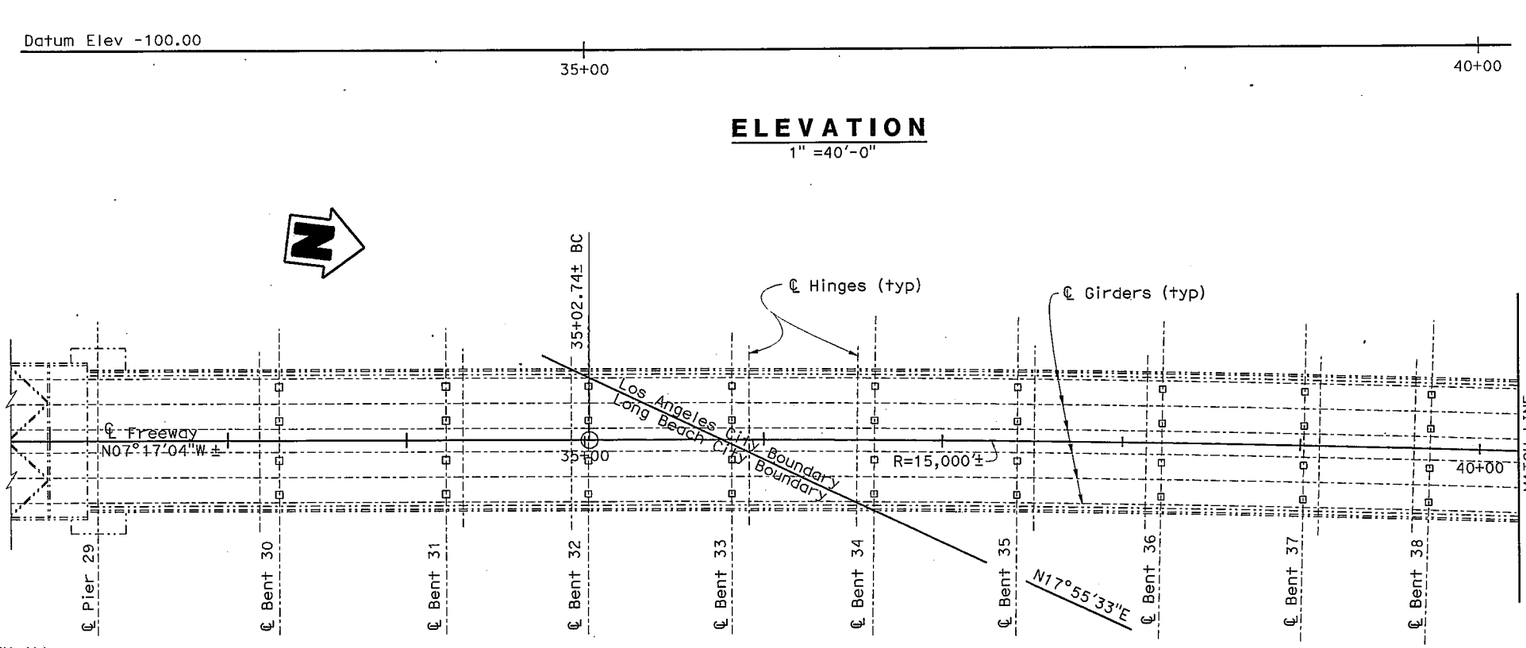
RETROFIT LEGEND

① Abutment Retrofit
② Column Bearing Retrofit
③ Hinge Retrofit
·□ Denotes Column Location

NOTE: Main Span not shown, See "STRUCTURE PLAN NO. 2" sheet for previous portion of Retrofit



ELEVATION
1" =40'-0"



NOTE: Main Span not shown, See "STRUCTURE PLAN NO. 2" sheet for previous portion of Retrofit

℄ Freeway (±)
R=15,000'
Δ=2°25'00"
T=316.39'
L=632.68'

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

"NO AS BUILT CHANGES" RM.

PLAN
1" =40'-0"

DESIGN	BY R. Bromenschenkel	CHECKED F. Zayati	
DETAILS	BY M. Johnson	CHECKED R. Bromenschenkel	
QUANTITIES	BY R. Bromenschenkel	CHECKED F. Zayati	

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH

CU 07
EA 265001

BRIDGE NO. 53-2618
POST MILE 3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
STRUCTURE PLAN NO. 3

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

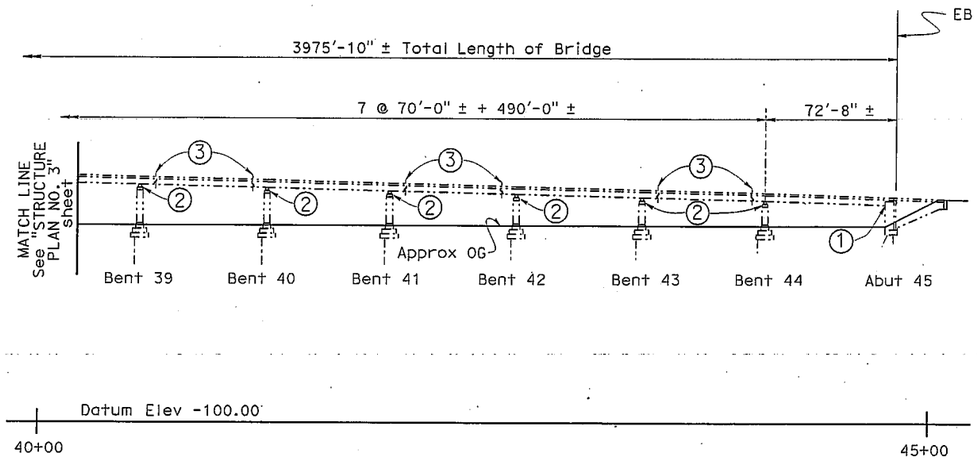
FILE => 53-2618-05sp3.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES: 05-17-07 | 05-16-07 | 06-21-07 | 09-22-06 | 10-04-06 | 10-10-06 | 10-17-06 | 12-22-06 | 03-16-07

SHEET 5 OF 12

USERNAME => tflenord DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 08:48



ELEVATION
1" = 40'-0"

RETROFIT LEGEND

① Abutment Retrofit
② Column Bearing Retrofit
③ Hinge Retrofit
▫ Denotes Column Location

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	13	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
FOUED ZAYATI
No. C 57046
Exp. 06-30-09
CIVIL
STATE OF CALIFORNIA

4-14-08
PLANS APPROVAL DATE

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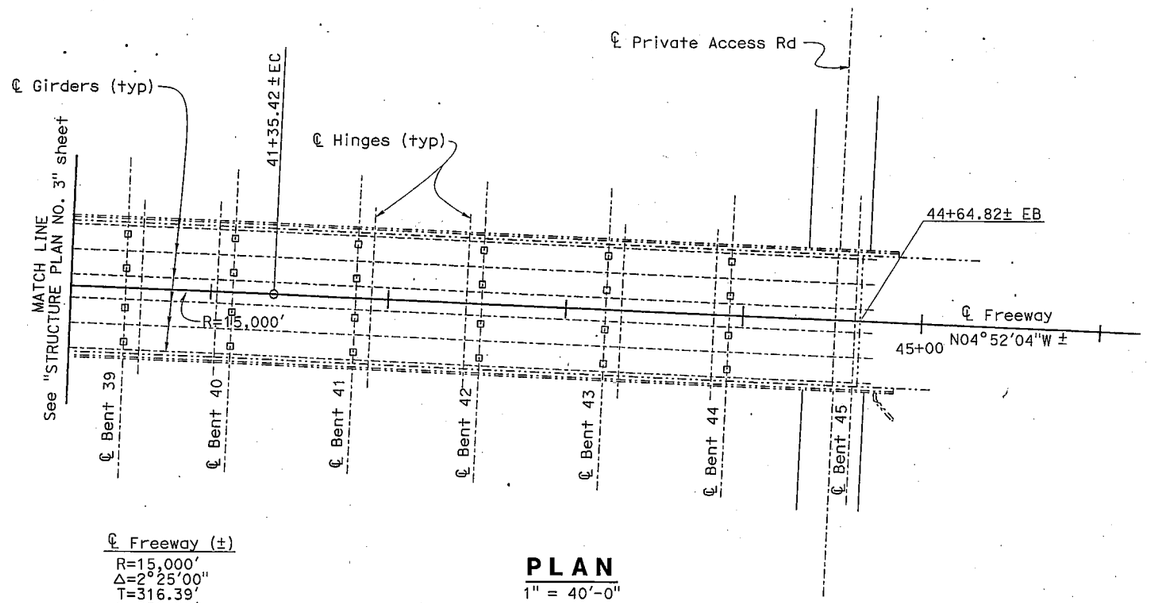


PLAN
1" = 40'-0"

℄ Freeway (±)
R=15,000'
Δ=2°25'00"
T=316.39'
L=632.68'

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

"No As Built Changes" RM

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	M. Johnson	R. Bromenschenkel
QUANTITIES	R. Bromenschenkel	F. Zayati

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH

BRIDGE NO. 53-2618
POST MILE 3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
STRUCTURE PLAN NO. 4

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07
EA 265001

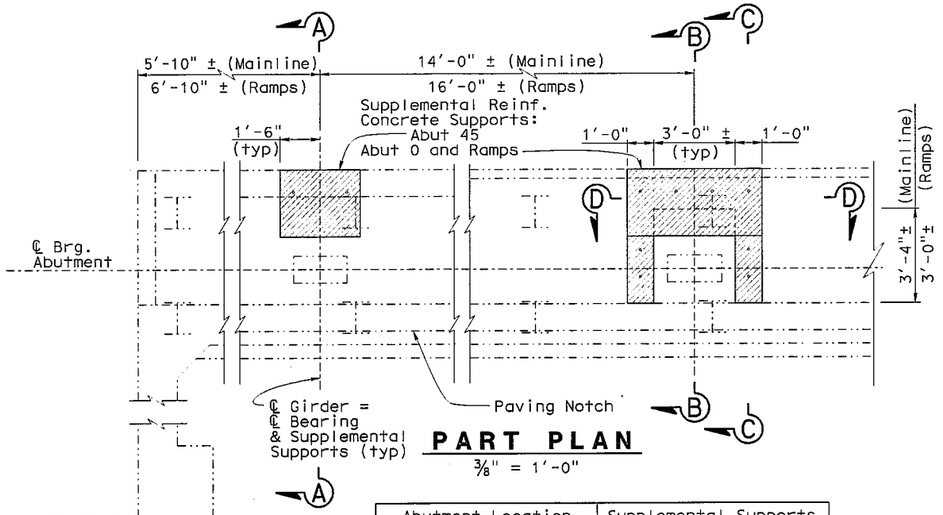
FILE => 53-2618-06sp4.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES: 06-21-07 | 5-17-06 | 09-19-06 | 10-04-06 | 10-16-06 | 10-17-06 | 12-21-06 | 03-16-07 | 05-11-07

SHEET 6 OF 12

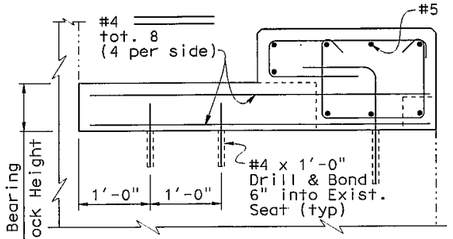
USERNAME => lrleonard DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 08:48



PART PLAN

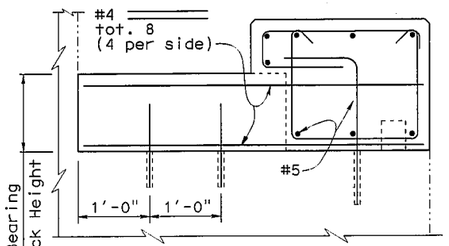
3/8" = 1'-0"

Abutment Location	Supplemental Supports
Mainline '0'	6
On '5'	2
Off '6'	2
Mainline '45'	6



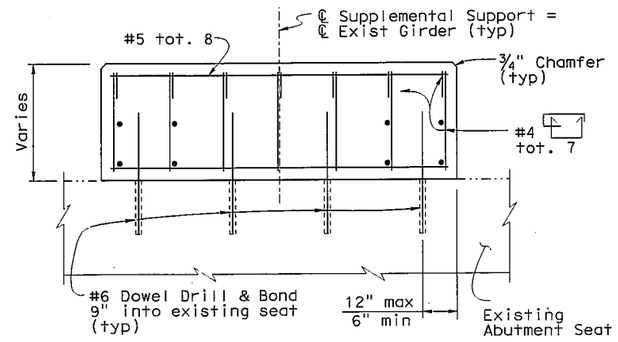
SECTION C-C
ABUTMENT 0

1 " = 1'-0"



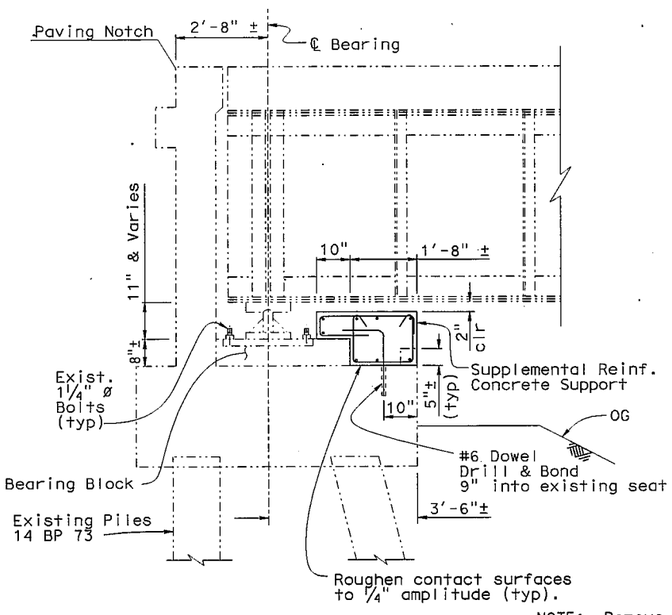
SECTION C-C
RAMPS

1 " = 1'-0"



SECTION D-D

1 " = 1'-0"

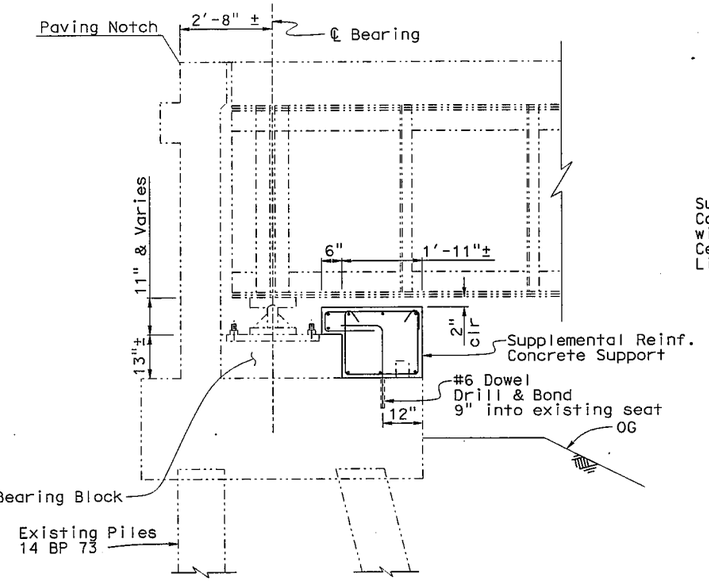


SECTION B-B
ABUTMENT 0

No Scale

NOTE: Remove unsound concrete as directed by the Engineer.

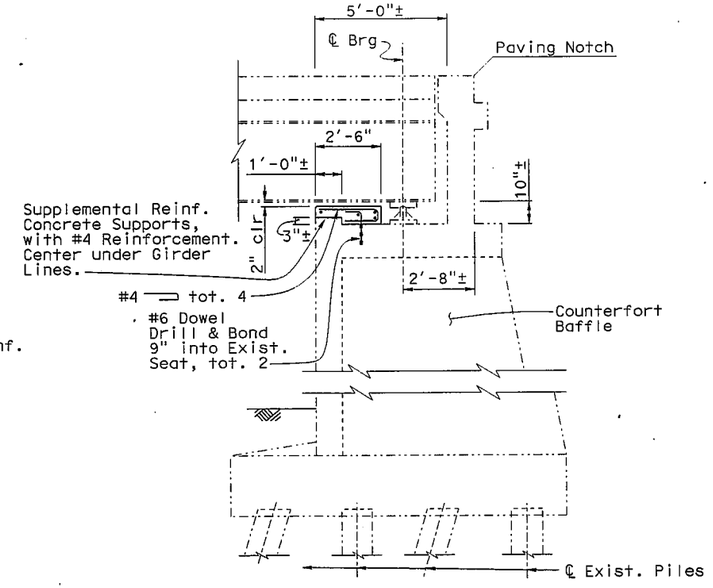
NO AS BUILT CHANGES R.M.



SECTION B-B
RAMPS

No Scale

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.



SECTION A-A

3/8" = 1'-0"

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	14	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER
FOUED ZAYATI
No. C 57046
Exp. 06-30-09
CIVIL
STATE OF CALIFORNIA

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
ABUTMENT RETROFIT DETAILS

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	K. Kubo	R. Bromenschenkel
QUANTITIES	R. Bromenschenkel	F. Zayati/J. Lane

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

BRIDGE NO. 53-2618
POST MILE 3.5/4.5

CU 07
EA 265001

FILE => 53-2618-07abut.dgn

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

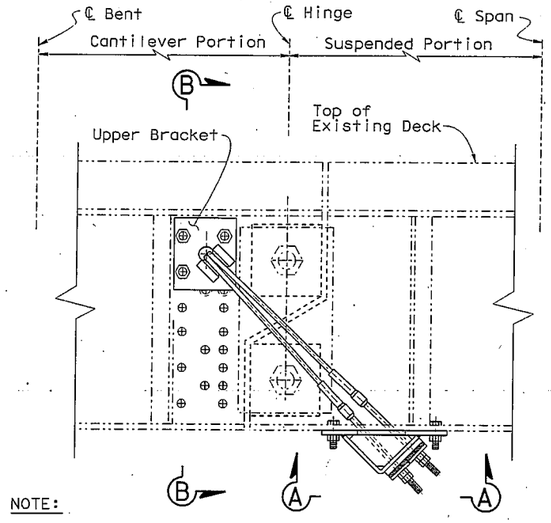
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 05-15-07 | 10-14-06 | 12-22-06 | 12-27-06 | 03-30-07 | 05-31-07 | 06-06-07 | 06-06-07 | 06-06-07 | 06-11-07

SHEET 7 OF 12

USERNAME => trmikesl DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 13:29

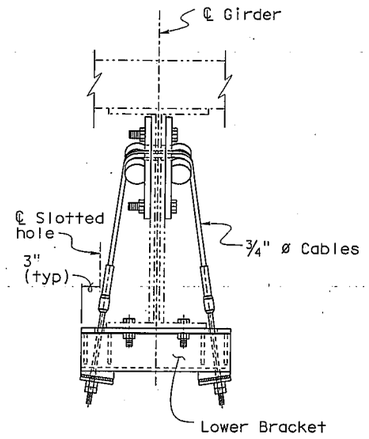


NOTE:

Two assemblies per Girder within hinge spans. Second assembly (not shown) is opposite hand.

ELEVATION - 36 INCH GIRDER

1" = 1'0"



VIEW B-B

1" = 1'0"

NOTES:

1. Hinge Retrofits for 36 inch Girders apply to the following locations: Mainline Spans - 37, 39, 41 & 43
2. All Rivets not shown.
3. Location of Rivets shown is approximate and based on May 8, 2006 field measurements.
4. ℄ Hinge shown in vertical position. Actual position may vary.
5. Cable nuts to be hand tightened and secured with thread locking compound.
6. All dimensions to bolt holes and recessed riverts, are approximate. Match marking may be required.
7. Thru bolts must align with exisiting rivets locations. See 'Spot-Blast Clean and Paint' detail.
8. All brackets to be coated with zinc rich primer after fabrication. A490 fasteners are not to be galvanized.
9. All steel GR50

LEGEND:

- ⊛ Denotes approx location of existing Rivets to remain in place, recessed under base plate.
- ◉ Denotes approx location of new A490 Bolts and Nuts.
- ⊚ Denotes approx location of existing Rivets replaced by A490 Bolts and Nuts.
- ⊕ Denotes approx location of existing Rivets to remain in place.
- ⊛ Denotes approx location of existing Flat Head Rivets to remain in place. Base plate to be machined as required.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	16	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

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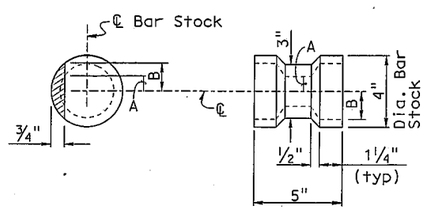
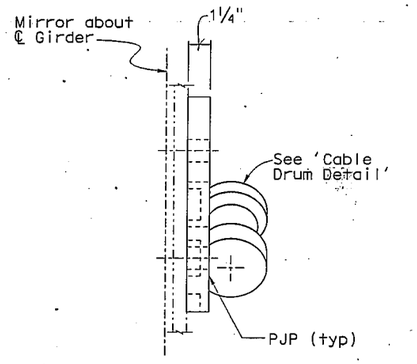
REGISTERED PROFESSIONAL ENGINEER — FOUED ZAYATI No. C 57046 Exp. 06-30-09 CIVIL — STATE OF CALIFORNIA

Denotes material removed from drum prior to welding to Web Plate.



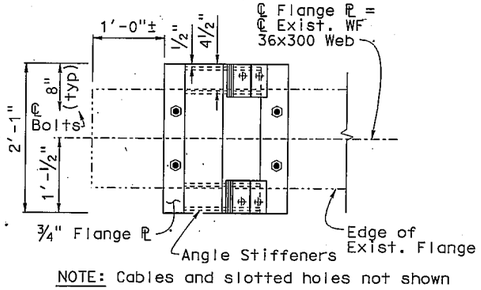
CABLE DRUM DETAIL

3" = 1'0"



VIEW C-C

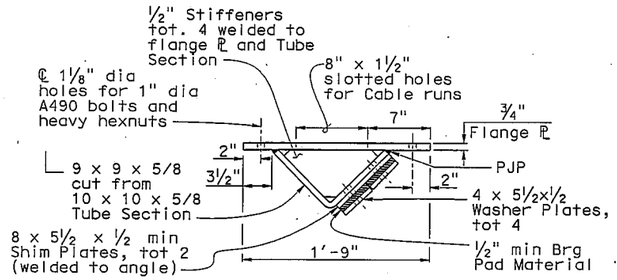
3" = 1'0"



NOTE: Cables and slotted holes not shown

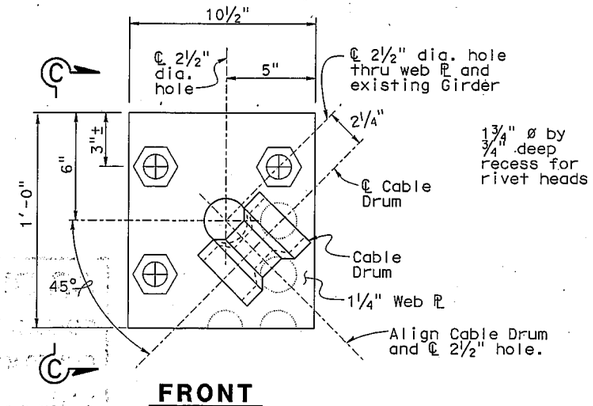
VIEW A-A

1" = 1'0"



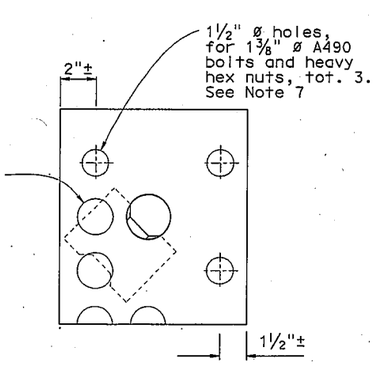
LOWER BRACKET DETAILS

1½" = 1'0"



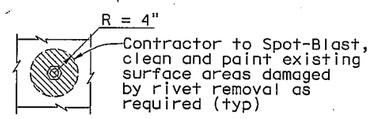
FRONT

3" = 1'0"



BACK

3" = 1'0"



SPOT BLAST CLEAN AND PAINT DETAIL

1" = 1'0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

NO AS BUILT CHANGES RQ'd.

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	K. Kubo	R. Bromenschenkel
QUANTITIES	R. Bromenschenkel	F. Zayati

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

BRIDGE NO.
53-2618
POST MILE
3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM
HINGE RETROFIT DETAILS NO. 1

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07
EA 265001

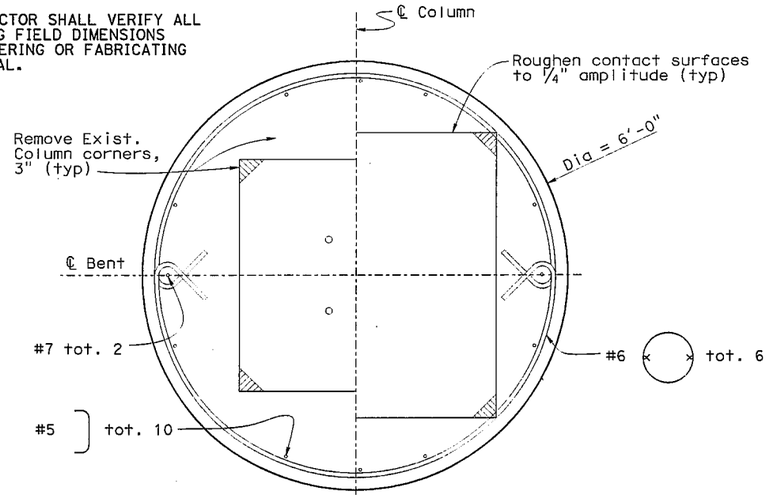
FILE => 53-2618-09hingedet01.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES										SHEET	OF
02-26-01	02-27-01	03-28-01	03-29-01	05-18-01	06-21-01		12-13-06	12-14-06	01-12-01	9	12

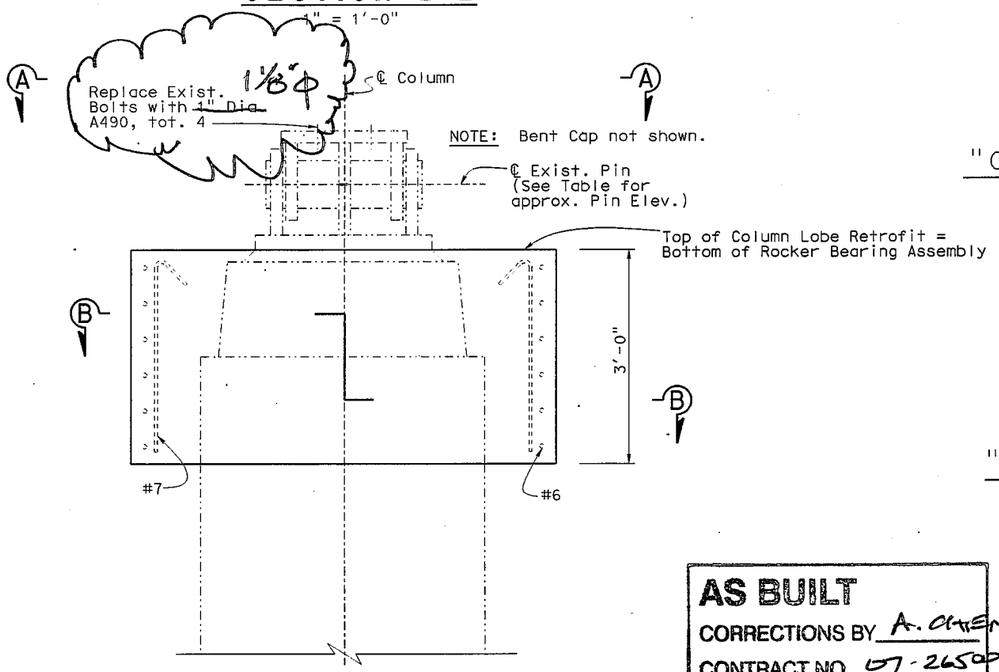
USERNAME => trlenard DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 08:48

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.



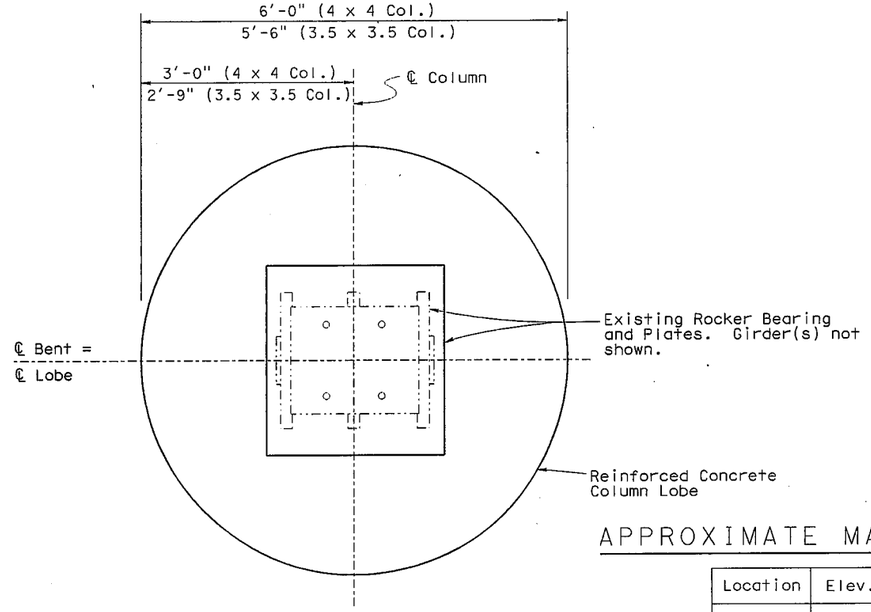
SECTION B-B

1" = 1'-0"



COLUMN RETROFIT - ELEVATION

1" = 1'-0"



VIEW A-A

No Scale

APPROXIMATE "OFF" RAMP PIN ELEVATIONS

Column No.	1	2
Bent 1	36.76	36.81
Bent 2	32.99	33.04
Bent 3	28.33	28.39
Bent 4	23.52	23.58
Abut 5	19.81	19.81

APPROXIMATE "ON" RAMP PIN ELEVATIONS

Column No.	1	2
Bent 18	39.15	39.10
Bent 1	37.13	37.07
Bent 2	33.88	33.77
Bent 3	29.85	29.74
Bent 4	25.81	25.69
Bent 5	21.77	21.65
Abut 6	18.64	18.64

APPROXIMATE MAINLINE PIN ELEVATIONS

Location	Elev.	Location	Elev.	Location	Elev.
Abut 0	19.02*	Bent 15	38.28	Bent 32	42.96
Bent 1	22.06	Bent 16	38.74	Bent 33	41.04
Bent 2	25.58	Bent 17	39.21	Bent 34	39.12
Bent 3	28.53	Bent 18	39.68	Bent 35	37.20
Bent 4	30.89	Bent 19	37.42	Bent 36	35.28
Bent 5	32.68	Bent 20**	35.56	Bent 37	33.36
Bent 6	32.28	Bent 21**	36.30	Bent 38	33.23
Bent 7	34.56	Bent 22	41.88	Bent 39	31.55
Bent 8	35.03	Bent 23	42.07	Bent 40	29.87
Bent 9	35.49	Bent 24	43.87	Bent 41	28.19
Bent 10	35.96	Bent 25	45.86	Bent 42	26.51
Bent 11	36.42	Pier 26	48.69*	Bent 43	24.83
Bent 12	36.88	Pier 29	48.75*	Bent 44	23.15
Bent 13	37.35	Bent 30	45.95	Abut 45	21.97*
Bent 14	37.81	Bent 31	43.72		

* Bearing Elevation
** Three Column Bent
At each location, all pins or bearing are at the same elevation.

NOTE: Pin elevation based on As-Built Datum.

AS BUILT
CORRECTIONS BY A. CHEN
CONTRACT NO. 07-265004
DATE 12/15/09

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	15	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
FOUED ZAYATI
No. C 57046
Exp. 06-30-09
CIVIL
STATE OF CALIFORNIA

4-14-08
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

DESIGN	BY R. Bromenschenkel	CHECKED F. Zayati	
DETAILS	BY K. Kubo	CHECKED R. Bromenschenkel	
QUANTITIES	BY R. Bromenschenkel	CHECKED F. Zayati	

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

BRIDGE NO. 53-2618
POST MILE 3.5/4.5

CU 07
EA 265001

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
COLUMN BEARING RETROFIT DETAILS

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

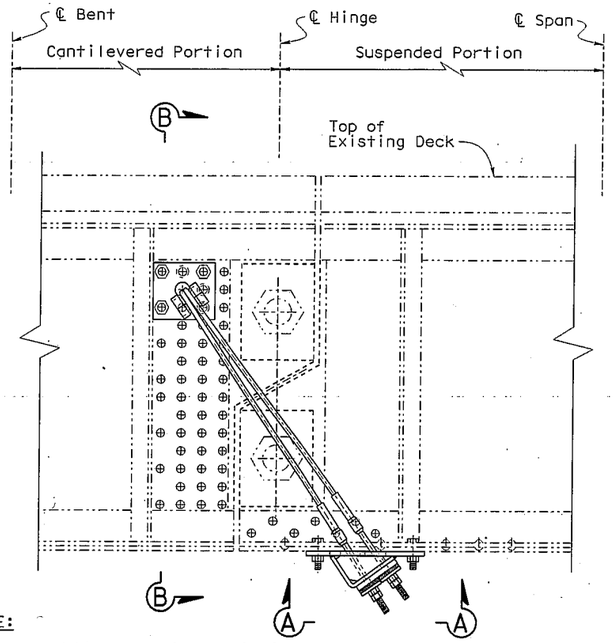
DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 10-03-06 | 10-10-06 | 10-11-06 | 10-11-06 | 12-22-06 | 03-30-07 | 05-16-07 | 06-21-07

SHEET 8 OF 12

FILE => 53-2618-08col.dgn

USERNAME => trienard DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 08:48

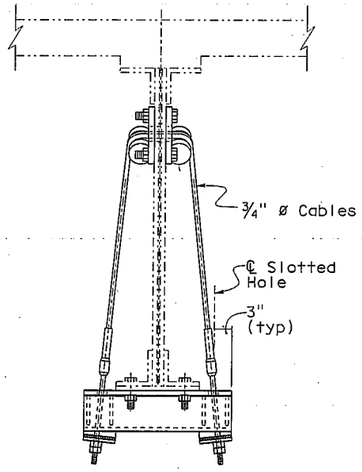


NOTE:

Two assemblies per Girder within hinge spans. Second assembly (not shown) is opposite hand.

ELEVATION - 54 INCH GIRDER

1" = 1'0"



VIEW B-B

1" = 1'0"

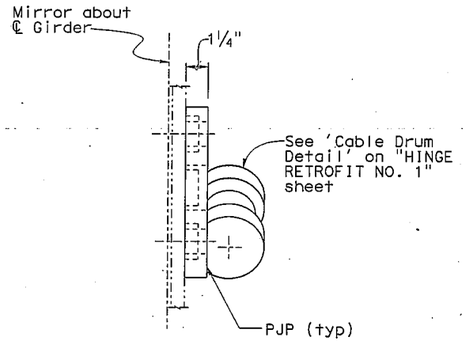
NOTES:

1. Hinge Retrofit for 54 inch Girders apply to the following locations:

   Mainline Spans: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 31, 33 & 35
   'On' Ramp Spans: 5, 3, 1 & 0
   'Off' Ramp Spans: 4, 2 & 0

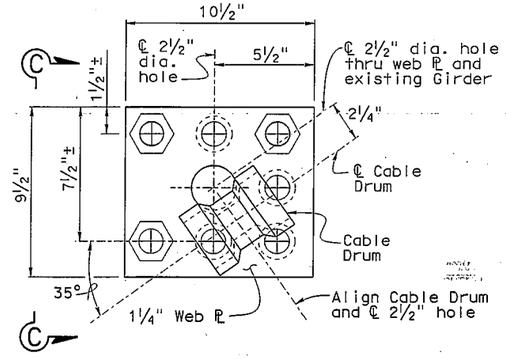
2. Notes #2 through #9 on "HINGE RETROFIT DETAILS NO. 1" sheet apply.

3. For 'LEGEND' see "HINGE RETROFIT DETAILS NO. 1" sheet.



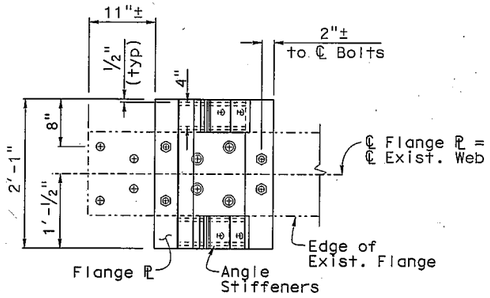
VIEW C-C

3" = 1'0"



FRONT

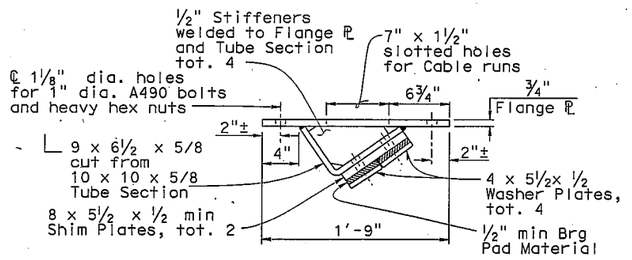
3" = 1'0"



NOTE: Cables and slotted holes not shown

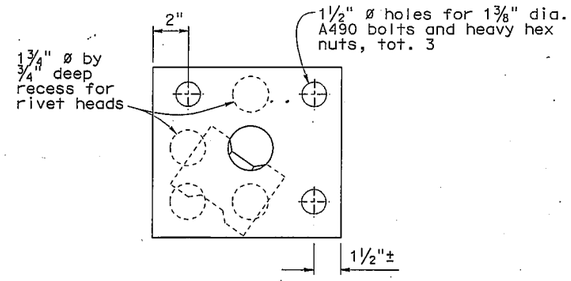
VIEW A-A

1" = 1'0"



LOWER BRACKET DETAILS

1½" = 1'0"



BACK

3" = 1'0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

"NO AS BUILT CHANGE" RM-

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO	TOTAL SHEETS
07	LA	47	3.6/4.5	17	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — FOUED ZAYATI — No. C 57046 — Exp. 06-30-09 — CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

DESIGN	BY R. Bromenschenkel	CHECKED F. Zayati	
DETAILS	BY K. Kubo	CHECKED R. Bromenschenkel	
QUANTITIES	BY R. Bromenschenkel	CHECKED F. Zayati	

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

BRIDGE NO. 53-2618
POST MILE 3.5/4.5

CU 07
EA 265001

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
HINGE RETROFIT DETAILS NO. 2

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES										SHEET	OF
12-06-06	12-07-06	12-14-06	12-19-06	01-16-07	02-28-07	03-30-07	04-02-07	05-18-07		10	12

FILE => 53-2618-10hingedet02.dgn

USERNAME => rrlenard DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 08:48

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	18	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

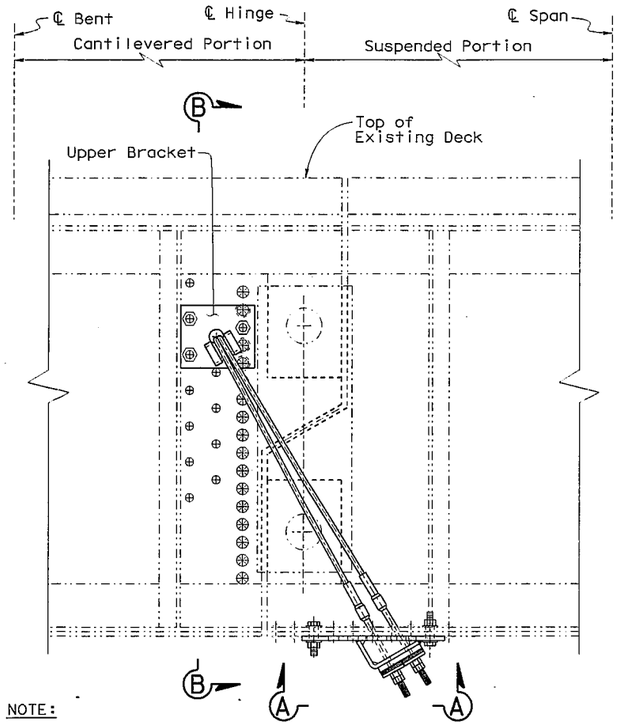
4-14-08
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — FOUED ZAYATI No. C 57046 Exp. 06-30-09 CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

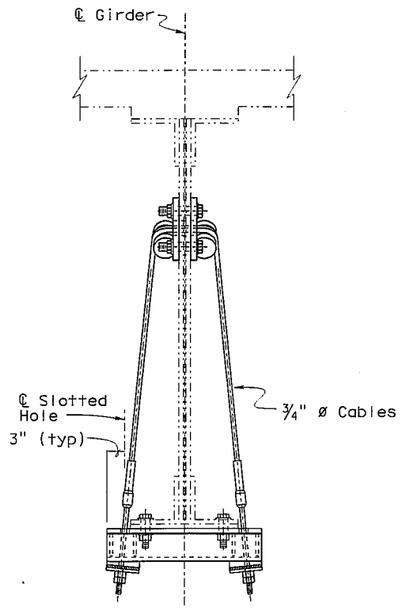
NOTES:

1. Hinge Retrofit for 68 inch Girders apply to the following locations: Mainline Spans: 24 & 29
2. Notes #2 through #9 on "HINGE RETROFIT DETAILS NO. 1" sheet apply.
3. For 'LEGEND' see "HINGE RETROFIT DETAILS NO. 1" sheet.

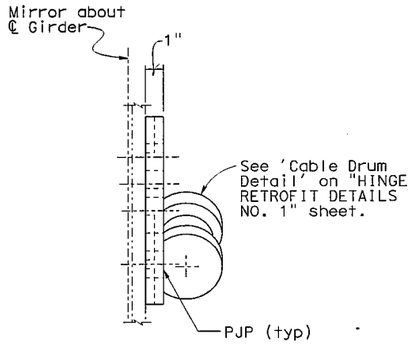


NOTE:
Two assemblies per Girder within hinge spans. Second assembly (not shown) is opposite hand.

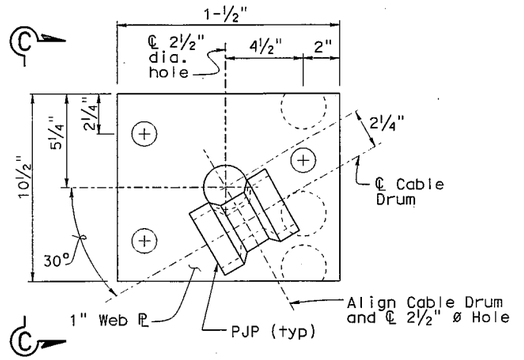
ELEVATION - 68 INCH GIRDER
1" = 1'0"



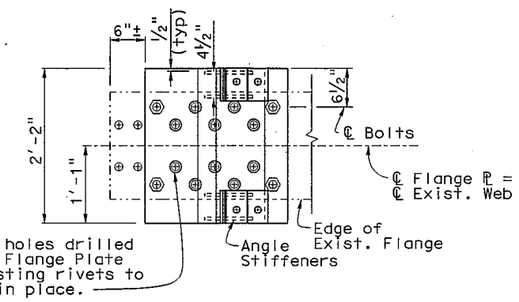
VIEW B-B
1" = 1'0"



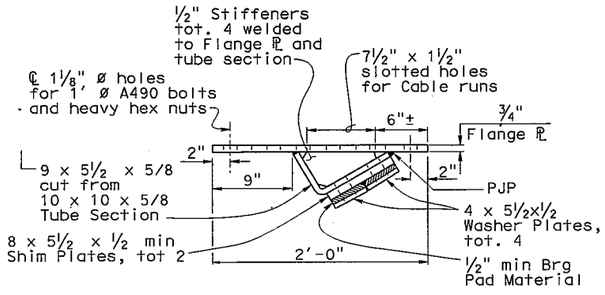
VIEW C-C
3" = 1'0"



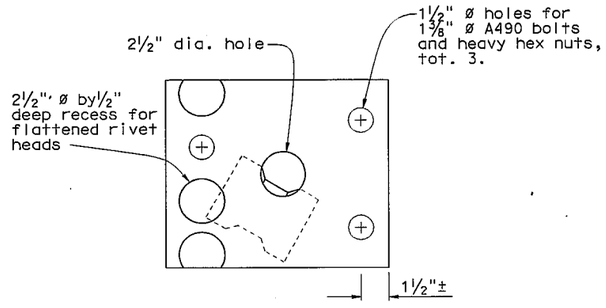
FRONT
3" = 1'0"



VIEW A-A
1" = 1'0"



LOWER BRACKET DETAILS
1½" = 1'0"



BACK
3" = 1'0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

"NO AS BUILT CHANGE"

DESIGN	BY R. Bromenschenkel	CHECKED F. Zayati	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
DETAILS	BY K. Kubo	CHECKED R. Bromenschenkel	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN DESIGN BRANCH 14
QUANTITIES	BY R. Bromenschenkel	CHECKED F. Zayati	CU 07 EA 265001

BRIDGE NO. 53-2618
POST MILE 3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM
HINGE RETROFIT DETAILS NO. 3

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3
FILE => 53-2618-11hingedet03.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES →
REVISION DATES: 02-28-01 | 03-28-01 | 04-02-01 | 4-4-01 | 05-14-01 | 06-21-01 | 12-22-06 | 02-21-07 | 02-28-07

SHEET 11 OF 12

USERNAME => trleonard DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 08:48

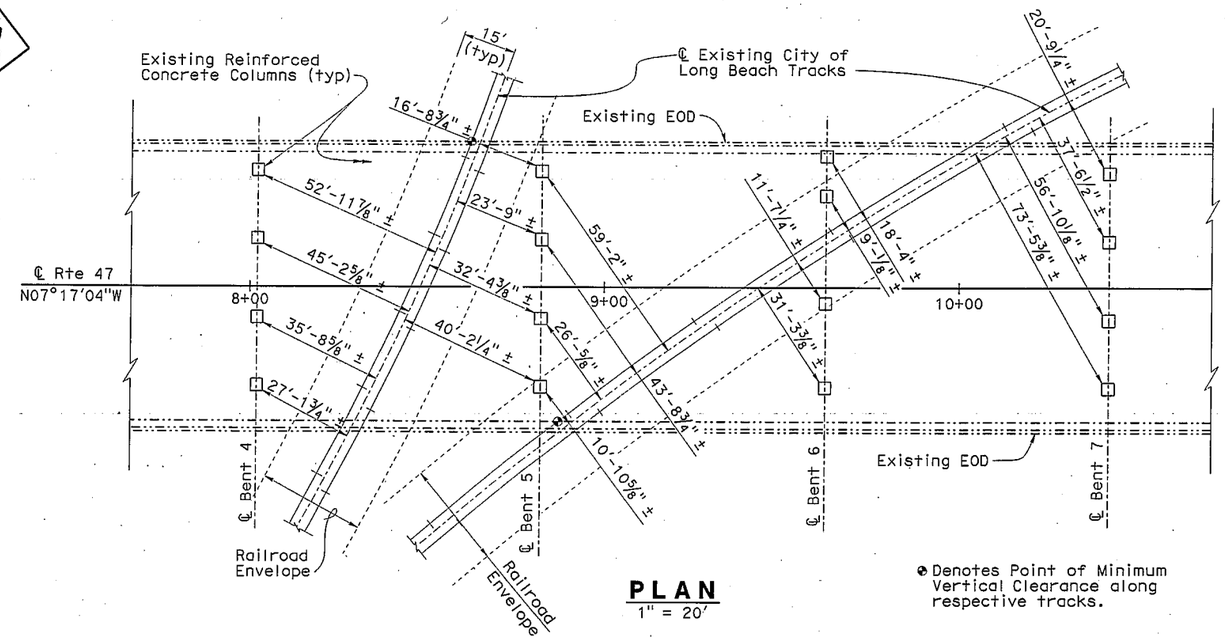
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	47	3.6/4.5	19	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
FOUED ZAYATI
No. C 57046
EXP. 06-30-09
CIVIL
STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

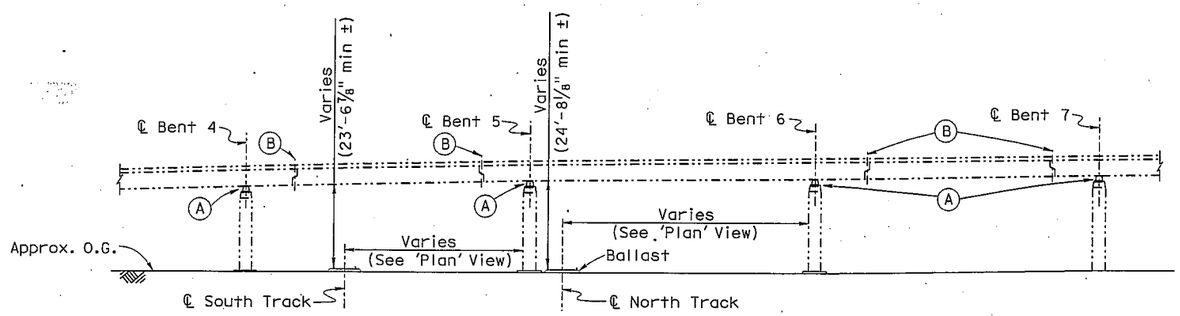


PLAN
1" = 20'

Denotes Point of Minimum Vertical Clearance along respective tracks.

NOTES:

1. Distances shown are approximate and based on December 2006 Field Survey.
2. Location of work
   - (A) Column Bearing Retrofit
   - (B) Hinge Retrofit



ELEVATION
1" = 20'

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

"NO AS BUILT CHANGE"

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	K. Kubo	R. Bromenschenkel
QUANTITIES		

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

BRIDGE NO.	53-2618
POST MILE	3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
RAILROAD CLEARANCE DETAILS

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07
EA 265001

FILE => 53-2618-12railroaddet.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES										SHEET	OF
01-11-07	05-18-07	06-21-07								12	12

USERNAME => trienord DATE PLOTTED => 16-APR-2008 TIME PLOTTED => 08:48

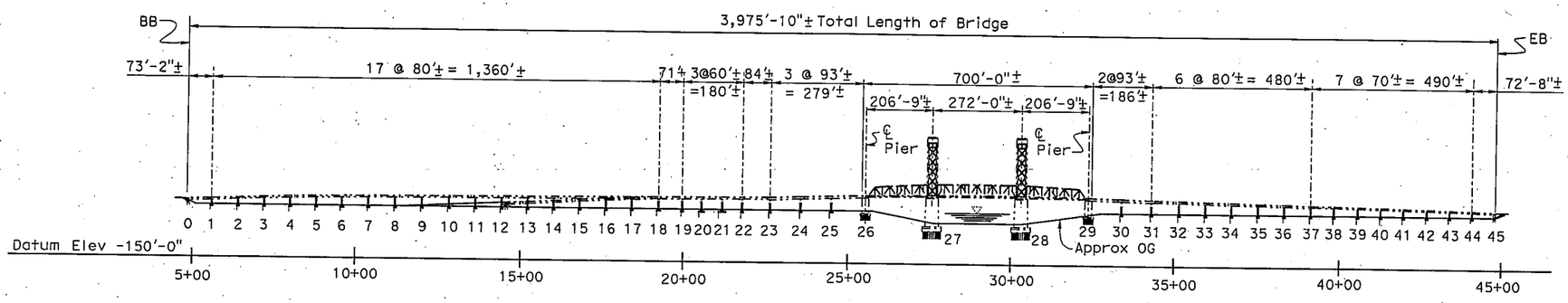
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	8	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — FOUED ZAYATI — No. C 57046 — Exp. 06-30-09 — CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

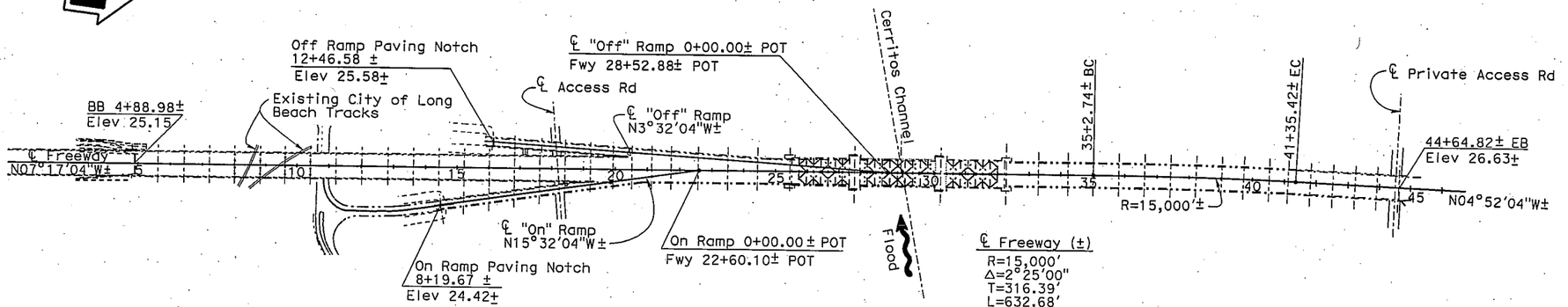


ELEVATION
1" = 200'

QUANTITIES

BRIDGE REMOVAL (PORTION)	LUMP	SUM
REMOVE RIVET	2,032	EA
STRUCTURAL CONCRETE, BRIDGE	262	CY
DRILL AND BOND DOWEL	60	LF
BAR REINFORCING STEEL (BRIDGE)	44,000	LB
STRUCTURAL STEEL (BRIDGE)	101,000 ~~95,500~~	LB
CLEAN AND PAINT STRUCTURAL STEEL	LUMP	SUM
SPOT BLAST CLEAN AND PAINT UNDERCOAT	2,076	SQFT
MISCELLANEOUS METAL (RESTRAINER - CABLE TYPE)(MODIFIED)	~~20,100~~ 14,800	LB

1



PLAN
1" = 200'

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

1 **REVISED PER ADDENDUM No. 1 DATED JULY 28, 2008**

"NO AS BUILT CHANGE"

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	M. Johnson	R. Bromenschenkel
QUANTITIES	R. Bromenschenkel	F. Zayati

LOAD FACTOR DESIGN — LIVE LOADING: HS20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD

	BY	CHECKED
LAYOUT	R. Bromenschenkel	F. Zayati
SPECIFICATIONS	D. Klein	PLANS AND SPECS COMPARED F. Zayati

X Ronald I. Bromenschenkel
DESIGN ENGINEER

STRUCTURES DESIGN GENERAL PLAN SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

CU 07
EA 265001

FILE => 53-2618-01gp.dgn

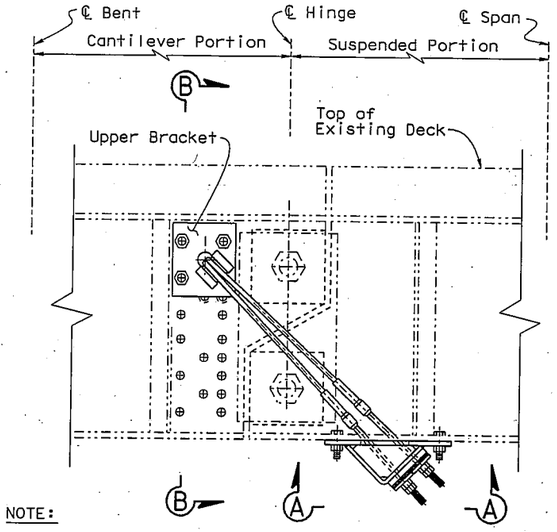
BRIDGE NO.	53-2618
POST MILE	3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
GENERAL PLAN

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES									SHEET	OF
10-14-06	10-11-06	12-27-06	01-04-07	01-05-07	05-17-07	05-18-07	06-21-07		1	12

USERNAME => trmnguye DATE PLOTTED => 23-JUL-2008 TIME PLOTTED => 09:41

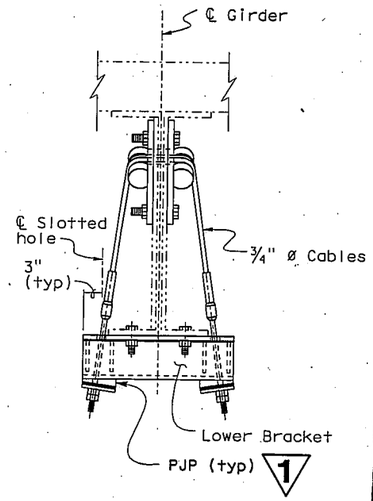


NOTE:

Two assemblies per Girder within hinge spans. Second assembly (not shown) is opposite hand.

ELEVATION - 36 INCH GIRDER

1" = 1'0"



VIEW B-B

1" = 1'0"

NOTES:

1. Hinge Retrofits for 36 inch Girders apply to the following locations: Mainline Spans - 37, 39, 41 & 43
2. All Rivets not shown.
3. Location of Rivets shown is approximate and based on May 8, 2006 field measurements.
4. ℄ Hinge shown in vertical position. Actual position may vary.
5. Cable nuts to be hand tightened and secured with thread locking compound.
6. All dimensions to bolt holes and recessed riverts, are approximate. Match marking may be required.
7. Thru bolts must align with exisiting rivets locations. See 'Spot-Blast Clean and Paint' detail.
8. All brackets to be coated with zinc rich primer after fabrication. A490 fasteners are not to be galvanized.
9. All steel GR50

LEGEND:

- ⊕ Denotes approx location of existing Rivets to remain in place, recessed under base plate.
- ◉ Denotes approx location of new A490 Bolts and Nuts.
- ⊛ Denotes approx location of existing Rivets replaced by A490 Bolts and Nuts.
- ⊕ Denotes approx location of existing Rivets to remain in place.
- ❀ Denotes approx location of existing Flat Head Rivets to remain in place. Base plate to be machined as required.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	16	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

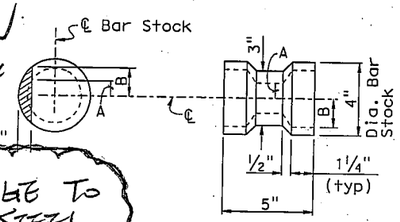
4-14-08
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — FOUED ZAYATI — No. C 57046 — Exp. 06-30-09 — CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

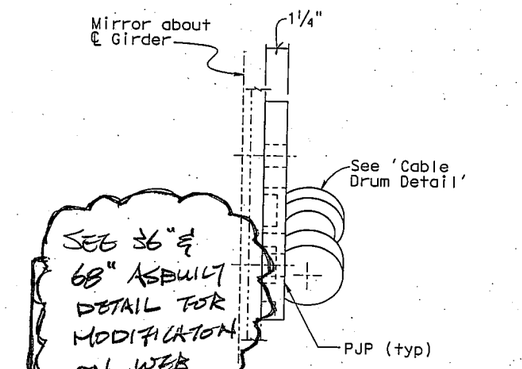
AS BUILT
CORRECTIONS BY A. CHEN
CONTRACT NO. 07-265004
DATE 12-15-09

Denotes material removed from drum prior to welding to Web Plate.



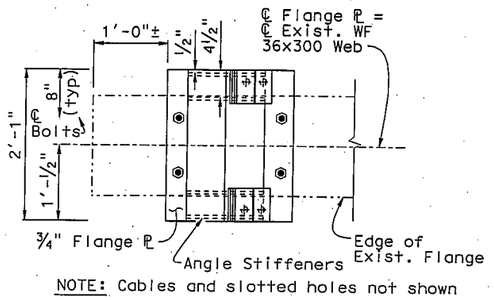
CABLE DRUM DETAIL

3" = 1'0"



VIEW C-C

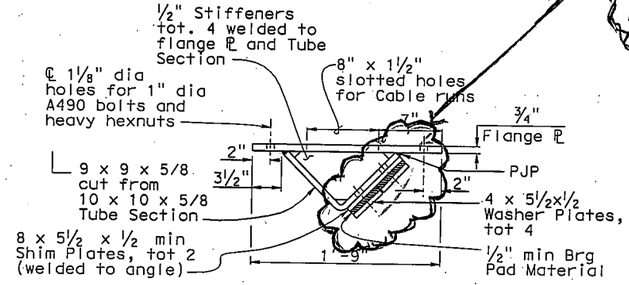
3" = 1'0"



NOTE: Cables and slotted holes not shown

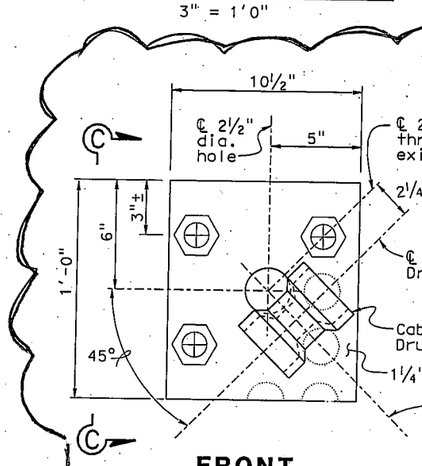
VIEW A-A

1" = 1'0"



LOWER BRACKET DETAILS

1½" = 1'0"

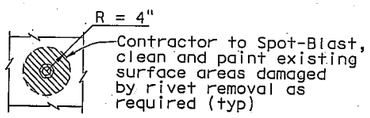


FRONT

3" = 1'0"

BACK

3" = 1'0"



SPOT BLAST CLEAN AND PAINT DETAIL

1" = 1'0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

1 REVISED PER ADDENDUM No. 1 DATED JULY 28, 2008

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	K. Kubo	R. Bromenschenkel
QUANTITIES	R. Bromenschenkel	F. Zayati

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

CU 07
EA 265001

FILE => 53-2618-09hingedet01.dgn

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM
HINGE RETROFIT DETAILS NO. 1

BRIDGE NO. 53-2618
POST MILE 3.5/4.5

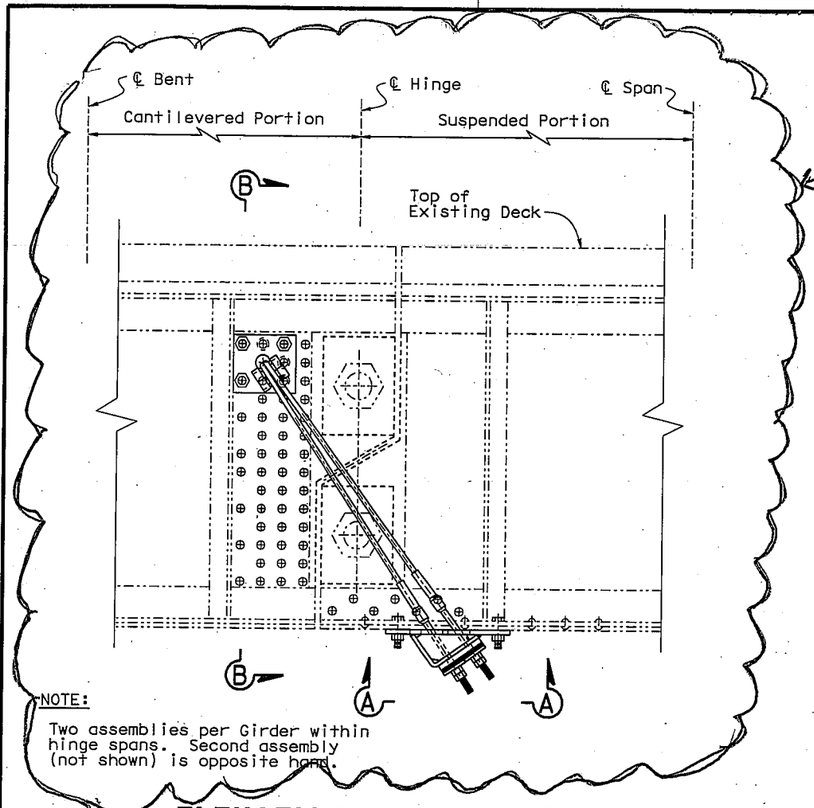
DISREGARD PRINTS BEARING EARLIER REVISION DATES →
REVISION DATES: 02-28-07 | 02-23-07 | 03-28-07 | 03-29-07 | 05-14-07 | 05-21-07 | 12-13-06 | 12-14-06 | 01-12-07

SHEET 9 OF 12

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

USERNAME => frmnguye DATE PLOTTED => 23-JUL-2008 TIME PLOTTED => 09:48



NOTE:
Two assemblies per Girder within hinge spans. Second assembly (not shown) is opposite hand.

ELEVATION - 54 INCH GIRDER
1" = 1'0"

BENT 13 HAS NEW WEB BRACKET LOCATION SEE 54" GIRDER AS BUILT DETAIL

NOTES:
1. Hinge Retrofit for 54 inch Girders apply to the following locations:
   Mainline Spans: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 31, 33 & 35
   'On' Ramp Spans: 5, 3, 1 & 0
   'Off' Ramp Spans: 4, 2 & 0
2. Notes #2 through #9 on "HINGE RETROFIT DETAILS NO. 1" sheet apply.
3. For 'LEGEND' see "HINGE RETROFIT DETAILS NO. 1" sheet.

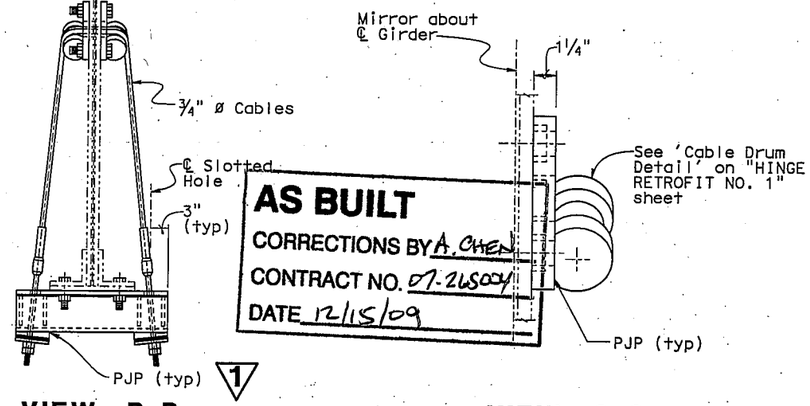
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	17	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — FOUED ZAYATI No. C 57046 Exp. 06-30-09 CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.



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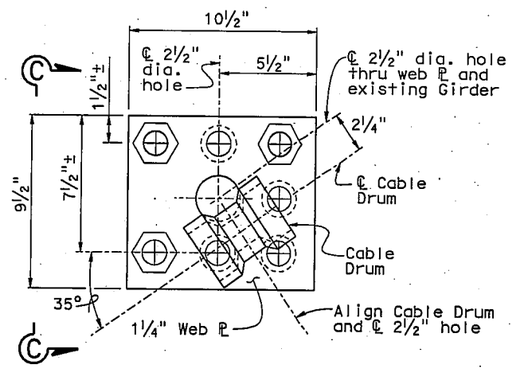
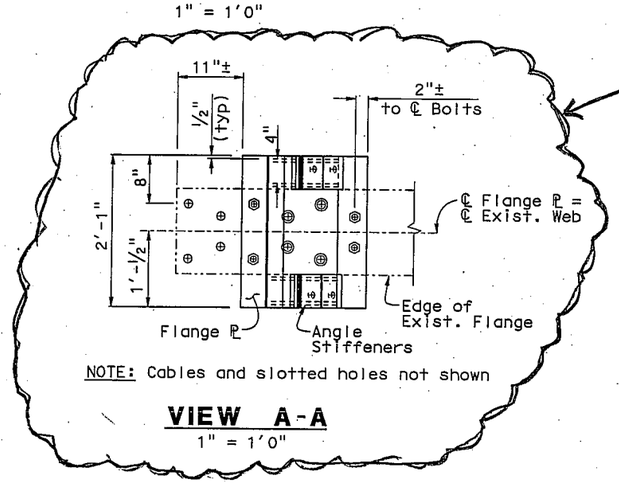
VIEW B-B
1" = 1'0"

VIEW C-C
3" = 1'0"



FRONT
3" = 1'0"



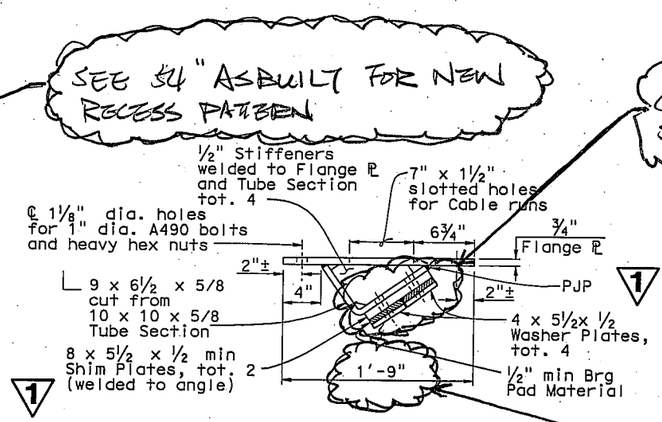
NOTE: Cables and slotted holes not shown

VIEW A-A
1" = 1'0"

SEE 54" ASBUILT FOR NEW RECESS PATTERN

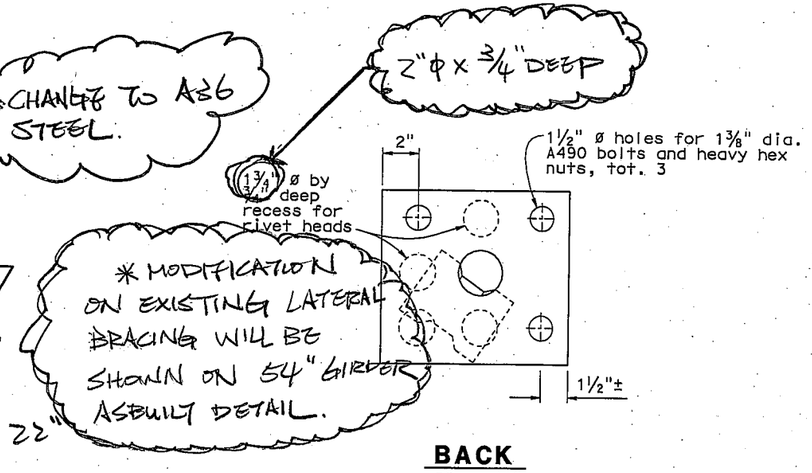
CHANGE TO A36 STEEL.

2"ϕ x ¾" DEEP



1

LOWER BRACKET DETAILS
1½" = 1'0"



BACK
3" = 1'0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

10.2.

1 **REVISED PER ADDENDUM No. 1 DATED JULY 28, 2008**

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	K. Kubo	R. Bromenschenkel
QUANTITIES	R. Bromenschenkel	F. Zayati

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

CU 07
EA 265001

BRIDGE NO. 53-2618
POST MILE 3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM BRIDGE
HINGE RETROFIT DETAILS NO. 2

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 12-06-06 | 12-07-06 | 12-14-06 | 12-18-06 | 01-12-07 | 02-28-07 | 03-30-07 | 04-02-07 | 05-18-07

SHEET 10 OF 12

FILE => 53-2618-10hingedet02.add

DATE PLOTTED => 23-JUL-2008 TIME PLOTTED => 08:08
USERNAME => rtrim

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	47	3.6/4.5	18	19

Foued Zayati 07-13-07
REGISTERED CIVIL ENGINEER DATE

4-14-08
PLANS APPROVAL DATE

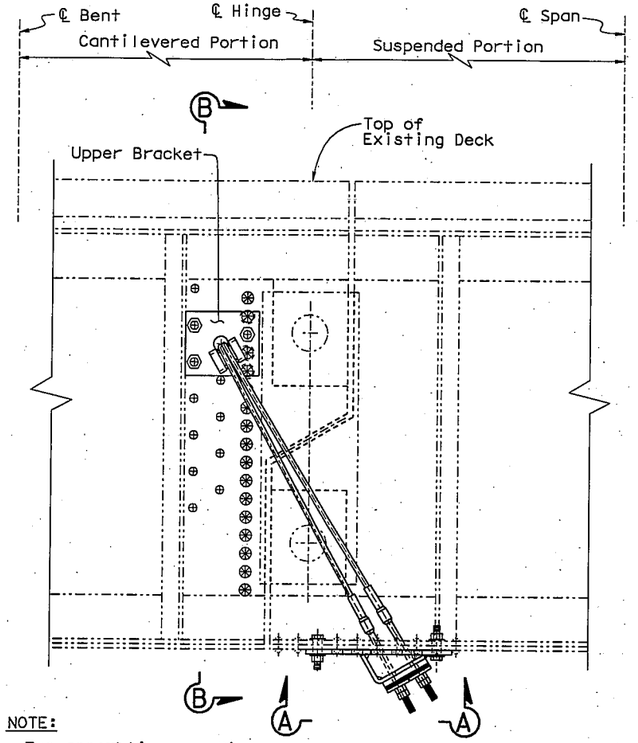
REGISTERED PROFESSIONAL ENGINEER — FOUED ZAYATI — No. C 57046 — Exp. 06-30-09 — CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

NOTES:

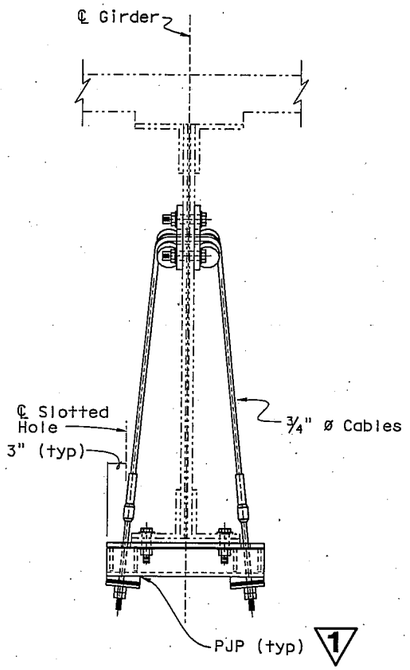
1. Hinge Retrofit for 68 inch Girders apply to the following locations: Mainline Spans: 24 & 29
2. Notes #2 through #9 on "HINGE RETROFIT DETAILS NO. 1" sheet apply.
3. For 'LEGEND' see "HINGE RETROFIT DETAILS NO. 1" sheet.

AS BUILT
CORRECTIONS BY A. CHEN
CONTRACT NO. 07-265024
DATE 12/15/09

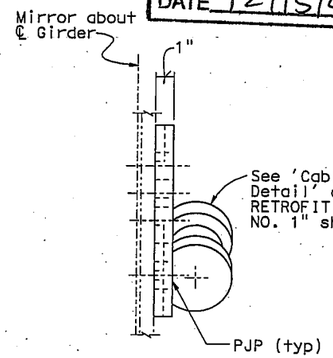


NOTE:
Two assemblies per Girder within hinge spans. Second assembly (not shown) is opposite hand.

ELEVATION - 68 INCH GIRDER
1" = 1'0"

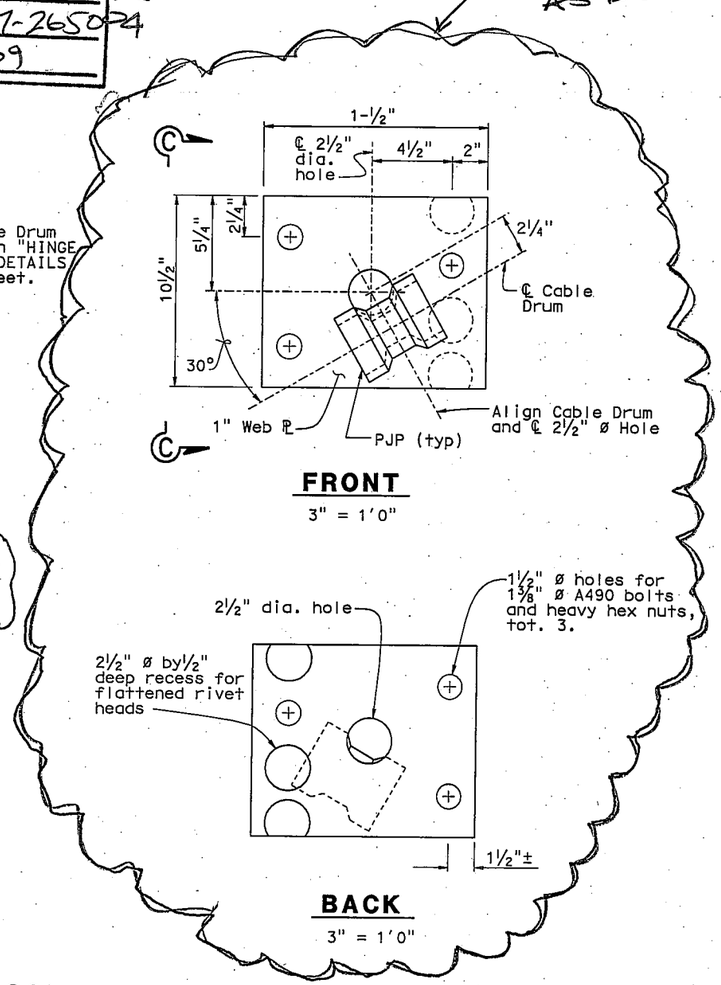


VIEW B-B
1" = 1'0"



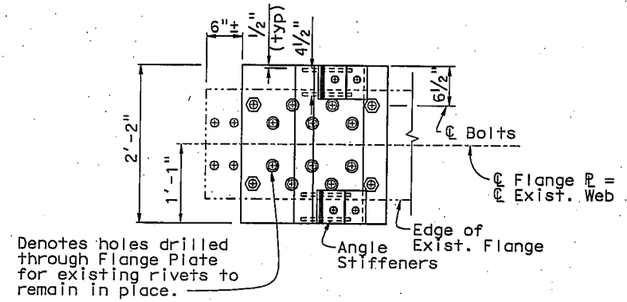
VIEW C-C
3" = 1'0"

SEE 36" & 68" AS BUILT DETAIL

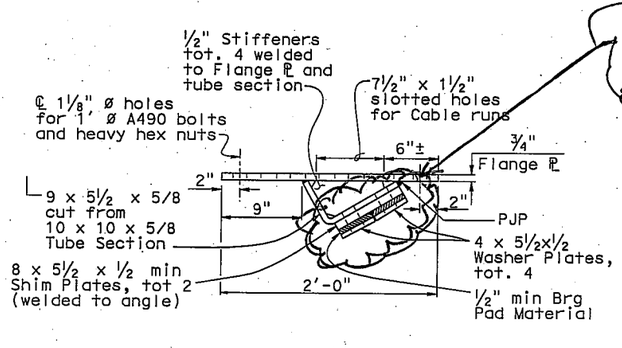


FRONT
3" = 1'0"

BACK
3" = 1'0"



VIEW A-A
1" = 1'0"



LOWER BRACKET DETAILS
1½" = 1'0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

1 REVISED PER ADDENDUM No. 1 DATED JULY 28, 2008

	BY	CHECKED
DESIGN	R. Bromenschenkel	F. Zayati
DETAILS	K. Kubo	R. Bromenschenkel
QUANTITIES	R. Bromenschenkel	F. Zayati

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 14

CU 07
EA 265001

BRIDGE NO.	53-2618
POST MILE	3.5/4.5

INTERIM EARTHQUAKE RETROFIT PROJECT
SCHUYLER HEIM
HINGE RETROFIT DETAILS NO. 3

DISREGARD PRINTS BEARING EARLIER REVISION DATES →
REVISION DATES: 02-26-07 | 03-30-07 | 01-04-07 | 1-1-07 | 05-14-07 | 06-21-07 | 12-26-06 | 02-25-07 | 02-26-07

SHEET 11 OF 12

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REV. 10/25/05)

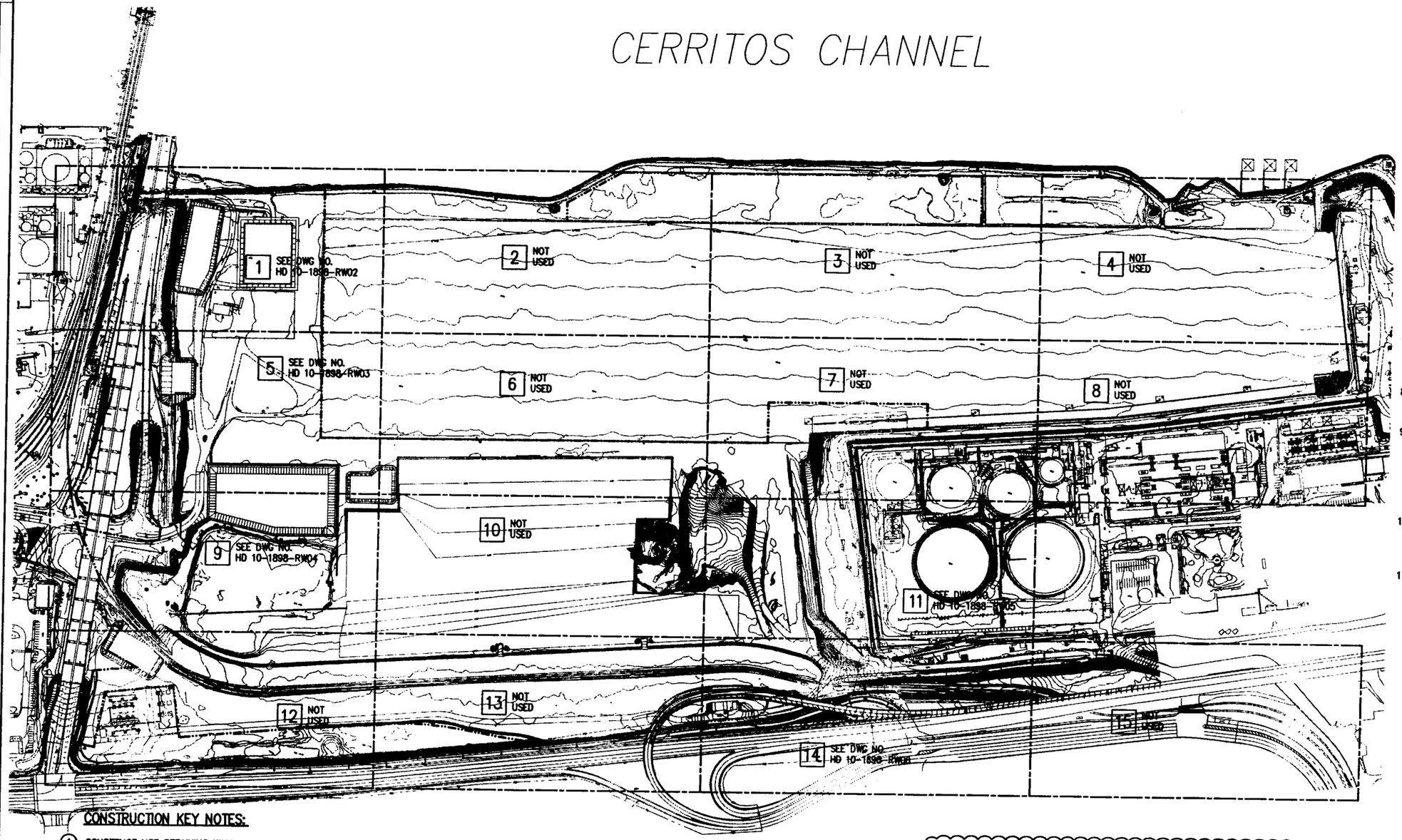
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

FILE => 53-2618-11hingedet03.dgn

DATE PLOTTED => 23-JUL-2008 TIME PLOTTED => 09:08
USERNAME => tflim

Path: C:\DWG\URS\PLTS\ | Xrefs: XCIVIL-MATCH : X1898-BDR : X1898RWALL : X2444-BORROW : X1898-XTOPO : X1898-LIMIT : X1898NOTE-RWALL | Filename: D1898RW01_A0.dwg | Last Save by: MICHAEL_ROMUB/13/2008 | Plot Date: 02/24/09 - 11:37 am | User: ika_chung | LAYOUT: RW01

CERRITOS CHANNEL



CONSTRUCTION KEY NOTES:

1. CONSTRUCT MSE RETAINING WALL.
2. MSE ALIGNMENT REFERENCE POINT. SEE 1/RW09
3. CONSTRUCT SETTLEMENT MONITORING PLATE. SEE 3/RW10
4. CONSTRUCT PCC RETAINING WALL. SEE 4/RW07
5. CONSTRUCT PRECAST PCC PANEL WITH ARCHITECTURAL FINISH. SPEC FORMLINERS PATTERN #1101 STANDARD SPEC RIB OR EQUIVALENT.

RETAINING WALL KEY PLAN

SCALE: 1"=200'

GRAPHIC SCALE 0 100' 200' 400'

N W E S

NOTES:

1. THE MSE RETAINING WALL IS A DESIGN/BUILD PROJECT ELEMENT.
2. CONTRACTOR SHALL PROVIDE ALL ENGINEERING, DESIGN AND STRUCTURAL CALCULATIONS STAMPED BY A LICENSED CIVIL OR GEOTECHNICAL ENGINEER IN THE STATE OF CALIFORNIA AND PROVIDE ALL TRANSPORTATION AND LABOR REQUIRED TO PROCESS AND OBTAIN ALL NECESSARY PERMITS FROM THE CITY OF LONG BEACH DEPARTMENT OF PLANNING AND BUILDING. CONTRACTOR SHALL APPLY FOR ALL NECESSARY PERMITS TEN (DAYS) AFTER CONTRACT NOTICE TO PROCEED.
3. THE CURRENT CODES IN THE CITY OF LONG BEACH ARE TITLE 18 OF LONG BEACH MUNICIPAL CODE, WHICH INCLUDES THE 2001 EDITION OF THE CALIFORNIA BUILDING CODE (BASED ON THE 1997 EDITION OF THE UNIFORM BUILDING CODE).
4. GRADING IN THE AREA OF THE RETAINING WALL IS INCLUDED IN CLB GRADING PERMIT #440397.
5. CONTRACTOR SHALL PROVIDE APPROVAL FOR THE MSE RETAINING WALL SYSTEM BY INTERNATIONAL CODE COUNCIL, CITY OF LOS ANGELES, CALTRANS, OR FEDERAL HIGHWAY ADMINISTRATION OR OTHER AGENCIES ACCEPTABLE TO THE ENGINEER.
6. FOR ANY DESIGN/BUILD ELEMENT OF THE RETAINING WALL THAT REQUIRES REGISTERED INSPECTION, FABRICATION MUST BE DONE EITHER UNDER CONTINUOUS REGISTERED INSPECTION OR IN A SHOP APPROVED BY THE CITY OF LONG BEACH, (2001 CBC SECTION 1701.7)
7. DRAWINGS AND CALCULATIONS FOR THE DESIGN/BUILD ELEMENT SHALL BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD PRIOR TO SUBMITTAL TO THE CITY OF LONG BEACH DEPARTMENT OF PLANNING AND BUILDING BUILDING.
8. DRAWINGS AND CALCULATIONS FOR THE DESIGN/BUILD ELEMENT SHALL BE REVIEWED AND APPROVED BY THE CITY OF LONG BEACH BUILDING AND SAFETY DEPARTMENT PRIOR TO INSTALLATION.
9. STRUCTURAL OBSERVATION IS REQUIRED PER LONG BEACH MUNICIPAL CODE SECTION 18.24.300. DESIGN DRAWINGS SHALL LIST THE REQUIREMENTS FOR THE PRE-CONSTRUCTION MEETING AND ALL ELEMENTS OF CONSTRUCTION THAT WILL RECEIVE STRUCTURAL OBSERVATIONS BY AN ENGINEER AND TIMING OF OBSERVATION AS NOTED ON THE CITY OF LONG BEACH STRUCTURAL OBSERVATION REQUIREMENTS & OWNER'S ACKNOWLEDGEMENT FORM.
10. REGISTERED INSPECTION IS REQUIRED FOR DESIGN/BUILD ELEMENTS, INCLUDING: CONCRETE WITH F'C GREATER THAN 2,500 PSI, REINFORCING STEEL FOR CONCRETE REQUIRING REGISTERED INSPECTION, GRADING, AND STRUCTURAL OBSERVATION.
11. DESIGN DRAWINGS SHALL INCLUDE THE FOLLOWING STATEMENT TO BE COMPLETED PRIOR TO PLAN CHECK SUBMITTAL:

I CERTIFY THAT THE GEOTECHNICAL REPORT FOR THIS PROJECT WAS PREPARED UNDER MY DIRECT SUPERVISION AND THE PARAMETERS USED IN THE DESIGN OF THE RETAINING WALLS ARE IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN THE GEOTECHNICAL REPORT FOR THIS PROJECT.

NAME _____ LICENSE NO. _____ DATE _____

I CERTIFY THAT THE GEOTECHNICAL REPORT FOR THIS PROJECT WAS PREPARED UNDER MY DIRECT SUPERVISION AND THE PARAMETERS USED IN THE DESIGN OF THE RETAINING WALLS ARE IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN THE GEOTECHNICAL REPORT FOR THIS PROJECT. (PCC WALL ONLY)

NAME [signature] LICENSE NO. [illegible] DATE 8-23-07

1

AS-BUILT CONDITIONS ILLUSTRATED ON THIS PLAN REFLECT INFORMATION PROVIDED BY OTHERS AND DRAFTED BY THE ENGINEER. THE ENGINEER HAS NOT VERIFIED THE ACCURACY OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED THEREIN AS A RESULT

CASH & ASSOCIATES
ENGINEERING & ARCHITECTURE
5772 BOLSA AVE. SUITE 100,
HUNTINGTON BEACH, CA 92649
(714)895-2072

MARK	DATE	BY	REVISIONS
1	07/08	KMS	AS-BUILT

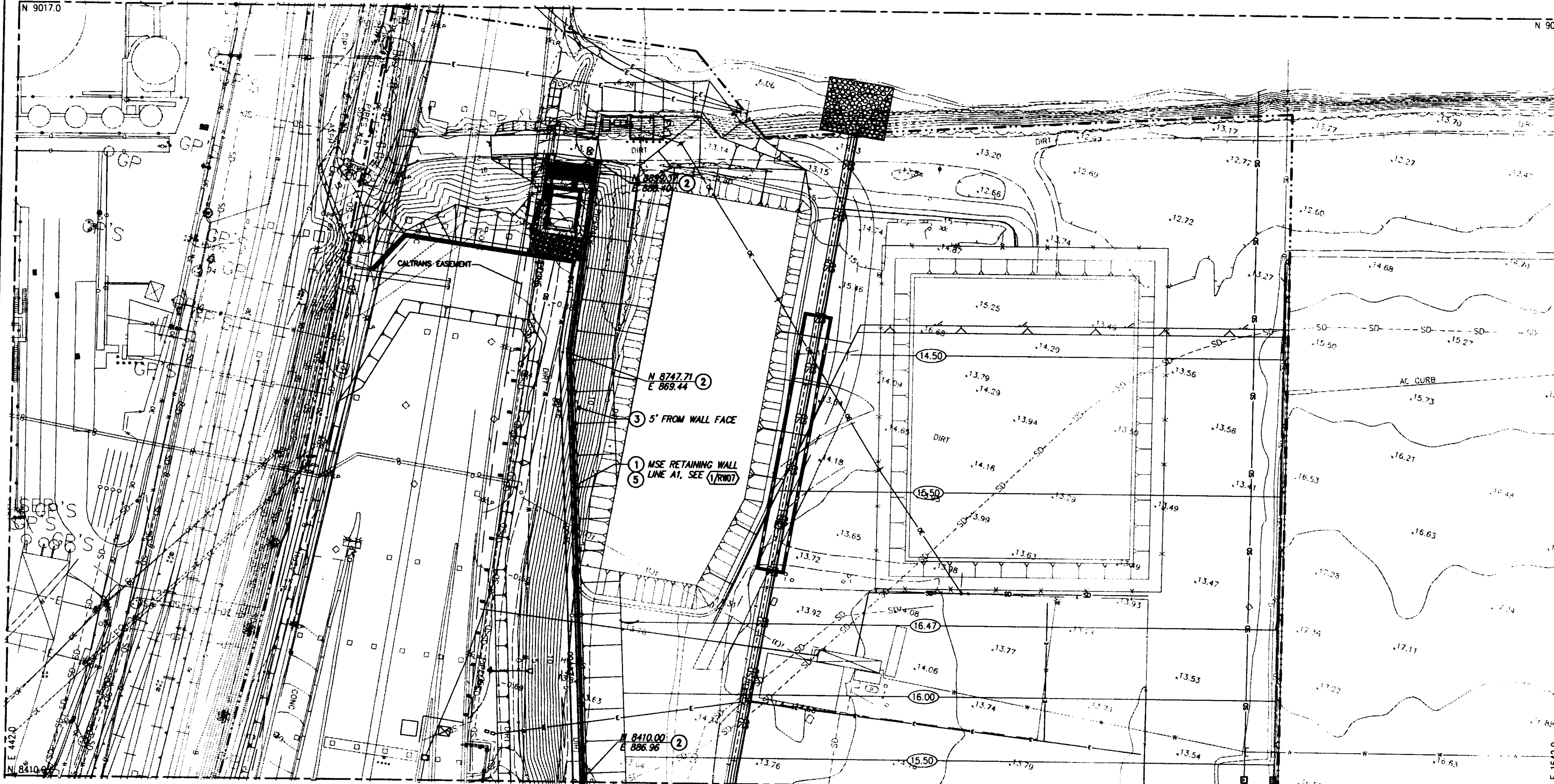
DRAWN MM DATE 10/05
DESIGNED MBS P.E. NO C-29699
PROJ. MGR SC P.E. NO
SECT. HEAD DJS P.E. NO C-46837
ASST. CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE

REGISTERED PROFESSIONAL ENGINEER MALFORD B. SWAN C29699 EXP. 3-31-07 CIVIL STATE OF CALIFORNIA

THE PORT OF LONG BEACH
925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

PIER S, BERTHS S102-S110
GRADING, DRAINAGE & UTILITIES
RETAINING WALL KEY PLAN

SCALE 1"=200' SHEET 231 OF 262
SPECIFICATION NUMBER HD-S2275
DRAWING NUMBER HD 10-1898-RW01



MATCHLINE SEE DWG. NO. HD 10-1898-RW03

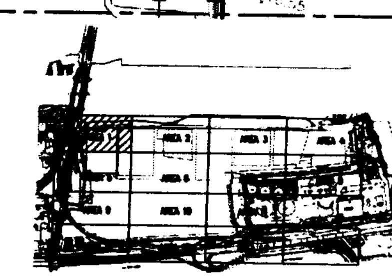
CONSTRUCTION KEY NOTES:

1. CONSTRUCT MSE RETAINING WALL.
2. MSE ALIGNMENT REFERENCE POINT. SEE (1/RW09)
3. CONSTRUCT SETTLEMENT MONITORING PLATE. SEE (3/RW10)
5. CONSTRUCT PRECAST PCC PANEL WITH ARCHITECTURAL FINISH. SPEC FORMLINERS PATTERN #1101 STANDARD SPEC RIB OR EQUIVALENT.

RETAINING WALL PLAN – AREA 1

SCALE: 1"=40'

0 20' 40' 80'
GRAPHIC SCALE



KEY MAP
NTS

AS-BUILT CONDITIONS ILLUSTRATED ON THIS PLAN REFLECT INFORMATION PROVIDED BY OTHERS AND DRAFTED BY THE ENGINEER. THE ENGINEER HAS NOT VERIFIED THE ACCURACY OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED THEREIN AS A RESULT

CASH & ASSOCIATES
ENGINEERING & ARCHITECTURE
5772 BOLSA AVE. SUITE 100,
HUNTINGTON BEACH, CA 92649
(714)895-2072

MARK	DATE	BY	REVISIONS
1	07/08	KMS	AS-BUILT

DRAWN NML DATE 10/05
DESIGNED WBS P.E. NO. C-29699
PROJ. MGR SG P.E. NO.
SECT. HEAD DJS P.E. NO. C-46837
ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE

REGISTERED PROFESSIONAL ENGINEER
WILFRIDO B. SIMBOL
C29699
EXP. 3-31-07
CIVIL
STATE OF CALIFORNIA

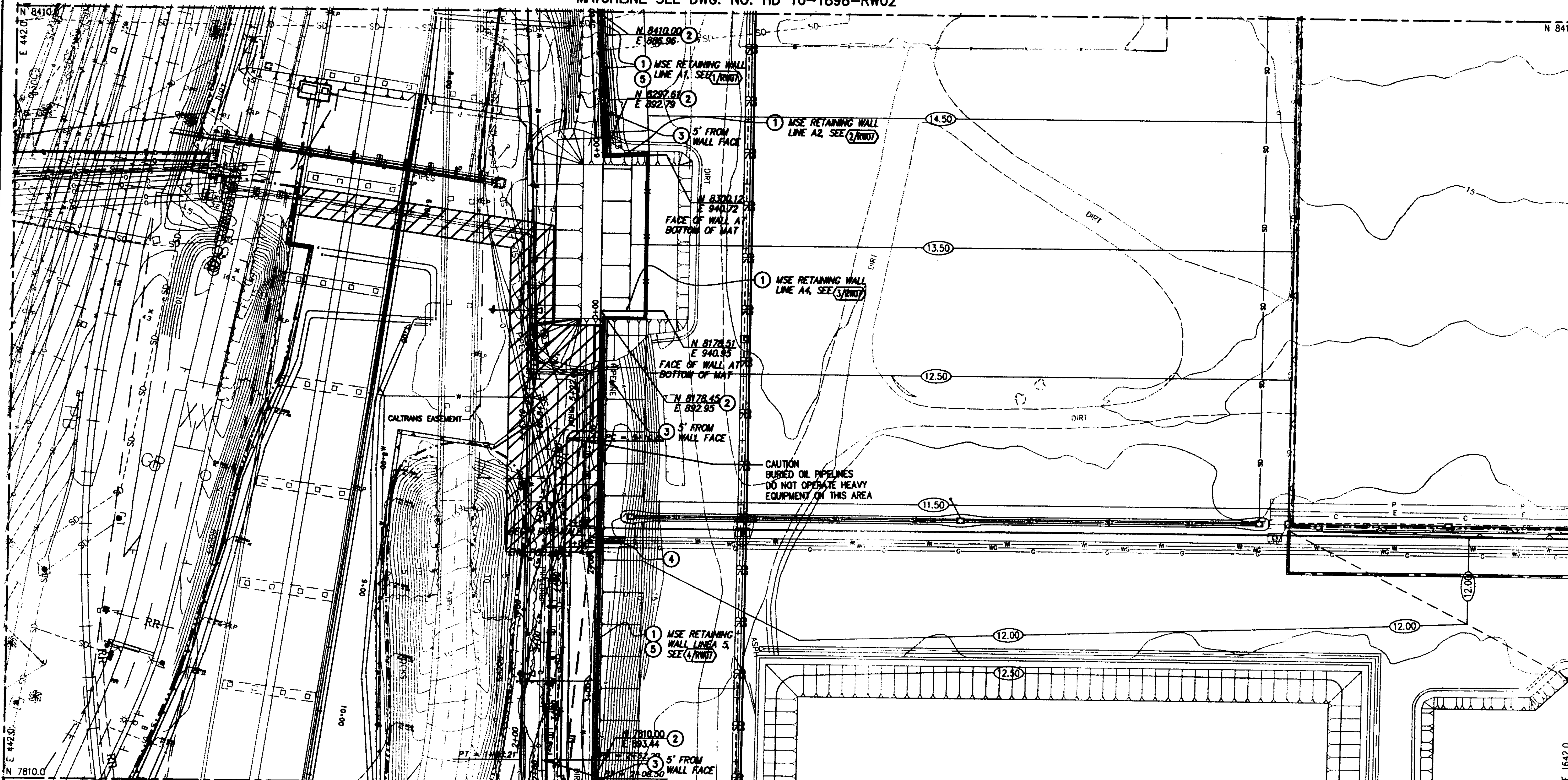
THE PORT OF LONG BEACH
925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

PIER S, BERTHS S102-S110
GRADING, DRAINAGE & UTILITIES
RETAINING WALL PLAN – AREA 1

SCALE 1"=40' SHEET 232 OF 262
SPECIFICATION NUMBER HD-S2275
DRAWING NUMBER HD 10-1898-RW02

Filename: D1898RW02_AB.dwg | Plot Date: 02/24/09 - 11:38 am | Last Save by: IKE_CHUNG ON: 1/16/2008
LAYOUT: RW02

MATCHLINE SEE DWG. NO. HD 10-1898-RW02



MATCHLINE SEE DWG. NO. HD 10-1898-RW04

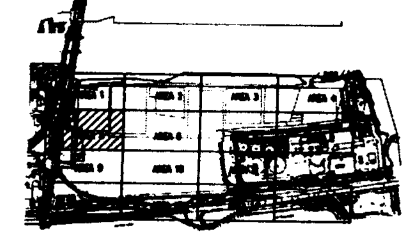
CONSTRUCTION KEY NOTES:

1. CONSTRUCT MSE RETAINING WALL.
2. MSE ALIGNMENT REFERENCE POINT. SEE 1/RW08
3. CONSTRUCT SETTLEMENT MONITORING PLATE. SEE 3/RW10
4. CONSTRUCT PCC RETAINING WALL. SEE 4/RW07
5. CONSTRUCT PRECAST PCC PANEL WITH ARCHITECTURAL FINISH. SPEC FORMLINERS PATTERN #1101 STANDARD SPEC RIB OR EQUIVALENT.

RETAINING WALL PLAN - AREA 5

SCALE: 1"=40'

0 20' 40' 80'
GRAPHIC SCALE



KEY MAP
NTS

AS-BUILT CONDITIONS ILLUSTRATED ON THIS PLAN REFLECT INFORMATION PROVIDED BY OTHERS AND DRAFTED BY THE ENGINEER. THE ENGINEER HAS NOT VERIFIED THE ACCURACY OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED THEREIN AS A RESULT

CASH & ASSOCIATES
ENGINEERING & ARCHITECTURE
5772 BOLSA AVE. SUITE 100,
HUNTINGTON BEACH, CA 92649
(714)895-2072

MARK	DATE	BY	REVISIONS
1	07/08	KMS	AS-BUILT

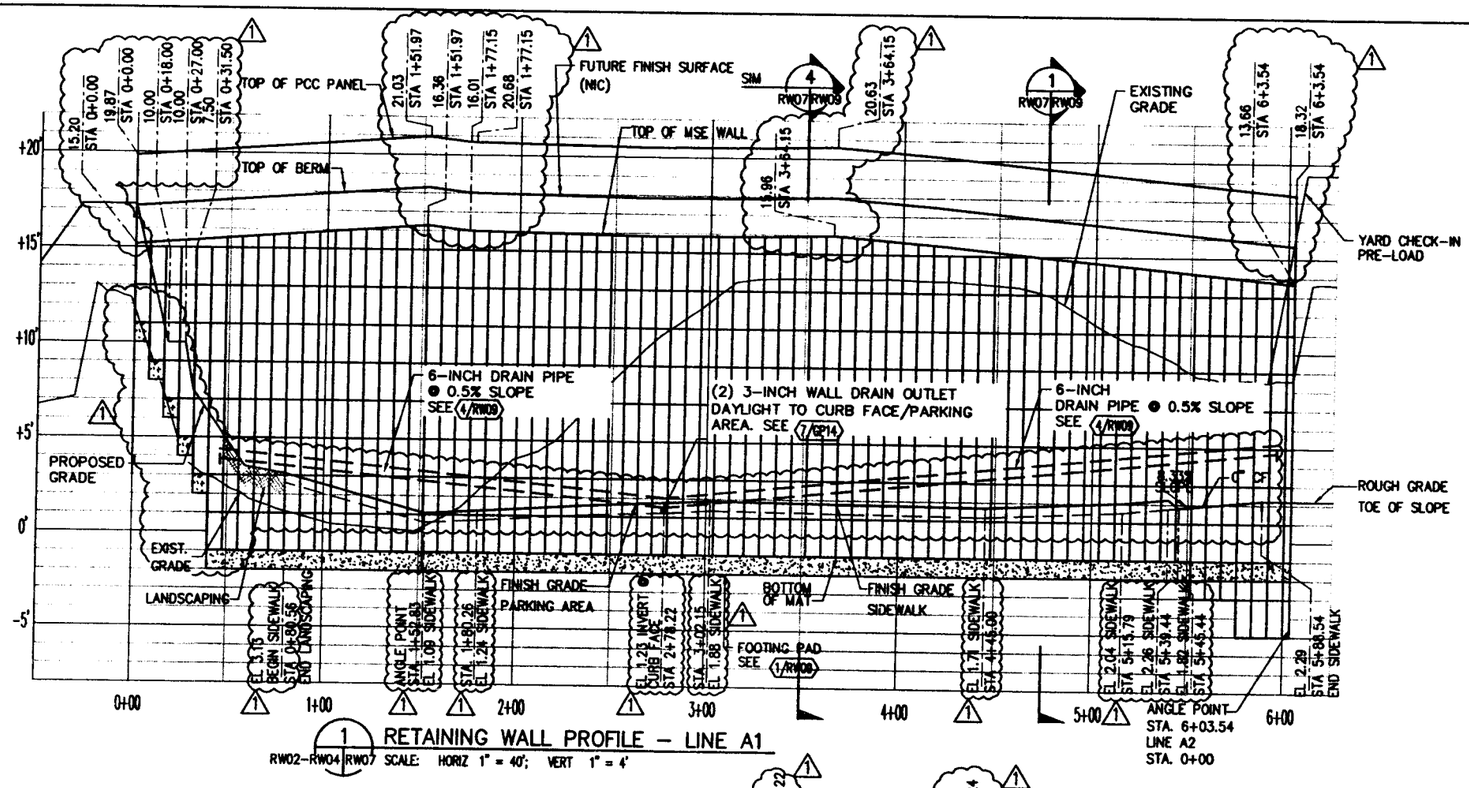
DRAWN MML DATE 10/05
DESIGNED WBS P.E. NO. C-29699
PROJ. MGR. SG P.E. NO.
SECT. HEAD DJS P.E. NO. C-46837
ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE

REGISTERED PROFESSIONAL ENGINEER WILFRIDO B. SIMBOL C29699 EXP. 3-31-07 CIVIL STATE OF CALIFORNIA

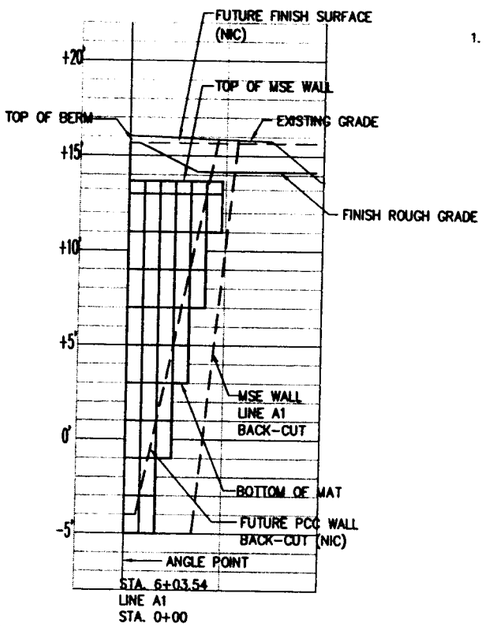
THE PORT OF LONG BEACH
925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

PIER S, BERTHS S102-S110
GRADING, DRAINAGE & UTILITIES
RETANING WALL PLAN - AREA 5

SCALE 1"=40' SHEET 233 OF 262
SPECIFICATION NUMBER HD-S2275
DRAWING NUMBER HD 10-1898-RW03

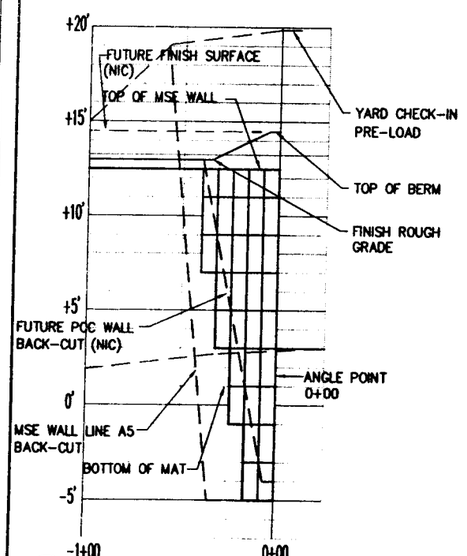


1 RETAINING WALL PROFILE – LINE A1
RW02–RW04 RW07 SCALE: HORIZ 1" = 40'; VERT 1" = 4'

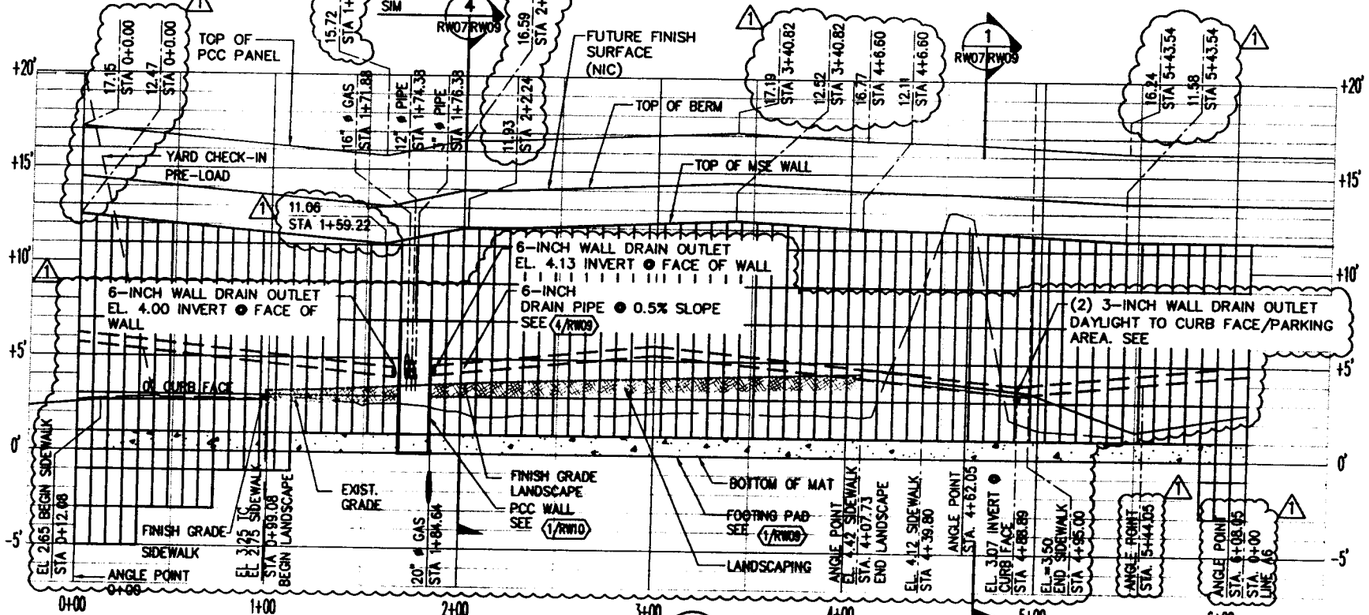


2 RETAINING WALL PROFILE – LINE A2
RW03 RW07 SCALE: HORIZ 1" = 40'; VERT 1" = 4'

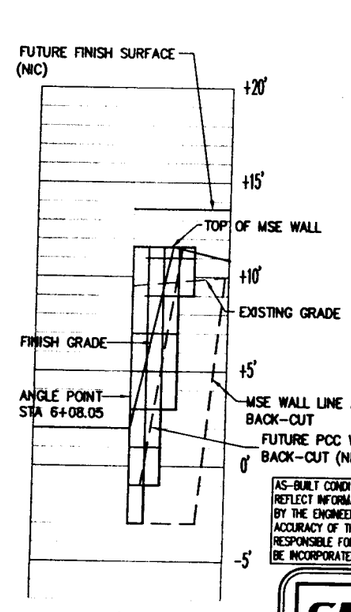
NOTE:
1. FUTURE FINISH SURFACE (N.I.C.). ELEVATION IS PROVIDED FOR DESIGN INFORMATION ONLY.



3 RETAINING WALL PROFILE – LINE A4
RW04 RW07 SCALE: HORIZ 1" = 40'; VERT 1" = 4'



4 RETAINING WALL PROFILE – LINE A5
RW03–RW04 RW07 SCALE: HORIZ 1" = 40'; VERT 1" = 4'



5 RETAINING WALL PROFILE – LINE A6
RW04 RW07 SCALE: HORIZ 1" = 40'; VERT 1" = 4'

AS-BUILT CONDITIONS ILLUSTRATED ON THIS PLAN REFLECT INFORMATION PROVIDED BY OTHERS AND DRAFTED BY THE ENGINEER. THE ENGINEER HAS NOT VERIFIED THE ACCURACY OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED THEREIN AS A RESULT

CASH & ASSOCIATES
ENGINEERING & ARCHITECTURE
5772 BOLSA AVE. SUITE 100,
HUNTINGTON BEACH, CA 92649
(714)895-2072

MARK	DATE	BY	REVISIONS
1	07/06	KMS	AS-BUILT

DRAWN NM DATE 10/05
DESIGNED WRS P.E. NO. C-29699
PROJ. MGR SG P.E. NO.
SECT HEAD DJS P.E. NO. C-46837
ASST CHIEF HARBOR ENGR P.E. NO C-25677 DATE
CHIEF HARBOR ENGINEER P.E. NO C-43065 DATE

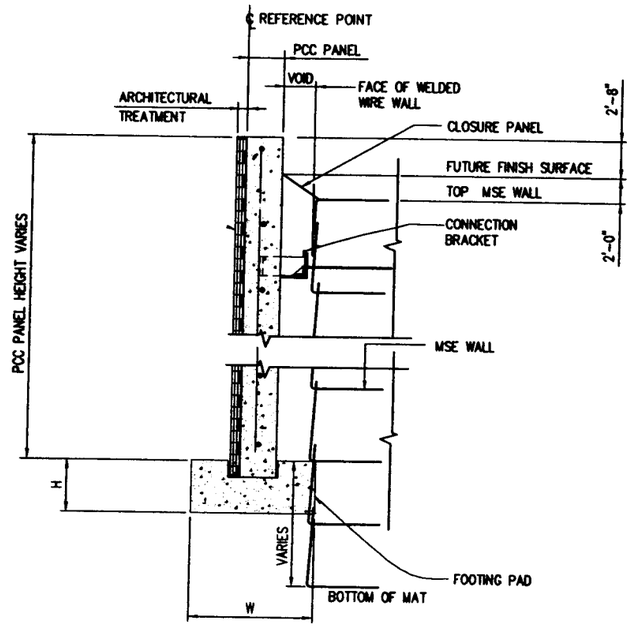
REGISTERED PROFESSIONAL ENGINEER ALFREDO R. SIMON C29699 EXP. 3-31-07 CIVIL STATE OF CALIFORNIA

THE PORT OF LONG BEACH
925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

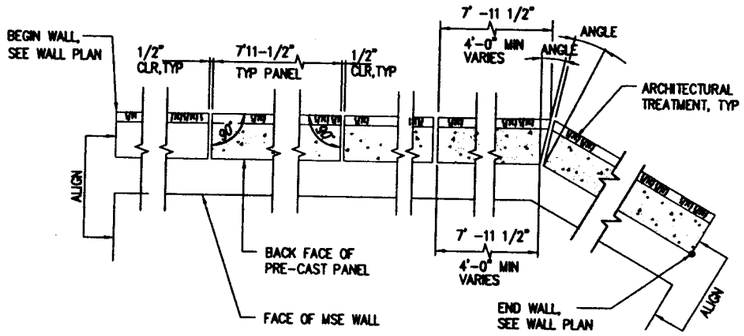
PIER S, BERTHS S102–S110
GRADING, DRAINAGE & UTILITIES
RETAINING WALL PROFILE 1

SCALE AS NOTED SHEET 237 OF 262
SPECIFICATION NUMBER HD-S2275
DRAWING NUMBER HD 10-1898-RW07

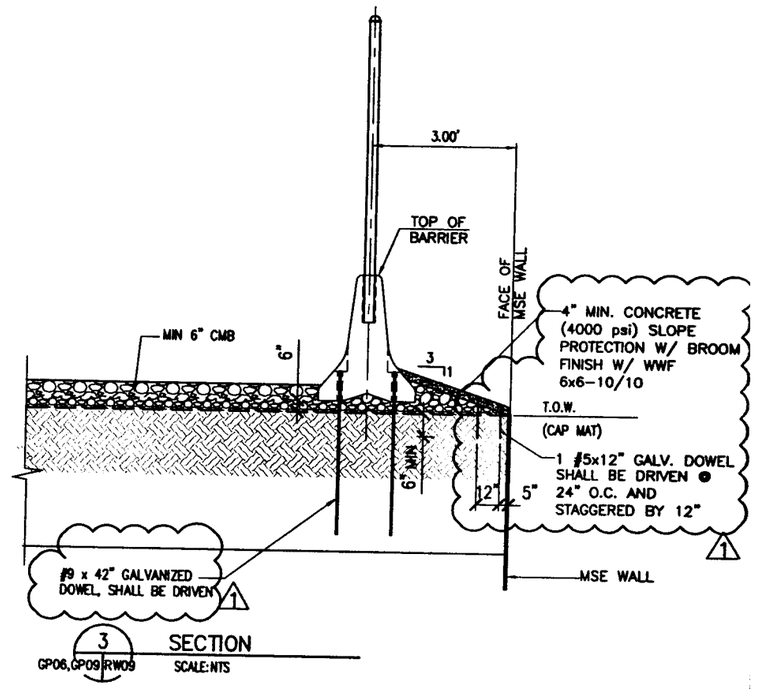
Path: C:\DWG\URS As-Builts 11\
Xrefs: x1898-BDR
Filename: D1898RW07_AB.dwg
Plot Date: 02/24/09 - 12:01 pm | Last Save by: PDB6 ON:2/15/2006
LAYOUT: RW07



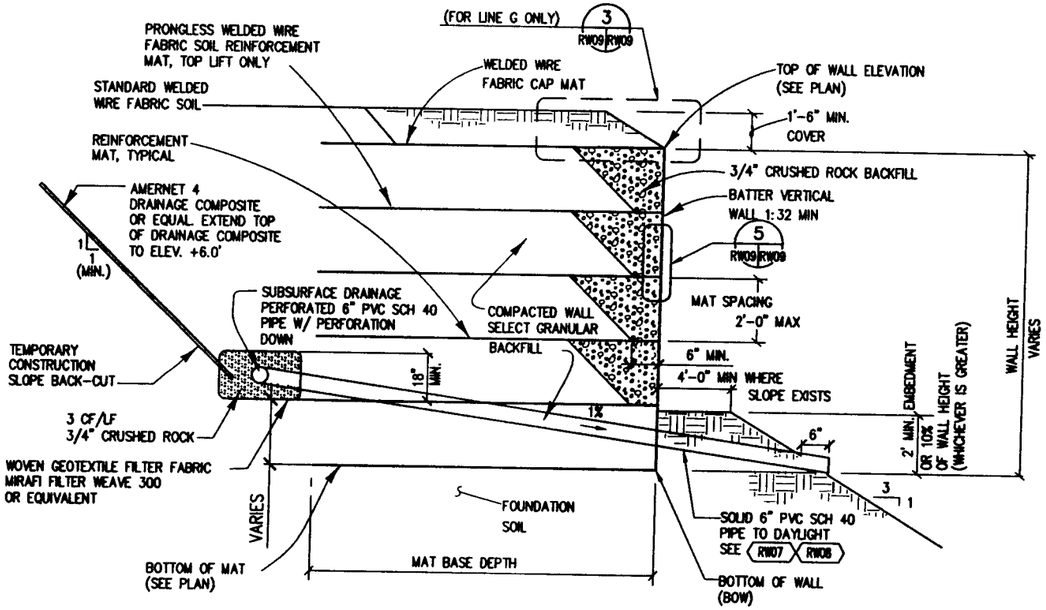
1 SECTION
RW01-RW07 RW09 SCALE:NONE



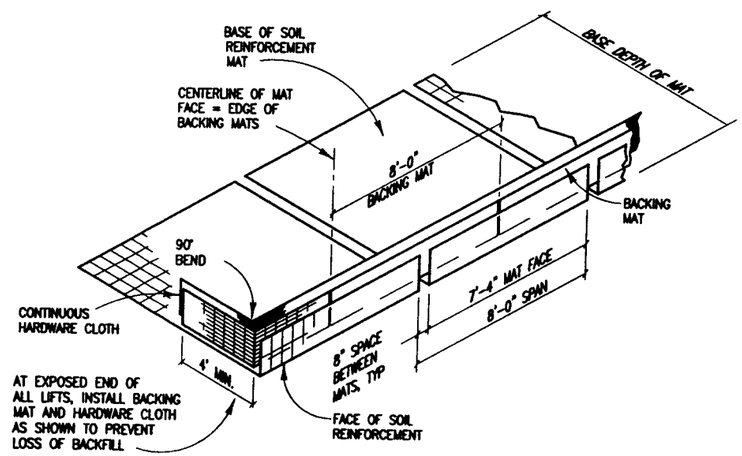
2 PRECAST CONC PANEL DETAIL
RW07 RW09 SCALE:NONE



3 SECTION
GP06,GP09 RW09 SCALE:NTS



4 WALL COMPONENTS DETAIL
RW1-RW6 RW09 SCALE:NTS



5 WALL COMPONENTS DETAIL
RW09 RW09 SCALE:NTS

AS-BUILT CONDITIONS ILLUSTRATED ON THIS PLAN REFLECT INFORMATION PROVIDED BY OTHERS AND DRAFTED BY THE ENGINEER. THE ENGINEER HAS NOT VERIFIED THE ACCURACY OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED THEREIN AS A RESULT

CASH & ASSOCIATES
ENGINEERING & ARCHITECTURE
5772 BOLSA AVE. SUITE 100,
HUNTINGTON BEACH, CA 92649
(714)895-2072

MARK	DATE	BY	REVISIONS
1	07/08	KMS	AS-BUILT

DRAWN NML DATE 10/05
DESIGNED WSS P.E. NO C-29699
PROJ. MGR SG P.E. NO
SECT. HEAD DJS P.E. NO C-46837
ASST CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE

REGISTERED PROFESSIONAL ENGINEER RICARDO G. SIMMEN C29699 EXP. 3-31-07 CIVIL STATE OF CALIFORNIA

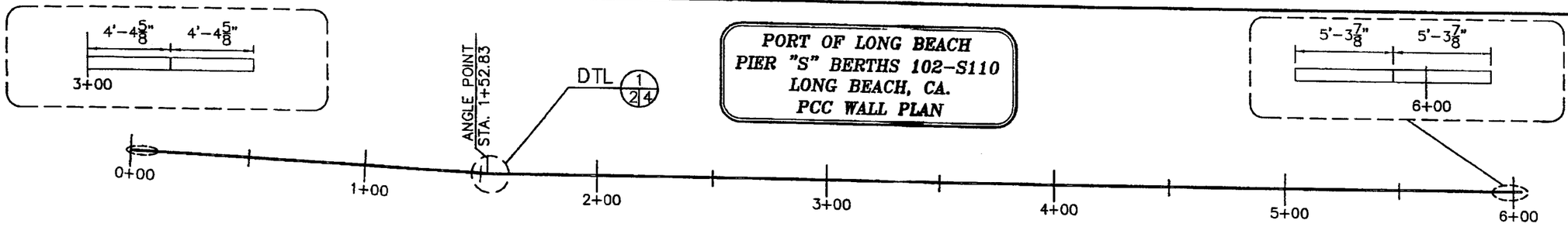
THE PORT OF LONG BEACH
925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

PIER S, BERTHS S102-S110
GRADING, DRAINAGE & UTILITIES
RETAINING WALL DETAILS 1

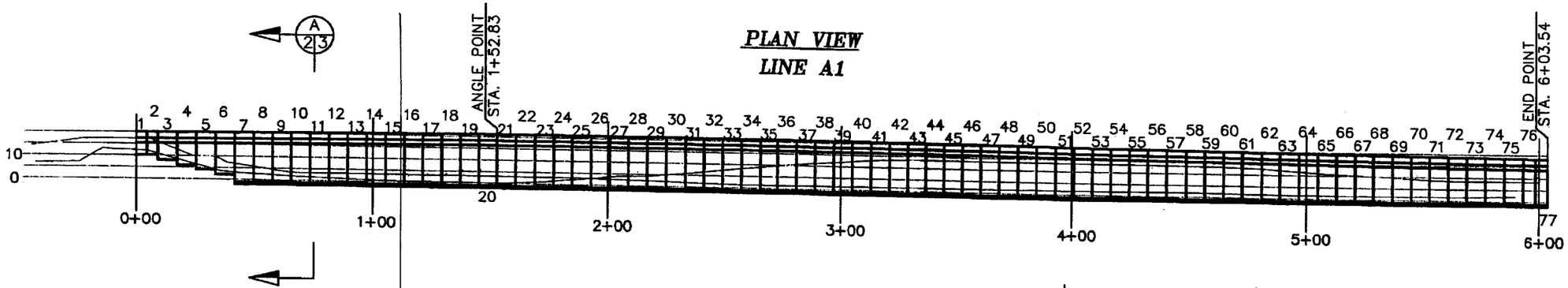
SCALE AS NOTED SHEET 239 OF 262
SPECIFICATION NUMBER HD-S2275
DRAWING NUMBER HD 10-1898-RW09

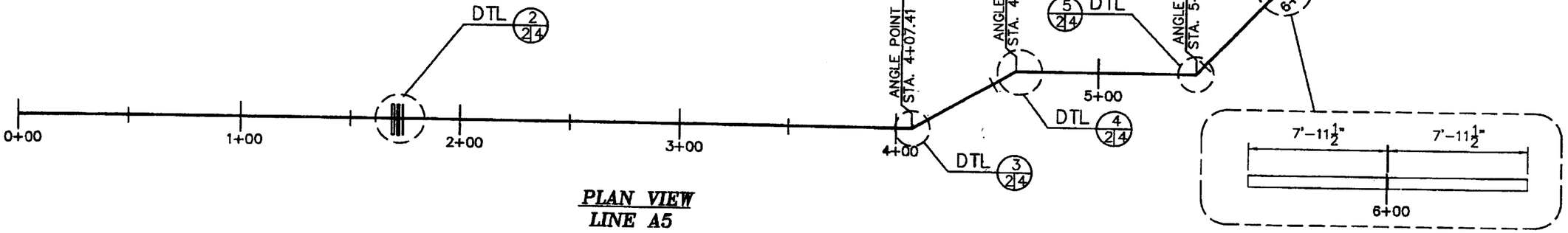
Plotted: 02/24/09 - 12:42 pm | Last Save by: PCB6 | On: 3/2/2006 | LAYOUT: RW09
by: ika_chung | Plot Date: 02/24/09 - 12:42 pm | Last Save by: PCB6 | On: 3/2/2006 | LAYOUT: RW09
Filename: D:\898RW09_AB.dwg
Xrefs: x1898-BDR
Plotted: C:\DWG\UNITS 11

PORT OF LONG BEACH
PIER "S" BERTHS 102–S110
LONG BEACH, CA.
PCC WALL PLAN

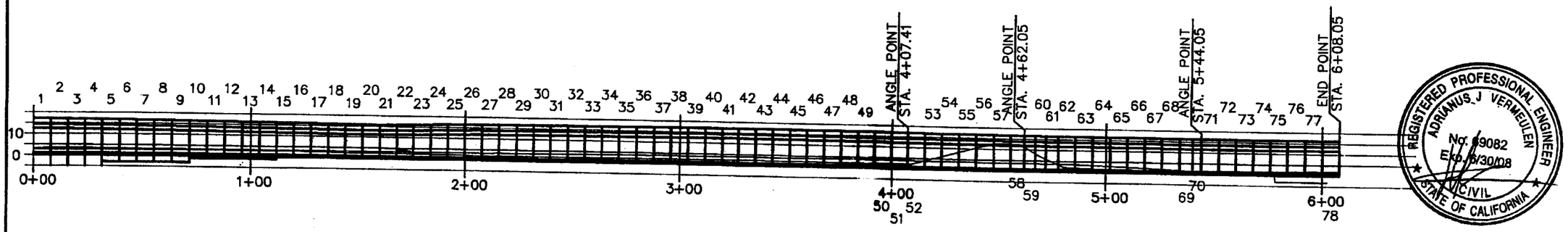


PLAN VIEW
LINE A1





PLAN VIEW
LINE A5



0 25' 50' 100'

SCALE: 1" = 50'–0"

REVISIONS	BY
06/06/06	SJ

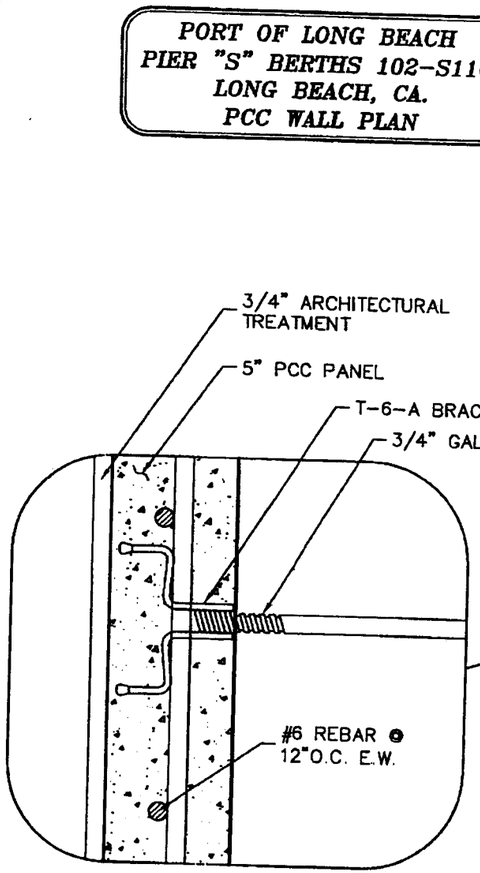
PORT OF LONG BEACH
PIER "S" BERTHS 102–S110
LONG BEACH, CA.
PCC WALL PLAN

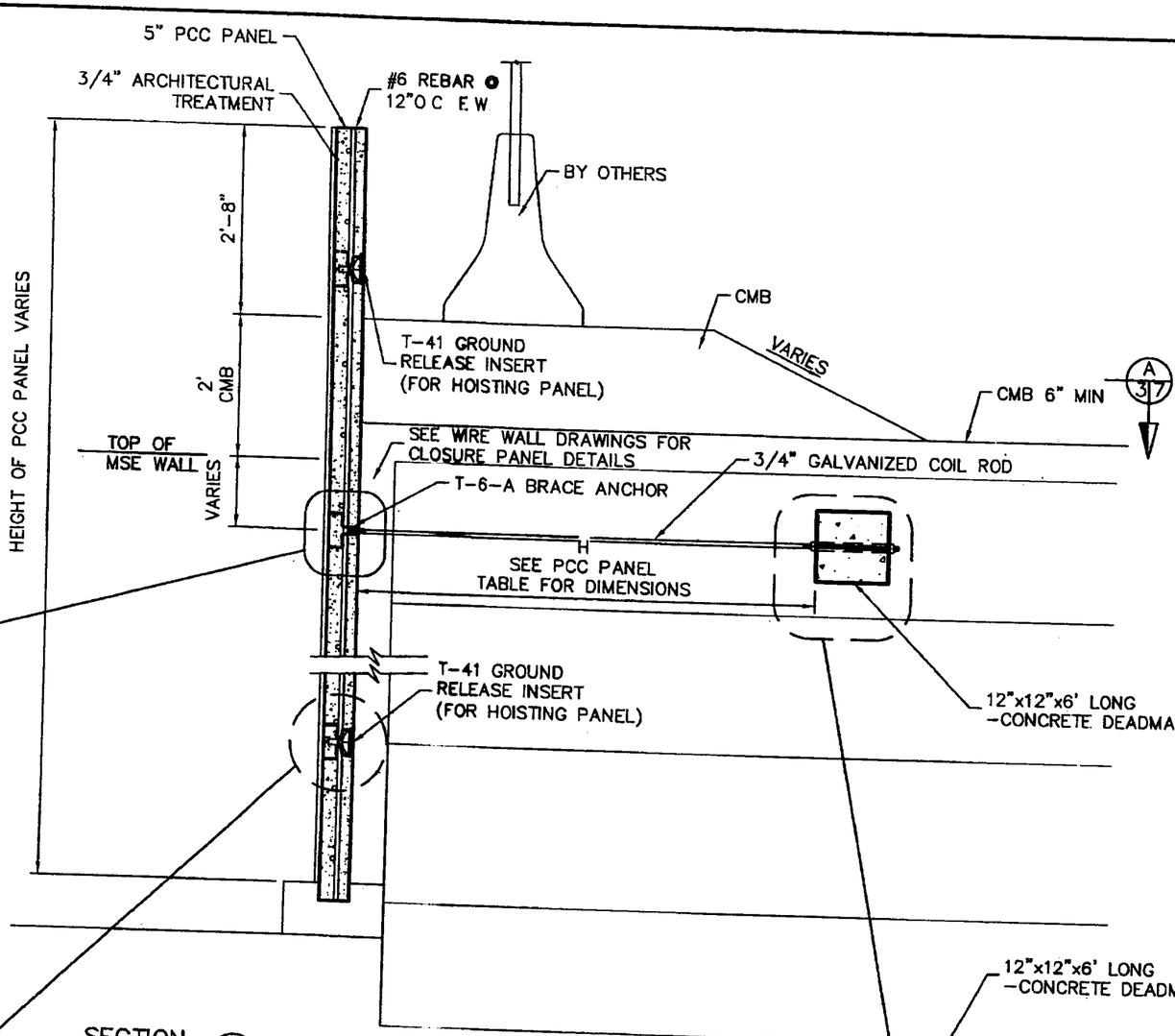
ORTIZ
6 CUSHING SHIUTE 200
IRVINE, CA. 92618

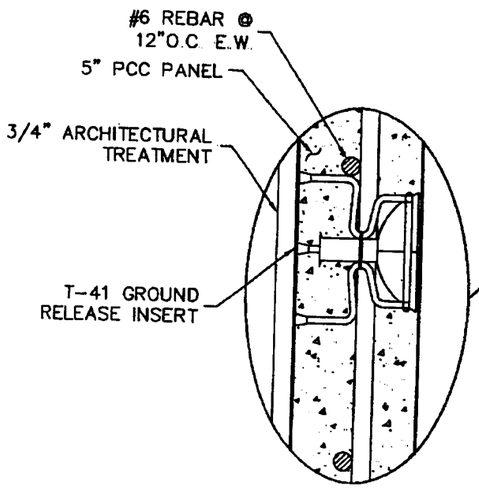
J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1335 N. DUTTON AVE., SANTA ROSA, CA. 95401
(707) 526-4503 FAX (707) 526-4505

SCALE:	1"=50'
DATE:	04/26/06
DRAWN BY:	S.H.J.
CHECKED BY:	A.J.V.
DRAWING NO:	9403–1/S2
SHEET:	2 OF 6

PORT OF LONG BEACH
PIER "S" BERTHS 102-S110
LONG BEACH, CA.
PCC WALL PLAN

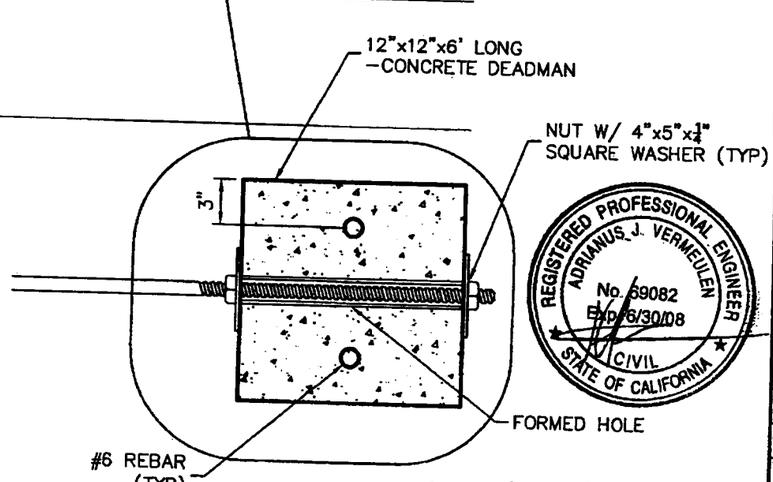






SECTION A 2 3

TYPICAL SECTION DETAILS



0 1' 2' 4'
SCALE: 1/2" = 1'-0"

REVISIONS	BY
06/06/06	SJ
09/05/06	JB

PORT OF LONG BEACH
PIER "S" BERTHS 102-S110
LONG BEACH, CA.
PCC WALL PLAN

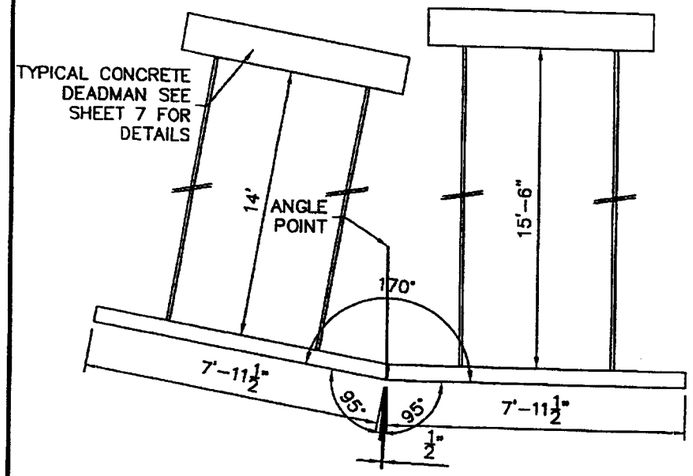
ORTIZ
6 CUSHING SHIUTE 200
IRVINE, CA. 92618

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1335 N. DUTTON AVE., SANTA ROSA, CA. 95401
(707) 528-4503 FAX (707) 528-4505

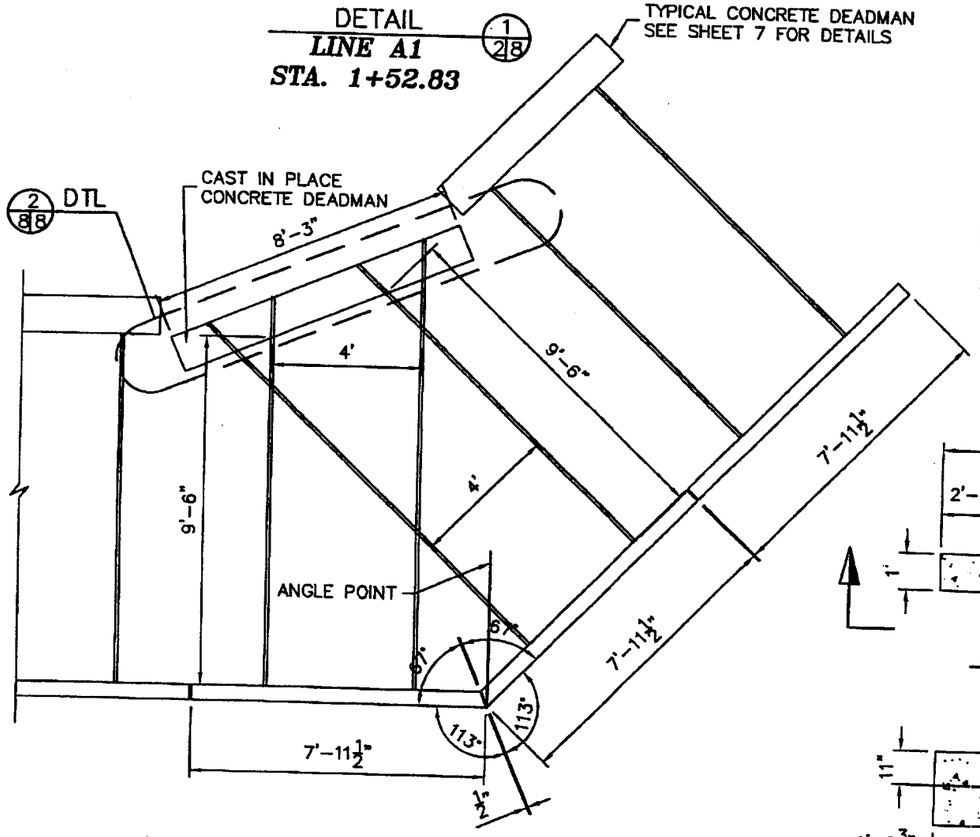
REGISTERED PROFESSIONAL ENGINEER
ADRIANUS J. VERMEULEN
No. 69082
Exp. 6/30/08
CIVIL
STATE OF CALIFORNIA

SCALE:	1/2"=1'
DATE:	04/26/06
DRAWN BY:	S.H.J.
CHECKED BY:	A.J.V.
DRAWING NO:	9403-1/S3
SHEET:	3 OF 7

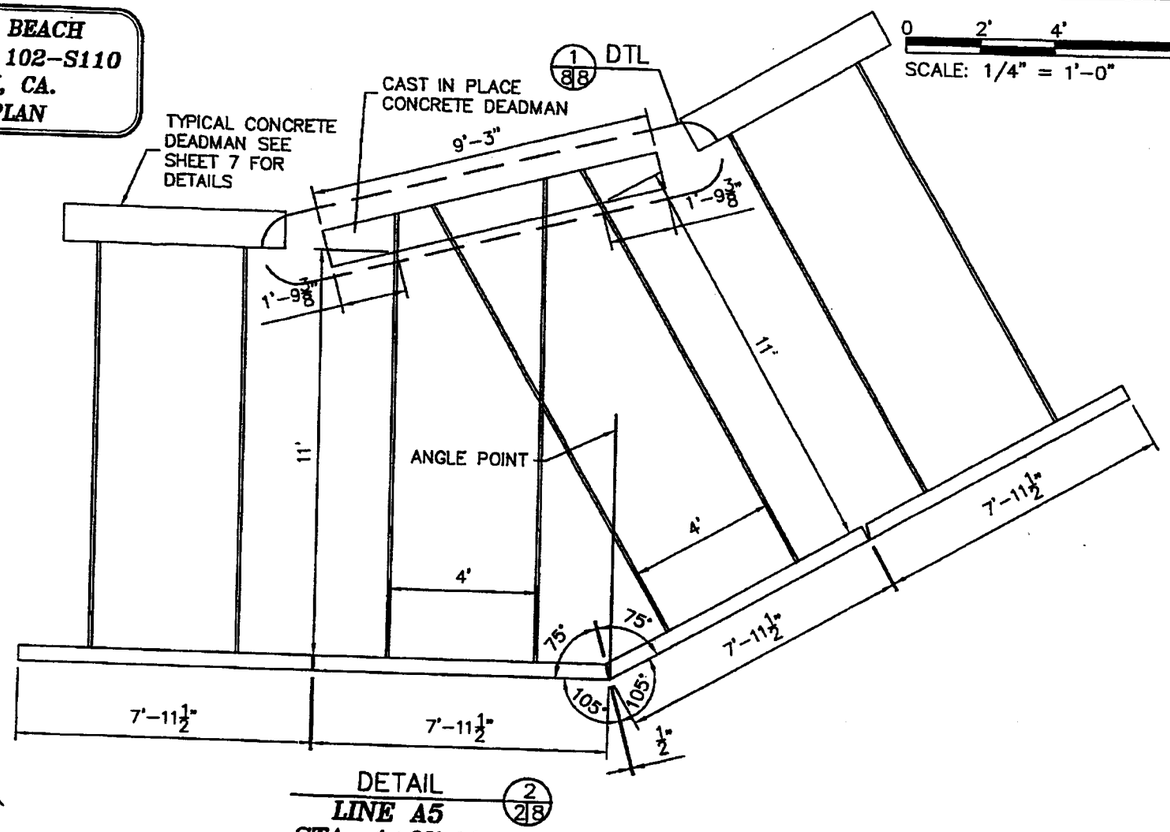
PORT OF LONG BEACH
PIER "S" BERTHS 102-S110
LONG BEACH, CA.
PCC WALL PLAN



DETAIL 1/2/8
LINE A1
STA. 1+52.83

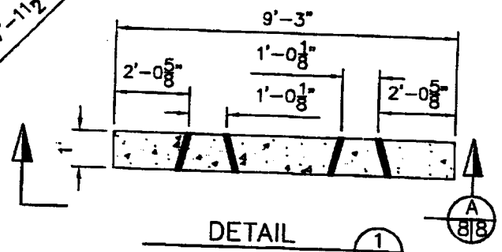


DETAIL 3/2/8
LINE A5
STA. 5+44.05

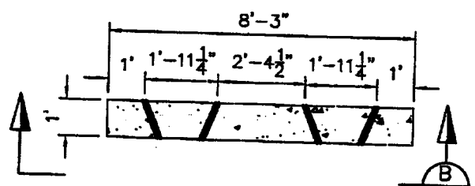


DETAIL 2/2/8
LINE A5
STA. 4+07.41

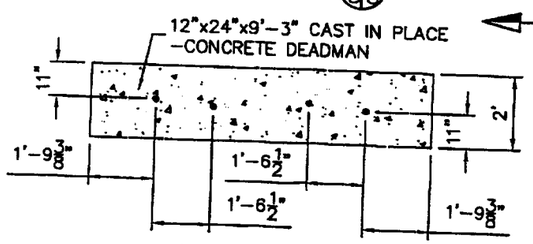
0 2' 4' 8'
SCALE: 1/4" = 1'-0"



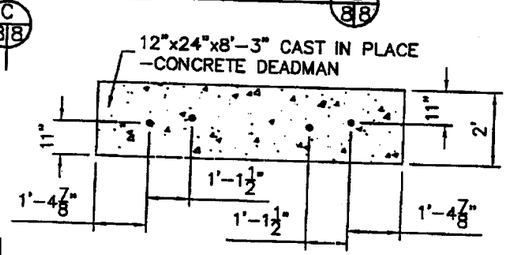
DETAIL 1/8/8



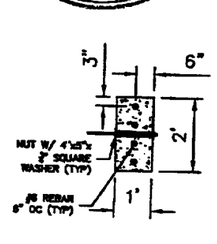
DETAIL 2/8/8



SECTION A 8/8



SECTION B 8/8



SECTION C 8/8

REGISTERED PROFESSIONAL ENGINEER
ADRIANUS J. VERMEULEN
No. 59082
Exp. 6/30/08
CIVIL
STATE OF CALIFORNIA

REVISIONS	BY
06/27/07	JB

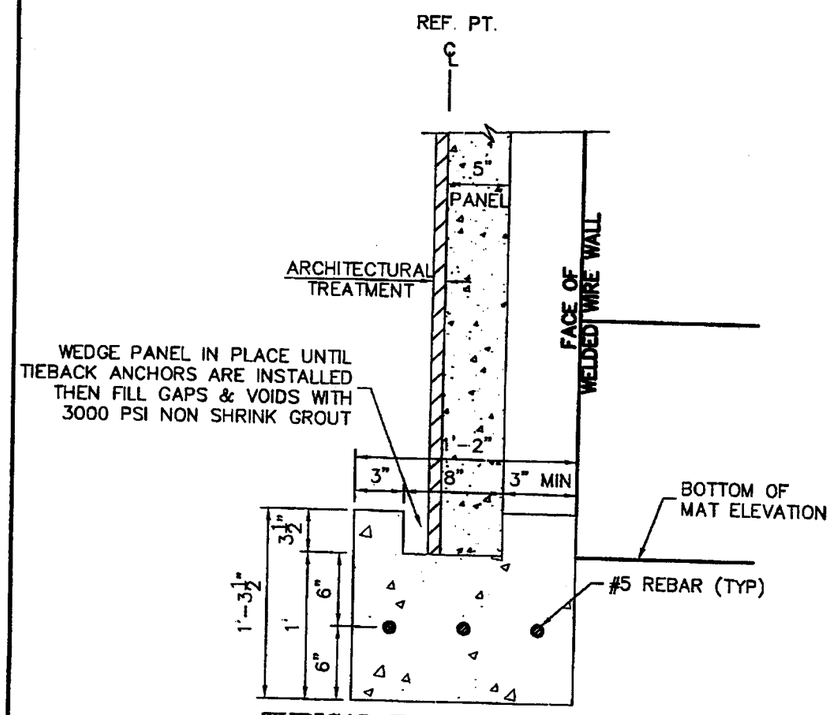
PORT OF LONG BEACH
PIER "S" BERTHS 102-S110
LONG BEACH, CA.
PCC WALL PLAN

ORTIZ
6 CUSHING SHIUTE 200
IRVINE, CA. 92618

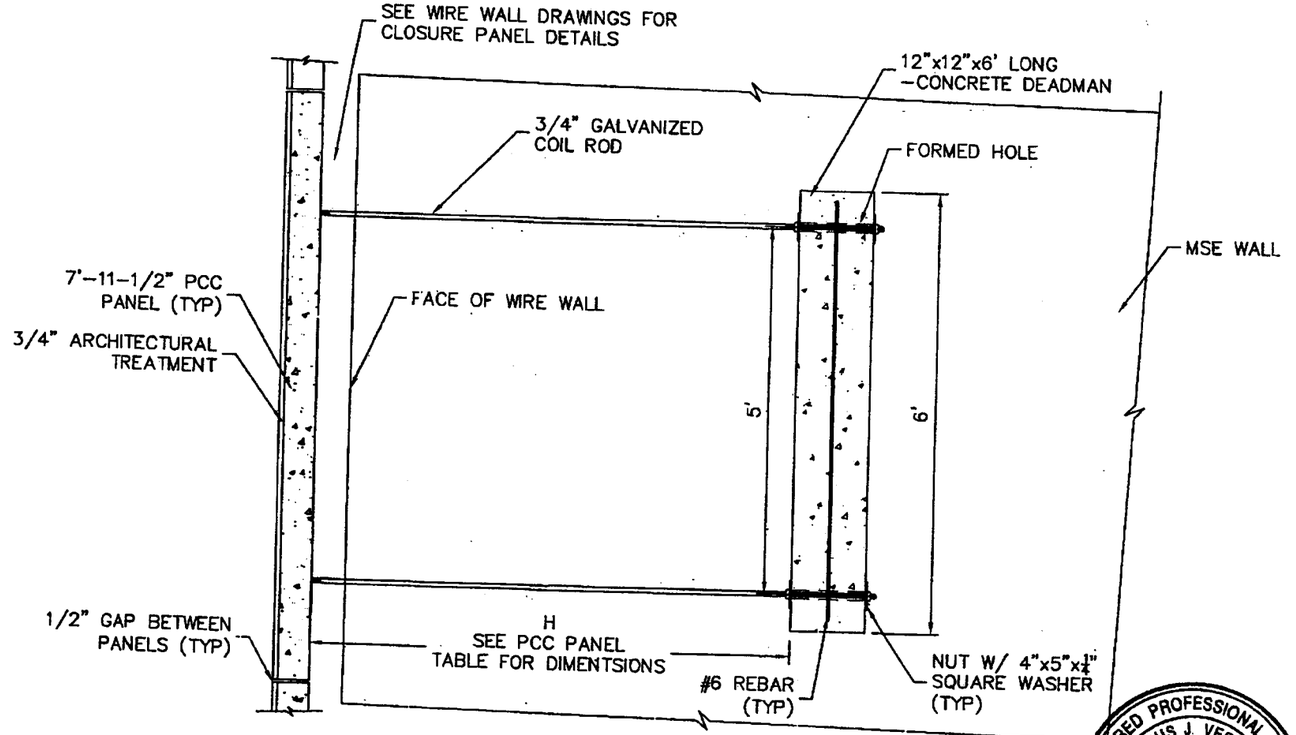
J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1339 N. DUTTON AVE. SANTA ROSA, CA. 95401
(707) 528-4503 FAX (707) 528-4505

SCALE:	1/4"=1'
DATE:	12/18/06
DRAWN BY:	S.H.J.
CHECKED BY:	A.J.V.
DRAWING NO:	9403-1/S8
SHEET:	8 OF 8

PORT OF LONG BEACH
PIER "S" BERTHS 102–S110
LONG BEACH, CA.
PCC WALL PLAN



TYPICAL FOOTING SECTION



SECTION A 3/7

REGISTERED PROFESSIONAL ENGINEER
ADRIANUS J. VERMEULEN
No. 69082
Exp. 6/30/08
CIVIL
STATE OF CALIFORNIA

0 1' 2' 4'
SCALE: 1/2" = 1'–0"

REVISIONS	BY

PORT OF LONG BEACH
PIER "S" BERTHS 102–S110
LONG BEACH, CA.
PCC WALL PLAN

ORTIZ
6 CUSHING SHUITE 200
IRVINE, CA. 92618

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1335 N. DUTTON AVE. SANTA ROSA, CA. 95401
(707) 528-4503 FAX (707) 528-4505

SCALE: 1/2"=1'
DATE: 08/28/06
DRAWN BY: S.H.J.
CHECKED BY: A.J.V.
DRAWING NO: 9403-1/S7
SHEET: 7 OF 7

J.M. TURNER ENGINEERING, INC.
CONSULTING WNGINEERS
1335 N. DUTTON AVE.
SANTA ROSA, CA. 95401

ORTIZ ENTERPRISES
PORT OF LONG BEACH
LONG BEACH, CA.
PCC PANEL LAYOUT

SHEET NO.: 2
BY: JB
DATE: 9/28

Line A1 Sarting @ Station 0+00

Typical PCC Panel 7' 11-1/2" x 5" Thick

PCC Panel Number	A	B	C	D	E	F	G	H	
1	8'-10-7/16"	8'-11-1/16"	3'	2'-0"	2'-0"	1'	1'-4"	6'	See Sheet 2 of 6
2	9'-11"	10'-11-1/8"	3'	2'-0"	2'-0"	1'	1'-4"	6'	See Sheet 2 of 6
3	10'-11-1/8"	10'-11-7/8"	5'	3'-6"	3'-6"	1'-6"	1'-11-3/4"	7'	
4	12'-11-7/8"	13'-9/16"	7'	4'-0"	4'-0"	1'-6"	1'-11-3/4"	8'	
5	15'-9/16"	15'-1-5/16"	9'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	9'	
6	17'-1-5/16"	17'-2-1/8"	10'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	12'	
7	21'-2-3/32"	21'-2-13/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	12'	
8	21'-2-13/16"	21'-3-1/2"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	12	
9	21'-3-1/2"	21'-4-5/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	12'-6"	
10	21'-4-5/16"	21'-5"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	12'-6"	
11	21'-5"	21'-5-11/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13	
12	21'-5-11/16"	21'-6-1/2"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13	
13	21'-6-1/2"	21'-7-3/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'	
14	21'-7-3/16"	21'-7-7/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
15	21'-7-7/8"	21'-8-11/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
16	21'-8-11/16"	21'-9-7/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
17	21'-9-7/16"	21'-10-1/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
18	21'-10-1/8"	21'-10-7/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
19	21'-10-7/8"	21'-11-5/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	
20	21'-11-5/8"	22'-5/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	See Detail 1 2-4
21	22'-5/16"	22'-5/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	See Detail 1 2-4
22	22'-5/16"	22'-1/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'-6"	
23	22'-1/8"	21'-11-7/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'-6"	
24	21'-11-7/8"	21'-11-13/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	
25	21'-11-13/16"	21'-11-5/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	
26	21'-11-5/8"	21'-11-7/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	
27	21'-11-7/16"	21'-11-3/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	
28	21'-11-3/16"	21'-11"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	
29	21'-11"	21'-10-7/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	
30	21'-10-7/8"	21'-10-11/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	
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33	21'-10-5/16"	21'-10-1/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	
34	21'-10-1/8"	21'-10"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	14'	
35	21'-10"	21'-9-13/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
36	21'-9-13/16"	21'-9-5/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
37	21'-9-5/8"	21'-9-7/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
38	21'-9-7/16"	21'-9-1/4"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
39	21'-9-1/4"	21'-9"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
40	21'-9"	21'-8-7/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
41	21'-8-7/8"	21'-8-11/16"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
42	21'-8-11/16"	21'-8-1/2"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
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44	21'-8-5/16"	21'-8-1/8"	15'	5'-0"	5'-0"	1'-6"	1'-11-3/4"	13'-6"	
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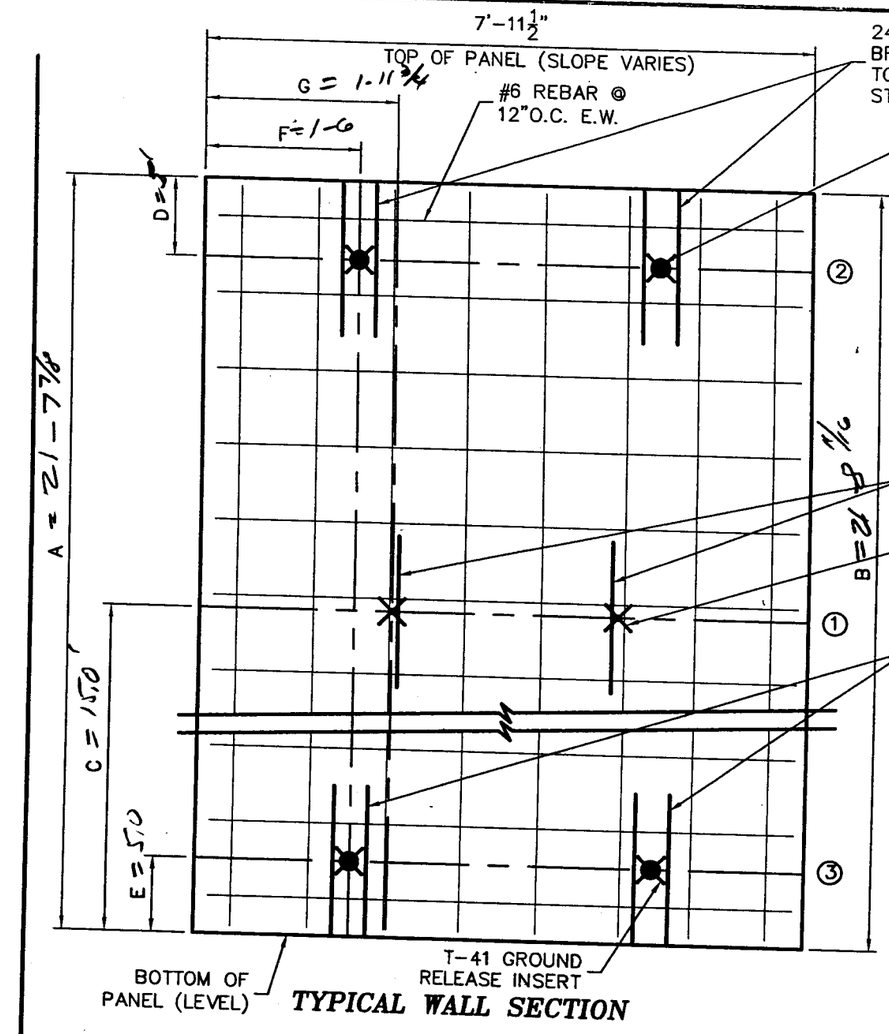
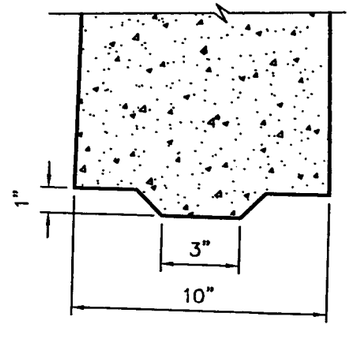
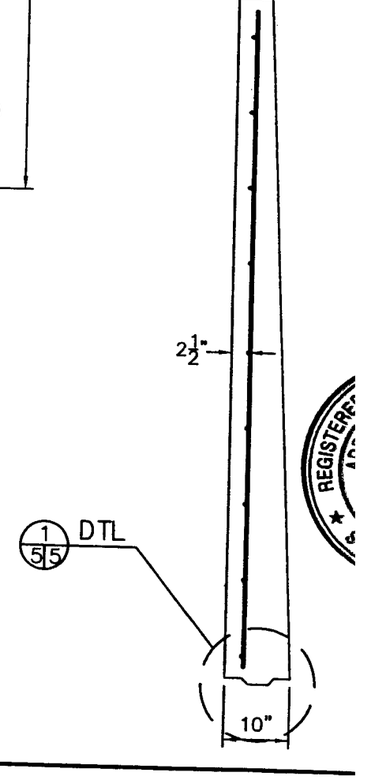


NOTE:
SEE TYPICAL PCC PANEL TABLE FOR DIMENTIONS.

1 – TIEBACK ANCHOR
2 – TWO PICK POINT
3 – FOUR PICK POIN



DETAIL 1/5/5



1/5/5 DTL

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Final Environmental Impact Statement/ Environmental Impact Report and Section 4(f) Evaluation

Commodore Schuyler Heim Bridge (Br. No. 53-2618) and SR-47 in the Ports of Long Beach and Los Angeles, Los Angeles County, California

07-LA-47-KP 4.4/9.3 (PM 2.7/5.8)
EA: 238500

The environmental review, consultation, and any other action required in accordance with applicable federal laws for this project are being, or have been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327.

May 2009
Volume I

Caltrans

SCH NO. 20021009
FHWA-CA-EIS-2007-07-01F
07-LA-47
EA: 238500

REPLACE THE VEHICULAR CONNECTION ALONG THE NORTH-SOUTH CORRIDOR BETWEEN TERMINAL ISLAND AND THE MAINLAND WITH A SEISMICALLY SAFE BRIDGE, AND PROVIDE A HIGH-CAPACITY ALTERNATIVE ROUTE TO AND FROM TERMINAL ISLAND TO IMPROVE SAFETY, TRAFFIC MOVEMENT, AND REDUCE TRAFFIC DELAYS.

FINAL ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT AND SECTION 4(F) EVALUATION FOR THE SCHUYLER HEIM BRIDGE REPLACEMENT AND SR-47 EXPRESSWAY PROJECT

Submitted Pursuant to (State) Division 13, California Public Resources Code
(Federal) 42 United States Code 4332(2)(c), 23 U.S.C. 327, and 49 U.S.C. 303 by
THE STATE OF CALIFORNIA, Department of Transportation, and
Cooperating and Responsible Agencies

May 12, 2009
Date of Approval

Ron Kosinski
Deputy District Director
Division of Environmental Planning District 7
California Department of Transportation

5/12/09
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Abstract

This Final EIS/EIR addresses the proposed alternatives for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project. The California Department of Transportation (Caltrans) is proposing to provide a seismically safe vehicular connection along the north-south corridor between Terminal Island and the mainland, and provide a high-capacity alternative route for traffic between Terminal Island and the mainland. Alternative 1 has been identified as the Preferred Alternative after careful consideration of all agency and public comments on the Draft EIS/EIR. The recommended alternative would involve substantial effects to air quality, noise, biological and cultural resources. Mitigation measures have been proposed to reduce the level of these impacts.

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Summary

S.1 Introduction

This Summary provides an overview of information provided in this Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway project. This project would occur within the Ports of Long Beach and Los Angeles and the cities of Long Beach and Los Angeles and is planned to be completed in 2013. This Summary provides a condensed version of the technical information discussed in the EIS/EIR and includes references to other sections of the document for additional detailed analysis and discussion.

This EIS/EIR describes the purpose and need for the project, the alternatives being considered, and the potential environmental impacts of those alternatives pursuant to the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The Final EIS/EIR consists of two volumes: Volume I contains the environmental analyses, and Volume II contains the technical appendices. Technical reports prepared in support of the EIS/EIR analyses are referenced in the appropriate sections of the document and are available for review.

S.2 Joint NEPA/CEQA Document

The proposed project is a joint project by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both CEQA and NEPA. Caltrans is the lead agency under CEQA. In addition, FHWA's responsibility for environmental review, consultation, and any other action required in accordance with applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327. Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA.

This Final EIS/EIR includes responses to comments received on the Draft EIS/EIR, identifies the preferred alternative and provides complete environmental documentation of the project alternatives. Some of this information has been modified in response to public comments on the analyses provided in the Draft EIS/EIR. Where the text is different (due to addition or deletion) in this Final EIS/EIR than it appeared in the Draft EIS/EIR, a vertical line appears in the margin. Following circulation of the Final EIS/EIR, if the decision is made to approve the project, a Notice of Determination will be published for compliance with the California Environmental Quality Act, and a Record of Decision will be published for compliance with the National Environmental Policy Act.

It was determined that for this particular project, the results of ACTA's HRA study and the University of California, Davis (UCD) analysis comprise significant new information.

Caltrans, as the Lead Agency, made the decision to disclose this new information to the public by preparing and circulating a Supplemental Draft Environmental Impact Statement/ Recirculated Draft Environmental Report (SDEIS/RDEIR) (see S.12). Changes related to the new information have been incorporated in this final document. The changes are mainly in sections from Chapter 3.0, the Air Quality (3.13) and Community Resources (3.3.3) sections, and portions of other chapters (Chapter 4.0, CEQA Evaluation; and Chapter 5.0, Cumulative Impacts). Changes related to the new information are underlined.

S.3 Project Location

The project area addressed in the Final EIS/EIR generally lies between Terminal Island on the south and SR-91 (Artesia Freeway) on the north, and between I-710 (Long Beach Freeway) on the east and I-110 (Harbor Freeway) on the west. This project area includes the Port of Long Beach, Port of Los Angeles, Wilmington District of the City of Los Angeles, southern part of the City of Carson, and western portion of the City of Long Beach. The southern portion of the project area consists primarily of industrial uses associated with the ports. To the north, the area is a mix of industrial, residential, and commercial uses. The project area is shown in Figure S-1.

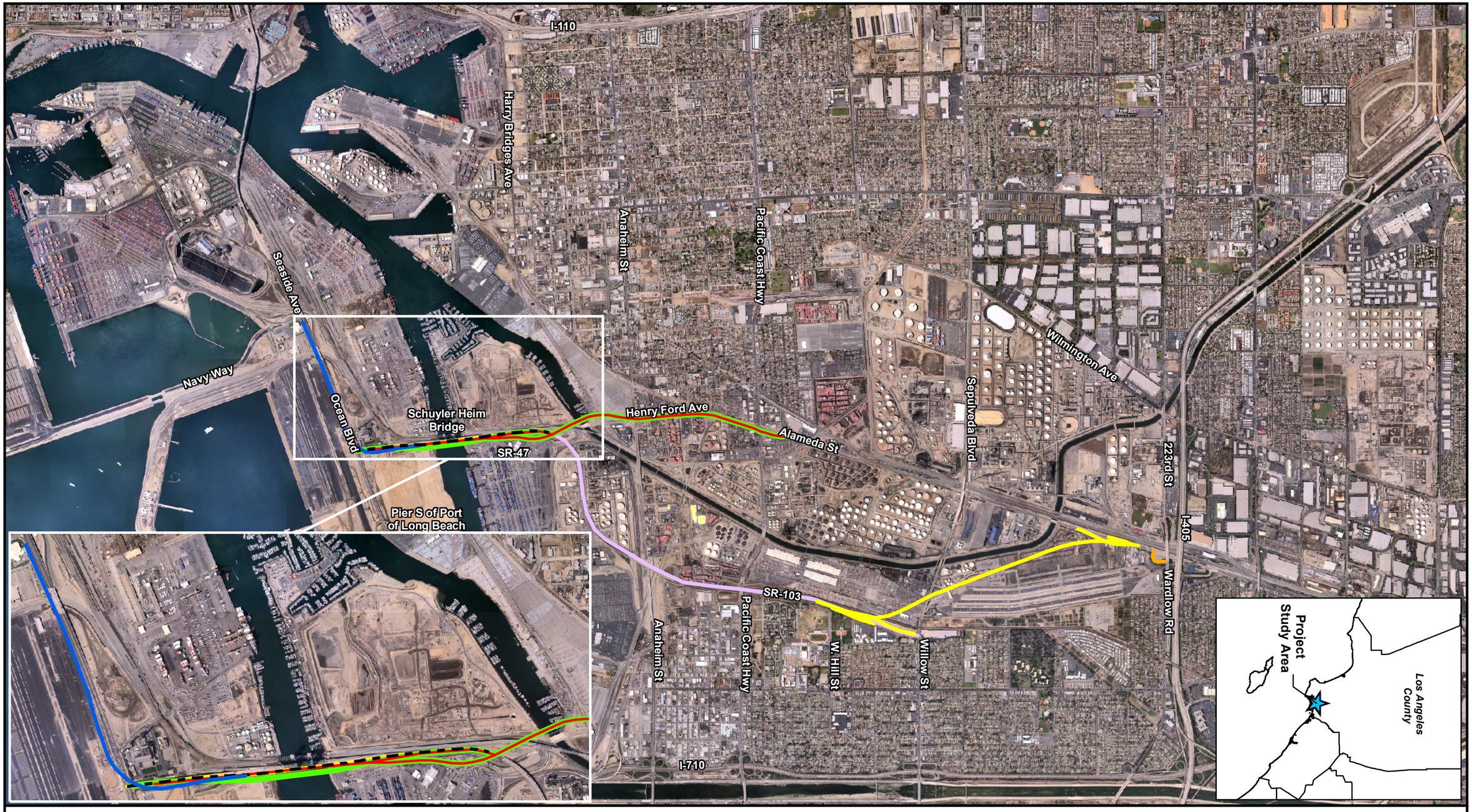
S.4 Project Purpose and Need

S.4.1 Project History and Need

S.4.1.1 Schuyler Heim Bridge

The Commodore Schuyler F. Heim Bridge (Schuyler Heim Bridge) crosses the Cerritos Channel in the Port of Long Beach, was commissioned by the United States Navy between 1946 and 1948, and is one of three bridges that connect Terminal Island to the mainland. The bridge was named for Commodore Schuyler F. Heim, commanding officer of the Terminal Island Naval Base throughout World War II. The United States Navy completed construction of the bridge in 1948 and then turned it over to the City of Long Beach, which operated the bridge until 1974. The bridge is a vertical lift structure with a 73-meter (m) (240-foot [ft]) span. It has an 820-ton movable (lift) span that is supported by two cross-braced steel towers suspended by cables, and a pair of 400+-ton counterweights.

Historic records indicate that, by 1951, the Schuyler Heim Bridge showed significant settlement caused by oil extraction in Long Beach Harbor. In 1951, the towers were leaning approximately 3.8 centimeters (cm) (1.5 inches [in]) to the east, and the approach structures had settled as much as 10.2 cm (4.0 in). The combined effects of settlement and leaning created the potential to bind the moveable parts and cause the lift span to fail. Subsequently, the towers were straightened, and additional work was conducted on the approaches, truss bearings, guard rails, pier footings, and lift span guide rollers.



LEGEND

- Alternative 1: Bridge Replacement and SR-47 Expressway
- Alternative 2: SR-103 Extension
- Alternative 3: Bridge Demolition Avoidance
- Alternative 4: Bridge Replacement Only
- Wardlow Road/223rd Street Ramp
- Ocean Boulevard/SR-47 Flyover
- Existing SR-103

Aerial Date: May 2002, AirPhotoUSA

Note: Project components not to scale

0 2,800 Feet

0 1,000 Meters

Figure S-1
Project Location and Build Alternatives
Schuyler Heim Bridge Replacement
and SR-47 Expressway

During the 1950s, the City of Long Beach pumped groundwater into depleted oil fields beneath the harbor, which mitigated the bridge's rate of subsidence. However, the harbor continued to sink, requiring bridge repairs. By the end of the decade, the shifting terrain beneath the bridge foundations had caused cracks in the reinforced concrete pillars beneath the bridge, requiring additional repairs. Throughout the 1960s, 1970s, and 1980s, bridge repairs continued for routine maintenance, as well as for damage caused by trucks and marine vessels. In 1987, the Whittier Narrows earthquake (Richter magnitude [M] 5.9) twisted a heavy girder in one of the towers. In 1988, Caltrans initiated a $2 million project to refurbish the bridge to accommodate increased vehicular and marine traffic in response to expansion of the ports.

After the 1994 Northridge earthquake, the Schuyler Heim Bridge was determined to be in need of seismic retrofit improvements. A Project Scope Summary Report (PSSR) was completed in 1998 to program the retrofit project and included the plans, specifications, and engineering estimate (PS&E) for the retrofit. During the PS&E phase, it was determined that replacement of the bridge would be more cost-effective and practical than retrofitting the existing bridge to meet seismic requirements for a major earthquake. Therefore, the retrofit design was halted.

Subsequently, in consultation with the U.S. Coast Guard, Caltrans developed several fixed-span bridge alternatives. These alternatives met the project purpose of complying with the 1994 state mandate for Caltrans to strengthen its bridges, and met the need to comply with seismic requirements, reduce potential safety hazards to vehicular and marine traffic, and provide a cost-effective solution to the ongoing deterioration of the bridge.

Currently, the approaches of the bridge are being retrofitted to address seismic deficiencies. However, this is not a full seismic retrofit of the bridge; it is limited to the bridge approaches to bring the approaches to the same seismic level as the main span, reducing their chance of collapse. Even after the approaches are retrofitted, the entire bridge would still be deficient and would sustain major damage, and possibly collapse after a seismic event that resulted in peak bedrock acceleration larger than 0.3g. The Palos Verdes fault is capable of generating an earthquake with 0.7 peak bedrock acceleration (PBA) at the Schuyler Heim Bridge.

S.4.1.2 Expressway

Independent of considerations related to the Schuyler Heim Bridge, an expressway was envisioned as part of a series of regional transportation improvements at the southern end of the Alameda Corridor to provide improved transportation, circulation, and goods movement to and from the Ports of Long Beach and Los Angeles. The SR-47 Expressway is cited in the Southern California Association of Governments Regional Transportation Plan. It would build upon a network of local streets by constructing a high-capacity expressway connecting the Ocean Boulevard/SR-47 Interchange with Alameda Street at Pacific Coast Highway, thereby providing a missing link in the local transportation system.

The existing SR-47 extends east from the southern terminus of the Harbor Freeway (I-110) in San Pedro, over the Vincent Thomas Bridge, along Seaside Avenue and Ocean Boulevard, then north across the Cerritos Channel on the Schuyler Heim Bridge, continuing north on Henry Ford Avenue, then onto Alameda Street until its terminus at I-10 in downtown Los Angeles.

The SR-103 Expressway is an alternative to the SR-47 Expressway. It also would build upon a network of local streets by constructing a high-capacity expressway that connects existing SR-103, beginning about 0.8 kilometer (km) (0.5 mile [mi]) north of Pacific Coast Highway, to Alameda Street at a point about 0.8 km (0.5 mi) south of the San Diego Freeway (I-405).

Currently, to connect from Terminal Island to Alameda Street, vehicles must travel 1.5 km (0.9 mi) north from Ocean Boulevard, then exit at the Henry Ford Avenue off-ramp and travel north through local streets, signalized intersections, and railroad crossings for about 2.0 km (1.2 mi) before joining Alameda Street just south of Pacific Coast Highway. Alameda Street continues north of Pacific Coast Highway for 4.0 km (2.5 mi) and connects to the I-405. About 5.5 km (3.4 mi) north of I-405, Alameda Street connects to the Artesia Freeway (SR-91).

The existing SR-103 begins north of the Schuyler Heim Bridge at the Terminal Island Freeway, where SR-47 exits at Henry Ford Avenue. SR-103 continues north to Pacific Coast Highway, where it ends.

S.4.2 Project Purpose

The purpose of the proposed project is to:

- Provide a structurally and seismically safe vehicular connection along the critical north-south corridor between Terminal Island and the mainland that can remain in service following a major earthquake to ensure that ground and vessel transportation are maintained.
- Improve operational and safety design features of the crossing to facilitate the movement of people, freight, and goods, while meeting current design standards to the maximum extent feasible.

The purpose of the proposed project also is to provide a high-capacity alternative route for traffic between Terminal Island and I-405 that would:

- Reduce traffic congestion on local surface streets (between Terminal Island and Pacific Coast Highway), as well as on I-110 and I-710.
- Improve safety by providing a limited-access route between Terminal Island and I-405 that would:
  - Eliminate at-grade railroad crossings and signalized intersections.
  - Connect the Schuyler Heim Bridge with an emergency service route that would facilitate movement to and from the ports following a major earthquake.

This high-capacity link would allow traffic to continue northward along Alameda Street, or SR-103, and provide essential north-south connectivity with the regional freeway system (I-405 and SR-91) for the movement of people and goods to and from the ports.

S.4.3 Project Need

Overall, there is a need to provide for uninterrupted transport of people, freight, and goods between Terminal Island and the mainland after a major earthquake. Currently, structural

and operational deficiencies with the Schuyler Heim Bridge and transportation route in the project area interfere with that need. These deficiencies are summarized below.

Schuyler Heim Bridge:

- Seismically and structurally deficient and functionally obsolete
- Substandard safety design standards. Lane widths, bridge rails, and shoulder widths do not meet Caltrans standards
- Delays to movement of people, freight, and goods caused by raising the bridge to allow marine traffic to pass underneath
- Safety issues related to traffic congestion caused by raising the bridge to allow marine traffic to pass underneath
- Bridge is near the end of its useful and functional life cycle.

Transportation routes in the project area:

- Shortage of north-south freeway capacity
- Projected congestion on local surface streets
- Potential for incidents related to cross-traffic at intersections and railroad crossings.

S.5 Summary Description of the Project Alternatives

This section provides a summary description of the proposed project alternatives. More detailed descriptions are provided in Chapter 2.0 – Project Alternatives.

S.5.1 Alternatives Evaluated in the Final EIS/EIR

As addressed in the Final EIS/EIR, the project consists of six alternatives:

- Alternative 1/1A: Bridge Replacement and SR-47 Expressway
- Alternative 2: SR-103 Extension to Alameda Street
- Alternative 3: Bridge Demolition Avoidance
- Alternative 4: Bridge Replacement Only
- Alternative 5: Transportation System Management
- Alternative 6: No Build

Alternatives 1 through 4 are considered the "build" alternatives, as shown in Figure S-1.

S.5.1.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

S.5.1.1.1 Alternative 1

This alternative involves replacement of the existing Schuyler Heim Bridge, construction of a new SR-47 Expressway to provide a high-capacity alternative route along the Alameda Corridor for traffic between Terminal Island and Alameda Street at Pacific Coast Highway, and construction of a flyover that would divert eastbound Ocean Boulevard traffic directly onto northbound SR-47 and across the new bridge. Construction activities for the replacement bridge and SR-47 Expressway are planned to begin in 2010 and be completed in 2013. Construction of the flyover, estimated to begin in 2017 and be completed in 2019,

will be implemented when the eastbound Ocean Boulevard left-turn demand results in a deteriorated level of service at the Ocean Boulevard/SR-47 intersection.

With this alternative, a new fixed-span bridge would be constructed, primarily within the existing bridge right-of-way (ROW) (Caltrans Highway Easement), but toward the east to avoid impacts to the railroad on the Badger Bridge, immediately to the west; the existing Schuyler Heim Bridge (lift bridge) would be demolished. The replacement bridge would be 13 m (43 ft) wider than the existing bridge due to the addition of standard shoulders, which are not present on the existing bridge. The replacement bridge would include three 3.6-m (12-ft) lanes (two through-lanes and one auxiliary lane), with 3-m (10-ft) shoulders in the northbound direction, and four 3.6-m (12-ft) lanes (three through-lanes and one auxiliary lane), with 3-m (10-ft) shoulders in the southbound direction. Bridge construction would include a southbound off-ramp and northbound on-ramp at New Dock Street on Terminal Island, as well as a northbound off-ramp and southbound on-ramp at Henry Ford Avenue on the mainland side of the bridge. Existing ramps to Henry Ford Avenue and other existing ramps and access would be retained. With this alternative, the new bridge would be supported by four piers in the channel, with a minimum vertical clearance of 14.3 m (47 ft) over the mean high water level (MHWL). This clearance would be maintained for the width of the navigable channel, which would be 54.9 m (180 ft), the same as under existing conditions.

The new SR-47 Expressway would begin on Terminal Island, at the intersection of SR-47 and Ocean Boulevard, extending north over New Dock Street and onto the new fixed-span bridge. The expressway would extend northward to Alameda Street, south of the intersection with Pacific Coast Highway, a distance of approximately 2.7 km (1.5 mi). The expressway would grade-separate five at-grade railroad crossings and three signalized intersections along its length. A segment of the expressway would be constructed as a viaduct over Henry Ford Avenue and Alameda Street and return to grade at Alameda Street, just south of Pacific Coast Highway. Under this alternative, connectivity to SR-103 would be maintained.

The Ocean Boulevard/SR-47 Flyover (flyover) would begin on Terminal Island, about 1,200 m (3,900 ft) west of the Ocean Boulevard/SR-47 intersection, extend eastward along the south side of Ocean Boulevard, and then turn north, cross over Ocean Boulevard and onto the new bridge. The west end of the flyover would be at grade, then rise to a maximum elevation of 21 m (69 ft) to join the new bridge. The elevated portions of the flyover would be supported by fourteen single-column bents, one 2-column outrigger bent, with a total of 15 spans. The flyover would have an overall length of 830 m (2,723 ft), ending at the northerly end point (gore point) of the northbound New Dock Street on-ramp onto the bridge. The left lane of the flyover would converge with the SR-47 through lane to the left; the right lane of the flyover would continue as a northbound SR-47 through lane and would have the option to continue to SR-47 or SR-103. The flyover would be located entirely within the City and Port of Long Beach.

S.5.1.1.2 Alternative 1A: Haunch Bridge Design

Alternative 1A is a structural variation of Alternative 1. The main purpose of this alternative is to improve the aesthetics of the replacement bridge over the Cerritos Channel and span a greater horizontal distance across the channel between columns. This is accomplished by increasing the span lengths over the channel and arching the superstructure soffits (the

bottom of the bridge structure). Under this alternative, the new bridge would be supported by two piers (four columns) in the Cerritos Channel, compared to four piers (eight columns) under Alternative 1. As with Alternative 1, the minimum vertical clearance between the piers would be 14.3 m (47 ft). This clearance would be maintained for the width of the navigable channel, which would be 54.9 m (180 ft).

Other aspects of this alternative, the SR-47 Expressway and Ocean Boulevard/SR-47 Flyover, would be the same as described for Alternative 1.

S.5.1.2 Alternative 2: SR-103 Extension to Alameda Street

With this alternative, the existing Schuyler Heim Bridge would be replaced by a fixed-span bridge, and the flyover described under Alternative 1 would be constructed.

This alternative also would extend SR-103 to the northwest on a four-lane viaduct to join Alameda Street between Sepulveda Boulevard and I-405. Improvements to SR-103 would begin approximately 3.2 km (2 mi) north of the Schuyler Heim Bridge and extend a distance of approximately 2.6 km (1.6 mi). The viaduct would cross over the Union Pacific Railroad manual yard and San Pedro Branch, through the Southern California Edison (SCE) utility corridor, across the Los Angeles Harbor Department Warehouse 16/17 area, over Sepulveda Boulevard, then parallel the western boundary of the Intermodal Container Transfer Facility (ICTF) to the centerline of Alameda Street. The viaduct would slope to grade south of the Wardlow Road ramps to I-405. Improvements would be made to the existing SR-103 to accommodate the southerly and northerly end connections of the viaduct.

S.5.1.3 Alternative 3: Bridge Demolition Avoidance

This alternative would preserve the existing Schuyler Heim Bridge and construct a new fixed-span bridge on an alignment east of the existing bridge. Under this alternative, the new bridge would have the same lane configuration as the replacement bridge for Alternative 1. Additionally, the SR-47 Expressway and Ocean Boulevard/SR-47 Flyover described under Alternative 1 would be constructed, and connectivity with SR-103 would be maintained.

This alternative is provided as a means of constructing a new bridge over the Cerritos Channel and, at the same time, preserving the existing bridge. The Schuyler Heim Bridge has been determined to be a historic property and is eligible for listing in the National Register of Historic Places. With Alternative 3, the existing bridge would be retrofitted and left in place, but would not be used. However, according to the U.S. Coast Guard, when a bridge is no longer used for its permitted purpose of providing land transportation, the bridge shall be removed from the waterway. Therefore, removal of the existing Schuyler Heim Bridge would be included as a condition of the federal permit for the replacement bridge.

S.5.1.4 Alternative 4: Bridge Replacement Only

This alternative would replace the existing Schuyler Heim Bridge (lift bridge) with a fixed-span bridge, largely along the existing bridge alignment, generally as described under Alternative 1. Also with this alternative, connectivity with the SR-103 would be maintained. The existing Schuyler Heim Bridge would be demolished, as would occur under Alternative 1.

With this alternative, however, no roadway improvements would occur, and the flyover would not be constructed. Additionally, the SR-47 Expressway described in Alternative 1 would not be constructed, and the SR-103 Extension to Alameda Street described in Alternative 2 would not be constructed.

S.5.1.5 Alternative 5: Transportation System Management

This alternative is designed to identify low-cost, easily implementable improvements to the local roadway system as an alternative to constructing more expensive improvements. This Transportation System Management (TSM) alternative focuses on improvements to routes that parallel the proposed SR-47 Expressway, and that serve the same trips. These trips include trucking drayage trips to and from the ICTF, and trips destined to and from the ports via Alameda Street, Henry Ford Avenue, and SR-47. The TSM alternative would include measures to improve capacity and traffic circulation at the Port of Long Beach and Port of Los Angeles through policy changes and use of the latest technologies. With this alternative, capital investment would be minimal compared to Alternatives 1 through 4.

The TSM alternative for this project includes the following key elements:

- **Intelligent Transportation Systems (ITS):** Systems applications in and around the ports area, with special emphasis on truck movements. These include measures to improve traffic circulation through traffic control, incident management, traffic surveillance, and traffic information dissemination with the aid of intelligent transportation system devices and systems.
- **Lower-cost roadway and intersection improvements:** Measures include restriping to provide additional turn lanes and acceleration lanes and traffic signalization improvements, primarily within existing rights-of-way.
- **Minor roadway widening:** There also could be peak-hour parking prohibitions to remove mid-block bottlenecks along selected roadways.

S.5.1.6 Alternative 6: No Build

Under this alternative, no improvements are proposed to the existing Schuyler Heim Bridge or local roadway system. Currently, the approaches of the bridge are being retrofitted to address seismic deficiencies. However, this is not a full seismic retrofit of the bridge; it is limited to the bridge approaches to bring the approaches to the same seismic level with the main span, reducing their chance of collapsing. The main span itself is deficient. Therefore, even after the approaches are retrofitted, the entire bridge would still be deficient. Hence, under this alternative the existing Schuyler Heim Bridge would continue to be seismically inadequate and subject to damage or collapse under strong seismic conditions. Maintenance activities would continue and would include application of protective coatings; lift mechanism repairs; deck resurfacing; and other, similar, maintenance activities. The bridge is expected to continue to deteriorate over time as its useful life is eroded further and as various magnitude earthquakes are experienced. At some point in the future, the bridge may need to be demolished and replaced, solely to avoid safety hazards.

This No Build alternative also would not provide any facilities to deal with the projected increase in vehicular traffic in the ports area.

S.5.1.7 Preferred Alternative

Local concerns have been integral to the decision-making process to determine the preferred alternative. Community comments and public concerns were considered. Issues raised by the various agencies that commented also were considered. Caltrans and Alameda Corridor Transportation Authority (ACTA), as the major transportation funding partners for the project, have discussed the various alternatives. Elected officials interested in the project have been consulted. The information contained in this Final EIS/EIR, which includes all comments and responses on the Draft EIS/EIR, was evaluated, discussed, and used as the basis for identifying the preferred alternative.

The identification of a preferred alternative was made after careful consideration of all agency and public comments to the Draft EIS/EIR. There was support for selection of both Alternative 1 and Alternative 2. Alternative 1 provides a new expressway along the SR-47 alignment, while Alternative 2 provides a new expressway along the SR-103 alignment. Both alternatives include replacing the existing Schuyler Heim Bridge with a fixed-span bridge. After comparing and weighing the benefits and impacts of the alternatives (see Table 2-2 for a summary of major impacts), funding availability, and community acceptance, Alternative 1 has been identified as the preferred alternative.

- Project purpose and need: The No Build and Transportation System Management alternatives (Alternatives 6 and 5) would not help address the seismic issues of the Schuyler Heim Bridge or address traffic congestion north of the bridge and, therefore, would not meet the purpose and need of the project. Therefore, neither the No Build alternative nor the Transportation System Management alternative was identified as a preferred alternative.

- Alternative 4 involves only replacement of the Schuyler Heim Bridge. Because it would not help address traffic congestion north of the bridge, it would not meet the project purpose and need. Therefore, it was not identified as a preferred alternative.

- Need to replace bridge for seismic safety: The Schuyler Heim Bridge was built in 1948 to 1946 standards and, therefore, does not conform to current seismic criteria. In the event of a major earthquake, the bridge would be so damaged it could not remain in service. Under Alternatives 5 and 6, the bridge would remain a major channel crossing and, therefore, would not meet the state's seismic code. Currently, the approaches of the bridge are being retrofitted to address seismic deficiencies. However, this is not a full seismic retrofit of the bridge; it is limited to the bridge approaches to bring the approaches to the same seismic level as the main span, reducing their chance of collapse. Even after the approaches are retrofitted, the entire bridge would still be deficient and would sustain major damage, and possibly collapse after a seismic event that resulted in peak bedrock acceleration larger than 0.3g. The Palos Verdes fault is capable of generating an earthquake with 0.7 PBA at the Schuyler Heim Bridge.

- Bridge maintenance: Due to its age, the Schuyler Heim Bridge is at the end of its useful life span and requires frequent maintenance to keep it functioning. The cost of such maintenance, plus the seismic rehabilitation that would be required to keep the bridge operational, would be more than twice the cost of a fixed-span-bridge replacement. These costs would be borne under Alternatives 5 and 6.

- Consistency with Port Master Plans:
  - Port of Long Beach: Port Master Plan
    Goals include improving internal Port circulation involving roadways, thereby providing additional highway access to Terminal Island.
  - Port of Los Angeles Master Plan
    Objectives include accommodating commerce to preclude the need to develop new ports, providing necessary and safe access between internal and external road systems, and utilizing appropriate safety standards for new facilities.

  Alternatives 5 and 6 would not meet the above goals of the Port of Long Beach and Port of Los Angeles port master plans.
- Wetland impact: A wetland is located on the tidal terrace east of the Schuyler Heim Bridge. This wetland is likely to be removed under Alternative 3, while it would be avoided and the impact minimized under Alternatives 1 and 2. Further, although Alternative 3 was originally included as an "avoidance alternative," subsequent consultation with the U.S. Coast Guard indicated that a condition of its permit would be to demolish the old bridge. The U.S. Coast Guard would not permit the new bridge if the old bridge would remain standing but not be used for traffic. Therefore, Alternative 3 would not be feasible and thus was not identified as a preferred alternative over Alternative 1.
- Hazardous waste impact: Portions of the Alternative 2 alignment overlie two former landfills. which, although no longer in use, were not closed according to existing regulations. One of these, the Class II Alameda Street Landfill is being reviewed for possible inclusion on the National Priority List (NPL), to make it eligible as a superfund site. Soil excavation at this landfill could encounter hazardous waste, which would require oversight by the Department of Toxic Substances Control to ensure safe management and disposal of the waste. There are no such sites in the vicinity of the Alternative 1 alignment. In addition, the cost for Alternative 2 is significantly higher than for Alternative 1. Therefore, Alternative 2 was not identified as a preferred alternative over Alternative 1.
- Cost issues: Higher costs would occur under Alternative 1A compared to Alternative 1. In particular, the project cost of Alternative 1A would be $7 million to $12 million greater than Alternative 1. In addition to greater cost, the design of the bridge under Alternative 1A would result in constructability issues that are not present in Alternative 1. Therefore, Alternative 1A was not identified as a preferred alternative over Alternative 1.

S.5.2 Alternatives Considered and Withdrawn

Three alternatives were considered and then eliminated from further consideration:

- Full retrofit of the existing Schuyler Heim Bridge (entire bridge extent)
- Extension of SR-103 to I-710
- Extension of SR-103 to I-405

S.5.2.1 Retrofit of Existing Schuyler Heim Bridge

The seismic retrofit project for the Schuyler Heim Bridge identified by Caltrans in 1998 involved retrofit of the approach structures and truss portions of the lift bridge, which would maintain the existence of the historic structure. The bridge could continue to be used, pending structural damage, such as from a major earthquake.

This alternative was eliminated. Based on cost comparisons of repairing the Schuyler Heim Bridge, Caltrans confirmed that constructing a new fixed-span bridge was more cost-effective than rehabilitating the existing bridge (Caltrans, 1999a). In addition, Caltrans has determined that the seismic retrofit alternative would not provide an emergency service facility that would be able to withstand a major earthquake and be serviceable immediately following a major earthquake (Caltrans, 1998). In addition, if a retrofit project were redesigned such that the bridge could be put into service immediately following a major earthquake, the foundations and pilings of the existing structure would have to be demolished and reconstructed. This alternative was eliminated from further consideration primarily because of the expense. It was determined that the cost to rehabilitate the bridge would be $213 million, while the cost to replace it with a new lift bridge would be $196 million, and the cost of building a new fixed-span bridge would be $86 million (Caltrans, 1999a).

S.5.2.2 SR-103 Extensions

The two alternatives to extend SR-103 would provide for a north/south expressway by extending the existing SR-103 corridor rather than constructing a facility on the SR-47 alignment. SR-103 is a 2.6-km (1.6-mi) state highway starting at SR-47 near Henry Ford Boulevard, and ending at Pacific Coast Highway. SR-103 is located north of Terminal Island in the cities of Los Angeles and Long Beach. It provides a direct link, via the Schuyler Heim Bridge, from major shipping terminals on Terminal Island to areas directly north, on the mainland.

S.5.2.2.1 Extension of SR-103 to I-710

This alternative would extend SR-103 to the north via a four-lane elevated expressway to join I-710 between I-405 and Del Amo Boulevard. A "half" interchange at I-710 would connect northbound SR-103 to northbound I-710 and southbound I-710 to southbound SR-103. With this alternative, SR-103 would fly over I-405, with no interchange. This alternative would follow the SCE easement.

This alternative presented several positive attributes; it would provide a freeway-to-freeway connection for SR-103 traffic; it would utilize available capacity of SR-103; and it would not cross the Dominguez Channel.

However, it was eliminated from further consideration due to its negative features, as follows:

- It would be significantly more costly than the SR-47 Expressway alternatives.
- It would require major right-of-way acquisition.
- There would be extensive utility impacts (SCE high-voltage lines) that could require a longitudinal encroachment agreement with Caltrans.

- It would require major reconstruction of the I-710/Del Amo Boulevard interchange.
- There would be potential traffic impacts to I-710.
- There is the potential for adverse environmental impacts to the Long Beach community, including residential neighborhoods, several public schools, a park, and a church.
- It could require safety enhancements and capacity improvements on SR-103 south of Anaheim Street, as the existing SR-103 main line curve at the Pier A Terminal has a design speed of only 56 km/hour (35 miles per hour [mph]), which would be too slow with this alternative.

S.5.2.2.2 Extension of SR-103 to I-405

This alternative would extend SR-103 to the northwest via a two- or four-lane elevated expressway to join I-405 between Alameda Street and Wilmington Avenue. A "half" interchange at I-405 would connect northbound SR-103 to westbound I-405 and would connect eastbound I-405 to southbound SR-103.

This alternative presented several positive attributes; it would provide a freeway-to-freeway connection for SR-103 traffic; it would utilize available capacity of SR-103; and it would not cross the Dominguez Channel. However, it was eliminated from further consideration due to its negative features, as follows:

- It would be significantly more costly than the SR-47 Expressway alternatives.
- It would require major right-of-way acquisition.
- There would be extensive utility impacts (SCE high-voltage lines).
- It would require major reconstruction of the I-405/Wilmington interchange.
- There would be potential traffic impacts to I-405.
- There is the potential for adverse environmental impacts to the Long Beach community, including residential neighborhoods, several public schools, and a park.
- It could require safety enhancements and capacity improvements on SR-103 south of Anaheim Street, as the existing SR-103 main line curve at the Pier A Terminal has a design speed of only 56 km/hour (35 mph), which would be too slow with this alternative.

S.6 Project Impacts

Potential impacts and avoidance, minimization, and/or mitigation measures for the proposed project are shown in Table S-1, which provides summaries of construction and/or operations impacts for each of the project alternatives. As shown in the table, measures are proposed that would avoid, minimize, or mitigate virtually all of the potential impacts. Exceptions include air quality impacts during construction and operation of Alternatives 1 through 4, and cultural resources impacts under Alternatives 1 through 4.

More extensive discussions of potential project impacts are provided under each environmental resource section in Chapter 3.0 of this Final EIS/EIR. Based on information provided in Chapter 3.0, no avoidance, minimization, or mitigation measures are proposed

for Land Use, Recreation, Coastal Zone; Growth; or Energy. For these three environmental resources, the effects of the project alternatives would not require that any measures be implemented.

S.7 Project Funding

For the proposed project, Caltrans has agreed to contribute $250 million from the State Highway Operation and Protection Program (SHOPP) for replacement of the Schuyler Heim Bridge. Funding for the Bridge replacement portion comes from the Grant Anticipation Revenue Vehicle (GARVEE) bond and is included in the 2008 SHOPP, which was approved by the California Transportation Commission (CTC) on March 13, 2008. Funding for the Expressway portion is included in the Trade Corridor Improvement fund (TCIF) program adopted by CTC on April 10, 2008. A part of the funding for the Expressway portion also comes from ACTA's Demonstration fund, Port fee, and ACTA bond.

Construction of a new expressway would require acquisition of right-of-way (primarily aerial and subsurface easements) from the Ports of Long Beach and Los Angeles, and from the City of Los Angeles. In most cases, the property would continue to be available for use by the ports and the city, but with some restrictions. The current right-of-way cost estimates (2007-2008 dollars) for Alternatives 1 through 4 include approximately $17.8 million to $114.4 million for non-ports properties. Within the Ports of Long Beach and Los Angeles, the costs are estimated to be approximately $27 million.

Caltrans would provide quality assurance for the duration of the project. Caltrans and ACTA would provide the required staffing. Estimated staffing requirements have been calculated as 460 person years (PY) for the total project, which includes 46 PY for Caltrans quality assurance within the Caltrans right-of-way. The Caltrans quality assurance project support cost is estimated at $7 million within the right-of-way.

The total cost estimates vary by alternative[1], as follows:

- Alternative 1 – $706.3 million
- Alternative 2 – $785.7 million
- Alternative 3 – $761.4 million
- Alternative 4 – $321.2 million
- Alternative 5 – $22.6 million
- Alternative 6 – $0 (no cost)

S.8 Public Involvement

S.8.1 Previous Public Involvement

In 2002, Caltrans and ACTA began formal public scoping and initiation of environmental studies for a previous project that included replacement of the Schuyler Heim Bridge and construction of an elevated SR-47 Expressway between Terminal Island and Alameda Street at Pacific Coast Highway. For the previously proposed project, the formal scoping and public involvement process began when a Notice of Preparation (NOP) to prepare an

[1] Alternatives 1, 2, and 3 include the cost estimate for flyover, which is $66 million.

EIR/EA was sent to the State Clearinghouse on January 28, 2002. Notice letters were sent to federal, state, and local agencies, and notices were published in local newspapers. A scoping meeting for the previous project was held on February 13, 2002.

Subsequently, the FHWA determined that an EIS would be required, and a Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* on June 8, 2004, with notices sent to the appropriate local, state, and federal agencies. Then, an NOI to prepare an EIS for the project proposed in this document was published in the *Federal Register* on July 26, 2004, and notices were sent to the appropriate local, state, and federal agencies. In September 2004, a scoping notice to inform the general public of the proposed project was published in the following newspapers: *Los Angeles Times*, *Long Beach Press Telegram*, *Daily Breeze*, *La Opinion*, and *The California Journal* (see Appendix F for copies of these notices).

Scoping letters and briefings were provided to elected officials and staff including, but not limited to, U.S. senators and house members, the California governor's office, State senators and assembly members, and local officials from the County of Los Angeles, City of Los Angeles, City of Long Beach, City of Carson, and City of Compton. In addition, presentations were made to stakeholder groups, including the Wilmington Neighborhood Council, Port of Los Angeles Port Community Advisory Committee, and Wilmington Chamber of Commerce. Scoping letters also were sent to individuals who requested notice of projects in the community.

Two formal scoping meetings/open houses were held at the Wilmington Senior Citizens Center during the afternoon and evening of September 9, 2004. The meetings introduced the project to responsible and cooperating agencies and the public, and solicited comments and concerns pertinent to the project.

Public concerns included noise, air quality, health, and traffic impacts on the residential areas in the City of Carson, construction and operation effects on Leeward Bay Marina, conflicting use of property along Alternative 2 (SR-103), traffic impacts to Pacific Coast Highway, traffic connection to eastbound SR-91, and port growth. Based upon written comment letters received from Latham & Watkins, PCR Services Corporation, and representatives from Watson Land Company, additional public noticing and commenting opportunities were provided to clarify the project alternatives and study area. An additional display ad was advertised in the *California Crusader News*, from February 24, 2005, through March 2, 2005.

Various issues were raised in comments received in response to the NOI or in comments submitted to the project team during the course of the environmental evaluation. These issues are summarized in Section S.12 – Areas of Interest.

S.8.2 Ongoing Public Involvement

Additional public involvement occurred during the circulation period, when the Draft EIS/EIR was provided to agencies and the public, comments on the document were received, and a public hearing was held on the Draft EIS/EIR on September 25, 2007. Public involvement also occurred for the SDEIS/RDEIR, that portion of the EIS/EIR that was recirculated. The SDEIS/RDEIR was provided to agencies and the public, and a 45-day period was provided for review. An additional public meeting was held on January 27, 2009.

After the public circulation reviews, all comments were considered, and Caltrans has identified a preferred alternative and made the final determination of the project's effect on the environment. This Final EIS/EIR identifies the preferred alternative and addresses public comments on the Draft EIS/EIR and the SDEIS/RDEIR.

In accordance with CEQA, Caltrans will: certify that the project complies with CEQA; prepare findings for all significant impacts identified; prepare a Statement of Overriding Considerations for impacts that cannot be mitigated below a level of significance; and certify that the findings and Statement of Overriding Considerations have been considered prior to project approval. Caltrans will then file a Notice of Determination with the State Clearinghouse that will identify whether or not: the selected project alternative will have significant impacts; mitigation measures were included as conditions of project approval; findings were made; and a Statement of Overriding Considerations was adopted.

In accordance with NEPA, it was determined that an EIS was required to evaluate the proposed project alternatives. Based on the information provided in the EIS/EIR, Caltrans will select an alternative and issue a Record of Decision (ROD) to notify the public of the chosen alternative and the reasons for that decision.

S.9 Project Coordination with Other Agencies

Below is a list of federal, state, regional, and local agencies and others who were consulted during the scoping process, contributed information for inclusion in the text, and/or contributed information for inclusion in the various technical reports prepared in conjunction with the EIS/EIR. Table S-2 provides a list of agency actions, permits, and approvals that would be required for completion of the proposed project.

S.9.1 Federal Agencies

National Marine Fisheries Services
United States Coast Guard
United States Army Corp of Engineers
United States Fish and Wildlife Service
United States Environmental Protection Agency
United States Department of the Interior

S.9.2 State Agencies

California Department of Fish and Game
California Department of Conservation, Division of Oil and Gas, District 2
California Regional Water Quality Control Board, Los Angeles, Region 4
California State Parks and Recreation
California Transportation Commission
California Coastal Commission
Department of Toxic Substances Control, Cypress office
State Historic Preservation Office

S.9.3 Regional Agencies

Metropolitan Transportation Authority
Southern California Association of Governments
South Coast Air Quality Management District

S.9.4 Local Agencies

City of Carson
City of Carson, Department of Health
City of Commerce, Department of Health and Services, Public Health Investigation
City of Los Angeles
City of Los Angeles, Department of Building and Safety
City of Los Angeles, Bureau of Sanitation, Industrial Waste Management Division
City of Long Beach
City of Long Beach, Department of Health, Hazardous Materials
City of Long Beach, Department of Health and Human Services
Long Beach Parks, Recreation and Marine
Long Beach Unified School District
Los Angeles City Fire Department

S.9.5 Tribal (Section 106)

S.9.5.1 Native American Consultation

In accordance with Section 106 of the National Historic Preservation Act, a request was made to the Native American Heritage Commission (NAHC) for a review of the *Sacred Lands Inventory* to determine if any known cultural properties are present within or adjacent to the project area of potential effects (APE). The NAHC responded, stating that no Native American cultural resources are known to exist within or adjacent to the project APE and provided a list of Native American groups and individuals for further consultation.

During the period of May through June 2002, the project solicited information and comments regarding cultural resources in the project area from local governments, public and private organizations, and other parties likely to have knowledge of, or concerns about, such resources. No responses were received following consultation.

A second round of consultation with the NAHC for the SR-103 Extension to Alameda Street was conducted in 2004; the NAHC again responded stating that no Native American cultural resources are known to exist within or adjacent to the project APE. On October 19, 2004, groups and individuals were again contacted regarding the SR-103 portion of the project. Again, no responses were received following consultation.

S.9.6 Other Coordination Activities

In addition to the above, there have been ongoing coordination meetings between ACTA, the Alameda Corridor Engineering Team (ACET), the Port of Long Beach, and the Port of Los Angeles during project design and development. These meetings have addressed environmental and engineering issues associated with the proposed project alternatives to assure that the project does not interfere with ongoing operations and planned development at the ports, particularly at Pier A and Pier S. As a result of these meetings, the project

alternatives have been designed to accommodate the interests of the ports and the pier operators. The issues addressed include, but are not limited to, at Pier S, advance planning for potential effects to the existing oil wells near Cerritos Channel, avoidance of the remediation cells, and compensation for loss of vehicular and equipment parking space. At Pier A, the SR-47 Expressway has been designed so the support columns avoid the operations buildings and avoid the alignment of a planned tunnel under SR-47. In addition, the design of the project alternatives is consistent with planned development at Pier A and Pier S. Another project element, the Ocean Boulevard/SR-47 Flyover, was developed as a result of these coordination meetings.

Also, the Project Development Team (PDT) conducts monthly coordination meetings to address design issues of all the alternatives in accordance with the needs of the various entities. Agencies in attendance at the PDT meetings include ACET, ACTA, representatives from Caltrans headquarters and Caltrans District 7, City of Carson, Federal Highway Administration, City of Los Angeles Department of Transportation, POLA and POLB.

Caltrans is currently consulting with the USFWS concerning potential impacts to federally-listed species. Based on the studies and consultation with resource agencies to date, Caltrans has determined that the possibility of impacts occurring to listed species is remote. However, in keeping with Caltrans' safety-first policy, we are continuing to consult with the USFWS on this matter. Because listed species are not likely to occur in the project area and any potential impacts would be discountable and immeasurable, Caltrans anticipates receiving concurrence on a Not Likely to Adversely Affect determination. Consultation will be concluded before the Record of Decision is approved.

S.10 Scope and Content of the Final EIS/EIR

This Final EIS/EIR examines the potential direct, indirect, and cumulative environmental effects of alternatives for the proposed project in accordance with requirements of NEPA and CEQA. The document describes why the project is being proposed, project alternatives, construction methods, the existing environment that could be affected by the alternatives, anticipated effects from each alternative, measures to avoid, minimize, or mitigate adverse effects, and those effects that cannot be fully mitigated. This document also addresses the preferred alternative and provides a record of all public comments received and responses prepared relative to the Draft EIS/EIR. The Final EIS/EIR is organized into nine chapters, plus this Summary and the Appendices, as follows:

Summary
This chapter provides a summary of the project alternatives, the preferred alternative, potential adverse effects and avoidance, minimization, and/or mitigation measures, the scope and content of the Final EIS/EIR, document organization, and key principles in preparing the document.

Chapter 1.0 Project Purpose and Need
This chapter describes the purpose and need for the project and the project objectives.

Chapter 2.0 Project Alternatives
Chapter 2.0 describes the project location, project background, alternatives evaluated in this Final EIS/EIR, preferred alternative, and alternatives initially considered but eliminated from further consideration.

Chapter 3.0 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures
This chapter is divided into 16 sections that address a specific environmental resource area. The sections are arranged according to the Human Environment, Physical Environment, and Biological Environment. Each environmental resource section describes the baseline condition as of July 2004, when the NOI was issued for this project, criteria for evaluating environmental effects, assessment methodology, effects of each alternative, and avoidance, minimization, and/or mitigation measures that would reduce or eliminate adverse effects.

Other sections of this chapter address the Relationship Between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity; and Irreversible and Irretrievable Commitments of Resources.

Chapter 4.0 California Environmental Quality Act Evaluation
Chapter 4.0 provides a discussion of significant adverse impacts as determined in compliance with CEQA criteria, mitigation measures that would eliminate or reduce the extent of such impacts, and unavoidable adverse impacts determined in accordance with CEQA criteria.

Chapter 5.0 Cumulative Impacts
This chapter describes the impact of each environmental resource by alternative, in combination with other reasonably foreseeable past, present, and future related projects in accordance with requirements of NEPA and CEQA.

Chapter 6.0 Summary of Comments and Coordination
Chapter 6.0 includes a description of the scoping process and coordination with public agencies and Native American tribes.

Chapter 7.0 List of Preparers
Chapter 7.0 identifies the individuals involved in preparing the EIS/EIR.

Chapter 8.0 Distribution List for the Final EIS/EIR
This chapter includes federal, state, regional and local agencies, groups, organizations, businesses, individuals, and libraries that will receive copies of the Final EIS/EIR.

Chapter 9.0 References
Chapter 9.0 identifies the documents and other sources of information utilized in preparing this Final EIS/EIR. References are arranged according to the section/chapter of the Final EIS/EIR where they appear.

Appendices
A CEQA Checklist
B Elevations
C Section 4(f) Evaluation
D Title VI Policy Statement
E Relocation Impact Report
F NOP, NOI, Scoping Notices

G Project Scope Summary Report (Seismic Retrofit)
H Environmental Commitment Record (ECR for the Preferred Alternative)
I Rights-of-Way
J Public Notices
- J.1 Notice of Completion/Notice of Availability
- J.2 Comment Period Extension Letter
- J.3 Public Hearing Notices
- J.4 Informational Flyer
- J.5 Public Hearing Materials
- J.6 SDEIS – RDEIR Materials

K Public Hearing Transcripts and Comment Cards
L Memorandum of Agreement
M FEIS/FEIR Acronyms and Abbreviations
N UC Davis HRA Review
O Conformity Redetermination

S.11 Areas of Interest

S.11.1 Scoping Comments

The following areas of interest were raised in comments received in response to the NOI or comments submitted to the project team during the course of the environmental evaluation:

- **Marine vessel detours and economic impacts**. The proposed replacement bridge is designed for a fixed vertical clearance of 14.3 m (47 ft). Potential adverse effects could occur with respect to marine vessels traveling in Cerritos Channel that are too tall to clear the 14.3-m (47-ft) vertical limit. Such vessels would be required to detour through the outer harbor, with a consequent economic impact.
- **Historic Schuyler Heim Bridge**. The existing Schuyler Heim Bridge is considered eligible for listing in the National Register of Historic Places and the California Register of Historic Resources. Demolition of the existing bridge or obstruction of views of the existing bridge behind the replacement bridge would constitute a substantial change in the significance of a historical resource.
- **Pier S and Pier A Property Acquisitions**. Property acquisitions required in areas of Pier S and Pier A would alter the planned physical layout and operation of the Pier S and Pier A Terminals by the Port of Long Beach.
- **Toxic Air Contaminants.** Concerns related to diesel truck traffic in proximity to the Wilmington community.
- **Community Concerns.** Numerous comments were raised by various community groups in the Wilmington area and City of Carson in opposition to the project. These relate to redirection of truck traffic closer to the Wilmington area, with resulting air emissions, noise, light and glare, and traffic issues, and concern for the effects to the aesthetics of the commercial and residential neighborhood.

S.11.2 Draft EIS/EIR Comments

- **Community Concerns**. Potential impacts to Carson residents in the Wilmington area, specifically east of Alameda Street and north of I-405. Primary concerns were increases in traffic-related noise, traffic congestion, and related emissions.
- **Health Risk Concerns-Toxic Air Contaminants.** The potential for an increase in air toxics emissions resulting from an increase in traffic in the Wilmington area.
- **Diversion of Water Flow into Leeward Bay Marina**. Concern that the proposed bridge support in the Consolidated Slip would divert water and therefore obstruct flow into and out of the marina.
- **Growth**. Belief that the proposed project would be a causal factor in port growth, resulting in associated air quality, traffic, and other impacts.
- **Pollution**. The movement of goods to and from the ports ought to be conducted by a more efficient, clean, green, non-polluting method of transport rather than by trucks.

S.12 Decision to Recirculate the Draft EIS/EIR

As a result of the comments received on air quality and potential health risk, the ACTA Board, as a Responsible Agency under CEQA, directed its staff to conduct an HRA. An air quality consultant prepared an HRA and submitted it to Caltrans for review and consideration. Caltrans obtained a review and analysis of the HRA by UCD. The draft HRA was reviewed by members of the UCD-Caltrans Air Quality Project, UCD Department of Civil and Environmental Engineering, and the UCD Department of Health Science. UCD reviewed the approaches and assumptions used in the emission estimation and modeling of the HRA, and identified some questions and issues in the draft HRA report. The UCD concerns are set forth in "Brief Screening-Level Review of the Draft Health Risk Assessment (HRA) for the Schuyler-Heim Bridge Replacement and SR-47 Expressway Project (Heim Bridge)" which is Appendix B to the SDEIS/RDEIR.

The CEQA Guidelines (15088.5[a]) specify that the lead agency must recirculate an EIR when there is significant new information added to the project analysis after public review of the Draft EIR. The results of ACTA's HRA and the UCD analysis were determined to be new information potentially having a significant environmental impact and thus requiring recirculation under CEQA Guidelines 15088.5(a). CEQ regulations, 40 CFR 1502.9(c) allows agencies to prepare supplements to either draft or final environmental impact statements if:

> (i) The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or
>
> (ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.

As stated above, it was determined that for this particular project, the results of ACTA's HRA study and the UCD analysis comprise significant new information. Caltrans disclosed this new information to the public by preparing and circulating the SDEIS/RDEIR in November 2008.

The CEQA Guidelines (15088.5[c]) allow for the lead agency to recirculate an environmental document that has been modified and address the new information that is the basis for the recirculation. Under Federal Highway Administration (FHWA) regulation 23 CFR 771.130a(2)], a draft EIS may be supplemented if there is new information relevant to environmental concerns. Therefore, this SDEIS/RDEIR only included sections from Chapter 3.0, the Air Quality (3.13) and Community Resources (3.3.3) sections, and portions of other chapters that were modified as the result of the new information.

S.12.1 Federal Rationale for Inclusion of Health Risk Information

The FHWA Interim Guidance for Mobile Source Air Toxics (MSAT) Analysis indicates that available technical tools do not reliably predict the project-specific health impacts of the MSAT emission changes associated with project alternatives. Limitations of the tools include the following:

- **Emissions.** The tools available from EPA and the California Air Resources Board to estimate MSAT emissions from motor vehicles are not sensitive to key variables that determine emissions of MSATs in the context of highway projects.
- **Dispersion.** The tools to predict how MSATs disperse are also limited. The current EPA and California line-source regulatory models, such as CALINE3, CAL3QHC, and CALINE4, were developed and validated for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of these dispersion models is adequate for predicting maximum concentrations that can occur over short time periods. Alternative dispersion models, like EPA's AERMOD, were not developed for use with line sources, requiring adaptation and approximation of line emission sources like roads. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.
- **Exposure Levels and Health Effects.** Even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude the analysis from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. A worst-case analysis approach does not mitigate these concerns because it replaces uncertainty with assumptions that lead to risk estimates that almost certainly are far in excess of anything realistic.

Despite these limitations, ACTA, a Responsible Agency under CEQA, directed the preparation of an HRA for the project in response to comments on the DEIS/DEIR regarding potential health risk related to MSATS. Once the ACTA HRA was prepared, Caltrans, the Lead Agency under NEPA as assigned by FHWA, determined that this HRA constituted

additional information that was potentially useful to the public and decision-makers and therefore should be made available under NEPA.

S.12.2 State Rationale for Inclusion of Health Risk Information

Caltrans has conducted its own internal review of the ACTA HRA and requested review of the HRA by the UCD, Department of Civil and Environmental Engineering. Caltrans, in consultation with UCD, has concerns about the assumptions, methodology, and findings of the HRA. The UCD concerns are set forth in the September 8, 2008, UCD Memo, (Appendix N). While Caltrans believes that current HRA methodologies have clear limitations and uncertainties, in highly unusual circumstances such as those presented by this project, such studies may be useful for the comparison of project alternatives. The unusual conditions of this project contributed to this decision. These unusual conditions include very large numbers of diesel trucks in the project area, substantial proportions of both minority and low-income persons, and adjacent sensitive land uses including schools and residential neighborhoods. At this time there is no uniform standard to measure HRAs. Since there is no clear acceptable methodology, this study, as well as others, are examples of how data can be reviewed and analyzed, but they are not the present standards or protocols to determine HRAs.

S.12.3 Local Rationale for Inclusion of Health Risk Information

ACTA, a joint powers authority formed by the cities and ports of Los Angeles and Long Beach, is a Responsible Agency under CEQA for the project and will be providing significant funding for and constructing the expressway portion of the project. ACTA elected to conduct a quantitative health risk analysis in response to community concerns raised during the circulation period about potential health impacts from the expressway portion of the proposed project. ACTA also indicated willingness to implement mitigation measures to reduce the estimated risk in excess of the SCAQMD significance threshold of 10 in one million to less than the SCAQMD significance threshold. ACTA's reasons for conducting such an analysis and mitigating impacts are as follows:

1. Comments on the Draft EIS/EIR requested that air toxics associated with increased truck traffic be addressed. There are local protocols currently in use for performing health risk assessments and established SCAQMD thresholds for evaluating the significance of estimated health risks. Such protocols and significance levels have been used by the individual members of the ACTA joint powers authority in the preparation of EIRs for projects within their jurisdictions.
2. ACTA is a Responsible Agency under CEQA and will be implementing the expressway portion of this project. This work will require development permits from the Port of Long Beach and Port of Los Angeles. CEQA documents prepared in support of recent port development permits have all included quantitative health risk assessments.

Changes to the sections of the Draft EIS/EIR are marked by a vertical line in the margin. In addition, changes related to the new information are underlined.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
3.1 LAND USE, RECREATION, AND COASTAL ZONE	No avoidance, minimization, and/or mitigation measures are proposed related to Land Use, Recreation, and Coastal Zone.
3.2 GROWTH	No avoidance, minimization, and/or mitigation measures are proposed related to Growth.
3.3 COMMUNITY IMPACTS	
CONSTRUCTION Alternatives 1, 1A, and 3 Permanent full acquisition of six businesses located on 10 parcels, permanent highway easements of approximately 125 partial takes (aerial/highway easements), and 78 temporary construction easements. Nine boat slips would be acquired at the Leeward Bay Marina. Alternative 2 Two buildings would be acquired as permanent highway easements, thereby denying them of their existing use for business. There are 61 partial parcel takes (permanent aerial/highway easements) and 44 temporary construction easements. Alternative 3 There are 24 temporary construction easements takes and 32 partial parcel takes (permanent aerial/highway easements with Alternative 3. Alternative 4 Approximately 17 partial takes for permanent aerial/highway easements.	CI-1 Provide relocation assistance or compensation to eligible persons and businesses in accordance with the federal Uniform Relocation Assistance and Property Acquisition Act of 1970, as amended (42 USC Sections 4601-4655) and the California Relocation Act (California Government Code, Section 7260 et. seq.).
OPERATIONS	No avoidance, minimization, or mitigation measures related to Community Impacts are proposed for project operations.
3.4 UTILITIES AND PUBLIC SERVICES	
CONSTRUCTION Alternatives 1, 1A, 2, 3, and 4 The build alternatives would affect existing utilities in the project area, requiring relocation and avoidance, with the potential for some service disruption.	U-1 Provide advance notification to utility users of the potential for service disruption and the anticipated time/date of the disruption.
Both the existing Schuyler Heim Bridge and the new bridge would be closed temporarily for up to 1 month, and the southbound SR-47 exit ramp at New Dock Street would be closed for approximately 4 months. As a result, land-based public and emergency services that rely upon the Schuyler Heim Bridge as their primary emergency route, including Port Police and LBFD, would be required to use alternative emergency response routes (primarily the Vincent Thomas and Gerald Desmond Bridges).	U-2 Prior to bridge construction, notify watch commanders and station chiefs of all fire, police, and other land- and water-based response stations that service the port area or use the Schuyler Heim Bridge or Cerritos Channel as a travel route to respond to service calls in order to minimize delays to emergency response providers during project construction.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
There would be a temporary closure of Cerritos Channel to marine vessel crossings for approximately 25 days at various times throughout the period of bridge construction.	This action will allow for the identification of alternate routes and the development of contingency response plans, including: • Temporary interim policies that will identify alternative resources within the public service and emergency response organization (i.e., alternative response units located closer to the incident); and • Mutual aid agreements between bordering public service and emergency response organizations (i.e., LAFD and LBFD) that could be dispatched in the event of a response delay of the primary response provider.
	U-3 Specify in the contract that construction in the Cerritos Channel must occur in a manner that allows emergency marine vessels to pass or be carried out in such a way that barges with construction equipment will be moved quickly to allow passage of emergency vessels.
	U-4 Determine where construction-related activities have the potential to disrupt response routes and coordinate with Los Angeles and Long Beach police and fire departments, as well as any local emergency medical service units.
	U-5 Utilize a Transportation Management Plan that is agreeable to all emergency service providers and the project design team.
	U-6 During final design, after selection of the preferred alternative, a determination will be made regarding which of the identified utilities will be relocated. Plans for the relocations will be developed in consideration of the project schedule and consultation with the utility providers which include, but are not limited to, LADWP, LBWD, SCE, SCG, GTE/Verizon, AT&T, City of Los Angeles. In addition, pipeline relocations will be planned and implemented in consultation with TOPCO, Exxon Mobil, Gulf Oil, and SCG. In further consultation with utility providers, some obsolete utilities may be removed at the request of the provider.
OPERATIONS	No avoidance, minimization, or mitigation measures related to Utilities and Public Services are proposed for project operations.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
3.5 TRAFFIC AND TRANSPORTATION	
CONSTRUCTION Alternatives 1, 1A, and 2 Project construction is expected to have temporary effects to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S Terminals. Up to 820 off-street employee parking spaces and 54 marine terminal equipment spaces would be affected. Alternative 3 Project construction is expected to have temporary effects to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S Terminals. Up to 977 off-street employee parking spaces and 167 marine terminal equipment spaces would be affected. Alternative 4 Project construction is expected to have temporary effects to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S Terminals. Up to 587 off-street employee parking spaces and 54 marine terminal equipment spaces would be affected.	T-1 Prior to construction, temporary parking spaces will be provided to replace existing parking capacity that will not be available during project construction. Caltrans will coordinate with the Port of Long Beach and Port of Los Angeles to identify replacement parking for the Pier A East and Pier S Terminals. Exact locations will be determined after consultation with responsible parties, including property owners. Considerations of feasibility will include, but not be limited to, vehicle capacity, time of availability, distance from terminal(s), and the need for employee shuttles. T-2 The Transportation Management Plan (TMP) will be implemented to enhance vehicular and pedestrian traffic.
OPERATIONS Alternatives 1, 1A, 2, and 4 Project operation is anticipated to have permanent effects to approximately 15 employee parking spaces at the Port of Long Beach Pier S Terminal. During project operations, up to 12 parking spaces may be taken from businesses at the southeast corner of Alameda Street and M Street, depending on final column placement. Also, 15 to 25 on-street parking spaces may be impacted along the east side of Henry Ford Avenue between Grant Street and Anaheim Street.	T-3 Compensation for the permanent loss of an estimated 15 employee parking spaces at the Port of Long Beach Pier S Terminal will be provided. Compensation will be based on an agreement between Caltrans and the Port of Long Beach.
Alternative 5 Under this alternative, there could be permanent effects if on-street parking is removed to provide additional travel lanes.	No avoidance, minimization, and/or mitigation measures are proposed for Alternative 5.
3.6 MARINE VESSEL TRANSPORTATION	No avoidance, minimization, and/or mitigation measures are proposed related to Marine Vessel Transportation.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
3.7 VISUAL RESOURCES	
CONSTRUCTION Alternatives 1, 1A, 2, 3, and 4 Construction of a new bridge, flyover, and/or expressway would result in specific impacts to the visual environment of those portions of the project area in view of the new facility(ies).	VR-1 The surfaces of columns, roadway barriers, soundwalls, and gore points will receive surface color treatments at specified locations, as determined by a Caltrans Licensed Landscape Architect.
	VR-2 Elements of the design of the proposed bridge and expressways, such as color, line, texture, and style, would be aesthetically pleasing and as unobtrusive as possible. During final design, particular attention would be paid to the vertical columns and soundwalls.
	VR-3 All visual design elements, including landscaping, would be designed and implemented with the concurrence of a Caltrans Licensed Landscape Architect and in compliance with local policies and guidelines. Additionally, input from interested parties, including the public, will be solicited and considered.
	VR-4 Trees and vines will be planted along soundwalls and other walls at specified locations, as determined by a Caltrans Licensed Landscape Architect.
	VR-5 Design of the elevated expressway would be compatible (scale and massing) with the existing Schuyler Heim Bridge or future bridge and the Badger Avenue/Henry Ford Railroad bridge.
Construction-related activities would be temporary in nature and impact. Construction activities at night have the potential to have greater effects because additional lighting that would be required to conduct the work could have temporary localized adverse effects.	VR-6 Night lighting would be used when required for safety for temporary construction activities. The lights would be directed downward and shielded to reduce light-spill outside of the area required for construction activities.
OPERATIONS	No avoidance, minimization, and/or mitigation measures related to Visual Resources are proposed for project operations.
3.8 CULTURAL RESOURCES	
CONSTRUCTION Alternatives 1, 1A, 2, 3, and 4 No archaeological resources were identified, and no archaeological sites are known to exist within the APE. If, during construction, unknown cultural materials are found, appropriate avoidance and minimization measures will be taken. Alternative 3 If the U.S. Coast Guard requires demolition of the Schuyler Heim Bridge following implementation of Alternative 3, CR-1 through CR-4 would be implemented.	CR-1 Measures for Unknown Archaeological Resources If any archaeological properties are discovered during construction, FHWA and SHPO shall be consulted, in accordance with 36 CFR 800.13(b).

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
	CR-2 Discovery of Human Remains If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to Public Resources Code Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission (NAHC), who will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact Mr. Gary Iverson, District Heritage Resource Coordinator, Caltrans District 7, so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed, as applicable.
Alternatives 1, 1A, 2, and 4 Demolition and replacement of the existing Schuyler Heim Bridge would constitute an Adverse Effect on the bridge, under Adverse Effect Criterion 2(i), 36 CFR 800.5(a). In addition, demolition of the Schuyler Heim Bridge would be considered an adverse effect under significance Criterion 2(A), Section 15064.5 of the CEQA Guidelines.	CR-3 The bridge shall be offered for sale for reuse in an alternate location to interested public agencies and non-profits. A marketing plan shall be prepared for the sale of the bridge including: a notification letter, fact sheet, list of intended recipients, as well as provisions for the salvage of smaller components in the case that there is no interest in re-use of the bridge. Advertisements shall be placed in appropriate newspapers of record. The offer shall run for 6 months. If no acceptable bids are received after 6 months this stipulation shall be deeded to have been met. The above shall be done in accordance with the U.S. Department of Transportation Historic Bridge Program 23USC144(o)(4)(A) and (B).
	CR-4 Informative permanent metal plaques shall be installed at both ends of the new bridge at public locations that provide a brief history of the original bridge, its engineering features and characteristics, the reasons for its demolition, and a statement of the characteristics of the replacement structure.
	CR-5 Pursuant to Section 110(b) of the NHPA, before the Bridge is demolished, the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) shall be contacted to determine what level and kind of recordation is required for the property. All documentation shall be completed and accepted by HABS/HAER before the Bridge is demolished.
	CR-6 Copies of the HABS/HAER report shall be disseminated to the City of Los Angeles Public Library and the City of Long Beach Public Library.
	CR-7 Information from the HABS/HAER report shall be available to the public for 10 years on an appropriate internet website.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
	CR-8 A documentary (motion picture or video) shall be produced and shall address the history of the Bridge, its importance and use within the history of the Port of Long Beach and Port of Los Angeles, and demonstrate its operation and function. The motion picture or video will be of broadcast quality, of sufficient length for a standard 30-minute time period and will be made available for local broadcast stations to public access channels in local cable systems and to schools/libraries.
	CR-9 Traveling museum exhibits shall be prepared and shall address the history of the Bridge, its importance and use within the history of the Port of Long Beach and the Port of Los Angeles, and demonstrate its operation and function, appropriate for display in small museums, or for use in schools.
	CR-10 Artifacts removed from the Bridge during preliminary stages of the demolition process shall be offered to local museums, and provide for their delivery to accepting institutions. Examples of such artifacts may include, but not be limited to, control panels, instruments, structural members, railings, signage, plaques or other identifying ornamentation, street lights, navigation lights, etc.
	CR-11 Measures CR-3, CR-5, CR-8, and CR-10, above, shall be completed prior to demolition of the Bridge. All stipulations shall be completed within 1 year of demolition, unless an extension of time is agreed upon.
OPERATIONS	No avoidance, minimization, and/or mitigation measures related to Cultural Resources are proposed for project operations.
3.9 HYDROLOGY, FLOODPLAINS, AND OCEANOGRAPHY	
CONSTRUCTION Alternatives 1, 1A, 2, 3, and 4 Construction of the new fixed-span bridge would require excavation and other soil disturbance activities and introduce additional impervious surfaces to the project area, which would promote surface runoff of construction pollutants (i.e. trash and petroleum compounds from construction equipment) and erosion of channel banks. The pollutants would be collected by surface runoff and discharged into the Cerritos Channel. Degradation to Cerritos Channel and/or Consolidated Slip/Dominguez Channel water quality could be attributed to construction activities associated with pile placement that would disturb sediment, causing resuspension and dispersal into the water column.	HY-1 The following are BMPs for protection of water quality of the receiving water during construction: • Tires on construction equipment that leaves a contaminated work site will be washed before the equipment leaves the site. • Within a contaminated work area, construction equipment will be cleaned only as necessary (e.g. moved to a non-contaminated area) to minimize the volume of decontamination wash water and prevent transport of contaminants from work site areas. • Designated locations will be provided for servicing, washing, and refueling equipment, away from temporary channels or swales that would quickly convey runoff to the drainage system and into the Cerritos Channel or Consolidated Slip/Dominguez Channel. • Contaminated material (e.g. oil, lubricants) will be kept at a safe distance, a minimum of 30.5 m (100 ft), from an entry into a receiving water body. Temporary barriers and containers

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
	will be used to confine any contaminated materials. Upon completion of construction, all contaminated material on the construction site will be removed and disposed of in accordance with federal, regional, and local regulations. • Use of marine construction equipment will not involve fuel transfers onsite. • A temporary spill containment system will be installed and maintained on either side of a water crossing. The contractor will be responsible for the containment plan and the execution of spill containment during the course of construction. The containment plan will be reviewed and approved by a resident engineer. • To prevent potential introduction of any lead-based paint into receiving waters, the contractor(s) will take appropriate measures to eliminate lead-based paint from reaching the receiving waters. If paint removal is necessary during the bridge dismantling process, the contractor will comply with all applicable laws and regulations relative to this process to ensure protection of receiving waters. • At project construction sites, as appropriate, the contractor will: – Provide stabilized entrances and exits – Regularly water the non-paved surfaces – Regularly sweep and vacuum paved surfaces – Install silt fences at the toe of excavation and embankment slopes – Install sand or gravel bag berms along the top of slopes – Install slope protection such as geotextiles, plastic covers, soil binders and erosion control blankets/mats – Install slope interruption devices such as fiber rolls and slope drains – Install permanent erosion control seeding, landscape planting or slope/rock paving – Protect storm drain inlets with inserts or linear interrupters such as gravel bag and/or sand bag berms – Manage stockpiles against wind and water erosion • Monitor and report BMP performance and conditions before and immediately after the completion of work, in accordance with SWPPP specifications.
	HY-2 Construction activities that would produce sediment transport of pollutants through the Cerritos Channel or Consolidated Slip/Dominguez Channel will be minimized through strict adherence to construction BMPs which include, but are not limited to, the following: • Channel bank work will include bank protection (riprap, concrete walls, and sheet piling) to eliminate the possibility of enhanced bank erosion.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
	HY-3 Groundwater encountered during construction will be temporarily stored onsite, tested, transported, treated, and disposed offsite. A dewatering permit will be obtained from the Los Angeles RWQCB. Based on results of the groundwater assessment and recommendations from the RWQCB, one of the following will be utilized for disposal of groundwater from the proposed dewatering operation: • Onsite treatment. This would entail designing and constructing a temporary water treatment plant for treating water generated from dewatering operations to reduce the concentrations of pollutants of concern below NPDES limits. • Treatment and disposal offsite. This would entail temporary storage of water on the project site, waste profiling, and then transporting the water to a regulated facility for treatment and disposal. • Disposal into local sewer system. This would entail disposal of the groundwater into the City of Los Angeles sewage treatment system, which is connected to the Terminal Island Treatment Plant. To dispose of groundwater into the City of Los Angeles sewer system, an Industrial Wastewater Discharge Permit is required, which is issued by the City of Los Angeles Department of Public Works, Bureau of Sanitation, Industrial Waste Management Division. To satisfy permit conditions, treatment of discharge water could be required.
OPERATIONS	No avoidance, minimization, and/or mitigation measures related to Hydrology, Floodplains, and Oceanography are proposed for project operations.
3.10 WATER QUALITY AND STORMWATER RUNOFF	
CONSTRUCTION Alternatives 1, 1A, 2, 3, and 4 Soil erosion from nearby bridge construction areas might allow surface runoff into the channel, resulting in solids transport and elevated levels of phosphates, TSS and TDS. Demolition of the existing Schuyler Heim Bridge could result in paint, rust debris, and particulate matter being deposited into the Cerritos Channel. Certain constituents, including copper, zinc, and a number of the organic compounds (PAHs), would be suspended in concentrations in excess of the WQC for a short time before being diluted. With the CIDH construction method for bridge support structures, holes for the support structures would be passively filled with groundwater, which would be removed prior to filling with slurry and concrete. The removed groundwater would then be disposed of properly.	See HY-1, HY-2, and HY-3, above.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
OPERATIONS Alternatives 1, 1A, 2, 3, and 4 Surface runoff effects from replacement bridge on the water quality of the Cerritos Channel are expected to vary depending on: • Incidental drippings from vehicles and accidental spills that introduce contaminant material, or waste discharge from the bridge and its approach structures • Bridge maintenance activities • Potential redirection of stormwater runoff • Surface runoff would flow into the Cerritos Channel and may include: • Particulates from pavement wear and vehicles • Metals such as zinc, lead, iron, copper, cadmium, chromium, nickel, and manganese • Bromide (from leaded gasoline exhaust) • Diesel fuel • Tire wear • Auto body rusting • Metal plating • Break lining wear • Greases and lubricating oils from automobiles and trucks • Trash discarded from vehicles • Pathogenic bacteria (indicators) from soil, litter, bird droppings, and stockyard waste hauled by vehicles on the new bridge	WQ-1 BMPs for surface runoff include construction of barriers at entry points to receiving waters to prevent large debris from entering the receiving water, and continuous monitoring of the new bridge structures for excessive buildup of debris that could be discharged in a precipitation event.
Alternatives 3, 5, and 6 Under Alternatives 3, 5, and 6, the existing Schuyler Heim Bridge would remain. (Under Alternatives 5 and 6, the bridge would continue to operate.) Low levels of pollutants from runoff from the bridge surface, painting of the steel truss members, and periodic introduction of paint material flaking from the bridge would continue.	WQ-2 Maintenance Activities. A Federal Highway Administration (FHWA) study concluded that most highway maintenance practices that could adversely affect water quality can be effectively minimized or reduced through readily available control practices or BMPs. An NCHRP report notes that fully enclosed containment structures are capable of recovering 85 to 90 percent of abrasives, paint particles, and dust for simple spans. However, this may not be feasible for bridges with high trusses or other complex structures. The following BMPs will be continued as related to ongoing maintenance for the existing Schuyler Heim Bridge: • Remove excess grease from moving parts of bridges manually and collect it for disposal. • Degrease prior to painting and hydro-blast to remove old paint with additive-free water, where possible. • Erect shrouds around working areas and suspend nets and tarps below bridges to catch debris from abrasive removal of old paint and over-spray from painting, where wind conditions permit. • Anchor tarps to barges below and enclose the bridge above to confine debris, where the bridge deck is not too far above water level.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
	• Use barges and booms to capture fugitive floating paint chips and custom-built enclosures to confine and capture abrasives, old paint chips, and paint. • Use vacuum or suction shrouds on blast heads to capture grit and old paint. • Carry out storing, mixing, and cleaning operations on land. • Keep all materials securely locked up, to avoid vandalism and accidental spills into the watercourse. • Schedule bridge maintenance to avoid egg incubation, juvenile rearing, and downstream migration periods of fish.
3.11 GEOLOGY/SOILS/SEISMICITY/ PALEONTOLOGY/ TOPOGRAPHY/MINERAL RESOURCES	
CONSTRUCTION Alternatives 1, 1A, 2, 3, and 4 Geology and Geologic Resources The project is located in an area of active faulting and historic ground shaking resulting from fault movement. Earthquakes could occur from movement on seven active, historically active, or potentially active faults ranging in distance of 85 km (53 mi) to 0.3 km (0.2 mi) from the project site.	The following avoidance and minimization measures would be incorporated into final project design: GEO-1 Design criteria, standards, and procedures contained in state and local jurisdiction standards and specifications (e.g., Uniform Building Code) would be applied during final design of the project, including earthquake-resistant standards to reduce potential effects from a major earthquake.
In addition, more than 80 percent of the project site is located in an area where historic occurrences of liquefaction, subsidence, and/or geological, geotechnical, and groundwater conditions indicate a potential for permanent ground displacement.	GEO-2 A geotechnical study would be completed for all areas associated with load-bearing features, and areas with potential for slope failure (e.g., trenches) and soil subsidence, and a geotechnical report would be prepared. The geotechnical report would include project-specific recommendations consistent with standards established by state and local jurisdictions. Geotechnical report recommendations would be incorporated into final project design.
	GEO-3 Monitoring during construction would be performed by a licensed geologist or engineer to verify construction occurs in compliance with features, standards, and practices included in final design to reduce potential effects from earthquake damage; slope and/or foundation instability; erosion, sedimentation, and flooding; land subsidence; and volcanic hazards.
Paleontology Excavation for bridge column footings and, at depths greater then 1.5 m (5 ft) below the current ground surface, any footing for elevated roadways, including on-ramps, off-ramps, and bridge approaches, would have a high potential for encountering fossil remains at previously unrecorded fossil sites and, therefore, could affect paleontologic resources if any such resources were encountered during construction.	PALEO-1 Implement Paleontological Resource Impact Mitigation Program which includes, but is not limited to, the tasks shown below. Additional detail is provided in the Paleontological Resources EIS/EIR Technical Section (Jones & Stokes, 2005). • Program will be directed by a paleontologist or paleontological consulting firm approved by Caltrans. • Conduct program in compliance with lead agency and professional society guidelines. • Develop and obtain museum storage agreement

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
	• Coordinate with construction contractor to provide information regarding lead agency requirements for the protection of Paleontological resources. • Conduct paleontological monitoring, as appropriate. • Treat any specimens collected in accordance with museum repository requirements. • Transfer any collected fossils to museum repository. • Maintain daily monitoring logs. • Prepare final report.
OPERATIONS	No avoidance, minimization, and/or mitigation measures related to Geology/Soils/Seismicity/ Paleontology/Topography/Mineral Resources are proposed for project operations.
3.12 HAZARDOUS WASTE/HAZARDOUS MATERIALS	
CONSTRUCTION Alternatives 1, 1A, and 4 Construction activities could encounter hazardous materials (and thereby have the potential for release of such materials) as a result of excavating subsurface soil, disturbing groundwater, or removing aboveground structures.	HAZ-1 Conduct a soil investigation prior to any soil excavation for the build alternatives (1 through 4). The investigation would assess the potential presence of hazardous contaminants and determine disposal options if necessary for the contaminated soil. The soil investigation could consist of an ADL investigation and investigation for other contaminants of concern due to effects from adjoining properties. Coordination with regulatory agencies will be made for soil investigation, sampling, and/or remediation.
	HAZ-2 Evaluate soil and groundwater information for the adjoining Sunshine Truck Stop, LA Refining Company, Texaco Refining, Texaco (1222 Anaheim Street), TCL (Pier S), Dow Chemical, and former Long Beach Naval Shipyard property to assess potential effects. If the review indicates evidence of contamination or a lack of sufficient data, a soil and groundwater investigation will be conducted, and further measures will be implemented, as necessary.
Alternatives 1, 1A, 2, and 4 Demolition of the existing bridge, which has the potential to contain regulated and/or potentially hazardous materials, including lead-based paint and asbestos, could result in the release of asbestos into the surrounding environment, where it could then enter the Cerritos Channel and adversely affect surface water quality.	HAZ-3 Inform demolition contractors of the potential presence of LBP in structures subject to demolition, and applicable Occupational Safety and Health Administration (OSHA) and other regulatory measures shall be adhered to in the demolition of such structures. If contamination is encountered during the construction process, implement appropriate health and safety measures to protect workers and the general public. Such measures may include engineering controls, requiring appropriate personal protective equipment, worker monitoring, and site-specific health and safety plans.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
	HAZ-4 A licensed professional will conduct a predemolition survey of the Schuyler Heim Bridge ACM and LBP. The purpose of the survey would be to determine the presence of regulated and/or potentially hazardous construction materials on the bridge. Any demolition activities that would remove or disturb these materials would implement measures in accordance with applicable regulations. As required by law, the abatement contractor shall be a licensed professional.
	HAZ-5 Conduct asbestos removal in conformance with Rule 1403 of the South Coast Air Quality Management District (AQMD) and EPA's National Emissions Standards for Hazardous Air Pollutants regulation.
	HAZ-6 Paint from the dismantled bridge sections would be chemically removed at a suitable offsite location in an upland area. This will be done to avoid the introduction of lead-based paint into the receiving waters. If paint removal is necessary during the dismantling process, the contractor would comply with all applicable laws and regulations relative to this process to ensure protection of receiving waters.
Alternative 2 Portions of the alignment of the SR-103 Extension overlie two former landfills. One of these, the Alameda Street Landfill, is proposed to be included in the National Priority List (NPL). If soil excavation at this landfill occurs during construction of the SR-103 Extension, hazardous waste could be encountered.	HAZ-7 Groundwater data for Alternative 2 currently are not available. However, considering the history and nature of activities conducted at some of the sites within the Alternative 2 right-of-way, it is recommended that a groundwater evaluation be conducted, to determine the measures necessary so as not to cause drag down of contamination during drilling/pile driving, migration of contamination, or create a conduit for migration of contamination, assess disposal alternatives for groundwater encountered during construction, and to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permitting process. If groundwater is found to be contaminated, it would be treated in place and/or transported for treatment and/or disposal at an appropriate facility, in accordance with applicable regulations.
	HAZ-8 If soil excavation is necessary in the vicinity of the two former landfills along the Alternative 2 alignment, a soil investigation will be conducted. If soil is found to be contaminated, it would be treated in place and/or excavated and transported for treatment and/or disposal at an appropriate facility, in accordance with applicable regulations. One of the former landfills, the Alameda Street Landfill, is proposed to be included in the National Priority List (NPL). Therefore, coordination with the Department of Toxic Substances Control (DTSC) would be made while evaluating the viability of Alternative 2.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
Alternative 3 Construction activities could encounter hazardous materials (and thereby have the potential for release of such materials) as a result of excavating subsurface soil, disturbing groundwater, or removing aboveground structures.	See HAZ-1 and HAZ-2, above.
	HAZ-9 During construction of the identified alternative, the contactor will be required to contact the Division of Oil and Gas for appropriate requirements if any wells are affected by project construction. Further, the contractor will be required to prepare workplans that will provide procedures for construction near idle, plugged, or abandoned wells that meet the requirements of the Division of Oil and Gas specifications. The work plans will be submitted for review and approval prior to implementation.
	HAZ-10 During construction of the identified alternative, the contractor will provide the Division of Oil and Gas with applicable building plans for review and approval. These documents will be prepared in accordance with the requirements outlined in the "Construction Project Site Review and Well Abandonment Procedure."
OPERATIONS Alternatives 3, 5, and 6 The Schuyler Heim Bridge would be retrofitted (Alternative 3, only) and remain in place and would require ongoing maintenance.	See WQ-2, above (Section 3.10, Water Quality and Stormwater Runoff).
3.13 AIR QUALITY	
CONSTRUCTION Alternatives 1, 1A, 2, 3, and 4 The direct sources of construction emissions would be from construction equipment exhaust or fugitive dust. Direct emissions of CO, NO_X, ROG, SO_X, and PM_{10} are predicted to exceed daily significance thresholds during construction. Impacts to sensitive receptors near construction areas would be inversely proportional to distance and would decrease with distance from the source. Construction laydown areas would be located as far from sensitive receptors as the project would allow.	The proposed action would be required to comply with control measures specified in SCAQMD Rule 403, Table 1. Measures for Fugitive PM_{10} / $PM_{2.5}$ AQ-1 Apply nontoxic soil stabilizers to all inactive construction areas (previously graded areas inactive for 10 days), and areas anticipated to be inactive for 10 days.
	AQ-2 Replace ground cover in disturbed areas as quickly as possible.
	AQ-3 Reduce traffic speed on all unpaved roads to 15 mph or less.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
Total Total emissions (direct plus indirect) of CO, NO_X, ROG, SO_X, and PM_{10} are predicted to exceed daily significance thresholds during project construction.	Measures for Exhaust Emissions of CO, ROG, NO_X and PM_{10} / $PM_{2.5}$ AQ-4 Develop and implement a trip reduction plan to achieve a 1.5 average vehicle ridership for construction employees.
	AQ-5 Implement a shuttle service for construction workers to and from retail services and food establishments during lunch hours.
	AQ-6 Prohibit truck idling in excess of 2 minutes. Employ periodic, unscheduled inspections to limit unnecessary idling. The SCAQMD has not quantified the efficiency of this mitigation measure.
	AQ-7 Suspend use of all construction equipment operations during second-stage smog alerts.
	AQ-8 Use electricity, if feasible, from power poles rather than temporary diesel- or gasoline-powered generators.
	AQ-9 Heavy Duty Truck Buyback Program The purpose of the buyback program would be to accelerate the modernizing of the heavy duty engine fleet operating in the South Coast Air Basin. By removing the older engines in the fleet and requiring replacement with newer, cleaner vehicles, a net reduction of NO_X emissions (and other combustion pollutants) would occur. This reduction would help offset marine vessel detour emissions. The protocols to be used would be consistent with the Carl Moyer Program, which is already being administered by the SCAQMD. However, this program is not available to projects such as Schuyler Heim Bridge Replacement and could not be used to actually implement this project's buy-back program. The Gateway Cities Diesel Fleet Modernization Program would be an example of a buyback program with similar reduction goals. Also, the POLA/POLB Clean Air Action Plan has a heavy duty truck buy back component. While participating in already existing programs might be preferable (and possible), it would not be necessary in order to accomplish heavy duty truck buy back. The heavy duty truck buy back could be done independently, though it would have to adhere to already accepted protocols (SCAQMD). A heavy duty truck buyback program would consist of three steps 1) identify target vehicles based on year of make; 2) provide incentives for operators to participate 3) establish a means to ensure that replacements meet the net improvement forecasted.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
	The construction phase of this project is where the greatest impact of increased emission levels occurs. Therefore, the buyback program would be designed to mitigate the NO_X emissions during that time. Based on recent buyback programs, the program for the proposed project would cost from $25,000 to $50,000 /ton of NO_X reduced. This cost can vary significantly and will continue to increase as time passes. The number of tons mitigated would be based on marine vessel detour NO_X emissions during construction. The rerouting of shipping vessels during project construction would amount to 132.8 lbs NO_X per day, which is equivalent to 24.2 tons NO_X per year. The indirect marine vessel emissions would be mitigated to a level that is below the SCAQMD significance threshold for construction emissions. It is estimated that each truck replacement would reduce an average of 0.55 tons per year of NO_X and 0.12 tons per year of PM. This is based on emission factors representative of current buyback programs such as the Gateway Cities Diesel Fleet Modernization Program. These emission reductions would continue for 3 to 5 years, depending on the year of the truck updated. This timeframe would exceed the duration of the project construction phase.
	AQ-10 To the extent feasible, utilize construction equipment equipped with Tier 2 or new engines.
	AQ-11 Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to ensure that construction equipment is properly maintained, tuned, and modified to established specifications.
	AQ-12 Prohibit tampering with engines, and require continuing adherence to manufacturer's recommendations.
The indirect source of construction emissions would be from marine vessels having to detour during construction. Emissions from marine vessels would exceed the SCAQMD NO_X threshold.	See AQ-9.
OPERATIONS Alternatives 1, 1A, 2, 3, and 4 Indirect emissions would result from marine vessel detours around Terminal Island during operation of the new bridge. Daily emissions of NO_X would exceed the SCAQMD threshold. Operation of the new bridge would result in a net increase in emissions greater than the SCAQMD thresholds for NO_X.	The increase in NO_X emissions due to marine vessel detours during project operation would be offset by the emissions reductions achieved by the truck buyback program implemented during project construction. See AQ-9. No additional avoidance, minimization, and/or mitigation measures are proposed for project operations.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
Alternatives 5 and 6	No avoidance, minimization, and/or mitigation measures are required.
ACTA's Finding as a result of the HRA Alternative 1, 1A ACTA finds that for Alternative 1, or 1A the project would have a significant impact on a number of residential receptors in the project vicinity Alternative 2 Alternative 2 would have a significant impact on a number of residential receptors as well as school workers and recreational users in the project vicinity.	Based on its conclusions as a Responsible Agency, ACTA will adopt AQ-13 as a condition of its approval for the proposed project. AQ-13 Retrofits of heating, ventilating and air conditioning (HVAC) units. New heating, ventilating, and air conditioning (HVAC) units, or retrofit of existing HVAC units, will be installed in schools and residences that have a significant increase in cancer risk as demonstrated by the HRA.
3.14 NOISE	
CONSTRUCTION Alternatives 1, 1A, and 3 Both the Anchorage Way Marinas and Leeward Bay Marina would be subject to substantial noise effects from pile driving construction activities. Pile driving activities for the Cerritos Channel are expected to last approximately 2 weeks (10 days) for each of the two stages of falsework pile driving. Falsework pile driving for the Consolidated Slip is expected to last less than 2 weeks (10 days). Alternatives 2 and 4 The Anchorage Way Marinas only would be subject to substantial noise effects from pile driving construction activities. Pile driving activities for the Cerritos Channel are expected to last approximately 2 weeks (10 days) for each of the two stages of falsework pile driving.	N-1 Construction noise monitoring and control plans consistent with local noise ordinances will be prepared by a qualified acoustical engineer who is a current member of the Institute of Noise Control Engineering (INCE), and has 5 years of experience performing construction noise analyses. If mitigation is warranted, potential measures, such as screening, noise blankets, etc., would be evaluated for their effectiveness, and appropriate measures would be implemented. N-2 During project construction, pile driving will occur during daylight hours only. N-3 Residents identified as being impacted by noise from pile driving in Cerritos Channel or Consolidated Slip may obtain hotel vouchers for a local hotel so they can temporarily move. This mitigation measure would apply only during the time that pile driving is being conducted in the Cerritos Channel or Consolidated Slip. Some residents may, however, choose to stay and tolerate the noise. No other mitigation or compensation measure would be provided to residents.
OPERATIONS Alternatives 1, 1A, 3 Leeward Bay Marina The peak-hour traffic noise levels would increase by between 1 and 10 dBA over existing conditions. Without abatement, the predicted loudest hourly noise levels would range from 61 to 67 dBA Leq(h). This alternative would result in noise levels at some locations that would approach the applicable Noise Abatement Criteria (NAC) for residential areas.	N-4 Leeward Bay Marina Caltrans and FHWA will incorporate noise abatement in the form of a barrier along the SR-47 Expressway, with an approximate length of 239 m (785 ft) and an average height of 2.44 m (8 ft). The barrier will abate future traffic noise levels by 5 to 7 dBA at 65 benefited noise-sensitive receivers. Preliminary reasonableness calculations indicate the estimated barrier cost would be approximately $23,400 per benefited residence, which is within the allowance per residence of $50,000 to $54,000.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
Wilmington Neighborhood The peak-hour traffic noise levels would increase from 5 to 13 dBA over existing conditions. Without abatement, the predicted loudest hourly noise levels would range from 61 to 69 dBA Leq(h). This alternative would result in noise levels at some locations that would exceed the applicable NAC for residential areas.	N-5 Wilmington Neighborhood For the Wilmington neighborhood, a barrier along the SR-47 Expressway and another on ground level along Alameda Street, with an approximate combined length of 1,405 m (4,610 ft) and height of 3.66 m (12 ft) to 5.49 m (18 ft) would be constructed to abate future traffic noise levels by 5 to 7 dBA at 56 benefited noise sensitive receivers. Preliminary reasonableness calculations indicate that the estimated barrier cost would be approximately $37,500 per benefited residence, which is within the allowance per residence of $48,000.
Alternative 2 Long Beach Neighborhood/SR-103 Extension The loudest hourly traffic noise level would either decrease by 1 to 4 dBA, increase by 1 to 2 dBA, or equal existing conditions. Without abatement, the predicted peak-hour noise levels at this location would range from 62 to 72 dBA Leq(h) and would exceed the applicable NAC at many locations within this residential receiver area.	N-6 Long Beach Neighborhood/SR-103 Extension Caltrans and FHWA will incorporate noise abatement in the form of two barriers along SR-103 with an approximate combined length of 835 m (2,740 ft) to abate traffic noise levels. The two barriers would be 3.66 m (12 ft) high, although the barrier section along the northbound off-ramp would be 4.57 m (15 ft) high. The barriers would reduce noise levels by 5 to 14 dBA for 27 equivalent frontage units. Preliminary reasonableness calculations indicate that the barriers would cost approximately $37,100 per benefited unit, which is below the allowance per residence of $44,000 to $52,000. The locations of the noise barriers are based on preliminary engineering plans and, as such, are considered to be approximate. The exact locations of these barriers would be determined during final design based on safety, engineering, and feasibility.
Alternative 4 Anchorage Way Marinas The loudest hourly noise levels would decrease by 1 to 5 dBA. As a result, the loudest hourly noise levels would approach or meet the applicable NAC.	Under Alternative 4, no avoidance, minimization, and/or mitigation measures are proposed for project operations.
Alternatives 5 and 6 Anchorage Way Marinas The loudest hourly noise levels would increase by 4 dBA due to an increase in traffic volume. This would not be a substantial increase, but all receiver locations would exceed the applicable NAC. Wilmington Neighborhood The loudest hourly noise levels would increase by 7 to 9 dBA due to an increase in traffic volume. This would not be a substantial increase, but several areas would approach, equal, or exceed the applicable NAC. Long Beach Neighborhood/SR-103 Extension The loudest hourly noise level would either equal the existing condition or increase by 1 or 2 dBA due to an increase in traffic volume. This is not a substantial increase, but a number of areas would either approach or exceed the applicable NAC.	Under Alternatives 5 and 6, no avoidance, minimization, and/or mitigation measures are proposed for project operations.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
3.15 ENERGY	No avoidance, minimization, and/or mitigation measures related to Energy are proposed.
3.16 BIOLOGICAL RESOURCES	
CONSTRUCTION Alternatives 1, 1A, 2, and 4 Wetlands east of the Schuyler Heim Bridge and along SR-103 could be affected by construction activities.	B-1 Wetland Avoidance To avoid the wetlands present to the east of the Schuyler Heim Bridge along the low tidal terrace on Cerritos Channel, and along SR-103 near Gabriel Street, construction staging, traffic, and vehicle access would be excluded from these areas to the extent feasible. Caution fencing would be installed to protect the small wetlands, and construction activities would be modified to avoid the areas. This measure also will be implemented, as necessary, to avoid adverse effects to jurisdictional waters.
Alternatives 1, 1A, 2, 3, and 4 Resuspension of fine-grained bottom sediments would occur during the replacement, including demolition (and retrofit under Alternative 3) of the Schuyler Heim Bridge in the Cerritos Channel, placement of bridge footings in the Consolidated Slip/Dominguez Channel, and other construction activities at either site. The harbor sediments in the area of the bridges are primarily silt and finer-sized fractions and, if resuspended, are expected to stay in suspension for days, resulting in exceedances of water quality standards that may last at least a few days. This relatively limited time of resuspended constituents in the water column indicates the potential for acute toxicity to invertebrates or fish but not chronic bioaccumulation or food-chain effects to birds or mammals. The Schuyler Heim Bridge is assumed to contain lead compounds, which could cause a significant adverse effect to the channel water quality during paint removal activities or demolition. Bridge pile-driving and related activities can be expected to result in elevated underwater sound levels on aquatic habitats and Essential Fish Habitat (EFH). Pile-driving may also potentially affect pinnipeds that may be within the vicinity during operations.	B-2 Protecting Aquatic Communities (including Essential Fish Habitat, Coastal Pelagic Species, Groundfish) Sediment resuspension would be minimized by adherence to the CIDH or CISS design of all in-water piles, whereby the outer shell would act as a coffer dam during construction and contain resuspended sediment onsite until it is removed from within the shell prior to concrete pile installation. Measures that would be implemented during construction (including retrofit [Alternative 3 only], demolition, and/or new bridge installation) to minimize sediment resuspension effects include: • Channel bank work would include bank protection (riprap, concrete walls) to eliminate the possibility of enhanced bank erosion. To reduce effects to channel water quality from lead compounds in paint during removal or during bridge demolition, the following measures in some combination would be implemented: • Erect shrouds around working areas and suspending nets and tarps below bridges to catch debris from abrasive removal of old paint, where wind conditions permit. • Anchor tarps to barges below and enclose the bridge above to confine debris, where the bridge deck is not too far above water level. • Use barges and booms to capture fugitive floating paint chips and custom-built enclosures to confine and capture the abrasives, old paint chips, and paint. • Use vacuum or suction shrouds on blast heads to capture grit and old paint. • Perform lead-based paint removal offsite following demolition of steel members. To reduce the effects of elevated underwater and terrestrial sound levels on aquatic habitats and EFH during construction from bridge pile driving and related activities, the following measures would be implemented:

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
	• Attenuation of pile driving sound would be developed during the PS&E stage; this is likely to include a contained air bubble curtain on larger pile installations and dewatering casings for smaller piles. Performance criteria for sound attenuation would be developed to achieve maximum practicable reductions in underwater sound levels. • A hydroacoustic monitoring plan would be developed, which would include appropriate sampling point locations, frequency, and methodology to be implemented during pile driving. The results of the hydroacoustic monitoring would be analyzed real time to identify appropriate safety isopleths and monitoring zones for sensitive resources. • Evaluate potential to modify pile driving operational procedures to reduce noise effects, such as ramping up of pile driving energy levels to allow mobile organisms to exit the area; evaluating potential use of vibratory versus impact hammers under certain conditions; using less force of the hydraulic impact hammer; and limiting pile driving to no more than 2 piles a day, with a minimum 12 hours interval between daily driving, to minimize cumulative exposure levels (SEL). • Evaluate potential for seasonal or daily time constraints, such as pile driving during a time of year when larval and juvenile stages of fish species with designated EFH are not present, driving piles during low tide periods when located in intertidal and shallow subtidal areas, and driving piles when the current is reduced (i.e., centered around slack current) in areas of strong current. To reduce and/or avoid potential impacts of elevated underwater sound levels on marine mammals during construction from pile driving the following additional measures would be implemented: • A detailed marine mammal monitoring/protection plan would be developed in coordination with NMFS; this would include use of biological monitors with authority to suspend pile driving activities should sensitive organisms be present or enter the area. Details of the plan would be developed, and would include methods to identify safety zone limits, numbers and locations of monitors, and conditions when pile driving would be suspended to protect resources.
Construction could result in the removal of southern tarplant and other special-status species, if present on the project site.	B-3 Protecting Special-Status Plant Species Preconstruction surveys for southern tarplant would be conducted prior to construction. Surveys would be conducted during the blooming period for this plant, between June and October. If identified on site: • The feasibility of avoiding areas that support the species would be evaluated and, if feasible, the area would be avoided during construction. • If avoidance is infeasible, then mitigation would be required (see Mitigation Measure B-13).

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
The loss of active roosts of bat species (pallid bat; long-legged myotis; long-eared myotis; Yuma myotis; western mastiff bat; pocketed free-tailed bat; and big free-tailed bat) as a result of bridge removal would represent an adverse effect.	B-4 Protecting Special-Status Bat Species Avoidance and minimization measures apply to the following species: pallid bat; long-legged myotis; long-eared myotis; Yuma myotis; western mastiff bat; pocketed free-tailed bat; big free-tailed bat. To avoid or minimize effects to these species, the following measures would be employed by ACTA (or their designee) relative to bridge or highway deconstruction or, under Alternative 3, seismic retrofit: • Four quarterly bat surveys would be conducted in the 12 months prior to start of construction to determine the presence or absence of the species, as determined appropriate by a qualified biologist. Surveys may include, but are not limited to the following: – Exit surveys of potential roost sites conducted by survey biologists stationed around the bridge or highway with binoculars and echolocation meters at nightfall – Surveys of all accessible potential roost sites on the bridge conducted by biologists permitted by CDFG for bat survey and handling • In the event any of the above special-status bat species are identified during field surveys, the following would be conducted: – Exclusion of active roost sites by appropriate barriers, installed during the nonbreeding season from September to March – Taking appropriate steps to exclude roosts when vacant during nighttime foraging periods when identified during construction – If the exclusion measures above fail, delay of construction where maternity roosts are encountered, until after the young have weaned and are in flight • Education of construction workers to identify potential roost sites, to avoid activity when identified, and to advise biological monitors when roosts are encountered.
Some noise and construction activity may affect bird nests within 456 m (1,500 ft) of the project site.	B-5 Protecting Bird Nests and Eggs Preconstruction surveys to identify potential nest sites for birds will be conducted by ACTA (or their designee) within all construction areas on the bridge prior to the nesting season. Potential nest sites will be passively excluded with bird spikes, plywood, or other means, as necessary. An onsite biological monitor will be present during construction activities to ensure that nests are not established within the construction zone, and to implement passive exclusion as necessary.
Some noise and construction activity may affect least tern nesting colonies within 456 m (1,500 ft) of the project site. The breeding activities of California least tern, if present, also could be disrupted.	B-6 Protecting California Least Tern Prior to construction, potential breeding habitat for least tern in the vicinity of the build alternatives (Alternatives 1 through 4) would be surveyed for the presence of least tern during the April 15 to September 15 survey period for nesting birds. If they are found to be present, the avoidance and minimization measures determined through consultation with the USFWS will be adhered to.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
Removal and replacement of the Schuyler Heim Bridge with a concrete fixed bridge would result in the loss of a known nest site for a breeding pair of peregrine falcons.	B-7 Protecting American Peregrine Falcon • Historical nesting sites on the Schuyler Heim Bridge would be made unsuitable prior to the nesting season (January 15 to July 30) to avoid direct effects to individuals or an active nest site during construction. This may include positioning exclusion materials, such as plywood, on these nest sites prior to the nesting season to render the sites unsuitable. • Site monitoring during the construction period would be conducted to observe the pair's movements and document its activities. This may assist in identifying nesting attempts by the pair on adjacent structures or within the construction zone. If this occurs, and the nest site is at risk or could be at risk during the nesting season, the site can be excluded. This includes risk from egg loss which may occur on a less than optimal nest site. If the nesting attempt site is not anticipated to be at direct risk from construction disturbance during the upcoming nesting season, then the pair will be allowed to nest, and nesting success will be monitored. • Efforts will be made to coordinate the construction schedule of the Schuyler Heim Bridge with the construction schedule of the future Gerald Desmond Bridge replacement project. If these two schedules do not overlap, then the Gerald Desmond Bridge may provide a nesting location for one peregrine pair to breed at the Schuyler Heim/Desmond bridge complex, which has generally been the case in past years. Coordination meetings with the Gerald Desmond Bridge project team are ongoing.
Some noise may occur during construction that could affect areas within 152 m (500 ft) of the project site; this may disrupt breeding activities for burrowing owl, if present.	B-8 Protecting Burrowing Owl To avoid effects on burrowing owls, preconstruction surveys of potential breeding sites would be conducted onsite within 152 m (500 ft) of construction activities. Burrowing owl individuals present within the construction area would be flushed from active burrows during the non-nesting season (August to January) and burrows excluded. These activities would be conducted in a manner consistent with the *Burrowing Owl Survey Protocol and Mitigation Guidelines*, prepared by The California Burrowing Owl Consortium in 1997. Exclusions would require maintenance and monitoring to assure that individuals do not return. If breeding birds are present, then mitigation would be implemented (see Mitigation Measure B-14).
Construction trucks and heavy equipment may introduce or transport seeds from non-native terrestrial vegetation, resulting in colonization of existing or newly created vacant spaces with exotic vegetation.	B-9 Protecting Against Invasive Species Caltrans and/or its contractors will implement the following measures to avoid the introduction or spread of noxious weeds into previously uninfested areas: • Educate construction supervisors and managers on weed identification and the importance of controlling and preventing the spread of noxious weed infestations. • Clean construction equipment at designated wash stations before entering the construction area. • Landscaping and erosion control included in the project would not use species listed as noxious weeds. • Seed all disturbed areas with certified weed-free native mixes. Use only certified weed-free straw or rice mulch in uplands only.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
	• Conduct a follow-up inventory of the construction area during the first spring following the completion of construction to verify that construction activities have not resulted in the introduction of new noxious weed infestations. • If new noxious weed infestations are located during the follow-up inventory, the appropriate resource agency will be contacted to determine the appropriate species-specific treatment methods.
OPERATIONS Alternatives 1, 1A, 2, and 4 Birds could be injured by coming into contact with transmission lines or energized parts of the transmission lines/towers.	B-10 Protecting Avian Species at Transmission Towers To protect against operational impacts to birds moving about or utilizing new transmission towers, construction design standards for avian protection will be followed, including use of visual line enhancers and adequate spacing between energized parts. No lighting will be associated with new transmission towers. Design standards for avian protection will be developed from the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and USFWS *Avian Protection Plan Guidelines* (APLIC and USFWS, 2005), APLIC's *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (APLIC, 1996), or APLIC's *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994* (APLIC, 1994).
The project would result in the removal of one known peregrine falcon nesting location on the Schuyler Heim Bridge, in a territory that typically supports one pair but contains two alternate nesting locations.	B-12 Mitigating for Loss of Peregrine Falcon Nest This measure may include the following, as appropriate, pending coordination with CDFG: • Create a new nest site by placing a nesting box (and potential additional support material) on a tower of the Badger Avenue Bridge or other elevated structure, as determined by a qualified biologist. Because the Badger Avenue Bridge is located adjacent to the Schuyler Heim Bridge, and is approximately the same height, there is the potential that it could provide a suitable vantage point and nesting location to peregrine falcons. The peregrine pair has never nested on this bridge in the past but this may be due to an absence of suitable nesting platforms and substrate. Further evaluation of any design changes or nesting ledge installations by a qualified peregrine expert would be conducted. • Offsite mitigation. The goal of the offsite mitigation would be to augment existing peregrine populations. This could be accomplished by purchasing approximately 10 nestling peregrines from a captive breeding facility and have those young released (hacked) in an area of California where, when they disperse, they will possibly create a new nesting pair. • The local peregrine falcon population (approximately five pairs) would be monitored for 2 years. The pair located on the Schuyler Heim Bridge would be monitored to determine if they nest on the Badger Bridge, or if they integrate into other territories by filling a vacancy in another pair, or by usurping existing individuals in a pair. If offsite mitigation is conducted, hacked peregrine falcons would be monitored to determine their fate and if a new nesting pair is established. An experienced peregrine falcon biologist would conduct monitoring of the hacked peregrine falcons.

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
Construction could result in the removal of southern tarplant and other special-status species, if present on the project site.	B-13 Mitigating Loss of Special Status Plant Species Surveys for special-status plant species shall be conducted during flowering season prior to construction, at the PS&E stage. If special-status plant species are found and cannot be avoided during project construction, then seed and/or propagules of the species would be collected and replanted at an alternative location. These activities will be conducted in coordination with the resource agencies. – Mitigation measures would be refined in coordination with the resource agencies and standard practices for this species. Measures may include the following: Areas determined to have appropriate hydrology and soil chemistry (salinity) shall be reseeded with seed collected from populations of southern tarplant. Southern tarplant is restricted to saline, vernally mesic areas, often along the margins of estuaries or areas of high salinity. – Prior to construction, southern tarplant and/or other special-status plant seed shall be collected by personnel experienced in collection of native seeds. Seed collection shall be conducted during successive years from September through December. One-half of the first year's collected seed shall be hand-broadcast at the reintroduction site with the remaining one-half stored in appropriate conditions for introduction the following year. Seed collected during the second season shall be stored for potential later use in the event that success standards are not met following the seeding during years one and two. – Because southern tarplant is an annual species, population numbers are expected to naturally fluctuate from year to year depending upon environmental conditions. Reseeded areas shall be monitored for three years following the initial seeding. Establishment shall be considered successful if plant densities during any of the three years of monitoring are comparable to densities of the impacted populations based on sampling quadrants. If established populations do not achieve comparable densities of impacted populations, additional reintroduction sites shall be identified and stored seed, obtained during the collection period, shall be introduced into additional sites over a two-year period (as in the initial reintroduction program described above).
Some noise may occur during construction that could affect areas within 152 m (500 ft) of the project site; this may disrupt breeding activities for burrowing owl, if present.	B-14 Mitigating for Burrowing Owl If flushing of individual birds and exclusions of burrows fail, construction activities would be delayed within 152 m (500 ft) of nest sites until after the breeding season for these species (February to July).

Table S-1
Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures

Environmental Resource/Impacts	Avoidance, Minimization, and Mitigation Measures*
Alternative 3 A small (about 1/4-acre) wetland is present within the footprint of Alternative 3, along the south bank of Cerritos Channel, just east of the existing Schuyler Heim Bridge. This wetland is likely to be removed under Alternative 3, as the proposed bridge alignment is directly in line with the wetland location.	B-15 Mitigating Loss of Wetland Under Section 404 of the Clean Water Act, a permit would be required from USACE prior to impacting waters of the U.S., including wetlands: • This is anticipated to be achieved through the Nationwide Permit system. • Compliance to permit conditions would be required. • The permit is likely to require implementation of mitigation to offset effects to waters of the U.S., including wetlands. This may include creation of offsite wetlands, or payment of fees into existing mitigation banks. Complying with these mitigation measures contained in the permit, once acquired, would provide mitigation for the effect.
OPERATIONS	No avoidance, minimization, and/or mitigation measures related to Biological Resources are proposed for project operations.

Table S-2
Agency Actions, Permits, and Approvals Needed

Agency	Role	Action	Comment
Federal			
Federal Highway Administration	Responsible Agency	Project funding; Compliance with Executive Order 1190 re: protection of wetlands; Compliance with Uniform Relocations and Assistance Act	
National Marine Fisheries Service	Responsible Agency	Consultation re: Essential Fish Habitat; Incidental Harassment Authorization (IHA)	IHA may be required for project construction effects on harbor seal and California sea lion.
U.S. Army Corps of Engineers	Responsible Agency	Section 404 Permit (Clean Water Act); Section 10 Permit (Rivers and Harbors Appropriations Act)	
U.S. Coast Guard	Cooperating Agency	Bridge Permit (Section 9, Rivers and Harbors Appropriations Act)	
U.S. Fish and Wildlife Service	Responsible Agency	Endangered species permitting	
State			
California Coastal Commission	Responsible Agency	Coastal Development Permit	Required only if the local Coastal Development Permits are appealed.
California Department of Fish and Game	Responsible Agency	Streambed Alteration Agreement (Section 1600, Fish and Game Code); Endangered Species Permitting (as applicable)	Applicable endangered species: Peregrine falcon; bats
California Department of Transportation	Lead Agency	EIS/EIR Approval	
California Transportation Commission	Responsible Agency	Approval authority for funding and route adoption	
State Historic Preservation Officer	Responsible Agency	Consultation; Approval per Section 106 (National Historic Preservation Act)	
Department of Toxic Substances Control	Responsible Agency	Consultation; Approval for landfill excavation (Alternative 2 only)	Soil excavation along portions of the Alternative 2 alignment could encounter hazardous waste, which would require oversight by the Department of Toxic Substances Control to ensure safe management and disposal of the waste.

Table S-2
Agency Actions, Permits, and Approvals Needed

Agency	Role	Action	Comment
Regional			
Regional Water Quality Control Board	Responsible Agency	Section 401 Water Quality Certification (Clean Water Act); Section 402 National Pollutant Discharge Elimination System [NPDES] Permit (Clean Water Act); Report of Waste Discharge	
South Coast Air Quality Management District	Responsible Agency	Clean Air Act compliance.	
Local			
Alameda Corridor Transportation Authority	Project Applicant	Project funding	
California Department of Transportation	Responsible for permitting within its jurisdiction	Encroachment permits	
City of Long Beach	Responsible for permitting within its jurisdiction	Discretionary approvals	
City of Los Angeles	Responsible for permitting within its jurisdiction	Discretionary approvals; Encroachment permits	
City of Los Angeles, Bureau of Engineering	Responsible for permitting within its jurisdiction	Coastal Development Permit	
City of Los Angeles, Fire Department	Responsible for permitting within its jurisdiction	Permits for storage and use of flammable hazardous materials (explosives)	
County of Los Angeles, Department of Public Works, Flood Control District	Responsible for permitting within its jurisdiction	Encroachment permits	Specific to work in the Dominguez Channel
Port of Long Beach	Responsible Agency	Harbor Development Permit; Coastal Development Permit	
Port of Los Angeles	Responsible Agency	Application for Development Project; Coastal Development Permit	

Chapter 1.0 Project Purpose and Need

1.1 Introduction

The Ports of Long Beach and Los Angeles form the largest port complex in the United States, based on container cargo volume, with the greatest cargo volume coming from international trade. The majority of this cargo must traverse over one of the three bridges that connect Terminal Island to the mainland on its way to or from the ports. The three bridges are the Commodore Schuyler F. Heim Bridge (Schuyler Heim Bridge), which runs north and south and connects the island to the Los Angeles community of Wilmington; the Gerald Desmond Bridge within the Port of Long Beach (POLB) on the east side of Terminal Island; and the Vincent Thomas Bridge within the Port of Los Angeles (POLA) on the west side of Terminal Island.

The existing Schuyler Heim Bridge is a steel, vertical-lift bridge that spans the Cerritos Channel. It is a popular route for vehicular traffic because the bridge's sustained longitudinal grades are relatively short and low. The bridge has become a vital transportation link between the POLA/POLB and the mainland.

In order to maintain this link and to facilitate the continued movement of goods (cargo) to and from the ports, it is proposed to provide a seismically safe vehicular connection along the critical north-south corridor between Terminal Island and the mainland (bridge). This connection currently is provided by the Schuyler Heim Bridge. A limited access, high-capacity alternative route (expressway) for traffic between Terminal Island and Interstate (I-) 405 is also proposed to meet traffic needs for the corridor.

The project study area addressed in this Final Environmental Impact Statement/ Environmental Impact Report (Final EIS/EIR) lies between I-710 on the east, I-110 on the west, State Route (SR)-91 on the north, and Ocean Boulevard on the south (see Figure 1-1). As shown, the Schuyler Heim Bridge is located within the City and Port of Long Beach. The proposed expressway would be located in the City and Port of Los Angeles (Alternatives 1 and 3) or in the Cities of Los Angeles, Long Beach, and Carson, and the Ports of Los Angeles and Long Beach (Alternative 2).

The proposed Schuyler Heim Bridge Replacement and SR-47 Expressway Project is subject to the transportation conformity requirement, as well as National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) evaluation. The proposed Schuyler Heim Bridge Replacement and SR-47 Expressway (Project ID: LA0D45) is included in the final Southern California Association of Governments (SCAG) 2008 Regional Transportation Improvement Program (RTIP) that was adopted in July 2008 and the conforming 2008 Regional Transportation Plan (RTP).

1.2 Purpose and Need for the Project

1.2.1 Project Purpose

The purpose of the proposed project is to:

- Provide a structurally and seismically safe vehicular connection along the critical north-south corridor between Terminal Island and the mainland that can remain in service following a major earthquake to ensure that ground and vessel transportation are maintained
- Improve operational and safety design features of the crossing to facilitate the movement of people, freight, and goods, while meeting current design standards to the maximum extent feasible

The purpose of the proposed project is also to provide a high-capacity alternative route for traffic between Terminal Island and I-405 that would:

- Reduce traffic congestion on local surface streets (between Terminal Island and Pacific Coast Highway), as well as on I-110 and I-710
- Improve safety by providing a limited-access route between Terminal Island and I-405 that would:
  - By-pass at-grade railroad crossings and signalized intersections
  - Connect the Schuyler Heim Bridge with an emergency service route that would facilitate movement to and from the ports following a major earthquake

This high-capacity link would allow traffic to continue northward along Alameda Street, or SR-103, and provide essential north-south connectivity with the regional freeway system (I-405 and SR-91) for the movement of people and goods to and from the ports.

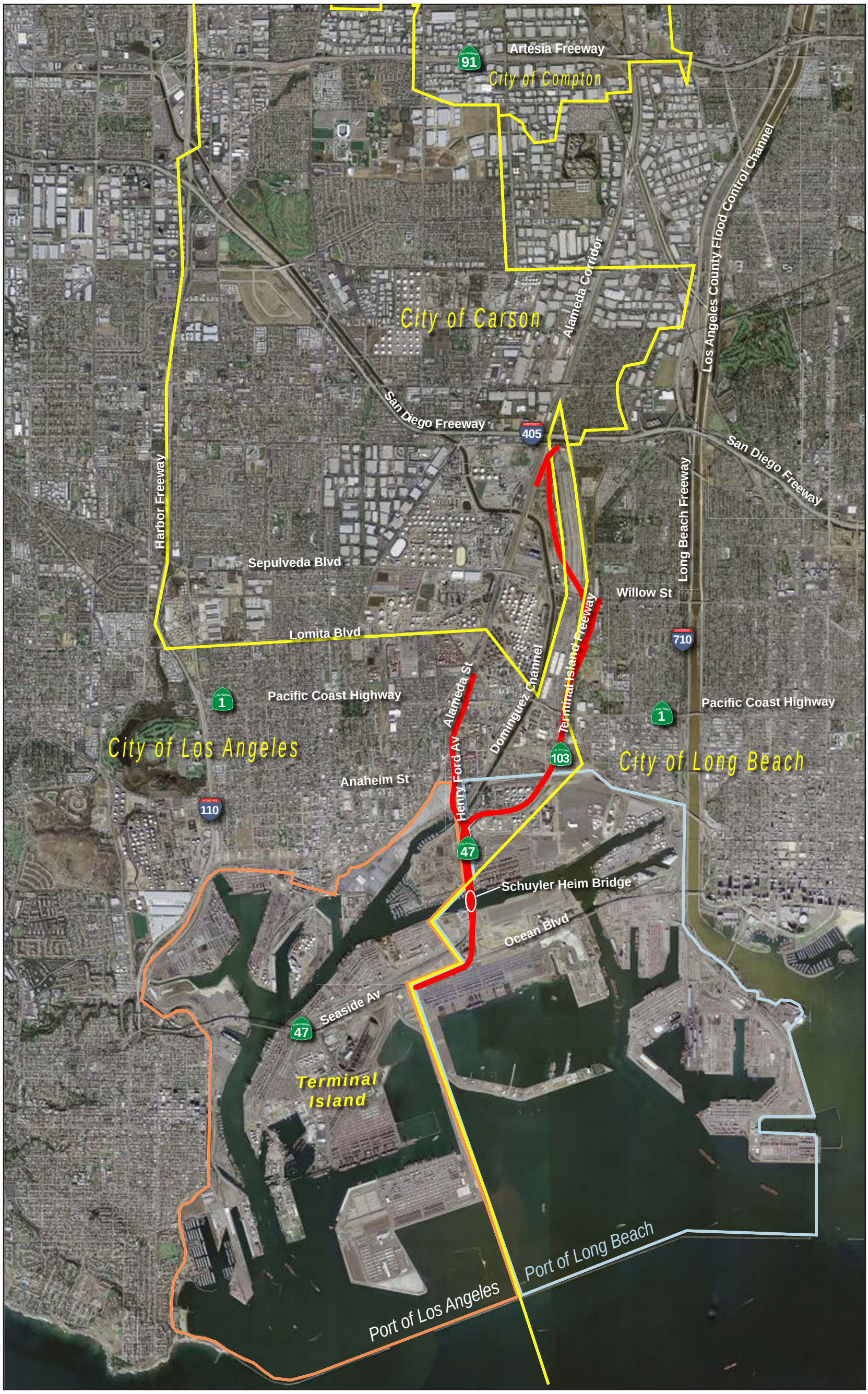
1.2.2 Need for the Project

1.2.2.1 Schuyler Heim Bridge

1.2.2.1.1 Seismic and Structural Deficiency

1.2.2.1.1.1 Seismic Deficiency

The Schuyler Heim Bridge is located within the Los Angeles Basin, which is an area of high seismic activity. The Northridge (1994, Magnitude [M] 6.7), Whittier Narrows (1987, M 5.8), San Fernando/Sylmar (1971, M 6.6) and Long Beach (1933, M 6.3) earthquakes are some of the larger earthquakes that have occurred in the region in recent memory. In addition, numerous fault lines occur in the area and have the potential to release earthquakes, some of which could affect the Schuyler Heim Bridge. Among these is the Palos Verdes Fault, which is located approximately 2.7 kilometers (km) (1.7 miles [mi]) from the bridge and is believed to be capable of an M 7.3 earthquake.



LEGEND:

- City Boundary
- Proposed Project Alignment
- Port of Los Angeles Boundary
- Port of Long Beach Boundary

No Scale

Source: U.S.G.S. Aerial Map Service,
Los Angeles Harbor Department, 2004

Figure 1-1
Study Area
Schuyler Heim Bridge Replacement and
SR-47 Expressway

After the 1994 Northridge quake, Caltrans determined that the Schuyler Heim Bridge was in need of a seismic retrofit (it was designed to meet 1946 standards). Subsequently, Caltrans identified the Schuyler Heim Bridge as one of three seismic retrofit projects requiring replacement of existing major bridge structures (Caltrans, 2005). Currently, the approaches of the bridge are being retrofitted to address seismic deficiencies. However, this is not a full seismic retrofit of the bridge; it is limited to the bridge approaches. Even after the approaches are retrofitted, the entire bridge extent would still be deficient and would not meet the purpose and need of the proposed project. In particular, even after the approaches are retrofitted, the bridge still has deficiencies as follows.

The timber piles supporting the approach structures at a number of bents were lacking adequate axial capacity to support the weight of the structure in the presence of earthquake-induced forces. Column footings lack adequate reinforcement to resist the demands from column moments. The bolts connecting the rocker bearings to the bent caps are likely to shear off, causing the bent caps to fall off their supports

The truss structures and lift span (three spans over the Cerritos Channel) were found to have several deficient members. The bottom lateral members, as well as the bearings of the truss spans, are likely to fail. For the lift span, failure was likely in the in the tower legs, transverse and longitudinal x-bracings, and tower anchorages to the piers.

In addition, FHWA and Caltrans have documented that the existing Schuyler Heim Bridge does not conform to current seismic criteria (Caltrans, 2002). Using the Caltrans 1996 Seismic Hazard Map, peak bedrock acceleration at the site is estimated to be 0.6 g[1]. However, it has been determined that, due to the ongoing deterioration of the bridge, it would only require a seismic event with a bedrock acceleration of 0.3 g to cause collapse of the main bridge spans and approaches. Without additional seismic safety improvements, it is likely that damage to the bridge would be so severe that it could not be reopened to traffic after a seismic event that resulted in peak bedrock acceleration larger than 0.3g. The Palos Verdes fault is capable of generating an earthquake with 0.7 peak bedrock acceleration (PBA) at the Schuyler Heim Bridge.

This seismic deficiency presents a major concern for the bridge. The bridge provides a critical connection between Terminal Island and the mainland and is crucial to providing emergency access to and from the island following a major earthquake. Such access would be needed to:

- Provide for emergency relief access to and from the island
- Maintain a connection for the critical movement of people, freight, and goods

The seismic deficiencies described above indicate that the bridge is not currently able to provide such access.

1.2.2.1.1.2 Structural Deficiency

The June 2003 Caltrans *Structure Inventory and Appraisal Report* classified the bridge as structurally obsolete and determined that the bridge had a consistently dropping sufficiency

[1] Bedrock acceleration is the horizontal movement of the earth (the solid rock below the soil surface) caused by an earthquake. Its magnitude is measured in terms of (g), the acceleration due to gravity, which represents the force with which the earth moves (e.g., 0.1 g is the acceleration equal to 10 percent of the force of gravity).

rating, which was 40.9 at the time of the 2003 report. Bridges with sufficiency ratings lower than 80 are considered "structurally deficient" and "functionally obsolete." Bridges with ratings less than 50 qualify for federal aid replacement under the Highway Bridge Replacement and Rehabilitation (HBRR) program.

When a bridge is structurally deficient, it means that the bridge is in relatively poor condition or has insufficient load-carrying capacity, due either to deficiencies in the original design or as a result of deterioration. When a bridge is functionally obsolete, it means that it is narrow, has inadequate under-clearances, has insufficient load-carrying capacity, is poorly aligned with the roadway, and/or can no longer adequately service modern traffic.

For the Schuyler Heim Bridge, the low sufficiency rating is the result of:

- The poor condition of the paint on the superstructure and lift-span portion of the bridge
- The need for frequent replacement of the open-grid decking on the lift span
- The low safety factor and poor condition of the lift cables for the lift span
- Section loss in the lift-span tower interior members
- The poor condition of the concrete deck of the approach spans
- The poor condition of the approach columns and foundations
- The substandard lane widths, bridge rails, and shoulder widths

1.2.2.1.2 Operational and Safety Design Issues

1.2.2.1.2.1 Operational and Safety Design Standards

As mentioned above, the existing bridge is considered to be functionally obsolete. It has substandard lane widths (generally 3.3 m [10.8 ft]), bridge rails, and shoulder widths (generally 1.5 m [3.8 ft], although in some places there is no shoulder). Because the bridge is utilized by a large number of heavy trucks, there is a need to provide a structure with standard lane widths that can better accommodate larger vehicles. In addition, there is a need to provide a standard shoulder in each direction so that disabled vehicles (due to accident or mechanical failure) can more easily be removed from the travel lanes.

Another safety concern results from the fact that traffic approaching the bridge must stop when the bridge is raised to allow boats to pass underneath. This creates the potential for accidents and results in a need to improve safety for vehicles as they approach the bridge. The proposed replacement will be a fixed-span bridge that will eliminate the raising and lowering condition that impedes vehicular traffic.

1.2.2.1.2.2 Delays to the Movement of People, Freight, and Goods

Currently, truck and other vehicular traffic utilizing the Schuyler Heim Bridge are subject to delays when tall marine vessels request passage and the vertical-lift span is raised to accommodate their movement under the bridge. At such times, traffic backups occur on both the bridge and at the on-ramps on either side of the Cerritos Channel (at New Dock Street and Henry Ford Avenue). There is a need to minimize or eliminate such delays and backups associated with the existing bridge crossing in order to facilitate the efficient movement of people, freight, and goods to and from Terminal Island.

1.2.2.1.2.3 Bridge Life Cycle and Maintenance/Repair

The Schuyler Heim Bridge was built in 1948 and was designed and constructed based on the existing and projected needs at that time. Since then, however, Terminal Island and the surrounding area have developed considerably; and, port-related traffic is expected to

increase substantially over the next several years. This additional traffic will inflict additional wear and tear on a structure that is at the end of its useful life span and requires frequent maintenance to keep functioning. These repairs sometimes necessitate the full or partial closure of the bridge, which can hinder the flow of traffic. There is a need for a reliable, low-maintenance structure that can withstand the heavy use resulting from port-related traffic and remain operational in future years.

Because of the deficiencies cited above, it can be seen that:

- There is the potential for a loss of service connection between Terminal Island and the mainland – The existing Schuyler Heim Bridge does not meet current seismic standards and would likely not be able to provide emergency service or other ground transportation access to and from the island immediately following a major earthquake. A major earthquake is likely to result in considerable damage to or partial failure of the existing bridge and require closure of the bridge for extensive repairs or emergency reconstruction.
- The bridge has a substandard design – The existing bridge does not meet current Caltrans roadway operational and safety design standards.
- There are delays to the movement of people, freight, and goods – The existing bridge is not efficient in transporting high quantities of people, freight, and goods due to disruptions when the vertical span is lifted for marine traffic in the Cerritos Channel.
- The bridge is near the end of its life span – The existing bridge has essentially exhausted its useful and functional life span.

1.2.2.2 High-Capacity Route

1.2.2.2.1 Transportation Demand/Insufficient Capacity

1.2.2.2.1.1 Insufficient Freeway Capacity

The existing transportation system within and adjacent to the ports is becoming increasingly constrained with cargo traffic and other vehicular traffic. A POLA/POLB study forecast that the amount of cargo entering the two ports would nearly double between 2010 and 2020. During the same time period, the amount of port-related truck traffic also is expected to double. This large, and rapid, increase in truck volume has the potential to seriously compromise essential north-south connectivity between the ports and the regional freeway system, thereby slowing and/or otherwise limiting the movement of people, freight, and goods.

In response to the projected increase in cargo, the Ports of Los Angeles and Long Beach, Caltrans, the MTA, and the cities of Los Angeles and Long Beach are currently developing several transportation improvement projects to help alleviate freeway system congestion. Among these is this proposed north-south expressway between Terminal Island and I-405, which would complement a new bridge; the bridge would be a portion of the expressway, with no bottleneck for traffic flow.

1.2.2.2.1.2 Local Surface Street Congestion

The 2007 Traffic Study (MMA, 2007) assessed current and future traffic in the project area. The study encompassed 20 intersections in a study area bounded by Ocean Boulevard to the south, Anaheim Street to the north, I-710 to the east, and I-110 to the west. The intersection

level of service (LOS) analysis for the freeway system (ramp merge/diverge areas and weaving sections) indicated that, during the 2030 base year, 10 of the 20 intersections evaluated would operate at LOS E (poor) or LOS F (failure) during one or more peak hours.

These 10 intersections are listed below:

- SR-47/New Dock Street on-ramp (unsignalized)
- SR-47/Henry Ford Avenue ramps (unsignalized existing and signalized in future)
- Henry Ford Avenue/Anaheim Street
- Alameda Street/Anaheim Avenue
- Alameda Street/PCH connector ramp north of PCH
- PCH/Alameda Street connector ramp east of Alameda Street
- Alameda Street/Sepulveda Boulevard connector ramp north of Sepulveda Boulevard
- Sepulveda Boulevard/Alameda Street connector ramp east of Alameda Street
- Alameda Street/223rd Street connector ramp south of 223rd
- 223rd Street/Alameda Street connector ramp east of Alameda Street

The delay criteria that determines LOS at intersections are shown in Table 1-1.

Table 1-1
LOS Categories

LOS	Avg. Delay/Vehicle (Sec)	Traffic Conditions
A	≤ 10	Little or no delay/congestion
B	> 10 – 20	Slight congestion/delay
C	> 20 – 35	Moderate delay/congestion
D	> 35 – 55	Significant delay/congestion
E	> 55 – 80	Extreme congestion/delay
F	> 80	Intersection failure/gridlock

Source: MMA, 2007.

Part of the problem leading to surface street congestion is that there is poor connectivity between Terminal Island and Alameda Street, most of which was recently widened over most portions to six lanes (three in each direction) and which provides an alternate, non-freeway route to I-405, SR-91, and to the regional freeway system. Currently, to connect from Terminal Island to Alameda Street, vehicles must travel 1.5 km (0.9 mi) on SR-47 north from Ocean Boulevard. They must then exit at the Anaheim Street off-ramp to Henry Ford Avenue and travel north through local streets, crossing three signalized intersections and five railroad crossings, for about 2 km (1.2 mi) before joining Alameda Street just south of Pacific Coast Highway. The use of surface streets and interference from the signalized intersections and railroad crossings lead to traffic congestion and delays.

1.2.2.2.1.3 Safety at Intersections and Railroad Crossings

Based on the ongoing growth of the ports of Long Beach and Los Angeles and associated increases in rail and vehicular traffic, the local street and at-grade rail crossings will experience increased traffic. This will increase the likelihood for grade-crossing incidents

at the following crossings within the project area: Union Pacific Railroad San Pedro Branch (Manual Subdivision)/Henry Ford Avenue and Pier A Way; ACTA 3/Henry Ford Avenue; West Basin Lead Track/Henry Ford Avenue; Wilmington Wye (two tracks)/Alameda Street, and Industry Track/Southbound SR-47 New Dock Street off-ramp. Because railroads consider grade crossing safety primarily a highway issue (Angels on Track Foundation, 2006), it becomes the responsibility of the roadway jurisdiction to provide for safe railroad crossings.

Studies have shown that a motorist is 30 times as likely to die in a collision with a train as in all other types of motor vehicle accidents (West Virginia Department of Transportation, 2006). Studies have also shown that there is a substantial increase in safety in locations where railways and roadways are grade-separated (Busch and Funderburg, 2003; Cintra Zachry, 2006). Hence, there is a need to reduce the potential for conflicts/incidents between vehicles and trains to improve the safety of this part of the transportation network. A secondary benefit to such an improvement would be to reduce the ensuing congestion and related incidents that occur after a train-vehicle accident.

1.2.2.2.2 Inability to Provide for Uninterrupted Transport of People, Freight, and Goods Following a Major Earthquake

As stated above, vehicles must now travel on surface streets, pass through signalized intersections and over railroad tracks while traveling between the Schuyler Heim Bridge and Alameda Street. In the event of a major earthquake, it is likely that this path would be littered with debris and blocked from use for an extended period of time.

This would present a problem in terms of providing emergency access to and from Terminal Island, as well as in providing for the continued movement of people, freight and goods, all of which would be essential during any emergency recovery effort.

As stated in Section 1.2.2.1, the Schuyler Heim Bridge is a critical link and must be able to provide emergency access between Terminal Island and the mainland following a major earthquake. However, this structure will only provide part of the facility needed to aid in post-earthquake recovery. What is also needed is a companion highway that can remain standing but can also bypass the closed surface streets and allow for connectivity with the regional freeway system and points farther north. Such a roadway would need to be built to a seismic design standard comparable to that of the bridge so that, when combined with the bridge structure, a complete, serviceable connection to the island would remain intact.

The need for such a highway structure becomes more apparent when considering that, of the three bridges that connect Terminal Island to the mainland, the Schuyler Heim Bridge may be the only usable bridge immediately following a major earthquake. In addition to the bridge, a facility that can provide access to I-710 and I-110, along with the rest of the regional freeway system, could be used in the rapid transport of emergency response vehicles, people, freight, and goods to and from Terminal Island.

Chapter 2.0 Project Alternatives

This chapter provides a description of the project alternatives evaluated in this Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR), as well as alternatives that were considered and are no longer under consideration. The proposed project alternatives were developed by a multi-disciplinary team to achieve the project purpose and need, and to avoid or minimize environmental impacts. The purpose of the project is to provide a limited-access, high capacity and seismically safe vehicular connection along the critical north-south corridor between Terminal Island and the mainland that will facilitate the movement of people, freight, and goods and reduce congestion on local roadways.

The project (proposed action) is located in Los Angeles County along State Route (SR-) 47 and SR-103 from Terminal Island on the south to SR-91 (Artesia Freeway) on the north. Together, the project alternatives cover a distance of approximately 4.9 kilometers (km) (3.1 miles [mi]), from SR-47 kilometer post (KP) 4.4 (post mile [PM] 2.7) to SR-47 KP 9.3 (PM 5.8) and from SR-47 KP 4.4 (PM 2.7) to SR-103 KP 6.5 (PM 4.0). Within the limits of the proposed project, SR-47 is an expressway with three through-lanes in the northbound and southbound directions. The lanes have widths ranging from 3.4 meters (m) (11 feet [ft]) to 3.6 m (12 ft). The existing median widths vary from 1.21 m (4 ft) to 1.9 m (6.2 ft), with a center concrete barrier that transitions into a raised median to protect the steel truss bridge posts through the length of the Schuyler Heim Bridge. While the SR-47 entrance and exit ramps have varying nonstandard outside shoulders of 1.0 m (3.2 ft) to 1.5 m (4.9 ft), SR-47 itself has no inside or outside shoulders.

Within the project area, SR-103 is a conventional 4-lane undivided highway with two through-lanes in each direction. The northbound lanes have nonstandard lane widths that range from 3.1 m (10 ft) to 3.3 m (10.8 ft). The southbound lanes range from 3.2 m (10.4 ft) to 3.3 m (10.8 ft) wide. The existing median varies from 1.2 m (3.7 ft) to 0.6 m (1.8 ft) side, with a center concrete barrier. The existing SR-103 does not have any inside or outside shoulders within this segment.

The Schuyler Heim Bridge is a lift bridge with three nonstandard through-lanes in the southbound direction and two nonstandard through-lanes in the northbound direction. The lanes are less than 3.6 m (11.8 ft) wide. The bridge roadway has no shoulders.

Six project alternatives are evaluated in this Final EIS/EIR: four build alternatives; one transportation system management (TSM) alternative; and a no build alternative. There are two major components to the build alternatives: replacement of the existing Schuyler Heim Bridge, and construction of a new expressway. Also, three of the alternatives (1 [and 1A], 2, and 3) include a flyover from eastbound Ocean Boulevard to northbound SR-47. The development process for these project components has occurred separately, as described in Section 2.1.

Depending on the identified alternative, a variety of permits and approvals would be required to complete the project. A list of potential permits and approvals is provided in Table 2-1. Additional information is contained in the individual environmental resource sections in Chapter 3.0.

Table 2-1
Permits and Approvals

Agency	Permit/Approval
Federal	
Federal Highway Administration	Project funding; Compliance with Executive Order 1190 re: protection of wetlands; Compliance with Uniform Relocations and Assistance Act
National Marine Fisheries Service	Consultation re: Essential Fish Habitat; Incidental Harassment Authorization (IHA)
U.S. Army Corps of Engineers	Section 404 Permit (Clean Water Act)
	Section 10 Permit (Rivers and Harbors Act)
U.S. Coast Guard	Bridge Permit (Section 9, Rivers and Harbors Act)
U.S. Fish and Wildlife Service	Endangered species permitting
State	
California Transportation Commission	State Route Adoption (Alternatives 1, 1A, 3)
California Department of Fish and Game	Streambed Alteration Agreement (Section 1600, Fish and Game Code)
	Endangered Species Permitting
California Coastal Commission	Coastal Development Permit
Department of Toxic Substances Control	Consultation; Approval for landfill excavation (Alternative 2 only)
Regional Water Quality Control Board	401 Water Quality Certification
	National Pollutant Discharge Elimination System (NPDES) Permit
	Report of Waste Discharge
	Notice of Construction
South Coast Air Quality Management District	Permit to Construct
State Historic Preservation Officer	Section 106 Approval (National Historic Preservation Act)
Local	
Alameda Corridor Transportation Authority	Project funding
California Department of Transportation	Encroachment permits
City of Long Beach	Discretionary Approvals
City of Los Angeles	Encroachment Permits
	Discretionary Approvals
City of Los Angeles, Bureau of Engineering	Coastal Development Permit
City of Los Angeles Fire Department	Permit to Store Hazardous Materials
	Explosives Permits
County of Los Angeles, Department of Public Works, Flood Control District	Encroachment Permits (Dominguez Channel)

Table 2-1
Permits and Approvals

Agency	Permit/Approval
Port of Long Beach	Harbor Development Permit
	Coastal Development Permit
	Application for Development Permit
Port of Los Angeles	Application for Development Permit
	Coastal Development Permit
	Engineering Permit

2.1 Alternatives Development Process

2.1.1 Bridge Alternatives

As part of its program to survey and strengthen bridges under its authority, Caltrans has determined that the Schuyler Heim Bridge is in need of seismic retrofit improvements. A Project Scope Summary Report (PSSR) was completed in July 1998 (Caltrans, 1998a) to provide screening-level alternatives and cost analyses, and to program the recommended project. In the PSSR, five alternatives were considered:

- Full seismic retrofit of the existing Schuyler Heim Bridge (entire bridge extent)
- Fixed-span bridge parallel to and offset from the existing alignment
- Fixed-span bridge following the general existing alignment
- Vertical-lift, movable bridge parallel to and offset from the existing alignment
- Vertical-lift, movable bridge generally following the existing alignment

The fixed-span-bridge options were dropped from further consideration due to vertical clearance and right-of-way constraints and concerns that were initially raised by the United States Coast Guard (Coast Guard), Port of Los Angeles, and Port of Long Beach. The parallel vertical-lift bridge alternative was dropped from further consideration because it required significant right-of-way acquisitions, and because it would require a temporary fixed-span bridge for detours, interim retrofit of approach spans, and acquisition of additional rights-of-way at prohibitive cost. Consequently, the PSSR recommended a seismic retrofit project, and plans, specifications, and estimates (PS&E) were begun for the retrofit design.

During the PS&E phase, Caltrans performed a more detailed cost comparison of retrofit/rehabilitation and replacement (Caltrans, 2002), and estimated the present worth of the project alternatives over a 75-year life cycle. The evaluation considered both rehabilitation of the existing lift bridge and replacement with a fixed-span bridge or lift bridge.

The cost evaluation showed that the seismic rehabilitation plus future replacement and vertical-lift-bridge replacement alternatives would be more than twice the cost of the fixed-span-bridge replacement alternative. As a result, the rehabilitation and vertical-lift-bridge replacement alternatives were dropped from further consideration, and a fixed-span-bridge alternative was reconsidered.

To provide bridge alternatives that meet current seismic criteria, are cost effective, and avoid demolition of the existing Schuyler Heim Bridge, a second fixed-span-bridge replacement alternative was added. This alternative would provide a fixed-span bridge east of the existing lift bridge. With this alignment, it would be possible for the existing Schuyler Heim Bridge to remain standing rather than be demolished, as would occur with the initial fixed-span-bridge replacement alternative.

The two fixed-span-bridge alternatives were:

- Bridge Alternative 1: Fixed-span-bridge replacement on the alignment of the existing Schuyler Heim Bridge
- Bridge Alternative 2: Fixed-span-bridge replacement on an alignment east of the existing Schuyler Heim Bridge

Several options for various heights and widths for these alternatives were considered. At the time of the Notice of Preparation (NOP) that was issued in 2002, there were two vertical-clearance options and three navigable-channel-width options for each of the fixed-span-bridge alternatives, as follows:

2.1.1.1 Vertical Clearance Options

- Vertical Clearance Option A: The vertical clearance of the fixed-span bridge would be 11.6 m (38 ft) over the mean high water level (MHWL) of 1.43 m (4.7 ft). This would maintain the same clearance as when the existing lift bridge is in the lowered position.
- Vertical Clearance Option B: The vertical clearance of the fixed-span bridge would be 14.3 m (47 ft) over the MHWL level. This profile would accommodate a 13.7-m (45-ft) fireboat.

2.1.1.2 Channel Width Options

- Channel Width Option A: The width of the navigable channel would be 54.9 m (180 ft), the same as the width of the existing navigable channel.
- Channel Width Option B: The width of the navigable channel would be decreased to between 42.7 m and 44.2 m (140 ft and 145 ft).
- Channel Width Option C: The width of the navigable channel would be decreased to between 24.4 m and 25.9 m (80 ft and 85 ft).

After the NOP was circulated, several changes were made to the options for bridge height and channel width. The Coast Guard expressed concerns with marine vessel access beneath a fixed-span bridge at 11.6 m (38 ft) above MHWL, and with a navigable channel width of 24.4 to 25.9 m (80 to 85 ft). In addition, the Coast Guard expressed a desire to examine a higher clearance bridge over Cerritos Channel to further lessen interference with marine vessel travel. Consequently, vertical-clearance Option B (14.3 m [47 ft]) and channel width Option A (54.9 m [180 ft]) were identified as the preferred vertical and horizontal dimensions.

Based on this analysis, one bridge configuration was agreed upon. The bridge configuration would feature a new fixed-span bridge adjacent to the east of the existing Schuyler Heim Bridge.

2.1.2 Expressway Alternatives

2.1.2.1 Proposed SR-47 Expressway Alignment

The SR-47 Expressway is envisioned as part of regional transportation improvements at the southern end of the Alameda Corridor, in the vicinity of the Ports of Los Angeles and Long Beach. The expressway is intended to provide improved transportation, circulation, and goods movement to and from the ports by utilizing recent improvements to Alameda Street. The Henry Ford Avenue Interchange and Grade Separation Project, along with the Ports Area Demonstration Projects, have created a five-lane street connecting SR-47 to Alameda Street and beyond to Pacific Coast Highway (SR-1), SR-91, and I-405. The proposed expressway would build on this existing network of local streets by constructing a high-capacity, uninterrupted expressway linking this transportation network.

The proposed SR-47 Expressway would be an elevated 2.7-km (1.7-mi) four-lane expressway that would connect the Schuyler Heim Bridge to Alameda Street, south of the intersection with Pacific Coast Highway. The expressway alignment would be located along existing SR-47, from Ocean Boulevard on the south, across the Schuyler Heim Bridge (also designated SR-47) to a tie-in with SR-103 (which begins just south of the Consolidated Slip/Dominguez Channel), then along a new alignment north of Henry Ford Avenue to its terminus at Alameda Street, just south of Pacific Coast Highway. The facility would be designed to Caltrans expressway geometric standards, with limited access, and a posted speed limit of 80 km (50 mi) per hour.

Access to and exit from the expressway on the southern end would be available via Terminal Island from either Ocean Boulevard or New Dock Street, just north of Ocean Boulevard. At the northern end of the expressway, connections would occur directly from Alameda Street. There would be no other points of access or exit along the 2.7-km (1.7-mi) expressway.

The expressway would provide grade separation from five existing at-grade rail crossings, including the Union Pacific Railroad San Pedro Branch, ACTA 3, West Basin Lead, and Wilmington Wye (two crossings). Henry Ford Avenue would continue as an at-grade road, consisting of two lanes of traffic in each direction beneath the elevated expressway, thereby continuing existing local access to facilities and businesses along Henry Ford Avenue.

The expressway would be elevated above surface streets, bypassing the existing signalized intersection at Henry Ford Avenue and Anaheim Street, the planned signalized intersection at Henry Ford Avenue and Denni Street, and the nonsignalized intersections along Henry Ford Avenue at I Street, Opp Street, and Grant Street. The expressway would be carried on a concrete structure ranging from 1.9 to 3.0 m (6 to 10 ft) in thickness. The structure would be supported by concrete bents and by columns approximately 2.1 to 2.7 m (6.9 to 8.9 ft) in diameter and spaced approximately 47 to 75 m (154 to 246 ft) apart.

The elevated expressway would return to grade approximately 250 m (820 ft) south of Pacific Coast Highway. This segment would be located on mechanically stabilized earth (MSE), with concrete retaining walls on either side. Surface street improvements would be made in the vicinity of the expressway touchdown ramp.

North of Pacific Coast Highway, a new connection from southbound Alameda Street to Pacific Coast Highway would be constructed. This new connection will eliminate the southbound left turn at O Street and improve operation of the Alameda Street/O Street intersection.

2.1.2.2 Other Alignments Considered

Three expressway alignment variations (alignments 1, 2, and 3) were considered. These were evaluated in the *Project Feasibility Study: Alameda Corridor Truck Expressway (SR-47)* (Alameda Corridor Engineering Team [ACET], 2002). Alignments 1 and 2 are variations of the SR-103/SR-47 interchange north of the Cerritos Channel, and alignment 3 follows the route between Pacific Coast Highway and the SR-103/SR-47 interchange.

With alignment 1, the SR-47 viaduct would split (northbound and southbound) just west of the Hanjin Enterprises main terminal building. The northbound connector to SR-103 would merge with the SR-103 viaduct just north of the Cerritos Channel. The southbound connector to SR-47 would rise over SR-103 toward the west, and then meet the SR-103 viaduct north of the Cerritos Channel.

With alignment 2, the SR-47 viaduct would not split. Instead, SR-103 would split. Northbound SR-103 would veer east, circle under the SR-47 viaduct, then meet southbound SR-103 west of the Hanjin Enterprises main terminal building.

Alignment 3 would extend from the SR-103/SR-47 interchange in a northbound direction to Pacific Coast Highway. The exact alignment at the SR-103/SR-47 interchange would vary, based on the alignment (1 or 2) chosen.

The chosen alignment that was carried forward for analysis is a combination of alignment 1 and alignment 2 for the SR-103/SR-47 interchange, plus alignment 3 for the area between the interchange and Pacific Coast Highway. This hybrid alignment incorporates design features which reduced design exceptions, provided enhanced safety (weaving and line-of-sight), avoided conflicts with utilities, and minimized right-of-way acquisitions.

2.1.3 Ocean Boulevard/SR-47 Flyover

The Traffic Study evaluated the effects of the proposed project on roadways and intersections in the project area (MMA, 2005) and recommended mitigation for the Ocean Boulevard/ SR-47 intersection in the form of a direct ramp (flyover) from eastbound Ocean Boulevard to northbound SR-47. The Traffic Study noted that, with construction of the SR-47 Expressway (proposed under project Alternatives 1 and 3), the Ocean Boulevard/SR-47 intersection would be level of service (LOS) F during all peak hours. With construction of the SR-103 Extension (proposed under project Alternative 2), the intersection would be LOS F during the morning (AM) peak hour, and LOS E during the mid-day (MD) and evening (PM) peak hours.

Based on the current Traffic Study (MMA, 2007), in the year 2030, without the project, the Ocean Boulevard/SR-47 intersection will be LOS E during AM and MD peak-hour traffic, and LOS D during PM peak-hour traffic. Therefore, even without the project, the Traffic Study noted, the flyover, which is part of the proposed project, would mitigate future LOS E conditions at the intersection. Further, current projections of 2030 traffic without the project may, in fact, underestimate traffic volumes, as year 2030 container volumes at the ports may increase to greater levels than reflected in current projections.

Based on the above considerations, it was determined that the flyover at the Ocean Boulevard/ SR-47 intersection would be a required element of the proposed project.

2.2 Proposed Project Alternatives

All of the proposed project alternatives would occur within the project study area shown in Figure 1-1. The project area addressed in this Final EIS/EIR generally lies between Terminal Island on the south and SR-91 on the north, and between I-710 (Long Beach Freeway) on the east and I-110 (Harbor Freeway) on the west. This project area includes the Port of Long Beach, Port of Los Angeles, Wilmington District of the City of Los Angeles, southern part of the City of Carson, and the western portion of the City of Long Beach. The southern portion of the project area consists primarily of industrial uses associated with the ports. To the north, the area is a mix of industrial, residential, and commercial land uses.

Within the project area, SR-47 and SR-103 sometimes share the same alignment (Figure 2-1). SR-47 traverses Terminal Island on Seaside Avenue and Ocean Boulevard, and then heads northerly across the Schuyler Heim Bridge. SR-47 continues northward along Henry Ford Avenue and intersects Alameda Street, just north of Denni Street. SR-47 continues along Alameda Street to SR-91 and continues northward, outside of the project area.

The SR-103 alignment also traverses Terminal Island on Seaside Avenue and Ocean Boulevard, and then heads northerly across the Schuyler Heim Bridge and along Henry Ford Avenue. Approximately 244 m (800 ft) north of Cerritos Channel, SR-103 (known locally as the Terminal Island Freeway) diverts toward the east, then extends northerly, ending at Sepulveda Boulevard/Willow Street.

The following project alternatives analyzed in this Final EIS/EIR were taken from the Caltrans *Project Report-Project Study Report* (PR-PSR) (Caltrans, 2007). Other alternatives, which were considered and then withdrawn, are found in Section 2.3.

- Alternative 1: Bridge Replacement and SR-47 Expressway
- Alternative 2: SR-103 Extension to Alameda Street
- Alternative 3: Bridge Demolition Avoidance
- Alternative 4: Bridge Replacement Only
- Alternative 5: Transportation System Management
- Alternative 6: No Build

For the purposes of this EIS/EIR, Alternatives 1 through 4 are considered the "build alternatives" and are shown in Figure 2-1. Also, for the purpose of this Final EIS/EIR, the proposed project consists of the six alternatives shown above.

Alternatives 1 through 5 would require acquisition of various easements and rights-of-way, depending on the chosen alternative. Aerial and highway easements would be acquired for elevated portions of the SR-47 Expressway, SR-103 Extension, and Ocean Boulevard/SR-47 Flyover (Alternatives 1, 2, and 3); surface easements would be obtained at the locations of the bents or other surface improvements. Where the alignments would be at grade, highway easements would be obtained, as necessary. Temporary construction easements also would be obtained. For Alternatives 1, 1A, and 3, a State Route Adoption would be required for the segment of the SR-47 Expressway that would be constructed between the northerly terminus of the existing SR-47 and Pacific Coast Highway. Right-of-way drawings are provided in Appendix I.

In the following discussions, the term "shafts" refers to the underground foundation that supports the roadway structure, through "bent" or "pier columns." Bents are found over land, while piers are located in water. For the project, shafts would be either cast-in-drilled-hole (CIDH) or cast-in-steel-shell (CISS) structures (Figure 2-2), depending on the specific soils conditions.

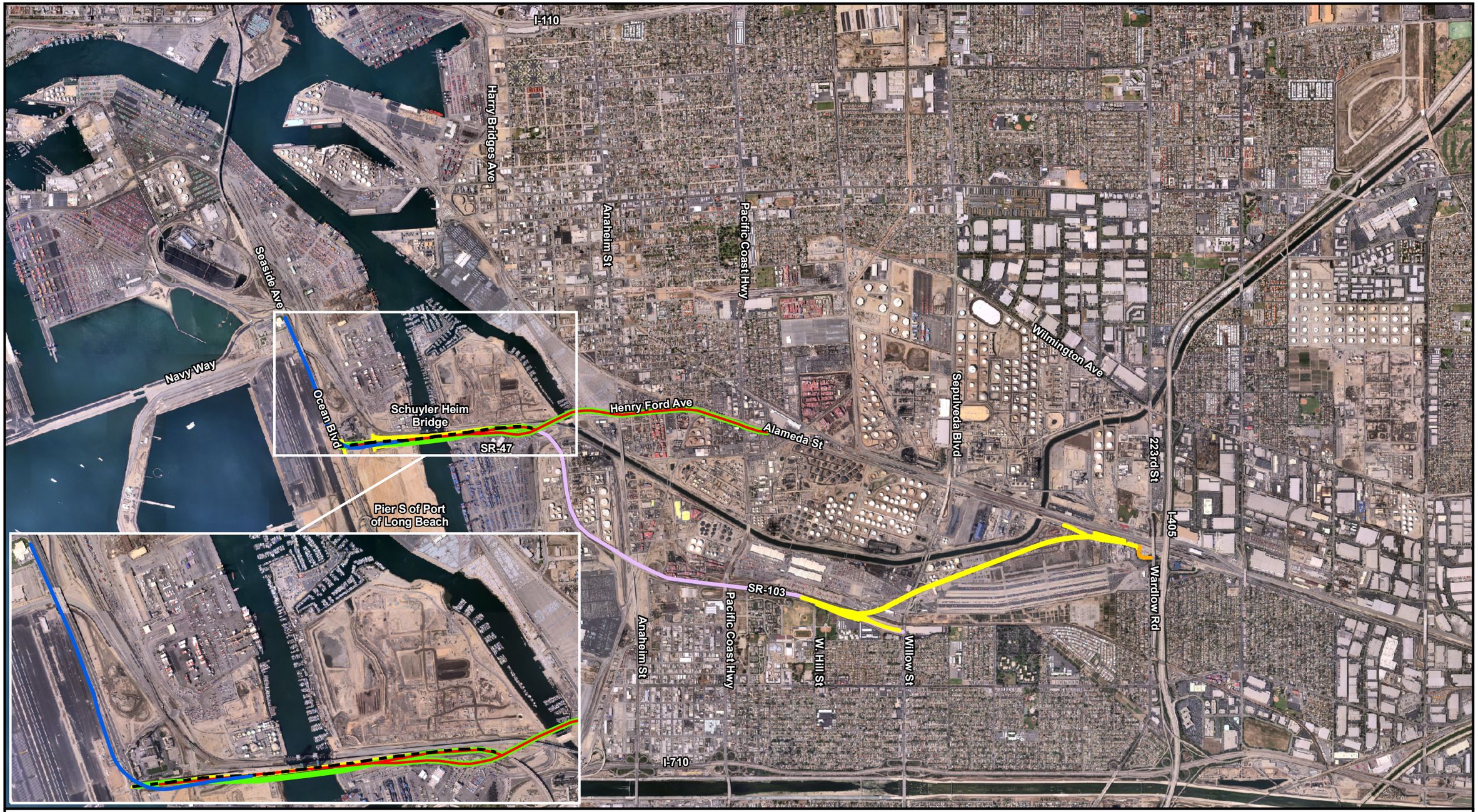
Most of the shafts would be of CIDH construction, as CIDH shafts can carry vertical and lateral loads through the deep, liquefiable soil layers of the project area. Also, the CIDH shafts do not require footings and, therefore, minimize right-of-way takes and utility relocations and, overall, less environmental effects compared to the CISS shafts. The CISS shafts, which require footings, would be constructed where soil conditions require additional support, such as the replacement bridge over the Cerritos Channel.

Construction of the SR-47 Expressway or SR-103 Extension would proceed in the same manner for Alternatives 1, 2, or 3, so one general expressway construction sequence is described in Section 2.2.1.2. (No expressway construction would be required for Alternatives 4, 5, or 6.) Depending on the identified alternative, an overall construction period of approximately 2 to 3 years has been estimated for the bridge and expressway components of the project, beginning in 2009[1]. This schedule assumes the use of multiple crews working over the course of a two-shift workday, typically for a 5-day workweek. This schedule also assumes that interfering utilities will have been removed prior to construction. The construction schedule for replacement of the Schuyler Heim Bridge is described as a 10-phase process, and for the expressway as an 8-phase process (Figure 2-3).

Construction of the flyover would proceed in the same manner for Alternatives 1, 2, or 3. Therefore, one general construction sequence is described in Section 2.2.1.2. (No flyover construction would be required for Alternatives 4, 5, or 6.) An overall construction period of approximately 1 year is anticipated for the flyover, beginning in 2015. The estimated construction schedule is shown in Figure 2-3.

The following sections provide the numbers of days, weeks, and months required for the various construction activities. All of these time periods are considered estimates, as the actual time required for a given activity may be longer or shorter than estimated, based on a variety of factors that include, but are not limited to, weather, production schedules, and delivery of materials.

[1] The construction period is currently projected to begin in 2010. The tasks and durations would remain the same.



LEGEND

- Alternative 1: Bridge Replacement and SR-47 Expressway
- Alternative 2: SR-103 Extension
- Alternative 3: Bridge Demolition Avoidance
- Alternative 4: Bridge Replacement Only
- Wardlow Road/223rd Street Ramp
- Ocean Boulevard/SR-47 Flyover
- Existing SR-103

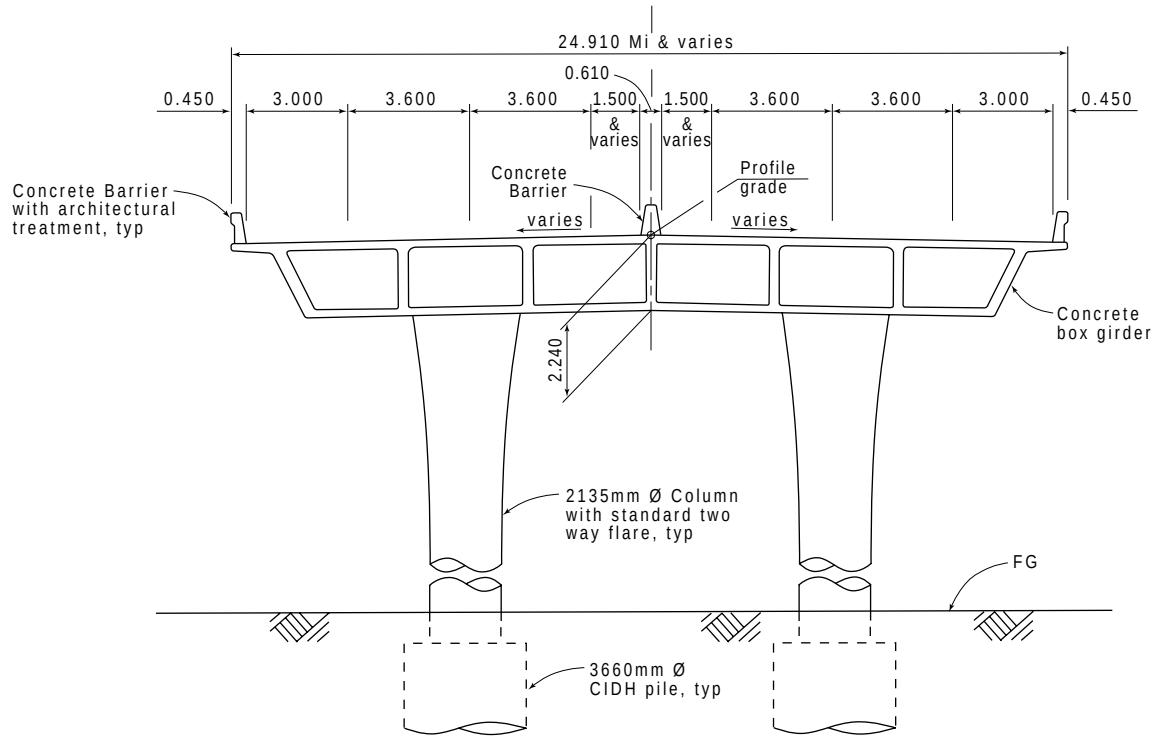
Aerial Date: May 2002

Note: Project components not to scale

0 2,800 Feet

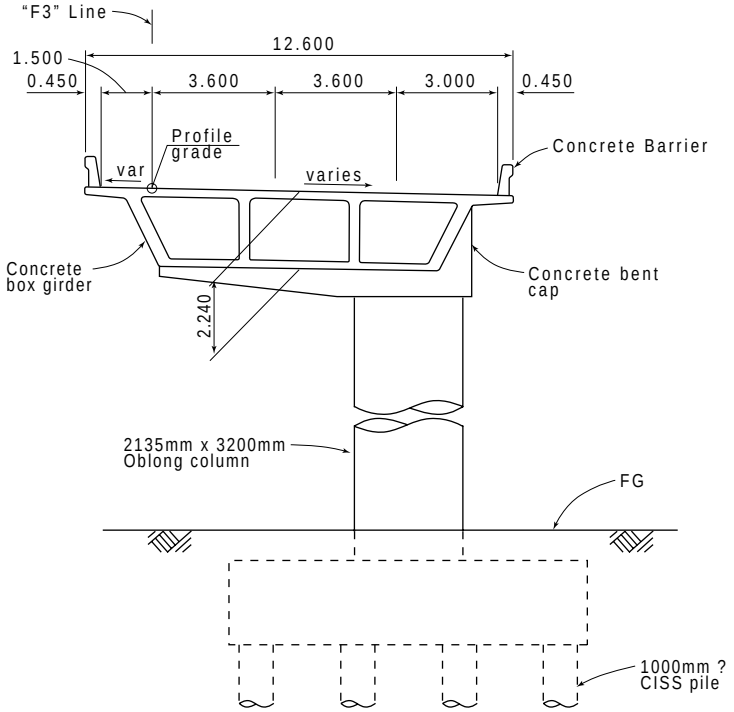
0 1,000 Meters

Figure 2-1
Build Alternatives
Schuyler Heim Bridge Replacement and SR-47 Expressway



Note: Dimensions in meters unless noted otherwise.

TYPICAL CIDH SECTION

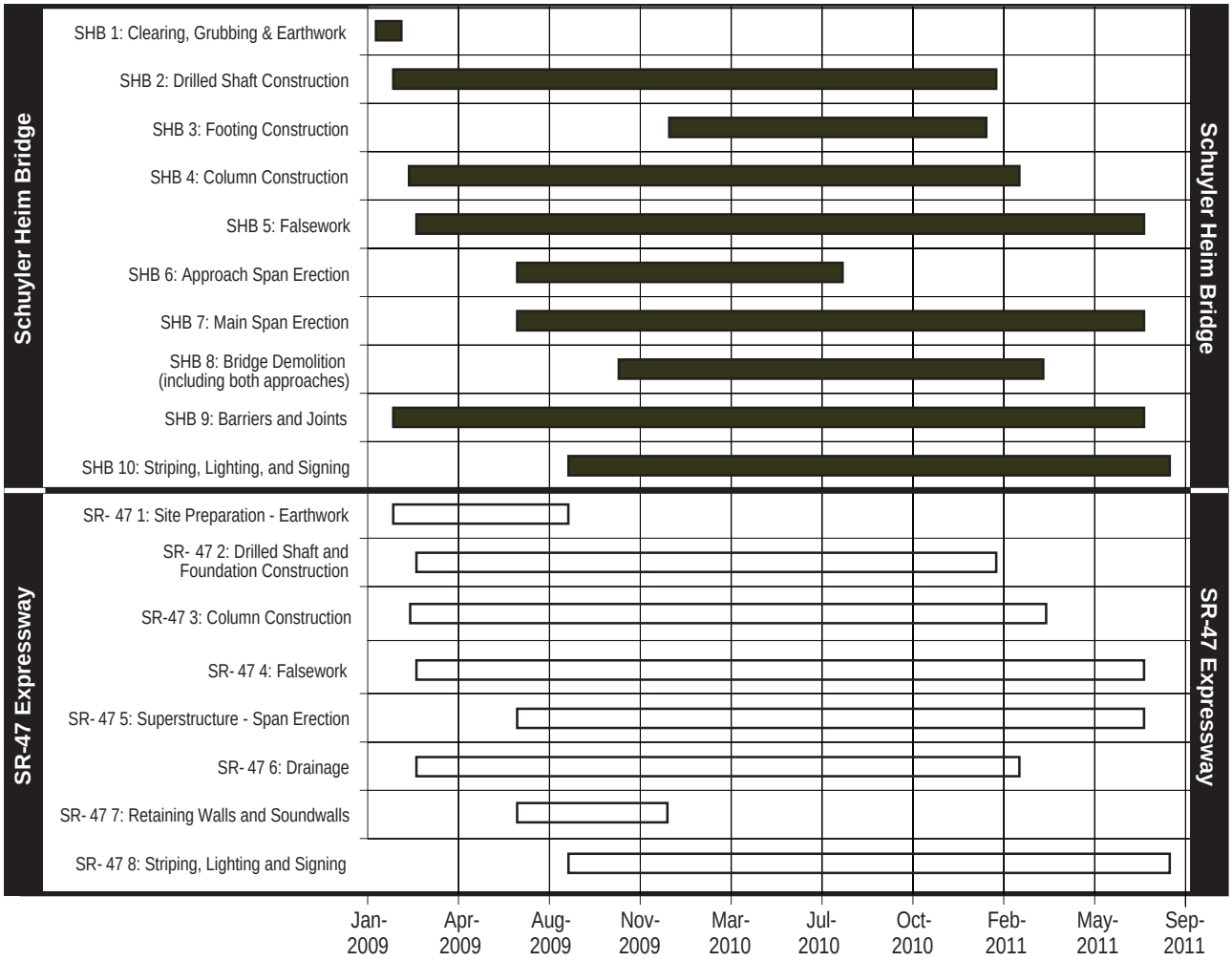


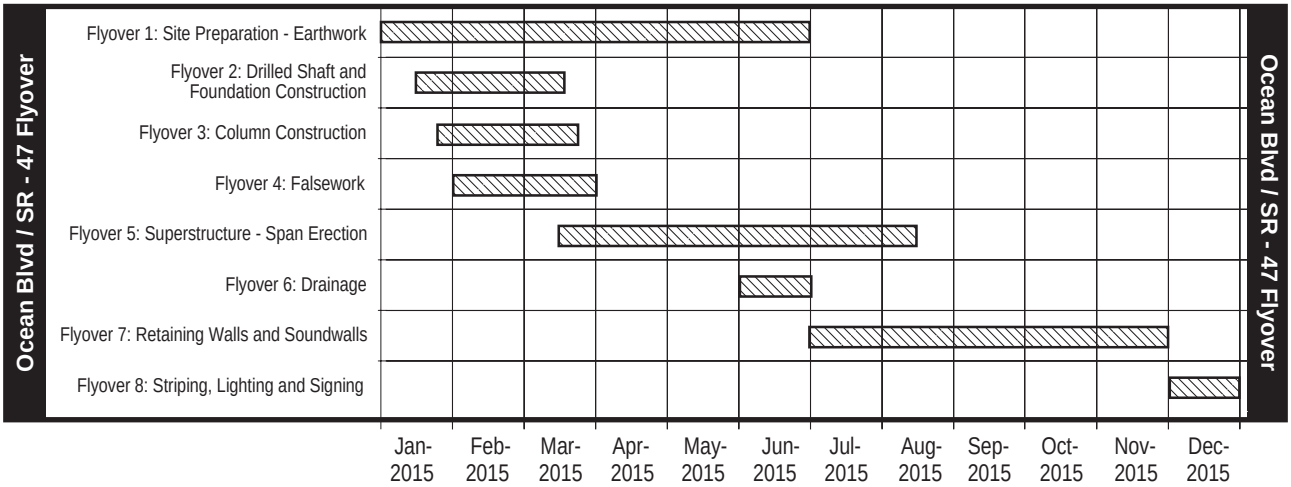
Note: Dimensions in meters unless noted otherwise.

TYPICAL CISS SECTION

Figure 2-2
Typical CIDH and CISS Construction
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Authority, May 2005





Notes:

1. Retrofit of the existing bridge could occur at any time prior to SHB 8: Bridge Demolition.
2. The schedule shown for the SR-47 Expressway also would apply to construction of the SR-103 Extension.

Figure 2-3
Project Construction Schedule
Schuyler Heim Bridge Replacement and SR-47 Expressway

2.2.1 Preferred Alternative

Local concerns have been integral to the decision-making process. Community comments and public concerns were considered. Issues raised by the various agencies that commented also were considered. Caltrans and ACTA, as the major transportation funding partners for this project, have discussed the various alternatives. Elected officials interested in the project have been consulted. The information contained in this Final EIS/EIR, which includes all comments and responses on the Draft EIS/EIR and the SDEIS/RDEIR, was evaluated, discussed, and used as the basis for identifying the preferred alternative.

The identification of a preferred alternative was made after careful consideration of all agency and public comments in the Draft EIS/EIR and the SDEIS/RDEIR. There was support for selection of both Alternative 1 and Alternative 2. Alternative 1 provides a new expressway along the SR-47 alignment, while Alternative 2 provides a new expressway along the SR-103 alignment. Both alternatives include replacing the existing Schuyler Heim Bridge with a fixed-span bridge. After comparing and weighing the benefits and impacts of the alternatives (see Table 2-2 for a summary of major impacts), funding availability, and community acceptance, Alternative 1 has been identified as the preferred alternative.

- Project purpose and need: The Transportation System Management and No Build alternatives (Alternatives 5 and 6) would not meet the purpose and need of the project, as neither would address the seismic issues of the Schuyler Heim Bridge or address traffic congestion north of the bridge. Therefore, neither the No Build alternative nor the Transportation System Management alternative was identified as a preferred alternative over Alternative 1.

  - Need to replace bridge for seismic safety. The Schuyler Heim Bridge was built in 1948 (to 1946 standards) and, therefore, does not conform to current seismic criteria. In the event of a major earthquake, the bridge would be so damaged it could not remain in service. Under Alternatives 5 and 6, the bridge would remain a major channel crossing and, therefore, would not meet the state's seismic code. Currently, the approaches of the bridge are being retrofitted to address seismic deficiencies. However, this is not a full seismic retrofit of the bridge; it is limited to the bridge approaches to bring them to the same seismic level with the main span, reducing their chance of collapsing. The main span itself is deficient. Therefore, even after the approaches are retrofitted, the entire bridge extent would still be deficient and would not meet the purpose and need of the proposed project.

  - Bridge maintenance. Due to its age, the Schuyler Heim Bridge is at the end of its useful life span and requires frequent maintenance to keep it functioning. The cost of such maintenance, plus the seismic rehabilitation that would be required to keep the bridge operational, would be more than twice the cost of a fixed-span-bridge replacement. These costs would be borne under Alternatives 5 and 6.

  - Traffic issues. Alternative 4 involves only replacement of the Schuyler Heim Bridge. Because it would not help address traffic congestion north of the bridge, it would not meet the project purpose and need. Therefore, Alternative 4 was not identified as a preferred alternative over Alternative 1.

- Consistency with Port Master Plans:
  - Port of Long Beach: Port Master Plan
    Goals include improving internal Port circulation involving roadways, providing additional highway access to Terminal Island.
  - Port of Los Angeles Master Plan
    Objectives include accommodating commerce to preclude need to develop new ports, providing necessary and safe access between internal and external road systems, and utilizing appropriate safety standards for new facilities.

    Alternatives 5 and 6 would not meet the above goals of the Port of Long Beach and Port of Los Angeles port master plans.
- Wetland impact: A wetland is located on the tidal terrace east of the Schuyler Heim Bridge. This wetland is likely to be removed under Alternative 3, while it would be avoided and the impact minimized under Alternatives 1 and 2. Further, although Alternative 3 was originally included as an "avoidance alternative," subsequent consultation with the U.S. Coast Guard indicated that a condition of its permit would be to demolish the old bridge. The U.S. Coast Guard would not permit the new bridge with the old bridge standing but not used for traffic. Therefore, Alternative 3 would not be feasible and thus was not identified as a preferred alternative over Alternative 1.
- Hazardous waste impact: Portions of the Alternative 2 alignment overlie two former landfills where uncontrolled dumping occurred. One of these, the Class II Alameda Street Landfill, is being reviewed for possible inclusion on the National Priority List. Soil excavation at this landfill could encounter hazardous waste, which would require oversight by the Department of Toxic Substances Control and other agencies to ensure safe management and disposal of the waste. Prior to construction, extensive investigation and remediation activities would be required. These activities could last years and delay completion of the project. In addition, the costs for hazardous waste mitigation and compliance under Alternative 2 ($57 million) are significantly higher than for Alternative 1 ($32 million). Therefore, Alternative 2 was not identified as a preferred alternative over Alternative 1.
- ACTA has determined that Alternative 1, 1A, or 3 would be the preferred alternative over Alternative 2 in light of ACTA's health risk assessment. In comparing the alternatives, Alternative 1 would have less health impacts than Alternative 2. Caltrans is taking ACTA and the community preference into consideration in the selection of the preferred alternative.
- Cost issues: Higher costs would occur under Alternatives 1A compared to Alternative 1. In particular, the project cost of Alternative 1A would be $7 million to $12 million greater than Alternative 1. In addition to greater cost, the design of the bridge under Alternative 1A would result in constructability issues that are not present in Alternative 1. Therefore, Alternative 1A was not identified as a preferred alternative over Alternative 1.

Table 2-2: Summary of Major Environmental Impacts and Costs by Alternative

Final EIS/EIR Section/ Environmental Resource		Alternative 1: Bridge Replacement and SR-47 Expressway	Alternative 1A: Bridge Haunch Design	Alternative 2: SR-103 Extension to Alameda Street	Alternative 3: Bridge Demolition Avoidance	Alternative 4: Bridge Replacement Only	Alternative 5: Transportation System Management	Alternative 6: No Build
3.3 COMMUNITY IMPACTS								
Construction	Acquisitions	Acquisition of six businesses (10 parcels), highway easements of approximately 125 partial takes, 78 temporary construction easements. Ten boat slips acquired at Leeward Bay Marina.	Acquisition of six businesses (10 parcels), highway easements of approximately 125 partial takes, 78 temporary construction easements. Ten boat slips acquired at Leeward Bay Marina.	Acquisition of two buildings for permanent highway easements; 61 partial parcel takes (permanent aerial/highway easements), 44 temporary construction easements.	Acquisition of six businesses (10 parcels), highway easements of approximately 125 partial takes, 78 temporary construction easements. Ten boat slips acquired at Leeward Bay Marina. Twenty-four temporary construction easement takes, 32 partial parcel takes (permanent aerial/highway easements).	Approximately 17 partial takes for permanent aerial/highway easements.	No impact	No impact
3.4 UTILITIES AND PUBLIC SERVICES								
Construction	Utilities	Relocation, avoidance, potential for service disruption. Relocate approximately 25 electrical lines; 6 natural gas lines; 3 sets of phone lines (1,500 pairs, <50 pairs, 900 pairs). Redesign current phone distribution system. Remove 1 water line; relocate 6 water line segments, 7 wastewater line segments. Dispose of 23,000m^3 concrete; 5,900 metric tons steel, 6,106m^3 asphalt, other solid waste.	Relocation, avoidance, potential for service disruption. Relocate approximately 25 electrical lines; 6 natural gas lines; 3 sets of phone lines (1,500 pairs, <50 pairs, 900 pairs). Redesign current phone distribution system. Remove 1 water line; relocate 6 water line segments, 7 wastewater line segments. Dispose of 23,000m^3 concrete; 5,900 metric tons steel, 6,106m^3 asphalt, other solid waste.	Relocation, avoidance, potential for service disruption. Relocate approximately 25 electrical lines; 6 natural gas lines; 3 sets of phone lines (1,500 pairs, <50 pairs, 900 pairs). Redesign current phone distribution system. Remove 1 water line; relocate 6 water line segments, 7 wastewater line segments. Dispose of 23,000m^3 concrete; 5,900 metric tons steel, 6,106m^3 asphalt, other solid waste.	Relocation, avoidance, potential for service disruption. Relocate approximately 15 electrical lines; 3 natural gas lines; one monitoring well; 3 sets of phone lines (1,500 pairs, <50 pairs, 900 pairs). Redesign current phone distribution system. Remove 1 water line; relocate 6 water line segments, 7 wastewater line segments. Dispose of 10,000m^3 concrete; 3,300 metric tons steel, 4,663m^3 asphalt, other solid waste.	Relocation, avoidance, potential for service disruption. Relocate 4 lines to 6 taller poles. Relocate TOPCO oil lines near LADWP DS 119; one <50 pairs phone line. Remove 1 water line; relocate 6 water line segments. Dispose of 10,000m^3 concrete; 3,300 metric tons steel, 2,602m^3 asphalt, other solid waste.	Dispose of minimal solid waste.	No impact
	Services	Public/emergency services use alternate emergency response routes (primarily Vincent Thomas, Gerald Desmond Bridges) during bridge closure. Closures: Schuyler Heim Bridge 1 month; southbound SR-47/New Dock Street 4 months; Cerritos Channel 25 non-consecutive days.	Public/emergency services use alternate emergency response routes (primarily Vincent Thomas, Gerald Desmond Bridges) during bridge closure. Closures: Schuyler Heim Bridge 1 month; southbound SR-47/New Dock Street 4 months; Cerritos Channel 25 non-consecutive days.	Public/emergency services use alternate emergency response routes (primarily Vincent Thomas, Gerald Desmond Bridges) during bridge closure. Closures: Schuyler Heim Bridge 1 month; southbound SR-47/New Dock Street 4 months; Cerritos Channel 25 non-consecutive days.	Public/emergency services use alternate emergency response routes (primarily Vincent Thomas, Gerald Desmond Bridges) during bridge closure. Closures: Schuyler Heim Bridge 1 month; southbound SR-47/New Dock Street 4 months; Cerritos Channel 25 non-consecutive days.	Public/emergency services use alternate emergency response routes (primarily Vincent Thomas, Gerald Desmond Bridges) during bridge closure. Closures: Schuyler Heim Bridge 1 month; southbound SR-47/New Dock Street 4 months; Cerritos Channel 25 non-consecutive days.	No impact	No impact

Table 2-2: Summary of Major Environmental Impacts and Costs by Alternative

Final EIS/EIR Section/ Environmental Resource		Alternative 1: Bridge Replacement and SR-47 Expressway	Alternative 1A: Bridge Haunch Design	Alternative 2: SR-103 Extension to Alameda Street	Alternative 3: Bridge Demolition Avoidance	Alternative 4: Bridge Replacement Only	Alternative 5: Transportation System Management	Alternative 6: No Build
3.5 TRAFFIC AND TRANSPORTATION								
Construction	Parking	At Port of Long Beach Pier A East and Pier S Terminals, up to 820 off-street employee parking spaces and 54 marine terminal equipment spaces.	At Port of Long Beach Pier A East and Pier S Terminals, up to 820 off-street employee parking spaces and 54 marine terminal equipment spaces.	At Port of Long Beach Pier A East and Pier S Terminals, up to 820 off-street employee parking spaces and 54 marine terminal equipment spaces.	At Port of Long Beach Pier A East and Pier S Terminals, up to 977 off-street employee parking spaces and 167 marine terminal equipment spaces.	At Port of Long Beach Pier A East and Pier S Terminals, up to 587 off-street employee parking spaces and 54 marine terminal equipment spaces.	No impact	No impact
Operations	Parking	Fifteen employee parking spaces at Port of Long Beach Pier S Terminal. Up to 12 parking spaces at the southeast corner of Alameda Street and M Street. Fifteen to 25 on-street parking spaces along the east side of Henry Ford Avenue between Grant Street and Anaheim Street.	Fifteen employee parking spaces at Port of Long Beach Pier S Terminal. Up to 12 parking spaces at the southeast corner of Alameda Street and M Street. Fifteen to 25 on-street parking spaces along the east side of Henry Ford Avenue between Grant Street and Anaheim Street.	Fifteen employee parking spaces at Port of Long Beach Pier S Terminal. Up to 12 parking spaces at the southeast corner of Alameda Street and M Street. Fifteen to 25 on-street parking spaces along the east side of Henry Ford Avenue between Grant Street and Anaheim Street.	Forty-five employee parking spaces at Port of Long Beach Pier S Terminal.	Fifteen employee parking spaces at Port of Long Beach Pier S Terminal. Up to 12 parking spaces at the southeast corner of Alameda Street and M Street. Fifteen to 25 on-street parking spaces along the east side of Henry Ford Avenue between Grant Street and Anaheim Street.	Permanent effects if on-street parking is removed to provide additional travel lanes.	No impact
3.6 MARINE VESSEL TRANSPORTATION								
Construction	Vessel detours	Some vessel detours around Terminal Island due to reduced Cerritos Channel clearance to 13.1 m (43 ft); width to 22.9 m (75 ft) for 240 days. Total channel closure 25 days; intermittent closure 40 days. Economic effect: $2.6 million	Some vessel detours around Terminal Island due to reduced Cerritos Channel clearance to 13.1 m (43 ft); width to 22.9 m (75 ft) for 240 days. Total channel closure 25 days; intermittent closure 40 days. Economic effect: $2.6 million	Some vessel detours around Terminal Island due to reduced Cerritos Channel clearance to 13.1 m (43 ft); width to 22.9 m (75 ft) for 240 days. Total channel closure 25 days; intermittent closure 40 days. Economic effect: $2.6 million	Some vessel detours around Terminal Island due to reduced Cerritos Channel clearance to 13.1 m (43 ft); width to 22.9 m (75 ft) for 240 days. Total channel closure 25 days; intermittent closure 40 days. Economic effect: $2.6 million	Some vessel detours around Terminal Island due to reduced Cerritos Channel clearance to 13.1 m (43 ft); width to 22.9 m (75 ft) for 240 days. Total channel closure 25 days; intermittent closure 40 days. Economic effect: $2.6 million	No impact	No impact
Operations	Vessel detours	Decreased vertical clearance to 14.3 m (47 ft) would require 87% of vessels to detour around Terminal Island. Economic effect: $23.6 million over 20 years.	Decreased vertical clearance to 14.3 m (47 ft) would require 87% of vessels to detour around Terminal Island. Economic effect: $23.6 million over 20 years.	Decreased vertical clearance to 14.3 m (47 ft) would require 87% of vessels to detour around Terminal Island. Economic effect: $23.6 million over 20 years.	Decreased vertical clearance to 14.3 m (47 ft) would require 87% of vessels to detour around Terminal Island. Economic effect: $23.6 million over 20 years.	Decreased vertical clearance to 14.3 m (47 ft) would require 87% of vessels to detour around Terminal Island. Economic effect: $23.6 million over 20 years.	No impact	No impact
3.7 VISUAL RESOURCES /AESTHETICS								
Construction		Construction would affect the visual environment of the bridge and SR-47 alignments.	Construction would affect the visual environment of the bridge and SR-47 alignments.	Construction would affect the visual environment of the bridge and SR-103 alignments.	Construction would affect the visual environment of the bridge and SR-47 alignments.	Construction would affect the visual environment of the bridge.	No impact	No impact
Operations		New bridge, flyover, and expressway would affect the visual environment in view of the new facilities.	New bridge, flyover, and expressway would affect the visual environment in view of the new facilities.	New bridge, flyover, and expressway would affect the visual environment in view of the new facilities.	New bridge, flyover, and expressway would affect the visual environment in view of the new facilities.	New bridge would affect the visual environment in view of the new facility.	No impact	No impact

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3.8 CULTURAL RESOURCES								
Construction	Historic resource	Demolition and replacement of Schuyler Heim Bridge would be an Adverse Effect under Adverse Effect Criterion 2(i), 36 CFR 800.5(a), and under significance Criterion 2(A), Section 15064.5 of the CEQA Guidelines.	Demolition and replacement of Schuyler Heim Bridge would be an Adverse Effect under Adverse Effect Criterion 2(i), 36 CFR 800.5(a), and under significance Criterion 2(A), Section 15064.5 of the CEQA Guidelines.	Demolition and replacement of Schuyler Heim Bridge would be an Adverse Effect under Adverse Effect Criterion 2(i), 36 CFR 800.5(a), and under significance Criterion 2(A), Section 15064.5 of the CEQA Guidelines.	Modifications to the approaches of the old bridge would cause an adverse effect. The U.S. Coast Guard may require demolition of the Schuyler Heim Bridge once the bridge is not used for land transportation. If the Schuyler Heim Bridge is removed, demolition would be an Adverse Effect under Adverse Effect Criterion 2(i), 36 CFR 800.5(a), and under significance Criterion 2(A), Section 15064.5 of the CEQA Guidelines.	Demolition and replacement of Schuyler Heim Bridge would be an Adverse Effect under Adverse Effect Criterion 2(i), 36 CFR 800.5(a), and under significance Criterion 2(A), Section 15064.5 of the CEQA Guidelines.	No impact	No impact
3.9 HYDROLOGY, FLOODPLAINS, AND OCEANOGRAPHY								
Construction	Sediment	Surface runoff of construction pollutants and erosion of channel banks. Degradation to Cerritos Channel and/or Consolidated Slip water quality from pile placement that would disturb sediment, causing resuspension and dispersal into the water column.	Surface runoff of construction pollutants and erosion of channel banks. Degradation to Cerritos Channel and/or Consolidated Slip water quality from pile placement that would disturb sediment, causing resuspension and dispersal into the water column.	Surface runoff of construction pollutants and erosion of channel banks. Degradation to Cerritos Channel water quality from pile placement that would disturb sediment, causing resuspension and dispersal into the water column.	Surface runoff of construction pollutants and erosion of channel banks. Degradation to Cerritos Channel and/or Consolidated Slip water quality from pile placement that would disturb sediment, causing resuspension and dispersal into the water column.	Surface runoff of construction pollutants and erosion of channel banks. Degradation to Cerritos Channel water quality from pile placement that would disturb sediment, causing resuspension and dispersal into the water column.	No impact	No impact
3.10 WATER QUALITY AND STORMWATER RUNOFF								
Construction	Water quality	Surface runoff into Cerritos Channel, resulting in solids transport and elevated levels of phosphates, TSS and TDS. Paint, rust debris, and particulate matter deposited into the Cerritos Channel from bridge demolition. Constituents such as copper, zinc, and organic compounds (PAHs) suspended in concentrations in excess of the WQC for a short time.	Surface runoff into the Cerritos Channel, resulting in solids transport and elevated levels of phosphates, TSS and TDS. Paint, rust debris, and particulate matter deposited into the Cerritos Channel from bridge demolition. Constituents such as copper, zinc, and organic compounds (PAHs) suspended in concentrations in excess of the WQC for a short time.	Surface runoff into the Cerritos Channel, resulting in solids transport and elevated levels of phosphates, TSS and TDS. Paint, rust debris, and particulate matter deposited into the Cerritos Channel from bridge demolition. Constituents such as copper, zinc, and organic compounds (PAHs) suspended in concentrations in excess of the WQC for a short time.	Surface runoff into the Cerritos Channel, resulting in solids transport and elevated levels of phosphates, TSS and TDS. Constituents such as copper, zinc, and organic compounds (PAHs) suspended in concentrations in excess of the WQC for a short time.	Surface runoff into the Cerritos Channel, resulting in solids transport and elevated levels of phosphates, TSS and TDS. Paint, rust debris, and particulate matter deposited into the Cerritos Channel from bridge demolition. Constituents such as copper, zinc, and organic compounds (PAHs) suspended in concentrations in excess of the WQC for a short time.	No impact	No impact

Table 2-2: Summary of Major Environmental Impacts and Costs by Alternative

Final EIS/EIR Section/ Environmental Resource		Alternative 1: Bridge Replacement and SR-47 Expressway	Alternative 1A: Bridge Haunch Design	Alternative 2: SR-103 Extension to Alameda Street	Alternative 3: Bridge Demolition Avoidance	Alternative 4: Bridge Replacement Only	Alternative 5: Transportation System Management	Alternative 6: No Build
Operations	Runoff	Surface runoff from replacement bridge--vehicle drippings, accidental spills, bridge maintenance, stormwater.	Surface runoff from replacement bridge--vehicle drippings, accidental spills, bridge maintenance, stormwater.	Surface runoff from replacement bridge--vehicle drippings, accidental spills, bridge maintenance, stormwater.	Surface runoff from replacement bridge--vehicle drippings, accidental spills, bridge maintenance, stormwater. Ongoing release of low levels of pollutants into the Cerritos Channel from painting, periodic paint flaking, and runoff from the existing bridge.	Surface runoff from replacement bridge--vehicle drippings, accidental spills, bridge maintenance, stormwater.	Pollutants from runoff from existing bridge surface, painting, and paint material flaking from the bridge would continue.	Pollutants from runoff from existing bridge surface, painting, and paint material flaking from the bridge would continue.
3.11 GEOLOGY/SOILS/SEISMICITY/ PALEONTOLOGY/TOPOGRAPHY/ MINERAL RESOURCES								
Construction	Seismicity	Earthquakes from movement on seven active, historically active, or potentially active faults located 0.3 km (0.2 mi) to 85 km (53 mi) from the project site. Potential for permanent ground displacement.	Earthquakes from movement on seven active, historically active, or potentially active faults located 0.3 km (0.2 mi) to 85 km (53 mi) from the project site. Potential for permanent ground displacement.	Earthquakes from movement on seven active, historically active, or potentially active faults located 0.3 km (0.2 mi) to 85 km (53 mi) from the project site. Potential for permanent ground displacement.	Earthquakes from movement on seven active, historically active, or potentially active faults located 0.3 km (0.2 mi) to 85 km (53 mi) from the project site. Potential for permanent ground displacement.	Earthquakes from movement on seven active, historically active, or potentially active faults located 0.3 km (0.2 mi) to 85 km (53 mi) from the project site. Potential for permanent ground displacement.	No impact	No impact
3.12 HAZARDOUS WASTE/HAZARDOUS MATERIALS								
Construction	Asbestos/lead-based paint release; landfill waste	Bridge demolition could result in release of asbestos and lead-based paint into the surrounding environment and the Cerritos Channel. For Alternative 1, the overall costs for dealing with hazardous waste are estimated at $32 million.	Bridge demolition could result in release of asbestos and lead-based paint into the surrounding environment and the Cerritos Channel. For Alternative 1A, the overall costs for dealing with hazardous waste are estimated at $32 million.	Bridge demolition could result in release of asbestos and lead-based paint into the surrounding environment and the Cerritos Channel. The alignment for the extension of SR-103 includes an area of two adjacent and inactive landfills that were not closed according to existing regulations. One of these is the Class II Alameda Street Landfill, being reviewed for possible inclusion on the National Priority List (NPL), to make it eligible as a superfund site. Under Alternative 2, there is potential for hazardous waste that may be present at the landfill to be exposed during project construction, with risks to workers and others. Therefore, prior to construction, extensive investigation and remediation activities that could last years and impede completion of the project would be required.	No major impact For Alternative 3, the overall costs for dealing with hazardous waste are estimated at $33 million.	Bridge demolition could result in release of asbestos and lead-based paint into the surrounding environment and the Cerritos Channel. For Alternative 4, the overall costs for dealing with hazardous waste are estimated at $11 million.	No major impact	No impact

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				For Alternative 2, the overall costs for dealing with hazardous waste are estimated at $57 million.				
Operations	Asbestos/lead-based paint release	No impact	No impact	No impact	The Schuyler Heim Bridge would remain in place and require ongoing maintenance, with the potential to release hazardous materials.	No impact	The Schuyler Heim Bridge would remain in place and require ongoing maintenance, with the potential to release hazardous materials.	The Schuyler Heim Bridge would remain in place and require ongoing maintenance, with the potential to release hazardous materials.
3.13 AIR QUALITY								
Construction	Criteria pollutants; fugitive dust	Direct emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ would exceed daily SCAQMD thresholds. Indirect emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ from marine vessel detours would be below general conformity *de minimus* levels.	Direct emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ would exceed daily SCAQMD thresholds. Indirect emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ from marine vessel detours would be below general conformity *de minimus* levels.	Direct emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ would exceed daily SCAQMD thresholds. Indirect emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ from marine vessel detours would be below general conformity *de minimus* levels.	Direct emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ would exceed daily SCAQMD thresholds. Indirect emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ from marine vessel detours would be below general conformity *de minimus* levels.	Direct emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ would exceed daily SCAQMD thresholds. Indirect emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ from marine vessel detours would be below general conformity *de minimus* levels.	No impact	No impact
Operations	Criteria pollutants	Daily emissions of NO_X from marine vessel detours would exceed the SCAQMD threshold.	Daily emissions of NO_X from marine vessel detours would exceed the SCAQMD threshold.	Daily emissions of NO_X from marine vessel detours would exceed the SCAQMD threshold.	Daily emissions of NO_X from marine vessel detours would exceed the SCAQMD threshold.	Daily emissions of NO_X from marine vessel detours would exceed the SCAQMD threshold.	No impact	No impact
3.14 NOISE								
Construction	Pile Driving	Anchorage Way Marinas Leeward Bay Marina Substantial noise from pile driving for 2 weeks (10 days) for each of the two stages of falsework pile driving.	Anchorage Way Marinas Leeward Bay Marina Substantial noise from pile driving for 2 weeks (10 days) for each of the two stages of falsework pile driving.	Anchorage Way Marinas Substantial noise from pile driving for 2 weeks (10 days) for each of the two stages of falsework pile driving.	Anchorage Way Marinas Leeward Bay Marina Substantial noise from pile driving for 2 weeks (10 days) for each of the two stages of falsework pile driving.	Anchorage Way Marinas Substantial noise from pile driving for 2 weeks (10 days) for each of the two stages of falsework pile driving.	No impact	No impact

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Operations	Traffic	Leeward Bay Marina One to 10 dBA increase in peak-hour traffic noise. Without abatement, the loudest hourly noise levels would be 61 to 67 dBA Leq(h). Noise at some locations would approach the applicable Noise Abatement Criteria (NAC) for residential areas. Wilmington Neighborhood Five to 13 dBA increase in peak-hour traffic noise. Without abatement, the loudest hourly noise would be 61 to 69 dBA Leq(h). Noise at some locations would exceed the applicable NAC for residential areas.	Leeward Bay Marina One to 10 dBA increase in peak-hour traffic noise. Without abatement, the loudest hourly noise levels would be 61 to 67 dBA Leq(h). Noise at some locations would approach the applicable Noise Abatement Criteria (NAC) for residential areas. Wilmington Neighborhood Five to 13 dBA increase in peak-hour traffic noise. Without abatement, the loudest hourly noise would be 61 to 69 dBA Leq(h). Noise at some locations would exceed the NAC for residential areas.	Long Beach Neighborhood/SR-103 Extension The loudest hourly traffic noise would either decrease by 1 to 4 dBA, increase by 1 to 2 dBA, or equal existing conditions. Without abatement, peak-hour noise would be 62 to 72 dBA Leq(h) and would exceed the NAC at many locations.	Leeward Bay Marina One to 10 dBA increase in peak-hour traffic noise. Without abatement, the loudest hourly noise levels would be 61 to 67 dBA Leq(h). Noise at some locations would approach the applicable Noise Abatement Criteria (NAC) for residential areas. Wilmington Neighborhood Five to 13 dBA increase in peak-hour traffic noise. Without abatement, the loudest hourly noise would be 61 to 69 dBA Leq(h). Noise at some locations would exceed the NAC for residential areas.	Anchorage Way Marinas The loudest hourly noise levels would decrease by 1 to 5 dBA and would approach or meet the NAC.	Anchorage Way Marinas The loudest hourly noise levels would increase by 4 dBA due to an increase in traffic volume. All receiver locations would exceed the NAC. Wilmington Neighborhood The loudest hourly noise levels would increase by 7 to 9 dBA. Some areas would approach, equal, or exceed the NAC. Long Beach Neighborhood/SR-103 Extension The loudest hourly noise level would either equal the existing condition or increase by 1 or 2 dBA due to an increase in traffic volume. Some areas would approach or exceed the NAC.	Anchorage Way Marinas The loudest hourly noise would increase by 4 dBA due to an increase in traffic volume. All receiver locations would exceed the NAC. Wilmington Neighborhood The loudest hourly noise would increase by 7 to 9 dBA due to an increase in traffic volume. Some areas would approach, equal, or exceed the NAC. Long Beach Neighborhood/ SR-103 Extension The loudest hourly noise would either equal the existing condition or increase by 1 or 2 dBA due to an increase in traffic volume. Some areas would approach or exceed the NAC.

Table 2-2: Summary of Major Environmental Impacts and Costs by Alternative

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3.16 BIOLOGICAL RESOURCES								
Construction	Surface and marine disturbance	Wetlands east of the Schuyler Heim Bridge will be avoided and impact minimized. Potential for acute toxicity to invertebrates or fish from resuspension of bottom sediments in the Cerritos Channel and Consolidated Slip. Adverse effect to Cerritos Channel water quality during Schuyler Heim Bridge paint removal and/or demolition. Loss of bat roosts, plus nest site for a pair of peregrine falcons from bridge removal. Noise and activity within 152 m (500 ft) could disrupt burrowing owl breeding activities. Removal of southern tarplant and other special-status species, if present. Introduction of non-native seeds, with resulting colonization. Noise from pile-driving in the Cerritos Channel and Consolidated Slip may result in elevated underwater sound levels on aquatic habitats, EFH, and marine mammals.	Wetlands east of the Schuyler Heim Bridge will be avoided and impact minimized. Potential for acute toxicity to invertebrates or fish from resuspension of bottom sediments in the Cerritos Channel and Consolidated Slip. Adverse effect to Cerritos Channel water quality during Schuyler Heim Bridge paint removal and/or demolition. Loss of bat roosts, plus nest site for a pair of peregrine falcons from bridge removal. Noise and activity within 152 m (500 ft) could disrupt burrowing owl breeding activities. Removal of southern tarplant and other special-status species, if present. Introduction of non-native seeds, with resulting colonization. Noise from pile-driving in the Cerritos Channel and Consolidated Slip may result in elevated underwater sound levels on aquatic habitats, EFH, and marine mammals.	Wetlands east of the Schuyler Heim Bridge and along SR-103 will be avoided and impact minimized. Potential for acute toxicity to invertebrates or fish from resuspension of bottom sediments in the Cerritos Channel. Adverse effect to Cerritos Channel water quality during Schuyler Heim Bridge paint removal and/or demolition. Loss of bat roosts, plus nest site for a pair of peregrine falcons from bridge removal. Noise and activity within 152 m (500 ft) could disrupt burrowing owl breeding activities. Removal of southern tarplant and other special-status species, if present. Introduction of non-native seeds, with resulting colonization. Noise from pile-driving in the Cerritos Channel may result in elevated underwater sound levels on aquatic habitats, EFH, and marine mammals.	A ¼-acre wetland on the south bank of the Cerritos Channel, east of Schuyler Heim Bridge, could be removed. Mitigation is proposed. Potential for acute toxicity to invertebrates or fish from resuspension of bottom sediments in the Cerritos Channel and Consolidated Slip. Noise within 152 m (500 ft) could disrupt breeding activities of burrowing owl. Removal of southern tarplant and other special-status species, if present. Introduction of non-native seeds, resulting in colonization with exotic vegetation. Noise from pile-driving in the Cerritos Channel and Consolidated Slip may result in elevated underwater sound levels on aquatic habitats, EFH, and marine mammals.	Wetlands east of the Schuyler Heim Bridge will be avoided and impact minimized. Potential for acute toxicity to invertebrates or fish from resuspension of bottom sediments in the Cerritos Channel. Adverse effect to Cerritos Channel water quality during Schuyler Heim Bridge paint removal and/or demolition. Loss of bat roosts, plus nest site for a pair of peregrine falcons from bridge removal. Noise and activity within 152 m (500 ft) could disrupt burrowing owl breeding activities. Removal of southern tarplant and other special-status species, if present. Introduction of non-native seeds, with resulting colonization. Noise from pile-driving in the Cerritos Channel may result in elevated underwater sound levels on aquatic habitats, EFH, and marine mammals.	No impact	No impact
Operations	Birds	Birds could be injured from contact with transmission lines or energized parts of transmission lines/towers.	Birds could be injured from contact with transmission lines or energized parts of transmission lines/towers.	Birds could be injured from contact with transmission lines or energized parts of transmission lines/towers.	No impact	Birds could be injured from contact with transmission lines or energized parts of transmission lines/towers.	No impact	No impact
Costs								
		$706.3 million[a]	$713.3 to $718.3 million[b]	$785.7 million[a]	$761.4 million[a]	$321.2 million	$22.6 million	$0 (no cost)

[a] Alternatives 1, 2, and 3 include the cost estimate for flyover, which is $66 million.

[b] As noted on pg 2-16, the project cost of Alternative 1A would be $7 million to $12 million greater than Alternative 1.

2.2.2 Alternative 1: Bridge Replacement and SR-47 Expressway

2.2.2.1 Description

Alternative 1 would combine the Schuyler Heim Bridge replacement project and the Alameda Corridor Expressway project to create a grade-separated expressway that would be a high-capacity alternate route between Terminal Island and Alameda Street/Pacific Coast Highway (Figures 2-4a through 2-4e). This alternative involves replacement of the Schuyler Heim Bridge; construction of a limited-access expressway that begins at Ocean Boulevard, crosses the bridge, and extends northward for a distance of approximately 2.7 km (1.7 mi); and construction of the proposed 1,550-m (5,084-ft) flyover. The flyover would divert eastbound Ocean Boulevard traffic directly onto northbound SR-47, which would provide direct access to the replacement bridge over the Cerritos Channel and enable traffic on this route to avoid the congested Ocean Boulevard/SR-47 intersection. The SR-47 Expressway would be designed to specific Caltrans geometric standards for expressways, with limited access and a posted speed limit of 80 km (50 mi) per hour. Representative elevations are shown in Appendix B.1. The completed expressway would relieve traffic congestion to and from Terminal Island, become part of SR-47, and be owned, operated, and maintained by Caltrans. Alternative 1 extends from SR-47 KP 4.4 to 9.3 (PM 2.7 to 5.8).

2.2.2.1.1 Bridge Replacement

Alternative 1 would replace the existing Schuyler Heim Bridge with a fixed-span bridge along and east of the existing bridge alignment. The proposed fixed-span bridge would be 13 m (43 ft) wider than the existing lift bridge due to the addition of standard shoulders, which are not present on the existing bridge. In the northbound direction, the replacement bridge would include three 3.6-m (12-ft) traffic lanes (two through-lanes and one auxiliary lane), and 3.0-m (10-ft) shoulders. In the southbound direction, the replacement bridge would include three 3.6-m (12-ft) traffic lanes, one 3.6-m (12-ft) auxiliary lane, and 3.0-m (10-ft) shoulders. The proposed alignment for the new fixed-span bridge is located primarily within and to the east of the existing bridge right-of-way. This alternative would be constructed so as to avoid any conflicts with current or future development of Pier A or Pier S.

The footprint of the proposed fixed-span bridge is located toward the east of the existing bridge footprint to avoid impacts to the railroad located on Badger Bridge, located immediately west of the existing Schuyler Heim Bridge (Figure 2-4b), and to accommodate construction sequencing and maintain traffic flows during construction. Existing and proposed northbound bridge cross sections are shown in Figure 2-5.

The vertical clearance of the proposed fixed-span bridge would be 14.3 m (47 ft) over the Cerritos Channel MHWL of 14.3 m (47 ft). This profile would accommodate a 13.7-m (45-ft) fireboat. The width of the navigable channel (distance between bridge-support columns and fenders) would be 54.9 m (180 ft), the same as under existing conditions.

The bridge replacement would include a southbound off-ramp and northbound on-ramp at New Dock Street on Terminal Island, as well as a northbound off-ramp and southbound on-ramp at Henry Ford Avenue on the mainland (north) side of the bridge. The New Dock Street southbound off-ramp would be elevated to clear the existing industry tracks that join the Badger Bridge rail alignment from east of SR-47. The new alignment of the off-ramp

would eliminate one of the two at-grade rail crossings at SR-47/New Dock Street. New Dock Street would be realigned to accommodate the realigned on-ramp and off-ramp. The Project would retain existing ramps to Henry Ford Avenue and other existing ramps and access.

2.2.2.1.2 SR-47 Expressway

Under Alternative 1, the new SR-47 Expressway (Figures 2-4a through 2-4e) would begin on Terminal Island, at the intersection of SR-47 and Ocean Boulevard. It would extend north over New Dock Street and onto the new fixed-span bridge. Just north of the New Dock Street on-ramp and off-ramp, the expressway and bridge would have seven lanes of traffic (three northbound lanes and four southbound lanes). The expressway would extend over the bridge and across the Cerritos Channel to an elevation of 14 m (46 ft) above the existing north levee of the channel (elevations are measured to the bottom of the support structure).

Just north of the Cerritos Channel, the expressway would split. Two inside northbound lanes (one through-lane and one optional through- and diverge-lane) and two outside southbound lanes would transition onto two separate two-lane structures for direct connections to and from the existing SR-103. Two outside northbound lanes (one through-lane and one optional through- and diverge-lane) and two inside southbound lanes would transition onto two separate two-lane structures for direct connections to and from the new SR-47 alignment.

At this point, the expressway would be approximately 17 m (56 ft) above grade (expressway elevations are shown in Appendix B.1). The four-lane elevated expressway would continue to rise and make a transition to the north and west, crossing over Pier A Plaza (at 21 m [69 ft] above grade), over SR-103 (at 18 m [59 ft] above grade), over the Alameda Corridor main line railroad tracks (at 18 m [59 ft] above the tracks), over the Consolidated Slip/ Dominguez Channel (at 16 m [52 ft] above the levee), and over Henry Ford Avenue. At a point approximately 0.85 km (0.5 mi) north of the Cerritos Channel, and approximately 0.3 km (984 ft) south of the Consolidated Slip/Dominguez Channel, the two SR-47 connectors would join to form one four-lane elevated expressway (Figure 2-4c). The elevated expressway crossing over the Consolidated Slip/Dominguez Channel would be supported by two columns placed in the channel; one column would be in the south bank of the Consolidated Slip, and the other would be in the water (outside the flow lines) near the north bank of the Consolidated Slip, within the Leeward Bay Marina.

After crossing the Consolidated Slip/Dominguez Channel, the elevated SR-47 Expressway would transition northward, crossing over Anaheim Street and along the alignment of Henry Ford Avenue. At Anaheim Street, the expressway would be located directly over Henry Ford Avenue, at a height of approximately 12 m (39 ft) above grade. The elevated expressway would continue north above Henry Ford Avenue, crossing over I Street, O Street, Grant Street, and Denni Street, at heights ranging from 6 m to 8 m (19 ft to 26 ft) above grade. The streets below the elevated structure would remain open for local access.

LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

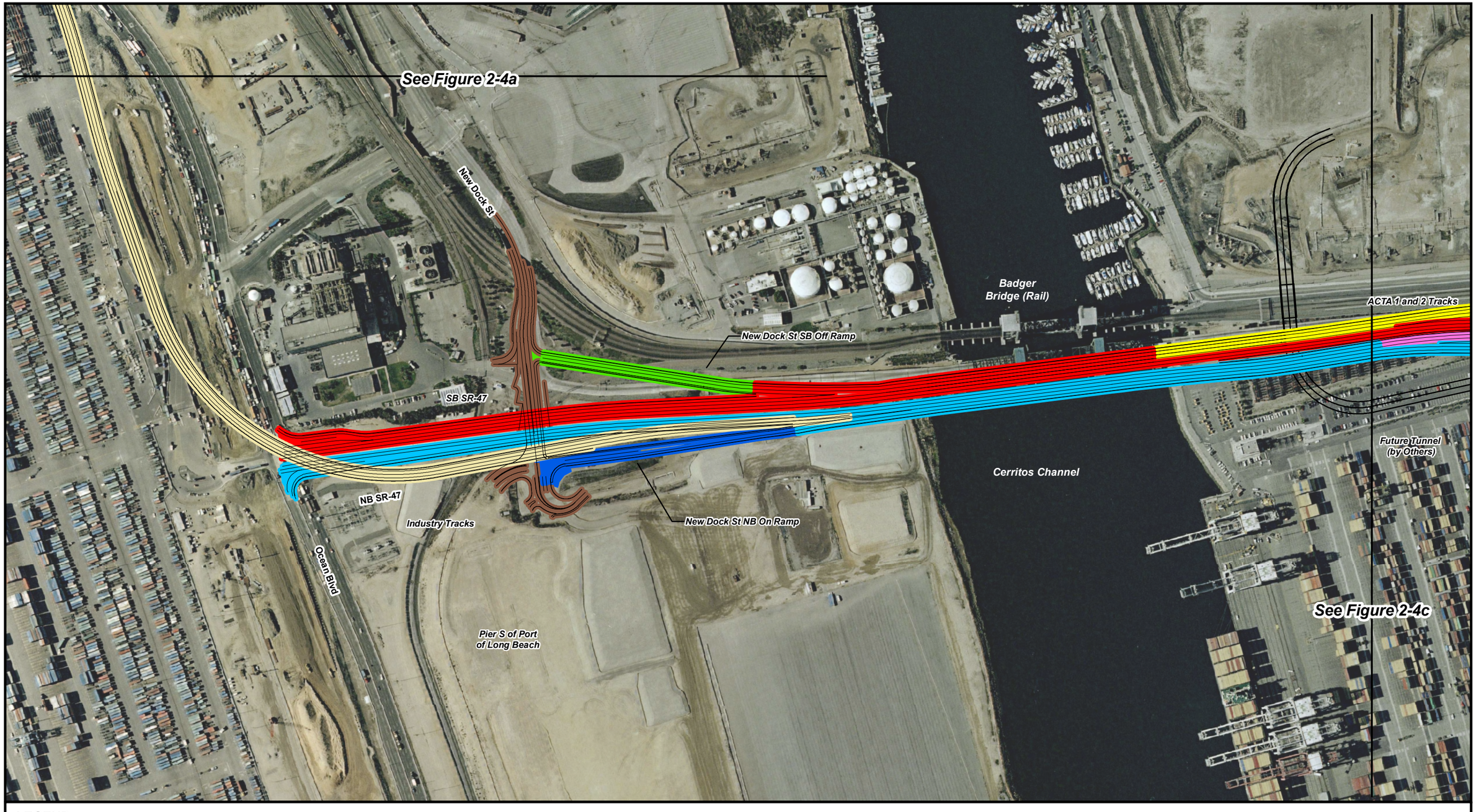
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-4a
Alternative 1:Bridge Replacement and SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

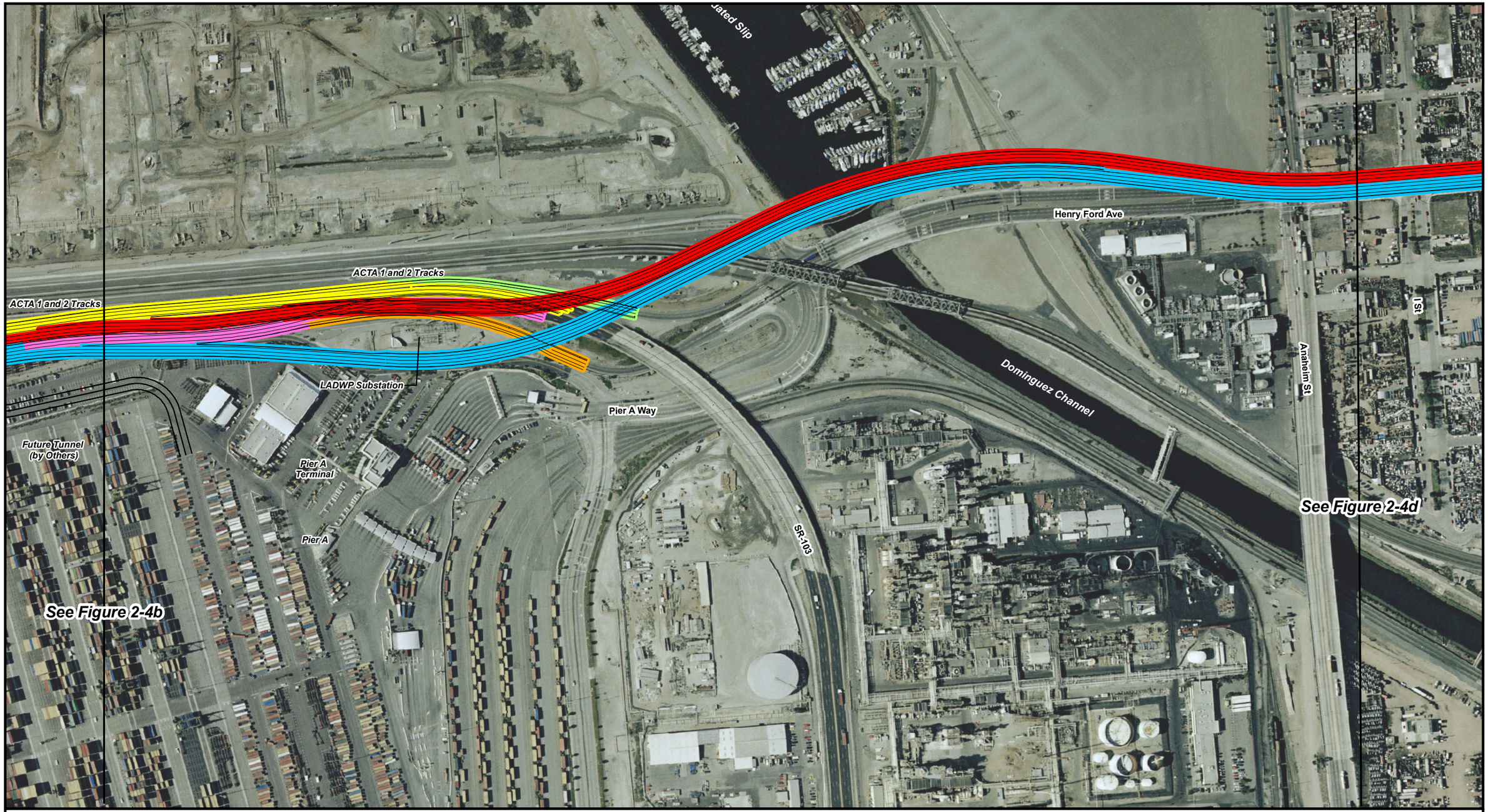
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-4b
Alternative 1:Bridge Replacement and SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

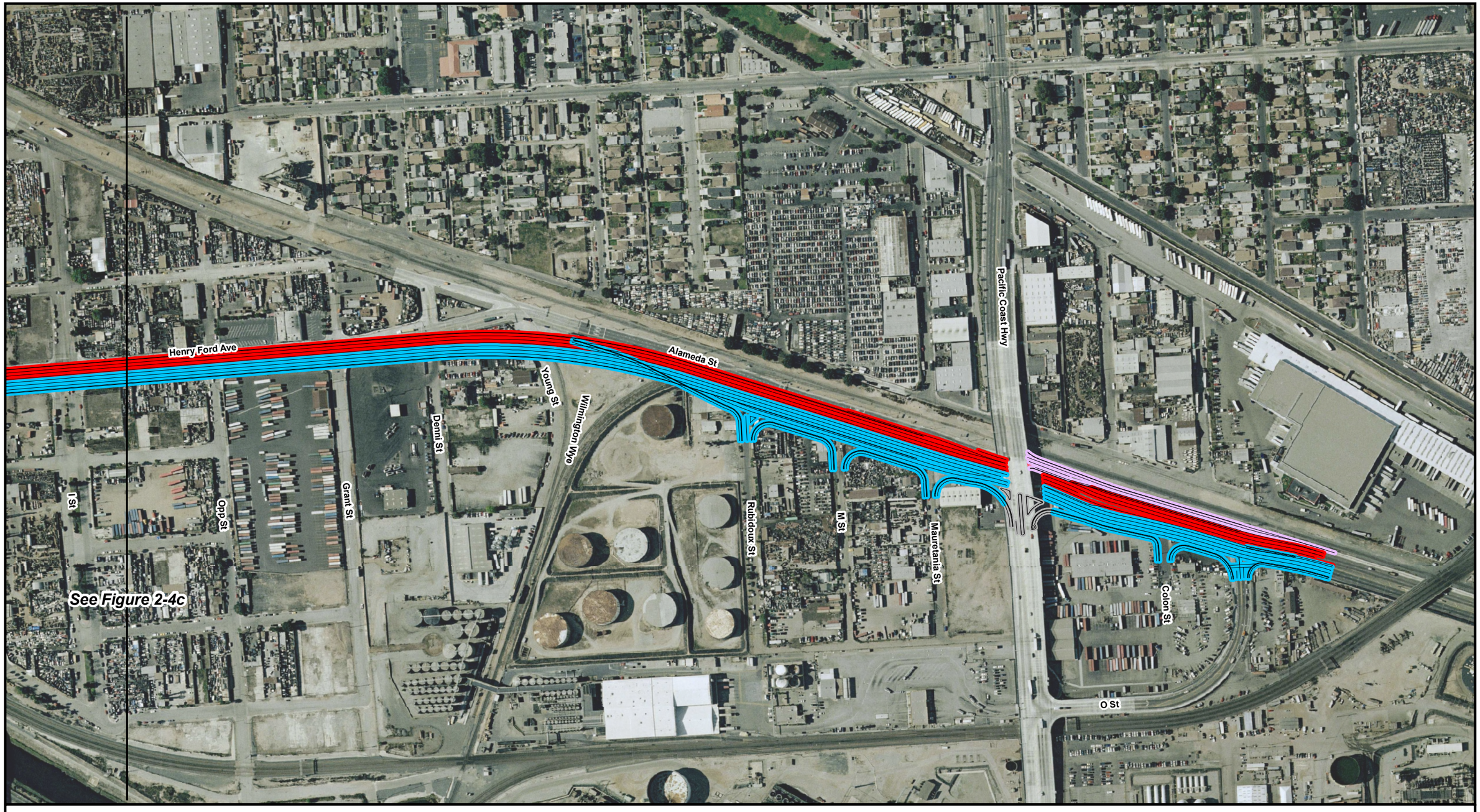
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-4c
Alternative 1:Bridge Replacement and SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-4d
Alternative 1:Bridge Replacement and SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

0 100 M

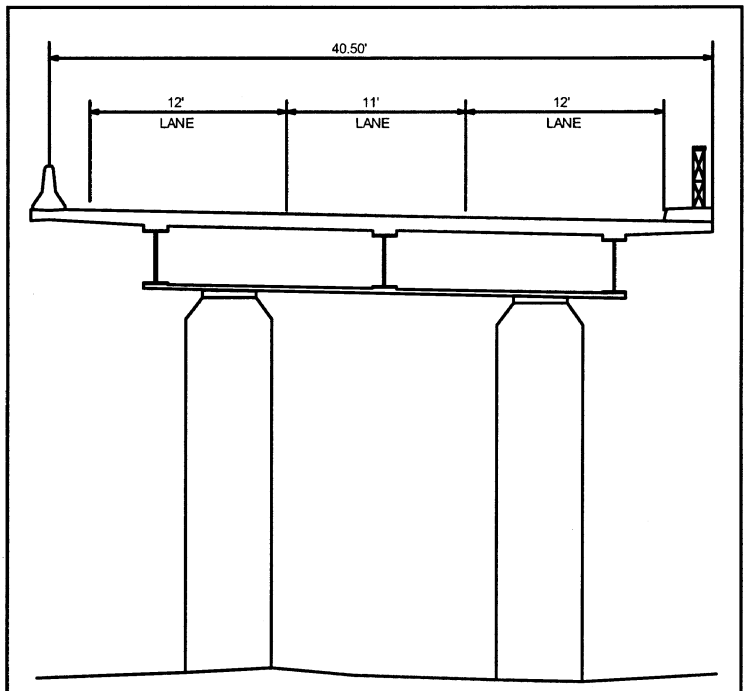
0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

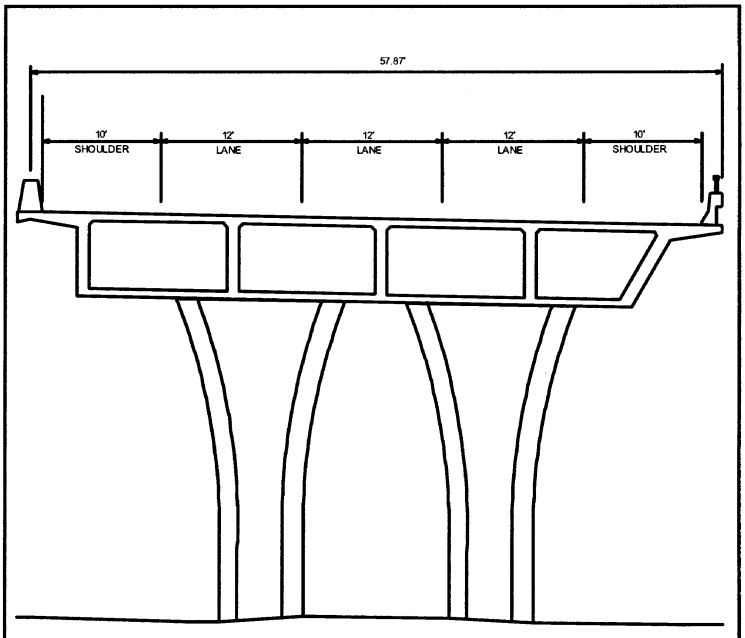
Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-4e
Alternative 1:Bridge Replacement and SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

Cross-Section Views of Northbound Lanes



State Route 47 at Existing Schuyler Heim Bridge



State Route 47 at Proposed Schuyler Heim Bridge

Not to Scale

Figure 2-5
Schuyler Heim Bridge: Existing and Proposed Cross Sections – Northbound
Schuyler Heim Bridge Replacement and SR-47 Expressway

After crossing over the southern leg of the Wilmington Wye Railroad and Young Street, the elevated expressway alignment would transition from Henry Ford Avenue to Alameda Street. The expressway then would return to grade, joining Alameda Street about one block south of Pacific Coast Highway, supported by a retaining wall and MSE abutment from north of Robidoux Street to about one block south of Pacific Coast Highway. Once at grade, the expressway would merge with the existing six travel lanes on Alameda Street.

The Pacific Coast Highway connector at O Street is part of the newly completed Pacific Coast Highway Grade Separation Project. Alternative 1 includes minor improvements at the Alameda Street/O Street intersection located two blocks north of Pacific Coast Highway; new rights-of-way would be required for the proposed improvements. A new connector from southbound Alameda Street to the Pacific Coast Highway overcrossing would be constructed to provide access to Pacific Coast Highway. The new connector would eliminate the southbound left turn at the Alameda Street/O Street intersection and improve traffic operation at the intersection. The project would terminate on Alameda Street, north of Pacific Coast Highway, approximately 40 m (131 ft) north of O Street, and south of the rail overcrossing.

Alternative 1 would include surface-street lane improvements such as widening lane re-striping, new curbs, and signal timing, on Alameda Street between Grant Street and Pacific Coast Highway, and on Young Street between Alameda Street and approximately 20 m (65 ft) east of the elevated expressway. A new connector street would be constructed between Alameda Street and Denni and Grant Streets. Intersection signalization would be improved along the entire corridor.

Also, northbound Alameda Street will be modified to provide dual right-turn lanes to the 223rd Street/Wardlow Road connector ramp, and southbound Alameda Street will be modified to provide dual left-turn lanes to the connector ramp. In addition, the connector ramp will be modified to add an optional left- or right-turn lane onto 223rd Street/Wardlow Road (Figure 2-4e). These changes will be made by restriping the ramp and Alameda Street and resignalization of the intersection.

2.2.2.1.3 Flyover

The Ocean Boulevard/SR-47 Flyover (flyover), as shown in Figure 2-6, will be a two-lane, elevated structure to divert traffic bound for northbound SR-47 directly onto the new bridge from eastbound Ocean Boulevard. Each land would be 3.6 m (11.8 ft) wide, with a 1.5-m shoulder on the north and west (inside curve) of the structure and a 3-m (10-ft) shoulder on the south and east (outside curve) of the structure. The purpose of the flyover is to enable this traffic to avoid the existing signalized Ocean Boulevard/SR-47 intersection. Under Alternative 1, the flyover would begin on Terminal Island, about 1,200 m (3,900 ft) west of the Ocean Boulevard/SR-47 intersection, extend eastward along the south side of Ocean Boulevard, and then turn north, cross over Ocean Boulevard, and extend onto the new bridge.

The west end of the flyover would be at grade, then rise to a maximum elevation of 21 m (69 ft) to cross over Ocean Boulevard, then descend to an elevation of 12.9 m (42.4 ft) to join the new bridge (see Figure 2-6). The elevated portions of the flyover would be supported by 14 single-column bents and 1 two-column outrigger bent. Each column is approximately 2.4 m (8 ft) in diameter. The structure will consist of 15 spans, with lengths that range

between 42 m (154 ft) and 64 m (210 ft). The flyover would have an overall length of 830 m (2,723 ft), ending at the northerly end point (gore point) of the northbound New Dock Street on-ramp onto the new bridge. The left lane of the flyover would converge with the SR-47 through lane to the left; the right lane of the flyover would continue as a northbound SR-47 through lane and would continue to SR-47. The flyover would be located entirely within the City and Port of Long Beach.

2.2.2.2 Construction Activities

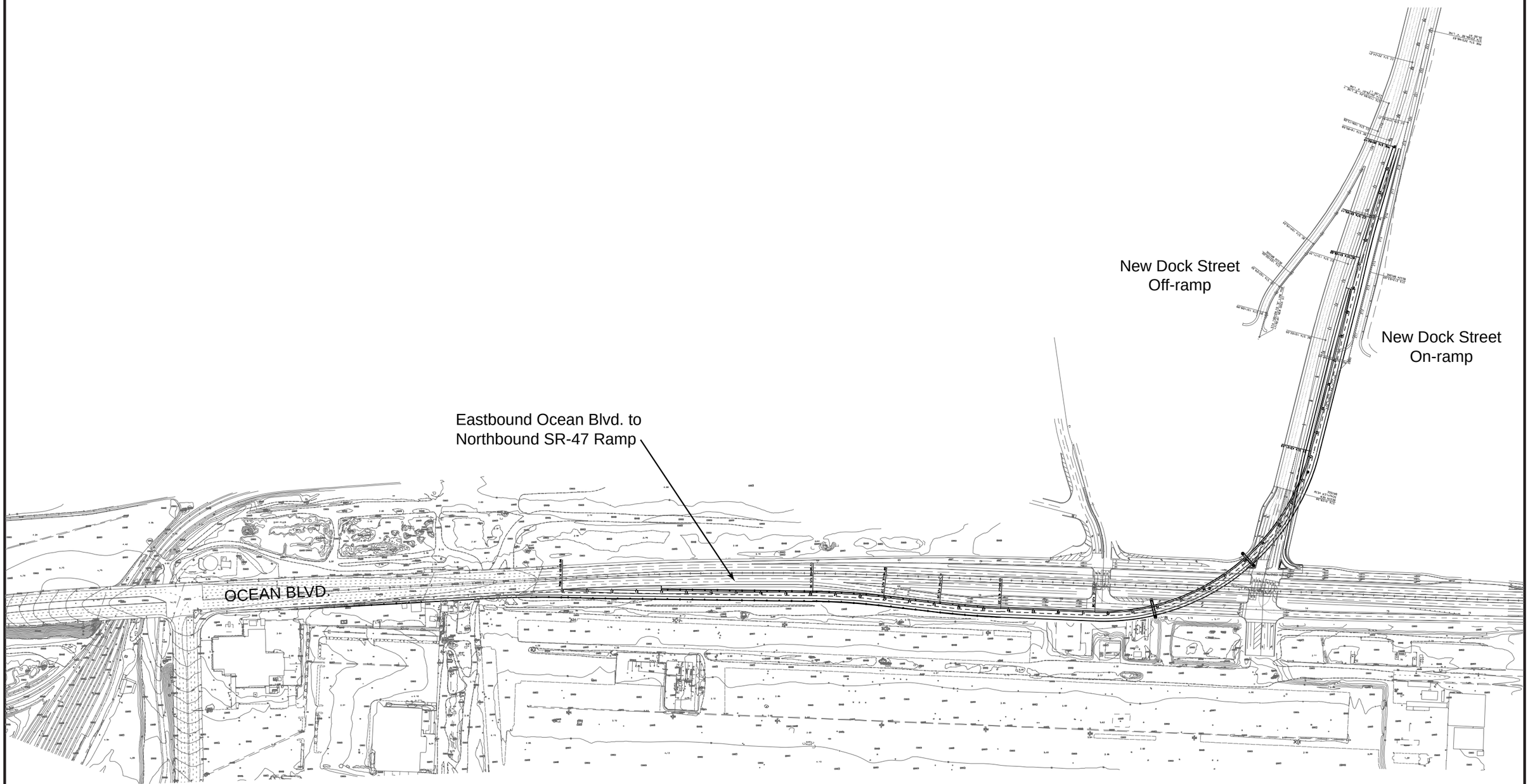
Construction of Alternative 1 is expected to take approximately 2 to 3 years and involve the following major types of activities: demolition, grading/excavation, foundation and bridge abutment/column construction, bridge construction, and expressway construction. Two construction methodologies were considered: cast-in-place (CIP) and segmental. With the conventional CIP methodology, construction would occur within a temporary structure, or "falsework" that is built and then removed once construction has been completed.

The segmental construction method is often used: 1) for bridges with span lengths greater than 91 m (300 ft); and 2) on sites where there are constraints on falsework placement (such as over the Cerritos Channel). This method involves construction of cantilevered segments from each end of the bridge. The cantilevered segments are extended toward each other until they meet in the middle and are connected.

The general construction sequence for the bridge, using the segmental method, would be as follows:

- Construct foundations and columns for the landward ends of the two cantilevered segments.
- Construct two piers, using CIP in the area outside the shipping channel.
- Use cranes to place form travelers on the two piers.
- Launch first traveler and construct first segment on one of the piers. Then launch second traveler and construct a segment on the other pier. Repeat this process until all segments are cast and are nearly touching.
- Cast closure joint.
- Complete superstructure portions with CIP and connect the cantilevered segments at both ends of the new bridge.

With use of the segmental method for constructing the main span of the new bridge, vertical clearance during project construction would be reduced to 12 m (39 ft) or less, resulting in channel restrictions for two periods of 90 days each (once during construction of the east side of the new bridge, and once during construction of the west side of the new bridge). The channel would be closed completely for a period of 5 days to remove the mid-span truss of the old bridge. With the exception of these periods of restriction and closure, the channel would be open for navigation during bridge construction.



Not to Scale

Figure 2-6
Flyover Alignment
Schuyler Heim Bridge Replacement
and SR-47 Expressway

With the CIP method of construction, there would be full closure of the channel for a period of 25 days, intermittent closures for a total 40 days, and channel restrictions for a total of 240 days. With the CIP method of construction, the channel would be open during 180 days of the construction period.

For reasons of cost, the CIP method is proposed for all expressway construction and for most or all bridge construction; the CIP method is approximately 50 percent less expensive than the segmental method. However, segmental construction could be used for portions of the bridge over the Cerritos Channel. The remainder of the bridge would be constructed using the conventional CIP method.

Construction of the Schuyler Heim Bridge replacement would occur prior to, or concurrently with, construction of the SR-47 Expressway. For purposes of this Final EIS/EIR, and to present a worst-case construction scenario, it is assumed that construction of the bridge and expressway would occur simultaneously. This would result in greater noise and air quality impacts, more land needed for construction (such as for laydown areas, vehicle storage), and more complex traffic management requirements than would sequential construction of the new bridge and expressway.

Construction of the bridge, expressway, and flyover proposed under Alternative 1 is described below. The construction schedule is shown in Figure 2-3.

2.2.2.2.1 Bridge Construction

Alternative 1 would require demolition of the existing Schuyler Heim Bridge in two phases, with construction of the new fixed-span bridge also phased to minimize the requirement for bridge closure (estimated to be approximately one month). The first, easterly, portion of the new fixed-span bridge would be constructed just east of the current bridge and then would be opened to traffic. Then the easterly portion of the Schuyler Heim Bridge would be demolished, the second, westerly, portion of the new bridge would be constructed, and the remainder of the Schuyler Heim Bridge would be demolished.

The eastern side of the new fixed-span bridge would be constructed east of the existing lift bridge. The south end of the new bridge would provide for tie-in to Ocean Boulevard or the Ocean Boulevard/SR-47 Flyover. On the north, the new bridge would tie into the northern approach to the existing bridge. The connection to Ocean Boulevard and the northern tie-in are expected to take approximately 2 weeks, during which time the existing bridge would be closed to traffic. Following completion of the tie-ins, traffic on the existing bridge would be diverted to the eastern side of the new bridge, and the existing bridge would be closed.

The eastern side of the existing bridge then would be demolished. Following this, the western side of the new bridge would be constructed adjacent to the newly installed eastern side, and the remainder of the existing bridge would be demolished. The tie-in at Ocean Boulevard would require the new bridge to be closed for approximately 1 to 2 weeks. The new bridge then would be open to traffic. Total closure of the Cerritos Channel crossing during construction is expected to be approximately 4 weeks.

Construction of the portion of the new bridge that is directly over the Cerritos Channel will require access from the north and south sides of the channel. Staging areas and materials storage will occur nearby, including at Pier A West. Material delivery and crane work would be accomplished from multiple barges. Barge work would be used to construct the CIDH

concrete columns to support the new bridge and erect falsework for the spans between the columns. Some temporary driven steel pipe columns, 600 millimeter (mm) (23.6 in) in diameter, would be installed at 6 m (19.6 ft) center-to-center spacing to support construction of the falsework. A structural steel superstructure with heavy timber decking would be constructed between the columns. During erection of the falsework, boat traffic would not be able to pass underneath.

During the anticipated 2- to 3-year construction period, marine traffic in Cerritos Channel would be limited, as temporary navigation openings would be a maximum 22.9 m (75 ft) wide and 13.1 m (43 ft) high. In addition, the channel could be closed for periods up to 30 days. During periods when the channel would be open, traffic could pass through the temporary openings.

Bridge construction would occur in phases. The construction scenario outlined below represents one approach. The construction schedule balances speed of construction with maintaining traffic on the bridge through a portion of the construction period and minimizes bridge closure during construction. As shown in Figure 2-3, these activities overlap during the construction process.

1. Site Preparation/Earthwork

Construction security fencing would be installed; rough grading would follow. Grading would focus on the north and south banks of the Cerritos Channel within the right-of-way for the new bridge. The banks of the channel then would be stabilized with permanent or temporary retaining walls, as necessary. It is expected that cut and fill would be balanced for this activity. This phase is estimated to require approximately 1 month to complete.

2. Drilled Shafts

This phase would involve drilling for the estimated four pairs of column foundations that would be needed to support the bridge in the Cerritos Channel. Each column foundation would be supported by 9 to 16 CISS piles and foundations, or one CIDH pile. Excavated material would be removed and used for fill, or disposed of in an approved landfill. Any material found to be contaminated would be analyzed to identify the type and level of contamination, then transported for disposal in an approved landfill.

At each foundation site, the excavated foundation would be fitted with reinforcing steel, and concrete would be poured to form the foundation and pile cap. The column foundations, with pile caps, then would be ready for the vertical columns to be installed. This phase would require an estimated 24 months to complete.

3. Footings

Some CISS piles would require additional footing construction to adequately support the column. This phase would require an estimated 13 months to complete.

4. Column Installation

Column installation would begin at the same time or after the drilled shaft work is completed. The columns would be spaced approximately 47 m to 75 m (154 ft to 246 ft) apart to support the fixed-span bridge. Each column would be approximately 2.1 m to 2.7 m (7 to 9 ft) in diameter.

At each column location, a steel reinforcing cage would be assembled, and forms would be installed around the cages. Concrete would be brought to the site in ready-mix trucks and poured into the forms. After a suitable curing period, the forms would be stripped. This phase would require an estimated 11 months to complete.

5. Falsework

Shortly after beginning column installation, wooden falsework would be constructed at each pair of columns to support completion of the overhead portions of the bridge. Falsework would consist of heavy timbers used to support the overhead installation reinforcing steel, and subsequent pouring of bent supports to connect each pair of columns. As an alternative, the bent supports may be precast concrete that would be brought to the site on flatbed trucks transferred to barges, and lifted onto the columns by cranes. During this phase, warning signs and night lighting would be utilized, as necessary, to alert marine traffic of the presence of construction structures. This phase would require an estimated 17 months to complete.

6. Approach Span Erection

When the falsework for the approach span is completed, installation would begin by constructing the bridge support structure (bents tying the four columns together) with steel and reinforced concrete. Overhead forms would be placed; then concrete would be poured and cured. The forms would be stripped as the final step. This phase would require an estimated 13 months to complete.

7. Main Span Erection

With a substantial portion of the falsework in place, installation of the main-span superstructure would begin. This would consist of the bents connecting the pairs of columns, and subsequently the bridge support structure, which would consist of structural steel and reinforced concrete. Just as in other poured-in-place installations, overhead forms would be installed around each section of the superstructure, concrete would be poured and cured, and forms would be stripped. This phase would result in the completion of the structural section of the main span. This phase would require an estimated 25 months to complete.

8. Bridge Demolition

For this phase, the existing bridge superstructure and piers would be removed. The pile caps would remain, except for a small portion of the existing main-span footing, which would be removed to allow placement of several CISS piles in the channel. If the bridge is not sold for reuse in an alternate location, the port does not object to leaving the existing bridge pile caps in place, provided they are cut off and appropriately as-built marked. The superstructure would be sent to a scrap metal exporting terminal. While there is no existing steel recycling mill in the POLB or POLA, there are several scrap metal exporting terminals at both ports. Because lead paint is likely to be encountered on the old superstructure, special measures would be employed during demolition to prevent lead contamination. A lead-based paint and asbestos survey would be conducted. If lead and/or asbestos were encountered at levels higher than the mandated thresholds, these materials would be removed from the steel for disposal prior to recycling. This demolition phase would require an estimated 17 months to complete.

9. Barriers and Joints

Once the approach and main-span decks have been completed, construction of the deck barriers and joints would begin. The deck barriers would consist of forms and reinforced concrete to provide vehicle protection along both the outside portions of the structure and the center divider. Joints would consist of forms and reinforced concrete to tie together each segment of the bridge and expressway structure, and allow for expansion and contraction of the road surface. This phase would require an estimated 18 months to complete.

10. Striping, Lighting, and Signing

This phase would provide the finish elements of the bridge. The surface would be striped for the prescribed number of traffic lanes, and lighting fixtures and signage would be installed. After this step, the bridge would be open for service. This phase would require an estimated 12 months to complete.

2.2.2.2.2 SR-47 Expressway Construction

Prior to construction, it would be necessary to acquire public and private properties. Properties needed for the expressway would be purchased and cleared of above-grade improvements. As necessary, at all construction sites along the expressway, either local traffic would be detoured, or the nearby street system would be striped to allow sufficient room for the movement of construction vehicles and equipment.

Construction stages for the SR-47 Expressway are described below.

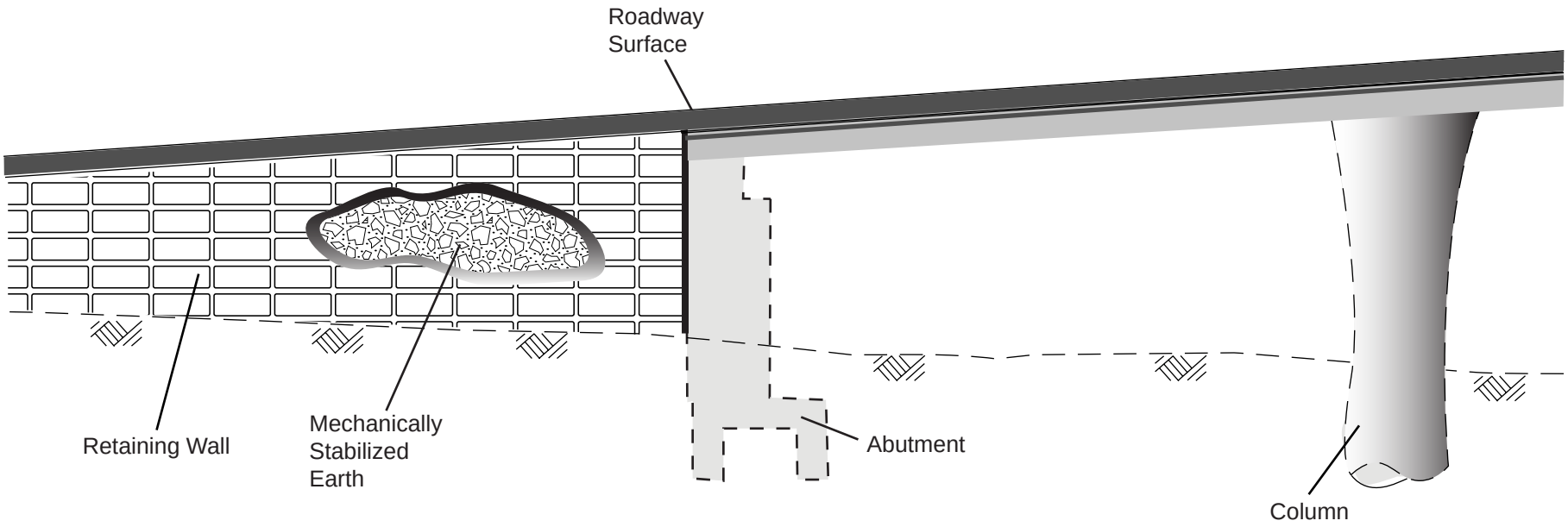
1. Site Preparation/Earthwork

Construction security fencing would be installed and rough grading would follow. Grading would focus on the northern end of the alignment, where the elevated expressway would return to grade on an MSE embankment supported on either side by concrete retaining walls (Figure 2-7). Earthwork is anticipated to include movement of approximately 58,106 cubic meters (76,000 cubic yards) of earth, with approximately 9,175 cubic meters (12,000 cubic yards) being imported material. The borrow site for imported material will be determined by the construction contractor. The borrow material will be required to be "clean." This phase would require an estimated 9 months to complete.

2. Drilled Shafts and Foundations

Foundation work would begin approximately 4 months after initiating earthwork. This phase would involve approximately 31,347 cubic meters (41,000 cubic yards) of excavation for the estimated 60 pairs of column foundations that would be needed to support the elevated expressway. Each column foundation would be supported by 9 to 16 CISS piles. Excavated material that is not useable on the construction site would be used as fill elsewhere or transported for disposal in an approved landfill. Any material found to be contaminated would be analyzed to identify the type and level of contamination, and then transported for disposal in an approved landfill.

At each foundation site, the excavated foundation would be fitted with reinforcing steel, and concrete would be poured to form the foundation and pile cap. The column foundations, with pile caps, then would be ready for installation of the vertical columns. This phase would require an estimated 23 months to complete.



— — — ground level

Not to scale

Figure 2-7
Typical MSE Wall
Schuyler Heim Bridge Replacement
and SR-47 Expressway

3. Column Installation

Column installation would begin shortly after the foundation work begins, with work progressing along the corridor in one or two work units, as required by the schedule. The estimated 60 pairs of columns would be spaced approximately 47 m to 75 m (154 to 246 ft) apart to support the elevated expressway. Each column would be approximately 2.1 m to 2.7 m (7 to 9 ft) in diameter.

At each column location, a steel reinforcing cage would be assembled, and forms would be installed around the cages. Concrete would be brought to the site in ready-mix trucks and poured into the forms. After a suitable curing period, the forms would be stripped. This phase would require an estimated 23 months to complete.

4. Falsework

Shortly after beginning column installation, wooden falsework would be constructed at each pair of columns to support completion of the overhead portions of the elevated expressway. Falsework would consist of heavy timbers used to support the overhead installation reinforcing steel, and subsequent pouring of bent supports to connect each pair of columns. As an alternative, the bent sections may be precast concrete that would be brought to the site on flatbed trucks and lifted onto the columns by cranes. During this phase, warning signs and night lighting would be utilized, as necessary, to alert oncoming motorists of the presence of construction structures. This phase would require an estimated 17 months to complete.

5. Superstructure

With a substantial portion of the falsework in place, installation of the overhead expressway superstructure would begin. The superstructure would consist of the bents connecting the pairs of columns, and subsequently the expressway support structure, which would consist of structural steel and reinforced concrete. Just as in other poured-in-place installations, overhead forms would be installed around each section of the superstructure, concrete would be poured and cured, and forms would be stripped. This phase would result in the completion of the structural section of the elevated expressway, approaches, and ramps. This phase would require an estimated 25 months to complete.

6. Drainage

This phase would begin about midway through the superstructure phase, whereby drainage facilities would be installed in the overhead elevated expressway and appurtenant structures. These would consist of storm drain main pipes, manholes, horizontal and vertical pipes, connectors, pump stations, catch basins, and special structures. This phase would require an estimated 24 months to complete.

7. Retaining Walls and Soundwalls

This phase would involve installation of the MSE retaining walls and sound-attenuation walls required at the north end of the proposed expressway where the elevated expressway returns to grade, south of Pacific Coast Highway. For the retaining walls, reinforcing steel first would be set in place; then forms would be installed and concrete poured. After a suitable curing period, the forms would be stripped.

For the soundwalls, foundations would be installed, and then the soundwalls would be constructed, typically by placing concrete block in lifts to achieve the desired height, as prescribed by the noise abatement measures. This phase would require an estimated 6 months to complete.

8. Striping/Lighting/Signing

This phase would provide the finish elements of the expressway. The surface would be striped for the prescribed number of traffic lanes, and lighting fixtures and signage would be installed. After this step, the expressway would be open for service. This phase would require an estimated 24 months to complete.

2.2.2.2.3 Flyover Construction

Construction of the Ocean Boulevard/SR-47 Flyover would be conducted independently of other Alternative 1 construction activities (bridge replacement and expressway) and is expected to be phased over a period of 1 year.

Prior to beginning construction, public and/or private properties would be acquired and above-grade improvements would be cleared, as necessary, for permanent and temporary surface and aerial easements within the flyover right-of-way. In addition, local traffic would be detoured, or the adjacent street system would be striped to allow sufficient room for the movement and operation of construction vehicles and equipment.

Construction of the flyover would be as described below.

1. Site Preparation/Earthwork

For this phase, construction security fencing would be installed; rough grading would follow. Grading would begin along the western end of the alignment, where the flyover would begin, and progress easterly. Earthwork is anticipated to include movement of approximately 11,980 cubic meters (15,660 cubic yards) of earth, with approximately 11,670 cubic meters (15,260 cubic yards) being imported material. This phase would require an estimated 6 months to complete.

2. Drilled Shafts and Foundations

Foundation work would begin approximately 2 weeks after initiating earthwork. This phase would involve approximately 311 cubic meters (400 cubic yards) of excavation for the estimated 11 column foundations that would be needed to support the elevated portion of the flyover. Each column foundation would be supported by a CIDH pile. Excavated material that is not useable on the construction site would be used as fill elsewhere or would be transported for disposal in an approved landfill. Any material found to be contaminated would be analyzed to identify the type and level of contamination and then transported for disposal in an approved landfill.

At each foundation site, the excavated foundation would be fitted with reinforcing steel, and concrete would be poured to form the foundation and pile cap. The column foundations, with pile caps, then would be ready for the vertical columns to be installed. This phase would require an estimated 2 months to complete.

3. Column Installation

Column installation would begin shortly after the column's foundation work begins, with work progressing eastward along the flyover alignment in one or two work units, as required by the schedule. The estimated 11 columns would be spaced approximately 60 m

to 80 m (197 to 262 ft) apart to support the elevated portion of the flyover structure. Each column would be approximately 2,135 m to 3,660 m (7 to 12 ft) in diameter.

At each column location, a steel reinforcing cage would be assembled, and forms would be installed around the cages. Concrete would be brought to the site in ready-mix trucks and poured into the forms. After a suitable curing period, the forms would be stripped. This phase would require an estimated 2 months to complete.

4. Falsework

Shortly after beginning column installation, wooden falsework would be constructed at each pair of columns to support completion of the overhead portions of the flyover. Falsework would consist of heavy timbers used to support the overhead installation reinforcing steel, and subsequent pouring of bent supports to connect each pair of columns. As an alternative, the bent sections may be precast concrete that would be brought to the site on flatbed trucks and lifted onto the columns by cranes. During this phase, warning signs and night lighting would be utilized, as necessary, to alert oncoming motorists of the presence of construction structures and activities. This phase would require an estimated 2 months to complete.

5. Superstructure

With a substantial portion of the falsework in place, installation of the overhead superstructure would begin. The superstructure would consist of bents connecting the pairs of columns, and subsequently the flyover support structure, which would consist of structural steel and reinforced concrete. Just as in other poured-in-place installations, overhead forms would be installed around each section of the superstructure, concrete would be poured and cured, and forms would be stripped. This would result in the completion of the structural section of the flyover and approach onto the bridge. This phase would require an estimated 5 months to complete.

6. Drainage

This phase would begin about midway through the superstructure phase, whereby drainage would be installed in the overhead flyover and appurtenant structures. Drainage structures would consist of storm drain main pipes, manholes, horizontal and vertical pipes, connectors, catch basins, and special drainage structures. This phase would require an estimated 1 month to complete.

7. Retaining Walls

This phase would involve installation of MSE retaining walls for a distance of 600 m (1,970 ft) from the approximate center of the flyover, where it rises from grade to cross over Ocean Boulevard. For the retaining walls, reinforcing steel first would be set in place; then forms would be installed and concrete poured. After a suitable curing period, the forms would be stripped. This phase would require an estimated 5 months to complete.

8. Striping/Lighting/Signing

This phase would provide the finish elements of the flyover. The road surface would be striped for the prescribed one or two traffic lanes, and lighting fixtures and signage would be installed. The flyover then would be open to traffic. This phase would require an estimated 1 month to complete.

2.2.2.3 Alternative 1A: Bridge Haunch Design

Alternative 1A provides a structural variation of the replacement bridge described under Alternative 1 and would cost approximately 11 percent less than the traditional bridge described under Alternative 1. The alternative bridge design and elevations are shown in Appendix B.2. Alternative 1A is proposed to improve the aesthetics of the replacement bridge over the Cerritos Channel. As under Alternative 1, this alternative includes construction of the SR-47 Expressway and the Ocean Boulevard/SR-47 Flyover. Other aspects of this alternative, including the bridge, expressway, and flyover construction schedules, would be the same as Alternative 1. As with Alternative 1, Alternative 1A extends from KP 4.4 to 9.3 (PM 2.7 to 5.8).

The Alternative 1A bridge haunch design is accomplished by increasing the span lengths over the channel and using parabolic superstructure soffits within these spans. The locations of superstructure hinges and structural frame lengths would be adjusted to better fit this alternative.

As a result of the increased span lengths, Alternative 1A has four columns (two pairs) in the Cerritos Channel (13 and 14), compared to eight columns (four pairs) in Alternative 1 (14, 15, 16 and 17). Further, columns 12 and 13 in Alternative 1A are closer to the channel edges than the columns in Alternative 1.

With this alternative, vertical clearance of the new bridge would be 14.3 m (47 ft) over the MHWL, the same as for Alternative 1. While the navigable channel width (clear distance between bridge support columns) is 102 m (334.6 ft), the vertical clearance of 14.3 m (47 ft) would be maintained only over a width of 54.9 m (180 ft). It is proposed that the fender system be placed at the same location as specified in Alternative 1; this would limit the width of the navigation channel to 54.9 m (180 ft), the same as the width of the existing navigation channel. A portion of the existing bridge columns may be utilized as part of the fender support system.

The proposed columns at bents 13 and 14 of Alternative 1A require 3-m (10-ft) diameter columns with 3.7-m (12-ft) diameter CISS shafts. At other locations, the proposed column diameter is 2.1 m (7 ft), and the supporting shafts are 2.7 m (9 ft) in diameter. The depth of the frame over the Cerritos Channel (Frame 4) varies from a minimum of 2.6 m (8.5 ft) at mid-span, to a maximum of 5.0 m (16.5 ft) at the face of the columns.

2.2.3 Alternative 2: SR-103 Extension to Alameda Street

2.2.3.1 Description

Under Alternative 2, the Schuyler Heim Bridge would be replaced, and the flyover would be constructed as in Alternative 1. With this alternative, SR-103 would be extended as a four-lane elevated expressway, beginning approximately 0.8 km (0.5 mi) north of Pacific Coast Highway and extending to Alameda Street, just south of 223rd Street/Wardlow Road (Figures 2-8, and 2-9a through 2-9f). The SR-103 Extension would be designed to specific Caltrans geometric standards for expressways, with limited access and a posted speed limit of 80 km (50 mi) per hour. Representative elevations for Alternative 2 are shown in Appendix B.3. Alternative 2 would extend from SR-47 KP 4.4 to SR-47 KP 7.3 (PM 2.7 to 4.5) and SR-103 KP 3.2 to SR-103 KP 6.5 (PM 2.0 to 4.0).

Legend

- Ocean Boulevard/SR-47 Flyover
- Existing SR-103
- Expressway Alignment
- Wardlow Road/223rd Street Ramp

0 2,800 Feet

0 1,000 Meters

Aerial Date: February 2006, AirPhotoUSA

Note: Project components not to scale

Figure 2-8
Alternative 2: Overview of SR-103 Extension to Alameda Street
Schuyler Heim Bridge Replacement and SR-47 Expressway

LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

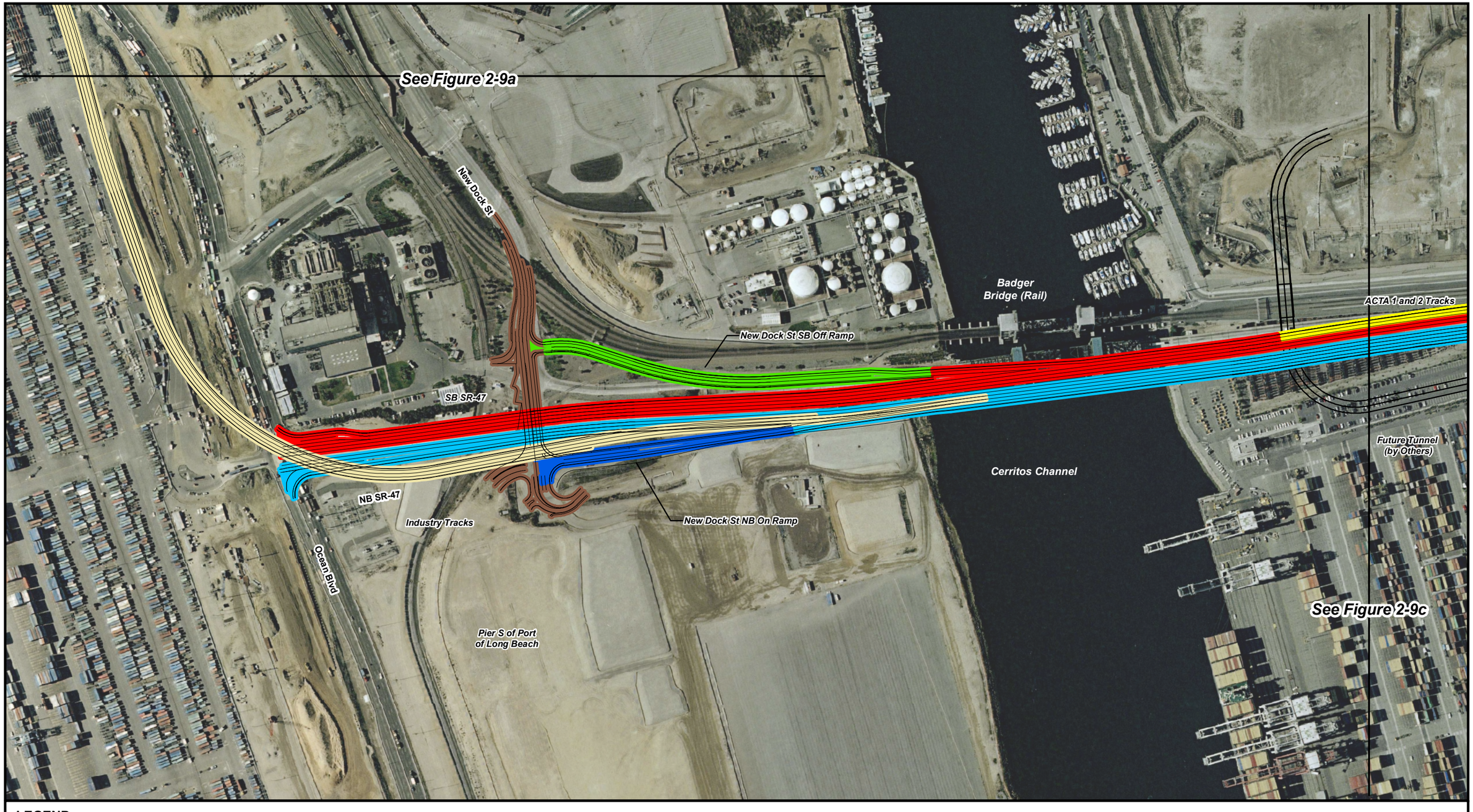
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-9a
Alternative 2: SR-103 Extension to Alameda Street
Schuyler Heim Bridge Replacement
and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

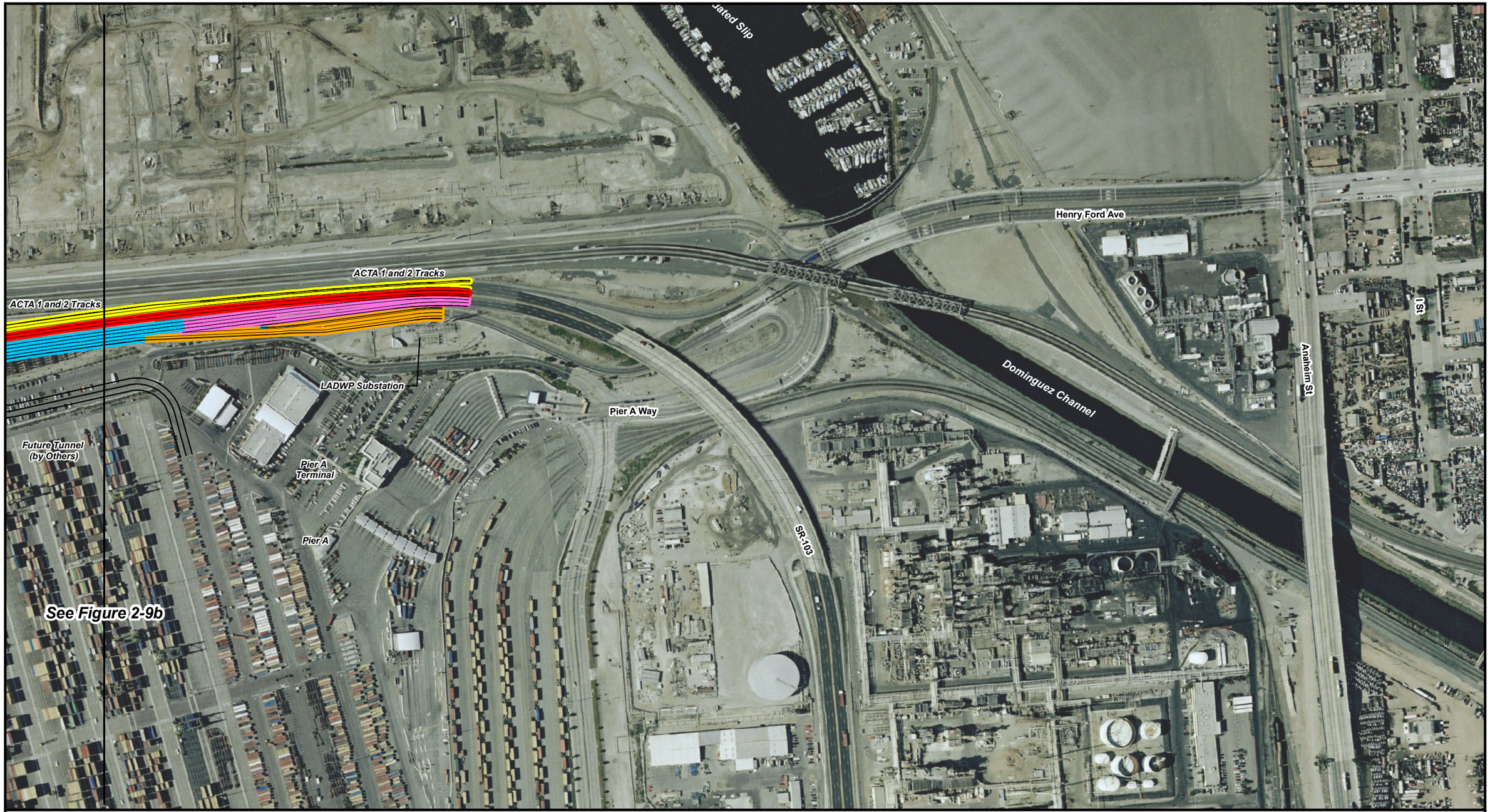
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-9b
Alternative 2: SR-103 Extension to Alameda Street
Schuyler Heim Bridge Replacement and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

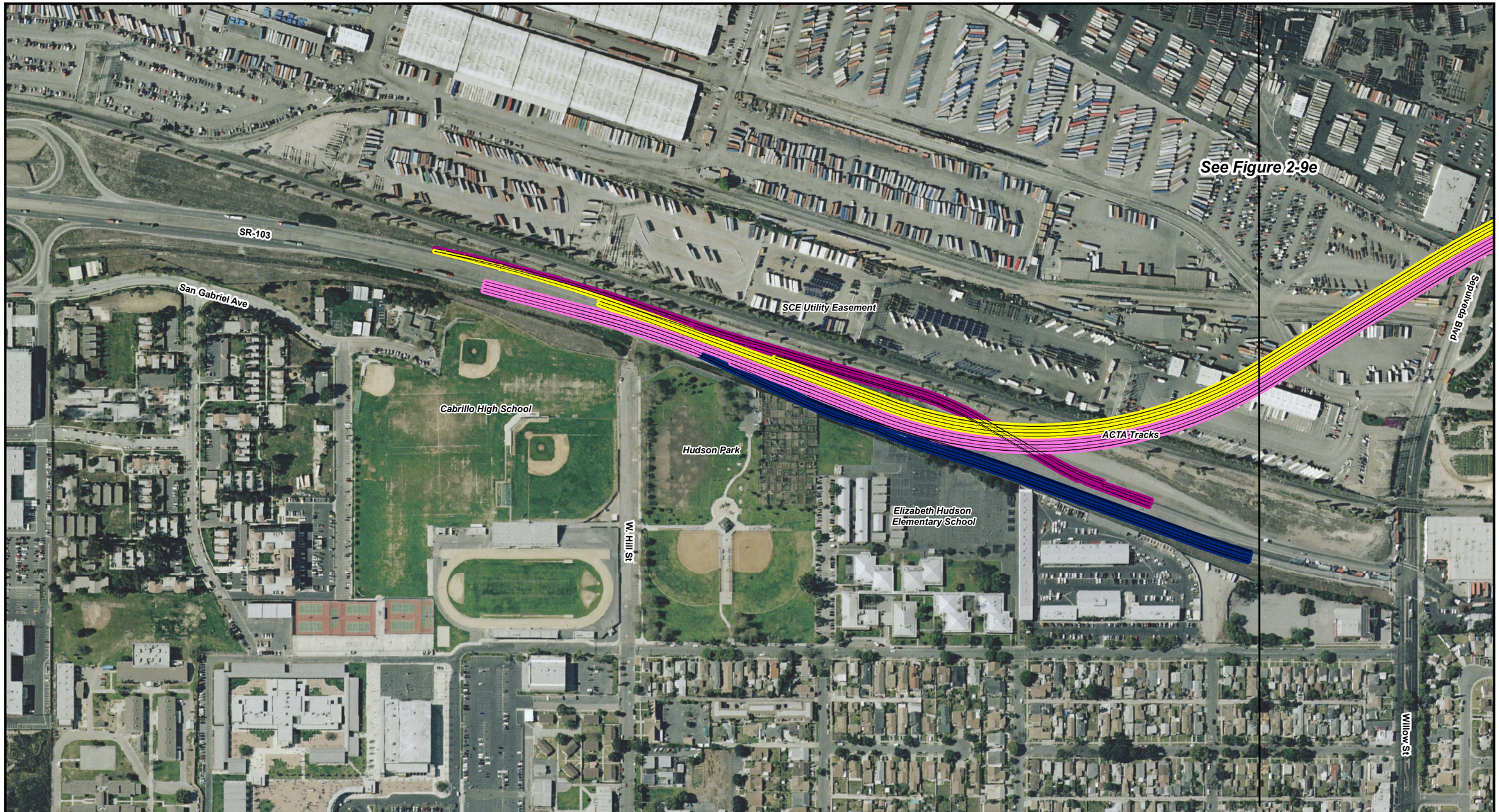
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-9c
Alternative 2: SR-103 Extension to Alameda Street
Schuyler Heim Bridge Replacement
and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

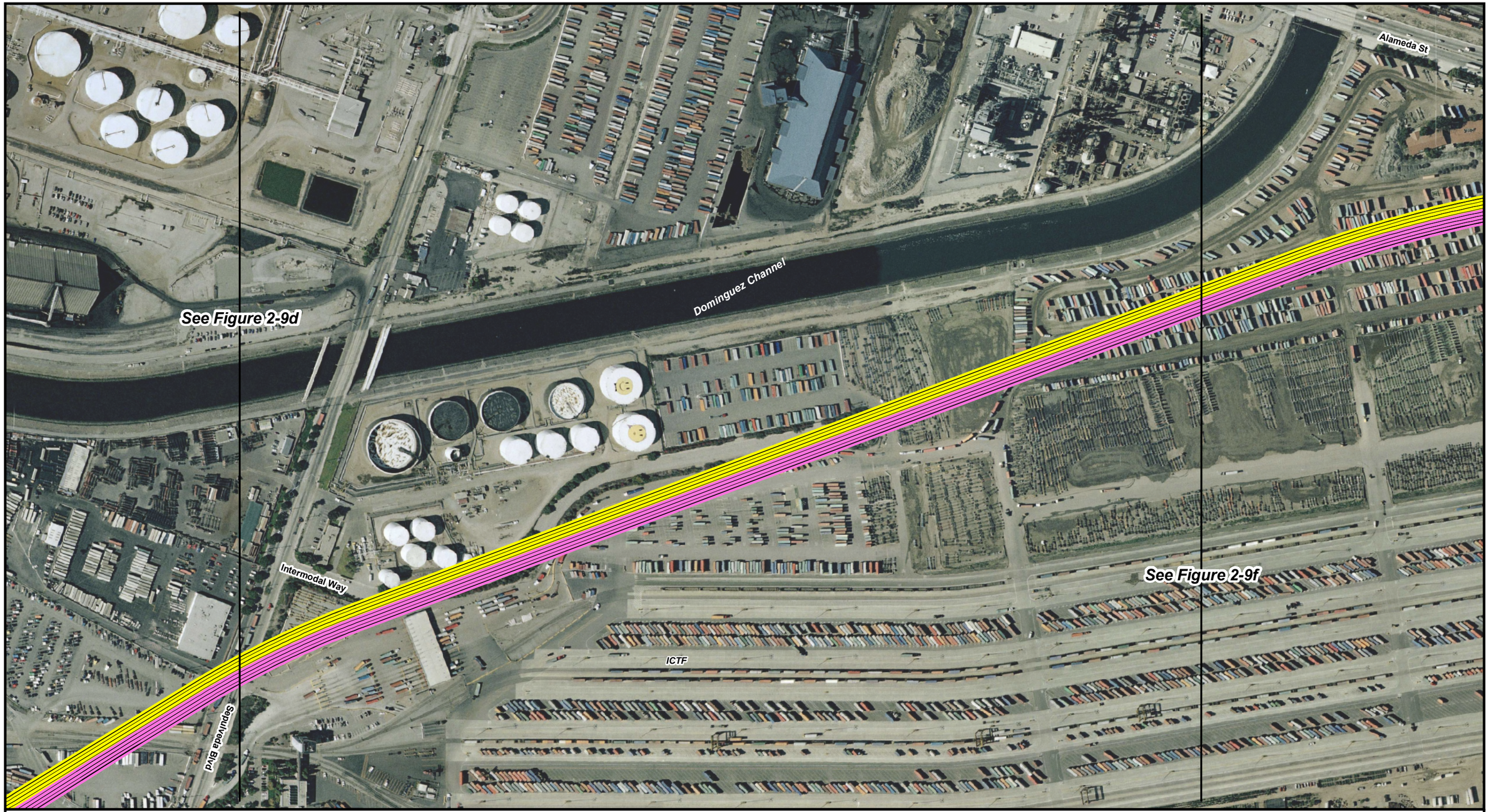
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-9d
Alternative 2: SR-103 Extension to Alameda Street
Schuyler Heim Bridge Replacement
and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

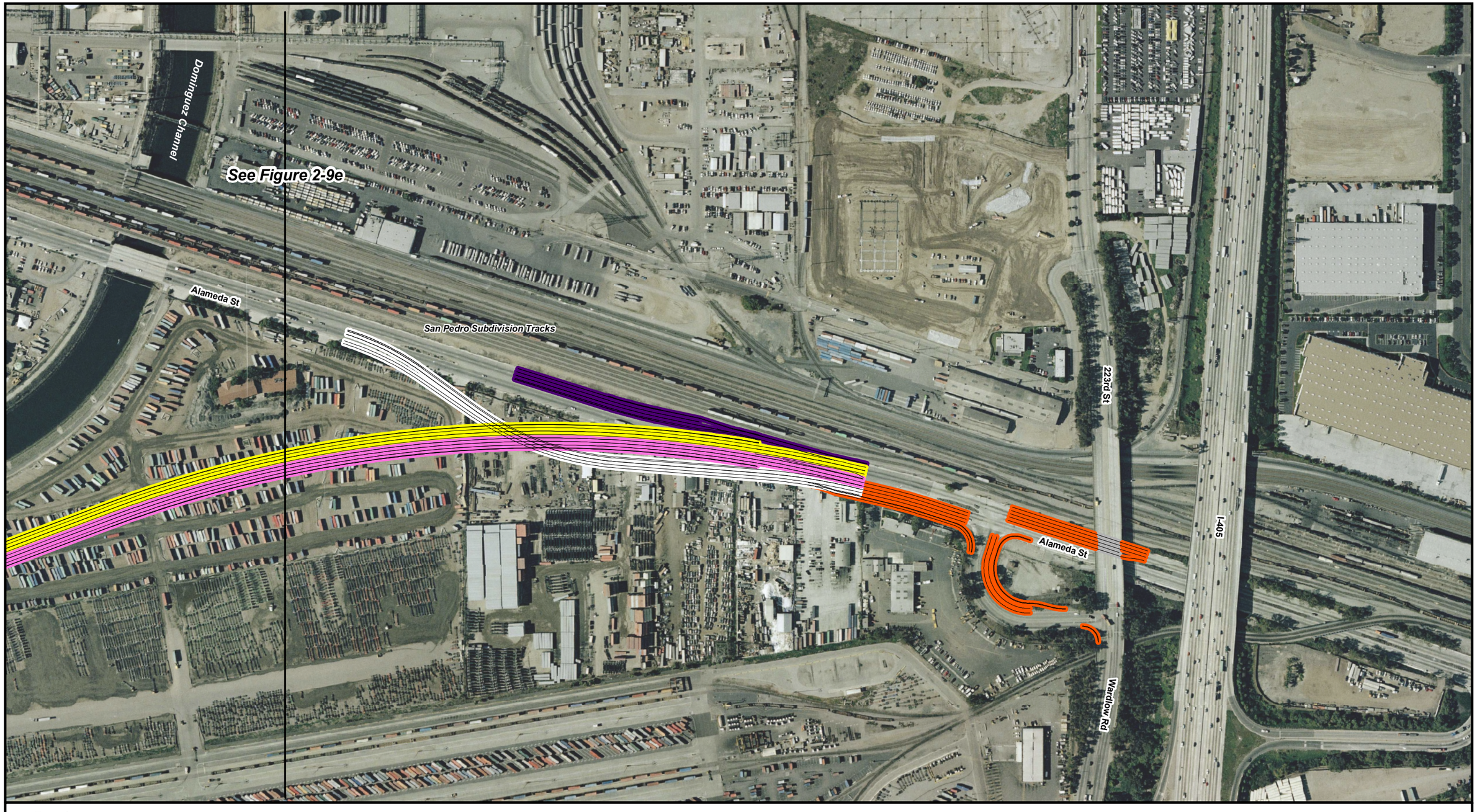
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-9e
Alternative 2: SR-103 Extension to Alameda Street
Schuyler Heim Bridge Replacement
and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-9f
Alternative 2: SR-103 Extension to Alameda Street
Schuyler Heim Bridge Replacement
and SR-47 Expressway

2.2.3.1.1 Bridge Replacement

Under Alternative 2, the bridge replacement would include a southbound off-ramp and northbound on-ramp at New Dock Street on Terminal Island. In addition, the bridge approaches would be modified to maintain connectivity to SR-47 and SR-103 north and south of the bridge.

Other elements regarding replacement of the Schuyler Heim Bridge would be the same as under Alternative 1.

2.2.3.1.2 SR-103 Extension

Improvements to SR-103 would begin approximately 3.2 km (2 mi) north of the Cerritos Channel, near the intersection of West Hill Street and SR-103. At a location approximately 0.4 km (0.25 mi) further north, SR-103 would be extended to the northwest on an elevated expressway to join Alameda Street just south of 223rd Street/Wardlow Road, a distance of approximately 2.6 km (1.6 mi). The elevated expressway would begin approximately at West Hill Street and extend to a location east of Alameda Street and south of the Wardlow Road on-ramp (Figure 2-8). The elevated expressway would rise from the existing at-grade SR-103 to approximately 18 m (60 ft) above grade, then make a transition to the north and west, crossing over the Union Pacific Railroad (UPRR) manual yard and San Pedro Branch, through the Southern California Edison (SCE) utility corridor, across the Los Angeles Harbor Department Warehouse 16/17 area, and over Sepulveda Boulevard. The elevated expressway then would parallel the western boundary of the intermodal container transfer facility (ICTF), moving northwest to transition to Alameda Street. The elevated expressway would transition to grade approximately 243.8 m (800 ft) south of the Wardlow Road on-ramp to I-405.

Also, northbound Alameda Street will be modified to provide dual right-turn lanes to the 223rd Street/Wardlow Road connector ramp, and southbound Alameda Street will be modified to provide dual left-turn lanes to the connector ramp. In addition, the connector ramp will be modified to provide: dual right-turn lanes from the connector ramp onto northbound Alameda Street; dual left-turn lanes from the connector ramp onto southbound Alameda Street; and an optional left- or right-turn lane onto 223rd Street/Wardlow Road (Figure 2-9f). These changes will be made by restriping the ramp and Alameda Street and resignalization of the intersection.

Widening and operational improvements would be made to the existing SR-103 to accommodate the southerly end connections of the proposed alignment and to Alameda Street to accommodate the northerly end connections south of Wardlow Road.

2.2.3.1.3 Flyover

The flyover would be constructed as described for Alternative 1. However, for this alternative, the right lane of the flyover would join SR-47 on the bridge, then it would continue to SR-103.

2.2.3.2 Construction Activities

2.2.3.2.1 Bridge Construction

Under Alternative 2, construction of the Schuyler Heim Bridge would be the same as described for Alternative 1.

2.2.3.2.2 SR-103 Extension Construction

Under Alternative 2, construction sequencing for the SR-103 Extension would be the same as for the SR-47 Expressway under Alternative 1. However, there would be a difference in the amount of material needed for earthwork. For Alternative 2, earthwork is anticipated to include movement of approximately 116,212 cubic meters (152,000 cubic yards) of earth, with approximately 18,349 cubic meters (24,000 cubic yards) being imported material.

This would be needed for the MSE support structures where the SR-103 Extension would transition from grade to elevated expressway at the south end of the alignment and from elevated expressway to grade at the north end of the alignment.

2.2.3.2.3 Flyover Construction

Under Alternative 2, construction of the flyover would be the same as described for Alternative 1.

2.2.4 Alternative 3: Bridge Demolition Avoidance

This alternative is provided as a means of constructing a new bridge over the Cerritos Channel and, at the same time, preserving the existing bridge. The Schuyler Heim Bridge has been determined to be a historic property and is eligible for listing in the National Register of Historic Places (NRHP). With Alternative 3, the existing bridge would be retrofitted and left in place, but would not be used. However, according to the U.S. Coast Guard, when a bridge is no longer used for its permitted purpose of providing land transportation, the bridge shall be removed from the waterway. Therefore, removal of the existing Schuyler Heim Bridge would be included as a condition of the federal permit for the replacement bridge. Nonetheless, this alternative is presented as a means of preserving a historic resource. Alternative 3 would extend from SR-47 KP 4.4 to 9.3 (PM 2.7 to 5.8).

2.2.4.1 Description

Under Alternative 3, a new bridge would be constructed east of, and without disturbance to, the existing Schuyler Heim Bridge, which would remain in place. The flyover and the SR-47 Expressway would be constructed as described under Alternative 1 (see Figures 2-10a through 2-10e).

2.2.4.1.1 Bridge Replacement

Under this alternative, a new fixed-span bridge would be constructed as described under Alternative 1, but it would have a more easterly alignment in order to avoid the existing lift bridge. The new bridge would have the same lane configuration as the bridge described under Alternative 1. This alternative would include a southbound off-ramp and northbound on-ramp at New Dock Street on Terminal Island, as well as a northbound off-ramp and southbound on-ramp at Henry Ford Avenue on the mainland side of the bridge. The elevations for this alternative are shown in Appendix B.4.

The existing Schuyler Heim Bridge would no longer be used for transportation purposes once the new bridge is operational.

LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

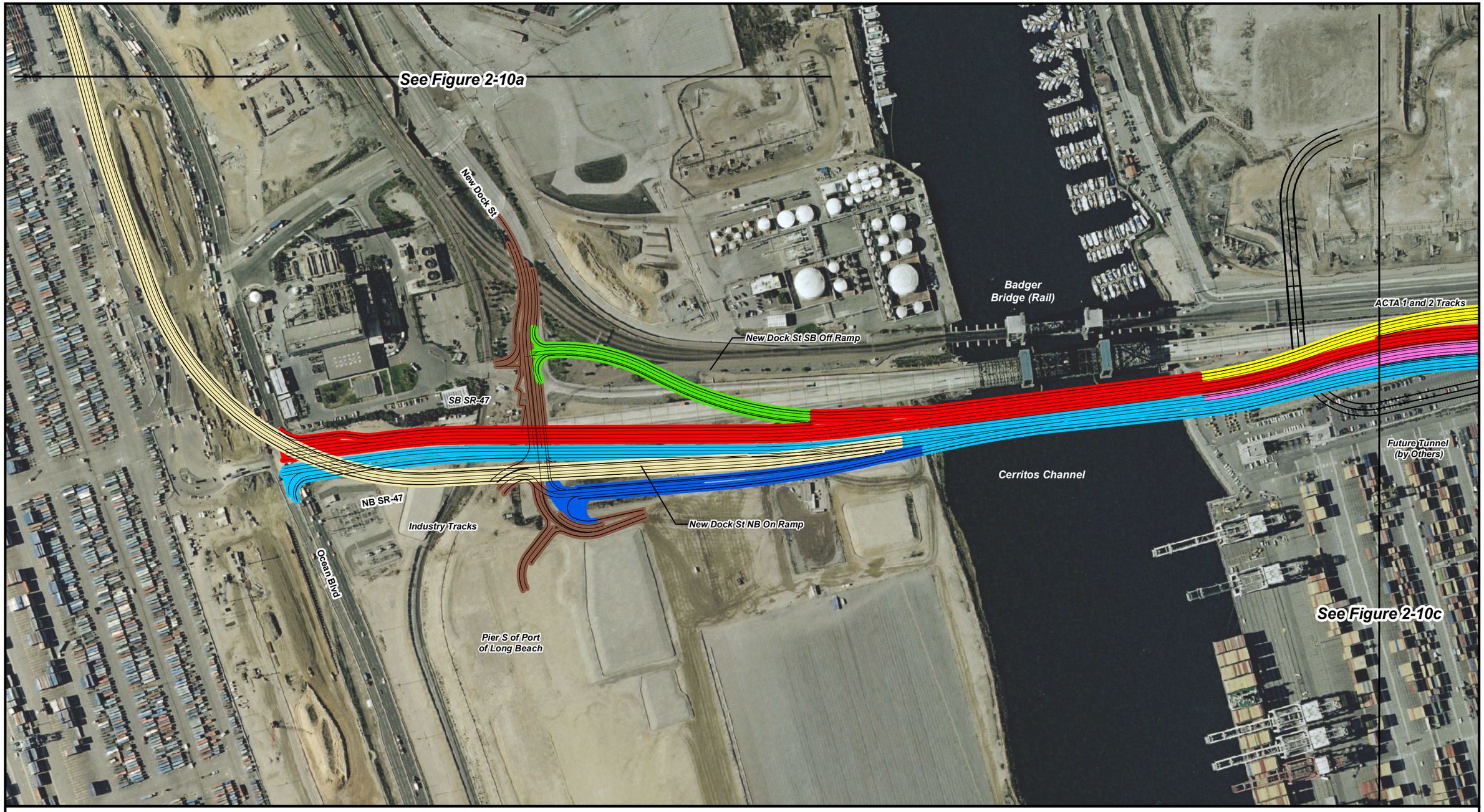
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-10a
Alternative 3: Bridge Demolition Avoidance
Schuyler Heim Bridge Replacement
and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

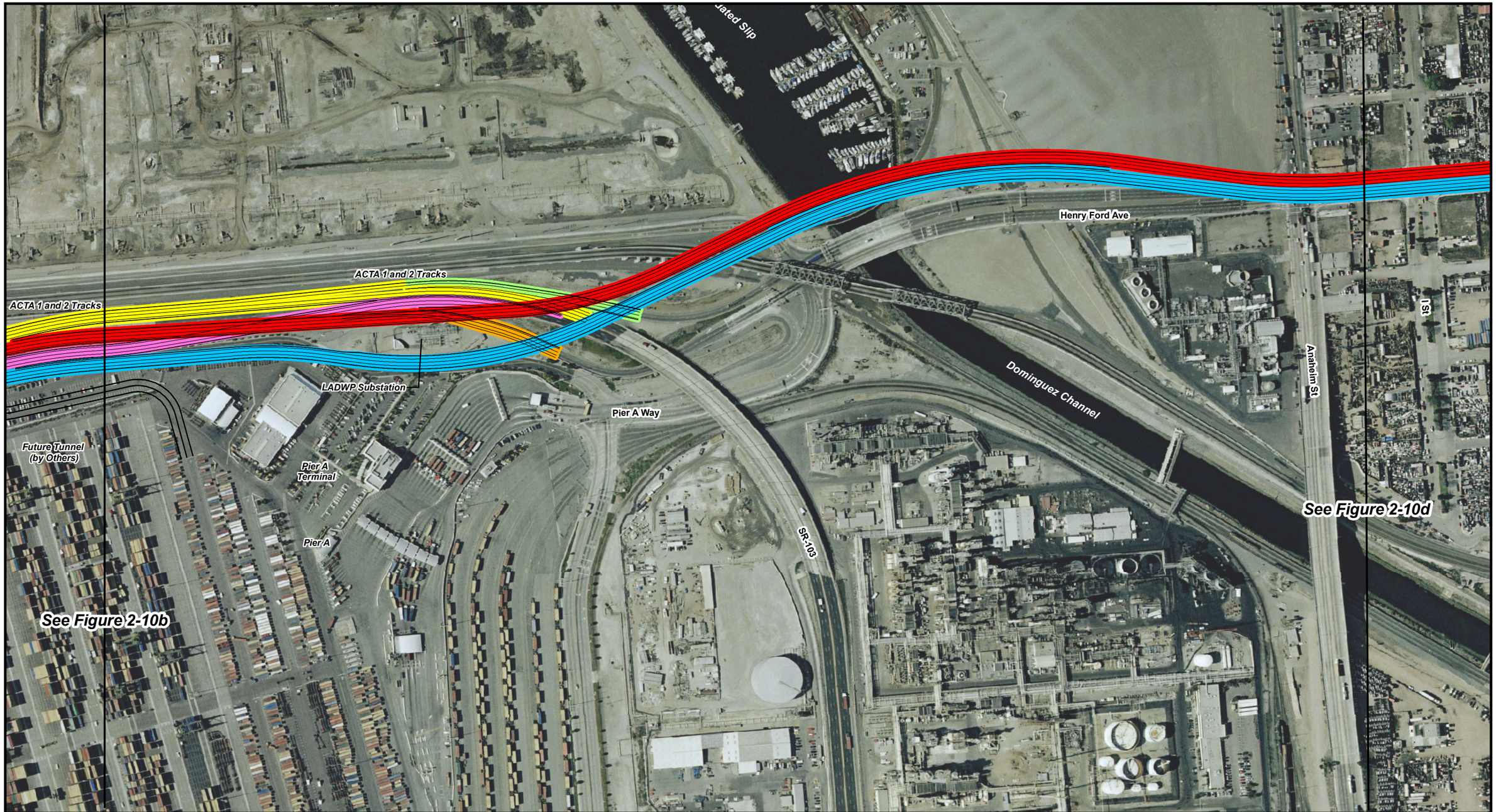
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-10b
Alternative 3: Bridge Demolition Avoidance
Schuyler Heim Bridge Replacement and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

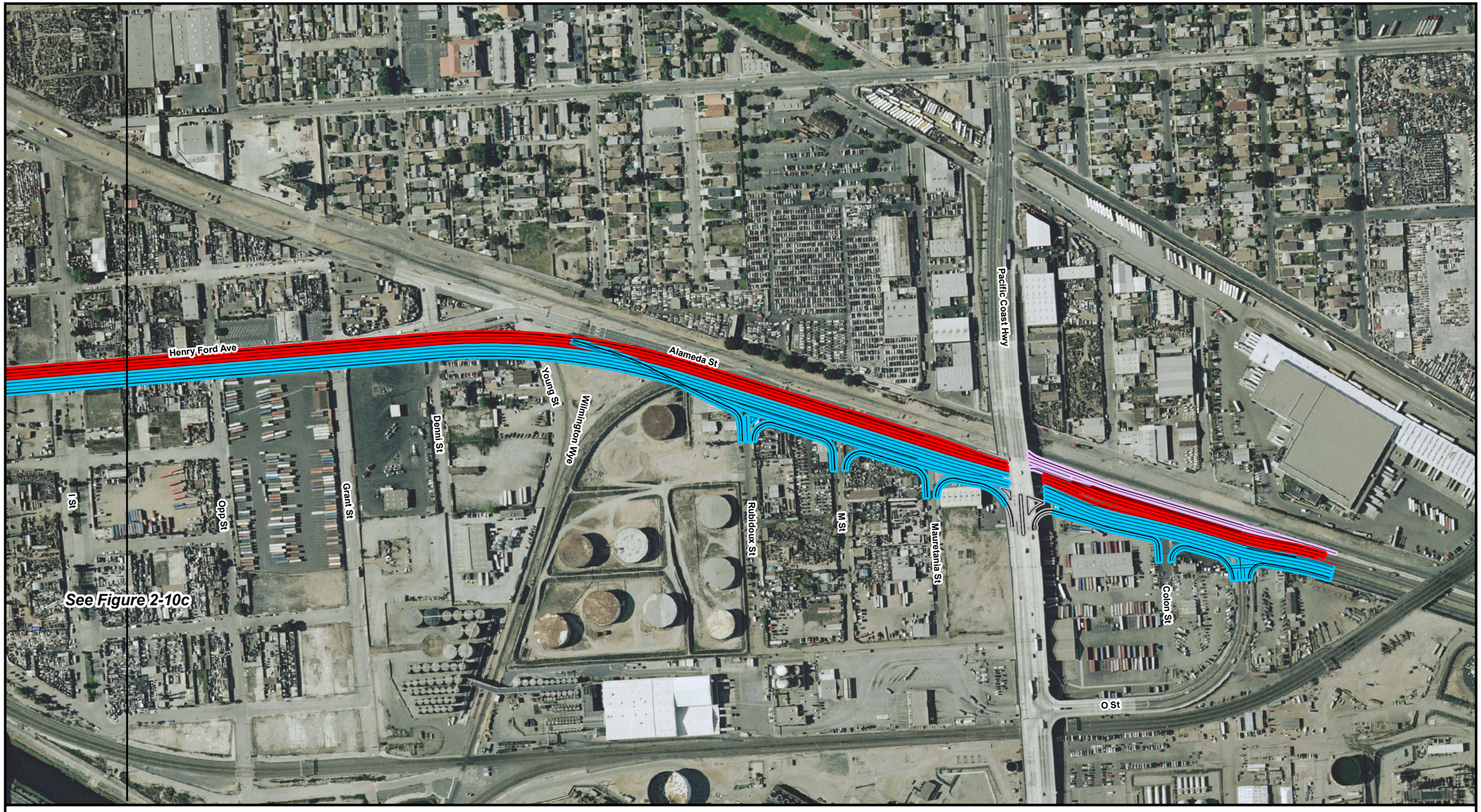
0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-10c
Alternative 3: Bridge Demolition Avoidance
Schuyler Heim Bridge Replacement and SR-47 Expressway



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation.
Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-10d
Alternative 3: Bridge Demolition Avoidance
Schuyler Heim Bridge Replacement
and SR-47 Expressway

LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-10e
Alternative 3: Bridge Demolition Avoidance
Schuyler Heim Bridge Replacement
and SR-47 Expressway

For Alternative 3, the retrofit would be consistent with the retrofit project described in the 1998 Initial Study/Environmental Assessment (IS/EA) (Caltrans 1998b), including measures to mitigate impacts to historic resources. The lift span of the retrofitted Schuyler Heim Bridge would be locked in an up position (14.3 m [47 ft] or higher), and the bridge would not be used for vehicular traffic. Approaches to the existing Schuyler Heim Bridge would be demolished, blockaded, or otherwise made inaccessible to vehicular traffic.

This alternative would enable the existing Schuyler Heim Bridge, which is eligible for listing on the NRHP, to remain in place.

2.2.4.1.2 SR-47 Expressway

Other than the changes noted above, elements of the SR-47 Expressway would be the same as under Alternative 1.

2.2.4.1.3 Flyover

Under Alternative 3, the flyover would be the same as described for Alternative 1.

2.2.4.2 Construction Activities

2.2.4.2.1 Bridge Construction

Under Alternative 3, there would be no demolition of the existing Schuyler Heim Bridge. With this exception, construction activities for the new fixed-span bridge would be the same as described for Alternative 1.

2.2.4.2.2 SR-47 Expressway Construction

Under Alternative 3, activities associated with construction of the SR-47 Expressway would be the same as described for Alternative 1.

2.2.4.2.3 Flyover Construction

Under Alternative 3, construction of the flyover would be the same as described for Alternative 1.

2.2.5 Alternative 4: Bridge Replacement Only

2.2.5.1 Description

This alternative would involve replacement of the Schuyler Heim Bridge with a fixed-span bridge, as described under Alternative 1. This alternative would include modification to the northerly and southerly approaches to the bridge to maintain connectivity to SR-103 and Ocean Boulevard (Figures 2-11a and 2-11b). Also, existing connections to Henry Ford Avenue would be maintained. Other elements related to replacement of the Schuyler Heim Bridge would be the same as under Alternative 1. However, with Alternative 4, there would be no grade-separation at the existing at-grade rail crossing south of the bridge. Also, New Dock Street would not be realigned, as would occur under Alternative 1, and the Ocean Boulevard/SR-47 Flyover would not be constructed. Alternative 4 would extend from SR-47 KP 5.6 to 7.3 (PM 3.5 to 4.5).

2.2.5.2 Construction Activities

Under Alternative 4, construction activities for the Schuyler Heim Bridge replacement would be the same as described for Alternative 1.

2.2.6 Alternative 5: Transportation System Management

2.2.6.1 Description

The Transportation System Management (TSM) alternative identifies easily implementable improvements to transportation in the project area as an alternative to improvements that would be more costly. For the proposed project, the TSM alternative focuses on improvements to traffic routes that parallel the proposed SR-47 Expressway, and that serve the same trips, including truck trips to and from the ICTF, and trips to and from the Ports of Long Beach and Los Angeles via Alameda Street, Henry Ford Avenue, and SR-47.

Trip reductions via travel demand management (TDM) techniques also would be employed as part of this TSM alternative. If feasible, TDM measures would reduce travel demand in the corridor and potentially lessen the need for further improvements. For this project, the TSM alternative would include measures to improve capacity and traffic circulation at the Ports of Long Beach and Los Angeles through policy changes and use of the latest technologies.

The following key elements are included:

- **Intelligent Transportation Systems (ITS)** applications in and around the ports, with special emphasis on truck movements
- **Intersection improvements,** such as restriping to provide additional turn lanes and acceleration lanes, where needed, and traffic signalization improvements
- **Minor roadway widening and/or peak-hour parking prohibitions** to remove midblock bottlenecks along selected roadways
- **Travel Demand Management**

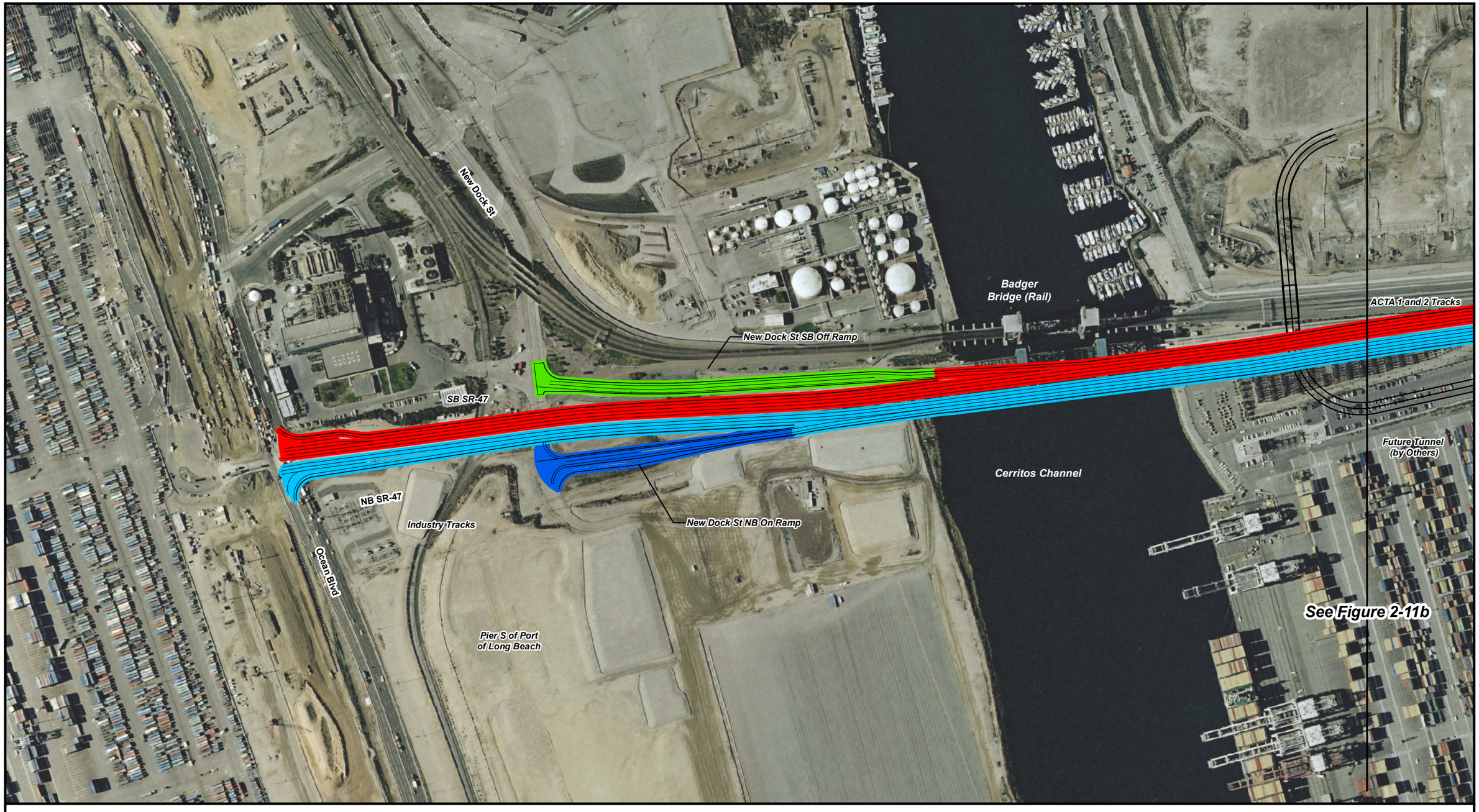
With Alternative 5, the existing Schuyler Heim Bridge would continue to deteriorate over time as its useful life is eroded further and as various magnitude earthquakes occur in the project area. At some point in the future, it could be necessary for the bridge to be demolished and replaced, solely to avoid safety hazards.

2.2.6.1.1 Intelligent Transportation Systems

The ITS element of the TSM alternative includes Advanced Transportation Management and Information Systems (ATMIS) and Advanced Traveler Information Systems (ATIS). The proposed ITS improvements would be designed to improve traffic circulation through traffic control, incident management, traffic surveillance, and dissemination of traffic information.

For this project, the ITS improvements would include an advanced detection system for trains approaching rail crossings between the Henry Ford Avenue/SR-47 interchange and Anaheim Street so that train blockages of those tracks would be detected in advance of and during the blockage. That information would be used to direct vehicular traffic to routes without blockages, such as SR-47/SR-103, I-710, I-110, Sepulveda Boulevard, Pacific Coast Highway, and Anaheim Street.

The focus of the ATMIS element is the application of proven ITS technologies within and near the project area. Truckers, dispatchers, terminal operators, traffic engineers, system operators, and others would be provided with traffic surveillance at critical points to better assist travel, minimize rail blockage delays, manage incidents, and efficiently divert truck traffic to various entrance and exit points.



LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-11a
Alternative 4: Bridge Replacement Only
Schuyler Heim Bridge Replacement
and SR-47 Expressway

LEGEND

- Henry Ford Avenue Off Ramp
- Henry Ford Avenue On Ramp
- NB SR-103
- NB SR-47
- New Dock Street Off Ramp
- New Dock Street On Ramp
- New Dock Street Realignment
- SB Alameda Street / Pacific Coast Highway Ramp
- SB SR-103
- SB SR-47
- SR47 Flyover
- NB Alameda Street Realignment
- NB SR-103 Realignment
- SB Alameda Street Realignment
- SB SR-103 Realignment
- Wardlow Road/223rd Street
- Port of Long Beach Tunnel

0 100 M

0 400 Ft

Source: ACET, 2006 Aerial Date: February 2006, AirPhotoUSA

Notes: Improvements shown at Pacific Coast Highway are below the grade separation. Legend items are for all detailed maps. Not all items are on every figure.

Figure 2-11b
Alternative 4: Bridge Replacement Only
Schuyler Heim Bridge Replacement and SR-47 Expressway

ATMIS would control ITS field elements and would monitor traffic signals and rail traffic. The system would have links to the City of Long Beach Traffic Management Center (TMC), the Caltrans Traffic Operation Center (TOC), and to future envisioned TMCs in the South Bay area. The ATMIS also would have an indirect link to the City of Los Angeles Automated Traffic Surveillance and Control (ATSAC) center via another Port of Long Beach project and, as noted above, an advance warning system for at-grade rail crossings.

Specific elements are described below:

- *Closed Circuit Television (CCTV) Surveillance*: CCTV systems would be deployed at strategic locations so the operation at each location could be visually monitored. Once surveillance of the specified locations is in place, the engineer would be able to identify incidents and/or congested locations and redirect traffic using other elements, such as changeable message signs (CMS).
- *Changeable Message Signs (*CMS): These are capable of transmitting valuable traffic information to motorists via large, field-installed display boards to inform drivers of approaching conditions. The CMS would be placed in advance of major interchanges and intersections, and at other points where driver routing decisions could be affected by the presence of timely information. CMS would be placed so that vehicles could divert from the Henry Ford Avenue/Alameda Street route when train blockages occur at the ACTA and Union Pacific (UP) tracks. The CMS also would be placed at or adjacent to terminal gate exits to forewarn truck drivers of incidents on area freeways, as well as to provide rail-crossing information. Incident information would be automatically retrieved from Caltrans, and appropriate messages then would be displayed on the CMS.

  In addition to the CMS that will be installed under the ATMIS project, six signs will be installed under the Ports Incident Management System (PIMS) funded by the Department of Homeland Security at the following locations:

  - southbound Alameda Street north of Pacific Coast Highway
  - southbound SR-103 north of Pacific Coast Highway
  - eastbound Ocean Boulevard east of SR-47
  - westbound Seaside Boulevard east of the Ocean Boulevard/Terminal Island Freeway interchange
  - southbound I-710 near Spring Street
  - southbound I-110 south of Torrance Boulevard

  Another potential location for future CMS would be at the northbound SR-47 off-ramp to alert motorists to long trains crossing Henry Ford Avenue or Alameda Street.
- *Expansion of Long Train Warning System:* the long train warning system could be expanded to Alameda Street between Anaheim Street and Pacific Coast Highway. In addition, short train crossings of Henry Ford Avenue/Alameda Street could be synchronized with the traffic signal systems.

- *Link to Long Beach Transportation Management Center (TMC), Caltrans TOC, future South Bay TMC, and Los Angeles Department of Transportation ATSAC*: These links would exchange traffic signal operation and traffic information with the ports' ATIS and provide opportunity to monitor traffic in the project area.
- *Advanced Traveler Information System*: This system would provide information in-vehicle and at kiosks and other locations to assist truckers and other motorists within and near the ports. This information could include route congestion data, rail blockage data, and other traveler information.

2.2.6.1.2 Roadway and Intersection Improvements

The TSM alternative includes minor physical improvements at intersections and along roadways, primarily within existing rights-of-way.

Due to recent port access demonstration program improvements, many of the local intersections have been improved in the past few years. Intersections that remain to be improved include: SR-103 where it terminates at Sepulveda Boulevard, and intersections along Henry Ford Avenue north of SR-47, along Anaheim Street between SR-103 and Alameda Street, and along Pacific Coast Highway between SR-47 and Alameda Street.

Alameda Street itself has been significantly improved via widening and grade separations. One further improvement would be to stripe Alameda Street to the full six lanes for through traffic. This would eliminate on-street parking and provide two additional lanes for travel.

2.2.6.2 Construction Activities

Due to the relatively small-scale nature of the TSM activities described above, construction associated with this alternative would be minor. Depending upon the specific element(s) implemented, there would be some grading, trenching, and excavation. There also could be installation of asphalt surfaces and concrete for curbs and foundations.

It is anticipated that these activities would be scheduled to occur during off-peak traffic hours.

2.2.7 Alternative 6: The No Build Alternative

Under the No Build alternative, replacement of the Schuyler Heim Bridge, construction of the flyover, and construction of either the SR-47 Expressway or SR-103 Extension would not occur. No additional improvements would be constructed beyond what is currently programmed for Henry Ford Avenue and Alameda Street. The existing multiple railroad grade crossings would remain in place, as would the existing signalized intersections along Henry Ford Avenue.

The Schuyler Heim Bridge would continue to be seismically inadequate and subject to damage or collapse under strong seismic conditions. Maintenance activities would continue and would include application of protective coatings, lift mechanism repairs, deck resurfacing, and similar maintenance activities. The existing bridge is expected to continue to deteriorate over time as its useful life is eroded further and as various magnitude earthquakes occur in the area. At some point in the future, it could be necessary for the bridge to be demolished and replaced solely to avoid safety hazards.

2.3 Alternatives Considered and Withdrawn

In addition to the alternatives described above, three other alternatives were considered for evaluation. However, these were eliminated from further consideration based on feasibility and environmental considerations. These alternatives were:

- Retrofit of the existing Schuyler Heim Bridge
- Extension of SR-103 to I-710
- Extension of SR-103 to I-405

Retrofit of the Schuyler Heim Bridge would maintain the existence of the historic structure. The bridge could continue to be used, pending structural damage, such as from a major earthquake.

The two SR-103 alternatives would provide for a north/south expressway by extending the existing SR-103 corridor rather than constructing a facility on the SR-47 alignment. SR-103 is a 2.6-km (1.6-mi) state highway that starts at SR-47 near Henry Ford Boulevard and ends at Pacific Coast Highway. SR-103 is located north of Terminal Island in the cities of Los Angeles and Long Beach. It provides a direct link, via the Schuyler Heim Bridge, from major shipping terminals on Terminal Island to areas directly north, on the mainland. Therefore, it would be a logical candidate as an alternative corridor to the proposed expressway.

North of Pacific Coast Highway, in the City of Long Beach, SR-103 continues as a surface street to a "T" intersection with Sepulveda Boulevard and Willow Street. At the Sepulveda/ Willow intersection, all traffic must turn either left or right, and truck restrictions exist on Willow Street east of SR-103. A major intermodal terminal, the ICTF, is located immediately northwest of the SR-103/Sepulveda/Willow intersection. Between Pacific Coast Highway and Sepulveda/Willow, the Union Pacific Railroad San Pedro Branch and an SCE power line easement are located immediately west of SR-103.

Various alternatives to extend SR-103 beyond its current terminus have been studied in the past. The Southern California Association of Governments (SCAG) prepared a study, *Potential Terminal Island Freeway – San Diego Freeway Connector* (1999), to examine the technical feasibility of a new connector and determine if it would reduce congestion and enhance vehicular mobility. The study evaluated a 4.3-km (2.7-mi), grade-separated elevated expressway between SR-103 and I-405. The proposed connector would cross the existing SCE easement and railroad lines on the west side of SR-103 and run between the ICTF and the Dominguez Channel. The expressway would join I-405 between Alameda Street and Wilmington Avenue. The study assumed a half-interchange with I-405 to provide direct access from northbound SR-103 to northbound I-405 and from southbound I-405 to southbound SR-103. The study estimated the capital cost of the project to be between $122 million and $180 million. The study found the connector to be feasible but questioned its need and benefit following completion of the Alameda Street improvements. The study also listed capital costs and utility relocation as major issues requiring further study.

During the public scoping meeting for the previous Schuyler Heim Bridge Replacement and SR-47 Expressway Project, the comment was made that SR-103 could be extended to join Alameda Street. This would constitute an alternative to constructing the expressway as described in the project at that time. During development of the SR-47 Expressway feasibility study, SCAG conducted a review of possible SR-103 Extension alternatives.

The SR-103 alignments that were considered and then eliminated from further consideration are shown in Figure 2-12 and described in Sections 2.3.2 and 2.3.3.

2.3.1 Full Retrofit of Existing Schuyler Heim Bridge

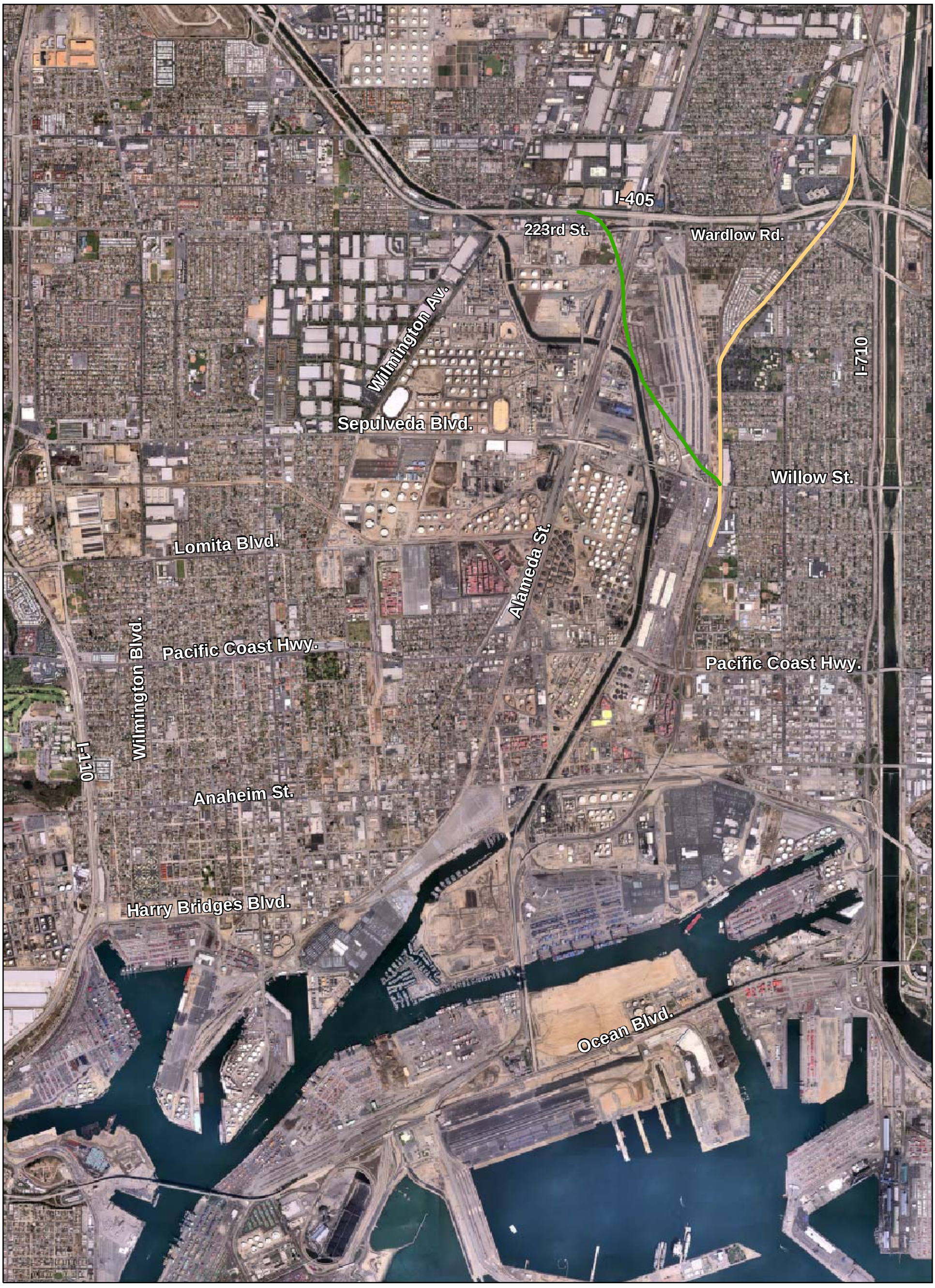
The seismic retrofit and rehabilitation project for the Schuyler Heim Bridge that Caltrans identified in 1998 involved a full retrofit that included the approach structures and truss portions of the lift bridge (columns and foundations, truss lifting towers, and counterweights). The defined retrofit work was as follows:

- Install longitudinal restrainers
- Retrofit tower bracing
- Retrofit tower portal
- Retrofit tower transverse strut
- Retrofit approach truss bearing
- Reconstruct lift-span truss bearings
- Retrofit counterweight frame
- Retrofit truss bottom lateral bracing
- Retrofit footings on Columns 27 and 28, and Abutments 26 and 29
- Remove existing fenders
- Install new fenders
- Remove sheet pile bulkhead
- Construct new column retaining walls at Abutments 26 and 29
- Install 1.21-m (48-in) CIDH concrete pilings at Abutments 26 and 29

Mitigation measures applicable to this alternative were identified in the 1998 IS/EA for the full seismic retrofit project (Caltrans, 1998b). The mitigation measures addressed potential impacts related to peregrine falcons, hazardous materials, and historic resources.

This Schuyler Heim Bridge full retrofit alternative was eliminated. Based on cost comparisons of repairing the Schuyler Heim Bridge, Caltrans confirmed that constructing a new fixed bridge was more cost-effective than rehabilitating the existing bridge (Caltrans, 1999). In addition, Caltrans determined that the full seismic retrofit alternative would not provide an emergency service facility that would be able to withstand a major earthquake and be serviceable immediately following a major earthquake[2]. In addition, if a full retrofit project were redesigned such that the bridge could be put into service immediately following a major earthquake, the foundations and pilings of the existing structure would have to be demolished and reconstructed. Because of the expense of this alternative, and its adverse effect on the historic integrity of the existing lift bridge, it was eliminated from further consideration.

[2] George Orsolini of Caltrans, the designer of the original seismic retrofit project (1998), in a conversation with Patty McCauley (Caltrans Liaison Engineer in the Office of Special Funded Projects, which provides oversight for structural work) stated that the original seismic retrofit design was a “no collapse” design, but that because the existing structure is in such poor condition, meeting the criteria for immediate service following a major earthquake is not achievable with regard to seismic design criteria.



N

0 0.5 1

Miles

Legend:

- SR-103 Extension to 405 Fwy
- SR-103 Extension to 710 FWY

Figure 2-12
Alternative Alignments Eliminated From Consideration
Schuyler Heim Bridge Replacement and SR-47 Expressway

2.3.2 Extension of SR-103 to I-710

This alternative would extend SR-103 to the north via a four-lane elevated expressway to join I-710 between I-405 and Del Amo Boulevard. A "half" interchange at I-710 would connect northbound SR-103 to northbound I-710, and southbound I-710 to southbound SR-103. With this alternative, SR-103 would fly over I-405, with no interchange. This alternative would follow the SCE easement. With this alternative, SR-103 would be widened to three lanes in each direction, beginning south of Anaheim Street, and extending northward to the beginning of the new elevated expressway. Other safety and operational improvements would be constructed on SR-103 between Anaheim Street and the Schuyler Heim Bridge.

This alternative presented several positive attributes; it would provide a freeway-to-freeway connection for SR-103 traffic; it would utilize available capacity of SR-103; and it would not cross the Dominguez Channel. However, it was eliminated from further consideration due to its negative features, as follows:

- It would require major right-of-way acquisition.
- There would be significant utility impacts (SCE high-voltage lines) that could require a longitudinal encroachment agreement with Caltrans.
- It would require major reconstruction of the I-710/Del Amo Boulevard interchange.
- There would be potential traffic impacts to I-710.
- There is the potential for adverse environmental impacts to the Long Beach community, including residential neighborhoods, several public schools, a park, and a church.
- It could require safety enhancements and capacity improvements on SR-103 south of Anaheim Street, as the existing SR-103 main line curve at the Pier A Terminal has a design speed of only 56 km/hour (35 miles per hour [mph]).
- It would be significantly more costly than the SR-47 Expressway alternatives.

2.3.3 Extension of SR-103 to I-405

This alternative would extend SR-103 to the northwest via a two- or four-lane elevated expressway to join I-405 between Alameda Street and Wilmington Avenue. A "half" interchange at I-405 would connect northbound SR-103 to westbound I-405 and would connect eastbound I-405 to southbound SR-103. With this alternative, SR-103 would be widened to three lanes in each direction, beginning south of Anaheim Street, and extending northward to the beginning of the new elevated expressway. Other safety and operational improvements would be constructed on SR-103 between Anaheim Street and the Schuyler Heim Bridge.

This alternative presented several positive attributes; it would provide a freeway-to-freeway connection for SR-103 traffic; it would utilize available capacity of SR-103; and it would not cross the Dominguez Channel. However, it was eliminated from further consideration due to its negative features, as follows:

- It would require major right-of-way acquisition.
- There would be significant utility impacts (SCE high-voltage lines).
- It would require major reconstruction of the I-405/Wilmington interchange.

- There would be potential traffic impacts to I-405.
- There is the potential for adverse environmental impacts to the Long Beach community, including residential neighborhoods, several public schools, and a park.
- It could require safety enhancements and capacity improvements on SR-103 south of Anaheim Street, as the existing SR-103 main line curve at the Pier A Terminal has a design speed of only 56 km/hour (35 mph).
- It would be significantly more costly than the SR-47 Expressway alternatives.

Chapter 3.0 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

In accordance with the National Environmental Policy Act (NEPA) and CEQ Regulations (40 CFR, Section 1500, et seq.), the primary purpose of an Environmental Impact Statement (EIS) is to serve as an action-forcing device to insure that the policies and goals defined in NEPA are infused into the ongoing programs and actions of the federal government. The NEPA analysis shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment (Section 1502.1 Purpose).

In order to effectively evaluate the alternatives as described above, the Council on Environmental Quality (CEQ) regulations also require the EIS to succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration; the descriptions shall be no longer than necessary to understand the effects of the alternatives (40 CFR, Section 1502.15).

The sections that follow provide detailed discussions of the potential environmental impacts of the six project alternatives (which include the No Build alternative), in compliance with the requirements of NEPA. Each alternative is evaluated in terms of the affected environment and impacts of project construction and operation. Measures to avoid, minimize, and/or mitigate effects of the project are identified for each alternative, as appropriate. In addition, effects that cannot be avoided, minimized, or mitigated also are identified.

An evaluation of the proposed project alternatives in accordance with California Environmental Quality Act (CEQA) criteria is provided in Chapter 4.0. It is noted, however, that Caltrans has not adopted its own thresholds of significance pursuant to CEQA. As a statewide agency covering diverse geographic areas, Caltrans has, as a matter of policy, left the determination of significance to district project development team members. The findings provided in Chapter 4.0 are based on information provided in this chapter (3.0) of the EIS/Environmental Impact Report (EIR). In compliance with Caltrans requirements, Chapter 4.0 addresses only impacts that are considered significant under CEQA. Discussion of the effects of all six project alternatives in accordance with Appendix G of the CEQA Guidelines is provided in Chapter 4.0 and in Appendix A – CEQA Checklist.

The evaluation criteria used for analysis of the proposed project alternatives are not universally adopted by Caltrans. However, the specific evaluation criteria are used to assist in determining the effects of these particular project alternatives within the area where the project is located - the Ports of Los Angeles and Long Beach and adjacent southerly Los Angeles County.

As part of the scoping and environmental analysis conducted for the project alternatives, the following environmental resource areas were considered, and it was determined that no farmlands or wild and scenic rivers are in the project area, and that there is no potential for the project alternatives to affect such resources. Consequently, there is no further discussion in this Final EIS/Environmental Impact Report (EIR) regarding:

- Farmlands
  The project alternatives are located in an area that is highly developed with heavy industrial, commercial, and transportation uses associated with the nearby Ports of Los Angeles and Long Beach, as well as some residential neighborhoods. There are no areas suitable for agricultural activities. Therefore, there is no potential for the proposed project to affect farmlands; the subject is not addressed further in this Final EIS/EIR.

- Wild and Scenic Rivers
  The project alternatives are located in an area that is highly developed with heavy industrial, commercial, and transportation uses associated with the nearby Ports of Los Angeles and Long Beach, as well as some residential neighborhoods. The project alternatives are not in the vicinity of and have no potential to affect any river designated as a component of, or proposed for inclusion in, the state or federal wild and scenic rivers system. Therefore, the subject is not addressed further in this Final EIS/EIR.

Much of the information provided in Chapter 3.0 is derived from the following technical studies, as referenced in the environmental resources discussions:

- *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Community Impact Assessment* (Caltrans, March 2008)
- *Traffic Study: Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Meyer, Mohaddes Associates, April 2007)
- *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Long Long-Term Economic Impacts to Marine Vessel Operation in Cerritos Channel* (Caltrans, December 2006)
- *Visual Impact Assessment: Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Caltrans, February 2007)
- *Historic Property Survey Report* (Myra L. Frank & Associates, 2002)
- *Final Supplemental Historic Property Survey Report (HPSR) for the SR-103 Extension Alternative: Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Myra L. Frank & Associates/Jones & Stokes, 2005)
- *Supplemental Historic Property Survey Report and Archaeological Survey Report for the SR-47 Flyover - Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Caltrans, March 2007)
- *Water Quality Impacts Technical Study* (Caltrans, January 2007)
- Technical Memorandum – Schuyler Heim Bridge (Bridge No. 53-2618) Geotechnical Review of Existing Data (Caltrans, 2001)

- *Final Initial Site Assessment for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Caltrans, 2008)
- *Supplemental ISA* (Caltrans, May 2007)
- *Final Schuyler Heim Bridge Replacement and SR-47 Expressway Project Section 4(f) Evaluation* (Caltrans, March 2008)
- *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study* (Caltrans, March 2008)
- *Human Health Risk Assessment for the Schuyler-Heim Bridge Replacement and SR-47 Expressway Project* (Weston Solutions, Inc.; October 24, 2008)
- *Noise Technical Report for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Caltrans, May 2007)
- Energy Technical Memorandum - Schuyler Heim Bridge Replacement and SR-47 Expressway Project - Energy Consumption (Caltrans, February 2007)
- *Natural Environment Study: Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Caltrans, May 2007)

These documents are available for review at the California Department of Transportation, District 7, 100 South Main Street, Los Angeles, California 90012.

3.1 Land Use, Recreation, and Coastal Zone

The information in this section is derived largely from the *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Community Impact Assessment* (Caltrans, 2007), which is hereby incorporated by reference.

3.1.1 Regulatory Setting

3.1.1.1 SCAG Regional Comprehensive Plan and Guide

The Regional Comprehensive Plan and Guide was developed by the Southern California Association of Governments (SCAG) in partnership with 14 subregions and was adopted in March 1996. A bottom-up planning process was used to incorporate local concerns into regional planning. The plan is designed to serve as a regional framework for local and regional decision-making with respect to anticipated growth over the next 20 years. The SCAG forecasts there will be 22.9 million people living in the Southern California region by 2030. The fastest growth is anticipated in the outlying areas, specifically north Los Angeles County and the Inland Empire. The plan sets forth strategies for meeting federal and state requirements with respect to transportation, growth management, air quality, housing, hazardous waste management, and water quality management.

The plan aims to achieve growth management through encouraging local land use actions, which in turn lead to the development of an urban form that will minimize development costs, save natural resources, and enhance the quality of life. The plan recommends projects that meet the following goals: increased mixed land uses, more efficient use of existing infrastructure, reduced environmental effects, more transit use, higher densities in strategic mass transit and urban centers, and more affordable housing.

3.1.1.2 City of Los Angeles General Plan

The City of Los Angeles General Plan is a comprehensive, long-range plan for city development and is the fundamental policy document of the City of Los Angeles. It responds to state and federal mandates to plan for the future and defines the framework by which the City's physical and economic resources are to be managed and utilized over time. Broad issues, goals, objectives, and policies are guided by the citywide General Plan framework. In addition, the plan defines citywide policies that will be implemented through subsequent amendments of the City's community plans, zoning ordinances, and other pertinent programs. There are seven elements in the General Plan.

The Land Use Element designates the general distribution, intensity, and development policies regarding residential, commercial, industrial, open space, and institutional uses. The Wilmington-Harbor City Community Plan intersects the project area. This community plan is discussed below in Section 3.1.1.2.1. The Land Use Element is divided into 35 local area plans (Community Plans), plus the Port of Los Angeles (POLA) Port Master Plan, and the Los Angeles Airport Plan (LAHD, 2005). The northerly portion of the project area would be within the Wilmington-Harbor City Community Plan, primarily within or adjacent to existing transportation corridors or on land that currently is used for industrial purposes. Because the majority of the alternative alignments would be located adjacent to or within existing road rights-of-way, no conflicts with planned uses are anticipated.

The City of Los Angeles General Plan also outlines goals and policies relative to parks and recreation facilities for new development within the City. The goals regarding recreation and parks are outlined in Infrastructure and Public Services – Chapter 9 of the General Plan (see Table 3.1-1).

3.1.1.2.1 Wilmington-Harbor City Community Plan

The Wilmington-Harbor City Community Plan was adopted on July 14, 1999 and establishes goals, objectives, policies, and programs applicable to the community. The Wilmington-Harbor City Community Plan area is bounded by Lomita Boulevard, the City of Long Beach, the Port of Los Angeles, Gaffey Street, and Normandie Avenue.

Because of its proximity to the Port of Los Angeles, a significant portion of the southeast community plan area is designated for industrial and light industrial uses. The industrial sector is a major contributor to the local economy. The plan encourages both new industrial growth, as well as development of improved circulation systems to accommodate the growth. It also contains policies governing direct access of cargo trucks to freeways, discouraging nonresidential traffic on residential streets, and upgrading the circulation system.

The project alternatives are located south of and within the western portion of Wilmington-Harbor City. The plan recommends integrating future development of the port with the Wilmington community, including changes to transportation and circulation systems, and port land acquisitions. The plan also recommends interagency coordination in the planning and implementation of port projects to facilitate efficiency in port operations, and to serve the interests of adjacent communities (LAHD, 2005).

3.1.1.2.2 East Wilmington Targeted Neighborhood Initiative

The East Wilmington Targeted Neighborhood Initiative was established in 1997 in connection with the Housing and Community Development Consolidated Plan. The goal of the program is to increase stakeholder participation in the allocation of Community Development Block Grants, which go toward improving the quality of life in targeted neighborhoods. The jurisdictional area for this initiative is bounded by Pacific Coast Highway to the north, Alameda Street to the east, Anaheim Street to the south, and Eubank Avenue to the west.

3.1.1.2.3 Los Angeles Harbor Industrial Center Redevelopment Plan

The Redevelopment Plan for the Los Angeles Harbor Industrial Center was adopted on July 18, 1974, by the Los Angeles City Council. The redevelopment area encompasses 232 acres and is exclusively industrial. It is bounded by Alameda Street to the east, Harry Bridges Boulevard to the south, Broad Street to the west, and Anaheim Street to the north. The redevelopment plan was designed to spur development of a labor-intensive industrial center in a previously blighted area. To accomplish this, the Redevelopment Agency recommended improvements to the existing street system, which it characterized as inadequate and overcrowded.

Table 3.1-1
Project Consistency with Local and Regional Plans/Policies

Plan/Policy	Project Consistent with Plan/Policy?	Remarks
Wilmington-Harbor City Community Plan (City of Los Angeles General Plan)		
Policy 3-1.2 Define and separate new and/or expanded industrial uses from other uses by freeways, flood control channels, highways and other physical barriers.	Yes	Project would provide a barrier between industrial uses east of Alameda Street and residential uses west of Alameda Street in East Wilmington community.
Policy 3-1.5 Cargo container storage facilities shall have direct access from major or secondary highways or through industrial areas with no access to such facilities through residential areas.	Yes	Project would facilitate improved access to and from cargo container storage facilities by means of grade-separated truck expressway, rather than local surface streets.
Policy 16-1.1 Discourage nonresidential traffic flow for streets designated to serve residential areas only by use of traffic control measures.	Yes	Project would provide a grade-separated truck expressway for non-residential traffic flow.
Policy 18-3.2 Upgrade the circulation system both internal and external to POLB to promote efficient transportation routes to employment, waterborne commerce, and commercial and recreational areas, and to divert Port-related traffic away from adjacent residential and commercial areas.	Yes	Project would assist regional efforts to reduce congestion and improve mobility in the port area.
City of Carson General Plan – Land Use Element		
Policy LU-7.2 Locate truck intensive uses in areas where the location and circulation pattern will provide minimal effects on residential and commercial uses.	Yes	Project would be located in an industrial/transportation corridor; would reduce surface street truck traffic, diverting it away from residential and commercial uses.

Table 3.1-1
Project Consistency with Local and Regional Plans/Policies

Plan/Policy	Project Consistent with Plan/Policy?	Remarks
Policy LU-10.1 Continue to work with regional and state agencies to ensure adequate transportation facilities along the Corridor to serve the adjacent areas.	Yes	Project would enhance the existing transportation network, connecting to the Alameda Corridor.
City of Carson General Plan – Transportation Element		
Policy TI-1.2 Devise strategies to protect residential neighborhoods from truck traffic.	Yes	Project would provide a truck expressway, diverting truck traffic from surface streets in residential areas.
Policy TI-1.3 Ensure that the City's designated truck routes provide efficient access to and from the I-405, I-110 and Route-91 Freeways, as well as the Alameda Corridor.	Yes	Project would enhance connectivity to freeways (and the Alameda Corridor.
Policy TI-1.5 Require that all new construction or reconstruction of streets or corridors that are designated, as truck routes, accommodate projected truck volumes and weights.	Yes	Project intends to accommodate projected truck volumes, and would be designed to accommodate projected truck weights.
SCAG Regional Comprehensive Plan and Guide – Growth Management Chapter (GMC), Regional Transportation Plan (RTP), Air Quality Chapter (AQC), Compass Growth Visioning (CGV)		
GMC Policy 3.01 The population, housing, and jobs forecast, which are adopted by SCAG's Regional Council and that reflect local plans and policies shall be used by SCAG in all phases of implementation and review.	Yes	The project analysis of impact on population, housing, and jobs is based on SCAG forecasts.

Table 3.1-1
Project Consistency with Local and Regional Plans/Policies

Plan/Policy	Project Consistent with Plan/Policy?	Remarks
GMC Policy 3.03 The timing, financing, and location of public facilities, utility systems, and transportation systems shall be used by SCAG to implement the growth policies of the region.	Yes	Project is currently programmed in the 2008 RTIP, and included in the 2008 RTP.
GMC Policy 3.10 Support local jurisdictions' actions to minimize red tape and expedite the permitting process to maintain economic vitality and competitiveness.	Yes	Project sponsor anticipates cooperation from local and regional agencies in project development and permitting.
GMC Policy 3.18 Encourage planned development in locations least likely to cause environmental impact.	Yes	Project would be constructed in the urbanized, primarily industrial Port area. The project will avoid, minimize, and/or mitigate all potential impacts to reduce or eliminate the effect.
GMC Policy 3.20 Support the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered species.	Yes	Project would protect and/or relocate vital resources affected by the project. Measures designed to avoid, minimize, or mitigate impacts to wetlands and areas containing unique and endangered plants and animals are proposed.
GMC Policy 3.21 Encourage the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites.	Yes	Project would document the historic Schuyler Heim Bridge in accordance with requirements of NEPA and CEQA prior to altering or demolishing the bridge. Any archaeological resources that may be unearthed also would be properly documented and/or preserved.
GMC Policy 3.22 Discourage development, or encourage the use of special design requirements, in areas with steep slopes, high fire, flood, and seismic hazards.	Yes	Project would be constructed in accordance with all applicable safety and design standards.

Table 3.1-1
Project Consistency with Local and Regional Plans/Policies

Plan/Policy	Project Consistent with Plan/Policy?	Remarks
GMC Policy 3.23 Encourage mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and to develop emergency response and recovery plans.	Yes	The EIR/EIS has identified measures to avoid, minimize, and/or mitigate measures where necessary to address adverse effects of the project.
AQC Policy 5.11 Through the environmental document review process, ensure that all levels of government consider air quality, land use, transportation, and economic relationships to ensure consistency and minimize conflicts.	Yes	The environmental document has addressed consistency of project with applicable plans and policies.
RTP Goal 1 Maximize mobility and accessibility for all people and goods in the region.	Yes	The project would improve access and movement of goods in the region.
RTP Goal 2 Ensure travel safety and reliability for all people and goods in the region.	Yes	The project would improve safety and reliability of goods and people between Terminal Island and the mainland.
RTP Goal 3 Preserve and ensure a sustainable regional transportation system.	Yes	The project would contribute to the sustainable movement of goods through the port and to the respective destination.
RTP Goal 4 Maximize the productivity of our transportation system.	Yes	The project would improve circulation within the port and would improve traffic conditions between Terminal Island and major traffic arterials on the mainland to the north.
RTP Goal 5 Protect the environment, improve air quality and promote energy efficiency.	Yes	The project would protect the environment through the use of mitigation measures to address adverse impacts, improve air quality, and promote energy efficiency.

Table 3.1-1
Project Consistency with Local and Regional Plans/Policies

Plan/Policy	Project Consistent with Plan/Policy?	Remarks
RTP Policy 1 Transportation investments shall be based on SCAG's adopted Regional Performance Indicators.	Yes	The project would be consistent with SCAG's adopted Regional Performance Indicators. The project is included in the 2008 RTP and the 2008 RTIP.
RTP Policy 2 Ensuring safety, adequate maintenance, and efficiency of operations on the existing multi-modal transportation system will be RTP priorities and will be balanced against the need for system expansion investments.	Yes	One of the primary goals of the proposed project is to provide a structurally and seismically safe vehicular connection along the critical north-south corridor between Terminal Island and the mainland.
CGV Principle 1 Improve mobility of all residents through the encouragement of transportation investments and land use decisions that are mutually supportive (GV P1.1); and promote a variety of transportation choices (GV P1.4).	Yes	The project is included in the SCAG 2008 Regional Transportation Plan (RTP) and 2008 Regional Transportation Improvement Program (RTIP) and therefore would improve mobility for all residents in the region.
CGV Principle 3 Enable prosperity of all people by encouragement of civic engagement (GV P3.5).	Yes	The project involved the public through formal public scoping, as required by CEQA and NEPA guidelines, including meetings with local, state, regional, and federal elected officials, neighborhood and business groups, and individual community groups.
CGV Principle 4 Promote sustainability for future generations by utilizing "green" development techniques (GV P4.4).	Yes	The project proposed recycling of construction and demolition debris in support of green development techniques.
Los Angeles County Congestion Management Program		
To link land use, transportation, and air quality decisions.	Yes	Project would facilitate transport of goods and personnel to and from POLA and POLB.

Table 3.1-1
Project Consistency with Local and Regional Plans/Policies

Plan/Policy	Project Consistent with Plan/Policy?	Remarks
City of Los Angeles General Plan –Infrastructure and Public Services (Recreation and Parks)		
OBJECTIVE 9.22 Monitor and forecast demand for existing and projected recreation and park facilities and programs.	Yes	Project would not increase demand for recreation and park facilities and programs.
Policy 9.22.1 Monitor and report appropriate park and recreation statistics and compare with population projections and demand to identify the existing and future recreation and parks needs of the City.	Yes	Project would not affect population projections. Project is proposed as a measure to respond to ongoing and projected growth in the area.
OBJECTIVE 9.24 Phase recreational programming and park development with growth.	Yes	Project would not induce growth. Project is proposed as a measure to respond to ongoing and projected growth in the area.
Policy 9.24.1 Phase the development of new programs and facilities to accommodate projected growth.	Yes	Project would not induce growth. Project is proposed as a measure to respond to ongoing and projected growth in the area.
Policy 9.24.2 Develop Capital Improvement Programs that take into account the City's forecasted growth patterns and current deficiencies.	Yes	Project would not induce growth. Project is proposed as a measure to respond to ongoing and projected growth in the area.
OBJECTIVE 9.25 Utilize park space in emergency situations.	Yes	Project would maintain access to or use of existing park space.
Policy 9.25.1 Continue to actively participate in emergency planning.	Yes	Project would improve circulation on local streets and, therefore, could result in improved emergency plans.

Table 3.1-1
Project Consistency with Local and Regional Plans/Policies

Plan/Policy	Project Consistent with Plan/Policy?	Remarks
Policy 9.25.2 Continue to utilize parks and recreation facilities as shelters in times of emergency.	Yes	Project would maintain access to and use of existing parks and recreation facilities.
City of Long Beach General Plan – Transportation Element		
Action Program 4: Port Access The City should continue to support and assist the Port to include the traffic improvement projects within the Port in the State Transportation Improvement Plan. In order to reduce the percentage of truck traffic on the Long Beach Freeway, especially during the peak hours, the City should work with the Port to pursue a 24-hour Port operation or to consider restricting truck access to the 710 Freeway during peak hours.	Yes	Project is to improve traffic conditions between Terminal Island and major traffic arterials on the mainland to the north. Project intends to accommodate projected truck volumes.
Primary Transit Corridor Policy 2 Revise the truck route system which preserves the integrity of neighborhoods while assuring the efficient movement of goods.	Yes	Project would accommodate existing and proposed truck volumes while diverting truck traffic from residential surfaces streets.
Primary Transit Corridor Policy 5 Encourage development along regional corridors and major arterials and at activity centers that complements capacity improvements and/or encourages demand management activities.	Yes	Project would improve traffic conditions between Terminal Island and major traffic arterials on the mainland to the north.
City of Long Beach General Plan – Land Use Element		
Goals and Objectives– Functional Transportation Long Beach will maintain or improve the current ability to move people and goods to and from development centers while preserving and protecting residential neighborhoods.	Yes	Project would improve traffic conditions between Terminal Island and major traffic arterials on the mainland to the north.

Table 3.1-1
Project Consistency with Local and Regional Plans/Policies

Plan/Policy	Project Consistent with Plan/Policy?	Remarks
City of Long Beach General Plan – Recreation Element		
Goal 4.7 Fully maintain public recreation resources.	Yes	Project would not affect maintenance requirements of public recreation resources.
Goal 4.8 Fully utilize all recreational resources, including those at public schools.	Yes	Project would be located to avoid interference with recreational resources.
Goal 4.9 Provide access to recreation resources for all individuals in the community.	Yes	Project would maintain existing access to recreation resources.
Policy 4.2 Protect public parkland from intrusive, non-recreational uses.	Yes	Project would facilitate movement through the project area and decrease opportunities to stop at parks in the project area.
Policy 4.6 With the help of the community, plan and maintain park facilities at a level acceptable to the constituencies they serve.	Yes	Project would facilitate movement through the project area and decrease opportunities to stop at parks in the project area.
Policy 4.10 Require all new developments to provide usable open space tailored to the recreation demands they would otherwise place on public resources.	Yes	Project would not affect existing demand for recreation resources.
Port of Long Beach: Port Master Plan		
Land Use Goal 3 Improve internal circulation involving roadways and rail.	Yes	Project would improve circulation within the port and would improve traffic conditions between Terminal Island and major traffic arterials on the mainland to the north.

Table 3.1-1
Project Consistency with Local and Regional Plans/Policies

Plan/Policy	Project Consistent with Plan/Policy?	Remarks
Land Use Goal 3, Objective d) Provide additional rail and highway access to Terminal Island.	Yes	Project would improve connectivity and traffic conditions between Terminal Island and major traffic arterials on the mainland to the north.
Transportation Element, Goal 1 Provide for efficient circulation of vehicular and rail traffic within the Port (with minimum disruption to port activities).	Yes	Project would improve connectivity and traffic conditions between Terminal Island and major traffic arterials on the mainland to the north, and would accommodate existing and proposed truck volumes.
Transportation Element, Goal 3 Ensure port improvements are consistent with the regional transportation network.	Yes	Project would improve connectivity and traffic conditions between Terminal Island and major traffic arterials on the mainland to the north, and would accommodate existing and proposed truck volumes.
District 3: Northwest Harbor Planning District, Goal 1 Purchase all non-port owned property to increase primary port land.	Yes	Project would improve connectivity and traffic conditions between the mainland and lands within District 3 to facilitate port activities.
District 4: Terminal Island Planning District, Goal 3 Improve rail and highway access to Terminal Island.	Yes	Project would improve connectivity and traffic conditions between the mainland and lands within District 3 to facilitate port activities.
Port of Los Angeles Master Plan		
Section V, A. General Objectives 1 As the Port of Los Angeles and its facilities are a primary economic and coastal resource of the state…the port is responsible for modernizing and constructing necessary facilities to accommodate…the demands of…commerce and other traditional water dependent and related facilities in order to preclude the necessity for developing new ports elsewhere in the state for such accommodations.	Yes	Project would modernize (i.e., the bridge) and construct facilities (i.e., the expressway) to facilitate commerce and meet existing and projected demands.

Table 3.1-1
Project Consistency with Local and Regional Plans/Policies

Plan/Policy	Project Consistent with Plan/Policy?	Remarks
Section V, A. General Objectives 7 Internal road, rail and access systems and connecting links with external road, rail and access systems shall be located and designed to provide necessary, convenient and safe access to and from land and water areas consistent with the existing or long-term preferred uses as set forth in [the] Port Master Plan, and shall be consistent with the City of Los Angeles' general transportation plan and local Coastal Program for areas adjacent to the boundaries of the port.	Yes	Project would provide safe and convenient coastal access to and from existing uses. It would not conflict with applicable plans.
Section V, B. Safety Objectives 1 The latest safety standards appropriate to the intended facility use based on appropriate risk analyses shall be used in the location, design, construction, and operation of all development projects in water areas and on land areas under the port's jurisdiction.	Yes	Project intends to modernize or replace the existing Schuyler Heim Bridge, thereby improving seismic safety of the structure. The project would be constructed in accordance with all applicable safety and design standards.
Section V, B. Safety Objectives 2 When a facility project is proposed which will involve the …transfer… of cargoes categorized by law as hazardous, an analysis of risk problems which may arise within the facility itself and which may affect adjacent facilities or areas shall be made and the results shall be used in locating designing, constructing and regulating the subsequent operation of the proposed facility project.	Yes	Trucks that currently transport hazardous materials across the existing Schuyler Heim Bridge would use the new or improved bridge and proposed expressway. A hazardous materials risk analysis shall be prepared for the operation of the project (proposed improvements and/or new structures) to ensure safe transport of all hazardous materials, as well as safety of surrounding uses.

3.1.1.2.4 Port of Los Angeles Plan

The Port of Los Angeles (POLA) Plan is part of the General Plan of the City of Los Angeles. The POLA Plan provides a 20-year guide to the continued development and operation of the port. It is designed to be consistent with the POLA Master Plan discussed in Section 3.1.1.9.1. The long-range preferred water and land uses for POLA include nonhazardous liquid and nonhazardous dry bulk cargo, general cargo, commercial fishing operations, and port-related commercial and industrial uses. However, these preferred goals are subject to the following criteria: changes in economic conditions that affect the types of commodities traded in waterborne commerce; the economic life of existing facilities handling or storing hazardous cargo; and precautions deemed necessary to maintain national security (LAHD, 2005).

3.1.1.3 City of Carson General Plan

The City of Carson adopted its updated General Plan on October 11, 2004. The plan recognizes the improvements planned for rail and truck traffic along the Alameda Corridor and sees this as an opportunity to capitalize on its land holdings and redevelop underutilized and vacant properties to meet demand for new industrial space. The Land Use Element of the plan states that truck-intensive uses should be located in areas where the location and circulation pattern will provide minimal effects on residential and commercial uses. The area south of I-405 and east of Wilmington Avenue is designated for heavy manufacturing.

3.1.1.4 City of Long Beach General Plan

The City of Long Beach adopted its General Plan in 1989 and includes the Long Beach Harbor area within Land Use District No. 12. This district is comprised of existing freeways, the Long Beach Harbor, and the Long Beach Airport. The General Plan assumes that the water and land use designations within the harbor area are formulated separately and adopted by due process as the Specific Plan of the Long Beach Harbor (also known as the Port Master Plan, as amended). The General Plan provides for delegation of responsibilities for planning within the boundaries of the Port of Long Beach (POLB) to the Board of Harbor Commissioners (POLB, 2005).

The City's Advance Planning Division of the Department of Planning and Building has been working on an update to the Land Use and Mobility (Transportation) Elements of the City's General Plan. In the Land Use and Mobility Elements Update of the General Plan: Tech Background Report, published in 2004, it is acknowledged that numerous planned improvements, including roadway improvements, are intended to be built in and around the Port area. Also, an increase in truck traffic is anticipated as the volume of containers handled at the ports is projected to increase four-fold between 2002 and 2025. The City supports transportation infrastructure improvements that improve the regional road transportation network.

Details of recreational facilities, goals, and policies are outlined in Chapter 4 – Open Space for Outdoor Recreation and Recreation Facilities of the City of Long Beach General Plan (see Table 3.1-1).

3.1.1.5 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) was enacted in 1972 to "preserve, protect, develop and, where possible, to restore or enhance, the resources of the nation's coastal zone for this and succeeding generations" and to "encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone" (16 USC 1452, section 303 [1] [2]) (POLB, 2005).

The CZMA is the primary federal law enacted to preserve and protect coastal resources. The CZMA sets up a program under which coastal states are encouraged to develop coastal management programs. States with an approved coastal management plan are able to review federal permits and activities to determine if they are consistent with the state's management plan.

California has developed a coastal zone management plan and has enacted its own law. The California Coastal Act of 1976, to protect the coastline. The policies established by the California Coastal Act are similar to those for the CZMA; they include the protection and expansion of public access and recreation, the protection, enhancement and restoration of environmentally sensitive areas, protection of agricultural lands, the protection of scenic beauty, and the protection of property and life from coastal hazards. The California Coastal Commission is responsible for implementation and oversight under the California Coastal Act.

Just as the federal CZMA delegates power to coastal states to develop their own coastal management plans, the California Coastal Act delegates power to local governments (15 coastal counties and 58 cities) to enact their own local coastal programs (LCPs). The LCPs determine the short- and long-term use of coastal resources in their jurisdiction consistent with the California Coastal Act goals. A federal consistency determination also may be needed.

The CZMA provides grants to states that develop and implement a federally approved Coastal Zone management plan. It also allows states with approved plans the right to review federal actions to ensure that they are consistent with those plans.

Section 307 (c)(3)(A) of the CZMA states that

> "*any applicant for a required federal license or permit to conduct an activity, in or outside the coastal zone, affecting any land or water use or natural resource of the coastal zone of that state shall provide a certification that the proposed activity complies with the enforceable policies of the state's approved program and that such activity will be conducted in a manner consistent with the program.*"

In order to participate in the coastal zone management program, a state is required to prepare a program management plan for approval by the National Oceanic and Atmospheric Administration, Office of the Coast and Ocean Resource Management (OCORM). After the OCORM approves a program management plan and its enforceable program policies, the state program gains "federal consistency." This means that any federal action (e.g., a project requiring federally issued licenses or permits) that takes place within a state's coastal zone must be found to be consistent with state coastal policies before the federal action can take place (POLB, 2005).

The project alternatives addressed in this Final EIS/EIR are subject to federal Coastal Zone Consistency Review, as they are within the California coastal zone, which extends from 3 miles at sea to an inland boundary that varies from a few blocks in urban areas to several miles in less developed areas. California has a federally approved Coastal Management Program, which includes the California Coastal Act. The program was approved by the OCORM in 1977 and gave the California Coastal Commission the authority to conduct federal consistency reviews for projects in California's coastal zone with the exception of San Francisco Bay, which has its own coastal management program (POLB, 2005).

3.1.1.6 California Coastal Act

The California Coastal Act (CCA) of 1976 is California's Coastal Zone management program. The CCA grants authority to the California Coastal Commission to regulate development and related resource-depleting activities within a defined Coastal Zone boundary. In developed areas, the Coastal Zone begins at the mean high tide line and extends 914 m (1,000 yards [yd]) inland. Any actions within the Coastal Zone require a formal consistency determination from the California Coastal Commission (i.e., statement that an action would or would not violate or contradict the policies of the CCA). In addition, most structures or activities that modify land use or water use in the Coastal Zone require a coastal development permit.

The CCA includes specific policies that address various issues, such as terrestrial and marine habitat protection, landform alteration, industrial uses, water quality, and ports. The policies of the CCA represent the statutory standards applied to planning and regulatory decisions made by the California Coastal Commission and local governments. Chapter 8 of the CCA recognizes the California ports as primary economic and coastal resources and as essential elements of the national maritime industry.

The CCA requires a port that has jurisdiction over land or water within the Coastal Zone to prepare a Port Master Plan (PMP), consisting of a land and water use plan and other implementing actions. The PMP is intended to protect coastal resources and to set guidelines for future development. The California Coastal Commission reviews each PMP to determine whether it conforms to CCA standards. Until the California Coastal Commission certifies a PMP, it exerts permit control over all new development within that part of the Coastal Zone. After certification, the regulatory authority of the California Coastal Commission is delegated to the port. The California Coastal Commission, however, retains permanent jurisdiction over the immediate shoreline (i.e., tidelands, submerged lands, and public trust lands). The POLB and POLA have Coastal Commission-certified master plans that address environmental, recreational, economic, and cargo-related concerns of the ports and surrounding regions (POLB, 2005)

In addition, as specified in Section 30715 in the CCA, the approval of certain development activities by the port governing body may be appealed to the California Coastal Commission. Roads or highways, including bridges, are included in the "appealable" category. Whenever an appealable development project is undertaken, the California Coastal Commission is informed and advised by the port governing body. Prior to the commencement of such a project, the California Coastal Commission and interested government agencies, persons, and organizations are notified and informed by the port governing body of the consistency of the project with the PMP and the provisions of the

CCA. When the port governing body approves such a project, the approval becomes effective after the 10th working day after notification of its approval, unless an appeal is filed with the California Coastal Commission within that time, in which case the project is held in abeyance pending a California Coastal Commission decision on the appeal (California Coastal Commission, 2002).

Chapter 3 of the CCA lists the six coastal resources planning and management policies that are used to evaluate a proposed project's consistency with the CCA:

- Maximize access to California's coast
- Protect water-oriented recreational activities
- Maintain, enhance, and restore California's marine environment
- Protect sensitive habitats and agricultural uses
- Minimize environmental and aesthetic impacts of new development
- Locate coastal-dependent industrial facilities within existing sites whenever possible (POLB, 2005).

The project alternatives are consistent with the CCA.

3.1.1.7 California Tidelands Trust

Pursuant to statute and the Public Trust Doctrine, the California State Lands Commission administers tidal and submerged lands for the people of the state (California State Lands Commission, 2001). Within the confines of the common law public trust doctrine, the legislature is the ultimate administrator of the tidelands trust and ultimate arbiter of permissible uses of trust lands. Tidelands may be granted in trust to local entities for uses consistent with the statutory trust grant. Public trust lands in the project area have been granted in trust by the legislature, to the City of Long Beach and City of Los Angeles, pursuant to Chapter 565, Statutes of 1911, as amended. The POLA and POLB jurisdictional properties are held in trust by the cities and administered by the Los Angeles and Long Beach Harbor Departments to promote and develop maritime-related commerce, navigation, and fisheries (LAHD, 2005).

The proposed project alternatives would be consistent with the Tidelands Trust Agreement.

3.1.1.8 Local Coastal Programs

Under the CCA, each local government lying in whole or in part within the Coastal Zone is required to prepare a local coastal program for that portion of the Coastal Zone within its jurisdiction. Local coastal programs are essentially land use plans and policies of the local government within sensitive coastal resources areas which, when taken together, meet the requirements of, and implement the provisions and policies of, the CCA at the local level.

A port master plan serves as the Local Coastal Program in port areas. The portions of the project area that are within the Port of Los Angeles or the Port of Long Beach are within the jurisdiction of the Los Angeles Port Master Plan and the Long Beach Port Master Plan.

3.1.1.9 Port Master Plans

Port master plans effectively serve as the local coastal program in port areas. The southern portion of the project area lies within the jurisdiction of the Los Angeles Port Master Plan and the Long Beach Port Master Plan.

3.1.1.9.1 Port of Los Angeles Master Plan

The Port of Los Angeles Master Plan, which was certified by the California Coastal Commission and became effective in April 1980, constitutes the Local Coastal Program for the portion of the harbor under the jurisdiction of the City of Los Angeles. The plan does not specifically address the proposed project, but is generally supportive of transportation improvements to and from the Port of Los Angeles.

The proposed project alternatives are consistent with Policy 15 of the plan, which states,

> *"When an existing facility in the Port requires alteration or modifications to maintain its level of service or improve the safety of the facility or its operations, such changes shall be made regardless of the fact that the particular facility is not necessarily designated to remain in its current location on a long-term basis."*

3.1.1.9.2 Port of Long Beach: Port Master Plan

The Port of Long Beach Port Master Plan was certified in 1978 by the California Coastal Commission, updated in 1983 and 1990, and has since been amended 12 times. The plan provides a planning tool to guide future port development in compliance with the goals of the California Coastal Act. The plan addresses public access, visual quality and recreation/ tourist uses; navigation; environmental quality; transportation/circulation; intermodal rail facility; and oil production and operation. The plan has been certified by the California Coastal Commission as being in conformance with the policies of Chapter 3 – Coastal Resources Planning Management Policies and Chapter 8 – Ports (POLB, 1999).

The POLB Master Plan was prepared by the Port to ensure that long-range planning reflects updated cargo forecast information, as well as current transportation and rail studies. The plan explains that planned projects include: (1) construction of a new Pier S marine terminal on redeveloped oil field property; and (2) redevelopment and expansion of the existing Pier A marine terminal through redevelopment of oil field property (Pier A West) and relocation of adjacent tenants. Information provided by the POLB indicates that a new tunnel is planned that would cross beneath SR-47 to allow vehicular access between Pier A and Pier A West.

The POLB Master Plan covers the Port of Long Beach Harbor District, which is generally harbor area land that is contained within the City of Long Beach. The area consists of nearly 2,700 acres of land and over 4,500 acres of water. The POLB is divided into 10 planning districts, which are geographical areas established to serve functional purposes by consolidating similar land and water uses, maximizing efficient use of facilities, and separating hazardous cargo from other areas of the port. The goals for each district serve as guidelines for long-term development. To be consistent with the POLB Master Plan, a project must conform to the goals of the district within which it is located (POLB, 1999). The harbor development permit (HDP) is the primary vehicle for evaluating Port projects and determining compliance with the Port Master Plan.

The project is in the POLB Harbor Planning Districts 3 and 4. District 3 is called the Northwest Harbor and is north of District 4. District 4 is the Terminal Island District. The allowable uses in each area are:

Northwest Harbor District

- Oil Production
- Primary Port Facilities
- Utilities
- Ancillary Port Facilities

Terminal Island District

- Primary Port Facilities
- Hazardous Cargo Facilities
- Port Related
- Oil Production
- Navigation
- Federal Uses
- Utilities
- Ancillary Port Facilities
- Non-Port uses for 3-acre Homeless Service Center
- Non-Port uses for 15-acre City of Long Beach Police Department headquarters and training academy

The POLB Master Plan zoning designation for the project site is "Port-related Industrial – IP" and is covered by the City of Long Beach Municipal Code. The existing Schuyler Heim Bridge and segment of SR-47 within the land use study area for the project addressed in this Final EIS/EIR are consistent with this zoning designation and, therefore, the project is consistent with the POLB Master Plan.

3.1.1.9.2.1 District 3 – Northwest Harbor Planning District

The Northwest Harbor Planning District is bounded on the north by the Los Angeles/ Long Beach city boundary, on the south by the Cerritos Channel, and on the east by Carrack Avenue. The portion of SR-47 within District 3 is public right-of-way. An anticipated project (POLB, 1999) is the Ocean Boulevard connector-Port access demonstration project, which states that Ocean Boulevard is an east/west four- and six-lane divided roadway connecting POLB with downtown Long Beach (POLB, 1999). The project addressed in this EIS/EIR would improve traffic flow northward from Ocean Boulevard and, therefore, is consistent with the POLB designation.

3.1.1.9.2.2 District 4 – Terminal Island Planning District

The Terminal Island Planning District is bounded on the north by the Cerritos Channel, on the east by the Back Channel, and on the south and west by the Navy Mole/Nimitz Road pier. District 4 consists primarily of property originally owned by the U.S. Navy, to be obtained by the POLB for primary port facilities, hazardous cargo facilities, port-related facilities, and navigation uses (POLB, 1999).

3.1.1.10 Dual Permit Zone

Proponents of development projects within the jurisdiction of the Port of Long Beach are required to apply for a Harbor Development Permit from the Board of Harbor Commissioners. Similarly, the Board of Harbor Commissioners at the Port of Los Angeles requires that project proponents apply for a Coastal Development Permit and an Engineering Permit for developments within the Port of Los Angeles. The City of Los Angeles typically issues Coastal Development Permits for projects within its jurisdiction. If a project is located in a dual jurisdiction area, the California Coastal Commission also may issue a Coastal Development Permit. For port-owned property located outside of the port, coastal development authority is shared by the city (Los Angeles or Long Beach) and the Coastal Commission, depending on where the property is located. The property will be under either single or dual jurisdiction.

3.1.1.11 Congestion Management Program

The Congestion Management Program (CMP) is a state-mandated program intended as the analytical basis for transportation decisions made through the State Transportation Improvement Program process. The CMP became effective when Proposition 111, the Gas Tax Initiative, was approved by California voters in 1990. The CMP was adopted by the Los Angeles Metropolitan Transportation Authority (MTA) and is updated every 2 years. The CMP was developed to link land use, transportation, and air quality decisions; develop a partnership among transportation decisionmakers on devising appropriate transportation solutions that include all modes of travel; and propose transportation projects that are eligible to compete for state gas tax funds (LAHD, 2005).

3.1.2 Affected Environment

The alternatives evaluated in this Final EIS/EIR include four build alternatives, one Transportation System Management (TSM) alternative, and a No Build alternative. These alternatives would generally extend from the Port of Long Beach (at Ocean Avenue) along SR-47 to Pacific Coast Highway, and from SR-103 north of Pacific Coast Highway northward to Sepulveda Boulevard near Interstate 405. The project area includes three municipal jurisdictions: the City of Long Beach (which includes the Port of Long Beach), the City of Los Angeles (including the Port of Los Angeles [POLA]), and the City of Carson. Figure 3.1-1 shows the project alternatives in relation to the city boundaries of Carson, Long Beach, and Los Angeles.

A land use study area for the project alternatives has been defined to include two units. The southern unit is associated with the Schuyler Heim Bridge replacement/rehabilitation alternatives (Alternatives 1, 1A, 2, 3, and 4) and SR-47 Expressway (Alternatives 1, 1A, 3, and 4). This unit includes the eastern half of the Wilmington Community in the City of Los Angeles, a small section of the City of Long Beach, and the northern section of the Port of Los Angeles and Port of Long Beach. The northern unit encompasses the SR-103 Extension associated with Alternative 2, and crosses from west Long Beach, through a narrow area of the City of Los Angeles, to southeast Carson. This unit is bounded by Alameda Boulevard, Sepulveda Boulevard, Webster Avenue, and Willard Street. In total, the study area is intended to encompass the vicinity where any potential effects of project construction and operation would be reasonably foreseeable. Alternatives 5 (TSM) and 6 (No Build) also are within these areas.

3.1.2.1 Existing Land Use

The southern unit of the study area is intensely developed with heavy industrial, commercial, and transportation uses associated with the nearby POLA and POLB. Typical industrial and commercial enterprises include auto/truck parts and repair; marine vessel repair; recycling and salvage yards; and marine cargo container storage. These include Piers A, S, and T of the Port of Long Beach. A residential neighborhood is located to the west of the study area, south of Pacific Coast Highway and west of Alameda Street. Most residences in this area are single-family. Various live-aboard boats are apparent in the marinas located in the Dominguez and Cerritos Channels. The northern unit of the project study area (the site of the SR-103 Extension) is located amidst heavy industrial and utility areas, bordered to the east by single-family residential areas, educational and public facilities, offices and warehousing uses (Figures 3.1-2a and 3.1-2b).

3.1.2.2 Existing Recreational Facilities

Parks and recreational areas were identified within the 1.2-km (1-mi) study area. They are operated and maintained by the City of Los Angeles (Department of Recreation and Parks) and the City of Long Beach (Department of Parks, Recreation, and Marine) and are shown in Figure 3-1.3 and listed in Table 3.1-2. As discussed in the Section 4(f) evaluation, two public schools where playgrounds/athletic fields are used for public recreation (Hudson Elementary School, Cabrillo High School) have been identified within about 0.4 km (0.25 mi) of the project alternatives (see Appendix C). Within the City of Los Angeles, the Department of Recreation and Parks maintains more than 15,600 acres of parkland with 387 neighborhood and regional parks, seven lakes, 176 recreation centers, 372 children's play areas, 13 golf courses, 387 tennis courts, 8 dog parks, 58 swimming pools, and 7 skate parks. The department also provides after-school programs and day care for children, teen clubs, basketball, volleyball, and softball and flag football games and leagues. At ocean and beach areas outside Los Angeles Harbor, there are other opportunities, such as marine recreation (e.g., boating and waterside entertainment).

The City of Long Beach Parks, Recreation, and Marine operates 92 parks with 25 community centers; 2 major tennis centers; 5 golf courses; the largest municipally operated marina system in the nation, with 3,800 boat slips; and 11 miles of beaches. More than 3,100 acres within the City's 50 square miles are devoted to recreation.

The park and recreation areas listed in Table 3.1-2 include facilities that support activities such as softball, basketball, volleyball, handball, table games, swimming, handicrafts, lawn games, picnicking, and small-children's activity/play areas. At ocean and beach areas near Los Angeles and Long Beach Harbors that are outside the study area, there are other opportunities, such as marine recreation (e.g., boating and waterside entertainment) and historic sites.

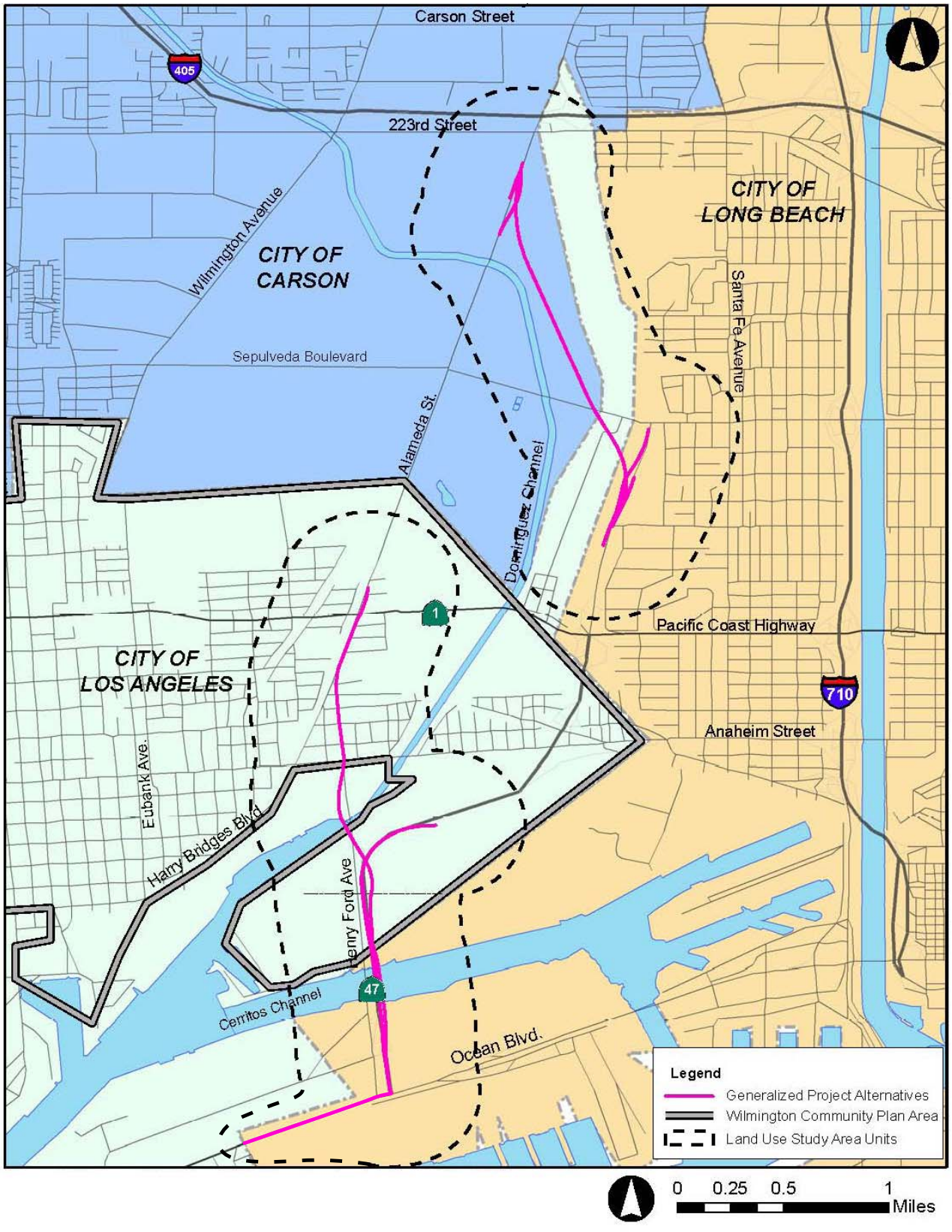


Figure 3.1-1
Planning Areas and Land Use Study Area Units
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: U.S. Census TIGER Data, 2000; City of Los Angeles General Plan, 2006.

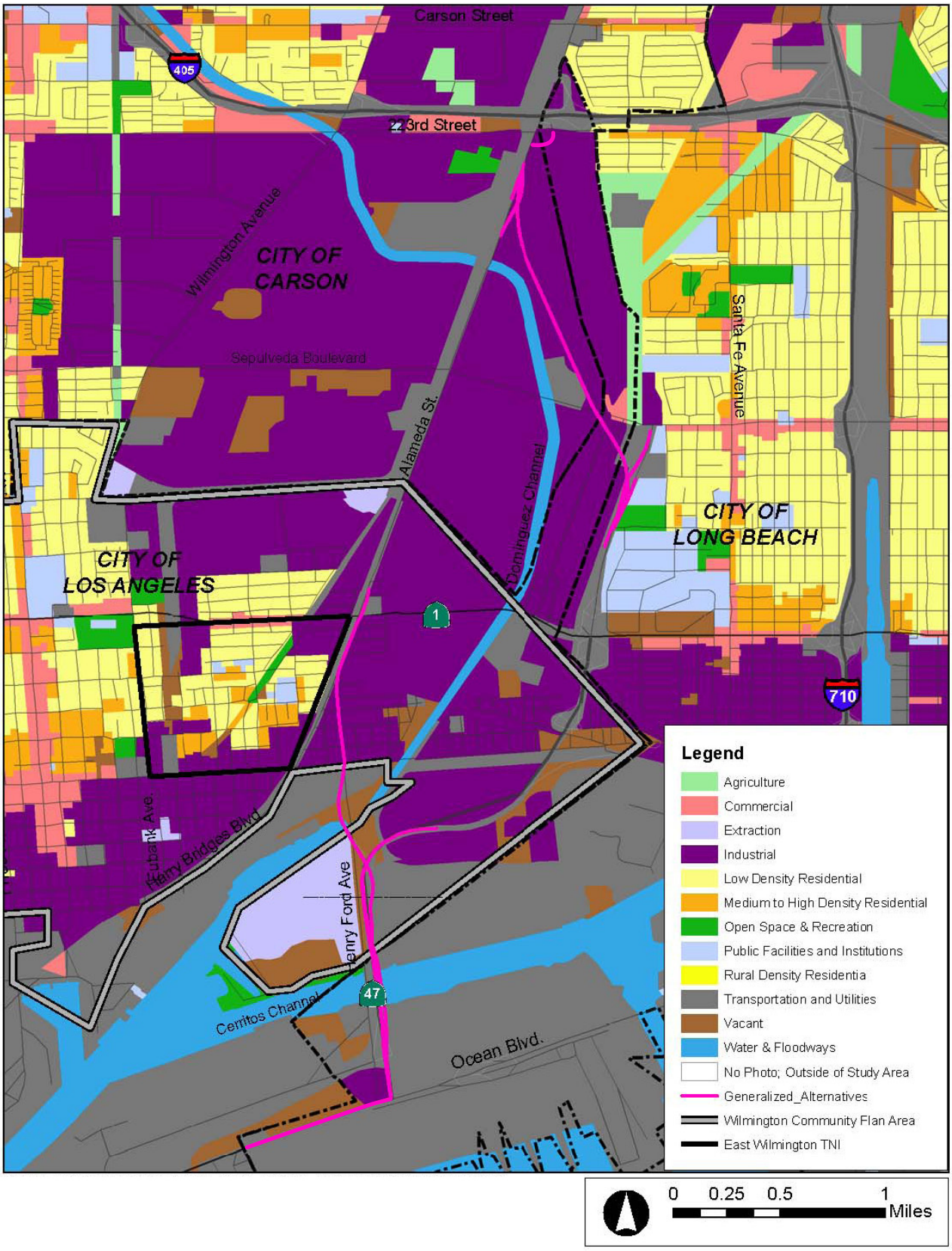


Figure 3.1-2a
Existing Land Use
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: U.S. Census TIGER Data, 2000; City of Los Angeles General Plan, 2006.

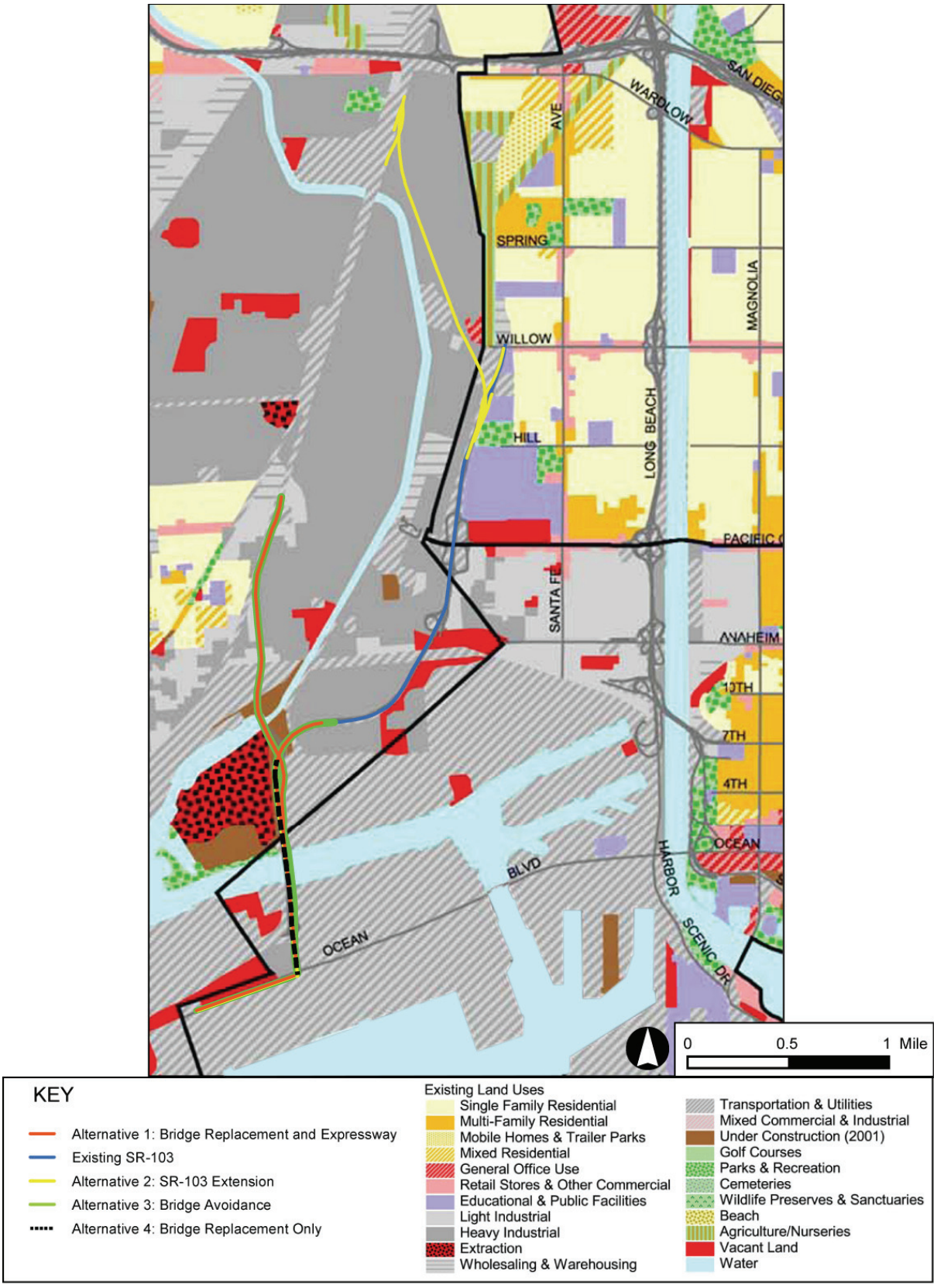


Figure 3.1-2b
Existing Land Use
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: City of Long Beach General Plan, *Figure 3-2-1 Existing Land Uses*, February 2004; DMJM Harris, 2005; Jones & Stokes, 2005.

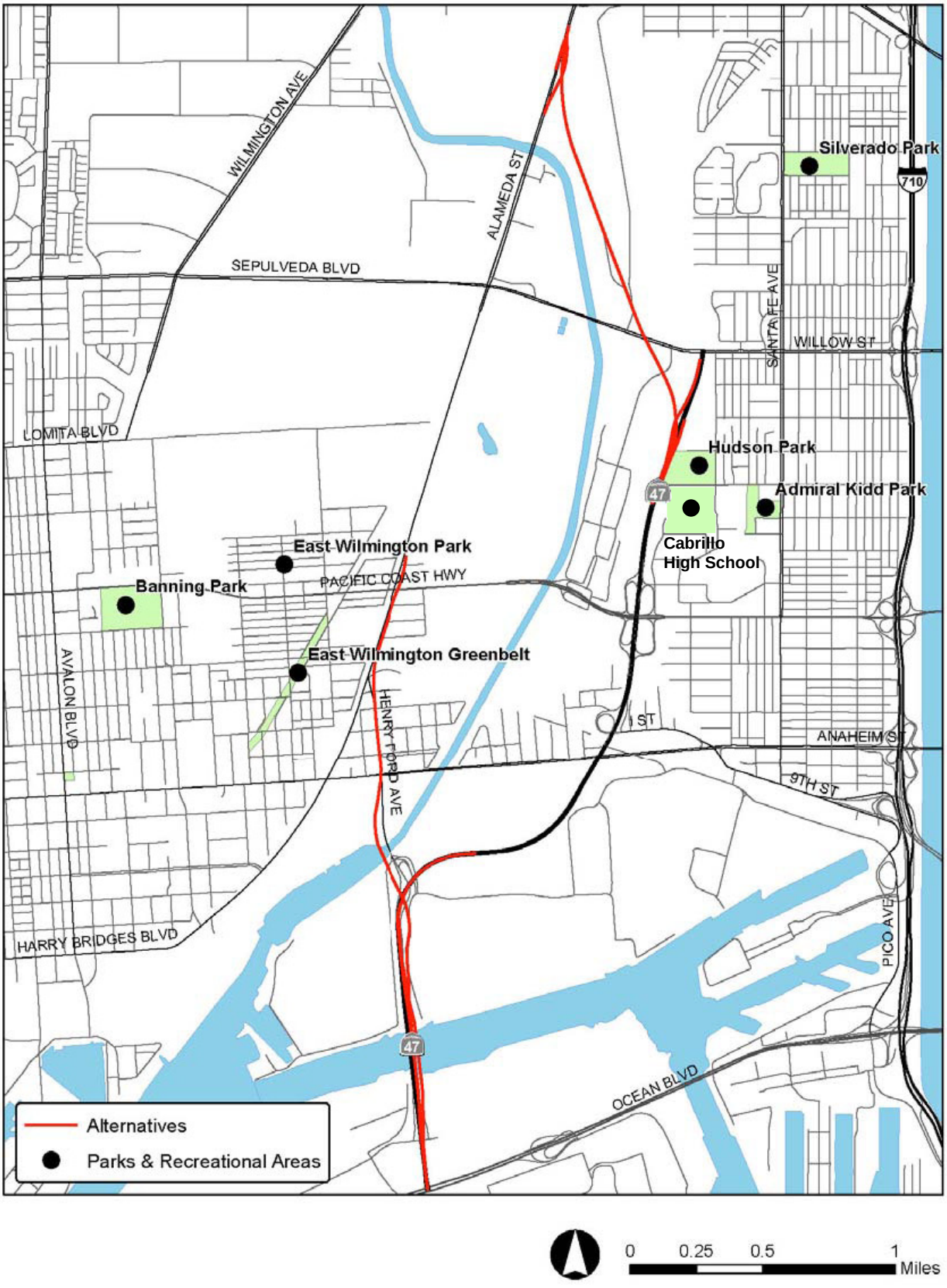


Figure 3.1-3
Parks and Recreation Facilities
Schuyler Heim Bridge Replacement
and SR-47 Expressway

Source: Jones & Stokes, 2005.

Table 3.1-2
Parks and Recreation Facilities

Facility Type	Name	Address	Distance from Project Alignments (kilometers/miles)
Parks	Hudson Park	2335 Webster Avenue Long Beach, CA	Adjacent
Parks	Admiral Kidd Park	2125 Santa Fe Avenue Long Beach, CA	0.61/0.38
Parks	Silverado Park	1545 West 31st Street Long Beach, CA	1.33/0.83
Parks	Banning Park	1331 Eubank Avenue Los Angeles, CA	1.38/0.86
Parks	East Wilmington Park	Watson Avenue and East O Street Los Angeles, CA	0.67/0.42
Parks	East Wilmington Greenbelt	Coil Avenue and Binn Avenue Los Angeles, CA	0.40/0.25
Playground/ Athletic Fields	Cabrillo High School	2001 Santa Fe Avenue Long Beach, CA	0.40/0.25

Sources: City of Los Angeles (1998), City of Long Beach (2002), Thomas Guide 2001.

Recreational facilities near the Ports of Long Beach and Los Angeles include several marinas, an aquarium, the *Queen Mary Cruise Ship*, museums, sportfishing berths, swimming, beaches, marine wildlife viewing facilities, and cruise ship launches (Port of Los Angeles, 2002; Port of Long Beach, 2002). With the exception of a privately owned marina located west of the Schuyler Heim and Badger Avenue bridges, these port-related recreational facilities are located at distances ranging from 6.4 km to 11 km (4 to 7 mi) from the Schuyler Heim Bridge. The marina is directly west of the bridges and moors various types of pleasure craft, including sailboats, small motor craft, and cabin cruisers. Some of the vessels at this marina are used by their owners as their primary residence.

The following parks and recreational facilities are owned, maintained and operated by the City of Los Angeles, Department of Recreation and Parks, and are located west of the SR-47 Expressway:

- The East Wilmington Greenbelt is comprised of approximately 5 acres of lawn and landscaping, fences, and baseball backstops. Planned for the site is a new 10,000-square-foot community center consisting of 2 volleyball courts, a basketball court, an office, lobby, restrooms, and 11 parking spaces.
- The East Wilmington Pocket Park occupies about 1 acre of landscaped green space.
- Banning Park contains the historic Banning Residence, a stagecoach barn, rose garden, and landscaped open space on a 20-acre site. The Banning Residence is recognized as a national, state, and local landmark and is open to the public for tours. The park provides important vagrant/migrant bird habitat and is an important passerine migrant bird stopover point within Los Angeles County. Banning Park also houses an outdoor pool, recreation center, and child care center.

The following parks and recreational facilities are owned, maintained and operated by Long Beach Parks, Recreation, and Marine and the Long Beach Unified School District, in the City of Long Beach and are located east of the SR-103 Extension.

- Hudson Park is a 13-acre park with two baseball fields, one soccer field, picnic area, play equipment, and community gardens project. Hudson Park is a popular park for adult sports leagues.
- The Hudson Elementary School includes playground and athletic fields on the west side of the school.
- Admiral Kidd Park is a 9-acre facility with a basketball court, baseball field, playground, soccer field, softball field, picnic area, and youth recreation programs.
- Silverado Park is an 11-acre park with baseball fields, basketball court, community center, gym, picnic areas, playground, pool, softball field, tennis courts, and volleyball, as well as programs for tiny tots, child care, youth recreation, teens, and seniors.

There are no wildlife or waterfowl refuges in the project vicinity.

3.1.2.3 Coastal Zone Access and Resources

A portion of the project area lies within the boundary of the Coastal Zone. The Coastal Zone designation in the vicinity of the project area extends approximately 914 meters (m) (1,000 yd) inland from the mean high-tide line of the sea. Figure 3.1-4 shows the official Coastal Zone boundary in the vicinity of the project. Access to the coast adjacent to the Schuyler Heim Bridge is relatively limited because the area is fully developed and industrialized, and under the jurisdiction of the Port of Long Beach or the Port of Los Angeles. However, the public can gain access to the coast via the marina just west of the bridge by foot, vehicle, bicycle, or watercraft using a network of roads, pathways, and the Cerritos Channel (watercraft only). In addition, the public can gain access to coastal waters from Terminal Island piers after crossing the Schuyler Heim Bridge.

The Coastal Zone environment in the project area is built-out and has few land areas that can support natural resources. Biological resources that are located in the Coastal Zone in the project area include limited native and non-native terrestrial plant species and wildlife species. Although special-status plant species were not identified onsite, several special-status bird species were observed. These include the American peregrine falcon, California brown pelican, and the double-crested cormorant. Additional species have the potential to occur at the Schuyler Heim Bridge project site. California sea lions also have been observed in the Cerritos Channel at the project site. Section 3.16 – Biological Resources provides additional information about native and non-native biological resources that occur in the Coastal Zone and project area.

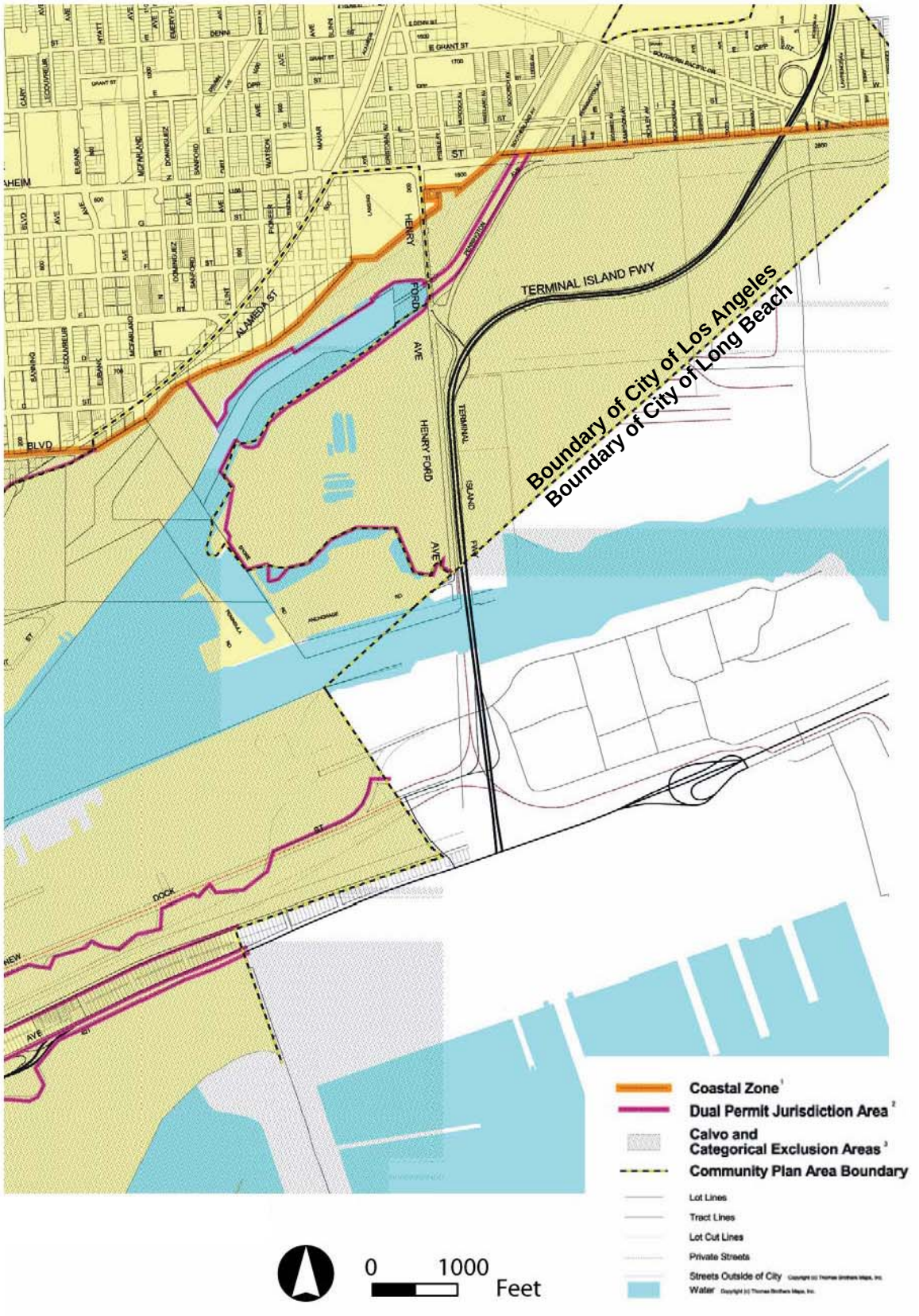


Figure 3.1-4
Coastal Zone Boundary
Schuyler Heim Bridge Replacement and SR-47 Expressway

Dual Permit Jurisdiction data was not available for City of Long Beach.
Source: City of Los Angeles, 2000.

3.1.3 Environmental Consequences

3.1.3.1 Evaluation Criteria

For the purposes of the analyses in this Final EIS/EIR, each project alternative was evaluated to determine if it would:

- Result in new land uses that are substantially incompatible with land uses and development in the vicinity
- Materially conflict with any applicable adopted land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect
- Physically divide an established community
- Permanently impair access to and from a park, recreational area, or wildlife/waterfowl refuge through the placement of barriers or other impediments to the local circulation pattern
- Increase demand for new or expanded parks, recreational areas, or wildlife/waterfowl refuges
- Have indirect construction effects on the surrounding parks, recreational areas, or wildlife/waterfowl refuges that would be substantially greater in magnitude and/or longer in duration than is typical of similar construction projects in similar communities.
- Interfere with or be inconsistent with existing coastal access
- Harm Coastal Zone resources
- Be inconsistent with the Port of Long Beach or Port of Los Angeles Master Plan.

3.1.3.2 Methodology

Applicable local and regional plans were reviewed to determine project consistency with such plans. Land use and zoning maps were also reviewed to determine whether the project would be compatible with existing and planned land uses, and development patterns.

3.1.3.3 Evaluation of Alternatives

This section evaluates the effects associated with the project alternatives on existing and proposed land uses, including recreation, development patterns, and plans and objectives. Each of the alternatives is discussed in detail. Table 3.1-1 shows the applicable land use goals, policies, and programs, and the project consistency with these plans.

3.1.3.3.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

3.1.3.3.1.1 Alternative 1 Construction Effects

Compatibility with Existing Land Use and Recreation

The alignment proposed under Alternative 1 would be located primarily within the existing right-of-way. As mentioned above, construction activities would include construction of the replacement bridge and approaches (exits, entrances), and construction of the 2.7-kilometer (km) (1.5-mile [mi]) SR-47 Expressway, including street improvements, demolition of the existing Schuyler Heim Bridge and, lastly, construction of the Ocean Boulevard/SR-47 Flyover (flyover). Excavation, grading, pile-driving, and other activities

related to construction of roadway and bridge structures would be required. These types of construction activities would result in some temporary, localized, site-specific disruptions to land uses in the area, primarily related to construction traffic from trucks and equipment, possible partial or full street closures, access disruptions to facilities and parking, increased noise and vibration, and increased air pollutant emissions.

Most of the alignment proposed under this alternative would be constructed within an existing industrial area, along an existing transportation corridor. Nearby sensitive land uses such as residences and businesses would be most susceptible to the temporary construction effects. However, these effects, with the exception of construction noise, would be short-term and or intermittent and limited to daytime hours, and are thus not considered to be adverse effects.

No park or recreation facilities would be used for construction staging or material laydown. The parks and recreation facilities that are nearest the SR-47 Expressway and that could be affected by construction are Hudson Park, which is adjacent to SR-47, and the East Wilmington Greenbelt, which is 0.8-km (0.5-mi) east of the proposed right-of-way for the SR-103 Extension. Although access to and utilization of the facilities in Hudson Park will be maintained throughout the construction period, the quality of use of the facilities closest to the construction zone could be periodically or temporarily reduced. The distance of the East Wilmington Greenbelt from the proposed alignment (0.8 km [0.5 mi]) would make temporary effects unlikely to affect enjoyment of the park. The other parks in the area are sufficiently distant from construction areas as to not be affected by construction-related air and noise.

Alternative 1 would not result in new or incompatible land uses. The alignment would pass through existing rights of way and industrial areas and would not bisect any residential neighborhoods. The nearest residential areas are located west of Alameda Street and north of Anaheim Street, which are west of the northernmost end of the proposed alignment.

Alternative 1 construction activities would be temporary in duration and would be conducted in accordance with typical measures to minimize effects such as noise and traffic during the construction period. Therefore, no adverse effects to land use are expected.

Potential construction effects related to land use are further addressed in Sections 3.4 – Utilities and Public Services, 3.5 – Traffic and Transportation, 3.13 – Air Quality, and 3.14– Noise.

Consistency with Plans and Policies

Alternative 1 is generally consistent with local land use plans, policies, and guidelines. Construction activities associated with Alternative 1 would not materially conflict with any such plans, policies, or guidelines. Table 3.1-1 compares the project with objectives and policies of local plans.

Coastal Zone Access and Resources

Construction of Alternative 1 would temporarily disrupt public access to Terminal Island, but would not prevent access to areas immediately surrounding the Schuyler Heim Bridge. Because two other bridges in the vicinity (Vincent Thomas and Gerald Desmond bridges) allow access to Terminal Island, and because the area surrounding the Schuyler Heim Bridge has various port-related industrial uses with restricted public access, public coastal

access effects and Coastal Zone resource effects during construction would be minimal. Consequently, construction of Alternative 1 is not expected to result in adverse access effects in the Coastal Zone.

There is a potential for Alternative 1 to affect aquatic communities in the Coastal Zone during construction activities such as pile driving and installation of cofferdams, as well as during demolition of the Schuyler Heim Bridge. These potential effects are addressed in detail in Section 3.16 – Biological Resources.

3.1.3.3.1.2 Alternative 1A Construction Effects

Compatibility with Existing Land Use

Alternative 1A, a haunch bridge design, is a structural variation of Alternative 1. The main purpose of this alternative is to improve the aesthetics of the replacement structure over the Cerritos Channel. The structural differences of this alternative would not result in effects to land use different than those discussed for Alternative 1. Thus, Alternative 1A would not result in new or incompatible land uses.

Consistency with Plans and Policies

The proposed Alternative 1A would not materially conflict with any plans or policies. Please refer to the discussion above under Alternative 1 and Table 3.1-1.

Coastal Zone Access and Resources

Construction effects to Coastal Zone access and resources under Alternative 1A would be the same as those described under Alternative 1.

3.1.3.3.1.3 Operations Effects

Compatibility with Existing Land Use and Recreation

Operations of Alternative 1 would not result in permanent land use conflicts.

Alternative 1 would not require acquisition of any nearby park or recreation facilities. Consequently, no direct effect to the surrounding parks and recreational facilities is expected.

Existing access points and circulation routes to and from nearby parks and recreation areas would all remain the same after Alternative 1 is operational. To the extent that truck traffic is diverted onto the SR-47 Expressway and away from surface roadways such as Henry Ford Avenue and Alameda Street, local traffic congestion and safety could be expected to improve, with some indirect beneficial effects on access to the parks and recreational areas.

Alternative 1 would not increase population and employment in the project area. Therefore, it would not contribute to increased demand for new or expanded parks, recreational areas, or wildlife/waterfowl refuges. Additionally, Alternative 1 is intended to accommodate the anticipated growth in port-related traffic. Insofar as this could indirectly result in additional jobs during construction and operation, some of which may go to local residents, there may be some incremental demand for new and expanded park/recreation services and facilities. Since local agencies are assumed to have already considered this potential growth in their capital facilities planning, there would be no adverse effects related to the negligible indirect effect of the proposed project.

Consistency with Plans and Policies

Alternatives 1 and 1A are consistent with land use plans and policies applicable to the study area. Although the project is not specifically identified in many of the plans or policies, all of them identify general transportation and circulation issues in the area, particularly with respect to port-related transportation. In every case, these documents cite safe and efficient movement of traffic to and from the ports as a critical issue. To the extent that Alternative 1 is intended to address that issue by improving access to and from the ports, it is consistent with local plans and policies.

A balance between improved circulation and community quality of life is also a common theme to most of the local plans and policies, especially the Wilmington Community Plan. This plan emphasizes the need to improve the transportation system serving the ports and divert port-related traffic away from adjacent residential areas. Alternative 1 accomplishes this by grade-separating heavy truck traffic, thereby reducing the likelihood of truck traffic cutting through residential surface streets. Alternative 1 would not directly conflict with applicable plans and policies, and thus would not result in an adverse effect.

Table 3.1-1 presents a summary of the applicable land use plans and policies, and project compatibility with such plans.

Coastal Zone Access and Resources

Alternative 1 would replace the existing Schuyler Heim Bridge with a fixed-span bridge that would allow a similar level of coastal access as existing and anticipated future conditions. The replacement bridge under Alternative 1 would have a fixed height of 14.3 m (47 ft) above the high water level and a 54.9-m (180-ft) navigable channel clearance width. Because the height of the bridge replacement would be reduced, some large commercial vessels and some recreational vessels (those taller than 14.3 m [47 ft] would not be able to pass beneath the new bridge. These vessels may have to be re-routed to gain access to certain coastal locations within the ports area.

3.1.3.3.1.4 Alternative 1A Operations Effects

Alternative 1A is a structural variation of Alternative 1. The main purpose of this alternative is to improve the aesthetics of the replacement structure over the Cerritos Channel. Permanent effects to land use and the Coastal Zone would be the same as those described for Alternative 1.

3.1.3.3.2 Alternative 2: SR-103 Extension to Alameda Street

3.1.3.3.2.1 Construction Effects

Compatibility with Existing Land Use and Recreation

Alternative 2 would be generally consistent with the commercial, industrial, and port-related land uses in the immediate vicinity of the corridor. The closest sensitive land uses to the proposed alignment would be existing residential land uses and public educational uses located east of SR-103 and north of Pacific Coast Highway within the City of Long Beach. These sensitive residential and educational land uses could be temporarily affected by construction activities, and would be generally incompatible with Alternative 2. However, the proposed SR-103 Extension does not and would not bisect these land uses; it would form the western boundary of the residential area, separating it from industrial and freight uses located further west. The majority of the residential areas within the City of Carson are located north of I-405 beyond the project alignment. Hudson Park, a 13-acre park operated

by the City of Long Beach, is located just south of Willow Street, immediately east of SR-103. Use of the park would remain unaffected by the physical location of Alternative 2. Other effects related to noise, light, and air quality due to increased truck traffic are investigated in Sections 3.7 – Visual Resources/Aesthetics, 3.13 – Air Quality, and 3.14 – Noise.

Consistency with Plans and Policies

Alternative 2 is generally consistent with local land use plans, policies, and guidelines. Construction activities associated with Alternative 2 would not materially conflict with any such plans, policies, or guidelines (see Table 3.1-1).

Coastal Zone Access and Resources

The SR-103 Extension proposed under Alternative 2 would be located outside the designated Coastal Zone boundary. The Schuyler Heim Bridge replacement portion and Ocean Boulevard/SR-47 Flyover would adopt the same design as Alternative 1. Thus, construction-related effects to the Coastal Zone in this area would be the same as those discussed under Alternative 1, and are not expected to be adverse.

3.1.3.3.2.2 Operations Effects

Compatibility with Existing Land Use and Recreation

Alternative 2 would not result in new land uses, nor would it conflict with existing land uses in the project vicinity. The proposed bridge replacement and flyover are intended to serve and be compatible with the port and industrial land use in the immediate vicinity and would be located entirely within areas designated by applicable land use plans as Heavy Industrial, Transportation, and Extraction (Long Beach General Plan, Los Angeles General Plan, Wilmington-Harbor City Community Plan). These types of uses typically are not impaired by the proximity of an expressway and, in many cases, benefit from and are already well integrated with, transportation facilities in the area. There are no sensitive land uses in the immediate vicinity of the bridge/SR-47/flyover portion of this alternative.

As discussed previously, the proposed SR-103 Extension would be adjacent to a residential area, but would not bisect this sensitive land use. Hudson Park (operated by the City of Long Beach) and Hudson Elementary School are located south of Willow Street, adjacent to the existing SR-103. Presently, SR-103 forms the western boundary of the residential area, separating it from industrial and freight uses located further west. The proposed alignment would curve northwest, away from sensitive land uses, through an industrial corridor and connect to Alameda Street, north of Sepulveda Boulevard. Alternative 2 would not directly conflict with existing land uses in the project area.

Some benefits may accrue to residential land uses because heavy transportation operations to and from the ports would be directed onto the expressway rather than local roadways. Truck traffic would be less likely to cut through residential side streets.

It is expected that Alternative 2 would be compatible with the existing pattern of land use and development in the study area.

Other impacts affecting sensitive land uses, such as air emissions, noise, light and glare, and traffic associated with the project in Sections 3.7 – Visual Resources/Aesthetics, 3.13 – Air Quality, and 3.14 – Noise.

Consistency with Plans and Policies

Alternative 2 would be consistent with the land use plans and policies applicable to the study area. Although the project is not specifically identified in any of the plans or policies, most identify general transportation and circulation issues, particularly with respect to port-related transportation. In many instances, these documents cite the safe and efficient movement of traffic to and from the ports as a critical issue. To the extent that Alternative 2 is intended to address that issue by improving access to and from the ports, it is clearly consistent with the local plans and policies.

A balance between improved circulation and community quality of life is a common theme to most of the local plans and policies, especially in the Wilmington-Harbor City Community Plan. This plan emphasizes the need to improve the transportation system serving the ports and divert port-related traffic away from adjacent residential areas. Alternative 2 accomplishes this by grade-separating traffic, thereby reducing the likelihood of traffic cutting through residential surface streets.

Table 3.1-1 summarizes the relationship between the project and the regional and local plans that have policy provisions relevant to the project.

Coastal Zone Access and Resources

The SR-103 Extension proposed under Alternative 2 would be located outside the designated Coastal Zone boundary. The Schuyler Heim Bridge replacement and flyover would adopt the same design as Alternative 1. Thus, permanent effects to the Coastal Zone in this area would be the same as those discussed under Alternative 1, and are not expected to be adverse.

3.1.3.3.3 Alternative 3: Bridge Demolition Avoidance

3.1.3.3.3.1 Construction Effects

Compatibility with Existing Land Use and Recreation

Alternative 3 would affect the same land use areas as Alternative 1. Construction effects to land use would be the same as those under Alternative 1 and would not result in any effects to land use.

Consistency with Plans and Policies

Alternative 3 would affect the same planning areas as Alternative 1 and would thus result in the same effects. Alternative 3 is generally consistent with existing local and regional plans for this area, and would not materially conflict with any plans or policies (see Table 3.1-1).

Coastal Zone Access and Resources

Construction activities for Alternative 3 would take place within the Coastal Zone, and would have similar effects to coastal access and resources as those discussed under Alternative 1, with the exception of those effects related to removal of the Schuyler Heim Bridge (i.e., the loss of invertebrate communities attached to existing bridge pilings and foundations in the Cerritos Channel and effects to feeding fish). Under Alternative 3, the existing Schuyler Heim Bridge would remain in place, while a new bridge would be constructed immediately to the east; thus, effects to aquatic life within the channel would be as discussed under Alternative 1. Because construction effects would be short term, and measures to reduce those effects would be employed, effects to the Coastal Zone are considered to be minimal.

3.1.3.3.3.2 Operations Effects

Compatibility with Existing Land Use and Recreation

Alternative 3 would not conflict with existing land uses in the project area. See discussion under Alternative 1.

Consistency with Plans and Policies

The operation of Alternative 3 would be consistent with applicable local and regional plans and policies. See discussion under Alternative 1 and Table 3.1-1.

Coastal Zone Access and Resources

Under Alternative 3, permanent effects to the Coastal Zone in this area would be the same as those discussed under Alternative 1 and are not expected to be adverse. The Schuyler Heim Bridge would remain in place but would not be operational. All traffic would be diverted onto the new bridge.

3.1.3.3.4 Alternative 4: Bridge Replacement Only

3.1.3.3.4.1 Construction Effects

Compatibility with Existing Land Use and Recreation

Alternative 4 would affect the same land use areas as Alternative 1, south of Anaheim Street. Construction effects to land use would be the same as those described under Alternative 1 for the bridge replacement and would not result in any effects to land use.

Consistency with Plans and Policies

Alternative 4 would affect the same planning areas as Alternative 1 for the bridge replacement, and would thus result in the same effects for those areas. This alternative is generally consistent with the existing local and regional plans, and would not materially conflict with any plans or policies.

Coastal Zone Access and Resources

The construction-related effects to the Coastal Zone in this area would be the same as those discussed under Alternative 1 for the bridge replacement and are not expected to be adverse.

3.1.3.3.4.2 Operations Effects

Compatibility with Existing Land Use and Recreation

Alternative 4 would not conflict with existing land uses in the project area and would be consistent with the industrial and port-related land uses in the vicinity of SR-47 and the Schuyler Heim Bridge. Industrial uses typically are not impaired by the proximity of a bridge and, in many cases, benefit from such proximity. Existing port uses are already well integrated with the transportation facilities in the area.

Consistency with Plans and Policies

The operation of Alternative 4 would be consistent with applicable local and regional plans and policies. Permanent effects related to consistency with plans and policies for Alternative 4 would be the same as those for Alternative 1 replacement of the Schuyler Heim Bridge.

Coastal Zone Access and Resources
Operations effects to Coastal Zone access and resources under Alternative 4 would be the same as those described under Alternative 1 related to replacement of the Schuyler Heim Bridge.

3.1.3.3.5 Alternative 5: Transportation System Management
3.1.3.3.5.1 Construction Effects
Compatibility with Existing Land Use and Recreation
The TSM Alternative would be compatible with existing land uses. This alternative would involve the employment of various transportation managements systems, the construction and placement of which would be minor. Existing land uses would not be affected or disrupted by the construction or placement of the elements proposed under this alternative. Thus, no adverse effects would result.

Consistency with Plans and Policies
Construction of the proposed TSM Alternative would be consistent with applicable plans and policies and, thus, would not result in adverse environmental effects.

Coastal Zone Access and Resources
Construction of proposed improvements would be small in scale and would not directly disturb previously undisturbed land outside existing right of way. Further, improvements under Alternative 5 are not likely to be constructed within the Coastal Zone, due to the absence of publicly-used streets within the Coastal Zone (industrial port area) in this area. Thus, no adverse effects to Coastal Zone access or resources would result from construction of Alternative 5.

3.1.3.3.5.2 Operations Effects
Compatibility with Existing Land Use and Recreation
Implementation of the TSM elements is designed to improve transportation and relieve congestion and, therefore, would not conflict with or adversely affect existing land uses.

Consistency with Plans and Policies
Implementation of the proposed improvements under Alternative 5 would serve to improve traffic circulation and safety in the project area and would be consistent with applicable plans and policies.

Coastal Zone Access and Resources
Alternative 5 is not likely to be located within the Coastal Zone and, therefore, would not result in any permanent effects to Coastal Zone access and/or resources.

3.1.3.3.6 Alternative 6: No Build
Construction Effects
No construction would take place under this alternative.

3.1.3.3.6.1 Operations Effects
No permanent effects to land use or to Coastal Zone access and resources would occur.

Consistency with Plans and Policies
Under the No Build alternative, replacement of the Schuyler Heim Bridge would not occur, nor would the flyover, SR-47 Expressway, or SR-103 Extension be constructed. Although

the No Build alternative would not conflict with applicable plans and policies, it also would not serve to accomplish the goals and objectives set forth in such plans and policies.

3.1.3.3.7 CEQA Consequences

Based on the above analysis, none of the project alternatives would divide any established community or conflict with existing land use plans, policies, or regulations. Also, none of the project alternatives would affect recreation facilities or their use. Also, as addressed in Section 3.16 – Biological Resources, potential impacts to a habitat conservation plan or natural community conservation plan would be less than significant. Therefore, based on the information provided in the above analyses, when considered in the context of CEQA criteria, land use impacts would be less than significant.

Potential impacts of the proposed project alternatives related to Land Use and Planning and to Recreation are addressed in the context of CEQA criteria in Chapter 4.0 – CEQA Evaluation, and in Appendix A – CEQA Checklist (IX, Land Use and Planning; XIV, Recreation).

3.1.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures related to Land Use, Recreation, and Coastal Zone would be required under any of the project alternatives.

3.2 Growth

The material provided in this section is derived primarily from the *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Community Impact Assessment* (Caltrans, 2008).

3.2.1 Regulatory Setting

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969, require evaluation of the potential environmental consequences of all proposed federal activities and programs. This provision includes a requirement to examine indirect consequences, which may occur in areas beyond the immediate influence of a proposed action and at some time in the future. The CEQ regulations, 40 CFR 1508.8, refer to these consequences as secondary impacts. Secondary impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

The California Environmental Quality Act (CEQA) also requires the analysis of a project's potential to induce growth. CEQA guidelines, Section 15126.2(d), require that environmental documents "…discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment…."

3.2.1.1 40 Code of Federal Regulations (CFR) Part 1508 Terminology and Index, 1508.8 (Effects)

The CEQ regulations do not specifically define growth-inducing effects, but include them as a potential indirect effect. Effects include:

> *(b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.*

3.2.1.2 FHWA Technical Advisory (TA) T6640.8a V

This section of the TA, the Environmental Impact Statement (EIS) Format and Content: G. Environmental Consequences 1, Land Use Impacts addresses growth as follows:

> *This discussion should identify the current development trends and the State and/or local government plans and policies on land use and growth in the area which will be impacted by the proposed project where possible, the distinction between planned and unplanned growth should be identified.*

3.2.1.3 Caltrans Environmental Handbook, Volume 4 "Community Impact Assessment" (CIA) June, 1997

This handbook defines growth inducement as "…the relationship between the proposed transportation project and growth within an area."

Growth-inducing effects can occur if the project either facilitates planned growth or induces unplanned growth. Growth inducement can take several forms. A project can remove barriers, provide access or eliminate other constraints which encourage growth that has been approved and anticipated through the General Plan process or under adopted growth projections. This planned growth would be reflected in land use plans that have been developed and approved with the underlying assumption that an adequate supporting transportation network would be constructed. Infrastructure improvements that support this planned growth can be described as accommodating or facilitating growth. In addition, a project can remove barriers, provide new access or otherwise encourage growth which is not assumed as planned growth in the General Plans or adopted growth projections for the affected local jurisdictions. This could include areas which are currently designated for open space, agricultural or other similar non-urban land uses which, because of the improved access provided by the project, would experience pressure to develop urban uses or develop at a higher level of intensity than originally anticipated.

Within the context of these definitions and consistent with the Caltrans CIA guidelines, a conclusion must be made regarding the potential growth-inducing effects of each alternative. Caltrans has determined that generally one of the following conclusions will apply (Caltrans, 1997):

> *Project will not affect growth: This conclusion can be made when no growth is expected or when the project would yield no advantages that would have effects on developers' decisions.*
>
> *Cannot determine the effect on growth: This conclusion can be appropriate when any conclusion about the likely course of growth would be speculative.*
>
> *Hasten or slow growth, intensify growth, or shift growth from elsewhere in the region: One of these conclusions can be made when developers and the local planning agency/agencies are expected to modify their course or timing of development because of the project. The terms "support growth," "contribute to growth," "facilitate growth" or "respond to growth" are less precise ways of making this conclusion.*
>
> *Induce growth: This conclusion can be made when a larger amount of development would be expected to occur (area wide) during or after the project's construction than otherwise would have been expected in the foreseeable future.*

3.2.2 Affected Environment

3.2.2.1 Regional Area Demographics

3.2.2.1.1 Existing Population

The total population in the County of Los Angeles as reported in the 2000 U.S. Census was 9,519,338 persons (study area census tracts are shown in Figure 3.2-1). Of the total population, the largest group was persons of Hispanic/Latino origin at 44.6 percent; white persons made up the next largest group at 31.1 percent. The remaining 24.3 percent, in order by descending proportions, were Asian, black, multi-racial, Native American, Native Hawaiian/Pacific Islander, and other.

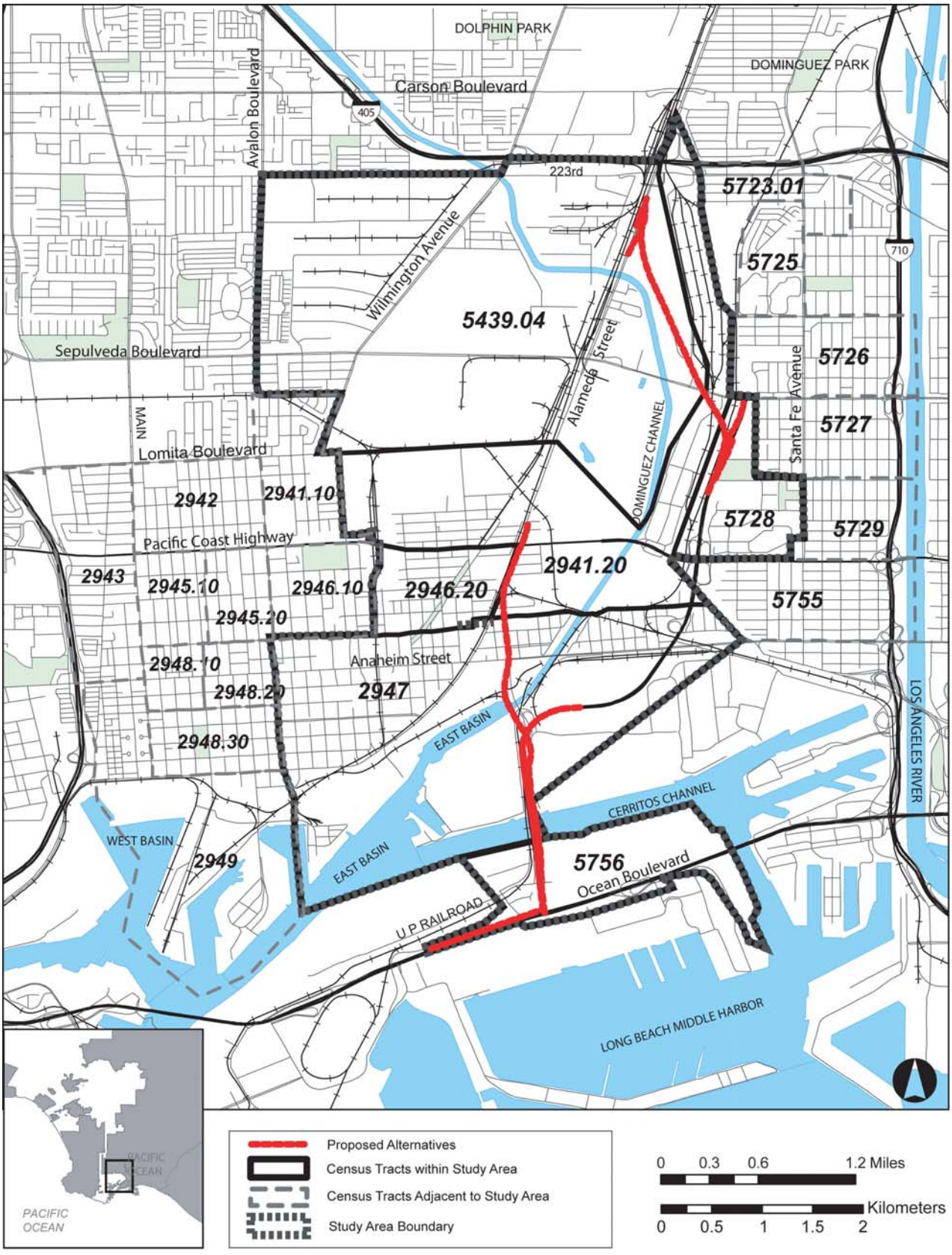


Figure 3.2-1
Population and Housing Study Area
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: GDT, Inc., 2003; Jones & Stokes, 2004.

The City of Los Angeles had 3,694,820 persons in 2000, with the largest group being persons of Hispanic/Latino origin at 46.5 percent. Non-Hispanic white persons were the next largest group at 29.7 percent of the total population. The remaining 23.8 percent, in order by descending proportions, were black, Asian, multi-racial, Native American, Native Hawaiian/ Pacific Islander, and other.

The City of Long Beach had 461,522 persons in 2000, with the largest group being persons of Hispanic/Latino origin at 35.8 percent. Non-Hispanic white persons were the next largest group at 33.1 percent of the total population. The remaining 31.1 percent, in order by descending proportions, were black, Asian, multi-racial, Native American, Native Hawaiian/ Pacific Islander, and other.

The City of Carson had 89,730 persons in 2000, with the largest group being persons of Hispanic/Latino origin at 34.9 percent. Non-Hispanic black persons were the next largest group at 25.7 percent of the total population. The remaining 39.4 percent, in order by descending proportions, were black, Asian, other races, multi-racial, Native Hawaiian/ Pacific Islander, and Native American (see Table 3.2-1).

Of the 9,519,338 persons residing within the County of Los Angeles, 29.5 percent were under 18 years of age in 2000, while 5.51 percent were 65 years of age and over. The 3,694,820 persons residing in City of Los Angeles had a similar distribution for persons under 18 years of age and 65 years of age and over, at 28 percent and 5.45 percent, respectively. Within the City of Long Beach, 30 percent of the total population of 461,522 were under the age of 18, and 4.88 percent were over the age of 65 in 2000. Within the City of Carson, 28.4 percent of the total population of 89, 730 were under the age of 18, and 10.7 percent were over the age of 65 in 2000 (see Table 3.2-2).

3.2.2.1.2 Housing

According to the 2000 U.S. Census, the total number of housing units in the County of Los Angeles was 3,270,909. Of the total housing units, 95.8 percent were occupied, and 4.2 percent were vacant. Of the total occupied housing units, 47.9 percent were owner-occupied, and 52.1 percent were rented.

The City of Los Angeles had a total of 1,337,706 housing units in 2000. Of the total, 95.3 percent of the housing units were occupied, and 4.7 percent were vacant. Owner-occupied housing units made up 38.6 percent of the total, and 61.4 percent were renter occupied.

The City of Long Beach had a total of 171,659 housing units in 2000. Of the total, 95 percent of the housing units were occupied, and 2.8 percent were vacant. Owner-occupied housing units made up 41 percent of the total, and 59 percent were renter occupied.

The City of Carson had a total of 25,337 housing units in 2000. Of the total, 97.2 percent of the housing units were occupied, and 2.7 percent were vacant. Owner-occupied housing units made up 77.9 percent of the total, and 22.1 percent were renter occupied.

3.2.2.2 Local Area Demographics

3.2.2.2.1 Existing Population

The total population of the census tracts comprising the project study area was 14,465 in 2000. Of the total population in the study area, persons of Hispanic/Latino origin accounted for 81.94 percent; Non-Hispanic white persons totaled 3.89 percent. The proportion of persons of Hispanic/Latino origin was substantially larger than the City of Los Angeles (46.53 percent) and County of Los Angeles (44.56 percent), City of Long Beach (35.77 percent) and City of Carson (34.9 percent) (see Table 3.2-1).

The study area population under 18 years of age in 2000 was 30 percent of the total, while approximately 12 percent were 65 years of age and older. According to the 2000 Census, the study area had a higher percentage of people under 18 years of age than the County of Los Angeles (29.5 percent), City of Los Angeles (28.1 percent), City of Long Beach (30.8 percent), and the City of Carson (28.4 percent). The percentage of population 65 and over in the study area was higher than the County of Los Angeles (5.5 percent), City of Los Angeles (5.5 percent), City of Long Beach (4.9 percent), and the City of Carson (10.66 percent) (see Table 3.2-2).

3.2.2.2.2 Housing

According to the 2000 U.S. Census, the total number of housing units in the study area in 2000 was 3,658. Of the total housing units, 94.2 percent were occupied and 5.8 percent were vacant. Of the total occupied housing, 45.12 percent were owner-occupied and 54.88 percent were rented, the percentage of owner-occupied housing units in the study area was lower than County of Los Angeles (47.9 percent) and city of Carson (77.9 percent), but higher than Cities of Los Angeles (38.6 percent) and Long Beach (41.1 percent). The study area had a lower percentage of renter occupied housing units as compared to City of Los Angeles (61.4 percent), and City of Long Beach (58.9 percent), but higher than City of Carson (22.1 percent) and County of Los Angeles (52.1 percent) (see Table 3.2-3 and Table 3.2-4).

3.2.2.3 Forecasted Population and Housing

According to the Southern California Association of Governments (SCAG) 2004 Regional Transportation Plan (adopted April 2004), the population of the County of Los Angeles in 2030 is forecasted to be 12,221,799, an increase of about 28 percent. SCAG projects that the population of the City of Los Angeles in 2030 will increase by about 16 percent to 4,309,625 persons.

The number of households in the County of Los Angeles is forecasted to be 4,120,270 in 2030, or about 31 percent greater than in 2000. The number of households in 2030 for the City of Los Angeles is forecasted to be 1, 637,475, an increase of about 28 percent (see Table 3.2-5).

Table 3.2-1
Existing Regional and Local Population Characteristics – Race/Ethnicity (2000)

Area	Total	White	%	Black	%	Native American	%	Asian	%	Native Hawaiian/ Pacific Islander	%	Other Race	%	Two or More Races	%	Hispanic or Latino	%
County of Los Angeles	9,519,338	2,959,614	31.09	901,472	9.47	25,609	0.27	1,124,569	11.81	23,265	0.24	19,935	0.21	222,661	2.34	4,242,213	44.57
City of Los Angeles	3,694,820	1,099,188	29.75	401,986	10.88	8,897	0.24	364,850	9.87	4,484	0.12	9,065	0.25	87,277	2.36	1,719,073	46.53
City of Long Beach	461,522	152,899	33.13	66,836	14.48	1,772	0.38	54,937	11.90	5,392	1.17	1,013	0.22	13,581	2.94	165,092	35.78
City of Carson	89,730	10,767	12.00	22,485	25.06	180	0.20	19,711	21.97	2,589	2.89	171	0.19	2,495	2.78	31,332	34.92
Study Area*	***14,465***	***562***	***3.89***	***1,105***	***7.64***	***26***	***0.18***	***647***	***4.47***	***107***	***0.74***	***9***	***0.06***	***156***	***1.08***	***11,853***	***81.94***
Census Tract 5439.04	4,426	177	4.00	540	12.20	4	0.09	456	10.30	69	1.56	3	0.07	80	1.81	3,097	69.97
Block Group 4	3	0	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	3	100.00
Census Tract 5728	263	32	12.17	66	25.10	4	1.52	69	26.24	0	0.00	2	0.76	14	5.31	76	28.90
Block Group 3	1	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Census Tract 2941.2	2,529	40	1.58	245	9.69	3	0.12	47	1.86	1	0.04	4	0.16	15	0.59	2174	85.96
Block Group 1	637	5	0.78	46	7.22	0	0.00	12	1.88	0	0.0	0	0.0	1	0.16	573	89.95
Block Group 2	1,204	12	1.00	92	7.64	1	0.08	7	0.58	0	0.0	4	0.33	5	0.42	1,083	89.95
Block Group 3	688	23	3.34	107	15.55	2	0.29	28	4.07	1	0.15	0	0.0	9	1.31	518	75.29
Census Tract 2946.2	3,931	82	2.09	38	0.97	8	0.20	38	0.97	6	0.15	0	0.0	8	0.20	3751	95.42
Block Group 1	1,600	29	1.81	8	0.50	6	0.38	15	0.94	6	0.38	0	0.0	4	0.25	1,532	95.75
Block Group 2	1,581	30	1.90	26	1.64	2	0.13	16	1.01	0	0.0	0	0.0	3	0.19	1,504	95.13
Block Group 3	750	23	3.07	4	0.53	0	0.0	7	0.93	0	0.0	0	0.0	1	0.13	715	95.33
Census Tract 2947	3,270	224	6.85	205	6.27	6	0.18	36	1.10	27	0.83	0	0.0	38	1.16	2734	83.61
Block Group 3	95	45	47.37	10	10.53	0	0.0	1	1.05	3	3.16	0	0.0	7	7.37	29	30.53
Block Group 4	1,894	151	7.97	177	9.35	3	0.16	25	1.32	14	0.74	0	0.0	26	1.37	1,498	79.09
Block Group 5	523	2	0.38	4	0.76	1	0.19	5	0.96	7	1.34	0	0.0	2	0.38	502	95.98
Block Group 6	727	18	2.48	3	0.41	2	0.28	5	0.69	3	0.41	0	0.0	3	0.41	693	95.32
Census Tract 5756	46	7	15.22	11	23.91	1	2.17	1	2.17	4	8.7	0	0	1	2.17	21	45.95
Block Group 2	2	1	50	0	0	0	0	1	50	0	0	0	0	0	0	0	0
Block Group 3	33	0	0	11	33.33	0	0	0	0	4	12.12	0	0	1	3.03	17	51.52

Table 3.2-1
Existing Regional and Local Population Characteristics – Race/Ethnicity (2000)

Area	Total	White	%	Black	%	Native American	%	Asian	%	Native Hawaiian/ Pacific Islander	%	Other Race	%	Two or More Races	%	Hispanic or Latino	%
Nearby Areas																	
Census Tract 5723.01	3,653	248	6.79	459	12.57	19	0.52	760	20.80	208	5.69	13	0.36	103	2.82	1,843	50.45
Census Tract 5725	3,700	797	21.54	1,362	36.81	12	0.32	228	6.16	145	3.92	5	0.14	113	3.05	1,038	28.05
Census Tract 5726	5,130	289	5.63	713	13.90	18	0.35	1,763	34.37	180	3.51	5	0.10	144	2.81	2,018	39.34
Census Tract 5727	5,495	255	4.64	688	12.52	10	0.18	2,610	47.50	88	1.60	7	0.13	207	3.77	1,630	29.66
Census Tract 5729	5,113	145	2.84	649	12.69	31	0.61	794	15.53	81	1.58	14	0.27	100	1.96	3,299	64.52
Census Tract 5755	252	55	21.83	19	7.54	3	1.19	7	2.78	2	0.79	4	1.59	2	0.79	160	63.49
Census Tract 2933.01	2,977	1,004	33.73	204	6.85	6	0.20	1,113	37.39	9	0.30	9	0.30	89	2.99	543	18.24
Census Tract 2933.02	4,302	1,491	34.66	317	7.37	7	0.16	555	12.90	64	1.49	10	0.23	105	2.44	1,753	40.75
Census Tract 2933.04	4,207	780	18.54	385	9.15	22	0.52	398	9.46	40	0.95	2	0.05	63	1.50	2,517	59.83
Census Tract 2933.05	4,660	1,658	35.58	391	8.39	17	0.36	348	7.47	25	0.54	10	0.21	81	1.74	2,130	45.71
Census Tract 2942	4,425	526	11.89	61	1.39	32	0.72	118	2.67	41	0.93	0	0.0	88	1.99	3,559	80.43
Census Tract 2943	7,059	781	11.06	183	2.59	21	0.30	340	4.82	92	1.30	15	0.21	97	1.37	5,530	78.34
Census Tract 2941.10	4,060	369	9.09	77	1.90	19	0.47	150	3.69	60	1.48	0	0.0	49	1.21	3,336	82.17
Census Tract 2944.10	3,854	616	15.98	1,008	26.15	8	0.21	379	9.83	42	1.09	4	0.10	83	2.15	1,714	44.47
Census Tract 2944.20	3,270	385	11.77	338	10.39	14	0.43	182	5.57	43	1.31	7	0.21	52	1.59	2,249	68.78
Census Tract 2945.10	4,266	186	4.36	73	1.71	7	0.16	62	1.45	32	0.75	0	0.0	19	0.45	3,887	91.12
Census Tract 2945.20	3,609	225	6.23	67	1.86	10	0.28	62	1.72	18	0.50	2	0.06	25	0.69	3,200	88.67
Census Tract 2946.10	3,875	262	6.76	62	1.60	5	0.13	76	1.96	24	0.62	5	0.13	48	1.24	3,393	87.56
Census Tract 2948.10	4,039	92	2.28	77	1.91	6	0.15	45	1.11	33	0.82	2	0.05	31	0.77	3,753	92.92
Census Tract 2948.20	3,555	117	3.29	9	0.25	3	0.08	46	1.29	13	0.37	0	0.0	22	0.62	3,345	94.09
Census Tract 2948.30	3,274	128	3.91	106	3.24	14	0.43	49	1.50	26	0.79	26	0.79	40	1.22	2,885	88.12
Census Tract 2949	3,262	142	4.35	170	5.21	5	0.15	57	1.75	33	1.01	3	0.09	27	0.83	2,825	86.60
Census Tract 2951.01	5,188	3,417	65.96	205	3.95	29	0.56	289	5.57	26	0.50	4	0.08	138	2.66	1,080	20.82

*Study Area consists of the block groups within the three census tracts adjacent to the project alignment (see Figure 3.2-1).
Sources: U.S. Census Bureau, Census of Population and Housing, Summary File 1 (2000); Caltrans (2007).

Table 3.2-2
Existing Regional and Local Population Characteristics – Age (2000)

Area	Total Population	Age			
		Under 18	%	65 and over	%
County of Los Angeles	9,519,338	2,803,888	29.45	524,199	5.51
City of Los Angeles	3,694,820	1,035,088	28.01	201,365	5.45
City of Long Beach	461,522	142,152	30.80	22,522	4.88
City of Carson	89,730	25,485	28.40	9561	10.66
Study Area	***14,465***	***4,343***	***30.02***	***1,673***	***11.57***
Census Tract 5439.04	4,426	1,612	36.42	249	5.63
Block Group 4	3	1	33.33	0	0.00
Census Tract 5728	263	78	29.66	13	4.94
Block Group 3	1	0	0.00	0	0.00
Census Tract 2941.2	2,529	938	37.09	112	4.43
Block Group 1	637	230	36.11	32	5.02
Block Group 2	1,204	467	38.79	45	3.74
Block Group 3	688	241	35.03	35	5.09
Census Tract 2946.2	3,931	1,407	35.79	1,150	29.25
Block Group 1	1,600	588	36.75	117	7.31
Block Group 2	1,581	565	35.74	130	8.22
Block Group 3	750	254	33.87	47	6.27
Census Tract 2947	3,270	294	8.99	147	4.50
Block Group 3	95	12	12.63	11	11.58
Block Group 4	1,894	682	36.01	75	3.96
Block Group 5	523	187	35.76	28	5.35
Block Group 6	727	265	36.45	33	4.54
Census Tract 5657	46	14	30.43	2	4.36
Block Group 2	2	0	0	0	0
Block Group 3	33	14	42.42	2	6.06
Nearby Areas					
Census Tract 5723.01	3,653	1,292	35.37	254	6.95
Census Tract 5725	3,700	1,326	35.84	817	22.08
Census Tract 5726	5,130	1,601	31.21	538	10.49
Census Tract 5727	5,495	1,582	28.79	651	11.85
Census Tract 5729	5,113	1,934	37.83	349	6.83
Census Tract 5755	252	68	26.98	5	1.98
Census Tract 2933.01	2,977	581	19.52	382	12.83
Census Tract 2933.02	4,302	1,279	29.73	368	8.55
Census Tract 2933.04	4,207	1,341	31.88	211	5.02
Census Tract 2933.05	4,660	1,390	29.83	383	8.22

Table 3.2-2
Existing Regional and Local Population Characteristics – Age (2000)

Area	Total Population	Age			
		Under 18	%	65 and over	%
Census Tract 2942	4,425	1,449	32.75	391	8.84
Census Tract 2943	7,059	2,299	32.57	572	8.10
Census Tract 2941.10	4,060	1,324	32.61	341	8.40
Census Tract 2944.10	3,854	1,327	34.43	262	6.80
Census Tract 2944.20	3,270	1,050	32.11	195	5.96
Census Tract 2945.10	4,266	1,664	39.01	151	3.54
Census Tract 2945.20	3,609	1,378	38.18	163	4.52
Census Tract 2946.10	3,875	1,339	34.55	303	7.82
Census Tract 2948.10	4,039	1,528	37.83	132	3.22
Census Tract 2948.20	3,555	1,386	38.99	124	3.49
Census Tract 2948.30	3,274	1,262	38.55	191	5.83
Census Tract 2949	3,262	1,368	41.94	163	5.00
Census Tract 2951.01	5,188	1,088	20.97	778	15.00

*Study Area consists of the block groups within the five Census Tracts adjacent to the project alignment (see Figure 3.2.1).

Sources: U.S. Census Bureau, Census of Population and Housing, Summary File 1 (2000); Caltrans (2007).

Table 3.2-3
Existing Regional and Local Housing Characteristics – Occupancy (2000)

Area	Total Units	Occupied Units	%	Vacant Units	%	Persons Per Household
County of Los Angeles	3,270,909	3,133,774	95.81	137,135	4.19	2.98
City of Los Angeles	1,337,668	1,275,358	95.34	62,310	4.66	2.83
City of Long Beach	171,659	163,107	95.02	8,552	4.98	2.77
City of Carson	25,337	24,648	97.28	689	2.72	3.59
Study Area*	***3,658***	***3,446***	***94.20***	***212***	***5.80***	***3.70***
Census Tract 5439.04	995	952	95.68	43	4.32	4.65
Block Group 4	1	1	100.00	0	0.00	3.06
Census Tract 5728	29	29	100.00	0	0.00	2.83
Block Group 3	1	1	100.00	0	0.00	1.00
Census Tract 2941.2	574	542	94.43	32	5.57	4.67
Block Group 1	149	139	93.29	10	6.71	4.58
Block Group 2	248	242	97.58	6	2.42	4.98
Block Group 3	177	161	90.96	16	9.04	4.27
Census Tract 2946.2	1,007	968	96.13	39	3.87	4.05
Block Group 1	392	371	94.64	21	5.36	4.29

Table 3.2-3
Existing Regional and Local Housing Characteristics – Occupancy (2000)

Area	Total Units	Occupied Units	%	Vacant Units	%	Persons Per Household
Block Group 2	404	394	97.52	10	2.48	4.01
Block Group 3	211	203	96.21	8	3.79	3.69
Census Tract 2947	1,034	941	91.01	93	8.99	3.39
Block Group 3	51	44	86.27	7	13.73	2.16
Block Group 4	604	552	91.39	52	8.61	3.32
Block Group 5	156	145	92.95	11	7.05	3.61
Block Group 6	219	196	89.50	23	10.50	3.71
Census Tract 5657	19	14	73.68	5	35.71	2.65
Block Group 2	1	1	100.00	0	0.00	1.00
Block Group 3	16	11	68.75	5	45.45	3.00
Nearby Areas						
Census Tract 5723.01	973	929	95.48	44	4.52	3.93
Census Tract 5725	1,328	1,256	94.58	72	5.42	2.75
Census Tract 5726	1,265	1,228	97.08	37	2.92	4.18
Census Tract 5727	1,345	1,306	97.10	39	2.90	4.12
Census Tract 5729	1,316	1,233	93.69	83	6.31	4.14
Census Tract 5755	58	53	91.38	5	8.62	4.19
Census Tract 2933.01	1,059	1,043	98.49	16	1.51	2.79
Census Tract 2933.02	1,414	1,378	97.45	36	2.55	3.10
Census Tract 2933.04	1,385	1,343	96.97	42	3.03	3.13
Census Tract 2933.05	1,731	1,660	95.90	71	4.10	2.81
Census Tract 2942	1,282	1,240	96.72	42	3.28	3.57
Census Tract 2943	1,970	1,912	97.06	58	2.94	3.66
Census Tract 2941.10	1,066	1,045	98.03	21	1.97	3.89
Census Tract 2944.10	1,425	1,369	96.07	56	3.93	2.80
Census Tract 2944.20	1,119	1,047	93.57	72	6.43	3.12
Census Tract 2945.10	1,068	1,027	96.16	41	3.84	4.15
Census Tract 2945.20	879	862	98.07	17	1.93	4.18
Census Tract 2946.10	1,096	1,069	97.54	27	2.46	3.62
Census Tract 2948.10	992	961	96.88	31	3.13	4.20
Census Tract 2948.20	870	847	97.36	23	2.64	4.19
Census Tract 2948.30	922	837	90.78	85	9.22	3.86
Census Tract 2949	839	815	97.14	24	2.86	3.99
Census Tract 2951.01	2,560	2,031	79.34	529	20.66	2.55

*Study Area consists of the block groups within the five census tracts adjacent to the project alignment (see Figure 3.2-1).

Sources: U.S. Census Bureau, Census of Population and Housing, Summary File 1 (2000); Caltrans (2007).

Table 3.2-4
Existing Regional and Local Housing Characteristics – Tenure (2000)

Area	Total Units	Occupied Units	Owner Occupied Units	%	Renter Occupied Units	%
County of Los Angeles	3,270,909	3,133,774	1,499,694	47.86	1,634,080	52.14
City of Los Angeles	1,337,668	1,275,358	491,836	38.56	783,522	61.44
City of Long Beach	171,659	163,107	66,971	41.06	96,136	58.94
City of Carson	25,337	24,648	19,205	77.92	5,443	22.08
Study Area*	***3,658***	***3,446***	***1,555***	***45.12***	***1,891***	***54.88***
Census Tract 5439.04	995	952	659	69.22	293	30.78
Block Group 4	1	1	0	0.00	1	100.00
Census Tract 5728	29	29	3	10.34	26	89.66
Block Group 3	1	1	1	100.00	0	0.00
Census Tract 2941.2	574	542	278	51.29	264	48.71
Block Group 1	149	139	62	44.60	77	55.40
Block Group 2	248	242	142	58.68	100	41.32
Block Group 3	177	161	74	45.96	87	54.04
Census Tract 2946.2	1007	968	474	48.92	494	51.03
Block Group 1	392	371	181	48.79	190	51.21
Block Group 2	404	394	177	44.92	217	55.08
Block Group 3	211	203	116	57.14	87	42.86
Census Tract 2947	1,034	941	141	14.98	800	85.02
Block Group 3	51	44	21	47.73	23	52.27
Block Group 4	604	552	41	7.43	511	92.57
Block Group 5	156	145	29	20.00	116	80.00
Block Group 6	219	196	49	25.00	147	75.00
Census Tract 5657	19	14	0	0.00	14	100.00
Block Group 2	1	1	0	0.00	1	100.00
Block Group 3	16	11	0	0.00	11	100.00
Nearby Areas						
Census Tract 5723.01	973	929	472	50.81	457	49.19
Census Tract 5725	1,328	1,256	353	28.11	903	71.89
Census Tract 5726	1,265	1,228	897	73.05	331	26.95
Census Tract 5727	1,345	1,306	852	65.24	454	34.76
Census Tract 5729	1,316	1,233	509	41.28	724	58.72
Census Tract 5755	58	53	4	7.55	49	92.45
Census Tract 2933.01	1,059	1,043	765	73.35	278	26.65
Census Tract 2933.02	1,414	1,378	825	59.87	553	40.13
Census Tract 2933.04	1,385	1,343	357	26.58	986	73.42

Table 3.2-4
Existing Regional and Local Housing Characteristics – Tenure (2000)

Area	Total Units	Occupied Units	Owner Occupied Units	%	Renter Occupied Units	%
Census Tract 2933.05	1,731	1,660	814	49.04	846	50.96
Census Tract 2942	1,282	1,240	747	60.29	493	39.76
Census Tract 2943	1,970	1,912	1,029	53.82	883	46.18
Census Tract 2941.10	1,066	1,045	637	60.96	408	39.04
Census Tract 2944.10	1,425	1,369	501	36.60	868	63.40
Census Tract 2944.20	1,119	1,047	268	25.60	779	74.40
Census Tract 2945.10	1,068	1,027	362	35.25	665	64.75
Census Tract 2945.20	879	862	270	31.32	592	68.68
Census Tract 2946.10	1,096	1,069	362	33.86	707	66.14
Census Tract 2948.10	992	961	131	13.63	830	86.37
Census Tract 2948.20	870	847	103	12.16	744	87.84
Census Tract 2948.30	922	837	242	28.91	595	71.09
Census Tract 2949	839	815	203	24.91	612	75.09
Census Tract 2951.01	2,560	2,031	1,628	80.18	403	19.84

*Study Area consists of the block groups within the five Census Tracts adjacent to the project alignment (see Figure 3.2-1).

Sources: U.S. Census Bureau, Census of Population and Housing, Summary File 1 (2000); Caltrans (2007).

Table 3.2-5
Existing and Projected Population and Households – 2000 To 2030

Area	Population 2000	Projected Population 2030	% Population Change	Households 2000	Projected Households 2030	% Households Change
County of Los Angeles	9,580,028	12,221,799	27.58	3,133,774	4,120,270	31.48
City of Los Angeles	3,711,969	4,309,625	16.10	1276578	1,637,475	28.27
City of Long Beach	463,406	561,694	21.21	163,088	198,040	21.43
City of Carson	90,526	109,412	20.86	24,744	30,597	23.65
Study Area*	***14,550***	***17,114***	***17.62***	***3,451***	***4,329***	***25.44***
Census Tract 5439.04	4,426	5,407	22.16	957	1,181	23.41
Census Tract 5728	263	309	17.49	29	36	24.14
Census Tract 2941.2	2,541	2,968	16.80	542	704	29.89
Census Tract 2946.2	3,950	4,563	15.52	968	1,194	23.35
Census Tract 2947	3,285	3,804	15.80	941	1,194	26.89
Census Tract 5657	46	63	36.96	14	20	42.86
Nearby Areas						
Census Tract 5723.01	3,628	4,370	20.45	917	1,087	18.54
Census Tract 5725	3715	4,480	20.59	1,256	1,523	21.26

Table 3.2-5
Existing and Projected Population and Households – 2000 To 2030

Area	Population 2000	Projected Population 2030	% Population Change	Households 2000	Projected Households 2030	% Households Change
Census Tract 5726	5151	6,236	21.06	1,228	1,435	16.86
Census Tract 5727	5517	6,719	21.79	1,306	1,545	18.30
Census Tract 5729	5134	6,198	20.72	1,233	1,485	20.44
Census Tract 5755	253	328	29.64	53	71	33.96
Census Tract 2933.01	2,991	3,508	17.29	1,043	1,296	24.26
Census Tract 2933.02	4,322	5,036	16.50	1,379	1,715	24.37
Census Tract 2933.04	4,227	4,890	15.68	1,344	1,724	28.27
Census Tract 2933.05	4,682	5,413	15.61	1,660	2,085	25.60
Census Tract 2942	4,446	5,133	15.45	1,240	1,518	22.42
Census Tract 2943	7,092	8,170	15.20	1,912	2,359	23.38
Census Tract 2941.10	4,079	4,747	16.38	1,045	1,302	24.59
Census Tract 2944.10	3,872	4,469	15.42	1,420	1,820	28.17
Census Tract 2944.20	3,285	3,797	15.59	1,047	1,329	26.93
Census Tract 2945.10	4,286	4,953	15.56	1,033	1,289	24.78
Census Tract 2945.20	3,626	4,196	15.72	862	1,092	26.68
Census Tract 2946.10	3,893	4,498	15.54	1,080	1,369	26.76
Census Tract 2948.10	4,058	4,695	15.70	962	1,216	26.40
Census Tract 2948.20	3,572	4,137	15.82	847	1,089	28.57
Census Tract 2948.30	3,289	3,810	15.84	837	1,053	25.81
Census Tract 2949	3,277	3,800	15.96	815	1,031	26.50
Census Tract 2951.01	5,213	6,005	15.19	2,032	2,562	26.08

*Study Area consists of the block groups within the five census tracts adjacent to the project alignment (see Figure 3.2-1).

The SCAG has forecasted the population for year 2030. According to the forecasts, the population of the study area would increase by 17.6 percent for the 30-year period from 2000 to 2030. The County of Los Angeles population is projected to grow by 27.6 percent, the City of Los Angeles would grow by 16.1 percent, the City of Long Beach would grow by 21.2 percent, and the City of Carson would grow by 20.9 percent. The study area would therefore grow at a rate similar to the City of Los Angeles.

Between 2000 and 2030, the number of households in the County of Los Angeles is forecasted to grow by 31.5 percent, the number of households in the City of Los Angeles would grow by 28.3 percent, the number of households in the City of Long Beach would grow by 21.4 percent, and the number of households in the City of Carson would grow by 23.7 percent. The growth of households in the study area (25.4 percent) would closely resemble the City of Carson.

3.2.3 Environmental Consequences

3.2.3.1 Evaluation Criteria

A project could be considered growth-inducing if it either increases the rate of planned growth or induces unplanned growth.

The growth-inducing effects analysis was based on the established methodology and approach in the Caltrans CIA guidelines. The potential for the alternatives to result in growth-inducing effects was assessed based on the following key steps:

- Define growth-inducing effects.
- Describe the role of local agencies in land use planning and their role in directing future growth.
- Describe the factors that affect future growth in the study area.
- Generally identify areas of approved and planned development and areas not currently planned for development in the study area.
- Assess the potential for the project alternatives to result in growth-inducing effects.
- Identify a specific conclusion regarding the potential growth-inducing effects of each alternative.

Four questions were used to assess the potential for the alternatives to result in growth-inducing effects:

Question 1: Would the Alternative influence the overall rate of growth (that is, the speed at which growth occurs)?

Question 2: Would the Alternative influence the location of growth?

Question 3: Would the Alternative influence the amount of growth?

Question 4: Would the Alternative influence the type of growth?

Several factors were considered when answering these questions:

- Existing or anticipated pressure for growth and development (economic and market conditions) without the alternatives.
- Potential growth-inducing effects associated with existing and/or planned development.
- Overall local and subregional economic conditions related to unemployment, demand for housing, overall population growth, growth in the local economy and other factors.
- Local and County approvals for development absent commitments to the alternatives and other major transportation infrastructure improvements.
- Relationship of land use planning approvals/authorities and the alternatives (see Section 3.1.3.3 for a discussion of project consistency and compatibility with local and regional plans and policies).

The assessment of whether each alternative results in growth-inducing effects considered the following:

- How each alternative, including the No Action Alternative, may affect the rate, location, and/or amount of growth.
- Whether the effects of the alternatives would be considered growth inducing.
- Whether those changes in rate, location, and amount of growth would occur under the No Action Alternative as well as under the Build Alternatives.

One of the following conclusions, based on the Caltrans CIA guidance, was drawn regarding the potential growth-inducing effects of each alternative:

- Project will not affect growth.
- Cannot determine the effect on growth.
- Project hastens or slows growth, intensifies growth or shifts growth from elsewhere in the region.
- Project induces growth.

For the purposes of this Final EIS/EIR, each project alternative was evaluated to determine if it would:

- Substantially increase the population or employment so as to require new infrastructure and or housing, the construction of which could cause adverse environmental consequences;
- Induce growth that exceeds levels anticipated under local land use plans and results in a substantial adverse physical change in the environment.

3.2.3.2 Methodology

A study area for the project was defined to include all census tracts adjacent to the project alignments. Information regarding population, race, income, and housing characteristics for year 2000 was obtained from the census. Windshield surveys were conducted to obtain information on the type of uses (businesses and facilities) that exist in the area. A related projects list provided in Section 5.2 identifies a number of residential and commercial facilities planned for the area surrounding the proposed project, as well as proposed projects within the Port of Long Beach and Port of Los Angeles. The proposed project is located in an area that is built out and is in an area that is currently developed.

3.2.3.3 Evaluation of Alternatives

3.2.3.3.1 Alternative 1: Bridge Replacement and SR-47 Expressway

3.2.3.3.1.1 Construction Effects

Direct

During the construction period, Alternative 1 would not directly induce growth, such as to require a change to a general plan and zoning ordinance for the jurisdiction to allow new residential development to occur.

The residential areas in the vicinity of the project site are largely built out and are relatively dense. Alternative 1 does not include development of new housing or population-generating uses such as large employment centers. Therefore, Alternative 1 is not anticipated to trigger new residential development.

The direct effects of a project on regional growth typically come from economic growth resulting from labor needs and expenditures. For the construction period, Alternative 1 would not result in the generation of a significant number of jobs in the region or the study area. Large-scale highway/bridge construction projects occur periodically in the region, and the short-term construction employees would likely be accommodated by the existing labor pool within the greater Los Angeles area. Therefore, no significant influx of workers into the local communities is anticipated; no significant growth in employment is anticipated.

Based on the above, construction activities for Alternative 1 would not involve the development of housing, and would not significantly affect the economy of the region. Therefore, no adverse direct growth-inducing effects would occur.

Indirect

A project would indirectly induce growth if it would remove obstacles to population growth or trigger the construction of new community service facilities that could increase the capacity of infrastructure in an area that currently meets the demand. Projects that would increase the capacity of a sewer treatment plant or widen a roadway beyond that which is needed to meet existing demand would indirectly induce growth.

Alternative 1 is located in an area that is built out and is on a site that is currently developed. The capacity of other, existing, infrastructure in the project area would not be expanded or upgraded to accommodate Alternative 1. The increase of infrastructure at the Ports of Los Angeles and Long Beach is planned in response to international market forces, and Alternative 1 is in response to growth at the port. Alternative 1 would not induce growth at the ports beyond that which is already forecasted.

The short-term indirect effects from construction may incrementally increase activity in nearby retail establishments as a result of construction workers patronizing local establishments. However, long-term effects would be negligible.

3.2.3.3.1.2 Operations Effects

Direct

Since the total number of housing units in the study area would not be affected by Alternative 1, no change in the demographic characteristics of the area could be reasonably expected to occur. The pattern and rate of population and housing growth would be expected to remain consistent with that which is contemplated in existing plans.

Indirect

No new or expanded infrastructure, housing, or other similar permanent physical changes to the environment would be necessary as an indirect consequence of Alternative 1.

3.2.3.3.2 Alternatives 1A, 2, 3, and 4

Under Alternatives 1A, 2, 3 and 4, the direct and indirect effects associated with construction and operation activities would be the same as those described for Alternative 1.

3.2.3.3.3 Alternative 5: Transportation System Management

The direct and indirect effects associated with construction and operation activities of Alternative 5 would be less than those described for Alternative 1.

3.2.3.3.4 Alternative 6: No Build

Under the No Build alternative, there would be no change to the existing bridge and/or roadways. Housing and economic conditions in the area would be unchanged from existing conditions, and there would be no temporary direct or indirect effect on the population growth of the area and there would be no long-term direct or indirect effect on the population growth of the area.

3.2.3.3.5 CEQA Consequences

Based on the information provided in the above analyses, when considered in the context of CEQA criteria, potential significant impacts to growth would not occur under any of the six project alternatives.

Potential impacts of the proposed project alternatives to growth are assessed in the context of CEQA criteria in Chapter 4.0 – CEQA Analysis and Appendix A – CEQA Checklist (XII, Population and Housing).

3.2.4 Avoidance, Minimization, and/or Mitigation Measures

No adverse effects are identified. Therefore, no avoidance, minimization, or mitigation measures are necessary for any of the alternatives addressed in this Final EIS/EIR.

3.3 Community Resources

The community impacts discussed in this section are divided into three parts: Community Character and Cohesion; Relocations; and Environmental Justice. The information is based on the *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Community Impact Assessment* (CIA) prepared for the proposed project by Jones & Stokes (Caltrans, 2008). The CIA was prepared in accordance with the *Caltrans Environmental Handbook, Volume 4 – Community Impact Assessment* (1997).

3.3.1 Community Character and Cohesion

3.3.1.1 Regulatory Setting

The National Environmental Policy Act of 1969 as amended (NEPA), established that the federal government use all practicable means to ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings (42 USC 4331[b][2]). The Federal Highway Administration (FHWA), in its implementation of NEPA (23 USC 109[h]), directs that final decisions regarding projects are to be made in the best overall public interest. This requires taking into account adverse environmental impacts, such as destruction or disruption of human-made resources, community cohesion, and the availability of public facilities and services.

Under the California Environmental Quality Act (CEQA), an economic or social change by itself is not to be considered a significant effect on the environment. However, if a social or economic change is related to a physical change, then social or economic change may be considered in determining whether the physical change is significant. Since this project would result in physical change to the environment, it is appropriate to consider changes to community character and cohesion in assessing the project's effects.

3.3.1.2 Affected Environment

The project alignments would be located in the Cerritos Channel area and adjoining areas to the south and north. A study area has been defined to include the eastern half of the Wilmington community of the City of Los Angeles, the northern section of the Port of Los Angeles, the western part of the City of Long Beach, and the southern part of the City of Carson (see Figure 3.2-1 in Section 3.2). This study area includes the tracts adjacent to the project alignments.

The study area is intensely developed with heavy industrial, commercial, and transportation uses associated with the nearby ports of Los Angeles and Long Beach. Residential neighborhoods are located primarily east of SR 103 and west of Alameda Street.

3.3.1.2.1 Regional Demographics and Local Demographics

Data on regional and local demographics are in Section 3.2 – Growth. The demographic characteristics provided are existing and forecasted population and housing. Information includes population by race/ethnicity and age; and number, type, and occupancy of housing units.

3.3.1.2.2 Income and Poverty Status

To determine the income and poverty characteristics for the study area, data were obtained from the 2000 U.S. Census at the tract level. These data indicate that per capita incomes for the study area population were for the most part markedly lower than in the County of Los Angeles or cities of Los Angeles, Long Beach, and Carson.

Data on the numbers of persons below the poverty threshold in the study area are indicative of a disadvantaged population (see Table 3.3-1). (The 1999 poverty threshold used for the 2000 U.S. data, as defined by the U.S. Census Bureau, was $8,501 for an individual and $17,029 for a family of four.)

Although the U.S. Census serves as the preferred income and poverty status indicator, data from the California Department of Education also provide information with which to assess the income and poverty characteristics of a community by identifying the number of students in project area schools that receive free or reduced price meals. In order for students to qualify for and receive free or reduced meal assistance, their family income must fall within certain poverty guidelines. The 2006 poverty level for a family of four, as defined by the U.S. Department of Health and Human Services (HHS) poverty guidelines, is $20,000.

Data from the California Department of Education indicates that several schools in the vicinity of the project received free or reduced price meal assistance during the 2004-2005 school year, thereby providing another strong indication that a substantial number of households in the study area are likely to have incomes below the poverty level (see Table 3.3-2). Data for percent receiving Cal Works in 2004–2005 was not available; the statistics for year 2003–2004 are presented in Table 3.3-2.

3.3.1.2.3 Neighborhood and Community Characteristics

The land use characteristics within the project area and vicinity are primarily industrial and manufacturing, with single-family residential neighborhood established directly to the east, west, and north of the proposed project alternatives. The neighborhoods to the east are within the City of Long Beach, while neighborhoods to the north and west are within the City of Carson.

Field surveys documented that there are no local commercial centers within the project area. Commercial centers are situated east of Alternative 1, along Santa Fe Avenue and Pacific Coast Highway.

The industrial sites in the project area generally consist of auto dismantling yards, recycling facilities, containment lots, and some old oil drilling facilities. Some of the businesses observed during field surveys are: Public Scale Recycling, Allco Auto Parts, and Shorty Auto Repair & Body Shop.

Table 3.3-1
Existing Regional and Local Population Characteristics – Income/Poverty (1999)

Area	Total Population	Per Capita Income ($)	Number of Persons Below Poverty Threshold	%
County of Los Angeles	9,519,338	20,683	1,674,599	17.59
City of Los Angeles	3,694,820	20,671	801,050	21.68
City of Long Beach	461,522	19,040	103,434	22.41
City of Carson	89,730	17,107	8,216	9.16
*Study Area**	*14,465*	*36,609 (9551)***	*3,765*	*26.11*
Census Tract 5439.04	4,426	9,811	978	22.10
Block Group 4	3	0	0	0.00
Census Tract 5728	263	5,873	205	77.95
Block Group 3	1	0	0	0.00
Census Tract 2941.2	2,529	12,278	317	12.53
Block Group 1	637	19,561	61	9.58
Block Group 2	1,204	7,805	193	16.03
Block Group 3	688	12,784	63	9.16
Census Tract 2946.2	3,931	10,173	941	23.94
Block Group 1	1,600	9,748	379	23.69
Block Group 2	1,581	10,655	323	20.43
Block Group 3	750	10,003	239	31.87
Census Tract 2947	3,270	9,622	1,324	40.49
Block Group 3	95	28,644	15	15.79
Block Group 4	1,894	7,513	808	42.66
Block Group 5	523	5,554	231	44.17
Block Group 6	727	15,315	270	37.14
Census Tract 5657	46	171,900	0	0.00
Block Group 2	2	171,900	0	0.00
Block Group 3	33	0	0	0.00

Table 3.3-1
Existing Regional and Local Population Characteristics – Income/Poverty (1999)

Area	Total Population	Per Capita Income ($)	Number of Persons Below Poverty Threshold	%
Nearby Areas				
Census Tract 5723.01	3,653	12,120	729	19.96
Census Tract 5725	3,700	10,268	1,530	41.35
Census Tract 5726	5,130	14,485	623	12.14
Census Tract 5727	5,495	12,215	895	16.29
Census Tract 5729	5,113	9,616	1,617	31.63
Census Tract 5755	252	6,992	111	44.05
Census Tract 2933.01	2,977	23,486	208	6.99
Census Tract 2933.02	4,302	19,856	421	9.79
Census Tract 2933.04	4,207	13,876	856	20.35
Census Tract 2933.05	4,660	21,084	698	14.98
Census Tract 2942	4,425	15,644	754	17.04
Census Tract 2943	7,059	13,060	1,654	23.43
Census Tract 2941.10	4,060	13,220	673	16.58
Census Tract 2944.10	3,854	14,856	1,092	28.33
Census Tract 2944.20	3,270	10,870	990	30.28
Census Tract 2945.10	4,266	9,615	1,167	27.36
Census Tract 2945.20	3,609	9,935	1,061	29.40
Census Tract 2946.10	3,875	12,330	853	22.01
Census Tract 2948.10	4,039	8,221	1,108	27.43
Census Tract 2948.20	3,555	13,063	1,601	45.04
Census Tract 2948.30	3,274	7,579	1,232	37.63
Census Tract 2949	3,262	8,087	1,343	41.17
Census Tract 2951.01	5,188	31,261	299	5.76

*Study Area consists of the block groups within the five Census Tracts adjacent to the project alignment (see Figure 3.2-1).

**Per Capita Income for Census Tract 5657 skews the average on the higher side and is not representative of the area. $9,551 is the average per capita income of the study area excluding Census Tract 5657; $36,609 is the average per capita Income of the study area including Census Tract 5657.

Source: Caltrans, 2007

Table 3.3-2
Study Area Income/Poverty Status – Students Receiving Assistance (2004 – 2005)

School	Percent Receiving Free and Reduced Price Meals 2004-2005	Percent Receiving Cal Works (Formerly AFDC) 2003-2004
Cabrillo (Juan Rodriguez) High School	57.9	5.1
Hudson Elementary School	77.5	9.9
Muir Elementary School	90.1	11.7
Savannah Academy (Grade 9)	57.8	3.8
Stephens Middle School	92.1	15.7
Wilmington Middle School	84.3	13.5
Wilmington Park Elementary School	80.5	13.7
Webster Elementary	94.2	24

Source: California Department of Education, Educational Demographics Unit (2005), Caltrans (2007).

3.3.1.3 Environmental Consequences

3.3.1.3.1 Evaluation Criteria

The proposed project alternatives were evaluated to determine if they would:

- Have indirect construction effects on the surrounding community that would be substantially greater in magnitude and/or longer in duration than is typical of similar construction projects and similar communities;
- Permanently impair access to and from the surrounding community through the placement of barriers or other impediments to the local circulation pattern; or
- Create a barrier or other physical change in the environment so substantial as to permanently divide, disperse, or otherwise severely disrupt a cohesive community.

3.3.1.3.2 Methodology

A study area for the project was defined in the CIA, and included all census tracts adjacent to the project alignments. Information regarding population, race, income, and housing characteristics for year 2000 was obtained from the Census. Windshield surveys were conducted to obtain information on the type of uses (businesses and facilities) that exist in the study area. Additionally, various print and Internet resources were consulted to gather data on the types of community facilities available in the vicinity of the alignments. The existing conditions data thus collected were analyzed to determine if and how the project would change the community dynamics. The evaluation criteria were used to determine if any adverse effects to the community would occur.

3.3.1.3.3 Evaluation of Alternatives

The following sections provide assessments of the potential environmental consequences of each alternative related to Community Character and Cohesion.

3.3.1.3.3.1 Alternative 1: Bridge Replacement and SR-47 Expressway

Construction Effects

Alternative 1

Construction activities would result in temporary, localized, site-specific disruptions to the community in the vicinity of the project area, primarily related to: construction-related traffic changes from trucks and equipment in the area; partial and/or complete street and lane closures, with some requiring detours; increased noise; lights and glare; and changes in air emissions.

Since project construction activities would be temporary and would not likely have effects substantially different from the same types of nuisance-like effects associated with typical construction activities throughout Southern California, no adverse effect is expected. Nonetheless, efforts will be made to inform the community about construction activities.

Direct Effects

Other than the short-term access disruptions related to project construction, no permanent barriers to neighborhood access are expected. Existing access points and circulation routes to and from the residential neighborhoods just west of the project area would remain open. To the extent that truck traffic is diverted onto the expressway and away from surface roadways such as Henry Ford Avenue and Alameda Street, local traffic congestion and safety could be expected to improve, with some ancillary beneficial effects on access to the residential neighborhoods.

Lane closures on the Schuyler Heim Bridge and closures of the New Dock Street ramps during construction are not anticipated to have an adverse effect on traffic operations on nearby streets and highways. A part of the traffic that would normally use the Schuyler Heim Bridge and travel on SR-103 or Henry Ford Avenue is expected to use the I-110 or I-710 freeways to get into and out of the Port area. Table 3.5-6 provides an estimate of the vehicles that are forecast to use the Schuyler Heim Bridge during project construction by type (truck/auto), direction, and time of day. During the mid-day peak hour, an estimated 870 vehicles are expected to use the I-110 and I-710 freeways during the planned lane closure at the bridge during project construction. This increase in traffic on these freeways would be low compared to existing traffic volumes. As a result, traffic volumes on I-110 and I-710 south of Pacific Coast Highway are expected to show little variance due to bridge and ramp closures during project construction (see Table 3.5-8). Also, levels of service are not expected to change. A Transportation Management Plan (TMP) will be prepared during the project design phase. The TMP will address strategies that should be used to enhance traffic operations during construction, such as:

- Public Awareness Campaign
- Alternate/detour routes with recommended signing
- Enhancements to existing signing and striping
- Safety and enforcement considerations
- Contingency Plans

In addition, the TMP will include measures to include safety considerations at the designated traffic signals at the intersections of Henry Ford Avenue and Anaheim Street, Henry Ford Avenue and Denni Street, Alameda Street and Pacific Coast Highway and at the

recommended pedestrian crossings at Alameda Street and Robidoux Street, M Street and Mauretania Street. Designated crossing guard intersections for pedestrian routes for Wilmington Park Elementary School will not be affected.

In addition, the TMP will assure that pedestrian access to businesses and other destinations within the construction area would be maintained throughout the construction period. If usual access points were lost, provisions for alternative access would be made. Appropriate signage would be placed to inform pedestrians of changes to usual pedestrian routes. Temporary sidewalks, if necessary, would be installed during the construction phase. To the extent feasible, disabled access would be maintained during construction.

Indirect Effects

Indirect effects to the community during construction would include increased noise in the vicinity of construction staging areas and construction sites, diminished air quality during excavation and grading activities, and aesthetic impacts due to the presence of construction equipment and lights. Efforts to minimize such effects would include locating staging areas away from residential areas. In addition, barriers would be installed along the perimeter of construction staging areas to reduce noise and visual impacts.

Alternative 1A

Under Alternative 1A, direct and indirect construction effects would the same as those described under Alternative 1. The aesthetic improvements to the replacement bridge would not result in any effects other than those described under Alternative 1.

Operations Effects

Operational adverse effects would occur if the project would divide or disrupt an existing cohesive community or create barriers that would reduce access to and from a community.

Alternative 1

Direct

Access/Circulation

Alternative 1 does not propose permanent closure or realignment of any of the local streets within or bordering the communities in the study area. Access is likely to improve as a result of the improvements proposed under Alternative 1. The flyover would improve access to SR-47, and the new SR-47 Expressway would provide better access for vehicles to and from Terminal Island; these improvements are likely to reduce congestion on the existing circulation system.

Community Cohesion

Certain characteristics of the residential neighborhoods located near Alternative 1—including the duration of their existence, physical and spatial attributes, and demographic profile—are indicative of an established cohesive community. The homes in this neighborhood appear to be over 30 years old, and are primarily single-family residences, which may suggest that some aspects of cohesiveness and neighborhood character have developed over time among long-term residents. In addition, the residential areas are relatively small and surrounded by commercial properties or roadways, thereby contributing to a sense of community through spatial proximity. Finally, the demographic data for the area in which the neighborhoods are located show substantial proportions of minority and low-income persons. It can reasonably be inferred that many residents of this neighborhood

fall within one or both of these groups. To the extent that demographic and physical characteristics have enabled a shared sense of stability to develop, some degree of community cohesion likely exists in this neighborhood.

The assessment of whether, and to what extent, Alternative 1 would adversely affect the cohesiveness of the adjacent community depends largely on whether the project is likely to create a barrier to the community. Because the project remains for the most part within existing rights-of-way adjacent to, but not through, the nearby residential portions of the community, no physical barrier would be created. The community surrounding the Alternative 1 would, therefore, be anticipated to remain intact.

Changes in Demographic Characteristics/Growth

Any residential displacement that may occur (Leeward Bay Marina) would not change the demographic characteristics of the project area. The pattern and rate of population and housing growth would be expected to remain consistent with that which is contemplated by existing plans for the area. No new or expanded infrastructure, housing, or other similar permanent physical changes to the environment would be necessary as an indirect consequence of Alternative 1.

Based on 2008 project design information, it is anticipated that nine boat slips would be acquired at the Leeward Bay Marina in the Port of Los Angeles, resulting in displacement of one resident. However, live-aboard residents at the Leeward Bay Marina rent slips on a month-to-month basis. According to the rental agreements, the Port can give these tenants 30 days advance notice to vacate for any reason, and the Port is not required to provide compensation (Caltrans, 2006).

Indirect

Indirect effects to the community during operations include air quality effects related to emissions from marine vessels that are unable to pass under the new bridge and must, instead, navigate around Terminal Island.

Alternative 1A

Under Alternative 1A, the operational direct and indirect effects would be the same as those described for Alternative 1. The aesthetic improvements to the replacement bridge would not result in effects other than those described under Alternative 1.

3.3.1.3.3.2 Alternative 2: SR-103 Extension to Alameda Street

Construction Effects

Construction activities for the bridge replacement and flyover would be the same as described under Alternative 1. Construction activities for the SR-103 Extension would largely be contained within the Union Pacific Railroad (UPRR) and SCE rights-of-way. A residential community exists to the east of existing SR-103. The extension of SR-103 could result in localized construction-period impacts on the nearby community. Two schools and a neighborhood park border the existing SR-103.

Direct

It is likely that, under Alternative 2, Willow Street from SR-103 would be affected for a short period of time until improvements are completed at this location. However, it is not expected that the construction would affect east-west travel along Willow Street. The SR-103

forms the western boundary of the community and does not pass through or bisect the community. The local street system within the community would remain unaffected by construction on SR-103.

Indirect

Indirect construction effects would largely be nuisance-type effects related to noise, visual resources and localized air quality. Indirect effects for the bridge replacement and flyover would be the same as described under Alternative 1. For the SR-103 Extension, only the southern portion borders the community; therefore, it is anticipated that the duration of construction activities in the vicinity of the community would be short. Additionally, views of the construction site would be shielded. There are no residences bordering the SR-103; therefore, there would be no effects to residences. The construction activities are unlikely to affect sports activities at the nearby school playgrounds and sports fields. The academic facilities are further east of SR-103; the noise and lights are unlikely to affect teaching activities.

Operations Effects

Operations effects for the bridge replacement and flyover would be the same as under Alternative 1. There are no operations effects anticipated to communities in the vicinity of Alternative 2. Improvements in access are likely to have some beneficial effects due to reduced congestion. The communities would remain intact; community character is likely to remain unaffected.

Direct

Access/Circulation

The community may benefit from the increased accessibility to and from I-405. No long-term impacts to the local circulation network are anticipated. Existing access to the community would remain unchanged.

Community Cohesion

Because the SR-103 portion of Alternative 2 remains for the most part within existing rights-of-way adjacent to, but not through, the nearby residential portions of the community, no physical barrier would be created. The community surrounding the project would, therefore, be anticipated to remain intact. Community character would remain unchanged. Implementation of Alternative 2 would not result in the introduction of new uses where none currently exist.

Changes in Demographic Characteristics/Growth

As no residential displacements are proposed, it is not likely that Alternative 2 would change the demographic characteristics of the project area. The pattern and rate of population and housing growth would be expected to remain consistent with that which is contemplated by existing plans for the area. Further, no new or expanded infrastructure, housing, or other similar permanent physical changes to the environment would be necessary as an indirect consequence of Alternative 2.

Indirect

No indirect permanent adverse effects would be the same as under Alternative 1.

3.3.1.3.3.3 Alternative3: Bridge Demolition Avoidance

Construction Effects

Construction effects would be similar to those described under Alternative 1; however, with this alternative the existing Schuyler Heim Bridge would not be demolished.

Direct

With the exception of retrofit of the Schuyler Heim Bridge, this alternative is similar to Alternative 1. This alternative would involve slightly more construction activity due to retrofit of the existing bridge, plus construction of a new replacement bridge and expressway. However, the retrofit activities would occur within the right-of-way of the existing bridge and would not be in the vicinity of any community areas. For this reason, no adverse effects are anticipated.

Indirect

Under Alternative 3, indirect effects would be similar to those described for Alternative 1.

Operations Effects

Under Alternative 3, permanent direct and indirect effects would be similar to those described for Alternative 1. Adverse effects are not anticipated.

3.3.1.3.3.4 Alternative 4: Bridge Replacement Only

Construction Effects

Construction of Alternative 4 would be limited to demolition of the existing bridge and construction of a new bridge. No roadway improvements or extensions would occur, and the flyover would not be constructed. Under this alternative, there would be no construction in the vicinity of the project area communities. Therefore, no adverse effects are anticipated.

Direct

No construction would take place in the vicinity of communities in Wilmington, Long Beach and Carson. Construction of the new bridge would not disrupt any communities.

Indirect

The construction site and staging area would be located far from the communities. No indirect effects related to noise, visual resources, and/or air quality would occur.

Operations Effects

Direct

The existing bridge does not meet current seismic criteria. Construction of the new bridge would ensure the safety of vehicles using it. No other direct effects would result.

Indirect

The new bridge may result in better flow of vehicles across the Cerritos Channel and may reduce bottleneck issues due to replacement of the lift bridge. This would be an overall beneficial effect for the transportation network in this area.

Under Alternative 3, indirect effects would be similar to those described for Alternative 1. No other indirect effects on the communities are anticipated.

3.3.1.3.3.5 Alternative 5: Transportation System Management

Construction Effects

Construction effects would result from roadway improvements such as restriping of lanes and road widening. These improvements may not be limited to one roadway; however, it is anticipated that improvements would be phased or staggered.

Direct

Depending on where the road widening would take place, the level of effects to the neighboring community would vary. If improvements are located on Alameda Street, SR-103, Willow Street, and/or Pacific Coast Highway, they are likely to result in minor traffic disruptions that may affect local communities. However, lane widening and restriping projects typically can be completed fairly quickly, and therefore, the disruptions would be for a relatively short period of time. No adverse effects would occur.

Indirect

No indirect effects are anticipated. The physical improvements/construction would be minor in nature. The traffic management techniques would not result in any indirect effects as construction would be minimal.

Operations Effects

The TSM Alternative would not result in any adverse effects, and the community would benefit from improvements in traffic conditions associated with this alternative.

Direct

Under this alternative, the traffic system in the area would be improved. However, the Schuyler Heim Bridge would continue to operate and pose a threat in the event of a major earthquake. Also, it would operate at current capacity, which is not sufficient to meet demands of the growing traffic. For these reasons, this TSM Alternative has a potential to result in adverse effects to the general population and not just the neighboring community in particular.

Indirect

The TSM measures would only provide congestion relief up to a certain roadway network capacity. In the future, as the traffic continues to increase, congestion conditions could occur. However, these conditions would primarily affect travel to and from the Ports, with some effects to the surrounding community, depending on effects to specific local traffic patterns.

3.3.1.3.3.6 Alternative 6: No Build

Construction Effects

Under Alternative 6, no direct or indirect construction effects would occur.

Operations Effects

The Schuyler Heim Bridge is expected to continue to deteriorate over time as its useful life is eroded further and as various magnitude earthquakes are experienced. At some point in the future, the bridge may need to be demolished and replaced solely to avoid safety hazards.

Direct

The bridge would continue to operate under capacity, and existing congestion conditions would continue. Additionally, the bridge is not seismically retrofitted; it therefore poses a

safety hazard. The bridge would pose safety hazards for the general population using the bridge. However, the bridge does not provide a link between communities and therefore would not result in specific impacts on the neighboring community.

Indirect
No indirect effects would occur.

3.3.1.3.4 CEQA Consequences

Based on the information provided in the above analysis, when considered in the context of CEQA criteria, none of the six project alternatives would have impacts related to population growth. Under Alternatives 1 and 3, potential displacement of residents in the Leeward Bay Marina would be less than significant.

Potential impacts of the proposed project alternatives to the character and cohesion of the surrounding community are assessed in the context of CEQA criteria in Appendix A – CEQA Checklist (XII, Population and Housing).

3.3.1.4 Avoidance, Minimization, and/or Mitigation Measures

Avoidance, minimization, and/or mitigation measures would be implemented for identified impacts that have the potential to affect community character and cohesion: see Sections 3.5 – Traffic and Transportation; 3.7 – Visual Resources/Aesthetics; 3.13 – Air Quality; and 3.14 - Noise.

3.3.2 Relocations

3.3.2.1 Regulatory Setting

Several federal and state laws govern property acquisition procedures. The Uniform Relocation Assistance and Real Properties Acquisition Policies Act of 1970, as amended (Uniform Act), mandates that certain relocation services and payments be made available to eligible residents, businesses, and nonprofit organizations displaced as a direct result of programs or projects undertaken by a federal agency or with federal financial assistance. The Uniform Act provides for uniform and equitable treatment of persons displaced from their homes or businesses who are eligible for assistance, and establishes uniform and equitable land acquisition policies. Generally, the Uniform Act requires that all aspects of property acquisition, including notice, appraisal, negotiation, and payment, be as reasonable and fair as possible and be handled as expeditiously as practicable.

According to Section 6018 of the Relocation Assistance and Real Property Acquisitions Guidelines (California Code of Regulations, Title 25, Section 1.6), the provisions of the California Relocation Act (California Act) (Government Code sections 7260-7277) shall apply in the absence of federal funds and/or involvement if a public entity undertakes a project and consequently must provide relocation assistance and benefits. The California Act, which is consistent with the intent and guidelines of the Uniform Act, seeks to: ensure the consistent and fair treatment of owners of real property; encourage and expedite acquisitions by agreement to avoid litigation and relieve congestion in the courts; and promote confidence in public land acquisitions.

The Uniform Act requires both financial assistance and programmatic assistance to eligible displaced persons, businesses, and non-profits, as described below.

The Relocation and Assistance Program (RAP) implemented by California Department of Transportation (Caltrans) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Title 49 Code of Federal Regulations (CFR) Part 24. The purpose of RAP is to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. Please see Appendix E for a summary of the Relocation Impact Report.

All relocation services and benefits are administered without discrimination, in compliance with Title VI of the Civil Rights Act (42 USC 2000d, et seq.). Please see Appendix D for a copy of the Department's Title VI Policy Statement.

3.3.2.1.1 Financial Assistance

Eligible displaced businesses and non-profit organizations are entitled to compensation for: reasonable moving expenses; direct losses of tangible personal property (not to exceed the cost of moving such property); expenses of searching for replacement property; and expenses of reestablishing a small business or non-profit organization (not to exceed $10,000). In lieu of the foregoing payments, a displaced business or non-profit can elect to receive a fixed relocation assistance payment of between $1,000 and $20,000.

3.3.2.1.2 Programmatic Assistance

Eligible displaced persons, businesses, and non-profit organizations are entitled to certain programmatic assistance in addition to monetary compensation. This assistance takes the form of coordinated relocation planning and counseling and may include recommendations on replacement housing or new business locations, information on other government assistance programs, and any other advisory services that may minimize the hardships of relocation. Programmatic assistance also would include the provision of certain "last resort" housing in the event that comparable replacement housing that is decent, safe, and sanitary is not available to displaced persons.

3.3.2.2 Affected Environment

The project alignments are located in an area that is intensely developed with heavy industrial, commercial, and transportation uses associated with the nearby Ports of Los Angeles and Long Beach. Residential neighborhoods are primarily located east of SR-103, and west of Alameda Street.

A large portion of the area in the vicinity of the project alternatives is owned by the Ports of Long Beach and Los Angeles.

3.3.2.3 Environmental Consequences

3.3.2.3.1 Evaluation Criteria

The proposed project alternatives were evaluated to determine if they would:

- Require residential property acquisitions and displacements so substantial as to disrupt the pattern and/or rate of existing and planned population and housing growth.
- Require non-residential property acquisitions and displacements so substantial as to disrupt the pattern and/or rate of existing and planned population and housing growth.

Temporary construction easements are defined as those acquisitions of property necessary to permit temporary occupancy of the property for construction staging and equipment storage areas, and for access to utilities and construction sites not otherwise accessible through public rights-of-way.

Permanent highway easements are defined as land that is encumbered by a permanent easement for as long as it is needed for highway purposes. When the highway need no longer exists, the land reverts to the underlying fee owner.

Permanent acquisitions include both full acquisitions of property, where an entire parcel would be acquired, and partial acquisitions of property, where only a portion of existing land, landscaping, parking, and/or structure would be acquired.

3.3.2.3.2 Methodology

Several types of acquisitions could occur for the proposed action. Implementation of one of the build alternatives (Alternative 1, 1A, 2, 3, 4) would involve permanent acquisition of properties and/or possible displacement of businesses located on those properties. In addition, permanent easements would be required in many locations. Any acquisitions, displacements, and easements related to construction of the proposed SR-47 Expressway, SR-103 Extension, or flyover are considered temporary in nature. The acquisitions, displacements, and easements necessary for operation of the proposed corridor are considered to be permanent.

A Draft Relocation Impact Report was prepared for the project; most of the information herein is from this report. To assess potential impacts, the parcels that would need to be acquired for the build alternatives were reviewed for the following circumstances.

- Whether the acquisition would be permanent or temporary
- What type of acquisition would be required (full acquisition or easement)
- Whether the acquisition would include relocation.

3.3.2.3.3 Evaluation of Alternatives

The project alternatives would not result in acquisition of residential properties. No residents would be displaced as a result of the project. It is anticipated that, under Alternatives 1, 1A, and 3, nine boat slips would be acquired at the Leeward Bay Marina in the Port of Los Angeles, resulting in displacement of one resident. However, live-aboard residents at the Leeward Bay Marina rent slips on a month-to-month basis. According to the rental agreements, the Port can give these tenants 30 days advance notice to vacate for any reason, and the Port is not required to provide compensation (Caltrans, 2006). Several businesses may need to be acquired and relocated as a result of the project alternatives. The types of acquisitions and relocations are described under each alternative below.

3.3.2.3.3.1 Alternative 1: Bridge Replacement and SR-47 Expressway

Construction Effects

During construction, temporary construction easements would be required to serve as staging areas, material lay down areas, and other, similar, uses.

Alternative 1

Direct

All construction easements would be temporary. A 3.05-m (10-ft)-wide temporary construction easement for the limits of the aerial structure would be required. A right of entry for access and construction is required for the affected port properties. In cases where the temporary construction easement would affect an existing building, a lesser-width temporary construction easement would be used to avoid impinging on the building. No residential properties would be used for temporary construction easement. Nine boat slips would be acquired at the Leeward Bay Marina.

There would be 82 temporary construction easements which may result in inconvenience to the property users/owners whose property is being used to accommodate construction of Alternative 1. However, the use and function of the businesses would remain unchanged and unaffected by these temporary easements.

Indirect

No indirect effects are identified.

Alternative 1A

Alternative 1A differs from Alternative 1 only in design of the new replacement bridge. Temporary construction easements for Alternative 1A would be the same as those described for Alternative 1.

Under Alternative 1A, construction direct and indirect effects would be the same as those described for Alternative 1.

Operations Effects

Alternative 1

Direct

Alternative 1 would result in permanent full acquisition of six businesses located on 11 parcels. These six businesses would have to be provided relocation assistance (see Tables 3.3-3 and 3.3-4). The businesses that would be relocated are machine shops, auto body shops, recycling, and container storage type uses, which generally are not compatible with residential and office commercial uses. The area in the vicinity of the Ports has been developed as an industrial area suitable for locating such businesses due to a lack of residential uses. Industrial uses may be considered undesirable due to issues related to use of hazardous materials, contamination, and noise/traffic nuisances. For this reason, the relocation of businesses would likely have to occur in an area where other such uses exist. If the relocated businesses could not be relocated within the Ports area, locations outside Los Angeles County would be considered.

Relocation activities would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation resources would be available to eligible recipients without discrimination.

There would also be permanent highway easements of approximately 129 partial takes (aerial/highway easements) (Table 3.3-5). Highway and aerial easements would be required along most of the SR-47 alignment. The right-of way takes include a 4.57-m (15-ft)-wide area

from the drip line for aerial easements, and 3.05-m (10-ft)-wide highway easements where the structure is at-grade and directly under the structure when it is above grade.

Fee acquisition or permanent easements would be required where structural columns are located on private property. Permanent easements would accommodate the columns above ground and the foundations below grade.

Alternative 1 would require permanent full acquisition of 6,985 square (sq) m (75,181 sq ft). Details are provided in Table 3.3-3.

Based on the type of business, the number of employees displaced as a result of full acquisitions was estimated using employee generation factors taken from *The Fiscal Impact Handbook* (Burchell & Listokin, 1978).

Light Industrial use is the principal property type that would be displaced under Alternative 1. This alternative would displace 11 parcels, a total of 6,985 sq m (75,181 sf), and would result in the displacement of 100 employees (see Table 3.3-4).

Table 3.3-3
Permanent Full Acquisitions

Alternative 1*					
APN	**Address**	**Owner**	**Land Use**	**Type of Business**	**Area (sf)**
7428-005-014	1622 E Denni Street	Waterman Trust	Commercial/ Industrial	Recycling	5,140
7428-005-013	1100 N. Henry Ford Ave.	Griselda Canaday Trust	Commercial/ Industrial	Not available	5,401
7428-005-028	1635 E. Denni Street	Eyraud Trust	Commercial/ Industrial	Materials, transportation systems and facilities management	5,543
7428-005-025	1120 N. Henry Ford Ave.	Moine, Charles A	Commercial/ Industrial	Recycling	25,091
7428-001-036	1800 E. Pacific Coast Hwy.	Waterman Trust	Commercial/ Industrial	Truck Wash	8,742
7315-018-015	Not Available	Waterman Trust	Vacant	Not available	3,964
7315-018-016	Not Available	Waterman Trust	Vacant	Not available	4,443
7315-018-012	Not Available	Waterman Trust	Vacant	Not available	4,051
7315-018-013	Not Available	Waterman Trust	Vacant	Not available	4,530
7315-018-014	Not Available	Waterman Trust	Vacant	Not available	3,441
7315-018-017	1815 E. Colon Street	Waterman Trust	Commercial/ Industrial	Transportation company repair shop	4,835

*Permanent full acquisitions for Alternative 1A and 3 are the same as for Alternative 1.
Source: Alameda Corridor Transportation Authority, 2007.

Table 3.3-4
Full Acquisitions of Non-Residential Properties (Parcels)

	Alternative 1		
	Number of Parcels	**Square Feet**	**Number of Employees Displaced**
Office	–	–	–
Industrial (Light)	6	54,752 sf	100
Parking	–	–	–
Vacant	5	20,429 sf	
Total	11	75,181	100

Employee displacement was calculated using the following factors: office – 1:250 sf and industrial – 1:525 sf (derived as an average of 1:300 sf for industrial plants and 1:750 sf for warehouses)
Source: Caltrans, 2007.

Table 3.3-5
Partial Acquisitions Required for Alternative 1

Item No.	APN (Assumed Larger Parcel)	Owner/ Grantor	Area Acquired (Sq Ft.)
1	7436-029-906	City of Long Beach	5,511
2	7436-029-906	City of Long Beach	280
3	7436-029-906	City of Long Beach	2,024
4	7436-029-906	City of Long Beach	2,228
5	7436-029-906	City of Long Beach	280
6	7436-029-906	City of Long Beach	872
7	7436-029-914	City of Long Beach	7,416
8	7436-029-906	City of Long Beach	3,014
9	7436-029-906	City of Long Beach	958
10	7436-029-914	City of Long Beach	53,981
11	7436-029-914	City of Long Beach	16,157
12	7436-029-914	City of Long Beach	700
13	7436-029-914	City of Long Beach	775
14	7436-029-906	City of Long Beach (Rail)	248
15	7436-029-914	City of Long Beach (Rail)	2,260
16	7436-029-923	City of Long Beach	334
17	7436-029-923	City of Long Beach	183
18	7436-029-917	City of Long Beach	13,681
19	7436-029-917	City of Long Beach	1,109
20	7436-029-917	City of Long Beach	1,722
21	7436-029-917	City of Long Beach	1,647
22	7436-029-917	City of Long Beach	527
23	7436-029-923	City of Long Beach	969

Table 3.3-5
Partial Acquisitions Required for Alternative 1

Item No.	APN (Assumed Larger Parcel)	Owner/ Grantor	Area Acquired (Sq Ft.)
24	7436-029-923	City of Long Beach	183
25	7436-029-923	City of Long Beach	893
26	7436-029-923	City of Long Beach	2,174
27	7436-029-923	City of Long Beach	474
28	7436-029-919	Vopak Terminal Long Beach*	215
29	7436-029-917	City of Long Beach	22
30	Street	City of Long Beach	581
31	7436-011-900	LACFCD	36,544
32	7436-011-900	LACFCD	9,892
33	7436-003-261	City of Long Beach	6,738
34	7436-003-261	City of Long Beach	25,511
35	7440-003-261, 906	City of Long Beach	13,358
36	7440-003-261, 906	City of Long Beach	77,490
37	7440-003-261	City of Long Beach	5,608
38	7440-003-281	City of Long Beach	9,784
39	7440-003-281	City of Long Beach	39,385
40	7436-029-917	City of Long Beach	1,087
41	7436-029-917	City of Long Beach	614
42	7436-029-917	City of Long Beach	97
43	7440-003-272	City of Long Beach	3,326
44	7440-003-272	City of Long Beach	8,224
45	7440-004-270	City of Long Beach	1,841
46	7440-004-270	City of Long Beach	2,185
47	7440-001-270	City of Long Beach	2,648
48	7440-001-270	City of Long Beach	10,430
49	7440-001-911	City of Long Beach	2,486
50	7440-001-911	City of Long Beach	17,524
51	7440-001-911	City of Long Beach	2,756
52	7440-001-912(?)	City of Los Angeles	624
53	7440-001-xxx	City of Los Angeles	3,972
54	7440-001-xxx	City of Los Angeles	624
55	7440-001-912	City of Los Angeles	2,508
56	7440-001-912	City of Los Angeles	20,473
57	7440-001-912	City of Los Angeles	3,810
58	7440-001-806	City of Los Angeles	355
59	7440-001-806	City of Los Angeles	2,110
60	7440-001-806	City of Los Angeles	323

Table 3.3-5
Partial Acquisitions Required for Alternative 1

Item No.	APN (Assumed Larger Parcel)	Owner/ Grantor	Area Acquired (Sq Ft.)
61	7440-002-823	City of Los Angeles	4,521
62	7440-002-823	City of Los Angeles	23,799
63	7440-002-823	City of Los Angeles	818
64	7440-001-912	City of Los Angeles	6,760
65	7440-001-912	City of Los Angeles	65,445
66	7440-001-912	City of Los Angeles	12,874
67	7428-037-019	Sher Brothers	603
68	7428-037-007, 008	Fishfader Trust	474
69	7428-037-900, 901, 902, 903	City of Los Angeles	1,001
0	7428-045-001, 023	Kim Trust	883
71	7428-045-024	M. Chaney Jones	215
72	7428-045-900	City of Los Angeles	980
73	7490-002-908	City of Los Angeles	43
74	7425-043-052	Frederick Voigt	194
75	7425-043-019, 055	Jose & Discordia Canales	194
76	7425-043-056	Armando and Rebeca Serna	183
77	7425-043-050	Bergman Trust	183
78	7425-043-018, 017, 047, 048, 051	Mork Trust	484
79	7425-042-009,025, 026, 027, 028, 029, 030, 031, 032	Union Mutualista De San Jose	915
80	7428-033-904, 905, 906	City of Los Angeles	1,216
81	7428-033-045, 046, 047, 048	Ramirez & Gonzales	2,013
82	7428-033-910, 911	City of Los Angeles	969
83	7428-031-029	SWM No One LLC	2,637
84	7425-041-002, 009, 010 (006?)	Waterman Trust	377
85	7428-005-009, 029, 030	Eyraud Enterprises	3,983
86	7428-005-009, 029, 030	Eyraud Enterprises	194
87	7428-005-014	Canady Trust (or Gizelda Degrazia/ TR?)	3,488
88	7428-005-025	Moine Trust	9,483
89	7428-004-902	City of Los Angeles and City of Long Beach	6,469
90	7428-004-902	City of Los Angeles and City of Long Beach	16,620
91	7428-004-902	City of Los Angeles and City of Long Beach	118
92	7428-004-902	City of Los Angeles and City of Long Beach	6,469

Table 3.3-5
Partial Acquisitions Required for Alternative 1

Item No.	APN (Assumed Larger Parcel)	Owner/ Grantor	Area Acquired (Sq Ft.)
93	7428-004-900	City of Los Angeles	2,551
94	7428-004-900	City of Los Angeles	118
95	7428-004-900	City of Los Angeles	7,858
96	7428-003-001, 002, 003, 004, 005	Ted R. and Theodore Smith	1,647
97	7428-003-001, 002, 003, 004, 005	Ted R. and Theodore Smith	6,760
98	7428-003-034, 035, 036, 037, 038, 039, 048, 049	Steinmeyer Trust	1,421
99	7428-003-034, 035, 036, 037, 038, 039, 048, 049	Steinmeyer Trust	5,576
100	7428-002-004, 005, 035, 036, 037, 038	Frank Dupuy	2,863
101	7428-002-004, 005, 035, 036, 037, 038	Frank Dupuy	11,582
102	7315-019-001, 002, 004, 005	Fuel Engineering	21,560
103	7440-002-917	City of Long Beach	33,573
104	7440-001-823 7440-001-912	City of Los Angeles	19,816
105	7428-004-902	City of Los Angeles City of Long Beach	32,389
106	7436-029-923	City of Long Beach	8,859
107	7440-021-913	US Govt (Navy)	5,038
108	7440-021-913	US Govt (Navy)	9,097
109	7436-032-907	COLB	68,814
110	7436-032-907	COLB	31,764
111	7436-032-907	COLB	14,639
112	7436-032-904	US Govt (transferred to COLB)	26,372
113	7436-032-904	US Govt (transferred to COLB)	9,655
114	7436-032-904	US Govt (transferred to COLB)	9,343
115	7436-032-800	SC Edison (transferred to COLB)	4,402
116	7436-032-800	SC Edison (transferred to COLB)	1,496
117	7436-032-800	SC Edison (transferred to COLB)	1,841
118	7436-032-901	COLB	7,847
119	7436-032-901	COLB	3,897
120	7436-032-901	COLB	1,690
121		COLB	5,586
122	7436-029-914	COLB	506
123	7436-029-914	COLB	12,432

Table 3.3-5
Partial Acquisitions Required for Alternative 1

Item No.	APN (Assumed Larger Parcel)	Owner/ Grantor	Area Acquired (Sq Ft.)
124	7436-029-914	COLB	4,349
125	7436-029-914	COLB	775
126	7436-029-917	COLB	3,875
127	N/A	Exist Street ROW	19,773
128	7315-010-002	Mo Trust	2,260
129	7315-010-009	Hertz Equipment Rental Co.	3,294

Source: Alameda Corridor Transportation Authority, 2007

It is likely that displaced employees would relocate with the business or find employment in the vicinity, where similar types of uses and industries exist. If businesses are relocated in the vicinity of the displaced property, it is likely that no employees would be displaced.

Indirect
If the businesses are not able to relocate within the same jurisdiction, this could result in loss of tax revenue. However, no adverse effect is anticipated.

Alternative 1A
Under Alternative 1A, displacements would be the same as under Alternative 1, and direct and indirect permanent effects also would be the same as under Alternative 1.

3.3.2.3.3.2 Alternative 2: SR-103 Extension to Alameda Street
For Alternative 2, a large portion of the right-of-way is owned by UPRR, Southern California Edison, and the Port of Los Angeles.

Highway and aerial easements would be required along almost the entire length of SR-103 for this alternative. Right-of-way takes include a 4.6-m (15-ft)-wide area from the drip line for aerial easements, 3.05-m (10-ft)-wide highway easements where the structure is at-grade, and under the structure when it is above grade. In addition, a 3.05-m (10-ft)-wide temporary construction easement would be required for the limits of the aerial structure.

Fee acquisition or permanent easements are required where structure columns are located on private property. A right of entry for access and construction would be provided for the affected Port properties.

Construction Effects
During construction, 73 temporary construction easements would be required to serve as staging areas, material lay down areas, and other, similar, uses.

Direct
Temporary construction easements would result in minor disturbance to the property owners, but would not affect use of the properties by the owners. No residential properties would be required for construction easement.

Indirect
No indirect effects are identified.

Operations Effects
Operations effects would occur as a result of permanent acquisitions and permanent easements.

Direct
Under Alternative 2, there would be no full takes of any residential or non-residential property. However, two buildings would be acquired as permanent highway easements, thereby denying them of their existing use for business. One of these businesses is owned by Corridor Properties, and the other is an industrial building owned by Southern California Edison. In the after-condition, the highway easements could allow for temporary uses, such as parking, temporary structures such as storage sheds or trailers, and storage of non-hazardous materials. There are 118 partial parcel takes (aerial/permanent highway easements) expected as a result of Alternative 2 (see Table 3.3-6).

Indirect
If the businesses are not able to relocate within the same jurisdiction, this could result in loss of tax revenue. However, no adverse effect is anticipated.

Table 3.3-6
Partial Acquisitions Under Alternative 2

Item No.	APN	Owner/ Grantor	Area Acquired (Sq. M.)
1	7315-021-270, 901	City of Long Beach and City of Los Angeles	3,057
2	7315-021-270, 901	City of Long Beach and City of Los Angeles	15,629
3	7315-021-270, 901	City of Long Beach and City of Los Angeles	3,789
4	7315-016-801, 804, 805	SCE	7,998
5	7315-021-801	SCE	44,972
6	7315-021-801	SCE	11,668
7	7315-015-905	City of Los Angeles	11,991
8	7315-015-905	City of Los Angeles	64,024
9	7315-015-905	City of Los Angeles	18,051
10	7315-015-012	Watson Land Co	915
11	7315-015-012	Watson Land Co	527
12	Street	City of Carson (E. Sepulveda Blvd.)	12,766
13	Street	City of Carson (E. Sepulveda Blvd.)	4,456
14	7315-011-805	SPRR (UPRR)	21,980
15	7315-011-805	SPRR (UPRR)	42,755
16	7315-011-805	SPRR (UPRR)	5,307
17	Street	City of Carson (Intermodal Wy)	2,077

Table 3.3-6
Partial Acquisitions Under Alternative 2

Item No.	APN	Owner/ Grantor	Area Acquired (Sq. M.)
18	Street	City of Carson (Intermodal Wy)	1,647
19	Street	City of Carson (Intermodal Wy)	36,759
20	Street	City of Carson (Intermodal Wy)	5,554
21	Street	City of Carson (Intermodal Wy)	807
22	Street	City of Carson (Intermodal Wy)	14,661
23	7315-011-013	Watson Land Co	6,857
24	7315-011-013	Watson Land Co	6,889
25	7315-011-807, 808, 811, 812, 814, 815	SPRR (UPRR)	59,267
26	7315-011-807, 808, 811, 812, 814, 817	SPRR (UPRR)	290,122
27	7315-011-807, 808, 811, 812, 814, 818	SPRR (UPRR)	10,775
28	7315-011-812, 814, 815	SPRR (UPRR)	37,060
29	7315-011-807	SPRR (UPRR)	1,001
30	7315-011-021	Watson Land Co	6,588
31	7315-011-021	Watson Land Co	38,341
32	7315-011-021	Watson Land Co	19,903
33	Street	City of Los Angeles (S. Alameda St.)	12,271
34	Street	City of Los Angeles (S. Alameda St.)	5,533
35	7315-010-005	Myron Chlavin and Rae Desser Estate	2,185
36	7315-010-005	Myron Chlavin and Rae Desser Estate	27,427
37	7315-010-005	Myron Chlavin and Rae Desser Estate	51,323
38	7315-010-005	Myron Chlavin and Rae Desser Estate	4,446
39	7315-010-008	Corridor Properties	30,903
40	7315-010-008	Corridor Properties	6,297
41	7315-010-002	Mo Trust	7,546
42	7315-010-009	Hertz Equip. Rental Corp.	9,720
43	7436-029-906	City of Long Beach	5,543
44	7436-029-906	City of Long Beach	280
45	7436-029-906	City of Long Beach	3,444
46	7436-029-906	City of Long Beach	205
47	7436-029-906	City of Long Beach	1,389
48	7436-029-906	City of Long Beach	2,024
49	7436-029-906	City of Long Beach	4,209
50	7436-029-906	City of Long Beach	10,592

Table 3.3-6
Partial Acquisitions Under Alternative 2

Item No.	APN	Owner/ Grantor	Area Acquired (Sq. M.)
51	7436-029-906	City of Long Beach	2,605
52	7436-029-906	City of Long Beach	818
53	7436-029-906	City of Long Beach	16,609
54	7436-029-906	City of Long Beach	53,626
55	7436-029-906	City of Long Beach	7,007
56	7436-029-906	City of Long Beach	6,189
57	7436-029-906	City of Long Beach	10,592
58	7436-029-906	City of Long Beach	5,533
59	7436-029-906	City of Long Beach	4,596
60	7436-029-914	City of Long Beach	161
61	7436-029-914	City of Long Beach	172
62	7436-029-914	City of Long Beach	248
63	7436-029-914	City of Long Beach	118
64	7436-029-914	City of Long Beach	54
65	7436-029-914	City of Long Beach	280
66	7436-029-914	City of Long Beach	183
67	7436-029-914	City of Long Beach	355
68	7436-029-914	City of Long Beach	205
69	7436-029-914	City of Long Beach	614
70	7436-029-914	City of Long Beach	355
71	7436-029-923	City of Long Beach	334
72	7436-029-923	City of Long Beach	484
73	7436-029-923	City of Long Beach	258
74	7436-029-923	City of Long Beach	151
75	7436-029-917	City of Long Beach	5,909
76	7436-029-917	City of Long Beach	1,701
77	7436-029-923	City of Long Beach	5,899
78	7436-029-923	City of Long Beach	484
79	7436-029-923	City of Long Beach	1,496
80	7436-029-923	City of Long Beach	1,044
81	7436-029-019	Vopak Terminal Long Beach, Inc.	2,325
82	7436-029-019	Vopak Terminal Long Beach, Inc.	1,421
83	7436-029-917	City of Long Beach	1,873
84	7436-029-917	City of Long Beach	2,250
85	7436-029-923	City of Long Beach	6,932
86	7436-029-923	City of Long Beach	3,305
87	7436-029-923	City of Long Beach	24,639
88		City of Long Beach	2,325

Table 3.3-6
Partial Acquisitions Under Alternative 2

Item No.	APN	Owner/ Grantor	Area Acquired (Sq. M.)
89		City of Long Beach	129
90	7436-011-900	LACFCD	9,074
91	7436-011-900	LACFCD	36,576
92	7436-003-261	City of Long Beach	6,706
93	7436-003-261	City of Long Beach	26,921
94	7436-003-261	City of Long Beach	17,933
95	7436-003-261	City of Long Beach	25,457
96	7436-003-281	City of Long Beach	893
97	7440-021-913	US Govt (Navy)	5,038
98	7440-021-913	US Govt (Navy)	9,096
99	7436-032-907	COLB	68,814
100	7436-032-907	COLB	31,764
101	7436-032-907	COLB	14,639
102	7436-032-904	US Govt (transferred to COLB)	26,372
103	7436-032-904	US Govt (transferred to COLB)	9,655
104	7436-032-904	US Govt (transferred to COLB)	9,343
105	7436-032-800	SC Edison (transferred to COLB)	4,402
106	7436-032-800	SC Edison (transferred to COLB)	1,496
107	7436-032-800	SC Edison (transferred to COLB)	1,841
108	7436-032-901	COLB	8,267
109	7436-032-901	COLB	4,026
110	7436-032-901	COLB	1,862
111		COLB	5,586
112	7436-029-914	COLB	506
113	7436-029-914	COLB	12,432
114	7436-029-914	COLB	4,349
115	7436-029-914	COLB	775
116	7436-029-917	COLB	1,615
117	N/A	Exist Street ROW	15,705
118	7315-010-800	Southern Pacific (UPRR)	840

Source: Alameda Corridor Transportation Authority, 2007

3.3.2.3.3.3 Alternative 3: Bridge Demolition Avoidance

Most of the Alternative 3 alignment, including the flyover, is similar to Alternative 1, except it proceeds easterly to avoid the existing Schuyler Heim Bridge and swings back westerly to join the existing Terminal Island Freeway. For Alternative 3, a major portion of the required right-of-way is owned by either the Port of Long Beach or a private property owner named Ultramar.

Construction Effects
During construction, 41 temporary construction easements would be required to serve as staging areas, material lay down areas, and other, similar, uses.

Operations Effects
There would be 61 partial parcel takes (aerial/permanent highway easements) expected as a result of Alternative 3. Under this alternative, there would be no residential or non-residential displacements requiring relocation.

3.3.2.3.3.4 Alternative 4: Bridge Replacement Only

Construction Effects

Direct
This alternative would require 8 temporary construction easements only for replacement of the existing Schuyler Heim Bridge. Land in the vicinity of the bridge is owned primarily by the Ports of Long Beach and Los Angeles. Construction of the replacement bridge would require eight temporary construction easements. Similar to Alternative 1, there would be no permanent residential acquisitions and, therefore, no residential displacements associated with the project construction.

Indirect
No indirect effects would occur.

Operations Effects
There would be operational easements of approximately 17 partial takes (aerial/highway easements) for Alternative 4.

3.3.2.3.3.5 Alternative 5: Transportation System Management
Under Alternative 5, no easements or acquisitions are anticipated. As a result, there would be no construction or operations effects related to relocations under this alternative.

3.3.2.3.3.6 Alternative 6: No Build
The project would not be constructed under the No Build alternative. No relocations would occur. As a result, there would be no construction or operations effects related to relocations under this alternative.

3.3.2.4 Avoidance, Minimization, and/or Mitigation Measures

3.3.2.4.1 Avoidance and Minimization Measures

3.3.2.4.1.1 Alternatives 1, 1A, and 3

CI-1 Provide relocation assistance or compensation to eligible persons and businesses in accordance with the federal *Uniform Relocation Assistance and Property Acquisition Act of 1970*, as amended (42 USC Sections 4601-4655) and the *California Relocation Act* (California Government Code, Section 7260 et. seq.)

3.3.2.4.1.2 Alternative 2
See **CI-1** under Alternative 1, above.

3.3.2.4.1.3 Alternative 3
See **CI-1** under Alternative 1, above.

3.3.2.4.1.4 Alternative 4

See **CI-1** under Alternative 1, above.

3.3.2.4.2 Alternatives 5 and 6

Under Alternatives 5 and 6, no avoidance and minimization measures would be required.

3.3.2.4.3 Mitigation Measures

No mitigation measures would be required.

3.3.3 Environmental Justice

3.3.3.1 Regulatory Setting

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, signed by President Clinton on February 11, 1994, directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse human health or environmental effects of federal projects and programs on minority and low-income populations to the greatest extent practicable and permitted by law. The term "minority" includes persons who identify themselves as Black, Asian/Pacific Islander, Native American, or of Hispanic origin. The term "low-income" includes persons whose household income is at or below the HHS poverty guidelines. A different threshold (e.g., U.S. Census Bureau poverty threshold) may be utilized as long as it is not selectively implemented and is inclusive of all persons at or below the HHS poverty guidelines. For 1999, this was $17,029 for a family of four and for 2007 was $20,650. All considerations under Title VI of the Civil Rights Act of 1964 and related statutes have also been included in the proposed project. Caltrans' commitment to upholding the mandates of Title VI is evidenced by its Title VI Policy Statement, signed by the Director, which can be found in Appendix D of this document.

3.3.3.2 Affected Environment

As noted in Section 3.2, the population of the project study area is characterized by substantial proportions of both minority and low-income persons (i.e., 82 percent minority, as many as 77 percent of persons below the poverty threshold in some areas). The proportions of these groups in the project area are much greater than in either the City or County of Los Angeles. Other indicators of a disadvantaged community also appear in the data (e.g., higher proportions of persons under 18 years of age and above 65, and greater housing density as measured by persons per household). In addition, given the relatively large proportions of minority and low-income persons reported in the U.S. Census tract and block group data for the project study area, it appears that these populations are in readily identifiable groups rather than dispersed in pockets throughout the greater area.

The reference community consists of the population that will benefit from the proposed project and is used in the environmental justice analysis to determine whether there are disproportionately high and adverse human health or environmental impacts when effects to the reference community are compared to those experienced by the affected community. To assist in the environmental justice analysis, the reference community for the project has been identified as the entire Southern California region, although it is potentially conceivable to include areas outside California within the reference community as well.

The project is a project of regional significance and would have a beneficial impact on the movement of goods in the region.

3.3.3.3 Environmental Consequences

3.3.3.3.1 Evaluation Criteria

The environmental justice analysis has been prepared in accordance with the applicable guidance for addressing environmental justice, including: DOT Order 5610.2 (April 15, 1997); FHWA Order 6640.23 (December 2, 1998); and FHWA Western Resource Center Interim Guidance (March 2, 1999). Consistent with this guidance, the environmental justice analysis evaluates the proposed project based on:

- Potential adverse effects on the project area population, including minority and low-income population groups; and
- Disproportionately high and adverse effects on minority and low-income population groups.

3.3.3.3.2 Methodology

The environmental justice analysis for the proposed project describes:

- The existing population and the presence of minority and low-income population groups
- Potential adverse effects on the project area population, including minority and low-income population groups
- Disproportionately high and adverse effects on minority and low-income population groups
- Community outreach and public involvement efforts

3.3.3.3.3 Evaluation of Alternatives

3.3.3.3.3.1 Existing Population Characteristics

Please refer to the discussion of affected environment in Section 3.3.1.2.

3.3.3.3.3.2 Adverse Effects to Overall Population

Issues Raised during Scoping Meeting

A scoping meeting was conducted for the project on September 9, 2004. Fourteen letters and verbal comments were received during the scoping meeting process. Some of the key issues related to environmental justice were in the areas of alternatives, traffic, access, air quality and public health, aesthetics, and noise.

Potential Environmental Justice Concerns

Based on the technical analyses conducted during the environmental process, the following areas of concern related to environmental justice were identified. These areas of concern are broadly identified below. The reader is referred to the indicated sections in the Final EIS/EIR for a detailed discussion by alternative.

Aesthetics: Temporary construction-period visual impacts would occur due to the presence of construction equipment and activities. Final EIS/EIR Section 3.7 provides a detailed discussion of visual and aesthetic impacts.

Air Quality: Project construction and operation would result in emissions of criteria pollutants above specified thresholds. Section 3.13 provides a detailed discussion of air quality impacts. Localized MSAT impacts would occur. A discussion of health risks effects is provided in Section 3.13.3.6. These impacts would be mitigated by ACTA as described in Section 3.13.4.3.21, AQ-13.

Noise: At different locations, the peak-hour traffic noise levels would increase from 1 to 13 dBA over existing conditions. Final EIS/EIR Section 3.14 provides a detailed discussion of noise impacts and noise abatement measures. During project construction, areas along both the Cerritos Channel and Consolidated Slip would be subject to substantial noise effects from pile driving. These impacts would be mitigated as described in Final EIS/EIR Section 3.13.4.2, Mitigation Measures.

Biological Resources: Wetlands could be affected. Removal and replacement of the Schuyler Heim Bridge with a fixed bridge would result in the loss of a known nest site for a breeding pair of peregrine falcons. Resuspension of harbor sediments during construction activities would affect aquatic communities. Please see Final EIS/EIR Section 3.16 for a detailed discussion of biological impacts.

Water Quality: Construction of a new fixed-span bridge would require excavation and other soil disturbance activities and introduce additional impervious surfaces to the project area, which would promote surface runoff of construction pollutants (i.e. trash and petroleum compounds from construction equipment) and erosion of channel banks. The pollutants would be collected by surface runoff and discharged into the Cerritos Channel. Certain constituents, including copper, zinc, and a number of the organic compounds (PAHs), would be suspended in concentrations in excess of the water quality criteria for a short time before being diluted. Please see Final EIS/EIR Section 3.10 for a detailed discussion of water quality impacts.

Geology, Soils, and Seismicity: More than 80 percent of the project site is located in an area where historic occurrences of liquefaction, subsidence, and/or geological, geotechnical, and groundwater conditions indicate a potential for permanent ground displacement. Please see Final EIS/EIR Section 3.11 for a detailed discussion of geological impacts.

Hazardous Waste/Hazardous Materials: Construction activities could encounter hazardous materials (and thereby have the potential for release of such materials) as a result of excavating subsurface soil, disturbing groundwater, or removing aboveground structures. Please see Final EIS/EIR Section 3.12 for a detailed discussion of impacts related to hazardous materials.

Traffic, Access and Parking: Both temporary and permanent parking impacts would occur. These impacts would be avoided, minimized or mitigated, as described in Final EIS/EIR Section 3.5.4

Acquisition and Relocation: Although no residential properties would be acquired, some businesses would need to be relocated. Nine boat slips would be acquired at the Leeward Bay Marina under Alternatives 1, 1A, and 3.

Cumulative Impacts: Several projects are proposed within and around the Ports of Los Angeles and Long Beach; construction schedules for some of these may overlap with the project addressed in this EIS/EIR. This could result in an intensification of construction-period

impacts. However, it expected that these projects also would be required to implement mitigation measures to reduce impacts to the extent feasible.

Analysis of Adverse Effects

Technical studies and analyses supporting the EIS/EIR have been reviewed to determine whether the project alternatives would have any adverse effects on all segments of the population, including minority and low-income population groups. The technical studies addressing air and water quality, noise, traffic and transportation, hazardous materials, and cultural resources indicate that some potential adverse effects are expected as a result of Alternatives 1, 1A, 2, 3, and 4. The impacts identified in these technical reports and the measures to avoid or reduce them can be summarized as follows:

Noise – Alternatives 1, 1A, 2, 3, and 4

- Construction of Alternatives 1, 1A, 2, 3, and 4 would generate short-term noise, including noise from pile driving, at nearby sensitive receptors. This noise will be abated to the extent feasible.
- Pile driving will be restricted to daytime hours.
- Residents of Anchorage Way Marinas and Leeward Bay Marina who are identified as being adversely affected by pile driving noise would be able to obtain hotel vouchers for a local hotel so they can temporarily move.
- For operation of Alternatives 1, 1A, 2, and 3, permanent noise walls have been proposed for abatement at appropriate locations, based on the noise study conducted for the project.
- See the Noise analysis in Section 3.14 of this Final EIS/EIR.

Traffic and Transportation – Alternatives 1, 1A, 2, 3, and 4

- During project construction, where there are lane closures of the Schuyler Heim Bridge, some traffic is expected to divert to I-110 or I-710. When these routes are operating at acceptable levels of service (LOS D or better), no congestion is anticipated. However, when I-110 and I-710 are operating at LOS E or LOS F, the addition of traffic diverted from the Schuyler Heim Bridge may result in added congestion and delays on these routes.
- TMP will be prepared to enhance traffic movement during construction.
- See the Traffic and Transportation analysis in Section 3.5 of this Final EIS/EIR.

Air Quality – Alternatives 1, 1A, 2, 3, and 4

- During construction, operation of onsite heavy-duty construction equipment, earth-moving activities, vehicle trips by employees, rerouting of automobile traffic during construction, and asphalt paving would generate emissions of nitrogen oxides (NO_X), volatile organic compounds (VOC), or reactive organic gases (ROG), PM_{10}, $PM_{2.5}$, sulfur oxides (SO_X), and CO. These emissions would have a temporary adverse air quality impact.

- Best Management Practices (BMPs) have been proposed that include application of soil stabilizers, reduction of vehicle speed, a trip reduction plan, and other measures to reduce emissions.

- During operation, vehicles would emit mobile source air toxics (MSAT) such as diesel particulate matter. Depending on the alternative selected, there may be a localized incremental increase in MSAT emissions at some locations, while there may also be an incremental benefit at other locations when compared to existing conditions. However, implementation of regulations, such as the ARB Draft Regulation to Control Emissions from In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks (compliance deadlines would begin in the year 2009), would be expected to reduce localized impacts by decreasing MSAT emissions. In addition, implementation of the project would result in improved regional air quality by improving the efficiency of truck movement through potentially affected communities, such as Wilmington, Carson, and Long Beach.

- The project is not expected to cause any direct adverse air quality impacts during operations. However, indirect adverse air quality impacts would occur due to emissions from marine vessels that would not be able to pass under the new fixed-span bridge and, instead, would be required to circumnavigate Terminal Island.

In addition, based on the discussion in Section 3.13 Air Quality (as amended), Caltrans has determined that the evidence provided in ACTA's HRA is not sufficient to make a determination of an adverse effect for health risk.

ACTA has made the following findings.

Air Quality – Alternatives 1, 1A, 2, and 3

  - ACTA finds that Alternative 1, 1 A, and 3 would have significant impacts on cancer risks to a number of residential receptors in the project vicinity, but these impacts would be mitigated, and the project would not cause significant impacts to acute and chronic risks to any of the receptors in the project area. Mitigation is proposed for these alternatives.

  - ACTA finds that Alternative 2 would have significant impacts on cancer risks for a number of residential receptors, parks, and workers in the project vicinity, but would not cause significant impacts to acute and chronic risks to any of the receptors in the project area.

- See the Air Quality analysis in Section 3.13 of this Final EIS/EIR.

Hazardous Materials – Alternatives 1, 1A, 2, 3, and 4

- During construction, excavation, drilling, and/or removal of aboveground structures could encounter hazardous materials, with resulting exposure of workers or the public and/or the release of hazardous materials to offsite locations.

- Standard engineering practices and BMPs would be followed, including, but not limited to, soil and groundwater sampling, predemolition surveys for asbestos-containing material and lead-based paint. Considerations for Alternative 2 include soil and groundwater investigations and soil investigations for aerially deposited lead. Based on these practices and procedures, no adverse effects would occur.

- See the Hazardous Waste/Hazardous Materials analysis in Section 3.12 of this Final EIS/EIR.

Cultural Resources – Alternatives 1, 1A, 2, 3, and 4

- The existing Schuyler Heim Bridge has been determined to be eligible for listing on the National Register of Historic Places. The loss of this resource would be considered an adverse effect that could not be fully mitigated.

- See the Cultural Resources analysis in Section 3.8 of this Final EIS/EIR.

Acquisitions and Displacements – Alternatives 1,1A, 2, 3, and 4

- Implementation of the build alternatives would not require acquisition or relocation of any residences. Under any of these alternatives, no more than six businesses would be fully acquired. This would affect a maximum of 100 jobs, which would not be a significant amount compared to the amount of comparable employment opportunities available in the area.

- See the Relocation analysis in Section 3.3.2 of this Community Resources discussion (Section 3.3).

Other sections of this EIS/EIR include efforts to minimize impacts and engage the community. For visual resource minimization measures, input from interested parties, including the public, will be solicited and considered (see 3.7, Visual Resources, Mitigation Measure VR-3). The community will be involved in selecting specific treatments for the expressway. Construction air quality impacts are temporary and mitigation measures to reduce construction impacts are detailed in Section 3.13, Air Quality, of this Final EIS/EIR (see 3.13.4.2, Mitigation Measures). For air quality impact resulting from marine vessel detours, the indirect marine vessel emissions would be mitigated to a level that is below the SCAQMD significance threshold for construction emissions (see AQ-9, Heavy Duty Truck Buyback Program). In addition, ACTA conducted a health risk assessment and based on its conclusions as a Responsible Agency, ACTA will adopt a mitigation measure to reduce incremental health risks from the proposed project. Although not as part of this proposed project, ACTA is in the process of working with the community to address noise issues north of I-405.

3.3.3.3.3.3 Disproportionately High and Adverse Effects to Minority and Low-Income Populations

Taking into consideration the abatement measures for noise impacts that have been proposed in the EIS/EIR, the impact avoidance and minimization efforts that have occurred during the project planning and development process, and the potential benefits that would accrue to the community, environmental justice considerations require an assessment of whether the effects of the project on minority and low-income groups could be considered disproportionately high and adverse.

Efficacy of Mitigation Efforts – Unavoidable Adverse Effects

Of the potential adverse effects identified, most would be avoided or substantially minimized. Others, such as substantial modification or demolition of the historic bridge; air quality impacts due to temporary construction air emissions; and air quality impacts due

to emissions from diversion of marine vessels around Terminal Island, could not be satisfactorily mitigated.

3.3.3.3.3.4 Other Measures to Minimize Adverse Effects

As part of the project planning and development process that has occurred over the past several years, measures have been incorporated into the project to avoid or minimize impacts to the surrounding community. Most notably, it was the likelihood of potentially severe community impacts (i.e., substantial property acquisitions and displacements) that led to the withdrawal of several alternative expressway alignments from further consideration.

Project Benefits

Implementation of one of the build alternatives would have offsetting benefits that would accrue to the community as a whole. Residents, businesses, and visitors would be afforded a safer and more reliable bridge. A critical link in the local and regional circulation system would be restored and would potentially assist in stimulating social and economic redevelopment projects proposed for the community.

Potential Disproportionately High and Adverse Effects

The determination of whether or not the effects of the proposed action are disproportionately high and adverse depends on whether: (1) the effects of the project are predominately borne by a minority or low-income population; or (2) the effects of the project are appreciably more severe or greater in magnitude to minority or low-income populations compared to the effects on non-minority or non-low-income populations (see FHWA, 1999).

Of the two considerations above, the first is most applicable to the determination of whether the proposed action may have a disproportionately high and adverse effect on minority and low-income persons in the study area. The second consideration could not likely be met in this case because the technical studies have shown no demonstrable evidence that the effects of this project are markedly different in severity or magnitude compared to other past or present highway improvement projects in the region.

Although the effects of the project would occur within an area having a population that is both minority and low-income, these effects cannot reasonably be considered disproportionately high and adverse. All but one Census tract in the project study area, (Census tract 5657 along Ocean Boulevard) are composed of substantial proportions of minority and low-income populations. Even though these groups would bear a large part of the burden associated with the project, it is due only to their proximity to short-term construction activities, and is the same as for any community that would be similarly affected by proximity to construction. Although the Schuyler Heim Bridge is an important part of the regional circulation system, local circulation patterns would not be substantially affected by construction of a new bridge. Construction of the flyover and SR-47 Expressway under Alternatives 1, 1A, and 3 may result in temporary construction-period inconveniences due to detours and delays. Also, construction of the flyover, new bridge, and SR-103 Extension under Alternative 2 may result in detours and delays.

Caltrans and ACTA both determine that the potential adverse effects resulting from the project would not be appreciably more severe or greater in magnitude on minority or low-income populations than they would be on the population as a whole. As noted in

Section 3.13, Air Quality (as amended), most of the potential adverse effects could be satisfactorily avoided or minimized through implementation of avoidance, minimization, or mitigation measures. Because there has been no evidence to suggest that the efficacy of these measures would differ with respect to different population groups, the net result would be the same for all population groups for these resource areas. The adverse effects that have been identified as unavoidable even after implementation of mitigation would also not be appreciably more severe or greater in magnitude on minority or low-income populations. For example, the Schuyler Heim Bridge and the characteristics that qualify it for historic status are presumably of similar importance to all population groups.

In comparing the impacts on the affected community to those of the reference community; the temporary and construction-period impacts such as access disruption, detours, noise from construction, presence of construction equipment, and reduced localized air quality would be predominantly borne by the affected community. However, these effects are either temporary or not high and adverse and the project included measures designed to minimize these effects (see Table S-1). Additionally, it is reasonable to assume that the affected community would be most benefited by the project due to reduction in projected congestion conditions in the area. Compared to the future projected congestion without the project, traffic flow would improve with the build alternatives as a result of reduced congestion on local streets and improved level of service at most of the intersections analyzed in the traffic study. (Section 3.5). Another benefit would be the improved safety of the bridge.

The affected community and the reference community would both experience regional air quality impacts related to deteriorated air quality in the basin.

As is detailed more fully below, the lead agencies have instituted public involvement and community outreach efforts to ensure that issues of concern or controversy to minority and low-income populations are identified and addressed where practicable as part of the project planning and development process and the environmental process.

Community Outreach and Public Involvement

To date, community outreach and public involvement have included the scoping meetings, public hearing, notices, presentations, publications, and public review and comment on the draft environmental document described in Chapter 6.0, Summary of Comments and Coordination. In addition, local elected officials were consulted to determine their issues and concerns. Efforts will continue to ensure meaningful opportunities for public participation during the project planning and development process. This may include, but not necessarily be limited to, additional community meetings, informational mailings, a project web site, and news releases to local media. The community outreach and public involvement programs for the project will seek to actively and effectively engage the affected community and will include mechanisms to reduce cultural, language, and economic barriers to participation. For example, with regard to visual design elements, Mitigation Measure VR-3 (Section 3.7, Visual Resources) states additional input from interested parties, including the public, will be solicited and considered. The project should also comply with applicable federal requirements promulgated in accordance with Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency (August 11, 2000), which requires that federal programs and activities be accessible to persons with limited English language proficiency.

The project will be developed in accordance with Title VI of the Civil Rights Act of 1964, which provides that no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under, any program or activity receiving federal financial assistance. In addition, the project will be developed in conformity with related statutes and regulations mandating that no person in the State of California shall, on grounds of race, color, sex, age, national origin, or disabling condition, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity administered by or on behalf of Caltrans.

Given the results of technical studies, and taking into consideration the following: (1) similarity of impacts to minority and low-income populations compared to the general population; (2) generally equivalent efficacy of proposed mitigation measures and project enhancements; and (3) off-setting benefits of the transportation facility, no disproportionately high and adverse effect on any minority and/or low-income populations would result from any of the build alternatives.

3.3.3.4 Environmental Justice Determination

Based on the above discussion and analysis, the project alternatives will not cause disproportionately high and adverse effects on any minority or low-income populations as per E.O. 12898 regarding environmental justice.

3.4 Utilities and Public Services

3.4.1 Regulatory Setting

3.4.1.1 Federal

The applicable federal regulatory agency is the Federal Energy Regulatory Commission (FERC). The FERC was created through the Department of Energy Organization Act on October 1, 1977, and assumed the responsibilities of its predecessor, the Federal Power Commission. FERC's legal authority comes from the Federal Power Act of 1935, the Natural Gas Act (NGA) of 1938, and the Natural Gas Policy Act of 1992. It is an independent regulatory agency within the Department of Energy that:

- Regulates the transmission and sale of natural gas for resale in interstate commerce
- Regulates the transmission of oil by pipeline in interstate commerce
- Regulates the transmission and wholesale of electricity in interstate commerce
- Licenses and inspects private, municipal, and state hydroelectric projects
- Oversees environmental matters related to natural gas, oil, electricity, and hydroelectric projects
- Administers accounting and financial reporting regulations and conduct of jurisdictional companies
- Approves site choices as well as abandonment of interstate pipeline facilities

3.4.1.2 State

3.4.1.2.1 California Public Utility Commission

The California Public Utility Commission (PUC) regulates privately owned electric, telecommunications, natural gas, water, and transportation companies, in addition to household goods movers and rail safety. The PUC Energy Division works in setting electric rates, protecting consumers, and promoting energy efficiency, electric system reliability, and utility financial integrity. The PUC regulates natural gas local distribution facilities and services, natural gas procurement, intrastate pipelines, and intrastate production and gathering. It works to provide opportunities for competition when in the interest of consumers, takes the lead in environmental review of natural gas-related projects, recognizes the growing interaction of electric and gas markets, and monitors gas energy efficiency and other public purpose programs.

3.4.1.2.2 California Energy Commission

The California Energy Commission (CEC) (formerly the Energy Resources Conservation and Development Commission) was established by the California Legislature in 1974 to address the energy challenges facing the state and address the importance of energy conservation. Created by the Warren-Alquist Act, the CEC is the principal energy policy and planning organization for California. The CEC has five major responsibilities, including: 1) forecasting future energy needs and maintaining historical energy data, 2) licensing 50 megawatt or larger thermal power plants, 3) promoting energy efficiency through appliance and building standards, 4) developing energy technologies and supporting

renewable energy, and 5) planning for and directing state response to energy emergencies. The CEC has been directed by the state legislature to direct energy research programs and renewable energy programs in the wake of electricity industry restructuring or deregulation.

3.4.1.2.3 Solid Waste

Assembly Bill (AB) 75, passed in 1999, requires all state agencies and large state facilities to meet 25 percent and 50 percent waste reduction mandates by January 1, 2002, and January 1, 2004, respectively. This reduction means that currently 50 percent of all solid wastes must be diverted from landfill disposal and transformation. The 50 percent mandate can be accomplished through source reduction, recycling, and composting. AB 75 also requires that state agencies and large state facilities adopt an Integrated Waste Management Plan.

3.4.1.3 City

The following discussion identifies regional and local City policies and regulations applicable to the project site.

3.4.1.3.1 City of Los Angeles

Regulatory oversight for public services within the city planning documents that provide guidance for new development are addressed in the following sections.

3.4.1.3.1.1 City of Los Angeles General Plan (2002)

Chapter 9 of the City of Los Angeles General Plan outlines goals and policies related to public service provisions for new development:

Infrastructure and Public Services

Police

Goal 9I

Every neighborhood in the City has the necessary police services, facilities, equipment, and manpower required to provide for the public safety needs of that neighborhood.

Objective 9.14

Protect the public and provide adequate police services, facilities, equipment, and personnel to meet existing and future needs.

Objective 9.15

Provide for adequate public safety in emergency situations.

Policy 9.15.1: Maintain mutual assistance agreements with local law enforcement agencies, state law enforcement agencies, and the National Guard to provide for public safety in the event of emergency situations.

Fire

Goal 9J

Every neighborhood has the necessary level of fire protection service, EMS, and infrastructure.

Objective 9.16

Monitor and forecast demand for existing and projected fire facilities and service.

Policy 9.16.1: Collect appropriate fire and population development statistics for the purpose of evaluating fire service needs based on existing and future conditions.

Objective 9.17
Assure that all areas of the city have the highest level of fire protection and EMS, at the lowest possible cost, to meet existing and future demand.

Objective 9.18
Phase the development of new fire facilities with growth.

Policy 9.18.1: Engage in fire station development advance planning, acknowledging the amount of time needed to fund and construct these facilities.

Objective 9.19
Maintain the Los Angeles Fire Department's ability to assure public safety in emergency situations.

Policy 9.19.1: Maintain mutual aid or mutual assistance agreements with local fire departments to ensure an adequate response in the event of a major earthquake, wildfire, urban fire, fire in areas with substandard fire protection, or other fire emergencies.

Policy 9.19.2: Maintain special firefighting units at the Port of Los Angeles, Los Angeles International Airport, and Van Nuys Municipal Airport capable of responding to special emergencies unique to the operations of those facilities.

Policy 9.19.3: Maintain the continued involvement of the fire department in the preparation of contingency plans for emergencies and disasters.

Libraries

Objective 9.21
Ensure library services for current and future residents and businesses.

Policy 9.21.1: Seek additional resources to maintain and expand library services.

Policy 9.21.2: Encourage the expansion of nontraditional library services, such as book mobiles and other book sharing strategies, where permanent facilities are not adequate.

Policy 9.21.3: Encourage the inclusion of library facilities in mixed-use structures in community and regional centers, at transit stations, and in mixed-use boulevards.

Schools

Goal 9N
Public schools that provide a quality education for all of the city's children, including those with special needs, and adequate school facilities to serve every neighborhood in the city so that students have an opportunity to attend school in their neighborhoods.

Objective 9.31
Work constructively with the Los Angeles Unified School District to monitor and forecast school service demand based upon actual and predicted growth.

Policy 9.31.1: Participate in the development of, and share demographic information about, population estimates.

Objective 9.32
Work constructively with LAUSD to promote the siting and construction of adequate school facilities phased with growth.

Policy 9.32.1: Work with the Los Angeles Unified School District to ensure that school facilities and programs are expanded commensurate with the city's population growth and development.

Policy 9.32.2: Explore creative alternatives for providing new school sites in the city, where appropriate.

Policy 9.32.3: Work with LAUSD to explore incentives and funding mechanisms to provide school facilities in areas where there is a deficiency in classroom seats.

Objective 9.33
Maximize the use of local schools for community use and local open space and parks for school use.

Safety Element of General Plan – City of Los Angeles

The Safety Element goals, objectives, policies, and programs are broadly stated to reflect the comprehensive scope of the Emergency Operations Organization (EOO). The EOO is the only program that implements the element. All city emergency preparedness, response, and recovery programs are integrated into EOO operations and are reviewed and revised continuously.

Goal 2

A city that responds with the maximum feasible speed and efficiency to disaster events so as to minimize injury, loss of life, property damage, and disruption of the social and economic life of the city and its immediate environs.

3.4.1.3.2 City of Long Beach

City of Long Beach General Plan is currently being updated. The City of Long Beach General Plan outlines goals and policies related to public service provisions for new development within the city.

The Safety Element, adopted in 1975, is to be tied in with social, economic, and environmental factors in the general development plan. Many city departments have established goals for the operation of their particular functions. These relevant development and protection goals are listed below:

Development Goals

Goal 3

Provide an urban environment that is as safe from all types of hazards as possible.

Goal 6

Encourage transportation systems, utilities, industries, and similar uses to locate and operate in a manner consistent with public safety goals.

Goal 7

Assure continued safe accessibility to all urban land uses throughout the city.

Goal 9
Encourage development that would augment efforts of other safety-related departments of the city (i.e., design for adequate access for firefighting equipment and police surveillance).

Protection Goals
Goal 3
Reduce public exposure to safety hazards.

Goal 4
Effectively utilize natural or man-made landscape features to increase public protection from potential hazards.

Goal 10
Provide the maximum feasible level of public safety protection services.

3.4.2 Affected Environment
Federal, state, county, and city governments, as well as private agencies, provide utilities and other public services (including emergency services) to the project area. The following discussion details the utilities and public/emergency services currently provided.

Utility services include electric and natural gas/liquid commodity services and distribution, telecommunications, solid waste disposal, water supply and treatment, and wastewater treatment systems.

The project area is intensely developed with heavy industrial, commercial, and transportation uses associated with the nearby Ports of Los Angeles and Long Beach. A residential neighborhood is located just west of the study area, south of Pacific Coast Highway (PCH) and west of Alameda Street. Another residential area is to the east of SR-103. Most residences in this area are single family. There also appear to be some live-aboard boats in the marina facility located at the Dominguez Channel. Figure 3.4-1 and Table 3.4-1, which includes a map key for Figure 3.4-1, depict the public services and facilities within the general vicinity of the proposed action.

3.4.2.1 Utilities
3.4.2.1.1 Electricity
The proposed project alternatives cross through three municipalities: the City of Los Angeles (and Port of Los Angeles), City of Carson, and City of Long Beach (and Port of Long Beach).

The City of Carson and the City and Port of Long Beach (including the vertical-lift Schuyler Heim Bridge) receive electrical power from Southern California Edison (SCE). SCE generates power from sources such as the San Onofre generating plant, the Big Creek hydroelectric plant, and Etiwanda generating station (gas-fired generation).

Table 3.4-1
Community Facilities and Services (2005)

Map Key	Facility Type	Name	Address
1	Police Stations	Long Beach Police – West Division	1835 Santa Fe Avenue Long Beach, CA
2		Long Beach Police Department – South Patrol Division	400 W Broadway
3		Los Angeles Police Department – Harbor Division	2175 John S. Gibson Boulevard
4		Port of Los Angles Police	425 South Palos Verdes
5		US Coast Guard – Sector Los Angeles-Long Beach	1001 South Seaside Avenue, Bldg. 20 San Pedro, CA 90731
6	Fire Stations	LAFD Station No. 38	124 I Street
7		LAFD Station No. 40	330 Ferry Street
8		LAFD Station No. 48	1101 South Grand Avenue
9		LAFD Station No. 49	400 Yacht Street
10		LAFD Station No. 110	2945 Miner Street, Berth 44-A
11		LAFD Station No. 111	954 South Seaside Avenue, Berth 260
12		LAFD Station No. 112	444 South Harbor Boulevard, Berth 86
13		LBFD Headquarters	925 Harbor Plaza Drive, Suite 100
14		LBFD Beach Operations	2101 East Ocean Boulevard
15		LBFD Station No. 1	100 Magnolia Avenue
16		LBFD Station No. 6	1231 Pier Avenue
17		LBFD Station No. 13	2475 Adriatic Avenue
18		LBFD Station No. 15	Pier F Avenue, Berth 202
19		LBFD Station No. 20	1900 Pier D Street
20		LBFD Station No. 21	225 Marina Drive
21		LBFD Station No. 24	611 Pier T Avenue
22	Schools	Hudson Elementary School	2335 Webster Avenue Long Beach, CA
23		Cabrillo High School	2001 Santa Fe Avenue Long Beach, CA
24		John Muir Elementary School	3038 Delta Avenue Long Beach, CA
25		St. Lucy Elementary School	2320 Cota Avenue Long Beach, CA
26		Webster Elementary School	1755 W. 32nd Way Long Beach, CA

Table 3.4-1
Community Facilities and Services (2005)

Map Key	Facility Type	Name	Address
27	Schools (continued)	Will J Reid Continuation High School	2152 W Hill Street Long Beach, CA
28		Bethune School	2041 San Gabriel Avenue Long Beach, CA
29		William Logan Stephens Jr. High	1830 W Columbia Street Long Beach, CA
30		Banning Senior High School	1527 Lakme Avenue Wilmington, CA
31		First Baptist Christian School	1360 Broad Avenue Wilmington, CA
32		Wilmington Park Elementary	1140 Mahar Avenue Wilmington, CA
33		Holy Family Grammar School	1122 E Robidoux Street Wilmington, CA
34	Places of Worship	Pramuan Simsriwatna Buddhist Temple	2015 W. Hill Street Long Beach, CA
35		St. Lucy Church	2344 Cota Avenue Long Beach, CA
36		Westside Baptist Church	2280 Caspian Avenue Long Beach, CA
37		St Paul's Baptist Church	1392 W 25th Street Long Beach, CA
38		Kingdom Hall-Jehovah's Witness	1295 W Willow Street Long Beach, CA
39		Willow St Church Of God	1455 W Willow Street Long Beach, CA
40		Word Of God Ministries	1401 W Spring Street Long Beach, CA
41		Inter Faith Cogic	1585 W 33rd Street Long Beach, CA
42		Holy Family Catholic Church	1011 E L Street Long Beach, CA
43		Faith Tabernacle Church	1643 Broad Avenue Wilmington, CA
44		Church Of Christ	24930 Lakme Avenue Wilmington, CA
45	Community Services	Senior Citizen Center	Silverado Park 1545 W. 31st Street Long Beach, CA
46	Libraries	Long Beach City Library – Harte Library	1595 W. Willow Street Long Beach, CA

SCE's power is distributed through a system of high-voltage (230-volt) transmission lines and receiving stations. Power is transformed specifically for customer use. For situations where substantial amounts of power are needed, 230-volt power is transformed to 34,500 volts (34.5 kilovolts [kV]) and directly linked to an industrial station. For commercial and residential use, the power is transformed to 4.8 kV and sent to a supply distribution station for distribution to users (including commercial or office complexes).

The City and Port of Los Angeles receive electrical power from a network of power stations and other sources operated by Los Angeles Department of Water and Power (LADWP). The LADWP generates power from sources such as the Haynes generating station, the Harbor steam plant, the Valley and Scattergood plants (oil and gas field sources), and the Los Angeles Aqueduct system.

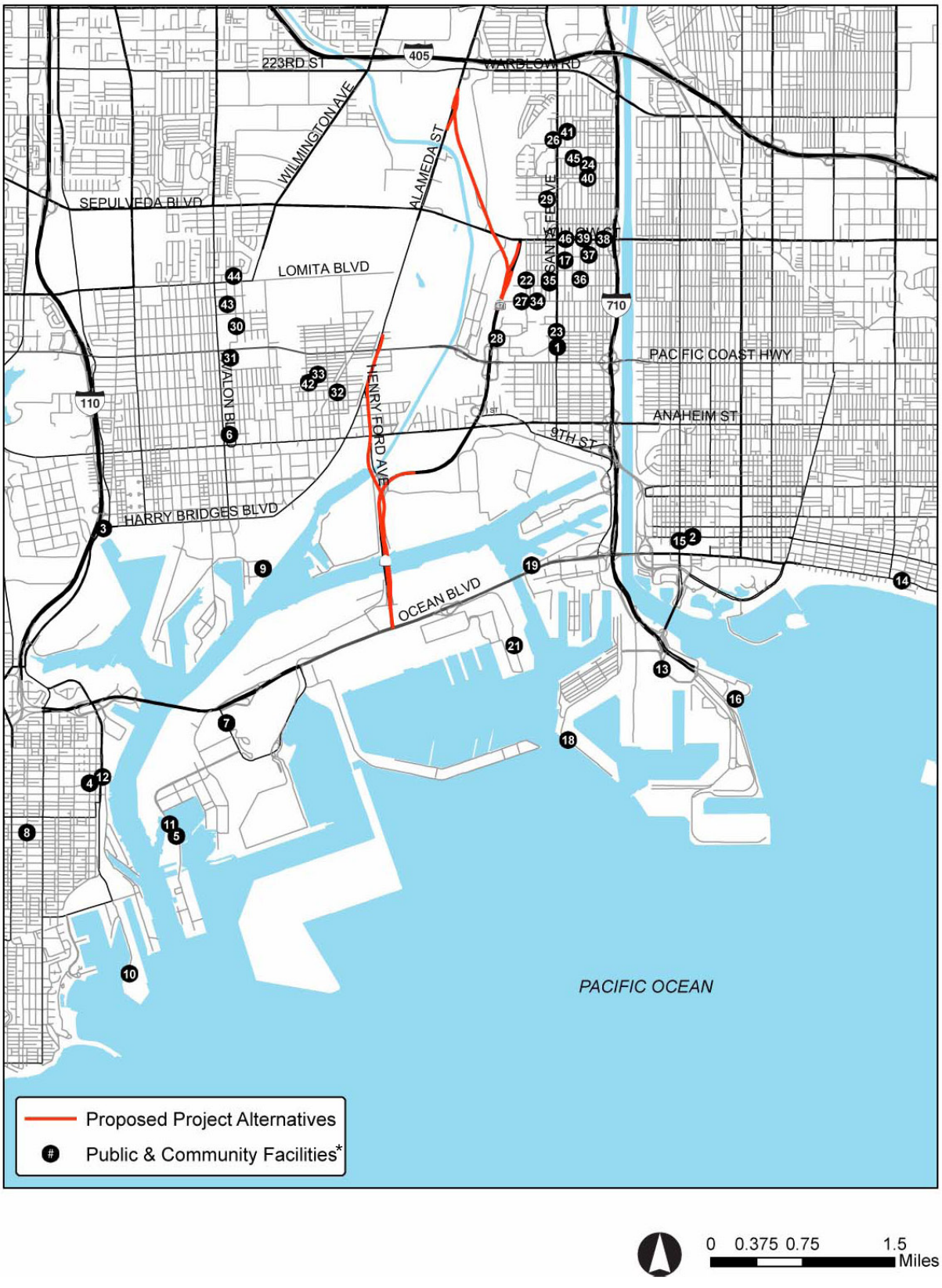
The LADWP distributes power in a manner similar to that described above for SCE. In the immediate project area, the LADWP distribution system carries power across the Cerritos Channel to the Port of Los Angeles and portions of Terminal Island located within the City of Los Angeles. As previously mentioned, the Schuyler Heim Bridge is powered by SCE. The LADWP aboveground distribution lines are located along the western portion of the Schuyler Heim Bridge.

3.4.2.1.2 Natural Gas and Liquid Commodities

The Southern California Gas Company (SCG) provides natural gas services to residents and businesses within the project area. The SCG service area encompasses 23,000 square miles of diverse terrain throughout most of Central and Southern California, and delivers nearly 1 trillion cubic feet of gas annually, or about 5 percent of all the natural gas delivered in the U.S. The total storage capacity is 122.1 billion cubic feet of gas—an amount sufficient to meet the needs of all SCG residential and business customers for about 20 weeks during the non-winter months, or 13 weeks during the winter, before being depleted (Southern California Gas Company, 2005).

Interstate pipeline delivery capacity into Southern California is over 4,000 million cubic feet per day (MMcf/day), with approximately 3,230 MMcf/day available directly to Gas Company customers. The interstate pipeline systems, along with local California gas supplies, deliver gas to most Southern California customers through SCG. SCG is forecasting an increase in total pipeline delivery capacity, from 3,875 MMc/day in 2004 to 4,675 MMcf/day in 2008.

Natural gas and liquid commodity pipelines are an integral part of the industrial transportation system and operational activities within the Ports of Long Beach and Los Angeles. Aboveground and underwater pipelines are located throughout the Ports to serve marine terminals for loading and unloading petroleum products and liquid commodities. Oil pipelines distribute supplies from oil fields that are owned by the City of Long Beach and the State of California and operated by the Tidelands Oil Company (TOPCO). Several natural gas and liquid commodity pipelines are located along the Schuyler Heim Bridge. These pipelines are owned and operated by various entities and are located underneath the Schuyler Heim Bridge (suspended from the bridge, underground, and within Cerritos Channel). Pipelines are also located within streets in the project area.



* See Table 3.4-1

Figure 3.4-1
Community Facilities and Services
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Jones & Stokes, 2005.

3.4.2.1.3 Telecommunications

GTE/Verizon and Southwestern Bell Communications (now AT&T) provide telephone service for the Los Angeles metropolitan area, including the Ports of Long Beach and Los Angeles. GTE/Verizon and AT&T engineer and maintain communication lines and service the telecommunication system in the project area. Existing major conduits run from the mainland to Terminal Island along the underside of Schuyler Heim Bridge.

3.4.2.1.4 Water

Water is supplied to the project vicinity by the Los Angeles Department of Water and Power (LADWP) and the Long Beach Water Department (LBWD).

Los Angeles

The LADWP provides water services to the City of Los Angeles. As the largest municipal utility in the nation, LADWP supplies an average of 215 billion gallons of water per year to approximately 3.9 million residents and businesses in Los Angeles. Because of the city's substantial size and growth, Los Angeles must rely upon a complex water system network for its water supply, drawing water from the Eastern Sierra Nevada watershed, the Sacramento and San Joaquin Rivers (via the California Aqueduct), and the Colorado River (via the Colorado River Aqueduct). The city also uses recycled water for industrial and irrigation purposes (about 1 percent of the total supply). To supplement these sources, the city uses recycled water for industrial and irrigation purposes. In 2004 (a year of below-normal snowfall), LADWP obtained 30 percent of its water supply from Los Angeles Aqueduct (Eastern Sierra), purchased 59 percent from the Metropolitan Water District of Southern California (MWD), and drew 11 percent from groundwater.

Long Beach

The Long Beach Water Department (LBWD) supplies water to the City of Long Beach and presently serves 492,000 people. Currently, water demand is met through rigorous conservation, aggressive water reuse, importing water, and by pumping and treating groundwater. The LBWD water supply is comprised of surface water purchased from MWD (42 percent), groundwater from 26 local groundwater wells (38 percent), conserved water (14 percent), and recycled water (6 percent).

3.4.2.1.5 Wastewater

Wastewater disposal services for the project area are provided by the City of Los Angeles and the City of Long Beach.

Los Angeles

The City of Los Angeles wastewater system serves over 4 million people within the city and 27 contract cities. The system consists of over 6,500 miles of sewer pipes, 54 pumping plants, and 4 wastewater treatment plants. The wastewater treatment plants collectively process 550 million gallons of wastewater per day.

Wastewater generated in the project area (within City of Los Angeles boundaries) is treated at the Terminal Island Treatment Plant/Advanced Water Treatment Facilities located on Terminal Island, approximately 2 miles southwest of the Schuyler Heim Bridge. The plant treats wastewater from over 130,000 people and 100 businesses in the heavily industrialized Los Angeles Harbor area, the communities of Wilmington and San Pedro, and a portion of Harbor City. The plant's capacity is 30 million gallons per day (mgd). It discharges an

average of 16 mgd through a 60-inch-diameter outfall in the harbor. During peak wet weather, the Terminal Island Treatment Plant can handle 45 mgd.

The Terminal Island Treatment plant recently became the third Los Angeles wastewater treatment plant to produce reclaimed water and one of the few plants in the country to produce water using reverse osmosis. The plant is capable of processing 4.5 mgd through reverse osmosis, resulting in water that meets all drinking water quality standards. Currently, treated water is used as valuable boiler feed water for local industries, saving millions of gallons of potable water each day. The plant also produces biosolids and biogas for beneficial reuse.

Long Beach

The LBWD is responsible for the various functions of the city's sanitary sewer system, including operations and maintenance. The system consists of 765 miles of sewer pipelines throughout the city. In 2005, the department televised 81,898 feet of sewer mains and laterals, enabling efficient location of maintenance/repair needs without expensive street excavation.

Approximately 40 million gallons of wastewater is delivered daily to Los Angeles County Sanitation District facilities located on the north and south sides of the City of Long Beach. Wastewater generated in the project vicinity could be delivered to either the Joint Water Pollution Control Plant (JWPCP) (located in Carson) or the Long Beach Water Reclamation Plant (located in Long Beach, west of the 605 Freeway). The JWPCP provides primary and partial secondary treatment for 350 million gallons of wastewater per day, and serves a population of 3.5 million people. The Long Beach Reclamation Plant provides primary, secondary, and tertiary treatment for 25 million gallons of wastewater per day, serving a population of 250,000 people. Treated sewage is used in one of three ways: irrigation for parks, golf courses, cemeteries, and athletic fields; groundwater basin recharge; or pumped into the Pacific Ocean.

3.4.2.1.6 Solid Waste

Solid waste is generated as a result of residential, commercial and industrial activities. There are nine major solid-waste landfill sites that serve the project region (which includes the Ports of Los Angeles and Long Beach, the Cities of Long Beach and Los Angeles, and the County of Los Angeles). Combined, these facilities have a total estimated remaining fill capacity of 147 million cubic yards of solid waste. Table 3.4-2 presents information for these solid waste disposal sites in the project region (California Integrated Waste Management Board [CIWMB], 2006).

The Integrated Waste Management Act of 1989 (AB 939) mandated that California cities and counties divert 50 percent of all solid waste entering landfills by the year 2000. This legislation, in addition to rapid economic development and expanding population growth in Southern California, has led to the development of facilities for the production of energy from solid waste. The Sanitation Districts of Los Angeles County currently operate two refuse-to-energy plants with a combined permitted capacity of 3,240 tons per day. These facilities are presented in Table 3.4-3.

Los Angeles County is also served by inert waste disposal sites and demolition waste recycling facilities. There are several construction and demolition debris recyclers in Los Angeles County that accept the type of waste that would be produced from demolition of the existing Schuyler Heim Bridge (concrete, asphalt, and metal). Table 3.4-4 lists four facilities that accept all three of these types of materials.

Table 3.4-2
Combined Disposal Capacity of Existing Permitted Solid Waste Facilities in Los Angeles County

Class III Landfill	Solid Waste Facility Permit Number	Facility Address	Remaining Capacity (cubic yards)
Antelope Valley	19-AA-0009	1200 West City Ranch Road Palmdale, CA 93551	2,978,143
Bradley West	19-AR-0008	9227 Tujunga Avenue Sun Valley, CA 91352	4,881,010
Calabasas	19-AA-0056	5300 Lost Hills Road Agoura, CA 91301	16,900,400
Chiquita Canyon	19-AA-0052	29201 Henry Mayo Drive Valencia, CA 91384	26,024,360
Lancaster	19-AA-0050	600 E. Avenue F Lancaster, CA 93535	22,645,000
Puente Hills	19-AA-0053	2800 South Workman Mill Road Whittier, CA 91745	62,291,000
Scholl Canyon	19-AA-0012	3001 Scholl Canyon Road Glendale, CA 91206	11,723,400
Savage Canyon	19-AH-0001	13919 East Penn Street Whittier, CA 90602	7,787,177
Sunshine Canyon	19-AA-0853	14747 San Fernando Road Los Angeles, CA 91344	16,000,000
TOTAL			147,280,895

Source: CIWMB, 2006

Table 3.4-3
Combined Disposal Capacity Refuse-to-Energy Facilities in Los Angeles County

Transformation Facility	Solid Waste Facility Permit Number	Facility Address	Permitted Capacity (tons per day)
Commerce Refuse-to-Energy Facility	19-AA-0506	5926 Sheila Street Commerce, CA 90040	1,000
Southeast Resource Recovery Facility	19-AK-0083	4000 Seaside Boulevard Long Beach, CA 90822	2,240

Source: CIWMB, 2006

Table 3.4-4
Los Angeles County Construction and Demolition Debris Recyclers
(Concrete, Asphalt, and Metal Materials)

C&D Debris Recyclers	Facility Address
Calabasas Sanitary Landfill	5300 Lost Hills Road Agoura, CA 91301
Master Recycling Center, Inc.	2845 Durfee Avenue El Monte, CA 91732
Nu-way Live Oak Landfill – Waste Management	13620 Live Oak Lane Irwindale, CA 91706
Scholl Canyon Landfill – Los Angeles Co. Sanitation District	3001 Scholl Canyon Road Glendale, CA 91206

Source: CIWMB, 2006

3.4.2.2 Public Services

3.4.2.2.1 Police Protection

Police protection in the project area is a cooperative effort among a number of law enforcement entities. The United States Coast Guard (USCG) has primary regulatory authority over the port waterways and any other type of water-based law enforcement or emergency response. However, most law enforcement response in the project area is handled jointly between USCG and state or local law enforcement entities. USCG use of the Cerritos Channel for water-based law enforcement response is limited because of the restricted speed zone (to reduce wake) and the possibility of damage to local marinas and small marine vessels caused by USCG vessels. Instead, USCG typically responds to law enforcement calls by navigating south of the ports using the outside channel (USCG, 2006).

Police services to the Port of Los Angeles are provided by both the Los Angeles Harbor Department Port Police (Port Police) and the Los Angeles Police Department (LAPD). The Port Police is the primary response agency in the Port by jurisdictional responsibility and is responsible for operations within Port boundaries. While the Port Police are the first response to an emergency, the port is within the City of Los Angeles, so the primary responsibility for police services falls to the Los Angeles Police Department (LAPD). The LAPD station located at 2175 John S. Gibson Boulevard in San Pedro has a staff of 257 officers and 28 civilians. Patrols are divided into two watches (day/PM and PM/ morning), and both radio-dispatched cars and traffic-control motorcycles are used to patrol the vicinity. Average emergency response time for the entire Harbor Division is approximately 10.6 minutes (LAPD, 2004). While LAPD has the capacity to provide land-based law enforcement to support Port Police if needed, it does not conduct boat patrols of the harbor, and more than 95 percent of its land patrols are not associated with the Port of Los Angeles.

The Port Police maintains a staff of more than 50 sworn officers. They provide 24-hour surveillance of port-controlled property, patrolling the waterfront with a fleet of approximately 40 various vehicles, 5 police boats, and a single skiff used to transport police divers. It is responsible for the safety and security of all passenger, cargo, and vessel operations at the port and enforces municipal, state, and federal laws, as well as Port tariff

regulations. Port Police is headquartered in San Pedro at 425 South Palos Verdes. Access to Terminal Island is gained primarily across the Vincent Thomas Bridge and the Schuyler Heim Bridge. Port Police uses the Schuyler Heim Bridge as the primary route to respond to land-based emergency calls in Wilmington and East Wilmington. Port Police uses the Cerritos Channel for water-based law enforcement responses that are west of the Schuyler Heim Bridge, where its jurisdiction ends. Response time for patrol vehicles is less than 5 minutes for all patrol areas (LAHD Port Police, 2004).

The Long Beach Police Department (LBPD) and Port of Long Beach Harbor Patrol provide law enforcement for the Port of Long Beach. The Long Beach Harbor Patrol provides land-based security for the port area, contracting to the Long Beach Police Department for law enforcement and other police services. The LBPD is primarily an antiterrorism unit, providing land- and water-based law enforcement for the Port of Long Beach.

The LBPD South Division is headquartered just north of the Port of Long Beach at 400 West Broadway. The Long Beach Harbor Patrol is headquartered at the Port of Long Beach Administration Building, 1835 Santa Fe Avenue. The LBPD uses primarily the Gerald Desmond Bridge for land-based law enforcement responses. Use of Cerritos Channel for water-based law enforcement is rare because LBPD jurisdiction extends only slightly west of the Schuyler Heim Bridge. Assistance to USCG and local and state law enforcement entities described above is provided as required by LAPD, California Department of Fish and Game (CDFG) wardens, U.S. Customs Inspectors, and the Federal Bureau of Investigation.

3.4.2.2.2 Fire Protection

Fire and emergency response services are provided to the project area by two fire departments. The Los Angeles City Fire Department (LAFD) provides services for the Port of Los Angeles, and the Long Beach Fire Department (LBFD) serves the Port of Long Beach.

The Long Beach and Los Angeles fire departments have stations specifically equipped to respond to either land- or water-based emergencies. Mutual aid agreements can be established between the city fire departments to assist each other if a need arises.

3.4.2.2.2.1 Los Angeles City Fire Department

The LAFD provides fire protection and emergency services for the project area that lies within the city boundaries of Los Angeles. The LAFD has a required minimum response time of 5 minutes. The LAFD facilities include land-based fire stations and fireboat companies located in the vicinity of the proposed action. Four LAFD fire stations and five fireboats that respond to water-based emergencies currently serve the Port of Los Angeles. The locations of these fire stations are listed in Table 3.4-1 and shown in Figure 3.4-1. The LAFD typically does not navigate through the Cerritos Channel east of the Schuyler Heim Bridge to respond to water-based emergencies because its line of jurisdiction ends to the west of the bridge. Under existing mutual aid agreements, LAFD and LBFD will provide backup emergency service for the other in the event of an emergency/disaster where no additional city apparatus are available to respond.

Fire Station No. 49, Berth 194, East Harbor Basin (400 Yacht Street) is a swing fire company with capabilities to respond to both land- and water-based emergencies by structuring a response crew with hook-and-ladder fire engine or fireboat, depending upon the type of emergency. Fireboat No. 3 (11.8 m [39 ft] and Fireboat No. 4 (22.5 m [74 ft]) are housed at Fire Station No. 49.

Fire Station No. 110, Berth 44-A, Cabrillo Marina Area (2945 Miner Street), and Fire Station No. 111, Berth 260, Fish Harbor (954 South Seaside Avenue), each house one small fireboat (Fireboats No. 5 and No. 1, respectively). These small fireboats are 11.8 m (39 ft) in length, with a pumping capacity of 2,000 gallons per minute (gpm). Each fireboat has a crew of three (one boat operator and two firefighters/scuba divers). Fire Station No. 112, Berth 86, Ports O'Call (444 South Harbor Boulevard), is a combination water- and land-based fire station. The station has one hook-and-ladder fire engine with a four-member crew and two paramedics. Fire Station No. 112 also houses Fireboat No. 2, a tractor tug, 32 m (105 ft) in length, 9 m (30 ft) wide, and approximately 13.7 m (45 ft) tall (from the waterline to the top of the vessel). The nearest fire protection facility has a staff of 15, including an Emergency Medical Services supervisor, a single engine company, a paramedic rescue ambulance, and one fireboat (LAFD Station 112, 2004).

In addition, several land-based fire stations are located within the Port of Los Angeles and the immediate vicinity, jointly responding to port-related emergencies with one or more of the four water-based fire stations, when required. These fire stations use the Schuyler Heim Bridge as their primary land-based response route between the City of Wilmington and western Terminal Island (LAFD, 2002).

Fire Station No. 40, Terminal Island (300 Ferry Street), is a land-based fire unit with one hook-and-ladder fire engine and a four-member crew.

Fire Station No. 38, Task Force and Rescue Unit 38 (124 East I Street), is a land-based fire unit with two hook-and-ladder fire engines operated by a crew of nine. Rescue Unit 38 is a two-person paramedic crew. Station 38 is a task force station with a staff of 9 and maintains a truck and engine company and paramedic ambulance (LAFD Station 38, 2004).

Fire Station No. 111 is on Terminal Island and home to LAFD Fireboat No. 1. The station is located at 1444 South Seaside Avenue, Berth 256, in San Pedro Harbor.

Fire Station No. 112 is located at 444 South Harbor Boulevard, Berth 86, in San Pedro Harbor. The station houses Fireboat No. 2, but also Engine No. 112, Rescue Ambulance No. 112, Emergency Medical Service (EMS) No. 6, and a medical supply trailer.

Fire Station No. 48 is located at 1601 South Grand Avenue, in San Pedro. The station is a task force station with a staff of 16. It maintains a truck and engine company and a hazardous materials unit (LAFD Station 48, 2004).

3.4.2.2.2.2 Long Beach Fire Department

District 1 of the LBFD provides fire and emergency services to the Port of Long Beach. District 1 is located in the southwest area of the City of Long Beach (which includes the Port of Long Beach and downtown area) and includes of Fire Stations No. 1, 2, 3, 6, 10, 15, 20, and 24. Collectively, the District 1 stations have daily staff of 52 personnel, and the following equipment: eight fire engines, one truck, four paramedic ambulances, two fireboats, and one technical rescue vehicle.

Water-based LBFD Fire Stations No. 15 and 20 are in the Port of Long Beach at Pier F and Pier D, respectively. These stations serve primarily the Port of Long Beach and would be the first to respond to water-based emergency calls within LBFD jurisdiction in the vicinity of the Schuyler Heim Bridge. The locations of these stations are shown in Table 3.4-1 and Figure 3.4-1. An additional water-based LBFD station is located at the Long Beach Marina (Station No. 21). Because of its distance from the Port of Long Beach, Station No. 21 would provide secondary or backup support to emergency calls in the vicinity of the Schuyler Heim Bridge. Each of the water-based fire stations is equipped with one fireboat; and Stations No. 15 and 20 each have a fire engine pumper (LBFD, 2000). Emergency response to port locations along the western extent of the LBFD jurisdiction requires navigation of the Cerritos Channel and travel to the western side of the Schuyler Heim Bridge (LBFD, 2002a).

Additional land-based LBFD fire stations are located in the vicinity of the Port of Long Beach and include Fire Station No. 1 at 100 Magnolia Avenue, Fire Station No. 6 at 1231 Pier F Avenue, and Fire Station No. 24 at 611 Pier T Avenue. These locations respond to land-based emergencies with the following equipment:

- Fire Station No. 1: two pumpers, one truck, and one paramedic rescue vehicle
- Fire Station No. 6: one pumper
- Fire Station No. 24: one pumper and one technical rescue vehicle.

These fire stations use the Gerald Desmond Bridge as the primary land-based emergency response route between the City of Long Beach and eastern Terminal Island. However, the Schuyler Heim Bridge could be used as a secondary access route when heavy traffic or other impediments preclude the use of the Gerald Desmond Bridge (LBFD, 2002b).

3.4.2.2.2.3 Los Angeles County Fire Department

The Los Angeles County Fire Department (LACOFD) serves unincorporated areas of the County of Los Angeles. LACOFD Station No. 127 is located at 2049 East 223rd Street in the City of Carson.

3.4.2.2.3 Schools

There are 12 educational facilities within the general vicinity of the proposed action. Of these, two are within the Los Angeles Unified School District (LAUSD), seven are within the Long Beach Unified School District (LBUSD), and three are private schools (Holy Family Grammar School, First Baptist Christian School, and St. Lucy Elementary School).

3.4.2.2.3.1 Los Angeles Unified School District – Local District 8

The LAUSD serves the City of Los Angeles, portions of 16 other cities in the county, and numerous unincorporated areas of the county that surround the City of Los Angeles. The LAUSD covers an area of 703.8 square miles, with an estimated population of 4.6 million. The two LAUSD schools within the project area are Banning Senior High School and Wilmington Park Elementary School.

3.4.2.2.3.2 Long Beach Unified School District

The LBUSD spans five cities: Long Beach, Lakewood, Signal Hill, Carson, and Avalon, as well as Two Harbors on Santa Catalina Island. The LBUSD educates more than 95,000 students in 95 public schools within the five cities. The seven LBUSD schools within the project area are Hudson Elementary School, Cabrillo High School, John Muir

Elementary School, Webster Elementary School, Will J Reid High School, Bethune School, and William Logan Stephens Jr. High School.

3.4.2.2.4 Libraries

The City of Long Beach Public Library (LBPL), a network of community libraries, provides local public library service to the project area through the Bret Harte Neighborhood Library, located at 1595 West Willow Street. The Bret Harte Neighborhood Library provides an array of special services, including a Family Learning Center, child and teen reading programs, computer facilities, and the Bookworm Buddy Program (LBPL website). There are no City of Los Angeles or Los Angeles County libraries in the study area.

3.4.2.2.5 Other Public Services and Facilities

Parks and Recreational Facilities are discussed in Section 3.1, Land Use, Recreation, and Coastal Zone.

3.4.3 Environmental Consequences

3.4.3.1 Evaluation Criteria

3.4.3.1.1 Utilities

3.4.3.1.1.1 Electricity

For the purposes of this Final EIS/EIR, the proposed alternatives were evaluated to determine if they would:

- Require or result in the need for new or expanded offsite distribution systems or power generating facilities, the construction of which would cause a substantial adverse physical change in the environment
- Conflict with adopted energy conservation plans
- Result in wasteful, inefficient, and unnecessary consumption of energy

Natural Gas and Liquid Commodities

For the purposes of this Final EIS/EIR, the proposed action would have an adverse environmental effect related to natural gas and liquid commodities if it would:

- Require or result in the need for new or expanded natural gas infrastructure, the construction of which would cause a substantial adverse physical change in the environment
- Conflict with adopted energy conservation plans
- Result in wasteful, inefficient, and unnecessary consumption of energy

Telecommunications

For the purposes of this Final EIS/EIR, the proposed project would have an adverse environmental effect related to telecommunications if it would:

- Require or result in the need for new or expanded telecommunications infrastructure, the construction of which would cause a substantial adverse physical change in the environment

Water Supply

For the purposes of this Final EIS/EIR, the project would have an adverse environmental effect if it:

- Substantially depletes water supplies
- Requires new offsite water supply or distribution facilities or expansion of existing facilities, the construction of which would cause a substantial adverse physical change in the environment
- Requires new or expanded water entitlements

Wastewater

For the purposes of this Final EIS/EIR, the project would have an adverse environmental effect if resulting wastewater flows:

- Exceed the capacity of the existing sanitary sewer system or treatment plant that serves the project site, thereby requiring new or expanded facilities, the construction of which would cause a substantial physical adverse change in the environment
- Exceed the capacity of existing sewer system or treatment plant, resulting in sewage spills or overflows that would have a substantial physical adverse effect on public health or the physical environment

Solid Waste

For the purposes of this Final EIS/EIR, the proposed project would result in adverse environmental effects if it would generate solid waste that would:

- Exceed the capacity of the landfill(s) serving the project site
- Require or result in new or expanded solid waste disposal facilities, the construction of which would cause a substantial adverse physical change in the environment

3.4.3.1.2 Public Services

Police Protection

For the purposes of this Final EIS/EIR, the proposed project would result in adverse environmental effects to police protection if it would:

- Create a substantial need for additional police services, requiring new or altered police facilities to maintain acceptable service ratios or response times, the construction of which would cause a substantial adverse physical change in the environment
- Substantially diminish the level of police protection services, thereby posing a hazard to public safety and security

Fire Protection

For the purposes of this Final EIS/EIR, the proposed project would result in adverse environmental effects to fire protection if it would:

- Create a substantial need for additional fire protection services, requiring new or altered fire department facilities to maintain acceptable service ratios or response times, the construction of which would cause a substantial adverse physical change in the environment
- Substantially diminish the level of fire protection services or results in inadequate emergency access, thereby posing a hazard to persons or property

Schools

For the purposes of this Final EIS/EIR, the proposed project would result in adverse environmental effects to schools if it would:

- Result in the students generated by the project exceeding existing enrollment capacities, thereby creating a substantial need for new or altered facilities, the construction of which would cause a substantial adverse physical change in the environment
- The physical effects of the project substantially affect the health, safety, or education of students at local schools

Libraries

For the purposes of this Final EIS/EIR, the proposed project would result in adverse environmental effects to libraries if it would:

- Create a substantial need or demand for library services, requiring new or physically altered library facilities in order to maintain acceptable service ratios, the construction of which would cause adverse environmental effects

Other Public Services and Facilities

For the purposes of this Final EIS/EIR, the proposed project would result in adverse environmental effects to other public services and facilities if it would:

- Create a substantial need for additional facilities, requiring new of physically altered facilities in order to maintain acceptable service ratios, the construction of which would cause adverse environmental effects

3.4.3.2 Methodology

The potential effects of the project alternatives are evaluated on a quantitative and qualitative basis through coordination with respective service agencies. Adverse effects would occur if the project would adversely affect the ability of service agencies to provide adequate service to the project area or other existing service areas. Due to the long-term nature of the project, certain assumptions and predictions regarding future supply of materials and the reliability of service providers were made. Potential effects have been evaluated utilizing the most current data and best professional judgment regarding future resource availability and service potential. Effects have been assessed through the criteria established for this project as defined above.

3.4.3.3 Evaluation of Alternatives

3.4.3.3.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

Alternative 1 would affect existing utilities in the project area, requiring relocation and avoidance, with the potential for some service disruption. As part of standard construction

practices and requirements, Underground Service Alert (USA) would be notified of the project prior to construction or demolition. USA would inform utility owners of the construction so that they can mark the location of utility lines prior to groundbreaking. Coordination with USA would serve to further identify the presence of unknown or unmarked utilities so that relocations or bypasses can occur, or the utilities can be avoided, in order to minimize service disruptions.

During final design, after selection of the preferred alternative, a determination will be made regarding which of the identified utilities will be relocated. Plans for the relocations will be developed in consideration of the project schedule and consultation with the utility providers which include, but are not limited to, LADWP, LBWD, SCE, SCG, GTE/Verizon, AT&T, City of Los Angeles. In addition, pipeline relocations will be planned and implemented in consultation with TOPCO, Exxon Mobil, Gulf Oil, and SCG. In further consultation with utility providers, some obsolete utilities may be removed at the request of the provider.

3.4.3.3.1.1 Construction Effects

Utilities

Electricity

Construction of Alternative 1 would require minimal amounts of electricity. No new offsite power or electrical infrastructure improvements would be required to accommodate the amount of energy needed for the project.

Existing electrical lines located along the bridge would be relocated to the new replacement bridge once the eastern half of the new bridge has been constructed.

At the LADWP Substation No. DS 119 near Pier A Plaza, existing 4.8-kilovolt (kV) overhead lines east of the substation lie in the path of elevated SR-47 structures. High power lines that would conflict with the proposed expressway and the flyover would require relocation on a taller steel pole. It is estimated that four high-voltage pole structures would be affected by Alternative 1.

A segment of an overhead feeder running from the West Basin Lead Track to a power pole immediately south of the Dominguez Channel would require relocation to the west of SR-47. It is estimated that six steel poles would be required. This segment consists of two 34.5-kV feeders and two 4.8-kV feeders and is considered by LADWP to be of major importance.

Overhead lines that parallel Henry Ford Avenue (34.5-kV and 4.8-kV lines) would require relocation from the West Basin Lead Track to Grant Street. Within this line segment, five 34.5-kV feeder crossings occur at Grant, Opp, First, and Anaheim Streets. These lines will require relocation from Denni Street to Robidoux Street. One 34.5-kV line, three 4.8-kV lines, and a secondary service line that crosses Henry Ford Avenue and Alameda Street will require relocation. It is expected that these line relocations will require underground ducts.

North of Robidoux Street, a single 4.8-kV overhead feeder runs parallel with SR-47 to Pacific Coast Highway. Within this feeder run, one 34.5-kV line, four 4.8-kV lines and one secondary service line cross Alameda Street. All these feeder lines will require relocation via underground ducts.

Prior to relocation activities, proper notice of service disruptions would be given to affected customers. As mentioned above, utility relocations would be coordinated with USA, thus helping minimize temporary service disruptions and potential adverse effects to utilities. Utility lines that would be maintained in place during construction would be protected in accordance with the requirements of ACTA and SCE. New or relocated utility lines, poles, and towers would be placed in an existing disturbed industrial area, and are thus not expected to have an adverse effect on the existing environment. Alternative 1 would not conflict with adopted energy conservation plans, nor would it result in wasteful or inefficient use of electricity.

Natural Gas and Liquid Commodities

Presently, there are numerous natural gas and oil pipelines crossing the project area in various directions. Construction of Alternative 1 would require the relocation of several segments of these pipelines. Relocation would be accomplished safely prior to construction.

A segment of existing TOPCO oil pipelines located south and east of the LADWP Substation (east of Henry Ford Avenue), occurring beneath the proposed northbound SR-47 Expressway ramps, would require relocation. Further north, an existing TOPCO oil pipeline corridor runs east to west. Relocation of a segment of each of these pipelines would be required, to avoid interference with the project. Just west of this point, additional TOPCO lines run beneath the proposed SR-47 Expressway, joining the corridor. A segment of these lines beneath the expressway would require relocation. Several utility lines, including oil and gas, are located along Henry Ford Avenue and Alameda Street, running north to south. The proposed SR-47 Expressway generally follows Henry Ford Avenue to Alameda Street. Along the route, several additional segments of oil pipeline would require relocation. Between "I" Street and East Grant Street, a long section of Mobil Oil pipeline would be relocated just east of the existing line, beneath the proposed elevated expressway. Further north, between Robidoux Street and Pacific Coast Highway, an additional long segment of utility lines, including oil and gas pipeline, would be relocated, shifted east.

Natural gas lines owned by SCG occur in various locations along the proposed SR-47 Expressway. A 3-meter (m) (10-foot [ft]) SCG line, starting from a point north of Badger (rail) Bridge, runs north-south just outside a utility corridor west of Henry Ford Avenue. A segment of this line would be permanently relocated to accommodate the proposed expressway. Further north, to the east of the proposed alignment, a 3-m (10-ft) SCG pipeline is located along Henry Ford Avenue. Segments of this line (north of the West Basin Lead Track) would require relocation to accommodate the proposed alignment. To the north, as the proposed expressway comes down to grade at Alameda Street, several segments of an existing SCG line located within Alameda Street would require relocation. This would include a long segment that would extend from Robidoux Street to Pacific Coast Highway.

Relocation of gas and oil pipelines could result in temporary disruption of service to customers within the vicinity. Prior to relocation activities, gas customers would be given notice of potential service disruptions. Coordination with oil pipeline owners would be required to facilitate relocation. As mentioned above, utility relocations would be coordinated with USA, thus helping minimize temporary service disruptions and potential adverse effects to utilities. Utility lines that would be maintained in place during

construction would be protected in accordance with the requirements of the Alameda Corridor Transportation Authority (ACTA) and the respective owners.

The relocations of pipeline segments are not expected to result in adverse environmental effects, as the segments would be placed near existing lines, and within existing utility corridors or industrialized areas. Trenching would not disturb previously undisturbed, or residential, areas. Alternative 1 would not conflict with adopted energy conservation plans, nor would it result in wasteful or inefficient use of oil or natural gas.

Telecommunications

A 1,500-pair telephone line runs underground from Anchorage Street northward, to a point 30 m (98 ft) south of Dominguez Channel. This line is located toward the west side of the existing Henry Ford utility corridor. This line crosses SR-47 as it extends east to Henry Ford Avenue and then heads northward along Henry Ford Avenue. South of Anaheim Street, placement of the foundation may interfere with this telephone line.

A minor telephone line (less than 50 pairs) runs parallel with SR-47 from Anchorage Street west of SR-47 until the intersection of Pier A Way and Pier A Plaza. This facility will require relocation via an underground duct bank.

A major underground telephone utility (approximately 900 pairs) runs under SR-47 from an existing telephone cabinet located near the intersection of Pier A Way and Pier A Plaza. This underground line interferes with the proposed SR-47 Expressway under Alternative 1 and would require relocation.

At the intersection of Anaheim Street and Henry Ford, the same major line crosses SR-47 as it comes west before it turns south toward Dominguez Channel. The portion of this line near the intersection may have to be relocated to miss a foundation.

North of Anaheim Street, telephone service to various buildings on both sides of Henry Ford Avenue are provided from multi-pair telephone cables that are currently installed on the east side of Henry Ford Avenue. From this overhead line, services to customers are provided via overhead lines and underground conduits.

The proposed SR-47 Expressway would require redesign of the present telephone distribution system. This redesign would incorporate a main telephone cable running underground along Henry Ford Avenue. From these main telephone cables, lateral runs would be provided on both sides of the streets where the lateral transitions to the overhead system via service poles. Service connections will be provided downstream from these laterals.

Relocation of telephone lines could result in the temporary disruption of telecommunication services. However, prior to relocation activities, proper notice of service disruptions would be given to affected customers. As mentioned above, utility relocations would be coordinated with USA, thus helping minimize temporary service disruptions and potential adverse effects to utilities. Telecommunication lines that would be maintained in place during construction would be protected in accordance with the requirements of ACTA and the respective owners. New or relocated telephone lines and poles would be placed in an existing disturbed industrial area and would not have an adverse effect on the existing environment.

Water

Presently, there are numerous LADWP-owned water supply pipelines crossing the project area in various directions. Construction of Alternative 1 would require the relocation of several segments of these pipelines. Relocation would be accomplished prior to construction.

A 10-inch water line segment bisecting SR-47 north of the Schuyler Heim Bridge would be permanently removed. Further north along the alignment (where the transfer yard facility track and Henry Ford Avenue cross the Dominguez Channel), a segment of 4-inch water pipe would be relocated (shifted) to the north, and a segment of 23.5-inch water pipe would also require relocation to the east. Further north, several utility lines (natural gas, water, oil) are located within Alameda Street, directly beneath the proposed alignment. In this area (beginning at a point parallel with E Street), several segments of water pipe would need to be relocated prior to construction. This includes a short segment of 6-inch water pipe (to be shifted east), a short segment of 23.5-inch water pipe (shifted west), and a short segment 6-inch water pipe near Robidoux Street (shifted east). Beginning at Robidoux Street, a lengthy segment of 8-inch water pipe would be moved east, the relocation extending to Pacific Coast Highway.

Relocation of water supply lines could result in the temporary disruption of water service to customers in the area. However, prior to relocation activities, proper notice of service disruptions would be given to affected customers. As mentioned above, utility relocations would be coordinated with USA, thus helping minimize temporary service disruptions and potential adverse effects to utilities. Water lines that would be maintained in place during construction would be protected in accordance with the requirements of ACTA and LADWP. New or relocated water lines would be placed in an existing disturbed industrial area and would not have an adverse effect on the existing environment.

A minimal amount of potable or gray water (reclaimed water) would be used during project construction for dust suppression and other construction related activities. Water would also be used by construction workers and for washing and cleaning construction equipment and vehicles. Adequate water supplies exist to accommodate the minimal amount of water that would be used during the construction phase. Thus, no adverse effect to water supply or infrastructure would occur.

Wastewater

Wastewater (sanitary sewer) lines owned by the City of Los Angeles presently cross the project area. Construction of Alternative 1 would require relocation of various segments of these wastewater lines. Relocation would be accomplished prior to construction.

Two short segments of 12-inch wastewater pipe located along Hanjin Way at Pier A (south of the LADWP substation) would be relocated to accommodate the proposed alignment; one segment would be shifted slightly west, the other segment slightly north. Segments of wastewater lines located along Henry Ford Avenue would require relocation, including segments of 8-inch pipe located just north of Anaheim Street, at I Street, and south of Opp Street. Further north, at Young Street and Henry Ford Avenue, relocation of a segment of 8-inch LADWP pipe would be required. Several utility lines (natural gas, water, oil) are located within Alameda Street directly beneath the proposed alignment. Among these, a

lengthy segment of 8-inch wastewater line would be shifted south; the relocation would extend from a point several hundred feet north of Young Street to Pacific Coast Highway.

Relocation of wastewater and sewer lines could result in temporary disruption of wastewater service to customers in the area. However, prior to relocation activities, proper notice of potential service disruptions would be given to affected customers. As mentioned above, utility relocations would be coordinated with USA, thus helping minimize temporary service disruptions and potential adverse effects to utilities. Wastewater lines and sewer pipes that would be maintained in place during construction would be protected in accordance with the requirements of ACTA and LADWP. Relocated wastewater pipe segments would be placed in an existing disturbed industrial area and would not have an adverse effect on the existing environment.

Construction activities for Alternative 1 would not result in the generation of substantial amounts of wastewater. Portable toilets would be available on-site for construction workers. Consequently, construction activities would not result in the discharge of wastewater into the existing sanitation systems. No adverse wastewater effects would result from construction of Alternative 1. Although Alternative 1 is estimated to generate approximately 15 million gallons of construction dewatering, this volume will be shipped offsite and treated.

Solid Waste

Construction of Alternative 1 would involve demolition of the existing vertical-lift Schuyler Heim Bridge. Demolition of the bridge would require disposal of bridge materials, including asphalt, concrete, steel, rebar, and other materials. Approximately 23,000 cubic meter (m^3) (30,083 cubic yards [yd^3]) of concrete and 5,900 metric tons (MT) (6,504 tons) of structural steel would be removed during demolition. Other debris (such as concrete, asphalt, wood, and steel) would also result from construction of the SR-47 Expressway. Approximately 6,106 m^3 (7,986 yd^3) of asphalt would be removed. A minimum 50 percent of construction and demolition debris would be diverted in accordance with AB 75, to which cities, counties, and regional agencies are subject. Recyclable materials would be hauled to local recycling facilities or inert landfills. This would minimize the use of Los Angeles County solid waste landfills and, therefore, minimize effects to landfill capacity. With the primary use of recycling facilities and inert landfills, capacities at existing permitted municipal solid waste facilities would not be adversely affected by the temporary and short-term disposal needs of the project.

Public Services

Under Alternative 1, a fixed bridge would be constructed east of the existing footprint of the Schuyler Heim Bridge. The existing bridge would remain functional while the new bridge is constructed. However, in order to transition vehicular traffic from the existing Schuyler Heim Bridge to the new fixed bridge, both routes would have to be closed temporarily for up to 1 month. The southbound SR-47 exit ramp at New Dock Street would be closed for approximately 4 months to construct the outstanding ramp and shift traffic east to the new bridge. During that time, traffic seeking to exit SR-47 at New Dock Street would be routed with a series of right turns to Ocean Boulevard, then to Henry Ford Avenue, and finally to New Dock Street. As a result, land-based public and emergency services that rely upon the Schuyler Heim Bridge as their primary emergency route, including Port Police and LBFD,

would be required to use alternative emergency response routes (primarily the Vincent Thomas and Gerald Desmond Bridges). Alternate routes would be developed prior to construction, which would not substantially affect average response times for land-based police, fire, and emergency services.

Additionally, construction activities for the portion of the bridge that spans the Cerritos Channel, including demolition of the existing bridge and placement of piles for the new bridge, would be conducted from barges anchored to the channel bottom. Water vessel traffic through this portion of Cerritos Channel would be temporarily restricted during construction of Alternative 1, and there would be a temporary closure of Cerritos Channel to marine vessel crossings for approximately 25 days throughout bridge construction period. Although attempts would be made to accommodate emergency response vessels that need to cross Cerritos Channel during construction, some detours may be necessary. As a result, water-based public and emergency services could be required to use alternate response routes. Alternate emergency access water routes would be developed by port authorities and emergency service providers. Adequate advance notice of water traffic, detours, and restrictions would be provided to affected parties. Alternate access routes would not substantially affect average emergency response times in the project area.

The new SR-47 Expressway would begin on Terminal Island, at the intersection of SR-47 and Ocean Boulevard, extending north over New Dock Street and onto the Schuyler Heim Bridge replacement. A new northbound on-ramp would be constructed from New Dock Street, and a new southbound off-ramp would be constructed to New Dock Street, as described above. The expressway would extend northward to Alameda Street, north of the intersection with Pacific Coast Highway, a distance of approximately 2.7 kilometers (km) (1.5 miles). Consequently, the construction of the expressway on land may result in delays and disruptions for public facilities and services near SR-47 along the Henry Ford Avenue construction area. However, alternate routes for emergency response would be developed prior to construction, and average response times for land-based police, fire, and emergency services would not be substantially affected.

Operations Effects

Operation of the replacement bridge, new SR-47 Expressway, and flyover would not result in permanent adverse effects to utilities and public services.

Utilities

Electricity

Operation of Alternative 1 would result in the consumption of modest amounts of electricity used for bridge and expressway lighting. Roadway illumination and bridge lighting would be required during nighttime hours as a measure of safety and security. The amount of electricity required for such lighting would not be substantial. Also, energy required to light the new bridge is not expected to be greater than what is currently used to light the existing Schuyler Heim Bridge (which will be demolished and will no longer require energy). Sufficient electricity supply exists to accommodate the expected operational needs of Alternative 1. No adverse effects to electricity supply or infrastructure would result.

Natural Gas and Liquid Commodities

Operation of Alternative 1 would result in the relocation of various segmented pipeline infrastructure. Relocation would be accomplished during construction, and is not expected

to result in adverse effects. Thus, no permanent operational effects to natural gas or liquid commodity facilities, infrastructure, or supply would occur as a result of Alternative 1.

Telecommunications

Alternative 1 would not result in permanent operational effects to telecommunication facilities, infrastructure, or service. All required relocation of telecommunication lines would be accomplished during construction.

Water Supply

Alternative 1 would not involve construction of any structures that would consume water or require a water supply. Thus, Alternative 1 would not affect water supply, infrastructure, or service. No adverse effects to water would result from operation of Alternative 1.

Wastewater

Alternative 1 would involve construction of a new bridge and roadway infrastructure and would not generate wastewater. Thus, Alternative 1 would not affect wastewater treatment capacity, infrastructure, or service. No adverse effects to wastewater treatment would result from the operation of Alternative 1.

Solid Waste

Operation of the proposed fixed bridge, expressway, and flyover under Alternative 1 would not generate solid waste. Thus, no permanent operational effects to solid waste disposal would occur.

Public Services

Operation of the new fixed bridge would not impede the ability of public and emergency services to respond to either water- or land-based emergencies. On the contrary, the new fixed bridge would be designed to withstand a major earthquake without collapsing, thus allowing emergency marine vessels to utilize the channel, as well as providing immediate service to emergency response vehicles. The additional lane width combined with the new 3-m (10-foot) shoulders in each direction would provide increased space for emergency vehicles to travel across the bridge, potentially decreasing land-based response times. The increased vertical height of the new bridge 14.3 meters (m) (47 feet [ft]) would allow quicker emergency response times for emergency response vessels (police and fireboats) by eliminating the existing vertical-lift bridge and the potential for delay when the lift span is raised. The replacement would provide adequate vertical clearance for oil and hazardous material spill response vessels and would have minimal, if any, effect on response times.

The replacement bridge would have the same navigable channel clearance as the existing bridge (54.9 m [180 ft]). Therefore, it would not impede the ability of the largest water-based emergency response vessels to pass between bridge support.

Adequate height and width clearances would be provided with the replacement bridge. Large water-based emergency response vessels would not be impeded or delayed.

In addition, if the Vincent Thomas Bridge were to collapse, or if other events blocked the inner harbor channels of either the Port of Long Beach or the Port of Los Angeles, Alternative 1 would cause vessels such as sailboats with mast heights greater than 14.3 m (47 ft) and other tall vessels to be detained in the port until an exit could be cleared.

Because such an event would be infrequent and would not affect emergency vessel transport through the Cerritos Channel (the 14.3-m [47-ft] bridge height would provide adequate clearance for the largest emergency response vessel), no serious adverse effects are anticipated.

Other effects from the new SR-47 Expressway include benefits to traffic circulation for public facilities and services near Henry Ford Avenue. In addition, operation of the flyover would include benefits to traffic circulation in the vicinity of the Ocean Boulevard/SR-47 intersection on Terminal Island.

3.4.3.3.2 Alternative 2: SR-103 Extension to Alameda Street

The SR-103 alignment north of the Schuyler Heim Bridge would transition westerly and join the existing SR-47 alignment near the existing LADWP Substation No. DS 119 near Pier A Plaza. Construction of the foundations for the bents that would support the elevated roadway and flyover would affect existing utilities. Additionally, utilities with aerial easements would be restricted due to the proposed new structures. Several overhead telephone and electrical facilities would be affected along the route.

As part of standard construction practices and requirements, USA would be notified of the project prior to construction or demolition. USA would inform utility owners of the construction so that they can mark the location of utility lines prior to groundbreaking. Coordination with USA would serve to further identify the presence of unknown or unmarked utilities so that relocations or bypasses can occur, or the utilities can be avoided, in order to minimize service disruptions.

Construction Effects

Utilities

Electricity

Alternative 2 would have the same effect on the LADWP Substation No. DS 119 (near Pier A Plaza) as Alternative 1. Existing 4.8-kilovolt (kV) overhead lines east of the substation lie in the path of elevated SR-103 structures. High power lines that would conflict with the proposed roadway would require relocation on a taller steel pole. It is estimated that four high-voltage pole structures would be affected by Alternative 2. SCE has a 2-inch underground electrical conduit along Sepulveda Boulevard, providing power for street lights. In addition, SCE duct banks are located along the east and west sides of Intermodal Way, and 2-inch SCE PVC conduits for street lighting are on both sides of Intermodal Way.

The proposed SR-103 extension would rise vertically from the center of the existing SR-103, transition to the north and west, and cross over the SCE utility corridor. Several existing high-voltage (66-kV and 240-kV) SCE transmission lines would conflict with the proposed SR-103 highway structure. In order to accommodate the new alignment, the existing towers would need to be raised 13.7 m (45 ft) on the average. The towers are currently 13.7 to 15.2 m (45 to 50 ft) high. Each tower installation would consist of four towers – three of which would carry the 240-kV lines, plus a single tower that would carry the 66-kV line. Transferring the transmission lines to taller structures would result in potential service disruptions to customers in the vicinity, and substantial utility relocation costs to the project. Similarly, for the flyover, taller poles would be required to hold the SCE transmission lines.

Underground SCE conduit along Sepulveda Boulevard and Intermodal Way may require avoidance or relocation. Transmission lines could be relocated underground; however, the construction cost for such an option would be dramatically more than that of increasing the height of existing towers.

Prior to relocation activities, proper notice of service disruptions would be given to affected customers. As mentioned above, utility relocations would be coordinated with USA, thus helping minimize temporary service disruptions and potential adverse effects to utilities. Utility lines that would be maintained in place during construction would be protected in accordance with the requirements of ACTA and SCE. New or relocated utility lines, poles, and towers would be placed in an existing disturbed industrial area, and are not expected to have an adverse effect on the existing environment. Raising the height of the utility towers could alter the existing view of the area; however, given the industrial setting, and the lack of scenic views, this would not be considered an adverse effect.

Alternative 2 would not conflict with adopted energy conservation plans, nor would it result in wasteful or inefficient use of electricity.

Natural Gas and Liquid Commodities

Presently, there are numerous natural gas and oil pipelines crossing the project area. A 12-inch SCG gas main is located within the Cerritos Channel just west of the Schuyler Heim Bridge, directly beneath the proposed replacement bridge. This gas main would be protected in place during construction. Several additional SCG pipelines are located at various points along the proposed bridge and SR-47 portion of Alternative 2, but would not directly conflict with those structures. However, SCG has an 8.5-inch line along the north side of Sepulveda Boulevard, and a 10-inch line along the south side of Sepulveda Boulevard.

Several oil pipelines coincide with the project area. Along the proposed SR-47 route, near LADWP Substation No. DS 119, existing TOPCO oil pipelines currently run east, then turn north, and eventually continue east. Relocation of a segment of these pipelines would be required near the southeast corner of the substation. Pipelines along the SR-103 portion of Alternative 2 include existing oil lines from Shell Oil and Exxon/Mobil. The Exxon/Mobil line appears to be an abandoned line. Along the proposed SR-103 portion of Alternative 2, a variety of oil pipelines are located north and south of Sepulveda Boulevard and within the 100-foot right-of-way. North of Sepulveda Boulevard are: one 6-inch Pacific States Oil line; four 4-inch to 10-inch Richfield Oil lines; and four 3-inch to 8-inch Richfield gasoline lines. On the south side of Sepulveda Boulevard are: two 8-inch Associated/Tidewater oil lines, one 6-inch Associated/Powerine oil line, one 5-inch Sunset Pacific Gasoline line, and one 6-inch U.S. Army gasoline line.

These various segments of natural gas and oil pipelines would be relocated safely prior to construction of Alternative 2. Though unlikely, relocation of pipelines could result in temporary disruption of service to natural gas customers in the surrounding vicinity. Prior to relocation activities, gas customers would be given notice of potential service disruptions.

Coordination with SCG and with oil pipeline owners would be required in order to facilitate relocation. As mentioned above, utility relocations would be coordinated with USA, thus helping minimize temporary service disruptions and potential adverse effects to utilities.

Utility lines that would be maintained in place during construction would be protected in accordance with the requirements of ACTA and the respective owners.

The relocation of pipeline segments is not expected to result in adverse environmental effects, as the segments would be placed near existing lines, within existing utility corridors or industrialized areas. Trenching would not disturb previously undisturbed, or residential, areas. Alternative 2 would not conflict with adopted energy conservation plans, nor would it result in wasteful or inefficient use of oil or natural gas.

Telecommunications

A 1,500-pair telephone line runs underground from Anchorage Street northward, to a point 30 m (98 ft) south of the Dominguez Channel. This line is located toward the west side of the existing Henry Ford utility corridor. This line crosses SR-47 as it extends east to Henry Ford Avenue and then heads northward along Henry Ford Avenue.

From Anchorage Street west of SR-47, a minor telephone line (less than 50 pairs) runs parallel with SR-47 until the intersection of Pier Way and Pier A Plaza. This facility would require relocation via an underground duct bank.

A major underground telephone utility (approximately 900 pairs) runs under SR-47 from an existing telephone cabinet located near the intersection of Pier A Way and Pier A Plaza. This underground line would interfere with the proposed SR-47 and requires relocation.

Relocation of telephone lines could result in the temporary disruption of telecommunication services. However, prior to relocation activities, proper notice of service disruptions would be given to affected customers. Utility relocations would be coordinated with USA, thus helping minimize temporary service disruptions and potential adverse effects to utilities. Telecommunication lines that would be maintained in place during construction would be protected in accordance with the requirements of ACTA and the respective owners. Because the relocated telephone lines and poles would be placed in an existing disturbed industrial area, they are not expected to have an adverse effect on the existing environment.

Water

Presently, numerous LADWP-owned water supply pipelines cross the project area in various directions. Construction of Alternative 2 would require the relocation of several segments of these pipelines. Relocation would be accomplished prior to construction.

Near the SR-47 portion of Alternative 2, a 10-inch water line segment bisecting SR-47 north of the Schuyler Heim Bridge would be permanently removed. All other water lines in this area would be protected in place. Along the proposed SR-103 portion of Alternative 2, on the south side of Sepulveda Boulevard, is a 12-inch Dominguez water line. Another water line of unknown diameter is also along Sepulveda Boulevard, and there is one along Intermodal Way. There also is a monitoring well in the cul-de-sac at the end of Intermodal Way.

Relocation of water supply lines could result in the temporary disruption of water service to customers in the area. However, prior to relocation activities, proper notice of service disruptions would be given to affected customers. As mentioned above, utility relocations would be coordinated with USA, thus helping minimize temporary service disruptions and potential adverse effects to utilities. Water lines that would be maintained in place during

construction would be protected in accordance with the requirements of ACTA and LADWP. New or relocated water lines would be placed in an existing disturbed industrial area and would not have an adverse effect on the existing environment.

A minimal amount of potable or gray water (reclaimed water) would be used during project construction for dust suppression purposes and other construction related activities. Water would also be used by construction workers and for washing and cleaning construction equipment and vehicles. Adequate water supplies exist to accommodate the minimal amount of water that would be used during the construction phase. Thus, no adverse effect to water supply or infrastructure would occur.

Wastewater

Wastewater (sanitary sewer) lines owned by the City of Los Angeles presently cross the project area. Construction of Alternative 2 would require relocation of various segments of these wastewater lines. Relocation would be accomplished prior to construction.

In the vicinity of the SR-47 portion of Alternative 2, no sanitary sewer or wastewater lines would require relocation. All lines in this area would be protected in place. There are no sanitary sewer lines along the proposed SR-103 portion of Alternative 2. However, there is a sanitary sewer line along Sepulveda Boulevard, as well as on Intermodal Way.

Relocation of wastewater and sewer lines could result in temporary disruption of wastewater service to customers in the area. However, prior to relocation activities, proper notice of potential service disruptions would be given to affected customers. As mentioned above, utility relocations would be coordinated with USA, thus helping minimize temporary service disruptions and potential adverse effects to utilities. Wastewater lines and sewer pipes that would be maintained in place during construction would be protected in accordance with the requirements of ACTA and LADWP. Relocated wastewater pipe segments would be placed in an existing disturbed industrial area and, therefore, would not have an adverse effect on the existing environment.

Construction activities for Alternative 2 would not result in the generation of substantial amounts of wastewater. Portable toilets would be available on-site for construction workers. Consequently, construction activities would not result in the discharge of wastewater into the existing sanitation systems. No adverse wastewater effects would result from construction of Alternative 2.

Solid Waste

Construction of Alternative 2 would involve demolition of the existing Schuyler Heim Bridge. Demolition of the bridge would require disposal of bridge materials, including asphalt, concrete, steel, rebar, and other materials. Approximately 23,000 m^3 (30,083 yd^3) of concrete and 5,900 MT (6,504 tons) of structural steel would be removed during demolition. Other debris (such as asphalt, concrete, steel, rebar, wood, etc.) would also result from construction of the SR-47 and SR-103 portions of the project. Approximately 7,901 m^3 (10,334 yd^3) of asphalt would be removed. A minimum 50 percent of construction and demolition debris would be diverted in accordance with AB 75, to which cities, counties, and regional agencies are subject. Recyclable materials would be hauled to local recycling facilities or inert landfills. This would minimize the use of Los Angeles County solid waste landfills and, therefore, minimize effects to landfill capacity. With the primary use of

recycling facilities and inert landfills, capacities at existing permitted municipal solid waste facilities would not be adversely affected by the temporary and short-term disposal needs of the project.

Public Services

Under Alternative 2, a fixed bridge and flyover would be constructed, the same as under Alternative 1, and construction effects to public services would be similar to those under Alternative 1. However, other effects would occur from construction of the SR-103 Extension rather than from the SR-47 Expressway that would be constructed under Alternative 1.

This alternative would extend SR-103 to the northwest on a four-lane elevated viaduct to join Alameda Street between Sepulveda Boulevard and I-405. Improvements to SR-103 would begin approximately 3.2 km (2 miles [mi]) north of the Schuyler Heim Bridge and extend a distance of approximately 2.6 km (1.6 mi). The viaduct would cross over the Union Pacific Railroad manual yard and San Pedro Branch, through the Southern California Edison (SCE) utility corridor, across the Los Angeles Harbor Department Warehouse 16/17 area, over Sepulveda Boulevard, then parallel the western boundary of the Intermodal Container Transfer Facility (ICTF) to the centerline of Alameda Street. The viaduct would slope to grade south of the Wardlow Road ramps to I-405. Improvements would be made to the existing SR-103 to accommodate the southerly and northerly end connections of the viaduct. Consequently, construction of the SR-103 extension may result in delays and disruptions for public facilities and services near SR-103.

Operations Effects

Utilities

Under Alternative 2, permanent effects of utilities (electricity, natural gas and liquid commodities, telecommunications, water supply, wastewater, and solid waste) would be the same as described for Alternative 1. No adverse effects would occur.

Public Services

Operations effects to public services under Alternative 2 would be similar to those described for Alternative 1. However, effects of a new expressway would occur relative to the SR-103 Extension rather than the SR-47 Expressway described under Alternative 1.

Other effects from the SR-103 Extension also would benefit traffic circulation for public facilities and services.

3.4.3.3.3 Alternative 3: Bridge Demolition Avoidance

3.4.3.3.3.1 Construction Effects

Utilities

Under Alternative 3, construction effects would be similar to Alternative 1, with the addition of retrofitting the existing Schuyler Heim Bridge, which would remain in place. The new bridge would be constructed to the east of the existing bridge. Thus, much of the short-term construction effects to utilities would be the same as those discussed under Alternative 1.

As part of standard construction practices and requirements, USA would be notified of the project prior to construction or demolition. USA would inform utility owners of the

construction so that they can mark the location of utility lines prior to groundbreaking. Coordination with USA would serve to further identify the presence of unknown or unmarked utilities so that relocations or bypasses can occur, or the utilities can be avoided, in order to minimize service disruptions.

Electricity

Under Alternative 3, the existing Schuyler Heim Bridge would not be demolished. Thus, any existing utility lines running along the bridge would remain in place. Remaining construction effects and relocations relating to electricity would be the same as those discussed under Alternative 1. Construction activities would not adversely affect the electrical infrastructure, supply or service in the vicinity of the proposed project.

Natural Gas and Liquid Commodities

The existing SCG gas line west of the Schuyler Heim Bridge would not be affected, as the existing bridge would remain in place. Other oil pipeline effects would be the same as those described for Alternative 1.

Telecommunications

None of the existing telecommunication lines in the bridge and approach area would be affected. Thus, temporary construction effects to telecommunications would be the same as those described under Alternative 1 and adverse effects would not occur.

Water

Under Alternative 3, construction effects and relocations relating to water supply would be the same as those discussed under Alternative 1. Construction activities would not adversely affect water supply, infrastructure, or service in the vicinity of Alternative 3.

Wastewater

Under Alternative 3, construction effects and relocations relating to wastewater conveyance and treatment would be the same as those discussed under Alternative 1. Construction activities would not adversely affect wastewater treatment and conveyance capacity, infrastructure, or service in the vicinity of Alternative 3.

Solid Waste

Construction and demolition debris (such as asphalt, concrete, steel, rebar, and wood) from construction activities proposed under Alternative 3 would be similar to, but substantially less than, under Alternative 1, as the existing Schuyler Heim Bridge would not be demolished but would remain in place. Approximately 10,000 m^3 (13,080 yd^3) of concrete, 3,300 MT (3,638 tons) of steel, and 4,663 m^3 (6,099 yd^3) of asphalt would be removed. A minimum of 50 percent of construction and demolition debris would be diverted in accordance with AB 75, to which cities, counties, and regional agencies are subject. Recyclable materials would be hauled to local recycling facilities or inert landfills. This would minimize the use of Los Angeles County solid waste landfills and, therefore, minimize effects to landfill capacity. With the primary use of recycling facilities and inert landfills, capacities at existing permitted municipal solid waste facilities would not be adversely affected by the temporary and short-term disposal needs of the project.

Public Services

This alternative preserves the existing Schuyler Heim Bridge while constructing a new fixed-span bridge on an alignment east of the existing bridge. The proposed fixed-span bridge is the same as described under Alternative 1. Construction effects to public services under Alternative 3 would be similar to Alternative 1. Under this alternative, the existing Schuyler Heim Bridge would remain in place, but would not be used.

3.4.3.3.3.2 Operations Effects

Utilities

Under Alternative 3, permanent effects to utilities (electricity, natural gas and liquid commodities, telecommunications, water supply, wastewater, and solid waste) would be the same as described for Alternative 1. No adverse effects would occur.

Public Services

Under Alternative 3, the operational effects to public services (police protection, fire protection, schools, and libraries) would be the same as those described under Alternative 1. No adverse effects would occur.

3.4.3.3.4 Alternative 4: Bridge Replacement Only

3.4.3.3.4.1 Construction Effects

Utilities

As with Alternative 1, the eastern half of the new, fixed-span bridge would be constructed while the existing Schuyler Heim Bridge remains in service. Traffic would then be directed to the newly constructed portion of the fixed-span bridge, and the Schuyler Heim Bridge would be demolished; then the rest of the new bridge would be constructed. Construction of the foundations for the bents that support the elevated portion of the roadway would impinge on the existing utilities. In addition, the aerial easements would impose restrictions on utilities where the new structures are proposed. Several overhead telephone and electrical facilities would be affected along the route, resulting in effects similar to those described under Alternative 1. Other construction effects would not occur, as this alternative does not include an expressway or flyover.

Electricity

Under this alternative, anticipated effects to the LADWP Substation No. DS 119 would be similar to those discussed under Alternative 1. Specifically, existing overhead lines east of the substation lie in the path of elevated SR-47 structures. An existing segment of two 34.5-kV feeders and two 4.8-kV feeders would conflict with the proposed roadway and would require relocation to taller steel poles. LADWP considers this segment of be of major importance. It is estimated that six high-voltage steel pole structures would be required.

Temporary disruptions to electrical service could potentially occur due to relocation activities. However, prior to such activities, proper notice of service disruptions would be given to affected customers. Utility lines that would be maintained in place during construction would be protected in accordance with the requirements of ACTA and SCE. New or relocated utility lines, poles, and towers would be placed in an existing disturbed industrial area, and are thus not expected to have an adverse effect on the existing environment. Furthermore, Alternative 4 would not conflict with adopted energy conservation plans, nor would it result in wasteful or inefficient use of electricity.

Natural Gas and Liquid Commodities

Near the LADWP Substation No. DS 119, existing TOPCO oil pipelines currently run east, then turn north, and eventually continue east. Relocation of a segment of these pipelines would be required near the southeast corner of the substation.

Telecommunications

A minor telephone line (less than 50 pairs) runs parallel with SR-47 from Anchorage Street west of SR-47 until the intersection of Pier A Way and Pier A Plaza. This facility would require relocation via an underground duct bank.

Temporary disruptions to telecommunication services could occur due to relocation activities. However, prior to such activities, proper notice of service disruptions would be given to affected customers. Telecommunication lines that would be maintained in place during construction would be protected in accordance with the requirements of ACTA, and the respective owners. New or relocated telephone lines and poles would be placed in an existing disturbed industrial area, and would not have an adverse effect on the existing environment.

Water Supply

Under Alternative 4, anticipated effects to water supply and infrastructure during construction would be similar to those described under Alternative 1, as applicable to replacement of the Schuyler Heim Bridge, or north to the SR-103 freeway connection. Required infrastructure changes would include removal of a segment of 10-inch water pipeline located north of the northern abutment of the existing Schuyler Heim Bridge.

It is also anticipated that minimal amounts of potable or gray water (reclaimed water) would be used during project construction for dust suppression and other construction related activities. Water would also be used by construction workers and for washing and cleaning construction equipment and vehicles. Adequate water supplies exist to accommodate the minimal amount of water that would be used during the construction phase. Thus, no adverse effect to water supply or infrastructure would occur under Alternative 4.

Wastewater

Under Alternative 4, wastewater or sewer line relocations are not anticipated. Construction activities for this alternative would not result in the generation of substantial amounts of wastewater. Portable toilets would be available on-site for construction workers. Consequently, construction activities would not result in the discharge of wastewater into the existing sanitation systems. No adverse wastewater effects would result from construction of Alternative 4.

Solid Waste

Construction of Alternative 4 would involve demolition of the existing Schuyler Heim Bridge. Demolition would require disposal of bridge materials, including asphalt, concrete, steel, rebar, and other materials. Approximately 23,000 m^3 (30,083 yd^3) of concrete and 5,900 MT (6,504 tons) of structural steel would be removed during demolition. Other debris (such as concrete, asphalt, wood, and steel) would also result from construction of the elevated expressway portion of the project. Approximately 2,602 m^3 (3,403 yd^3) of asphalt would be removed. A minimum of 50 percent of construction and demolition debris would

be diverted in accordance with AB 75, to which cities, counties, and regional agencies are subject. Recyclable materials would be hauled to local recycling facilities or inert landfills. This would minimize the use of Los Angeles County solid waste landfills and, therefore, minimize effects to landfill capacity. With the primary use of recycling facilities and inert landfills, capacities at existing permitted municipal solid waste facilities would not be adversely affected by the temporary and short-term disposal needs of the project.

Public Services

Under Alternative 4, a new, fixed-span bridge would be constructed within and east of the existing footprint of the Schuyler Heim Bridge. Construction effects to public services under Alternative 4 would be similar to those related to bridge replacement under Alternative 1, without additional effects from the new SR-47, or flyover, which would not be constructed under this alternative.

3.4.3.3.4.2 Operations Effects

Utilities

Under Alternative 4, permanent effects to utilities (electricity, natural gas and liquid commodities, telecommunications, water supply, wastewater, and solid waste) would be comparable to those described for Alternative 1 as related to replacement of the Schuyler Heim Bridge. No adverse effects would occur.

Public Services

Under Alternative 4, operational effects to public services (police protection, fire protection, schools, and libraries) would be the same as those described for Alternative 1 as related to replacement of the Schuyler Heim Bridge. No adverse effects would occur.

3.4.3.3.5 Alternative 5: Transportation System Management

3.4.3.3.5.1 Construction Effects

Utilities

Construction of the proposed TSM Alternative could include pavement re-striping, traffic signal adjustment, installation of new ramp metering, signal synchronization, installment of changeable message signs (CMS), and closed circuit television surveillance systems (CCTV).

Electricity

None of the proposed improvements or systems would require the relocation of electrical utility lines. Negligible amounts of electricity could be required for installation of TSM elements. Thus, no adverse effects would result from the construction of this alternative.

Natural Gas and Liquid Commodities

Construction of the proposed improvements and systems would not affect existing natural gas pipelines or oil pipelines. No pipeline relocation would be required. Thus, no adverse effects to natural gas and liquid commodities would result from the construction of this TSM Alternative.

Telecommunications

Construction of the proposed improvements and systems would not affect any existing telecommunication lines in the project area. No utility relocation would be required. Thus, no adverse effects to telecommunications would result from the construction of this TSM Alternative.

Water Supply
Construction of the proposed improvements and systems under Alternative 5 would not affect any existing water supply lines or infrastructure in the project area. No utility relocation would be required. Thus, no adverse effects to water supply would result from the construction of this alternative.

Wastewater
Construction of the proposed improvements and systems would not affect any existing wastewater lines in the project area. No utility relocation would be required. Thus, no adverse effects to wastewater treatment, conveyance, or infrastructure would result from the construction of Alternative 5.

Solid Waste
Construction of Alternative 5 could result in minimal amounts of solid waste and debris. The amount of debris generated is expected to be negligible and would not adversely exceed the capacity of landfills serving the project site. Thus, construction would not result in adverse effects to solid waste disposal.

Public Services
Alternative 5 would include low-cost, easily implementable improvements as an alternative to construction of more expensive improvements. This alternative focuses on improvements to routes that parallel the proposed SR-47 Expressway and that serve the same trips. The TSM Alternative would include measures to improve capacity and traffic circulation at the Port of Long Beach and Port of Los Angeles through policy changes and use of the latest technologies. Consequently, construction effects from this alternative would be less than adverse to public facilities and services in the project area.

3.4.3.3.5.2 Operations Effects

Utilities
Implementation of Alternative 5 would not adversely affect natural gas, liquid commodities, telecommunications, water supply, wastewater, or solid waste disposal facilities. However, electricity would be required for the operation of various elements proposed under this alternative.

Electricity
Electricity would be required for operation of various elements proposed under this alternative. Changeable message signs (CMS), closed circuit television surveillance systems (CCTV), ramp meters and intelligent transportation system (ITS) applications would require the use of electricity. The amount of electricity required would be minimal. Energy saving measures, such as solar power, would be applied wherever feasible. Thus, no long-term or permanent adverse effects to electricity supply or infrastructure are anticipated as a result of the operation of Alternative 5.

Natural Gas and Liquid Commodities
Implementation of Alternative 5 would not adversely affect natural gas or liquid commodity supply, infrastructure, or service. No adverse effects would result.

Telecommunications
Implementation of Alternative 5 would not adversely telecommunication infrastructure or service. Therefore, no long-term or permanent adverse effects to telecommunications are anticipated as a result of Alternative 5.

Water Supply
Implementation of Alternative 5 would not adversely affect water supply, infrastructure, or service. No adverse effects would result.

Wastewater
Implementation of Alternative 5 would not adversely affect wastewater conveyance, treatment, or infrastructure. No adverse effects would result.

Solid Waste
Alternative 5 would not generate solid waste. Therefore, no long-term or permanent effects to solid waste facilities are anticipated as a result of Alternative 5.

Public Services
Implementation of Alternative 5 would not adversely affect public services (police and fire protection, schools, and libraries).

3.4.3.3.6 Alternative 6: No Build
3.4.3.3.6.1 Construction Effects
Under the No Build alternative, replacement of the Schuyler Heim Bridge would not occur, nor would the SR-47 Expressway, SR-103 Extension, or flyover be constructed; thus, energy would not be required for construction. No utility relocation would take place. The No Build alternative would not result in any adverse effects to utilities or public services.

3.4.3.3.6.2 Operations Effects
Utilities
Under the No Build alternative, replacement of the Schuyler Heim Bridge would not occur, nor would the SR-47 Expressway, SR-103 Extension, or flyover be constructed. As a result, utility service would remain the same as under existing conditions, and existing infrastructure would continue to provide the project area with electricity, natural gas, telecommunications, water, wastewater treatment, and solid waste disposal without interruption or other effects.

Public Services
Public and emergency services would continue to respond to calls within their service areas; existing response routes would continue to be used and no change in response times would occur.

However, under the No Build alternative, the existing Schuyler Heim Bridge would remain seismically deficient, and there is a likelihood that a future major seismic event would damage the bridge such that it would have to be replaced or that the event could result in collapse of the bridge. In either case, emergency services and response to and from Terminal Island and/or through the Cerritos Channel would be temporarily restricted until the bridge could be repaired or replaced.

3.4.3.3.7 CEQA Consequences

Based on the information provided in the above analyses of the affected environment, when potential impacts of the proposed project alternatives are assessed in the context of the CEQA criteria for Public Services and for Utilities and Service Systems, the above analysis demonstrates that impacts either will not occur or will be less than significant. None of the project alternatives would result in a need to construct new or alter existing fire or police protection, schools, parks, or other public facilities. Therefore, under CEQA, there would be no impact to Public Services under any of the six project alternatives.

The above analysis also shows that impacts to landfill capacity would be less than significant for Alternatives 1 through 5; impacts to stormwater drainage facilities would be less than significant for Alternatives 1 through 4; impacts to water supply would be less than significant for Alternatives 1 through 5, impacts to water supply would be less than significant for Alternatives 1 through 5. For Alternatives 5 and 6, there would be no impact. Also, because the project would comply with regulatory requirements for solid waste and would not require new or expanded wastewater treatment facilities, there would be no impact related to these issues under any of the six project alternatives. Therefore, under CEQA, impacts to Utilities and Service Systems either would be less than significant or would not occur at all.

Potential impacts of the proposed project alternatives to Utilities and Service Systems are assessed in the context of the CEQA criteria in Chapter 4.0 – CEQA Analysis and Appendix A – CEQA Checklist (XII, Public Services; XVI, Utilities and Service Systems).

3.4.4 Avoidance, Minimization, and/or Mitigation Measures

3.4.4.1 Avoidance and Minimization Measures

3.4.4.1.1 Construction

3.4.4.1.1.1 Alternatives 1, 1A, 2, 3, and 4

U-1 Provide advance notification to utility users of the potential for service disruption and the anticipated time/date of the disruption.

U-2 Prior to bridge construction, notify watch commanders and station chiefs of all fire, police, and other land- and water-based response stations that service the port area or use the Schuyler Heim Bridge or Cerritos Channel as a travel route to respond to service calls in order to minimize delays to emergency response providers during project construction. This action will allow for the identification of alternate routes and the development of contingency response plans, including:

- Temporary interim policies that will identify alternative resources within the public service and emergency response organization (i.e., alternative response units located closer to the incident); and
- Mutual aid agreements between bordering public service and emergency response organizations (i.e., LAFD and LBFD) that could be dispatched in the event of a response delay of the primary emergency response provider.

U-3 Specify in the contract that construction in the Cerritos Channel must occur in a manner that allows emergency marine vessels to pass or be carried out in such a way that barges with construction equipment will be moved quickly to allow passage of emergency vessels.

U-4 Determine where construction-related activities have the potential to disrupt response routes, and coordinate with Los Angeles and Long Beach police and fire departments, as well as any local emergency medical service units.

U-5 Utilize a Transportation Management Plan that is agreeable to all emergency service providers and the project design team.

U-6 During final design, after selection of the preferred alternative, a determination will be made regarding which of the identified utilities will be relocated. Plans for the relocations will be developed in consideration of the project schedule and consultation with the utility providers which include, but are not limited to, LADWP, LBWD, SCE, SCG, GTE/Verizon, AT&T, City of Los Angeles. In addition, pipeline relocations will be planned and implemented in consultation with TOPCO, Exxon Mobil, Gulf Oil, and SCG. In further consultation with utility providers, some obsolete utilities may be removed at the request of the provider.

3.4.4.1.1.2 Alternatives 5 and 6

No avoidance or minimization measures would be necessary.

3.4.4.1.2 Operations

No avoidance or, minimization measures would be required for operation of the proposed project.

3.4.4.2 Mitigation Measures

No mitigation measures are proposed for utilities or public services for any of the project alternatives.

3.5 Traffic and Transportation

This section summarizes the results of the *Traffic Study: Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Meyer, Mohaddes Associates [MMA], 2007), a comprehensive traffic study that analyzed traffic conditions in the project area and the potential effects of the project alternatives on those conditions. The analysis includes current and forecasted traffic volumes and levels of service (LOS). It evaluates effects to traffic from replacement of the Schuyler Heim Bridge, either alone or in association with a new SR-47 Expressway or SR-103 Extension (see Figures 3.5-1 and 3.5-2).

3.5.1 Regulatory Setting

Caltrans, as assigned by FHWA, directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 CFR 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

Caltrans, as assigned by FHWA, is committed to carrying out the 1990 Americans with Disabilities Act (ADA) by building transportation facilities that provide equal access for all persons. The same degree of convenience, accessibility, and safety available to the general public will be provided to persons with disabilities.

3.5.2 Affected Environment

3.5.2.1 Transportation System

For this analysis, the study area includes the area bounded by: Ocean Boulevard, Seaside Avenue, and Route 47/Vincent Thomas Bridge to the south; I-110 to the west; Sepulveda Boulevard to the north; and I-710 to the east. Specifically, the analysis includes the SR-47 Expressway mainline, ramps, and intersections in the immediate vicinity of the project, and intersections north and south of the project. The following intersections were analyzed:

- SR-47/Ocean Boulevard Interchange (future configuration with flyover)
- SR-47/New Dock Street on-ramp (unsignalized)
- SR-47/New Dock Street off-ramp (unsignalized)
- SR-47/Henry Ford Avenue ramps (unsignalized existing and signalized in future)
- Henry Ford Avenue/Anaheim Street
- Henry Ford Avenue/Denni Street
- Alameda Street/Anaheim Avenue
- Alameda Street/PCH connector ramp north of PCH
- PCH/Alameda Street connector ramp east of Alameda Street
- Alameda Street/Sepulveda Boulevard connector ramp north of Sepulveda Boulevard
- Sepulveda Boulevard/Alameda Street connector ramp east of Alameda Street

- Alameda Street/223rd Street connector ramp south of 223rd
- 223rd Street/Alameda Street connector ramp east of Alameda Street
- 223rd Street/I-405 southbound ramps
- Alameda Street/I-405 northbound ramps
- Alameda Street/Carson Street connector ramp south of Carson Street
- Carson Street/Alameda Street connector ramp east of Alameda Street
- Alameda Street/Del Amo Boulevard connector ramp south of Del Amo Boulevard
- Del Amo Boulevard/Alameda Street connector ramp east of Alameda Street
- Alameda Street/SR-91 eastbound ramps
- Alameda Street/Artesia Boulevard connector ramp north of Artesia Boulevard

Except as otherwise noted, the intersections are signalized.

Three bus routes serve the project area. The Los Angeles Metropolitan Transportation Authority operates Routes 202 and 232; Los Angeles Department of Transportation Transit operates Commuter Express Route 142. Route 202 provides AM and PM peak hour service from Wilmington to Willow Brook via Alameda Street. Route 202 operates on 30-minute headways from 5:25 AM until 9:49 AM and again from 3:25 PM until 7:19 PM. Route 232 provides all-day service from Los Angeles International Airport to Downtown Long Beach via Pacific Coast Highway. Route 232 operates with approximately 20-minute headways during peak hours and 30-minute headways during off-peak hours. Service for Route 232 begins at 3:46 AM and continues through 12:31 AM. Commuter Route 142 provides daily service between San Pedro, Terminal Island, and Downtown Long Beach. Route 142 provides service on 25-minute headways throughout the day and 30-minute headways from 6:10 PM until 11:40 PM. Route 142 has bus stops located along Ocean Boulevard.

3.5.2.2 Existing Traffic Conditions

The Schuyler Heim Bridge is one of three bridges that connect Terminal Island to the mainland. The Schuyler Heim Bridge is a steel vertical-lift bridge that spans a popular route for traffic to and from Terminal Island and has become a vital traffic link between the ports and the mainland.

The two other bridges are the Gerald Desmond Bridge in the Port of Long Beach, east of Terminal Island, and the Vincent Thomas Bridge in the Port of Los Angeles, west of Terminal Island. The Ports of Long Beach and Los Angeles are the two largest ports in the United States, based on container cargo volume. The Schuyler Heim Bridge is located between Interstate (I)-710 and I-110 and provides a route to both highways in the event of an earthquake that disrupts service on the Gerald Desmond Bridge, which provides I-710 access to Terminal Island, and the Vincent Thomas Bridge, which provides I-110 access to Terminal Island.

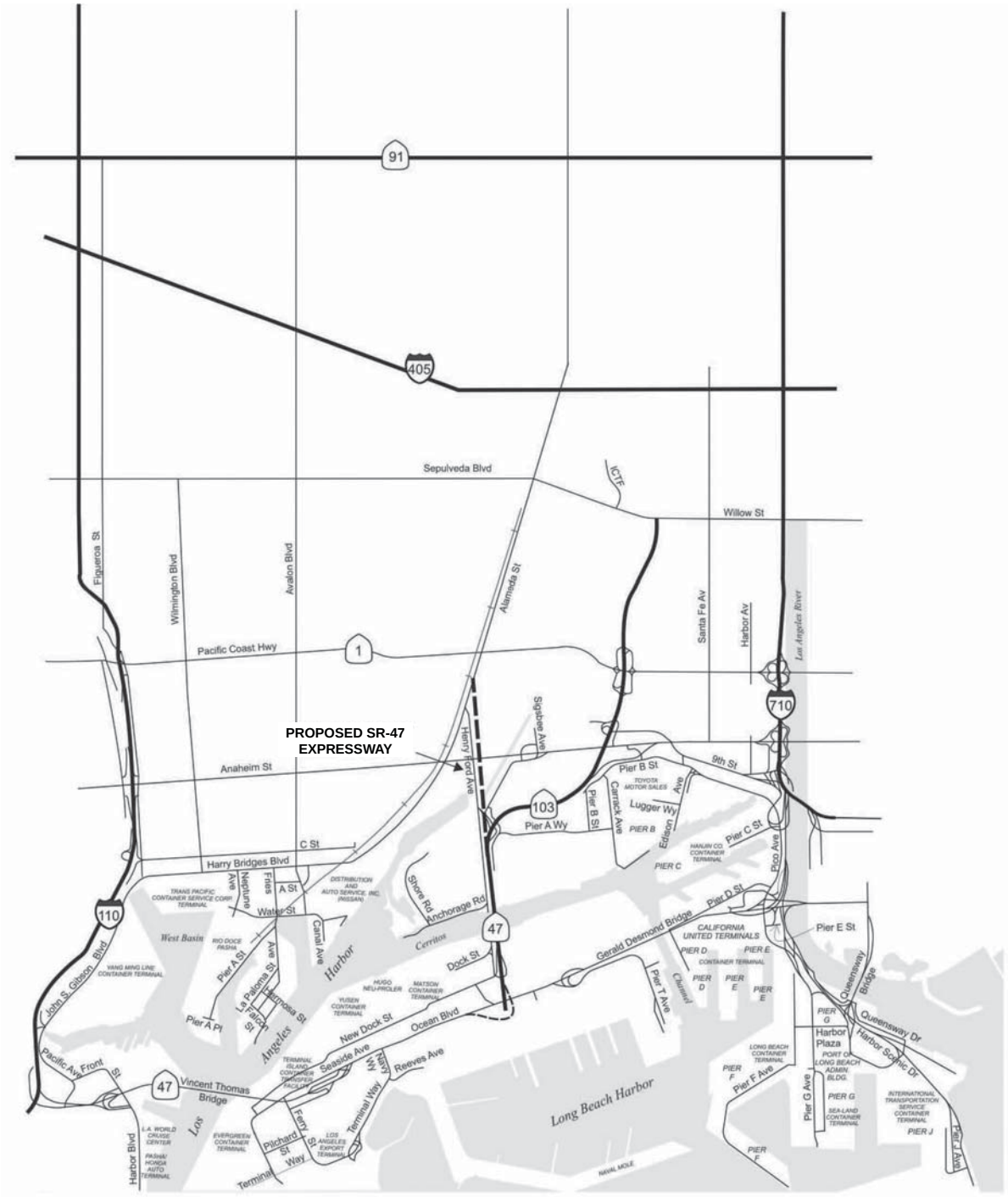


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Figure 3.5-1
Proposed SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

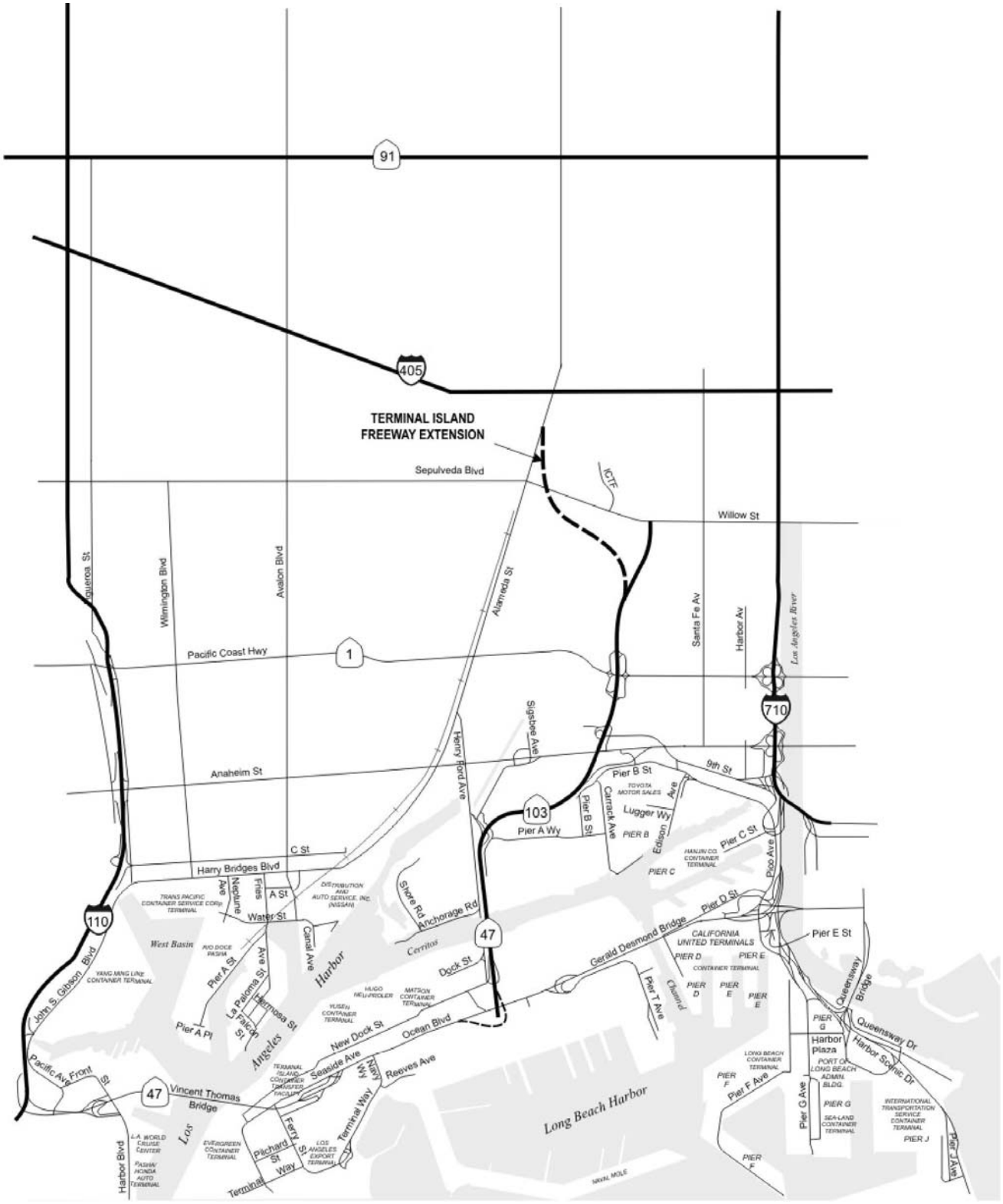

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Figure 3.5-2
Proposed SR-103 Extension
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

The Ports of Los Angeles and Long Beach, Caltrans, the MTA, and the cities of Los Angeles and Long Beach are currently developing several transportation improvement projects to alleviate freeway system congestion. Among these is the SR-47 Expressway, which would provide a four-lane elevated limited-access expressway, with auxiliary lanes at transition points with other roadways and at the Cerritos Channel crossing. The aerial expressway would by-pass at-grade railroad crossings and intersections between Terminal Island and Alameda Street/Pacific Coast Highway. The number of daily train crossings for Wilmington Wye East, Wilmington Wye West, Manual Subdivision (UPRR San Pedro), Henry Ford Bypass (ACTA3), and West Basin Lead (Leeward Bay Marina) are 15, 8, 79, 21, and 118 trains, respectively. Daily long trains (greater than 1,000 ft) on Wilmington Wye East and Wilmington Wye West are approximately 10 percent and 6 percent of traffic, respectively. The train traffic is estimated to increase by 8 percent per year.

When complete, the expressway would provide the missing link between the Ocean Boulevard Interchange on Terminal Island and Alameda Street on the mainland. This link would allow traffic to continue north from Terminal Island to connect to Pacific Coast Highway, I-405, and/or SR-91. The expressway would also help maximize use of the recently completed six-lane Alameda Street.

At present, to connect from Terminal Island to Alameda Street, vehicles must travel 1.5 kilometers (km) (0.9 mile [mi]) north from Ocean Boulevard, exit at the Henry Ford Avenue off-ramp, travel north through local streets, signalized intersections, and railroad crossings for about 2.0 km (1.2 mi), then join Alameda Street just south of Pacific Coast Highway.

Traffic volumes in the study area are shown in Table 3.5-1. Existing SR-47 mainline and ramp volumes for the AM, Mid-day (MD), and PM peak hours are shown in Figure 3.5-3. New intersection turning movement traffic counts were taken at all 20 study locations in 2004 for the AM, MD, and PM peak hours. All traffic volume counts include separate truck classification counts, separating auto and truck traffic to facilitate the application of passenger car equivalent (PCE) factors. Existing turning movements at the study intersections are presented in Figures 3.5-4, 3.5-5, and 3.5-6 for the AM, MD, and PM peak hours, respectively.

Table 3.5-1
2003 Traffic Volumes

Location	AADT/Peak Hour
Interstate 110 – south of PCH*	112,000/9,000
Interstate 710 – north of PCH*	143,000/11,600
Interstate 710 – south of PCH*	130,000/11,800
SR-103 – south of PCH*	14,300/1,650
Henry Ford Avenue – north of Anaheim Street	AM Peak – 650 (46% truck) PM Peak – 720 (22% truck)
Alameda Street – SR-1 to I-405	AM Peak – 1,670 (30% truck) PM Peak – 1,980 (28% truck)
Alameda Corridor Expressway – south of PCH	NA – future proposed facility

*Source: 2003 Caltrans Count Book as described in the Traffic Study for the project MMA, 2007.

Intersection operations are described by LOS criteria. In accordance with commonly accepted traffic engineering guidelines, LOS categories A through F are directly related to the average control delay per vehicle (see Table 3.5-2).

Table 3.5-2
LOS Categories

LOS	Avg Delay/Vehicle (Sec)	Traffic Conditions
A	≤ 10	Little or no delay/congestion
B	> 10 – 20	Slight congestion/delay
C	> 20 – 35	Moderate delay/congestion
D	> 35 – 55	Significant delay/congestion
E	> 55 – 80	Extreme congestion/delay
F	> 80	Intersection failure/gridlock

Source: MMA, 2007.

Table 3.5-3 (Existing Intersection Operating Conditions) summarizes the existing AM, MD, and PM peak-hour intersection operating conditions. For signalized intersections, operations are described in terms of volume/ capacity (V/C) ratio, using the Critical Movement Analysis (CMA) in conformance with City of Carson and City of Los Angeles guidelines. For unsignalized intersections, operations are reported in terms of average vehicle delay, using the Highway Capacity Manual (HCM) delay-based methodology. As shown, all but three of the study locations currently operate at LOS C or better. Three locations are currently at LOS D:

- Alameda Street/Anaheim Street (PM peak hour)
- Sepulveda Boulevard/Alameda Street connector ramp east of Alameda Street (PM peak hour)
- 223rd Street/Alameda Street connector ramp east of Alameda Street (PM peak hour)

3.5.2.2.1.1 Implementation of Truck/Passenger Car Equivalencies

The presence of vehicles larger than passenger cars in the traffic stream affects traffic flow in two ways: (1) vehicles that are larger than passenger cars occupy more roadway space (and capacity) than individual passenger cars, and (2) the operational capabilities of these vehicles, including acceleration, deceleration, and maintenance of speed, are generally inferior to passenger cars, resulting in formation of gaps in the traffic stream, thereby reducing overall highway capacity.

For the LOS analysis, the forecast truck traffic volumes are converted to PCE, as follows:

- A PCE factor of 1.1 was applied to tractors (bobtails) truck volumes
- A PCE factor of 2.0 was applied to chassis truck volumes
- A PCE factor of 2.0 was applied to container truck volumes

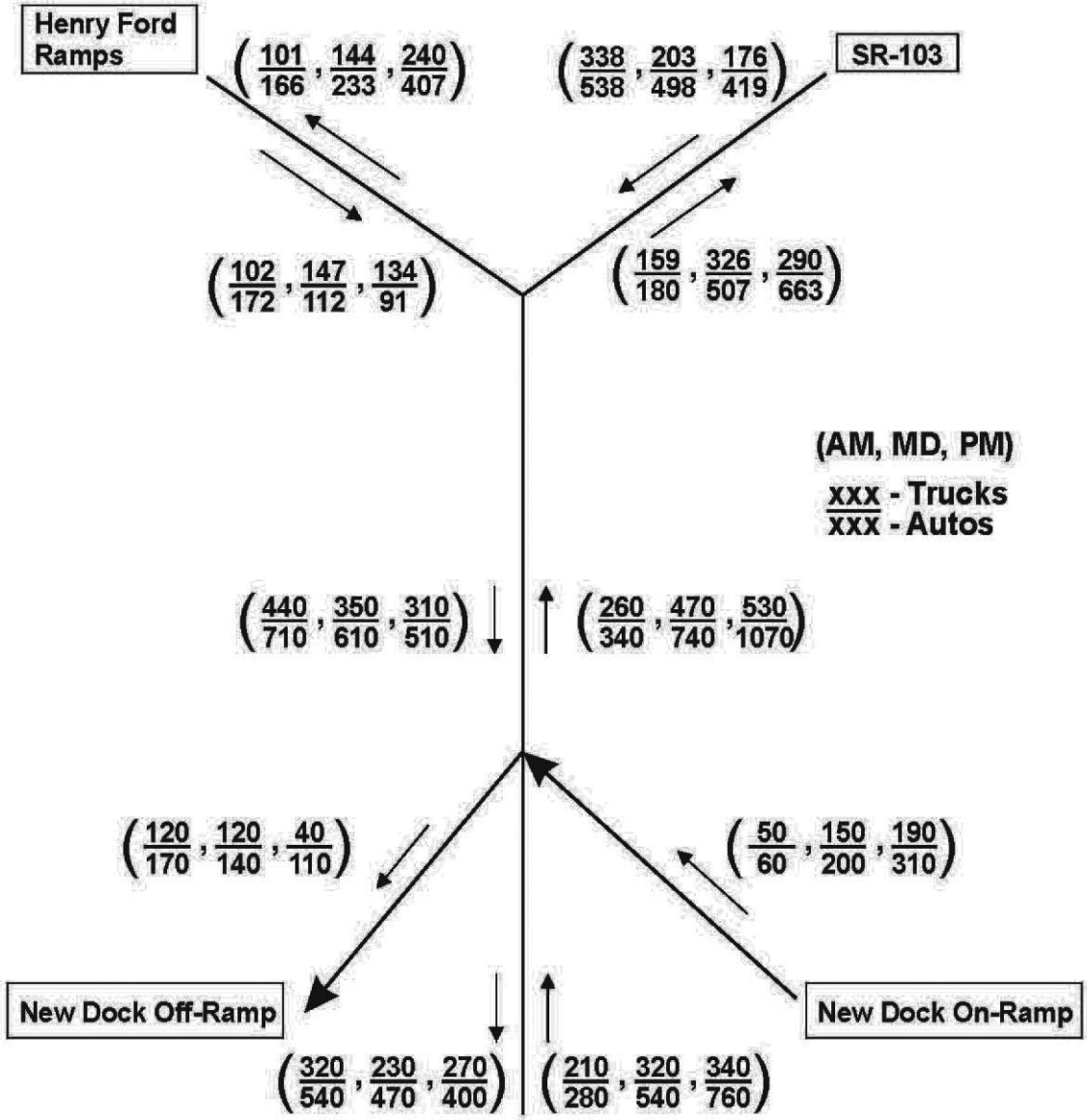

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Figure 3.5-3
Existing - SR-47 Mainline and Ramp Volumes
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

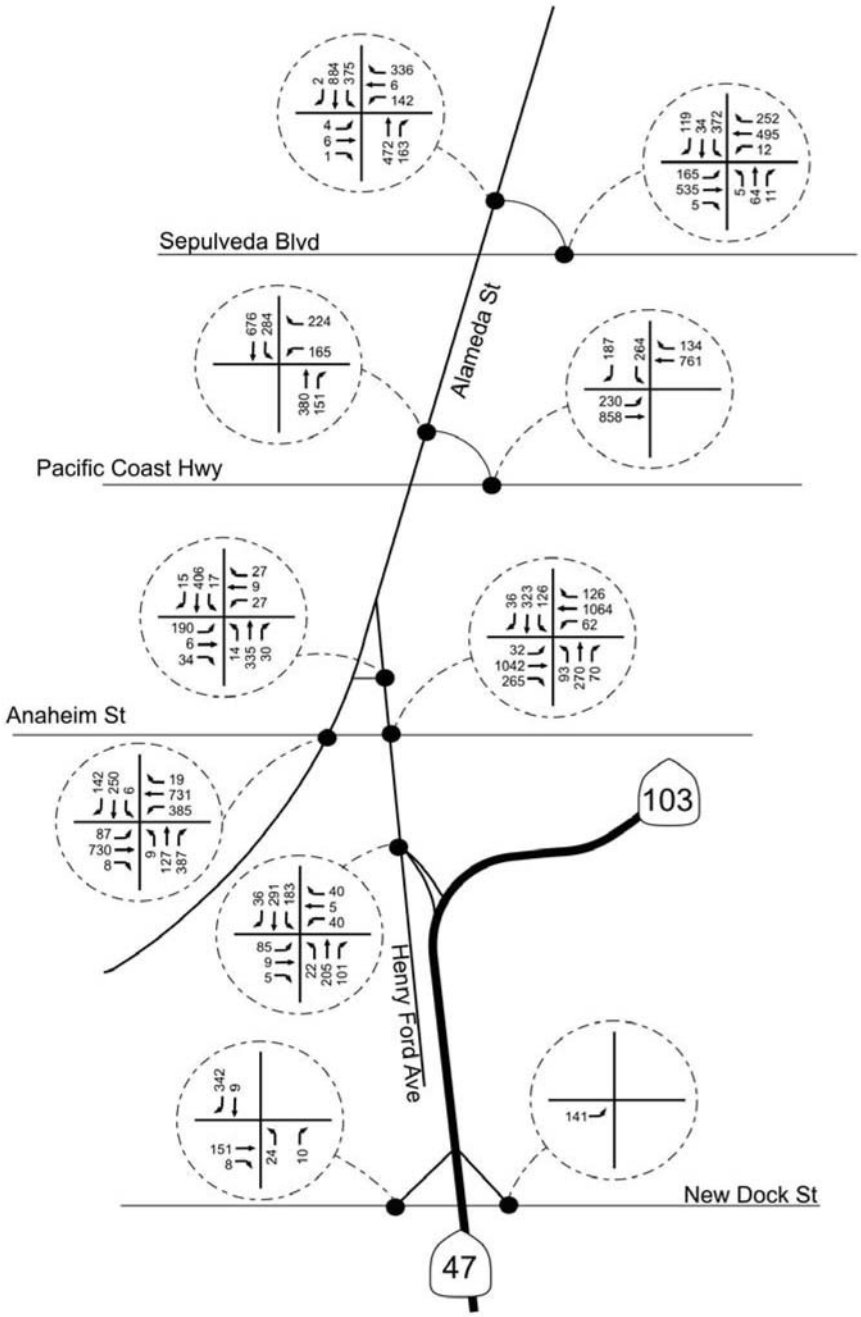

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Figure 3.5-4a
Existing AM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

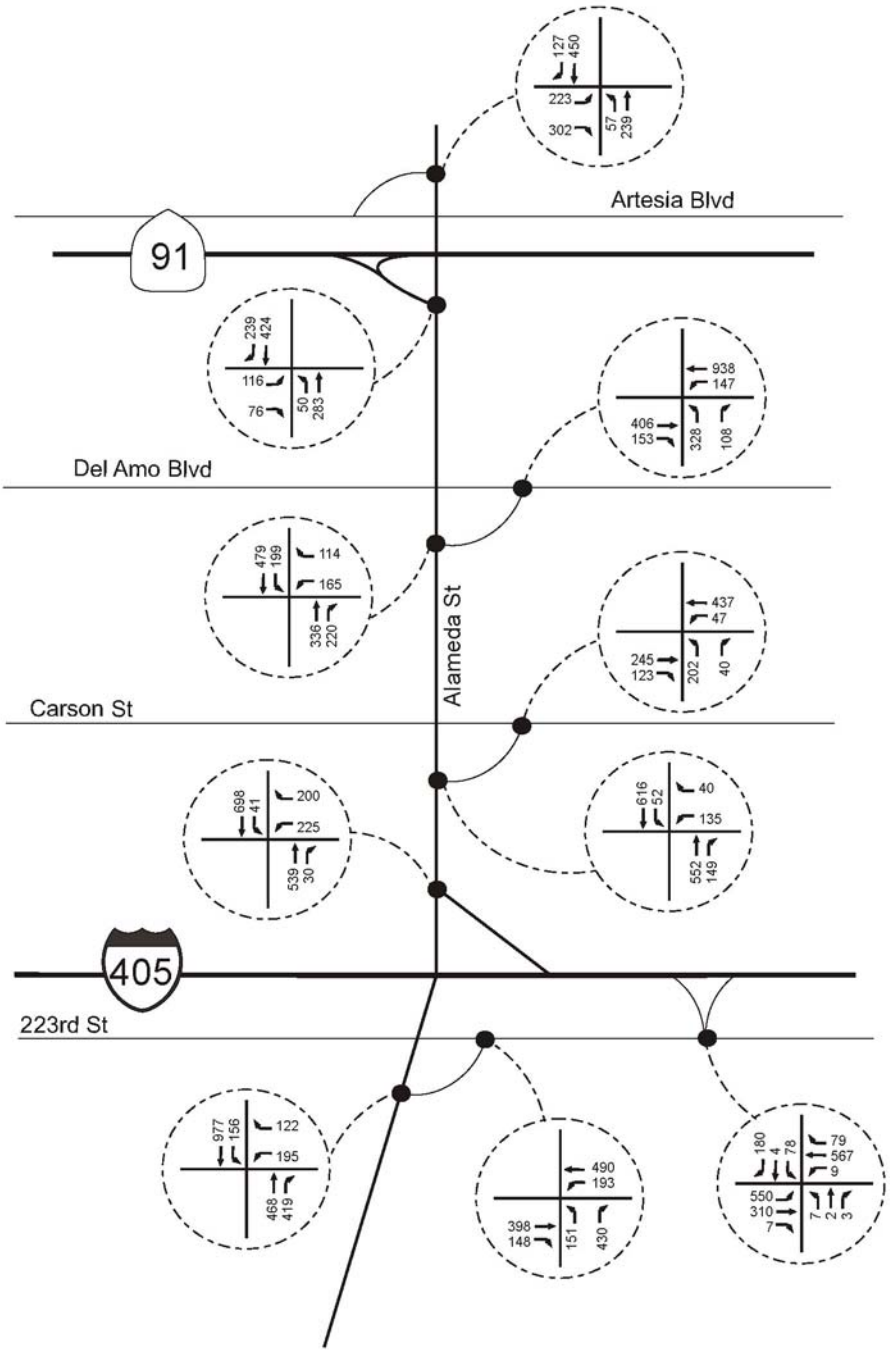

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Figure 3.5-4b
Existing AM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

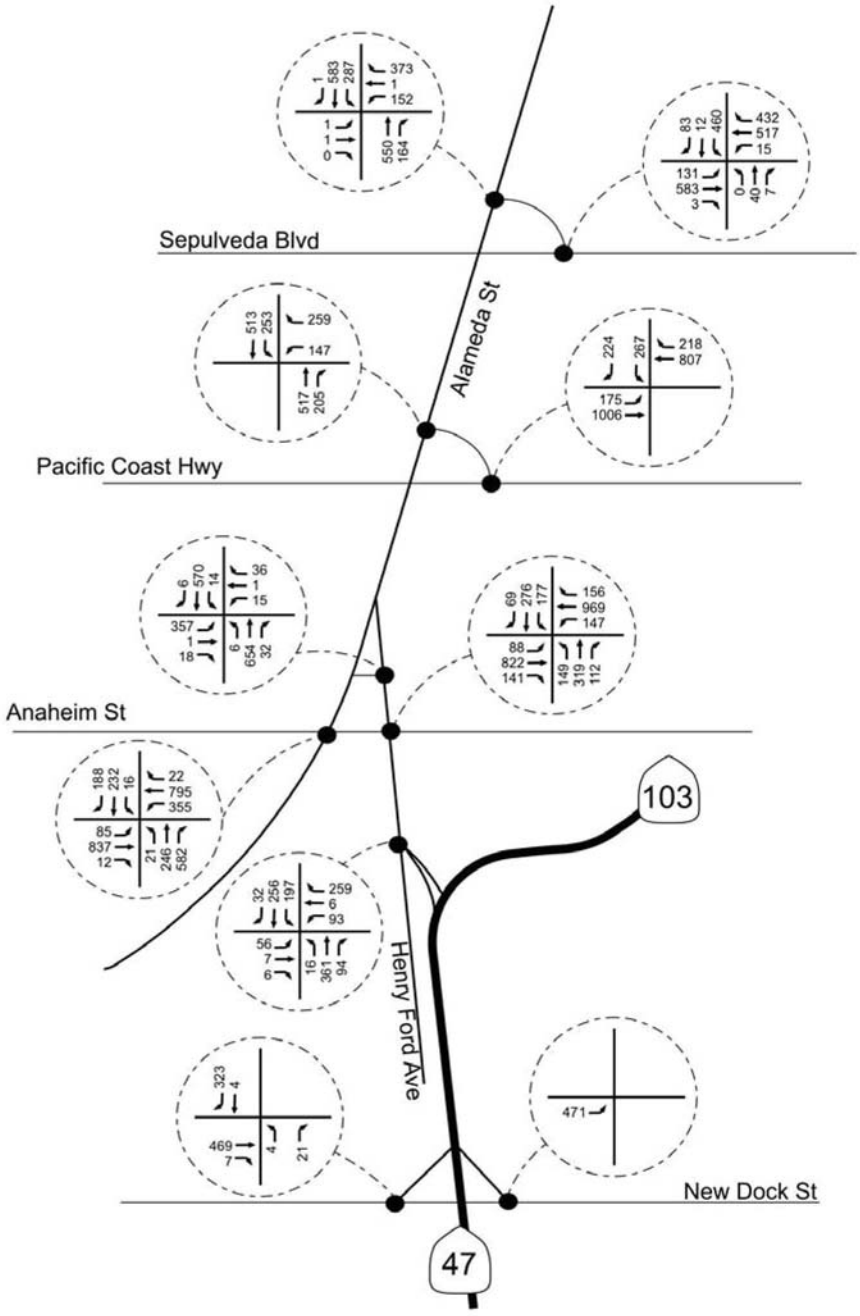

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Figure 3.5-5a
Existing MD Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

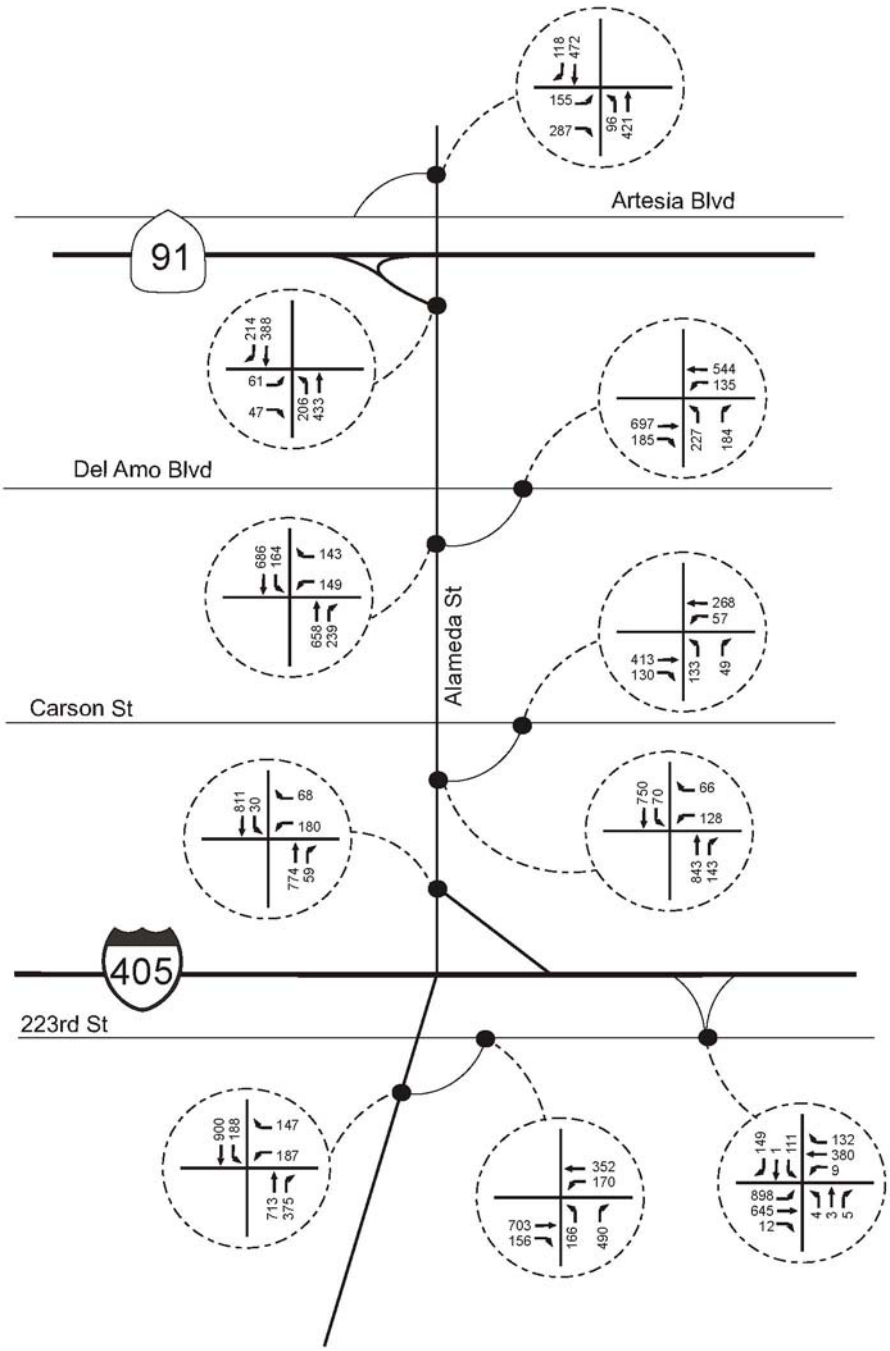

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Figure 3.5-5b
Existing MD Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

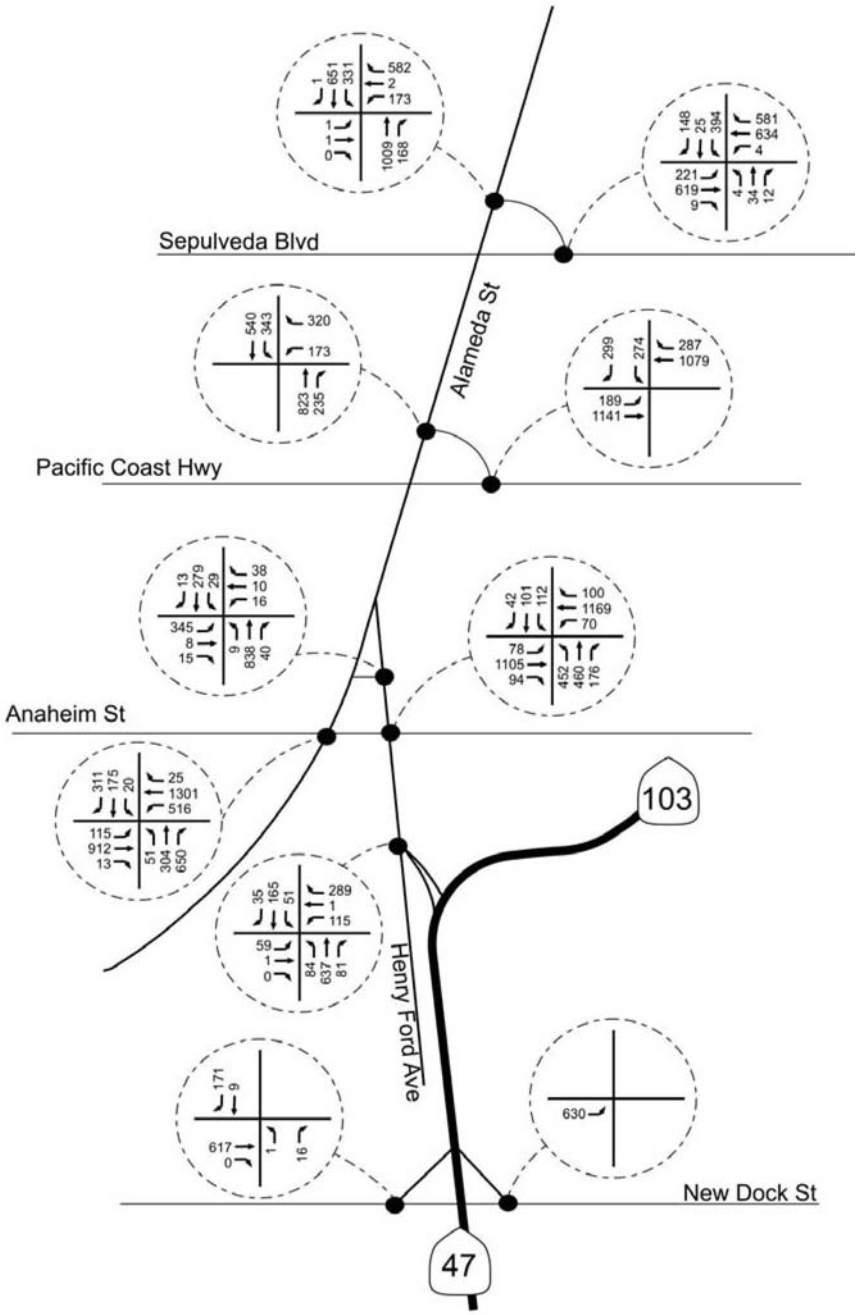

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Figure 3.5-6a
Existing PM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

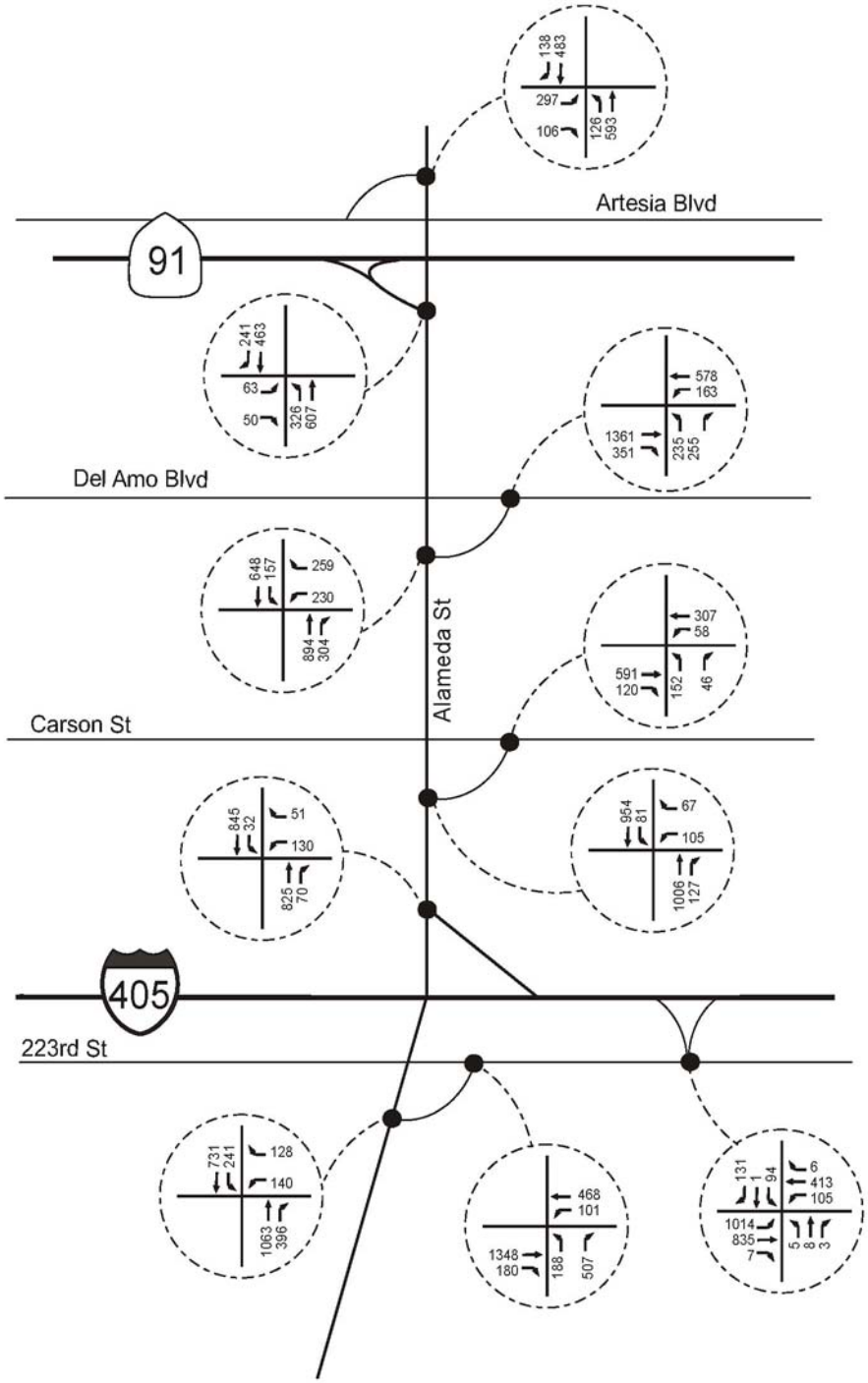

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Figure 3.5-6b
Existing PM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

Table 3.5-3
Existing Intersection Operating Conditions (PCE)*

Intersection	AM Peak Period		MD Peak Period		PM Peak Period	
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS
SR-47/New Dock SB off-ramp[a]	11.1	B	10.8	B	10.7	B
SR-47/New Dock NB on-ramp[b]	8.3	A	10.2	B	11.6	B
SR-47/Henry Ford ramps*	10.1	B	11.2	B	12.9	B
Henry Ford Avenue/Anaheim Street	0.579	A	0.639	B	0.767	C
Henry Ford Avenue/Denni Street	0.347	A	0.531	A	0.605	B
Alameda Street/Anaheim Street	0.535	A	0.718	C	0.818	D
Alameda Street/PCH Connector Ramp north of PCH	0.462	A	0.503	A	0.658	B
PCH/Alameda Street Connector Ramp east of Alameda Street	0.556	A	0.550	A	0.644	B
Alameda Street/Sepulveda Boulevard Connector Ramp north of Sepulveda Boulevard	0.536	A	0.490	A	0.690	B
Sepulveda Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.699	B	0.694	B	0.825	D
Alameda Street/223rd Street Connector Ramp south of 223rd Street	0.540	A	0.526	A	0.618	B
223rd Street/Alameda Street Connector Ramp east of Alameda Street	0.441	A	0.591	A	0.836	D
223rd Street/I-405 SB ramps	0.497	A	0.574	A	0.616	B
Alameda Street/I-405 NB ramps	0.320	A	0.342	A	0.324	A
Alameda Street/Carson Street Connector Ramp south of Carson Street	0.240	A	0.313	A	0.348	A
Carson Street/Alameda Street Connector Ramp east of Alameda Street	0.304	A	0.324	A	0.397	A
Alameda Street/Del Amo Boulevard Connector Ramp south of Del Amo Boulevard	0.288	A	0.331	A	0.462	A
Del Amo Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.346	A	0.345	A	0.523	A
Alameda Street/SR-91 EB ramps	0.216	A	0.266	A	0.381	A
Alameda Street/Artesia Boulevard north of Artesia Boulevard	0.284	A	0.344	A	0.373	A

[a] Unsignalized intersection – analyzed using HCM delay based methodology.
[b] Intersection currently does not function as standard intersection as there are no conflicting traffic movements until terminal is built-out.
*PCE – Passenger Car Equivalent (1 bobtail = 1.1 cars, 1 chassis = 2 cars, 1 container = 2 cars)
Source: MMA, 2007.

3.5.2.3 Pedestrian and Bicycle Facilities

There are few pedestrian facilities or bicycle facilities along the alternative alignments, as the area is predominantly industrial in character and has high volumes of multiple-axle truck traffic. However, pedestrian routes and street crossings for the Wilmington Park Elementary School are noted. Although most are west of Alameda Street and outside the project area, four pedestrian crossings are within the project area; three are east of Alameda Street at the intersections of Alameda Street/Robidoux Street, Alameda Street/M Street, and Alameda Street/Mauretania Street. A fourth pedestrian crossing is at the intersection of Alameda Street/Pacific Coast Highway.

The nearest bike trail is the Los Angeles River Bike Path, located along the Los Angeles River, parallel to I-710.

New continuous ADA-compliant sidewalks and curb ramps along Henry Ford Avenue are proposed. For safety reasons, pedestrians and bicycles are prohibited on the expressway.

3.5.3 Environmental Consequences

3.5.3.1 Evaluation Criteria

Study intersections fall within the City of Long Beach, City of Los Angeles, and City of Carson. The cities of Long Beach and Carson consider LOS D to be the minimum acceptable level of service. In those cities, an adverse effect is considered to be a project-related change in V/C ratio of 0.02 or greater, where the resulting "with-project" level of service is E or F. In the City of Los Angeles, LOS D is also the minimum acceptable threshold; however, the City has a sliding scale of acceptable effects for service levels C, D, E, and F. For example, a greater effect is allowed under LOS C than LOS D before being considered adverse. It is noted that Caltrans does not have LOS designations.

A regional standard approach that is consistent with the three jurisdictions is used for this analysis. An adverse effect is considered to be a project-generated change in V/C ratio of 0.02 or greater, with a final LOS of E or F.

3.5.3.2 Methodology

3.5.3.2.1 Traffic Volume Development

3.5.3.2.1.1 Year 2030 Traffic Volumes

Traffic volumes and average daily traffic (ADT) were developed using information from the Ports and from SCAG. The Port of Long Beach/Port of Los Angeles transportation model was utilized to develop traffic volumes and ADT for port-related traffic. The SCAG 2004 Regional Transportation Plan (RTP) model was used to develop traffic volumes and ADT for non-port related traffic. For port-related traffic, the 2003, 2015, and 2030 daily port truck trips were split into four time periods, as defined by SCAG, as follows: AM (6am-9am), MD (9am-3pm), PM (3pm-7pm), and Night (7pm-6am). Trip tables were then generated for port autos, bobtails, chassis, and containers for the four time periods.

Next, the non-port related traffic, including regional Drive Alone (DA), High Occupancy Vehicles (HOVs), High Occupancy Vehicles 2+ (HOV2+), Light-Heavy Duty (LHD) trucks, Medium Heavy Duty (MHD) trucks and Heavy-Heavy Duty (HHD) trucks for the four time periods, was adjusted to the ports traffic analysis zones system.

Then, the ports and regional non-port related trip tables were combined for the purpose of the highway traffic assignment, whereby trip tables for the four time periods (AM, MD, PM, and Night) were developed, each containing trip tables for the following 10 types of vehicles:

- SCAG DA
- SCAG HOV
- SCAG HOV2+
- Port Autos
- SCAG LHD Trucks
- SCAG MHD Trucks
- SCAG HHD Trucks
- Port Bobtails
- Port Chassis
- Port Containers

Finally, highway traffic assignment was performed for each time period using the SCAG highway assignment methodology. The results of the highway traffic assignments for the four time periods were then added together to obtain the forecast ADT volumes.

3.5.3.2.1.2 2030 Trip Tables

The 2030 AM, MD, and PM peak-hour regional trip tables were developed using the SCAG 2030 trip tables, which then were divided by 0.38, 0.25, and 0.27, respectively, to develop peak-hour trip tables. The peak-hour factors were developed as part of the Ports of Long Beach and Los Angeles Transportation Study model calibration and validation. The resulting model includes unique hourly trip tables, which match the peak-hour trip generation estimates that were developed for the Port zones. The trip tables were developed for 8 to 9 AM, 2 to 3 PM, and 4 to 5 PM, which are the Port AM, MD, and PM peak hours.

The analysis includes a single Schuyler Heim Bridge configuration which consists of a new bridge with two traffic lanes and one auxiliary lane in the northbound direction and three traffic lanes and one auxiliary lane in the southbound direction. Additionally, the bridge includes full shoulders.

3.5.3.2.2 Analysis Methodologies

This analysis evaluates existing and forecast Year 2030 conditions within the study area for each of the proposed alternatives. The year 2030 was used because the standard for traffic evaluation is to evaluate conditions for 20 years after opening year. The following were analyzed:

- SR-47 Expressway mainline weaving analysis for Year 2030
- Mainline operations analysis on SR-47, I-110, I-710, and SR-103
- Intersection LOS
- Arterial operations and weaving analysis of the section of Alameda Street at and north of the point where the new expressway meets the existing roadway system.

Mainline Analysis

The results of the 2030 base (without the project) mainline LOS analysis are presented in Table 3.5-4, which shows that the level of service is expected to be LOS E or better during all peak hours on SR-103 and I-110 (south of Pacific Coast Highway). The LOS on I-710 south

and north of Pacific Coast Highway is expected to be LOS F in both directions for all peak periods.

Table 3.5-4
Year 2030 Mainline Level-of-Service (without the project)

Location	2030 Base					
	AM		MD		PM	
	Density	LOS	Density	LOS	Density	LOS
NB Alameda Corridor Expressway – south of PCH	NA	NA	NA	NA	NA	NA
SB Alameda Corridor Expressway – south of PCH	NA	NA	NA	NA	NA	NA
NB SR-103 – south of PCH	22.7	C	25.7	C	31.1	D
SB SR-103 – south of PCH	21.6	C	20.6	C	11.6	B
NB Interstate 710 – south of PCH	> 45	F	>45	F	> 45	F
SB Interstate 710 – south of PCH	> 45	F	>45	F	> 45	F
NB Interstate 710 – north of PCH	> 45	F	>45	F	> 45	F
SB Interstate 710 – north of PCH	> 45	F	>45	F	> 45	F
NB Interstate 110 – south of PCH	35.2	E	32.0	D	29.1	D
SB Interstate 110 – south of PCH	26.9	D	30.0	D	37.2	E

Source: MMA, 2007.

Intersection Analysis

Table 3.5-5 summarizes the 2030 AM, MD, and PM peak-hour levels of service at 20 intersections in the study area. The table shows that 11 of the intersections are forecast to operate at LOS E or LOS F during one or more peak hours in 2030 without the project.

3.5.3.3 Evaluation of Alternatives

3.5.3.3.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

3.5.3.3.1.1 Construction Effects

Construction of Alternative 1 requires closing lanes on the existing Schuyler Heim Bridge, resulting in impacts to traffic operations.

Port truck traffic is heaviest during MD and PM peak hours. To accommodate expected flows during the peak hours, the Schuyler Heim Bridge is assumed to have two lanes in the northbound direction and one lane in the southbound direction open during the construction period. To analyze the effect of lane closures, traffic model estimates of traffic diversion due to bridge closure were generated. On both I-110 and I-710, truck volumes were projected to increase by 10 to 80 trucks per hour during the AM, MD, and PM peaks, with the highest increases in the MD peak. Most surface streets were projected to have decreases in truck volumes, with only minor increases (10 to 20 trucks per hour) on parts of Pacific Coast Highway and Sepulveda Boulevard.

During bridge closures, traffic volumes will decrease on SR-103 and Henry Ford Avenue because most of the traffic affected by bridge closure (especially trucks) is expected to use the I-110 and I-710 Freeways to get in and out of the Port area. When these routes are operating at acceptable levels of service (LOS D or better), no congestion is anticipated.

However, when I-110 and I-710 are already operating at LOS E or LOS F, the addition of traffic diverted from the Schuyler Heim Bridge may result in added congestion and delays.

Transit service is anticipated to be interrupted or rerouted occasionally during construction. After construction, transit service is expected to resume normal operations.

Table 3.5-5
Year 2030 Projected Intersection Conditions (without the project)*

Intersection	AM		MD		PM	
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS
SR-47/New Dock SB off-ramp**	35.8	E	68.8	F	15.6	C
SR-47/New Dock NB on-ramp**	15.8	C	29.5	D	37.1	E
SR-47/Henry Ford ramps**	31.4	D	75.5	F	139.6	F
Henry Ford Avenue/Anaheim Street	0.991	E	1.073	F	1.167	F
Henry Ford Avenue/Denni Street	0.540	A	0.778	C	0.812	D
Alameda Street/Anaheim Street	0.822	D	1.095	F	1.122	F
Alameda Street/PCH Connector Ramp north of PCH	1.266	F	1.357	F	1.367	F
PCH/Alameda Street Connector Ramp east of Alameda Street	1.001	F	0.949	E	1.024	F
Alameda Street/Sepulveda Boulevard Connector Ramp north of Sepulveda Boulevard	1.011	F	1.160	F	1.296	F
Sepulveda Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.781	C	0.909	E	1.008	F
Alameda Street/223rd Street Connector Ramp south of 223rd Street	0.857	D	0.993	E	1.093	F
223rd Street/Alameda Street Connector Ramp east of Alameda Street	0.620	B	0.639	B	0.901	E
223rd Street/I-405 SB ramps	0.552	A	0.700	C	0.683	B
Alameda Street/I-405 NB ramps	0.691	B	0.711	C	0.711	C
Alameda Street/Carson Street Connector Ramp south of Carson Street	0.469	A	0.64	B	0.697	B
Carson Street/Alameda Street Connector Ramp east of Alameda Street	0.403	A	0.432	A	0.562	A
Alameda Street/Del Amo Boulevard Connector Ramp south of Del Amo Boulevard	0.611	B	0.724	C	0.792	C
Del Amo Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.676	B	0.577	A	0.678	B

Table 3.5-5
Year 2030 Projected Intersection Conditions (without the project)*

Intersection	AM		MD		PM	
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS
Alameda Street/SR-91 EB ramps	0.263	A	0.358	A	0.333	A
Alameda Street/Artesia Boulevard north of Artesia Boulevard	0.320	A	0.543	A	0.502	A

* Based on PCE volumes (1 bobtail = 1.1 cars, 1 chassis = 2 cars, 1 container = 2 cars)
** Unsignalized intersection – analyzed using HCM delay based methodology.
Source: MMA, 2007.

Schuyler Heim Bridge

The forecasted 2011 peak-hour traffic volumes and LOS on the Schuyler Heim Bridge during construction are summarized in Tables 3.5-6 and 3.5-7, respectively. The bridge capacity and the average speed are assumed to be 1,500 passenger cars per hour per lane (pcphpl) and 25 mph, respectively, LOS E is the worst-case condition, which would occur southbound during the morning peak. At other times, the bridge would operate at LOS D or better.

Table 3.5-6
Forecasted 2011 Construction Period Peak-Hour Traffic Volumes on Schuyler Heim Bridge

Peak Hour	Northbound (2 Lanes Only)			Southbound (1 Lane Only)		
	Auto Traffic	Truck Traffic	Total PCE* Traffic	Auto Traffic	Truck Traffic	Total PCE* Traffic
AM	240	170	520	450	400	1170
Midday	380	580	1390	170	470	960
PM	810	400	1480	250	150	500

*PCE – Passenger Car Equivalent (1 bobtail = 1.1 cars, 1 chassis = 2 cars, 1 container = 2 cars)
Source: MMA, 2007.

Table 3.5-7
Level of Service along Schuyler Heim Bridge during Construction

Peak Hour	Northbound		Southbound	
	V/C Ratio	LOS	V/C Ratio	LOS
AM	0.17	E or Better	0.75	E or Better
Midday	0.45	E or Better	0.62	E or Better
PM	0.48	E or Better	0.32	E or Better

Source: *Traffic Study Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (MMA, 2007).

New Dock Street Southbound On-ramp and Off-ramp Closures

Off-Ramp Closure

During project construction, the New Dock Street off-ramp from SR-47 will be closed for several months. To analyze the effect of this closure, the TDF traffic model was run for freeways and surface streets in the study area, with the New Dock Street off-ramp closed and the number of lanes on the Schuyler Heim Bridge reduced. The model showed a

reduction of 140, 130, and 60 trucks using southbound Schuyler Heim Bridge during the AM, MD, and PM peak hours, respectively. These trucks are mostly diverted to I-710 and I-110.

On-Ramp Closure

During construction, the New Dock Street on-ramp from SR-47 also will be closed for several months. To analyze the effect of this closure, the TDF model was run for freeways and surface streets in the study area, with the New Dock Street on-ramp closed and the number of lanes on the Schuyler Heim Bridge reduced. The model showed a reduction of 90, 130, and 90 trucks using northbound Schuyler Heim Bridge during the AM, MD, and PM peak hours, respectively. These trucks are mostly diverted to I-710 and I-110, which increase by 40 to 70 trucks in the AM and PM peak hours, and by 30 to 110 trucks in the MD peak hour. Compared to the volumes on the I-710 and I-110, the addition of the new truck volumes is considered to be low and would not result in a change in LOS on these freeway facilities. Thus, routes currently operating at acceptable levels (LOS D or better) are not expected to become congested due to the on-ramp closure. The closure will add more traffic to I-710 during times when it operates at LOS E or LOS F, so traveler delays may become somewhat longer on the I-110 or I-710 at times when these freeways are already operating at LOS E or LOS F.

For I-110 and I-710, the addition of 40 to 70 trucks will result in an increase in demand of approximately 1 percent. At LOS D or worse, the decrease in speed associated with a 1 percent increase in demand is less than 1 mph (Transportation Research Board, 2000). For 5 miles of freeway at 50 mph, this will result in a difference in travel time of 7 seconds or less.

Conclusion

Lane closures on the Schuyler Heim Bridge and closures of the New Dock Street ramps during construction are not anticipated to have an adverse effect on traffic operations on nearby streets and highways. A part of the traffic that would normally use the Schuyler Heim Bridge and travel on SR-103 or Henry Ford Avenue is expected to use the I-110 or I-710 freeways to get into and out of the Port area. Table 3.5-6 provides an estimate of the vehicles that are forecast to use the Schuyler Heim Bridge during project construction by type (truck/auto), direction, and time of day. During the mid-day peak hour, an estimated 870 vehicles are expected to use the I-710 and I-110 freeways during the planned lane closure of the bridge during project construction. This increase in traffic on these freeways would be low compared to existing traffic volumes. As a result, traffic volumes on I-110 and I-710 south of Pacific Coast Highway are expected to show little variance due to bridge and ramp closures during project construction (see Table 3.5-8). Also, levels of service are not expected to change.

A more detailed traffic analysis and a Transportation Management Plan (TMP) will be prepared during the design phase of the selected alternative. The TMP will address strategies to enhance traffic operations during construction, such as:

- Public awareness campaign
- Alternate/detour routes with recommended signing
- Enhancements to existing signing and striping
- Safety and enforcement considerations
- Contingency plans

In addition, the TMP will assure that pedestrian access to businesses and other destinations within the construction area would be maintained throughout the construction period. If usual access points were lost, provisions for alternative access would be made. Appropriate signage would be placed to inform pedestrians of changes to usual pedestrian routes. Temporary sidewalks, if necessary, would be installed during the construction phase. To the extent feasible, disabled access would be maintained during construction.

Table 3.5-8
Forecasted 2011 Peak-Hour Traffic Volumes for I-710 and I-110

		Passenger Car Equivalent (PCE) Traffic[(a)]			
		Northbound		Southbound	
Roadway	Time of Day	Before Construction	During Construction	Before Construction	During Construction
I-710 s/o PCH	AM	5,690	5,790	6,460	6,560
	MD	6,100	6,190	6,320	6,420
	PM	6,460	6,500	6,250	6,340
I-110 s/o PCH	AM	6,410	6,420	5,190	5,360
	MD	5,950	6,030	5,860	5,730
	PM	5,650	5,700	6,790	6,870

[a] Additional detail (trucks, autos, PCE) is provided in MMA, 2007, Tables 20 and 21.
Source: MMA, 2007

Parking

During project construction, Alternative 1 is anticipated to have temporary effects to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S Terminals. Construction would affect up to 820 off-street employee parking spaces and 54 marine terminal equipment spaces (see Table 3.5-9). These temporary effects would be considered adverse and would require measures to minimize harm.

Table 3.5-9
Project-Related Off-Street Parking Requirements

Alternative	Location	Temporary Parking Spaces	Temporary Marine Terminal Equipment Parking	Permanent Parking Spaces
1/1A: Bridge Replacement and SR-47 Expressway	Pier A East	330	23	0
	Pier S	490	31	15[a]
	Total	820	54	15
2: SR-103 Extension to Alameda Street	Pier A East	330	23	0
	Pier S	490	31	15[a]
	Total	820	54	15
3: Bridge Demolition Avoidance	Pier A East	487	23	0
	Pier S	490	144	45
	Total	977	167	0

Table 3.5-9
Project-Related Off-Street Parking Requirements

Alternative	Location	Temporary Parking Spaces	Temporary Marine Terminal Equipment Parking	Permanent Parking Spaces
4: Bridge Replacement Only	Pier A East	97	23	0
	Pier S	490	31	15[a]
	Total	587	54	15
5: Transportation System Management	Undetermined		Undetermined	Undetermined
6: No Build	None		None	None

[a] Pier S permanent parking impacts estimated at 15 spaces per 0.1 acre.

Also during project construction, up to 12 off-street parking spaces at the southeast corner of Alameda Street and M Street may be removed. These parking spaces are associated with businesses that would be removed for right-of-way acquisition and would be included in the overall compensation. Also, there could be a temporary loss of 15 to 25 on-street parking spaces along the east side of Henry Ford Avenue between Grant Street and Anaheim Street during project construction.

Pedestrian and Bicycle Facilities

Project construction may interfere with pedestrian traffic. Construction may require temporary removal or blockage of sidewalks and interruption of traffic signals. Pedestrians may be required to use temporary walkways and/or adhere to construction–specific intersection control measures.

Project construction will not affect the Los Angeles River Bike Path.

3.5.3.3.1.2 Operations Effects

Alternatives 1 and 1A Traffic Conditions

Year 2030 traffic volumes with Alternative 1 for the roadways and intersections within the study area were developed using the methodology and traffic model described previously. Table 3.5-10 shows forecast link traffic volumes and changes in traffic flow due to the project. As shown, in year 2030, Alternative 1 would reduce port truck volumes on I-110 by up to 10 percent, or 110 trucks, during the PM peak hour and on I-710 by up to 11 percent, or 500 trucks, during the AM peak hour. SR-47 mainline and ramp volumes for the 2030 Alternative 1 AM, MD, and PM peak hours are shown in Figure 3.5-7. Figures 3.5-8, 3.5-9, and 3.5-10 illustrate traffic volumes at study intersections with Alternative 1 for the AM, MD, and PM peak hours, respectively.

Table 3.5-10
Year 2030 Peak Hour Traffic Volumes
Alternative 1

SEGMENT	LOCATION	2030 No-Build Modeled Volume			2030 Alternative 1 Modeled Volume			Volume Difference			Percent Difference		
		AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour
Other Vehicles (Autos and SCAG Trucks)													
Alameda Street	s/o Del Amo Boulevard	3,640	3,450	4,360	3,160	2,850	3,830	-480	-600	-530	-13%	-17%	-12%
Alameda Street	s/o I-405	4,700	4,090	5,220	3,920	3,110	4,710	-780	-980	-510	-17%	-24%	-10%
Schuyler Heim Bridge	New Dock - Henry Ford	2,300	1,310	2,770	3,000	2,120	3,850	700	830	1100	30%	63%	40%
Henry Ford	s/o Anaheim Street	1,190	710	1,530	1,020	560	1,360	-170	-150	-170	-14%	-21%	-11%
I-110	n/o Sepulveda Boulevard	13,620	13,110	15,230	13,670	13,260	15,370	50	150	140	0%	1%	1%
I-110	s/o Pacific Coast Highway	10,690	10,200	12,260	10,560	10,230	12,170	-130	30	-90	-1%	0%	-1%
I-110	s/o SR-91	18,500	17,730	19,790	18,560	17,730	19,740	60	0	-50	0%	0%	0%
I-710	n/o Sepulveda Boulevard (s/o I-405)	7,420	6,970	9,700	7,930	7,600	9,950	510	630	250	7%	9%	3%
I-710	s/o Pacific Coast Highway	6,310	6,110	8,480	6,670	6,410	8,460	360	300	-20	6%	5%	0%
I-710	s/o SR-91	11,730	11,150	13,780	12,100	11,690	14,200	370	540	420	3%	5%	3%
SR-103	s/o Pacific Coast Highway	1,630	1,090	2,100	1,990	1,560	2,550	360	470	450	22%	43%	21%
SR-103 Extension	s/o 223rd / Wardlow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SR-47 Expressway	Henry Ford to Alameda	N/A	N/A	N/A	630	500	1,140	N/A	N/A	N/A	N/A	N/A	N/A
Port Trucks													
Alameda Street	s/o Del Amo Boulevard	820	1,220	640	1,190	1,510	890	370	290	250	45%	24%	39%
Alameda Street	s/o I-405	1,260	1,630	920	1,850	2,110	1,390	590	480	470	47%	29%	51%
Schuyler Heim Bridge	New Dock - Henry Ford	2,440	3,030	1,800	2,810	3,410	2,140	360	340	330	15%	11%	18%
Henry Ford	s/o Anaheim Street	830	1,150	610	350	570	270	-480	-580	-340	-58%	-50%	-56%
I-110	n/o Sepulveda Boulevard	1,560	1,780	1,010	1,480	1,750	940	-80	-30	-70	-5%	-2%	-7%
I-110	s/o Pacific Coast Highway	1,650	1,920	1,090	1,500	1,790	980	-150	-130	-110	-9%	-7%	-10%
I-110	s/o SR-91	1,250	1,390	870	1,250	1,430	860	0	40	-10	0%	3%	-1%
I-710	n/o Sepulveda Boulevard (s/o I-405)	4,680	4,830	3,420	4,180	4,390	3,050	-500	-440	-370	-11%	-9%	-11%
I-710	s/o Pacific Coast Highway	4,160	4,500	3,220	3,810	4,110	2,870	-350	-390	-350	-8%	-9%	-11%

Table 3.5-10
Year 2030 Peak Hour Traffic Volumes
Alternative 1

SEGMENT	LOCATION	2030 No-Build Modeled Volume			2030 Alternative 1 Modeled Volume			Volume Difference			Percent Difference		
		AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour
I-710	s/o SR-91	4,170	4,230	3,050	3,850	4,030	2,810	-320	-200	-240	-8%	-5%	-8%
SR-103	s/o Pacific Coast Highway	1,600	1,980	1,170	1,140	1,490	940	-460	-490	-230	-29%	-25%	-20%
SR-103 Extension	s/o 223rd / Wardlow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SR-47 Expressway	Henry Ford to Alameda	N/A	N/A	N/A	1,500	1,660	1,130	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Car Equivalent (PCE)													
Alameda Street	s/o Del Amo Boulevard	5,170	5,770	5,610	5,290	5,660	5,490	120	-110	-120	2%	-2%	-2%
Alameda Street	s/o I-405	6,980	7,150	6,980	7,190	6,990	7,310	210	-160	330	3%	-2%	5%
Schuyler Heim Bridge	New Dock - Henry Ford	6,440	6,530	5,370	7,790	8,000	7,080	1350	1470	1710	21%	23%	32%
Henry Ford	s/o Anaheim Street	2,540	2,670	2,600	1,730	1,695	1,860	-810	-975	-740	-32%	-37%	-28%
I-110	n/o Sepulveda Boulevard	16,640	16,770	17,350	16,540	16,870	17,360	-100	100	10	-1%	1%	0%
I-110	s/o Pacific Coast Highway	13,790	13,920	14,430	13,400	13,710	14,140	-390	-210	-290	-3%	-2%	-2%
I-110	s/o SR-91	21,200	21,190	21,920	21,270	21,220	21,860	70	30	-60	0%	0%	0%
I-710	n/o Sepulveda Boulevard (s/o I-405)	15,780	15,840	16,050	15,420	15,720	15,650	-360	-120	-400	-2%	-1%	-2%
I-710	s/o Pacific Coast Highway	13,730	14,330	14,430	13,480	13,940	13,790	-250	-390	-640	-2%	-3%	-4%
I-710	s/o SR-91	19,290	19,100	19,600	19,030	19,340	19,620	-260	240	20	-1%	1%	0%
SR-103	s/o Pacific Coast Highway	4,390	4,580	4,160	3,970	4,190	4,220	-420	-390	60	-10%	-9%	1%
SR-103 Extension	s/o 223rd / Wardlow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SR-47 Expressway	Henry Ford to Alameda	N/A	N/A	N/A	3180	3410	3130	N/A	N/A	N/A	N/A	N/A	N/A

Note: Volumes for Alternative 3 are the same as those for Alternative 1.

Weaving Analysis

Operation of SR-47 Expressway was modeled for the MD peak-hour condition, which has the heaviest truck traffic on this corridor. Table 3.5-11 shows Year 2030 MD peak-hour level of service for the weaving sections on SR-47, generally from the merge/diverge points north of the New Dock Street ramps to the area where SR-47 and SR-103 split. The results indicate LOS D or better for Alternative 1.

Table 3.5-11
Alternative 1 Weaving Analysis – SR-47 between New Dock Street On- and Off-ramps and the Diverge/Merge with SR-103

Expressway Segment	Midday Peak Hour	
	Density	LOS
Southbound SR-47 north of New Dock off-ramp	13.8	B
Northbound SR-47 north of New Dock on-ramp	25.5	C

Source: MMA, 2007.

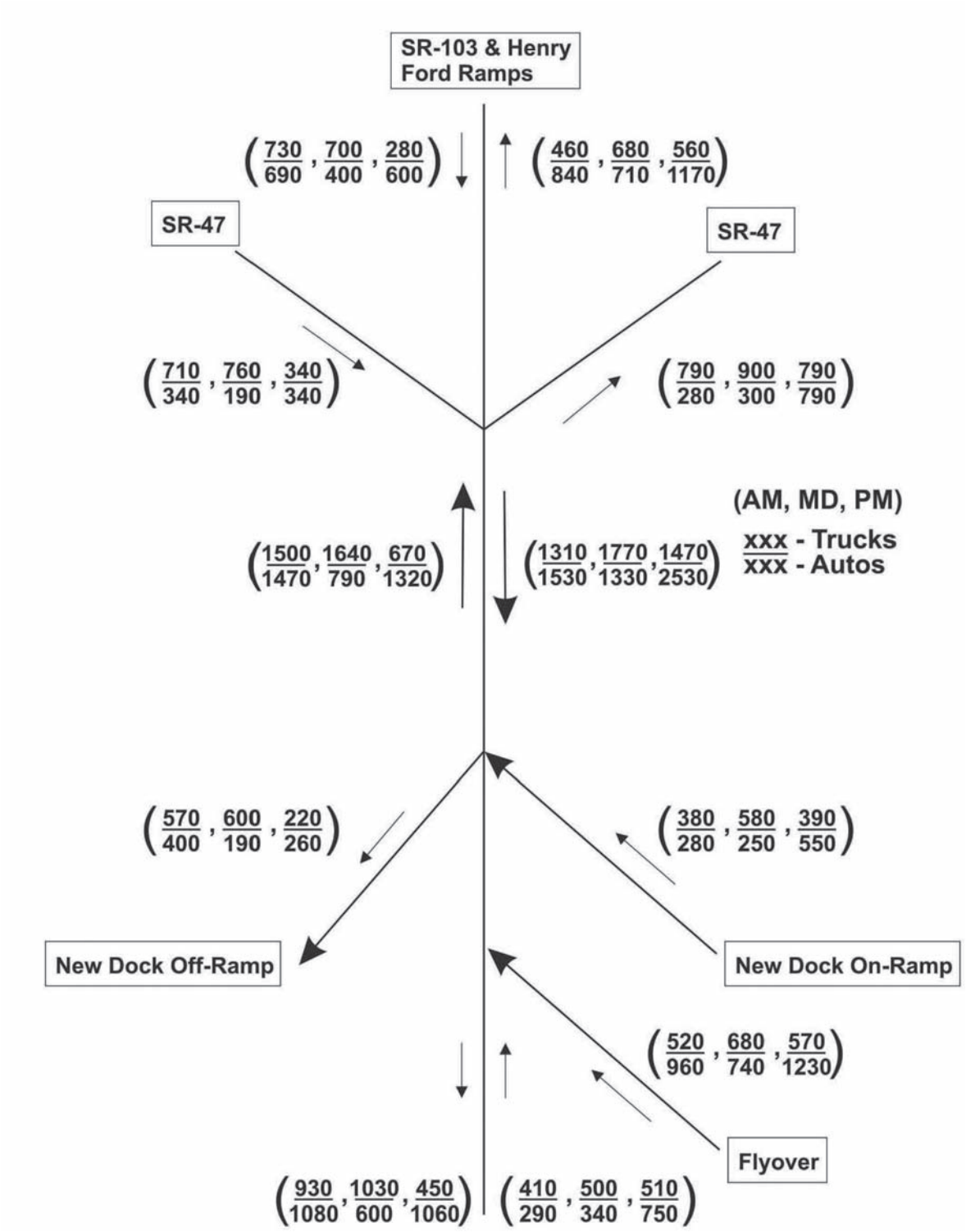
Mainline Analysis

The mainline level of service results are presented in Table 3.5-12 and shows that mainline level of service is expected to be LOS E or better during all peak hours on SR-47, SR-103, and I-110 (south of Pacific Coast Highway). The LOS on I-710 is expected to be LOS F in the northbound and southbound directions for the AM, MD and PM peak hours. Comparing the results to Table 3.5-4, the project would result in improved LOS on northbound SR-103 and I-110 south of Pacific Coast Highway and in reduced vehicle density on several other road segments.

Table 3.5-12
Year 2030 Alternative 1 Mainline Level-of-Service (PCE)*

Location	AM		MD		PM	
	Density	LOS	Density	LOS	Density	LOS
NB Alameda Corridor Expressway – south of PCH	18.2	C	21.1	C	24.2	C
SB Alameda Corridor Expressway – south of PCH	17.1	B	16.8	B	10.5	B
NB SR-103 – south of PCH	22.0	C	24.4	C	28.6	D
SB SR-103 – south of PCH	18.1	C	17.9	B	14.3	B
NB Interstate 710 – south of PCH	> 45	F	>45	F	> 45	F
SB Interstate 710 – south of PCH	> 45	F	>45	F	> 45	F
NB Interstate 710 – north of PCH	> 45	F	>45	F	> 45	F
SB Interstate 710 – north of PCH	> 45	F	>45	F	> 45	F
NB Interstate 110 – south of PCH	34.3	D	31.2	D	28.0	D
SB Interstate 110 – south of PCH	25.5	C	29.5	D	36.4	E

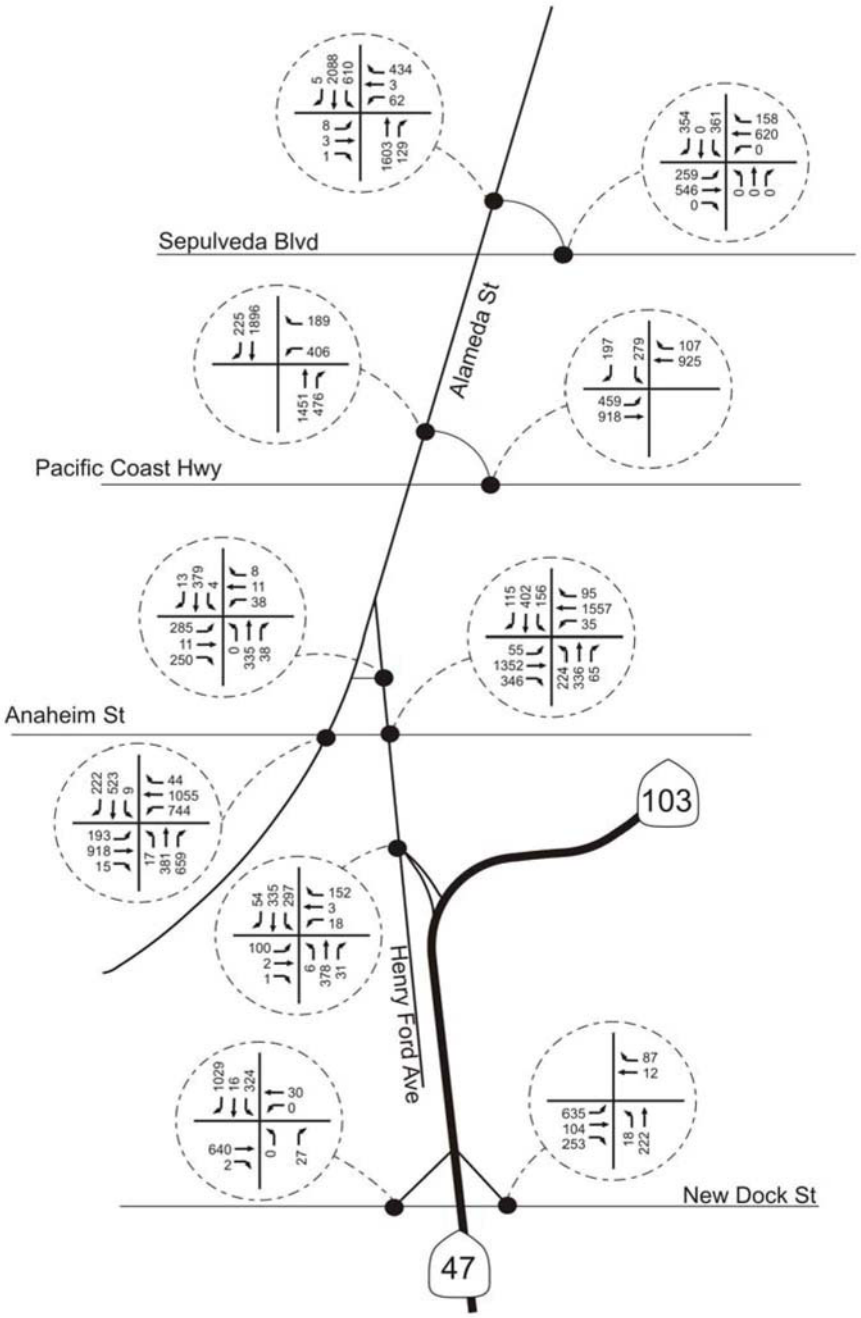
*PCE – Passenger Car Equivalent (1 bobtail = 1.1 cars, 1 chassis = 2 cars, 1 container = 2 cars)
Source: MMA, 2007.



No Scale

Figure 3.5-7
2030 Alt 1 SR-47 Mainline and Ramp Volumes
Schuyler Heim Bridge Replacement and SR-47 Expressway

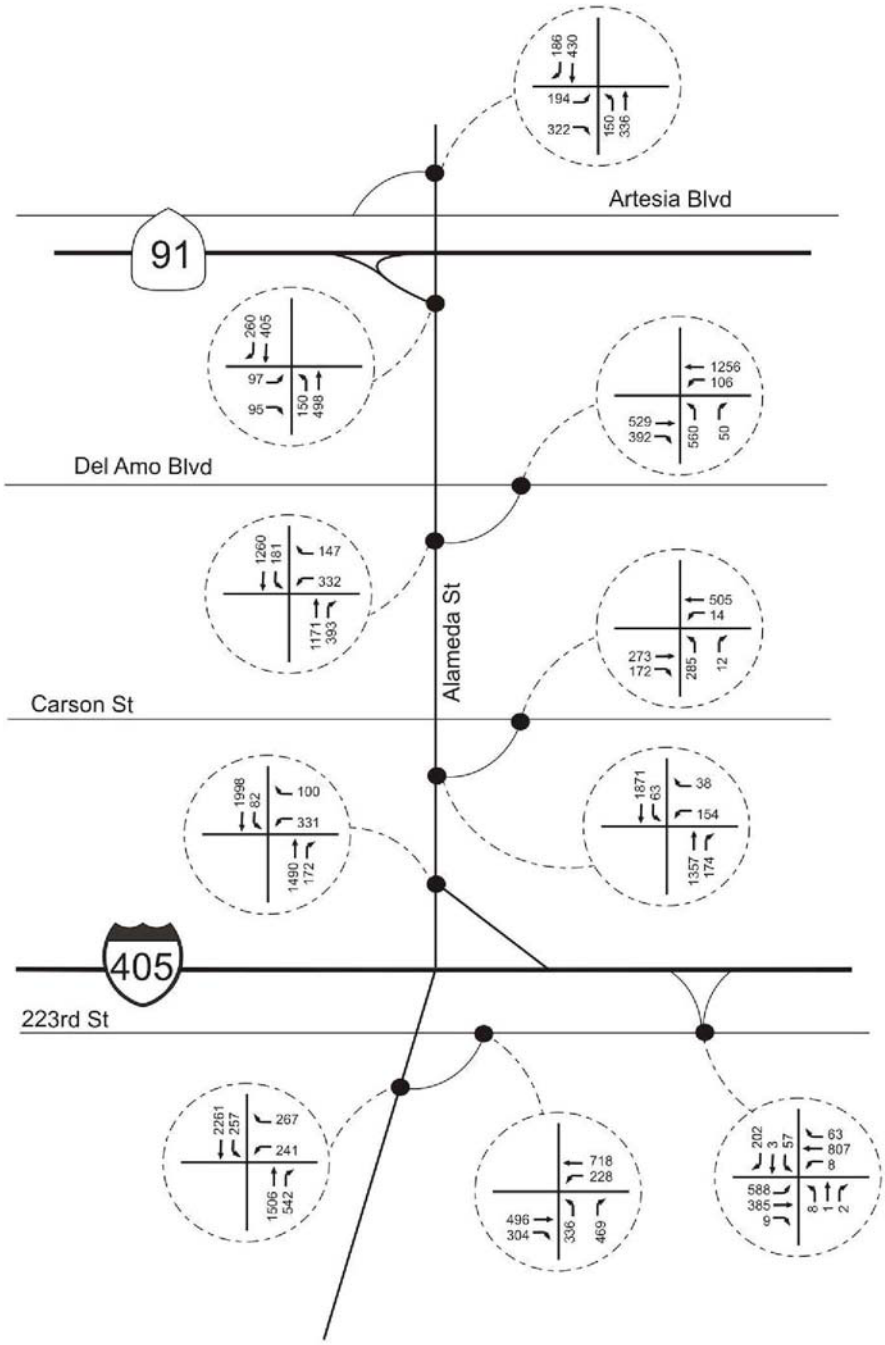
Source: Meyer, Mohaddes Associates



No Scale

Figure 3.5-8a
2030 SR-47 AM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

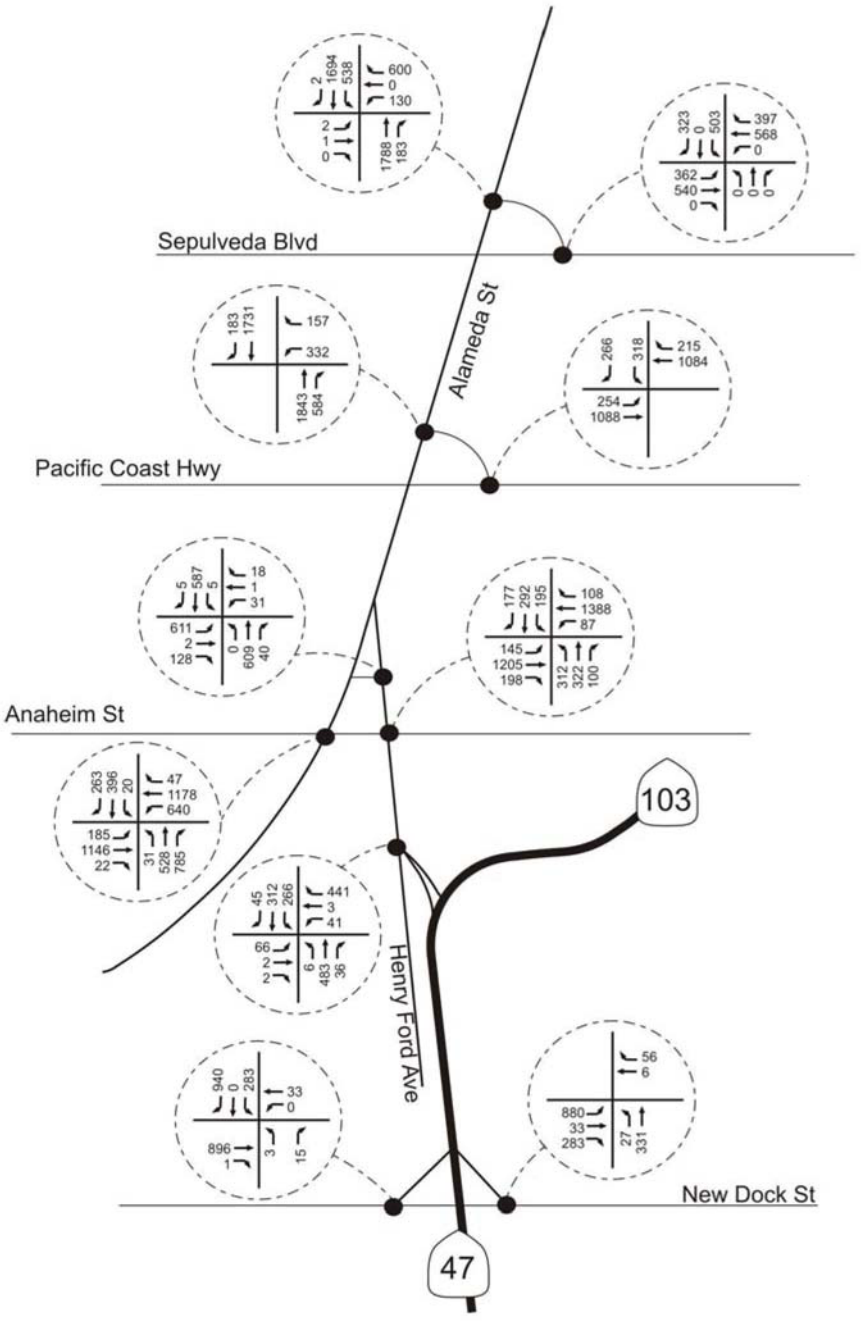
Source: Meyer, Mohaddes Associates



No Scale

Figure 3.5-8b
2030 SR-47 AM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

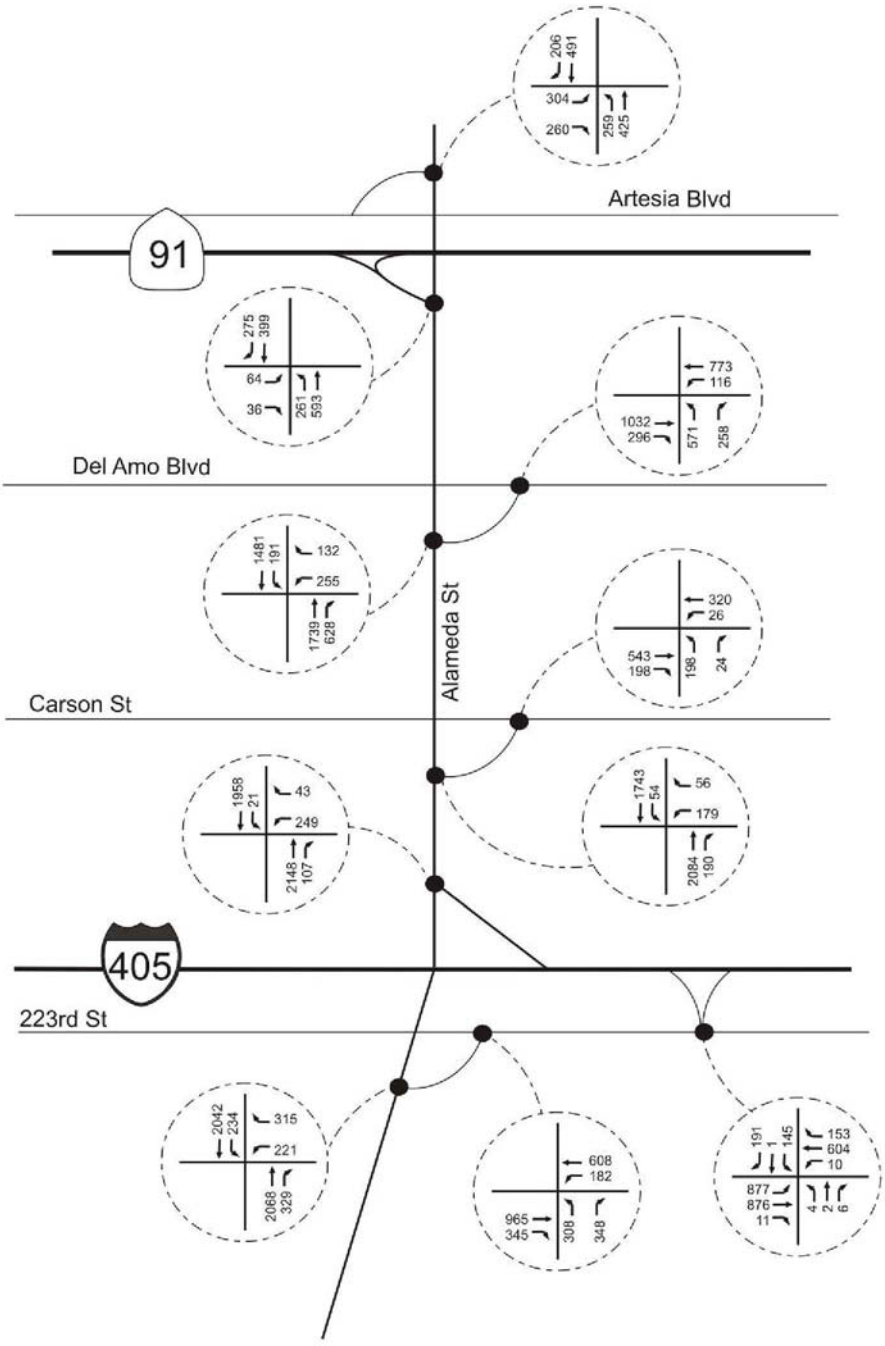
Source: Meyer, Mohaddes Associates



No Scale

Figure 3.5-9a
2030 SR-47 MD Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

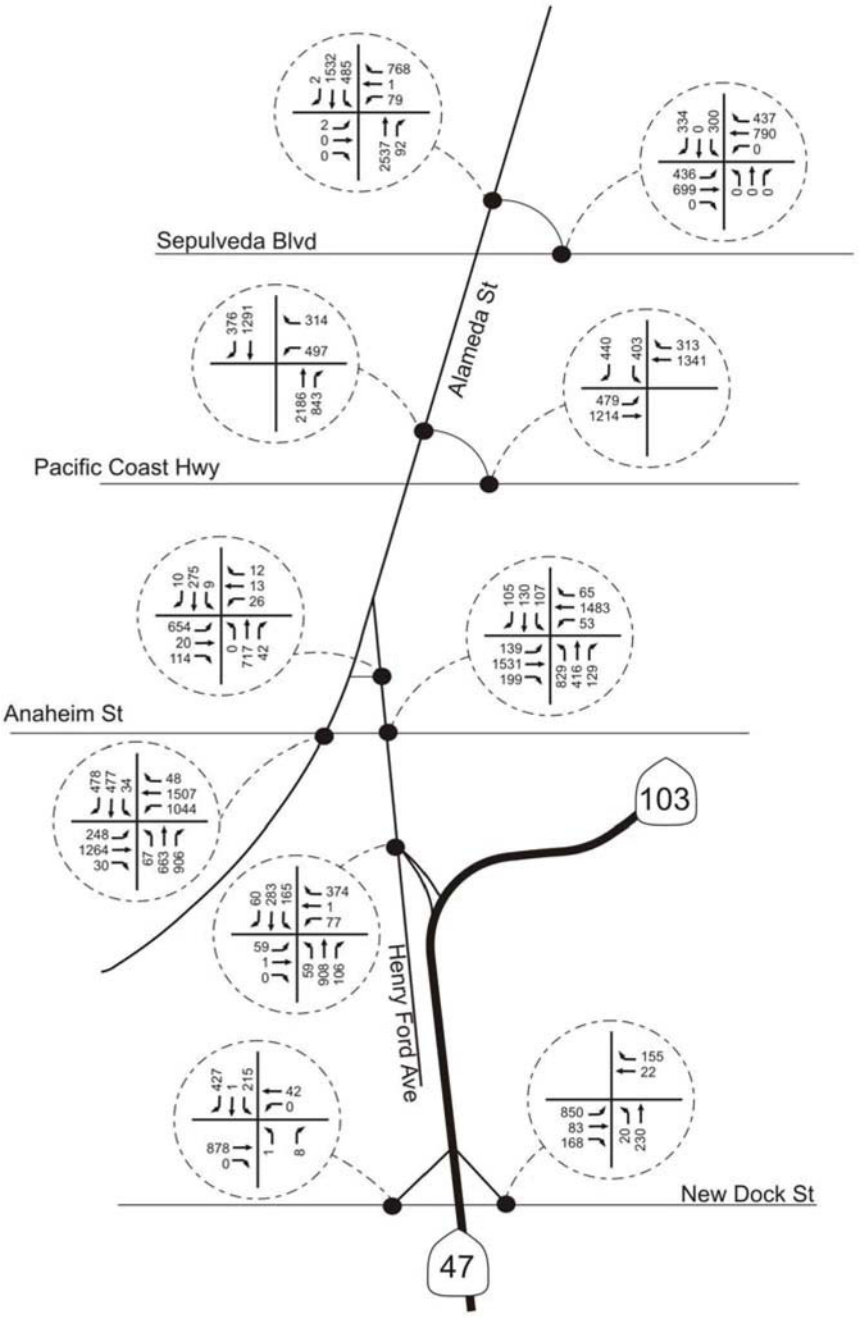
Source: Meyer, Mohaddes Associates



No Scale

Figure 3.5-9b
2030 SR-47 MD Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates



No Scale

Figure 3.5-10a
2030 SR-47 PM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

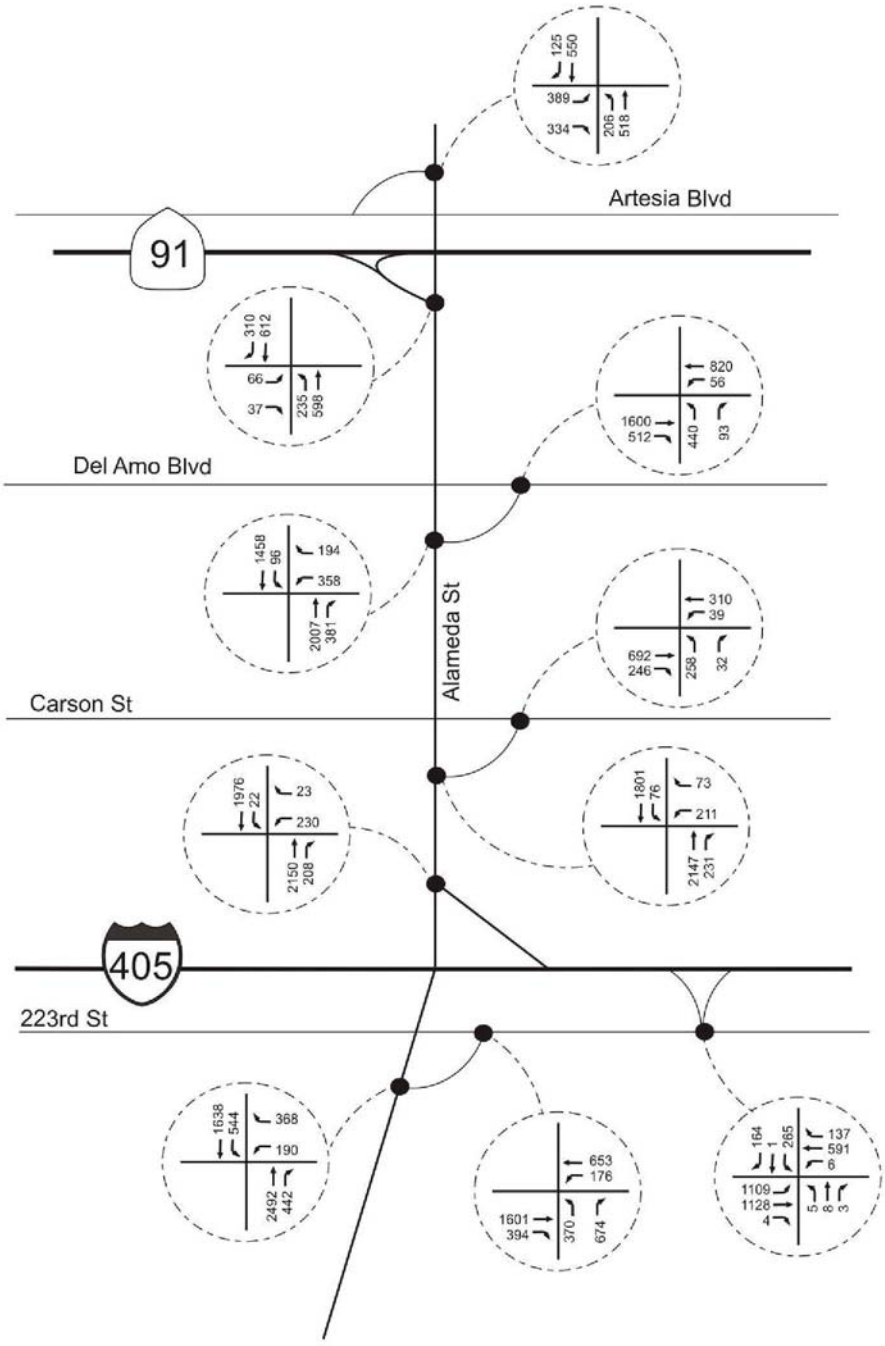


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Figure 3.5-10b
2030 SR-47 PM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

Intersection Analysis

Tables 3.5-13, 3.5-14, and 3.5-15 summarize the 2030 Alternative 1 AM, MD, and PM peak-hour levels of service at the intersections in the study area. The SR-47/Ocean Boulevard/Henry Ford Avenue interchange analysis results are presented separately in Table 3.5-16. The project does not result in any adverse effects at the study intersections.

At a few locations, the forecast is for the V/C ratio to decrease, and the level of service to improve. For the intersections of SR-47 ramps and Henry Ford Avenue, as well as Henry Ford Avenue and Anaheim Street, the improvement is due to the SR-47 Expressway providing a more attractive alternative route for north/south traffic.

The V/C ratio marginally improves at a few other locations north of the expressway; the project primarily contributes added traffic to north/south through-movements, which are grade separated. The model predicts that, in some locations, the turning movements to/from Alameda Street would be reduced slightly. Some automobile traffic is displaced to other routes due to the higher propensity for trucks and autos to use the grade-separated portions of Alameda Street.

Alternative 1 will improve the LOS at most of the intersections in comparison with Year 2030 No Build alternative with the exception of Alameda Street/223rd Street ramp during the PM peak hour. In order to mitigate the impact of additional traffic on this intersection, geometric improvements are made to the intersections as part of the project. A detailed traffic operation analysis using SYNCHRO are performed to evaluate the traffic operation of the intersections with the proposed improvements and results are presented in Table 3.5-17. As results indicate, the intersections would operate at LOS C or better.

Table 3.5-13
Year 2030 Alternative 1 AM Peak Intersection Conditions

	Base		Alternative 1		
Intersection	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	Change
SR-47/New Dock SB off-ramp*	35.8	E	35.0	D	***-0.8***
SR-47/New Dock NB on-ramp*	15.8	C	13.7	B	***-2.1***
SR-47/Henry Ford ramps*	31.4	D	13.6	B	***-11.5***
Henry Ford Avenue/Anaheim Street	0.991	E	0.842	D	***-0.149***
Henry Ford Avenue/Denni Street	0.540	A	0.380	A	***-0.16***
Alameda Street/Anaheim Street	0.822	D	0.810	D	***-0.012***
Alameda Street/PCH Connector Ramp north of PCH	1.266	F	0.692	B	***-0.574***
PCH/Alameda Street Connector Ramp east of Alameda Street	1.001	F	0.759	C	***-0.242***
Alameda Street/Sepulveda Boulevard Connector Ramp north of Sepulveda Boulevard	1.011	F	0.942	E	***-0.069***
Sepulveda Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.781	C	0.756	C	***-0.025***

Table 3.5-13
Year 2030 Alternative 1 AM Peak Intersection Conditions

Intersection	Base		Alternative 1		Change
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	
Alameda Street/223rd Street Connector Ramp south of 223rd Street	0.857	D	0.829	D	***-0.028***
223rd Street/Alameda Street Connector Ramp east of Alameda Street	0.620	B	0.542	A	***-0.078***
223rd Street/I-405 SB ramps	0.552	A	0.580	A	0.028
Alameda Street/I-405 NB ramps	0.691	B	0.700	B	0.009
Alameda Street/Carson Street Connector Ramp south of Carson Street	0.469	A	0.472	A	0.003
Carson Street/Alameda Street Connector Ramp east of Alameda Street	0.403	A	0.377	A	***-0.026***
Alameda Street/Del Amo Boulevard Connector Ramp south of Del Amo Boulevard	0.611	B	0.564	A	***-0.047***
Del Amo Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.676	B	0.566	A	***-0.11***
Alameda Street/SR-91 EB ramps	0.263	A	0.268	A	0.005
Alameda Street/Artesia Boulevard north of Artesia Boulevard	0.320	A	0.331	A	0.011

* Unsignalized intersection – analyzed using HCM delay based methodology.
Source: MMA, 2007.

Table 3.5-14
Year 2030 Alternative 1 MD Peak Intersection Conditions

Intersection	Base		Alternative 1		Change
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	
SR-47/New Dock SB off-ramp*	68.8	F	35.2	E	***-33.6***
SR-47/New Dock NB on-ramp*	29.5	D	21.3	C	***-8.2***
SR-47/Henry Ford ramps*	75.5	F	13.9	B	***-43.4***
Henry Ford Avenue/Anaheim Street	1.073	F	0.881	D	***-0.192***
Henry Ford Avenue/Denni Street	0.778	C	0.682	B	***-0.096***
Alameda Street/Anaheim Street	1.095	F	0.975	E	***-0.12***
Alameda Street/PCH Connector Ramp north of PCH	1.357	F	0.631	B	***-0.726***
PCH/Alameda Street Connector Ramp east of Alameda Street	0.949	E	0.705	C	***-0.244***
Alameda Street/Sepulveda Boulevard Connector Ramp north of Sepulveda Boulevard	1.160	F	0.992	E	***-0.168***

Table 3.5-14
Year 2030 Alternative 1 MD Peak Intersection Conditions

Intersection	Base		Alternative 1		Change
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	
Sepulveda Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.909	E	0.847	D	***-0.062***
Alameda Street/223rd Street Connector Ramp south of 223rd Street	0.993	E	0.880	D	***-0.113***
223rd Street/Alameda Street Connector Ramp east of Alameda Street	0.639	B	0.625	B	***-0.014***
223rd Street/I-405 SB ramps	0.700	C	0.653	B	***-0.047***
Alameda Street/I-405 NB ramps	0.711	C	0.717	C	0.006
Alameda Street/Carson Street Connector Ramp south of Carson Street	0.640	B	0.607	B	***-0.033***
Carson Street/Alameda Street Connector Ramp east of Alameda Street	0.432	A	0.417	A	***-0.015***
Alameda Street/Del Amo Boulevard Connector Ramp south of Del Amo Boulevard	0.724	C	0.726	C	0.002
Del Amo Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.577	A	0.543	A	***-0.034***
Alameda Street/SR-91 EB ramps	0.358	A	0.321	A	***-0.037***
Alameda Street/Artesia Boulevard north of Artesia Boulevard	0.543	A	0.471	A	***-0.072***

* Unsignalized intersection – analyzed using HCM delay based methodology.
Source: MMA, 2007.

Table 3.5-15
Year 2030 Alternative 1 PM Peak Intersection Conditions

Intersection	Base		Alternative 1		Change
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	
SR-47/New Dock SB off-ramp*	15.6	C	13.6	B	***-2.0***
SR-47/New Dock NB on-ramp*	37.1	E	19.3	C	***-17.8***
SR-47/Henry Ford Ramps*	139.6	F	18.9	C	***-97.2***
Henry Ford Avenue/Anaheim Street	1.167	F	1.013	F	***-0.154***
Henry Ford Avenue/Denni Street	0.812	D	0.753	C	***-0.059***
Alameda Street/Anaheim Street	1.122	F	1.114	F	***-0.008***
Alameda Street/PCH Connector Ramp north of PCH	1.367	F	0.893	D	***-0.474***
PCH/Alameda Street Connector Ramp east of Alameda Street	1.024	F	1.006	F	***-0.018***

Table 3.5-15
Year 2030 Alternative 1 PM Peak Intersection Conditions

Intersection	Base		Alternative 1		Change
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	
Alameda Street/Sepulveda Boulevard Connector Ramp north of Sepulveda Boulevard	1.296	F	1.140	F	***-0.156***
Sepulveda Boulevard/Alameda Street Connector Ramp east of Alameda Street	1.008	F	0.976	E	***-0.032***
Alameda Street/223rd Street Connector Ramp south of 223rd Street	1.093	F	1.201	F	0.108
223rd Street/Alameda Street Connector Ramp east of Alameda Street	0.901	E	1.035	F	0.134
223rd Street/I-405 SB ramps	0.683	B	0.796	C	0.113
Alameda Street/I-405 NB ramps	0.711	C	0.728	C	0.017
Alameda Street/Carson Street Connector Ramp south of Carson Street	0.697	B	0.656	B	***-0.041***
Carson Street/Alameda Street Connector Ramp east of Alameda Street	0.562	A	0.538	A	***-0.024***
Alameda Street/Del Amo Boulevard Connector Ramp south of Del Amo Boulevard	0.792	C	0.734	C	***-0.058***
Del Amo Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.678	B	0.583	A	***-0.095***
Alameda Street/SR-91 EB ramps	0.333	A	0.354	A	0.021
Alameda Street/Artesia Boulevard north of Artesia Boulevard	0.502	A	0.488	A	***-0.014***

* Unsignalized intersection – analyzed using HCM delay based methodology.
Source: MMA, 2007.

Table 3.5-16
Year 2030 Alternative 1 SR-47/Ocean Boulevard/Pier S Avenue Interchange Analysis Results

Scenario	Time Period	Average Intersection Delay		Overall Intersection Level of Service	
		Henry Ford	Ocean Blvd.	Henry Ford	Ocean Blvd.
Base	AM	41.5	69.2	D	E
	MD	45.0	77.2	D	E
	PM	36.6	50.8	D	D
SR-47 Expressway	AM	28.5	49.1	C	D
	MD	30.8	47.6	C	D
	PM	23.4	43.9	C	D

Source: MMA, 2007.

Table 3.5-17
Year 2030 Alternative 1 Alameda Street/223rd Street Traffic Operation Analysis Results with Project Improvements

		Alternative 1								
	Intersection	AM Peak		Cycle Length (sec.)	MD Peak		Cycle Length (sec.)	PM Peak		Cycle Length (sec.)
		LOS	Delay (sec).		LOS	Delay (sec.)		LOS	Delay (sec.)	
1	Alameda St / 223rd St Connector Ramp s/o 223rd St	B	20	120	B	19.9	120	C	25.4	120
2	223rd St / Alameda St Connector Ramp e/o Alameda St	B	18.6	120	B	17.4	120	C	31.4	120

Source: MMA, 2007.

Parking

During project operations, Alternative 1 is anticipated to have permanent effects to approximately 15 employee parking spaces at the Port of Long Beach Pier S Terminal (see Table 3.5-9). This loss of parking capacity is considered an adverse effect. Measures to minimize harm would be implemented.

During project operations, the parking spaces removed with the businesses at the corner of Alameda Street and M Street would be permanently lost, as would their associated businesses. Also, 15 to 25 on-street parking spaces along the east side of Henry Ford Avenue between Grant Street and Anaheim Street could be permanently impacted, depending on the final placement of columns for the overhead expressway. This impact is not considered adverse, as on-street parking at this location is at the discretion of the jurisdiction or Caltrans and can be removed at any time. No avoidance, minimization, mitigation, or compensation measures would be required.

Pedestrian and Motorist Safety

Project-related effects to traffic on Alameda Street between I-405 and SR-91 are addressed throughout Section 3.5.3. Compared to the 2030 base (No Project [Alternative 6]), Alternatives 1, 2, and 3 would result in additional port truck traffic on Alameda Street between I-405 and SR-91. However, with this increase in the number of port trucks, there also would be a decrease in the number of cars and other vehicles. As a result, when considered in terms of passenger car equivalents (PCE), the overall difference between traffic in 2030 with the project and traffic in 2030 without the project would be less than 10 percent. As shown, there would be a decrease in PCE under Alternatives 1 and 3, plus increases in PCE under Alternative 2.

Under Alternatives 1 and 3, although there would be an increase of 120 PCE (2 percent) during the morning (AM) peak hour, there would be decreases of 110 PCE (2 percent) and 120 PCE (2 percent) during the midday (MD) and evening (PM) peak hours. Under Alternative 2, there would be increases of 330 PCE (6 percent) during the AM peak hour, 250 PCE (4 percent) during the MD peak hour, and 220 PCE (4 percent) during the PM peak hour. Without the project, which is equivalent to Alternatives 4, 5, and 6, traffic would continue to increase compared to existing levels, based on the ongoing growth at the ports.

It is noted that, as part of the Ports Access Demonstration Projects (PADP), the City of Carson and the Los Angeles County Department of Public Works have implemented improvements to Alameda Street where it traverses the City of Carson between Lomita Boulevard and SR-91. In general, the PADP projects include street widening, repaving, grade separations, intersection and interchange improvements, and bridge improvements. In the City of Carson, PADP projects along Alameda Street include widening the roadway to six lanes, widening existing lanes, constructing and improving sidewalks, and installing grade separations at Alameda/Carson and Alameda/Del Amo. These improvements have enhanced the safety of the roadway for both motorists and pedestrians and increased the design capacity of the roadway to accommodate expected increases in port-related traffic.

Based on the above discussion, the project would utilize improvements to Alameda Street between the I-405 and SR-91. The project is not expected to adversely affect pedestrian safety.

3.5.3.3.2 Alternative 2: SR-103 Extension to Alameda Street

3.5.3.3.2.1 Construction Effects

Under Alternative 2, construction effects will be the same as those described for Alternative 1 for activities related to replacement of the Schuyler Heim Bridge and construction of the flyover. There would be no effects in the vicinity of the Consolidated Slip/Dominguez Channel, as construction would not occur in that area. Under Alternative 2, the same types of construction effects would occur along SR-103 as along SR-47 under Alternative 1.

Parking

Parking effects would be the same as under Alternative 1 (see Table 3.5-9).

3.5.3.3.2.2 Operations Effects

Year 2030 traffic volumes were developed using the methodology described in Section 3.5.3.2.1. Table 3.5-18 shows Year 2030 link traffic volumes and changes in traffic flow due to Alternative 2. SR-47 mainline and ramp volumes for the 2030 Alternative 2 AM, MD, and PM peak hours are shown in Figure 3.5-11. Figures 3.5-12, 3.5-13, and 3.5-14 illustrate study intersection volumes with Alternative 2, for the AM, MD, and PM peak hours, respectively.

Mainline Analysis

The results of the 2030 Alternative 2 Expressway mainline analysis indicate that the level of service is expected to be LOS D or better during all peak hours on southbound SR-103 (south of PCH) and I-110 (both directions, south of PCH) (Table 3.5-19). LOS on I-710 is expected to be LOS F in the northbound direction for the MD and PM peak hours, and LOS F in the southbound direction for all three peak hours. Alternative 2 is projected to improve LOS on northbound and southbound SR-47 south of Pacific Coast Highway, on northbound I-110 south of Pacific Coast Highway, and to reduce vehicle density on several other analysis segments.

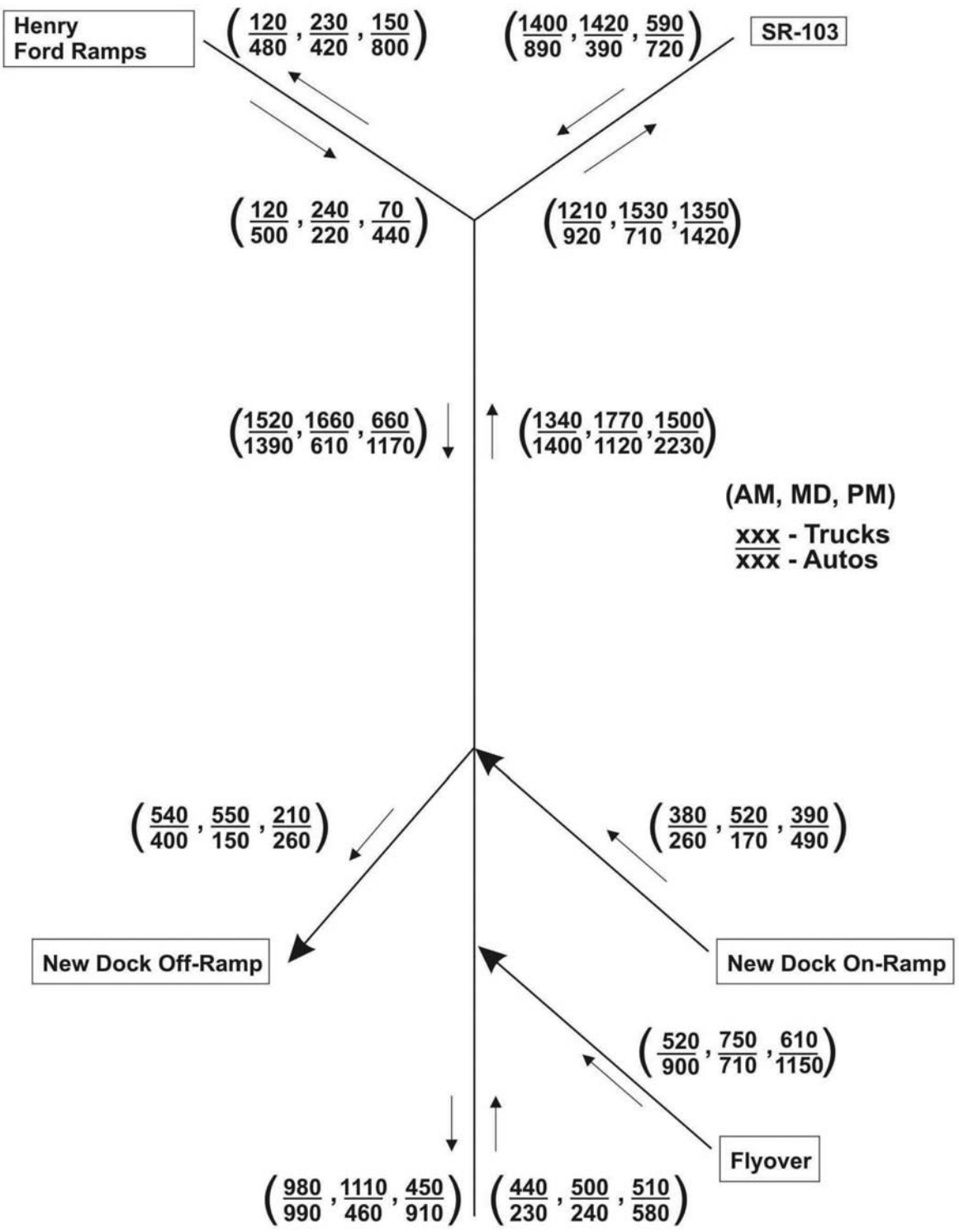
Table 3.5-18
Year 2030 Peak Hour Traffic Volumes
Alternative 2

SEGMENT	LOCATION	2030 No-Build Modeled Volume			2030 Alternative 2 Modeled Volume			Volume Difference			Percent Difference		
		AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour
Other Vehicles (Autos and SCAG Trucks)													
Alameda Street	s/o Del Amo Boulevard	3,640	3,450	4,360	3,120	2,900	3,830	-520	-550	-530	-14%	-16%	-12%
Alameda Street	s/o I-405	4,700	4,090	5,220	3,920	3,110	4,710	-780	-980	-510	-17%	-24%	-10%
Schuyler Heim Bridge	New Dock - Henry Ford	2,300	1,310	2,770	2,790	1,730	3,400	480	420	630	21%	32%	23%
Henry Ford	s/o Anaheim Street	1,190	710	1,530	1,260	780	1,630	70	70	100	6%	10%	7%
I-110	n/o Sepulveda Boulevard	13,620	13,110	15,230	13,560	13,180	15,280	-60	70	50	0%	1%	0%
I-110	s/o Pacific Coast Highway	10,690	10,200	12,260	10,510	10,190	12,150	-180	-10	-110	-2%	0%	-1%
I-110	s/o SR-91	18,500	17,730	19,790	18,610	17,850	19,910	110	120	120	1%	1%	1%
I-710	n/o Sepulveda Boulevard (s/o I-405)	7,420	6,970	9,700	7,980	7,490	10,020	560	520	320	8%	7%	3%
I-710	s/o Pacific Coast Highway	6,310	6,110	8,480	6,760	6,470	8,660	450	360	180	7%	6%	2%
I-710	s/o SR-91	11,730	11,150	13,780	12,160	11,780	14,480	430	630	700	4%	6%	5%
SR-103	s/o Pacific Coast Highway	1,630	1,090	2,100	2,270	1,660	3,010	640	570	910	39%	52%	43%
SR-103 Extension	s/o 223rd / Wardlow	N/A	N/A	N/A	840	740	1,280	N/A	N/A	N/A	N/A	N/A	N/A
SR-47 Expressway	Henry Ford to Alameda	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Port Trucks													
Alameda Street	s/o Del Amo Boulevard	820	1,220	640	1,320	1,680	1,070	500	460	430	61%	38%	67%
Alameda Street	s/o I-405	1,260	1,630	920	1,850	2,110	1,390	590	480	470	47%	29%	51%
Schuyler Heim Bridge	New Dock - Henry Ford	2,440	3,030	1,800	2,860	3,430	2,160	410	390	350	17%	13%	19%
Henry Ford	s/o Anaheim Street	830	1,150	610	450	670	290	-380	-480	-320	-46%	-42%	-52%
I-110	n/o Sepulveda Boulevard	1,560	1,780	1,010	1,400	1,620	900	-160	-160	-110	-10%	-9%	-11%
I-110	s/o Pacific Coast Highway	1,650	1,920	1,090	1,450	1,730	960	-200	-190	-130	-12%	-10%	-12%
I-110	s/o SR-91	1,250	1,390	870	1,190	1,360	850	-60	-30	-20	-5%	-2%	-2%
I-710	n/o Sepulveda Boulevard (s/o I-405)	4,680	4,830	3,420	3,960	4,170	2,920	-720	-660	-500	-15%	-14%	-15%

Table 3.5-18
Year 2030 Peak Hour Traffic Volumes
Alternative 2

SEGMENT	LOCATION	2030 No-Build Modeled Volume			2030 Alternative 2 Modeled Volume			Volume Difference			Percent Difference		
		AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour
I-710	s/o Pacific Coast Highway	4,160	4,500	3,220	3,670	4,030	2,790	-490	-470	-430	-12%	-10%	-13%
I-710	s/o SR-91	4,170	4,230	3,050	3,890	3,840	2,720	-280	-390	-330	-7%	-9%	-11%
SR-103	s/o Pacific Coast Highway	1,600	1,980	1,170	2,720	3,180	2,120	1120	1200	950	70%	61%	81%
SR-103 Extension	s/o 223rd / Wardlow	N/A	N/A	N/A	1,820	1,980	1,340	N/A	N/A	N/A	N/A	N/A	N/A
SR-47 Expressway	Henry Ford to Alameda	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Car Equivalent (PCE)													
Alameda Street	s/o Del Amo Boulevard	5,170	5,770	5,610	5,500	6,020	5,830	330	250	220	6%	4%	4%
Alameda Street	s/o I-405	6,980	7,150	6,980	7,190	6,990	7,310	210	-160	330	3%	-2%	5%
Schuyler Heim Bridge	New Dock - Henry Ford	6,440	6,530	5,370	7,650	7,660	6,640	1210	1130	1270	19%	17%	24%
Henry Ford	s/o Anaheim Street	2,540	2,670	2,600	1,940	1,890	2,110	-600	-780	-490	-24%	-29%	-19%
I-110	n/o Sepulveda Boulevard	16,640	16,770	17,350	16,280	16,540	17,200	-360	-230	-150	-2%	-1%	-1%
I-110	s/o Pacific Coast Highway	13,790	13,920	14,430	13,240	13,570	14,080	-550	-350	-350	-4%	-3%	-2%
I-110	s/o SR-91	21,200	21,190	21,920	21,190	21,210	22,000	-10	20	80	0%	0%	0%
I-710	n/o Sepulveda Boulevard (s/o I-405)	15,780	15,840	16,050	15,080	15,200	15,490	-700	-640	-560	-4%	-4%	-3%
I-710	s/o Pacific Coast Highway	13,730	14,330	14,430	13,320	13,830	13,840	-410	-500	-590	-3%	-3%	-4%
I-710	s/o SR-91	19,290	19,100	19,600	19,270	19,090	19,730	-20	-10	130	0%	0%	1%
SR-103	s/o Pacific Coast Highway	4,390	4,580	4,160	6,990	7,310	6,810	2600	2730	2650	59%	60%	64%
SR-103 Extension	s/o 223rd / Wardlow	N/A	N/A	N/A	4,000	4,280	3,700	N/A	N/A	N/A	N/A	N/A	N/A
SR-47 Expressway	Henry Ford to Alameda	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: Volumes for Alternative 3 are the same as those for Alternative 1.



No Scale

Figure 3.5-11
2030 Alt 2 SR-47 Mainline and Ramp Volumes
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

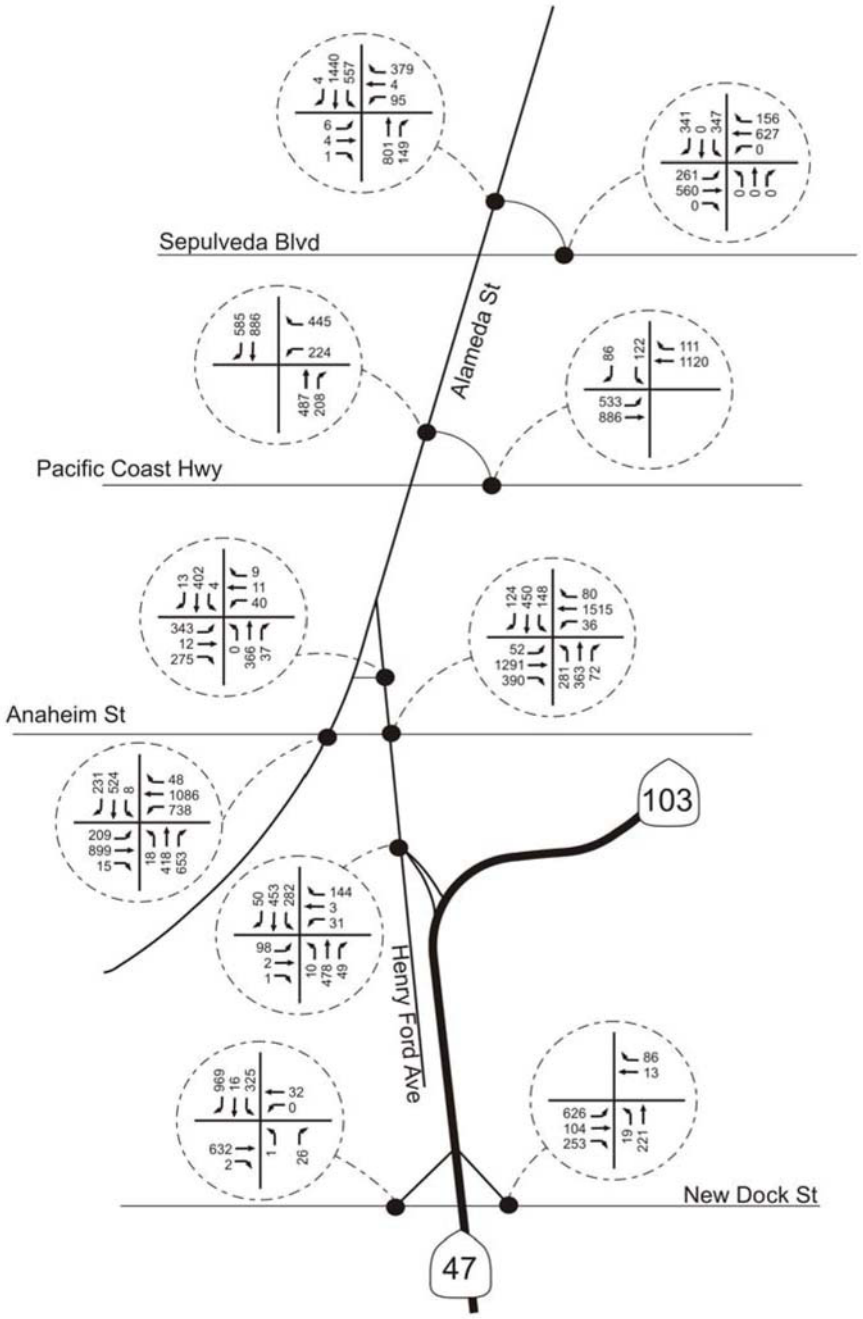


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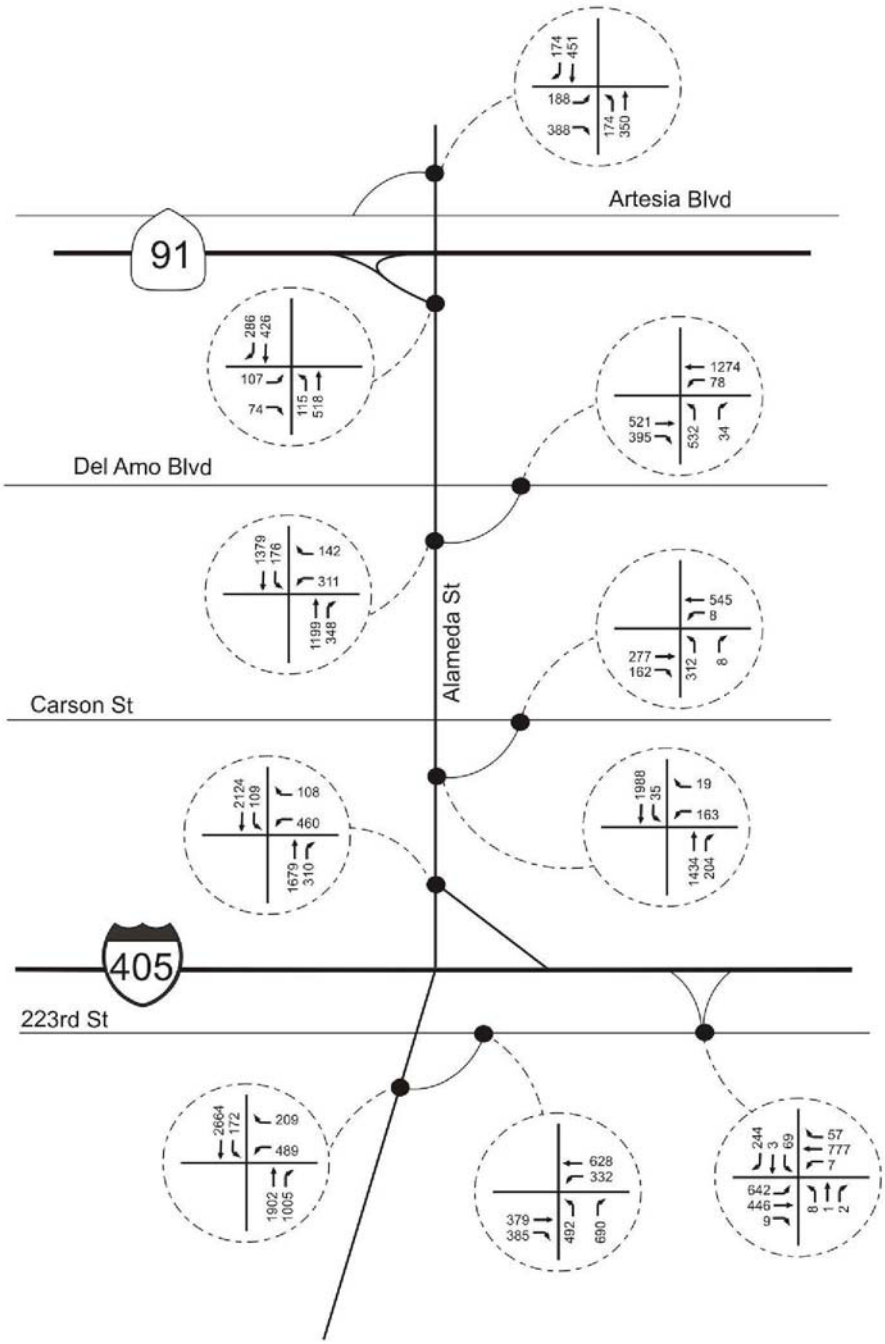
Figure 3.5-12a
2030 SR-103 AM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

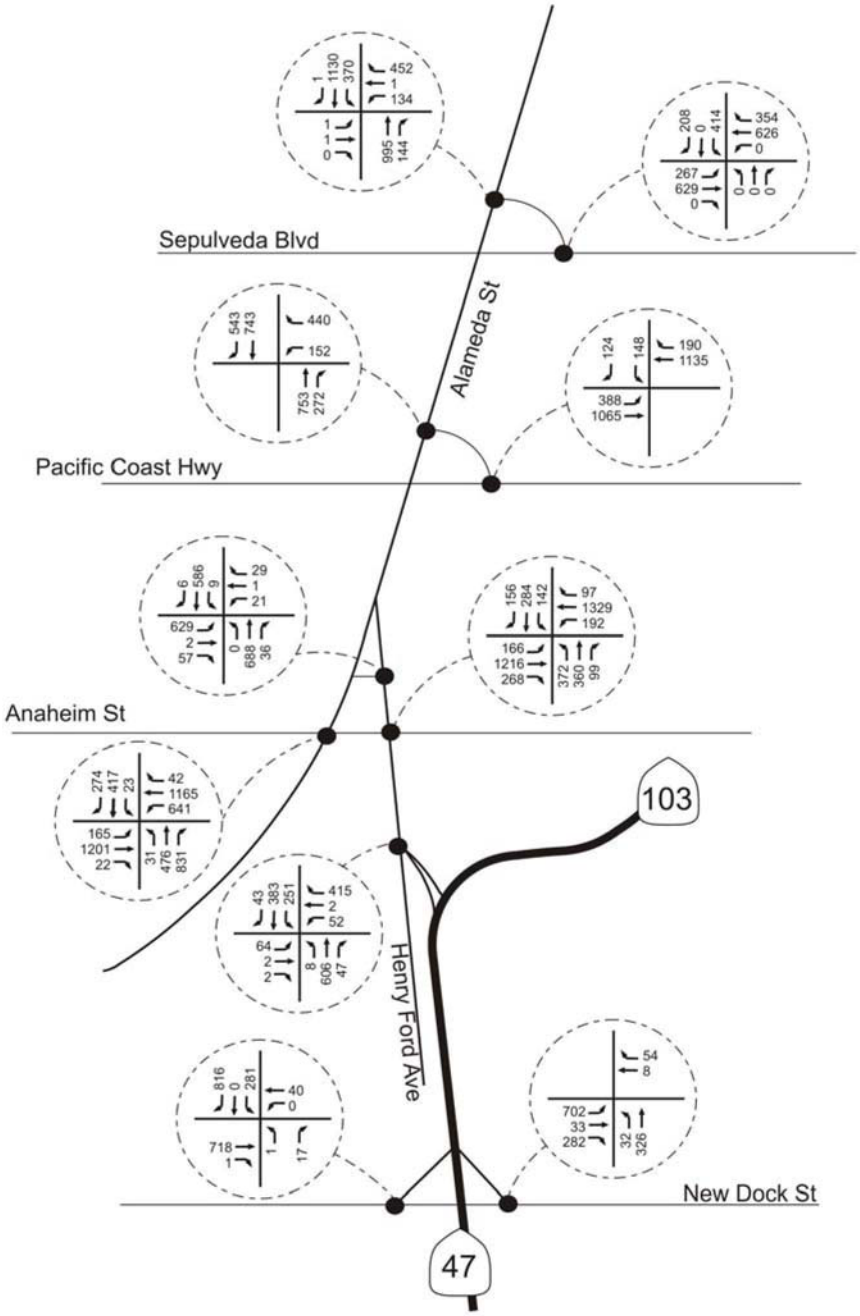
Source: Meyer, Mohaddes Associates



No Scale

Figure 3.5-12b
2030 SR-103 AM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

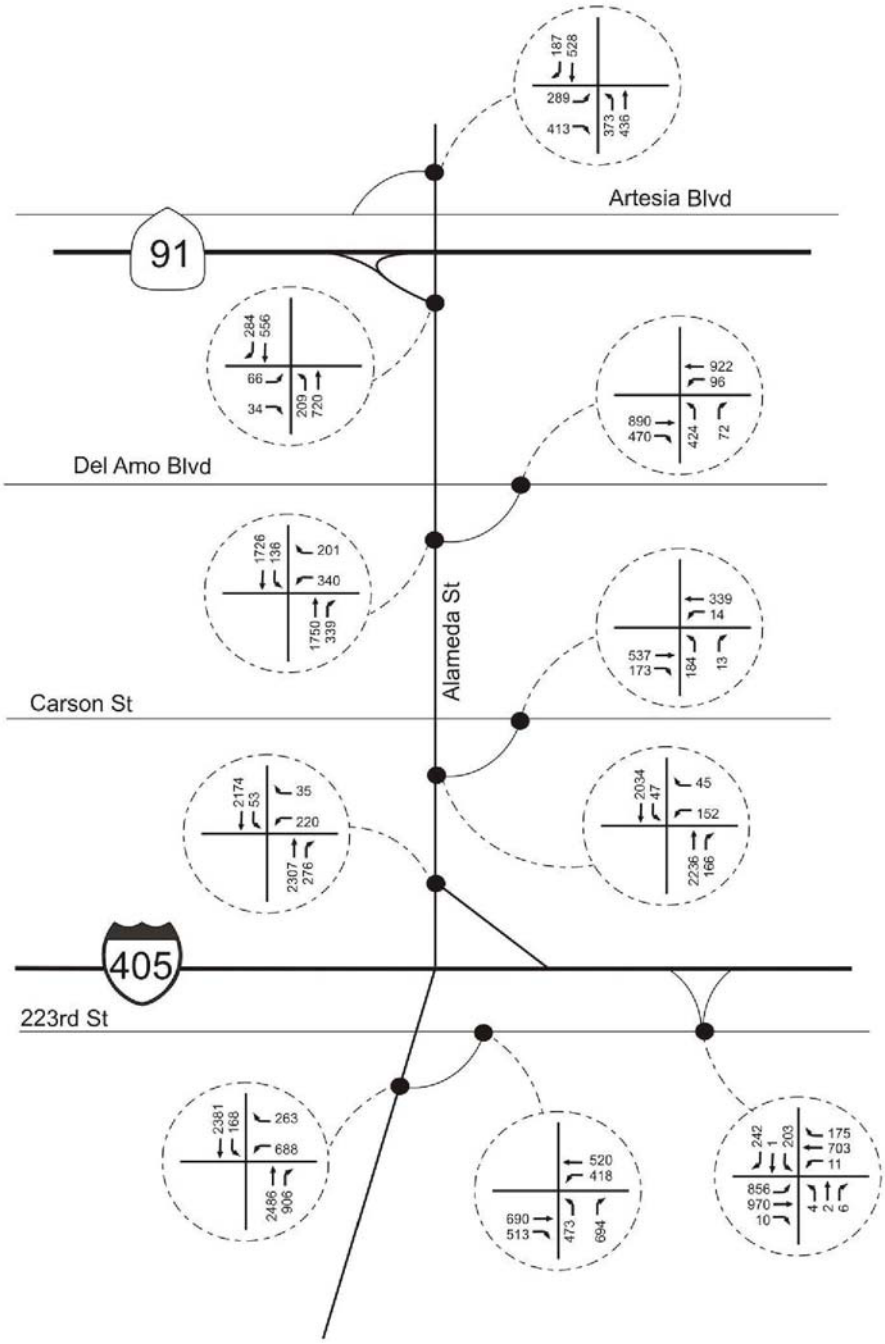
Source: Meyer, Mohaddes Associates



No Scale

Figure 3.5-13a
2030 SR-103 MD Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

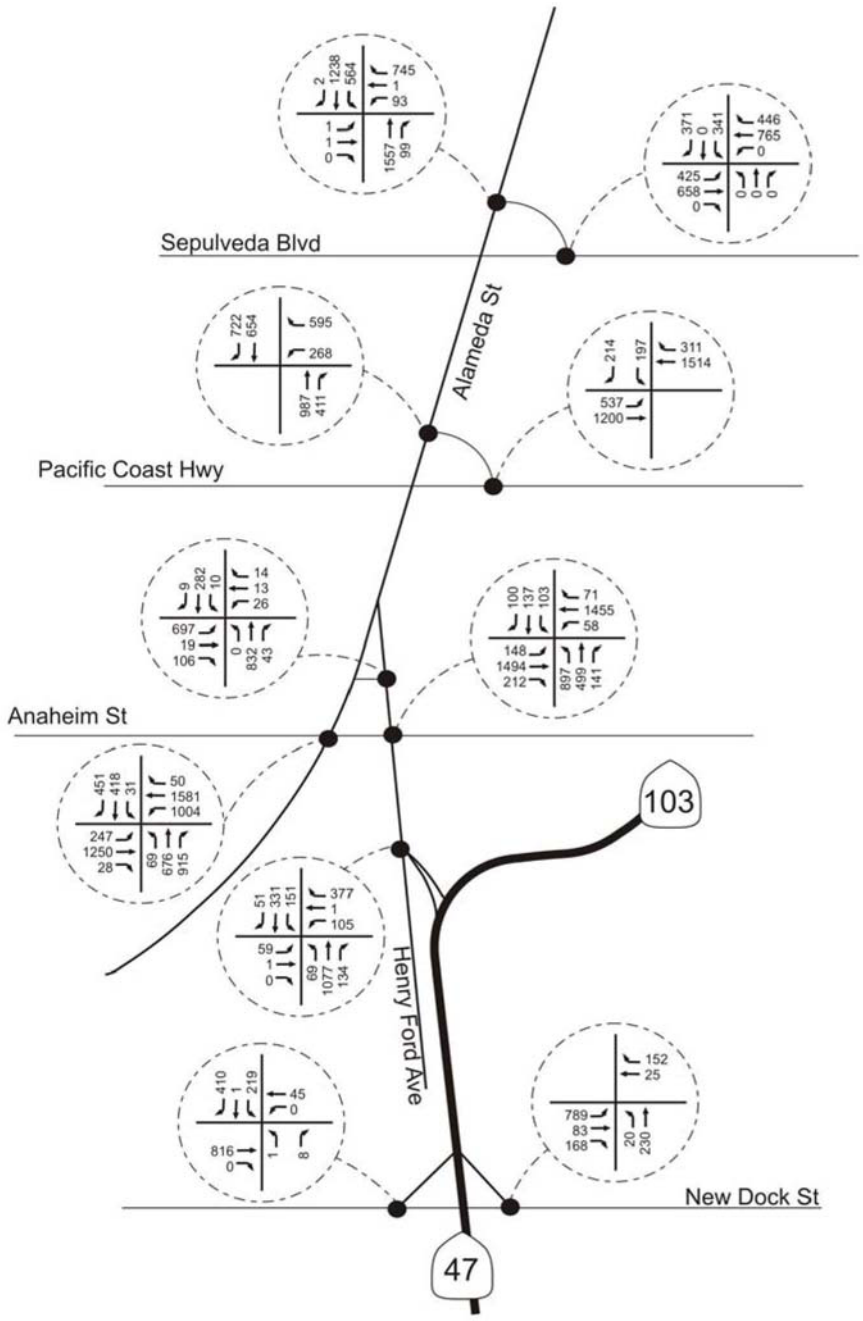
Source: Meyer, Mohaddes Associates



No Scale

Figure 3.5-13b
2030 SR-103 MD Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

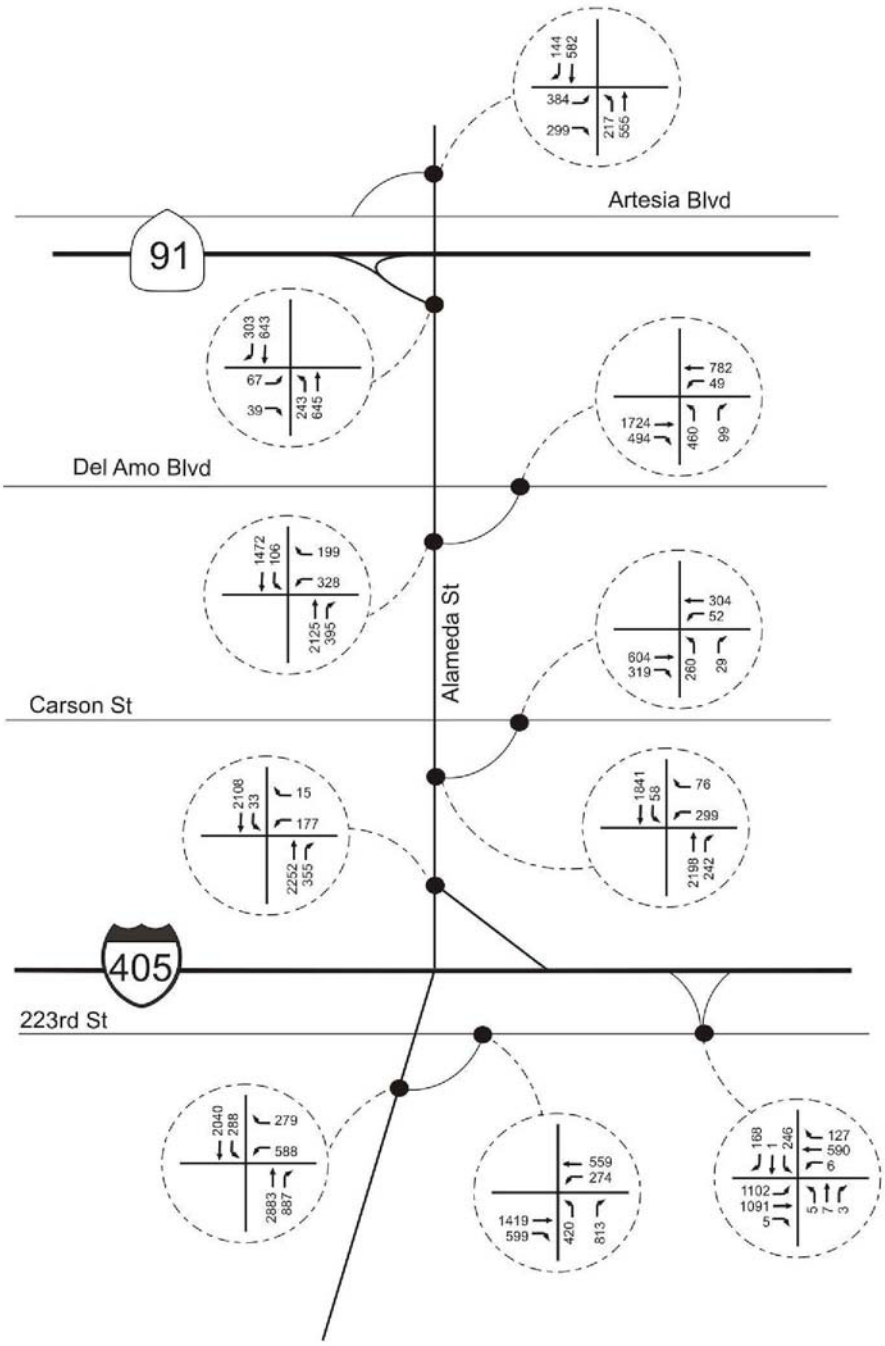
Source: Meyer, Mohaddes Associates



No Scale

Figure 3.5-14a
2030 SR-103 PM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates



No Scale

Figure 3.5-14b
2030 SR-103 PM Peak Hour Volumes (PCE)
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Meyer, Mohaddes Associates

Table 3.5-19
Year 2030 Alternative 2 Mainline Level of Service

Location	AM		MD		PM	
	Density	LOS	Density	LOS	Density	LOS
NB Alameda Corridor Expressway – south of PCH	NA	NA	NA	NA	NA	NA
SB Alameda Corridor Expressway – south of PCH	NA	NA	NA	NA	NA	NA
NB SR-103 – south of PCH	40.1	E	40.7	E	40.9	E
SB SR-103 – south of PCH	34.7	D	33.3	D	23.5	C
NB Interstate 710 – south of PCH	44.0	E	>45	F	> 45	F
SB Interstate 710 – south of PCH	> 45	F	>45	F	> 45	F
NB Interstate 710 – north of PCH	> 45	F	>45	F	> 45	F
SB Interstate 710 – north of PCH	> 45	F	>45	F	> 45	F
NB Interstate 110 – south of PCH	33.3	D	30.3	D	27.8	D
SB Interstate 110 – south of PCH	25.4	C	29.5	D	36.1	E

Source: MMA, 2007.

Intersection Analysis

For Alternative 2, Tables 3.5-20, 3.5-21, and 3.5-22 summarize the 2030 AM, MD, and PM peak-hour intersection LOS. The SR-47/Ocean Boulevard/Henry Ford Avenue interchange analysis results are presented separately in Table 3.5-23. Results are similar to Alternative 1, although an unsignalized intersection at the SR-47/New Dock Street southbound off-ramp is anticipated to improve from LOS E to LOS D during the AM peak hour.

Table 3.5-20
Year 2030 Alternative 2 AM Peak Intersection Conditions

Intersection	Base		Alternative 2		Change
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	
SR-47/New Dock SB off-ramp*	35.8	E	28.0	D	***-7.8***
SR-47/New Dock NB on-ramp*	15.8	C	13.6	B	***-2.2***
SR-47/Henry Ford ramps	31.4	D	15.8	C	***-10.4***
Henry Ford Avenue/Anaheim Street	0.991	E	0.86	D	***-0.131***
Henry Ford Avenue/Denni Street	0.540	A	0.431	A	***-0.109***
Alameda Street/Anaheim Street	0.822	D	0.802	D	***-0.02***
Alameda Street/PCH Connector Ramp north of PCH	1.266	F	0.494	A	***-0.772***
PCH/Alameda Street Connector Ramp east of Alameda Street	1.001	F	0.748	C	***-0.253***

Table 3.5-20
Year 2030 Alternative 2 AM Peak Intersection Conditions

Intersection	Base		Alternative 2		Change
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	
Alameda Street/Sepulveda Boulevard Connector Ramp north of Sepulveda Boulevard	1.011	F	0.739	C	***-0.272***
Sepulveda Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.781	C	0.757	C	***-0.024***
Alameda Street/223rd Street Connector Ramp south of 223rd Street	0.857	D	1.169	F	0.312
223rd Street/Alameda Street Connector Ramp east of Alameda Street	0.620	B	0.754	C	0.134
223rd Street/I-405 SB ramps	0.552	A	0.622	B	0.07
Alameda Street/I-405 NB ramps	0.691	B	0.865	D	0.174
Alameda Street/Carson Street Connector Ramp south of Carson Street	0.469	A	0.502	A	0.033
Carson Street/Alameda Street Connector Ramp east of Alameda Street	0.403	A	0.410	A	0.007
Alameda Street/Del Amo Boulevard Connector Ramp south of Del Amo Boulevard	0.611	B	0.550	A	***-0.061***
Del Amo Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.676	B	0.537	A	***-0.139***
Alameda Street/SR-91 EB ramps	0.263	A	0.255	A	***-0.008***
Alameda Street/Artesia Boulevard north of Artesia Boulevard	0.320	A	0.353	A	0.033

* Unsignalized intersection – analyzed using HCM delay based methodology.
Source: MMA, 2007.

Table 3.5-21
Year 2030 Alternative 2 MD Peak Intersection Conditions (PCE)

Intersection	Base		Alternative 2		Change
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	
SR-47/New Dock SB off-ramp*	68.8	F	18.9	C	***-49.9***
SR-47/New Dock NB on-ramp*	29.5	D	15.6	C	***-13.9***
SR-47/Henry Ford ramps	75.5	F	17.6	C	***-41.6***
Henry Ford Avenue/Anaheim Street	1.073	F	0.872	D	***-0.201***
Henry Ford Avenue/Denni Street	0.778	C	0.725	C	***-0.053***
Alameda Street/Anaheim Street	1.095	F	1.028	F	***-0.067***
Alameda Street/PCH Connector Ramp north of PCH	1.357	F	0.475	A	***-0.882***
PCH/Alameda Street Connector Ramp east of Alameda Street	0.949	E	0.686	B	***-0.263***
Alameda Street/Sepulveda Boulevard Connector Ramp north of Sepulveda Boulevard	1.160	F	0.659	B	***-0.501***
Sepulveda Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.909	E	0.786	C	***-0.123***
Alameda Street/223rd Street Connector Ramp south of 223rd Street	0.993	E	1.394	F	0.401
223rd Street/Alameda Street Connector Ramp east of Alameda Street	0.639	B	0.853	D	0.214
223rd Street/I-405 SB ramps	0.700	C	0.709	C	0.009
Alameda Street/I-405 NB ramps	0.711	C	0.796	C	0.085
Alameda Street/Carson Street Connector Ramp south of Carson Street	0.640	B	0.621	B	***-0.019***
Carson Street/Alameda Street Connector Ramp east of Alameda Street	0.432	A	0.388	A	***-0.044***
Alameda Street/Del Amo Boulevard Connector Ramp south of Del Amo Boulevard	0.724	C	0.672	B	***-0.052***
Del Amo Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.577	A	0.561	A	***-0.016***
Alameda Street/SR-91 EB ramps	0.358	A	0.323	A	***-0.035***
Alameda Street/Artesia Boulevard north of Artesia Boulevard	0.543	A	0.559	A	0.016

* Unsignalized intersection – analyzed using HCM delay based methodology.
Source: MMA, 2007.

Table 3.5-22
Year 2030 Alternative 2 PM Peak Intersection Conditions (PCE)

Intersection	Base		Alternative 2		Change
	Volume/ Capacity or Delay	LOS	Volume/ Capacity or Delay	LOS	
SR-47/New Dock SB off-ramp*	15.6	C	13.3	B	***-2.3***
SR-47/New Dock NB on-ramp*	37.1	E	17.3	C	***-19.8***
SR-47/Henry Ford ramps	139.6	F	37.6	E	***-77.9***
Henry Ford Avenue/Anaheim Street	1.167	F	1.034	F	***-0.133***
Henry Ford Avenue/Denni Street	0.812	D	0.825	D	0.013
Alameda Street/Anaheim Street	1.122	F	1.112	F	***-0.01***
Alameda Street/PCH Connector Ramp north of PCH	1.367	F	0.671	B	***-0.696***
PCH/Alameda Street Connector Ramp east of Alameda Street	1.024	F	0.942	E	***-0.082***
Alameda Street/Sepulveda Boulevard Connector Ramp north of Sepulveda Boulevard	1.296	F	1.011	F	***-0.285***
Sepulveda Boulevard/Alameda Street Connector Ramp east of Alameda Street	1.008	F	0.967	E	***-0.041***
Alameda Street/223rd Street Connector Ramp south of 223rd Street	1.093	F	1.497	F	0.404
223rd Street/Alameda Street Connector Ramp east of Alameda Street	0.901	E	1.068	F	0.167
223rd Street/I-405 SB ramps	0.683	B	0.776	C	0.093
Alameda Street/I-405 NB ramps	0.711	C	0.757	C	0.046
Alameda Street/Carson Street Connector Ramp south of Carson Street	0.697	B	0.691	B	***-0.006***
Carson Street/Alameda Street Connector Ramp east of Alameda Street	0.562	A	0.543	A	***-0.019***
Alameda Street/Del Amo Boulevard Connector Ramp south of Del Amo Boulevard	0.792	C	0.757	C	***-0.035***
Del Amo Boulevard/Alameda Street Connector Ramp east of Alameda Street	0.678	B	0.615	B	***-0.063***
Alameda Street/SR-91 EB ramps	0.333	A	0.368	A	0.035
Alameda Street/Artesia Boulevard north of Artesia Boulevard	0.502	A	0.505	A	0.003

* Unsignalized intersection – analyzed using HCM delay based methodology.
Source: (MMA, 2007).

Table 3.5-23
Year 2030 Alternative 2 SR-47/Ocean Boulevard/Pier S Avenue Interchange Analysis Results

Scenario	Time Period	Average Intersection Delay		Overall Intersection Level of Service	
		Henry Ford	Ocean Blvd	Henry Ford	Ocean Blvd
Base	AM	41.5	69.2	D	E
	MD	45.0	77.2	D	E
	PM	36.6	50.8	D	D
SR-103 Extension	AM	26.0	46.8	C	D
	MD	25.6	55.3	C	E
	PM	27.1	46.6	C	D

Source: MMA, 2007.

Alternative 2 will improve the LOS at most of the intersections in comparison with the Year 2030 No Build alternative with the exception of Alameda Street/223rd Street ramp during the PM peak hour. In order to mitigate the impact of additional traffic on this intersection, geometric improvements are made to the intersections as part of the project. A detailed traffic operation analysis using SYNCHRO are performed to evaluate the traffic operation of the intersections with the proposed improvements and results are presented in Table 3.5-24. As results indicate, the intersections would operate at LOS D or better.

Table 3.5-24
Year 2030 Alternative 2 Alameda Street/223rd Street Traffic Operation Analysis Results with Project Improvements

		Alternative 2								
	Intersection	AM Peak		Cycle Length (sec.)	MD Peak		Cycle Length (sec.)	PM Peak		Cycle Length (sec.)
		LOS	Delay (sec).		LOS	Delay (sec.)		LOS	Delay (sec.)	
1	Alameda St / 223rd St Connector Ramp s/o 223rd St	B	15.5	120	C	22.1	120	D	37.7	120
2	223rd St / Alameda St Connector Ramp e/o Alameda St	C	22.4	120	C	26.8	120	D	39.7	120

Source: MMA, 2007.

Parking

During project operations, Alternative 2 is anticipated to have permanent effects to approximately 15 employee parking spaces at the Port of Long Beach Pier S Terminal (see Table 3.5-9). This loss of parking capacity is considered adverse. Measures to avoid or minimize adverse effects would be implemented.

3.5.3.3.3 Alternative 3: Bridge Demolition Avoidance

3.5.3.3.3.1 Construction Effects

Under Alternative 3, construction effects to traffic and transportation would be the same as those described under Alternative 1.

Parking

During project construction, Alternative 3 is expected to have temporary effects to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S Terminals. Up to 977 off-street employee parking spaces and 167 marine terminal equipment spaces would be affected (see Table 3.5-9). These temporary effects are considered adverse. Measures to avoid or minimize adverse effects would be implemented. On-street parking is not expected to be affected by project construction.

3.5.3.3.3.2 Operations Effects

Under Alternative 3, traffic effects during project operations would be the same as those described for Alternative 1.

Parking

During project operations, Alternative 3 is anticipated to have permanent effects to approximately 45 employee parking spaces at the Port of Long Beach Pier S Terminal (see Table 3.5-9). This loss of parking capacity is considered adverse. Measures to avoid or minimize adverse effects would be implemented.

3.5.3.3.4 Alternative 4: Bridge Replacement Only

3.5.3.3.4.1 Construction Effects

Under Alternative 4, construction effects related to traffic and transportation would be the same as under Alternative 1, but would pertain only to replacement of the Schuyler Heim Bridge, as no other construction is proposed under Alternative 4.

Parking

During project construction, Alternative 4 is expected to have temporary effects to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S Terminals. Up to 587 off-street employee parking spaces and 54 marine terminal equipment spaces would be affected (see Table 3.5-9). These temporary effects are considered adverse. Measures to avoid or minimize adverse effects would be required. On-street parking is not expected to be affected by project construction.

3.5.3.3.4.2 Operations Effects

Under Alternative 4, congestion at the Cerritos Channel crossing would be lessened. Because the new bridge would be a fixed-span structure, traffic would be able to cross at all times, unlike the current condition where traffic may be required to queue and wait for the existing Schuyler Heim Bridge to be lowered. Under Alternative 4, traffic at the Ocean Boulevard/SR-47 intersection would not be expected to increase as it would under Alternatives 1, 1A, 2, and 3. With those alternatives, the new SR-47 Expressway or SR-103 Extension is projected to attract additional traffic. Under Alternative 4, there would be no new expressway to attract additional traffic at the Ocean Boulevard/SR-47 intersection. Therefore, although traffic flow is expected to improve, as there would be no delays associated with raising and lowering the bridge, traffic volumes are expected to be the same as would occur with the No Build alternative (Alternative 6). The modeled peak-hour traffic in the study area under Alternative 4 is shown in Table 3.5-25.

Table 3.5-25
Year 2030 Peak Hour Traffic Volumes
Alternative 4

SEGMENT	LOCATION	2030 No-Build Modeled Volume			2030 Alternative 4 Modeled Volume			Volume Difference			Percent Difference		
		AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour
Other Vehicles (Autos and SCAG Trucks)													
Alameda Street	s/o Del Amo Boulevard	3,640	3,450	4,360	3,640	3,450	4,360	0	0	0	0%	0%	0%
Alameda Street	s/o I-405	4,700	4,090	5,220	4,700	4,090	5,220	0	0	0	0%	0%	0%
Schuyler Heim Bridge	New Dock - Henry Ford	2,300	1,310	2,770	2,300	1,310	2,770	0	0	0	0%	0%	0%
Henry Ford	s/o Anaheim Street	1,190	710	1,530	1,190	710	1,530	0	0	0	0%	0%	0%
I-110	n/o Sepulveda Boulevard	13,620	13,110	15,230	13,620	13,110	15,230	0	0	0	0%	0%	0%
I-110	s/o Pacific Coast Highway	10,690	10,200	12,260	10,690	10,200	12,260	0	0	0	0%	0%	0%
I-110	s/o SR-91	18,500	17,730	19,790	18,500	17,730	19,790	0	0	0	0%	0%	0%
I-710	n/o Sepulveda Boulevard (s/o I-405)	7,420	6,970	9,700	7,420	6,970	9,700	0	0	0	0%	0%	0%
I-710	s/o Pacific Coast Highway	6,310	6,110	8,480	6,310	6,110	8,480	0	0	0	0%	0%	0%
I-710	s/o SR-91	11,730	11,150	13,780	11,730	11,150	13,780	0	0	0	0%	0%	0%
SR-103	s/o Pacific Coast Highway	1,630	1,090	2,100	1,630	1,090	2,100	0	0	0	0%	0%	0%
SR-103 Extension	s/o 223rd / Wardlow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SR-47 Expressway	Henry Ford to Alameda	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Port Trucks													
Alameda Street	s/o Del Amo Boulevard	820	1,220	640	820	1,220	640	0	0	0	0%	0%	0%
Alameda Street	s/o I-405	1,260	1,630	920	1,260	1,630	920	0	0	0	0%	0%	0%
Schuyler Heim Bridge	New Dock - Henry Ford	2,440	3,030	1,800	2,440	3,030	1,800	0	0	0	0%	0%	0%
Henry Ford	s/o Anaheim Street	830	1,150	610	830	1,150	610	0	0	0	0%	0%	0%
I-110	n/o Sepulveda Boulevard	1,560	1,780	1,010	1,560	1,780	1,010	0	0	0	0%	0%	0%
I-110	s/o Pacific Coast Highway	1,650	1,920	1,090	1,650	1,920	1,090	0	0	0	0%	0%	0%
I-110	s/o SR-91	1,250	1,390	870	1,250	1,390	870	0	0	0	0%	0%	0%
I-710	n/o Sepulveda Boulevard (s/o I-405)	4,680	4,830	3,420	4,680	4,830	3,420	0	0	0	0%	0%	0%

Table 3.5-25
Year 2030 Peak Hour Traffic Volumes
Alternative 4

SEGMENT	LOCATION	2030 No-Build Modeled Volume			2030 Alternative 4 Modeled Volume			Volume Difference			Percent Difference		
		AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour	AM Peak Hour	MD Peak Hour	PM Peak Hour
I-710	s/o Pacific Coast Highway	4,160	4,500	3,220	4,160	4,500	3,220	0	0	0	0%	0%	0%
I-710	s/o SR-91	4,170	4,230	3,050	4,170	4,230	3,050	0	0	0	0%	0%	0%
SR-103	s/o Pacific Coast Highway	1,600	1,980	1,170	1,600	1,980	1,170	0	0	0	0%	0%	0%
SR-103 Extension	s/o 223rd / Wardlow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SR-47 Expressway	Henry Ford to Alameda	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Car Equivalent (PCE)													
Alameda Street	s/o Del Amo Boulevard	5,170	5,770	5,610	5,170	5,770	5,610	0	0	0	0%	0%	0%
Alameda Street	s/o I-405	6,980	7,150	6,980	6,980	7,150	6,980	0	0	0	0%	0%	0%
Schuyler Heim Bridge	New Dock - Henry Ford	6,440	6,530	5,370	6,440	6,530	5,370	0	0	0	0%	0%	0%
Henry Ford	s/o Anaheim Street	2,540	2,670	2,600	2,540	2,670	2,600	0	0	0	0%	0%	0%
I-110	n/o Sepulveda Boulevard	16,640	16,770	17,350	16,640	16,770	17,350	0	0	0	0%	0%	0%
I-110	s/o Pacific Coast Highway	13,790	13,920	14,430	13,790	13,920	14,430	0	0	0	0%	0%	0%
I-110	s/o SR-91	21,200	21,190	21,920	21,200	21,190	21,920	0	0	0	0%	0%	0%
I-710	n/o Sepulveda Boulevard (s/o I-405)	15,780	15,840	16,050	15,780	15,840	16,050	0	0	0	0%	0%	0%
I-710	s/o Pacific Coast Highway	13,730	14,330	14,430	13,730	14,330	14,430	0	0	0	0%	0%	0%
I-710	s/o SR-91	19,290	19,100	19,600	19,290	19,100	19,600	0	0	0	0%	0%	0%
SR-103	s/o Pacific Coast Highway	4,390	4,580	4,160	4,390	4,580	4,160	0	0	0	0%	0%	0%
SR-103 Extension	s/o 223rd / Wardlow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SR-47 Expressway	Henry Ford to Alameda	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: Volumes for Alternative 3 are the same as those for Alternative 1.

Parking

During project operations, Alternative 4 is anticipated to have permanent effects to approximately 15 employee parking spaces at the Port of Long Beach Pier S Terminal (see Table 3.5-9). This loss of parking capacity is considered adverse. Measures to avoid or minimize adverse effects would be implemented.

3.5.3.3.5 Alternative 5: Transportation System Management

3.5.3.3.5.1 Construction Effects

Under Alternative 5, construction will involve a variety of improvements to streets and intersections within the project study area. Effects from constructing the selected TSM facilities are expected to be minimal, such as partial lane closures for short periods of time to erect signs and make other improvements. If street widening should occur, temporary lane closures on the selected rights-of-way would be expected. Temporary detours would be established, if necessary.

Parking

It is anticipated that off-street parking would not be affected. However, there could be temporary effects to on-street parking in the vicinity of construction activities.

3.5.3.3.5.2 Operations Effects

Under Alternative 5, traffic flow in the project area would be facilitated within the existing system of roads. Changes to the number of vehicles using the various roadways are not anticipated.

Parking

Effects to off-street parking are not anticipated. There could, however, be effects to current parking capacity if on-street parking is removed to provide additional travel lanes. The overall result of establishing the selected TSM measures would be an improvement in traffic flow. However, any permanent effects to parking capacity would be considered adverse.

3.5.3.3.6 Alternative 6: No Build

Under Alternative 6, there would be no change to the existing Schuyler Heim Bridge or existing roadway system. As a result, there would be no effects to existing traffic patterns or to the existing transportation system. Traffic levels would increase as projected within the project area (see Tables 3.5-4 and 3.5-5).

Parking

Under Alternative 6, there would be no changes to existing on-street or off-street parking capacities. No avoidance or minimization measures would be required.

3.5.3.3.7 CEQA Consequences

Based on the information provided in the above analysis, when considered in the context of CEQA criteria, impacts to traffic and transportation, including parking issues, would be less than significant. Under Alternatives 1, 2, 3, and 4, temporary parking will be provided during the period of project construction as part of project design. Also, a TMP will be implemented during project construction. Under Alternatives 1, 2, and 4, compensation for permanent loss of parking capacity will be provided as part of the project, based on an agreement between Caltrans and the Port of Long Beach. Impacts under Alternative 5 would be less than significant. There would be no impact to traffic and transportation under Alternative 6.

Potential impacts of the proposed project alternatives to Traffic and Transportation are addressed in the context of CEQA criteria in Chapter 4.0 – CEQA Analysis and Appendix A – CEQA Checklist (XV, Transportation/Traffic).

3.5.4 Avoidance, Minimization, and/or Mitigation Measures

3.5.4.1 Construction

3.5.4.1.1 Avoidance and Minimization Measures

3.5.4.1.1.1 Alternatives 1, 1A, 2, and 4

T-1 Prior to construction, temporary parking spaces will be provided to replace existing parking capacity that will not be available during project construction. Caltrans will coordinate with the Port of Long Beach and Port of Los Angeles to identify replacement parking for the Pier A East and Pier S Terminals. Exact locations will be determined after consultation with responsible parties, including property owners. Considerations of feasibility will include, but not be limited to, vehicle capacity, time of availability, distance from terminal(s), and the need for employee shuttles.

T-2 The Transportation Management Plan will be implemented to enhance vehicular and pedestrian traffic.

3.5.4.1.1.2 Alternative 3: Bridge Demolition Avoidance

T-1, T2 See T-l and T2, above.

3.5.4.1.1.3 Alternatives 5 and 6

No avoidance or minimization measures would be required for construction of the TSM and No Build alternatives.

3.5.4.1.2 Mitigation Measures

No mitigation measures would be required during project construction.

3.5.4.2 Operations

3.5.4.2.1 Avoidance and Minimization Measures

3.5.4.2.1.1 Alternatives 1, 1A, 2, and 4

T-3 Compensation for the permanent loss of an estimated 15 employee parking spaces at the Port of Long Beach Pier S Terminal will be provided. Compensation will be based on an agreement between Caltrans and the Port of Long Beach.

3.5.4.2.1.2 Alternative 5

No avoidance or minimization measures are proposed for Alternative 5. As necessary, measures would be developed and included in the Final EIS/EIR if this alternative is chosen for development.

3.5.4.2.1.3 Alternative 6

No avoidance or minimization measures are proposed for Alternative 6.

3.5.4.2.2 Mitigation Measures

No mitigation measures would be required for project operations.

3.6 Marine Vessel Transportation

The information provided in this section is based entirely on the *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Long-Term Economic Impacts to Marine Vessel Operation in Cerritos Channel* (Caltrans, 2006), which is hereby incorporated in its entirety.

3.6.1 Regulatory Setting

3.6.1.1 Federal

Federal regulations concerning marine navigation are codified in 33 CFR parts 1 through 399 and are implemented by the U.S. Coast Guard (USCG) and the U.S. Army Corps of Engineers. Federal regulations for marine vessel shipping are codified in 46 CFR Parts 1 through 599 and are implemented by the USCG, Maritime Administration, and Federal Maritime Commission. The Navigation Rules, enforced by the USCG, establish actions to be taken by vessels to avoid collision. These rules are established through the International Navigational Rules Act of 1977 (Public Law 95-75, 91 Stat. 308, or 33 U.S.C. 1601-1608). California laws concerning marine navigation are codified in the Harbors and Navigation Code and implemented by local city and county governments.

The entire marine vessel study area is within the 11th USCG District, which includes all of California offshore waters. Each USCG District publishes a weekly *Local Notice to Mariners* (LNM), which is the primary means for disseminating information pertaining to navigational safety and other items of interest to mariners. Information contained in the LNM includes reports on hazards to navigation, channel conditions, obstructions, dangers, restricted areas, and construction or modification of bridges. The report includes the establishment of, changes to, and deficiencies in aids to navigation and any other information pertaining to the safety of the waterways. These notices are published weekly. LNMs are developed from information received from the USCG, the general public, the Army Corps of Engineers, U.S. Merchant Fleet and other sources.

The USCG has consolidated the requirements for drawbridge operations, including Cerritos Channel, as contained in Code 33 of Federal Regulations, Part 117. Radiotelephones are installed to enable the drawtender at the Schuyler Heim Bridge and the Badger Avenue Bridge to communicate with vessels by radiotelephone.

The USCG would issue the permit to construct the new bridge proposed under Alternatives 1, 2, 3, and 4. According to the USCG, when a bridge is no longer used for its permitted purpose of providing land transportation, the bridge must be removed from the waterway. Therefore, the federal permit for the replacement bridge would include the condition that the existing Schuyler Heim Bridge be removed.

3.6.1.2 Local

Vessel operating rules and regulations outside the harbor entrances have been developed over the years as a result of past experience. The rules and regulations are continuously updated by the USCG, with input from the pilots, Ports of Los Angeles and Long Beach, shipping lines, and other involved entities. As discussed above, they are published in the CFR and United States (U.S.) Coast Pilot, as well as Port Tariffs.

Marine vessel transportation within the Ports of Los Angeles and Long Beach is governed in accordance with a myriad of local, state, and federal regulations, plus requirements of international treaties. Vessel traffic in the Ports is regulated by policies established by the USCG; the USCG and the respective Port Police enforce these policies. The Vessel Traffic System and the Marine Exchange monitor vessel transits. The transits are controlled and guided by the Ports of Los Angeles and Long Beach Port Pilots, and transits follow the USCG Navigation Rules of the Road. Overall management is under the guidance of the USCG Captain of the Port.

The Marine Exchange is a voluntary, nonprofit organization affiliated with the Los Angeles Chamber of Commerce. The organization is supported by subscriptions from port-related organizations that recognize the need for such an organization and use its services. The Marine Exchange is designed to enhance vessel safety in the main approaches (i.e., the Precautionary Area) to the port. Although the service is voluntary, all vessels are encouraged to participate in the interests of safety and prudent seamanship. The service consists of a coordinating office, specific reporting points, and very high frequency-frequency modulation (VHF-FM) radio communications used to communicate with participating vessels. Vessel traffic channels have been established in the port, and there are numerous aids to navigation. Within the Ports of Los Angeles and Long Beach, local rules are established and enforced by the Port's Police Department.

3.6.2 Affected Environment

For the purposes of this discussion, the affected environment consists of San Pedro Bay and the Cerritos Channel.

3.6.2.1 San Pedro Bay

San Pedro Bay, between Seal Beach on the east and Point Fermin on the west, is 132 kilometers (km) (82 miles [mi]) northwest of San Diego. On the shores of the bay are the cities and port areas of Long Beach and Los Angeles. Terminal Island, in the northwest part of San Pedro Bay, separates the outer bay from Los Angeles and Long Beach inner harbors. The bay is protected by breakwaters and is a safe harbor in any weather. The openings between the breakwaters, known as Angels Gate and Queens Gate, provide entry to the Port of Los Angeles and the Port of Long Beach, respectively. Long Beach Harbor, in the eastern part of San Pedro Bay, includes the City of Long Beach and part of Terminal Island. Los Angeles Harbor, at the western end of San Pedro Bay, includes the districts of San Pedro, Wilmington, and a major part of Terminal Island. Long Beach and Los Angeles Harbors are connected by Cerritos Channel. The distance between the seaward entrances to the two harbors is about 6.4 km (4 mi).

The Ports of Long Beach and Los Angeles form the largest port complex on the Pacific coast, and have the reputation of being America's most modern port facilities. Both ports have extensive foreign and domestic traffic, with modern facilities for the largest ocean-going vessels, accommodating all types of marine cargo.

3.6.2.2 Cerritos Channel

The Port of Los Angeles and Port of Long Beach do not place restrictions on the size or type of vessels that enter the Ports although, in the Inner Harbor, vessels are limited by water

depths of 14 meters (m) (45 feet [ft]). Cerritos Channel can accommodate vessels with drafts of this magnitude. The Cerritos Channel currently accommodates vessels with maximum dimensions as follows: length 244 m (800 ft), beam 27 m (90 ft), draft 14 m (45 ft), and vertical clearance 50 m (165 ft). The channel is about 183 m (600 ft) wide except for passage under the Schuyler Heim Bridge, where it is 55 m (180 ft) wide. This channel is about 1.8 nautical miles in length and links the Inner Harbor section (Port of Long Beach) of the Port complex with the East Basin (Port of Los Angeles), in addition to having uses along its banks (Piers 191-213, plus private marinas).

As stated above, the Commodore Schuyler F. Heim Bridge (Schuyler Heim Bridge) crosses the Cerritos Channel, but has clearance limitations; large commercial vessels are unable to travel under it. It is easier for these vessels to get to berths in the Port of Long Beach via the Long Beach Back Channel. Therefore, very few large commercial vessels pass under the Schuyler Heim Bridge. The vessel traffic in the East Basin and Cerritos Channel near the project site includes auto carrier ships traveling to Berths 196-198, scrap metal dry-bulk ships bound for the Hugo Neu-Proler terminal, small liquid-bulk tankers going to Dow Chemical, and motor and sailboats traveling to and from the East Basin marinas.

The normal height of the Schuyler Heim Bridge in the lowered position is approximately 10.9 m (36 ft) to 12.4 m (41 ft) above water, depending on the tide. This compares to the adjacent (west) Henry Ford Avenue Railroad Bridge (Badger Avenue Bridge), which has a vertical clearance of approximately 1.8 m (6 ft) to 2.4 m (8 ft) above water. The Badger Avenue Bridge is maintained by the Port of Los Angeles, but is operated by the Pacific Harbor Line (PHL). Full lift height of the Schuyler Heim Bridge is approximately 38 m (126 ft) above water. The Caltrans operator controls the height of the lift. The bridge is lifted only after surface traffic comes to a complete halt, and it is verified that no pedestrians are on the bridge. The Caltrans operator is contacted by the vessel by audio signal, visual signal, or marine radio (this must comply with USCG Regulations). The majority of the contacts are by marine radio.

3.6.2.3 Vessel Traffic

Vessel traffic channels have been established in the harbor, where there are numerous aids to navigation. Many types of recreational and commercial marine vessels utilize the harbor area, including fishing boats, recreational vessels, passenger-carrying vessels, tankers, auto carriers, container vessels, dry bulk carriers, and barges. Commercial vessels follow traffic lanes established by the USCG when approaching and leaving the harbor. These traffic lanes meet at the "Precautionary Area" where incoming and outgoing traffic crosses.

The harbor utilizes a Vessel Traffic Information Service (VTIS), operated by the Marine Exchange and the USCG, using shore based radar to monitor traffic within the main approaches to the harbor, including the Precautionary Area and vicinity. Radar systems are also operated by both the Long Beach and Los Angeles pilot services to monitor vessel traffic within the harbor area. This information is available to all vessels upon request. The pilot services also manage the use of anchorages under an agreement with the USCG. A communication system links the following key operational centers: USCG Captain of the Port, VTIS, Los Angeles Pilot Station, Long Beach Pilot Station, and Port of Long Beach Security. This system is used to exchange vessel movement information and safety notices among the various organizations.

An estimated 5,845 vessels called at the Ports in 2005, a 2 percent increase from the 5,724 calls in 2004; vessel traffic to the Ports is anticipated to continue to increase (see Table 3.6-1). Vessel traffic in the Cerritos Channel consists mostly of recreational vehicles, tugs and barges, and shipping, with few tankers or other marine traffic.

Table 3.6-1
Vessel Calls at the Ports of Los Angeles and Long Beach

Year	Vessel Calls
2008[a]	6,095
2007[a]	6,040
2006[a]	5,915
2005	**5,845**
2004	5,727
2003	5,696
2002	5,396
2001	5,662
2000	5,936

Source: Marine Exchange of Southern California, (2005), including
[a] Projections for 2006-2008.

Due to additional train traffic from the Alameda Corridor, there has been an additional waiting time for the Badger Avenue Bridge to lift in Cerritos Channel. As a result, vessels are going around Terminal Island, and the number of lifts has decreased (Table 3.6-2). To avoid the Badger Avenue Bridge and Schuyler Heim Bridge delays, vessels circumnavigate Terminal Island. For a tug/barge combination, about 60 to 90 minutes are needed to make a complete detour around Terminal Island.

Table 3.6-2
Vessels Through Cerritos Channel Requiring Bridge Lift

	2003[a] January and July	2004 January and July	2005 January and July
Tugs	1,578	1,428	1,554
Tugs w/Barge	528	486	498
Fishing	24	0	12
Sail	792	852	510
Cruise	30	36	24
Oil Container	27	6	12
Ship	15	6	6
Power	36	30	24
CG Cutter	6	30	6
Tanker	6	0	12
Tow	12	0	0
Fire Boat	18	18	6
Total	3,072	2,892	2,664

[a] Data adjusted to account for bridge closure in early January 2003.
Source: Caltrans, 2006.

3.6.3 Environmental Consequences

3.6.3.1 Evaluation Criteria

An adverse effect on marine vessel transportation would occur if an increase in traffic from project construction and/or operations results in congestion within the harbor and/or if the capacity for maritime commerce to operate efficiently and safely is exceeded. This would include an increase in delays or interference with port operations that results in an increase in operator cost, forcing closure of the port operation.

3.6.3.2 Methodology

The USCG is responsible for issuing permits for bridges and structures that cross the Cerritos Channel. As part of the bridge permitting process, the USCG considers anticipated economic effects to marine vessel usage. Caltrans was engaged to quantify effects to marine vessel navigation through the Cerritos Channel resulting from the potential reconstruction of the Schuyler Heim Bridge from a lift bridge to a fixed-span bridge. The primary economic effect would be increased operating costs for marine vessels that would have to detour around Terminal Island as a result of the new height restriction, as the maximum clearance under the new bridge would be less than the maximum clearance under the existing bridge in the lift position.

Factors used to analyze the economic effect on marine vessel navigation in the Cerritos Channel include: overall growth in marine vessel traffic, length of detour, distribution of traffic by vessel type, seasonality, vessel size, mast folding, horizontal constraints of the Cerritos Channel, and operating cost (Caltrans, 2007).

Data show that more vessels are choosing to detour around Terminal Island because of the uncertainty in delay times in the Cerritos Channel; therefore it was assumed that there would be a lack of growth in marine vessel traffic in the Cerritos Channel. It was assumed that the time needed to detour around Terminal Island is approximately 90 minutes for tugs with barge combinations and tow vessels, and 60 minutes for all other vessels traveling at higher speeds. For purposes of the economic analysis, the added cost to operators is the net detour time, which is the detour time minus the through-channel time. The net detour time for vessel operation will be approximately 35 minutes for vessels traveling at high speeds and 65 minutes for tugs with barge combinations and tow vessels. In addition, data show that the distribution of traffic by vessel type demonstrates that vessel traffic through the Cerritos Channel declined from 2003 to 2005. Based on interviews with vessel, bridge, and Port facility operators and the USCG, maritime traffic in the Cerritos Channel would continue to be seasonal, peaking during the summer months of June, July, and August.

The interviews also indicate that the size of vessels traveling though Cerritos Channel is not likely to increase over time. As fleets are replaced, operators will have a strong economic incentive to use replacement vessels that can pass under the new, fixed-bridge structure to avoid operational costs associated with detours. It was assumed that all vessels with masts higher than 14.3 m (47 ft) would detour (i.e., no vessels would fold their masts to pass under the new fixed bridge). It was also assumed that there would be no constraints to marine traffic from the navigational width of the new bridge, as it would be the same as with the existing lift-bridge. Only tug/barge combinations could be constrained because of the horizontal distance between bridge fenders and water level.

Operational costs were obtained from Crowley Maritime Services for tugs and tugs with barges; published rental rates were used for fishing boats and sailboats. When data for a particular vessel type were unavailable, costs from one of the available vessel types were used. The primary economic impact would be increased operating costs for marine vessels that would have to detour around Terminal Island as a result of the new height restrictions.

Marine vessel traffic patterns within the Port of Los Angeles are established in accordance with requirements of the USCG. With the proposed project, vessel traffic patterns would be the same as under existing conditions. Vessels that call at berths adjacent to the Schuyler Heim Bridge would continue to enter the Outer Harbor at Angel's Gate, then proceed to the area via the Glenn Anderson Ship Channel, Main Channel, East Basin Channel, and Cerritos Channel. Ships that call in the area would be guided to a berth by port tugboats. Project operations would result in ships with heights above 14.3 m (47 ft) accessing the terminal from the Port of Long Beach, east of the project site. Implementation of the project would alter the current navigation routes and schedules of these vessels.

Various sources were used to estimate the effects presented in this analysis. The main sources of data include:

- Video analysis by Port of Los Angeles for 2000 and 2001
- Schuyler Heim Bridge activity logs, April-June 2001 and April-June 2002
- 1994 Badger Bridge Reconstruction Economic Analysis, by Los Angeles Harbor Department
- 1999, 2000, and 2001 Annual Marina Surveys, by Marina Masters Association
- Caltrans, Schuyler Heim Bridge Lift Data for January and July 2003, January and July 2004, and January and July 2005
- Operating cost data from interviews with a vessel operator and published reports and charter rates

A complete list of contacts and references is included in the economic effect to marine vessel transportation study (Caltrans, 2007).

In order to verify the above data and focus research efforts on relevant areas, staff from various organizations, such as Port of Long Beach, Port of Los Angeles, USCG, were interviewed either in person, by telephone, or both. In addition to reviewing various support documents, historical data, recent data, traffic projections, current infrastructure improvements, and information from interviews were analyzed to ascertain marine vessel transportation trends and patterns.

3.6.3.3 Evaluation of Alternatives

3.6.3.3.1 Alternative 1: Bridge Replacement and SR-47 Expressway

3.6.3.3.1.1 Construction Effects

Alternative 1

Marine Vessel Effects

Construction of the proposed replacement bridge would result in constraints to marine vessel navigation for a 2-year period. These constraints would be a reduced bridge clearance height of approximately 13.1 m (43 ft) and reduced width of 22.9 m (75 ft). Although marine vessel traffic would be affected by bridge construction, it would not be affected by construction of the expressway or flyover.

Construction operations affecting the Cerritos Channel would require the use of barges aided by tugboats to erect the channel falsework (pile driving and beam erection), span construction, remove the existing Schuyler Heim Bridge structure, and construct the other half of the new bridge. Barges and tugboats operating approximately 2 hours per day would be needed, on average, to remove or ship in materials for construction of the new bridge structure. This would result in partial blockage of the approximate 22.9 m (75 ft) wide channel during this phase of construction. Although the use of one barge and tug daily would be a small percentage of existing maritime traffic in the Cerritos Channel, no tug with barge combinations would be able to pass under the bridge during construction when the channel is restricted horizontally to an approximate 22.9 m (75 ft) width due to bridge falsework.

The Cerritos Channel would be closed to marine traffic for approximately 25 days; closed intermittently for 40 days; and have channel restrictions to approximately 13.1 m (43 ft) vertical clearance and 22.9 m (75 ft) horizontal clearance for 240 days over a total period of 16 months (September 2009 through December 2010) (see Appendix E in Caltrans, 2006.)

A list of marine terminal facilities and marinas on Cerritos Channel is provided in Table 3.6-3, but is not inclusive of all affected marine operators. Restrictions and closures associated with constructing the proposed replacement bridge in the Cerritos Channel would result in an estimated economic effect of $2.6 million to marine vessel operators.

Table 3.6-3
Marine Terminal Facilities and Marinas in Cerritos Channel

Marine Terminal Facilities	Marinas
Long Beach Marine Terminal	Terminal Island Marina
Dow Chemical	Fellows Marina
Matson Container Terminal	Cerritos Yacht Anchorage
	Yacht Anchorage
	Lighthouse Yacht Anchorage
	Colonial Yacht Anchorage
	Newmark's Yacht Anchorage

Source: Caltrans, 2006.

Roadway Effects

The proposed Schuyler Heim Bridge replacement could result in longer travel times and distances for freight and other roadway users during the construction period. It is estimated that the bridge would not be closed to road traffic for more than a few days at a time during each construction phase. However, there would be lane closures during construction which would restrict traffic movement.

Alternative 1A

Construction effects under Alternative 1A are expected to be comparable to those under Alternative 1. Because there would be fewer piers placed in the Cerritos Channel under Alternative 1A, effects from width restrictions within the channel are expected to be slightly less than under Alternative 1.

3.6.3.3.1.2 Operations Effects

Alternative 1

Marine Vessel Effects

Under Alternative 1, the new fixed-span bridge would provide a vertical clearance for marine traffic of approximately 14.3 m (47 ft). The existing bridge provides vertical clearance of approximately 38.4 m (126 ft), provides a horizontal clearance of about 54.9 m (180 ft) between fenders, and has a span length of 73.2 m (240 ft). The replacement bridge would provide the same horizontal clearance between fenders and span, but would decrease the effective vertical clearance by approximately 24.1 m (79 ft) to 14.3 m (47 ft).

Data from the Port of Los Angeles for the year 2002 indicate that about 13 percent of the vessels over 12.2 m (40 ft) in height that traveled in the Cerritos Channel at that time were between 12.2 m (40 ft) and 14.3 m (47 ft). Thus, it was assumed that 13 percent of the vessels requiring a lift in 2005 could pass under a 14.3 m (47 ft) bridge and would not need to detour (see Table 3.6-2). For the current analysis, it was estimated that, over a period of 20 years, the operational height of the new bridge would result in detours costing the marine industry approximately $23.6 million. The period of 20 years is consistent with the standard that was used for traffic evaluation (see Section 3.5), which is to evaluate conditions for 20 years after opening year.

Compensation related to marine vessel detours would be provided as a permit condition if lawfully imposed by the U.S. Coast Guard.

Roadway Effects

The proposed replacement bridge would provide substantial economic benefits for roadway users of the Schuyler Heim Bridge. These benefits are described below.

Economic Effects from Improved Mobility

Replacement of the Schuyler Heim Bridge with a fixed-span structure is critical to successful completion of the SR-47 Expressway project. When complete, the 2.7 km (1.7 mi.) expressway would provide the missing link between the Ocean Boulevard Interchange on Terminal Island and Alameda Street on the mainland. This link would allow traffic to continue north to connect to Pacific Coast Highway, I-405, and/or SR-91. The proposed expressway also would help maximize use of Alameda Street, most of which is six lanes, and provide crossing over the signalized intersections at Henry Ford Avenue, Anaheim Street, and Denni Street.

Year 2030 traffic projections indicate that the proposed expressway would result in a 6 percent reduction in truck traffic on I-710 (between Ocean Boulevard and Pacific Coast Highway) and a 5 percent reduction in truck traffic on I-110 (between SR-47 and Pacific Coast Highway). Traffic conditions on parallel arterial streets also would improve.

The economic benefits that would result from this project include:

- Reduced delay to roadway users during operations due to elimination of the lift bridge.
- Fewer accidents related to operation of the bridge as a lift bridge.
- Indirect benefits to businesses resulting from more reliable and consistent delivery of goods to and from Terminal Island.

Improved Safety and Emergency Response

The SR-47 Expressway and new bridge would provide an important service route that would enable emergency service vehicles and equipment to access Terminal Island in the event of an emergency.

In the event of an earthquake, the new fixed-span bridge and SR-47 Expressway would provide a route to both I-710 and I-110 in the event service was disrupted on both the Gerald Desmond Bridge and the Vincent Thomas Bridge. The new bridge and expressway would also provide a route that could remain in service to ensure ground and vessel transportation immediately following a major earthquake. After a major earthquake, the new bridge and expressway would provide a safety route for vehicular users of the bridge and marine users of the Cerritos Channel.

Ongoing Bridge Cost Reductions

Replacement of the Schuyler Heim Bridge would minimize the annual capital costs of bridge improvements by maximizing the life span of the bridge and minimizing future maintenance, operational activities, and costs.

3.6.3.3.2 Alternatives 1A, 2, 3 and 4

Construction and operations effects from Alternatives 1A, 2, 3, and 4 would be comparable to those described for Alternative 1.

3.6.3.3.3 Alternatives 5 and 6

Under Alternatives 5 and 6, construction or operations effects to marine vessel transportation are not anticipated.

3.6.3.3.4 CEQA Consequences

Based on the information provided in the above analyses, when considered in the context of CEQA criteria, project-related effects to marine vessel traffic would be less than significant under Alternatives 1, 2, and 3. Alternatives 4, 5, and 6 would not affect marine vessel traffic.

Evaluation of Marine Vessel Transportation in the context of CEQA criteria is provided in Chapter 4.0 – CEQA Analysis and Appendix A – CEQA Checklist, where a criterion for marine vessels has been added to XV, Transportation/Traffic.

3.6.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation measures are proposed related to marine vessel transportation.

3.7 Visual Resources/Aesthetics

This section analyzes how implementation of the proposed project would affect the visual environment of areas near the project. The FHWA methodology for Visual Assessment for Highway Projects (FHWA, 1981) has been used as a guide for conducting the analysis. The information provided in this section is derived from the *Visual Impact Assessment: Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Caltrans, 2007) which is hereby incorporated by reference.

3.7.1 Regulatory Setting

Federal, state, and regional and local requirements that pertain specifically to aesthetic resources and urban design in the proposed project area are summarized below.

3.7.1.1 Federal Requirements

The National Environmental Policy Act of 1969, as amended (NEPA), requires the federal government to use all practicable means to ensure all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings (42 United States Code [USC] 4331[b][2]). To further emphasize this point, the Federal Highway Administration (FHWA) in its implementation of NEPA (23 USC 109[h]) directs that final decisions regarding projects are to be made in the best overall public interest, taking into account adverse environmental impacts including, among others, the destruction or disruption of aesthetic values.

3.7.1.2 State Requirements

The California Environmental Quality Act (CEQA) establishes that it is the policy of the state to take all action necessary to provide the people of the state "with…enjoyment of aesthetic, natural, scenic and historic environmental qualities" (CA Public Resources Code Section 21001[b]).

3.7.1.3 Regional and Local Requirements

The Port of Los Angeles Master Plan, City of Los Angeles General Plan, Wilmington-Harbor Community Plan, Port of Long Beach Master Plan, City of Long Beach Municipal Code, and City of Carson General Plan have general and specific goals and policies that pertain to aesthetics associated with transportation projects within their jurisdiction. A summary of those goals and policies is provided below.

3.7.1.3.1 Port of Los Angeles Master Plan

The Port Master Plan (1979, plus amendments) provides for the short- and long-term development, expansion, and alteration of the Port of Los Angeles. The Port Master Plan has been certified by the California Coastal Commission is part of the Local Coastal Program (LCP) of the City of Los Angeles, and is consistent with the Port of Los Angeles Plan, an element of the City's General Plan. The Port Master Plan does not contain any element specific to visual resources.

3.7.1.3.2 City of Los Angeles General Plan

The City of Los Angeles General Plan is an advisory document with 11 elements: Transportation, Infrastructure Systems, Housing, Noise, Air Quality, Conservation, Open Space, Historic Preservation and Cultural Resources, Safety, Public Facilities and Services, and Land Use. The Land Use Element, in turn, includes 35 local area plans, known as Community Plans, as well as counterpart plans for the Port of Los Angeles and Los Angeles International Airport. The Port of Los Angeles Plan is intended to serve as the official 20-year guide to the continued development and operation of the Port, and is consistent with the Port Master Plan (City of Los Angeles, 1982).

The City of Los Angeles General Plan Land Use Map designates John S. Gibson Boulevard, Pacific Avenue, Front Street, and Harbor Boulevard as scenic routes, with specific acknowledgment of the views of harbor activities and the Vincent Thomas Bridge available to north- and southbound motorists (City of Los Angeles, 1999a). These routes are also designated as Super Truck Routes, a designation related to the volume of Port-related truck traffic accessing Port facilities along these roadways (City of Los Angeles, 1982). Front Street is additionally designated as a scenic route for its views westward of historic San Pedro. South of the Vincent Thomas Bridge, Harbor Boulevard is similarly designated as a scenic route because of Port views (City of Los Angeles, 1999a). No other area roadways are designated scenic routes, and there are no officially designated scenic lookouts.

The City has not adopted formal guidelines governing the scenic corridors associated with designated scenic highways, but has established interim guidelines as part of the Transportation Element addressing roadway alignment, earthwork, signage, landscaping, and utilities (City of Los Angeles, 1999b).

The one objective of the Los Angeles General Plan that addresses aesthetic concerns is:

> **Objective 4:** To assure priority for water and coastal-dependent development within the Port while maintaining and, where feasible, enhancing the coastal zone environment and public views of, and access to, coastal resources.

3.7.1.3.3 Wilmington-Harbor City Community Plan

The Wilmington-Harbor City Community Plan includes policies and standards for multiple residential, commercial, and industrial projects and for community design. These design policies and standards are to ensure that residential, commercial, and industrial projects and public spaces and rights of way incorporate specific elements of good design. The intent is to promote a stable and pleasant environment. In commercial corridors, the emphasis is on the provision and maintenance of the visual continuity of streetscapes and the creation of an environment that encourages pedestrian and economic activity. In industrial areas, the intent is to improve compatibility with the nonindustrial areas and encourage quality industrial development.

The community design and landscaping guidelines section establishes a set of guidelines to "improve the environment, both aesthetically and physically, as opportunities in the Wilmington-Harbor City Community Plan area occur which involve public improvements or other public and/or private projects that affect public spaces and rights-of-way."

The guidelines advocate that "public spaces and rights-of-way should capitalize on existing physical access to differentiate the community as a unique place in the City." Additionally, the guidelines state that "the presence or absence of street trees is an important ingredient in the aesthetic quality of an area. Consistent use of appropriate street trees provides shade during hot summer months, emphasizes sidewalk activity by separating vehicle and pedestrian traffic, and creates an area-wide identity which distinguishes neighborhoods within the Wilmington-Harbor City from each area."

The following areas for improvements that address aesthetic concerns on major transportation corridors and are recommended within the guidelines include:

- Entryway Improvements
- Streetscape
- Street Trees
- Street Lighting
- Sidewalks/Paving
- Signage

3.7.1.3.4 Port of Long Beach Master Plan

The Port Master Plan includes a public access, visual quality, and recreational/tourist element (POLB, 1999). Visual quality is addressed in the following language from the Master Plan:

> *The Port has several major responsibilities in the area of visual quality, particularly in regard to: (a) minimizing disruptive views, (b) landscaping or providing an attractive buffer between the recreational facilities and port industries, and (c) improving the appearance of Harbor lands at or along the major vehicular approaches. The Port has also made a commitment to providing enhanced comprehensive informational signage to provide better guidance to the public in reaching places of business and points of interest within the Harbor District.*
>
> *The most sensitive views include:*
>
> - *Predominant structures visible to the east from downtown Long Beach and along the ocean bluffs*
> - *Ground-level views along the boundary of Queensway Bay*
> - *Ground level views along Harbor Scenic Drive from southbound lanes south of Anaheim Street*
> - *Color, form, texture, and scale are the four criteria used during project review.*

3.7.1.3.5 City of Long Beach Municipal Code and General Plan

The City of Long Beach Municipal Code (21.42.032) specifies "the landscape requirements for Port-related Industrial Zone (IP) zoned properties shall be those established in the Master Landscape Plan for the Port. The Port of Long Beach (POLB) Planning Bureau shall review and approve all landscape plans for projects located in the IP zone." All properties located within the Long Beach portions of the proposed roadway corridor are zoned IP.

The General Plan indicates that the responsibilities for planning within legal boundaries of the harbor lies with the Board of Harbor Commissioners.

3.7.1.3.6 City of Carson General Plan

The City of Carson General Plan Land Use Element and the Transportation and Infrastructure Element emphasize the general aesthetic environment of the City of Carson, and include provisions related to the specific aesthetic environment of the Alameda Corridor (City of Carson, 2004a; City of Carson, 2004b). The eastern side of the Alameda Corridor between Dominguez Street and the southern boundary of the City is identified in the Land Use Element as a Special Study Area. Special study areas "offer special opportunities for development and redevelopment based on their size, location, access, or freeway visibility." Goals, policies, and implementation measures included in the Land Use and Transportation and Infrastructure elements that address aesthetic concerns are presented below.

The City of Carson General Plan – Land Use Element guiding principle states that "the City of Carson is committed to creating an attractive environment for its citizens by developing, implementing, and enforcing community design guidelines which will assure quality development and the maintenance and beautification of properties."

The Land Use Element specifically states that "property maintenance is important in Carson. In both residential neighborhoods and non-residential areas, focus should be placed on property maintenance and improvement." The goal of the City is to "eliminate all evidence of property deterioration throughout Carson" and includes the following policy and implementation measure:

- Policy LU-9.3: Continue to promote and expand programs such as the Carson Beautification Program, which recognizes excellence in property upkeep in residential areas.
  - Implementation LU-IM-9.7: Develop a design and improvement plan based on the City Capital Improvement Program including strengthened landscaping, identification graphics, and other physical improvements to enhance major public thoroughfares and activities areas.

The Land Use Element specifically lists the Alameda Corridor as an issue, as follows: "While there are distinct advantages to the Alameda Corridor, there are also disadvantages. Traffic, noise, and economic impacts to businesses and residential neighborhoods immediately adjacent are among the primary issues." The goal of the City is "development along the Alameda Corridor which is beneficial to residents, property owners, businesses, and the City." The policy and implementation measure applicable to the proposed project and related to this goal includes:

- Policy LU-10.2: Work with the existing applicable task forces and prepare a special study for those areas adversely impacted by the development of the Corridor.
  - Implementation Measure LU-IM-10.1: Prepare a special study for those area(s) adversely impacted by the development of the Corridor, specifically that area east of the Alameda Corridor, between Dominguez Street and the southern boundary of the City. Provide appropriate mitigation for the impacts associated with the Corridor on the neighborhood.

(Note: The special study for the Alameda Corridor has not yet been conducted [City of Carson, 2005a].)

The Land Use Element specifically identifies City Image as an issue, as follows:

> *There are a number of unattractive and/or nonconforming land uses located along highly visible freeway corridors which impact the public's perception of the community. Many of these properties are located in areas which can be considered 'gateways' into the City. Appropriate screening, landscaping, and buffering should be encouraged in order to improve the City's image. In addition, entries into the City and key streets should be enhanced with landscaping and entry statements as appropriate.*

The goal of the City is to "create a visually attractive appearance through Carson." The policies and implementation measures applicable to the project presented in the Land Use Element related to this goal include:

- Policy LU-12.1: Develop and implement a Citywide Urban Design Plan.
  - Implementation Measure LU-IM-12.1: Develop a Citywide Urban Design Plan.

(Note: The Urban Design Plan has not yet been developed [City of Carson, 2005b].)

- Policy LU-12.4: Amend the landscaping requirements in the Zoning Ordinance to enhance the appearance of the community and to provide for the use of trees to provide shade.
  - Implementation Measure LU-IM-12.9: Enhance landscaping requirements and maintenance standards in the landscape section(s) of the City's Ordinance.
  - Implementation Measure LU-IM-12.10: Encourage drought-tolerant plant species, water conservation and related features in the landscape section(s) of the City's Ordinance.
- Policy LU-12.5: Improve City appearance by requiring landscaping to screen, buffer, and unify new and existing development. Mandate continued upkeep of landscaped areas.
  - Implementation Measure LU-IM-12.11: Require exposed structural sidewalls to be screened with landscaping.
  - Implementation Measure LU-IM-12.12: Require landscaping to provide visual continuity along a street, even where the buildings are in different zones or land use districts.
  - Implementation Measure LU-IM-12.13: When conflicting land uses adjoin, require a dense landscape screen to mitigate the friction between land uses.

Another goal provided under the City image issue is to "enhance freeway corridors and major arterials which act as gateways into the City of Carson." The policies and implementation measures applicable to the project presented in the Land Use Element related to this goal include:

- Policy LU-14.1: Work with California Department of Transportation (Caltrans) to provide and maintain an attractive freeway environment in Carson, including access ramps.

  - Implementation Measure LU-IM-14.1: Provide and properly maintain appropriate freeway landscaping.
  - Implementation Measure LU-IM-14.2: Enhance the landscaping near freeway on- and off-ramps to announce the driver's entry into Carson.
  - Implementation Measure LU-IM-14.3: Improve the surfaces of freeway structures visible to travelers with scoring, tile, landscaping, or other treatments to improve the raw, unfinished appearance of these structures.

- Policy LU-14.3: Provide entry markers with landscaping on the major arterials.
  - Implementation Measure LU-IM-14.4: Design and fund attractive entry markers and areas for the major arterials.

The Transportation and Infrastructure Element specifically identifies improving the quality of transportation corridors as an issue as follows: "some of the City's major transportation corridors are deficient in infrastructure maintenance and landscaping improvement." The goal of the City is to "provide improved aesthetic enhancements to and maintenance of the City's transportation corridors." The policies and implementation measures applicable to the project presented in the Transportation and Infrastructure Element related to this goal include:

- Policy TI-7.1: Provide landscaped medians and greenbelts along major arterials, when economically feasible.
  - Implementation Measure TI-IM-7.1: Through design standards and zoning requirements, require landscaped medians and parkways for all new development on major arterials.

- Policy TI-7.2: Encourage the aesthetic quality and maintenance of facilities within the City, under the jurisdiction of other agencies.
  - Implementation Measure TI-IM-7.2: Pursue agreements within Caltrans to construct new sound walls, as necessary, with landscaping, along all state freeways in the City.

- Policy TI-7.3: Target and prioritize street beautification programs along major transportation corridors.
  - Implementation Measure TI-IM-7.4: Develop design plans for all major streets to provide walls, landscape features, and hardscape features, as appropriate, to protect and beautify neighborhoods to provide an aesthetic environment for the users of transportation corridors. First priority should be given to Avalon, south of Carson, and Wilmington, south of 213th Street.
  - Implementation Measure TI-IM-7.5: Develop a land use and design plan for the Alameda Transportation Corridor to provide for appropriate uses, access, sound walls, landscape features, and hardscape features, to protect and beautify the Dominguez area/neighborhoods as well as to limit access to Alameda and improve the flow of traffic.

(Note: The land use and design plan for the Alameda Transportation Corridor has not yet been developed [City of Carson, 2005a].)

3.7.2 Affected Environment

3.7.2.1 Regional Setting

The project is located in the southern portion of the Los Angeles Basin coastal plain in an area characterized by relatively flat topography. The nearest naturally elevated features are the Palos Verdes hills, which are located approximately 6.4 kilometers (km) (4 miles [mi]) west of the proposed project, and Signal Hill, which is located approximately 4.8 km (3 mi) east of the project. The landscape in the project region is characterized by low-density urban development, with scattered pockets of residential, commercial, industrial, public facilities, extraction, and open space land uses.

The proposed project is in southwestern Los Angeles County. The Ports of Los Angeles and Long Beach are located in the southern portion of the project area. State Route (SR) -47 and the Schuyler Heim Bridge are generally located on the boundary between the two Ports. Most of the industrial uses in the project region are concentrated in the Ports and along and adjacent to Alameda Street, which extends north of the project area (Figure 3.7-1).

The study area is bounded by Terminal Island and the Ports of Los Angeles and Long Beach on the south, SR-91 (Gardena Freeway) on the north, Interstate (I) -110 (Harbor Freeway) on the west, and I-710 (Long Beach Freeway) on the east.

3.7.2.2 Project Setting

To provide a clear description of the existing visual setting and define anticipated effects, the project area is divided into four landscape units. Landscape units are areas of distinct, but not necessarily homogenous, visual character that offer similar kinds of views toward the proposed project and/or within which there would likely be similar concerns about landscape issues. A landscape unit often corresponds to a place or district that is commonly known among local viewers. These landscape units provide the framework for analyzing the effects of the proposed project alternatives and developing appropriate impact mitigation measures.

The four landscape units listed below are shown in Figure 3.7-1:

- Channel Landscape Unit
- Wilmington Landscape Unit
- Long Beach Landscape Unit
- Carson Landscape Unit

The description of existing visual conditions in each of the four landscape units includes the following elements that contribute to the visual environment: an overview of the location of the unit; characterization of the unit's visual character; discussion of the unit's viewshed and key view(s); and a description of the visual quality of the unit as seen from key view(s).

3.7.2.2.1 Description and Visual Character

A general description of the location of each landscape unit is provided to establish its geographic setting relative to the overall project area. The visual character of each landscape unit is described, as are the land uses and features that contribute to its visual character. Visual character is descriptive and nonevaluative; it is based on a consideration of the

pattern of the landscape as a product of the visual characteristics of the underlying landform and the landcover on it, including water, vegetation, and developed features.

3.7.2.2.2 Viewshed and Key Views

A viewshed is a subset of a landscape unit and is comprised of all the surface areas visible from an observer's viewpoint. The limits of a viewshed are defined as the visual limits of the views from the location of the proposed project. The viewshed also includes the locations of viewers likely to be affected by visual changes brought about by project features. Potential viewsheds extend out into the surrounding area. But, from many areas in the flat urban landscape of the project area, views toward the proposed alignments and structures are substantially screened by intervening structures and, in some cases, by vegetation. The viewsheds for the proposed project include locations within the four landscape units where viewers are likely to be affected by visual changes related to the project features. For the purposes of this analysis, the ends of viewsheds are defined by the boundaries of the landscape units.

It is impractical to attempt to capture all locations within a viewshed from where a project may be seen. Therefore, representative locations called "key views" were selected. In selecting these key views, the emphasis was placed on views from publicly accessible locations of proposed project elements that have the potential to be seen by the largest numbers of sensitive viewers. The locations of the key viewpoints used to illustrate visual conditions and photographic simulations are depicted in Figure 3.7-1. Photographs of existing conditions associated with key viewpoints are valuable to help describe the appearance of the landscape unit. The photographs are also important because they provide a basis for evaluating potential visual effects of the project and help depict visual elements that can be seen in various distance zones. The three distance zones used to describe the distance between viewers and an object are foreground, middleground, and background.

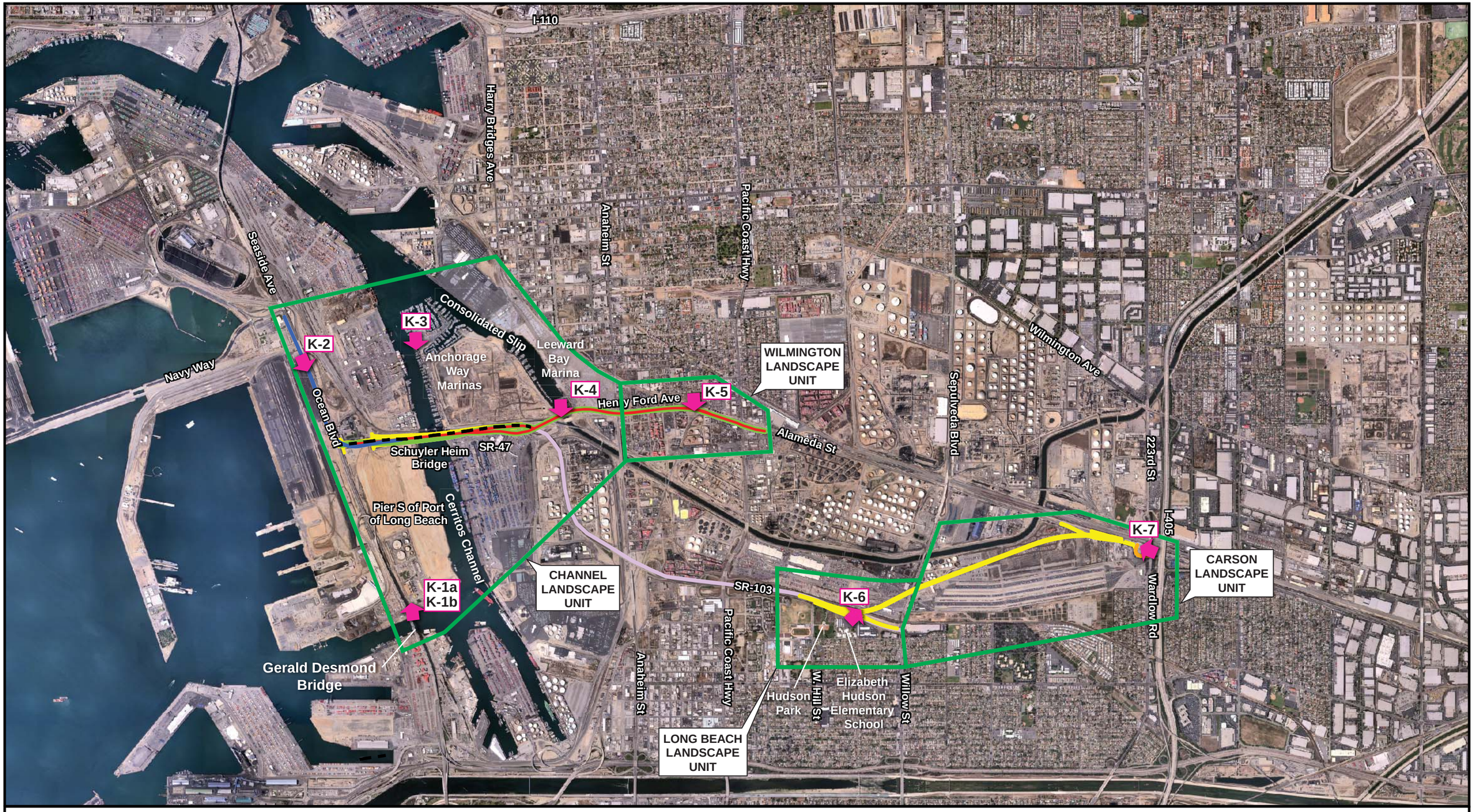
3.7.2.2.3 Visual Quality

The description of each landscape unit includes an assessment of the visual quality of the landscape viewed from key view(s) within that unit. Visual quality is evaluated by identifying the vividness, intactness, and unity present in the viewshed; assessments of these three qualities are combined to develop an overall rating of the setting's visual quality. The three dimensions used to evaluate visual quality are defined as follows:

Vividness – The visual power or memorability of landscape components as they combine in distinctive visual patterns.

Intactness – The visual integrity of the natural and man-built landscape and its freedom from encroaching elements. It can be present in well-kept urban and rural landscapes, as well as in natural settings.

Unity – The visual coherence and compositional harmony of the landscape considered as a whole. It frequently attests to the careful design of individual manmade components in the landscape.



LEGEND

- Alternative 1: Bridge Replacement and SR-47 Expressway
- Alternative 2: SR-103 Extension
- Alternative 3: Bridge Avoidance
- Alternative 4: Bridge Replacement Only
- Wardlow Road/223rd Street Ramp
- Ocean Boulevard/SR-47 Flyover
- Existing SR-103
- Landscape Units
- K-1 Key Viewpoint
- General Photo Direction

Aerial Date: May 2002

Note: Project components not to scale

0 2,800 Feet

0 1,000 Meters

Figure 3.7-1
Location Map, Build Alternatives, Landscape Units, and Key Viewpoints
Schuyler Heim Bridge Replacement and SR-47 Expressway Project

3.7.2.3 Landscape Units

A description of each of the landscape units is provided below. To support the descriptions, character photos are used in some cases to illustrate existing visual conditions. In addition, within each landscape area, one or more simulation viewpoints were selected to capture views typical of those in the viewing area. Typical viewpoints are important because they provide a basis for evaluating the potential project visual effects of greatest concern. In selecting these viewpoints, the emphasis was placed on views from publicly accessible locations that have the potential to be seen by the largest numbers of sensitive viewers. The locations of the viewpoints used for the analysis are shown in Figure 3.7-1.

3.7.2.3.1 Channel Landscape Unit

3.7.2.3.1.1 Description and Visual Character

The Channel Landscape Unit is the largest unit evaluated and includes the southernmost parts of the proposed project area. This unit includes portions of Terminal Island, including a segment of Ocean Boulevard and the Cerritos Channel, the marinas and Port lands on the north side of the Cerritos Channel, and the Consolidated Slip/Dominguez Channel.

The visual character of most of this unit is maritime industry and/or heavy industry. Large-scale transportation features such as shipping channels, freeways, bridges, and railroads pass through the unit and are prominent visual elements. Most of the land in this landscape unit is part of either the Port of Los Angeles or Port of Long Beach. The north-south SR-47 alignment in this area lies along the approximate boundary between the two ports. Land use in this area reflects its role as part of the ports complex. Two large shipping terminals line the banks of the Cerritos Channel. A large area on the south side of the channel east of the Schuyler Heim Bridge has been cleared by the Port of Long Beach to accommodate additional terminal development. A new abovegrade Ocean Boulevard alignment is under construction, on a separate Port of Long Beach project, south of the existing Ocean Boulevard.

Other uses in the area include large paved areas used for container storage, a power plant, and tank storage facilities. The Union Pacific Railroad is located west of SR-47, south of the Terminal Island Freeway (SR-103), and crosses the Cerritos Channel via Badger Avenue Bridge, a lift bridge located directly west of the Schuyler Heim Bridge. There are several marinas located in both the Cerritos Channel and Dominguez Channel that contain recreational vessels, some of which are occupied by live-aboard residents. No other residences are located within the Channel Landscape Unit. The marinas have the same appearance as many commercial pleasure marinas, with landscaped parking areas, walkways, service buildings, floating docks, and boats. However, the lands and waters that surround the marinas have a maritime industrial and/or heavy industry visual character.

3.7.2.3.1.2 Viewshed and Key View(s)

The terrain in this landscape unit is essentially flat, although elevated views are available to travelers on the Gerald Desmond Bridge, Schuyler Heim Bridge, elevated sections of the roadway south and north of the Schuyler Heim Bridge, and sections of Ocean Boulevard, east of Navy Way. Key views from three viewsheds were selected to represent the visual condition of the Channel Landscape Unit. The three key views would also have views of the proposed project. Key View 1 is located on the western end of the Gerald Desmond Bridge and was chosen to represent elevated views of the unit (to the west) from a major

transportation route. Key View 2 was selected to represent views along eastbound Ocean Boulevard to the southern approach of the Schuyler Heim Bridge (SR-47) to include the proposed flyover.

Key View 3 was selected to represent views of the Cerritos Channel to the east from the Anchorage Way Marinas, which is located at the intersection of the Cerritos Channel and the Consolidated Slip. Key View 4 was selected to represent views to the east from Leeward Bay Marina, which is located at the upstream end of the Consolidated Slip.

Key View 1 (Gerald Desmond Bridge)

The primary view from the western end of the Gerald Desmond Bridge is to the west and includes the Schuyler Heim Bridge, Badger Avenue Bridge, and elevated portions of SR-47 north and south of the Schuyler Heim Bridge (see Figures 3.7-2, 3.7-3, and 3.7-4). Additionally, heavy industrial land uses associated with Port activities, including the open-water shipping channel, container ships, container facilities, and associated structures (marine terminals, container handling facilities, bulk material handling facilities, and large overhead cranes) are part of the expansive view. Tall electric transmission towers and open land slated for future Port development are included the heavily industrial view.

Key View 2 (Eastbound Ocean Boulevard)

The primary view looking eastward along Ocean Boulevard is of a major transportation route to the Gerald Desmond Bridge and includes current construction of the future abovegrade Ocean Boulevard (to be completed as a separate Port of Long Beach project) (Figure 3.7-5). Container handling facilities on the north side of Ocean Boulevard are part of the view, and the City of Long Beach skyline is visible to the east.

Key View 3 (Anchorage Way Marinas)

The primary views from this viewpoint are of the Schuyler Heim Bridge and Badger Avenue Bridge, and heavy industrial land uses associated with Port activities. These uses include marine terminals, container handling facilities, bulk material handling facilities, large overhead cranes, and storage facilities (Figures 3.7-6 and 3.7-7, existing views). The open water of the Cerritos Channel and associated marine vessels at the Anchorage Way Marinas are part of the near view.

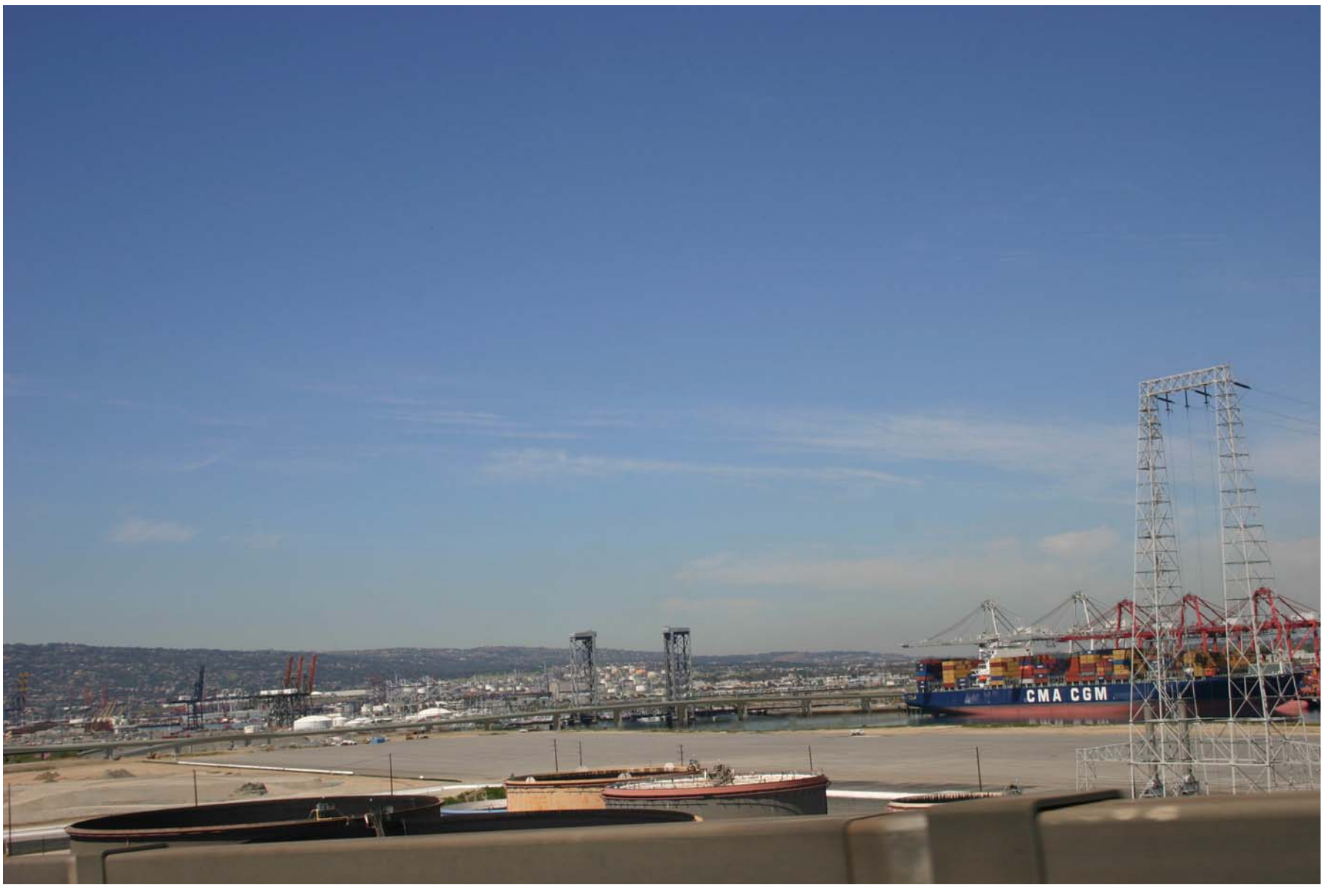
Key View 4 (Leeward Bay Marina)

Views from Key View 4 take in the two elevated rail truss bridges, Henry Ford Avenue north of SR-47, and various Port activities such as large overhead cranes (Figure 3.7-8, existing view). In addition, the open water of the Consolidated Slip, associated marine vessels, the marina office, a restaurant, an oil refinery, transmission lines, and heavy industrial land uses associated with Port activities are part of the expansive view from this location.

3.7.2.3.1.3 Visual Quality

The visual quality of the Channel Landscape Unit is characterized as "low" because of the adjacent Port-related activities, most of which have a maritime industry and/or heavy industry character. Land uses are similar in character within this landscape unit; but they lack visual vividness, intactness, or unity. There is little vegetation, except for landscaping associated with commercial properties, along a few transportation corridors, and at the marinas. The Dominguez Channel is bordered by a concrete levy on either side; the Cerritos Channel is bordered by concrete levies and manufactured pilings.

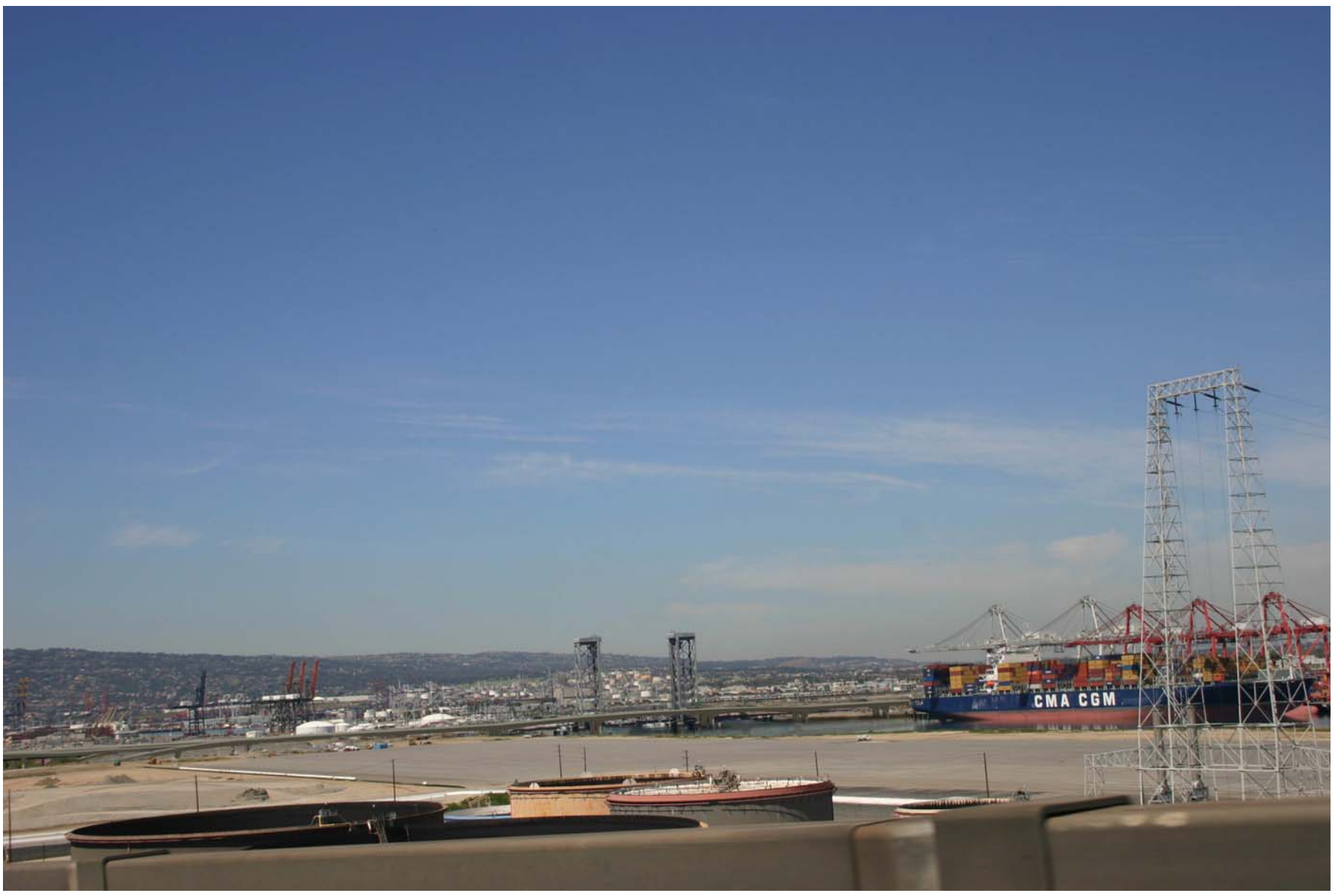
Key View 1: Existing Gerald Desmond View - looking west toward Schuyler Heim Bridge



Key View 1: Simulation of Gerald Desmond Bridge View of fixed-span bridge - looking west toward Schuyler Heim Bridge

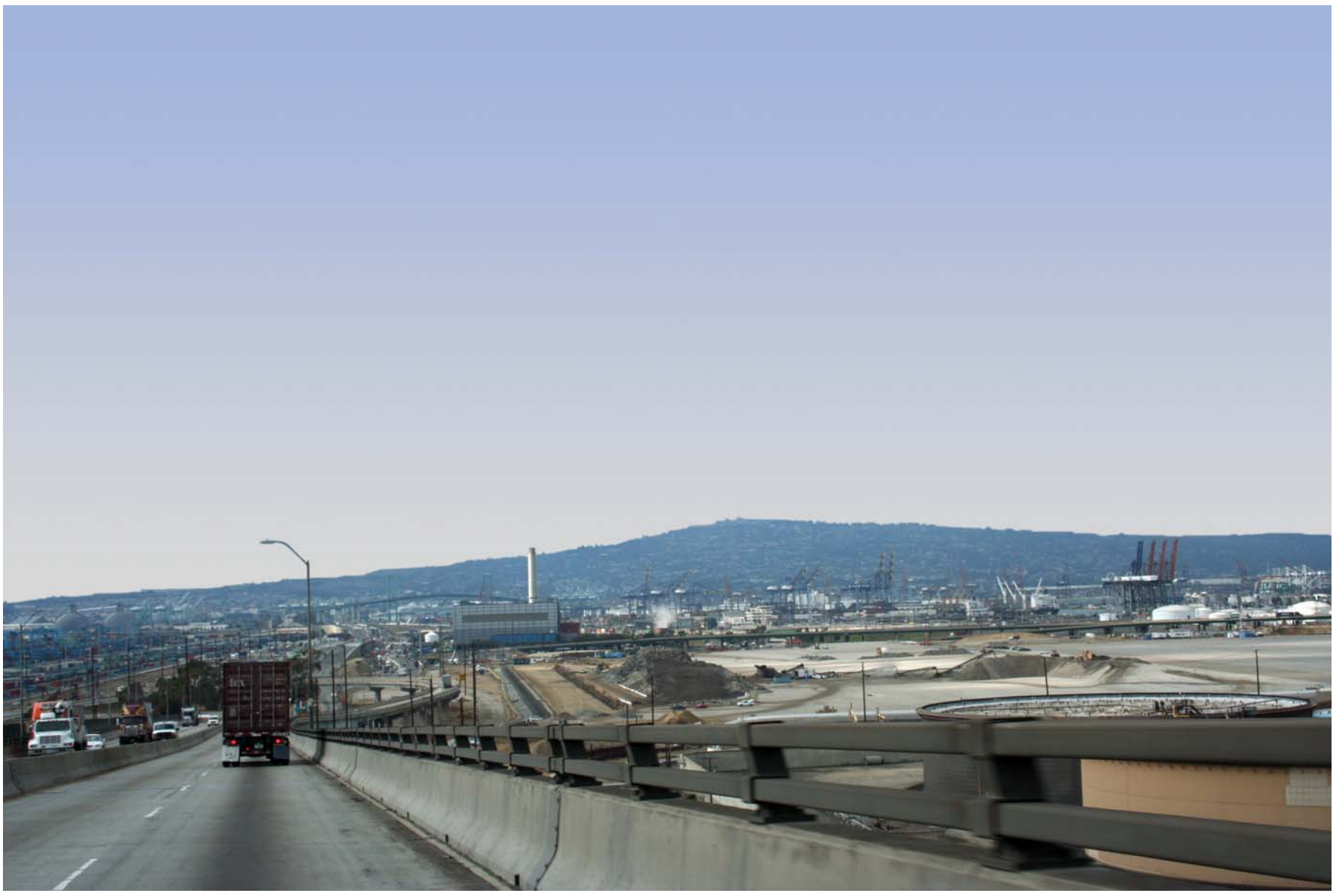
Figure 3.7-2
Key View 1a (Gerald Desmond Bridge) - Fixed-Span Bridge
Schuyler Heim Bridge Replacement
and SR-47 Expressway Project

Key View 1: Existing Gerald Desmond View - looking west toward Schuyler Heim Bridge

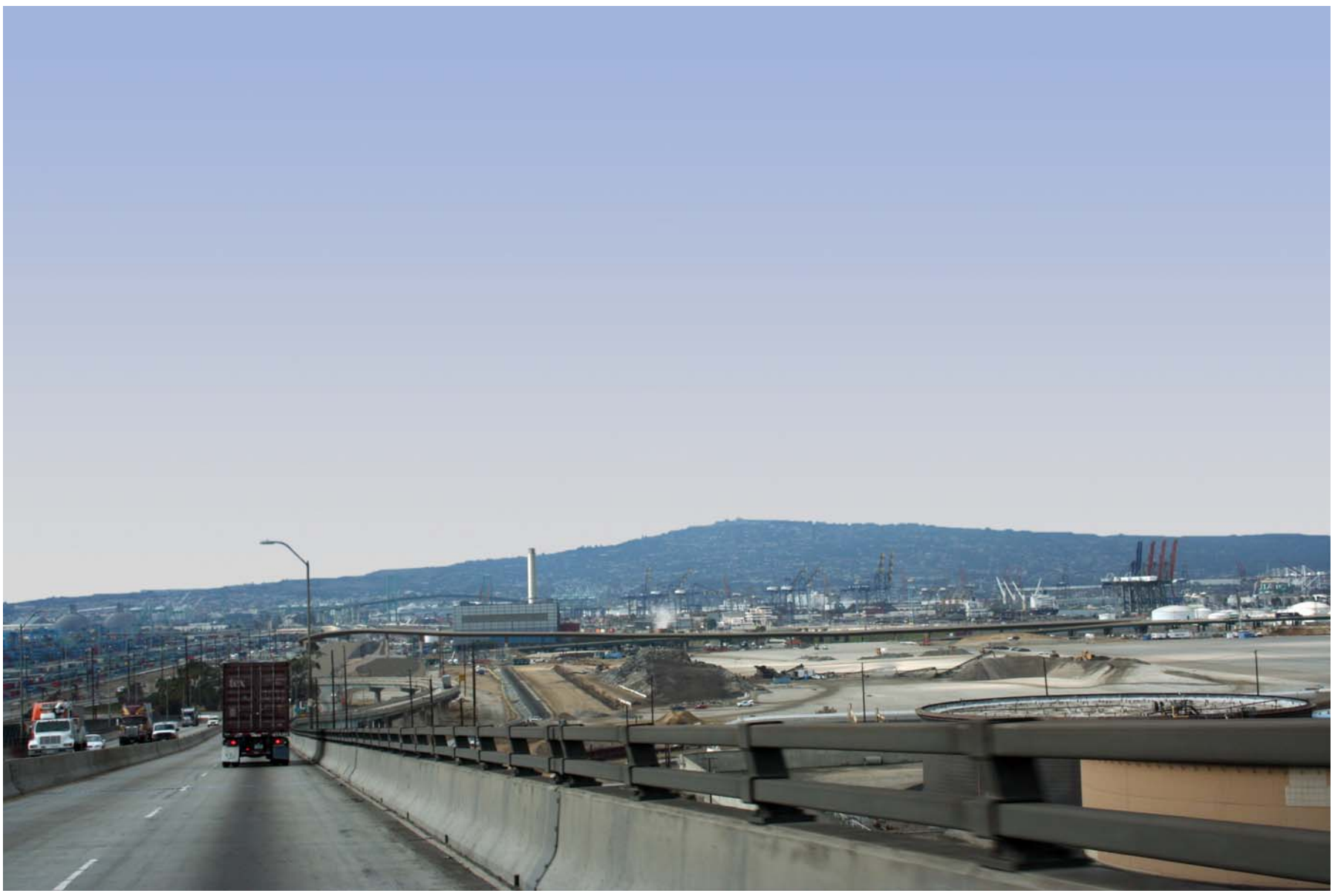


Key View 1: Simulation of Gerald Desmond Bridge View of fixed-span bridge (haunch design) - looking west toward Schuyler Heim Bridge

Figure 3.7-3
Key View 1a (Gerald Desmond Bridge) - Fixed-Span Bridge (Haunch Design)
Schuyler Heim Bridge Replacement
and SR-47 Expressway Project



Key View 1: Existing Gerald Desmond Bridge View - looking west toward Schuyler Heim Bridge



Key View 1: Simulation of Gerald Desmond Bridge View - looking west toward Schuyler Heim Bridge

Figure 3.7-4
Key View 1b (Gerald Desmond Bridge) - Flyover
Schuyler Heim Bridge Replacement
and SR-47 Expressway Project

Key View 2: Existing Ocean Boulevard - looking eastward

Key View 2: Simulation of Ocean Boulevard - looking eastward

Figure 3.7-5
Key View 2 (Eastbound Ocean Boulevard) - Flyover
Schuyler Heim Bridge Replacement
and SR-47 Expressway Project

Key View 3: Existing Anchorage Way Marinas View - looking east toward Badger Bridge and Schuyler Heim Bridge

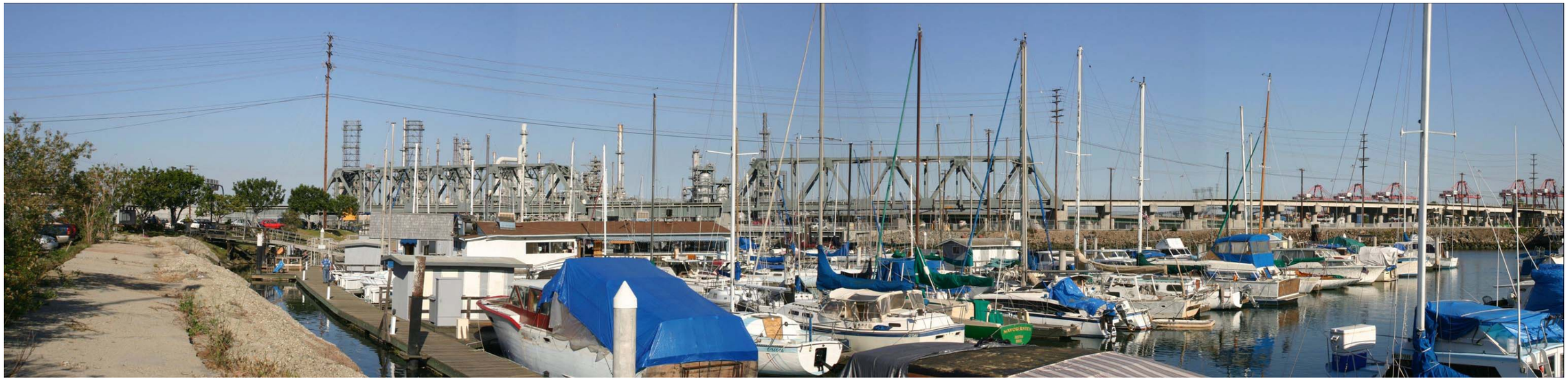
Key View 3: Simulation of Anchorage Way Marinas View of fixed-span bridge - looking east toward Badger Bridge and Schuyler Heim Bridge

Figure 3.7-6
Key View 3 (Anchorage Way Marinas) - Fixed-Span Bridge
Schuyler Heim Bridge Replacement
and SR-47 Expressway Project

Key View 3: Existing Anchorage Way Marinas View - looking east toward Badger Bridge and Schuyler Heim Bridge

Key View 3: Simulation of Anchorage Way Marinas View of fixed-span bridge (haunch design) - looking east toward Badger Bridge and Schuyler Heim Bridge

Figure 3.7-7
Key View 3 (Anchorage Way Marinas) - Fixed-Span Bridge (Haunch Design)
Schuyler Heim Bridge Replacement
and SR-47 Expressway Project



Key View 4: Existing Leeward Bay Marina View - looking east toward Henry Ford Avenue and SR-47

Key View 4: Simulation of Leeward Bay Marina View of elevated expressway - looking east toward Henry Ford Avenue and SR-47

Figure 3.7-8
Key View 4 (Leeward Bay Marina)
Elevated Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway

The majority of public views within the Channel Landscape Unit encompass transportation corridors, including local streets; rail and utility corridors; and heavy industrial, light industrial, and commercial uses. Publicly available views of the marine channel are generally limited to views seen from the marinas in the Cerritos Channel and Consolidated Slip. These views are dominated by Port and infrastructure facilities. The Channel Landscape Unit contains no unique visual resources. Local city and community plans do not designate any roads within or near the landscape unit as scenic or of special importance.

3.7.2.3.2 Wilmington Landscape Unit

3.7.2.3.2.1 Description and Visual Character

The Wilmington Landscape Unit encompasses the portion of the proposed project area immediately north of the Channel Landscape Unit. It follows Henry Ford Avenue north from the intersection of Anaheim Street to the point where Henry Ford Avenue intersects with Alameda Street and then follows the Alameda Street corridor to just north of Pacific Coast Highway.

This landscape unit has a mix of landscape character types, including heavy industry, light industry, commercial and scattered residential. This landscape unit is dominated by land uses such as oil refineries, container storage, recycling facilities, scattered commercial ventures, and utility and rail corridors. A pocket of residential properties and an elementary school are located immediately west of the intersection of Henry Ford Avenue and Alameda Street, west of an existing rail line, between approximately Grant Street to the south and Robidoux Street to the north. A representative view of the residential area and the various land uses that parallel Henry Ford Avenue are depicted in Figure 3.7-9, existing view. An above grade rail line runs parallel to and is located adjacent to the west of Alameda Street in this section of the project area.

3.7.2.3.2.2 Viewshed and Key View(s)

Viewsheds within the Wilmington Landscape Unit that would include areas where project components could be located generally occur along transportation routes, such as Henry Ford Avenue and Alameda Street, but also include the residential area west of Henry Ford Avenue and Alameda Street. The terrain in this landscape unit is generally flat, with no elevated views available to travelers or residents. Views within these viewsheds are dominated by local streets, rail and utility corridors, heavy industry, light industry, and commercial uses. Large-scale industrial and infrastructure facilities are sometimes visible in the middleground or background.

The key view that was selected to represent this landscape unit is located in a residential area located on Young Street. The view (to the east) from Key View 5 is toward the proposed project alignment, which is across the existing rail corridor right-of-way.

3.7.2.3.2.3 Visual Quality

The general visual quality of the Wilmington Landscape Unit is characterized as "low" because of the presence of heavy industrial and light industrial uses intermixed with commercial and residential uses. The industrial and commercial uses are similar in character within this landscape unit, but they lack visual vividness, intactness, or unity. There is very little vegetation, except for landscaping associated with commercial and residential properties and along a few roadways.

The visual quality of the residential area west of Henry Ford Avenue and Alameda Street is characterized as "moderate," although large-scale industrial and infrastructure facilities are sometimes visible in the middleground or background. The Wilmington Landscape Unit contains no unique visual resources. Local city and community plans do not designate any roads within or near the landscape unit as scenic or of special importance.

3.7.2.3.3 Long Beach Landscape Unit

3.7.2.3.3.1 Description and Visual Character

The Long Beach Landscape Unit encompasses the southern portion of the proposed project area along SR-103 from the area south of Hudson Park, north to the intersection at Willow Street/Sepulveda Boulevard. This landscape unit is divided generally east/west by the existing SR-103 alignment.

The area west of SR-103 in this landscape unit has an industrial character that is dominated by linear features such as the intermodal container transfer facility (ICTF), Union Pacific Railroad line, and an SCE electric transmission corridor. This area also contains areas of heavy and light industry. Most of the area east of the existing SR-103 alignment in this landscape unit has a residential character; it includes the single-family residential area located east of Hudson Park, Elizabeth Hudson Elementary School (440 Webster Street), and Cambodian Buddhist Temple (2100 West Willow Street).

3.7.2.3.3.2 Viewshed and Key View(s)

The terrain in the Long Beach Landscape Unit is essentially flat, and there are no elevated views. Primary viewsheds within the unit include the SR-103 corridor and the residential neighborhood to the east. The key view (Key View 6) selected for this landscape unit is located at Elizabeth Hudson Elementary School. The view (to the northwest) is toward the existing SR-103 alignment (Figure 3.7-10, existing view). It includes views of the SR-103 alignment, rail line, and electric transmission corridor west of SR-103. Additionally, the ICTF structures, container storage facilities, and heavy industrial facilities can be seen.

3.7.2.3.3.3 Visual Quality

Public views along and west of SR-103 are dominated by linear transportation and utility features along with heavy and light industry. Land uses west of SR-103 are similar in character, but lack visual vividness, intactness, or unity. The visual quality of these views is characterized as "low" to "moderately low" because of the presence of heavy industrial and transportation uses intermixed with commercial and residential uses. The visual quality of the foreground views of the residential neighborhood east of SR-103 is characterized as "moderate." Although the park, institutional facilities, and residences have a low degree of vividness and a moderately low level of intactness and unity, heavy industry and infrastructure features are visible in some locations in the middleground and background.

The Long Beach Landscape Unit contains no unique visual resources. Local city and community plans do not designate any roads within or near the landscape unit as scenic or of special visual importance.

Key View 5: Existing Young Street View - looking east toward Henry Ford Avenue

Key View 5: Simulation of Young Street View of elevated expressway - looking east toward Henry Ford Avenue

Figure 3.7-9a
Key View 5 (Young Street) - Elevated Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Key View 5: Existing Young Street View - looking east toward Henry Ford Avenue

Key View 5: Simulation of Young Street View of elevated expressway and sound walls - looking east toward Henry Ford Avenue

Figure 3.7-9b
Key View 5 (Young Street) - Elevated Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Key View 6: Existing Hudson School View - looking northwest toward SR-103

Key View 6: Simulation of Hudson School View of the elevated expressway and sound walls - looking northwest toward SR-103

Figure 3.7-10
Key View 6 (Hudson Elementary School) - SR-103 Extension
Schuyler Heim Bridge Replacement
and SR-47 Expressway Project

3.7.2.3.4 Carson Landscape Unit

3.7.2.3.4.1 Description and Visual Character

The Carson Landscape Unit encompasses the northern portion of the proposed project alignment along SR-103 from Sepulveda Boulevard, north-northwest to east of the Dominguez Channel, then north to Alameda Street to north of the 223rd Street on-/off-ramp. This landscape unit was defined to include the entry route into the City of Carson south along Alameda Street, south of I-405.

The majority of lands that are viewed by the public in this landscape unit have an industrial character. The unit has areas of heavy and light industry, along with scattered commercial land uses that are intersected by linear features such as streets, railroad lines, and utility corridors. The eastern portion of the landscape unit contains residential neighborhoods and has a residential visual character.

3.7.2.3.4.2 Viewshed and Key View(s)

The terrain in the Carson Landscape Unit is flat, and elevated views are generally limited to I-405. The primary viewsheds within this unit are along travel corridors. There is no view of the project alignment from the residences located in the eastern area of the landscape unit because of the presence of sound barriers installed between the residences and rail corridors and the heavy and light industrial facilities located between the residences and the project alignment. The key view (looking southerly) for this landscape unit is Key View 7, which is located on Alameda Street near the 223rd Street on- /off-ramp. Key View 7 offers a view of the proposed alignment from the intersection of the I-405/223rd Street off-ramps and includes a mix of light industrial and commercial developments, vacant lots, and utility and rail rights-of-way (Figure 3.7-11, existing view).

3.7.2.3.4.3 Visual Quality from Key View(s)

The general visual quality of the Carson Landscape Unit is characterized as "low" because of the concentration of heavy and light industry intermixed with commercial uses. The industrial and commercial uses are similar in visual character within this landscape unit, but they lack visual vividness, intactness, or unity. There is very little vegetation; some landscaping is associated with commercial properties and along Alameda Street. The residential neighborhoods in the eastern portion of this landscape unit do not have a view of the proposed alignment.

The Carson Landscape Unit contains no unique visual resources. Local city and community plans do not designate any roads within or near the landscape unit as scenic. However, the City of Carson General Plan contains policies that reflect an interest in creating visually attractive transportation corridors and major arterials (such as Alameda Street) that serve as gateways to the City of Carson, in addition to enhancing freeway corridors.

3.7.2.4 Viewers and Viewer Sensitivity

A variety of people have views of areas within the four landscape units and would have views of activities associated with the proposed project. There are four primary viewer types in the project area: people driving on roadways through the project area; residents; recreational and marina users; and people who work in the area. These groups vary in regard to their sensitivity to, and awareness of, the visual environment. Viewer awareness of the visual environment is related to factors such as how long a viewer sees a scene in the

environment (people driving on a road would view a scene for a shorter period of time than a resident viewing the same scene) and whether or not a person lives in an area or recreates in it (local residents and recreationists would be expected to have greater awareness than vehicle drivers and workers).

Most people who view the project area do so while driving through it. Drivers and passengers traveling on routes that pass through the project area, such as SR-47, SR-103, Henry Ford Avenue, and Alameda Street, likely have a moderate to high awareness of the project visual environment and moderate concerns about changes to the environment. Drivers traveling on I-405 at normal freeway speeds usually focus attention on long-range, nonperipheral views. Travelers experiencing congested traffic conditions would tend to focus on views from the freeway. Daily commuters (between Los Angeles and Orange County) may have an increased awareness of views from the freeway due to the amount of time spent on the facility every day. Drivers and passengers on I-405 may have low awareness of the features of the proposed project and have a low concern about the effects of the project on their view, which is obstructed from the elevated roadway by landscaping, buildings, and other facilities.

Residents within the project area include people living in single-family structures, people living in multi-family structures, and people living on boats in the marinas. All of these people have long-duration views of parts of the project area from their homes, schools, or other places, and have a high awareness of their visual environment and changes to it.

Recreational users (boaters) on the open-water marine channels within the landscape units have foreground, middleground, and background views of areas of the project as they traverse the open water for short to long periods of time. They likely have moderate awareness of the features in the landscape and would have a moderate concern relative to changes in the visual environment.

Employees of businesses in the project area would have foreground, middleground, and background views of the project for short to long time periods, depending on the location and type of their employment. Employees working outside adjacent to the open-water channels are likely to have a moderate awareness of the project visual environment and similar concerns related to the effects of the project on their views. Other employees working outdoors would have moderate to high awareness of the project visual environment and moderate to high concern for changes to the environment. Employees working indoors would have low to moderate awareness of the project and low to moderate concern about the effects of the project on their view.

Key View 7: Existing Alameda Street View - looking south along the Alameda Transportation Corridor just south of I-405

Key View 7: Simulation of Alameda Street View of SR-103 Extension - looking south along the Alameda Transportation Corridor just south of I-405

Figure 3.7-11
Key View 7 (Alameda Street South of I-405) - SR-103 Extension
Schuyler Heim Bridge Replacement
and SR-47 Expressway Project

3.7.3 Environmental Consequences

3.7.3.1 Evaluation Criteria

In the FHWA visual analysis system, a project alternative could have a significant visual affect if it results in a substantial change in the overall visual character or quality has an adverse effect on viewer response.

Visual resource change is the sum of the changes in visual character and visual quality. The first step in determining visual resource change is to assess the compatibility of the project with the visual character of the existing landscape. The second step is to compare the visual quality of the existing resources with projected visual quality after the project is constructed.

The resulting visual effects level is determined by combining the severity of resource change with the degree to which people are likely to oppose the change. The four visual effects levels and their definitions are provided below.

Low – Minor adverse change to the existing visual resource, with low viewer response to change in the visual environment. May or may not require mitigation.

Moderate – Moderate adverse change to the visual resource with moderate viewer response. Effects can be mitigated within 5 years, using conventional practices.

Moderately High – Moderate adverse visual resource change with high viewer response or high adverse visual resource change with moderate viewer response. Extraordinary mitigation practices may be required. Landscape treatment required would generally take longer than 5 years to mitigate.

High – A high level of adverse change to the resource or a high level of viewer response to visual change such that architectural design and landscape treatment cannot mitigate the effects. An alternative project design may be required to avoid adverse effects.

3.7.3.2 Methodology

The process used in the visual assessment for this document generally follows the guidelines outlined in the FHWA *Visual Impact Assessment for Highway Projects* (FHWA, 1981). The methodology includes ways to describe existing visual character and quality and how to assess changes to visual resources from transportation projects. Application of the FHWA methodology entailed six principal steps to assess the effects of the proposed alternatives on visual resources. They are as follows:

A. Define the project setting and viewshed
B. Identify key views for visual assessment
C. Analyze existing visual resources and viewer response
D. Depict the visual appearance of project alternatives
E. Assess the visual effects of project alternatives
F. Propose methods to mitigate adverse visual effects

An important element of the impact assessment process was the analysis of the visual changes that would occur in the key views identified as a part of the documentation of existing visual conditions. In step D., for each of the key views, photo simulations were prepared that provide an accurate and realistic-appearing rendering of how the view

would appear after the project-related changes are in place. These changes include avoidance and minimization measures, as appropriate. Adherence to local land use and transportation policies and guidelines regarding aesthetic design including, but not limited to, landscaping, would be incorporated into the alternatives by project design. The avoidance and minimization measures that would be incorporated into project design to ensure compatibility with local policies and the surrounding visual environment are shown in Table 3.7-1.

Comparison of the simulated view with existing conditions provided the basis for a systematic assessment of the character and visual quality of the altered view using the FHWA evaluative criteria. This analysis then provided the basis for determining how the project would affect the view and the level of visual impact the project would have for the view.

Table 3.7-1
Potential Aesthetic Minimization Measures – By Alternative
Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Aesthetic Detail	Project Component	Project Elements and Locations	Alternative
Surface/Color Treatment	Columns	**Schuyler Heim Bridge – Dominguez Channel Crossing; Elevated Expressway – south and north of Schuyler Heim Bridge and north to Pacific Coast Highway; SR-103 Extension from near Hudson Elementary north to Alameda Street; Ocean Boulevard Flyover**	Alternative 1 Alternative 1A Alternative 2 Alternative 3 Alternative 4 (no flyover under this alternative)
Surface/Color Treatment	Roadway Barriers	**Schuyler Heim Bridge – Dominguez Channel Crossing; Elevated Expressway – south and north of Schuyler Heim Bridge and north to Pacific Coast Highway; SR-103 Extension from near Hudson Elementary north to Alameda Street; Ocean Boulevard Flyover**	Alternative 1 Alternative 1A Alternative 2 Alternative 3 Alternative 4 (no flyover under this alternative)
Surface/Color Treatment	Ground-level Soundwall	**Existing SR 103** – west of and in the vicinity of Elizabeth Hudson Elementary School	**Existing SR 103:** Alternative 2

Table 3.7-1
Potential Aesthetic Minimization Measures – By Alternative
Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Aesthetic Detail	Project Component	Project Elements and Locations	Alternative
Surface/Color Treatment	Elevated Soundwall	**Elevated Expressway over Consolidated Slip** – west of Leeward Bay Marina **Elevated Expressway – SR-103 Extension** – west of and in the vicinity of Elizabeth Hudson Elementary School	**Elevated Expressway over Consolidated Slip:** Alternative 1 Alternative 1A Alternative 3 **Elevated Expressway – SR-103 Extension:** Alternative 2
Surface/Color Treatment	Gore Points	**Northbound and southbound Schuyler Heim Approaches** – at off-ramps/ on-ramps **Elevated Expressway – Eastbound Ocean Boulevard Flyover** **Elevated Expressway – SR 103 adjacent to Hudson Elementary School** **Elevated Expressway Return to Grade at Pacific Coast Highway** **Elevated Expressway – Return to grade south of I-405 on Alameda Street**	**Northbound and southbound Schuyler Heim Approaches:** Alternative 1 Alternative 1A Alternative 2 Alternative 3 Alternative 4 **Elevated Expressway – Eastbound Ocean Boulevard Flyover:** Alternative 1 Alternative 1A Alternative 2 Alternative 3 **Elevated Expressway – SR 103 adjacent to Hudson Elementary School:** Alternative 2 **Elevated Expressway Return to Grade at Pacific Coast Highway:** Alternative 1 Alternative 1A Alternative 3 **Elevated Expressway – Return to grade south of I-405 on Alameda Street:** Alternative 2

Table 3.7-1
Potential Aesthetic Minimization Measures – By Alternative
Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Aesthetic Detail	Project Component	Project Elements and Locations	Alternative
Plantings – Hedge/Shrubs	Elevated Expressway	Existing Henry Ford Avenue and Alameda Street – east of Wilmington residential neighborhood and west of existing rail corridor	**Existing Henry Ford Avenue and Alameda Street:** Alternative 1 Alternative 1A Alternative 3
Plantings – Trees	Elevated Expressway	Existing Henry Ford Avenue and Alameda Street – east of Wilmington residential neighborhood and west of existing rail corridor	**Existing Henry Ford Avenue and Alameda Street:** Alternative 1 Alternative 1A Alternative 3
Plantings – Vines	Ground-level Soundwall	**Existing SR 103** – west of and in the vicinity of Elizabeth Hudson Elementary School	**Existing SR 103:** Alternative 2
Plantings – Trees	Ground-level Soundwall	**Existing SR 103** – west of and in the vicinity of Elizabeth Hudson Elementary School	**Existing SR 103:** Alternative 2

Note:
Aesthetic details on and measures adjacent to project features (including architectural treatment and landscaping) would be designed and integrated into the project in coordination with and under the direction of a Caltrans Licensed Landscape Architect to minimize visual impacts. The Caltrans Licensed Landscape Architect would determine the location of specific applicable and feasible measures implemented to minimize visual impacts along the project alignment.

3.7.3.3 Evaluation of Alternatives

3.7.3.3.1 Alternative 1: Bridge Replacement and SR-47 Expressway

3.7.3.3.1.1 Construction Effects

Activities related to the dismantling of existing structures and the construction of new ones would add noise, dust, equipment (cranes, trucks, barges), light, and movement (from activities) to the visual environment. Construction related activities would be temporary in nature and impact. Construction activities at night have the potential to have greater effects because additional lighting that would be required to conduct the work could have temporary localized adverse effects.

Direct

Activities related to removal of the existing Schuyler Heim Bridge and construction of a new bridge would be seen and heard by viewers from Key Views 1, 2, 3, and 4. Most viewers from Key View 1 (Gerald Desmond Bridge) and Key View 2 (Eastbound Ocean Boulevard) would observe activities from their vehicles. The effects to these viewers would be "low." Viewers from Key View 3 (Anchorage Way Marinas) and Key View 4 (Leeward Bay Marina)

would consist primarily of marina users and live-aboard residents. The east end of the Anchorage Way Marinas is within 250 feet of proposed construction activity areas. Demolition and construction activities would be apparent to varying degrees from many parts of the two marinas during various phases of demolition and construction. Dust related to these activities would create "moderate" effects depending upon proximity to the activities, wind, etc. Construction activities could occur at night, which would introduce additional light to the environment near the construction. Because industrial activities presently occur (and are visually and audibly apparent) in proximity of the marina, the temporary effects from demolition and construction activities associated with Alternative 1 would be considered "moderate."

Construction activities associated with the elevated portions of the proposed improvements to SR-47 (including the flyover) would be observed from Key View 2 (Eastbound Ocean Boulevard), Key View 4 (Leeward Bay Marina), and Key View 5 (Young Street). Night-time construction would result in more light in the vicinity of construction activities. Because the key views are located in areas that have a mix of industrial and other intensive land uses (and activities) and are near heavily used transportation routes, the temporary effects at each key view would be "low."

Indirect

The facilities that would be built under Alternative 1 (new fixed-span bridge, SR-47 Expressway, and Ocean Boulevard/SR-47 Flyover) would be located in areas that are associated with industrial activities and the movement of cargo and vehicles. Construction associated with Alternative 1 would have no indirect effects on the visual character of the project area.

3.7.3.3.1.2 Operations Effects

The dismantling of existing structures and construction of new transportation structures and features would result in permanent changes to the visual environment. The following describes the permanent effects that would occur with implementation of Alternative 1.

Direct

Changes to the Visual Environment

The proposed replacement of the existing Schuyler Heim Bridge with a fixed-span bridge would result in a change in the visual environment. The new bridge would not include the towers associated with the existing lift structure. The change would not alter the visual character of the area near the bridge, which would continue to be a highly industrialized, Port-dominated landscape. The proposed simpler design of the new bridge would slightly reduce the vertical visual clutter of the view over the Cerritos Channel from Key View 1 (Gerald Desmond Bridge) (Figure 3.7-3, simulation) and Key View 3 (Anchorage Way Marinas) (Figure 3.7-6, simulation). The Schuyler Heim Bridge towers, which would be removed, currently create a slight blockage of the view from the west toward the Badger Avenue Bridge from Key View 1 (Figure 3.7-2, simulation). The only demolition activities that would be seen from Key View 4 (Leeward Bay Marina) would be removal of the towers.

The proposed reconstruction of the northbound and southbound on-/off-ramps at New Dock Street would be seen from Key View 1 (Gerald Desmond Bridge) and Key View 3, (Anchorage Way Marinas), but would not affect the vividness, intactness, or unity of the visual environment seen from these two views. The on/off ramps at Henry Ford Avenue

would not be seen from Key View 2 (Eastbound Ocean Boulevard) and Key View 4 (Leeward Bay Marina). Views from Key Views 1, 2, 3, and 4 would continue to include a modified SR-47 and a truck-dominated transportation corridor at approximately the same location as the current on-grade corridor. To accommodate the elevated SR-47 Expressway, a power transmission corridor near Key View 4 (Leeward Bay Marina) would be relocated to remain west of the new elevated expressway. Some docks and boats at the Leeward Bay Marina would be removed to accommodate the new viaduct. These actions would change the existing visual conditions, but would not change the visual character or quality of views in the area near the elevated expressway or the new transmission line corridor.

Modifications to the SR-103 transition ramps and the SR-47 elevated expressway north of the Schuyler Heim Bridge would not be visible from Key View 1 (Gerald Desmond Bridge), Key View 2 (Eastbound Ocean Boulevard), or Key View 3 (Anchorage Way Marinas). The SR-47 Expressway would be visible from Key View 4 (Leeward Bay Marina) and Key View 5 (Young Street). Construction of the SR-47 viaduct and the installation of soundwalls on the west side of the viaduct would create a change in the visual environment for the residents of Leeward Bay Marina (Figure 3.7-8, simulation), Young Street (Figure 3.7-9, simulation), and nearby areas of Wilmington.

Construction of only the SR-47 viaduct east of the Wilmington neighborhood would create a change in the visual environment for the residents of Young Street and nearby areas of Wilmington and nearby areas of Wilmington (Figure 9a, Simulation View). The presence of the viaduct would enclose the view and reduce the expansiveness of the view. Construction of Alternative 1 would reduce the visual character of the view from this area by interjecting a large, man-made feature in an already highly industrialized, mixed-use corridor of low quality along Henry Ford Avenue; that is, the large, man-made feature in the immediate foreground would encroach on the view, thereby reducing the intactness from this key view. Additionally, the overall unity would decrease due to the presence of the viaduct in the immediate foreground view. The visual quality of the view would remain low; the viewers in this area could have a high sensitivity to changes in the immediate foreground. Therefore, this alternative, when only the viaduct is constructed in this area, would generally reduce the visual character and quality of the view from this area.

Alternately, installation of an at-grade soundwall west of the existing rail line on the east side of the Wilmington Landscape Unit would also create an additional change in the visual environment for the residents of Young Street and nearby areas of Wilmington (Figure 9b, Simulation View). In these areas, the presence of the viaduct and the installation of soundwalls at grade and on the elevated expressway would enclose the view and reduce the amount of visible sky. Construction of the soundwall associated with Alternative 1 would improve the visual character of the view from Young Street by blocking the highly industrialized, mixed-use corridor of low visual quality along Alameda Street, including the heavy industrial facilities and associated signage. Implementation of this alternative would result in some degree of improvement of the intactness of the view by eliminating the visual encroachment of the mixed-use facilities and utility and transportation corridor. Therefore, this alternative would generally improve the visual character and visual quality of the view from this area.

The proposed construction of the Ocean Boulevard/SR-47 Flyover from eastbound Ocean Boulevard to the southern approach to the Schuyler Heim Bridge (Key View 2) would be a change in the visual environment. The change would not affect the character of the view, which would remain a view of a highly industrialized, Port-dominated landscape that would continue to include a Port-traffic dominated transportation corridor. Construction of the flyover, however, would afford eastbound Ocean Boulevard travelers a more expansive view to the east because the present security fencing between Ocean Boulevard and Pier T would be relocated, providing travelers with a view of the Long Beach city skyline.

Overall, establishment of the flyover, plus relocation of the fencing to the south, would create a slight improvement in the visual quality of this key view.

Viewer Response

Travelers using the westbound Gerald Desmond Bridge have middleground views of the Schuyler Heim Bridge, flyover, and SR-47 northbound and southbound approaches to the bridge. The view from Key View 1 (Gerald Desmond Bridge) is of a complex landscape with its visual character influenced by the presence of heavy industry and Port-related activities. Viewer awareness of the changes is likely to be low because duration of the view is short and, as shown in Figure 3.7-4 (simulation), the features proposed for modification do not stand out in the complex landscape. The level of viewer response to the proposed demolition of the existing Schuyler Heim Bridge and replacement with a fixed-span bridge, as well as the flyover and modification of SR-47 northbound and southbound approaches to the bridge, is anticipated to be low because there would be no overall change in the visual character or visual quality of the view.

Travelers using Ocean Boulevard eastbound from Navy Way are provided with background views of the Gerald Desmond Bridge and city of Long Beach skyline. The view from Key View 2 (Eastbound Ocean Boulevard) is of a truck-dominated transportation corridor with its visual character influenced by the presence of heavy industry and Port-related activities. Viewer awareness of the changes is likely to be moderate, because duration of the view is relatively long, and the flyover is a singular structure that stands out in the complex landscape as it crosses above Ocean Boulevard. The level of viewer response to the proposed flyover, is anticipated to be moderate, due to its visual prominence in middleground views. The flyover, however, will be consistent with the existing visual character quality of the view, which provides numerous transportation alignments.

Residents of the Anchorage Way Marinas (Key View 3) have a middleground view of the Schuyler Heim Bridge and the northbound and southbound approaches to the bridge. The view from Key View 3 is of a complex landscape due to the heavily industrialized nature of Port-related activities. Although the duration of view from this key view could be long for users of this area, viewer awareness of the changes is likely to be low because the features proposed for modification would not be located in the foreground and would not stand out in the complex landscape. Viewer response to the proposed demolition of the existing Schuyler Heim Bridge and replacement with a fixed-span bridge is anticipated to be low because there is no overall change in the visual character or visual quality of the view.

The view from the Key View 4 (Leeward Bay Marina) is of a complex landscape brought about by the heavily industrialized nature of Port-related activities. The view from this key view is of long duration for live-aboard residents, and viewers would have high awareness of

the SR-47 viaduct over the east end of the Consolidated Slip. Viewer response to the SR-47 Expressway, however, is anticipated to be moderate because the changes, while visible, do not create a substantial alteration of the visual character or visual quality of the view.

The view from Key View 5 (Young Street) is of a complex, industrialized and mixed-use landscape heavily influenced by the presence of heavy and light industrial facilities and rail and utility corridors. Viewer awareness of the elevated expressway is likely to be high, as duration of the view is long. Viewer response to the sound walls may be high and positive because of the removal of visual clutter from the Young Street view, which could be interpreted as a beneficial effect of the project.

Resulting Visual Effect

The proposed replacement of the existing Schuyler Heim Bridge with a fixed-span bridge would result in no substantial change to the visual vividness, intactness, and unity of the visual environment of Key View 1 (Gerald Desmond Bridge) and Key View 3 (Anchorage Way Marinas). Viewer awareness of and response is anticipated to be low. The resulting visual effects from these two key views are not anticipated to be adverse, and the area would retain a visual quality rating of "low."

The effect of the flyover would result in no substantial change to the visual vividness, intactness, and unity of the visual environment of Key View 1 (Gerald Desmond Bridge) or Key View 2 (Eastbound Ocean Boulevard). Therefore, viewer awareness of and response to implementation of the flyover is anticipated to be low to moderate. The resulting visual effects from these key views are not anticipated to be adverse, and the area would retain a visual quality rating of "low." The flyover would not be visible from the other key views and would have no effect on the visual qualities of those areas.

The proposed reconstruction of SR-47 as an elevated expressway over the eastern end of Consolidated Slip would somewhat change the visual environment of Key View 4 (Leeward Bay Marina). Implementation of Alternative 1 would introduce a viaduct, on-structure sound wall, and power transmission lines into the foreground to middleground view from the marina. This alternative would introduce a long horizontal element into the middle region of the sky and provide a higher degree of spatial definition to the eastern end of the marina area. Although it would create a change, Alternative 1 would not affect the visual vividness, intactness, and unity of the visual environment of Key View 4 (Leeward Bay Marina). The visual quality of the area would remain "low."

Under Alternative 1, a reduction in the visual character and visual quality of Key View 5 would occur if construction does not include soundwalls at grade west of the existing rail line and on the west side of the elevated SR 47 viaduct. It is anticipated that viewer awareness of and response to the changes is likely to be high. Much of the viewer response is likely to be negative because of the introduction of the large, human-made feature into the existing highly industrialized, mixed-use foreground view. As discussed in the project description, local general plan requirements for landscaping will be implemented as a part of the project, as applicable. If landscaping includes tall trees and hedge planting (west of the existing rail line right-of-way), where feasible, the landscaping would play a role in integrating the elevated expressway into the view and compensate for the negative visual effects that some viewers might ascribe to the view. Therefore, no adverse visual effect is anticipated.

Alternately, under Alternative 1, a beneficial change to the visual character and visual quality of Key View 5 would occur if construction includes soundwalls at grade west of the existing rail line and on the west side of the elevated SR 47 viaduct. It is anticipated that viewer awareness of and response to the changes is likely to be high. Although much of the viewer response is likely to be positive because of the screening the soundwalls would provide of views toward the industrial facilities to the east, some of the response to the sense of enclosure created may be negative. Implementation of landscaping along the sound walls, where feasible, could play a role in integrating the walls into the view and partially compensating for the negative visual effects that some viewers might ascribe to the view-blocking effects of the walls. Overall, impacts to visual resources would not be adverse, and no mitigation beyond the planned landscaping would be required.

The features associated with Alternative 1 would not be visible from Key View 6 (Hudson Elementary School) or Key View 7 (Alameda Street near the 223rd Street on- /off-ramp) and would have no effect on the visual quality of those areas.

Indirect

Alternative 1 operations would have little indirect affect on the visual environment of the general project area. The new transportation elements associated with Alternative 1 would be located in, and seen from, areas that are largely industrial and commercial in character, with scattered residential neighborhoods. Indirect visual effects from Alternative 1 would be non-existent to "low."

3.7.3.3.2 Alternative 1A

3.7.3.3.2.1 Construction Effects

The types of direct and indirect construction effects under Alternative 1A would be the same as those described under Alternative 1.

3.7.3.3.2.2 Operations Effects

The dismantling of existing structures and construction of new structures and features would result in permanent changes to the visual environment. None of the operations effects associated with Alternative 1A would result in adverse effects to the visual environment.

Direct

As with Alternative 1, Alternative 1A would replace the existing Schuyler Heim Bridge with a new fixed-span bridge. The replacement bridge under this alternative would be a structural variation of the bridge described for Alternative 1 that would include an increased span length over the channel and different pier alignment (Figure 3.7-3, simulation, and Figure 3.7-7, simulation). Compared to the bridge proposed for Alternative 1, this Alternative 1A "haunch" design would have a more substantial appearance and would have more of an emphasis on architectural detailing.

The proposed Alternative 1A bridge replacement would result in a change in the visual environment. As with Alternative 1, the change would not affect the character of the area from which the bridge could be seen. It would remain a highly industrialized, Port-dominated landscape that would continue to include a bridge spanning the Cerritos Channel. The proposed bridge design would slightly reduce the visual clutter of the view over the Cerritos Channel from Key Views 1 and 3.

Under Alternative 1A, the SR-47 Expressway, flyover, and SR-103 connectivity features would be the same as described for Alternative 1.

The viewer responses and resulting visual effect would be the same as those described for Alternative 1.

Indirect

Under Alternative 1A, indirect effects would be the same as those described for Alternative 1.

3.7.3.3.3 Alternative 2: SR-103 Extension to Alameda Street

3.7.3.3.3.1 Construction Effects

Under Alternative 2, the types of construction effects would be the same as those described in Alternative 1.

Direct

Direct effects from construction activities related to replacement of the Schuyler Heim Bridge and construction of the flyover would be the same as those described under Alternative 1.

Construction activities associated with the proposed improvements to SR-103 would be observed in areas such as those near Key View 6 (Hudson Elementary School) and Key View 7 (Alameda Street south of I-405). If construction would occur at night, it would result in more light in the vicinity of construction activities. Both key views are located in areas that have a mix of industrial and other intensive land uses (and activities) and are near heavily used transportation routes. These areas currently have considerable night lighting because of the 24-hour nature of much of the work in the area, security lighting, and lighting related to roads and highways. The temporary effect to viewers at Key View 7 (Alameda Street south of I-405) related to construction would be "low." Temporary effects to viewers (residents) near Key View 6 (Hudson Elementary School) would be "low" to "moderate."

Indirect

The facilities that would be constructed under Alternative 2 would be located in areas that are associated with industrial activities and the movement of cargo and vehicles. Construction activities would have no indirect effects on the visual character of the project area.

3.7.3.3.3.2 Operations Effects

The permanent visual effects related to replacement of the Schuyler Heim Bridge and construction of the flyover described in Alternative 1 would apply to Alternative 2. Under Alternative 2, however, the SR-47 elevated expressway north of the bridge would not be constructed. Therefore, Alternative 2 would not change the existing visual environment along the route of the SR-47 Expressway associated with Alternative 1 (Key View 4 [Leeward Bay Marina] and Key View 5 [Young Street]). Operations effects associated with the extension of SR-103 are discussed below.

Direct

Changes to the Visual Environment

Under Alternative 2, the direct visual effects related to the replacement of the Schuyler Heim Bridge and construction of the flyover would be the same as those described in

Alternative 1. Additionally, Alternative 2 would extend SR-103 to Alameda Street. This would result in changes to the visual environment along the extension route. The extension would require construction of an elevated expressway that would be visible from areas along the route, including views from Key View 6 (Hudson Elementary School) and Key View 7 (Alameda Street south of I-405). Sound walls would be constructed at grade and on the elevated roadway near Hudson Elementary School. The at-grade sound walls would not screen the elevated expressway from Key View 6 (Hudson Elementary School) (Figure 3.7-10, simulation). Construction of this viaduct near Hudson Elementary School would require the existing electric transmission towers visible west of SR-103 to be raised to provide clearance for the elevated expressway. The addition of a ramp on Alameda Street at the northern terminus of the SR-103 extension would be visible from Key View 7 (Alameda Street south of I-405), depicted in Figure 3.7-11, simulation.

Viewer Response

Viewers from Key View 6 (Hudson Elementary School) would have middleground views of the elevated SR-103 viaduct, sound walls, and modified transmission towers. The existing view is of a highly industrialized transportation, rail, and utility corridor. Viewer awareness would likely be moderate, as the view would be of moderate to long duration. Viewer response to this alternative is anticipated to be low because there would be no overall change in the visual character or visual quality of the view.

The users of Alameda Street near the location of Key View 7 (Alameda Street south of I-405) would have foreground to middleground views of the northern terminus of SR-103. Viewer awareness is likely to be high, although the view is of short duration because the viaduct would become a dominant element of the view. Viewer response to this alternative is anticipated to be low because there would be no overall change in the visual character or visual quality of the view.

Resulting Visual Effect

The extension of SR-103 to Alameda Street and the construction of a ramp to Alameda Street at the northern terminus would introduce new visual elements to areas near the extension (Figure 3.7-11, simulation). The elevated expressway would introduce a long, horizontal element into the middle region of the sky from many areas along the route, including from Key View 6 (Hudson Elementary School). However, the presence of the elevated expressway would not necessarily reduce visual quality due to the fact that existing visual elements have an industrial and transportation character. There will be no change in the visual quality of this view.

The addition of a ramp on Alameda Street at the northern terminus of the SR-103 Extension would be visible from Key View 7 (Alameda Street south of I-405) and would also result in a change in the visual environment (Figure 3.7-11, simulation). The introduction of a ramp to the viaduct would result in no overall change in the visual character or visual quality of the view from Key View 7. The ramp would be consistent with the character of Alameda Street as a transportation corridor that is used for Port-related traffic. It would also be consistent with nearby industrial and commercial facilities, as well as adjacent rail and utility corridors. Under this alternative, the visual quality of the view from Alameda Street south of I-405 would remain rated as “low.”

Indirect

The facilities that would be constructed under Alternative 2 would be located in areas that are associated with industrial activities and the movement of cargo and vehicles. Construction activities would have no indirect effects on the visual character of the general project area.

3.7.3.3.4 Alternative 3: Bridge Demolition Avoidance

3.7.3.3.4.1 Construction Effects

With this alternative, the existing Schuyler Heim Bridge would not be removed. However, a new fixed-span bridge would be built on an alignment east of and adjacent to the existing bridge, and the effects related to bridge construction would be similar to those described under Alternative 1. In addition, effects of constructing the flyover and SR-47 Expressway would be the same as described under Alternative 1.

Under Alternative 3, the direct and indirect effects would be the same as those discussed for Alternative 1.

3.7.3.3.4.2 Operations Effects

Under Alternative 3, operations effects to the visual environment would be similar to those described in Alternative 1. There would be some differences, however, as described in the following sections.

Direct

Changes to the Visual Environment

Under this alternative, the existing Schuyler Heim Bridge would undergo seismic retrofit for safety purposes and would remain standing, but unused. This alternative would avoid demolition of an historic resource. A new fixed-span bridge, which would be constructed east of, and adjacent to, the existing bridge, would add a new horizontal element to the visual environment. The new bridge would be visible from Key View 1 (Gerald Desmond Bridge). It also would be visible from Key View 3 (Anchorage Way Marinas), although it would be screened to a certain extent by the existing Schuyler Heim Bridge and Badger Avenue/Henry Ford Bridge.

Retrofit of the existing Schuyler Heim Bridge would introduce additional structural integrity to the existing span. The elements of the retrofit would be mostly screened from Key View 1 (Gerald Desmond Bridge) by the new fixed-span bridge and from Key View 3 (Anchorage Way Marinas) by the Badger Avenue Railroad Bridge.

Under this alternative, the SR-47 elevated expressway would be constructed north of the new fixed-span bridge; the flyover would be constructed along Ocean Boulevard, and connectivity with SR-103 would be maintained as described under Alternative 1. The visual effects described under Alternative 1 would apply to the SR-47 Expressway and flyover portions of Alternative 3.

Viewer Response

Viewer response to construction of the new fixed-span bridge east of the existing Schuyler Heim Bridge would be similar to that described under Alternative 1. Viewer response to construction of the SR-47 Expressway, the flyover, and maintenance of the SR-103 connectivity would also be similar to the response that would occur under Alternative 1.

Additionally, viewer response to the seismic retrofit of the existing bridge would likely be moderate, as the view would be of a short to long duration. Viewer response to this alternative is anticipated to be low because there would be no overall change in the visual character or visual quality of the view.

Resulting Visual Effect

The addition of a second vehicular bridge (fixed-span bridge) across the Cerritos Channel and retrofit of the existing bridge would slightly change the existing visual environment. The new bridge and retrofit would not affect the visual character of the areas near it, which would continue to reflect nearby industrial and transportation land uses. The visual effects of this alternative associated with construction of the new bridge, flyover, and SR-47 Expressway, along with maintaining connectivity with SR-103, would be similar to the effects described under Alternative 1. The visual quality of the view due to retrofit of the existing bridge from Key View 1 (Gerald Desmond Bridge) and Key View 3 (Anchorage Way Marinas) would remain "low" due to the number of other visual elements seen from these key views that have an industrial character.

Indirect

Under Alternative 3, indirect effects of project operations would be the same as those described for Alternative 1.

3.7.3.3.5 Alternative 4: Bridge Replacement Only

3.7.3.3.5.1 Construction Effects

Under Alternative 4, construction direct and indirect effects related to demolition and replacement of the Schuyler Heim Bridge, and modification to the bridge's northbound and southbound approaches, would be the same as those described for Alternative 1 for the bridge portion only. The flyover would not be constructed under this alternative.

3.7.3.3.5.2 Operations Effects

Under Alternative 4, direct and indirect operations effects related to demolition and replacement of the Schuyler Heim Bridge would be the same as those described for the bridge under Alternative 1.

3.7.3.3.6 Alternative 5: Transportation System Management

Under Alternative 5, there would be no changes to the existing Schuyler Heim Bridge, Cerritos Channel crossing, or local roadway system, and the flyover would not be constructed. As a result, there would be no change to the existing visual character and quality of the project area related to implementation of this alternative.

3.7.3.3.6.1 Construction Effects

Minor, localized effects associated with roadway and intersection improvements and minor roadway widening would occur under this alternative.

Direct
Direct construction effects would occur as a result of roadway and intersection improvements and minor roadway widening.

Indirect
The facilities that would be constructed under Alternative 5 would be located in areas that are associated with industrial activities and the movement of cargo and vehicles. There would be no indirect effects on the visual character of the general project area.

3.7.3.3.6.2 Operations Effects
Direct
Direct operations effects would occur as a result of roadway and intersection improvements and minor roadway widening.

Indirect
The facilities that would be constructed under Alternative 5 would be located in areas that are associated with industrial activities and the movement of cargo and vehicles. There would be no indirect effects on the visual character of the general project area.

3.7.3.3.7 Alternative 6: No Build
Under Alternative 6, there would be no changes to the existing visual environment and there would be no associated construction or operations effects.

3.7.3.3.8 CEQA Consequences
Based on the above analysis, in accordance with CEQA criteria, the project alternatives would not have the potential to have an adverse effect on a scenic vista or scenic resource, as none exist in the project area. Further, due to the existing developed industrial character of the project site, none of the proposed alternatives would substantially degrade the existing visual character or quality of the site and its surroundings or create a new source of substantial light or glare. Impacts to aesthetics would be less than significant for Alternatives 1, 2, 3, and 4. There would be no impact to aesthetics or visual resources under Alternatives 5 and 6.

Potential impacts of the proposed project alternatives to Visual Resources/Aesthetics are addressed in the context of CEQA criteria in Chapter 4.0 – CEQA Analysis. Also see Appendix A – CEQA Checklist (I, Aesthetics).

3.7.4 Avoidance, Minimization, and/or Mitigation Measures

3.7.4.1 Avoidance and Minimization Measures

3.7.4.1.1 Alternatives 1, 1A, 2, 3, and 4
VR-1 The surfaces of columns, roadway barriers, soundwalls, and gore points will receive surface color treatments at specified locations, as determined by a Caltrans Licensed Landscape Architect.

VR-2 Elements of the design of the proposed bridge and expressways, such as color, line, texture, and style, would be aesthetically pleasing and as unobtrusive as possible. During final design, particular attention would be paid to the vertical columns and soundwalls.

VR-3 All visual design elements, including landscaping, would be designed and implemented with the concurrence of a Caltrans Licensed Landscape Architect and in compliance with local policies and guidelines. Additionally, input from interested parties, including the public, will be solicited and considered.

VR-4 Trees and vines will be planted along soundwalls and other walls at specified locations, as determined by a Caltrans Licensed Landscape Architect.

VR-5 Design of the elevated expressway would be compatible (scale and massing) with the existing Schuyler Heim Bridge or future bridge and the Badger Avenue/ Henry Ford Railroad bridge.

VR-6 Night lighting would be used when required for safety for temporary construction activities. The lights would be directed downward and shielded to reduce light-spill outside of the area required for construction activities.

3.7.4.1.2 Alternatives 5 and 6

No avoidance and minimization measures are required for Alternatives 5 and 6.

3.7.4.2 Mitigation Measures

Measures VR-1 through VR-5, above, would provide adequate mitigation for project Alternatives 1 through 4.

No mitigation measures would be required for Alternatives 5 and 6.

3.8 Cultural Resources

"Cultural resources" as used in this document refers to all historical and archaeological resources, regardless of significance.

3.8.1 Regulatory Setting

The State Route 47 (SR-47) Expressway and Schuyler Heim Bridge Replacement Project is regulated by the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act. Section 106 of the National Historic Preservation Act as amended (Section 106, 16 United States Code [USC] 470f) requires that effects on significant cultural resources be taken into consideration in any federal undertaking. NEPA requires that federal agencies integrate the NEPA process with other environmental laws, including Section 106. Although compliance with Section 106 is the responsibility of the lead federal agency, the work necessary to comply can be undertaken by others.

The project alternatives also are subject to compliance with the California Environmental Quality Act (CEQA) (Public Resources Code [PRC], Section 21084.1). As defined under state law in Title 14 California Code of Regulations (CCR) §4850, the term "historical resource" means "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or which is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural history of California." For the purposes of CEQA, "historical resource" is further defined under PRC §15064.5 as a "resource listed in, or determined eligible for listing in the California Register."

Properties listed in or determined eligible for listing in the National Register of Historic Places (NRHP), such as those identified in the Section 106 process, are automatically listed in the California Register of Historic Resources (CRHR). Therefore, all "historic properties" under federal preservation law are automatically "historical resources" under state preservation law. Historical resources are also presumed to be significant if they are included in a local register of historical resources (e.g., the list of City of Los Angeles Historic-Cultural Monuments) or identified as significant in a qualified historical resource survey. Section 15064.5 of the *State CEQA Guidelines* sets forth the criteria and procedures for determining significant historical resources and the potential effects of a project on such resources.

Significant paleontologic resources are defined as fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or important to define a particular time frame or geologic strata or that add to an existing body of knowledge in specific areas. Paleontologic remains are accepted as non-renewable resources significant to our culture and are protected under provisions of the Antiquities Act of 1906 and subsequent related legislation, including CEQA.

3.8.1.1 Federal Requirements

3.8.1.1.1 Section 106 of the National Historic Preservation Act

The National Historic Preservation Act of 1966, as amended, (NHPA) sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places. Section 106 of NHPA requires federal agencies to take into account the effects of their

undertakings on such properties and to allow the Advisory Council on Historic Preservation the opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation (36 CFR 800). On January 1, 2004, a Section 106 Programmatic Agreement (PA) among the Advisory Council, FHWA, State Historic Preservation Officer (SHPO), and Caltrans went into effect for Caltrans projects, both state and local, with FHWA involvement. The PA takes the place of the Advisory Council's regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans.

The Section 106 process entails the six primary steps listed below.

- Initiate consultation and public involvement.
- Identify and evaluate historic properties with the project Area of Potential Effects (APE).
- Assess effects of the project on historic properties.
- Consult with the State Historic Preservation Officer (SHPO) regarding adverse effects on historic properties, resulting in a memorandum of agreement (MOA).
- Submit the MOA to the Advisory Council on Historic Preservation (ACHP).
- Proceed in accordance with the MOA.

3.8.1.1.2 The Area of Potential Effects

As defined in the Section 106 regulations, the area of potential effects (APE) means:

> *"…the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects cause by the undertaking" [36 CFR §800.16(d)].*

The APE for the combined proposed projects includes the maximum existing or proposed right-of-way for all alternatives currently under consideration, easements (temporary and permanent), all improved properties subject to temporary or permanent changes in access (ingress and egress), and areas where visual or audible changes could occur outside the required right-of-way (as shown in the *Historic Property Survey Report* [Myra L. Frank & Associates, 2002]). The APE for all the alternatives of the combined projects was defined by Jessica Feldman (architectural historian, Jones & Stokes), coordinated by Ron Kosinski (Chief, Environmental Services, Caltrans District 7), and signed on October 9, 2002. The APE map was approved by FHWA on October 9, 2002. Subsequently, another alternative for the project, the SR-103 Extension to Alameda Street Alternative, was proposed, and that alternative required additional supporting studies. The APE for the SR-103 Extension to Alameda Street was defined by Jessica Feldman, architectural historian with Jones & Stokes, and coordinated by Kelly Ewing-Toledo, associate architectural historian with Caltrans District 7 (Caltrans, 2005). The APE was approved by Caltrans on March 9, 2005, and by FHWA on March 10, 2005. A Supplemental Archaeological Survey Report (ASR) was prepared for the proposed Ocean Boulevard/SR 47 Flyover addition to the project alternatives. The APE for the flyover was defined by Mark C. Robinson, senior archeologist with Jones & Stokes and was approved by Caltrans on March 15, 2007.

3.8.1.1.3 Historic Properties

Section 106 requires federal agencies, or those they fund or permit, to consider the effects of their actions on "historic properties." As defined by ACHP regulations (36 CFR Part 800) for implementing Section 106:

> *"Historic property" means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the National Register criteria [36 CFR §800.16(l)].*

To determine whether an undertaking could affect NRHP-eligible properties, cultural resources (including archaeological, historical, and architectural properties) must be inventoried and evaluated for listing in the NRHP.

Historic properties also may be covered under Section 4(f) of the U.S. Department of Transportation Act, which regulates the "use" of land from historic properties.

Historical resources are considered under CEQA, as well as California PRC Section 5024.1, which established the California Register of Historical Resources. PRC Section 5024 requires state agencies to identify and protect state-owned resources that meet National Register of Historic Places listing criteria. It further specifically requires Caltrans to inventory state-owned structures in its rights-of-way. Sections 5024(f) and 5024.5 require state agencies to provide notice to and consult with SHPO before altering, transferring, relocating, or demolishing state-owned historical resources that are listed on or are eligible for inclusion in the National Register or are registered or eligible for registration as California Historical Landmarks.

3.8.1.2 State Requirements

3.8.1.2.1 California Environmental Quality Act

In the State of California, fossil remains are considered to be limited, nonrenewable, and sensitive scientific resources. These resources are afforded protection under the following State of California legislation (California Office of Historic Preservation 1983):

- California Environmental Quality Act of 1970 (CEQA)
- Title 13 Public Resources Code, 21000 et seq., requires public agencies and private interests to identify the potential adverse impacts and/or environmental consequences of their proposed project(s) to any object or site important to the scientific annals of California (Division 1, Public Resources Code: 5020.1 [b])
- Guidelines for the Implementation of CEQA (as amended 1 January 1999)

In addition to the above, the *California CEQA Guidelines* Section 15064.5(a)(3) provides protection for paleontologic resources by requiring that they be identified and mitigated as historical resources under CEQA.

3.8.1.2.2 California Health and Safety Code

Human remains are also sometimes associated with archaeological sites. According to CEQA, "archaeological sites known to contain human remains shall be treated in accordance with the provisions of State Health and Safety Code Section 7050.5." The protection of human remains is also ensured by California Public Resources Codes, Section 5097.94, 5097.98, and 5097.99.

If human remains are exposed during construction, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the county coroner has made the necessary findings as to origin and disposition pursuant to PRC 5097.98. Construction must halt in the area of the discovery of human remains, the project proponent must assure that the area is protected, and consultation and treatment shall occur as prescribed by law.

3.8.2 Affected Environment

3.8.2.1 Natural Setting

The project area is located on the margins of San Pedro Bay, at the southern edge of the Los Angeles Plain. San Pedro Bay in prehistoric times was a saltmarsh and estuary habitat interspersed with sandbars and mud flats (McCawley, 1996). The beach and coastal strand zone was home to a variety of sea mammals, sea birds, fish, and shell fish as well as seaweed and kelp beds. Prior to modern development, the Los Angeles-Long Beach Harbor was a low-lying coastal marsh called Wilmington Lagoon or San Pedro Creek (Schell et al., 2003). The lagoon had a complex network of estuaries, stream channels, tidal channels, sand spits, beaches, and marshy inlands (Schell et al., 2003). However, modern port development has transformed the project area into an urban industrial environment, and much of the project area has been filled. None of the natural environmental setting of the project region remains intact.

The Los Angeles region has a Mediterranean climate characterized by warm, dry summers and mild winters with most annual rainfall occurring between the months of November and April. Elevation in the project area is about 1.5 meters (m) to 3.0 m (5 to 10 feet [ft]) above mean sea level (AMSL).

3.8.2.2 Prehistoric Setting

3.8.2.2.1 Early Man

A few archaeologists and nonprofessionals working in Southern California have claimed that cultural remains of great antiquity, in excess of 15,000 to 50,000 years old, have been found in the region. Most of these sites are centered in the Mojave and Colorado deserts or in coastal Southern California. The most widely publicized of these sites is the Calico Early Man Site (Schuiling, 1979; Simpson, 1980). Thus far, however, none of these "Early Man" sites have withstood scientific scrutiny, and most archaeological researchers in California dismiss this purported "Early Man" period as unsubstantiated by scientific evidence.

3.8.2.2.2 12000 to 7500 B.P. Interval (Terminal Pleistocene/Early Holocene Period)

This interval is characterized by the arrival of humans in Southern California and subsequent adaptation to environmental changes brought about by the end of the Ice Age.

The early occupants of Southern California were nomadic large-game hunters whose tool assemblage included percussion-flaked scrapers and knives; large, well-made stemmed, fluted, or leaf-shaped projectile points (e.g., Lake Mojave, Silver Lake); crescentics; heavy core/cobble tools; hammer stones; bifacial cores; and choppers and scraper planes.

Between 13,000 and 10,000 B.P., climatic conditions became warmer and more arid, and large Pleistocene animals such as mammoths and mastodons gradually disappeared. This warming trend resulted in a rise in sea levels. During the Early Holocene (10,000 to 6,600 years ago), rapid sea level rise markedly altered the California coast. As a result of marine encroachment, large portions of the continental shelf were submerged, and it is likely that most archaeological sites associated with the Early Holocene along the southern mainland coast were destroyed by this sea level advance and sedimentation (Carbone, 1991).

As sea levels began to rise, the environment transitioned to estuarine and lagoon configurations that fostered an increase in marine, avian, and small terrestrial species. The peak of alteration of both biotic and physical variables occurred approximately 8,000 to 7,300 years ago (Carbone, 1991).

3.8.2.2.3 The 7500 to 5000 B.P. Interval (Middle Holocene Period)

In Southern California, this period is marked by two technologies designed to expand food sources: seed grinding and the use of marine resources. General settlement-subsistence patterns of the Middle Holocene were exemplified by a greater emphasis on seed gathering, adaptation to various ecological niches, further population growth, and an increase in sedentism. The artifact assemblage of this period is similar to that of the previous period and includes large leaf-shaped points and knives, manos and milling stones used for grinding hard seeds, crude hammer stones, scraper planes, choppers, large drills, crescents, and large flake tools, as well as non-utilitarian artifacts, such as beads, pendants, charm stones, discoidals, and cogged stones (Kowta, 1969; True, 1958; Warren et al., 1961).

The Topanga Complex is perhaps the best-known component from this period; aside from sites in Topanga Canyon, the only evidence of prehistoric occupation of the Los Angeles Basin dating to this interval is recovery of an occasional discoidal or cogged stone from sites dating to more recent periods of prehistory.

3.8.2.2.4 The 5000 to 1500 B.P. Interval (Middle to Late Holocene)

In general, cultural patterns remained similar to those of the preceding interval. However, cultural material at many coastal sites became more elaborate, reflecting an increase in sociopolitical complexity and efficiency in subsistence strategies. Later components of the Topanga Complex date to this period. In addition, several sites south of Ballona Lagoon on the Del Rey bluffs confirm a rather well-developed Middle to Late Holocene presence (Van Horn, 1987; Van Horn and Murray, 1985). Projectile points for the Ballona Bluffs sites are, in some cases, similar to those found at sites in the southeastern California deserts, specifically in the Pinto Basin and at Gypsum Cave. This suggests that the coastal occupants of this period were in close contact with cultures occupying the eastern deserts.

3.8.2.2.5 The 1500 B.P. to A.D. 1769 Interval (Late Holocene)

Los Angeles County is within the Late Prehistoric Canaliño cultural area (Rogers, 1929), which later evolved into the protohistoric Gabrielino and Chumash cultures. It is believed

that Late Prehistoric/Canaliño occupations first occurred approximately 2,000 years ago and persisted until the Mission Period (c. A.D. 1769 to 1830).

Reliance on the bow and arrow for hunting, along with the use of bedrock mortars and milling slicks, mark the beginning of this period. Diagnostic artifacts include small triangular projectile points, mortars and pestles, steatite ornaments and containers, perforated stones, circular shell fishhooks, and numerous and varied bone tools, as well as bone and shell ornamentation. Elaborate mortuary customs along with generous use of asphaltum and the development of extensive trade networks are also characteristic of this period. The Late Horizon shows increases in population size, economic and social complexity, and the appearance of social ranking.

Late prehistoric coastal sites are numerous. Probably one of the richest sites in coastal Southern California, the Malibu Site (CA-LAN-264) at the mouth of Malibu Creek, was occupied during this period. It has yielded stratified midden deposits and prehistoric tools such as large mortars and long pestles, *Haliotis* shell fishhooks, tarring pebbles, and steatite vessels (Walker, 1951).

3.8.2.3 Ethnohistoric Setting

During the prehistoric period, the Los Angeles region was inhabited by the Gabrielino people. The Gabrielino had access to a broad and diverse resource base, and this wealth of resources, coupled with an effective subsistence technology, well developed trade network, and ritual system, resulted in a society that was among one of the most materially wealthy and culturally sophisticated cultural groups in California at the time of contact (Bean and Smith, 1978:538; Kroeber, 1925:621).

The Gabrielino, a Uto-Aztecan or Shoshonean group, may have entered the Los Angeles Basin as recently as 1500 B.P. or may have migrated into the Los Angeles region in successive waves over a lengthy period of time beginning as early as 4000 B.P. (Moratto, 1984). In early protohistoric times, the Gabrielino occupied a large territory that included the entire Los Angeles Basin, the coast from Malibu to Aliso Creek, parts of the Santa Monica Mountains, the San Fernando Valley, the San Gabriel Valley, the San Bernardino Valley, the northern parts of the Santa Ana Mountains, and much of the middle to lower Santa Ana River. They also occupied the islands of Santa Catalina, San Clemente, and San Nicolas.

Within this large territory were more than 50 residential communities with populations ranging from 50 to 150 individuals. Generally, Gabrielino settlements were created at the intersection of several ecozones. The majority of the population drifted as families to temporary hillside or coastal camps throughout the year, returning to the central location on ritual occasions or when resources were low and it was necessary to live on stored foods.

Subsistence was based on a composite hunting and gathering strategy that included large and small land animals, sea mammals, river and ocean fish, and a variety of vegetal resources. Offshore fishing was accomplished from boats made of pine planks sewn together and sealed with asphaltum or bitumen. Much of the fishing, shellfish harvesting, and fowling took place along the ocean shoreline or along freshwater courses. Sea mammals were taken with harpoons, spears, and clubs. River and ocean fishing was undertaken with the use of line and hook, nets, basket traps, spears, and poisons (Hudson and Blackburn, 1982). Technological and artistic items included shell set in asphaltum, carvings, painting,

an extensive steatite industry, baskets, and a wide range of stone, shell, and bone objects that were both utilitarian and decorative.

The Gabrielino were apparently first contacted by Europeans in 1542 when Juan Rodríguez Cabrillo explored the California coast. Following subsequent Spanish visits to the region, colonization began in 1769, followed by the establishment of Missions San Gabriel (1771) and San Fernando (1797). Due in part to the introduction of EuroAmerican diseases and the harsh effects of mission life, Gabrielino population and culture suffered a gradual deterioration. Following the secularization of the missions in 1834, most surviving Gabrielino became wage laborers on the ranchos of Mexican California. In the early 1860s, a smallpox epidemic nearly wiped out the remaining Gabrielino. A combination of disease, harsh living conditions, and poor diet resulted in the disappearance of the Gabrielino as a culturally identifiable group in the 1900 federal census (Bean and Smith, 1978). However, persons of Gabrielino descent continued to live in the Los Angeles area to the present time.

3.8.2.4 Historic Setting

The affected environment is generally the area between the Commodore Schuyler Heim Bridge (Schuyler Heim Bridge) and the Pacific Coast Highway. The area is characterized by extremely large parcels with industrial buildings and equipment primarily related to oil production and shipping. Residential parcels are located east of North Alameda Street. There are undeveloped parcels in the southern portion of the project area that typically are used for shipping container storage.

Transportation is the defining theme in the immediate area of the proposed project. Since the mid-nineteenth century, various forms of transportation, from railroad and shipping, to industries related to the automobile, have shaped the area immediately to the east and west of North Alameda Street and North Henry Ford Avenue. The renaming of one of the major thoroughfares between the harbor areas and the Pacific Coast Highway in honor of the Ford factory once sited nearby is just one indication of the important role transportation has played in the neighborhood.

The discovery of oil beneath the region would bolster the local economy. By the 1920s, Sanborn Maps of the San Pedro-Wilmington District clearly show that numerous service stations, oil-related commercial structures and similar businesses that catered to the workers in these companies, had carved out their niche in the area to the east of North Alameda Street.

Related to the growth of the oil-producing industry, the automobile-industry and advantage of location, neighborhoods composed of modest Craftsman bungalows were being built for those who worked in these environments. These homes were constructed to the west of North Alameda Street, creating a clear demarcation between the industrial/commercial and the residential zones of the community.

3.8.2.4.1 The Ford Motor Company Assembly Plant

The Ford Motor Company Long Beach Assembly Plant was constructed in 1929-30 on the Cerritos Channel. The Long Beach Assembly Plant was located at 700 North Henry Ford Avenue (formerly known as Badger Avenue), and was in operation from 1930 until 1958. The workers at this plant, designed by Albert Kahn and was based on existing design used for the construction of five other Ford Assembly Plants, produced the Model A. This car

replaced the popular and significant Ford Model T in 1927. It is estimated that up to 1,200 people were employed at the assembly plant. It was demolished in 1990-1991.

3.8.2.4.2 The Oil Industry in Wilmington

Industries related to oil production and refining have played a considerable part in the development of the project area. At various times, the Southern California region has been home to 28 separate oil fields. There are five nearby refineries, and the remnants of small-scale oil production are evident throughout the region with oil derricks and holding tanks in backyards, vacant parcels and alongside roadways. As it happens, the entire region is sited on the Wilmington Oil Fields, the third largest field in the United States, which remains in continual use today.

3.8.3 Environmental Consequences

3.8.3.1 Evaluation Criteria

3.8.3.1.1 National Register Significance Criteria

For federal projects, cultural resource significance is evaluated in terms of eligibility for listing in the NRHP. In order for a property to be considered for inclusion in the NRHP it must meet the criteria for evaluation set forth in 36 CFR Part 60.4, as follows:

> *The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of design, setting, materials, workmanship, feeling, and association and*
>
> *(a) that are associated with events that have made a significant contribution to the broad patterns of our history; or*
>
> *(b) that are associated with the lives of persons significant in our past; or*
>
> *(c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
>
> *(d) that have yielded, or may be likely to yield, information important in prehistory or history.*

Among other criteria considerations, a property that has achieved significance within the last 50 years is not considered eligible for inclusion in the NRHP unless certain exceptional conditions are met.

Further, for a historical resource to qualify for the NRHP under one or more of the four criteria listed above, it must possess what is called "integrity." Integrity is the degree to which a property has retained characteristics needed to convey its significance. The NRHP recognizes seven types of integrity: location, design, setting, materials, workmanship, feeling, and association.

With respect to the level of integrity for properties being evaluated under Criterion D, research potential, which is the most common criterion applied to prehistoric and historical archaeological sites, is defined as their ability to address important research questions outlined in a formal research design (National Park Service 1991). For archaeological sites, integrity of location, materials, and association are generally the most crucial. To address

important research topics, archaeological deposits usually must be in their original location, retain depositional integrity, contain adequate quantities and types of materials in suitable condition to address important research topics, and have a clear association.

Deposits that have been disturbed by earth-moving activities such as grading, trenching, or looting often lack the ability to address important questions because depositional relationships have been lost, deposits from widely different periods and associations have been mixed, or the contents of the deposit have been skewed by selective removal of materials. However, disturbed deposits may still retain the ability to address specific types of research topics. For a historic property, including an archaeological site, to be eligible for the NRHP, it must both retain integrity and be significant.

3.8.3.1.2 State of California Criteria

3.8.3.1.2.1 CEQA Guidelines

Section 15064.5 of the *State CEQA Guidelines* sets forth the criteria and procedures for determining significant historical resources and the potential effects of a project on such resources.

Generally, a cultural resource shall be considered by the lead state agency to be "historically significant" if the resource meets any of the criteria for listing on the California Register, including the following:

> *(A) The resource is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;*
>
> *(B) The resource is associated with the lives of persons important in our past;*
>
> *(C) The resource embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of an important creative individual or possesses high artistic values; or*
>
> *(D) The resource has yielded, or may be likely to yield, information important in prehistory or history.*

The cited statutes and guidelines specify how cultural resources are to be managed in the context of projects. Briefly, archival and field surveys must be conducted, and identified cultural resources must be inventoried and evaluated in prescribed ways. Prehistoric and historical resources deemed "historically significant" must be considered in project planning and development.

Paleontologically sensitive sedimentary units are those with a high potential for containing significant paleontologic resources, usually rock units within which significant vertebrate or invertebrate fossils have been determined to be present or likely to be present. These units include, but are not limited to, sedimentary formations that contain significant paleontologic resources anywhere within their geographical extent, as well as sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Determinations of paleontologic sensitivity must therefore consider not only the potential to yield abundant vertebrate fossils but also the potential for production of a few significant fossils which may provide new and significant data on fossils types, species changes over time, or geologic strata. Areas that may contain datable organic remains older than the Recent era (less than

10,000 years in age) and areas that may contain unique, new vertebrate deposits, traces, and/or trackways must also be considered paleontologically sensitive.

Fossils are of scientific interest if one or more of the following criteria apply:

- The fossils provide data on the evolutionary relationships and developmental trends among organisms, both living and extinct;
- The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
- The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;
- The fossils demonstrate unusual or spectacular circumstances in the history of life; or
- The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation and are not found in other geographic locations.

For the purpose of this cultural resources analysis, and in accordance with Appendix G of the CEQA Guidelines, a project would have a potentially significant effect on the environment if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5.
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
- Disturb any human remains, including those interred outside of formal cemeteries.

3.8.3.1.2.2 Regulations Concerning the Discovery of Human Remains

According to the California Health and Safety Code, six or more human burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052). Section 7050.5 of the Health and Safety Code requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the Native American Heritage Commission (NAHC). The NAHC must then attempt to notify any descendants, and arrangements for appropriate treatment of the remains must be made in consultation with the descendants.

3.8.3.2 Methodology

3.8.3.2.1 Record Search

An archaeological records and literature search for all the alternatives for the combined State Route 47 Expressway and the Schuyler Heim Bridge Replacement Project was

conducted by the South Central Coastal Information Center, California State University, Fullerton, on February 20, 2002. (This search encompassed the area of the proposed flyover.) A supplemental records search for the SR-103 Extension to Alameda Street was conducted by the same institution on October 4, 2004. In January 2007, the archaeological records and literature search for the SR-47 Expressway and SR-103 Extension portions of the project were reviewed for the flyover addition. Other sources consulted during this investigation included a review of the *National Register of Historic Places*, the *California State Historic Resources Inventory*, the *California Historical Landmarks*, the *California Register of Historic Places*, the *City of Los Angeles Cultural Monuments*, and the *California Points of Historical Interest*. In addition, historic maps, including Downey (1896 and 1943) 15'-series U.S. Geological Survey (USGS) quadrangle maps, were inspected.

No historical or prehistoric archaeological sites have been recorded within the combined project APE. One recorded historic built environment, 19-180784, is located within the project study area. This resource consists of a complex of wood-frame storage and office buildings built to accommodate oil production workers and machinery for the Tidelands Oil production facility; see the historic section for further analysis.

The results of the records and literature search indicate 19 cultural resources studies within a 0.8 kilometer (km) (0.5-mile [mi]) radius of the project APE; of those studies, six transect portions of the APE. Records indicate two prehistoric archaeological sites within a 0.5-mile radius of the project study area, CA-LAN-2788 and 19-002682. Site CA-LAN-2788 consists of a Native American burial, while 19-002682 is a Native American cemetery with 25 human interments with associated artifacts and a midden deposit located west of the Southern Pacific railroad and Dominguez Channel. Five historic archaeological sites also are within the 0.5-mile radius of the APE and include CA-LAN-2850H, a box culvert and headwall constructed of steel-reinforced concrete; a late-19th-century to early-20th-century refuse deposit (19-002943); a brick septic tank, most likely associated with the Dolores Yard and built circa 1940 (19-003045); a wood box culvert that houses one 8-inch 1920s oil pipeline (19-003063); and a cylindrical brick and mortar septic tank associated with a 1920s Pacific Electric Railway freight and passenger station (19-003064).

Two built-environment resources have also been recorded within the 0.5-mile radius; these resources are a 100-acre storage tank facility constructed in the 1920s (19-86868) and a one-story frame building constructed circa 1905 as part of the Pacific Electric Railway (19-180783).

3.8.3.2.2 Archaeological Field Methods

An archaeological survey of the project APE was conducted by two archaeologists on March 19, 2002, with additional survey for the SR-103 extension APE on October 7, 2004 (Applied EarthWorks, 2002; 2004). The APE for the flyover was surveyed by an archaeologist on February 18, 2007 (Jones and Stokes, 2007). Most of the project APE is located in a built, industrial environment; asphalt pavement, concrete sidewalks, standing buildings, and paved driveways and parking areas cover approximately 87 percent of the ground surface. In these areas, only a cursory archaeological survey was completed. In portions of the APE where the ground surface was exposed (<10 percent), an intensive survey was completed using 1- to 2-m (3.2 to 6.5 ft) survey transects. No archaeological resources were identified as a result of the archaeological survey of the project APE.

Background research for the APE indicates the area was a large marshy wetland before the beginning of the 20th century. The cities of Los Angeles and Long Beach began filling and dredging the delta to expand the port for higher capacity and larger ships. In addition, oil production from the Wilmington oil field, with seven producing zones, has caused approximately 9 m (29 ft) of subsidence in the Long Beach area. Subsequently, the City of Long Beach has routinely imported fill to bring the subsided areas back to grade. As such, the project's APE is located in a very industrialized area that has been disturbed by development for more than 100 years. Artificial fill has been placed throughout the project APE to maintain the ground elevation. As well, many areas in and adjacent to the project APE have been graded to unknown depths periodically though the years, and large portions of the channel areas have been dredged.

The high degree of ground disturbance and the importation of artificial fill were the basis of the determination that it is highly unlikely that intact archaeological deposits will be encountered during project construction. Additionally, the elevation of the project APE of 1.5 m to 3 m (5 to 10 ft) AMSL and the fact that the project APE was formerly a very marshy wetland that likely was not suitable for human habitation, coupled with the fact that the project study area has undergone tremendous alterations throughout the past 100 years, was the basis of the determination that it is unlikely that significant prehistoric or historical archaeological resources will be encountered during project construction.

3.8.3.2.3 Native American Consultation

In accordance with Section 106 of the National Historic Preservation Act, a request was made to the NAHC for a review of the *Sacred Lands Inventory* to determine if any known cultural properties are present within or adjacent to the project APE. The NAHC responded, stating that no Native American cultural resources are known to exist within or adjacent to the project APE and provided a list of Native American groups and individuals for further consultation.

During the period of May through June 2002, the project solicited information and comments regarding cultural resources in the Schuyler Heim Bridge project area from local governments, public and private organizations, and other parties likely to have knowledge of or concerns about such resources, as described in the *Negative Archaeological Survey Report* (NASR, 2002). Letters requesting information were sent to the following:

- The Gabrielino/Tongva Tribal Council of the Gabrielino Tongva Nation
- The Los Angeles City/County Native American Indian Commission
- Ms. Cindi Alvitre, Ti'At Society
- Mr. John Jeffredo, Island Gabrielino Group
- Mr. Robert Dorame, Gabrielino Tongva Indians of California Tribal Council
- Mr. Anthony Morales, Gabrielino/Tongva Tribal Council
- Mr. Jim Velasques
- Mr. Samuel Dunlap
- Mr. John Valenzuela
- Mr. Craig Torres
- Mr. Alfred Valenzuela
- Ms. Angela Louise Lassos-Sanchez

A second round of consultation with the NAHC for the SR-103 Extension to Alameda Street was conducted in 2004; the NAHC again responded stating that no Native American cultural resources are known to exist within or adjacent to the project APE. On October 19, 2004, the following groups and individuals were again contacted regarding the SR-103 portion of the project:

- The Gabrielino/Tongva Tribal Council of the Gabrielino Tongva Nation
- The Los Angeles City/County Native American Indian Commission
- Ms. Cindi Alvitre, Ti'At Society
- Mr. Robert Dorame, Gabrielino Tongva Indians of California Tribal Council
- Mr. Anthony Morales, Gabrielino/Tongva Tribal Council
- Mr. Jim Velasques
- Mr. Samuel Dunlap
- Mr. Craig Torres
- Mr. John Tomy Rosas, Gabrielino Tongva Indians of California Tribal Council
- Ms. Susan Frank, Gabrielino Band of Mission Indians of California
- Mercedes Dorame, Gabrielino Tongva Indians of California Tribal Council

No response from these individuals or organizations was received following consultation.

3.8.3.2.4 SR-47 Architectural/Historical Resources Identified

The APE for the SR-47 Expressway alignment, in the southern portion of the project area was developed in coordination with Caltrans and the APE map was approved by FHWA on October 9, 2002. The APE for the flyover was developed in coordination with Caltrans, and the APE map was approved on March 15, 2007.

An architectural field survey of all properties within the SR-47 APE was undertaken according to standard Caltrans guidelines and procedures by a qualified architectural historian on February 11 and 28, 2002. Fifty-two (52) properties were identified within the proposed project's APE. Twenty-five (25) properties were identified as built in 1957 or earlier. Twenty-five (25) pre-1957 properties were identified within the APE, none of which are currently listed in, previously determined eligible or were found to appear eligible for listing in the NRHP or the CRHR. No historic districts, no historic landscapes, and no locally designated landmarks are located within or immediately adjacent to the APE. This information was recorded in the State Route 47 Expressway and Schuyler Heim Replacement Project Combined Historic Property Survey Report (Myra L. Frank & Associates, 2002).

No archaeological resources were identified as a result of the 2007 survey within the flyover APE. The area is extensively developed as part of the Port of Long Beach, and there is little potential to encounter undiscovered archaeological resources. The Schuyler Heim Bridge has been previously evaluated for eligibility for listing on the *National Register of Historic Places* (National Register). The bridge was first evaluated by Caltrans in its 1986 *Historic Bridge Inventory*; however, at that time, it was determined to be ineligible for listing on the National Register because it was less than 50 years old.

In 1998, the bridge was re-evaluated as part of a proposed seismic retrofit project (Kane, 1998). At that time, the Schuyler Heim Bridge was determined to be eligible for listing on the NRHP under Criterion C in engineering as the highest vertical lift bridge in the Western

United States and one of the most significant vertical bridges in the state of California. The bridge was also found to meet the eligibility criteria for inclusion in the CRHR under Criterion 3 and is considered an historical resource for the purposes of CEQA.

The State Historic Preservation Officer (SHPO) concurred with these findings in a letter dated June 18, 2003 (SHPO, 2003).

In March 2002, Myra L. Frank & Associates (MFA) solicited information and comments regarding cultural resources in the SR-47 project area from the following:

- Art Alameda, President, San Pedro Bay Historical Archives
- Tom Andrews, Executive Director, Historical Society of Southern California
- Christy Johnson McAvoy, President, Los Angeles Conservancy
- Daniel Munoz, President, Los Angeles City Historical Society
- Susan Totaro, Project Manager, Los Angeles Harbor/Wilmington Community Redevelopment Agency
- David Esparza, President, Wilmington Historical Society
- Con Howe, Director of Planning, Planning Department City of Los Angeles
- Jay M. Oren, Architect-Historic Preservation Officer, Cultural Affairs Department City of Los Angeles
- Councilwoman Janice Hahn

As of December 12, 2005, MFA/Jones & Stokes (JS) had received no responses indicating knowledge of previously unidentified cultural resources in the project area.

3.8.3.2.5 SR-103 Architectural/Historical Resources Identified

The SR-103 Extension Alternative APE was defined in coordination with Caltrans and FHWA approved the APE map on March 10, 2005. The previous SR-47 APE map required no changes.

An architectural field survey of all properties within the SR-103 Extension Alternative was undertaken by a qualified architectural historian according to standard Caltrans guidelines and procedures on October 6 and 19, 2004. Of the 16 total developed properties within the SR-103 Extension Alternative APE, eight have post-1958 buildings with no overriding significance that required no further study. The remaining eight properties were developed with pre-1958 properties and were formally evaluated in the SR-103 *Final Supplemental Historic Property Survey Report* (Myra L. Frank/Jones & Stokes, 2005).

In October 2004, MFA/JS re-sent these letters with information about the proposed SR-103 Extension Alternative to the following parties, which include all of the original receivers of the 2002 correspondence, plus the following:

- Art Alameda, President, San Pedro Bay Historical Archives;
- Tom Andrews, Executive Director, Historical Society of Southern California;

- Daniel Munoz, President, Los Angeles City Historical Society;
- Con Howe, Director of Planning, City of Los Angeles Planning Department;
- Louis Skelton, Los Angeles County Historic Landmarks and Records Commission;
- Councilwoman Janice Hahn;
- Susan Totaro, Project Manager, Los Angeles Harbor/Wilmington Community Redevelopment Agency;
- Ken Bernstein, Director of Preservation Issues, Los Angeles Conservancy;
- Roberta Deering, Executive Director, California Preservation Foundation;
- Banning Residence Museum;
- Los Angeles Maritime Museum; and
- Historical Society of Long Beach.

As of December 12, 2005, no responses had been received from these parties.

3.8.3.2.6 SHPO Consultation

An HPSR that evaluated the potential historic properties within the APE for the original alternatives was prepared in September 2002. As described in the 2002 HPSR, one historic property, the Schuyler Heim Bridge, was determined eligible for the NRHP. The SHPO concurred with the findings of the 2002 HPSR on June 18, 2003, that 27 historic properties identified within the APE were not eligible to the NRHP. However, SHPO stated that it could not concur on the Finding of Adverse Effect at that time because additional information was needed regarding the potential for buried deposits within the Area of Potential Effects. Subsequently, additional archaeological information was provided to SHPO, who concurred with the Finding of Adverse Effect in a letter dated July 27, 2005. A revised Finding of Adverse Effect document, dated September 2006, was prepared as new alternatives had slightly altered the project description since the November 2002 document. SHPO concurred with the revised adverse effect finding in a letter dated March 6, 2007. These letters from SHPO are included at the end of this section.

In addition to the original project described in the 2002 HPSR, an alternative to the SR-47 Expressway, the SR-103 Extension, was subsequently proposed, and that alternative required a Supplemental HPSR and supporting studies. No additional historic properties were identified in the SR-103 Extension Supplemental HPSR, dated June 2005. Caltrans requested SHPO concurrence in a letter dated August 4, 2005. The SHPO did not respond to this request for concurrence, and the review time passed so, on October 25, 2005, Caltrans notified SHPO that it would proceed based on its findings, per Stipulation VIII.C.5a of the January 2004 Programmatic Agreement between FHWA, the Advisory Council on Historic Preservation, SHPO, and Caltrans.

3.8.3.3 Evaluation of Alternatives

No archaeological resources were identified in the project APE, and no archaeological sites are known to be within the APE. If archaeological resources should be discovered, the

appropriate avoidance and minimization measures would be implemented in compliance with 36 CFR800.

The only historic property that was identified within the APE is the Schuyler Heim Bridge. The Criteria of Adverse Effect is applied to each of the alternatives below, analyzing their potential effect on the Schuyler Heim Bridge.

3.8.3.3.1 Alternatives 1, 1A, 2, and 4

3.8.3.3.1.1 Construction Effects

Direct

These alternatives propose to demolish the existing Schuyler Heim Bridge, and replace it with a new span. This would constitute an Adverse Effect on the Schuyler Heim Bridge under Adverse Effect Criterion 2(i) (36 CFR 800.5(a)]. In addition, demolition of the Schuyler Heim Bridge would be considered an adverse effect under Significance Criterion 2(A), Section 15064.5 of the CEQA Guidelines.

Indirect

Because the only historic property identified would be demolished during the construction phase, there would be no additional indirect effects on historic properties under this alternative.

3.8.3.3.1.2 Operations Effects

Under Alternatives 1, 1A, 2, and 4, the loss of the Schuyler Heim Bridge would be a permanent adverse effect on historic properties. With these alternatives, there will be no operational effects to archaeological resources.

3.8.3.3.2 Alternative 3: Bridge Demolition Avoidance

3.8.3.3.2.1 Construction Effects

Direct

No archaeological resources were identified, and no archaeological sites are known to exist within the APE. If, during construction, unknown cultural materials are found, appropriate measures will be taken, as detailed in Section 3.8.4.1 – Avoidance and Minimization Measures. There are no known temporary direct effects to historical resources under this alternative, as construction would not impact the existing Schuyler Heim Bridge. However, according to the U.S. Coast Guard (USCG), when a bridge is no longer used for its permitted purpose of providing land transportation, the bridge shall be removed from the waterway. Therefore, removal of the existing Schuyler Heim Bridge would be included as a condition of the federal permit for the replacement bridge.

Indirect

There will be no indirect construction indirect effects.

3.8.3.3.2.2 Operations Effects

Direct

There will be no direct operational effects to archaeological resources.

This alternative is the only one to propose the preservation of the historic property. Nevertheless, the bridge approaches would be removed and the bridge no longer used for vehicular traffic. While this alternative retains the historic property in place, it would

change the character of the bridge's original use. Therefore, Alternative 3 would be an adverse effect on the Schuyler Heim Bridge under Adverse Effect Criteria 2(ii) and 2(iv).

Indirect

There will be no indirect operations effects to cultural resources.

The Schuyler Heim Bridge spans the Cerritos Channel, which is administered by the USCG. Under USCG regulations, FHWA cannot let Schuyler Heim Bridge remain in place after the new bridge is constructed, because it is a condition of the permit issued by the USCG. Therefore, if the USCG requires the demolition of the bridge in order for FHWA to meet USCG regulations for a permit, then Alternative 3 would be considered an adverse effect on the Schuyler Heim Bridge under Adverse Effect Criterion 2(i).

3.8.3.3.3 Alternatives 5 and 6

3.8.3.3.3.1 Construction Effects

Direct

Alternatives 5 and 6 would not involve ground disturbance in undeveloped areas. Therefore, there will be no construction-related direct or indirect effects to archaeological resources.

3.8.3.3.3.2 Operations Effects

Direct

Under Alternative 5, there may be minor ground disturbance in previously developed portions of the project area. Therefore, there is no potential for discovery of archeological resources. Alternative 6 is the No Build alternative. Therefore, there will be no direct operations effects to archaeological resources.

These alternatives would not demolish, alter, or otherwise physically damage the Schuyler Heim Bridge. The bridge would remain in its original location and setting. None of the Adverse Effect Criteria would apply; therefore there would be no effect on historic properties under Alternatives 5 and 6.

Indirect

Alternatives 5 and 6 will not involve ground disturbance in undeveloped portions of the project area. Therefore, there will be no indirect operational effects to archaeological resources.

The No Build alternative would leave the existing Schuyler Heim Bridge in place, unaltered except through routine maintenance and upkeep. However, the bridge's overall condition would be expected to continue to deteriorate. This could be considered an indirect effect under Adverse Effect Criteria 2(iv) and 2(vi) (36 CFR 800.5(a).

3.8.3.3.4 CEQA Consequences

When potential impacts of the proposed project alternatives are assessed in the context of the CEQA criteria for Cultural Resources, the above analysis demonstrates that, under Alternatives 1, 2, and 4, impacts to a historical resource (Schuyler Heim Bridge) would be significant and, under Alternative 3, impacts to the Schuyler Heim Bridge would be less than significant. Under Alternatives 1, 2, 3, 4, and 5, impacts to archaeological and paleontological resources would be less than significant, as would impacts to human

remains, should any be unearthed. Under Alternative 6, there would be no impact to Cultural Resources.

Discussion of impacts related to Cultural Resources in accordance with CEQA criteria are provided in Chapter 4.0 – CEQA Evaluation, Appendix A – CEQA Checklist (V, Cultural Resources). Significant impacts are addressed in Section 4.3 – Mandatory Findings of Significance, Section 4.4 – Significant Environmental Effects of the Proposed Project, Section 4.5 – CEQA Analysis of Alternatives, Table 4-1 - Significant Environmental Impacts and Mitigation Measures, and Table 4-2 - CEQA Unavoidable Adverse Impacts.

3.8.4 Avoidance, Minimization, and/or Mitigation Measures

3.8.4.1 Avoidance and Minimization Measures

3.8.4.1.1 Construction

3.8.4.1.1.1 Alternatives 1, 1A, 2, and 4

CR-1 Measures for Unknown Archaeological Resources

If any archaeological properties are discovered during construction, Caltrans and SHPO shall be consulted, in accordance with 36 CFR 800.13(b).

CR-2 Discovery of Human Remains

If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to Public Resources Code Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission (NAHC) who will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact Mr. Gary Iverson, District Heritage Resource Coordinator, Caltrans District 7, so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed, as applicable.

3.8.4.1.1.2 Alternative 3

If the U.S. Coast Guard requires demolition of the Schuyler Heim Bridge following implementation of Alternative 3, CR-1 and CR-2 would be implemented.

3.8.4.1.1.3 Alternatives 5 and 6

No avoidance and minimization measures are proposed during construction of Alternatives 5 and 6.

3.8.4.1.2 Operations

No avoidance and minimization measures are proposed for project operations.

3.8.4.2 Mitigation Measures

3.8.4.2.1 Construction

3.8.4.2.1.1 Alternatives 1, 1A, 2 and 4

In compliance with federal historic preservation laws, mitigation measures are presented in a Memorandum of Agreement (MOA) that has been submitted to SHPO pursuant to Section 106 PA Stipulation XI, 36 CFR 800.6(a) and 800.6(b)(1). The final suite of mitigation

is presented in the Final MOA, signed by Caltrans and SHPO, and provided in Appendix L. Caltrans shall ensure that the following measures are implemented.

CR-3 The bridge shall be offered for sale for reuse in an alternate location to interested public agencies and non-profits. A marketing plan shall be prepared for the sale of the bridge including: a notification letter, fact sheet, list of intended recipients, as well as provisions for the salvage of smaller components in the case that there is no interest in re-use of the bridge. Advertisements shall be placed in appropriate newspapers of record. The offer shall run for 6 months. If no acceptable bids are received after 6 months this stipulation shall be deeded to have been met. The above shall be done in accordance with the U.S. Department of Transportation Historic Bridge Program 23USC144(o)(4)(A) and (B).

CR-4 Informative permanent metal plaques shall be installed at both ends of the new bridge at public locations that provide a brief history of the original bridge, its engineering features and characteristics, the reasons for its demolition, and a statement of the characteristics of the replacement structure.

CR-5 Pursuant to Section 110(b) of the NHPA, before the Bridge is demolished, the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) shall be contacted to determine what level and kind of recordation is required for the property. All documentation shall be completed and accepted by HABS/HAER before the Bridge is demolished.

CR-6 Copies of the HABS/HAER report shall be disseminated to the City of Los Angeles Public Library and the City of Long Beach Public Library.

CR-7 Information from the HABS/HAER report available to the public for 10 years on an appropriate internet website.

CR-8 A documentary (motion picture or video) shall be produced and shall address the history of the Bridge, its importance and use within the history of the Port of Long Beach and Port of Los Angeles, and demonstrate its operation and function. The motion picture or video will be of broadcast quality, of sufficient length for a standard 30-minute time period and will be made available for local broadcast stations to public access channels in local cable systems and to schools/libraries.

CR-9 Traveling museum exhibits shall be prepared and shall address the history of the Bridge, its importance and use within the history of the Port of Long Beach and the Port of Los Angeles, and demonstrate its operation and function, appropriate for display in small museums, or for use in schools.

CR-10 Artifacts removed from the Bridge during preliminary stages of the demolition process shall be offered to local museums, and provide for their delivery to accepting institutions. Examples of such artifacts may include, but not be limited to, control panels, instruments, structural members, railings, signage, plaques or other identifying ornamentation, street lights, navigation lights, etc.

CR-11 Measures CR-3, CR-5, CR-8, and CR-10, above, shall be completed prior to demolition of the Bridge. All stipulations shall be completed within 1 year of demolition, unless an extension of time is agreed upon.

3.8.4.2.1.2 Alternative 3: Bridge Demolition Avoidance

See **CR-3** through **CR-11**, above.

Under Alternative 3, if the USCG requires demolition of the Schuyler Heim Bridge following implementation of this alternative, measures **CR-3** through **CR-11** would be implemented.

3.8.4.2.1.3 Alternatives 5 and 6

Under Alternatives 5 and 6, no significant effects are anticipated to archaeological or historical resources, and no mitigation measures would be required.

3.8.4.2.2 Operation

No mitigation measures are proposed for project operations.

STATE OF CALIFORNIA — Gray Davis, *Governor*

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax

February 28, 2002

Ronald Kosinski
Department of Transportation
120 South Spring Street (MS 16 A)
Los Angeles, CA 90012

RE: SCH# 2002021009 – Schuyler Heim Bridge Replacement and Alameda Corridor Truck Expressway Project

Dear Mr. Kosinski:

The Native American Heritage Commission has reviewed the above mentioned NOP. To adequately assess and mitigate project-related impacts on archaeological resources, the Commission recommends the following actions be required:

- ✓ Contact the appropriate Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
  - A Sacred Lands File Check.
  - A list of appropriate Native American Contacts for consultation concerning the project site and to assist in the mitigation measures.
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5 (f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5 (e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Rob Wood

Rob Wood
Environmental Specialist III
(916) 653-4040

CC: State Clearinghouse

STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov

June 18, 2003

Reply To: FHWA030424A

Gary N. Hamby, Division Administrator
U.S. Department of Transportation
Federal Highway Administration
California Division
980 Ninth Street, Suite 400
Sacramento, CA 95814-2724

Re: Determinations of Eligibility and Effect for the Proposed State Route 47 Truck Expressway and the Commodore Schuyler Heim Bridge Replacement Project, Los Angeles, CA [HDA-CA, FILE NO. 07-LA-47, DOCUMENT NO. P44486]

Dear Mr. Hamby:

You have provided me with the results of your efforts to determine whether the above undertaking will affect historic properties. You have done this, and are consulting with me, in order to comply with Section 106 of the National Historic Preservation Act and implementing regulations codified at 36 CFR Part 800.

The Federal Highway Administration (FHWA) has determined that the Commodore Schuyler Heim Bridge was previously determined eligible in 1998. The FHWA has also found that 29 properties qualify for treatment under the Caltrans Interim Policy for the Treatment of post-1957 Buildings. In addition the FHWA has determined that the following properties are not eligible for the National Register of Historic Places (NRHP):

- Oil Wells, south side of the Cerritos Channel and east of the Commodore Schuyler Heim Bridge
- SR 47, north and south of the Commodore Schuyler Heim Bridge
- 1050 N Alameda Street, Wilmington, CA
- 1260 N Alameda Street, Wilmington, CA
- 1230 N Alameda Street, Wilmington, CA
- 1601 E Anaheim Street, Wilmington, CA
- 1625 E Anaheim Street, Wilmington, CA
- 1539 E Denni Street, Wilmington, CA
- 1634 E Denni Street, Wilmington, CA
- 1609 E Grant Street, Wilmington, CA
- 1023-27 N Henry Ford Avenue, Wilmington, CA
- 1120 N Henry Ford Avenue, Wilmington, CA
- 1041 N Henry Ford Avenue, Wilmington, CA
- 1563 E L Street, Wilmington, CA
- 1559 E L Street, Wilmington, CA
- 1538 E L Street, Wilmington, CA
- 1725-31 E M Street, Wilmington, CA
- 1710 E Mauretania Street, Wilmington, CA
- 1714 E Mauretania Street, Wilmington, CA
- 1674 E Mauretania Street, Wilmington, CA

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Mr. Hamby
June 18, 2003
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- 1733 E Robidoux Street, Wilmington, CA
- 1621 E Robidoux Street, Wilmington, CA
- 1617 E Robidoux Street, Wilmington, CA
- 1619 E Robidoux Street, Wilmington, CA
- 1702 E Robidoux Street, Wilmington, CA
- 1544 E Young Street, Wilmington, CA
- 1539-41 E Young Street, Wilmington, CA

I concur with the above determinations.

To better inform my review of the FHWA's effort to identify historic properties in the undertaking's APE, I would appreciate knowing

(1) where and to what horizontal and vertical extent the undertaking will disturb the ground in the APE,

(2) whether and where portions of the APE consist of artificial landforms, and to what approximate depth the portions of the APE that consist of natural landforms have been graded or otherwise disturbed,

(3) the record search evidence that indicates where on the landscape of the record search area prior research has found prehistoric shell middens, lithic scatters, village ruins, and a cemetery (*VI. Remarks* section of 6 October 2002 Negative ASR for the State Route 47 Truck Expressway).

I have elected not to address FHWA's finding of "adverse effect" for this undertaking pending my receipt of the additional information requested under items (1) - (3), above.

Thank you for considering historic properties during project planning. If you have any questions, please contact Natalie Lindquist at (916) 654-0631 and e-mail at nlind@ohp.parks.ca.gov or Michael McGuirt at (916) 653-8920 and e-mail at mmcgu@ohp.parks.ca.gov.

Sincerely,

Dr. Knox Mellon
State Historic Preservation Officer

Oct 25 04 11:42a JONES & STOKES LA 2136275376 p.3

STATE OF CALIFORNIA – THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov

July 27, 2005

In Reply Refer To: FHWA030424A

Gene K. Fong
Division Administrator
U.S. Department of Transportation
Federal Highway Administration, California Division
650 Capitol Mall, Suite 4-100
Sacramento, CA 95814

Dear Mr. Fong:

Re: State Route 47 (SR47) Truck Expressway City of Los Angeles, Los Angeles County, California 07-LA-47-KP 4.5/8.5 (PM 2.8/5.3) EA987903 and the Commodore Schuyler Heim Bridge Replacement Project City of Los Angeles, Los Angeles County, California 07-LA-47-KP 5.6/6.9 (PM 3.5/4.3) EA199900.

You are continuing consultation with SHPO regarding the subject undertaking pursuant to 36 CFR Part 800 regulations implementing Section 106 of the National Historic Preservation Act. Previous consultation on this undertaking between the U.S. Department of Transportation (FHWA) (letter of April 18, 2003) and SHPO (letter of June 18, 2003) resulted in SHPO concurring that 27 historic properties identified by Caltrans in the project Area of Potential Effect (APE) were not eligible to the National Register of Historic Places (NRHP).

At that time, SHPO could not concur on the proposed finding of Adverse Effect as there were several areas of concern involving the APE and Efforts to Identify Historic Properties within the APE. Those areas of concern were identified in our letter of June 18, 2003. In addition to the earlier consultation letter from FHWA, the following documents have been submitted in support of this undertaking:

- *Historic Property Survey Report for the State Route 47 (SR47) Truck Expressway City of Los Angeles, Los Angeles County, California 07-LA-47-KP 4.5/8.5 (PM 2.8/5.3) EA987903 and the Commodore Schuyler Heim Bridge Replacement Project City of Los Angeles, Los Angeles County, California 07-LA-47-KP 5.6/6.9 (PM 3.5/4.3) EA199900* (Feldman, Horne, and Herbert: September 2002).

- *Finding of Adverse Effect Schuyler Heim Bridge (53-2618) Replacement EA 199900 07-LA-47-K.P. 5.6/6.9 (PM 3.5/4.3)* (JRP Historical Consulting Services: November 22, 2002).

Caltrans District 07 has responded to the request by SHPO for additional information on this undertaking in a letter dated April 14, 2005. Based on the additional information provided in that letter I have the following comments:

1) I concur that the Area of Potential Effects is appropriate as per 36 CFR §§ 800.4(a) (1) and 800.16(d) and that the efforts made to identify historic properties have been appropriate as per 36 CFR § 800.4(b).

2) I further concur that the Finding of Adverse Effect is appropriate as per 36 CFR § 800.5(a)(1) and that the supporting documentation has been provided as per 36 CFR § 800.11(d).

In the letter (FHWA letter HAD-CA File # 07-LA-47 Document #P44486 dated April 18, 2003) initiating consultation on this undertaking, FHWA stated that "An executed Memorandum of Agreement to address identified adverse effects associated with the Schuyler Heim Bridge replacement proposal will be forwarded under separate cover for further consultation." I look forward to continuing consultation on this undertaking at that time.

Thank you for seeking my comments and for considering historic properties in planning your project. If you require further information, please contact William Soule at phone 916-654-4614 or email wsoule@parks.ca.gov or Natalie Lindquist at phone 916-654-0631 or email nlindquist@parks.ca.gov.

Sincerely,

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

Cc:

Gary Iverson
Office Chief, Cultural Studies
Department of Transportation
District 07, Division of Environmental Planning
100 S. Main Street, Suite 100
Los Angeles, CA 90012

2

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7
DIVISION OF ENVIRONMENTAL PLANNING
100 S. Main St.
Los Angeles, CA 90012
PHONE (213) 897-0702
FAX (213) 897-1060

August 4, 2005

Mr. Milford Wayne Donaldson, FAIA
State Historic Preservation Officer
Office of Historic Preservation
Department of Parks & Recreation
P.O. Box 942896
Sacramento, CA 94296-0001

Re: Supplemental Historic Property Survey Report for the SR-103 Extension Alternative of the Commodore Schuyler Heim Bridge Replacement and SR-47 Truck Expressway Project in the Ports of Long Beach and Los Angeles, Los Angeles County, California

Dear Mr. Donaldson:

The California Department of Transportation (Caltrans), under the authority of the Federal Highway Administration (FHWA), is initiating consultation with the State Historic Preservation Officer (SHPO) regarding the SR-103 Extension Alternative of the Commodore Schuyler Heim Bridge Replacement and SR-47 Truck Expressway Project. This consultation is undertaken in accordance with the January 2004 *Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation (PA).*

Enclosed you will find a *Supplemental Historic Property Survey Report* (SHPSR) for the proposed undertaking, prepared by Jessica B. Feldman, Architectural Historian of Myra L. Frank/Jones & Stokes, initially prepared prior to the PA going into effect, but now dated June 2005. As a result the report contains some use of pre-PA terminology and procedures. This does not affect the validity of the SHPSR's conclusions, and Caltrans District 7 PQS have properly addressed other issues relevant to PA consistency. 0The SHPSR is intended to document three of Caltrans' actions under the PA for Section 106 of the National Historic Preservation Act: determination of the Area of Potential Effects (APE); identification of potential historic properties located within the undertaking's APE; and evaluation of potential historic properties for eligibility to the National Register of Historic Places (NRHP). Under the PA, Caltrans is responsible for ensuring the appropriateness of the APE (Stipulation VIII.A) and the adequacy of historic property identification efforts (Stipulation VIII.B). We are consulting with you at the present time under Stipulation VIII.C.5 of the PA, which requires that we seek your concurrence on Caltrans' determinations of eligibility for potential historic properties.

In cooperation with FHWA and Caltrans, the Alameda Corridor Transportation Authority (ACTA) has proposed constructing an expressway between the Commodore Schuyler Heim Bridge and Alameda Street, north of Pacific Coast Highway (SR-1), as a way to alleviate traffic in a congested area. Also, Caltrans had proposed replacing the Schuyler Heim Bridge. Those two actions comprised one project, which was addressed in the *Historic Property Survey Report for the State Route 47 (SR-47) Truck Expressway and the Commodore Schuyler Heim Bridge Replacement Project (2002 HPSR)* prepared by Myra L. Frank & Associates, Inc., and JRP Historical Consulting Services in October 2002 (final SHPO concurrence July 27, 2005). The same project is now called the Schuyler Heim Bridge Replacement and SR-47 Expressway Project. Subsequent to receiving SHPO concurrence, an alternative to the SR-47 Expressway was proposed, and the alternative now requires a supplemental HPSR. The alternative would extend State Route 103 (SR-103) to the northwest on an elevated viaduct. Because two years have passed since the 2002 HPSR was prepared, this SR-103 SHPSR also addresses properties within the SR-47 Expressway APE for their potential to qualify as historic properties that now meet the age criteria. A full project description and depiction of the APE can be found on page 2 and Exhibit 3 of the SHPSR.

Consultation and identification efforts for the SR-103 Extension Alternative of the Commodore Schuyler Heim Bridge Replacement and SR-47 Truck Expressway Project (summarized in pages 1-2 of the attached SHPSR) resulted in the identification of ten (10) properties requiring formal evaluation within the APE, including:

- 916 N. Henry Ford Ave., Wilmington (within the SR-47 Expressway APE)
- 1622 E. Robidoux St., Wilmington (within the SR-47 Expressway APE)
- 2100 W. Willow St., Long Beach
- Hudson Park, Long Beach
- 2365 Sepulveda Blvd., Los Angeles
- 22440 S. Alameda St., Carson
- 22500 S. Alameda St., Carson
- 22606 S. Alameda St., Carson
- 22422 S. Alameda St., Carson
- 2430 E. 223rd St., Carson

None of these properties requiring formal evaluation have been previously determined eligible for the NRHP. Pursuant to Stipulation VIII.C of the PA, these properties were formally evaluated for NRHP eligibility for the SR-103 Extension Alternative of the Commodore Schuyler Heim Bridge Replacement and SR-47 Truck Expressway Project; these evaluations are documented in Appendix A (Supplemental Historical Resources Evaluation Report) of the SHPSR.

All resources identified within the APE without any potential for NRHP eligibility were exempted from formal evaluation pursuant to Stipulation VIII.C.1 and Attachment 4 of the PA ("Properties Exempt from Evaluation").

Pursuant to Stipulation VIII.C.5 of the PA, Caltrans is requesting your concurrence with the following eligibility determinations:

- None of the ten (10) properties listed above have been determined eligible for the NRHP as they are typical examples of a style of architecture of which many are extant, and they lack an overall architectural quality and distinction. Furthermore, there are no known associations with important historic events, personages, or movements.

We look forward to receiving your response within 30 days of your receipt of this submittal, in accordance with Stipulation VIII.C.5.a of the PA. Pending you concurrence regarding Caltrans' eligibility determinations, Caltrans' finding for this portion of the undertaking (pursuant to Stipulation IX.A.2) is "No Historic Properties Affected," due to the absence of identified historic properties with this undertaking's APE.

If you need additional information, please do not hesitate to contact Caltrans Architectural Historian Kelly Ewing-Toledo at 213.897.4095 (fax 213.897.9572; e-mail Kelly_Ewing-Toledo@dot.ca.gov) or myself at 213.897.3818. Finally, thank you for your assistance with this undertaking.

Sincerely,

/Kelly Ewing Toledo

for Gary Iverson
Office Chief, Cultural Studies
Caltrans District 7
Los Angeles

Attachment: Supplemental Historic Property Survey Report for the SR-103 Extension Alternative of the Commodore Schuyler Heim Bridge Replacement and SR-47 Truck Expressway Project in the Ports of Long Beach and Los Angeles, Los Angeles County, California

Cc: Gene Fong, FHWA Division Administrator

"Caltrans improves mobility across California"

Gary Iverson
10/25/2005 03:28 PM

To: mmcguirt@parks.ca.gov, smikesell@parks.ca.gov, Steve.Healow@fhwa.dot.gov, Kelly Ewing-Toledo/D07/Caltrans/CAGov@DOT, Jill Hupp/HQ/Caltrans/CAGov@DOT
cc:
cc:
Subject: 30 days past notice: Route 103 extension and Truck Expressway

The following project was sent by Caltrans District 7 Division of Environmental Planning to SHPO:

Supplemental Historic Property Survey Report for the SR-103 Extension Alternative of the Commodore Schuyler Heim Bridge replacement and SR-47 Truck Expressway Project in the Ports of Long Beach and Los Angeles, Los Angeles County, California, PM 2.8/5.3.

SHPO received this documentation on August 8, 2005 per certified return receipt #7004 2510 0007 2264 7539.

The 30 day review period ended on September 7, 2005

Since 30 days for comment has now passed, Caltrans is hereby informing all concerned that we are proceeding forward per stipulation VIII.C.5.a of the PA.

3.9 Hydrology, Floodplains, and Oceanography

The information for this section is derived in part from the *Berth 206-209 Interim Container Terminal Reuse Project Draft Environmental Effect Report* (LAHD, 2005), and from the *Water Quality Impacts Technical Study* (Caltrans, 2007). The technical study is herein incorporated by reference. This section addresses the physical parameters involved with hydrology and oceanography. Section 3.10 addresses the water quality properties of oceanography.

3.9.1 Regulatory Setting

Executive Order 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Highway Administration requirements for compliance are outlined in 23 CFR 650 Subpart A.

In order to comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments
- Risks of the action
- Impacts on natural and beneficial floodplain values
- Support of incompatible floodplain development
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project.

The 100-year floodplain is defined as "the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the 100-year floodplain."

3.9.1.1 Federal

The federal Water Pollution Control Act (also known as the Clean Water Act of 1997 [CWA]) (33 U.S.C. 1251 et seq.) is the principal statute governing water quality. The statute's goal is to end all discharges entirely and to restore, maintain, and preserve the integrity of the nation's waters. The act regulates both the direct and indirect discharge of pollutants into the nation's waters. It mandates permits for wastewater and stormwater discharges, requires states to establish site-specific water quality standards for navigable bodies of water, and regulates other activities that affect water quality, such as dredging and the filling of wetlands.

For stormwater or industrial-related discharges into an existing waterway, water quality control is governed by a National Pollutant Discharge Elimination System (NPDES) Permit. Originally, NPDES focused on reducing pollutants from discharges from industrial process wastewater and municipal sewage treatment plants. In 1987, CWA was amended to require the U.S. Environmental Protection Agency (EPA) to establish requirements for regulating stormwater discharges through use of NPDES stormwater permits. In 1990, Section 402(p) was added to CWA to regulate Municipal Separate Storm Sewer System (MS4) discharges into existing waterways. The MS4 systems are now required to obtain an NPDES permit, and local jurisdictions are also required to adopt programs that control discharges for new and redevelopment areas.

The major CWA section that applies to activities potentially occurring as part of the proposed action is NPDES Section 402:

> *Section 402 (33 U.S.C. 1342 and 40 CFR 122): This section of CWA establishes a permitting system for the discharge of any pollutant (except dredge or fill material) into waters of the United States. An NPDES permit is required for all point source discharges of pollutants to surface waters. A point source is a discernible, confined, and discrete conveyance, such as by pipe, ditch, or channel.*

3.9.1.2 State

The Porter-Cologne Water Quality Act (Water Code Sections 13000 et seq.) is the basic water quality control law for California. Under this act, the State Water Resources Board (SWRB) has ultimate control over state water rights and water quality policy. The act also established nine regional water quality boards to oversee water quality issues on a day-to-day basis at the regional level. Each regional board is required to adopt a water quality control plan or basin plan that reflects the regional differences in existing water quality, the beneficial uses of the region's ground and surface water, and local water quality conditions and problems. The proposed project site is located within the Los Angeles Region (Region 4) that is addressed by the Los Angeles Regional Basin Plan for the Coastal Watersheds of Los Angeles and Ventura counties.

The boards implement the permit provisions (Section 402) and certain planning provisions (Sections 205, 208, and 303) of CWA. This means that the state issues one discharge permit for purposes of both state and federal law. Under state law, the permit is officially called Waste Discharge Requirements. Under federal law, the permit is officially called an NPDES General Permit.

Beginning March 10, 2003, EPA and SWRB regulations began regulating discharges from projects with soil disturbance of 1 acre or more by amending the NPDES General Permit that originally regulated soil disturbances of 5 acres or more. SWRB Resolution No. 2001-46 also modified provisions of the general permit to require permittees to prepare a specific water quality sampling and analysis plan, including analytical procedures for covered construction sites.

In addition, Section 303 (d) of CWA requires the state to develop a list of "impaired" water bodies that may require additional protection (beyond traditional short-term and long-term control) to ensure established water quality standards are achieved and maintained. For these water bodies, states are required to develop appropriate total maximum daily loads (TMDLs). TMDLs are the sum of the individual pollutant load allocations for point sources, nonpoint sources, and natural background conditions, with an appropriate margin of safety for a designated water body.

3.9.1.3 Local

Both the NPDES General Permit for construction activities and MS4 are enforced at the regional level by regional water boards. Specific local requirements, however, are defined at the local jurisdiction level. The determining factor whether the proposed project is subject to the California Department of Transportation (Caltrans) MS4 Permit or the Los Angeles County MS4 Permit is whether the project is being constructed on property under Caltrans

jurisdiction or Los Angeles County/City jurisdiction. If it is both, the proposed project is potentially subject to requirements of both permits. Thirty days or more prior to project construction, it is anticipated that project proponents will file for State General Construction NPDES Permit coverage (a Notice of Intent will be filed with the State Water Resources Control Board). A redundant application may also occur for the MS4 Permit (Caltrans and Los Angeles County).

3.9.1.3.1 National Pollutant Discharge Elimination System Permit

In 1996, Caltrans requested that SWRB consider adopting a single NPDES permit for all activities, properties, and facilities that would cover both MS4 requirements and the statewide Construction General Permit requirements. The permit is intended to cover all Caltrans activities that require a current MS4 permit and construction activities that require a federal permit.

In its request for a single NPDES permit, Caltrans created a stormwater management program (SWMP). The intent of SWMP is to reduce or prevent pollutants in stormwater discharge and authorized non-stormwater discharges through development and implementation of best management practices (BMPs). The SWMP must also comply with the local Municipal MS4 Storm Water Permit for the region in which the project is located. The BMPs chosen must comply with best available technology economically achievable/ best conventional technology standards, whichever is applicable. There are three categories of BMPs in SWMPs:

- Technology-based and pollution prevention controls, including maintenance and design BMPs
- Construction controls
- Treatment controls.

The intent of the combined permit is to assure consistency with state construction-related requirements and municipal MS4 requirements. Following is an overview of the requirements for each of these components:

3.9.1.3.1.1 General Permit for Construction Requirements

The General Permit requires all dischargers where construction activity disturbs 1 acre or more to:

- Develop and implement a Storm Water Pollution Prevention Plan (SWPPP) that specifies BMPs to prevent construction pollutants from contacting stormwater and with the intent of keeping all products of erosion moving offsite into receiving waters.
- Eliminate or reduce non-stormwater discharges to MS4s and other waters.
- Perform inspections of all BMPs.

It is the responsibility of the discharger to obtain a General Permit before any soil disturbance. The discharger must submit a notice of intent (NOI) to SWRB. Coverage under this permit shall not commence until the discharger develops an adequate SWPPP for the project.

The SWPPP must be implemented at the appropriate level to protect water quality at all times throughout the life of the project. The major objectives of a SWPPP are to:

- Identify all pollutant sources, including sources of sediment, from the construction site
- Identify non-stormwater discharges
- Construct and implement BMPs to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges
- Develop a maintenance schedule for all post-construction BMPs designed to reduce or eliminate pollutants.

The General Permit requires development and implementation of a monitoring program. The program must be implemented at the start of construction activity. The monitoring program must include inspections that obtain these goals:

- Identify areas contributing to stormwater discharge
- Evaluate whether BMPs identified in the SWPPP are adequate and functioning properly
- Evaluate whether additional control practices or corrective maintenance activities are needed
- Develop a sampling and analysis plan that accurately identifies potential sources of pollutants and the locations where these pollutants have the potential to discharge offsite.

3.9.1.3.1.2 Los Angeles County MS4 Permit Requirements

Los Angeles County Municipal Storm Water Permit requirements fall under NPDES No. CAS614001. The primary objectives of the local stormwater program requirements are to:

- Effectively prohibit non-stormwater discharges, and
- Reduce the discharge of pollutants from stormwater conveyance systems to the maximum extent practicable (MEP statutory standard).

The primary goal of the permit is to stop polluted discharges from entering the storm drain system and local receiving and coastal waters. A requirement of the Los Angeles County Municipal Storm Water Permit is implementation of standard urban stormwater mitigation plans (SUSMPs) and numerical design standards for BMPs, which municipalities began implementing in February 2001. The general requirements of the SUSMP include:

- Controlling peak stormwater runoff discharge rates
- Conserving natural areas
- Minimizing stormwater pollutants of concern
- Protecting slopes and channels
- Providing storm drain stenciling and signage
- Properly designing outdoor material storage areas
- Properly designing trash storage areas
- Providing proof of ongoing BMP maintenance.

The City of Los Angeles is covered under the Permit for Municipal Storm Water and Urban Runoff Discharges within Los Angeles County (Los Angeles Regional Water Control Board [Regional Board] Order No. 01-182) and is obligated to incorporate provisions of this document in city permitting actions. The municipal permit incorporates SUSMP requirements, and these include a treatment control BMP for projects falling within certain development and redevelopment categories.

3.9.1.3.1.3 Drainage and Flood Control Improvements

Drainage and flood control structures and improvements in Los Angeles County are subject to review and approval by the Los Angeles County Department of Public Works (LACDPW), while structures and improvements in the City of Los Angeles are subject to review and approval by the City of Los Angeles Department of Public Works (DPW), Bureau of Engineering. In general, the county maintains the large regional channels, and smaller storm sewers are maintained by the city.

Both agencies utilize design standards to provide a specified level of protection against flooding for different types of land use. Both LACDPW and DPW regulate drainage-related improvements through plan approvals and permits. Both agencies require project proponents to design stormwater collection and conveyance systems using specifications and procedures set forth in their respective storm drain design manuals. The project plans and specifications are submitted to the appropriate jurisdictional agency for review and approval. The agency review includes an evaluation of the effects of the project's discharge on the agency's jurisdictional drain system. Projects resulting in stormwater flows that exceed the drainage system's capacity are not approved. In such cases, methods for reducing effects to the storm drain system can include controlling peak and total discharge through stormwater detention or increasing site perviousness.

3.9.2 Affected Environment

3.9.2.1 Hydrology

The Schuyler Heim Bridge is located in the East Basin of the Los Angeles Harbor where it crosses the Cerritos Channel. The Cerritos Channel is part of the Inner Harbor (channels, basins, and slips north of the Vincent Thomas Bridge) and connects to the Outer Harbor (south of Reservation Point to the San Pedro and Middle breakwaters) via the Main Channel. The Los Angeles Harbor is physically connected to the Long Beach Harbor by the Cerritos Channel. Since the 1900s, dredge and fill projects have considerably altered the natural marine, bay, and shoreline environment to create the present harbor. Offshore, construction of the San Pedro, Middle, and Long Beach breakwaters and other structures has altered the historic pattern of currents and sediment transport. The breakwaters from the harbor protection system segregate the harbor from oceanic conditions.

Near-shore oceanic conditions dominate the marine environment of the Los Angeles Harbor and are primarily influenced by the Southern California coastal marine environment known as the Southern California Bight, which extends from Point Conception south to San Diego and on to Ensenada, Mexico. The main freshwater influx into the Los Angeles Harbor is through the Dominguez Channel, which drains approximately 80 square miles of urban and industrial areas. Other freshwater contributors are the discharge of treated sewage from the

Terminal Island Treatment Plant into the Outer Harbor, and discharges from several major storm drains that enter the harbor at different locations.

The area surrounding the project is highly developed and industrialized because of its proximity to the Ports of Long Beach and Los Angeles. Surrounding land uses include industrial shipyards and refineries, container terminal and storage facilities, as well as the former Long Beach Naval Shipyard. Three marinas are located in the vicinity of the Schuyler Heim Bridge within the project area.

The Schuyler Heim Bridge is the crossing means for State Route (SR) -47 over the Cerritos Channel in the Port of Long Beach. The Cerritos Channel is used primarily as a deep water path for the transport of cargo between the Los Angeles and Long Beach Harbors. Within the project limits, the navigable portion of the Cerritos Channel is approximately 99 meters (m) (325 feet [ft]) wide, contains depths ranging up to 15.2 m (50 ft) at its center, and is lined with concrete and riprap. The existing navigable width of the channel beneath the bridge is 55 m (180 ft) between columns. The Consolidated Slip/Dominguez Channel within the project limits is a narrow, riprap-lined channel ranging from approximately 38 m (125 ft) to less than 106.6 m (350 ft) in total width. Mean water depths within the channel are shallow, less than 4 to 6 m (<20 ft), and bottom sediments consist of more than 90 percent clay.

3.9.2.2 Floodplain

Historically, the Port of Los Angeles was a tidal marsh and terminus for the Dominguez Channel, San Gabriel River, and Los Angeles River. Flooding in the area occurred frequently, produced either by tidal influence or as a result of storm events overflowing the Los Angeles River. Before the beginning of the 20th century, the area was a large wetland, composed of sedimentary silt and sand from the rivers, forming tidal flats, and saturated soils from the ocean. The City of Los Angeles began filling and dredging the delta to expand the port for higher capacity and larger ships. Due to the area's natural base as a tidal marsh with a high water table, major portions of the project area had previously been mapped as a 100-year floodplain.

3.9.2.2.1 Bridge Area

A review of the applicable Flood Insurance Rate Maps (FIRMs) for the project area was conducted, which included the City of Los Angeles (panel 107 of 112, community Panel Number 060137 0107 E, map revision date July 6, 1998), and the City of Long Beach (Panel 20 of 25, Community Panel Number 060136 0020 C, revision date February 25, 2000, through a Letter of Map Revision [LOMR]). FIRMs are produced by the Federal Emergency Management Agency (FEMA), as are all revisions to regulatory flood zones, and are based on hydrologic and hydraulic analyses of potential flooding conditions in the drainage basins in the area.

The FIRMs for the area indicate that the northern approaches to the Schuyler Heim Bridge (within the City of Los Angeles corporate limits) are zoned as AR with a base flood elevation of 11 (anticipated depth of the floodwater above the land surface). The "AR" designation indicates that "the area is of a special flood hazard, which results from the decertification of a previously accredited flood protection system, but that is in the process of being restored. The AR designation mapped by FEMA in 1998 was due to potential overtopping of the existing Los Angeles River levees. A short floodwall was constructed on

top of the levees; the project area was then removed from the 100-year floodplain on February 25, 2000.

3.9.2.2.2 Expressway Area

According to FIRM Panel Number 060137-0107 E (1998), the project area (from the southern extent to Anaheim Street) is delineated as Zone AR. Zone AR is the flood insurance rate zone used to depict areas protected from flood hazards by flood control structures, such as levees, that are being restored. In the case of the proposed action, the 100-year floodplain (Zone AR) mapped by FEMA in 1998 was due to potential overtopping of the existing Los Angeles River levees. A short floodwall was constructed on top of the levees; and the project area was then removed from the 100-year floodplain on February 25, 2000.

According to the Federal Highway Administration (FHWA), an encroachment on a floodplain occurs when transportation improvements would be built within a base floodplain. As a result of the Zone AR declassification, the area in which the project would be located is now mapped as Zone X, which is a 500-year floodplain. Zone X is defined as an area with a 0.2 percent annual chance of inundation by flooding. Therefore, the project would not require a Location Hydraulic Study, a Summary Floodplain Encroachment Report, or a Floodplain Evaluation Report.

3.9.2.3 Oceanography

Los Angeles Harbor is a southern extension of the relatively flat coastal plain, bounded on the west by the Palos Verdes Hills. The Palos Verdes Hills offer protection to the bay from prevailing westerly winds and ocean currents. The Los Angeles Harbor was originally an estuary that received freshwater from the Dominguez Channel, San Gabriel River, and Los Angeles River. Over the past 80 to 100 years, development of the Los Angeles/ Long Beach Harbor complex, through dredging, filling, and channelization, has completely altered the local estuarine physiography.

3.9.2.3.1 Tides

Sea level variations (tides) are the result of astronomical and meteorological conditions. Tidal variations along the coast of Southern California are caused by the passage of two harmonic tide waves, one with a period of 12.5 hours and the other with a period of 25 hours. This combination of harmonic tide waves usually produces two high and two low tides each day. The twice-daily (semidiurnal) tide of 12.5 hours predominates over the daily (diurnal) tide of 25 hours in Los Angeles Harbor, generating a diurnal inequality, or mixed semidiurnal tide. This causes a difference in height between successive high and low waters ("water" is commonly used in this context instead of "tide"). The result is two high waters and two low waters each day, consisting of a higher high water and a lower high water, and a higher low water and a lower low water, respectively referred to as HHW, LHW, HLW, and LLW (LAHD, 2005).

A greater-than-average range between HHW and LLW occurs when the moon, sun, and earth are aligned with each other to create a large gravitational effect, also known as a spring tide, and corresponds to the phenomenon of a new or full moon. Neap tides, which occur during the first and third quarters of the moon, have a narrower range between HHW and LLW. In this situation, the moon, sun, and earth are perpendicular to each other, thereby reducing the gravitational effect on the water levels (LAHD, 2005).

The mean tidal range for the Outer Harbor, calculated by averaging the difference between all high and low waters, is 1.15 m (3.76 ft); and the mean diurnal range, calculated by averaging the difference between all the HHW and LLW, is approximately 1.71 m (5.6 ft) (LAHD, 2005). The extreme tidal range (between maximum high and maximum low waters) is about 3.2 m (10.5 ft); the highest and lowest tides reported are 2.43 m (7.96 ft) above mean lower low water (MLLW) and -0.78 m (-2.56 ft) below MLLW, respectively (written as 7.96 MLLW and -2.56 MLLW) (LAHD, 2005). MLLW is the mean of all lower low waters, equal to 0.85 m (2.8 ft) below mean sea level. It is the datum from which Southern California tides are measured.

Available Los Angeles Harbor tide data indicate that the highest water elevations usually occur from November through March. The more severe offshore storms usually occur along the California coast during this same period. These higher water elevations typically range from +2.13 to +2.29 m (+7 to +7.5 ft) MLLW (LAHD, 2005).

3.9.2.3.2 Waves

Ocean waves impinging on the Southern California coast can be divided into three primary categories, according to origin: Southern Hemisphere swell, Northern Hemisphere swell, and seas generated by local winds. Los Angeles Harbor is directly exposed to ocean swells entering from two main exposure windows to the south and southeast, regardless of swell origin. The more severe waves from extra-tropical storms (Hawaiian storms) enter from the south to southeast direction. The Channel Islands, particularly Santa Catalina Island, provide some sheltering from these larger waves, depending on the direction of approach. The other major exposure window opens to the south, allowing swells to enter from storms in the Southern Hemisphere, tropical storms (chubascos), and southerly waves from extra-tropical storms. Waves and seas entering Los Angeles Harbor are greatly diminished by the time they reach the Inner Harbor. Most swells from the Southern Hemisphere arrive at Los Angeles from May through October. Southern Hemisphere swells characteristically have low heights and long wave periods (wave period is a measurement of the time between two consecutive peaks as they pass a stationary location). Typical swells rarely exceed 1.22 m (4 ft) in height in deep water. However, with periods as long as 18 to 21 seconds, they can break at over twice their deepwater wave height. Northern Hemisphere swells occur primarily from November through April. Deepwater significant wave heights have ranged up to 6.1 m (20 ft), but are typically less than 3.66 m (12 ft). Northern Hemisphere wave periods generally range from 12 to 18 seconds (LAHD, 2005).

Local wind-generated waves are predominantly from the west and southwest. However, they can occur from all offshore directions throughout the year, as can waves generated by diurnal sea breezes. Local waves are usually less than 1.33 m (6 ft) in height, with wave periods of less than 10 seconds (LAHD, 2005).

3.9.2.3.3 Circulation and Flushing

Circulation patterns are established and maintained by tidal currents. Flood tides in Los Angeles Harbor flow into the harbor and up the channels, while ebb tides flow down the channels and out of the harbor. In the Outer Harbor, near Angel's Gate and Queen's Gate, maximum surface tidal velocities reach approximately 0.8 feet per second (fps), while minimum tidal velocities of 0.088 fps occur in the Inner Harbor area since the construction of the Pier 400 landfill (LAHD, 2005).

Circulation patterns in the Los Angeles Harbor are determined by a combination of tide, wind, thermal structure, and local topography. A large clockwise gyre is found in the surface waters of Outer Los Angeles and Long Beach Harbors during both rising and falling tides (LAHD, 2005). The net tidal exchange is inward through Angel's Gate, and outward through Queen's Gate and the gap between the eastern end of Long Beach Breakwater and Alamitos Bay. Thus, there is a net eastward flow within the harbor (LAHD, 2005).

Mixing is less in the Inner Harbor than in the Outer Harbor. Tidal-induced water exchange in the Inner Los Angeles Harbor is 22 percent of the total harbor water volume per day (LAHD, 2005). Neglecting discharges, flushing efficiency of the harbor has been determined using the tidal prism method. Overall tidal exchange rates fluctuate between 8 and 25 percent, with the flushing rate estimated at 90 tidal cycles (LAHD, 2005).

3.9.3 Environmental Consequences

3.9.3.1 Evaluation Criteria

For the purposes of the analyses in this Final EIS/EIR, the proposed alternatives were evaluated with respect to hydrology, floodplains, and oceanography to determine if they would:

- Result in permanent adverse effects to water circulation.
- Result in exposure of people or property to water-related hazards, such as flooding.
- Substantially reduce or increase the amount of surface water in Los Angeles Harbor.

3.9.3.2 Methodology

The following hydrology, floodplains, and oceanography analysis is based on review of the *Berth 206-209 Interim Container Terminal Reuse Project Draft Environmental Effect Report* (LAHD, 2005) and *Water Quality Impacts Technical Study* (Caltrans, 2007). Effects to hydrology, floodplains, and oceanography are evaluated based on knowledge of the proposed type, intensity, and duration of project construction activities and qualitative assessments of Project-related effects in the context of the existing setting of the Ports of Los Angeles and Long Beach.

3.9.3.3 Evaluation of Alternatives

3.9.3.3.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

3.9.3.3.1.1 Construction Effects

Construction of Alternative 1 would directly affect both the Cerritos Channel and the Consolidated Slip/Dominguez Channel. The construction effects for pile construction and falsework would be similar for the two areas.

Alternative 1 would not change the course and direction of offsite drainage, and drainage would not exceed the capacity of existing or planned stormwater systems. Alternative 1 also would not affect water surface elevation, and there would be no additional flood risk to life or property. Alternative 1 would not result in changes to water circulation within the harbor. There will be no effect to circulation patterns, which are established and maintained by tidal currents. Although Alternative 1 would replace the Schuyler Heim Bridge within the Cerritos Channel, the new bridge would not result in a substantial reduction or increase

in the amount of surface water in the Los Angeles Harbor because there would not be any loss of water area due to construction of Alternative 1 (i.e., no dredging, no fill).

In accordance with the City's municipal code and other applicable regulations, Alternative 1 would implement applicable stormwater pollution prevention measures as specified under NPDES permit requirements for the control of stormwater pollution during construction. Specific requirements include, at a minimum, BMPs for sediment control, construction materials control, site management, and erosion control. In addition, an SWPPP would be developed for construction materials and waste management, as Alternative 1 would require disturbance of more than 1 acre of land. In the event construction of Alternative 1 requires the disturbance of soil during the rainy season, defined as October 1 until May 1, a wet weather erosion control plan (WWECP) would also be developed. Adherence to these requirements would be enforced through plan check reviews and site inspection upon and following the issuance of a building permit or grading permit.

Implementation of the above-mentioned measures would reduce sediment-laden runoff, prevent the migration of contaminants from construction areas to surface waters, and ensure stormwater discharges do not violate applicable water quality standards. As such, potential construction effects to water quality from polluted runoff would not be adverse.

Construction of the new fixed-span bridge would require excavation and other soil disturbance activities, promoting surface runoff of construction pollutants (i.e. trash and petroleum compounds from construction equipment) and erosion of channel banks. These pollutants would be collected by surface runoff and discharged into Cerritos Channel. This would be considered an adverse effect.

There are also potential adverse effects associated with groundwater that may be encountered during pile driving and excavation activities. Groundwater in the project area does not meet NPDES permit limits, would require onsite storage and treatment, and offsite disposal. Additional degradation to Cerritos Channel and/or Consolidated Slip/ Dominguez Channel water quality could be attributed to construction activities associated with pile placement that would disturb sediment, causing resuspension and dispersal into the water column, also considered an adverse effect.

Construction of the replacement bridge under Alternative 1 would extend into the rainy season. There is a potential for worker exposure to flood-related hazards. This situation is considered remote because, during heavy rainstorms, construction is generally halted for safety reasons. Flooding that occurs as a result of continuous heavy rains is not expected to endanger workers, as there would be ample time for workers to leave the worksite, if necessary.

A floodplain evaluation estimates a level of risk or environmental effect with respect to encroachment on a "base floodplain," which is the area subject to flooding by the base flood. In most floodplain evaluations, the base flood used to determine effects is the precipitation event corresponding to a 100-year return period (the 100-year flood). A 100-year flood is defined as a precipitation event and flood that retains a 1 percent chance of being exceeded (in depth of the floodwater) in any given year. An encroachment is any action implemented within the limits of a base floodplain and typically includes construction activities or

permanent structures. The following items also are generally considered in the evaluation of floodplain effects:

- Risks to human life or property due to flooding
- Compatibility of floodplain development
- Effects on natural and beneficial floodplain value
- Measures to restore and preserve the natural and beneficial floodplain values

Risks to Human Life or Property

Construction of the replacement bridge would occur largely in the same footprint as the existing bridge; therefore, there would be no new encroachments into the regulatory floodplain. The width of the replacement bridge would be slightly wider than the existing bridge, but would result in only a slight increase in peak flows when compared to existing conditions. The replacement bridge also would be an elevated structure, with a vertical clearance of about 14.32 m (47 ft) above the high water level of the Cerritos Channel, which would minimize any flood risk and safety hazards of users. Risks to human life or property would not increase.

Compatibility of Floodplain Development

The project would replace a similar structure in a 500-year floodplain and would, therefore, be a compatible development.

Effects on Natural and Beneficial Floodplain Values

Natural and beneficial floodplain values are natural resource attributes that are uniquely associated with a floodplain, including fish, wildlife, plants, open space, natural beauty, and agriculture. The banks of Cerritos Channel, as well as much of the floodplain in the project area, are heavily urbanized, with very limited natural area to support natural and beneficial floodplain values. Since minimal wildlife and vegetation are located in the project area, natural and beneficial floodplain values would not be affected.

Measures to Restore and Preserve Floodplain Values

Alternative 1 would not involve measures to restore and preserve the natural and beneficial floodplain values of the area. Alternative 1 would not require temporary use of any areas designated as a 100-year floodplain and, therefore, would not create any temporary effects on floodplains.

As discussed above, Alternative 1 is within the 100-year floodplain of the Los Angeles River and Inner Harbor Area, as designated by FEMA. However, the new replacement bridge would be constructed so as not to impede or redirect flood flows. There are no impediments to sheet flows moving to the channel.

3.9.3.3.1.2 Operations Effects

Construction of the new bridge would not create more impervious areas than currently exist within the project area. The new fixed-span bridge would introduce a similar sized impervious surface, resulting in similar surface runoff during project operations. The bridge runoff contribution is considered negligible compared to overland drainage that enters the channel from other impervious surfaces in the project vicinity.

The new bridge would be designed so that stormwater runoff would flow along gutters toward the ends of the bridge and discharge into detention basins connected to the existing storm drainage system. Existing drainage patterns are not expected to be substantially altered by Alternative 1. With the new bridge, there would be no overall increase in surface area, and no increase to the amount of runoff that is currently discharged to the existing storm drain system. There would be no requirement for construction of a new storm drainage facility or expansion of existing drainage facilities.

Although the bridge footprint extends beyond impervious surfaces in some areas, the groundwater beneath the project area is of poor quality due to contamination, and the project area is not used for groundwater recharge. Operations effects to hydrology, floodplains, and oceanography would not be considered adverse.

Stormwater runoff from the expressway would be collected and receive some level of treatment prior to release. Groundwater resources would not be affected because the project area is not used for groundwater recharge. Therefore, Alternative 1 operations would not result in adverse effects to hydrology, floodplains, and oceanography.

3.9.3.3.2 Alternative 2: SR-103 Extension to Alameda Street

3.9.3.3.2.1 Construction Effects

Potential effects to oceanography and groundwater would be the same as described for Alternative 1.

3.9.3.3.2.2 Operations Effects

Alternative 2 would be constructed and operated within a 500-year floodplain. The proposed expressway included in Alternative 2 would be constructed so as not to impede or redirect flood flows. Therefore, Alternative 2 would have no operations effects to hydrology, floodplains, and oceanography.

3.9.3.3.3 Alternative 3: Bridge Demolition Avoidance

3.9.3.3.3.1 Construction Effects

Construction effects under Alternative 3 would be comparable to those described for Alternative 1.

3.9.3.3.3.2 Operations Effects

Alternative 3 would create a new bridge to the east of the existing Schuyler Heim Bridge. This alternative would result in an additional 17.8 cfs of runoff to the Cerritos Channel. This amount is negligible when compared to existing drainage to the Cerritos Channel. Pollutant loading effects are also expected to be minimal. Continued maintenance of the existing bridge would have potential effects to water quality, involving the introduction of abrasives, paints, and dust into Cerritos Channel waters. However, these maintenance activities would be infrequent, and BMPs would be followed to minimize introduction of these materials. The small quantities of materials potentially introduced would represent a less than adverse effect to water quality parameters. An additional 14.8 acres of impervious surface area would be created by this alternative. However, the project area is not used for groundwater recharge, and groundwater effects would not occur. Therefore, Alternative 3 would have no operations effects to hydrology, floodplains, and oceanography.

3.9.3.3.4 Alternative 4: Bridge Replacement Only

Construction and operations effects under Alternative 4 would be the same as those described for Alternative 1 only as related to the replacement of the Schuyler Heim Bridge.

3.9.3.3.5 Alternative 5: Transportation System Management

3.9.3.3.5.1 Construction Effects

Alternative 5 would not include any major capital improvements. Therefore, there would be negligible effects to hydrology, floodplains, and oceanography.

3.9.3.3.5.2 Operations Effects

No operations effects under Alternative 5 are anticipated.

3.9.3.3.6 Alternative 6: No Build

3.9.3.3.6.1 Construction Effects

Since no construction would occur under Alternative 6, no temporary effects are anticipated.

3.9.3.3.6.2 Operations Effects

Under the No Build Alternative, the replacement bridge and proposed expressway would not be built, and no additional storm drainage, improvements, or water quality measures would be built. Existing drainage patterns and runoff quantities would remain the same. In addition, the quality of urban runoff pollutants would remain unchanged. Low levels of contamination would continue to be introduced into Cerritos Channel from surface runoff and lead paint flaking from the existing bridge. Also under this alternative, the existing flood conditions would not be affected.

3.9.3.3.7 CEQA Consequences

Based on the information provided above, in accordance with CEQA criteria, impacts related to Alternatives 1, 2, 3, 4, and 5 would be less than significant. Under Alternative 6, no impacts would occur.

Potential impacts of the proposed project alternatives to hydrology, floodplains, and oceanography are assessed in the context of CEQA criteria in Chapter 4.0 – CEQA Analysis and Appendix A – CEQA Checklist (VIII, Hydrology and Water Quality).

3.9.4 Avoidance, Minimization, and/or Mitigation Measures

Stormwater runoff would be controlled along the project alignment to minimize effects to the Cerritos Channel or Consolidated Slip/Dominguez Channel. Guidelines for stormwater management would be followed as prescribed in the District 7 Directive No. DD20, dated October 10, 2000. Additionally, mitigation would be guided by the *Caltrans Statewide Storm Water Management Plan (SWMP).*

Construction would conform to two Caltrans NPDES permits: Caltrans Permit (Order No. 99-06-DWQ) and Construction General Permit (Order No. 99-08-DWQ). No mitigation measures would be required.

Additionally, the contractor will be required to submit a construction BMP plan for approval before construction begins.

3.9.4.1 Avoidance and Minimization Measures

3.9.4.1.1 Construction

3.9.4.1.1.1 Alternatives 1, 1A, 2, 3, and 4

HY-1 Surface Runoff Measures. Construction would require the adoption of the following BMPs for protection of water quality during construction. The following BMPs will limit soil erosion, implement water conservation practices, and maintain water quality of the receiving water during construction:

- Tires on construction equipment that leaves a contaminated work site will be washed before the equipment leaves the site.
- Within a contaminated work area, construction equipment will be cleaned only as necessary (e.g. moved to a non-contaminated area) to minimize the volume of decontamination wash water and prevent transport of contaminants from work site areas.
- Designated locations will be provided for servicing, washing, and refueling equipment, away from temporary channels or swales that would quickly convey runoff to the drainage system and into the Cerritos Channel or Consolidated Slip/ Dominguez Channel.
- Contaminated material (e.g. oil, lubricants) will be kept at a safe distance (a minimum of 30.5 m (100 ft) from an entry into a receiving water body. Temporary barriers and containers will be used to confine any contaminated materials. Upon completion of construction, all contaminated material on the construction site will be removed and disposed of in accordance with federal, regional, and local regulations.
- Use of marine construction equipment will not involve fuel transfers onsite.
- A temporary spill containment system will be installed and maintained on either side of a water crossing. The contractor will be responsible for the containment plan and the execution of spill containment during the course of construction. The containment plan will be reviewed and approved by a resident engineer.
- To prevent potential introduction of any lead-based paint into receiving waters, the contractor(s) will take appropriate measures to eliminate lead-based paint from reaching the receiving waters. If paint removal is necessary during the bridge dismantling process, the contractor will comply with all applicable laws and regulations relative to this process to ensure protection of receiving waters.
- At project construction sites, as appropriate, the contractor will:
  - Provide stabilized entrances and exits
  - Regularly water the non-paved surfaces
  - Regularly sweep and vacuum paved surfaces
  - Install silt fences at the toe of excavation and embankment slopes
  - Install sand or gravel bag berms along the top of slopes

  - Install slope protection such as geotextiles, plastic covers, soil binders and erosion control blankets/mats
  - Install slope interruption devices such as fiber rolls and slope drains
  - Install permanent erosion control seeding, landscape planting or slope/rock paving
  - Protect storm drain inlets with inserts or linear interrupters such as gravel bag and/or sand bag berms
  - Manage stockpiles against wind and water erosion
- Monitor and report BMP performance and conditions before and immediately after the completion of work, in accordance with SWPPP specifications.

HY-2 Sediment Measures. Construction activities that would produce sediment transport of pollutants through the Cerritos Channel or Consolidated Slip/Dominguez Channel will be minimized through strict adherence to construction BMPs, which include, but are not limited to, the following:

- Channel bank work will include bank protection (riprap, concrete walls, and sheet piling) to eliminate the possibility of enhanced bank erosion.

HY-3 Groundwater Measures. Groundwater encountered during construction will be temporarily stored onsite, tested, transported, treated, and disposed offsite. A dewatering permit will be obtained from the Los Angeles RWQCB.

Based on results of the groundwater assessment and recommendations from the RWQCB, one of the following will be utilized for disposal of groundwater from the proposed dewatering operation: Onsite Treatment, Treatment and Disposal Offsite, or Disposal into Local Sewer System.

Onsite Treatment

This would entail designing and constructing a temporary water treatment plant for treating water generated from dewatering operations to reduce the concentrations of pollutants of concern below NPDES limits.

Treatment and Disposal Offsite

This would entail temporary storage of water on the project site, waste profiling, and then transporting the water to a regulated facility for treatment and disposal.

Disposal into Local Sewer System

This would entail disposal of the groundwater into the City of Los Angeles sewage treatment system, which is connected to the Terminal Island Treatment Plant. The groundwater can be disposed by connecting the dewatering operation to a local sewer line adjacent to the project site or to a trunk line. The type of sewer line connection is dependent upon the rate of flow of the groundwater from the dewatering operation and would be determined by the permitting agency. Information obtained from the City of Los Angeles Department of Public Works, Bureau of Sanitation, indicates that the treatment plant has an average daily capacity of 16 million gallons per day (mgd), with a daily peak capacity of 30 mgd.

To dispose of groundwater into the City of Los Angeles sewer system, an Industrial Wastewater Discharge Permit is required, which is issued by the City of Los Angeles Department of Public Works, Bureau of Sanitation, Industrial Waste Management Division (IWMD). To satisfy permit conditions, treatment of discharge water could be required.

3.9.4.1.1.2 Alternatives 5 and 6

No avoidance and minimization measures would be required for construction of Alternatives 5 and 6.

3.9.4.1.2 Operations

No avoidance and minimization measures would be required for project operations.

3.9.4.2 Mitigation Measures

Based on the above, mitigation measures are not required for construction or operation of the project alternatives.

3.10 Water Quality and Stormwater Runoff

The information for this section is derived entirely from the *Water Quality Impacts Technical Study* (Caltrans, 2007), which is herein incorporated by reference.

3.10.1 Regulatory Setting

The Federal Water Pollution Control Act of 1972, also referred to as the Clean Water Act (CWA) of 1972 (33 U.S. Code [U.S.C.] Section 1251 *et. seq.*) is the primary federal law regulating water quality. The CWA was passed to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Specific sections of the CWA control the discharge of pollutants and wastes into the aquatic and marine environment.

Section 401 of the CWA requires water quality certification from the state board or regional board when a project (1) requires a federal license or permit (Section 404 is the most common federal permit for Caltrans projects) and (2) will cause discharge into waters of the United States. Section 402 of the CWA establishes the National Pollutant Discharge Elimination System permit system for the discharge of any pollutant (except dredge or fill material) into waters of the United States. To ensure compliance with Section 402, the State Water Resources Control Board has developed and issued a National Pollutant Discharge Elimination System, Statewide Storm Water Permit, to regulate storm water discharges from all of Caltrans right-of-way, properties, and facilities. The permit regulates both storm and non-stormwater water discharges during and after construction.

Responsibility for the protection of water quality in California rests with the State Water Resources Control Board (State Water Board) and the nine Regional Water Quality Control Boards (Regional Water Boards). The State Water Board sets statewide policies and develops regulations for the implementation of water quality control programs mandated by state and federal regulations. Each Regional Water Board is responsible for developing and assigning standards for surface waters, publishing reports, providing water quality education, and implementing programs that address surface water quality. The Los Angeles Water Board retains jurisdiction over the project area addressed in this Final EIS/EIR.

The Regional Water Boards develop and implement Water Quality Control Plans, also known as Basin Plans. Water quality objectives defined in the basin plans serve as guidelines for all point source and nonpoint source discharges to California receiving waters. On June 13, 1994, the Los Angeles Water Board adopted a Basin Plan for the Los Angeles Region that includes water quality objectives and designates beneficial uses for surface and groundwater resources within the Los Angeles Basin, including coastal water resources.

Section 401 of the CWA requires certification that a permitted project complies with state water quality standards for proposed actions within state waters. The Los Angeles Water Board administers the Water Quality Certification program addressed in this EIS/EIR.

The CWA and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) establish a program to regulate the discharge of dredge and fill materials into the navigable Waters of the U.S. Under this provision, the U.S. Army Corps of Engineers (USACE) must issue permits for deposit of fill in waterways and wetland areas on both private and public lands.

Other federal agencies, such as the U.S. Fish and Wildlife Service (USFWS) and the U.S. Environmental Protection Agency (EPA), provide recommendations concerning the issuance of permits and identify conditions to include in the permit.

In addition, the State Water Resources Control Board issues the Statewide Permit for all Caltrans construction activities of 0.4 hectare (1 acre) or greater, or a number of smaller projects that are part of a common plan of development with the total area exceeding 0.4 hectares (1 acres), or projects that have the potential to significantly impair water quality. Caltrans projects subject to the Statewide Storm Water Permit require a Storm Water Pollution Prevention Plan; projects smaller than 0.4 hectares require a Water Pollution Control Program.

Subject to Caltrans review and approval, the contractor prepares both the Storm Water Pollution Prevention Plan and the Water Pollution Control Program. These identify construction activities that may cause pollutants in storm water and specify measures to control these pollutants. Because neither the Water Pollution Control Program nor the Storm Water Pollution Prevention Plan has been prepared at this time, the discussions in this section of the EIS/EIR focus on anticipated pollution sources or activities that may cause pollutants in the storm water discharges.

3.10.1.1 Regulation of Stormwater Discharges

3.10.1.1.1 Federal Requirements

In 1972, the CWA was amended to prohibit the discharge of pollutants to Waters of the U.S. from any point source unless the discharge is in compliance with the NPDES permit. The 1987 amendments to CWA added Section 402(p), which directs that stormwater discharges are point source discharges and establishes a framework for regulating municipal and industrial stormwater discharges under the NPDES program.

On November 16, 1999, the federal regulations for controlling pollutants in stormwater discharges were promulgated by EPA into the Code of Federal Regulations (CFR) (40 CFR Parts 122, 123 and 124.) Pursuant to these regulations, Municipal Separate Storm Sewer Systems (MS4) stormwater permits are required for discharges from a municipal stormwater sewer system serving a population of 100,000 or more. EPA defined MS4 to include state-owned road systems; in California, the MS4s were issued individual NPDES permits by the Regional Water Boards. The California Department of Transportation (Caltrans) obtained an MS4 permit for all areas of the areas where they are required.

Caltrans has coverage under the NPDES Permit and Statewide Stormwater Permit and Waste Discharge Requirements, which reference and incorporate by reference the current NPDES General Permit for discharges of stormwater runoff associated with construction activities. These permits directly regulate construction and stormwater discharges from facilities owned and operated by Caltrans. The Statewide Construction General Permit is issued by the State Water Resources Control Board (Order No. 99-08-DWQ, NPDES General Permit No. CAS000002). The provisions of the Construction General Permit are implemented by each of the Regional Water Boards. The Construction General Permit requires a Storm Water Pollution Prevention Plan (SWPPP) that includes Best Management Practices (BMPs) to control erosion and discharge of wastes at the construction site.

3.10.1.1.2 Local Requirements

The City of Los Angeles, City of Long Beach, and California Coastal Commission have put forth requirements for stormwater quality control during and following construction, which also must be incorporated into the project, depending on the alternative selected.

The City of Los Angeles maintains a pollution abatement program, which would be followed in accordance with the selected alternative. This program follows NPDES guidelines and deals with assuring that public agencies are abiding by SWPPP requirements. Additionally, the program seeks to optimize beneficial uses of receiving waters by reducing pollutant loads. BMPs that have been established in the past by the City of Los Angeles include catch basins, oil and grease separators, and sediment separators.

The Port of Long Beach retains additional requirements that would be followed during project construction. The Port works with the Los Angeles Water Board to implement the Long Beach Storm Water Management Program (LBSWMP), which consists of several elements, including the following:

- Program management
- Geographic characterization
- Development/construction program
- Illicit connection and discharges elimination program
- Education/public information program
- Annual reporting program

Additionally, and as required under the City of Long Beach Municipal Storm Water and Urban Runoff Discharge Permit (SWRCB Order No. 99-060, NPDES No. CAS004003), the permittee must adhere to a Long Beach Monitoring Program, which requires mass emissions monitoring, multispecies toxicity testing, toxicity identification evaluations, BMP effectiveness evaluation, and cooperative monitoring of the Cerritos Channel. The requirements of this permit include receiving water limitations, discharge prohibitions, storm water management, monitoring and reporting, and special provisions. Monitoring requirements applicable to the project would be determined upon construction of the project alternative and acquisition of the storm water permit.

The California Coastal Commission also has requirements in its *Plan for Controlling Polluted Runoff* (California Coastal Commission, 2000), which outlines strategies for addressing polluted runoff and identifies actions that will achieve the commission's objectives. A listing of strategies and background is available in their Procedural Guidance Manual. California Coastal Commission policies include the following:

- Maintain, enhance, and, where feasible, restore marine resources
- Protect against spillage
- Control effects of dredging in specified port areas

3.10.1.1.3 Beneficial Uses

Beneficial uses form the cornerstone of water quality protection under the basin plan. Appropriate water quality objectives are identified in the Basin Plan to ensure the protection of these uses. The designated beneficial uses, together with water quality objectives, form the water quality standards. Existing beneficial uses for the Cerritos Channel and the

estuarine portion of the Dominguez Channel are presented in Table 3.10-1. To preserve the beneficial uses at their current level, water quality objectives have been developed and published in the basin plans.

Table 3.10-1
Beneficial Uses of Inland Surface Waters and Coastal Waters
Los Angeles Region Water Quality Control Plan

Surface Water Feature	Existing Beneficial Uses	Potential Beneficial Uses
Inner Los Angeles – Long Beach Harbor	• Industrial Service Supply • Navigation • Noncontact Water Recreation • Commercial and Sport Fishing • Marine Habitat • Rare, Threatened or Endangered Species	• Water Contact Recreation • Shellfish Harvesting
Dominguez Channel (in estuary)	• Contact and Noncontact water recreation • Preservation of Rare, Threatened or Endangered Species • Commercial and Sport Fishing • Marine, Estuarine, and Wildlife Habitat • Migratory and Spawning habitat	• Navigation

Note:
From Basin Plan, Adopted by California Regional Water Quality Control Board, Los Angeles Region, June 13, 1994 (Caltrans, 2005)

3.10.1.1.4 Water Quality Objectives

The Basin Plan contains both numeric and narrative surface water quality objectives. The discharge of waste into surface waters must not violate either of these objectives. Table 3.10-2 lists the various narrative water quality objectives applicable to all inland surface waters and enclosed bays and estuaries.

The Los Angeles Water Board has developed numeric water quality objectives for various constituents in inland surface waters of California, including TDS, sulfate, chloride, boron, and nitrogen. However, no specific objectives are listed for the Dominguez Channel Watershed at this time. Nevertheless, it can be assumed that the water quality components presented in the basin plans for other watersheds are applicable to the surface runoff analysis.

Because harbors usually contain a limited amount of potential for mixing and dispersion of contaminants with the open ocean, the contamination input is likely to concentrate over time. The water quality of the Los Angeles and Long Beach Harbors can be impacted by climate changes, seasonal overturns in the water, biological activity, effluent discharges, and surface runoff, all of which influence the Los Angeles Water Board water quality objectives and standards.

Table 3.10-2
Narrative Water Quality Objectives for Surface Waters
Los Angeles Region Water Quality Control Plan

Parameter	Objective
Ammonia	Ammonia concentrations in receiving waters shall not exceed values listed in the Basin Plan (Tables 3-1 to 3-4, calculated for specific pH and temperature).
Bacteria	In waters designated for noncontact water recreation (REC-2), the fecal coliform concentration shall not exceed 200/100 mL, based on a minimum of not less than four samples for any 30-day period, nor shall more than 10 percent of total samples during any 30-day period exceed 4000/10 mL.
Bioaccumulation	Toxic pollutants shall not be present at levels that will bioaccumulate in aquatic life to levels that are harmful to aquatic life or human health.
Biostimulatory Substances	No biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses.
Biochemical Oxygen Demand (BOD)	No substances that result in increases in the biochemical oxygen demand that adversely affect beneficial uses.
Chemical Constituents	No concentrations of chemical constituents in amounts that adversely affect any designated beneficial use.
Chlorine	Chlorine residual shall not be present in surface water discharges at concentrations that exceed 1.0 mg/L or impair beneficial uses.
Color	No coloration that causes nuisance or adversely affects beneficial uses.
Exotic Vegetation	Exotic vegetation shall not be introduced around stream courses to the extent that such growth causes nuisance or adversely affects beneficial uses.
Floating Material	No floating materials, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affects beneficial uses.
Dissolved Oxygen	Waters shall be free of substances that result in increases in the BOD, which adversely affect beneficial uses.
MBAS	No Methylene Blue Activated Substances (MBAS) in concentrations greater than 0.5-mg/L in waters designated municipal water use (MUN). Note: Municipal and Domestic Use is identified as a 'potential' use for this watershed.
Mineral Quality	There are no waterbody specific mineral quality objectives identified for this watershed in the Basin Plan.
Nitrogen	Nitrogen levels shall not exceed 10 mg/L (nitrate-nitrogen plus nitrate-nitrogen), 45 mg/L (as nitrate), 10 mg/L (as nitrate-nitrogen), or 1 mg/L (as nitrite-nitrogen).
Oil and Grease	No oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, cause nuisance, or otherwise adversely affect beneficial uses.
PCBs	The purposeful discharge of PCBs to waters of the Region, or at locations where the waste can subsequently reach waters of the Region, is prohibited.
Pesticides	Waters designated as domestic or municipal supply shall not contain concentrations of pesticides in excess of the limiting concentrations contained in Title 22 of the California Code of Regulations, listed in Table 3-7 of the Basin Plan. Note: Municipal and Domestic Use is identified as a 'potential' use for this watershed.

Table 3.10-2
Narrative Water Quality Objectives for Surface Waters
Los Angeles Region Water Quality Control Plan

Parameter	Objective
pH	Not less than 6.5 or more than 8.5. No changes in normal ambient pH levels to exceed 0.2 units from natural conditions as a result of waste discharge.
Radioactivity	Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.
Suspended Material	No suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Settleable Material	No settleable material that causes nuisance or adversely affects beneficial uses.
Tastes and Odors	No taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible aquatic resources, cause nuisance, or adversely affect beneficial uses.
Temperature	The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperatures does not adversely affect beneficial uses.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that are toxic to or produce detrimental physiological responses to human, plant, or aquatic life.
Turbidity	Where natural turbidity is between 0 and 50 NTU, increases shall not exceed 20 percent. Where natural turbidity is greater than 50 NTU, increases shall not exceed 10 percent. Note: The Los Angeles Water Board may issue specific Waste Discharge Requirements (WDRs) permit allowing higher concentrations within zones of dilution.

Additionally, these events can impact other water quality indexes, such as the temperature and pH of the receiving water. The specific water quality indexes historically linked to the contents of surface runoff include total suspended solids (TSS), TDS, and salinity.

An increase in TSS will reduce the transparency (measured as the depth to which one can discern black and white colored objects) of the receiving water. A study performed in the Henry Ford (Badger Avenue) Bridge Replacement Project noted that the transparency in the harbor between 1980 and 1984 ranged from 0 m to 12 m (0 ft to 40 ft), with mean values ranging between 2.3 m and 3.2 m (7.7 ft and 10.7 ft). The study also noted that the inner harbor (where the Cerritos Channel lies) generally contained a greater transparency than the main channel during the winter, summer, and fall. The study concluded that mean values in all areas of the harbor were adequate to safeguard the existing and proposed beneficial uses of the harbor as a marine and fish habitat, as defined by the Los Angeles Water Board.

Total dissolved solids can increase when poor quality surface runoff reaches the receiving water, as fine particulate matter can be easily transmitted off roadways and through sheet flow into receiving waters. Dissolved solids also can increase the salinity of the surface water. Los Angeles Harbor salinities usually range between 30.0 and 34.2 parts per thousand. Salinity, however, has been noted to be lower in the inner harbor, and in the Consolidated Slip/Dominguez Channel in the project vicinity.

Other contaminants that can be carried into receiving waters in surface runoff include heavy metals, oil and grease, and chlorinated hydrocarbons. The heavy metals (mostly cadmium, chromium, copper, mercury, lead, nickel, silver, and zinc), oil, and grease likely result from runoff from a roadway or bridge structure. Historically, the main concern with respect to these contaminants is their tendency to become suspended in the harbor sediments, where they can smother bottom-dwelling animals and promote anaerobic conditions in the water column. These types of contaminants tend to be most prevalent during construction activities associated with roadways and bridges.

3.10.2 Affected Environment

The project site is located within and along the southern boundary of the West Coast Groundwater Basin. This basin is bordered on the east by the Newport-Inglewood fault, on the west by the Santa Monica Bay, on the north by Ballona Gap (north of Los Angeles International Airport), and on the south by Palos Verdes Hills.

Five major aquifers have been identified within the West Coast Basin: the Silverado and Lynwood Aquifers, which are part of the San Pedro Formation; the Gage Aquifer, which is part of the Lakewood Formation; and the Gaspur and Semiperched Aquifers, which are part of the Holocene and latest Pleistocene deposits. The shallowest occurrence of regional groundwater underlying the project site is the Gaspur Aquifer. The Gaspur Aquifer typically consists of gravel and cobbles at its base and grades upward into medium to coarse sand. Along the northern edge of the project site, the Gaspur Aquifer ranges in thickness from 18.28 to 30.48 m (60 to 100 ft); and the top of it is reported to be 24.38 to 42.67 m (80 to 140 ft) below ground surface (bgs).

The shallow aquifers (Gaspur, Semiperched, and Gage) are not currently used for drinking water purposes because of low yield and/or generally poor quality. The Lynwood and Silverado Aquifers are currently used as drinking water sources. There are no drinking water wells within a 1,609.34-m (1-mi) radius of the project site. There are three active municipal-supply groundwater wells located within 8.05 km (5 mi) of the project site, but these are situated inland of the Dominguez Gap Barrier Injection (located north of the project site). Two of these wells are operated by the Dominguez Water Corporation (DWC) and reportedly produce drinking water from the Silverado Aquifer. The third drinking water supply well is operated by the City of Lomita.

The Gaspur Aquifer is the shallowest occurrence of regional groundwater underlying the area. There is a semiperched, water-bearing zone, however, that is first encountered between 0.30 and 3.05 m (1 and 10 ft) bgs, slightly varying within the five properties surrounding the project site. This shallow, semiperched water-bearing unit is separated from the Gaspur Aquifer by thick sequences of bay muds and clays.

The Gaspur Aquifer ranges in thickness from 18.28 to 30.48 m (60 to 100 ft) and is reported to be encountered between 24.38 to 42.67 m (80 and 140 ft) bgs. The aquifer runs in a north-south direction and is approximately 4 km (2.5 mi) wide within the Terminal Island area. The direction of regional groundwater flow in the Gaspur Aquifer is toward the north. There has been extensive intrusion of seawater into the Gaspur Aquifer indicating that, at some point, it is in contact with the ocean. There are lenses of sandy and/or gravelly clays that permit water to move vertically from the semiperched aquifers to the Gaspur Aquifer.

The project site also is within the Dominguez Channel Watershed, within the Los Angeles-San Gabriel Hydrologic Unit. This hydrologic unit is further divided into a hydrologic subarea (HSA), which is delineated principally on the basis of topography and watershed divides. Groundwater elevations generally descend from the Dominguez Channel toward the south to the Cerritos Channel where groundwater is near sea level. Tidal fluctuations, rainfall, and local pumping of groundwater result in variations of the ground water level. In general, south of Opp Street, groundwater is approximately 0 to 3 m (0 to 9.8 ft) below ground surface; north of Opp Street, groundwater is approximately 3 to 6 m (9.8 to 19.6 ft) below ground surface. The project lies within the Central HSA Split. The Cerritos Channel connects the Los Angeles Harbor on the southeast with the Inner Long Beach Harbor on the west. The Dominguez Channel connects to the East Basin of the Port of Los Angeles via the Consolidated Slip.

The area surrounding the project is highly developed and industrialized because of its proximity to the Ports of Long Beach and Los Angeles. Surrounding land uses include industrial shipyards and refineries, container terminal and storage facilities, as well as the former Long Beach Naval Shipyard. Three marinas are located in the vicinity of the Schuyler Heim Bridge within the project area.

The Schuyler Heim Bridge is the crossing means for SR-47 over the Cerritos Channel in the Port of Long Beach. The Cerritos Channel is used primarily as a deep water path for the transport of cargo between the Los Angeles and Long Beach Harbors. Within the project limits, the navigable portion of the Cerritos Channel is approximately 99 meters (m) (325 feet [ft]) wide, contains depths ranging up to 15.2 m (50 ft) at its center, and is lined with concrete and riprap. The existing navigable width of the channel beneath the bridge is 54.9 m (180 ft) between columns. The Dominguez Channel/Consolidated Slip within the project limits is a narrow riprap-lined channel ranging from approximately 38 m (125 ft) to less than 106.6 m (350 ft) in total width. Mean water depths within the channel are shallow, less than 4 to 6 m (<20 ft), and bottom sediments consist of more than 90 percent clay.

3.10.2.1 Historical Background

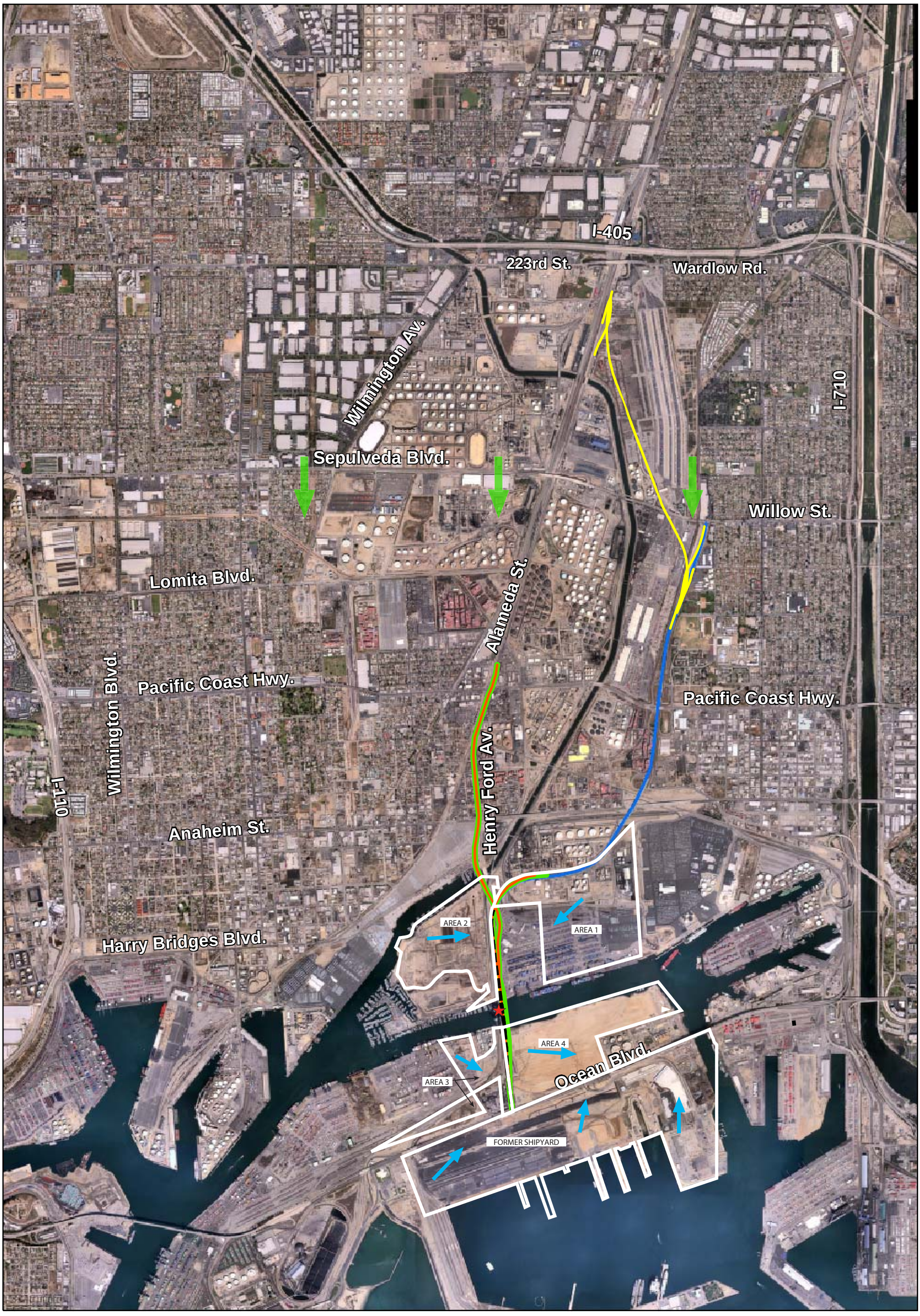
3.10.2.1.1 Area 1 (Pier A)

Area 1 is located east of the project site, on the north side of Cerritos Channel. Groundwater beneath Area 1 is first encountered between 0.30 m and 3.05 m (1 ft and 10 ft) below ground surface (bgs). The semiperched groundwater flow direction in the northern portion of Area 1 is generally toward the southwest, with varying groundwater flow directions toward the north and west in the southern portion of Area 1, as shown in Figure 3.10-1.

The former TCL Corporation (TCL) operated a disposal facility in Area 1 that reportedly accepted primarily oil field waste and tank bottom sludge from 1951 to 1972. Benzene concentrations (60 to 152 micrograms per liter [µg/L]) historically have been detected at higher concentrations in the northeastern portion of Area 1.

3.10.2.1.2 Area 2

Area 2 is located north and west of the project site (Figure 3.10-1). This property is partially vacant and is currently being developed by the Port of Long Beach. Groundwater beneath Area 2 is first encountered between 0.30 m and 3.05 m (1 ft and 10 ft) bgs. The semiperched groundwater flow direction is generally to the east, toward the project site.



Legend

- Alternative 1: Bridge Replacement and Expressway
- Existing SR-103
- Alternative 2: SR-103 Extension
- Alternative 3: Bridge Avoidance
- Alternative 4: Bridge Replacement Only
- Groundwater Flow Direction in Port Area
- General Groundwater Flow Direction

N

0 0.5 1

Miles

Figure 3.10-1
Adjacent Property Map with Groundwater Flow Directions
Schuyler Heim Bridge Replacement and SR-47 Expressway

As part of an initial Phase II Environmental Site Investigation for the Henry Ford Avenue Grade Separation Project (Grade Separation Project), six groundwater samples were collected from the semiperched groundwater zone in Area 2. Total recoverable petroleum hydrocarbons (TRPH) was detected at concentrations (ranging from 1,000 to 52,000 µg/L) in excess of National Pollutant Discharge Elimination System (NPDES) daily maximum limits. Volatile organic compounds (VOCs) were also detected; however, the concentrations were all below the NPDES daily maximum limits with the exception of benzene (5 µg/L in one sample). Total dissolved solids (TDS) levels (ranging from 1,750 to 21,500 milligrams per liter [mg/L]) exceeded the NPDES daily maximum limit and indicated brackish water underlying Area 2.

In the Supplemental Phase II Environmental Site Investigation for the Grade Separation Project, two groundwater samples were collected from the semiperched zone 3.05 m (10 ft) bgs in Area 2. Concentrations of VOCs (benzene and ethylbenzene), total petroleum hydrocarbon-diesel (TPH-d), TRPH, oil and grease, and metals were detected during this investigation. The following TPH-d, TRPH, and benzene concentrations were detected in excess of the NPDES daily maximum limits during this supplemental investigation:

- TPH-diesel (18,200 µg/L)
- TRPH (1,100 µg/L)
- Benzene (66.2 µg/L)

Four metals also were detected at concentrations exceeding NPDES daily maximum limits, including:

- Arsenic (114 and 125 µg/L)
- Total chromium (346 and 797 µg/L)
- Copper (1,040 µg/L)
- Lead (142 and 440 µg/L)

The following water quality parameters also exceeded NPDES daily maximum limits during this supplemental investigation:

- Total suspended solids (6,300 mg/L)
- Settleable solids (40 milliliters [mL]/L/hour)
- Turbidity (5,290 nephelometric turbidity units [NTU])

3.10.2.1.3 Area 3

Area 3 is located directly west of the project site, on the south side of Cerritos Channel, and is divided into two parcels. One parcel is located west of the Dow Chemical Company and north of New Dock Street, and the second parcel is located south of New Dock Street. Groundwater beneath Area 3 is first encountered between 2.13 m and 4.27 m (7 ft and 14 ft) bgs. The semiperched groundwater flow direction is south to southeast in the northern portion of the property, and southeast to east in the southern portion of the property, as shown in Figure 3.10-1.

In 1990, some metals, VOCs, and semivolatile organic compounds (SVOCs) were detected above reporting limits (RLs) in soil and groundwater at Area 3. Concentrations of some metals (cadmium, chromium, lead, and silver) and VOCs (benzene and vinyl chloride) were detected in shallow groundwater samples in excess of NPDES daily maximum limits.

3.10.2.1.4 Area 4 (Pier S)

Area 4 is located on the south side of the Cerritos Channel, directly east of the Schuyler Heim Bridge. This area is currently being remediated and graded, and utilities are being installed for potential use, should the Board of Harbor Commissioners approve an EIR for future development. Groundwater beneath Area 4 is first encountered between 0.61 m and 1.83 m (2 ft and 6 ft) bgs. The semiperched groundwater flow direction is generally to the southeast, away from the project site, as shown in Figure 3.10-1.

A Remedial Action/Record of Decision was completed in April 1999, and a Remedial Investigation/Feasibility Study was completed in October 1999. Area 4 was originally part of the quarterly groundwater monitoring program conducted by the Port of Long Beach. All the monitoring wells, however, were abandoned in December 1999 due to construction activities in this area.

During the last quarterly groundwater monitoring event at Area 4 (December 1999), TDS was measured at levels ranging from 12,000 to 34,000 mg/L, which are in excess of the NPDES daily maximum limit. Metals (barium, molybdenum, and vanadium) were detected in the groundwater; however, no metals were detected at levels in excess of the NPDES maximum daily limits. No VOCs or SVOCs were present during the December 1999 quarterly groundwater monitoring event at Area 4.

3.10.2.1.5 Former United States Navy Long Beach Shipyard (Former Shipyard)

This property is located directly south of the project site on the southern side of Terminal Island within the Los Angeles and Long Beach Harbor districts. The former shipyard is bordered on the north by oil fields, on the east by salt water injection wells and the Long Beach Harbor, and on the west by Los Angeles Harbor. Sites 8, 9, 10, and 12 (considered areas of concern) lie along Ocean Boulevard in the northeastern portion of the former shipyard.

In 1992, the following constituents were reported at these sites:

- Site 8 – metals (arsenic)
- Site 9 – metals (arsenic); TRPH; and VOCs (1,1-dichloroethane [1, 1-DCA], 1,2-dichloroethane [1,2-DCA], tetrachloroethylene, and trichloroethene)
- Site 10 – metals (arsenic); TRPH; and VOCs (1,2-DCE and trichloroethene)
- Site 12 – metals (arsenic) and TRPH

Groundwater beneath the former shipyard is first encountered between 0.30 m and 3.05 m (1 ft and 10 ft) bgs. The semiperched groundwater flow direction is generally to the northeast, in the direction of the Cerritos Channel.

3.10.2.1.6 Existing Schuyler Heim Bridge

In 1997, Geocon Environmental Consultants, Inc. performed environmental engineering services to evaluate groundwater beneath the Schuyler Heim Bridge right-of-way. Three VOCs (toluene, ethylbenzene, and xylenes) were detected at concentrations above RLs during this investigation; however, no VOCs were detected in excess of the NPDES daily maximum limits. Six metals (arsenic, chromium, copper, lead, selenium, and silver) were detected at concentrations above RLs during this investigation; however, no metals

were detected in excess of the NPDES daily maximum limits. TRPH concentrations were detected above RLs. The average concentration of TRPH detected during this investigation was 290 µg/L.

3.10.2.2 Groundwater Quality

3.10.2.2.1 Area 1 (Pier A)

Area 1 is currently undergoing quarterly groundwater monitoring by the Port of Long Beach. The September 2001 quarterly groundwater monitoring event indicated that VOCs, SVOCs, and metals are present in the groundwater at Area 1. TDS and turbidity were detected at levels in excess of NPDES daily maximum limits (1,000 mg/L and 150 NTU, respectively). TDS levels ranged from 6,790 to 120,000 mg/L; turbidity levels ranged from 17 to 360 NTUs during the quarterly monitoring event.

Seven metals were detected above RLs during the quarterly monitoring event, including arsenic, barium, cadmium, copper, silver, vanadium, and zinc. Only concentrations of cadmium (30 µg/L) and silver (110 µg/L), however, exceeded NPDES daily maximum limits.

Three groundwater monitoring wells (WSWAT-33, -34, and -40) contained free product during the quarterly monitoring event and, therefore, were not sampled. None of the groundwater monitoring wells sampled contained purgeable, extractable, or TRPH at levels above the RLs. One SVOC (benzoic acid) and several VOCs (benzene; 1, 1-DCA; 1,2-DCA; trans-1,2-dichloroethylene [trans-1,2-DCE]; cis-1,2-dichloroethylene [cis-1,2-DCE]; and vinyl chloride) were also detected above RLs during the quarterly monitoring event. The following VOCs exceeded NPDES daily maximum limits:

- 1,1-DCA (8.9 µg/L) in one sample
- 1,2-DCA (9.4 µg/L) in one sample
- Benzene (3.5 µg/L) in one sample
- Vinyl chloride (10.8 and 210 µg/L) in two samples

Based on the September 2001 quarterly groundwater monitoring event, the following constituents are present in groundwater beneath Area 1 at concentrations in excess of NPDES daily maximum limits: TDS, turbidity, cadmium, silver, 1,1-DCA, 1,2-DCA, benzene, and vinyl chloride.

3.10.2.2.2 Area 2

Area 2 is also undergoing quarterly groundwater monitoring by the Port of Long Beach. TDS (ranging from 12,400 to 63,600 mg/L) and turbidity (240 NTUs) were detected at levels in excess of NPDES daily maximum limits (1,000 mg/L and 150 NTU, respectively) during the September 2001 quarterly groundwater monitoring event. Concentrations of some metals (barium and copper) were detected above RLs; however, no metals detected were in excess of NPDES maximum daily limits. No purgeable, extractable, or total TRPHs were detected above RLs during the quarterly monitoring event. No VOCs or SVOCs were detected. Based on the September 2001 quarterly groundwater monitoring event, TDS and turbidity are present in groundwater at Area 2 at levels in excess of NPDES daily maximum limits.

3.10.2.2.3 Area 3

Area 3 is also undergoing quarterly groundwater monitoring by the Port of Long Beach. TDS levels (ranging from 27,000 to 31,300 mg/L) exceeded NPDES daily maximum limits (1,000 mg/L) during the September 2001 quarterly groundwater monitoring event. Concentrations of two metals, barium (110 and 100 µg/L) and copper (160 µg/L), were detected above RLs. No metals were detected, however, at concentrations in excess of the NPDES daily maximum limits. No purgeable, extractable, or total TRPH were detected above RLs. No VOCs or SVOCs were detected. The September 2001 quarterly groundwater monitoring event at Area 3 indicated only TDS at levels in excess of the NPDES daily maximum limit.

3.10.2.2.4 Area 4 (Pier S)

In April 2000, Harding Lawson and Associates (HLA) performed an Expanded Groundwater Investigation and Risk Assessment of the Terminal Island Deep Benzene Plume (at Pier S) for the Port of Long Beach. Benzene was detected at depths ranging from approximately 15 m to 40 m (50 ft to 130 ft) bgs in the majority of groundwater samples collected during this investigation. The highest concentrations generally were detected between 15 m to 31 m (50 ft and 102 ft) bgs. Benzene concentrations ranged from 2.6 to 1,050 µg/L, which exceed the NPDES daily maximum limit.

Although benzene was detected beneath Area 4, the direction of groundwater flow at Area 4 is to the southeast, away from the project site.

3.10.2.2.5 Former United States Navy Long Beach Shipyard

The following constituents were detected at concentrations in excess of the NPDES daily maximum limits in the former Naval Shipyard:

- Arsenic (55.1 µg/L)
- TRPH (ranging from 110 to 9,330 µg/L)
- 1,1-DCA (ranging from 6 to 15 µg/L)
- 1,2-DCA (ranging from 5 to 190 µg/L)
- Tetrachloroethylene (ranging from 10 to 26 µg/L)

3.10.2.2.6 Existing Schuyler Heim Bridge Right-of-Way (ROW)

Only TRPH concentrations were detected within the existing Schuyler Heim ROW in excess of the NPDES daily maximum limits during this investigation.

3.10.2.3 Surface Water Quality

The Dominguez Watershed is comprised of approximately 110 square miles of land in the southern portion of Los Angeles County. The Dominguez Watershed boundary is defined by a complex network of storm drains and smaller flood control channels terminating at the Consolidated Slip in Los Angeles Harbor. The Dominguez Channel extends from the Los Angeles International Airport to the Los Angeles Harbor and drains large, if not all, portions of the Cities of Inglewood, Hawthorne, El Segundo, Gardena, Lawndale, Redondo Beach, Torrance, Carson, and Los Angeles. The remaining land areas within the watershed drain to several debris basins and lakes or directly to the Los Angeles and Long Beach Harbors. Tributaries to Dominguez Channel include several storm drains and minor channels. Approximately 96 percent of the watershed area is developed; and the overall land uses are transportation, commercial, industrial, and residential. From the 1910s

until today, millions of gallons per day of industrial wastewater have been discharged into the Dominguez Channel. All current discharges are monitored and regulated as part of the NPDES permit system, as administered by the Regional Water Quality Control Board (Regional Board).

The Cerritos Channel flows through the Inner Long Beach Harbor into the Pacific Ocean and is highly impacted by tidal fluctuations, although Terminal Island tends to diminish this effect. During neap tides (occurring at the first and the third quarters of the moon), water flows west and southwest from the Cerritos Channel into the East Basin. There are no surface bodies of water used as drinking water sources within a 6.43-km (4-mi) radius of the project site.

Selected aspects of the water quality of the Los Angeles and Long Beach Harbors were evaluated in a recent (2000) survey by MEC Analytical Systems Inc. Quarterly monitoring was conducted to assess spatial and temporal changes in water temperature, salinity, dissolved oxygen, pH, and water clarity (transmissivity). Results of this survey suggested that the water quality in the Los Angeles and Long Beach Harbors and Consolidated Slip was within the normal ranges expected for estuarine and near-coastal waters throughout the survey.

3.10.2.4 Oceanography

3.10.2.4.1 Cerritos Channel

The quality of the Cerritos Channel sediment in the vicinity of the Schuyler Heim Bridge has been recently characterized using collections from deep and shallow cores. Surface samples of the top 6 inches of sediment were collected on January 8, 2002, and are representative of current surface conditions around the Schuyler Heim Bridge.

Sediment cores to 5.5 m (18 ft) deep were collected in 1994 during the Henry Ford (Badger Avenue) bridge replacement project. These sediment cores were collected for the railroad bridge less than 30.5 m (100 ft) immediately to the west of the Schuyler Heim Bridge. Although older, the 1994 core samples are appropriate for characterizing the current deeper sediments of the Schuyler Heim Bridge site. Compared to surface sediments, deeper sediments are much less likely to change in quality over time.

Both sets of sediment samples are representative of the quality of sediment that may be expected to be resuspended during project construction. The depth of sediment disturbance is currently unknown; however, it is reasonable to expect that sediments must be penetrated at least as deep as these samples in setting piles or installing and removing sheet pile cofferdams.

The 1994 deep samples were collected using vibracores, and the 2002 surface sediment samples were collected by hand by divers. Table 3.10-3 presents the results of the recent sampling of surface sediments near the Schuyler Heim Bridge, along with the deeper strata of the 1994 cores.

A full range of pesticides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs) were examined from the sediment samples; but only those constituents with detected values are shown in Table 3.10-3. In general, there is a pattern of the highest contaminant concentrations occurring in the four surface samples, followed by

the three 1.2-m to 3.0-m (4-ft to 10-ft) deep samples, followed by the single deeper sample from 2.7 m to 5.3 m (9 ft to 17.5 ft). This same pattern was apparent in the 1994 deep core samples. The exception was that many of the top section samples (top 1.5 m to 3 m [5 ft to 10 ft]) were higher in concentrations of metals, dichlorodiphenyl dichloroethylene (DDE), and PAHs than the current surface samples shown in Table 3.10-3. Although surface sediments appear to be more contaminated than the deeper sediments (as was also noticed in the 1994 study), they also appear to be variably less contaminated than surface layers that were sampled in the 1994 study.

Table 3.10-3
Sediment Chemistry for Detected Chemicals in the Vicinity of the Schuyler Heim Bridge
Cerritos Channel, Port of Long Beach

		Average Concentrations		
Sediment Constituent	**Units**	**4 Samples (Surface)[a]**	**3 Samples (4-10 feet)[b]**	**1 Sample (9-17.5 feet)[b]**
Percent solids	%	43	63	68
Total organic carbon (TOC)	%	2.0	1.3	0.5
Aluminum	mg/kg	28,450	NS	NS
Arsenic	mg/kg	NS	6.4	5.5
Cadmium	mg/kg	NS	0.4	ND
Chromium	mg/kg	67	57	31
Copper	mg/kg	122	39	18
Lead	mg/kg	54	31	10
Mercury	mg/kg	0.12	0.23	0.2
Nickel	mg/kg	40	23	14
Zinc	mg/kg	227	96	52
4,4'-DDE	µg/kg	23.25	0.65	8.50
Anthracene	µg/kg	129	83	ND
Benzo(a)anthracene	µg/kg	485	82	90
Benzo(a)pyrene	µg/kg	595	67	70
Benzo(b)fluoranthene	µg/kg	660	157	160
Benzo(g,h,i)perylene	µg/kg	323	ND to 53	ND
Benzo(k)fluoranthene	µg/kg	315	54	60
Chrysene	µg/kg	563	127	110
Fluoranthene	µg/kg	695	463	240
Indeno(1,2,3-cd)pyrene	µg/kg	355	ND to 27	ND
Phenanthrene	µg/kg	268	92	75
Pyrene	µg/kg	783	520	460

Table 3.10-3
Sediment Chemistry for Detected Chemicals in the Vicinity of the Schuyler Heim Bridge
Cerritos Channel, Port of Long Beach

Sediment Constituent	Units	Average Concentrations		
		4 Samples (Surface)[a]	3 Samples (4-10 feet)[b]	1 Sample (9-17.5 feet)[b]
Naphthalene	µg/kg	ND	ND to 27	34
Total PAHs	µg/kg	5,169	1,645	1,299

[a]Surface sediment samples from January 9, 2002.
[b]Vibracore samples from 1994 Badger Avenue Bridge Study.
ND below method detection limit (If ND is greater than 50 percent of values, then range is shown instead of average)
NS not sampled
mg/kg milligrams per kilogram
µg/kg micrograms per kilogram

3.10.2.4.2 Consolidated Slip/Dominguez Channel

Based on sediment concentrations of dichlorodiphenyl trichloroethane (DDT), PCB, cadmium, copper, lead, mercury, zinc, dieldrin, chlordane (all exceed sediment quality guidelines), sediment toxicity, and degraded benthic infaunal community, the Consolidated Slip/Dominguez Channel is considered to be a toxic hot spot by the State Water Quality Control Board (SWQCB) Bay Protection and Toxic Cleanup Program (BPTCP). Numerous sediment characterization studies have identified elevated levels of inorganic and organic contaminates in sediment and resident organisms from this area. The contaminants of concern (COC) in the Consolidated Slip/Dominguez Channel have been identified as:

3.10.2.4.2.1 Inorganics

- Copper
- Lead
- Mercury
- Zinc

3.10.2.4.2.2 Organics

- DDT and derivatives (DDE and dichlorodiphenyl dichloroethane [DDD])
- PAH
- PCB

DDT and its metabolites were determined to be primary chemicals of ecological concern. The Consolidated Slip currently is listed as a Clean Water Act Section 303(d) impaired water body. In sediment samples obtained in 2002, concentrations of total DDT (tDDT) and benzene hexachloride (BHC) isomers, were determined from shallow surface sediments collected within the Consolidated Slip downstream of the Dominguez Channel. These concentrations are shown in Table 3.10-4.

Comparisons of sediment concentrations of tDDT and BHC data from samples collected in 1994 and 2002 indicated that sediment contaminant loads in the Dominguez Channel

have moved downgradient, indicating a buildup of sediment contaminants in the Consolidated Slip.

Concentrations of COCs collected from stations immediately downstream of Henry Ford Avenue (Stations CS-1 through CS-3) during October 2002 studies of deeper sediments (to 6 m [20 ft]) from the Consolidated Slip are shown in Table 3.10-5 (AMEC, 2003).

The results of sediment sampling for several chemical constituents indicate that the maximum concentrations observed in Consolidated Slip sediments exceed the effect range median (Environmental Effects-Moderate [ERM]) values established by the National Oceanic and Atmospheric Administration (NOAA).

Table 3.10-4
Concentrations of tDDT and BHC Isomers Detected in Sediments Within the Consolidated Slip in 2002

	Geometric Mean Concentrations (µg/kg Dry Weight [DW])					
Sediment Parameter	**Surface (<0.5 feet)**	**N**	**0.5 to 3.0 feet**	**N**	**>3.0 feet**	**N**
α-BHC	14.96	5	9.49	6	15.26	6
β-BHC	18.28	5	8.67	6	9.5	6
δ-BHC	25.56	5	9.59	6	10.37	6
γ-BHC (Lindane)	8.68	5	6.61	6	12.46	6
tDDT	475.37	5	142.40	6	106.96	6

µg/kg micrograms per kilogram

Table 3.10-5
Range of Concentration of Contaminants of Concern Measured From Sediments Collected From the First Three Sampling Stations Within the Consolidated Slip Downstream of Henry Ford Avenue From Depths of 0-20 feet

Sediment Constituent	**Copper**	**Lead**	**Mercury**	**Zinc**	**Total DDTs**	**Total PAHs**	**Total PCBs**
Units	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**µg/kg**	**µg /kg**	**µg /kg**
Station CS-1	25 to 49	6.8 to 21	0.059 to 0.18	57 to 100	ND to 3.8	ND to 1,300	20.7 to 27.2
Station CS-2	12 to 3,600	4.1 to 2,700	0.038 to 4.3	42 to 5,400	ND to 1,209	63 to 680,000	20.3 to 160.7
Station CS-3	19 to 1,800	7.1 to 2,900	0.039 to 8.8	64 to 4,000	ND to 1,922	19 to 180,000	18.8 to 1,645

ND below detection limit
mg/kg milligrams per kilogram
µg/kg micrograms per kilogram

Average concentrations (based on data collected over the past 10 years) were close to or greater than the NOAA ERM values for copper, lead, mercury, DDT, PCB, and chlordane. Sediment samples were compared to effect range median quotients (ERMQs).

Results indicated that high concentrations of chlordane and total PCBs were causing high ERMQ values in the Consolidated Slip.

3.10.2.4.3 Sediment Distribution and Settling Characteristics

Sediment samples taken from the project site in Cerritos Channel also have been analyzed for grain size distribution and settling characteristics. Particle size analyses were conducted on four samples according to standard methods (American Society for Testing and Materials [ASTM] D-422). Results of these analyses are summarized in Table 3.10-6. The results indicate that the sediment taken in January 2002 contains a significant percentage (greater than 80 percent) of coarse silt (0.0625 millimeter [mm]) and finer material.

The sediment grain size distribution for sediments collected within the Consolidated Slip are shown in Table 3.10-7. Results indicate that the sediment taken in January 2000 from the Consolidated Slip contains a significant percentage of silt (52+ percent) and clay (27+ percent) and finer materials (combined greater than 80 percent).

Table 3.10-6
Cumulative Percent Passing Standard Sieves
Cerritos Channel, Port of Long Beach

STD Sieve (mm)	Sample 1 %	Sample 2 %	Sample 3 %	Sample 4 %
0.85	97.2	97.3	98.4	98.7
0.425	93.8	95.4	97.3	96.4
0.18	90.6	92.4	95.1	94.2
0.15	89.7	90.8	94.1	93.3
0.075	85.6	81.9	85.7	87.9
<0.075	85.4	81.1	85.1	87.4

mm millimeter

Table 3.10-7
Sediment Grain Size Characteristics for Consolidated Slip, January 2002

Depth (m)	18
Median Size (phi)	5.90
Median Size (microns)	16.74
Dispersion	2.98
Skewness	0.28
% gravel	0.00
% sand	19.88
% silt	52.36
% clay	27.77
% coarse	0.01
% fines (silt + clay)	80.12

The extent of transport of a turbidity plume is a function of the settling velocity of the particles contained in the plume. Table 3.10-8 presents settling velocities for a full range of sediment sizes for saltwater. The settling velocities were calculated with standard equations adjusted for the viscosity of saltwater.

As shown in Table 3.10-8, settling velocities of silt and clay-sized particles are exceedingly small. Silt particles can remain in suspension for several hours or days. Clay particles, with settling velocities of less than 1 m (3.2 ft) per day, can remain in suspension for weeks, months, or longer. Table 3.10-9 shows the time required for sediment at the lower end of the size range to settle through a 13.4-m (44-ft) water column (the approximate depth of the Cerritos Channel at the project site).

Hydrometer studies were also performed on the four sediment samples collected at the project site in Cerritos Channel. These studies involved placing a known amount of sediment in a vertical column of water, and measuring the change in density of the sediment/water mixture over time. As some material settles out of suspension, the density of the mixture decreases. The measured density can be converted into the weight of material remaining in suspension.

Table 3.10-8
Settling Velocities for Various Sediments in Saltwater

Sediment Description	Size Range (μm)		Settling Velocity (cm/s)
	Upper	Lower	
Sand, Coarse	1000	500	1.88E+01
Sand, Medium	500	250	8.92E+00
Sand, Fine	250	125	3.65E+00
Sand, Very Fine	125	62.5	6.54E-01
Silt, Coarse	62.5	31.25	3.93E-01
Silt, Medium	31.25	15.625	1.05E-01
Silt, Fine	15.625	7.813	2.50E-02
Silt, Very Fine	7.813	3.906	5.44E-03
Clay, Coarse	3.906	1.953	1.12E-03
Clay, Medium	1.953	0.977	2.26E-04
Clay, Fine	0.977	0.488	4.71E-05
Clay, Very Fine	0.488	0.244	1.06E-05

μm micron
cm/s centimeters per second

Table 3.10-9
Time Required for Various Sediments to Settle to the Bottom of the Cerritos Channel
Port of Long Beach (44 feet, total depth)

Sediment Description	Sediment Fraction (%)	Settling Time	Units
Sand, Very Coarse	2.1[a]	18	Seconds
Sand, Coarse		1.2	Minutes
Sand, Medium	2.2	2.5	Minutes
Sand, Fine	2.6	6.1	Minutes
Sand, Very Fine	7.8	34.2	Minutes
Silt, Coarse	84.8[b]	57.0	Minutes
Silt, Medium		3.6	Hours
Silt, Fine		14.9	Hours
Silt, Very Fine		2.9	Days
Clay, Coarse		13.5	Days
Clay, Medium		2.3	Months
Clay, Fine		11.0	Months
Clay, Very Fine		4.0	Years

[a]Estimated % fraction for very coarse and coarse sand sediment fractions combined.
[b]Estimated % fractions for silt and clay sediment fractions combined.

The results of the hydrometer investigations show the percent of original material remaining in suspension for various times up to one day. These results are the average of the four samples. Note that almost 30 percent of the sediment is still in suspension after one day. Because the hydrometer is approximately 0.3 m (1 ft) tall, the results indicate that approximately 30 percent of the material has a settling velocity of less than 0.3 m (1 ft) per day. This settling speed corresponds to a medium clay-sized particle. The hydrometer studies confirm that the silt and clay-sized particles present in the sediment will remain in suspension for periods on the order of days and longer (see Table 3.10-9).

3.10.3 Environmental Consequences

3.10.3.1 Evaluation Criteria

Project alternatives effects to water quality and stormwater runoff were evaluated to determine if they would:

- Substantially reduce ability to achieve water quality standards and objectives.
- Cause a degradation in water quality from on-site stormwater discharges due to project construction and operation.

3.10.3.2 Methodology

Evaluations in this section were based on professional standards and results from technical reports prepared for the project alternatives. This analysis assumes that the project proponent will conform to City of Los Angeles building standards, grading permit requirements, and erosion control requirements. This analysis also assumes that all disclosed project effects apply to construction at both the interchange and bridge sites unless otherwise indicated.

This evaluation was based on the *Water Quality Impacts Technical Study* (Caltrans, 2007). The key project-related hydrologic and water quality effects were identified and evaluated based on the physical characteristics of the study area and the magnitude, intensity, and duration of activities. Additional information was obtained from the *Storm Water Data Report* prepared by Caltrans (2007).

3.10.3.3 Evaluation of Alternatives

3.10.3.3.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

3.10.3.3.1.1 Construction Effects

Construction impacts focus on the effects on the water quality of increased stormwater runoff from combinations of the removal of the old Schuyler Heim Bridge, buildout of a new, fixed-span bridge, and construction of the SR-47 Expressway and the Ocean Boulevard/ SR-47 Flyover (flyover).

Water quality in the Cerritos Channel and Consolidated Slip/Dominguez Channel are likely to be affected during project construction. Construction would occur in phases, including: earthwork; foundation laying; and installation of columns, false work, superstructure, and sound walls/retaining walls. Construction would include dredging, dewatering, concrete pouring, welding, paint removal, and other activities that have the potential to affect water quality. Complete prevention of these effects may be difficult due to complex site conditions that include limited space and other constraints. In general, the potential for construction effects would correspond to the type, location, and duration of activities in each construction stage. Construction of Alternative 1 includes BMPs, which will minimize effects to water quality and control runoff.

Surface Runoff

Surface runoff will occur during construction of the new expressway and flyover and, if not controlled, could affect water quality in local receiving waters. Construction will include implementation of BMPs, which will control surface runoff and, therefore, minimize effects to water quality.

Erosion

Construction sites tend to disturb soil and promote erosion. The bed of the Cerritos Channel would be modified during construction of a replacement bridge, with the addition of fill material adjacent to abutments and/or new piers. Additionally, soil erosion from nearby areas dedicated to construction of the bridge approaches might allow surface runoff into the channel, which would transport solids material and increase TSS levels in the channel.

Pollutants

During construction of the bridge, in the worst-case scenario, runoff would not be contained on the structure itself but would be allowed free discharge into the Cerritos Channel. Any contaminant compounds in the runoff would be immediately discharged into the water. Pollutants could range from trash left on the constructed bridge span to fuels and oils that might have spilled onto it. Equipment that is operated in the construction area might leak petroleum compounds, which would contaminate the work site. Staging areas utilized for fueling equipment also are subject to this risk. Other concerns for discharge of materials that could degrade water quality include areas set aside for cleaning equipment. Elevated levels of phosphates, as well as suspended and dissolved solids, are additional potential consequences related to the construction of Alternative 1.

Lead-Based Paint

For the Los Angeles Harbor Department Henry Ford (Badger Avenue) Bridge Replacement Project (adjacent to the Schuyler Heim Bridge), an analysis was performed on potential effects of demolition activities surrounding removal of the existing bridge. The major concerns were paint, rust debris, and particulate matter being deposited in the channel. A chemical analysis of the paint chips on that bridge indicated high concentrations of lead (6,925 milligrams per kilogram [mg/kg]) and chromium (1,397 mg/kg). Both were well in excess of the total threshold limit concentration (TTLC) set by the CCR Title 22 (0.1 mg/kg and 0.5 mg/kg, respectively). The Schuyler Heim Bridge is expected to have similar characteristics, as it was built and maintained during the same approximate time period.

For Alternatives 1 and 1A, the contractor(s) will take appropriate measures to eliminate lead-based paint from reaching the receiving waters during the dismantling of the Schuyler Heim Bridge. If paint removal is necessary during the dismantling process, the contractor will comply with all applicable laws and regulations relative to its process to ensure protection of receiving waters.

Sediment

Alternative 1 requires demolition of the existing Schuyler Heim Bridge, construction of new structures over the Cerritos Channel and Consolidated Slip/Dominguez Channel, and on Terminal Island and along the SR-47 Expressway alignment on the mainland.

Along the SR-47 Expressway alignment, soil disturbances will occur with substructure excavation for cast-in-drilled-hole (CIDH) piles and for construction of several MSE ramps. Additional soil disturbances will occur at New Dock Street, Ocean Boulevard, Alameda Street, and Henry Ford Avenue. The disturbances will include, but not be limited to, 10 access ramps and side slopes, Alameda Street and 223rd Street widening, three laydown areas with stockpiles, and four BMP areas. Overall, soil stabilization and erosion control will be constructed on 2:1 slopes with concrete slope paving. The estimated total disturbed area for completion of the project is 12.8 hectares (31.6 acres). An estimated 5.4 hectares (13.3 acres) will be within Caltrans right of way.

Soil stabilization and sediment control practices will be provided throughout the rainy season (from October 1 until May 1). During the rainy season, the total active disturbed area of the project site will not be more than 12.8 hectares (31.6 acres); 5.4 hectares (13.3 acres) will be within Caltrans right of way. In addition, in accordance with the required NPDES permit, a Standard Urban Stormwater Mitigation Plan (SUSMP) will be implemented.

Measures provided in the SUSMP will be used to control peak storm water runoff rates, conserve natural areas, minimize pollutants of concern, protect slopes and channels, provide storm drain stenciling and signage, provide for appropriate trash storage, provide proof of ongoing BMPs, and meet design standards for treatment control BMPs.

Construction of new bridge footings would require disturbance of existing sediments on the channel bottom. The sediments on the channel bottom in the immediate area of the bridge are extremely light and unconsolidated (Table 3.10-10). Any construction work would result in some sediment resuspension and dispersal into the water column of the channel.

Two primary levels of construction would occur; heavy construction that would disturb sediment (such as excavation of the channel bottom or foundation demolition), and light construction with minimal sediment resuspension effects (such as driving cast-in-steel-shell [CISS] piles).

Table 3.10-10
Sediment Grain Size Characteristics for Consolidated Slip, January 2002

Depth (m)	18
Median Size (phi)	5.90
Median Size (microns)	16.74
Dispersion	2.98
Skewness	0.28
% gravel	0.00
% sand	19.88
% silt	52.36
% clay	27.77
% coarse	0.01
% fines (silt + clay)	80.12

To relate the surface and deeper sediment quality to eventual construction-related effects and water quality, the amount of resuspended sediment in the water column must be estimated, as well as the extent of the channel exposed to the resuspended sediment. The following discussion presents an analysis of sediment material suspended during construction activities within the Cerritos Channel.

Turbidity Plume Analysis

The farfield dilution model River Diffusion Farfield (RDIFF) was used to predict the dilution due to turbulent diffusion downstream of the project site. At least 80 percent of the surface sediment in Cerritos Channel is composed of silt and clay, similar to the Consolidated Slip/Dominguez Channel (Table 3.10-10). Small silt- and clay-sized particles are assumed to act as nonsettleable solids. Therefore, these particles would not settle while they are carried down the channel; their concentration would decrease due to turbulent diffusion.

Currents

Ambient currents at the project site govern the distance that the turbidity plume would be carried from the project site. Flow measurements taken in Cerritos Channel and channel geometry taken from nautical charts were used to calculate representative velocities in the

channel. Flow measurements for three tidal conditions (spring tide, mean tide, and neap tide) were converted to current velocities by dividing the measured flow by the cross-sectional area of the channel. Results of the ambient current calculations are summarized in Table 3.10-11.

Table 3.10-11
Calculation of Peak Velocities in the Cerritos Channel for Various Tidal Conditions

Measured Peak Flow of Tide (cfs)	Channel Area in Ebb Direction (ft^2)	Channel Area in Flood Direction (ft^2)	Ebb Velocity		Flood Velocity	
			Ft/s	m/s	ft/s	m/s
6,839 (Spring)	33,000	22,000	0.194	0.059	0.290	0.089
5,167 (Mean)	33,000	22,000	0.157	0.048	0.235	0.072
2,792 (Neap)	33,000	22,000	0.085	0.026	0.127	0.039

cfs cubic feet per second
ft^2 square feet
ft/s foot per second
m/s meter per second

Table 3.10-12 depicts the distance that a plume would travel over the duration of a tidal cycle at various speeds. These calculations assume a flood tide duration of 6 hours and an ebb tide duration of 7 hours (ebb currents routinely persist longer than flood currents). For the maximum flood current, the plume would travel a distance of approximately 1,250 m (4,101 ft) upstream before the tide turns. The length of the Cerritos Channel between the Schuyler Heim Bridge and the western end is approximately 1,200 m (3,937 ft). This indicates that the turbidity plume would begin to turn back into the channel on the ebb tide once it reaches the end of the channel.

Table 3.10-12
Travel Distances for Given Current Speeds in Cerritos Channel

Maximum Ambient Current (m/s)[a]	Average Ambient Current (m/s)[a]	Flood Direction (W) Distance Traveled in 6 hours at Average Current Speed (m)	Ebb Direction (E) Distance Traveled in 7 hours at Average Current Speed (m)
0.09	0.058	1,244	1,452
0.08	0.051	1,106	1,290
0.07	0.045	968	1,129
0.06	0.038	829	968
0.05	0.032	691	806
0.04	0.026	553	645
0.03	0.019	415	484

[a] Based on velocities presented in Table 3.10-11.

These calculations are for the center of the plume. Dispersion in the direction of travel likely would bring a small fraction of the material beyond the confines of Cerritos Channel. However, the majority of the plume would be expected to remain within the channel, reversing direction with the tides until the particles disperse across the channel and eventually settle.

Model Predictions

The RDIFF model was used to investigate the impact of a variety of ambient current speeds and initial plume widths on sediment transport.

The fastest currents in Cerritos Channel are associated with flood tides during spring tide conditions. These currents move east to west in the channel and, because the channel west of the bridge is narrower than it is east of the bridge, the currents increase slightly in magnitude west of the bridge. Model results were presented for runs using the spring tide currents in the flood direction and are representative of worst-case conditions. The results are presented for a variety of initial plume widths, ranging from 3.1 m to 30.5 m (10 ft to 100 ft). Plumes with larger initial width would experience less dilution because there would be lesser opportunity for the plume to disperse laterally.

Figures 3.10-2 and 3.10-3 contain RDIFF model predictions for initial plume widths of 30.5 m, 15.2 m, and 3.1 m (100 ft, 50 ft, and 10 ft). These figures show contours of concentration as the plume is carried away from the project site by the ambient currents. The total width of the channel is 152.4 m (500 ft), and the approximate length of channel is 1,524 m (5,000 ft). The color scale shows percent of initial concentration as the plume disperses throughout the channel.

Resuspended Sediment Effects on Water Quality

The quality of surface sediment (Table 3.10-3) was multiplied by an assumed volume of resuspended sediment to yield an estimate of the initial concentration of total resuspended constituents in the water column under worst-case conditions. Those initial concentrations can be taken as the 100 percent initial concentration, as shown with the modeled channel dilutions in Figures 3.10-2 and 3.10-3.

Tables 3.10-13 and 3.10-14 indicate the estimated range of initial resuspended sediment concentrations of metals and organic compounds from each of the three layers tested (Table 3.10-3), compared to specific state of California water quality criteria (WQC) for those constituents. The WQC for metals and DDE are levels for the protection of aquatic life for acute exposure (acute exposure is considered due only to the temporary nature of the sediment plume). The WQC for organic compounds are for the protection of human health upon consumption of organisms. There are no comparable aquatic life protection criteria. Where an exceedance of a WQC is noted, there is a potential adverse impact with respect to water quality.

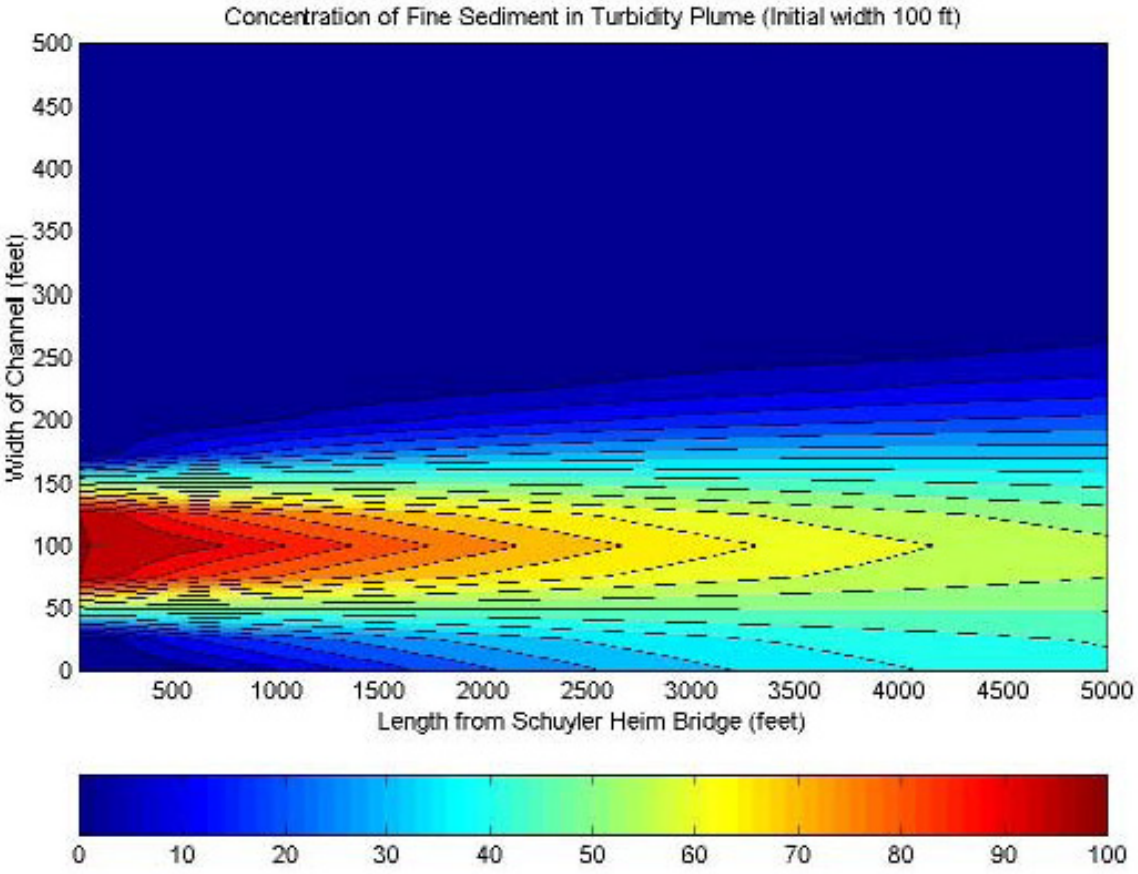


Figure 3.10-2
Predicted Spread of Turbidity Plume in Cerritos Channel with Initial Width of 100 feet
Schuyler Heim Bridge Replacement and SR-47 Expressway

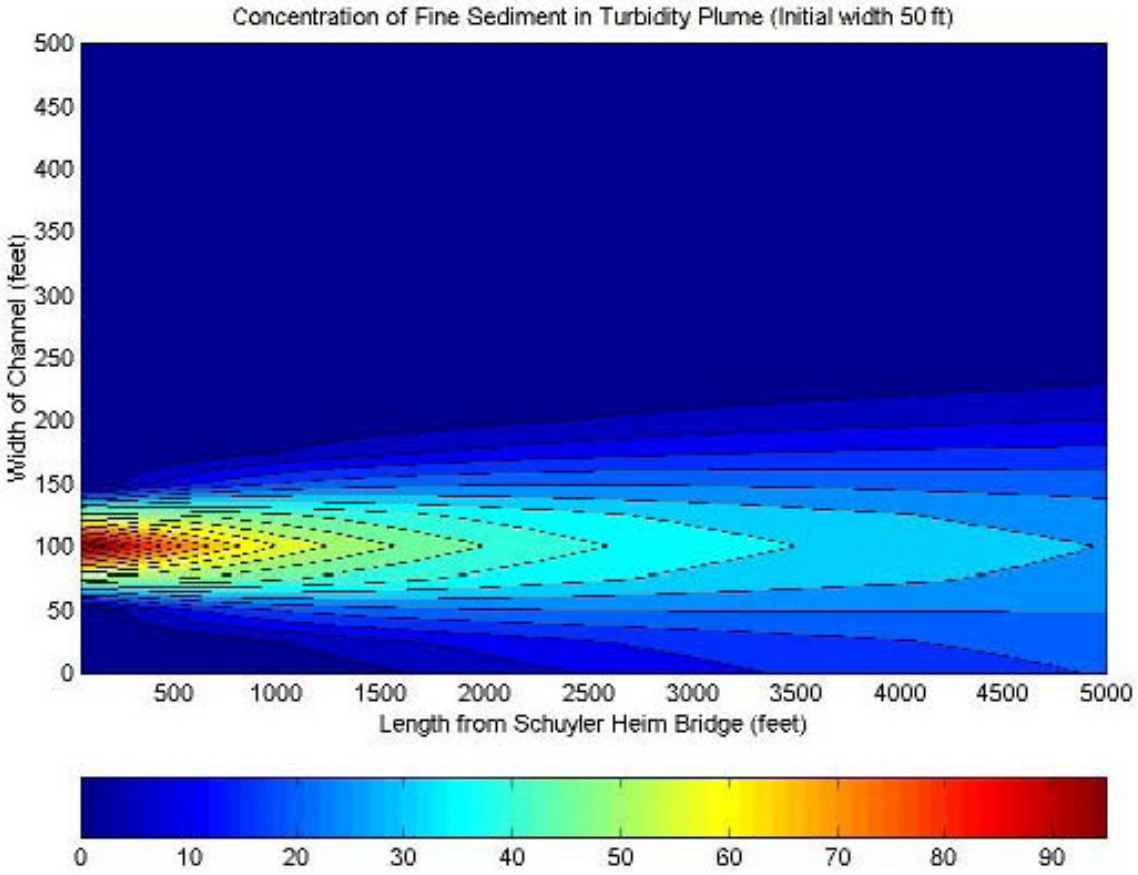


Figure 3.10-3
Predicted Spread of Turbidity Plume in Cerritos Channel with Initial Width of 50 feet
Schuyler Heim Bridge Replacement and SR-47 Expressway

Table 3.10-13
Resuspended Sediment Concentrations for Metals in Cerritos Channel

Sediment Constituent	Initial Resuspended Sediment Concentrations[a] (Total Recoverable)	Average Resuspended Sediment Concentrations[a,b] (Dissolved)	WQC[c]	Dilutions to Achieve WQC
Aluminum	790	NA	NC	NR
Arsenic	0.24 to 0.26	0.24 to 0.26	0.069	3.5 to 3.7
Cadmium	ND to 0.016	ND to 0.016	0.042	NR to 0.4
Chromium	1.36 to 2.32	1.35 to 2.30	1.1	1.23 to 2.09
Copper	0.79 to 3.38	0.66 to 2.81	0.0048	137 to 585
Lead	0.44 to 1.51	0.42 to 1.44	0.210	2.0 to 6.8
Mercury	0.003 to 0.009	0.003 to 0.008	0.0018	1.4 to 4.25
Nickel	0.61 to 1.11	0.60 to 1.10	0.074	8.2 to 14.9
Zinc	2.28 to 6.29	2.16 to 5.95	0.090	24 to 66

NA not available
ND below detection limit
NC no criteria
NR no dilution required
WQC Water Quality Criteria
[a]Concentration in milligrams/liter.
[b]Concentrations have been converted from Total Recoverable to Dissolved.
[c]From California Toxics Rule
Source: Caltrans, 2005

The estimated resuspended sediment volumes shown in Tables 3.10-13 and 3.10-14 correspond to a 1.5 cubic-meter (52.9 cubic-feet) volume of sediment (1 m by 3 m by 0.5 m [3.2 ft by 9.8 ft by 1.6 ft]). To acquire the sediment concentration of each constituent, that volume was multiplied by the percent solids fraction and the dry-weight density of the sediment to yield total weight (in kilograms [kg]) of material suspended. The total weight was then multiplied by the constituent concentration to yield the weight of the given suspended chemical (in milligrams [mg] or micrograms [µg]). Finally, that weight was divided by the volume of water in the water column, which measured 1 m by 3 m by 13.4 m (3.2 ft by 9.8 ft by 43.9 ft) (40.2 cubic [cu] meters [1,420 cu ft] equals 40,200 liters [10,620 gallons]), to yield estimated initial concentrations in the plume.

With the ebb and flow of the tide, a sediment plume would be developed. Given the distance to the ends of the Cerritos Channel, settlement of sediment, and the back and forth flow of tidal action, the sediment plume is expected to be largely confined to the channel. The worst-case sediment resuspension would occur if uncontrolled active construction occurred on the channel bottom.

Table 3.10-14
Resuspended Sediment Concentrations for Organics in Cerritos Channel

Sediment Constituent	Initial Resuspended Sediment Concentrations[a] (Total Recoverable)	Average Resuspended Sediment Concentrations[a,b,c] (30-Day Avg.)	WQC[d]	Dilutions to Achieve WQC
4,4'-DDE	0.026 to 0.645	0.008 to 0.194	0.130	NR to 5
Anthracene	3.37 to 3.59	1.01 to 1.08	110,000	NR
Benzo(a)anthracene	3.32 to 13.46	1.0 to 4.0	0.049	68 to 275
Benzo(a)pyrene	2.69 to 16.52	0.81 to 4.96	0.049	55 to 337
Benzo(b)fluoranthene	6.34 to 18.32	1.9 to 5.5	0.049	129 to 374
Benzo(g,h,i)perylene	ND to 8.95	ND to 2.69	NC	NR
Benzo(k)fluoranthene	2.18 to 8.74	0.65 to 2.62	0.049	45 to 178
Chrysene	4.83 to 15.62	1.45 to 4.69	0.049	99 to 319
Fluoranthene	10.53 to 19.29	3.16 to 5.79	370	NR
Indeno(1,2,3-cd)pyrene	ND to 9.85	ND to 2.96	0.049	NR to 201
Phenanthrene	3.29 to 7.43	0.99 to 2.23	NC	NR
Pyrene	20.19 to 21.72	6.06 to 6.52	11,000	NR
Naphthalene	ND to 1.49	ND to 0.045	NC	NR

WQC is for DDT in water

ND below detection limit

NC no criteria

NR no dilution required

[a]Concentration in micrograms/liter.

[b]Concentrations have been converted from Total Recoverable to Dissolved.

[c]Concentrations are average daily values, based on the initial concentrations, for nine distinct channel construction activities into the channel bottom within a 30-day period.

[d]From California Toxics Rule

Source: Caltrans, 2005.

For the expected initial plume of 3 m (10 ft) (corresponding to a localized source of sediment resuspension under uncontrolled heavy construction in the channel), the maximum ambient currents would carry the plume to the end of the Cerritos Channel before the tide and the plume reverse directions. A dilution of approximately 16 to 1 would be expected during a single trip from the project location to the end of the channel. Subsequent passes in following tides would increase the dilution. These calculations were performed assuming worst-case ambient currents associated with spring tide conditions. More commonly experienced tide conditions would produce smaller currents and would allow for more dispersion across the width of the channel before the plume would reach the end of the channel.

The initial suspended sediment concentration in the Cerritos Channel, listed in Table 3.10-13 and Table 3.10-14, would occur in the immediate zone of uncontrolled heavy construction, such as demolition of existing bridge foundations or excavations for new foundations. Other construction in the channel, such as driving steel sleeves for piles, would result in minimal sediment resuspension because active soil excavation would not occur. Rather, minimal sediment resuspension would occur at the sleeve-sediment interface as the sleeve is driven. It is estimated that pile driving in the Cerritos Channel for about 18 piles would occur over an estimated period of 2 months.

The results of the sediment resuspension analysis indicate that certain constituents would be suspended in concentrations in excess of the WQC for a short time before being diluted. Copper, zinc, and a number of the organic compounds (PAHs) fall into this category. Uncontrolled heavy construction in the channel would result in exceedances of the WQC for some metals and organic compounds. The WQC exceedances from uncontrolled heavy construction would result in acute temporary exposure to organisms. Activities such as pile driving would not be expected to result in substantial sediment resuspension or exceedances of WQCs.

Groundwater

Groundwater is not anticipated to be affected by surface construction activities for the SR-47 Expressway or the Ocean Boulevard/SR-47 Flyover, as Caltrans-owned right of way cannot discharge directly into municipal or domestic water supply reservoirs or groundwater percolation facilities. Also, the project site does not contain any City of Los Angeles, City of Long Beach, or Los Angeles County domestic water supply reservoirs or groundwater percolation facilities. Therefore, potential effects to groundwater from Alternative 1 construction activities are expected to be limited to construction of the replacement bridge over the Cerritos Channel and SR-47 Expressway bridge over the Consolidated Slip/ Dominguez Channel.

The major effects of Alternative 1 construction would occur with removal and disposal of groundwater that has passively seeped into the channels. Construction of support structures on the south approach of a new bridge across the Cerritos Channel would use either the CIDH method or the CISS method for the support structure on the south approach. Similar methods would be used for construction of support structures for the elevated viaduct crossing the Consolidated Slip/Dominguez Channel. In the CIDH method, a hole is drilled, filled with slurry to prevent cave-ins, and then pumped with concrete (which displaces the slurry and is reused). The hole is expected to passively fill with groundwater, which would be removed prior to filling with slurry and concrete. The removed groundwater would then be disposed of properly. CIDH is not expected to affect groundwater movement because the slurry would prevent movement, and there would not be active dewatering aside from emptying the hole prior to filling with slurry.

In the CISS method, a steel sleeve is driven into the ground, the soil in the middle is excavated, and the shell filled with concrete. There would be minimal groundwater extraction with this method.

Because active dewatering is not anticipated during construction, groundwater movement is not expected to be adversely affected.

Additional discussion of groundwater effects may be found in Section 3.9 – Hydrology/ Floodplains/Oceanography.

3.10.3.3.1.2 Operations Effects

Surface Runoff

Operational effects to water quality as a result of expressway operations are not expected to substantially differ from existing conditions, as the existing project area is largely covered by impervious surface. Stormwater runoff from the expressway and flyover would be collected and, as necessary, treated prior to release to remove oil and grease and other hazardous materials. Stormwater runoff will be conveyed through a series of new and existing drainage facilities into the Dominguez Channel and Cerritos Channel, which discharge into the San Pedro Bay near Long Beach.

Large tributary areas will catch substantial amounts of rainfall, requiring drainage from the elevated highway structure to the surface below using concrete curbs and gutters, drainage inlets, and an underground network of reinforced concrete pipes that connect to existing outfalls that drain into the Consolidated Slip/Dominguez Channel and Cerritos Channel. Collected stormwater will be directed to the existing underground drainage system via new column down drains. The new drainage system does not create or modify existing outlets to the channels.

Upon completion, Alternative 1 will result in little increase in the impervious surface of the project area, while maintaining total storm water runoff volumes at their existing levels. The amount of storm water collected in the southern portion of the project area is expected to increase slightly, as the flyover will widen Ocean Boulevard; the surface of the replacement bridge will not be significantly greater than the existing bridge. In the northern portion of the project area, the impervious area will remain constant. Water previously collected on Henry Ford Avenue will now fall on and be collected on the elevated expressway above, thereby eliminating rainfall on that portion of Henry Ford Avenue.

Because runoff volumes for the area will not increase, sediment loading also is not expected to increase. Therefore, adherence to the regulatory requirements and standard BMP control methods would reduce the likelihood of a reduction in local water quality, and operational effects on water quality would be minimal.

The drainage system described above for Alternative 1 will distribute the collected runoff into five separate BMP areas for water quality treatment. After treatment, the stormwater will drain into the exiting storm drain system and ultimately into the local channels. Surface run-on from offsite is not anticipated. However, any that may be collected in the drainage system will combine with the runoff and be treated accordingly.

The water quality treatment areas will have four biofiltration swales and four detention devices within approximately 12,900 square meters along the Alternative 1 right of way. The biofiltration swales will treat approximately 44 percent of the water flows, capturing metals, PAHs, pesticides sediment, and other toxic contaminants. After flowing through the swales, the treated stormwater will flow into the existing storm drain system and be pumped into San Pedro Bay.

The swales will be located along the Alternative 1 alignment as follows:

- Between New Dock Street, the SR-47 exit ramp at New Dock Street, and the Industrial Tracks
- Between Pier A Plaza Way and the SR-47 exit ramp at Henry Ford Avenue
- West of Henry Ford Avenue, north of the Dominguez Channel, south of the West Basin Lead Track, and east of the ACTA 1 and ACTA 2 Tracks.

The detention devices will treat approximately 40 percent of the water flows, with energy dissipaters at the inlets and impermeable basin liners to collect and sore runoff while pollutants are allowed to settle. After 60 hours, the detention devices will be drained to avoid vector breeding and propagation. After draining, the treated runoff will be pumped into the existing storm drain system and then into San Pedro Bay. The detention devices will be located along the Alternative 1 alignment as follows:

- Between New Dock Street, the SR-47 exit ramp at New Dock Street, and the Industrial Tracks
- Between Pier A Plaza Way and the SR-47 exit ramp at Henry Ford Avenue
- West of Henry Ford Avenue, north of the Dominguez Channel, south of the West Basin Lead Track, and east of the ACTA 1 and ACTA 2 Tracks
- Between Henry Ford Avenue on the west, Young Street on the south and east, and the Wilmington Wye Tracks on the north and east.

Surface runoff effects from the bridge structures on the water quality of the Cerritos Channel and Consolidated Slip/Dominguez Channel are expected to vary depending on:

- Incidental drippings from vehicles and accidental spills that introduce contaminant material or waste discharge from the bridge and its approach structures
- Bridge maintenance activities (i.e., bridge painting, surface treatments and surface cleaning, substructure repair, joint repair, repairing drainage structures and pavement repair, and repaving)
- Potential redirection of stormwater runoff (necessitated by channelization or grading of the terrain)

Surface runoff from Alternative 1 would flow into the Cerritos Channel and Consolidated Slip/Dominguez Channel. Pollutants that may be in the runoff include:

- Particulates from pavement wear and vehicles
- Metals such as zinc, lead, iron, copper, cadmium, chromium, nickel, and manganese
- Bromide (from leaded gasoline exhaust)
- Diesel fuel
- Tire wear
- Auto body rusting
- Metal plating
- Break lining wear

- Greases and lubricating oils from automobiles and trucks
- Trash discarded from vehicles and along the roadside
- Pathogenic bacteria (indicators) from soil, litter, bird droppings, and stockyard waste hauled by vehicles on the new bridge

The catchment areas were estimated for Alternative 1 based on the anticipated buildout of the bridge replacement itself, as well as the approach roadway on either side of the Cerritos Channel crossing. Inclusion of the approaches allows for the runoff estimate to be a conservative value, since it is likely that a large amount of the surface runoff produced at the approaches would not be deposited directly into the channel.

Table 3.10-15 presents the runoff estimates for the new fixed-span bridge that would be constructed under Alternative 1 (also Alternatives 1A, 2, 3, and 4).

Table 3.10-15
Calculation of Approximate Surface Runoff Flow Rates From New Bridge

Alternative	Catchment Area (acres)	Approximate Runoff Peak Flow (cfs)
Alternatives 1, 1A, 2, and 4 (Existing Alignment)	14.4	17.3
Alternative 3 (Realignment and existing Schuyler Heim Bridge)	26.4	31.7
Alternative 6 (No Build)	11.6	13.9
Cerritos Channel Basin	**1,500**	**1,800**

Note: Runoff peak flow determined using the Rational Method for alternatives.
cfs: cubic feet per second

The flows presented in Table 3.10-15 are for a 25-year return-period storm. Alternative 1 would result in total of 0.49 cu m/s (17.3 cfs) of peak flow to the Cerritos Channel. In comparing the estimated runoff amount with the maximum design discharge for a 25-year storm for the entire Cerritos Channel, also presented in the table, it can be seen that the surface runoff from the bridge would represent a negligible portion of the overall drainage into the Cerritos Channel. Due to the minimal runoff contribution, pollutant loadings from the new bridge are expected to have a minimal effect on water quality in the Cerritos Channel.

Because the existing lift bridge would be replaced with an unpainted concrete structure, there would be no ongoing painting and maintenance and no sloughing of paint or release of contaminants into the Cerritos Channel.

In addition, the following are included in project design to protect water quality:

- Vegetated swales where pollutants are removed as the water sheet flows across
- Basins for detaining storm water for up to 48 hours as pollutants settle out
- Filtration system where the first chamber settles out the larger solids and the second changer traps hydrocarbons and metals as they pass through the filter media.

Groundwater

Permanent effects to the quality of the groundwater within Cerritos Channel and Consolidated Slip/Dominguez Channel would be minimal upon completion of the new bridge structures because there would not be any increase in the transport of pollutants into the groundwater through infiltration during the operational life of the new structures. For example, the sediment surface over which the Schuyler Heim Bridge is located is considered impervious, and the replacement bridge would not substantially change the nature or extent of the impervious surface. In addition, the new bridge would extend slightly onto the unpaved area east of the existing bridge. Although there would be a slight increase in impervious surfaces, the project area is not used for groundwater recharge. Therefore, effects to groundwater resources are not anticipated.

3.10.3.3.2 Alternative 2: SR-103 Extension to Alameda Street

3.10.3.3.2.1 Construction Effects

Under Alternative 2, potential construction effects to surface runoff, sediment, and groundwater during replacement of the Schuyler Heim Bridge would be the same as those described for Alternative 1.

Surface Runoff

Potential adverse effects on water quality of the Dominguez Channel could occur during construction of the expressway for the SR-103 Extension. These could include runoff from construction facilities, erosion of exposed soils, and runoff from nearby roads. However, due to the distance between the Dominguez Channel and the SR-103 Extension alignment, as well as the application of BMP to control surface runoff, these effects are expected to be minimal.

There also could be adverse effects on water quality of the Cerritos Channel during construction of the flyover. These could include runoff from construction facilities, erosion of exposed soils, and runoff from nearby roads. However, due to the application of BMP to control surface runoff, these effects are expected to be minimal

Groundwater

Existing contaminated groundwater in the project area could be encountered during excavation activities for pier foundations and footings for the new fixed-span bridge and SR-103 Extension. The contaminated water would require treatment prior to disposal.

3.10.3.3.2.2 Operations Effects

Surface Runoff

Operational effects to water quality as a result of expressway operations are not expected to substantially differ from existing conditions, as the project area is largely covered by impervious surface. Stormwater runoff from the expressway would be collected and, as necessary, treated prior to release to remove oil and grease and other potentially hazardous materials. Adherence to the regulatory requirements and standard BMP control methods would reduce the likelihood of a reduction in local water quality. Therefore, it is anticipated that operational effects on water quality would be minimal.

Groundwater

Alternative 2 would construct an elevated viaduct largely over existing rights of way. Because the project area is not used for groundwater recharge, effects to groundwater resources are not anticipated.

3.10.3.3.3 Alternative 3: Bridge Demolition Avoidance

3.10.3.3.3.1 Construction Effects

Construction effects under Alternative 3 would be comparable to those for Alternative 1.

3.10.3.3.3.2 Operations Effects

Surface Runoff

Alternative 3 would create a new bridge to the east of the existing Schuyler Heim Bridge. This alternative would result in an additional 17.8 cfs of runoff to the Cerritos Channel. This amount of runoff is considered to be negligible when compared to existing drainage to the Cerritos Channel. Pollutant loading effects to water quality also are expected to be minimal.

Operations effects as a result of expressway operations would be the same as those described under Alternative 1.

Groundwater

As can be seen in Table 3.10-15, Alternative 3 would result in an additional 12 acres of impervious surface area. Because the project area is not used for groundwater recharge, effects to groundwater resources related to an increase in impervious area are not anticipated.

3.10.3.3.4 Alternative 4: Bridge Replacement Only

Construction and Operations effects under Alternative 4 would be the same as those related to replacement of the existing Schuyler Heim Bridge under Alternative 1.

3.10.3.3.5 Alternative 5: Transportation System Management

3.10.3.3.5.1 Construction Effects

Since the TSM Alternative would not include any major capital improvements, there would be negligible effects related to water quality and stormwater runoff.

3.10.3.3.5.2 Operations Effects

Under this alternative, the replacement bridge would not be constructed, and the existing Schuyler Heim Bridge would continue to operate. There also would not be a new expressway or flyover. Effects related to contaminated groundwater or surface runoff would not occur. Low levels of pollutants from current surface runoff from the existing bridge surface, painting of the steel truss members, and periodic introduction of paint material flaking from the bridge during the operational life of the bridge would continue.

3.10.3.3.6 Alternative 6: No Build

3.10.3.3.6.1 Construction Effects

Since no construction would occur under Alternative 6, no effects are anticipated.

3.10.3.3.6.2 Operations Effects

Under the No Build alternative, the operations effects would be the same as described above for Alternative 5.

3.10.3.3.7 CEQA Consequences

Based on the information provided in the above analysis, in accordance with CEQA criteria, impacts related to Water Quality and Stormwater Runoff under Alternatives 1, 2, 3, 4, and 5 would be less than significant. Under Alternative 6, no impacts would occur.

Potential impacts of the proposed project alternatives related to Water Quality and Stormwater Runoff are assessed in the context of CEQA criteria in Chapter 4.0 – CEQA Analysis, Appendix A – CEQA Checklist (VIII, Hydrology and Water Quality).

3.10.4 Avoidance, Minimization, and/or Mitigation Measures

3.10.4.1 Avoidance and Minimization Measures

3.10.4.1.1 Construction

3.10.4.1.1.1 Alternatives 1, 1A, 2, 3, and 4

Surface Runoff Measures

For Alternative 1, the final suite of surface runoff measures is expected to include those listed in the Hydrology, Floodplains, and Oceanography section of this document. Please see Section 3.9.4, **HY-1**.

Sediment Measures

Please see Section 3.9.4, **HY-2**.

Groundwater Measures

Please see Section 3.9.4, **HY-3**.

3.10.4.1.1.2 Alternatives 5 and 6

No avoidance and minimization measures would be required for Alternatives 5 and 6.

3.10.4.1.2 Operations

3.10.4.1.2.1 Alternatives 1, 1A, 2, 3, and 4

WQ-1 BMPs for surface runoff include construction of barriers at entry points to receiving waters to prevent large debris from entering the receiving water, and continuous monitoring of the new bridge structures for excessive buildup of debris that could be discharged in a precipitation event.

3.10.4.1.2.2 Alternatives 3, 5, and 6

Under Alternatives 3, 5, and 6, the Schuyler Heim Bridge would remain in place and would require ongoing maintenance. The following avoidance and minimization measures would apply.

WQ-2 Maintenance Activities. A Federal Highway Administration (FHWA) study concluded that most highway maintenance practices that could adversely affect water quality can be effectively minimized or reduced through readily available control practices or BMPs. An NCHRP report notes that fully enclosed containment structures are capable of recovering 85 to 90 percent of abrasives, paint particles, and dust for simple spans. However, this may not be feasible for bridges with high trusses or other complex structures.

The following BMPs will be continued as related to ongoing maintenance for existing Schuyler Heim Bridge:

- Remove excess grease from moving parts of bridges manually and collect it for disposal.
- Degrease prior to painting, and hydro-blast to remove old paint with additive-free water, where possible.
- Erect shrouds around working areas and suspend nets and tarps below bridges to catch debris from abrasive removal of old paint and over-spray from painting, where wind conditions permit.
- Anchor tarps to barges below and enclose the bridge above to confine debris, where the bridge deck is not too far above water level.
- Use barges and booms to capture fugitive floating paint chips and custom-built enclosures to confine and capture the abrasives, old paint chips, and paint.
- Use vacuum or suction shrouds on blast heads to capture grit and old paint.
- Carry out storing, mixing, and cleaning operations on land.
- Keep all materials securely locked up, to avoid vandalism and accidental spills into the watercourse.
- Schedule bridge maintenance to avoid egg incubation, juvenile rearing, and downstream migration periods of fish.

3.10.4.2 Mitigation Measures

Mitigation measures are not required for construction and/or operation of the project alternatives.

3.11 Geology/Soils/Seismicity/Paleontology/Topography/ Mineral Resources

3.11.1 Regulatory Setting

3.11.1.1 Federal

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are also protected under the California Environmental Quality Act (CEQA).

For paleontological resources, a number of federal statutes specifically address the treatment of these resources and funding for mitigation as a part of federally authorized or funded projects (e.g., Antiquities Act of 1906 [16 USC 431-433], Federal-Aid Highway Act of 1935 [20 USC 78]).

The National Environmental Policy Act of 1969 as amended (NEPA) requires the federal government to use all practicable means to ensure all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings (42 US Code [USC] 4331[b][2]). To further emphasize this point, the Federal Highway Administration (FHWA) in its implementation of NEPA (23 USC 109[h]) directs final decisions for projects be made in the best overall public interest, taking into account adverse environmental effects, including the destruction or disruption of the natural environment, including soils, geology, and mineral resources.

NEPA implies the protection of significant paleontological resources under its mandate to "enrich the understanding of the ecological systems and natural resources important to the Nation"(Title 42 USC § 4321) and to "preserve important historic, cultural, and natural aspects of our national heritage" (Title 42 USC § 4331(b)(4).

3.11.1.2 State

The California Environmental Quality Act (CEQA) establishes that it is the policy of the state to take all action necessary to provide the people of the state "…enjoyment of aesthetic, natural scenic, and historic environmental qualities" (California Public Resources Code Section 21001[b]). CEQA requires analysis of significant environmental effects of a project on the environment, including effects related to soils, erosion, topography, and geological hazards.

The state of California has adopted the International Building Code (IBC), based in large part on the older Uniform Building Code (UBC), for implementation in 2007. The IBC includes regulations for construction to avoid geotechnical hazards such as expansive soil, settlement, and slope instability. The code also includes standards and general parameters for seismic design.

In addition to the guidance provided by these codes, the California Geologic Survey (CGS) defines zones in which special engineering geologic studies are required. The Alquist-Priolo Act of 1972 was enacted to address the hazard and damage caused by surface fault rupture

during an earthquake. The Act requires the State Geologist to identify and map the trace of active faults in California and to establish "earthquake fault zones" along these faults. Proposed development/ construction projects that will be implemented within one of these state-defined AP-Special-Studies Zones must address the potential for surface rupture from earthquake faulting.

In recognition of the effects of the Northridge earthquake, the legislature passed the Hazards Mapping Act that requires the CGS to prepare guidelines and maps for evaluation of seismic hazards other than surface fault-rupture, and to recommend mitigation measures. Special Publication 117 ([CDMG], 1997) provides guidelines for evaluation of seismic hazards, especially liquefaction and landslides.

The California Department of Occupation and Health promulgates regulations regarding earthwork safety, such as shoring in trenches, height and gradient of temporary excavation slopes, and tunnel construction safety procedures.

In the State of California, fossil remains are considered to be limited, nonrenewable, and sensitive scientific resources. These resources are afforded protection under the following State of California legislation (California Office of Historic Preservation 1983):

- California Environmental Quality Act of 1970 (CEQA)
- 13 Public Resources Code, 21000 et seq., requires public agencies and private interests to identify the potential adverse effects and/or environmental consequences of their proposed project(s) to any object or site important to the scientific annals of California (Division 1, Public Resources Code: 5020.1 [b])

Paleontological resources are protected under California law by CEQA, the California Administrative Code, Title 14, Section 4306 et seq., and Public Resources Code Section 5097.5 (see Section 3.8 – Cultural Resources).

3.11.1.3 Local

Geologic resources and geotechnical hazards in the project vicinity are governed primarily by local jurisdictions. The conservation and safety elements of the City of Los Angeles General Plan contain policies for the protection of geologic features and avoidance of geologic hazards (City of Los Angeles, 1996; 2001). Local grading ordinances establish detailed procedures for excavation and earthwork required during construction. In addition, building codes and building design standards establish requirements for construction of aboveground structures. Most local jurisdictions rely on the 1997 California Uniform Building Code (UBC) as a basis of seismic design. All local jurisdictions must comply with regulations of the Alquist-Priolo Act.

3.11.2 Affected Environment

3.11.2.1 Paleontology

Paleontological resources of the project area include rock units that underlie the ground surface and have a potential for yielding fossil remains. Some of these rock units are not exposed at the surface in the project area, but might occur at depths shallow enough that they would be encountered by earth-moving activities associated with project construction.

Fossils, the remains or indications of once-living organisms, are important scientific resources because of their use in: 1) documenting the evolution of particular groups of organisms; 2) reconstructing the environments in which they lived; 3) and determining the ages of the rock units in which they occur and of the geologic events that resulted in the deposition of the sediments constituting these rock units. Identifiable fossil remains recovered from the rock units present in the project area would be particularly important if they represented a new or rare species; geologic (temporal) or geographic range extension; new taxonomic record for the rock unit; age-diagnostic species; or a skeletal element different from, or a specimen more complete than, those now available for its respective species.

3.11.2.2 Regional and Local Geology

The project area lies at the southern margin of the Los Angeles coastal plain, a flat-lying alluvial plain underlain by comparatively unconsolidated, undisturbed, and undissected continental strata of Pleistocene and Holocene age (Jennings, 1962; Poland et al., 1956). The coastal plain, in turn, lies in the northwestern Peninsular Ranges Province, where major linear geographic features (mountains, valleys) and the underlying geologic structures (faults, folds) trend in a dominantly northwesterly direction (Jahns, 1954; Jennings, 1962). Regional surficial geologic mapping of the project area and vicinity is provided by Jennings (1958) at a scale of 1:250,000, and by Poland et al. (1956) at a scale of 31,680. These sources indicate that the entire project area is immediately underlain by Holocene alluvial and coastal deposits, which consist of silt, sand, and gravel in steam channels and beneath flood plains, and clay, silt, sand, and gravel along and near the coast (Poland et al., 1956). However, much of the area in and around the Los Angeles and Long Beach Harbors is covered by unmapped historic artificial fill.

The project site is located between the Transverse Range and Peninsular Range Geomorphic Provinces along the southwestern block of the Los Angeles Basin, which is approximately 80 kilometers (km) long, 32 km wide (50 miles [mi] long and 20 mi wide), and slopes gently to the southwest. The basin is bounded to the east by the Newport-Inglewood structural zone and to the west by the Pacific Ocean. The Port of Los Angeles is located adjacent to the east side of the Palos Verdes Hills, a structural block elevated along the Palos Verdes Fault.

Thick sequences of unconsolidated and semi-consolidated Quaternary marine and continental sediments are located within the Los Angeles Basin. These deposits are underlain by volcanic rocks and marine sedimentary rocks of early Pleistocene, Pliocene, and Miocene age over Jurassic to Late Cretaceous basement rocks. The approximate age of the various geologic units within the basin is shown in Table 3.11-1.

The basement complex is comprised of the metamorphic Catalina Schist facies of the Franciscan Formation (possibly Jurassic to Late Cretaceous), which is composed primarily of green chlorite and blue glaucophane schists and may underlie most of Southern California. In certain areas, up to 6,100 meters (m) (20,000 feet [ft]) of Miocene and younger sedimentary and volcanic rocks overlay the Catalina Schist. The metamorphic basement in the Palos Verdes Hills area is overlain by the Monterey Formation (Miocene). The basement rocks have no known base and are in fault contact with other basement rocks (undetermined age). The Newport-Inglewood Fault Zone is thought to separate the Franciscan Formation from an eastern granitic facies (LAHD/USCG, 1994).

Table 3.11-1
Geologic Time Scale

Era	Period	Epoch	Approximate Age (Millions of Years)
Cenozoic	Quaternary	Holocene (Recent)	0-0.008
		Pleistocene	0.008-1.8
	Tertiary	Pliocene	1.82-5.3
		Miocene	5.3-23.8
		Oligocene	23.8-33.7
		Eocene	33.7-55.5
		Paleocene	55.5-65
Mesozoic	Cretaceous		65-145
	Jurassic		145-213
	Triassic		213-248
Paleozoic	Permian		248-286
	Carboniferous	Pennsylvania	286-325
		Mississippian	325-360
	Devonian		360-410
	Silurian		410-440
	Ordovician		440-505
	Cambrian		505-544
Precambrian			544-4500

Source: USGS, 1999

In the general harbor area, the Repetto and Pico Formations represent Pliocene deposits. The lower Pliocene Repetto Formation is found at a depth of approximately 116 m (380 ft) below ground surface (bgs) in the area of the project site and is represented primarily by massive siltstone. The Pliocene Pico Formation unconformably overlies the Repetto Formation to a depth of approximately 67 m (220 ft) bgs and is represented by siltstone and sandstone (LAHD/USCG, 1994).

The lower to middle Pleistocene San Pedro Formation is present within the project area from approximately 67 m (220 ft) bgs to 15 m (50 ft) bgs and consists of marine gravels, sands, silts, and clays. Unnamed upper Pleistocene marine deposits, possibly equivalent to the Palos Verdes Sands, unconformably overlie the San Pedro formation. The Palos Verde Sands deposits consist of shallow marine sands and silts up to 6 m (20 ft) thick (LAHD/USCG, 1994).

More recent alluvial deposits were deposited in the project area by the Los Angeles River and are composed of sands and gravels. During the last major worldwide drop in sea level (Pleistocene glacial period), the ancestral Los Angeles River incised upper Pleistocene marine deposits, downcutting to a depth of approximately 46 m (150 ft). With the end of the glacial period, sea levels rose and filled the incised trench with marine and estuarine sediments. The basal portions of the marine and estuarine sediments are coarse sands and gravels; while the upper portion consists of fine sands, silts, and clays (LAHD/USCG, 1994). No active or potentially active volcanoes are located in or near to the project site.

3.11.2.3 Soils

Soils found on the exposed land portions of the project area evaluated for the Henry Ford (Badger Avenue) Bridge Replacement Project, which includes the Schuyler Heim Bridge, are comprised of fine sand and silt, with clay layers and shells also represented in the hydraulic fill material used in the creation of Terminal Island and extension of the mainland (LAHD/USCG, 1994).

3.11.2.3.1 Soil Expansivity

Expansive soils are generally the result of the presence of specific clay minerals that expand in volume when wet and shrink in volume when dry. Clays associated with expansive soils are present in the geologic units that occur in the project area. Additionally, imported fill material may contain clays associated with expansive soils.

3.11.2.3.2 Soil Corrosiveness

Soil electrical resistivity indicates the relative capability of a soil to carry electrical current. This is generally recognized as the most significant soil characteristic with regard to corrosivity of the soil. Soil resistivity can change dramatically with moisture content. Soil, which has a high resistivity when it is dry, can have substantially lower resistivity when it is wet or saturated depending on factors such as pH and chemical content (Corrocont, 2006). Corrosive soils could occur within the project area due to presence of seawater/brackish groundwater (see Section 3.9, Hydrology, Floodplains, and Oceanography).

3.11.2.4 Faulting

The Los Angeles Basin is located south of the intersection of the northwest-trending San Andreas Fault System and the east-west-trending Transverse Ranges Fault System. Both fault systems are responding to strain produced by the relative motions of the Pacific and North American Tectonic Plates. The strain is relieved by displacement on the San Andreas and related faults, and by displacement on faults in the Transverse Ranges through an earthquake (abrupt movement) or creep along the fault surface.

An earthquake is classified by the magnitude of wave movement (related to the amount of energy released), which traditionally has been quantified using the Richter scale. This is a logarithmic scale wherein each whole number increase in Richter magnitude (M) represents a tenfold increase in the wave magnitude generated by an earthquake. Earthquakes of M 6.0 to 6.9 are classified as moderate, those between M 7.0 and 7.9 are classified as major, and those of M 8.0 or greater are classified as great.

Seismic analyses generally include discussions of maximum credible and maximum probable earthquakes. A maximum credible earthquake (MCE) is the largest event a fault is believed to be capable of generating. The probability of occurrence is not considered in this characterization. The maximum probable earthquake (MPE) is either theoretically determined or is the largest earthquake to have occurred on a given fault within the last 200 years, or it is an earthquake that ruptures one-tenth of the total fault length.

Both the Transverse Ranges and Los Angeles basin are characterized by numerous geologically young faults. These faults are classified as historically active, active, potentially active, or inactive, based on the following criteria:

- Historically Active: Faults that have generated earthquakes accompanied by surface rupture during historic time (approximately the last 200 years), and faults that exhibit creep.
- Active: Faults that show geologic evidence of movement within Holocene time (approximately the last 11,000 years).
- Potentially Active: Faults that show geologic evidence of movement during the Quaternary period (approximately the last 2,000,000 years).
- Inactive: Faults that do not show evidence of movement during all of Quaternary time or longer.

Active faults within approximately 80 km (50 mi) of the project area include, but are not limited to, the Palos Verdes Fault Zone, Newport-Inglewood Structural Zone, Whittier-Elsinore Fault Zone, San Jacinto Fault Zone, San Andreas Fault Zone, Malibu-Santa Monica-Hollywood-Raymond Hill Fault System, and Elysian Park Thrust Fault. The location of the active faults in the project area are shown in Figure 3.11-1. Details about each are presented in Table 3.11-2 and discussed below.

Table 3.11-2
Active Faults in the Project Area

Fault Name	Approximate Distance From Project Area (Miles)	Activity Classification	MCE Magnitude (Richter)	MPE Magnitude (Richter)
Palos Verdes Fault Zone	1.7	Potentially Active	7.3[1]	6.75
Newport-Inglewood Structural Zone	4 to 6	Historically Active	7.6	6.6
Whittier-Elsinore Fault Zone	20	Active	7.7	6.8
San Jacinto Fault Zone	50	Historically Active	8.2	7.5
San Andreas Fault Zone	53	Historically Active	8.4	7.7
Malibu-Santa Monica-Hollywood-Raymond Hill Fault System	24	Historically Active	7.5[2]	6.6 [3]
Elysian Park [2] Thrust Fault	20	Historically Active	7.0	5.75

MCE = Maximum Credible Earthquake
MPE = Maximum Probable Earthquake
[1] Caltrans, 2001
[2] City of Los Angeles, FHWA, and Caltrans. 2005; City of Los Angeles, 2000
[3] City of Oxnard, 2004.
Source: Los Angeles Harbor Department/U.S. Coast Guard, 1994

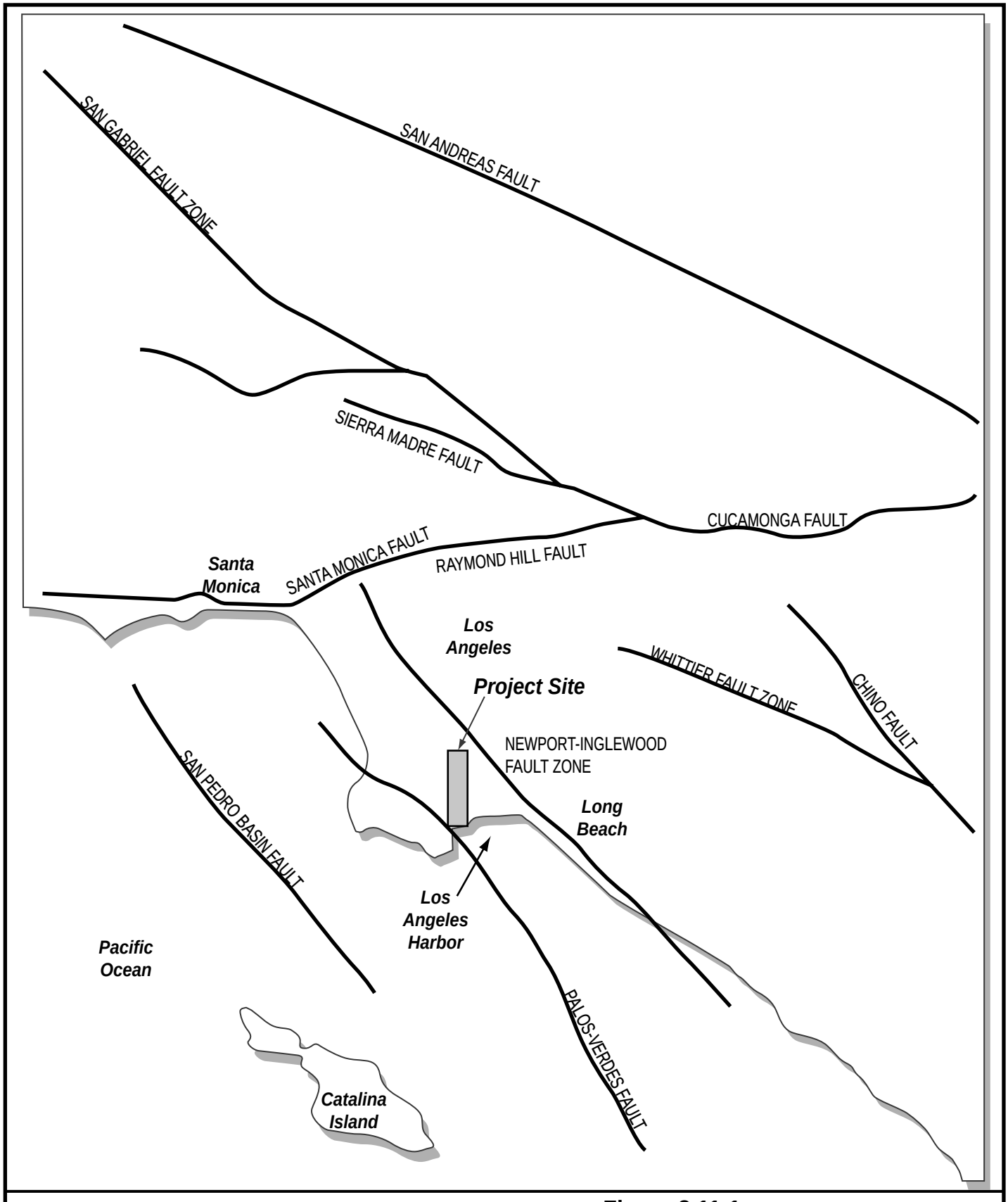


Figure 3.11-1
Major Faults in the Los Angeles Harbor Vicinity
Schuyler Heim Bridge Replacement and SR-47 Expressway

Sources: Los Angeles Harbor Department, 1994
U.S.G.S., 2005

3.11.2.4.1 Palos Verdes Fault Zone

The Palos Verdes Fault Zone is located along the northeast edge of the Palos Verdes Hills. It is presumed that this fault zone crosses within about 2.7 km (1.7 mi) of the Schuyler Heim Bridge. No damaging historic earthquakes are associated with the Palos Verdes Fault, but minor seismic activity has been measured near offshore segments of this fault (LAHD/USCG, 1994).

3.11.2.4.2 Newport-Inglewood Structural Zone

This structural zone is located about 6 to 10 km (4 to 6 mi) northeast of the Schuyler Heim Bridge. It runs in a northwesterly direction from Newport Beach through Signal Hill, the Dominguez, Rosecrans, Baldwin, and Cheviot Hills, and terminates against the Santa Monica Fault. The Newport-Inglewood Structural Zone exhibits continuous seismic activity. The 1933 Long Beach earthquake (M 6.3) is the most notable recent earthquake to occur along this fault zone (LAHD/USCG, 1994).

3.11.2.4.3 Whittier-Elsinore Fault Zone

This fault zone is located approximately 32 km (20 mi) northeast of the project site. It is a major northwest-trending fault system extending from the San Gabriel Valley to the Mexican border. It is a zone of moderate seismic activity which has produced numerous earthquakes of M 4 and 5 (LAHD/USCG, 1994).

3.11.2.4.4 San Jacinto Fault Zone

The San Jacinto Fault Zone is located approximately 80 km (50 mi) east of the project site. This fault zone is comprised of a northwest-trending series of faults extending from the eastern San Gabriel Mountains, south through the Borrego Valley on the southwest side of the Salton Sea. Seismicity along this fault zone is moderately high. It is one of the most active fault zones in Southern California, producing numerous small to moderately large historic earthquakes. Three large earthquakes that have occurred along this fault zone are the 1923 earthquake (M 6.3), the 1918 earthquake (M 6.8), and the 1899 earthquake (M 6.6). The high level of seismic activity exhibited by this fault zone indicates continuous releases of strain along this zone (LAHD/USCG, 1994).

3.11.2.4.5 San Andreas Fault Zone

The San Andreas Fault Zone is located approximately 85 km (53 mi) northeast of the project site. This fault system is considered the boundary between two major crustal plates (North American and Pacific) that are moving in opposite directions. Two of California's three great earthquakes, the 1906 San Francisco (M 8.3) and the 1857 Fort Tejon (believed to be greater than M 8.3) earthquakes, occurred on the San Andreas Fault. There is a high probability that Southern California will experience another great earthquake similar in magnitude to the 1857 event early in the 21st century (LAHD/USCG, 1994).

3.11.2.4.6 Elysian Park Thrust Fault

The Elysian Park Thrust Fault, located approximately 32 km (20 mi) northeast of the project site, is part of the Puente Hills blind-thrust system, which extends from downtown Los Angeles south to the City of Brea. The 1987 Whittier Narrows earthquake occurred on the Puente Hills blind-thrust system. This system is capable of generating earthquakes on the order M 6.5 to 7.1 (City of Los Angeles, FHWA, and Caltrans, 2005).

3.11.2.4.7 Malibu-Santa Monica-Hollywood-Raymond Hill Fault System

This system is known as the Frontal Fault System and is comprised of several individual faults located within 39 km (24 mi) of the harbor area. Faults within this system have been active during Quaternary, and probably Holocene, time. The most notable recent earthquake along this system was the Point Mugu earthquake (M 5.9) of February 21, 1973 (LAHD/USCG, 1994).

3.11.2.5 Seismicity

3.11.2.5.1 Surface Rupture

Surface fault rupture can occur where earthquakes are large or where hypocenters (locations) of the actual fault failure are shallow. Surface rupture is more likely on active faults. The state of California, through the Alquist-Priolo Earthquake Zoning Fault Act, has created special studies zones around active faults to restrict development (CDMG, 1999). The project site is not located within an Alquist-Priolo Special Studies Zone.

3.11.2.5.2 Ground Shaking

The amount of ground shaking resulting from an earthquake depends on the magnitude of the earthquake, the distance from the fault generating the seismic event, and local geologic conditions.

Two important characteristics of local geologic conditions that affect the magnitude of ground shaking are ground softness at a site and total thickness of sediments beneath a site. Seismic waves travel faster through hard rocks (more consolidated rocks) than through softer rocks (less consolidated rocks) and sediments. As the waves pass from harder to softer rocks and slow down, the amplitude of the waves must increase to carry the same amount of energy. Thus, shaking tends to be stronger at sites with softer surface layers where seismic waves move more slowly (Southern California Earthquake Center [SCEC], 2000).

3.11.2.5.3 Liquefaction

Liquefaction describes the phenomena whereby soil shearing resistance is lost as a result of ground shaking. Saturated granular soils (sands) develop increased pore pressures when shaken. These excess pressures can become significant if the intensity and duration of the ground shaking is great enough. The result of the shaking is that the soil temporarily takes on liquid-like characteristics and loses shear resistance. Consequently, structures built on these soils can sink. For a given level of ground shaking, the increase of pore pressures depends on the density of the granular soils and their fines content. Liquefaction generally occurs in areas of high groundwater levels.

The groundwater table at the project site was measured in 1998 and found to be 3 to 8 ft bgs adjacent to the Cerritos Channel. Further tests conducted in 1998 indicated loose to medium dense sandy soils in the upper 6.1 to 10.7 m (20 to 30 ft) of the ground along the bridge (Caltrans, 2001). According to the California Division of Mines and Geology (now referred to as the California Geologic Survey) *Seismic Hazard Zones* map of the Long Beach quadrangle, dated March 25, 1999, more than 80 percent of the project site is located in an area where historic occurrence of liquefaction, and/or local geological, geotechnical, and groundwater conditions indicate a potential for permanent ground displacements. In general, this area includes all parts of the project, with the exception of the extent of Alternative 1 along Alameda Street. Permanent ground displacements associated with

liquefaction generally include lateral spreading and post liquefaction settlement of underlying foundation soils.

3.11.2.5.4 Subsidence

The Long Beach and Wilmington areas have undergone significant subsidence related to large scale oil production from the Wilmington field. Subsidence was first noted in 1941 at the Long Beach Naval shipyard during construction of Dry Dock No. 1 when surveyors found that they could not check elevations of established bench marks. During the 1950s and early 1960s, the shipyard was threatened with inundation by the sea due to subsidence. A bowl-shaped depression of the ground developed and was centered at the east end of Terminal Island just north of Dry Dock No. 1. By 1970, maximum subsidence at the center of the bowl exceeded 9 m (29 ft).

From 1928 to 1970, maximum subsidence in the project area ranged from 4 to 5 m (14 to 18 ft). To reduce this subsidence, pilot water flooding was begun in 1953, and full-scale repressurization was underway by 1960. Survey data by the Long Beach Division of Oil Properties indicate that rates of subsidence were greatly reduced, and direction of movement was reversed. Total rebound of more than 1 foot has been recorded in the Schuyler Heim Bridge area. The repressurization program is adjusted annually to minimize elevation changes (LAHD/USCG, 1994).

3.11.2.5.5 Tsunamis and Seiches

All low-lying areas along the California coast are subject to potentially hazardous tsunamis. Tsunamis are long period waves generated from distant and local offshore earthquakes, onshore and offshore landslides, or volcanic eruptions. The magnitude of the potential hazard from a tsunami is a function of the coastline configuration, sea floor topography, individual wave characteristics, and distance and direction from the source. Two tsunamis generated by the 1960 Chile earthquake caused damage in the Los Angeles and Long Beach harbors in 1960. Waves up to 1.5 m (5 ft) in height occurred in the Cerritos Channel, and currents up to 12 knots were reported. A 6.5-foot run-up for a 100-year tsunami and an 11-foot run-up for a 500-year tsunami are predicted near the Long Beach Harbor Entrance (LAHD/USCG, 1994).

A seiche is an oscillatory wave in an enclosed body of water. Seiches have caused extensive damage and/or erosion in the harbor. Most of the damage to boats and harbor facilities caused by the tsunami associated with the 1960 Chilean earthquake resulted from seiching within the Cerritos Channel (LAHD/USCG, 1994).

3.11.2.6 Topography

The project is situated in the northern portion of the physiographic basin known as the Coastal Plain of Los Angeles or the Los Angeles Basin. Dominguez Hills, Signal Hill, and the Palos Verdes Hills are the most prominent landforms in the region. The project is located within the Dominguez Gap, part of the Downey Plain, which is the primary landform feature along the project alignment. The prominent physiographic features in the vicinity of the project are shown in (Figure 3.11-2).

3.11.2.6.1 Dominguez Hills and Signal Hill

The northern portion of the project area approaches the Dominguez Hills and the northwesterly extension of Signal Hill, which are evidence of the Newport-Inglewood uplift. The Dominguez Hills consist of an elliptical, northwest-trending anticlinal dome that ranges in elevation from 6 to 59 m (20 to 195 ft) above mean sea level (msl). Signal Hill lies east of the project area and is the central feature of the Newport-Inglewood uplift (ACTA, 1992).

3.11.2.6.2 Palos Verdes Hills

The southern end of the project area is adjacent to the eastern flank of the Palos Verdes Hills. In this area, the hills consists of low-lying, wave-cut terraces that gradually rise from about 15 m (50 ft) above msl near San Pedro to approximately 122 m (400 ft) above msl on the eastern and northern flanks of the hills (ACTA, 1992).

3.11.2.6.3 Dominguez Gap

The project would be located within the Dominguez Gap, which consists of the portion of the Downey Plain lying between the Dominguez Hills and the northwestern extension of Signal Hill. The gap is approximately 2.5 km (1.6 mi) wide at its narrowest point and approximately 11 km (7 mi) long. The Dominguez Gap was mainly entrenched by an ancestral San Gabriel River. An estimated 46 m (150 ft) of Holocene sediment has been deposited into the Dominguez Gap (ACTA, 1992).

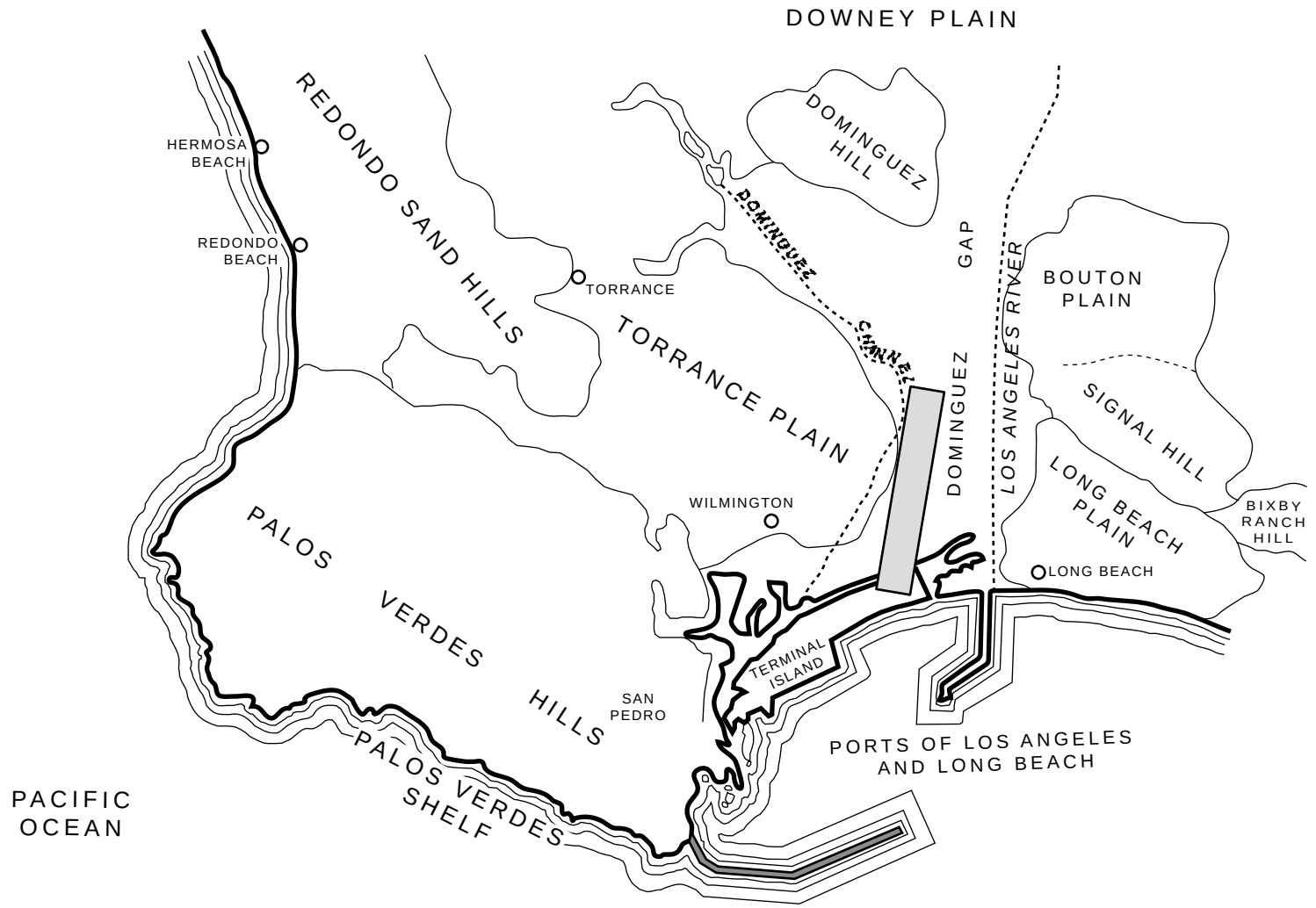
3.11.2.6.4 Downey Plain

The majority of the Downey Plain is located north of the project area. The Downey Plain is a Holocene-age plain formed by the coalescing of the Los Angeles and San Gabriel-Rio Hondo River systems alluvial fans. The elevation of the Downey Plain ranges from sea level to 84 m (275 ft) above msl; the slope of the plain is generally less than 5.5 m (18 ft) per mi (ACTA, 1992).

3.11.2.7 Landslides

Generally, a landslide is defined as the downward and outward movement of loosened rock or earth down a hillside or slope. Landslides can occur either slowly or very suddenly, and frequently accompany other natural hazards, such as earthquakes, floods, or wildfires. More than one third of landslides are associated with heavy rains or the melting of winter snows. Additionally, landslides can be triggered by ocean wave action or induced by the undercutting of slopes during construction, improper artificial compaction, or saturation from sprinkler systems or broken water lines. In areas on hillsides where the ground cover has been destroyed, landslides are probable because there is nothing to hold the soil. Immediate dangers from landslides are the destruction of property and danger from rocks, mulch, and water sliding downhill or downstream. Other potential dangers include broken electrical, water, gas, and sewage lines.

The project site is not located where previous occurrence of landslide movement, or local topographic, geological, geotechnical, or subsurface water conditions indicate a potential for permanent ground movement (DOC, 2005).



LEGEND:

Project Site

Waterway

0 10 Miles

Scale is Approximate

Source: ACTA, 1992

Figure 3.11-2
Schematic Presentation
Physiographic Provinces
Schuyler Heim Bridge Replacement
and SR-47 Expressway

3.11.2.8 Mineral Resources

The Los Angeles Basin is a major oil-producing region in Southern California. The project site is located within the Wilmington Oil Field, but not within the active drilling area. The ultimate recovery of the field is estimated at 3 billion barrels of oil. The field is approximately 17.7 km (11 mi) long and 4.8 km (3 mi) wide (California Department of Conservation, 2003), located on the Wilmington Anticline, which extends from onshore San Pedro to offshore Seal Beach. Oil is produced from five major sand intervals ranging in depths from 610 m (2,000 ft) to 3,353 m (11,000 ft), where over two and one-half billion barrels of oil have been recovered (City of Long Beach, 2000). The field produced 84.4 million barrels of oil from January 1998 through October 2002, making it the sixth largest producing oil field in California (California Department of Conservation, 2003).

3.11.3 Environmental Consequences

This section discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. The Caltrans Office of Earthquake Engineering is responsible for assessing the seismic hazard for Caltrans projects. The current policy is to design structures to withstand a major earthquake.

3.11.3.1 Evaluation Criteria

The California Geological Survey is currently revising its guidance for preparing geologic input to environmental reports. The "Guidelines for Geologic/Seismic Considerations in Environmental Impact Reports" (Note 46), as prepared by the California Division of Mines and Geology (1975) and summarized in the EIS/SEIR for the South Orange County Transportation Infrastructure Improvement Project (FHWA et al., 2004), was used to evaluate the potential effects of geotechnical, geology, and soil issues for this Final EIS/EIR. A summary of the checklist of issues related to geologic resources use to evaluate the potential effects to geotechnical, geology, and soil issues is provided in Table 3.11-3.

Paleontologically sensitive sedimentary units are those with a high potential for containing significant paleontologic resources, usually rock units within which significant vertebrate or invertebrate fossils have been determined to be present or likely to be present. These units include, but are not limited to, sedimentary formations that contain significant paleontologic resources anywhere within their geographical extent, as well as sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Determinations of paleontologic sensitivity must therefore consider not only the potential to yield abundant vertebrate fossils but also the potential for production of a few significant fossils which may provide new and significant data on fossils types, species changes over time, or geologic strata. Areas that may contain datable organic remains older than the Recent era (less than 10,000 years in age) and areas that may contain unique, new vertebrate deposits, traces, and/or trackways must also be considered paleontologically sensitive.

Fossils are of scientific interest if one or more of the following criteria apply:

- The fossils provide data on the evolutionary relationships and developmental trends among organisms, both living and extinct.

- The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein.
- The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas.
- The fossils demonstrate unusual or spectacular circumstances in the history of life.
- The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation and are not found in other geographic locations.

Table 3.11-3
Evaluation Criteria for Geotechnical, Geology, and Soils Effects

Geologic Resource	Issue	Evaluation Criteria
Earthquake Damage	Fault Movement (including ground rupture, tsunami, and seiche)	Would project development substantially alter the local/regional stress regime and possibly trigger fault movement?
	Liquefaction	Would project development alter subsurface conditions and result in a potential for liquefaction?
	Landslides	Would project development create or induce a potential for landsliding?
	Differential Compactions/ Seismic Settlement	Would project development alter subsurface conditions and create a potential for settlement during seismic shaking?
	Ground Shaking	Would project development alter the local/regional stress regime and possibly trigger seismicity?
	Seismically Induced Flooding (failure of dams or levees)	Does the project include the construction of a dam or levee that would have the potential to undergo an uncontrolled release as a result of seismic shaking, or would the project alter conditions at an existing reservoir and result in a potential for an uncontrolled release as a result of seismic shaking?
Slope and/or Foundation Instability	Landslides and Mudflows	Would project development promote the occurrence of landslides or mudflows?
	Unstable Cut and Fill Slopes (including trench wall instability)	Would project development adversely alter existing cut and/or fill slopes, making them potentially unstable?
	Collapsible and Expansive Soil	Would project development trigger collapse or expansive soil behavior that would lead to a structural collapse or hazardous release?
Erosion, Sedimentation, and Flooding	Erosion of Graded Areas	Would project development expose areas to erosion, and create potential impacts to other areas/projects?
	Alteration of Runoff	Would project development negatively alter existing runoff patterns?
	Unprotected Drainage Ways	Would project development include the creation of unprotected drainage ways?
	Increased Impervious Surfaces	Would project development result in a significant increase in impervious surfaces?

Table 3.11-3
Evaluation Criteria for Geotechnical, Geology, and Soils Effects

Geologic Resource	Issue	Evaluation Criteria
Land Subsidence	Extraction of Groundwater, Gas, Oil, Geothermal Energy	Could the project cause significant settlement?
	Hydrocompaction, Peat Oxidation	Would project development induce collapse behavior in peat-bearing soils or soils or soils subject to hydrocollapse?
Volcanic Hazards	Lava Flow	Could the project trigger a lava flow?
	Ash Fall	Could the project trigger an ash fall?

Source: FHWA and Foothill/Eastern Transportation Corridor Agencies, 2004.

According to CEQA, a project that may cause a substantial adverse change in the significance of a paleontological resource is a project that may have a significant effect on the environment (CEQA rev. 1998, Section 15064.5[b]). CEQA further states that a substantial adverse change in the significance of a resource means the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance would be materially impaired. Therefore, for purposes of the analyses in this EIS/EIR, and in accordance with Appendix G of the *State CEQA Guidelines*, a project would have a potentially significant effect on the environment if it:

- Directly or indirectly destroys a unique paleontological resource or site.

3.11.3.2 Methodology

3.11.3.2.1 Geologic Resources

Geologic resources were identified and assessed based on published reports and maps and knowledge of the general geologic setting.

Geologic effects were evaluated in two ways: (1) effects of the proposed alternative on the local geologic environment; and (2) effects of geologic hazards on the proposed alternative. Geologic effects may result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury. Effects were evaluated in accordance with the evaluation criteria shown in Table 3.11-3.

The following project features, engineering practices, and standard design and construction requirements would be incorporated into final design and were considered when assessing potential environmental effects of each of the alternatives:

- Design criteria, standards, and procedures contained in state and local jurisdiction standards and specifications (e.g., IBC) would be applied during final design of the proposed project, including earthquake-resistant standards to reduce potential effects from a major earthquake.
- A geotechnical study would be completed for all areas associated with load-bearing features, and areas with potential for slope failure (e.g., trenches) and soil subsidence, and a geotechnical report would be prepared. The geotechnical report would include project-specific recommendations consistent with standards established by state and

local jurisdictions. Geotechnical report recommendations would be incorporated into the final project design.

- Monitoring during construction would be performed by a licensed geologist or engineer to verify construction occurs in compliance with features, standards, and practices included in final design to reduce potential effects from earthquake damage; slope and/or foundation instability; erosion, sedimentation, and flooding; land subsidence; and volcanic hazards.

3.11.3.2.2 Paleontology

The tasks discussed below were conducted to develop a baseline paleontological resource inventory of the project area, and to assess the potential paleontological productivity and paleontological importance of each rock unit. Information was gathered on the number and density of fossil sites and the abundance and types of fossil remains previously recorded from each rock unit in the project area and vicinity, including those present in the shallow subsurface. These tasks were completed in compliance with Society of Vertebrate Paleontology (SVP, 1995) guidelines for assessing the scientific importance of paleontological resources in an area of potential environmental effect.

3.11.3.2.2.1 Stratigraphic Inventory

Geologic maps and reports covering the surficial geology of the project area were reviewed to determine the rock units exposed in the project area, particularly those rock units known to be fossiliferous, and to delineate their respective areal distributions.

3.11.3.2.2.2 Paleontological Resource Inventory

Published and unpublished geologic and paleontological literature was reviewed to document the number, locations, and depths of previously recorded fossil sites in and near the project area from each rock unit that is exposed in the project area or presumed to be present in the shallow subsurface. This literature review was supplemented by an archival search at the Natural History Museum of Los Angeles County (LACM) Vertebrate Paleontology Department for additional information regarding the occurrences of fossil sites and remains from the project area and vicinity. No field survey of the project area was conducted because the area is fully developed, and is underlain by artificial fill and by strata that are too young to contain fossilized remains.

3.11.3.2.2.3 Paleontological Resource Assessment Criteria

The paleontological importance—high, low, none, or undetermined—of a rock unit reflects its potential paleontological productivity and the scientific importance of the fossils it has produced locally. The paleontological importance of each rock unit exposed in the project area was assessed using the following criteria:

1) High importance: rock unit has comparatively high potential for containing unrecorded fossil sites and for yielding scientifically important fossil remains in project area.
2) Low importance: rock unit has comparatively low potential for containing any unrecorded fossil site or for yielding any scientifically important fossil remains in project area.
3) Undetermined importance: rock unit for which too few data are available to allow an accurate assessment of its potential for containing any unrecorded fossil site or for yielding any scientifically important fossil remains in project area.

4) No importance: unfossiliferous artificial fill and igneous and high-grade metamorphic rock units having no potential for containing any fossil remains.

Note, however, that any fossil site containing identifiable fossil remains and the fossil-bearing stratum are considered paleontologically important, regardless of the overall paleontological or scientific importance of the rock unit in which the site and stratum occur. For example, a fossiliferous soil horizon in an otherwise unfossiliferous rock unit would be considered scientifically important, even though the remainder of the rock unit was considered to be of low scientific importance.

The following tasks were completed to establish the paleontological importance of each rock unit exposed in the project area:

1) The scientific importance of the fossil remains recorded from the rock unit was assessed.
2) The potential paleontological productivity of the rock unit was assessed, based on the number or density of fossil sites it contains and the number of fossil specimens it has yielded in the project area and vicinity.
3) The paleontological importance of the rock unit was assessed, based on its documented or potential fossil content in the project area.

3.11.3.2.2.4 Paleontological Resource Assessment by Rock Unit

Historic Artificial Fill

The ground surface in most, if not all, of the project area probably is underlain by unmapped historic artificial fill. Sediment dredged from the Los Angeles Harbor subsequently was spread as artificial fill across the southern part of Wilmington (City of Los Angeles Department of Public Works, Bureau of Engineering et al., 1997; Lander and Slawson, 1997; Dibblee, 1999), and presumably, along with sediment dredged from Long Beach Harbor, also was spread across much of the remaining area surrounding the harbors and on Terminal Island (Dibblee 1999).

The fossilized shells of shallow-water marine mollusks have been found in the artificial fill (City of Los Angeles Department of Public Works, Bureau of Engineering et al. 1997). However, these remains lack geographic and geologic provenance data; any fossil remains that might be encountered in artificial fill during project-related earth-moving also would lack such provenance data. Therefore, the artificial fill is considered to have no paleontological importance.

Alluvial and Coastal Deposits and the Palos Verdes Sand

No fossil site is definitely recorded as being in the alluvial and coastal deposits. The apparent absence of fossil remains and previously recorded fossil sites from these deposits in and near the project area and their presumed Holocene age indicate that there probably is no more than a low potential for scientifically important fossil remains being encountered in the alluvial and coastal deposits by shallow earth-moving activities.

However, a number of previously recorded LACM fossil sites (1163, 1919, 3319, 4129, 6664) have been found in geographic areas mapped by Poland et al. (1956) as being immediately underlain by alluvial and coastal deposits. These sites, which occur in the immediate vicinity of the project area, were encountered at depths 1.5 meters (m) to 9 m (5 to 30 feet [ft]) below the surface. It is possible that some, if not all of these sites, particularly

those at greater depths, actually were encountered in the Palos Verdes Sand, which immediately underlies the alluvial and coastal deposits stratigraphically (Poland et al., 1956). These sites, like others definitely recorded from the Palos Verdes Sand, have yielded fossils of extinct species of Ice Age (middle to late Pleistocene) land mammals, including mammoth, camel, and bison (Miller 1971; Jefferson, 1991). Further, a ground sloth jaw was dredged from the Northwest Slip in the West Basin of Los Angeles Harbor at LACM fossil site 6705. In addition, the remains of marine vertebrate species (shark and seal) last occur with camel remains at a depth of 48 feet at LACM fossil site 3550.

These fossil remains from the deeper portions of the alluvial and coastal deposits or from the Palos Verdes Sand are scientifically important, and the occurrence of a number of previously recorded fossil localities in the immediate vicinity of the project area suggests that there is a high potential for similar fossil remains being encountered in these deposits by earth-moving activities in the project area at depths greater than 1.5 m (5 ft) below the ground surface.

3.11.3.3 Evaluation of Alternatives

Geology

This section describes effects of each of the alternatives related to geologic resources, soils, seismicity, topography, and mineral resources. The effects of project-related geologic issues related to hazards and hazards materials are discussed in Section 3.12 – Hazardous Waste/ Hazardous Materials. The effects of geologic issues related to hydrology and water quality, including groundwater levels, are discussed in Sections 3.9 – Hydrology, Floodplains, and Oceanography and 3.10 – Water Quality and Stormwater Runoff.

Paleontology

Paleontological resources such as unrecorded fossil sites and fossil-bearing strata, could be adversely affected by direct and indirect effects resulting from earth-moving activities where the project area is underlain by alluvial and coastal deposits and perhaps the Palos Verdes Sand.

Direct effects on the paleontological resources of the project area would result mostly from earth-moving activities, particularly excavation for bridge column footings, in previously undisturbed strata. The accompanying loss of any fossil specimen and fossil site would be an adverse effect.

Indirect effects might result from unauthorized fossil collecting by construction personnel, and amateur and commercial fossil collectors who would be afforded easier access to fossiliferous exposures or debris piles created by these earth-moving activities. Unauthorized fossil collecting would be temporary, but also might result in the permanent loss of fossil remains and sites. The loss of these additional paleontological resources would be an adverse effect.

3.11.3.3.1 Alternatives 1, 1A, 2, and 3

3.11.3.3.1.1 Construction Effects

Geology

Direct

Fault Movement (Ground Rupture, Tsunami, Seiche). No active faults are known to cross the project area, and no earthquake fault zones have been mapped in the project area (CDMG, 1999). Incorporation of applicable regulations and practices will reduce the potential for ground rupture. The bridge and flyover area of the project site is located where tsunamis and seiches have historically occurred. However, construction of the new fixed-span bridge, flyover, and SR-47 Expressway would not significantly alter the local or regional stress regime; therefore, the project would not trigger fault movement that could result in ground rupture, tsunami, or seiche in the area.

Liquefaction. According to the California Division of Mines and Geology (now referred to as the California Geologic Survey) *Seismic Hazard Zones* map of the Long Beach quadrangle, dated March 25, 1999, more than 80 percent of the project site is located in an area where historic occurrence of liquefaction, and/or local geological, geotechnical and groundwater conditions indicates a potential for permanent ground displacements. However, the damage potential associated with liquefaction would be reduced through project design, which would incorporate geotechnical recommendations and current codes and practices relative to the potential for liquefaction related ground displacements. Such practices may include the use of cast-in-steel-shell (CISS) piles which can be designed to withstand the excess down-drag loading associated with the seismic settlements of liquefiable soils. The existing surface of the project area is consolidated geologic units overlain by unconsolidated sediment and artificial fill. Temporary dewatering may be required locally during construction; however, no long-term groundwater pumping is anticipated for the project. The project would meet current engineering standards for cut and fill and would not affect groundwater levels; therefore, the project would not alter subsurface conditions that would result in a potential for liquefaction.

Landslides. The project area is not located in an area identified as having potential for landslides, as it is on a gentle coastal plain with minimal elevation change between the southern and northern portions. Development of Alternatives 1, 1A, 2, and 3 would not significantly alter the existing topography; therefore, construction would not create or induce the potential for landsliding.

Differential Compactions/Seismic Settlement. Temporary dewatering may be required locally during construction; however, no long-term groundwater pumping is anticipated for these alternatives. The project would meet current engineering standards for cut and fill and would not affect groundwater levels. Therefore, construction of these alternatives would not alter subsurface conditions that would result in a potential for differential compaction or seismic settlement in the event of seismic shaking.

Ground Shaking. Although no active faults are known to cross the project area, and no earthquake fault zones have been mapped in the project area, the potential for strong ground shaking from faults located within the region cannot be reduced. However, the damage potential would be substantially reduced through project design, which would incorporate geotechnical recommendations and current codes and practices relative to the potential for ground motion. Construction of the fixed-span bridge, flyover, and SR-47

Expressway would not significantly alter the local or regional stress regime; therefore, the construction of these alternatives would not trigger fault movement that could result in ground shaking in the area.

Seismically Induced Flooding (Failure of Dams or Levees). Alternatives 1, 1A, 2, and 3 do not include construction of a dam or levee. They may include construction adjacent to existing levees on the Cerritos Channel and Dominguez Channel/Consolidated Slip. Construction adjacent to levees would be consistent with existing engineering standards; therefore, these alternatives would not be anticipated to result in an uncontrolled release as a result of seismic shaking.

Landslides and Mudflows. The project area is not located in an area identified as having potential for landslides or mudflows. Additionally, it is located on a gentle coastal plain with minimal elevation change between the southern and northern portions. Alternatives 1, 1A, 2, and 3 would not significantly alter the existing topography and, therefore, would not promote the occurrence of landslides or mudflows.

Unstable Cut and Fill Slopes (including Trench Wall Instability). Alternatives 1, 1A, 2, and 3 would be constructed to existing engineering standards and meet California Occupational Safety and Health Administration (Cal-OSHA) safety requirements for cut and fill slopes, including trench walls. Therefore, project development would not adversely alter existing cut or fill slopes that the slopes would become potentially unstable.

Collapsible and Expansive Soil. A geotechnical study would be completed prior to completion of final design to identify the presence of expansive soil. If identified, engineering standards would be met to address the presence of the expansive soil. Therefore, Alternatives 1, 1A, 2, and 3 would not trigger collapse or expansive soil behavior that would lead to a structural collapse or hazardous release.

Erosion of Graded Areas. Alternatives 1, 1A, 2, and 3 would create new graded areas that would be subject to erosion if not adequately managed and controlled. Project construction methods would include features to protect areas from erosion (from wind and water) (see Sections 3.9 and 3.10). Therefore, potential adverse effects to areas exposed to erosion and potential erosion effects to other areas would be reduced.

Alteration of Runoff. Alternatives 1, 1A, 2, and 3 would not alter existing runoff patterns (see Sections 3.9 and 3.10). Therefore, adverse effects due to alteration of existing runoff patterns would not occur.

Unprotected Drainage. Alternatives 1, 1A, 2, and 3 would not include the creation of unprotected drainage ways. Therefore, there would be no effects related to unprotected drainage ways.

Increased Impervious Surfaces. Alternatives 1, 1A, 2, and 3 would result in new impervious surface. However, the majority of the new impervious surface would be on the elevated expressway or bridge, which would not significantly affect the existing ground surface and associated infiltration of surface water (see Sections 3.9 and 3.10). Therefore, these alternatives would not result in an adverse effect due to an increased area of impervious surface.

Extraction of Groundwater, Gas, Oil, and Geothermal Energy. Temporary dewatering may be required locally during construction; however, no long-term groundwater pumping is anticipated. Because Alternatives 1, 1A, 2, and 3 do not include extraction of gas, oil, or geothermal energy, there would be no settlement related to construction activities.

Hydrocompaction, Peat Oxidation. A geotechnical study will be conducted prior to completion of final design to identify peat-bearing soils or soils subject to hydrocollapse, If these soils are identified within the project area, applicable engineering standards would be implemented during construction. Therefore, Alternatives 1, 1A, 2, or 3 would not induce collapse behavior in peat-bearing soils or soils subject to hydrocollapse.

Volcanic Hazards. The project area does not include active or potentially active volcanoes. Therefore, Alternatives 1, 1A, 2, and 3 would not trigger a lava flow or an ash fall.

Mineral Resources

Project construction activities will be located outside the active drilling area of the Wilmington Oil Field. Therefore, existing oil wells will not be relocated or otherwise affected. Also, excavation for bridge and expressway piers will extend to maximum depths of approximately 46 m (150 ft), while oil producing zones begin at depths of approximately 610 m (2,000 ft). Therefore, Alternatives 1, 1A, 2, and 3 will have no direct or indirect impacts to mineral resources.

Indirect

No indirect effects related to geology or geologic resources would occur as a result of construction activities for Alternatives 1, 1A, 2, or 3.

Paleontology

Direct

Excavation for bridge column footings and, at depths greater then 1.5 m (5 ft) below the current ground surface, any footing for elevated roadways, including on-ramps, off-ramps, and bridge approaches, would have a high potential for encountering fossil remains at previously unrecorded fossil sites. Therefore, Alternatives 1, 1A, 2, or 3 could affect paleontological resources if any such resources were encountered during construction.

Historic Artificial Fill

There would be no significant effect on paleontological resources as a result of earth-moving activities in those parts of the project area underlain by artificial fill. Any fossil remains encountered in the artificial fill would lack any information regarding their provenance and, therefore, would be of no scientific importance.

Alluvial and Coastal Deposits and Palos Verdes Sand

Earth-moving activities at depths less than 1.5 m (5 ft) below the present ground surface in those parts of the project area underlain by alluvial and coastal deposits would be insignificant because, at such shallow depths, this rock unit probably is too young to contain fossils.

On the other hand, a number of previously recorded fossil localities in the alluvial and coastal deposits at depths greater than 1.5 m (5 ft) below the ground surface, possibly in the Palos Verdes Sand, have yielded the fossilized remains of Pleistocene land mammals in the immediate vicinity of the project area. Therefore, earth-moving activities at depths greater than 1.5 m (5 ft) in any area of the project could have an adverse effect on paleontological resources if any such resources were encountered during construction. Effects in these areas would result primarily from excavation for bridge column footings.

Indirect
No indirect effects related to paleontological resources would occur as a result of construction activities for Alternatives 1, 1A, 2, or 3.

3.11.3.3.1.2 Operations Effects
There would be no direct or indirect effects from project operations to geological or paleontological resources as a result of implementing Alternatives 1, 1A, 2, or 3.

3.11.3.3.2 Alternative 4: Bridge Replacement Only
3.11.3.3.2.1 Construction Effects
Construction effects of Alternative 4 related to geology or geologic resources would be the same as those described for demolition and construction of a new fixed-span bridge under Alternative 1.

Earth-moving activities at depths greater than 1.5 m (5 ft) in any area of Alternative 4 could have an adverse effect on paleontological resources if any such resources were encountered during construction. Effects in these areas would result primarily from excavation for bridge column footings.

3.11.3.3.2.2 Operations Effects
Operational effects of Alternative 4 related to geology or geologic resources would be the same as those described for Alternative 1.

Under Alternative 4, there would be no direct or indirect effect to paleontological resources.

3.11.3.3.3 Alternative 5: Transportation System Management
3.11.3.3.3.1 Construction Effects
Implementation of the measures associated with the Transportation System Management (TSM) alternative would require either no construction or construction on a smaller scale than Alternative 1. Therefore, construction effects of this alternative related to geologic or paleontological resources would be less than those described for Alternative 1.

3.11.3.3.3.2 Operations Effects
Under Alternative 5, there would be no operational effects to geological or paleontological resources as a result of project operations.

3.11.3.3.4 Alternative 6: No Build
3.11.3.3.4.1 Construction Effects
Under the No Build alternative, there would be no change to the existing environment. Therefore, Alternative 6 would not result in construction effects related to geological or paleontological resources.

3.11.3.3.4.2 Operations Effects
Under the No Build alternative, there would be no change to the existing environment. Therefore, the alternative would not result in effects related to geological or paleontological resources.

However, under this alternative, the existing Schuyler Heim Bridge would continue to be seismically inadequate and subject to damage or collapse under strong seismic conditions. The existing bridge is expected to continue to deteriorate over time as its useful life is eroded further and as various magnitude earthquakes are experienced. At some point in the

future, it could be necessary for the bridge to be demolished and replaced solely to avoid safety hazards. Replacement of the bridge under this alternative would result in effects to geological and paleontological resources as described for replacement of the Schuyler Heim Bridge under Alternatives 1, 2, and 4.

3.11.3.4 CEQA Consequences

Based on the information provided in the above analyses, in accordance with CEQA criteria, impacts related to geology, soils, seismicity, topography, and mineral resources would be less than significant under Alternatives 1, 2, 3, 4, and 5. Under Alternative 6, no impacts would occur. Potential impacts to paleontological resources would be considered significant, but with mitigation would be reduced to less than significant.

Potential impacts of the proposed project alternatives related to geology, soils, seismicity, paleontology, topography, and mineral resources are assessed in the context of CEQA criteria in Chapter 4.0 – CEQA Analysis, Appendix A – CEQA Checklist Discussion. Geology, soils, seismicity, and topography are addressed under VI, Geology and Soils; Paleontology is addressed under V, Cultural Resources; and Mineral Resources are addressed under X, Mineral Resources. Potentially significant impacts are addressed in Section 4.4 – Significant Environmental Effects of the Proposed Project, Section 4.5 – CEQA Analysis of Alternatives, and Table 4-1 - Significant Environmental Impacts and Mitigation Measures.

3.11.4 Avoidance, Minimization, and/or Mitigation Measures

3.11.4.1 Alternatives 1, 1A, 2, 3, and 4

3.11.4.1.1 Geology and Geologic Resources

3.11.4.1.1.1 Avoidance and Minimization Measures

The following project features, engineering practices, and standard design and construction requirements would be incorporated into final design and were considered when assessing potential environmental effects of each of the build alternatives:

GEO-1 Design criteria, standards, and procedures contained in state and local jurisdiction standards and specifications (e.g., Uniform Building Code) would be applied during final design of the project, including earthquake-resistant standards to reduce potential effects from a major earthquake.

GEO-2 A geotechnical study would be completed for all areas associated with load-bearing features, and areas with potential for slope failure (e.g., trenches) and soil subsidence, and a geotechnical report would be prepared. The geotechnical report would include project-specific recommendations consistent with standards established by state and local jurisdictions. Geotechnical report recommendations would be incorporated into final project design.

GEO-3 Monitoring during construction would be performed by a licensed geologist or engineer to verify construction occurs in compliance with features, standards, and practices included in final design to reduce potential effects from earthquake damage; slope and/or foundation instability; erosion, sedimentation, and flooding; land subsidence; and volcanic hazards.

3.11.4.1.1.2 Mitigation Measures

No mitigation measures would be required.

3.11.4.1.2 Paleontology

3.11.4.1.2.1 Avoidance and Minimization

Avoidance and minimization measures would be implemented in accordance with the paleontological resource impact mitigation program set forth in the Paleontological Resources technical report (Jones & Stokes, 2005) and summarized below.

Compliance with the mitigation program would occur to minimize construction effects on paleontological resources that might occur during earth-moving activities, particularly excavation, in the project area. These measures would be required under any alternative involving new bridge construction (Alternatives 1, 1A, 2, 3, and 4.) These measures would be implemented in those parts of the project area that are underlain by alluvial and coastal deposits, and possibly the Palos Verdes Sand, and where excavation and other earth-moving activities would extend to depths at least 1.5 m (5 ft) below the present ground surface. This program would allow for recovery of some scientifically important fossil remains, should any be encountered; their preservation in a recognized museum repository; the recording of associated fossil specimen data and corresponding geologic and geographic site data, and their archiving at the repository; and the availability of these specimens and data for future study by qualified scientific investigators.

PALEO-1 Implement Paleontological Resource Impact Mitigation Program which includes, but is not limited to, the tasks shown below. Additional detail is provided in the Paleontological Resources EIS/EIR Technical Section (Jones & Stokes, 2005).

- Program will be directed by a paleontologist or paleontological consulting firm approved by Caltrans.
- Conduct program in compliance with lead agency and professional society guidelines.
- Develop and obtain museum storage agreement.
- Coordinate with construction contractor to provide information regarding lead agency requirements for the protection of Paleontological resources.
- Conduct paleontological monitoring, as appropriate.
- Treat any specimens collected in accordance with museum repository requirements.
- Transfer any collected fossils to museum repository.
- Maintain daily monitoring logs.
- Prepare final report.

3.11.4.1.2.2 Mitigation Measures

No mitigation measures would be required.

3.11.4.2 Alternatives 5 and 6

No avoidance, minimization, or mitigation measures would be required for Alternatives 5 and 6.

3.12 Hazardous Waste/Hazardous Materials

This section describes the existing conditions for hazardous waste and materials at or in the vicinity of the proposed project alternatives and evaluates the potential impacts that could result from implementing each of the alternatives. Measures to reduce impacts of the alternatives are provided where applicable.

Hazardous waste and hazardous materials include those actions and materials that affect the health and safety of the public and release of hazardous materials into the environment. Hazards discussed in this section include both hazardous waste and naturally occurring and man-made contamination in soil.

The information in this section is based primarily on the *Revised Final Initial Site Assessment (ISA) for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Caltrans, 2008) and the *Supplemental ISA* (Caltrans, 2007), which are hereby incorporated in their entirety. The risk of upset assessment is based on the Final EIR for the Berth 206-209 Interim Container Terminal Reuse Project (LAHD, 2005).

3.12.1 Regulatory Setting

Hazardous substances are defined by state and federal regulations as substances that must be regulated in order to protect the public health and the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. The term "hazardous substances" encompasses every chemical regulated by the United States Department of Transportation (DOT), including emergency response. Hazardous materials generally are chemicals that have the capacity to cause a health hazard or harm to the environment during an accidental release or mishap. The California Code of Regulations (CCR) Title 22, Chapter 11, Article 2, Section 66261, provides the following definition:

> *A hazardous material is a substance or combination of substances which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either: (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of or otherwise managed.*

According to CCR Title 22 (Chapter 11, Article 3), substances having a characteristic of toxicity, ignitability, corrosivity, or reactivity are considered hazardous. Hazardous wastes are hazardous substances that no longer have a practical use, such as materials that have been abandoned, discarded, spilled, or contaminated, or that are being stored prior to disposal. They are by-products of processes and/or activities that can pose a substantial or potential hazard to human health or the environment when improperly managed.

Toxic substances may cause short-term or long-term health effects, ranging from temporary effects to permanent disability or death. Examples of toxic substances include most heavy metals, pesticides, benzene, gasoline, hexane, sulfuric acid, lye, explosives, pressurized canisters, and radioactive and biohazardous materials. Soils may also be toxic because of accidental spilling of toxic substances.

Hazardous waste and hazardous materials are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating air and water quality, human health, and land use.

3.12.1.1 Federal

3.12.1.1.1 Hazardous Waste Regulations

In 1976, Congress enacted the Resource Conservation and Recovery Act (RCRA) (42 United States Code [USC] Sections 6901-6992K) to regulate the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA provides the basic framework for the federal regulation of hazardous waste.

3.12.1.1.2 Emergency Planning and Community Right-To-Know

The Emergency Planning and Community Right-To-Know Act of 1986 (42 USC Sections 11001-11050), also known as SARA Title III, requires businesses and local emergency planning and response agencies to report information about the amounts of materials that businesses use, release, and/or spill. The act also provides the public with information about potential hazards in their communities.

3.12.1.1.3 Occupational Safety

Federal occupational safety and health regulations contain provisions with respect to hazardous materials management. The applicable federal law is the Occupational Safety and Health Act (OSHA) of 1970 as amended (29 USC, Sections 651-678; 29 CFR 1910). Federal OSHA requirements are designed to promote worker safety, worker training, and worker right-to-know. OSHA establishes regulatory requirements primarily by promulgating occupational safety and health standards. These standards establish permissible exposure limits (PELs) for a number of air contaminants (29 CFR sec. 1910.1000). These PELs define the amount of hazardous airborne chemicals to which an employee safely could be exposed over specific periods of time. When administrative or engineering controls cannot achieve compliance with PELs, protective equipment or other protective measures must be used.

Employers are required to train a team of employees to applicable federal OSHA-defined (29 CFR 1910.120, Hazardous Waste Operations and Emergency Response [HAZWOPER] Standards) levels to respond to accidental releases of hazardous materials and, as appropriate, to retain on-call contractors to respond to accidental releases of hazardous materials.

3.12.1.1.4 Other Federal Laws

- EPA National Emissions Standards for Hazardous Air Pollutants (NESHAPS) relative to lead-based paint (LBP) and asbestos-containing materials (ACM)
- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, Executive Order 12088, Federal Compliance with Pollution Control, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

3.12.1.2 State

3.12.1.2.1 Hazardous Waste Regulations

RCRA allows individual states to develop their own programs for the regulation of hazardous waste, provided the state program is at least as stringent as RCRA. The state of California has developed the California Hazardous Waste Control Law (Health and Safety Code sec. 25100 et seq.; 22 CCR sec. 66260.1 et seq.), which is modeled closely after RCRA. The EPA granted final authorization to California for RCRA enforcement on August 1, 1992. These regulations identify standards for the classification, management, transportation, and disposal of hazardous waste.

3.12.1.2.2 Emergency Planning and Community Right-To-Know

In California, many of the requirements of SARA Title III overlap with state regulations. The Waters Bill (Assembly Bill 2185; Health and Safety Code sec. 25500 et seq.) was adopted by the California Legislature in 1985. This bill requires any facility that meets minimum reporting requirements for the use and storage of hazardous materials to initiate emergency response planning, including development of a Business Emergency Plan (BEP). Basic requirements of hazardous materials planning under the Waters Bill include the development of detailed hazardous materials inventories for all materials used and stored onsite, a program of employee training for hazardous materials release response, and the identification of emergency contacts and response procedures.

In 1996, the federal Accidental Release Prevention (ARP) Program (40 CFR 68) was promulgated. California added certain provisions specific to the state, which created the California Accidental Release Prevention (CalARP) Program. CalARP requires that any owner or operator of a stationary source that has more than a threshold quantity of regulated substances to submit a Risk Management Plan (RMP).

CalARP defines three program levels with different requirements, depending upon the complexity, accident history, and potential impact of releases of regulated substances. In general, facilities must identify potential receptors and assess the risks to the public from potential releases. The RMP must include an emergency response plan.

Under OSHA, the U.S. Department of Labor, Occupational Safety and Health Administration, can delegate its authority to administer the act to states that have developed a state plan with provisions at least as stringent as those provided by OSHA. California is a delegated state for federal OSHA purposes. The CalOSHA program (codified in CCR, Title 8, and in the Labor Code, Secs. 6300-6711) is administered and enforced by the Division of Occupational Safety and Health, a unit of the California Department of Industrial Relations.

3.12.1.2.3 State Health and Safety Code

Section 2002(j) of the State Health and Safety Code, for the purposes of vector control and prevention, defines a public nuisance. Section 2060 enables the Greater Los Angeles County Vector Control District to abate a public nuisance pursuant to "the person … who controls the diversion, delivery, conveyance, or flow of water shall be responsible for the abatement

of a public nuisance that is caused by, or as a result of, that property or the diversion, delivery, conveyance, or control of that water" (County Vector Control District, 2004).

3.12.1.3 Local and Regional

3.12.1.3.1 South Coast Air Quality Management District (SCAQMD)

The SCAQMD is the local agency responsible for ensuring that federal and state ambient air quality standards are attained and maintained in the greater Los Angeles area, which includes all or portions of Los Angeles, Orange, Riverside, and San Bernardino counties. This includes SCAQMD Rule 1403 relative to LBP and ACM.

3.12.1.3.2 City of Los Angeles Fire Code

Additional requirements pertaining to hazardous materials management are set forth in the City of Los Angeles Fire Code (LAFC). The LAFC regulates the types, configurations, and quantities of hazardous materials that can be managed at a facility. Also, LAFC specifies design standards for the storage and management of hazardous materials.

Citywide emergency response planning and emergency evacuation plans are coordinated by the Emergency Preparedness Department and the Emergency Operations Board of the City of Los Angeles. These plans are documented in the Emergency Operations Master Plan and Master Plan Procedures and Annexes of the City of Los Angeles. Operational units of the City of Los Angeles (e.g., departments) maintain emergency plans for their operations and facilities within the framework of the Citywide plan. These plans are updated annually or when appropriate due to changed conditions.

3.12.1.3.3 City of Los Angeles Municipal Code

In 2004, the City of Los Angeles approved Ordinance No. 175,790 amending Section 91.106.4.1 and Division 71 of Article 1, Chapter IX of the Los Angeles Municipal Code to establish Citywide methane mitigation requirements and to include more current construction standards to control methane intrusion into buildings.

3.12.1.3.4 City of Long Beach Fire Code

Additional requirements pertaining to hazardous materials management are set forth in the City of Long Beach Fire Code. The City of Long Beach Fire Code regulates the types, configuration, and quantities of hazardous materials that can be managed at a facility. It also specifies design standards for the storage and management of hazardous materials.

Citywide emergency response planning and emergency evacuation plans are coordinated by the Emergency Preparedness Department.

3.12.1.3.5 City of Long Beach Municipal Code

Additional requirements such as compliance, cleanup, delegation of administrative responsibility related to hazardous materials are set forth in the Chapters 8.86, 8.87, and 8.88 of the City of Long Beach Municipal Code. The Long Beach Certified Unified Program Agency has now been in effect since July 1, 1997. This Unified Program combines both Fire Department and Health Department programs related to hazardous materials management into one Agency function in the City of Long Beach, encompassing two cities; Long Beach and Signal Hill.

3.12.1.3.6 Port of Los Angeles

Potential health and safety effects are associated with activities in the Port area involving the transfer, handling, and storage of hazardous materials in liquid bulk form. Hazards presented by these materials during an accidental release include possible fire and explosion, and the possible release of toxic materials to the atmosphere. To minimize the effects of accidents on vulnerable resources in the Port area, the California Coastal Commission and LAHD have developed a Risk Management Plan (RMP), which is an element of the Port Master Plan (PMP). The RMP contains policies to guide future development in the Port in an effort to eliminate the danger of such accidents to vulnerable resources. This is to be achieved mainly through physical separation, as well as through facility design factors, fire protection, and other risk management methods.

3.12.2 Affected Environment

In support of the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway Project, hazardous waste and hazardous materials issues were evaluated within the right-of-way (ROW) associated with the four build alternatives. The four build alternatives are as follows:

- Alternative 1: Bridge Replacement and SR-47 Expressway
- Alternative 2: SR-103 Extension to Alameda Street
- Alternative 3: Bridge Demolition Avoidance
- Alternative 4: Bridge Replacement Only

The ROW for Alternatives 1, 2, and 3 consists of an approximately 4.9-kilometer (km) (3.1-mile [mi]) section from the Ocean Boulevard/SR-47 Flyover (flyover) in the south, across the Schuyler Heim Bridge and over the Cerritos Channel, continuing to the point where the SR-47 Expressway would merge with Alameda Street. The ROW for Alternative 4 consists of the bridge alignment, plus the bridge approaches on the north and south banks of the Cerritos Channel. The ROW parcels associated with the build alternatives are located within the Los Angeles Coastal Plain approximately 32.2 km (20 mi) southwest of downtown Los Angeles, at the north end of Long Beach Harbor. Surface water in the area includes the Dominguez Channel, the Cerritos Channel and, to the west, the Los Angeles River. There are no bodies of surface water used as sources of drinking water within a 6.4 km- (4 mi-) radius of the project site.

The project area is historically industrial in use, and that use continues to the present. The area is closely connected with activities at the Ports of Los Angeles and Long Beach; therefore, it contains land uses that either directly serve or are ancillary to port activities. The area has predominately heavy industrial zoning that permits the handling of hazardous materials in the course of normal business activities for heavy industrial operations such as oil refinery operations, heavy equipment repair, auto body repair, and auto dismantling. The ROW for the alternatives passes through heavily industrial areas that have the potential to affect the ROW parcels, based on their historical and current activities.

Properties within the project ROW and adjacent properties that have potential to adversely impact the project ROW are discussed in Section 3.12.3.3 – Evaluation of Alternatives. The soil and groundwater within the project ROW has the potential to be impacted.

Therefore, during construction activities, there is the potential for encountering hazardous materials as a result of excavating subsurface soil, disturbing groundwater, or removing underground structures. If hazardous materials are encountered, measures will be taken so as not to cause migration of contamination, create a conduit for migration of contamination, or drag down of contamination construction activities.

3.12.2.1 Roadway Safety

The Ports of Long Beach and Los Angeles form the largest port complex in the United States, based on container cargo volume. Ocean Boulevard in the City of Long Beach is the major east-west route serving Terminal Island and other areas of the Ports of Los Angeles and Long Beach. The SR-47 provides a four-lane, limited access roadway between Terminal Island and Alameda Street north of Pacific Coast Highway. To connect from Terminal Island to Alameda Street, vehicles must travel 1.5 km (0.93 mi) north from Ocean Boulevard, exit at the Henry Ford Avenue off-ramp, travel north through local streets, three signalized intersections, and five railroad crossings for about 2.0 km (1.24 mi); then join Alameda Street, just south of Pacific Coast Highway.

The Caltrans Traffic Accident Surveillance and Analysis System (TASAS) accident records for the 3-year period from April 1, 2002, to March 31, 2005, are summarized in Table 3.12-1.

Table 3.12-1
Traffic Accident Surveillance and Analysis System Accident Rate Summary: SR-47 and SR-103

			Actual Rates Per MVM			California Average Rates Per MVM		
Location	Post Miles	MVM	Fatal	Fatal + Inj.	Total	Fatal	Fatal + Inj.	Total
Alternatives 1, 3, and 4								
SR-47	PM 3.49 to 4.56	26.39	0	0.11	1.06	0.004	0.21	0.66
SR-103	PM 0.00 to 1.69	27.42	0	0.26	0.77	0.004	0.16	0.50
Alternative 2								
SR-47	PM 3.49 to 4.56	26.39	0	0.11	1.06	0.004	0.21	0.66
SR-103	PM 2.0 to 4.0	26.39	0	0.11	1.06	0.004	0.21	0.66

Reference: TASAS District 7 Table B rates for the period 04/01/2002 to 03/31/2005

Notes: Accident rates indicate the number of accidents per million vehicle miles (MVM)

Fatal: Fatalities

Fatal + Inj.: Fatalities plus injuries

Total: All reported accidents

The Caltrans TASAS Selective Accident Retrieval (TSAR) database reports 14 accidents occurring on Alternatives 1, 3, and 4 (SR-47), and 14 accidents occurring on Alternative 2 (SR-103) during the same time period.

3.12.3 Environmental Consequences

3.12.3.1 Evaluation Criteria

There are no set evaluation criteria for determining what is considered an adverse impact from risk of upset and health hazards associated with the proposed project. However, in an attempt to identify criteria for evaluating impacts, the following factors were considered:

- Regulatory framework.
- Probable frequency and severity of consequences to people or property as a result of a potential accidental release or explosion of a hazardous substance.
- Degree to which the project could require a new, or interfere with an existing, emergency response or evacuation plan, and the severity of the consequences.
- Degree to which a project design will reduce the frequency or severity of a potential accidental release or explosion of a hazardous substance.

Based on these factors, an alternative would have an adverse impact if it would:

- Substantially interfere with implementation of emergency response plans or emergency evacuation plans, thereby increasing risk of injury or death.
- Create a hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Result in the exposure of people or the environment to hazardous materials during or after construction.

3.12.3.2 Methodology

NEPA requires an analysis and detailed statement of the environmental effect of any proposed federal action adversely affecting the quality of the human environment. Potential effects were evaluated in terms of direct effects associated with physical contact by the project with existing or historic activities. These activities were evaluated within the project site and immediate surrounding area and are believed or known to involve the use, discharge, or disposal of hazardous substances. This includes the transportation or use of any hazardous materials that may be used in conjunction with the proposed project alternatives and the level of protection afforded residents of the affected environment from construction and operation of the project alternatives.

The initial evaluation of environmental conditions within the project right-of-way (Alternatives 1 through 4) was conducted using the ISA framework. The ISA has been completed within the framework of the American Society for Testing and Materials (ASTM) Practice E 1527, Phase I Assessment Standard Process.

This ISA does not include the ASTM Standard "nonscope considerations" for lead in drinking water, radon, wetlands, regulatory compliance, cultural and historic resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, or high-voltage power lines. The ISA also does not include any physical sampling of the affected media within the project right-of-way.

The ISA includes the following main elements; records review, historical research (aerial photos, historical topography maps, oil and gas maps, flood control maps, Sanborn fire insurance maps), site reconnaissance, interviews, and an ISA report.

On-site reconnaissance and interviews were not conducted for most of the parcels associated with the project right-of-way due to potential hostile property owners and the risk of initiation of inverse condemnation claims. Most of the site reconnaissance was conducted from public access roads. However, access and interviews were conducted at the ICTF property relative to Alternative 2.

The Final EIR for the Berth 206-209 Interim Container Terminal Reuse Project analyzed accident probabilities for risk of upset (LAHD, 2005). The Federal Emergency Management Agency (FEMA) partitions potential accident scenarios into five categories based on the annual probabilities of occurrence. For example, on an annual basis, FEMA defines a "Common Accident" as one that would be expected to occur at a facility an average of one or more times each year (LAHD, 2005). On this basis, assuming an accident frequency equal to or greater than (≥) one incident per 365 operational days yields a daily probability of occurrence of 1/365 or approximately $\geq 2.7 \times 10^{-3}$. Accordingly, the following daily probabilities of occurrence may be derived from and assigned to the five FEMA accident categories:

- Common Accidents – Events expected to occur one or more times each year on average (daily probabilities of occurrence greater than [>] 2.7×10^{-3}).
- Likely Accidents – Events expected to occur at least once every 10 years on average (daily probabilities of occurrence 2.7×10^{-3} to 2.7×10^{-4}).
- Reasonably Likely Accidents – Events predicted to occur between once every 10 years and once every 100 years on average (daily probabilities of occurrence 2.7×10^{-4} to 2.7×10^{-5}).
- Unlikely Accidents – Events predicted to occur between once every 100 years and once every 1,000 years on average in a specific locale (daily probabilities of occurrence 2.7×10^{-5} to 2.7×10^{-6}).
- Very Unlikely Accidents – Events predicted to occur less than once in 1,000 years (daily probabilities of occurrence less than 2.7×10^{-6}).

This is roughly equivalent to the accidental spill or release probability categories established by the Los Angeles County Fire Department and summarized in Table 3.12-2 (Los Angeles Harbor Department [LAHD], 2005).

FEMA further notes that, for a qualitative evaluation of the type represented by this risk of upset assessment, "Common" and "Likely" accidents may be equated to high probability; "Reasonably Likely" and "Unlikely" accidents to medium probability; and "Very Unlikely" accidents to low probability categories. The present analysis adopts the following qualitative definitions of probability of occurrence (LAHD, 2005):

- *Low Probability of Occurrence* – Considered unlikely during the expected lifetime of the facility, assuming normal operation and maintenance.
- *Medium Probability of Occurrence* – Considered possible during the expected lifetime of the facility.

- *High Probability of Occurrence* – Considered sufficiently high to assume event will occur at least once during the expected lifetime of the facility.

Table 3.12-2
Accident Probabilities Established by the Los Angeles County Fire Department

Category	Occurrence
A – Frequent	0 to 1 year More than once per year
B – Periodical	Every 1 to 10 years At least once each decade
C – Occasional	Every 10 to 100 years Probably during the lifetime of the facility
D – Possible	Every 100 to 10,000 years Not expected, but could occur
E – Improbable	Not for 10,000 or more years Not expected likely to occur at all

Source: LAHD, 2005.

Table 3.12-3 provides a comparison of these accident scenario probabilities and frequencies.

Table 3.12-3
Accident Scenario Probabilities/Frequencies

Probability of Occurrence	Accident Frequency[(1)]
Low – unlikely during the expected lifetime of the facility	Very Unlikely/Improbable – less than once in 1,000 years ($< 2.7 \times 10^{-6}$)
Medium – possible during expected facility lifetime	Unlikely/Possible – between 100-1,000 years (2.7 x 10-5 to 2.7×10^{-6})
	Reasonably Likely/Occasional – between 10 to 100 years (2.7 x 10-4 to 2.7×10^{-5})
High – likely at least once during expected facility lifetime	Likely/Periodical – at least once every 10 years (2.7 x 10-3 to 2.7×10^{-4})
	Common/Frequent – one or more times each year ($> 2.7 \times 10^{-3}$)

Source: LAHD, 2005.
(1) Likelihood of event per operational day.
< less than
> greater than

3.12.3.3 Evaluation of Alternatives

3.12.3.3.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

3.12.3.3.1.1 Construction Effects

Construction effects associated with Alternatives 1 and 1A would be the potential for construction activities to encounter hazardous materials (and thereby have the potential for release of such materials) as a result of excavating subsurface soil, disturbing groundwater, or removing aboveground structures. Once construction is complete, the disturbance

creating these potential exposures would cease. The construction activities most likely to result in exposure to hazardous materials would include drilling or excavating for foundations or pile caps, excavating in areas of shallow groundwater, dewatering, utility relocation, earth movement for purposes of producing roadway grades, and demolition of aboveground structures to create the right-of-way needed for the project.

If hazardous materials are encountered in the field, the potential effects that could occur would include exposure of construction workers to the hazardous materials, exposure of the public to such materials, exposure of the ecological receptors to hazardous substances in the sediments (see Section 3.16 for discussion), the potential for disturbance to or onsite handling of materials to contaminate either the groundwater or surface water near the exposure, or the risk of releasing hazardous materials in such a way as to promote or allow migration beyond the construction site, through either the air, soil, groundwater, or surface water (e.g., Consolidated Slip/Dominguez Channel). The extent of potential effects would depend upon the nature of the hazardous material encountered and the extent to which exposure and/or offsite migration might occur. If hazardous materials are encountered in the field, they would be managed in accordance with existing local, state, and federal regulations, as appropriate. Estimated costs (in 2007 dollars) are approximately $32 million.

For all materials encountered in the field during the construction period, standard engineering management practices would be followed, including sampling and analysis (health risk, threat to ground water, and waste characterization), field engineering monitoring, compliance with locally required measures prescribed by the appropriate agencies (i.e., Department of Toxic Substances Control [DTSC], LAFD, Regional Water Board), worker safety, and industrial hygiene compliance services for waste management and oversight. In addition, all contaminated soils will be appropriately transported and disposed offsite as RCRA hazardous, non-RCRA-hazardous, or non-hazardous waste (as defined by the state of California).

Historical commercial and industrial activities within 0.4 km (0.25 mi) of the project right-of-way have resulted in groundwater and soil contamination. In addition, there are several sites that may require remediation. For some of the sites, environmental investigations and/or remediation activities either have been conducted or are currently being conducted. Other sites have institutional controls such as Land Use Covenants, which restrict use of or disturbance of the land and protect remedial alternatives imposed on the site. Work performed on these sites will be conducted with appropriate regulatory agency oversight. Table 3.12-4 shows sites currently under investigation.

Table 3.12-4
List of Environmentally Significant Sites

	Environmentally Significant Sites	Alternative	Distance to Project ROW	Media Impacted	Source of Impact	Current Status
1	Former Long Beach Naval Shipyard Terminal Island Complex	1, 1A, 2, 3, and 4	Adjacent to property on north and south of Ocean Boulevard	Soil and Groundwater	Spills, LUSTs, and historical activities	Land Use Controls (LUCs) are in place for soil at Installation Restoration (IR) Program Site 6A, because diesel, arsenic, cobalt, Benzo(a)pyrene, benzo(a)anthracene, Benzo(b)flouranthene, Dibenzo(a,h)anthracene, pentachlorophenol, and PCBs Aroclor-154, and Aroclor-1260 exceed statistical background concentrations and preliminary remediation goals. LUCs for groundwater are in place at IR Site 6A, because 1,4-dichlorobenzene, arsenic, vinyl chloride, benzene, chloroform, perchloroethene (PCE), and trichloroethene (TCE) exceed statistical background concentrations and risk-based screening criteria. The next five-year review at IR 6A is scheduled for December of 2009. At IR Site 14, long-term monitoring (LTM) is underway. Groundwater contamination comprised of cis-1,2-DCE; trans-1,2-DCE; and VC extends northeasterly beneath portions of Ocean Boulevard. The former Long Beach Naval Shipyard complex has been developed as Pier T, which is currently operated by Hanjin Shipping Company.
2	Dow Chemical Company 305 Henry Ford Avenue Long Beach, CA 90822	1, 1A, 2, 3, and 4	Adjacent to property on the west, south of the Cerritos Channel	Groundwater	Spills	Ongoing groundwater monitoring for chlorinated chemicals.
3	TCL Corporation (TCL) 420 Henry Ford Avenue Wilmington, CA 90744	1, 1A, 2, 3, and 4	East of property, just north and south of Cerritos Channel	Soil and Groundwater	Former disposal facility for oil field waste and tank-bottom sludge	Has three units; TCL1, TCL2, and TCL3. TCL1 and TCL2 (known as Pier S) have completed remedial actions. Status of TCL3 is unknown. In addition, POLB conducting groundwater

Table 3.12-4
List of Environmentally Significant Sites

	Environmentally Significant Sites	Alternative	Distance to Project ROW	Media Impacted	Source of Impact	Current Status
						monitoring at TCL site and the results indicate presence of VOCs, SVOCs, and metals.
4	LA Refining Company 1926 Pacific Coast Highway Wilmington, CA 90744	1, 1A, 3, and 4	Adjacent to property	Groundwater	Leaking UST	Remedial action initiated
5	Texaco 1625 Anaheim Street Wilmington, CA 90774	1, 1A, 3, and 4	Adjacent to property	Groundwater	Leaking UST	Undergoing remedial action
6	Texaco 1222 Anaheim Street Wilmington, CA 90744	1, 1A, 3, and 4	Adjacent to property	Soil and Groundwater	Leaking UST	Pollution Characterization
7	Sunshine Truck Stop 1800 Pacific Coast Highway Wilmington, CA 90744	1, 1A, 3, and 4	Adjacent to property on the east site on Pacific Coast Highway	Soil and Groundwater	Spills, LUSTs, and historical activities	Site assessment and remediation
8	Alameda Street Landfill 22700 South Alameda Street Carson, CA 90801	2	Within Subject Property	Soil and Groundwater	Former landfill	Site characteristics unknown; not publicly available. Currently the site is leased to ICTF by the Watson Land Company to be used for shipping container storage. The surface is unpaved. Recommended for inclusion in the National Priority List (NPL).
9	Hardwick Disposal Pit (EDR Map ID 19)	2	Within Subject Property	Soil and Groundwater	Former landfill	Site characteristics unknown; not publicly available. Currently the site is leased to ICTF by the Watson Land Company to be used for shipping container storage. The surface is unpaved.
10	ICTF Yard (EDR Map ID 37)	2	Within Subject Property	Soil	Leaks and spills	Active yard
11	Chemoil Tank Farm (EDR Map ID 33)	2	Adjacent to Subject Property	Soil	Leaks and spills	Active tank farm

Demolition and construction activities are proposed under Alternative 1. The existing bridge has the potential to contain regulated and/or potentially hazardous materials, including lead-based paint and asbestos. The SCAQMD requires asbestos-containing materials ACM to be removed prior to demolition. The SCAQMD has identified specific asbestos abatement procedures to remove asbestos material and requires safety features to prevent asbestos releases. Asbestos removal will be conducted in conformance with Rule 1403 of the SCAQMD and with EPA NESHAPS. Because ACM will be removed prior to demolition and in conformance with state and federal regulations, release of asbestos into the surrounding environment will not occur. The steel members of the existing bridge are coated with LBP. If steel is reused, LBP would be removed prior to reuse. As described in Section 3.10, Water Quality and Stormwater Runoff, LBP could then enter the Cerritos Channel and adversely affect surface water quality. As a result, mitigation measures have been proposed to prevent water quality effects. LBP removed from steel members would be handled and disposed of in accordance with all applicable laws and regulations, adverse effects are not anticipated.

Construction of the new fixed-span bridge would require excavation of unpaved substrate on land and excavation of soils beneath the Cerritos Channel for placement of piles. Soil at the project site is considered a recognized environmental condition (REC), and excavation activities could encounter hazardous substances during construction. Measures will be taken to seal off the contaminated zone during drilling so as not to drag down contamination or create a conduit for migration of contamination. All hazardous material encountered would be managed, transported, and disposed of in accordance with all applicable laws and regulations, and effects are not anticipated.

Alternative 1 would require the right-of-way for the new bridge to encroach onto the Pier S Terminal in the Port of Long Beach. This terminal has undergone soil remediation, and remediation cells are located on the property. Although the right-of-way would not extend into the former remediation site on Pier S, it could affect the two existing oil wells adjacent to the east of the existing bridge. If this should occur, the wells would either be moved to a new location or capped below the surface and closed, in accordance with requirements of the well owner, the California Department of Conservation Division of Oil, Gas, and Geothermal Resources (Division of Oil, Gas, and Geothermal Resources), and the Port of Long Beach. Because this alternative would require minimal right-of-way acquisition and encroachment onto Pier S, adverse effects are not anticipated.

Alternative 1 includes improvements that will occur over a period of approximately 2 to 3 years. Diesel-powered construction equipment utilized for the project is expected to be in good working order. However, equipment could spill oil, gas, or fluids during normal usage or during refueling or maintenance activities. Construction of Alternative 1 would most likely involve the use of solvents, biocides, and fuels that can be considered hazardous if not used, stored, or disposed of properly. However, all storage, transport, disposal, and use of hazardous materials at construction sites would be subject to federal, state, and local regulations, and as long as these requirements are met, potential effects would not be considered adverse.

Construction activities would be conducted using Best Management Practices (BMPs) in accordance with the Caltrans NPDES and SWPPP. Applicable BMPs include, but are not limited to, vehicle and equipment fueling and maintenance; material delivery, storage, and

use; spill prevention and control; solid and hazardous waste management; and contaminated soil management. The application of BMPs would limit the potential for accidents involving hazardous materials. In the event an accidental release occurs, work will stop, and emergency spill, containment, and cleanup procedures will be implemented as specified in the Emergency/Contingency Plan. As a result, adverse environmental effects or involving injury to workers or to the general public are not anticipated.

3.12.3.3.1.2 Operations Effects

Operation of the new fixed-span bridge would not affect identified recognized environmental conditions or present a material risk of harm to public health or the environment because the replacement bridge would be an inert structure and would not involve ongoing operations such as dewatering. No adverse effects related to hazardous materials are anticipated.

The project is within an urban area adjacent to Los Angeles Harbor surrounded by built and paved areas, and areas containing limited non-native irrigated landscaping that is not prone to fire. No wildlands that could be adversely affected are adjacent to the project site, and there is no potential for wildfires to affect the project site.

Alternative 1 would provide roadway extensions with standard lane and shoulder widths to improve traffic operations. Alternative 1 would improve SR-47, which is a major arterial route for truck traffic to and from the ports, and construct a flyover at the Ocean Boulevard/ SR-47 intersection. The SR-47 Expressway would eliminate a number of railroad grade crossings, which would enhance safety for both railroad and roadway traffic. It also would allow the truck traffic to bypass a number of city streets, thereby improving the efficiency of the roadway network and improve roadway safety. The flyover would divert traffic bound for northbound SR-47 directly onto the new bridge from eastbound Ocean Boulevard, thereby avoiding the signalized Ocean Boulevard/SR-47 intersection. These proposed improvements are expected to reduce traffic accidents.

Operation of Alternative 1 is not expected to generate long-term hazardous material-related effects to the environment, other than providing an improved transportation facility for possible shipment of hazardous materials/cargo similar to other existing and planned roads and in accordance with current regulations regarding the transport of hazardous materials and wastes. The shipment and transport of hazardous materials is strictly regulated by the United States Department of Transportation (DOT). Should such shipment take place, the potential exists for accidents involving the spill/release of hazardous materials. The actual accident itself, however, would be a short-term event, unless substantial contamination occurred that would require extended clean-up and remediation measures. The effects associated with such an accident or release could range from localized and confined events to catastrophic events involving fires and/or toxic releases near populated areas. Operation of Alternative 1 is not expected to result in either an increase or decrease in the shipment of hazardous waste within the project area. Any accidental release of hazardous materials or wastes, the same as occurs under existing conditions, would be subject to the requirements of a wide range of laws and regulations.

Based on the methodology described above for accident probabilities, the likelihood of an accident involving a truck resulting in the release of hazardous materials was calculated. Table 3.12-5 provides calculation results for trucks. Based on the calculated accident rates probability, project-related truck trips during operations have a medium probability (once

every 10 to 100 years) of resulting in the accidental release of hazardous materials. However, this is similar to the risk associated with the existing use of SR-47 because Alternative 1 does not increase/decrease the transport or volume of cargo. The same number of trucks will continue to use SR-47 to ingress/egress Terminal Island, as well as other Port areas. As discussed in the traffic analysis (Section 3.5.3 – Environmental Consequences), the traffic model predicts that, during peak hours, Alternative 1 would result in a reduction of port truck volumes on I-110 by as much as 5 percent, or 70 trucks (AM peak hour) and on I-710 by as much as 10 percent, or 430 trucks (MD peak hour). Therefore, implementation of Alternative 1 would not result in an adverse risk of upset effect.

Table 3.12-5
Truck Accident Probability

	Construction	Operations
Trucks per day	59	29
Accidents per mile	0.0000023	0.0000023
One-way distance	20 miles	20 miles
Probability of release during accident	20%	20%
Annual probability of accident resulting in release	13.5%	6.7%
Probability of accident with hazardous material release (one time per number of years)	7.41	14.84
Frequency of occurrence	Likely/Periodical	Reasonably Likely/ Occasional
Probability of occurrence	High	Medium

Source: LAHD, 2005.

The severity of an accidental release and the potential for public health effects is dependent upon the timing, location, and type of material involved and cannot be predicted accurately. However, emergency response to an accidental release of hazardous material will be coordinated in compliance with Caltrans procedures and in accordance with the Standardized Emergency Management System proscribed under Section 8607 of the California Government Code. This emergency response process will serve to limit potential adverse effects to public health through the expedited containment and removal of the hazardous substance released to the soil and/or waterways, surface waters, or ocean. Compliance with other federal, state, and local laws and regulations (e.g., driver training and licensing or DOT packaging requirements) would further serve to limit potential adverse public health effects.

Flyover design would entail drainage facilities that would channel any drainage or spill into collection systems and prevent spillage onto the roadway below.

Operation of Alternative 1 would involve a volume of cargo that is equal to the baseline condition and, therefore, would not increase the potential for accidents involving hazardous material releases resulting from fire or explosion. Any potential for risks associated with fire or explosion will be minimized by adherence to existing laws, regulations, and safety procedures. This would also minimize the risk of releases of hazardous materials to the environment from such accidents.

As noted above, a major objective of the response action would be cleanup and removal of the released materials and debris from the site of the incident. Because cleanup would be expected to happen quickly, the effect to the environment within the Alternative 1 area generally would be limited to effects to the ground surface or very shallow soils. The project area is already heavily disturbed and developed, and no sensitive species or habitats are present. With implementation of established response procedures, these effects to the environment would not be adverse.

In addition to the above, the project site is not within an airport land use plan, is not located within 3.3 km (2 mi) of a public airport, and is not in the vicinity of a private airstrip. The nearest public airport is Long Beach Airport, approximately 12.9 km (8 mi) northeast of the project site. Several heliports exist within the port area. A heliport is located at Slip 93 and is used by Island Express Helicopters for trips in conjunction with the Catalina Terminal. The heliport is located approximately 0.4 km (0.25 mi) north of the project area and is surrounded by a 1.8-m (6-ft) –high barrier. The project site is not within the typical flight path of helicopters using the heliport. A second heliport, one that is seldom used, is located approximately 4.8 km (3 mi) to the southwest, at Ports O'Call. A third heliport exists on the southwest corner of Pier F in the POLB. This heliport is for the new Security Command and Control Center (SCCC) to serve security operations and coordination needs of numerous government agencies, including the U.S. Coast Guard (USCG), U.S. Customs and Border Protection (CBP), federal and state Homeland Security offices, Long Beach Police Department (LBPD), POLB Harbor Patrol and Security Division, as well as the Port of Los Angeles (POLA). The SCCC heliport is located on the roof of the SCCC building, and is located approximately 2.4 km (1.5 mi) south of the project area. The heliport operations approach and departure flight paths are over the water, and are not anticipated to be affected by the project.

As a result of distance from the project site, there is minimal potential for a related hazard to affect air traffic patterns, increase air traffic levels, or cause a substantial safety risk to air operations in the project area.

3.12.3.3.2 Alternative 2: SR-103 Extension to Alameda Street

3.12.3.3.2.1 Construction Effects

Under Alternative 2, construction effects and procedures related to hazardous and other wastes would be the same as those described for Alternative 1 for the bridge replacement and flyover portions of the project property (see Table 3.12-4).

In addition, Alternative 2 would include the property specific to the SR-103 Extension shown in Table 3.12-4. As shown in the table, portions of the proposed SR-103 alignment overlie two inactive landfills where uncontrolled dumping occurred and, although they are no longer in use, they were not closed in accordance with existing regulations. One of these, the Class II (contains chemically and biologically decomposable substances) Alameda Street Landfill, was operated from 1954 until 1963 and currently underlies the Intermodal Container Transfer Facility (ICTF). No information is publicly available regarding the second, adjacent landfill. Currently, no information is publicly available on the nature of the landfilled waste or on closure procedures that were implemented at the time for either landfill. However, the Alameda Street Landfill is being reviewed for possible inclusion on the National Priority List (NPL) (City of Carson, 2002), which would make it eligible as a superfund site to facilitate its cleanup.

With construction of Alternative 2, approximately 62 columns would be installed through the area of the two inactive landfills to support the new elevated expressway. The columns would be 3.6 m (12 ft) in diameter and extend to depths of 30.5 m (100 ft) below ground surface, potentially through hazardous waste. This would increase the exposure risk to workers and others in the vicinity form potential contact with the waste and potential emissions to the air. In addition, there is also the risk of contamination migrating downward as the columns are constructed through the landfill. Therefore, proper plans and procedures should be incorporated into the construction specifications so as to minimize this additional risk of contamination.

Prior to construction in this area, Caltrans would coordinate with the appropriate regulatory agencies including, but not limited to, the California Integrated Waste Management Board, Regional Water Board, Local Enforcement Agency, South Coast Air Quality Management District, and Department of Toxic Substances Control. Initially, Caltrans would develop plans and procedures to conduct a site investigation to determine the depth and lateral extent of the landfill, characterize the waste type (hazardous, designated, municipal solid waste, inert) and, as necessary, determine the presence of specific hazardous and/or toxic substances. Based on results of the waste characterization, further plans and procedures would be developed to remove the waste in accordance with safe management and disposal practices that are protective of human health and the environment. These would include procedures for contaminated soils to be appropriately transported and disposed offsite as RCRA hazardous, non-RCRA-hazardous, or non-hazardous waste (as defined by the state of California). These extensive activities could last years and impede completion of the project. For Alternative 2, the estimated costs of dealing with hazardous wastes along the entire project alignment (in 2007 dollars) are approximately $57 million.

3.12.3.3.2.2 Operations Effects

Under Alternative 2, operations effects related to the new bridge and flyover would be the same as those described for Alternative 1. Once the expressway facility is constructed and operational, no further involvement with hazardous materials on parcels within or adjacent to the corridor would occur. The expressway itself would permit the transport of such materials, which is governed by applicable federal and state laws, just as would be carried on any other state highway.

With the SR-103 Extension under Alternative 2, the chances of an accidental release of hazardous materials into the environment will be increased along the alignment, as there would be additional traffic along the route. All transport of hazardous materials is subject to federal, state and local regulations intended to minimize public safety risks. As required under law, the transportation of hazardous materials and wastes is monitored to ensure the notification of local jurisdictions in the event of a release.

There is the potential for spills of toxic and hazardous materials being transported on the facility proposed under Alternative 2. The potential for spills would be approximately the same as for spills on other existing roads and freeways in the project area. However, Alternative 2 would introduce the potential risk associated with highway transport of hazardous materials to areas not presently subject to this risk. There is the potential for a transportation accident involving hazardous materials to result in explosion, fire, physical contact by emergency response personnel, potential airborne exposure of the public to contaminants, and surface/groundwater contamination. The spill of a toxic and/or

hazardous waste from a vehicle would be regulated and cleaned up in accordance with existing federal, state, and local regulations.

Flyover design would entail drainage facilities that would channel any drainage or spill into collection systems and prevent spillage onto the roadway below.

The number of hazardous materials shipments carried along the new SR-103 Extension generally would be a function of the production of (or the demand for) hazardous materials within the region, and is not directly related to the size or condition of the expressway. Any increase in the number of hazardous materials shipments could bring an increased risk of upset or accidents involving the release of hazardous materials into the environment, although such risk is independent of implementation of Alternative 2. However, implementation of Alternative 2 would be expected to reduce traffic congestion and enhance safety generally, thereby reducing the risk of an accident involving a hazardous materials shipment.

3.12.3.3.3 Alternative 3: Bridge Demolition Avoidance

3.12.3.3.3.1 Construction Effects

Construction effects under Alternative 3 would be largely the same as those described for Alternative 1. However, Alternative 3 would involve greater encroachment onto Pier S than would Alternative 1 and could encounter the soil remediation cells on that site. In such an event, the DTSC would be contacted to determine the course of action that is most protective of human health and the environment prior to commencement of work. Although a Land Use Covenant has not been instituted on this site, the Port of Long Beach and DTSC will not allow disturbance of the soil without approval. Based on regulatory agency determination and test results, the soil either would be left in place or disposed of at an appropriate disposal site. In addition, this alternative will require the abandonment of two existing active oil wells on Pier S. The Division of Oil, Gas, and Geothermal Resources supervises the drilling, operation, maintenance, plugging, and abandonment of onshore and offshore oil, gas, and geothermal wells in order to prevent damage to life, health, and property and has requirements that must be followed to ensure such actions occur properly and to prevent future problems. Estimated costs (in 2007 dollars) are approximately $33 million.

To prevent hazards associated with idle, plugged, or abandoned wells, minimization measures have been proposed to ensure construction is conducted by the contractor in accordance with the requirements of the Division of Oil, Gas, and Geothermal Resources. As a result, adverse effects related to hazardous materials releases are not anticipated.

3.12.3.3.3.2 Operations Effects

Operations effects under Alternative 3 would be the same as those described for Alternative 1.

3.12.3.3.4 Alternative 4: Bridge Replacement Only

3.12.3.3.4.1 Construction Effects

Construction effects under Alternative 4 would be the same as those described for Alternative 1 for the bridge replacement only, as this alternative would not include construction of an expressway or flyover. Estimated costs (in 2007 dollars) are approximately $11 million.

3.12.3.3.4.2 Operations Effects

Operations effects under Alternative 4 would be the same as those described for Alternative 1 for the bridge replacement only.

3.12.3.3.5 Alternative 5: Transportation System Management

3.12.3.3.5.1 Construction Effects

Since the TSM alternative would not include any major capital improvements, there would be negligible effects related to hazardous materials and wastes as a result of the minor traffic improvements.

3.12.3.3.5.2 Operations Effects

With this alternative, the existing Schuyler Heim Bridge would remain in place and in use and, therefore, would require ongoing maintenance, as occurs under existing conditions. Bridge maintenance activities would include, but not be limited to, painting, surface treatments and surface cleaning, repaving, and repair of the substructure, joints, drainage structures, and pavement. As occurs under existing conditions, these activities include the potential for release of hazardous substances.

3.12.3.3.6 Alternative 6: No Build

3.12.3.3.6.1 Construction Effects

There are no construction effects associated with the No Build alternative.

3.12.3.3.6.2 Operations Effects

The operations effects under the No Build alternative are the same as those described above for Alternative 5. These effects include ongoing maintenance activities and the potential release of hazardous substances.

3.12.3.3.7 CEQA Consequences

Based on the information provided in the above analysis, in accordance with CEQA criteria, under Alternatives 1, 2, 3, 4, and 5, impacts would be less than significant or there would be no impact. Under Alternative 6, no impacts would occur related to hazardous waste and hazardous materials. Specifically, transport, use and disposal of hazardous materials, or accidental release of hazardous materials, would be less than significant under Alternatives 1 through 5. Under Alternatives 1 and 3, emissions within one-quarter mile of a school would be less than significant, and there would be no impact related to hazardous waste and hazardous materials under Alternatives 2, 4, 5, and 6.

Under Alternatives 1, 2, 3, and 4, impacts related to the project being located on a listed hazardous materials site, impacts would be less than significant. Under Alternatives 5 and 6, there would be no impact.

Under Alternatives 1 through 5, impacts related to project location within an airport land use plan, within 2 miles of an airport, or near a private airstrip would be less than significant, as would impacts related to emergency response or evacuation plans. There would be no impact under any of the six project alternatives to impacts related to wildland fires. For Alternative 6, there would be no impact.

Potential impacts of the proposed project alternatives related to Hazardous Waste/ Hazardous Materials are assessed in the context of CEQA criteria in Chapter 4.0 – CEQA Analysis. Also see Appendix A – CEQA Checklist (VII, Hazards and Hazardous Materials).

3.12.4 Avoidance, Minimization, and/or Mitigation Measures

When an alternative is selected, approved, and funded, an updated ISA and preliminary site investigation (PSI) will be performed during the Plans, Specifications, and Estimates (PS&E) phase of the project for all properties within the proposed alignment of the preferred alternative. This will identify sites that are environmentally adverse. If a build alternative is chosen, a parcel-by-parcel investigation will be performed for properties identified as environmentally adverse, with the potential to affect the alternative right-of-way.

3.12.4.1 Avoidance and Minimization Measures

3.12.4.1.1 Alternatives 1, 1A, and 4

3.12.4.1.1.1 Construction

HAZ-1 Conduct a soil investigation prior to any soil excavation for the build alternatives. The investigation would assess the potential presence of hazardous contaminants and determine disposal options if necessary for the contaminated soil. The soil investigation could consist of an ADL investigation and investigation for other contaminants of concern due to effects from adjoining properties. Coordination with regulatory agencies will be made for soil investigation, sampling, and/or remediation.

HAZ-2 Evaluate soil and groundwater information for the adjoining Sunshine Truck Stop, LA Refining Company, Texaco Refining, Texaco (1222 Anaheim Street), TCL (Pier S), Dow Chemical, and former Long Beach Naval Shipyard property to assess potential effects related to the project. If the review indicates evidence of contamination or a lack of sufficient data, a soil and groundwater investigation will be conducted, and further measures will be implemented, as necessary.

HAZ-3 Inform demolition contractors of the potential presence of LBP in structures subject to demolition, and applicable Occupational Safety and Health Administration (OSHA) and other regulatory measures shall be adhered to in the demolition of such structures. If contamination is encountered during the construction process, implement appropriate health and safety measures to protect workers and the general public. Such measures may include engineering controls, requiring appropriate personal protective equipment, worker monitoring, and site-specific health and safety plans.

HAZ-4 A licensed professional will conduct a predemolition survey of the Schuyler Heim Bridge ACM and LBP. The purpose of the survey would be to determine the presence of regulated and/or potentially hazardous construction materials on the bridge. Any demolition activities that would remove or disturb these materials would implement measures in accordance with applicable regulations. As required by law, the abatement contractor shall be a licensed professional.

HAZ-5 Conduct asbestos removal in conformance with Rule 1403 of the South Coast Air Quality Management District (SCAQMD) and EPA's National Emissions Standards for Hazardous Air Pollutants regulation.

HAZ-6 Paint from the dismantled bridge sections would be chemically removed at a suitable offsite location in an upland area. This will be done to avoid the

introduction of lead-based paint into the receiving waters. If paint removal is necessary during the dismantling process, the contractor would comply with all applicable laws and regulations to ensure protection of receiving waters.

3.12.4.1.2 Alternative 2

3.12.4.1.2.1 Construction

See **HAZ-1**, **HAZ-3**, **HAZ-4**, **HAZ-5**, and **HAZ-6**, above.

HAZ-7 Groundwater data for Alternative 2 currently are not available. However, considering the history and nature of activities conducted at some of the sites within the Alternative 2 right-of-way, it is recommended that a groundwater evaluation be conducted, to determine the measures necessary so as not to cause drag down of contamination during drilling/pile driving, migration of contamination, or create a conduit for migration of contamination, assess disposal alternatives for groundwater encountered during construction, and to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permitting process. If groundwater is found to be contaminated, it would be treated in place as allowed by a permit issued by the appropriate regulatory agency and/or transported for treatment and/or disposal at an appropriate facility, in accordance with applicable regulations.

HAZ-8 If soil excavation is necessary in the vicinity of the two former landfills along the Alternative 2 alignment, there is the potential to encounter hazardous waste, based on past activities. Therefore, it is recommended that a soil investigation be conducted. If soil is found to be contaminated, it would be treated in place and/or excavated and transported for treatment and/or disposal at an appropriate facility, in accordance with applicable regulations.

One of the former landfills, the Alameda Street Landfill, is proposed to be included in the National Priority List (NPL). Therefore, coordination with the U.S. Environmental Protection Agency and Department of Toxic Substances Control (DTSC) would be made while evaluating the viability of Alternative 2.

3.12.4.1.3 Alternative 3

3.12.4.1.3.1 Construction

See **HAZ-1** and **HAZ-2**, above.

HAZ-9 During construction of the identified alternative, the contactor will be required to contact the Division of Oil and Gas for appropriate requirements if any wells are affected by project construction. Further, the contractor will be required to prepare workplans that will provide procedures for construction near idle, plugged, or abandoned wells that meet the requirements of the Division of Oil and Gas specifications. The work plans will be submitted for review and approval prior to implementation.

HAZ-10 During construction of the identified alternative, the contractor will provide the Division of Oil and Gas with applicable building plans for review and approval. These documents will be prepared in accordance with the requirements outlined in the "Construction Project Site Review and Well Abandonment Procedure."

3.12.4.1.3.2 Operations

Under Alternative 3, the Schuyler Heim Bridge would remain in place and would require ongoing maintenance. The following would apply.

Maintenance Activities

A Federal Highway Administration (FHWA) study concluded that most highway maintenance practices that could adversely affect water quality can be effectively minimized or reduced through readily available control practices or BMPs. An NCHRP report notes that fully enclosed containment structures are capable of recovering 85 to 90 percent of abrasives, paint particles, and dust for simple spans. However, this may not be feasible for bridges with high trusses or other complex structures.

See **WQ-2** in Section 3.10, Water Quality and Stormwater Runoff.

3.12.4.1.4 Alternatives 5 and 6

Under Alternatives 5 and 6, the Schuyler Heim Bridge would remain in place and would require ongoing maintenance, as described above for Alternative 3.

See **WQ-2** in Section 3.10, Water Quality and Stormwater Runoff.

3.12.4.2 Mitigation Measures

No mitigation measures related to hazardous waste/hazardous materials are proposed for any of the project alternatives.

3.13 Air Quality

This chapter evaluates the potential air quality effects of the proposed action. The information contained in this section is based upon the *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study* which is hereby incorporated by reference in its entirety (Caltrans, 2009).

3.13.1 Regulatory Setting

3.13.1.1 Federal Requirements

Federal air quality policies are regulated through the federal Clean Air Act (CAA). The United States Environmental Protection Agency (EPA) adopted the CAA in 1970 and its amendments in 1977 and 1990. Pursuant to the CAA, EPA has established nationwide air quality standards to protect public health and welfare with an adequate margin of safety. These federal standards, known as the national ambient air quality standards (NAAQS), represent the maximum allowable atmospheric concentrations and were developed for seven "criteria" pollutants: ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter less than 10 microns in aerodynamic diameter, (PM_{10}) and $PM_{2.5}$, sulfur dioxide (SO_2), and lead (Pb). The State of California has also established maximum allowable concentrations for these pollutants. The federal (and California) ambient air quality standards are summarized in Table 3.13-1 and represent safe levels of each pollutant to avoid specific adverse effects to human health and the environment.

Table 3.13-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	Federal Standards[b]	
			Primary[c]	Secondary[d]
O_3	8 Hours	0.070 ppm	0.075 ppm	Same as Primary
	1 Hour	0.09 ppm	— [e]	— [e]
CO	8 Hours	9.0 ppm	9 ppm	—
	1 Hour	20 ppm	35 ppm	—
NO_2	Annual Average	0.03 ppm [h]	0.053 ppm	0.053 ppm
	1 Hour	0.18 ppm [h]	—	—
$S0_2$	Annual Average	—	0.030 ppm	—
	24 Hours	0.04 ppm	0.14 ppm	—
	3 Hours	—	—	0.5 ppm
	1 Hour	0.25 ppm	—	—
$PM_{2.5}$	Annual Geometric Mean	12 µg/m^3	15 µg/m^3	15 µg/m^3
	24 Hours	—	35 µg/m^3 [f]	35 µg/m^3
PM_{10}	Annual Arithmetic Mean	20 µg/m^3	—[f]	—
	24 Hours	50 µg/m^3	150 µg/m^3	150 µg/m^3
Lead	30-Day Average	1.5 µg/m^3	—	—
	Calendar Quarter	—	.15 µg/m^3	Same as Primary
Sulfates	24 Hours	25 µg/m^3	—	—

Table 3.13-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	Federal Standards[b]	
			Primary[c]	Secondary[d]
Hydrogen Sulfide	1 Hour	0.03 ppm	—	—
Vinyl Chloride	24 Hours	0.010 ppm	—	—
Visibility-Reducing Particles	8 Hours (10 AM to 6 PM, PST)	See Note [g]	—	—

Notes:

[a] California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, $PM_{2.5}$, and visibility-reducing particles are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

[b] National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than 1.

[c] National Primary Standards represent the levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[d] National Secondary Standards represent the levels of air quality necessary to protect the environment, including public welfare, from any known or anticipated adverse effects of a pollutant.

[e] On June 15, 2005, the 1-hour ozone standard of 0.12 parts per million (ppm) was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) areas. (Those areas do not yet have an effective date for their 8-hour designations.) The Los Angeles area is not an EAC.

[f] On September 21, 2006, the EPA promulgated a new 24-hour $PM_{2.5}$ standard and revoked the annual PM_{10} standard. These changes were effective December 17, 2006. To attain the new $PM_{2.5}$ standard, the 3-year average of the 98th percentile 24-hour concentration at each population-oriented monitor within an area must not exceed 35 $\mu g/m^3$.

[g] A sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

[h] The California air quality standards for NO_2 were amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.03 ppm. These changes became effective on March 20, 2008.

ppm parts per million by volume

PST Pacific Standard Time

$\mu g/m^3$ micrograms per cubic meter

Source: ARB, 2008 (http://www.arb.ca.gov/aqs/aqs.htm), updated 11/17/2008

The 1977 CAA amendment required each state to develop and maintain a State Implementation Plan (SIP) for each criteria pollutant that violates the applicable NAAQS. The SIP serves as a tool to avoid and minimize emissions of pollutants that exceed ambient threshold criteria and to achieve compliance with the NAAQS. In 1990, the CAA was amended to strengthen regulation of both stationary and mobile emission sources for criteria pollutants. Conformity to the SIP is defined under the 1990 CAA amendments as conformity with the plan's purpose in eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of these standards.

3.13.1.1.1 Transportation Conformity

Transportation conformity is an analytical process required for all federally funded transportation projects in California. The Southern California Association of Governments (SCAG) is the federally designated Metropolitan Planning Organization (MPO) responsible for transportation planning in the South Coast Air Basin (Basin). Air quality provisions in the CAA, transportation planning provisions of United States Code (USC) Title 23 and Title 49 and Code of Federal Regulations (CFR) Title 40 Parts 51 and 93 are intended to

ensure that integrated transportation and air quality planning occurs in areas such as Los Angeles County, which are designated by EPA as nonattainment or maintenance areas for ambient levels of CO, O_3, PM_{10}, and $PM_{2.5}$. The transportation conformity process establishes the major connection between transportation planning and emission reductions from transportation sources. In addition, the Intermodal Surface Transportation Efficiency Act of 1991 (revised in 1998 as TEA-21) linked compliance with conformity requirements to continued Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) funding of transportation plans, programs, and projects. These requirements were not changed with enactment of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) on August 10, 2005. The revised planning requirements set forth in SAFETEA-LU require SCAG to develop, update, and maintain the RTP on a 4-year cycle.

Under the 1990 CAA Amendments, the U.S. Department of Transportation cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to the SIP for achieving the goals of the CAA requirements. Conformity with the CAA takes place on two levels—first, at the regional level and second, at the project level. The proposed project must conform at both levels to be approved. A brief outline of the regional and project-level conformity process follows.

3.13.1.1.1.1 Regional Conformity Determination

Regional level conformity in California is concerned with how well the region is meeting the standards set for CO, NO_2, O_3, and PM. The South Coast Air Basin (SCAB) is currently designated as nonattainment for O_3, PM_{10}, and $PM_{2.5}$ and as an attainment/maintenance area for CO and NO_X. The SCAB is in attainment for the other criteria pollutants. At the regional level, Regional Transportation Plans (RTP) are developed that include all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, an air quality model is run to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the CAA are met. If the conformity analysis is successful, the regional planning organization, SCAG, and the appropriate federal agencies, such as the FHWA, make the determination that the RTP is in conformity with the SIP for achieving the goals of the CAA. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as described in the RTP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

3.13.1.1.1.2 Project-Level Conformity

In addition to regional conformity, a project-level conformity determination is also required in CO, PM_{10}, and $PM_{2.5}$ nonattainment and maintenance areas. The following criteria are required to demonstrate project-level conformity:

- The project is listed in a conforming RTP and Regional Transportation Improvement Program (RTIP).
- The design concept and scope that were in place at the time of the conformity finding are maintained through implementation.
- The project design concept and scope must be defined sufficiently to determine emissions at the time of the conformity determination.

- The project must not cause a new local violation of the federal standards for CO, PM_{10}, or $PM_{2.5}$ or exacerbate an existing violation of the federal standards for CO, PM_{10}, or $PM_{2.5}$.
- Project-level conformity also requires written commitment to implementation of air pollution control measures identified in the approved SIP and relied on for RTP conformity analysis; and any PM10 or PM2.5 control measures identified in the SIP for project-level implementation or committed to as part of the NEPA document (see 40 CFR 93.115(c)(2), 93.117, 123(c), and 125)..

Project-level conformity for the final criteria listed above is demonstrated by performing "hot spot" analyses in areas designated as "nonattainment" or "maintenance" areas for CO, PM_{10}, and $PM_{2.5}$. A region is a nonattainment area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas but have recently met the standard are called maintenance areas. Further discussion of attainment status is provided in Section 3.13.2.3.

3.13.1.1.1.3 Applicability of Transportation Conformity to the Proposed Action

The proposed action of Schuyler Heim Bridge replacement and the expressway is subject to transportation conformity requirement, as well as National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) evaluation.

3.13.1.1.2 Mobile Source Air Toxics (MSAT)

The CAA identified 188 air toxics, also known as hazardous air pollutants. EPA has assessed this expansive list of toxics and identified a group of 21 as mobile source air toxics (MSATs), which are set forth in an EPA final rule, Control of Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17235). EPA also extracted a subset of this list of 21 that it now labels as the six priority MSATs. These MSATs are benzene, formaldehyde, acetaldehyde, diesel particulate matter (DPM)/diesel exhaust organic gases, acrolein, and 1,3-butadiene. FHWA has developed an interim guidance on how to analyze MSATs in the NEPA process for highways. The entire MSAT analysis is presented in an Appendix to the Final Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study (Caltrans, 2009).

3.13.1.2 State Requirements

The California Air Resources Board (ARB) oversees California air quality policies. California ambient air quality standards (CAAQS), shown in Table 3.13-1, were established in 1969 pursuant to the Mulford-Carrell Act. These standards are generally more stringent than the NAAQS and include four additional pollutants: sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particulates. The California CAA, which was approved in 1988, requires each local air district in the state to prepare an Air Quality Management Plan (AQMP) that complies with the CAAQS.

Recently, California has also enacted regulations for emissions of greenhouse gases (GHGs), which contribute to climate change. While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to GHG emissions reduction and climate change research and policy have increased dramatically in recent years. In 2002, with the passage of Assembly Bill 1493 (AB 1493), California launched an innovative and pro-active approach to dealing with GHG emissions

and climate change at the state level. AB 1493 requires the ARB to develop and implement regulations to reduce automobile and light truck GHG emissions; these regulations will apply to automobiles and light trucks beginning with the 2009 model year.

In addition, on June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: (1) 2000 levels by 2010; (2) 1990 levels by the 2020; and (3) 80 percent below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that ARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

With Executive Order S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this executive order, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

Climate change and GHG reduction is also a concern at the federal level; however, at this time, no legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change. However, California, in conjunction with several environmental organizations and several other states, sued to force EPA to regulate GHGs as a pollutant under the Clean Air Act (*Massachusetts vs. Environmental Protection Agency et al.*, U.S. Supreme Court No. 05–1120. 549 U.S. Argued November 29, 2006—Decided April 2, 2007). The court ruled that GHGs do fit within the Clean Air Act's definition of a pollutant, and that EPA does have the authority to regulate GHGs. Despite the Supreme Court ruling, there are no promulgated federal regulations to date limiting greenhouse gas emissions.

3.13.1.3 Regional and Local Requirements

The South Coast Air Quality Management District (SCAQMD) is the local agency responsible for ensuring that federal and state ambient air quality standards are attained and maintained in the Greater Los Angeles area, which includes all or portions of Los Angeles, Orange, Riverside, and San Bernardino counties. SCAG is the federally designated MPO responsible for transportation planning. As such, SCAG is required to ensure that all transportation plans, programs, and projects conform to the state and federal Clean Air Acts. The SCAQMD AQMP/SIP outlines policies and mitigation measures to achieve federal and state standards for healthful air quality in the South Coast Air Basin (Basin). The most recent EPA-approved South Coast SIPs are the 1997 Air Quality Management Plan (SCAQMD, 1997) and the *1999 Amendment to the 1997 Ozone AQMP Revision for the South Coast Air Basin and Settlement Agreement on the 1994 Ozone SIP Litigation* (SCAQMD, 1999).

The 2003 AQMP/SIP was approved by the SCAQMD Board of Directors and ARB in 2003 (SCAQMD, 2003). The 2003 AQMP was submitted to EPA for approval on January 9, 2004. On March 25, 2004, EPA found the South Coast SIP budgets in the 2003 AQMP for transportation projects to be adequate (Federal Register [FR] Vol. 69, No. 58, 15325). The most recent AQMP, the 2007 Final AQMP/SIP, was adopted by the AQMD Board on June 1, 2007. On July 13, 2007, the AQMD Board adopted the 2007 Final AQMP Transportation Conformity Budgets and directed the Executive Officer to forward the adopted 2007 AQMP Transportation Conformity Budgets to the ARB for its approval and subsequent submittal to the EPA (SCAQMD, 2007). On September 27, 2007, the ARB Board adopted the State

Strategy for the 2007 SIP and the 2007 SCAQMD Plan as part of the SIP. The final 2007 AQMP, along with the transportation conformity budgets of SCAB, were submitted to EPA for approval on November 28, 2007. The 2007 AQMP submittal to the EPA included a request to reclassify the South Coast Air Basin to "extreme" nonattainment of the 8-hour ozone standard and to extend the attainment date to June 2024. In May 2008, EPA found that the baseline motor vehicle emissions budgets for 8-hour ozone and $PM_{2.5}$ in the 2007 AQMP, as amended on April 30, 2008, are adequate for transportation conformity purposes (73 FR 28110, May 15, 2008; as corrected on 73 FR 34837, June 18, 2008). However, EPA is currently being litigated on the adequacy finding on the $PM_{2.5}$ budgets. In the same notice, EPA also notified the public that the SIP-based motor vehicle emission budgets for 8-hour ozone and $PM_{2.5}$ are inadequate for transportation conformity purposes.

SCAQMD Rule 403 (Fugitive Dust) requires specific actions or measures to prevent, reduce, or mitigate particulate matter emissions generated from man-made fugitive dust sources. Required actions for each fugitive dust source within the active operation are listed in Rule 403 Table 1, Best Available Control Measures. Additional requirements for large operations with 50 acres or more of disturbed surface area, or with a daily earth-moving or throughput volume of 5,000 cubic yards are listed in Rule 403 Tables 2 and 3. However, the requirements for larger operations do not apply to this project.

SCAQMD Rule 1166 (Volatile Organic Compound Emissions from Decontamination of Soil) limits the emissions of volatile organic compounds (VOCs) from soil contaminated with VOC as a result of leakage from storage or transfer facilities, accidental spillage, or other deposition. Rule 1166 will apply during the construction phase of the proposed project and is addressed below in Section 3.13.3.5.1.1.

In addition, the City of Los Angeles has adopted its L.A. CEQA Thresholds Guide (City of Los Angeles 2006) that references the SCAQMD CEQA Air Quality Handbook (SCAQMD http://www.aqmd.gov/ceqa/handbook/signthres.pdf, accessed August 2008) to evaluate whether a project would cause any significant exposure of air toxics in project vicinity. Discussions of the health risk analysis of the project are included in Sections 3.13.3.4.3 and 3.13.3.6.

3.13.2 Affected Environment

3.13.2.1 Climate

The project site is located in the western-most portion of the Basin in Los Angeles County. The Basin experiences a mild and fairly dry climate, with mean average temperatures ranging from approximately 55 degrees Fahrenheit (°F) in the winter to approximately 83°F in the summer. Average wind speeds in the Basin are light and primarily from the west. The normal daily wind pattern is characterized by a daytime sea breeze and a weak nighttime land breeze. Region-wide elevated temperature inversions are common and can occur at any time of the year. The usually mild climatological pattern of the area is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. Elevated terrain to the north and east of the Basin, combined with temperature inversions and low wind speeds, often result in poor air circulation of the area and, consequently, poor air quality.

3.13.2.2 Ambient Air Quality

3.13.2.2.1 Criteria Pollutants

A network of ambient air quality monitoring stations located throughout the Basin characterize the air quality environment in the Basin. The North Long Beach monitoring station is located closest to the project area (approximately 5 miles northeast) and provides ambient air quality data representative of local conditions. The North Long Beach station monitors CO, O_3, SO_2, NO_2, PM_{10}, and $PM_{2.5}$. These six pollutants are called "criteria" pollutants. Federal and state standards that have been established represent the maximum allowable atmospheric concentrations of these pollutants. The state and federal ambient air quality standards are listed in Table 3.13-1. The following provides a summary of the criteria pollutant monitoring data for the time period 2001 through 2006, a description of mobile source air toxics, and a description of greenhouse gases.

Ambient air quality data from the North Long Beach monitoring station for the years 2001 through 2006 are summarized in Table 3.13-2, which lists maximum pollutant levels measured and the number of days each year the ambient concentrations were above federal and state standards. This discussion focuses on the three most recent years of the monitoring data (2004-2006). The state and federal CO, NO_2, and SO_2 standards for the years 2004 to 2006, inclusive, were not exceeded at the North Long Beach station. In the past 3 years, there were no violations of the federal 8-hour O_3 standard or the California 1-hour O_3 standard. The state annual arithmetic mean standard for PM_{10} has been exceeded in all 3 years, and a total of 13 days exceeded the state 24-hour PM_{10} standards. However, there have been no recorded exceedances of the federal 24-hour PM_{10} standard in the past 3 years. The current federal 24-hour $PM_{2.5}$ standard became effective December 2006, so the two exceedances reported in Table 3.13-2 for 24-hr $PM_{2.5}$ reflects exceedances of the old standard. The current federal 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$ was exceeded each year in the past 3 years. The state standard for the annual average $PM_{2.5}$ concentration was exceeded in each of the past 3 years, while the federal standard for the annual average $PM_{2.5}$ concentration for the same time period was exceeded in 2 of the 3 years.

PM_{10} monitoring data are available from other stations near the project site. SCAQMD operates three monitoring stations in the Long Beach and Wilmington area at Hudson School, Edison Elementary School, and the Wilmington Childcare Center for the Rule 1158 study (SCAQMD, 2004). The monitoring data indicated that the PM_{10} concentrations at Hudson School site were higher than the other stations. The monitoring data also indicated that the PM_{10} concentrations were decreasing over the past years at all three stations.

3.13.2.2.2 Mobile Source Air Toxics

In addition to the criteria pollutants, mobile source air toxics comprise another group of pollutants of concern in the South Coast Air Basin. The six priority MSATs are benzene, formaldehyde, acetaldehyde, DPM/diesel exhaust organic gases, acrolein, and 1,3-butadiene. The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment.

Table 3.13-2
Summary of Maximum Ambient Air Monitoring Levels

Pollutant	Averaging Time	2001	2002	2003	2004	2005	2006
CO (ppm)	1-Hour	6.0	5.8	5.5	4.2	4.2	4.2
	Days of State Exceedances	0	0	0	0	0	0
	Days of Federal Exceedances	0	0	0	0	0	0
	8-Hour	4.74	4.56	4.66	3.37	3.51	3.36
	Days of State Exceedances	0	0	0	0	0	0
	Days of Federal Exceedances	0	0	0	0	0	0
O_3 (ppm)	1-Hour	0.091	0.084	0.099	0.090	0.091	0.081
	Days of State Exceedances	0	0	1	0	0	0
	8-Hour	0.070	0.064	0.068	0.074	0.069	0.058
	Days of State Exceedances	--	--	--	--	--	--
	Days of Federal Exceedances	0	0	0	0	0	0
NO_2 (ppm)	Annual Average	0.030	0.029	0.029	0.028	0.024	0.022
	Federal Exceedances	0	0	0	0	0	0
	1-Hour	0.122	0.130	0.135	0.121	0.136	0.102
	Days of State Exceedances	0	0	0	0	0	0
SO_2 (ppm)	Annual Average	0.002	0.002	0.002	0.005	0.002	0.001
	Federal Exceedances	0	0	0	0	0	0
	24-Hour	0.009	0.008	0.008	0.013	0.010	0.010
	Days of State Exceedances	0	0	0	0	0	0
	Days of Federal Exceedances	0	0	0	0	0	0
	3-Hour	0.027	0.026	0.020	0.026	0.033	0.023
	Days of Federal Exceedances	0	0	0	0	0	0
	1-Hour	0.047	0.030	0.033	0.042	0.041	0.027
	Days of State Exceedances	0	0	0	0	0	0

Table 3.13-2
Summary of Maximum Ambient Air Monitoring Levels

Pollutant	Averaging Time	2001	2002	2003	2004	2005	2006
PM_{10} ($\mu g/m^3$)	Annual Arithmetic Mean	37	36	33	33	30	31
	State Exceedances	1	1	1	1	1	1
	24-Hour	91	74	63	72	66	78
	Days of State Exceedances	10	5	4	5	4	5
	Days of Federal Exceedances	0	0	0	0	0	0
$PM_{2.5}$ ($\mu g/m^3$)	Annual Arithmetic Mean	21.2	19.5	18	17.9	15.9	14.1
	State Exceedances	1	1	1	1	1	1
	Federal Exceedances	1	1	1	1	1	0
	24-Hour	72.9	62.7	115.2	66.6	53.8	58.5
	Days of Federal Exceedances	1	0	3	1	0	0

Notes:
1. Monitoring data from the North Long Beach Monitoring Station (060374002) monitor.
2. Hydrogen sulfide, vinyl chloride, and visibility-reducing particles are not monitored.
ppm parts per million
$\mu g/m^3$ micrograms per cubic meter
Source: CARB, 2007b, www.arb.ca.gov/adam/welcome, as of July 2007.
EPA, 2007, www.epa.gov/air/data, as of July 2007.

The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken verbatim from EPA's IRIS database and represents the EPA's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- Benzene is characterized as a known human carcinogen.
- The potential carcinogenicity of acrolein cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- Formaldehyde is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- 1,3-butadiene is characterized as carcinogenic to humans by inhalation.
- Acetaldehyde is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- Diesel exhaust is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.

Diesel exhaust also represents chronic respiratory effects, possibly the primary non-cancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. The SCAQMD recently completed the Multiple Air Toxics Exposure Study III (MATES-III), which is a monitoring and risk evaluation study conducted periodically in the South Coast Air Basin (SCAQMD, 2008). The MATES-III study included a monitoring program, an updated emissions inventory of toxic air contaminants (TACs), and a modeling effort to characterize risk across the Basin (SCAQMD, 2008). Compared to previous studies of air toxics in the Basin, the MATES-III study found decreasing risks for air toxics exposures (SCAQMD, 2008). Although the study showed exposures to emissions of air toxics are being reduced overall, the study concludes that the risks remain unacceptable, and are higher near areas such as the ports and transportation corridors (SCAQMD, 2008). The highest risks were found near the Port area, in areas near central Los Angeles, and in areas near transportation corridors (SCAQMD, 2008).

In addition to the MATES-III study, the following studies also correlated adverse health impacts from exposure to diesel particulate matter near the Ports and roadways:

- California Air Resources Board. 2006. Final Diesel Particulate Matter Exposure Assessment Study for the Ports of Los Angeles and Long Beach.
- Green, R.S. Smorodinsky S., Kim J.J., et al. Proximity of California Public Schools to Busy Roads. January 2004. Environmental Health Perspectives 2004; 112:61-66.
- Kim J.J., Smorodinsky S., Lipsett M., et al. Traffic-Related Air Pollution Near Busy Roads. The East Bay Children's Respiratory Health Study. June 2004. American Journal of Respiratory and Critical Care Medicine 2004; 170:520-526.

- Zhu Y., Hinds W., Kim S., Sioutas C. Concentration and Size Distribution of Ultrafine Particles Near a Major Highway. Journal of Air and Waste Management Association. September 2002. 52: 1032-1042.

There have also been several other monitoring studies in the area near the proposed action. The ARB conducted a special Community Air Quality Monitoring Study in which monitoring data and potential cancer risks at the Wilmington School and North Long Beach stations were evaluated, with the exception of risks identified for diesel PM_{10} (ARB, 2003). The study found that PM_{10} concentrations measured at Wilmington School were higher than the levels measured at the North Long Beach station (ARB, 2003). The following are additional references of completed monitoring studies and on-going monitoring near the proposed action:

- SCAQMD MATES-III Study included ten monitoring sites. The monitoring data is available at http://www.aqmd.gov/prdas/matesIII/matesIII.html
- SCAQMD Rule 1158 studies which include monitoring data from Elizabeth Hudson Elementary School. These studies are available at http://www.aqmd.gov/tao/Rule1158Studies.htm
- The Port of Los Angeles air quality monitoring stations includes two community stations; one station is the Wilmington Community Station and the other station is the San Pedro Community Station. These monitoring stations have been operational since February 2005. The monitoring data is available at http://www.portoflosangeles.org/environment_aqm_results.htm
- ARB monitors toxics at the North Long Beach Station. Information about the monitoring network and monitoring data is available at http://www.arb.ca.gov/aaqm/toxics.htm

3.13.2.2.3 Greenhouse Gases

The final category of pollutants included as part of the ambient air discussion is greenhouse gases. Greenhouse gases (GHG) include the following pollutants (EPA, 2007):

- Carbon dioxide (CO_2) is a naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes, and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance.
- Methane (CH_4) is a greenhouse gas with a global warming potential most recently estimated at 23 times that of CO_2. CH_4 is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.
- Nitrous oxide (N_2O) is a greenhouse gas with a global warming potential of 296 times that of CO_2. Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.
- Hydrofluorocarbons (HFCs) are compounds containing only hydrogen, fluorine, chlorine, and carbon. HFCs have been introduced as a replacement for the chlorofluorocarbons identified as ozone depleting substances.

- Perfluorocarbons (PFCs) are compounds containing only fluorine and carbon. Similar to HFCs, PFCs have been introduced as a replacement for chlorofluorocarbons. PFCs are also used in manufacturing and emitted as by-products of industrial processes. PFCs are powerful greenhouse gases.
- Sulfur hexafluoride (SF_6) is a colorless gas soluble in alcohol and ether, and slightly soluble in water. It is a very powerful greenhouse gas used primarily in electrical transmission and distribution systems, as well as dielectrics in electronics.

According to a recent white paper by the Association of Environmental Professionals (Hendrix *et al,* 2007), "an individual project does not generate enough greenhouse gas emissions to significantly influence global climate change." Global climate change is a cumulative impact, and a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of greenhouse gases.

Caltrans and its parent agency, the Business, Transportation, and Housing Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels, and 40 percent of all human made GHG emissions are from transportation, Caltrans has created and is implementing the Climate Action Program at Caltrans (Caltrans, 2006). One of the main strategies in the Caltrans Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (0-25 miles per hour [mph]) and speeds over 55 mph (the most severe emissions occur from 0-25 miles per hour). Relieving congestion by enhancing operations and improving travel times in high congestion travel corridors will lead to an overall reduction in GHG emissions. The proposed project would be expected to relieve congestion and improve travel times, which may result in an overall reduction of GHG emissions.

3.13.2.3 Attainment Status

The federal CAA requires the EPA to designate areas in the country as attainment or nonattainment with respect to each criteria pollutant, depending on whether the areas meet the national ambient air quality standards. Similarly, the California CAA requires the ARB to designate areas in the state as attainment or nonattainment, depending on whether the areas meet the California ambient air quality standards. (Section 3.13.1.1 provides a detailed discussion of the federal CAA.) Both the EPA and ARB have used counties as the areas to designate attainment/nonattainment status in California. Table 3.13-3 presents the current State and Federal designations for Los Angeles County, which includes the project area.

Table 3.13-3
State and Federal Air Quality Designations for Los Angeles County (as of October 2008)

Pollutant	State Designation	Federal Designation
Ozone (8-hour)	Nonattainment	Severe Nonattainment [1]
Ozone (1-hour)	Nonattainment	Revoked [70 FR 44470] [2]
PM_{10}	Nonattainment	Serious Nonattainment

Table 3.13-3
State and Federal Air Quality Designations for Los Angeles County (as of October 2008)

Pollutant	State Designation	Federal Designation
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Attainment/Maintenance [3]
NO_2	Attainment	Attainment/Maintenance
All Others	Attainment/Unclassified	Attainment/Unclassified

Notes:
1. In 2008, the ARB made a formal request to the EPA to re-classify the South Coast Air Basin from "severe-17" to "extreme" nonattainment of the 8-hour ozone standard.
2. On June 15, 2005, the 1-hour ozone standard of 0.12 parts per million (ppm) was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) areas. (Those areas do not yet have an effective date for their 8-hour designations.)
3. EPA has re-designated South Coast Air Basin as attainment for CO, effective June 11, 2007.

Data sources:

CARB, 2006 State Area Designations, http://www.arb.ca.gov/desig/desig.htm, accessed in July 2007.

EPA, www.epa.gov/air/oaqps/greenbk/index.html, federal designation as of June 15, 2007.

3.13.2.4 Sensitive Receptors

Sensitive air quality receptors, as defined by the SCAMQD (2006), include receptors such as residences, schools, and hospitals. The ambient air concentrations shown in Table 3.13-2 are representative of the existing conditions experienced by sensitive receptors located near the project area. The immediate vicinity of the project area includes the Port of Long Beach and the community of Wilmington in Los Angeles. The community of Wilmington is just west of the proposed SR 47 Expressway and includes sensitive air quality receptors such as residences, schools, and hospitals. The nearest hospital is located about 1.4 miles northwest of the north end of the proposed SR-47 Expressway. The nearest residences are approximately 100 feet west of the SR 47 Expressway near Alameda Street and Henry Ford Avenue. The school nearest to the proposed project is the Wilmington Park School at 1140 Mahar Avenue, approximately 700 feet west of the connection of proposed SR-47 and Alameda Street. Other schools in the area include:

- Holy Family Grammar School (1122 Roubidoux)
- Phineas Banning High School (1527 Lakme Avenue)
- Bonita Street Elementary School (21929 Bonita Street)
- Webster Elementary School (1755 West 32 Way)
- Elizabeth Hudson Elementary School (2335 Webster Avenue)
- Muir Elementary School (3038 Delta Avenue)
- California Heights Parent Participation Nursery School (1500 East Carson Street)
- Reid High School (2152 West Hill Street)
- Mary McLeod Bethune Child Development Center (2041 San Gabriel Avenue)
- Stephens William Logan Middle School (1830 West Columbia Street)
- Cabrillo High School (2001 Santa Fe Avenue)

Residences are also located aboard moored vessels in the marina to the west of the Schuyler Heim and Henry Ford bridges. Along the northern border of the project area, there

are residences located in the City of Carson between Dominguez Street and I-405. The Long Beach Silverado Senior Center is located near the project area at 1545 West 31st Street.

3.13.3 Environmental Consequences

3.13.3.1 Federal Evaluation Criteria

3.13.3.1.1 Transportation Conformity

As stated above, the following items are required to demonstrate project-level conformity for the SR-47 Expressway:

- The project is listed in a conforming RTP and RTIP.
- The design concept and scope that were in place at the time of the conformity finding are maintained through implementation.
- The project design concept and scope must be defined sufficiently to determine emissions at the time of the conformity determination.
- The project must not cause a new local violation of the federal standards for CO, PM_{10}, or $PM_{2.5}$ or exacerbate an existing violation of the federal standards for CO, PM_{10}, or $PM_{2.5}$.

3.13.3.1.2 Mobile Source Air Toxics

Currently, there are no established criteria for determining when MSAT emissions should be considered a significant issue in the NEPA context. FHWA has developed an interim guidance on how to analyze MSATs in the NEPA process for highways. Depending on the specific project circumstances, FHWA has identified three levels of analysis depending on a project's potential MSAT impacts: (1) no analysis for projects with no potential for meaningful MSAT effects; (2) qualitative analysis for projects with low potential MSAT effects; and (3) quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

3.13.3.2 State Evaluation Criteria

Public agencies are authorized to establish thresholds of significance that the agency will use to determine the significance of environmental effects (Section 21082and CEQA Guidelines Section 15064.7).These thresholds are meant to promote consistency, efficiency, and predictability in the initial study process (OPR, *Thresholds of Significance: Criteria for Defining Environmental Significance* CEQA Technical Advice Series, September 1994). As Caltrans has statewide jurisdiction, it has not and has no intention to develop thresholds of significance for CEQA. Caltrans made this decision because the setting for projects varies so extensively across the state and the significance of an effect depends on the environmental setting. Rather, Caltrans will continue to analyze significance on a case-by-case basis looking at the degree and intensity of the impacts.

Chapter 4.0, CEQA Analysis, contains Caltrans' evaluation of the potential impacts of the proposed project alternatives in the context of CEQA criteria for Air Quality.

3.13.3.3 Regional and Local Evaluation Criteria

3.13.3.3.1 Criteria Pollutant Emissions Thresholds

In addition to the CEQA criteria, the SCAQMD has recommendations for construction and operation significance thresholds. Air quality impacts resulting from construction were deemed significant if daily emission estimates were above the significance thresholds for

construction emissions provided in the SCAQMD CEQA Air Quality Handbook (SCAQMD, 2006). The construction emission thresholds are provided below.

- 75 pounds per day ROG
- 100 pounds per day NO_X
- 550 pounds per day CO
- 55 pounds per day $PM_{2.5}$
- 150 pounds per day PM_{10}
- 150 pounds per day SO_X

Indirect impacts resulting from marine vessel emissions would be considered significant if the resulting increase would be above the significance thresholds for operational emissions provided in the SCAQMD CEQA Air Quality Handbook (SCAQMD, 2006). The operational emission thresholds are provided below.

- 55 pounds per day ROG
- 55 pounds per day NO_X
- 550 pounds per day CO
- 55 pounds per day $PM_{2.5}$
- 150 pounds per day PM_{10}
- 150 pounds per day SO_X

3.13.3.3.2 Health Risk Assessment Thresholds

Two approaches were considered for the Health Risk Assessment (HRA) thresholds. As summarized below, the first presents the Caltrans' approach and the second presents Alameda Corridor Transportation Authority's (ACTA) approach to HRA thresholds.

Caltrans Approach on HRA Thresholds

Caltrans has not adopted HRA thresholds and is not subject to local jurisdictions or their thresholds of significance. However, Caltrans remains committed to thoroughly analyzing air quality impacts and incorporating measures to avoid, minimize and if necessary mitigate them.

ACTA's Approach on HRA Thresholds:

Pursuant to the City of L.A. and SCAQMD CEQA thresholds, health risk is considered significant if the incremental increase of cancer risk due to a project exceeds ten in one million (10×10^{-6}) or if the increase of chronic or acute hazard index from the project exceeds 1.0.

Cancer, chronic and acute risk thresholds are typically applied to stationary sources of emissions rather than linear mobile sources such as the proposed project. However, for purposes of the proposed project analysis, ACTA, a joint powers authority of which both the City of Los Angeles and the Port of Los Angeles are members, elected to conduct an HRA as part of its funded portion of the proposed project and to use the health risk significance levels from the City of L.A. Thresholds Guideline (consistent with the SCAQMD thresholds). Therefore, ACTA would consider the health risk to be significant if the incremental increase of cancer risk due to a project exceeds ten in one million (10×10^{-6}) or if the increase of chronic or acute hazard index from the project exceed 1.0.

3.13.3.4 Methodology

3.13.3.4.1 Transportation Conformity

Project-level transportation conformity is demonstrated by inclusion of the project in the adopted RTP and approved RTIP. Both the regional-level and project–level CO, PM_{10}, and $PM_{2.5}$ hot spot analyses for the proposed build alternatives during project operations will have been addressed as required by the regional plan and program. The hot spot analyses were based on the Caltrans guidance document, *Transportation Project-Level Carbon Monoxide Protoco*l (*CO Protocol*) (UCD, 1997) and the FHWA/EPA guidance document, *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (EPA, 2006). The CO hot spot modeling was performed using CAL3QHC according to the methodology outlined in the *CO Protocol*. CO emission factors were calculated with EMFAC2007, using default vehicle population data for the Basin. The modeled CO concentrations were combined with the predicted CO background concentrations and compared with the air quality standards. The CO hot spot analysis is summarized in Section 3.13.3.4.1.2. The PM_{10} and $PM_{2.5}$ hot spot analyses are summarized in Section 3.13.3.4.1.3. Detailed documentation of the CO and PM_{10}/$PM_{2.5}$ hotspot analyses are available in appendixes to the Air Quality Technical Study (Caltrans, 2009).

The proposed Schuyler Heim Bridge Replacement and SR-47 Expressway Project (Project ID: LA0D45) is included in the Southern California Association of Governments (SCAG) conforming 2008 RTP and final 2008 RTIP that was adopted by SCAG on July 17, 2008. Federal approval of the 2008 RTIP was issued on November 17, 2008. On May 6, 2009, FHWA determined the project-level conformity requirements for the proposed project have been met. The letter with FHWA's determination is included as Appendix O.

3.13.3.4.1.1 Vehicle Operations Emissions

The Schuyler Heim Bridge/SR-47 project is consistent with the federally approved 2008 RTP and 2008 RTIP. The project meets the regional transportation conformity requirements. The vehicle operations emissions were included in this section for illustration purposes only.

Criteria pollutant emissions are predicted to decrease in future years for both the No Build and Build Alternatives when compared to the existing conditions. As shown in Table 3.13-4, criteria pollutant emissions from Alternatives 1 and 3 are lower than emissions from the No Build alternative due to a predicted decrease in vehicle miles traveled (VMT) in the study area for 2011, 2015, and 2030. Emissions for Alternative 4 are predicted to be the same as those for the No Build alternative because VMT in the project area is predicted to be the same. CO emissions from Alternative 2 in 2011 and 2015 are slightly higher than the No Build alternative because Alternative 2 has a higher passenger car VMT. Increased VMT for Alternative 2 is attributable to increased capacity from the extension of SR-103. All future year scenarios have emissions less than the baseline 2003 conditions. This decrease in emissions over time can be attributed to EPA and ARB regulations that would require cleaner fuels and cleaner engines in future years.

Table 3.13-4
Peak Daily Vehicle Emissions for the Project Study Area

Year	Alternative	CO (lb/day)	NO_X (lb/day)	ROG (lb/day)	SO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
2003	Existing Conditions	54,560	26,620	2,893	207	1,131	901
2011	No Build	24,544	18,138	1,417	52	876	669
	Alternative 1	24,399	17,989	1,402	52	871	665
	Alternative 2	24,635	16,934	1,364	51	836	632
	Alternative 3	24,399	17,989	1,402	52	871	665
	Alternative 4	24,544	18,138	1,417	52	876	669
2015	No Build	19,161	13,114	1,096	57	784	577
	Alternative 1	18,988	12,967	1,079	57	779	574
	Alternative 2	19,188	13,165	1,093	57	789	582
	Alternative 3	18,988	12,967	1,079	57	779	574
	Alternative 4	19,161	13,114	1,096	57	784	577
2030	No Build	11,153	5,902	704	72	629	455
	Alternative 1	10,870	5,704	664	72	625	441
	Alternative 2	10,960	5,770	671	72	631	445
	Alternative 3	10,870	5,704	664	72	625	441
	Alternative 4	11,153	5,902	704	72	629	455

3.13.3.4.1.2 Localized CO Effects

The fourth criteria for demonstrating transportation conformity is an analysis of CO, PM_{10}, and $PM_{2.5}$ hot spots. Localized CO effects were assessed by estimating the maximum ambient CO concentrations near the intersections assumed to have the greatest potential effect for the buildout and planning horizon years of 2011 and 2030, respectively. The predicted concentrations were compared to the NAAQS and CAAQS for CO. Detailed input values and modeling files are available in the Air Quality Technical Study (Caltrans, 2009). Maximum 1-hour and 8-hour CO concentrations were estimated at each of the eight intersections for the build and the No Build alternatives. Potential effects were assessed for the base year, 2003, and multiple build alternatives for 2011 and 2030 using the respective PM peak-hour traffic projections (Caltrans, 2009). In addition, CO hotspot modeling was also performed for the two intersections that are affected by the flyover in 2015. The majority of the project will be complete by the opening year of 2011; however, the flyover at Ocean Boulevard and SR-47 will be complete in 2015.

Table 3.13-5 presents the peak 1-hour and 8-hour CO concentrations for the baseline conditions in 2003. Table 3.13-6 presents the peak 1-hour and 8-hour CO concentrations predicted under no build and buildout conditions (2011 and 2030). Table 3.13-7 presents the peak 1-hour and 8-hour CO concentrations predicted under no build and buildout conditions for the year 2015 when the flyover will be complete. Tables 3.13-5, 3.13-6, and 3.13-7 show that the maximum 1-hour CO concentrations and the maximum 8-hour CO concentrations

would be well below both the state and federal standards. Based on the results of this analysis, the proposed project would not contribute to a violation of the CO standards.

Table 3.13-5
Maximum Predicted CO Concentrations, Base Conditions (2003)

Intersection	Maximum 1-Hour CO Concentration (ppm)	Maximum 8-Hour CO Concentration (ppm)
Henry Ford Avenue/Anaheim Street	7.1	5.8
Alameda Street/Anaheim Street	7.1	5.8
Alameda Street/Pacific Coast Highway north of Pacific Coast Highway	6.4	5.3
Alameda Street/Sepulveda Boulevard north of Sepulveda	7.2	5.9
Alameda Street/Sepulveda Boulevard east of Alameda	7.2	5.9
Alameda Street/223rd Street south of 223rd Street	6.5	5.4
Ocean Boulevard. Westbound/SR-47	N/A	N/A
Ocean Boulevard. Eastbound/SR-47	N/A	N/A
National Ambient Air Quality Standards	35	9
California Ambient Air Quality Standards	20	9

Notes:

1. Concentrations include a predicted 1-hour background concentration of 5.5 ppm and an 8-hour background concentration of 4.7 ppm, representing the measured CO concentrations from 2003
2. Ocean Boulevard ramps do not exist in Base 2003 scenario.
3. The maximum 8-hour CO concentration was calculated by multiplying the project level 1-hour CO concentration by the 8-hour persistence factor (0.7) and adding the 8-hour CO background concentration (4.7 ppm).

Table 3.13-6
Maximum Predicted CO Concentrations – 2011 and 2030

Intersection	Alternative	Maximum 1-Hour CO Concentration (ppm)		Maximum 8-Hour CO Concentration (ppm)	
		2011	2030	2011	2030
Henry Ford Avenue/ Anaheim Street	No Build	5.9	5.6	4.5	4.3
	Alt 1 - PM Peak Hour	5.8	5.6	4.4	4.3
	Alt 2 - PM Peak Hour	5.8	5.5	4.4	4.2
	Alt 3 - PM Peak Hour	5.8	5.6	4.4	4.3
	Alt 4 - PM Peak Hour	5.9	5.6	4.5	4.3
Alameda Street/Anaheim Street	No Build	5.9	5.6	4.5	4.3
	Alt 1 - PM Peak Hour	5.8	5.6	4.4	4.3
	Alt 2 - PM Peak Hour	5.8	5.5	4.4	4.2
	Alt 3 - PM Peak Hour	5.8	5.6	4.4	4.3
	Alt 4 - PM Peak Hour	5.9	5.6	4.5	4.3

Table 3.13-6
Maximum Predicted CO Concentrations – 2011 and 2030

Intersection	Alternative	Maximum 1-Hour CO Concentration (ppm)		Maximum 8-Hour CO Concentration (ppm)	
		2011	2030	2011	2030
Alameda Street/PCH	No Build	5.6	5.4	4.3	4.1
	Alt 1 - PM Peak Hour	5.6	5.5	4.3	4.2
	Alt 2 - PM Peak Hour	5.5	5.3	4.2	4.0
	Alt 3 - PM Peak Hour	5.6	5.5	4.3	4.2
	Alt 4 - PM Peak Hour	5.6	5.4	4.3	4.1
Alameda Street North of Sepulveda Boulevard	No Build	6	5.8	4.5	4.4
	Alt 1 - PM Peak Hour	6.2	5.8	4.7	4.4
	Alt 2 - PM Peak Hour	6.5	5.7	4.9	4.3
	Alt 3 - PM Peak Hour	6.2	5.8	4.7	4.4
	Alt 4 - PM Peak Hour	6	5.8	4.5	4.4
Sepulveda Boulevard east of Alameda Street	No Build	6	5.8	4.5	4.4
	Alt 1 - PM Peak Hour	6.2	5.8	4.7	4.4
	Alt 2 - PM Peak Hour	6.5	5.7	4.9	4.3
	Alt 3 - PM Peak Hour	6.2	5.8	4.7	4.4
	Alt 4 - PM Peak Hour	6	5.8	4.5	4.4
Alameda Street/223rd Street	No Build	5.6	5.5	4.3	4.2
	Alt 1 - PM Peak Hour	5.7	5.4	4.3	4.1
	Alt 2 - PM Peak Hour	5.6	5.6	4.3	4.3
	Alt 3 - PM Peak Hour	5.7	5.4	4.3	4.1
	Alt 4 - PM Peak Hour	5.6	5.5	4.3	4.2
Ocean Boulevard Westbound/SR-47	No Build	5.5	5.5	4.2	4.2
	Alt 1 - PM Peak Hour	5.7	5.4	4.3	4.1
	Alt 2 - PM Peak Hour	5.7	5.4	4.3	4.1
	Alt 3 - PM Peak Hour	5.7	5.4	4.3	4.1
	Alt 4 - PM Peak Hour	5.5	5.5	4.2	4.2
Ocean Boulevard Eastbound/SR-47	No Build	5.5	5.5	4.2	4.2
	Alt 1 - PM Peak Hour	5.7	5.4	4.3	4.1
	Alt 2 - PM Peak Hour	5.7	5.4	4.3	4.1
	Alt 3 - PM Peak Hour	5.7	5.4	4.3	4.1
	Alt 4 - PM Peak Hour	5.5	5.5	4.2	4.2

Table 3.13-6
Maximum Predicted CO Concentrations – 2011 and 2030

Intersection	Alternative	Maximum 1-Hour CO Concentration (ppm)		Maximum 8-Hour CO Concentration (ppm)	
		2011	2030	2011	2030
National Ambient Air Quality Standards		35		9	
California Ambient Air Quality Standards		20		9	

Notes:
1. Concentrations include a predicted 1-hour background concentration of 5.1 ppm and an 8-hour background concentration of 3.9 ppm in 2011 and 2030. These are the predicted future concentrations for 2010 and 2020 from SCAQMD CO Concentrations, http://www.aqmd.gov/ceqa/handbook/CO/CO.html.
2. The maximum 8-hour CO concentration was calculated by multiplying the project level 1-hour CO concentration by the 8-hour persistence factor (0.7) and adding the 8-hour CO background concentration (3.9 ppm).

Table 3.13-7
Maximum Predicted CO Concentrations – 2015

Intersection	Alternative	Maximum 1-Hour CO Concentration (ppm)	Maximum 8-Hour CO Concentration (ppm)
		2015	2015
Ocean Blvd. Westbound/SR-47	No Build	5.6	4.3
	Alt 1 - PM Peak Hour	5.7	4.3
	Alt 2 - PM Peak Hour	5.5	4.2
	Alt 3 - PM Peak Hour	5.7	4.3
	Alt 4 - PM Peak Hour	5.6	4.3
Ocean Blvd. Eastbound/SR-47	No Build	5.6	4.3
	Alt 1 - PM Peak Hour	5.7	4.3
	Alt 2 - PM Peak Hour	5.5	4.2
	Alt 3 - PM Peak Hour	5.7	4.3
	Alt 4 - PM Peak Hour	5.6	4.3
National Ambient Air Quality Standards		35	9
California Ambient Air Quality Standards		20	9

Notes:
1. Concentrations include a predicted 1-hour background concentration of 5.1 ppm and an 8-hour background concentration of 3.9 ppm in 2015. These are the predicted future concentrations for 2015 (SCAQMD CO Concentrations, http://www.aqmd.gov/ceqa/handbook/CO/CO.html).
2. The maximum 8-hour CO concentration is calculated by multiplying the project level 1-hour CO contribution by the 8-hour persistence factor (0.7) and adding the 8-hour CO background concentration.
3. The NAAQS for CO are 35 ppm (1-hour) and 9 ppm (8-hour). The CAAQS for CO are 20 ppm (1-hour) and 9 ppm (8-hour).

3.13.3.4.1.3 Localized PM_{10} and $PM_{2.5}$

Localized PM_{10} and $PM_{2.5}$ effects were analyzed following the *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM_{10} and $PM_{2.5}$ Nonattainment and Maintenance Area* (EPA, 2006) (PM Guide). On March 10, 2006, EPA issued amendments to the Transportation Conformity Rule to address localized impacts of particulate matter: "*$PM_{2.5}$ and PM_{10} Hot-Spot Analyses in Project-level Transportation Conformity Determinations for the New $PM_{2.5}$ and Existing PM_{10} National Ambient Air Quality Standards*" (71 FR 12468). As required by the amended transportation conformity rule, a qualitative $PM_{2.5}$ hot spot analysis was completed as part of the project-level conformity analysis. However, the PM_{10} hot-spot analysis was originally prepared before the release of the Transportation Conformity Rule amendments in March 2006 following the *Technical Report: Particulate Matter and Transportation Project Analysis Protocol* (UCD, Caltrans, FHWA; 2005). According to 40 CFR 93.104(d), conformity must be re-determined if there is a three year lapse since initiation of the environmental document for air quality purposes. Since final approval of the proposed project is expected beyond March 2009, the PM_{10} hot-spot analysis has been updated to follow the March 2006 guidelines. This section presents a summary of the PM_{10} and $PM_{2.5}$ hot-spot analyses. A more detailed description of the PM_{10} and$PM_{2.5}$ analyses are contained in the Air Quality Technical Study (Caltrans, 2009).

A qualitative PM_{10} and $PM_{2.5}$ hot-spot analysis was performed following the *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (EPA, 2006) [PM Guide]. The proposed project is located in Los Angeles County, which is designated as nonattainment for the federal PM_{10} and $PM_{2.5}$ standards and is required to attain and maintain the NAAQS. The hot-spot analysis addresses the 24-hour federal PM_{10} standard (150 $\mu g/m^3$). The current $PM_{2.5}$ 24-hour standard (35 $\mu g/m^3$) became effective on December 17, 2006. However, the nonattainment designations are based on the previous 24-hour standard of 65 $\mu g/m^3$. Therefore, $PM_{2.5}$ conformity for the proposed action was evaluated for the 24-hour standard of 65 $\mu g/m^3$ and annual standard of 15 $\mu g/m^3$. Based on the project types listed in the PM Guide, the proposed project would be categorized as a new or expanded highway project that would have a significant number of diesel vehicles, and would affect intersections that are at LOS D, E, or F with a significant number of diesel vehicles. The proposed project would be considered a project of air quality concern based on the criteria listed in the final conformity rule (40 CFR 93.123 [b][1]). Therefore, a qualitative project-level hot spot assessment was conducted in order to assess whether the project would cause or contribute to any new localized PM_{10} or $PM_{2.5}$ violations, or increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{10} or $PM_{2.5}$ NAAQS.

The hot spot analysis was based on directly emitted emissions, including, tailpipe, brake wear, and tire wear, because the direct emissions have the potential to cause nearby hot spots, or localized areas of elevated concentration. Re-entrained road dust was also included in the analysis. The emission inventories presented in the SCAQMD 2007 AQMP show that emissions from paved roads are the single largest contributor to directly emitted PM_{10} and $PM_{2.5}$ emissions. Construction-related PM_{10} and $PM_{2.5}$ emissions were not included in this hot spot analysis because these emissions would be considered temporary since construction would last less than 5 years (40 CFR 93.123[c][5]). Secondary $PM_{2.5}$ emissions would be associated with regional impacts and, therefore, are not included in a hot spot analysis. Appendix M of the Air Quality Technical Study of this project (Caltrans, 2009) contains the

detailed PM_{10} and $PM_{2.5}$ Hot-Spot Analyses that were submitted to the SCAG Transportation Conformity Working Group (TCWG). The $PM_{2.5}$ hot spot analysis was originally submitted and approved by the TCWG during the October 2006 meeting. However, changes to the design and scope of the project required that the $PM_{2.5}$ hot spot analysis be updated and re-submitted to the TCWG. The updated $PM_{2.5}$ hot spot analysis was submitted for review by the TCWG during the March 2008 and deemed acceptable for circulation. The PM_{10} hot spot analysis was approved by the TCWG for circulation at the January 27, 2009.

Traffic Condition Improvements

The purpose of building the SR-47 Expressway or the SR-103 Extension along with the Schuyler Heim Bridge replacement is to reduce traffic congestion on local surface streets between Terminal Island and Pacific Coast Highway or I-405, as well as on I-110 and I-710. The project would also improve traffic conditions by eliminating at-grade railroad crossings and signalized intersections.

An increase of PM_{10} or $PM_{2.5}$ emissions would occur if the project significantly increased VMT in the project area, and at locations where there are more traffic delays. The traffic delays would occur at the intersections where vehicles are accumulating and idling. It is unlikely that PM_{10} or $PM_{2.5}$ hot spots would be associated with the proposed project because local accumulation and delay of vehicles would be reduced by the project. LOS would improve with the build alternatives when compared to the No Build alternative. Potential localized PM_{10} or $PM_{2.5}$ increases associated with the slight increase in VMT would be offset by the increase of vehicle speed in the project area, which is an indication of reduced congestion and idling of vehicles. Thus, the project is not expected to cause any concern with respect to localized concentrations of PM_{10} or $PM_{2.5}$.

Traffic Conditions and Air Quality

The traffic data near the North Long Beach monitoring station and the Long Beach-East Pacific Coast Highway monitoring station were reviewed to evaluate the relationship between traffic conditions and monitoring data. The Long Beach-East Pacific Coast Highway station was selected for comparison since it is located closer to the project area than the North Long Beach station.

The annual average daily traffic (AADT) and truck percentages near the North Long Beach monitoring station and Long Beach-East Pacific Coast Highway monitoring station were reviewed. The North Long Beach station is located approximately 0.5 mile north of I-405 and one mile east of the I-405/I-710 junction. For the year 2006, the AADT at the I-405/I-710 junction was 290,000 (Caltrans, 2008b). In addition, the truck AADT for the largest trucks (5 axles) was 6,856, or 2.4 percent of the total AADT (Caltrans, 2008b). For comparison, the Long Beach-East Pacific Coast Highway monitoring station is located approximately 1 mile east of the Pacific Coast Highway (PCH)/I-710 junction. For the year 2006, the AADT at the PCH/I-710 junction was 48,000 (Caltrans, 2008b). In addition, the truck AADT for the largest trucks (5 axles) was 5,130, or 11 percent of the total AADT (Caltrans, 2008b). A review of the traffic data has shown that the largest truck volumes are similar for both monitoring stations.

In addition, the $PM_{2.5}$ monitoring values at the Long Beach-East Pacific Coast Highway monitoring station are similar to those at the North Long Beach monitoring station. For the years 2004, 2005, 2006 the 24-hour $PM_{2.5}$ concentrations measured at the Long Beach-East Pacific Coast Highway were 59.7 $\mu g/m^3$, 50.8 $\mu g/m^3$, and 53.6 $\mu g/m^3$, respectively.

Comparing these concentrations to the concentrations reported in Table 3.13-2 for the North Long Beach station show the values are similar. Therefore, since the truck percentages and monitoring data at the North Long Beach station and Long Beach-East Pacific Coast Highway station are similar, the North Long Beach station reflects the same traffic conditions as at the project location, and the monitoring data are shown to be representative of ambient air quality for the project area.

For PM_{10}, the monitor values recorded at both the North Long Beach station and the Long Beach-East Pacific Coast Highway have not exceeded the federal 24-hour standard in the past three years. Since the truck percentages are similar and the monitors have not reported an exceedance of the standard, the both monitors would be representative of ambient air quality for the project area.

Vehicle Exhaust Emissions

Table 3.13-4 presents emissions, including PM_{10} and $PM_{2.5}$, from vehicles traveling in the project study area for the years 2003, 2011, 2015, and 2030. As shown in Table 3.13-4, PM_{10} and $PM_{2.5}$ emissions from Alternatives 1, 1A, 2, and 3 would be slightly lower than those from the No Build alternative. The emissions in Table 3.13-4 were conservatively estimated based on the average vehicle speed for the entire project area. The emissions decrease for Alternatives 1, 1A, and 3 are due to a predicted decrease in VMT in the study area and an increase in vehicle speed for 2011, 2015, and 2030. Although there would be a slight increase in VMT for Alternative 2, due to increased capacity from the extension of SR-103, the PM_{10} and $PM_{2.5}$ emissions for Alternative 2 in 2011 and 2030 would still be less than the No Build alternative. Emissions for Alternative 4 are predicted to be the same as those for the No Build alternative because the VMT and vehicle mix in the project area is predicted to be the same. Emissions for Alternative 3 are predicted to be the same as those for Alternative 1 because Alternative 3 would have the same traffic conditions as Alternative 1. Emissions associated with Alternative 5 were not discussed in this analysis because there is no traffic information available for Alternative 5.

Re-entrained Road Dust

Re-entrained road dust was estimated based on VMT and Chapter 13.2.1 of *AP-42, Fifth Edition, Compilation of Air Pollutant Emission Factors* (EPA, 2006). The emission inventories presented in the SCAQMD 2007 AQMP show that emissions from paved roads are the single largest contributor to directly emitted PM_{10} and $PM_{2.5}$. According to the PM Guide, $PM_{2.5}$ emissions from re-entrained road dust must only be considered if the EPA or state air agency has made a finding that these emissions are a significant contributor to the $PM_{2.5}$ problem in a given area (40 CFR 93.102[b][3]). Since the SCAQMD 2007 AQMP is incorporated as part of the California 2007 SIP, $PM_{2.5}$ from re-entrained roads was included in the hotspot analysis.

Table 3.13-8 presents the paved road emissions for the years 2003, 2011, 2015, and 2030. The PM_{10} and $PM_{2.5}$ emissions for the build alternatives would be the same or less than the No Build alternative for each year analyzed. Paved road emissions are expected to increase with time because the calculation of paved road emissions is based on VMT and vehicle weight. Since the VMT and the percentage of trucks are predicted to increase with time, the paved road emissions would also increase with time. This finding is consistent with the emission inventories reported in the SCAQMD 2007 AQMP, which also shows paved road emissions increasing with time. Since paved road emissions are included in the 2007 AQMP, which is part of the California SIP, paved road emissions have been accounted for as part of

the PM_{10} and $PM_{2.5}$ attainment plan. Therefore, the proposed project is unlikely to cause new violations or increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{10} or $PM_{2.5}$ NAAQS.

Table 3.13-8
Daily Vehicle Re-Entrained Road Dust Emissions for the Project Study Area

Project Alternative	2003		2011		2015		2030	
	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
No Build	51,058	6,430	56,031	7,182	65,017	8,448	89,802	11,941
Alternative 1, 1A	—	—	54,887	7,010	63,567	8,232	87,213	11,554
Alternative 2	—	—	49,540	6,181	64,732	8,393	88,425	11,724
Alternative 3	—	—	54,887	7,010	63,567	8,232	87,213	11,554
Alternative 4	—	—	56,031	7,182	65,017	8,448	89,802	11,941

Conclusion

In summary, PM_{10} and $PM_{2.5}$ emissions resulting from vehicle exhaust and re-entrained road dust for the build alternatives would be the same or less than the No Build alternative. Based on the current ambient PM_{10} and $PM_{2.5}$ concentrations in the project area (see Table 3.13-2), the project is not expected to have a significant localized PM_{10} or $PM_{2.5}$ concentration increase when compared to the No Build alternative. Therefore, the project meets the conformity hot spot requirements in 40 CFR §93.116 and §93.123 for PM_{10} and $PM_{2.5}$.

The project has demonstrated project-level conformity by its inclusion in the federally approved 2008 RTP and the final 2008 RTIP, and by the hot spot analyses showing the proposed project would not cause or contribute to a violation of the CO, PM_{10}, or $PM_{2.5}$ federal standards.

3.13.3.4.2 Mobile Source Air Toxics

A quantitative MSAT analysis was prepared for the proposed project because major arterials affected by the project serve a large number of diesel trucks, and there would be a potential to concentrate high levels of diesel particulate matter. In addition, the immediate vicinity of the project area includes the community of Wilmington in Los Angeles. The community of Wilmington is just west of the proposed SR-47 Expressway and includes sensitive air quality receptors such as residences, schools, and hospitals. The project qualifies for a quantitative MSAT analysis because: (1) the project would serve diesel trucks with the potential to concentrate diesel particulate matter; and (2) sensitive receptors are within the project area and near the project site. At this time, a quantitative MSAT analysis is intended to provide a method to compare alternatives rather than emphasizing the specific MSAT emission values or estimating health risk. The final subsection of the MSAT analysis provides a discussion of the limitations of the MSAT analysis.

The MSAT analysis was performed as required by the FHWA "*Interim Guidance on Air Toxic Analysis for National Environmental Policy Act (NEPA) Documents*" (Interim Guidance) and utilized the methodology and the software tool developed by University of California Davis

(UCD, 2006). The University of California, Davis references, *Estimating Mobile Source Air Toxics Emissions: A Step-by-Step Project Analysis Methodology* (UCD, 2006), and software tool *Project-Level Mobile Source Air Toxics Analysis: Spreadsheet Tool*, version 1.2 (MSAT Tool), were used to develop benzene, acrolein, acetaldehyde, 1,3-butadiene, and formaldehyde emission factors from EMFAC2007 total organic gas (TOG) emission factors. The diesel particulate matter emission factors from EMFAC2007 were used to estimate diesel truck emissions. Emissions were estimated for automobiles, South Coast Air Basin trucks, and Port trucks for the major roadway segments in the project area. It was conservatively assumed that Port trucks in the years 2015 and 2030 would be heavy duty diesel trucks with model year 2007 or newer engines.

MSAT emissions were evaluated by roadway segments contained within the boundary of Highway 91 to the north, Interstate 110 (I-110) to the west, Interstate 710 (I-710) to the east, and Ocean Boulevard to the south. The following is a list of the roadway segments included in the MSAT analysis. Not all the roadway segments were included with each alternative. For example, the segment SR-103, Realignment to End (23rd and Wardlow) was only included for Alternative 2.

- SR-47 Mainline, New Dock Ramps to Henry Ford Ramps
- Henry Ford Ramps
- Henry Ford north of Ramps to Alameda
- SR-103 begin (at SR-47 /Henry Ford Junction) to Anaheim
- SR-103 Anaheim to Pacific Coast Highway (PCH)
- SR-103 PCH to Realignment (Sepulveda/Willow ramps)
- SR-103 Ramps south of Sepulveda/Willow
- SR-103, Realignment to End (223rd/Wardlow)
- E and W Harry Bridges, Figueroa to start Alameda
- Alameda beginning (E Harry Bridges) to Anaheim
- Alameda Anaheim to Henry Ford
- Alameda, Henry Ford to PCH
- Alameda PCH to 405
- Alameda 405 to del Amo
- Alameda, del Amo to South Santa Fe Avenue
- Alameda, South Santa Fe Avenue to SR-91
- I-110, "C" Street Interchange to Anaheim
- I-110, Anaheim to PCH
- 1-110, PCH to Sepulveda
- I-110, Sepulveda to Carson
- I-110, Carson to Del Amo
- I-110, Del Amo to 405
- I-110, 405 to SR-91
- I-710, Anaheim to PCH
- I-710, PCH to Willow
- I-710, Willow to 405
- I-710, 405 to Del Amo
- I-710, Del Amo to Long Beach Blvd Interchange
- I-710, Long Beach Boulevard to SR-91
- PCH, I-110 to Alameda
- PCH, Alameda to SR-103
- PCH, SR-103 to I-710
- Sepulveda, I-110 to Avalon
- Sepulveda, Avalon to Alameda
- Sepulveda, Alameda to ICTF
- Sepulveda, ICTF to SR-103
- Del Amo, I-110 to Wilmington
- Del Amo, Wilmington to Alameda
- Del Amo, Alameda to I-710
- 223rd Street, I-110 to Avalon
- 223rd Street, Avalon to Wilmington
- 223rd Street, Wilmington to Alameda
- West Wardlow from Alameda to I-710

The detailed MSAT analysis is available as Appendix N to the Air Quality Technical Study (Caltrans, 2009).

Since Alternative 3 would have the same traffic conditions as Alternative 1, and Alternative 4 would not affect the traffic conditions when compared to the No Build alternative, it was assumed that Alternatives 3 and 4 would have the same MSAT emissions as Alternatives 1 and 6, respectively. In addition, a traffic analysis was not performed for Alternative 5. Therefore, the MSAT analysis will only include a discussion of Alternatives 1, 2, and 6.

Results

The MSAT Tool was used to estimate the MSAT emissions presented in Table 3.13-9. As shown in Table 3.13-9, the MSAT emissions are predicted to significantly decrease over time, even though the traffic volumes and percentage of diesel trucks are expected to increase over time. The decrease in MSAT emissions for the alternatives analyzed is consistent with EPA projections that MSAT emissions will decrease over the next 15 years. However, the MSAT analysis shows a slight increase in diesel particulate matter emissions in the year 2030 when compared to the year 2015. This increase is due to aging of the truck fleet because it was assumed the Port trucks would have model year 2007 or newer engines. In the year 2015, a model year 2007 engine would only be 8 years old. However, by the year 2030, trucks with model year 2007 engines would have aged to 23 years old. The aging of the truck fleet results in the higher emission factors in 2030 compared to 2015.

In general, there would be minor differences in MSAT emissions between the build alternatives for each analysis year. However, MSAT emissions for the No Build alternative, Alternative 1, and Alternative 2 in the future years would be much lower when compared to the existing condition. The MSAT emissions in the years 2015 and 2030 would be less than or the same for Alternatives 1 and 2 when compared to the No Build alternative. MSAT emissions, excluding diesel particulate matter, would be predicted to decrease with time despite increasing VMT.

MSAT emissions were estimated by road segment and the summary of the MSAT emissions by segment are provided in Appendix N to the Air Quality Technical Study.

Table 3.13-9
Daily MSAT Emissions for the Project Study Area

		Emissions (lbs/day)					
Year	**Scenario**	**Diesel PM**	**Benzene**	**1,3-Butadiene**	**Acetaldehyde**	**Acrolein**	**Formaldehyde**
2003	**Existing Condition**	828	70	16	14	4	53
2015	**No Build (Alternative 6)**	95	12	3	2	1	10
	Alternative 1	94	12	3	2	1	10
	Alternative 2	91	12	3	2	1	10
2030	**No Build (Alternative 6)**	128	3	1	0.4	0.2	4
	Alternative 1	127	3	1	0.4	0.2	4
	Alternative 2	128	3	1	0.4	0.2	4

Limitations of MSAT Analysis

The following discussion regarding the limitations of the MSAT analysis is prototype language taken from the Interim Guidance, Appendix C. A detailed discussion of the limitations of analyzing MSAT emissions is provided in the Air Quality Technical Study (Caltrans, 2009).

Unavailable Information for Project-Specific MSAT Impact Analysis. This MSAT analysis includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable predicting the project-specific health impacts of the emission changes associated with the project alternatives. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22[b)]) regarding incomplete or unavailable information:

Information that Is Unavailable or Incomplete -- Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

- Emissions. The tools available from EPA and the California Air Resources Board to estimate MSAT emissions from motor vehicles are not sensitive to key variables that determine emissions of MSATs in the context of highway projects.

- Dispersion. The tools to predict how MSATs disperse are also limited. The current EPA and California regulatory models, such as CALINE3, CAL3QHC, and CALINE4, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

- Exposure Levels and Health Effects. Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude the analysis from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs. Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some emission types either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

There have been studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes -- particularly respiratory problems. Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable performing a more comprehensive evaluation of the health impacts specific to this project.

Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of Impacts Based upon Theoretical Approaches or Research Methods Generally Accepted in the Scientific Community. Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow reasonable predictions of relative emission changes between alternatives for larger projects, the amount of MSAT emissions from each of the proposed project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

This MSAT analysis has provided a comparison of MSAT emissions relative to the various alternatives, and has acknowledged that, for the analysis years 2015 and 2030, MSAT emissions from Alternatives 1 and 2 would result in similar MSAT emissions when compared to the No Build alternative. Since the concentrations and duration of exposures are uncertain, the health effects from these emissions cannot be estimated.

3.13.3.4.3 Health Risk Assessment and Methodology

The previous section presented the MSAT emissions analysis for compliance with FHWA NEPA guidance. This section presents the HRA methodology, prepared per ACTA's instruction, to evaluate the health risk resulting from operation of the proposed project. The reasons for conducting an HRA for the proposed project are:

- Community members with commercial and residential land uses adjacent to the transportation corridor submitted comments on the draft EIS/EIR requesting that air toxic emissions associated with increased truck traffic be addressed.
- There are local HRA protocols for stationary sources and established SCAQMD thresholds for evaluating the significance of health risk. The methodology used in the HRA was modeled after these established protocols but recognizes the spatial differences inherent in transportation projects. ACTA has adopted these thresholds, but Caltrans has not adopted HRA thresholds and is not subject to local thresholds of significance.
- ACTA is a Responsible Agency under CEQA and will be implementing the expressway portion of the proposed project. This work will require Port Development Permits from the Port of Long Beach and Port of Los Angeles; ACTA will be required to submit an HRA in support of its application for the permits. CEQA documents prepared in support of recent Port development permits have all included quantitative HRAs.

The purpose of the HRA was to evaluate both the adverse impacts and benefits of the proposed project in terms of localized and regional health risk. The HRA considered the health risks of Alternative 1, 1A and Alternative 2 by comparison to Alternative 6 (No Build). Alternative 3 was assumed to be the same as Alternative 1, Alternative 4 was assumed to be the same as Alternative 6, and Alternative 5 was not evaluated.

The air dispersion modeling and HRA focused on a broad geographic area. The geographic area extends approximately 7.5 miles north of the Schuyler Heim Bridge and over 5 miles from the end of the actual improvements at Alameda Street and Pacific Coast Highway. The land uses surrounding the geographic area used in the HRA were also identified. Land use type is important for assessing the health risks along the roadways and for determining where mitigation measures may be needed.

The HRA focused on both incremental cancer and non-cancer acute and chronic health risk impacts from Port trucks, local South Coast Air Basin trucks, and cars. Cancer risks for residential, school, worker, and recreation receptors were evaluated using two emission scenarios, which included one based on 70-year average emissions (year 2003 through 2072) and the other one based on 2015 emissions. Both scenarios evaluated the risks over a 70-year period for several categories of exposed receptors (residential, commercial/industrial workers, recreational workers and users, and school workers and students). The following HRA methodology sections present the emission estimates, emission scenarios, dispersion modeling, and risk assessment. The HRA report is included as an appendix to this document and provides a more detailed discussion of the methodology

3.13.3.4.3.1 Emission Estimation

Total organic gas (TOG) and diesel particulate matter emissions, on existing and future roadways were estimated using approved emission factors models, such as EMFAC2007. In order to estimate air toxic emissions, the constituents of the total organic gas (TOG) and particulate matter (PM) were identified using ARB profiles.

Emissions were estimated for the existing conditions (year 2003), year open to traffic (2015), and the horizon year of 2030. Port trucks were assumed to be 100 percent heavy-heavy Duty (HHD) trucks. For existing conditions (2003) and until the year 2007, it was assumed that all

of the HHD Port trucks would be diesel-fueled. After 2007, it was assumed that Port trucks would begin to be replaced due to the implementation of the Ports Clean Air Action Plan (CAAP), specifically, the Port Clean Truck Program. Specific commitments of the CAAP were incorporated into the Port truck fleet profiles to capture these important improvements in the project build-out years of 2015 and 2030 (personal communication, Chris Patton, Port of Los Angeles). The CAAP emission reductions were not discounted in terms of effectiveness for two reasons: 1) all measures are supported by firm commitments on behalf of both ports[1]; and 2) the SCAQMD is currently collaborating with the ports on a rulemaking process for "backup" measures should these programs fall short of their goals[2].

In addition to the Ports' Clean Truck Program assumptions, the non-Port medium-heavy duty (MHD) and HHD truck fleet was assumed to be in compliance with the ARB "On-Road Heavy Duty Diesel Vehicles Regulation" which was approved in December of 2008. Under this regulation, both MHD and HHD trucks would have to meet emission standards for model year 2003 engines or better by 2015, and model year 2007 or better by 2017.

In 2015, for both Port and non-Port trucks, the diesel truck emissions factors for DPM were assumed to be reduced by an additional 10 percent to account for two AB 32 discrete early action measures, the low carbon fuel standard (LCFS) and the Heavy-Duty Vehicle Greenhouse Gas Reduction Measure (similar to EPA's SmartWay truck fuel efficiency program). These discrete early action measures are scheduled to be adopted by ARB and enforceable by 2010. A 10 percent reduction of DPM emissions represents the lower limit of the reduction targets under these measures; therefore, this reduction was considered conservative.

In 2030, for both Port and non-Port trucks, the diesel truck emissions factors for DPM were assumed to be reduced by an additional 35 percent. This reduction would come from a combination of the LCFS, increased fuel efficiency, and vehicle hybridization strategies outlined in ARB's proposed scoping plan for AB 32. The 35 percent reduction was based on the assumption that 100 percent of the remaining diesel trucks would use biodiesel or an equivalent alternative fuel. Biodiesel produces approximately 35 percent less particulate matter emissions than diesel fuel. The particulate matter emitted from biodiesel combustion is less carcinogenic than the particulate matter resulting from combustion of diesel fuel. Biodiesel was used as a worst-case assumption to account for implementation of the AB 32 alternative fuels program. The alternative fuel provisions of AB 32 would likely result in a variety of fuel types with a higher percentage reduction in DPM than biodiesel.

Emissions were estimated for both maximum hourly and annual average emissions. Maximum hourly emissions were estimated using peak hour traffic projections from the traffic study for each roadway segment. The traffic study used three peak hour periods; AM, midday (MD), and PM. The peak midday (MD) hour was used for both regional traffic and Port trucks since this hour had the highest truck volumes. The PM peak hour was used for automobiles since this hour had the highest automobile traffic volumes. This approach was considered conservative because the maximum short-term traffic impacts would be evaluated in the HRA. Annual average emission rates were developed for project years 2003, 2015, and 2030 based on average daily traffic (ADT) for the proposed project and

[1] May 15th 2007, Los Angeles Board of Harbor Commissioners, Clean Truck Program Concession Agreement

[2] San Pedro Bay CAAP, FAQs, http://www.polb.com/faqs

regional roadways. The Port of Long Beach/Port of Los Angeles transportation model (see Meyer Mohaddes Traffic Study [ACET, 2007]) was utilized to develop the traffic data used in the analysis.

3.13.3.4.3.2 Emission Scenarios

Emission scenarios were developed for the acute, chronic, and cancer risk analysis. For the acute and chronic risk analysis, maximum hourly and annual average emissions were estimated for each of the proposed project years of 2003, 2015, and 2030. For the cancer risk analysis, two emission scenarios were included in the HRA, one based on 70-year average emissions and the other one based on 2015 emissions.

70-Year Average Emissions Scenario

For the purpose of the cancer risk analysis, the exposure period was assumed to be the 70-year period of 2003 through 2072. The 70-year average emissions were derived by linearly interpolating between years 2003 to 2015 and from 2015 to 2030. After 2030, emissions were assumed to be constant at 2030 levels. The 70-year long term average emissions are composed of 12 years of no net increase in project emissions (because the project will not be in place until 2015), 15 years of reasonably foreseeable incremental project emissions (2016 though 2030), and 43 years of estimated incremental project emissions at 2030 levels (2031 though 2072). Additional details for the 70-year average emission rates are included in the HRA.

The 70-year average emissions scenario may overestimate cancer risk due to the conservative assumptions used in the analysis. The analysis used traffic projections and reasonably anticipated regulatory programs up to the year 2030. Beyond 2030 project emissions were estimated and may not (1) be reflective of the economic conditions of the time, (2) realize future technological advances or (3) account for promulgation of additional regulations for diesel risk or greenhouse gas emissions reduction purposes.

2015 Emissions Scenario

The 2015 emissions scenario was used to address uncertainties related to future year emissions (e.g. emissions beyond 2015). The 2015 emissions scenario evaluated cancer risks over a 70-year period but only incorporated known parameters. The 2015 emissions scenario relies on reasonably foreseeable traffic estimates and includes regulations or programs either currently required or those with expected dates of adoption (e.g., Ports' Clean Truck Program and ARB's On-Road Heavy Duty Diesel Vehicles Regulation, which is set for adoption by the Board in December of 2008).

Recommendation of the Preferred Emission Scenario

The 2015 emission scenario is recommended as the preferred emissions scenario. This scenario was used to evaluate project significance and mitigation because it is based on reasonable foreseeable conditions (adopted already or soon to be adopted regulations). The 2015 emission scenario avoids the speculation of the 70-year analysis, which assumes that significant growth in imports and truck traffic would occur without advances in emission control technology past 2020. Potential health risk may be over-predicted using the 70-year average emissions scenario and it may be unnecessary to implement mitigation beyond what would be necessary in 2015. Factors that contribute to over-prediction of potential risks in the 70-year scenario include:

- *Potentially unrealistic growth assumptions.* The analysis assumed growth in Port operations, consistent with recent environmental evaluations (to 44 million TEUs [twenty-foot equivalent unit] in 2020). The Ports' estimated terminal capacity of 42.5 million TEUs is based on the assumption that considerable additional acres of land can be developed for Port purposes. Absent that, a more realistic estimate is under 36 million TEUs, substantially less than what was used in this analysis to predict increases. Many factors can affect growth projections including the current economic downtrend, which may lead to reduced demand for imported goods, and recently imposed fees that may make importation through the San Pedro ports less economically attractive in the future. If growth in imports is less than projected, or diversion of cargo to other more economically advantageous ports occurs, truck emissions would be lower than projected and health risks would decrease accordingly. Other ports positioned to compete with the Los Angeles and Long Beach ports are located on the Gulf and East Coasts via the Panama Canal and Suez Canal, as well as West Canadian and Mexican ports. Potential loss of market share at the Port Los Angeles or Port of Long Beach would significantly reduce the Port-related traffic on SR-47 beyond 2015.

- *Lack of future regulations.* The 70-year analysis assumes that while traffic continues to increase, no regulations would be adopted to reduce truck emissions other than those currently adopted or proposed for adoption. Thus, for over 50 years (2020-2073) emissions are projected to grow due to increased traffic but no emissions reductions are assumed due to new regulations. The clear trend in air pollution control is for increasingly stringent vehicle emission and vehicle fuel standards to be adopted by ARB and the Federal EPA every 5 to 7 years. During the last ten years, regulations have been promulgated that reduce NO_X and PM by 35 percent; in the next few years EPA expects to reduce diesel PM by 94 percent. Therefore, the assumption that no additional regulations would be adopted is highly unrealistic given the history of vehicle emission regulations in California. In fact, it is highly likely that a series of additional regulatory programs would be implemented during the 70-year period evaluated in the HRA.

- The analysis incorporated the fact that the Ports of Long Beach and Los Angeles have committed to a truck retrofit program, as well as an LNG hybrid retrofit program through 2012. The analysis has assumed significant deterioration of the fleet from 2015 to 2030 (10 to 15 percent) due to aging. The Port's Clean Trucks Program will lead to more rapid fleet turnover than in the past due to the issuance of Port concessions, more trucking by larger companies with the capital to replace trucks more often, and a reduction in independent operators due to more stringent Port requirements and competition. ARB's proposed on-road heavy duty truck regulation, scheduled for adoption in late 2008, will also accelerate fleet turnover. A more rapid fleet turnover rate may limit this deterioration in emission rates.

- *New motor vehicle fuels.* A more diversified approach to alternate fuels (beyond biodiesel) may result in substantially greater DPM emission reductions.

- *New goods movement technologies.* The ports are also investigating electric trucks and other zero-emissions container movement systems and, if implemented, would eliminate existing sources of diesel emissions.

The expected scenario is that advanced emission control technologies, fleet turnover higher than in the past, and innovations in goods movement technologies would maintain or improve the overall truck emissions profile at or near 2015 levels (or lower). For these reasons, the 2015 emissions scenario is recommended as a more realistic estimate of health risk associated with the proposed project than the 70-year emission scenario.

3.13.3.4.3.3 Air Dispersion Modeling

The air dispersion modeling was performed using the EPA preferred regulatory air dispersion model AERMOD with 12 consecutive months of meteorological data from September 2006 through August 2007. The meteorological data was collected at the St. Peter and Paul School by SCAQMD, and was pre-processed for AERMOD by the Port of Los Angeles using the latest EPA guidance. The St. Peter and Paul School dataset was selected for its proximity to the proposed project area as well as its acceptability for use in similar regional modeling efforts inland of Port operations.

The roadways used in the air dispersion modeling included existing roadways as well as new alignments to be constructed as part of the proposed project. Volume source representations of the roadways were developed based on roadway configurations. Receptors were positioned on two main receptor grids, a coarse grid and a refined grid, covering the approximate 9-km x 14-km region surrounding the proposed project area. The area covered by the grids was defined based on proximity to roadways and the land use type along the alignment. The coarse grid was used to identify regional effects of the proposed project. The refined grid was used to identify areas of localized health effects on schools, parks, and residential neighborhoods. Sensitive land use areas were identified based on 2001 SCAG land use data for residential, primary and secondary schools, parks, and marinas.

3.13.3.4.3.4 Risk Assessment

The HRA was performed following the latest guidance outlined in the "*Air Toxics Hot Spots Program Risk Assessment Guidelines*" (Office of Environmental Health Hazard Assessment (OEHHA), August 2003). The ARB Hotspots Analysis and Reporting Program (HARP), Version 1.4a, along with the HARP On-Ramp program (Version 1.0), was used for HRA modeling. The HARP Risk Module predicts health impacts in terms of cancer risk, acute hazard index (HIA), and chronic hazard index (HIC).

Since inhalation is the dominant pathway of cancer risks, the Derived (Adjusted) Method in HARP was used for the cancer risk evaluation based on Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk (ARB, 2003). Cancer risks for worker, student, and recreational user receptors were based on the ratio of the breathing rates and exposure durations to the resident receptors. The details of the worker, student, and recreation cancer risk assumptions are presented in the HRA report.

Cancer Risks Approach. Cancer risk from diesel trucks was evaluated by quantifying emissions of diesel exhaust particulate matter. Cancer risk from gasoline-fueled cars and trucks was evaluated by identifying the organic exhaust stream constituents (acetaldehyde, benzene, 1,3-butadiene, and formaldehyde). Cancer risk contributed from LNG trucks was evaluated using combustion of diesel fuel component as DPM, the total organic gas (TOG) components of the LNG exhaust, and PM from LNG combustion.

Non-Cancer Risks Approach. Chronic health effects were calculated based on annual average emissions for the individual project year producing the maximum chronic impact (year 2030). Chronic impacts from diesel trucks were evaluated using diesel exhaust particulate matter. Chronic health effects from components of gasoline exhaust were evaluated for acetaldehyde, acrolein, benzene, 1,3-butadiene, and formaldehyde. Chronic health effects from LNG exhaust were evaluated using combustion of diesel fuel component as DPM, the TOG components of LNG exhaust, and PM from LNG combustion. It should be noted that the chronic risks due to diesel PM were based on its reference exposure level (REL), which may not reflect the adverse impacts of particulate matter on cardiovascular and respiratory disease and deaths, exacerbation of asthma, and enhancement of allergic responses (CARB, 2008).

Acute health effects were calculated based on maximum peak hour emissions for the individual project year producing the maximum acute impact (year 2015). Acute impacts from diesel truck emissions were evaluated by identifying the constituents of both the organic and particulate component of the diesel exhaust. This was done because OEHHA has not established an acute REL for diesel exhaust. Acute health effects from components of gasoline exhaust were evaluated using OEHHA established acute RELs for acrolein, benzene, and formaldehyde. Acute health effects for the LNG exhaust were evaluated by identifying the components of the DPM exhaust as well as TOG and PM from LNG combustion.

3.13.3.4.4 Greenhouse Gases

Caltrans recognizes the concern that carbon dioxide emissions raise for climate change. However, accurate modeling of GHG emissions levels, including carbon dioxide at the project level, at the project level is not currently possible. No federal, state, or regional regulatory agency has provided methodology or criteria for GHG emission and climate change impact analysis. Therefore, Caltrans is unable to provide a scientific or regulatory based conclusion regarding whether the project's contribution to climate change is cumulatively considerable

Caltrans continues to be actively involved on the Governor's Climate Action Team as ARB works to implement AB 1493 and AB 32. As part of the Climate Action Program at Caltrans (December 2006), Caltrans is supporting efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies: job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. Caltrans is working closely with local jurisdictions on planning activities; however, Caltrans does not have local land use planning authority. Caltrans is also supporting efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks. However it is important to note that the control of the fuel economy standards is held by the United States Environmental Protection Agency and ARB. Lastly, the use of alternative fuels is also being considered; Caltrans is participating in funding for alternative fuel research at the University of California Davis."

Additional measures have the potential to reduce GHG emissions. These measures include using reclaimed water, landscaping, energy efficient lighting, and idling restrictions. The following presents a brief discussion of these measures.

- Reclaimed Water - It is estimated that 30 percent of the electricity used in California is used for the treatment and delivery of water. Using reclaimed water helps conserve energy and reduces GHG emissions from electricity production. Reclaimed water would be used, if available, during construction and operation of the proposed project.
- Landscaping - Landscaping would reduce surface warming and through photosynthesis would decrease carbon dioxide. Two avoidance and mitigation measures, included with Section 3.7 (VR-3 and VR-4), incorporate landscaping as elements of the proposed project design, which includes planting trees and vines at specified locations, as determined by a Caltrans Licensed Landscape Architect. Implementation of these measures would also have the potential to reduce GHG emissions.
- Energy efficient lighting - Energy efficient streetlights and LED traffic signals would be incorporated, to the extent feasible, in the final design of the proposed project.
- Idling restrictions for trucks - Section 3.13.4 includes a mitigation measure (AQ-6) that would prohibit truck idling in excess of 2 minutes during construction. This measure would be expected to also reduce GHG emissions during construction.

Implementation of these measures has the potential to reduce GHG emissions in addition to the reductions expected from operation of the proposed project.

Additionally, other agencies such as the EPA and the ARB have or will be considering regulations to improve vehicle efficiency for the purpose of reducing GHGs. Any such regulations will further reduce GHG emissions from mobile sources that will utilize the project. Furthermore, since the project will accommodate port-generated traffic, additional GHG reductions will occur through implementation of the Settlement Agreement entered into between the Port of Los Angeles and the Attorney General's office. Among other things, the Settlement Agreement requires that when approving future projects the Port of Los Angeles must adopt any of the following mitigation measures feasible:

- Anti-idling measures;
- In-terminal truck electrification;
- Terminal user GHG mitigation fees;
- Fleet modernization incentives;
- Mandatory tire check/inflation programs;
- HFC leak inspections;
- HFC mitigation fees;
- Requirements for use of alternative refrigerants; and
- Commuter incentives.

All of these Settlement Agreement measures will further reduce GHG emissions from mobile sources that will utilize the project.

3.13.3.4.5 Construction Emissions

Construction equipment and vehicle emission factors of CO, NO_X, ROG, SO_X, and PM_{10} used in construction emission calculations were obtained from information available in the *CEQA Air Quality Handbook* (SCAQMD, 1993 and 2006), EMFAC2007 emissions model, and the EPA *Compilation of Air Pollutant Emission Factors* (AP-42). Summaries of the emissions factors and their sources are contained in the Air Quality Technical Report (Caltrans, 2009). Because there are currently few or no $PM_{2.5}$ emission factors for combustion processes, the $PM_{2.5}$ emissions were calculated following the methodology recommended by SCAQMD and using the $PM_{2.5}$ fraction of PM_{10} (SCAQMD, 2006). Emission factors for PM_{10} from the *CEQA Air Quality Handbook*, EMFAC2007 emissions model, and the EPA *Compilation of Air Pollutant Emission Factors* (AP-42) were used in the calculation of fugitive dust emissions. Fugitive dust emissions were separated into two categories; exposed areas and unpaved roads. Exposed areas were assumed to be graded areas, excavated areas, and stockpiles. The reported fugitive dust emissions include a 68 percent control efficiency achieved by watering the exposed areas three times a day. The reported fugitive dust emissions from unpaved roads include a 45 percent control efficiency achieved by watering the unpaved roads three times a day. These control efficiencies are based on the information contained in Table 11-4 of the CEQA Handbook. It was conservatively assumed that the $PM_{2.5}$ emissions would be the same as the PM_{10} emissions.

3.13.3.5 Evaluation of Alternatives (Criteria Pollutant Impacts)

This section provides the environmental analysis of construction and operations by alternative. Project transportation conformity is discussed under Section 3.13.3.4.1. Health risk impacts discussions are presented in Section 3.13.3.6.

3.13.3.5.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

3.13.3.5.1.1 Construction Effects

Construction activities would involve demolition of the existing Schuyler Heim Bridge and construction of the replacement bridge, Ocean Boulevard/SR-47 Flyover (flyover), and SR-47 Expressway. Two construction methodologies were considered for Alternative 1: CIP and segmental. Detailed construction equipment lists for Alternative 1 are available in the Air Quality Technical Study (Caltrans, 2009).

During demolition, materials present in the existing Schuyler Heim Bridge may be released into the atmosphere. According to the Initial Site Assessment (Caltrans, 2005b), the Schuyler Heim Bridge was evaluated for the presence of asbestos-containing materials (ACM) and lead-based paint (LBP). Based on the type and condition of the Schuyler Heim Bridge, ACM and LBP likely are present and considered recognized environmental conditions (RECs). It has been recommended that a predemolition survey of the Schuyler Heim Bridge be conducted for ACM and LBP. The purpose of the survey would be to determine the presence of regulated and/or potentially hazardous construction materials on the bridge. If ACM is determined to be present, it will be removed prior to demolition, in accordance with SCAQMD Rule 1403 and EPA's National Emissions Standards for Hazardous Air Pollutants (NESHAP).

Another pollutant of potential concern in assessing air quality impacts associated with construction activities is naturally occurring asbestos. Asbestos is a toxic air contaminant that is regulated under the Asbestos Airborne Toxic Control Measure (ATCM), which was

adopted by the ARB in 1990 and amended in 2000. The ATCM states that allowable asbestos content in surfacing materials must be less than 0.25 percent, effective spring 2001. In addition to surfacing materials, asbestos may occur naturally in serpentinite and ultramafic rock and can be released when the rock is broken or crushed.

According to the Department of Conservation, Division of Mines and Geology, the project is located in a county that does contain serpentinite or ultramafic rock. However, any serpentinite or ultramafic rock found in Los Angeles County is restricted to the Catalina Islands. The surficial geology of the Long Beach area is composed of quaternary alluvial material that consists of sands, gravels, silts, and clays and not ultramafic or serpentinite material (Cal. DWP, 1961). Therefore, fugitive asbestos from naturally occurring materials would not be emitted in significant quantities during construction or operation of Alternatives 1 and 1A. Surfacing materials also would not contain more than 0.25 percent asbestos; therefore, Alternatives 1 and 1A would not have an adverse effect on air quality from emissions of asbestos.

Direct

Criteria Pollutants

Direct construction emissions include emissions from equipment that would be used during site preparation and project construction to perform activities such as clearing, grading, excavating, and demolishing existing structures. These activities would involve the use of diesel- and gasoline-powered equipment that would generate emissions of criteria pollutants such as CO, NO_X, ROG, SO_X, PM_{10}, and $PM_{2.5}$. Emissions of NO_X and ROG would contribute to the formation of ozone, and NO_X would also contribute to the formation of $PM_{2.5}$. Direct emissions from Alternative 1 construction are shown in Table 3.13-10. The construction emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ would exceed the SCAQMD thresholds. In addition, since the project is located in Los Angeles County, which has been federally designated nonattainment status for ozone, $PM_{2.5}$, and PM_{10}, the construction emissions associated with Alternative 1 would have an adverse but temporary effect on air quality.

As described above, construction emissions of CO, ROG, SO_X, NO_X, PM_{10}, and $PM_{2.5}$ would be expected to have adverse but temporary effects on air quality. The proposed action would be required to comply with control measures specified in SCAQMD Rule 403, Table 1, and in Rule 1186. Construction activities will also be subject to compliance with Caltrans Standard Construction Specifications. In addition, mitigation measures would be implemented to further reduce air quality effects during project construction.

Sensitive Receptors

Construction activities may expose sensitive receptors in the vicinity to short-term elevated diesel PM_{10} levels. However, the PM_{10} concentrations would be considered less than substantial because the risk posed by diesel PM_{10} is based on long-term exposure. Therefore, sensitive receptors would not be exposed to substantial pollutant concentrations during construction of the project alternatives. The CO concentrations at the intersections shown in Tables 3.13-6 and 3.13-7 are less than the air quality standards; therefore, sensitive receptors would not be exposed to substantial pollutant concentrations during operation.

Table 3.13-10

Alternative 1/Alternative 1A Maximum Direct Construction Emissions with Mitigation to Control Fugitive Dust

	Cast-in-Place Method Emissions						Segmental Method Emissions					
	CO (lb/day)	**NO_X (lb/day)**	**ROG (lb/day)**	**SO_X (lb/day)**	**PM_{10} (lb/day)**	**$PM_{2.5}$ (lb/day)**	**CO (lb/day)**	**NO_X (lb/day)**	**ROG (lb/day)**	**SO_X (lb/day)**	**PM_{10} (lb/day)**	**$PM_{2.5}$ (lb/day)**
Maximum Construction Equipment Exhaust	831	1761	206	1.8	85	77	764	1546	194	1.7	78	71
Maximum Workers Commute	73	7.6	7.5	0.08	0.65	0.41	67	7	6.9	0.07	0.6	0.35
Maximum Fugitive Dust	NA	NA	NA	NA	903	191	NA	NA	NA	NA	716	152
Combined Maximum Daily Emissions	**905**	**1769**	**214**	**1.9**	**988**	**269**	**831**	**1553**	**201**	**1.7**	**795**	**223**
SCAQMD Thresholds (lb/day)	**550**	**100**	**75**	**150**	**150**	**55**	**550**	**100**	**75**	**150**	**150**	**55**

Note:

1. According to SCAQMD *CEQA Air Quality Handbook* Table 11-4, the control efficiencies of the fugitive dust from construction sites and unpaved roads were assumed to be 68 percent and 45 percent, respectively, by watering the sites or unpaved roads three times a day. The PM_{10} emissions listed in the table have taken into account the above control efficiencies.

Odors

During project construction, objectionable odors likely would occur related to operation of diesel-powered equipment and to road-building activities, such as paving and asphalting. Objectionable odors may occur as a result of construction in marine sediments for demolition of the existing Schuyler Heim Bridge and construction of the new bridge, as well as drilling and augering activities on land for the support piers for both the bridge and flyover. These subsurface activities may encounter contaminated sediments and/or soils that would release VOCs and release objectionable odors to the atmosphere. Such odors, however, would be short-term and limited to the area where the specific activity is occurring. Odors would cease once the subsurface construction activity ceases. The perception of these odors is dependent upon climatic conditions such as temperature, humidity, wind speed, and wind direction.

Construction will be conducted in compliance with SCAQMD Rule 1166, which limits VOC emissions. In addition, construction activities will be located within fenced, secured sites as far from receptors as feasible, with no public access. Due to the relatively short-term nature of construction odors, controlled access, and the distance to the nearest receptors, odors are not likely to affect a substantial number of people.

Indirect

As a result of the closures and restrictions to marine vessel traffic, ships that cannot pass would need to take a longer route outside the Cerritos Channel. The increased trip time of these ships would result in increased emissions of criteria pollutants and would cause an indirect effect to the ambient air quality during project construction.

Worst-case daily emissions from the marine vessel detour were calculated for the days when the channel is closed completely. The maximum number of hours per day marine vessels would spend in detour during the Schuyler Heim Bridge construction were estimated using the data provided in *Draft Schuyler Heim Bridge Replacement and SR-47 Expressway Project: Long Term Economic Impacts to Marine Vessel Operation in the Cerritos Channel* (Caltrans, 2005a). $PM_{2.5}$ emissions were calculated following the methodology recommended by SCAQMD and using the $PM_{2.5}$ fraction of PM_{10} (SCAQMD, 2006). The detoured ships primarily would be non-ocean-going ships, such as tugboats, fishing boats, yachts, and harbor operations vessels. It was assumed that ships would be slow, cruising 50 percent of the time and maneuvering the rest of the time during the detour.

The daily hours for detour were estimated based on the full closure of the channel, and thus are the same for both construction methods, CIP and segmental. The majority of the marine vessel emissions would be from tugboats. Maximum daily indirect marine vessel emissions of NO_X, ROG, CO, SO_X, PM_{10}, and $PM_{2.5}$ during construction are shown in Table 3.13-11.

The sum of direct and indirect emissions from construction associated with Alternative 1 would have an adverse but temporary effect on air quality. Mitigation will be implemented.

Table 3.13-11
Maximum Daily Marine Vessel Detour Emissions During Schuyler Heim Bridge Construction

Ship Type	Worst-case Daily Detour Hours During Construction (hours/day)	CO (lb/day)	NO_X (lb/day)	ROG (lb/day)	SO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Tugs	4.95	29.1	117.0	4.4	0.079	3.1	2.81
Harbor Operations	0.11	0.75	3.0	0.11	0.0020	0.079	0.072
Fishing	0.02	0.037	0.15	0.0055	0.00010	0.0038	0.0035
Yachts	1.07	2.7	11.0	0.42	0.0074	0.29	0.26
Tankers	0.02	0.43	1.6	0.067	0.0011	0.042	0.039
Total	NA	33.1	132.8	5.0	0.09	**3.5**	3.2

3.13.3.5.1.2 Operations Effects

Direct

Criteria Pollutants

The SR-47/SHB project is listed in the conforming 2008 RTP and the 2008 RTIP; therefore, the project would have satisfied the conformity requirements as required by the regional plan and program. In addition, localized CO, PM_{10}, and $PM_{2.5}$ emissions associated with operation of Alternative 1 were evaluated. The CO emissions shown in Table 3.13-6 and 3.13-7 for Alternative 1 are less than the federal standards shown in Table 3.13-1. The qualitative PM hot spot analysis is discussed in Section 3.13.3.4.1.3. Localized PM_{10}/PM_{25} demonstrated that the project would not contribute to or exacerbate exceedances of the PM_{10} or $PM_{2.5}$ standards. Therefore, no permanent direct air quality effects would be expected under Alternative 1.

Odors

Objectionable odors from project operations would be consistent with odors produced by existing bridge and road uses, primarily vehicle exhaust and diesel emissions. The perception of these odors is dependent upon climatic conditions such as temperature, humidity, wind speed, and wind direction. The perception of odors resulting from project operations would be reduced to the extent that vehicular traffic along the SR-47 Expressway would be elevated and would be above the level of sensitive receptors, where odors would be dispersed. No additional sources of odor would be expected.

Indirect

Replacement of the existing Schuyler Heim Bridge with a fixed-span bridge would have indirect effects on local air quality by affecting the marine traffic. Replacing the lift-span bridge with the lower fixed-span bridge would force taller marine vessels to take a longer route around Terminal Island and would delay vessels with adjustable mast heights. The increased trip times for the marine vessels would result in increased emissions of criteria pollutants. Emissions of CO, NO_X, ROG, SO_X, and PM_{10} resulting from marine vessel detours and delays in 2011 and 2030 were calculated using the *Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data* (EPA, 2000) in conjunction with forecasted delay and detour travel times (Caltrans, 2005a). $PM_{2.5}$ emissions were calculated following the methodology recommended by SCAQMD and using the $PM_{2.5}$ fraction of PM_{10} (SCAQMD,

2006). The detour hours during operation of the Schuyler Heim Bridge in 2011 are the same as in 2030, based on the assumption that the marine traffic would not increase in future years (Caltrans, 2005a).

Daily emissions resulting from marine vessel detours during operation of the proposed fixed-span Schuyler Heim Bridge, as well as the comparisons with SCAQMD operational emission thresholds are presented in Table 3.13-12. These emissions would be the same for Alternatives 1, 1A, 2, 3, and 4. Project operations would result in a net increase in NO_X emissions greater than the SCAQMD operation threshold for NO_X. However, this emissions increase would be offset by the emissions reductions achieved by the truck buyback program implemented during project construction. The amount of NO_X emissions offset would be up to 133 lb/day (24.2 ton/year) at the beginning of project operation, and may gradually decrease over future years as the entire truck fleet becomes newer and cleaner.

Table 3.13-12
Indirect Daily Operational Emissions from Marine Vessels

Ship Type	Worst-Case Daily Detour Hours During Operation (hours/day)	CO (lb/day)	NO_X (lb/day)	ROG (lb/day)	SO_2 (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Tugs	3.53	20.77	83.52	3.16	0.06	2.18	2.00
Harbor Operations	0.08	0.54	2.15	0.08	0.0015	0.06	0.05
Fishing	0.02	0.03	0.10	0.004	0.0001	0.003	0.003
Yachts	0.76	1.95	7.85	0.30	0.0053	0.20	0.19
Tankers	0.02	0.31	1.14	0.05	0.0008	0.03	0.03
Total		**23.6**	**94.8**	**3.59**	**0.06**	**2.47**	**2.27**
SCAQMD Thresholds		**550**	**55**	**55**	**150**	**150**	**55**

Summary

Table 3.13-13 presents the total peak daily emissions from direct (see Table 3.13-4) and indirect (see Table 3.13-12) operation emissions. Implementation of Alternative 1 in 2011, 2015, or 2030 would result in a net decrease in emissions when compared to the existing conditions. Therefore, mitigation would not be required for project operation.

Table 3.13-13
Peak Daily Emissions for the Project Study Area
(Sum of Direct and Indirect Emissions)

Year	Alternative	CO (lb/day)	NO_X (lb/day)	ROG (lb/day)	SO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
2003	Existing Conditions	54,560	26,620	2,893	207	1,131	901
2011	No Build	24,568	18,233	1,421	52	878	671
	Alternative 1	24,423	18,084	1,406	52	873	667
	Alternative 2	24,659	17,029	1,368	51	838	634
	Alternative 3	24,423	18,084	1,406	52	873	667
	Alternative 4	24,568	18,233	1,421	52	878	671

Table 3.13-13
Peak Daily Emissions for the Project Study Area
(Sum of Direct and Indirect Emissions)

Year	Alternative	CO (lb/day)	NO_X (lb/day)	ROG (lb/day)	SO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
2015	No Build	19,185	13,209	1,100	57	786	579
	Alternative 1	19,012	13,062	1,083	57	781	576
	Alternative 2	19,212	13,260	1,097	57	791	584
	Alternative 3	19,012	13,062	1,083	57	781	576
	Alternative 4	19,185	13,209	1,100	57	786	579
2030	No Build	11,177	5,997	708	72	631	457
	Alternative 1	10,894	5,799	668	72	627	443
	Alternative 2	10,984	5,865	675	72	633	447
	Alternative 3	10,894	5,799	668	72	627	443
	Alternative 4	11,177	5,997	708	72	631	457

3.13.3.5.2 Alternative 2: SR-103 Extension to Alameda Street

3.13.3.5.2.1 Construction Effects

Construction activities would involve demolition of the existing Schuyler Heim Bridge, plus construction of the replacement bridge, flyover, and SR-103 Extension. Two construction methodologies were considered for Alternative 2: CIP and segmental. Detailed construction equipment lists for Alternative 2 are available in the Air Quality Technical Study (Caltrans, 2009).

Direct

Direct emissions from Alternative 2 construction are shown in Table 3.13-14. The construction emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ would exceed the SCAQMD thresholds. In addition, since the project is located in Los Angeles, which has been federally designated nonattainment status for CO, ozone, PM_{10}, and $PM_{2.5}$, the direct construction emissions associated with Alternative 2 would have adverse but temporary effects on air quality.

Indirect

Under Alternative 2, the bridge construction would be the same as under Alternative 1. Also, marine vessel traffic restrictions would be the same as under Alternative 1. Therefore, effects from marine vessel detour emissions during construction of the Schuyler Heim Bridge (Tables 3.13-11) would be the same as those described for Alternative 1.

The sum of direct and indirect emissions from construction associated with Alternative 2 would have an adverse but temporary effect on air quality.

3.13.3.5.2.2 Operations Effects

Under Alternative 2, direct and indirect operations effects would be the same as those described for Alternative 1.

3.13.3.5.2.3 Construction Effects

The existing bridge would not be demolished under this alternative so there would be no construction effects associated with emissions from bridge demolition. Construction activities would involve construction of the replacement bridge, flyover, and the SR-47 Expressway. Two construction methodologies were considered for Alternative 3: CIP and segmental. Detailed construction equipment lists for Alternative 3 are available in the Air Quality Technical Study (Caltrans, 2009).

Direct

Direct construction emissions from Alternative 3 construction are shown in Table 3.13-15. The construction emissions of CO, NO_X, ROG, PM_{10}, and $PM_{2.5}$ would exceed the SCAQMD thresholds. In addition, since the project is located in Los Angeles County, which has been federally designated nonattainment status for CO, ozone, PM_{10}, and $PM_{2.5}$, the construction emissions associated with Alternative 3 would have adverse but temporary effects on air quality.

3.13.3.5.3 Alternative 3: Bridge Demolition Avoidance

Indirect

Under Alternative 3, the bridge construction would be comparable to Alternative 1. Also, marine vessel traffic restrictions would be the same as under Alternative 1. Therefore, effects from marine vessel detour emissions during construction of the Schuyler Heim Bridge (Tables 3.13-11) would be the same as those described for Alternative 1.

The sum of direct and indirect emissions from construction associated with Alternative 3 would have an adverse but temporary effect on air quality.

3.13.3.5.3.1 Operations Effects

Under Alternative 3, direct and indirect operations effects would be the same as those described for Alternative 1.

3.13.3.5.4 Alternative 4: Bridge Replacement Only

3.13.3.5.4.1 Construction Effects

Construction activities would involve demolition of the existing bridge and construction of the replacement bridge. Two construction methodologies were considered for Alternative 4: CIP and segmental. Detailed construction equipment lists for Alternative 4 are available in the Air Quality Technical Study (Caltrans, 2009).

Direct

Direct construction emissions from Alternative 4 construction are shown in Table 3.13-16. The construction emissions of NO_X, ROG, PM_{10}, and $PM_{2.5}$ would exceed the SCAQMD thresholds. In addition, since the project is located in Los Angeles County, which has been federally designated nonattainment status for CO, ozone, PM_{10}, and $PM_{2.5}$, the construction emissions associated with Alternative 4 would have adverse but temporary effects on air quality.

Table 3.13-14
Alternative 2 Maximum Direct Construction Emissions with Mitigation to Control Fugitive Dust

	Cast-in-Place Method Emissions						Segmental Method Emissions					
	CO (lb/day)	**NO_X (lb/day)**	**ROG (lb/day)**	**SO_X (lb/day)**	**PM_{10} (lb/day)**	**$PM_{2.5}$ (lb/day)**	**CO (lb/day)**	**NO_X (lb/day)**	**ROG (lb/day)**	**SO_X (lb/day)**	**PM_{10} (lb/day)**	**$PM_{2.5}$ (lb/day)**
Maximum Construction Equipment Exhaust	822	1736	204	2	83	76	777	1619	193	2	76	69
Maximum Workers Commute	75	7.8	7.7	0.08	0.67	0.42	68	7.1	7	0.08	0.61	0.38
Maximum Fugitive Dust	NA	NA	NA	NA	904	191	NA	NA	NA	NA	717	152
Combined Maximum Daily Emissions	**897**	**1744**	**211**	**1.9**	**988**	**268**	**846**	**1626**	**200**	**1.9**	**794**	**222**
SCAQMD Thresholds (lb/day)	**550**	**100**	**75**	**150**	**150**	**55**	**550**	**100**	**75**	**150**	**150**	**55**

Note:

1. According to SCAQMD *CEQA Air Quality Handbook* Table 11-4, the control efficiencies of the fugitive dust from construction sites and unpaved roads were assumed to be 68 percent and 45 percent, respectively, by watering the sites or unpaved roads three times a day. The PM_{10} emissions listed in the table have taken into account the above control efficiencies.

Table 3.13-15
Alternative 3 Maximum Direct Construction Emissions with Mitigation to Control Fugitive Dust

	Cast-in-Place Method Emissions						Segmental Method Emissions					
	CO (lb/day)	**NO_X (lb/day)**	**ROG (lb/day)**	**SO_X (lb/day)**	**PM_{10} (lb/day)**	**$PM_{2.5}$ (lb/day)**	**CO (lb/day)**	**NO_X (lb/day)**	**ROG (lb/day)**	**SO_X (lb/day)**	**PM_{10} (lb/day)**	**$PM_{2.5}$ (lb/day)**
Maximum Construction Equipment Exhaust	814	1745	203	1.8	83	76	755	1528	192	1.6	77	70
Maximum Workers Commute	75	7.8	7.7	0.08	0.67	0.42	69	7.2	7.1	0.08	0.62	0.39
Maximum Fugitive Dust	NA	NA	NA	NA	893	189	NA	NA	NA	NA	706	150
Combined Maximum Daily Emissions	**889**	**1753**	**211**	**1.9**	**976**	**265**	**824**	**1535**	**199**	**1.7**	**784**	**220**
SCAQMD Thresholds (lb/day)	**550**	**100**	**75**	**150**	**150**	**55**	**550**	**100**	**75**	**150**	**150**	**55**

Note:

1. According to SCAQMD *CEQA Air Quality Handbook* Table 11-4, the control efficiencies of the fugitive dust from construction sites and unpaved roads were assumed to be 68 percent and 45 percent, respectively, by watering the sites or unpaved roads three times a day. The PM_{10} emissions listed in the table have taken into account the above control efficiencies.

Table 3.13-16
Alternative 4 Maximum Direct Construction Emissions with Mitigation to Control Fugitive Dust

	Cast-in-Place Method Emissions						Segmental Method Emissions					
	CO (lb/day)	**NO_X (lb/day)**	**ROG (lb/day)**	**SO_X (lb/day)**	**PM_{10} (lb/day)**	**$PM_{2.5}$ (lb/day)**	**CO (lb/day)**	**NO_X (lb/day)**	**ROG (lb/day)**	**SO_X (lb/day)**	**PM_{10} (lb/day)**	**$PM_{2.5}$ (lb/day)**
Maximum Construction Equipment Exhaust	503	1091	121	1	50	236	445	901	111	1	45	41
Maximum Workers Commute	41	4.3	4.2	0.05	0.37	0.23	35	3.7	3.6	0.04	0.3	0.2
Maximum Fugitive Dust	NA	NA	NA	NA	635	134	NA	NA	NA	NA	448	95
Combined Maximum Daily Emissions	**544**	**1095**	**125**	**1.1**	**685**	**180**	**480**	**905**	**115**	**1**	**493**	**136**
SCAQMD Thresholds (lb/day)	**550**	**100**	**75**	**150**	**150**	**55**	**550**	**100**	**75**	**150**	**150**	**55**

Note:

1. According to SCAQMD *CEQA Air Quality Handbook* Table 11-4, the control efficiencies of the fugitive dust from construction sites and unpaved roads were assumed to be 68 percent and 45 percent, respectively, by watering the sites or unpaved roads three times a day. The PM_{10} emissions listed in the table have taken into account the above control efficiencies.

Indirect

Under Alternative 4, the bridge construction would be the same as under Alternative 1. Also, marine vessel traffic restrictions would be the same as under Alternative 1. Therefore, effects from marine vessel detour emissions during construction of the Schuyler Heim Bridge (Tables 3.13-11) would be the same as those described for Alternative 1.

The sum of direct and indirect emissions from construction associated with Alternative 4 would have an adverse but temporary effect on air quality.

3.13.3.5.4.2 Operations Effects

Under Alternative 4, direct and indirect operations effects would be the same as those described with operation of the new bridge under Alternative 1.

3.13.3.5.5 Alternative 5: Transportation System Management

3.13.3.5.5.1 Construction Effects

There would be minimal construction under the TSM alternative. Therefore, there would be no direct or indirect construction effects to air quality.

3.13.3.5.5.2 Operations Effects

Direct

Components of the TSM alternative would improve traffic flow and reduce delays which would be expected to reduce vehicle emissions. Therefore, there would be no direct effect to air quality under the TSM alternative.

Indirect

Under the TSM alternative, Schuyler Heim Bridge would not be replaced, so marine vessels would not be required to detour around Terminal Island. Therefore, there would be no indirect effect to air quality under the TSM alternative.

3.13.3.5.6 Alternative 6: No Build

Under Alternative 6, there would be no change to the existing Schuyler Heim Bridge or to the local roadway system.

3.13.3.5.6.1 Construction Effects

There would be no construction activities under the No Build alternative. Therefore, there would be no direct or indirect construction effects to air quality.

3.13.3.5.6.2 Operations Effects

Direct

The CO concentrations shown in Table 3.13-6 and 3.13-7 for No Build alternative are less than the federal standards shown in Table 3.13-1. The qualitative PM_{10} analysis is discussed in Section 3.13.3.4.1.3. Localized PM_{10}/PM_{25} showed that the project would be unlikely to cause new violations or increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{10} or $PM_{2.5}$ NAAQS. Therefore, no direct air quality effects would be expected under Alternative 6.

Indirect

Under the No Build alternative, the existing lift-span bridge would not be replaced with a fixed span bridge. Therefore, marine traffic could continue using current routes, and there would be no indirect emissions from operations.

3.13.3.6 Evaluation of Health Risk Impacts

Caltrans as the Lead Agency and ACTA as a Responsible Agency have come to different conclusions with regards to ACTA's HRA and making significance determinations for each alternative. These conclusions are discussed below.

3.13.3.6.1 Caltrans' HRA Impact Evaluation

While Caltrans agrees that there may be adverse health impacts associated with operation of the proposed project, Caltrans has determined the impacts are less than significant. This finding is based on (1) the uncertainty of ACTA's HRA assumptions, methodology and findings as they relate to statements of risk for specific projects and (2) the evaluation of ATCA's HRA by the UC Davis – Caltrans Air Quality Project Team (Appendix B to the Supplemental Draft EIS/Recirculated Draft EIR). The following is an evaluation of ACTA's HRA by Caltrans and UCD:

> ACTA's Health Risk Assessment used an industry- and regulatory-standard dispersion model (U.S. Environmental Protection Agency's (EPA's) AERMOD[3]) and worst-case meteorological and traffic assumptions. The Health Risk Assessment methodology described in the California Office of Environmental Health Hazard Assessment (OEHHA) Health Risk Assessment Guidance[4], and the South Coast Air Quality Management District (SCAQMD) California Environmental Quality Act (CEQA) Handbook[5] was used. In general, this method uses worst-case assumptions including: use of the highest possible emission factors; use of the highest available traffic volumes or other measures of emission strength; worst-case meteorology, and the assumption that persons at residential receptors will be exposed to the maximum pollutant concentrations for 70 years, 24 hours/day, 350 days/year.
>
> The HRA used vehicle emission factors for specific years from the current version of the California Air Resources Board (ARB) EMFAC on-road mobile source emission inventory model (EMFAC2007)[6]. The EMFAC model is used in California instead of U.S. EPA's MOBILE6[7] emission inventory model. EMFAC does not directly produce emission factors for toxic air contaminants from mobile sources (Mobile Source Air Toxics – MSAT). MSAT emission factors must be calculated "off-model" by determining the fractions of Total Organic Gas (TOG) and particulate matter emission factors that represent the toxic compounds of interest, from various types of vehicle activity. This process uses "speciation factors" provided by California ARB[8]. The HRA used emission factors only for years 2003, 2015, and 2030, with adjustments to account for a specific truck emission reduction program committed to by the ports of Los Angeles and Long Beach as well as estimated diesel particulate matter (DPM) reduction in future years based on CARB's draft scoping plan for

[3] US EPA Support Center for Air Quality Models, accessed 9/15/2008: http://www.epa.gov/scram001/dispersion_prefrec.htm#aermod

[4] California Office of Environmental Health Hazard Assessment, accessed 9/15/2008: http://www.oehha.ca.gov/air/hot_spots/HRAguidefinal.html

[5] South Coast Air Quality Management District, accessed 9/16/2008: http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html

[6] California Air Resources Board, accessed 9/15/2008: http://www.arb.ca.gov/msei/msei.htm

[7] US EPA OTAQ, accessed 9/15/2008: http://www.epa.gov/OTAQ/m6.htm

[8] California Air Resources Board, accessed 9/15/2008: http://www.arb.ca.gov/ei/speciate/speciate.htm

AB32. This is an extremely conservative, even worst-case, assumption, because EMFAC accounts for vehicle fleet emission improvements over time based on regulations in force at the time a particular EMFAC version is developed. EMFAC, as used in other types of air quality modeling such as for criteria pollutants like carbon monoxide and particulate matter, would show substantially decreasing emissions from the truck fleet over time as diesel engine emission controls become more stringent. Ignoring this well-documented effect artificially increases the assumed emissions, modeled pollutant concentrations, and modeled health risks. See Figure 3.13-1 for an illustration of MSAT emission trends for the South Coast Air Basin using EMFAC 2007 and ARB speciation factors as packaged in the CT-EMFAC tool[9].

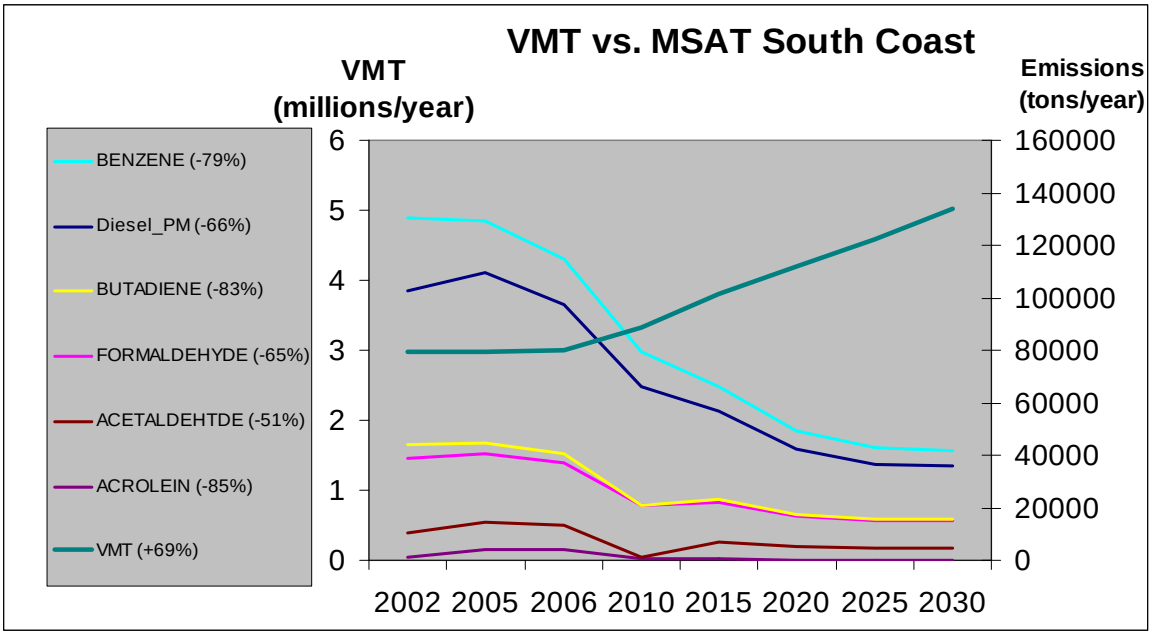


Figure 3.13-1

MSAT Trends in the South Coast Air Basin

Schuyler Heim Bridge Replacement and SR-47 Expressway

EMFAC does have limitations for MSAT analysis, including:

- EMFAC does not provide emission factors beyond 2040 at this time (EMFAC 2007), so a 70-year analysis using EMFAC must make assumptions regarding the behavior of vehicle fleet emissions after that. The normal, and conservative, response would be to assume that 2040 emission rates remain constant for the rest of the analysis period.

[9] California Dept. of Transportation, Air Quality web site, accessed 9/30/22008: http://www.dot.ca.gov/hq/env/air/pages/ctemfac_license.htm

- The current (2007) version of EMFAC does not include estimates of the effect of diesel fleet regulations adopted by the ARB since 2006, which are intended to accelerate near-term emission reductions by requiring expedited conversion of the vehicle fleet to newer engines and use of emission reduction retrofits. These programs would have a similar effect to the LNG-powered Port truck program considered in the HRA, but applied over the entire truck and off-road diesel-powered equipment fleets. It is very likely, therefore, that vehicle fleet emissions of MSAT will decline faster, and possibly more, than is presently accounted for in EMFAC 2007 and ARB's speciation factors. This effect is also not accounted for in the standard approach to HRA, so MSAT emissions in the project area will almost certainly be considerably lower than what was estimated in the HRA document. The HRA document does include an analysis using 2015 emissions (the year the project would open) rather than 70-year projected emissions, which shows a substantial reduction in impact for the 2015-based analysis.

FHWA states in its Interim Guidance for MSAT analysis[10] that current approaches to quantitative health risk assessment include many uncertainties, and that it is not appropriate at this time to base project approval and alternative choice decisions on such studies. OEHHA agrees that substantial uncertainty exists, but advises the use of highly conservative assumptions to provide a "safety factor" given the uncertainty.

The HRA performed by ACTA, based on a conservative approach derived from OEHHA procedures, indicates that Alternative 1 will at most impact a small number of residences, and no other types of sensitive receptor, at a level barely exceeding the SCAQMD threshold. Alternative 2 would more severely impact a larger number and sensitivity of receptors, including schools. The HRA indicates that, even using the most conservative approach, there would not be a significant non-cancer risk increase, and that workplace cancer and non-cancer risks resulting from the project are also less than significant.

If a standard of "reasonably foreseeable" effects rather than "worst case" were used, Alternative 1 would not have the significant impacts, as found by ACTA. Alternative 2 would have a greater impact regardless of assumptions due to the number and sensitivity of, and short distance to, receptors, and the higher increment of risk in the affected area. The "reasonably foreseeable" effect is based on consideration of continued Total Organic Gas and Diesel Exhaust Particulate Matter (DPM) emission reductions in the future, as projected by the EMFAC2007 model; additional State, Federal, and local (SCAQMD) programs enacted after the model was released; and consideration of reduced near-term travel activity due to goods movement responses to varying economic conditions (Port activity growth substantially slowed in 2007-8).

3.13.3.6.1.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

Based on the HRA evaluation, Caltrans does not believe that there is adequate or satisfactory evidence to support a determination of a significant impact due to exposure to air toxics. The evidence provided in ACTA's HRA document is not sufficient to make the determination of a CEQA significance related to increased cancer risk for this project.

[10] Federal Highway Administration (FHWA), accessed 9/15/2008: http://www.fhwa.dot.gov/environment/airtoxic/020306guidmem.htm

3.13.3.6.1.2 Alternative 2 SR-103 Extension to Alameda Street

As stated above, Caltrans does not believe that there is adequate or satisfactory evidence to support a determination of a significant impact due to exposure to air toxics and that the evidence provided in ACTA's HRA is not sufficient to make the determination of a CEQA significance related to increased cancer risk for this project. Alternative 2 may have a greater impact related to MSATs even considering "reasonably foreseeable" rather than worst-case effects, due to the proximity of schools and a larger number of residences than Alternative 1. Alignment modification to reduce impacts would be difficult for this alternative due to the adjacent land uses and character of the existing facility, and HVAC installation/modification as proposed by ACTA for Alternative 1 would, if done, need to be on a much larger scale with less confidence that risks would be substantially reduced. Impacts on certain sensitive land uses, like outdoor play areas of schools and parks adjacent to the freeway, would not be feasible to mitigate.

3.13.3.6.1.3 Alternative 3: Bridge Demolition Avoidance

Health risk impacts of Alternative 3 would be the same as Alternative 1.

3.13.3.6.1.4 Alternative 4: Bridge Replacement Only

The operational effects of Alternative 4 would be the same as Alternative 6. Data are insufficient to quantitatively indicate whether these alternatives would or would not have a significant MSAT impact compared to the Baseline (2003) condition. However, qualitative consideration of traffic and other air quality studies suggests that truck traffic would be closer to sensitive receptors and operating under higher-emitting urban street conditions, leading to potential MSAT impacts of the no build option that would be higher than those of the build alternatives.

3.13.3.6.1.5 Alternative 5: Transportation System Management

The operational effects of Alternative 5 would be similar to the effects discussed under Alternative 4.

3.13.3.6.1.6 Alternative 6: No Build

The operational effects of Alternative 6 would be the same as discussed above, under Alternative 4.

3.13.3.6.2 ACTA's Evaluation of Health Risk Impacts

Two emission scenarios were included in the HRA for the cancer risk analysis: one based on 2015 emissions and the other one based on 70-year average emissions. Both scenarios evaluated cancer risk over a 70-year period. However, due to the uncertainties associated with the 70-year average emissions scenario (see Section 3.13.3.4.3.2 for details), cancer risk was considered significant only when the 2015 emissions scenario predicted an incremental increase in risk that would exceed the SCAQMD significance threshold. The following sections provide ACTA's determination of significance for the project alternatives.

3.13.3.6.2.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

Non-cancer Risks

Acute and chronic hazard indexes would be below the significance threshold of 1 for all receptors. Therefore, ACTA has determined that the non-cancer risk under Alternative 1 would be less than significant.

Cancer Risks

HRA Results of the 2015 Emission Scenario (preferred)

The results of the 2015 emission scenario indicate that the proposed project would result in substantial regional benefits that reduce risk from exposure to diesel exhaust in the majority of the study area. However, there would be localized areas of increased cancer risks. The main areas where increased cancer risk occurs would be along Alameda Street and the new SR-47 expressway.

Table 3.13-17 presents the maximum cancer risks from the 2015 emission scenario. The worker, student, and recreational user incremental cancer risk would be less than 10 in one million. Therefore, the incremental cancer risk to these receptors would be less than significant. The Long Beach neighborhood incremental cancer risk would be 5.4 in one million, the Dominguez neighborhood incremental cancer risk would be 9.8 in one million, the Lincoln Village neighborhood incremental cancer risk would be 10.1 in one million, and the Wilmington neighborhood incremental cancer risk would be 10.6 in one million. The incremental cancer risk for the Lincoln Village and Wilmington residential receptors would exceed the significance threshold of 10 in one million; therefore, ACTA finds the cancer risk for these residential receptors would be significant. The significant incremental increase in cancer risk affects a small number of homes (less than 30). Feasible mitigation measures would be available to reduce the estimated risk to less than the significant.

HRA Results of the 70-year Emission Scenario (for information only)

The 70-year average emissions scenario indicates that Alternative 1 would result in substantial regional benefits of reduced cancer risks in the majority of the study area. However, there would be localized areas of increased cancer risks. The main areas where increased cancer risk occurs would be along Alameda Street and the new SR-47 expressway.

Table 3.13-18 presents the maximum cancer risk for the 70-year emission scenario. The worker, student, and recreational user incremental cancer risk would be less than 10 in one million. Therefore, the incremental cancer risk to these receptors would be less than significant. The Wilmington neighborhood incremental cancer risk would be 10.3 in one million, the Long Beach neighborhood incremental cancer risk would be 10.4 in one million, the Dominguez neighborhood incremental cancer risk would be 13.6 in one million, and the Lincoln Village neighborhood incremental cancer risk would be 13.7 in one million. The incremental cancer risk for the residential receptors would exceed the significance threshold of 10 in one million; therefore, ACTA finds the cancer risk for the residential receptors would be significant.

In summary, based on the local significance threshold, ACTA finds that for Alternative 1, or 1A the project would have a significant impact on a number of residential receptors in the project vicinity. Mitigation measures to reduce the cancer risks were evaluated and it was ACTA's determination that retrofits of heating, ventilating and air conditioning (HVAC) units would be feasible mitigation measure to reduce the incremental cancer risks. The residential cancer risk impacts after mitigation are expected to be below the SCAQMD significance threshold on 10 in one million. ACTA has determined that Alternative 1, or 1A, would not cause significant acute or chronic risk impacts to receptors in the project area.

Table 3.13-17
Summary of Sensitive Receptor Cancer Risk

Alternative 1: 2015 Emission Scenario
Cancer risk is expressed as number per one million

Residential Regions	Receptor[a]	UTM Coordinates[b]		Residential Risk		
		East (m)	North (m)	Baseline	Alt 1	Increase
Dominguez	2535	386,675	3,744,275	87.8	97.6	9.8
Lincoln Village	2389	386,525	3,743,825	84.9	95.0	10.1
Long Beach	2274	386,675	3,743,375	52.5	57.9	5.4
Wilmington	1548	384,975	3,740,025	39.7	50.3	10.6

Recreational Areas	Receptor[a]	UTM Coordinates[b]		Worker Risk			Recreational User Risk		
		East (m)	North (m)	Baseline	Alt 1	Increase	Baseline	Alt 1	Increase
Hudson Park	1677	386,825	3,740,325	10.9	11.3	0.4	16.4	17.0	0.6

School Areas	Receptor[a]	UTM Coordinates[b]		Worker Risk			Student Risk		
		East (m)	North (m)	Baseline	Alt 1	Increase	Baseline	Alt 1	Increase
Cabrillo High School	1623	386,775	3,740,225	10.8	11.2	0.4	2.5	2.6	0.1

Note:
[a] - Multiple receptors may share maximum risk increase; receptor listed is lowest-numbered.
[b] - Universal Transverse Mercator projection, Zone 11, NAD 83.

Table 3.13-18
Summary of Sensitive Receptor Cancer Risk

Alternative 1: 70-year Average Emission Scenario
Cancer risk is expressed as number per one million

Residential Regions	Receptor[a]	UTM Coordinates[b]		Residential Risk		
		East (m)	North (m)	Baseline	Alt 1	Increase
Dominguez	2535	386,675	3,744,275	164.0	177.6	13.6
Lincoln Village	2389	386,525	3,743,825	160.0	173.7	13.7
Long Beach	2254	386,725	3,743,275	109.0	119.4	10.4
Wilmington	1372	384,875	3,739,375	99.8	110.1	10.3

Recreational Areas	Receptor[a]	UTM Coordinates[b]		Worker Risk			Recreational User Risk		
		East (m)	North (m)	Baseline	Alt 1	Increase	Baseline	Alt 1	Increase
Hudson Park	1695	386,825	3,740,425	27.6	27.4	None	41.5	41.0	None

School Areas	Receptor[a]	UTM Coordinates[b]		Worker Risk			Student Risk		
		East (m)	North (m)	Baseline	Alt 1	Increase	Baseline	Alt 1	Increase
Cabrillo High School	1623	386,775	3,740,225	31.0	30.6	None	7.2	7.1	None

Note:
[a] - Multiple receptors may share maximum risk increase; receptor listed is lowest-numbered.
[b] - Universal Transverse Mercator projection, Zone 11, NAD 83.

3.13.3.6.2.2 Alternative 2 SR-103 Extension to Alameda Street

Non-cancer Risks

Acute and chronic hazard indexes would be below the significance threshold of 1 for all receptors. Therefore, ACTA has determined that the non-cancer risk under Alternative 2 would be less than significant.

Cancer Risk

HRA Results of the 2015 Emission Scenario

The 2015 emissions scenario indicates that Alternative 2 would result in substantial regional benefits of reduced cancer risks in the majority of the study area. However, there would be localized areas of increased cancer risks. The main areas of increased risk would be along existing SR-103 and its extension from Sepulveda to 223rd Street.

Table 3.13-19 presents the maximum cancer risks from the 2015 emission scenario. The recreational worker and student incremental cancer risk would be less than 10 in one million. Therefore, the cancer risk to these receptors would be less than significant. The Cabrillo High School worker and Hudson Park recreational user incremental cancer risk would be greater than 10 in one million. Therefore, ACTA finds the cancer risk to these receptors would be significant. There would be no incremental increase for cancer risk in the Wilmington neighborhood, the Dominguez neighborhood incremental cancer risk would be 6.3 in one million, the Lincoln Village neighborhood incremental cancer risk would be 6.9 in one million, and the Long Beach neighborhood incremental cancer risk would be 16.1 in one million. The cancer risk for the Long Beach residential receptor would exceed the significance threshold of 10 in one million; therefore, ACTA finds the cancer risk for this receptor would be significant. The significant incremental increase in cancer risk affects a small number of homes (less than 150). Feasible mitigation measures would be available to reduce the residential and school worker risk to less than significant. However, feasible mitigation measures have not been identified for the recreational user and this impact would remain significant.

HRA Results of the 70-year Emission Scenario

The 70-year average emissions scenario indicates that Alternative 2 would result in substantial regional benefits of reduced cancer risks from exposure to diesel exhaust in the majority of the study area. The 70-year average emissions scenario indicates there would be localized areas of increased cancer risks. The main areas of increased risk would be along existing SR-103.

Table 3.13-20 presents the maximum cancer risks from the 70-year emission scenario. The student incremental cancer risk would be less than 10 in one million. Therefore, the cancer risk to this receptor would be less than significant. The Cabrillo High School worker, Hudson Park worker, and Hudson Park recreational user incremental cancer risk would be greater than 10 in one million. Therefore, ACTA finds the cancer risk to these receptors would be significant. The Wilmington neighborhood incremental cancer risk would be 1.5 in one million, the Dominguez neighborhood incremental cancer risk would be 18.7 in one million, the Lincoln Village neighborhood incremental cancer risk would be 18.7 in one million, and the Long Beach neighborhood incremental cancer risk would be 19.9 in one million. The cancer risk for the Dominguez, Lincoln Village, and Long Beach residential receptors would exceed the significance threshold of 10 in one million; therefore, ACTA finds the cancer risk for these receptors would be significant.

Table 3.13-19
Summary of Sensitive Receptor Risks

Alternative 2: 2015 Emission Scenario
Cancer risks is expressed as number per one million

Residential Regions	Receptor[a]	UTM Coordinates[b]		Residential Risk		
		East (m)	North (m)	Baseline	Alt 2	Increase
Dominguez	2535	386,675	3,744,275	87.8	94.1	6.3
Lincoln Village	2389	386,525	3,743,825	84.9	91.8	6.9
Long Beach	1736	387,125	3,740,525	50.1	66.2	16.1
Wilmington	1189	384,325	3,738,725	26.7	26.4	None

Recreational Areas	Receptor[a]	UTM Coordinates[b]		Worker Risk			Recreational User Risk		
		East (m)	North (m)	Baseline	Alt 2	Increase	Baseline	Alt 2	Increase
Hudson Park	1677	386,825	3,740,375	10.9	20.3	9.4	16.4	30.5	14.1

School Areas	Receptor[a]	UTM Coordinates[b]		Worker Risk			Student Risk		
		East (m)	North (m)	Baseline	Alt 2	Increase	Baseline	Alt 2	Increase
Cabrillo High School	1623	386,775	3,740,225	10.8	22.7	11.9	2.5	5.3	2.8

Note:
[a] - Multiple receptors may share maximum risk increase; receptor listed is lowest-numbered.
[b] - Universal Transverse Mercator projection, Zone 11, NAD 83.

Table 3.13-20
Summary of Sensitive Receptor Risks

Alternative 2: 70-year Average Emission Scenario
Cancer risk is expressed as number per one million

Residential Regions	Receptor[a]	UTM Coordinates[b]		Residential Risk		
		East (m)	North (m)	Baseline	Alt 2	Increase
Dominguez	2586	386,725	386,725	164.0	182.7	18.7
Lincoln Village	2389	386,525	386,525	160.0	178.7	18.7
Long Beach	1718	387,125	387,125	116.0	135.9	19.9
Wilmington	1191	384,425	384,425	60.7	62.2	1.5

Recreational Areas	Receptor[a]	UTM Coordinates[b]		Worker Risk			Recreational User Risk		
		East (m)	North (m)	Baseline	Alt 2	Increase	Baseline	Alt 2	Increase
Hudson Park	1695	386,825	3,740,425	27.6	39.4	11.8	41.5	59.1	17.7

School Areas	Receptor[a]	UTM Coordinates[b]		Worker Risk			Student Risk		
		East (m)	North (m)	Baseline	Alt 2	Increase	Baseline	Alt 2	Increase
Cabrillo High School	1623	386,775	386,775	31.0	46.1	15.1	7.2	10.7	3.5

Note:
[a] - Multiple receptors may share maximum risk increase; receptor listed is lowest-numbered.
[b] - Universal Transverse Mercator projection, Zone 11, NAD 83.

The significant incremental increase in cancer risk affects a small number of homes (less than 150). Feasible mitigation measures would be available to reduce the residential and school worker risk to less than the significant. However, feasible mitigation measures have not been identified for the recreational worker or recreational user; therefore, ACTA has determined that this impact would remain significant.

In summary, based on the local significance threshold, ACTA has determined that Alternative 2 would have a significant impact on a number of residential receptors as well as school workers and recreational users in the project vicinity. Mitigation measures to reduce the cancer risks were evaluated and it was determined that retrofits of HVAC units would be a feasible mitigation measure to reduce the incremental cancer risks for residential and school worker receptors. However, since recreational user exposure occurs outdoors at Hudson Park, the HVAC retrofits would not be an effective approach. Therefore, ACTA has determined that the cancer risk for recreational users at Hudson Park would remain significant.

3.13.3.6.2.3 Alternative 3: Bridge Demolition Avoidance

Health risk impacts of Alternative 3 would be the same as Alternative 1.

3.13.3.6.2.4 Alternative 4: Bridge Replacement Only

Alternative 4 (Bridge Only) is equivalent in terms of traffic to the No Build alternative. The operational effects of Alternative 4 would be the same as Alternative 6 (No Build). In ACTA's HRA, health risk impacts of Alternative 4 were not evaluated by comparison to Alternative 6 (No Build) since the impacts would be expected to be the same.

3.13.3.6.2.5 Alternative 5: Transportation System Management

Health risk impacts due to Alternative 5 were not evaluated but would be anticipated to be the same the No Build alternative.

3.13.3.6.2.6 Alternative 6: No Build

For the purposes of this analysis, the No Build alternative was used as the baseline condition for ACTA's health risk analysis.

3.13.3.6.3 Conservative Nature and Uncertainties of the HRA

By their nature, health risk estimates cannot be completely accurate because scientists, medical experts, regulators, and practitioners do not completely understand how toxic air pollutants harm human cells or how different pollutants might interact with each other in the human body. The exposure assessment often relies on computer models that are based on a multitude of assumptions, both in terms of present and future conditions.

When information is missing or uncertain, risk analysts generally make assumptions that tend to prevent them from underestimating the potential risk. These assumptions provide a margin of safety in the protection of human health. Again, to protect public health, these assumptions are very conservative. For example, for residential exposures risk assessments assume continuous exposure to the maximum dose for 70 years. However, most people do not stay in one place for 24 hours a day, 350 days a year and 70 years.

Additionally, no single universal way exists of doing health risk assessments, leading to possible problems in comparing different risks. Assumptions also change over time, and even HRAs completed using the same models can produce different results.

OEHHA has provided a discussion of risk uncertainty, which is reiterated here (OEHHA, 2003).

There is a great deal of uncertainty associated with the process of risk assessment. The uncertainty arises from lack of data in many areas necessitating the use of assumptions. The assumptions used in these guidelines are designed to err on the side of health protection in order to avoid underestimation of risk to the public. Sources of uncertainty, which may either overestimate or underestimate risk, include: 1) extrapolation of toxicity data in animals to humans, 2) uncertainty in the estimation of emissions, 3) uncertainty in the air dispersion models, and 4) uncertainty in the exposure estimates. Uncertainty may be defined as what is not known and may be reduced with further scientific studies. In addition to uncertainty, there is a natural range or variability in the human population in such properties as height, weight, and susceptibility to chemical toxicants. Scientific studies with representative individuals and large enough sample size can characterize this variability.

Interactive effects of exposure to more than one carcinogen or toxicant are also not necessarily quantified in the HRA. Cancer risks from all emitted carcinogens are typically added, and hazard quotients for substances impacting the same target organ system are added to determine the hazard index (HI). Many examples of additivity and synergism (interactive effects greater than additive) are known. For substances that act synergistically, the HRA could underestimate the risks. Some substances may have antagonistic effects (lessen the toxic effects produced by another substance). For substances that act antagonistically, the HRA could overestimate the risks.

Other sources of uncertainty, which may underestimate or overestimate risk, can be found in exposure estimates where little or no data are available (e.g., soil half-life and dermal penetration of some substances from a soil matrix).

The differences among species and within human populations usually cannot be easily quantified and incorporated into risk assessments. Factors including metabolism, target site sensitivity, diet, immunological responses, and genetics may influence the response to toxicants. The human population is much more diverse both genetically and culturally (e.g., lifestyle, diet) than inbred experimental animals. The intraspecies variability among humans is expected to be much greater than in laboratory animals. Adjustment for tumors at multiple sites induced by some carcinogens could result in a higher potency. Other uncertainties arise 1) in the assumptions underlying the dose-response model used, and 2) in extrapolating from large experimental doses, where, for example, other toxic effects may compromise the assessment of carcinogenic potential, to usually much smaller environmental doses. Also, only single tumor sites induced by a substance are usually considered. When epidemiological data are used to generate a carcinogenic potency, less uncertainty is involved in the extrapolation from workplace exposures to environmental exposures. However, children, a subpopulation whose hematological, nervous, endocrine, and immune systems, for example, are still developing and who may be more sensitive to the effects of carcinogens on their developing systems, are not included in the worker population and risk estimates based on occupational epidemiological data are more uncertain for children than adults. Finally, the quantification of each uncertainty applied in the estimate of cancer potency is itself uncertain.

Thus, risk estimates generated by an HRA should not be interpreted as the expected rates of disease in the exposed population but rather as estimates of potential risk, based on current knowledge and a number of assumptions. Additionally, the uncertainty factors integrated within the estimates of noncancer RELs are meant to err on the side of public health protection in order

to avoid underestimation of risk. Risk assessment is best used as a ruler to compare one source with another and to prioritize concerns. Consistent approaches to risk assessment are necessary to fulfill this function.

3.13.3.7 CEQA Consequences

Potential impacts of the proposed project alternatives are assessed in the context of CEQA criteria for Air Quality in Chapter 4.0 – CEQA Analysis. Based on the above analysis, under Alternatives 1, 2, 3, and 4, criteria pollutants impacts to air quality would be significant. Under Alternative 5, criteria pollutants impacts to air quality would be less than significant. Caltrans has determined that there is not adequate or satisfactory evidence to support a determination of a significant impact due to exposure to air toxics. The evidence provided in ACTA's HRA document is not sufficient to make the determination of a CEQA significance related to increased cancer risk for this project.

ACTA has determined that cancer risk impacts associated with Alternatives 1 and 3 would be significant for a limited number of residential receptors. Alternative 2 would have significant impacts on cancer risks for a number of residential receptors, parks, and workers in the project vicinity. Operation of Alternative 4 would be the same as Alternative 6 (No Build); therefore, no health risk increase is expected from Alternative 4. Cancer risks for Alternative 5 were not evaluated. Under Alternative 6, the project would not be constructed; therefore, there would be no impact to air quality or health risks. Significant impacts related to air quality are addressed in Section 4.5.1.

3.13.4 Avoidance, Minimization, and/or Mitigation Measures

3.13.4.1 Avoidance and Minimization Measures

No avoidance or minimization measures are proposed to reduce air quality impacts.

3.13.4.2 Mitigation Measures

3.13.4.2.1 Construction

3.13.4.2.1.1 Alternatives 1, 1A, 2, 3, and 4

The following mitigation measures would reduce air quality effects during project construction and provide the noted potential efficiencies as determined by SCAQMD.

Mitigation Measures for Fugitive $PM_{10}/PM_{2.5}$

AQ-1 Apply nontoxic soil stabilizers to all inactive construction areas (previously graded areas inactive for 10 days), and areas anticipated to be inactive for 10 days. Nontoxic soil stabilizers can reduce $PM_{10}/PM_{2.5}$ emissions from these areas by 30 to 65 percent.

AQ-2 Replace ground cover in disturbed areas as quickly as possible. A reduction of 15 to 49 percent in $PM_{10}/PM_{2.5}$ emissions for disturbed areas could be achieved.

AQ-3 Reduce traffic speed on all unpaved roads to 15 mph or less. $PM_{10}/PM_{2.5}$ emissions from travel on unpaved roads can be reduced by 40 to 70 percent by managing vehicle speeds.

Mitigation Measures for Exhaust Emissions of CO, ROG, NO_X and $PM_{10}/PM_{2.5}$

AQ-4 Develop and implement a trip reduction plan to achieve a 1.5 average vehicle ridership for construction employees. A trip reduction plan can reduce emissions of ROG, NO_X, CO, and PM_{10} from worker commutes by 0.1 to 2.2 percent, 0.1 to 2.9 percent, 0.1 to 2.9 percent, and 0.1 to 2.9 percent, respectively (SCAQMD, 1993).

AQ-5 Implement a shuttle service for construction workers to and from retail services and food establishments during lunch hours. A shuttle service can reduce emissions of ROG, NO_X, CO, and PM_{10} from lunch hour trips by 0.1 to 1.0 percent, 0.1 to 1.3 percent, 0.1 to 1.3 percent, and 0.1 to 1.3 percent, respectively (SCAQMD, 1993).

AQ-6 Prohibit truck idling in excess of 2 minutes. Employ periodic, unscheduled inspections to limit unnecessary idling. The SCAQMD has not quantified the efficiency of this mitigation measure.

AQ-7 Suspend use of all construction equipment operations during second-stage smog alerts. The SCAQMD has not quantified the efficiency of this measure.

AQ-8 Use electricity, if feasible, from power poles rather than temporary diesel- or gasoline-powered generators. Using electricity from power poles is an effective measure to reduce emissions of ROG, NO_X, CO, and PM_{10} from generators. Reduction efficiencies for these compounds are 97 to 99 percent.

AQ-9 Heavy Duty Truck Buyback Program

The purpose of the buyback program would be to accelerate the modernizing of the heavy duty engine fleet operating in the South Coast Air Basin. By removing the older engines in the fleet and requiring replacement with newer, cleaner vehicles, a net reduction of NO_X emissions (and other combustion pollutants) would occur. This reduction would help offset marine vessel detour emissions.

The protocols to be used would be consistent with the Carl Moyer Program, which is already being administered by the SCAQMD. However, this program is not available to projects such as Schuyler Heim Bridge Replacement and could not be used to actually implement this project's buy-back program. The Gateway Cities Diesel Fleet Modernization Program would be an example of a buyback program with similar reduction goals. Also, the POLA/POLB Clean Air Action Plan has a heavy duty truck buy back component. While participating in already existing programs might be preferable (and possible), it would not be necessary in order to accomplish heavy duty truck buy back. The heavy duty truck buy back could be done independently, though it would have to adhere to already accepted protocols (SCAQMD).

A heavy duty truck buyback program would consist of three steps: (1) identify target vehicles based on year of make; (2) provide incentives for operators to participate; and (3) establish a means to ensure that replacements meet the net improvement forecasted.

The construction phase of this project is where the greatest impact of increased emission levels occurs. Therefore, the buyback program would be designed to mitigate the NO_X emissions during that time. Based on recent buyback programs, the program for the proposed project would cost from $25,000 to $50,000/ton of NO_X reduced. This cost can vary significantly and will continue to increase as time passes. The number of tons mitigated would be based on marine vessel detour NO_X emissions during construction. The rerouting of shipping vessels during project construction would amount to 132.8 lbs NO_X per day, which is equivalent to 24.2 tons NO_X per year. The indirect marine vessel emissions would be mitigated to a level that is below the SCAQMD significance threshold for construction emissions.

It is estimated that each truck replacement would reduce an average of 0.55 tons per year of NO_X and 0.12 tons per year of PM. This is based on emission factors representative of current buyback programs such as the Gateway Cities Diesel Fleet Modernization Program.

These emission reductions would continue for 3 to 5 years, depending on the year of the truck updated. This timeframe would exceed the duration of the project construction phase.

AQ-10 To the extent feasible, utilize construction equipment equipped with Tier 2 or newer engines.

AQ-11 Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to ensure that construction equipment is properly maintained, tuned, and modified to established specifications.

AQ-12 Prohibit tampering with engines, and require continuing adherence to manufacturer's recommendations.

3.13.4.2.2 Operations

The following mitigation measures would reduce air quality effects during project operations.

3.13.4.2.2.1 Alternatives 1, 1A, and 3

The increase in NO_X emissions due to marine vessel detours during project operation would be offset by the emissions reductions achieved by the truck buyback program implemented during project construction. No avoidance, minimization, and/or mitigation measures are proposed for project operations.

3.13.4.3 Mitigation Measures for Health Risks

Based on its conclusions as a Responsible Agency, ACTA will adopt the mitigation measure below as a condition of its approval for the proposed project.

3.13.4.3.1 Alternatives 1, 1A, and 3

AQ-13 Retrofits of heating, ventilating and air conditioning (HVAC) units. New heating, ventilating, and air conditioning (HVAC) units, or retrofit of existing HVAC units, will be installed in schools and residences that have a significant increase in cancer risk as demonstrated by the HRA.

These measures were evaluated and determined to be a feasible measure to reduce the incremental cancer risks of the project.

The rationale behind the choice of HVAC retrofits is as follows:

- This measure can be effectively implemented by a transportation authority and directly benefits the community that is impacted.
- The measure has been used effectively in mitigating the health risks of other transportation projects (e.g., San Diego Metropolitan Transit Development Board (SDMTDB) light rail).
- The retrofit of high efficiency filters on either an existing or new HVAC system will be capable of removing the pollutant that drives health risk in the community, namely diesel particulate matter.

For purposes of this assessment, the efficiency of diesel particulate removal is estimated to be 90 percent. This estimate is a conservative assumption, since the guaranteed removal rate is closer to 99 percent based on manufacturers' data. However, in this case, much lower removal rates (in the 20 to 30 percent range) would still be considered effective mitigation.

Since the maximum residential receptor risk along the transportation corridor in 2015 is estimated to be less than 11 in a million, HVAC retrofits would be an effective mechanism to mitigate incremental health risks to levels below the significance criterion threshold (10 in one million). The retrofits would involve installing new heating and air conditioning systems with high efficiency filters in selected homes along the expressway corridor. The filters would be capable of removing diesel particulate matter, which is responsible for the majority of the contribution of health risk, from the ambient air. HVAC retrofits are the preferred mitigation measure since this approach has been used in similar projects to protect sensitive receptors from diesel risk.

3.13.4.3.2 Alternative 2

Mitigation measures to reduce the cancer risks were evaluated and ACTA determined that retrofit of heating, ventilating and air conditioning (HVAC) units would be a feasible measure to reduce the incremental cancer risks at residential and school worker receptors. However, since recreational user exposure occurs outdoors at Hudson Park, the HVAC retrofits would not be an effective approach. Therefore, ACTA has determined that the cancer risk for recreational users at Hudson Park would remain significant.

3.13.4.3.3 Alternatives 4, 5 and 6

No mitigation measures were found to be necessary.

3.14 Noise

The information presented in this section is based upon the *Noise Technical Report for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Caltrans, 2007) which is herein incorporated by reference in its entirety.

Noise is defined as unwanted sound. Noise usually is objectionable because it is disturbing or annoying due to its pitch or loudness. Pitch is frequency of a tone or sound. The human ear does not hear all frequencies equally. In particular, the ear de-emphasizes low and very high frequencies. Loudness is intensity of sound waves combined with the reception characteristics of the ear.

A decibel (dB) is a unit of measurement that is used to indicate the relative amplitude of a sound. Sound levels in decibels are calculated on a logarithmic scale. Subjectively, each 10-dBA increase in sound level is generally perceived as a doubling of loudness. An increase of 3 dBA is barely perceptible, and an increase of 5 dBA is readily perceptible.

There are several methods of characterizing sound. The most common in California is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 3.14-1. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe noise over an arbitrary duration.

Table 3.14-1
Representative Outdoor and Indoor Noise Levels (dBA)

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet Fly-over at 1,000 ft	100	
Gas Lawn Mower at 3 ft	90	
Diesel Truck at 50 ft at 50 mph	80	Food Blender at 3 ft Garbage Disposal at 3 ft
Noise Urban Area, Daytime Gas Lawn Mower, 100 ft Commercial Area	70	Vacuum Cleaner at 10 ft Normal Speech at 3 ft
Heavy Traffic at 300 ft	60	Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime, Quiet Suburban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Rural Nighttime	30	Library Bedroom at Night, Concert Hall (Background)
	20	Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: Caltrans, 1998a.

As noise travels from the source to the receiver, it changes both in level and frequency. The most obvious change is the decrease in noise as distance from the source increases. The manner in which noise is reduced depends on a variety of factors, including the noise source, as well as the region over which the noise source propagates. Noise generated by a point source, such as equipment at a construction site, drops off at a rate of 6 dBA per doubling of distance. Traffic noise attenuates, or is reduced, at a different rate. The movement of vehicles makes the noise source appear to emanate from a line as opposed to a single point when viewed over a period of time. Noise levels drop off at a rate of approximately 3 dBA per doubling of distance for this type of source. However, ground type also plays into how much of a dropoff over distance will occur. Surfaces such as soft dirt or grass absorb some of the sound energy as the sound passes over and therefore increase the dropoff rate or attenuation. Hard surfaces such as parking lots or bodies of water do not have this excess absorption. For the sake of simplicity, attenuation rates are approximated as 3 dBA per doubling of distance for hard sites, and 4.5 dBA per doubling of distance for soft sites.

The level of highway traffic noise depends on three things: (l) the volume of traffic, (2) speed of the traffic, and (3) the number of trucks in the flow of the traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds (although it takes a doubling of traffic to increase noise levels by only 3 dB), and greater numbers of trucks. Vehicle noise is a combination of the noises produced by the engine, exhaust, and tires. The loudness of traffic noise can also be increased by defective mufflers or other faulty equipment on vehicles. Any condition (such as a steep incline) that causes heavy laboring of motor vehicle engines will increase traffic noise levels. In addition, there are other, more complicated factors that affect the loudness of traffic noise. For example, as a person moves away from a highway, traffic noise levels are reduced by distance, terrain, vegetation, and natural and manmade obstacles. Traffic noise is not usually a serious problem for people who live more than 150 meters (m) (492 feet [ft]) from heavily traveled freeways or more than 30 to 60 m (98 to 197 ft) from lightly traveled roads.

3.14.1 Regulatory Setting

3.14.1.1 Federal Requirements

The National Environmental Policy Act (NEPA) provides broad authority and responsibility for evaluating and mitigating adverse environmental effects, including highway traffic noise. NEPA directs the federal government to use all practical means and measures to promote the general welfare and foster a healthy environment.

The Federal-Aid Highway Act of 1970 mandated the Federal Highway Administration (FHWA) to develop noise standards for mitigating highway traffic noise. The law requires promulgation of traffic noise-level criteria for various land use activities. The law further provides that FHWA not approve plans and specifications for a federally aided highway project unless the project includes adequate noise abatement measures to comply with the standards. In compliance with this act, the FHWA has developed and implemented regulations for the analysis of noise impacts and the mitigation abatement of highway traffic noise from federally aided highway projects. These regulations are contained in 23 CFR 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise." The regulations require the following during the planning and design of a highway project: (1) identification of traffic noise impacts; (2) examination of potential abatement measures;

(3) incorporation of reasonable and feasible noise abatement measures into the highway project; and (4) coordination with local officials to provide helpful information on compatible land use planning and control. The regulations contain noise abatement criteria (NAC) that represent the upper limit of acceptable highway traffic noise for different types of land uses and human activities. The regulations do not require that the abatement criteria be met in every instance. Rather, they require that every reasonable and feasible effort be made to provide noise abatement when the criteria are approached or exceeded. Compliance with the noise regulations is a prerequisite for the granting of federal-aid highway funds for construction or reconstruction of a highway. In addition, the FHWA has prepared its *Highway Traffic Noise Analysis – Policy and Guidance* (FHWA, 1995), which provides guidance regarding NAC.

3.14.1.2 State Requirements

To comply with CEQA, Caltrans has established noise policies for evaluating the impacts of Type 1 projects, such as the proposed project, in the *Traffic Noise Analysis Protocol for New Highway Construction and Highway Reconstruction Projects* (Protocol) (Caltrans, 2006). A Type 1 project is defined in 23 CFR 772 as "A proposed federal or federal-aid highway project for the construction of a highway on a new location, or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes." Caltrans also extends the definition of Type 1 projects to state highway projects without federal funding.

The Protocol also fulfills the highway noise analysis and abatement/mitigation requirements stemming from Section 216 et seq. of the California Streets and Highways Code, which indicates that if, as a result of a proposed freeway project, noise levels in classrooms of public or private elementary or secondary schools exceed 52 dBA L_{eq}(h), Caltrans shall provide noise abatement to reduce classroom noise to the criterion or below. If the classroom noise exceeds the criterion of 52 dBA L_{eq} both before and after the proposed freeway project, Caltrans shall, at a minimum, provide noise abatement to reduce classroom noise to pre-project noise levels.

3.14.2 Affected Environment

3.14.2.1 Location of Noise Sensitive Receptors

The project could affect the noise environment through changes in the proximity of traffic to noise sensitive receptors (e.g., residences and schools) or through exposure of such receptors to construction noise. Noise effects therefore could occur in the vicinity of the SR-47 Expressway alignment, the SR-103 Extension alignment, and the Schuyler Heim Bridge. Land uses in these areas are mixed, consisting primarily of inhabited boats in the marinas, residential neighborhoods in Wilmington and Long Beach, schools in Long Beach, and commercial/industrial developments throughout the corridor. The acronym after each name below refers to the code used to identify the noise monitoring locations in Figure 3.14-1 through 3.14-5.

- Anchorage Way Marinas (AWM). The marinas are considered a residential area because of live-aboard boats; the boat docks are west of and below the Schuyler Heim Bridge, which is made of grated metal and does not currently disrupt the line of sight between traffic and receivers within the marina.

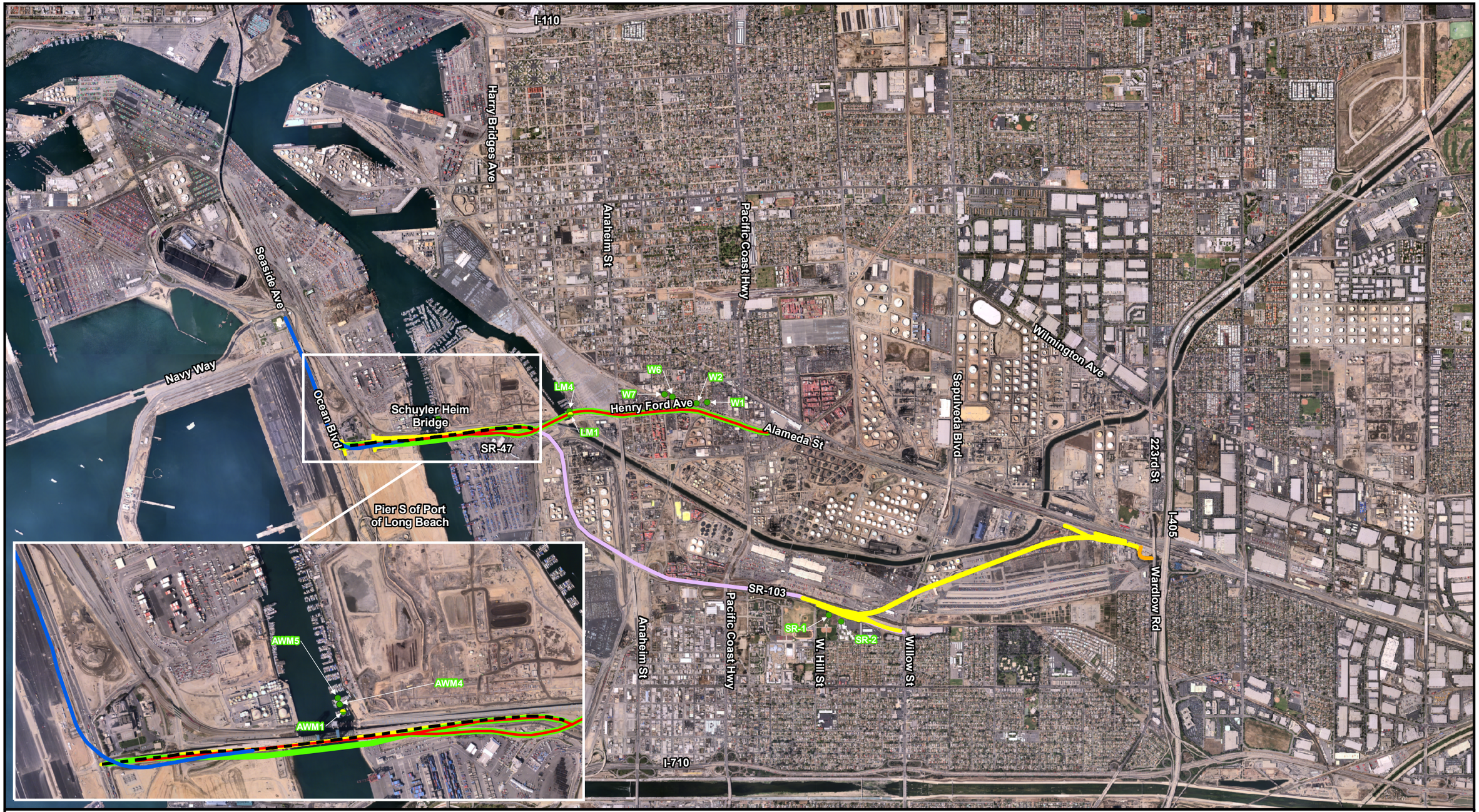
- Leeward Bay Marina (LM). This marina also is considered a residential area because of live-aboard boats. The boat docks are west of and below Henry Ford Avenue, which banks slightly away from the marina, thus shielding the receivers to some extent by obstructing the line of sight between traffic and the receivers.
- Wilmington Neighborhood (W). This single-family residential neighborhood is just west of Alameda Street, north and south of Henry Ford Avenue, and south of Pacific Coast Highway. A train track runs along Alameda Street between the neighborhood and the street on an elevated berm, providing some attenuation from traffic noise by breaking the line of sight between the vehicle tires and the receivers.
- Long Beach neighborhood/SR-103 Extension (SR). This area is east of the proposed SR-103 Extension and consists of the Elizabeth Hudson Elementary School; Savannah Academy, an early childhood education facility; Reid High School; Cabrillo High School; a park; and a single-family residential neighborhood. The elementary school classrooms are approximately 137 m (450 ft) east of the existing SR-103, and a playground lies between the classrooms and SR-103. A city park is south of the elementary school and includes a community garden that backs up to the SR-103 right-of-way. The Savannah Academy is at the south of the park. The high school classrooms are over 320 m (1,050 ft) east of SR-103, but the athletic fields back up to the SR-103 right-of-way. South of the high school is neighborhood containing scattered residences and abandoned/incomplete construction.

3.14.2.2 Existing Noise Environment

Noise measurements were taken on May 25 and 26, 2005, at 11 locations within the four receiver areas using Larson Davis Model 824 sound level meters. The monitoring locations are shown in Figures 3.14-1 through 3.14-5. Weather conditions were generally clear, with temperatures around 75 degrees Fahrenheit (°F). Relative humidity varied from 40 percent to 52 percent, and wind conditions were calm. All monitoring equipment used in the study was programmed for slow time response and the A-weighted decibel scale. To ensure accuracy, the equipment was calibrated before and after each measurement. The accuracy of the calibrator is maintained through a program established by the manufacturer and is traceable to the National Bureau of Standards. All instrumentation meets the requirements of the American National Standards Institute (ANSI) S1.4-1983.

Short-term (15-minute) measurements were taken at each of the 11 locations and were accompanied by traffic volume counts. These were supplemented by long-term (24-hour) measurements at two of the monitoring locations: Anchorage Way Marinas and Leeward Bay Marina (at the dock nearest the Schuyler Heim Bridge and the dock nearest Henry Ford Avenue, respectively). At both of these locations, noise levels were measured at microphone heights of 1.5 m (5 ft) to correspond with ground floor receptors. The long-term measurements were used to identify the hour during which noise levels were the loudest.

The loudest average hourly noise levels at a number of locations within the four main receiver areas were calculated using the FHWA Traffic Noise Model (TNM) version 2.5. TNM calculates traffic noise based on the geometry of the site, which includes the positioning of lanes, receivers, and barriers. The noise source is the traffic flow, which is input into the program using such factors as hourly volumes and speeds of automobiles, medium trucks, and heavy trucks.



LEGEND

- Alternative 1: Bridge Replacement and SR-47 Expressway
- Alternative 2: SR-103 Extension
- Alternative 3: Bridge Demolition Avoidance
- Alternative 4: Bridge Replacement Only
- Wardlow Road/223rd Street Ramp
- Ocean Boulevard/SR-47 Flyover
- Existing SR-103
- Short-term/Long-term Noise Monitoring Stations
- Short-term Noise Monitoring Stations

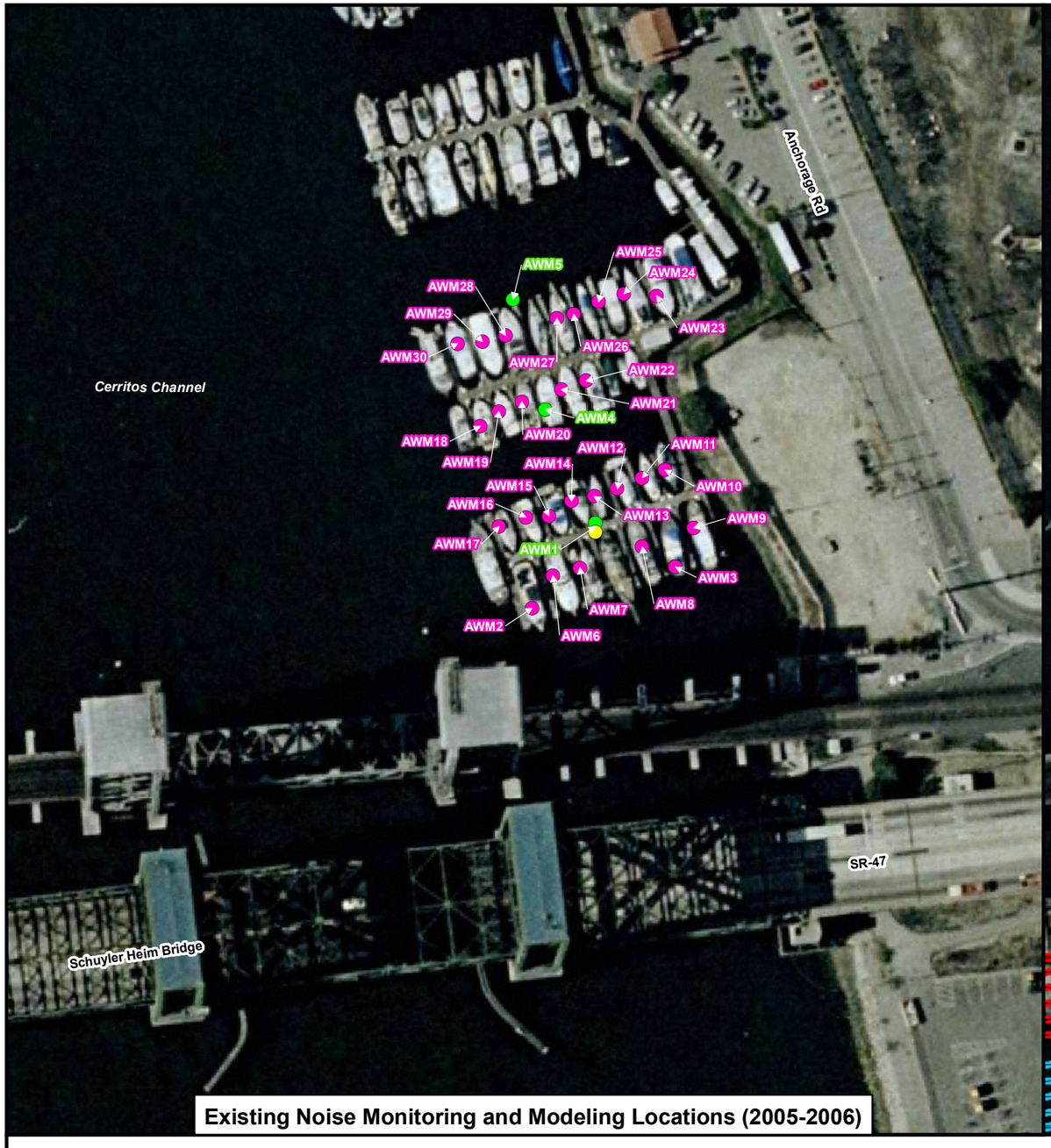
AWM - Anchorage Way Marinas
LM - Leeward Bay Marina
SR - SR-103
W - Wilmington

0 2,800 Feet
0 1,000 Meters

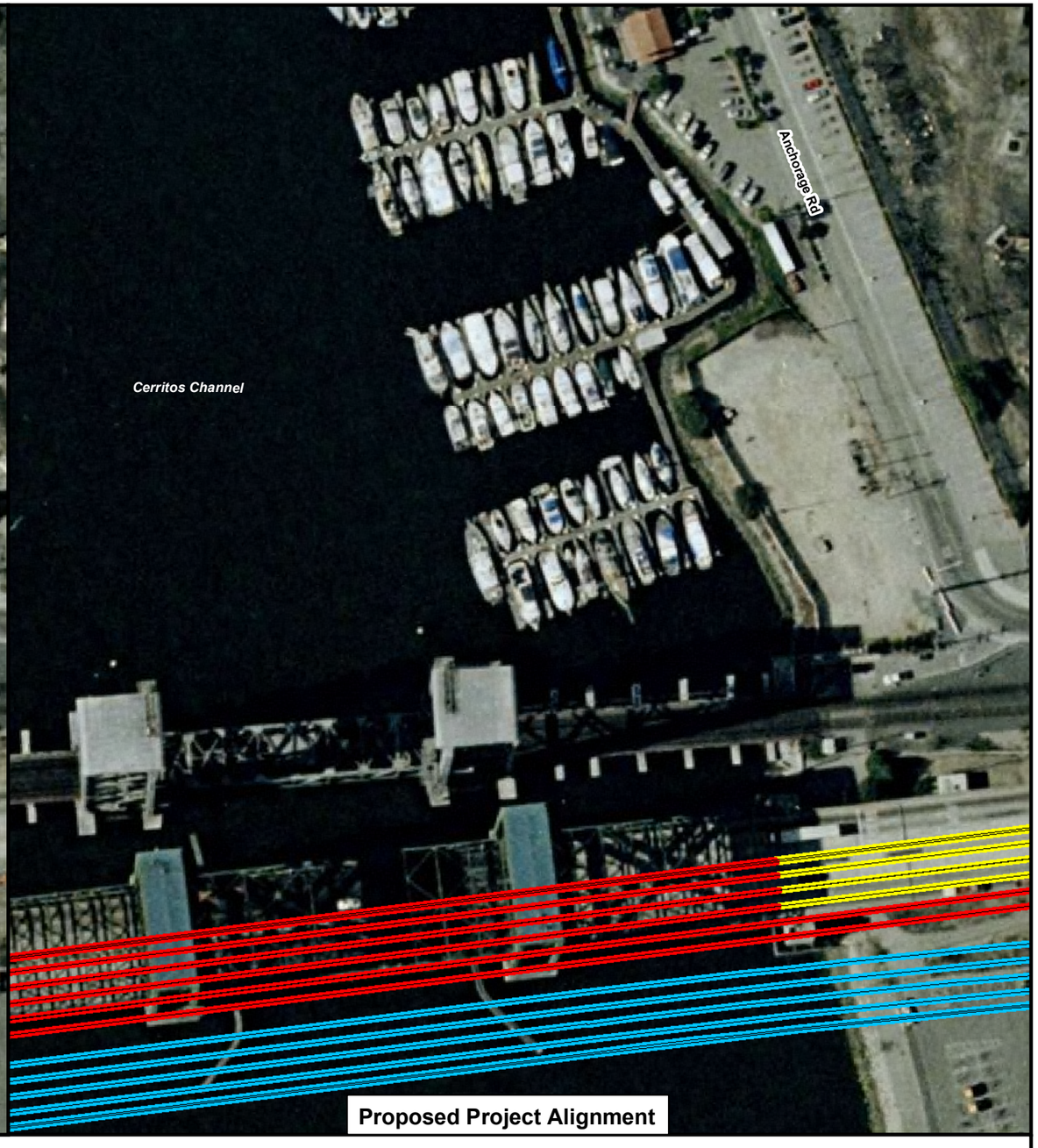
Aerial Date: May 2002, AirPhotoUSA

Note: Project components not to scale

Figure 3.14-1
Noise Monitoring Locations
Schuyler Heim Bridge Replacement and SR-47 Expressway



Existing Noise Monitoring and Modeling Locations (2005-2006)



Proposed Project Alignment

LEGEND

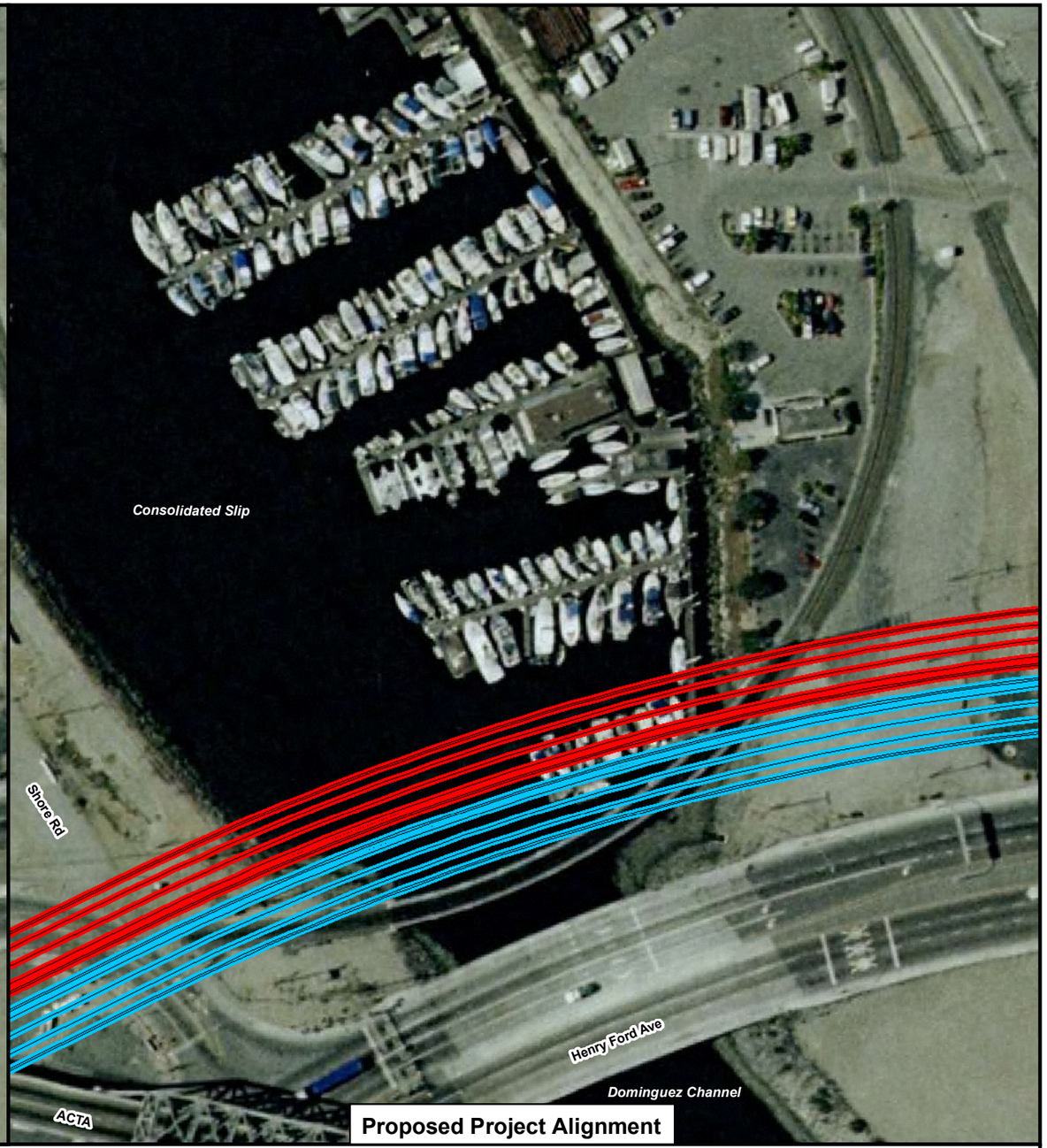
- Short-term Monitoring
- Short-term/Long-term Monitoring
- Noise Modeling
- NB SR-47
- SB SR-47
- NB SR-103
- SB SR-103
- NB SR-103 Realignment
- SB SR-103 Realignment

Not to Scale

Source: ACET, 2005 Aerial Date: February 2006

Figure 3.14-2
Anchorage Way Marinas Noise Monitoring and Modeling Locations
Schuyler Heim Bridge Replacement and SR-47 Expressway

Existing Noise Monitoring and Modeling Locations (2005-2006)



Proposed Project Alignment

LEGEND

- Short-term Monitoring
- Short-term/Long-term Monitoring
- Noise Modeling
- NB SR-47
- SB SR-47
- NB SR-103
- SB SR-103
- NB SR-103 Realignment
- SB SR-103 Realignment

Not to Scale

Source: ACET, 2005 Aerial Date: February 2006

Figure 3.14-3
Leeward Bay Marina
Noise Monitoring
and Modeling Locations
Schuyler Heim Bridge Replacement
and SR-47 Expressway

Existing Noise Monitoring and Modeling Locations (2005-2006)

Proposed Project Alignment

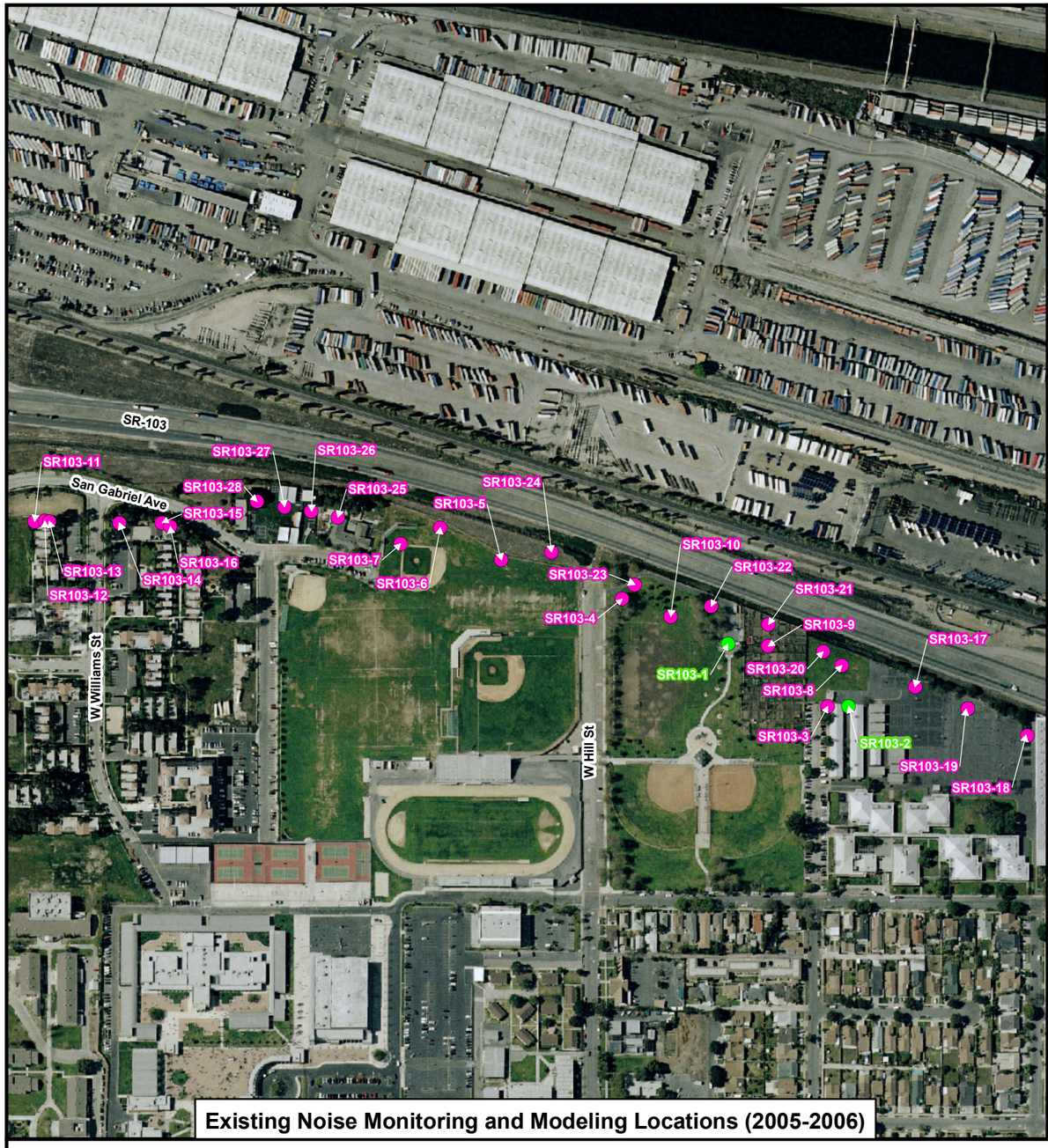
LEGEND

- Short-term Monitoring
- Short-term/Long-term Monitoring
- Noise Modeling
- NB SR-47
- SB SR-47
- NB SR-103
- SB SR-103
- NB SR-103 Realignment
- SB SR-103 Realignment

Not to Scale

Source: ACET, 2005 Aerial Date: February 2006

Figure 3.14-4
Wilmington Neighborhood Noise Monitoring and Modeling Locations
Schuyler Heim Bridge Replacement and SR-47 Expressway



Existing Noise Monitoring and Modeling Locations (2005-2006)

Proposed Project Alignment

LEGEND

- Short-term Monitoring
- Short-term/Long-term Monitoring
- Noise Modeling
- NB SR-47
- SB SR-47
- NB SR-103
- SB SR-103
- NB SR-103 Realignment
- SB SR-103 Realignment

Not to Scale

Source: ACET, 2005 Aerial Date: February 2006

Figure 3.14-5
Long Beach Neighborhood/SR-103
Noise Monitoring
and Modeling Locations
Schuyler Heim Bridge Replacement
and SR-47 Expressway

There is considerable train traffic in the study area, and trains, particularly when their horns sound at the at-grade crossings, are a major noise source. When trains are present, they often generate higher hourly noise levels than vehicular traffic. Train traffic is intermittent, however. Therefore, to provide the most conservative analysis, the characterization of the noise environment assumes that no trains are present and that vehicular traffic is the primary noise source. The noise modeling locations are shown in Figures 3.14-2 through 3.14-5. AWM1 through AWM30 represent the receivers within the Anchorage Way Marinas; LM1 through LM33 represent receivers within the Leeward Bay Marina; W1 through W49 represent receivers within the Wilmington Neighborhood; and SR-103-1 through SR-103-28 represent the Long Beach Neighborhood/SR-103 Extension area, including the schools and park.

Within the Anchorage Way Marinas, the calculated loudest-hour L_{eq} ranged from 67 to 71 dBA; within the Leeward Bay Marina, the loudest-hour L_{eq} ranged from 57 to 62 dBA; within the Wilmington neighborhood, the loudest hour L_{eq} ranged from 50 to 63 dBA; and within the Long Beach neighborhood along the SR-103 Extension, the loudest hour L_{eq} ranged from 62 to 73 dBA (see Section 3.14.3.3).

3.14.3 Environmental Consequences

3.14.3.1 Evaluation Criteria

In accordance with the Caltrans *Traffic Noise Analysis Protocol* (2006), a noise impact occurs when the future peak-hour noise level with the project substantially exceeds the existing peak-hour noise level (substantial increase is defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the Noise Abatement Criteria (NAC). Approaching the NAC is defined as coming within 1 dBA of the NAC, shown in Table 3.14-2. It also is noted that local ordinances are considered when developing project construction plans.

Table 3.14-2
Activity Categories and Noise Abatement Criteria (NAC)

Activity Category	NAC, Hourly A-Weighted Noise Level, dBA L_{eq}(h)	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 Exterior	Developed lands, properties, or activities not included in Categories A or B above
D	–	Undeveloped lands
E	52 Interior	Residence, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: Federal Highway Administration (FHWA), Highway Traffic Noise Analysis, Abatement Policy and Guidance, June 1995.

3.14.3.2 Methodology

Traffic noise level predictions for project alternatives were generated using TNM version 2.5 at locations of noise sensitive receptors within 150 m (492 ft) of the roadway being modeled. This is consistent with FHWA's observation that "Traffic noise is not usually a serious problem for people who live more than 150 m (492 ft) from heavily traveled freeways" (FHWA, 1995).

The TNM input files for existing conditions were developed using the existing roadway geometry and estimated surrounding terrain. Measured traffic noise levels and concurrent traffic count data were used to evaluate the accuracy of the TNM in estimating traffic noise levels within the four project areas.

Existing (2005) and projected future (2030) traffic noise levels were computed with the TNM model, using existing and future traffic data at the four study areas. Traffic data used for the assessment of existing (2005) and projected future (2030) noise exposure are provided by Meyer, Mohaddes Associates.

For noise abatement evaluation, TNM is used to determine locations and heights of noise barriers required to reduce future traffic noise exposure to feasible levels (5-dBA noise reduction) and levels below the applicable NAC. To determine whether a proposed noise barrier is feasible, the barrier must provide a minimum of a 5-dBA reduction to the impacted noise sensitive receivers, as well as meet various other practical requirements, such as non-obstruction of driveways/roadways, breaking the line-of-sight from the receiver to a 3.5-m (11.5-ft) truck exhaust stack. To determine whether a proposed barrier is reasonable, the allowance per benefited residence must be greater than or equal to the barrier cost per benefited residence. If the proposed noise abatement is feasible and reasonable, abatement is recommended.

3.14.3.3 Evaluation of Alternatives

The loudest hourly traffic noise levels resulting from implementation of the project alternatives were estimated for a number of specific locations within the four receiver areas. The following sections include discussions of construction noise associated with each project alternative and depict the existing and predicted future loudest hourly traffic noise levels rounded to the nearest whole number at each location for the build alternatives (Alternatives 1 [and 1A], 2, 3, and 4) and the No Build alternative (Alternative 6). Improvements for Alternative 5 would be relatively minor, and the exact locations are not known at this time. Implementation of Alternative 5 would not result in a perceptible change in noise levels. It is important to note that not all alternatives affect all locations.

3.14.3.3.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

3.14.3.3.1.1 Construction Effects

Direct

Table 3.14-3 summarizes typical noise levels generated by construction equipment that could be used to construct Alternatives 1, 1A, and the other build alternatives (2, 3, and 4).

Noise sources associated with construction activities can generally be regarded as "point" sources. As such, construction noise levels would decrease by 6 dBA with every doubling of distance. Highway construction activities do not typically stay in one location for long periods, and noise-sensitive receivers in a given location would not be exposed for extended periods to noise generated by construction. Additionally, provisions would be included in

the plans and specifications requiring the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and use of muffler systems. Caltrans standard construction practices also include complying with all local sound control rules. Caltrans practices include consideration of the needs of the community, and Caltrans will take all reasonable steps to avoid disruption during construction.

Table 3.14-3
Construction Equipment Noise

Type of Construction Equipment	Maximum Level, dBA at 15 m (50 ft)
Scrapers	89
Bulldozers	85
Heavy trucks	88
Backhoe	80
Pneumatic tools	85
Concrete Pump	82
Impact Pile Driver	90 to 105

Source: Environmental Protection Agency, 1971

Pile-Driving Noise

Pile driving has the potential to be the loudest and most intrusive construction activity. Unavoidable adverse noise impacts that would occur during the construction phase would occur primarily from pile driving. However, pile driving is generally limited to those areas requiring a pier or vertical support structure. Pile driving is analogous to a hammer hitting a nail. Pile-driving operations are responsible for very high peak or impact noise levels during construction. The EPA ("Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," December 31, 1971) reports that pile-driving operations can result in peak noise levels of 90 to 105 dBA at 15 m (50 ft), with 100 dBA being typical. The angle of the noise impact on some pile drivers is such that topography and buildings that block the line of sight for grading equipment and general construction equipment noise may not block the line of sight for pile-driving noise. As a result, intervening topography or structures may not necessarily reduce construction noise levels at receptors that are in the line of sight of certain pile-driving activities. Based on a pile-driving noise level of 100 dBA at 15 m (50 ft), noise levels at other distances can be forecast. At a distance of 150 m (500 ft), the pile-driving noise might still be as high as 80 dBA. The pile-driving noise level will decrease as the distance from the source increases. Table 3.14-4 shows attenuation over distance from the pile driver (hard site assumed).

Both the Cerritos Channel and Consolidated Slip marinas would be subject to substantial noise effects from pile-driving construction activities. Pile-driving activities for the Cerritos Channel are expected to last approximately 2 weeks (10 days) for each of the two stages of falsework pile driving. Falsework pile driving for the Consolidated Slip is expected to last less than 2 weeks (10 days). Both the Cerritos Channel and Consolidated Slip marinas (Anchorage Way Marinas and Leeward Bay Marina, respectively) would be subject to short-term noise impacts from pile-driving construction activities.

Table 3.14-4
Pile-Driving Noise: Attenuation Over Distance

Distance		Noise Level
(m)	(ft)	dBA
15	50	100
25	82	96
50	164	90
75	246	86
100	328	84
150	492	80
200	656	78
300	984	74
400	1,312	71
500	1,640	70
600	1,969	68
700	2,297	67
800	2,625	65

Source: Environmental Protection Agency, 1971

Due to the noise effects, pile driving will occur during daylight hours only. However, noise is expected to be adverse at some locations. The nearest receptors at the Anchorage Way Marinas are approximately 174 m (570 ft) from potential pile driving at the north end of the new bridge across the Cerritos Channel. Maximum noise levels from pile driving at such distances are expected to be in the 79 to 80 dBA range. The nearest receptors at the Leeward Bay Marina are approximately 60 m (200 ft) from potential pile driving at the north side of the Consolidated Slip. At these receptors, estimated pile-driving maximum noise levels would be 88 dBA. Noise abatement will be implemented in accordance with state and local standards and requirements to the extent feasible.

Indirect

No indirect construction effects would occur.

3.14.3.3.1.2 Operations Effects

Direct

Anchorage Way Marinas

Table 3.14-5 summarizes the calculated existing and future traffic noise levels under Alternative 1 and No Build conditions at the Anchorage Way Marinas. Without abatement, the prescribed loudest hourly traffic noise levels at the Anchorage Way Marinas receiver area would range from 68 to 70 dBA $L_{eq}(h)$, compared to 67 to 71 dBA under existing conditions.

Table 3.14-5
Anchorage Way Marinas – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 1 and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternative 1 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
AWM1	**70**	**69**	-1	**74**	+4
AWM2	**71**	**70**	-1	**75**	+4
AWM3	**70**	**70**	-0-	**74**	+4
AWM4	**68**	**68**	-0-	**72**	+4
AWM5	**67**	**68**	+1	**71**	+4
AWM6	**70**	**70**	-0-	**74**	+4
AWM7	**70**	**70**	-0-	**74**	+4
AWM8	**70**	**70**	-0-	**74**	+4
AWM9	**70**	**69**	-1	**74**	+4
AWM10	**69**	**69**	-0-	**73**	+4
AWM11	**69**	**69**	-0-	**73**	+4
AWM12	**69**	**69**	-0-	**73**	+4
AWM13	**69**	**69**	-0-	**73**	+4
AWM14	**69**	**69**	-0-	**73**	+4
AWM15	**69**	**69**	-0-	**73**	+4
AWM16	**69**	**69**	-0-	**73**	+4
AWM17	**69**	**69**	-0-	**73**	+4
AWM18	**68**	**68**	-0-	**72**	+4
AWM19	**68**	**68**	-0-	**72**	+4
AWM20	**68**	**68**	-0-	**72**	+4
AWM21	**68**	**68**	-0-	**72**	+4
AWM22	**68**	**68**	-0-	**72**	+4
AWM23	**67**	**68**	+1	**71**	+4
AWM24	**67**	**68**	+1	**71**	+4
AWM25	**67**	**68**	+1	**71**	+4
AWM26	**67**	**68**	+1	**71**	+4
AWM27	**67**	**68**	+1	**71**	+4
AWM28	**67**	**68**	+1	**71**	+4
AWM29	**67**	**68**	+1	**71**	+4
AWM30	**67**	**68**	+1	**71**	+4

Notes: **Bold** numbers represent areas where the predicted loudest hourly noise level would approach or exceed the NAC.

Alternative 1A would result in the same noise levels as Alternative 1.

A noise barrier along the west side of the Schuyler Heim Bridge, with an approximate length of 356 m (1,168 ft) and height of 3.96 m (13 ft), would reduce noise levels in the marinas by 5 to 7 dBA.

Currently, approximately 15 percent of the marina slips are utilized as residential "live-aboards." This means that, of the 30 to 35 impacted boat locations, only five live-aboard boats would benefit from the noise barrier. Preliminary reasonableness calculations indicate that the barrier would cost approximately $97,200 per benefited live-aboard, which exceeds the allowance per residence of $44,000 to $48,000 for this area. Therefore, it would not be reasonable to build this barrier.

Leeward Bay Marina

Table 3.14-6 summarizes the calculated existing and future traffic noise levels under Alternative 1 and No Build conditions at the Leeward Bay Marina. Without abatement, the predicted loudest hourly traffic noise levels at boat slips within the Leeward Bay Marina would range from 61 to 67 dBA $L_{eq}(h)$.

Table 3.14-6
Leeward Bay Marina – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 1, 3, and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternatives 1 and 3 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
LM1	62	—*	—	65	+3
LM2	62	—*	—	65	+3
LM3	61	—*	—	65	+4
LM4	60	62	+2	63	+3
LM5	60	63	+3	63	+3
LM6	60	61	+1	63	+3
LM7	58	**67**	+9	61	+3
LM8	57	**67**	+10	61	+4
LM9	57	**67**	+10	61	+4
LM10	58	**67**	+9	61	+3
LM11	60	63	+3	63	+3
LM12	60	63	+3	63	+3
LM13	60	63	+3	63	+3
LM14	60	62	+2	63	+3
LM15	60	62	+2	63	+3
LM16	60	61	+1	63	+3
LM17	59	65	+6	62	+3
LM18	59	64	+5	62	+3
LM19	59	65	+6	62	+3
LM20	59	65	+6	62	+3
LM21	59	65	+6	62	+3

Table 3.14-6
Leeward Bay Marina – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 1, 3, and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternatives 1 and 3 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
LM22	59	65	+6	62	+3
LM23	59	64	+5	63	+4
LM24	59	64	+5	62	+3
LM25	57	**67**	+10	61	+4
LM26	58	**67**	+9	61	+3
LM27	57	**66**	+9	60	+3
LM28	56	**66**	+10	60	+4
LM29	57	**66**	+9	60	+3
LM30	57	**66**	+9	60	+3
LM31	57	**66**	+9	60	+3
LM32	57	**66**	+9	60	+3
LM33	57	**66**	+9	60	+4

Notes: **Bold** numbers represent areas where the predicted loudest hourly noise level would approach or exceed the NAC.
Nine boat slips within these locations would be acquired as part of the project.

A barrier with an approximate length of 289 m (950 ft) and height of 2.44 m (8 ft) would be needed to abate noise levels in this area. Such a barrier would reduce noise levels by 5 to 7 dBA at 65 boat locations. Table 3.14-7 shows the results of the noise barrier modeling analysis for the Leeward Bay Marina.

Table 3.14-7
Leeward Bay Marina – Noise Barrier Reduction for Alternatives 1 and 3

Receiver ID No.	Alternatives 1and 3 $L_{eq}(h)$, dBA	Proposed Barrier $L_{eq}(h)$, dBA	Reduction (dBA)
LM1	—*	—	—
LM2	—*	—	—
LM3	—*	—	—
LM4	62	58	4
LM5	63	58	5
LM6	61	58	3
LM7	**67**	60	7
LM8	**67**	60	7
LM9	**67**	61	6
LM10	**67**	60	7
LM11	63	58	5
LM12	63	58	5

Table 3.14-7
Leeward Bay Marina – Noise Barrier Reduction for Alternatives 1 and 3

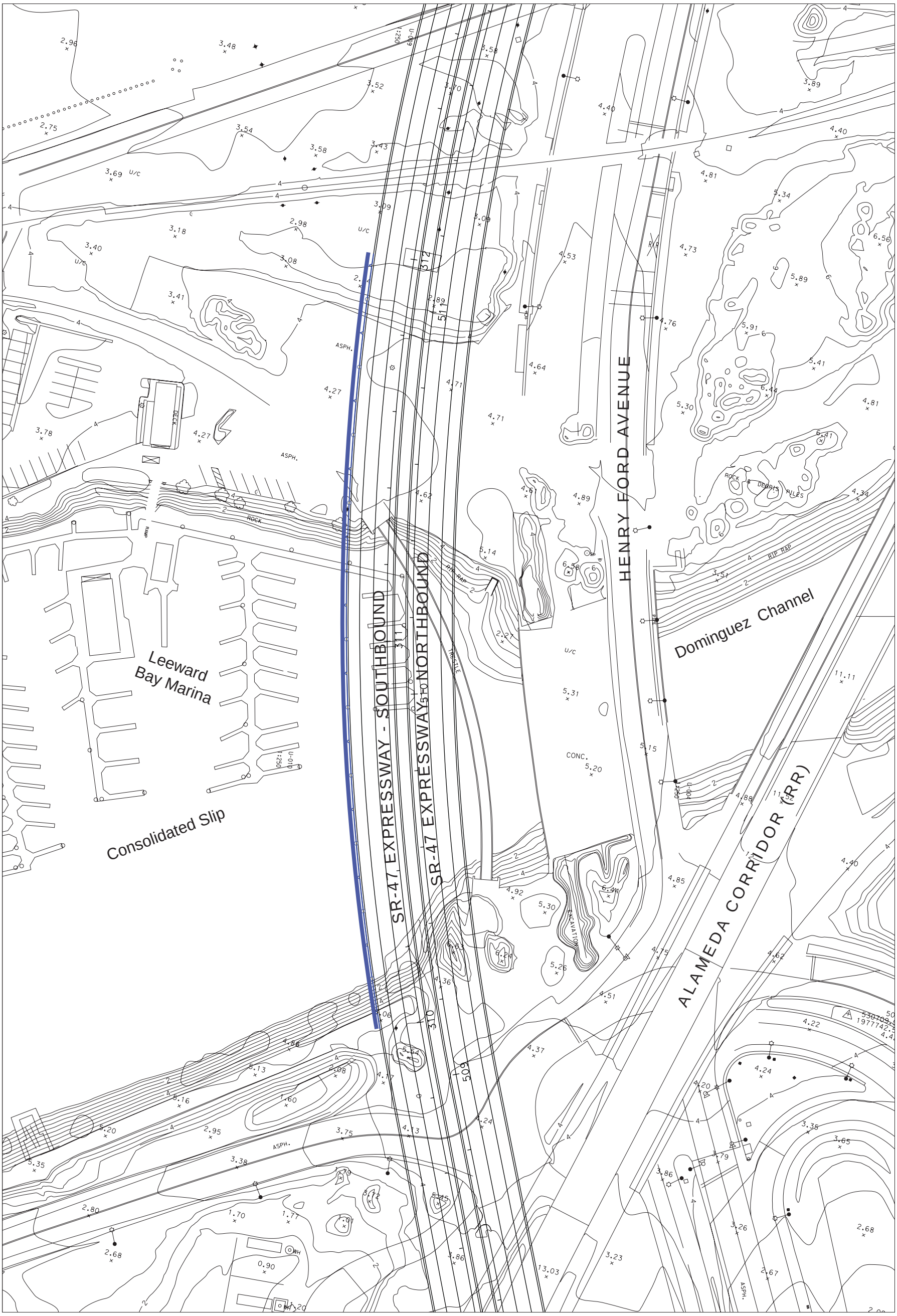
Receiver ID No.	Alternatives 1and 3 L_{eq}(h), dBA	Proposed Barrier L_{eq}(h), dBA	Reduction (dBA)
LM13	63	58	5
LM14	62	58	4
LM15	62	58	4
LM16	61	58	3
LM17	65	59	6
LM18	64	59	5
LM19	65	59	6
LM20	65	59	6
LM21	65	59	6
LM22	65	59	6
LM23	64	59	5
LM24	64	58	6
LM25	**67**	60	7
LM26	**67**	60	7
LM27	**66**	61	5
LM28	**66**	61	5
LM29	**66**	61	5
LM30	**66**	61	5
LM31	**66**	60	6
LM32	**66**	60	6
LM33	**66**	61	6

Notes: **Bold** numbers represent areas where the predicted loudest hourly noise level would approach or exceed the NAC.
Boxed cells show barrier heights that would achieve the Caltrans minimum requirement of 5 dBA noise reduction.
Nine boat slips within these locations would be acquired as part of the project.

Assuming a utilization rate of 15 percent of boats as live-aboards, there would be 10 benefited noise sensitive receivers. Preliminary reasonableness calculations indicate that the estimated barrier cost would be approximately $23,400 per benefited residence, which is within the allowance per residence of $50,000 to $54,000. Therefore, it would be feasible and reasonable to build a barrier at this location. The location of the noise barrier is shown in Figure 3.14-6.

Wilmington Neighborhood

Table 3.14-8 summarizes the calculated existing and future traffic noise levels under Alternative 1 and No Build conditions at the Wilmington neighborhood. Without abatement, the predicted loudest hourly noise levels in the Wilmington neighborhood would range from 61 to 69 dBA L_{eq}(h) under Alternative 1.



LEGEND:

Expressway Soundwall

No Scale

Notes: See Figure 14-3 for overview of location. Final location and architectural features of soundwalls will be determined during final design.

Figure 3.14-6
Soundwalls – Leeward Bay Marina
Schuyler Heim Bridge Replacement
and SR-47 Expressway

Table 3.14-8
Wilmington Neighborhood – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 1, 3, and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternatives 1 and 3 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
W1	56	**67**	+11	64	+8
W2	60	**69**	+9	**69**	+8
W3	56	**67**	+11	65	+9
W4	63	**68**	+5	**70**	+7
W5	55	65	+10	63	+8
W6	62	**68**	+6	**69**	+7
W7	61	**67**	+6	**69**	+8
W8	57	65	+8	64	+7
W9	56	64	+8	63	+7
W10	55	63	+8	62	+7
W11	54	62	+8	61	+7
W12	57	65	+8	65	+8
W13	56	64	+8	63	+7
W14	54	63	+9	62	+8
W15	57	65	+8	65	+8
W16	56	65	+9	64	+8
W17	56	64	+8	63	+7
W18	55	63	+8	62	+7
W19	54	63	+9	61	+7
W20	52	61	+9	59	+7
W21	52	62	+10	59	+7
W22	53	62	+9	61	+8
W23	54	63	+9	62	+8
W24	57	64	+7	64	+7
W25	58	65	+7	65	+7
W26	53	62	+9	60	+7
W27	54	63	+9	61	+7
W28	55	63	+8	62	+7
W29	56	64	+8	63	+7
W30	52	63	+8	60	+8
W31	54	64	+10	62	+8
W32	51	62	+11	59	+8
W33	50	61	+11	58	+8
W34	57	**66**	+9	65	+8
W35	56	65	+9	63	+7
W36	55	65	+10	63	+8

Table 3.14-8
Wilmington Neighborhood – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 1, 3, and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternatives 1 and 3 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
W37	54	64	+10	61	+7
W38	53	64	+11	61	+8
W39	52	63	+11	59	+7
W40	48	61	+13	56	+8
W41	48	61	+13	57	+9
W42	49	62	+13	58	+9
W43	51	63	+12	60	+9
W44	52	64	+12	61	+9
W45	53	65	+12	62	+9
W46	49	62	+13	57	+8
W47	50	63	+13	59	+9
W48	52	64	+12	61	+9
W49	53	65	+12	62	+9

Notes: **Bold** numbers represent areas where the predicted loudest hourly noise level would approach or exceed the NAC.
The 49 noise receptors represent the entire Wilmington neighborhood potentially affected by the proposed project. The neighborhood contains more homes than the receptors used in the analysis.

For Alternative 1, two barriers, one along the SR-47 Expressway and another on ground level along Alameda Street, would be needed to abate future traffic noise. The approximate combined length of both barriers would be 1,405 m (4,610 ft). The height of the barriers would be between 3.66 m (12 ft) and 5.49 m (18 ft). Calculations based on preliminary design data indicate that the barrier would reduce noise levels by 5 to 9 dBA at approximately 56 residences.

Preliminary reasonableness calculations indicate that the barrier cost per benefited residence would be approximately $37,500. This cost is well below the allowance per residence of $48,000. Therefore, it would be both reasonable and feasible to build a noise barrier at the Wilmington neighborhood (Table 3.14-9).

Table 3.14-9
Wilmington Neighborhood Noise Barrier Reduction

Receiver ID No.	Alternatives 1&3 $L_{eq}(h)$, dBA	Proposed Barrier $L_{eq}(h)$, dBA	Reduction (dBA)
W1	**67**	60	7
W2	**69**	63	6
W3	**67**	60	7
W4	**68**	60	8
W5	65	60	5
W6	**68**	59	9

Table 3.14-9
Wilmington Neighborhood Noise Barrier Reduction

Receiver ID No.	Alternatives 1&3 $L_{eq}(h)$, dBA	Proposed Barrier $L_{eq}(h)$, dBA	Reduction (dBA)
W7	**67**	59	8
W8	65	59	6
W9	64	58	6
W10	63	58	5
W11	62	58	4
W12	65	60	5
W13	64	60	4
W14	63	61	2
W15	65	59	7
W16	65	59	5
W17	64	59	5
W18	63	60	4
W19	63	60	3
W20	61	56	6
W21	62	56	6
W22	62	56	6
W23	63	57	7
W24	64	57	7
W25	65	58	7
W26	62	58	4
W27	63	58	5
W28	63	58	5
W29	64	58	6
W30	63	57	6
W31	64	59	6
W32	62	56	6
W33	61	56	6
W34	**66**	60	6
W35	65	60	6
W36	65	59	6
W37	64	59	5
W38	64	58	6
W39	63	57	6
W40	61	54	6
W41	61	55	6
W42	62	55	7
W43	63	57	7
W44	64	58	7
W45	65	58	7
W46	62	55	6

Table 3.14-9
Wilmington Neighborhood Noise Barrier Reduction

Receiver ID No.	Alternatives 1&3 $L_{eq}(h)$, dBA	Proposed Barrier $L_{eq}(h)$, dBA	Reduction (dBA)
W47	63	56	7
W48	64	57	7
W49	65	58	7

1. **Bold** numbers represent areas where the predicted loudest hourly noise level would approach or exceed the NAC.
2. Boxed cells show barrier heights achieving the Caltrans minimum requirement of 5 dBA noise reduction and breaking the line of sight to a 3.5 m-high (11.5-ft-high) truck exhaust stack.
3. The 49 noise receptors represent the entire Wilmington neighborhood potentially affected by the proposed project. The neighborhood contains more homes than the receptors used in the analysis.

Long Beach Neighborhood/SR-103 Extension
This receiver area would not be affected by Alternative 1.

Indirect
No indirect effects would occur.

Alternative 1A
The noise evaluation described under Alternative 1 is also applicable to Alternative 1A.

3.14.3.3.2 Alternative 2: SR-103 Extension to Alameda Street
3.14.3.3.2.1 Construction Effects
Direct
Construction noise would be similar to that discussed under Alternative 1, consistent with the types of equipment and noise levels shown in Table 3.14-3. Noise created during replacement of the Schuyler Heim Bridge under Alternative 2 would be the same as would occur under Alternative 1. Noise associated with construction of a new expressway would be virtually the same as under Alternative 1, but along the SR-103 alignment rather than the SR-47 alignment.

The greatest construction noise associated with Alternative 2 would be from pile driving in the Cerritos Channel, related to replacement of the Schuyler Heim Bridge. Under Alternative 2, no pile driving would occur near the Leeward Bay Marina or near Cabrillo High School or Elizabeth Hudson Elementary School.

During project construction, noise from equipment operating near Cabrillo High School and Elizabeth Hudson Elementary School could approach 80 to 89 dBA at playground locations adjacent to the proposed expressway alignment. However, because this noise is from a point source, it would decrease by 6 dBA per doubling of distance from the source. As a result, at the exterior of the nearest school buildings, and away from the new expressway alignment, maximum construction noise levels would be up to 62 dBA, which is substantially less than at locations adjacent to or near the construction site. Based on such exterior levels, construction noise levels within the interior of the high school classrooms are expected to be below 50 dBA and, therefore, would not be likely to interfere with classroom communication. The nearest building at the Elizabeth Hudson Elementary School is approximately 39 meters (128 feet) from the future SR-103. At this distance, the loudest construction noise level would

be 81 dBA at the exterior of this building. Such levels are expected to result in adverse impacts during construction periods. It is anticipated that the Caltrans construction noise control specifications, which would include placement of temporary noise barriers, would reduce construction noise levels at the schools to acceptable levels.

Indirect

No indirect effects would occur.

3.14.3.3.2.2 Operations Effects

Direct

Anchorage Way Marinas

Table 3.14-10 summarizes the calculated existing and future traffic noise levels under Alternative 2 and No Build conditions at the Anchorage Way Marinas. Under Alternative 2, without abatement, the predicted loudest hourly traffic noise levels at boat locations within the marinas would range from 71 to 75 dBA $L_{eq}(h)$.

Table 3.14-10
Anchorage Way Marinas – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 2 and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternative 2 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
AWM1	**70**	**70**	-0-	**74**	+4
AWM2	**71**	**70**	-1	**75**	+4
AWM3	**70**	**69**	-1	**74**	+4
AWM4	**68**	**68**	-0-	**72**	+4
AWM5	**67**	**68**	+1	**71**	+4
AWM6	**70**	**70**	-0-	**74**	+4
AWM7	**70**	**70**	-0-	**74**	+4
AWM8	**70**	**69**	-1	**74**	+4
AWM9	**70**	**69**	-1	**74**	+4
AWM10	**69**	**69**	-0-	**73**	+4
AWM11	**69**	**69**	-0-	**73**	+4
AWM12	**69**	**69**	-0-	**73**	+4
AWM13	**69**	**69**	-0-	**73**	+4
AWM14	**69**	**69**	-0-	**73**	+4
AWM15	**69**	**69**	-0-	**73**	+4
AWM16	**69**	**69**	-0-	**73**	+4
AWM17	**69**	**69**	-0-	**73**	+4
AWM18	**68**	**68**	-0-	**72**	+4
AWM19	**68**	**68**	-0-	**72**	+4
AWM20	**68**	**68**	-0-	**72**	+4
AWM21	**68**	**68**	-0-	**72**	+4
AWM22	**68**	**68**	-0-	**72**	+4

Table 3.14-10
Anchorage Way Marinas – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 2 and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternative 2 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
AWM23	**67**	**68**	+1	**71**	+4
AWM24	**67**	**68**	+1	**71**	+4
AWM25	**67**	**68**	+1	**71**	+4
AWM26	**67**	**68**	+1	**71**	+4
AWM27	**67**	**68**	+1	**71**	+4
AWM28	**67**	**68**	+1	**71**	+4
AWM29	**67**	**68**	+1	**71**	+4
AWM30	**67**	**68**	+1	**71**	+4

Notes: **Bold** numbers represent areas where the predicted loudest hourly noise level would approach or exceed the NAC.

A noise barrier with the same length and height characteristics as that evaluated under Alternative 1 would reduce noise levels at the first four rows of boat slips within the Anchorage Way Marinas by 5 to 7 dBA. Currently, approximately 15 percent of the marina slips are utilized as residential live-aboards. This means that, of the 30 to 35 impacted boat locations, only five live-aboards would benefit from the barrier. Preliminary reasonableness calculations indicate that the barrier would cost approximately $97,200 per benefited live-aboard, which exceeds the allowance per residence of $44,000-48,000 for this area. Based on that analysis, a noise barrier would not be reasonable at this location.

Long Beach Neighborhood/SR-103 Extension

Table 3.14-11 summarizes the calculated existing and future traffic noise levels under Alternative 2 and No Build conditions at the Long Beach Neighborhood/SR-103 Extension. The predicted loudest hourly noise levels in this area would range from 62 to 72 dBA $L_{eq}(h)$ for Alternative 2.

Table 3.14-11
Long Beach Neighborhood/SR-103 Extension – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 2 and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternative 2 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
SR103-1	**67**	**68**	+1	**68**	+1
SR103-2	65	**66**	+1	**66**	+1
SR103-3	64	65	+1	65	+1
SR103-4	**68**	**70**	+2	**69**	+1
SR103-5	**68**	**69**	+1	**69**	+1
SR103-6	**70**	**70**	-0-	**72**	+2

Table 3.14-11
Long Beach Neighborhood/SR-103 Extension – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 2 and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternative 2 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
SR103-7	**66**	**67**	+1	**67**	+1
SR103-8	**71**	**69**	-2	**72**	+1
SR103-9	**69**	**69**	-0-	**71**	+2
SR103-10	**68**	**70**	+2	**69**	+1
SR103-11	62	62	-0-	63	+1
SR103-12	62	62	-0-	63	+1
SR103-13	62	63	+1	63	+1
SR103-14	63	64	+1	64	+1
SR103-15	64	65	+1	64	0
SR103-16	63	64	+1	64	+1
SR103-17	**72**	**69**	-3	**73**	+1
SR103-18	**68**	64	-4	**70**	+2
SR103-19	**71**	**67**	-4	**73**	+2
SR103-20	**72**	**70**	-2	**73**	+1
SR103-21	**73**	**71**	-2	**75**	+2
SR103-22	**73**	**72**	-1	**74**	+1
SR103-23	**71**	**72**	+1	**73**	+2
SR103-24	**72**	**72**	-0-	**74**	+2
SR103-25	**68**	**68**	-0-	**69**	+1
SR103-26	**68**	**68**	-0-	**69**	+1
SR103-27	**68**	**68**	-0-	**69**	+1
SR103-28	**68**	**68**	-0-	**69**	+1

Notes: **Bold** numbers represent areas where the predicted loudest hourly noise level would approach or exceed the NAC.

For this alternative, two overlapping noise barriers along the east side of SR-103, with an approximate combined length of 835 m (2,740 ft), would be needed to abate traffic noise levels at the Long Beach Neighborhood/SR-103 Extension. The two barriers would be 3.66 m (12 ft) high; the barrier section along the northbound off-ramp would be 4.57 m (15 ft) high. The two noise barriers would reduce noise levels by 5 to 14 dBA for 27 equivalent frontage units. Preliminary reasonableness calculations indicate that the barriers would cost approximately $37,100 per benefited unit, which is below the allowance per residence of $44,000 to $52,000. Therefore, it would be feasible and reasonable to build a barrier at this location.

Table 3.14-12 shows the predicted noise levels as well as the noise reduction for these barriers. Figure 3.14-7 shows the locations of the noise barriers, which are based on preliminary engineering plans and, as such, are considered to be approximate. The exact locations for the barriers would be determined during final design based on safety, engineering, and feasibility. The barriers would reduce noise levels in the receiver areas to below the NAC.

The residential area in the southern part of the Long Beach neighborhood would not experience noise levels that approach or exceed the NAC. Therefore, a noise barrier would not be needed for that area.

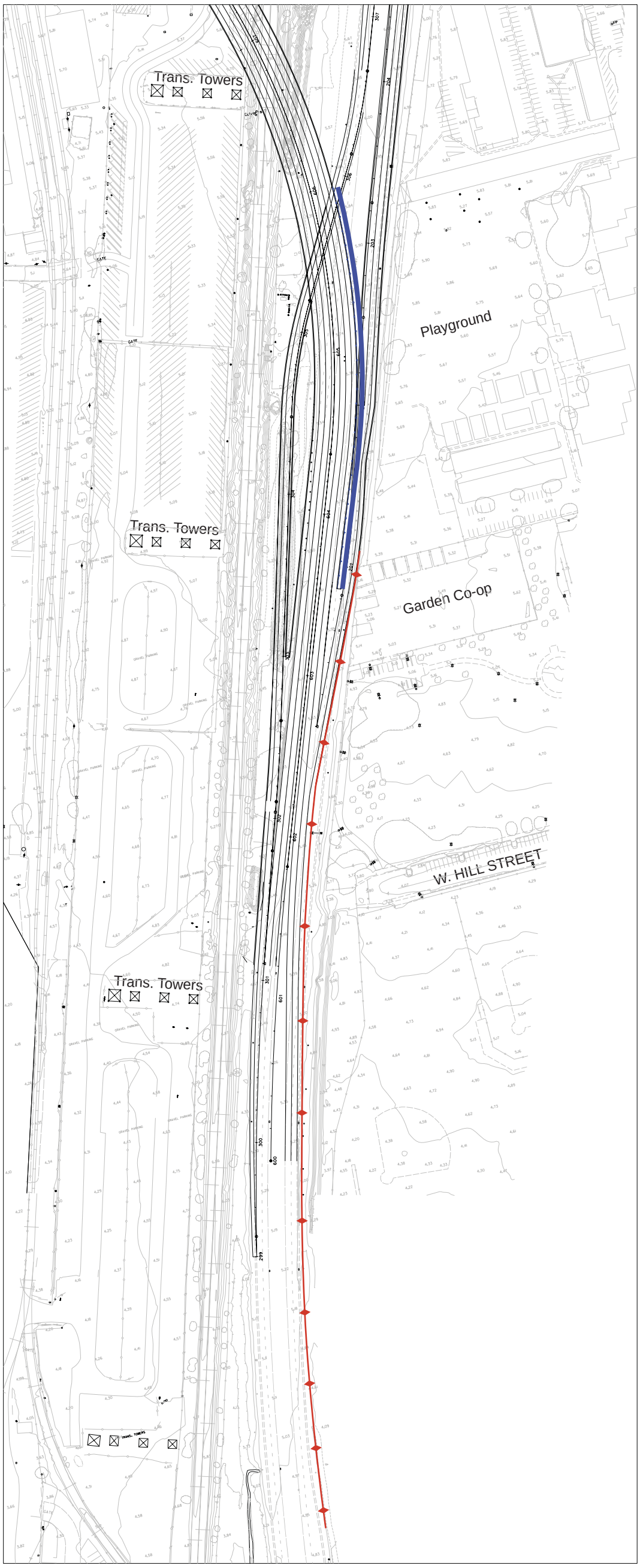
Table 3.14-12
Long Beach Neighborhood/SR-103 Extension – Noise Barrier Reduction for Alternative 2

Receiver ID No.	Alternative 2 $L_{eq}(h)$, dBA	Proposed Barrier $L_{eq}(h)$, dBA	Reduction (dBA)
SR103-1	**68**	58	10
SR103-2	**66**	57	9
SR103-3	65	57	8
SR103-4	**70**	58	12
SR103-5	**69**	60	9
SR103-6	**70**	60	10
SR103-7	**67**	59	8
SR103-8	**69**	61	8
SR103-9	**69**	59	10
SR103-10	**70**	58	12
SR103-11	62	62	0
SR103-12	62	62	0
SR103-13	63	62	1
SR103-14	64	63	1
SR103-15	65	63	2
SR103-16	64	63	1
SR103-17	**69**	60	9
SR103-18	64	57	7
SR103-19	**67**	60	7
SR103-20	**70**	62	8
SR103-21	**71**	63	8
SR103-22	**72**	58	14
SR103-23	**72**	59	13
SR103-24	**72**	60	12
SR103-25	**68**	61	7
SR103-26	**68**	61	7
SR103-27	**68**	62	6
SR103-28	**68**	63	5

Notes: **Bold** numbers represent areas where the predicted loudest hourly noise level would approach or exceed the NAC.

Boxed cells show barrier heights that would achieve the Caltrans minimum requirement of 5 dBA noise reduction.

Shaded cells show that the sensitive receivers are in the parks.



LEGEND:

Expressway Soundwall

At-Grade Soundwall

Notes: See Figure 3.14.3 for overview of location. Final location and architectural features of soundwalls will be determined during final design.

No Scale

Figure 3.14-7
Soundwalls – SR-103
Schuyler Heim Bridge Replacement and SR-47 Expressway

Indirect

No indirect effects would occur.

3.14.3.3.3 Alternative 3: Bridge Demolition Avoidance

3.14.3.3.3.1 Construction Effects

Temporary direct and indirect construction effects would be the same as described under Alternative 1.

3.14.3.3.3.2 Operations Effects

Direct

Anchorage Way Marinas

Table 3.14-13 summarizes the calculated existing and future traffic noise levels under Alternative 3 and No Build conditions at the Anchorage Way Marinas. Under Alternative 3, without abatement, the predicted loudest hourly traffic noise levels at this location would range from 66 to 68 dBA $L_{eq}(h)$, which is less that the range of 67 to 71 dBA under existing conditions.

Table 3.14-13
Anchorage Way Marinas – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 3 and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternative 3 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
AWM1	**70**	**67**	-3	**74**	+4
AWM2	**71**	**68**	-3	**75**	+4
AWM3	**70**	**68**	-2	**74**	+4
AWM4	**68**	**67**	-1	**72**	+4
AWM5	**67**	**66**	-1	**71**	+4
AWM6	**70**	**68**	-2	**74**	+4
AWM7	**70**	**68**	-2	**74**	+4
AWM8	**70**	**68**	-2	**74**	+4
AWM9	**70**	**67**	-3	**74**	+4
AWM10	**69**	**67**	-2	**73**	+4
AWM11	**69**	**67**	-2	**73**	+4
AWM12	**69**	**67**	-2	**73**	+4
AWM13	**69**	**67**	-2	**73**	+4
AWM14	**69**	**67**	-2	**73**	+4
AWM15	**69**	**67**	-2	**73**	+4
AWM16	**69**	**67**	-2	**73**	+4
AWM17	**69**	**67**	-2	**73**	+4
AWM18	**68**	**67**	-1	**72**	+4
AWM19	**68**	**67**	-1	**72**	+4
AWM20	**68**	**67**	-1	**72**	+4
AWM21	**68**	**67**	-1	**72**	+4

Table 3.14-13
Anchorage Way Marinas – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 3 and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternative 3 (Build)		Alternative 6 (No Build)	
	L_{eq}(h), dBA	L_{eq}(h), dBA	Change (dBA)	L_{eq}(h), dBA	Change (dBA)
AWM22	**68**	**67**	-1	**72**	+4
AWM23	**67**	**66**	-1	**71**	+4
AWM24	**67**	**66**	-1	**71**	+4
AWM25	**67**	**66**	-1	**71**	+4
AWM26	**67**	**66**	-1	**71**	+4
AWM27	**67**	**66**	-1	**71**	+4
AWM28	**67**	**66**	-1	**71**	+4
AWM29	**67**	**66**	-1	**71**	+4
AWM30	**67**	**66**	-1	**71**	+4

Notes: **Bold** numbers represent areas where the predicted loudest hourly noise level would approach or exceed the NAC.

Therefore, noise abatement is not necessary. In addition, under Alternative 3, a barrier along the Schuyler Heim Bridge with an approximate length of 381 m (1,250 ft) and height of 4.88 m (16 ft) would be needed to effectively reduce future noise levels at the Anchorage Way Marinas. The barrier would reduce noise levels by 5 dBA for the first four rows of boats in the marina. Assuming a 15 percent utilization rate, there would be only five benefited live-aboards. Preliminary reasonableness calculations indicate that the barrier would cost approximately $128,000 per benefited sensitive receiver, which exceeds the allowance per residence of $44,000 to $48,000. Therefore, it would not be reasonable to build this barrier.

Leeward Bay Marina
The noise evaluation described under Alternative 1 is also applicable to Alternative 3 (see Tables 3.14-6 and 3.14-7).

Wilmington Neighborhood
The noise evaluation described under Alternative 1 is also applicable to Alternative 3 (see Table 3.14-8).

Long Beach Neighborhood/SR-103 Extension
This receiver area would not be affected by Alternative 3.

Indirect
No permanent indirect effects would occur.

3.14.3.3.4 Alternative 4: Bridge Replacement Only
3.14.3.3.4.1 Construction Effects
Construction noise related to bridge demolition and construction would be the same as described under Alternative 1 for the Cerritos Channel area only.

3.14.3.3.4.2 Operations Effects

Direct

Anchorage Way Marinas

Table 3.14-14 summarizes the calculated existing and future traffic noise levels under Alternative 4 and No Build conditions at the Anchorage Way Marinas. Without abatement, the predicted loudest hourly traffic noise levels at this location would range from 64 to 66 dBA $L_{eq}(h)$, which is less than the 67 to 71 dBA under existing conditions.

Table 3.14-14
Anchorage Way Marinas – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 4 and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternative 4 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
AWM1	**70**	65	-5	**74**	+4
AWM2	**71**	**66**	-5	**75**	+4
AWM3	**70**	**66**	-4	**74**	+4
AWM4	**68**	65	-3	**72**	+4
AWM5	**67**	65	-3	**71**	+4
AWM6	**70**	66	-4	**74**	+4
AWM7	**70**	66	-4	**74**	+4
AWM8	**70**	65	-5	**74**	+4
AWM9	**70**	65	-5	**74**	+4
AWM10	**69**	65	-4	**73**	+4
AWM11	**69**	65	-4	**73**	+4
AWM12	**69**	65	-4	**73**	+4
AWM13	**69**	65	-4	**73**	+4
AWM14	**69**	65	-4	**73**	+4
AWM15	**69**	65	-4	**73**	+4
AWM16	**69**	65	-4	**73**	+4
AWM17	**69**	65	-4	**73**	+4
AWM18	**68**	65	-3	**72**	+4
AWM19	**68**	65	-3	**72**	+4
AWM20	**68**	64	-4	**72**	+4
AWM21	**68**	64	-4	**72**	+4
AWM22	**68**	64	-4	**72**	+4
AWM23	**67**	64	-3	**71**	+4
AWM24	**67**	64	-3	**71**	+4
AWM25	**67**	64	-3	**71**	+4
AWM26	**67**	64	-3	**71**	+4
AWM27	**67**	64	-2	**71**	+4

Table 3.14-14
Anchorage Way Marinas – Existing and Projected Future (2030) Peak-Hour Noise Levels (dBA) for Alternatives 4 and 6

Receiver ID No.	Existing (2005)	Future (2030)			
	Existing Alignment	Alternative 4 (Build)		Alternative 6 (No Build)	
	$L_{eq}(h)$, dBA	$L_{eq}(h)$, dBA	Change (dBA)	$L_{eq}(h)$, dBA	Change (dBA)
AWM28	**67**	64	-3	**71**	+4
AWM29	**67**	64	-3	**71**	+4
AWM30	**67**	64	-3	**71**	+4

Notes: **Bold** numbers represent areas where the predicted loudest hourly noise level would approach or exceed the NAC.

Alternative 4 would require a barrier with a total approximate length of 356 m (1,168 ft) and height of 4.88 m (16 ft). The barrier would reduce noise levels by 5 to 6 dBA for the first four rows of boat slips (up to 35 slips) within the Marina. Assuming a 15 percent utilization rate for live-aboards, there would be only five benefited noise sensitive receivers. Preliminary reasonableness calculations indicate that the barrier would cost approximately $119,600 per benefited residence, which exceeds the allowance per residence of $44,000-46,000. Therefore, it would not be reasonable to build this barrier.

Leeward Bay Marina
This receiver area would not be affected by Alternative 4.

Wilmington Neighborhood
This receiver area would not be affected by Alternative 4.

Long Beach Neighborhood/SR-103 Extension
This receiver area would not be affected by Alternative 4.

Indirect
No indirect effects would occur due to project operations under Alternative 4.

3.14.3.3.5 Alternative 5: Transportation System Management
3.14.3.3.5.1 Construction Effects
Direct
Construction effects for the Alternative 5 surface improvements would be less than under the build alternatives (Alternatives 1 through 4). Under Alternative 5, the amount of construction that would be required would be considerably less and limited to activities such as widening roadways, adding turn lanes, and installing electric signs.

Indirect
No indirect effects would occur as a result of project construction under Alternative 5.

3.14.3.3.5.2 Operations Effects

Direct

This alternative would not result in traffic changes that would affect the noise environment; Year 2030 noise levels would be comparable to those described for the future No Build scenario (Alternative 6). The changes in noise levels would occur regardless of whether or not this alternative was implemented.

Indirect

Under Alternative 5, no noise abatement would be required. However, a number of locations would exceed the NAC by Year 2030 due to background growth and may require noise abatement in the future.

3.14.3.3.6 Alternative 6: No Build

3.14.3.3.6.1 Construction Effects

Direct

Under this alternative, construction noise associated with the project would not occur, although at some point in the future, the existing bridge may need to be demolished and replaced due to safety considerations. If this occurred, noise effects would be comparable to those described under Alternative 4.

Indirect

No indirect effects would occur under Alternative 6.

3.14.3.3.6.2 Operations Effects

Direct

Anchorage Way Marinas

As shown in Tables 3.14-5, 3.14-10, 3.14-13, and 3.14-14, the loudest hourly traffic noise levels at the Anchorage Way Marinas would increase by 4 dBA due to an overall increase in traffic volume. This would not be a substantial increase, but all receiver locations would exceed the applicable NAC.

Leeward Bay Marina

As shown in Table 3.14-6, the loudest hourly traffic noise levels would increase by either 3 or 4 dBA due to an increase in traffic volume. Although this would not be a substantial increase, some receiver locations would be above the NAC.

Wilmington Neighborhood

As shown in Table 3.14-8, the loudest hourly traffic noise levels would increase by 7 to 9 dBA due to an increase in traffic volume. This would not be a substantial increase, but several receivers would approach or equal the NAC.

Long Beach Neighborhood/SR-103 Extension

As shown in Table 3.14-11, the loudest hourly traffic noise level would either equal the existing condition or increase by 1 or 2 dBA due to an increase in traffic volume. This is not a substantial increase but, as shown in the table, a number of areas would either approach or exceed the NAC.

Indirect

Under Alternative 6, no noise abatement would be required. However, a number of locations would exceed the NAC by Year 2030 due to background growth and may require noise abatement in the future.

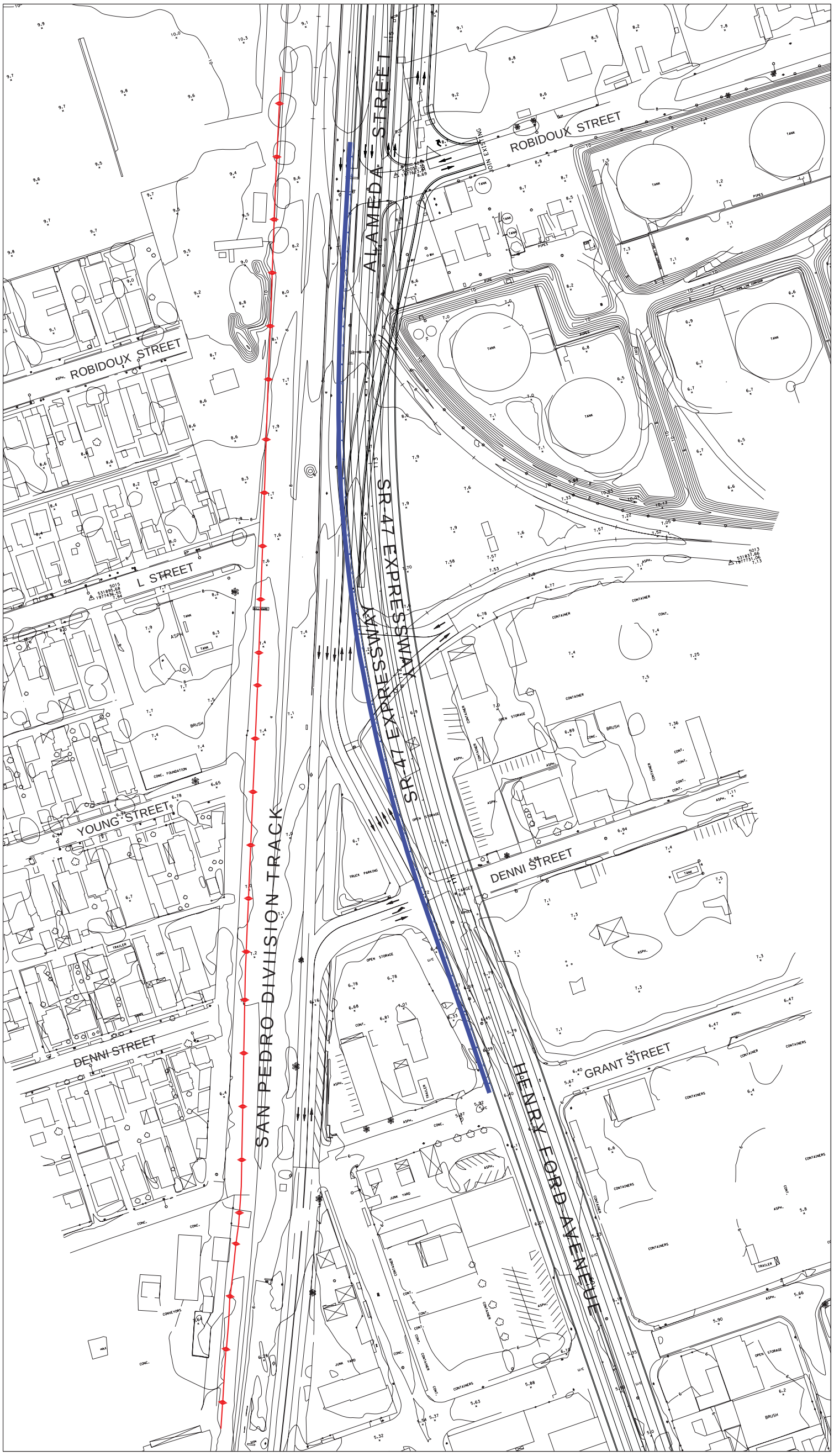
3.14.4 Avoidance, Minimization, and/or Mitigation Measures

Noise abatement measures that are reasonable and feasible and that are likely to be incorporated into the project, as well as noise effects for which no apparent solution is available, must be identified and incorporated into the project's plans and specifications (23 CFR 772.11[e][1] and [2]), giving weight to the benefits and cost of abatement, and to the overall social, economic, and environmental effects (CFR 772.9). Abatement must provide at least a 5-dBA reduction in highway traffic noise levels in order to provide noticeable and effective attenuation. When noise abatement is proposed, it is recommended that an attempt be made to achieve the greatest reduction possible.

A variety of noise abatement measures were considered but determined to be infeasible or not reasonable. Impact avoidance was not considered practical due to the density of development in the project vicinity. Property acquisition is rarely implemented solely or primarily on the basis of potential noise impacts. Under Caltrans guidelines, such measures are typically only considered where "severe" noise impacts are projected ("severe" impacts are defined as future build noise levels at residences of 75 dBA L_{eq}[h] or greater, or project generated noise level increases of 30 dBA or more). Traffic management measures were rejected because a primary purpose of this project is to redirect some Port-related traffic away from existing routes that experience high levels of traffic. Any traffic management measures that would effectively reduce noise would be contrary to the project's purpose and might redistribute noise impacts elsewhere. Structural insulation is not as cost effective as a noise barrier, and it does not provide any attenuation for outdoor areas such as yards or school playgrounds, nor would it work in a marina. Based on current information, Caltrans intends to abate project noise effects through the installation of noise barriers.

Potential barrier designs were considered at the four receiver areas where noise levels would approach or exceed the NAC: the Anchorage Way Marinas, Leeward Bay Marina, Wilmington Neighborhood, and Long Beach Neighborhood/SR-103 Extension. Feasibility was based on the ability of the barrier to result in a minimum 5-dBA reduction in the future noise level. Other considerations included topography, access requirements, other noise sources, and safety considerations. Once a noise barrier achieved the minimum of a 5-dBA reduction at a given receiver, the reasonableness of that barrier was determined.

To determine whether a noise barrier would be reasonable, the total cost allowance was calculated in accordance with the *Traffic Noise Analysis Protocol for New Highway Construction and Highway Reconstruction Projects* (Protocol) (Caltrans, 2006) and then compared to the total cost of the barrier. The locations of the noise barriers described below and shown in Figures 3.14-6, 3.14-7, and 3.14-8 are approximate; the exact locations of these barriers would be determined during final design based on safety, engineering, and feasibility. The barriers would reduce noise levels in the receiver areas to below the NAC.



LEGEND:

Expressway Soundwall

At-Grade Soundwall

Note: Final location and architectural features of soundwalls will be determined during final design.

No Scale

Figure 3.14-8
Soundwalls – Wilmington Area
Schuyler Heim Bridge Replacement and SR-47 Expressway

3.14.4.1 Avoidance and Minimization Measures

3.14.4.1.1 Construction

3.14.4.1.1.1 Alternatives 1, 1A, 2, 3, and 4

N-1 Construction noise monitoring and control plans consistent with local noise ordinances will be prepared by a qualified acoustical engineer who is a current member of the Institute of Noise Control Engineering (INCE), and has 5 years of experience performing construction noise analyses. If mitigation is warranted, potential measures, such as screening noise blankets, etc., would be evaluated for their effectiveness, and appropriate measures would be implemented.

3.14.4.1.1.2 Alternatives 5 and 6

No avoidance and minimization measures are proposed for these alternatives.

3.14.4.1.2 Operation

No avoidance and minimization measures are proposed for project operations.

3.14.4.2 Mitigation Measures

3.14.4.2.1 Construction

3.14.4.2.1.1 Alternatives 1, 1A, 2, 3, and 4

N-2 During project construction, pile driving will occur during daylight hours only.

N-3 Residents identified as being impacted by noise from pile driving in Cerritos Channel or Consolidated Slip may obtain hotel vouchers for a local hotel so they can temporarily move. This mitigation measure would apply only during the time that pile driving is being conducted in the Cerritos Channel or Consolidated Slip. Some residents may, however, choose to stay and tolerate the noise. No other mitigation or compensation measure would be provided to residents.

3.14.4.2.1.2 Alternatives 5 and 6

No mitigation measures are proposed for construction of Alternative 5 or for Alternative 6.

3.14.4.2.2 Operations

3.14.4.2.2.1 Alternatives 1, 1A, and 3

Leeward Bay Marina

N-4 For the Leeward Bay Marina, a barrier along the SR-47 Expressway, with an approximate length of 239 m (785 ft) and height of 2.44 m (8 ft) would be constructed to abate future traffic noise levels by 5 to 7 dBA at 65 benefited receivers. Preliminary reasonableness calculations indicate that the estimated barrier cost would be approximately $23,400 per benefited residence, which is within the allowance per residence of $50,000 to $54,000. Therefore, it would be feasible and reasonable to build a barrier at this location.

Wilmington Neighborhood

N-5 For the Wilmington neighborhood, a barrier along the SR-47 Expressway and another on ground level along Alameda Street, with an approximate combined length of 1,405 m (4,610 ft) and height of 3.66 m (12 ft) to 5.49 m (18 ft) would be constructed to abate future traffic noise levels by 5 to 7 dBA at 56 benefited noise sensitive receivers. Preliminary reasonableness calculations indicate that the estimated barrier cost would be approximately $37,500 per benefited residence,

which is within the allowance per residence of $48,000. Therefore it would be feasible and reasonable to build a barrier at this location.

3.14.4.2.2.2 Alternative 2

Long Beach Neighborhood/SR-103 Extension

N-6 For the Long Beach Neighborhood/103 Extension, two noise barriers along SR-103 with an approximate combined length of 835 m (2,740 ft) would be constructed to abate traffic noise levels. The two barriers would be 3.66 m (12 ft) high, although the barrier section along the northbound off-ramp would be 4.57 m (15 ft) high. The two noise barriers would reduce noise levels by 5 to 14 dBA for 27 equivalent frontage units. Preliminary reasonableness calculations indicate that the barriers would cost approximately $37,100 per benefited unit, which is below the allowance per residence of $44,000 to $52,000. Therefore, it would be feasible and reasonable to build the barriers at these locations.

The locations of the noise barriers are based on preliminary engineering plans and, as such, are considered to be approximate. The exact locations of these barriers would be determined during final design based on safety, engineering, and feasibility. The barriers would reduce noise levels in the receiver areas to below the NAC.

3.14.4.2.2.3 Alternatives 4, 5 and 6

Under Alternatives 4, 5, and 6, no noise abatement would be required. A number of locations would exceed the NAC by Year 2030 due to background growth and may require noise abatement in the future.

3.14.4.2.3 CEQA Consequences

Based on the information provided in the above analyses, noise impacts from project operations would be significant, less than significant, or less than significant with mitigation incorporated. Noise abatement would be achieved by installation of soundwalls, as follows: under Alternatives 1 and 3 at the Leeward Bay Marina; and under Alternative 2 at the Long Beach Neighborhood/SR-103 Extension.

When considered in the context of CEQA criteria, under Alternatives 1, 2, 3, and 4, impacts of construction noise from pile driving would be considered less than significant after mitigation. Under Alternative 5, construction impacts would be less than significant; under Alternative 6, there would be no construction and, therefore, no impact.

Potential impacts of the proposed project alternatives related to noise are assessed in the context of CEQA criteria in Chapter 4.0 – CEQA Analysis and Appendix A – CEQA Checklist (XI, Noise). Significant Noise impacts are addressed in Section 4.4 – Significant Environmental Effects of the Proposed Project, Section 4.5 – CEQA Analysis of Alternatives, Table 4-1 - Significant Environmental Impacts and Mitigation Measures, and Table 4-2 - CEQA Unavoidable Adverse Impacts.

3.15 Energy

The information provided in this section is derived entirely from the *Schuyler Heim Bridge Replacement and SR-47 Expressway Project - Energy Consumption* (Energy Technical Memorandum) (CH2M HILL, 2007), which is hereby incorporated by reference.

3.15.1 Regulatory Setting

NEPA (42 USC Part 4332) requires the identification of all potentially significant impacts to the environment, including energy impacts.

The CEQA Guidelines, Appendix F, Energy Conservation, state that EIRs are required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

Each public utility and public services agency is directed by internal standards and policies that guide the provision of service to their customers. The California Public Utilities Commission (PUC) regulates privately owned natural gas, electric, telephone, and water companies, as well as railroads and marine transportation companies. The PUC does not regulate municipal or district-owned energy utilities, or mutual water companies.

The California Energy Commission (CEC) is California's primary energy policy and planning agency. The CEC was created by the legislature in 1974 and is located in Sacramento. Five major responsibilities of the CEC include:

- Forecasting future energy needs and keeping historical energy data
- Licensing thermal power plants 50 megawatts or larger
- Promoting energy efficiency through appliance and building standards
- Developing energy technologies and supporting renewable energy
- Planning for and directing state response to energy emergency

The CEC's role includes overseeing funding programs that support public interest energy research; advancing energy science and technology through research, development, and demonstration; and providing market support to existing, new, and emerging renewable technologies.

3.15.2 Affected Environment

Energy is currently consumed in the study area for the construction of public and private projects: operation of automobiles, trucks, and marine vessels, and for operation of existing land uses. Automobile and truck fueling stations are located throughout the project area.

3.15.3 Environmental Consequences

3.15.3.1 Evaluation Criteria

The project alternatives were evaluated to determine if they would result in a demand for energy that would exceed the current supply, or cause a substantial increase in the rate of energy use.

3.15.3.2 Methodology

3.15.3.2.1 Construction

Direct energy consumption during project construction involves energy used by the construction equipment, work trucks, haul trucks, and worker commutes. It was assumed that all heavy construction equipment, such as loaders, cranes, scrapers, bulldozers, tugboats, workboats and crew boats, and heavy trucks use diesel fuel, while work trucks (pickups) and personal vehicles use gasoline.

Fuel consumption due to vehicle travel, including the haul trucks, pickups, and workers' commute vehicles, was calculated based on the vehicle miles traveled (VMT) and fuel economy rates in units of miles per gallon. The fuel economy values used in this analysis were developed by the Oak Ridge National Laboratory and published in the *2006 Transportation Energy Data Book; Edition 25* (Table 3.15-1) (U.S. Department of Energy, 2006). Following the methodology indicated in the *2006 Transportation Energy Data Book*, the gallons per year of fuel usage were converted directly to barrels per year using the conversion of 42 gallons per barrel. In the analysis, potential energy consumption is measured in British thermal units (Btu). One Btu is the quantity of energy necessary to raise one pound of water one degree Fahrenheit at one atmosphere of pressure (CH2M HILL, 2007).

Table 3.15-1
Energy Consumption Factors for Autos and Trucks

Vehicle Type	Energy Consumption Factor (Btu/vehicle mile)	Fuel Economy (miles per gallon)
Passenger Vehicles (auto, van, light trucks)	5,572	22.3
Pick-up Truck	5,572	17.7
Heavy Truck	23,461	7.3

Data source: 2006 Transportation Energy Data Book; Edition 25, Oak Ridge Laboratory, 2006
Btu = British thermal units
Source: CH2M HILL, 2007.

Fuel consumption by construction equipment was calculated based on equipment horsepower rating, fuel consumption rate, and operating hours. Because actual horsepower ratings are unknown at this time, the analysis utilized the default horsepower rating for each type of construction equipment in URBEMIS2002 (version 8.7.0). The diesel fuel consumption rate of the construction equipment was obtained from *SCAQMD CEQA Handbook* Table A9-8-C (SCAQMD, 1993). Equipment operating hours of each construction year were estimated based on the project construction schedule and equipment use (CH2M HILL, 2007).

Fuel consumption due to tug boat operation during construction of the new fixed-span bridge was estimated according to the methodology described in the USEPA *Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data* (2000).

Two construction methodologies were considered for the proposed project: cast-in-place (CIP) and segmental. With the conventional CIP methodology, construction would occur within a temporary structure, or "falsework," that is built and then removed once construction has been completed.

The segmental construction method is often used for bridges: 1) with span lengths greater than 91 meters (m) (300 feet [ft]); and 2) on sites where there are constraints on falsework placement (such as over the Cerritos Channel). This method involves construction of cantilevered segments from each end of the bridge. The cantilevered segments are extended toward each other until they meet in the middle and are connected.

The CIP method is proposed for all expressway construction and for most or all bridge construction. Segmental construction could be used for portions of the bridge over the Cerritos Channel. The remainder of the bridge would be constructed using the conventional CIP method. Construction emissions from the CIP and segmental methods are both analyzed.

Marine traffic would be restricted during bridge construction. This would force marine vessels to take a longer route around Terminal Island. The increased trip times for the marine vessels would result in increased fuel consumption.

3.15.3.2.2 Operations

Estimates of local energy demand directly related to each project alternative were analyzed for project operations in years 2003, 2011, 2015, and 2030. Local energy demand for transportation projects is typically dominated by vehicle fuel usage. The energy demand analysis assumes that the energy consumption by vehicles was much greater than the incremental change in electrical energy consumption for any additional lighting required for the project area. Therefore, energy use from lighting has not been quantified. Annual VMT within the project area were used to calculate energy consumption and characterize the energy demand the project would have on local resources. Peak hour VMT for cars and trucks were converted to daily VMT, and the annual VMT was estimated by multiplying the daily VMT by 365 days per year (Table 3.15-2).

Table 3.15-2
Annual Vehicle Miles Traveled for Project Operations

		No Build (VMT in millions)	**Alternative 1** (VMT in millions)	**Alternative 2** (VMT in millions)	**Alternative 3** (VMT in millions)	**Alternative 4** (VMT in millions)
2003	Auto	1,373.4	NA	NA	NA	NA
	Truck	211.64	NA	NA	NA	NA
2011	Auto	1,344.6	1,349.4	1,407.9	1,349.4	1,344.6
	Truck	233.17	228.29	204.67	228.29	233.17
2015	Auto	1,411.5	1,416.8	1,428.6	1,416.8	1,411.5
	Truck	270.76	264.73	269.59	264.73	270.76
2030	Auto	1,600.3	1,608.6	1,619.3	1,608.6	1,600.3
	Truck	372.16	361.93	366.86	361.93	372.16

Note:
VMT = Vehicle Miles Traveled
Source: CH2M HILL, 2007.

3.15.3.3 Evaluation of Alternatives

The following sections describe the energy consumption of each project alternative. A summary comparison of all alternatives can be found in Tables 3.15-3 and 3.15-4. Direct energy consumption involves energy used by the construction equipment, work trucks, haul trucks, and worker commutes. Indirect energy consumption involves energy used by marine vessels. It is expected that most energy consumption will be of fossil fuels and electricity.

3.15.3.3.1 Alternatives 1 and 1A: Bridge Replacement and SR-47 Expressway

3.15.3.3.1.1 Construction Effects

Direct Effect

Energy would be expended during construction of Alternative 1 (and 1A). Construction activities would involve demolition of the existing Schuyler Heim Bridge and construction of the new fixed-span bridge, Ocean Boulevard/SR-47 Flyover (flyover), and SR-47 Expressway. Energy expenditures would be short-term in duration, occurring periodically during each of the project construction phases over a period of approximately 33 months, and would not likely result in significant waste or inefficient use of energy. The potential for wasteful energy use during construction is low. Construction would occur in phases, with multiple crews working over the course of a two-shift workday, typically for a 5-day workweek. Energy expended during construction would be ongoing in nature, and phasing of construction activities would lessen the potential for wasteful energy use. In addition, mitigation measures proposed for air quality impacts include the development and implementation of a trip reduction plan (see AQ-4, Air Quality Section 3.13.4, Avoidance, Minimization, and/or Mitigation Measures) and a shuttle service (see AQ-5) for construction employees, which would also minimize wasteful energy use during construction.

Direct construction energy consumption would be by equipment used during site preparation and construction to perform activities such as clearing, grading, excavating, and demolishing existing structures. These activities would involve the use of diesel- and gasoline- powered equipment that would utilize fuel. Air quality mitigation measures that would minimize fuel consumption and efficient equipment operation include prohibiting unnecessary truck idling (see AQ-6); utilizing construction equipment equipped with Tier 2 or new engines, to the extent feasible (see AQ-10); and maintenance, tuning, and inspection of equipment engines (see AQ-11).

Tables 3.15-3 and 3.15-4 summarize the diesel and gasoline consumption for Alternative 1 for the CIP and segmental construction methods, respectively. Detailed calculations of fuel consumption during project construction can be found in the Energy Technical Memorandum (CH2M HILL, 2007).

Tables 3.15-5 and 3.15-6 summarize the equivalent crude oil consumption for Alternative 1 for the CIP and segmental method, respectively. Table 3.15-5 shows that the crude oil consumption for the CIP method for year 2009 is 31,999 barrels/year; for 2010 is 39,112 barrels/year; for 2011 is 9,975 barrels/year; and for 2014 is 4,503 barrels/year. Table 3.15-6 shows that crude oil consumption for the segmental method for year 2009 is 32,461 barrels/year, for 2010 is 39,393 barrels/year, for 2011 is 8,071 barrels/year, and for 2014 is 4,503 barrels/year.

Indirect Effect

Indirect effects would include fuel consumption from marine vessel detours during construction. There would be more closures of the Cerritos Channel and restriction periods using the CIP method than using the segmental method. Therefore, fuel consumption from the marine vessel detours was estimated using the closure/restriction schedule of the CIP method to represent the worst-case scenario.

Annual fuel consumption from marine vessel detours is shown in Table 3.15-7. The table shows that 46,198 gallons/year of diesel fuel will be consumed during construction in 2009, and 124,278 gallons/year will be consumed for construction in 2010.

Table 3.15-3
Construction Fuel Consumption Summary – Cast-in-Place Method

A. Diesel Consumption

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		Diesel Fuel Consumption (Gallons/Year)		
2009	1,237,590	1,645,177	1,143,676	270,283
2010	1,497,985	1,815,693	1,401,227	400,002
2011	378,625	378,207	362,556	148,627
2014	177,759	177,759	177,759	0
		Equivalent Crude Oil Consumption (Barrels/Year)		
2009	29,466	39,171	27,230	6,435
2010	35,666	43,231	33,363	9,524
2011	9,015	9,005	8,632	3,539
2014	4,232	4,232	4,232	0

Note:
In accordance with USEPA (2006), gallons per year of fuel use were converted directly to barrels per year using the conversion of 42 gallons per barrel.

B. Gasoline Consumption

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		Gasoline Consumption (Gallons/Year)		
2009	106,358	134,641	104,415	51,118
2010	144,723	165,840	144,252	78,492
2011	40,308	41,424	40,767	18,781
2014	11,349	11,349	11,349	0
		Equivalent Crude Oil Consumption (Barrels/Year)		
2009	2,532	3,206	2,486	1,217
2010	3,446	3,949	3,435	1,869
2011	960	986	971	447
2014	270	270	270	0

Note:
In accordance with USEPA (2006), gallons per year of fuel use were converted directly to barrels per year using the conversion of 42 gallons per barrel.

Source: CH2M HILL, 2007.

Table 3.15-4
Construction Fuel Consumption Summary – Segmental Method

A. Diesel Consumption

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		Diesel Fuel Consumption (Gallons/Year)		
2009	1,265,310	1,691,148	1,190,640	426,380
2010	1,519,734	1,858,552	1,444,888	575,207
2011	304,135	304,537	288,484	75,044
2014	177,759	177,759	177,759	0
		Equivalent Crude Oil Consumption (Barrels/Year)		
2009	30,126	40,265	28.349	10,152
2010	36,184	44,251	34.402	13,395
2011	7,241	7,251	6,869	1,787
2014	4,232	4,232	4,232	0

Note:
In accordance with USEPA (2006), gallons per year of fuel use were converted directly to barrels per year using the conversion of 42 gallons per barrel.

B. Gasoline Consumption

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		Gasoline Consumption (Gallons/Year)		
2009	98,068	124,377	96,125	42,828
2010	134,774	148,314	134,304	68,544
2011	34,844	35,446	35,302	13,317
2014	11,349	11,349	11,349	0
		Equivalent Crude Oil Consumption (Barrels/Year)		
2009	2,335	2,961	2,289	1,020
2010	3,209	3,531	3,198	1,632
2011	830	844	841	317
2014	270	270	270	0

Note:
In accordance with USEPA (2006), gallons per year of fuel use were converted directly to barrels per year using the conversion of 42 gallons per barrel.

Source: CH2M HILL, 2007.

Table 3.15-5
Annual Energy Consumption during Project Construction – Cast-in-Place Method

	Total Equivalent Crude Oil Consumption (Barrels/Year)			
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
2009	31,999	42,377	29,716	7,652
2010	39,112	47,179	36,797	11,393
2011	9,975	9,991	9,603	3,986
2014	4,503	4,503	4,503	0

Source: CH2M HILL, 2007.

Table 3.15-6
Annual Energy Consumption during Project Construction – Segmental Method

	Total Equivalent Crude Oil Consumption (Barrels/Year)			
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
2009	32,461	43,227	30,637	11,172
2010	39,393	47,783	37,600	15,327
2011	8,071	8,095	7,709	2,104
2014	4,503	4,503	4,503	0

Source: CH2M HILL, 2007.

Table 3.15-7
SR-47 – Marine Vessel Detour Fuel Consumption (Annual)

	Gallons/Year (Diesel)	**Barrels/Year (Crude Oil)**	**Barrels/Year (Crude Oil)**
Construction 2009	46,198	1,100	1,100
Construction 2010	124,278	2,959	2,959
Operation 2011 and after	110,475	2,630	2,630

Note:
In accordance with USEPA (2006), gallons per year of fuel use were converted directly to barrels per year using the conversion of 42 gallons per barrel.
Source: CH2M HILL, 2007.

3.15.3.3.1.2 Operations Effects

Direct Effect

Table 3.15-8 summarizes the potential annual energy use for operation of Alternative 1. Detailed calculations of fuel consumption during project operations can be found in the Energy Technical Memorandum (CH2M HILL, 2007). Calculations indicate that the estimated energy consumption for Alternative 1 is less than the No Build alternative in both 2011 and 2030.

Table 3.15-8
Projected Annual Energy Use for Project Operations

		No Build (In millions)	Alternative 1 (In millions)	Alternative 2 (In millions)	Alternative 3 (In millions)	Alternative 4 (In millions)
2003	Auto (MMBtu/Year)	7.653	NA	NA	NA	NA
	Truck (MMBtu/Year)	4.965	NA	NA	NA	NA
	Total (MMBtu/Year)	12.618	NA	NA	NA	NA
	Total Barrels of Crude Oil (Barrels/Year)	2.157	NA	NA	NA	NA
2011	Auto (MMBtu/Year)	7.492	7.519	7.845	7.492	7.519
	Truck (MMBtu/Year)	5.471	5.356	4.802	5.471	5.356
	Total (MMBtu/Year)	12.963	12.875	12.646	12.963	12.875
	MMBtu Difference compared to 2003 Base	.345	.257	.029	.345	.257
	MMBtu Difference compared to 2011 No Build	NA	-.088	-.316	NA	-.088
	Total Barrels of Crude Oil (Barrels/Year)	2.20	2.19	2.17	2.20	2.19
2015	Auto (MMBtu/Year)	7.86	7.89	7.96	7.86	7.89
	Truck (MMBtu/Year)	6.35	6.21	6.32	6.35	6.21
	Total (MMBtu/Year)	14.217	14.105	14.285	14.217	14.105
	MMBtu Difference compared to 2003 Base	1.60	1.49	1.67	1.60	1.49
	MMBtu Difference compared to 2015 No Build	NA	-0.112	0.068	NA	-0.11
	Total Barrels of Crude Oil (Barrels/Year)	2.39	2.38	2.40	2.40	2.38
2030	Auto (MMBtu/Year)	8.917	8.963	9.022	8.917	8.963
	Truck (MMBtu/Year)	8.731	8.49	8.601	8.731	8.50
	Total (MMBtu/Year)	17.648	17.454	17.630	17.649	17.454
	MMBtu Difference compared to 2003 Base	5.031	4.867	5.012	5.030	4.837
	MMBtu Difference compared to 2030 No Build	NA	-0.194	-0.019	NA	-0.194
	Total Barrels of Crude Oil (Barrels/Year)	2.923	2.898	2.926	2.923	2.898

Note:
In accordance with USEPA (2006), gallons per year of fuel use were converted directly to barrels per year using the conversion of 42 gallons per barrel.

MMBtu/Year – million British thermal units per year.

Source: CH2M HILL, 2007

Indirect Effect

Replacement of the existing Schuyler Heim Bridge with a fixed-span bridge would have indirect impacts on fuel consumption by affecting marine traffic. Replacing the lift-span bridge with a fixed-span bridge would force taller marine vessels to take a longer route around Terminal Island and would delay vessels with adjustable mast heights. The increased trips for the marine vessels would result in increased fuel consumption. Annual fuel consumption from marine vessel detours is shown in Table 3.15-7. An air quality measure to reduce impacts from marine vessel detours by reducing the emissions in the ports aging heavy-duty truck fleet is AQ-9, the Heavy Duty Truck Buyback Program. This mitigation measure is intended to accelerate the modernization of the heavy-duty engine fleet by replacing older trucks with newer engines, which would also improve fuel efficiency (see Air Quality Section 3.13.4, Avoidance, Minimization, and/or Mitigation Measures).

3.15.3.3.2 Alternative 2: SR-103 Extension to Alameda Street

3.15.3.3.2.1 Construction Effects

Direct

Energy would be expended during construction of Alternative 2. Energy expenditures would be short-term in duration, occurring periodically during each of the project construction phases and would not likely result in significant waste or inefficient use of energy. The potential for wasteful energy use during construction is low.

Construction activities would involve demolition of the existing Schuyler Heim Bridge and construction of the new fixed-span bridge, flyover, and SR-103 Extension. Tables 3.15-3 and 3.15-4 summarize the diesel and gasoline consumption for Alternative 2 for the CIP and segmental construction methods, respectively. Detailed calculations of fuel consumption during project construction can be found in the Energy Technical Memorandum (CH2M HILL, 2007).

Tables 3.15-5 and 3.15-6 summarize the equivalent crude oil consumption for Alternative 2 for the CIP and segmental method, respectively. The tables show that crude oil consumption for the CIP method for years 2009 and 2010 is higher for Alternative 2 than for Alternative 1. For years 2011 and 2014, Alternative 2 is comparable to Alternative 1.

The tables show that crude oil consumption for the segmental method for years 2009 and 2010 is higher for Alternative 2 than Alternative 1, and for years 2011 and 2014, Alternative 2 is comparable to Alternative 1.

Indirect

Under Alternative 2, impacts from marine vessel detour fuel use would be the same as for Alternative 1 because bridge construction and marine vessel traffic restrictions would be the same as under Alternative 1.

3.15.3.3.2.2 Operations Effects

Direct

Alternative 2 is estimated to have slightly greater energy consumption than the No Build alternative, but this increase is less than 1 percent.

Indirect

Impacts from marine vessel detour fuel use would be the same as those for Alternative 1 because bridge construction and marine vessel traffic restrictions would be the same.

3.15.3.3.3 Alternative 3: Bridge Demolition Avoidance

3.15.3.3.3.1 Construction Effects

Direct

Energy would be expended during construction of Alternative 3. Energy expenditures would be short-term in duration, occurring periodically during each of the project construction phases, and would not likely result in significant waste or inefficient use of energy. The potential for wasteful energy use during construction is low.

The existing Schuyler Heim Bridge would not be demolished under this alternative. Construction activities would involve construction of the new fixed-span bridge, flyover, and the SR-47 Expressway. Tables 3.15-3 and 3.15-4 summarize the diesel and gasoline consumption for Alternative 3 for the CIP and segmental construction methods, respectively. Detailed calculations of fuel consumption during project construction can be found in the Energy Technical Memorandum (CH2M HILL, 2007).

Tables 3.15-5 and 3.15-6 summarize the equivalent crude oil consumption for Alternative 3 for the CIP and segmental method, respectively. The tables indicate that crude oil consumption for the CIP method for years 2009, 2010, and 2011 is lower for Alternative 3 than for Alternative 1. For year 2014, crude oil consumption for Alternative 3 is comparable to Alternative 1.

The tables indicate that crude oil consumption for the segmental method for years 2009, 2010, and 2011 for Alternative 3 is slightly lower than Alternative 1. For year 2014, crude oil consumption for Alternative 3 is comparable to Alternative 1. This lower energy consumption can be attributed to preserving the existing Schuyler Heim Bridge, rather than using energy for demolition.

Indirect

Under Alternative 3, impacts from marine vessel detour fuel use would be the same as those for Alternative 1 because the bridge construction and marine vessel traffic restrictions would be the same.

3.15.3.3.3.2 Operations Effects

Under Alternative 3, energy demand for project operations would be the same as described under Alternative 1.

3.15.3.3.4 Alternative 4: Bridge Replacement Only

3.15.3.3.4.1 Construction Effects

Direct

Energy would be expended during construction of Alternative 4 for demolition and replacement of the Schuyler Heim Bridge. Under this alternative, no flyover or expressway would be constructed. Energy expenditures would be short-term in duration, occurring periodically during each of the project construction phases, and would not likely result in significant waste or inefficient use of energy. The potential for wasteful energy use during construction is low.

Tables 3.15-3 and 3.15-4 summarize the diesel and gasoline consumption for Alternative 4 for the CIP and segmental construction methods, respectively. Detailed calculations of fuel consumption during project construction can be found in the Energy Technical Memorandum (CH2M HILL, 2007).

Tables 3.15-5 and 3.15-6 summarize the equivalent crude oil consumption for Alternative 4 for the CIP and segmental method, respectively. The tables indicate that, under Alternative 4, crude oil consumption for both the CIP method and segmental method for years 2009, 2010, 2011, and 2014 would be less than Alternative 1. This can be attributed to the fact that Alternative 4 involves only demolition and replacement of the Schuyler Heim Bridge and does not involve construction of the flyover, SR-47 Expressway, or SR-103 Extension.

Indirect

Under Alternative 4, impacts from marine vessel detours would be the same as Alternative 1 because bridge constriction and marine vessel traffic restrictions would be the same.

3.15.3.3.4.2 Operations Effects

Under Alternative 4, energy demand during project operations would be the same as described under Alternative 1.

3.15.3.3.5 Alternative 5: Transportation System Management

3.15.3.3.5.1 Construction Effects

Energy would be expended during construction of Alternative 5. Energy expenditures would be short-term in duration, occurring periodically during project construction and would not likely result in significant waste or inefficient use of energy. The potential for wasteful energy use during construction is low.

Construction activities associated with the TSM alternative would be minimal. Therefore, this alternative is not expected to have any measurable effects on energy demand related to project construction activities.

3.15.3.3.5.2 Operations Effects

Direct

No information is available to evaluate the operations impacts of the TSM Alternative. However, improvements in traffic flow could be expected to reduce energy demand for vehicles in the area of the TSM improvements.

Indirect

With the TSM Alternative, marine traffic would continue using current routes. Therefore, there would be no indirect effects associated with changes in fuel consumption of marine vessels.

3.15.3.3.6 Alternative 6: No Build

3.15.3.3.6.1 Construction Effects

The No Build alternative is no action; no change to the existing environment would occur under this alternative. There would be no construction activities and, therefore, no direct or indirect construction-related demand on energy.

3.15.3.3.6.2 Operations Effects

Direct

No direct impacts would be expected from operations under the No Build alternative.

Indirect

Since the existing lift-span bridge would not be replaced with a fixed-span bridge, marine traffic would continue using current routes. Therefore, there would be no indirect effects associated with fuel consumption of marine vessels.

3.15.4 Avoidance, Minimization, and/or Mitigation Measures

No measures to minimize harm related to energy are proposed because the change in energy consumption under project Alternatives 1 through 5 compared to Alternative 6 (No Build) is substantially less than one percent on an annual basis.

Based on this analysis, the project alternatives would not have an adverse effect on energy demand, and no avoidance, minimization, or mitigation measures would be required.

3.16 Biological Resources

The information provided in this section is derived from the *Natural Environment Study: Schuyler Heim Bridge Replacement and SR-47 Expressway Project* (Caltrans, 2007) (NES), which is hereby incorporated by reference. The reader is directed to that document for sources of information.

3.16.1 Regulatory Setting

3.16.1.1 Federal Regulations

This section describes permits and agreements that may be required under associated natural resource laws and regulations. The following permits would not be required for Alternatives 5 (Transportation System Management Alternative) and 6 (No Build Alternative).

3.16.1.1.1 Clean Water Act

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Clean Water Act (33 USC 1344) is the primary law regulating wetlands and waters. The Clean Water Act (CWA) regulates the discharge of dredged or fill material into waters of the United States (U.S.), including wetlands. Waters of the U.S. include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the Clean Water Act, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils subject to saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the Clean Water Act.

Section 404 of the Clean Water Act establishes a regulatory program that provides that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program is run by the U.S. Army Corps of Engineers (USACE) with oversight by the Environmental Protection Agency (EPA).

Permits associated with Sections 401, 402, and 404 of the CWA (described below) will be required for this project.

3.16.1.1.1.1 Section 401

Section 401 of the CWA, governed by 33 United States Code (USC) 1341 and 40 Code of Federal Regulations (CFR) 121, requires a water quality certification from the State Board or Regional Board when a project: (1) requires a federal license or permit (a Section 404 permit is the most common federal permit for Caltrans projects); and (2) will result in a discharge to waters of the U.S. Such certification may be conditioned. Project activities that typically result in a discharge subject to Section 401 water quality certification are the construction and subsequent operation of a facility.

The State Water Resources Control Board (SWRCB) revised state regulations for the 401 Water Quality Certification Program; these revisions went into effect on June 24, 2000. The likelihood of a passive waiver has been reduced by the revised regulations.

3.16.1.1.1.2 Section 402

Section 402 of the CWA, governed by 33 USC 1342 and 40 CFR 122, establishes a permitting system for the discharge of any pollutant (except dredge or fill material) into waters of the U.S. A National Pollutant Discharge Elimination System (NPDES) permit is required for all point discharges of pollutants to surface waters. A point source is a discernible, confined, and discrete conveyance such as a pipe, ditch, or channel.

3.16.1.1.1.3 Section 404

Section 404 of the CWA, governed by 33 USC 1344 and 33 CFR 323, establishes a permit program administered by USACE regulating the discharge of dredged or fill material into waters of the U.S. (including wetlands). The Section 404 (b)(1) guidelines allow the discharge of dredged or fill material into the aquatic system only if there is no practicable alternative that would have fewer adverse effects. The CWA amended the federal Water Pollution Control Act of 1972.

3.16.1.1.2 River and Harbors Appropriations Act of 1899

Sections 9 and 10 of the Rivers and Harbors Appropriations Act of 1899 relate to the protection of navigable water in the U.S. and regulate any construction affecting navigable waters and any obstruction, excavation, or filling. Sections 9 and 10 require permits for all structures, such as riprap, and activities, such as dredging, in navigable waters of the U.S. Navigable waters are defined as those subject to the ebb and flow of the tide and susceptible to use in their natural condition or by reasonable improvements as a means to transport interstate or foreign commerce. USACE grants or denies permits based on the effects on navigation. Most activities covered under this act are also covered under Section 404 of the CWA. All activities involving navigable waters of the U.S. require a Section 10 permit. Projects must obtain approval of plans for construction, dumping, and dredging permits (Section 10) and bridge permits (Section 9). Agencies involved in the coordination of the Rivers and Harbors Appropriations Act include the U.S. Coast Guard, USACE, EPA, as well as local and state agencies. Section 9 of the Rivers and Harbors Appropriations Act is administered by the U.S. Coast Guard. Section 10 of the Rivers and Harbors Appropriations Act is administered by USACE. It is anticipated that the project will require permits under Sections 9 and 10 of the Rivers and Harbors Appropriations Act.

3.16.1.1.3 Executive Order 11990: Protection of Wetlands

The Executive Order for the Protection of Wetlands (E.O. 11990) also regulates activities of federal agencies with regard to wetlands. Essentially, this executive order states that a federal agency, such as the Federal Highway Administration, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: 1) there is no practicable alternative to the construction; and 2) the proposed project includes all practicable measures to minimize harm.

3.16.1.1.4 Federal Endangered Species Act

The primary federal law protecting threatened and endangered species is the Federal Endangered Species Act: 16 USC, Section 1531, et seq. (See also 50 CFR Part 402.) This act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as the Federal Highway Administration, are required to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS)

to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 is a Biological Opinion, or an incidental take permit. Section 3 of the Federal Endangered Species Act (FESA) defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct."

3.16.1.1.5 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) was enacted to protect and manage marine mammals and their products. Under the MMPA, the Secretary of Commerce is responsible for the conservation and management of pinnipeds (seals, sea lions, and their allies) other than walruses, and cetaceans (whales, dolphins, and porpoises). Under the definitions (50 CFR §216.3) outlined in the MMPA, to take a marine mammal means to "harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal." The 1994 amendments define "harassment levels." Early consultation with NMFS should occur to identify effects and mitigation commitments in the National Environmental Policy Act (NEPA) document. If applicable, the project sponsor should apply for an Incidental Harassment Authorization (IHA) and submit or reference the NEPA document when applying for an IHA.

3.16.1.1.6 Magnuson-Stevens Fishery Conservation and Management Act

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act set forth a number of new mandates for NMFS, regional fishery management councils, and federal action agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate essential fish habitat (EFH) in Fishery Management Plans (FMPs) or FMP amendments for all managed species. Federal action agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding potential adverse effects of their actions on EFH and respond in writing to the recommendations of NMFS. In addition, NMFS is required to comment on any state agency activities that would impact EFH.

The purpose of addressing habitat in this act is to provide for one of the overall marine resource management goals of the nation – maintaining sustainable fisheries. As evidenced for all wildlife resources, suitable habitat is absolutely essential for their sustenance. Although the concept of EFH is similar to that of critical habitat under the ESA, measures recommended to protect EFH by NMFS or a Council are advisory, not proscriptive. An effective EFH consultation process is vital to ensuring that federal actions serve the Magnuson-Stevens Act resource management goals.

The Magnuson-Stevens Act requires that EFH be identified for all species that are federally managed. This includes species managed by the Councils under Council FMPs, as well as those managed by NMFS under FMPs developed by the Secretary of Commerce.

Applicable species to Alternatives 1, 2, 3, and 4 include Coastal Pelagic Species, which include four finfish species: northern anchovy (*Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), Pacific sardine (*Sardinops sagax*), and chub mackerel (*Scomber japonicus*) as well as market squid (*Loligo opalescens*). These species are managed within the Coastal Pelagic Species FMP. Applicable species to Alternatives 1, 2, 3, and 4 also include

groundfish. A total of 82 groundfish species (flat and rockfish) are identified on the Pacific Groundfish FMP.

Preliminary consultation with the NMFS has been conducted and was reported in the NES. This consultation confirmed the presence of FMPs in the project area. Further review by the NMFS is pending distribution of this document and/or the NES to the NMFS.

3.16.1.1.7 Migratory Bird Treaty Act

This treaty with Canada, Mexico, and Japan protects migratory birds by making it unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, or kill said species. The law applies to the removal of nests (such as swallow nests on bridges) occupied by migratory birds during the breeding season.

3.16.1.1.8 Invasive Species Control

On February 3, 1999, President Clinton signed Executive Order 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." FHWA guidance issued August 10, 1999, directs the use of the state's noxious weed list to define the invasive plants that must be considered as part of the NEPA analysis for a proposed project.

3.16.1.2 Bald Eagle Protection Act

Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d, 54 Stat. 250) as amended, provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act. The 1978 amendment authorizes the Secretary of the Interior to permit the taking of golden eagle nests that interfere with resource development or recovery operations. A 1994 Memorandum (59 F.R. 22953, April 29, 1994) from President William J. Clinton to the heads of Executive Agencies and Departments sets out the policy concerning collection and distribution of eagle feathers for Native American religious purposes.

3.16.1.3 State Regulations

3.16.1.3.1 California Water Code and Additional Water Quality Regulations

The state enforces federal water quality protection programs for which they have been delegated authority under the California Water Code and implementing regulations. The Porter-Cologne Water Quality Control Act provides a comprehensive statewide system for water pollution control that included designation of the SWRCB and nine Regional Boards covering the entire State of California. Under the Porter-Cologne Act, the SWRCB is responsible for adopting water quality standards as required to fulfill the responsibilities of the state under the CWA (Sections 401 and 402). In addition to surface water discharge permitting requirements of the CWA, the Porter-Cologne Act regulates discharges and potential discharges to groundwater.

Any person proposing to discharge waste that could affect the quality of waters of the state must file a Report of Waste Discharge. The Regional Board may permit discharges that comply with the CWA and the Porter-Cologne Act, subject to issuance of waste discharge requirements to protect the quality of waters of the state.

3.16.1.3.2 State Endangered Species Act

California has enacted the California Endangered Species Act (CESA), California Fish and Game Code, Section 2050, et seq. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate planning to offset project-caused losses of listed species populations and their essential habitats. The California Department of Fish and Game (CDFG) is the agency responsible for implementing CESA. Section 2081 of the Fish and Game Code prohibits "take" of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by CDFG. For projects requiring a Biological Opinion under Section 7 of the FESA, CDFG may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the Fish and Game Code.

3.16.1.3.3 California Fully Protected Wildlife Species Provisions

California Fish and Game Code §§3511, 4700, 5050, and 5515 prohibit the taking of fully protected birds, mammals, amphibians, and fish. The CDFG might authorize the project, with conditions, after reviewing the project effects.

The California least tern, California brown pelican and peregrine falcon are all state Fully Protected species. "Take" of these species, as defined by Section 2081 of the Fish and Game Code, will not occur.

3.16.1.3.3.1 Birds of Prey Protection Provision

California Fish and Game Code § 3503.5 prohibits the taking of birds of prey, including any birds of the order Falconiformes or Strigiformes, and including nests or eggs of such birds.

3.16.1.3.4 California Fish and Game Code, Section 1600

Sections 1600-1607 of the Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFG before beginning construction. If CDFG determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFG jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFG.

3.16.1.3.5 Ballast Water Management for Control of Nonindigenous Species Act

The Ballast Water Management for Control of Nonindigenous Species Act, California Public Resources Code (PRC) § 71200 *et seq.* (enacted January 1, 2000), requires ballast water management practices for all vessels, domestic and foreign, carrying ballast water into waters of the state after operating outside the Exclusive Economic Zone (EEZ). Specifically, the regulation prohibits ships from exchanging ballast water within port waters, and

requires that exchange occur outside the EEZ in deep, open ocean waters. Alternatively, ships may retain water while in port, discharge to an approved reception facility, or implement other similar protective measures.

3.16.2 Affected Environment

3.16.2.1 Natural Communities

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. There were no habitat areas that have been designated as critical habitat under the Federal Endangered Species Act within the project area. Areas designated Essential Fish Habitat under the Magnusen Stephens Fisheries Management Act are addressed below. Wetlands and other waters are also discussed below under Jurisdictional Waters Including Wetlands.

The project area consists of an urbanized, port environment, with extensive development including port facilities, transportation facilities including roads, bridges, and railways, and commercial and industrial buildings and facilities. Activities at and near the ports, including truck and rail transport and container ship loading and unloading, are ongoing 24 hours per day, seven days per week. For purposes of safety and security, activity areas are brightly illuminated during nighttime operations. Developed native terrestrial plant communities are generally not supported within the project area. Vacant, open lands within the project area are generally devoid of vegetation, either through recent or historic site disturbance, including soil compaction. Terrestrial wildlife species present in the urban and industrialized area have adapted to the developed environment, or consist of waterbirds that have adapted to using port waters for foraging and roosting.

Wetland and aquatic habitats are present within the project area, and support native and non-native communities. Intertidal wetlands are present in isolated locations along Cerritos Channel and in other locales. Port waters support intertidal and subtidal aquatic communities, including hard- and soft-bottomed benthic communities, and water column communities. Port waters within the project area support abundant fish communities, as well as foraging marine mammals.

3.16.2.1.1 Urban/Developed Areas

Terrestrial vegetation within urban, developed areas of the project area, where present, consists primarily of non-native plant species, ruderal, and landscaped areas. Many areas are dominated by non-native landscape ornamentals and include species of eucalyptus (*Eucalyptus* sp.), ice plant (*Mesembryanthemum* sp.), and pine tree (*Pinus* sp.). Small patches of non-native herbaceous and shrub species and naturalized landscaped species also exist within the project area. The non-native plant species present along the approaches to the Schuyler Heim Bridge are primarily composed of fivehorn smotherweed (*Bassia hyssopifolia*), mustard (*Brassica* sp.), ripgut brome (*Bromus diandrus*), red brome (*Bromus rubens*), eucalyptus, prickly lettuce (*Lactuca serriola*), white sweetclover (*Melilotus alba*), ice plant, Russian thistle (*Salsola* sp.), spiny sowthistle (*Sonchus asper*), and Johnsongrass (*Sorghum halepense*). A number of juvenile palm trees also are scattered within the site. Spreading pellitory (*Parietaria judaica)* was observed in dense patches below the southern approach to the Schuyler Heim Bridge. Landscaped areas exist north of the Cerritos Channel and along the approach to the Schuyler Heim Bridge and adjacent to Hanjin Way, as well as along

Ocean Avenue and the southern approach to the bridge. Similar areas are found along the alignment to Alameda Street.

The north bank of the proposed bridge over the East Basin-Consolidated Slip/Dominguez Channel is sparsely vegetated with several non-native species including Brazilian pepper (*Schinus terebenithifolius*), tree tobacco (*Nicotiana glauca*), and small-flowered ice-plant.

Native vegetation is present in scattered locations and includes Emory's baccharis (*Baccharis emoryi*), mulefat (*Baccharis salicifolia*), horseweed (*Conyza canadensis*), spreading alkaliweed (*Cressa truxillensis*), tall flatsedge (*Cyperus eragrostis*), and knotweed (*Polygonum* sp.). The majority of native vegetation occurring on the project area at the Schuyler Heim Bridge occurs within the southern portion of the project site, between the Schuyler Heim Bridge and railroad tracks that lead to and from the Henry Ford Bridge. In addition, the north bank of the proposed bridge over the Consolidated Slip/Dominguez Channel is sparsely vegetated with some native mulefat present. The south bank of Consolidated Slip/ Dominguez Channel supports some native mulefat and Brewer's saltbush *(Atriplex lentiformes*), and a small amount of pickleweed. Mulefat shrubs are also present within the north-south portion of the footprint of the proposed flyover. The east-west portion of the flyover is alongside existing roadways in highly degraded conditions or developed conditions; no natural habitat is present.

At the northern portions of the existing SR-103 alignment (Alternative 2), roadside areas consisting of iceplant and other non-native ruderal species are found adjacent to the alignment. Also, along the northern segment of the SR-103 alignment, extensive areas of landscaped vegetation exist along the proposed alignment within the existing streets.

Wildlife species expected to occur frequently in the urbanized, developed portions of the project area include rock dove (*Columba livia*), mourning dove (*Zenaida macroura*), black phoebe (*Sayornis nigricans*), barn swallow (*Hirundo rustica*), American crow (*Corvus branchyrhynchos*), European starling (*Sturnus vulgaris*), house finch *(Carpodacus mexicanus*), and house sparrow (*Passer domesticus*). Mammals that are expected to occur in the project area are feral cats *(Felis domesticus*), Virginia opossum (*Didelphis virginiana*), and Norway rats (*Rattus norvegicus*). In addition, the American peregrine falcon (*Falco peregrinus anatum*) has a long history of nesting within the developed, port environment, and a pair has been reported nesting on the south tower of the Schuyler Heim Bridge for many years (see further discussions below).

Other wildlife within urban, developed areas within the project area may include numerous species of bats that may utilize structures such as the Schuyler Heim Bridge or other elevated roadways or bridges in the area for roosting, including the Ocean Avenue rail bridge, which crosses the rail line within the footprint of the flyover.

The elevated section of the existing SR-103 viaduct in the vicinity of Anaheim Street may support bat roosts or bird nests (Alternative 2). In the vicinity of the small community park, north of Pacific Coast Highway along and to the south of SR-103 (Alternative 2), numerous trees including non-native and native landscaped trees exist, providing numerous roosting and potential nesting opportunities for raptors and other birds.

3.16.2.1.2 Brackish Intertidal and Non-tidal Wetlands

A small wetland is present within the footprint of Alternative 3, on a low tidal terrace just above the riprap bank along the south bank of Cerritos Channel, just east of the existing Schuyler Heim Bridge. The wetland is dominated by pickleweed, with additional species including alkali seaheath (*Frankenia salina*) and spreading alkalibush (*Cressa truxillensis*). It appears fully within the regular tidal inundation zone, and is characteristic of tidal wetlands in brackish or saline conditions. In addition, pickleweed established in the intertidal zone is present in soil-filled crevices between riprap blocks along the Cerritos Channel east of the Schuyler Heim Bridge.

Early site visits and air photos indicated this wetland was approximately 0.25 acre in size. During a survey on December 7, 2006, it was found that the wetland had been degraded by construction activities on Pier S. A portion of the wetland was filled and it now extends approximately 30.5 meters (m) (100 feet [ft]) in the east-west direction and approximately 15.2 m (50 ft) in the north-south direction, reducing the size of the wetland to approximately 0.11 acre. The western edge of the wetland is approximately 22.8 m (75 ft) east of the plane of the southern abutment of the Schuyler Heim Bridge.

Along SR-103 (north of Pacific Coast Highway), an approximate 1-acre tidal wetland/ stormwater drainage feature currently exists east of the roadway and adjacent to San Gabriel Street. This feature contains native species including alkali seaheath, and pickleweed. This feature continues and connects to the north with a narrow strip along (and east of) SR-103. This area contains a stormwater channel and connects to the feature described below. The area appears to be outside the footprint of direct Alternative 2 effects.

3.16.2.1.3 Aquatic Communities

Extensive aquatic wildlife habitat is present in the port waters within the project area, and a number of reports have documented conditions within aquatic habitats in the Port of Los Angeles Harbor shoreline habitats generally consist of intertidal and shallow subtidal riprap. These materials and additional hard substrates (i.e., pilings) provide habitats for both attached and motile invertebrates, which, in turn, provide food and shelter for rocky shore fishes. The rocky intertidal community on the riprap materials, as on most rocky shores, exhibits vertical zonation and is represented by crustacean, mollusk, echinoderm, and polychaete taxa. In the Los Angeles/Long Beach Harbor areas, composition and abundance of the intertidal community depends on the location, exposure, and substrate. The inner reaches of the harbor contain a sparser and less diverse rocky intertidal community. Compared to the outer and middle harbor sampling locations, the mean abundance of invertebrates occupying riprap habitats was much lower within the Cerritos Channel. The rocky subtidal epibiota in the Cerritos Channel is dominated by red (including corallines) and blue-green algal species, worm snails (*Serpulobis squamigerus*), phoronids (*Phoronis vancouverensis*), and mussels (*Mytilus* spp.).

The smaller invertebrates that constitute the benthic infaunal community of the soft-bottom channel area have been characterized previously for this general area of the Los Angeles and Long Beach inner harbors as a part of sediment quality assessments and a biological baseline study of San Pedro Bay. Compared to outer and middle harbor locations, the Cerritos Channel has an epibenthic and benthic invertebrate assemblage indicative of poorer habitat quality. Benthic infaunal organisms are the macroscopic animals that live in the

top layers of sediment within the marine environment. The distribution and abundance of these species depends on the interacting sediment and environmental variability with the sediment composition characteristics being the primary determinant of their distribution. Many of the existing dominant infaunal species are thought to have been introduced from exotic sources. Within the Cerritos Channel, there are relatively more abundant infaunal invertebrate taxa associated with low to moderate nutrient enrichment compared to other harbor locations. The worst habitat quality was determined to be in the East Basin/ Consolidated Slip in the inner harbor. The epibenthic and infaunal benthic species assemblages associated with those habitats are dominated by pollution indicator species characteristic of substantial contamination.

The distribution of fish species/assemblages throughout the Harbor areas was most closely correlated with water depths. Compared to outer and middle harbor areas, fish abundance, biomass, and species numbers in the vicinity of the project area are generally lower. Pelagic fish species (within the water column) in the inner harbor (the Cerritos Channel sampling location) had the lowest average abundance (147 fish/sample), biomass (2.6 to 6.0 kilograms [kg]/sample) and fewest overall species (11) when compared to all other outer and middle harbor sampling areas. In addition, for demersal fish species (associated with the bottom), the inner harbor location (the Cerritos Channel sampling location) also had the lowest average abundance (165 fish/sample), biomass (1.0 to 3.0 kg/sample) and fewest overall species (18) when compared to other sampling locations within the study area. The Cerritos Channel sampling location clustered with other locations with a species assemblage consisting of schooling fish, including northern anchovy (*Engraulis mordax*), California grunion (*Leuresthes tenuis*), chub mackerel (*Scomber japonicus*), and jack mackerel (*Trachurus symmetricus*) along with others including sardine (*Sardinops sagax*), topsmelt (*Atherinops affinis*), queenfish (*Seriphus politus*), and specklefin midshipman (*Porichthys myriaster*). The principal demersal fish assemblage that characterized the Cerritos Channel location was barred sand bass (*Paralabrax maculatofasciatus*), plainfin midshipman (*Porichthys notatus*), specklefin mipshipman, and yellowchin sculpin (*Icelinus oculatus*), and others including surf perches (Embiotocidae).

Two pinnipeds, the California sea lion (*Zalophus californianus*) and the harbor seal (*Phoca vitulina*), are frequent visitors inside the ports of Los Angeles and Long Beach.

Aquatic communities are present in the project area in Cerritos Channel and in the East Basin-Consolidated Slip/Dominguez Channel. In addition to characterization of these habitats provided by the other studies summarized above, additional terrestrial and aquatic field surveys were conducted in Cerritos Channel in the vicinity of the project area in 2002, 2004, and 2006 as a part of preparation of this environmental document. The information identified during those surveys is provided here.

3.16.2.1.3.1 Aquatic Plant Communities

From the marine surveys conducted in 2002, aquatic plant communities in the immediate area of the Schuyler Heim Bridge footings, channel bottom, and channel edges were extremely limited, presumably due primarily to light limitation caused by low water clarity and bridge shading. Direct smothering by siltation may be another limiting factor. The few macro-algae species encountered in the survey included brown algae (*Sargassum* sp., *Halosaccion* sp.) along the riprap area on the bank and red algae (*Prionitis* sp.,

Pterysiphonia sp.) in the upper subtidal zone. These species are representative of hard-substrate macro-algae of California intertidal and subtidal waters.

Although there is the potential for eelgrass (*Zostera marina*) beds to exist in shallow, Southern California harbor environments, the project site does not have the correct slope and substrate combination for the community. A shallow, flat, soft substrate is required for eelgrass. The proper depths for eelgrass at the project site are covered in riprap or vertical concrete; the softer substrates of flatter relief are too deep to support plant life. No eelgrass was found during the aquatic survey at the Schuyler Heim Bridge location. In addition, eelgrass was not observed during the site visit to the Consolidated Slip/Dominguez Channel; and conditions appear too deep to support the community in this location.

3.16.2.1.3.2 Aquatic Wildlife Communities

From the results of the marine survey conducted near the Schuyler Heim Bridge site, the diversity and abundance of all aquatic populations appeared heavily influenced by the extreme siltation at the proposed project location. From those observations, representative dominant fish and invertebrate species are shown below by habitat, with the species names listed for the most abundant organisms observed. Representative species by community type consisted of:

- High intertidal (bridge/pilings): Barnacles (*Chthamalus* sp.) and limpits
- Mid to low intertidal (bridge/pilings): Mussels (*Mytilus edulis*) and barnacles (*Chthamalus* sp.)
- Riprap area (southern channel edge): Mussels (*Mytilus edulis*), starfish (*Asterina miniatia*), nudibranchs, sea cucumbers, and tunicates
- High subtidal (bridge/pilings): Mussels (*Mytilus edulis*), tunicates (*Styela plicata*), hydroids, sponges, and starfish
- Mid-deep subtidal (bridge/pilings): Mussels (*Mytilus edulis*), rock scallops (*Crassodoma giganteus*), tunicates (*Steyela montereyensis*), annelids, and anemones
- Soft, channel bottom: Tube anemones (*Pachycerianthus fimbriatus*), sea pens (*Stylatula elongata*), and sea urchins
- Deep debris field: White surfperch (*Phanerodon furcatus*) and black surfperch (*Embiotica jacksoni*)

The aquatic community was relatively depauperate (poorly developed) in abundance and low in diversity. Diversity and abundance decreased with depth and subsequent degree of siltation. All species are common representatives of California intertidal and subtidal aquatic communities.

The only fishes observed during the 2002 aquatic survey (white surfperch [*Phanerodon furcatus*] and black surfperch [*Embiotica jacksoni]*) were at the edge of the debris field in deep, turbid water. No special-status fish or special-status marine mammal species were observed within the Cerritos Channel or Consolidated Slip/Dominguez Channel. California sea lion (*Zalophus californianus*) was observed in Cerritos Channel and is expected to be a regular visitor to the site. Harbor seals (*Phoca vitulina*) may also use the aquatic habitats in the vicinity of the project area.

3.16.2.1.4 Open Water Communities

The open water within the port environment provides ample roosting and foraging opportunities for a number of species of birds. This includes waterfowl or other waterbirds and raptors which may forage on fish, invertebrates, or other birds. Species which may use the open water areas for foraging or roosting include American peregrine falcon, double-crested cormorant (*Phalacrocorax auritus*), California brown pelican (*Pelecanus occidentalis californicus*), all of which were observed in the vicinity of the proposed project during field surveys. Additional water birds expected to use the marine environment in the project area include several species of gulls including California gull (*Larus californicus*), Western gull (*Larus occidentalis*), and mew gull (*Larus canus*); eared grebe (*Podiceps nigricollus*), great blue heron, (*Ardea herodias*), snowy egret, (*Egretta thula*), black-crowned night heron (*Nycticorax nycticorax*), mallard *(Anis platyrhynchos*), willit (*Catoptrphorus semipalmatus*), and California least tern (*Sterna antillarum*).

3.16.2.1.5 Essential Fish Habitat

The Magnuson-Stevens Act requires that Essential Fish Habitat (EFH) be identified for all species that are federally managed. This includes species managed by the fishery Management Councils under FMPs, as well as those managed by the NMFS under FMPs as developed by the Secretary of Commerce. EFH for species affected within the project area includes habitat for Coastal Pelagic Species (CPS) and Pacific Coast Groundfish (PCG). Coastal Pelagic Species are managed under a FMP and include four finfish species: northern anchovy (*Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), Pacific sardine (*Sardinops sagax*), and chub mackerel (*Scomber japonicus*) as well as market squid (*Loligo opalescens*). The EFH for the CPS is described and identified, by species, as Appendix D of Coastal Pelagic Species FMP.

Pacific Coast Groundfish are a group of 82 species (flatfishes, rockfishes, and others) and are identified within the Pacific Groundfish FMP. The EFH for groundfish is defined as the aquatic habitat necessary to allow groundfish production to support long-term sustainable fisheries for groundfish and for all groundfish contributions to a healthy ecosystem. There are seven composite EFH descriptions for groundfish in the FMP based on seven major habitat types. The project area falls under the Estuarine EFH identified in the FMP. This is defined as those waters, substrates, and associated biological communities within bays and estuaries of the EEZ, from mean higher high water line (MHHW), which is the high tide line, or extent of the upriver saltwater intrusion to the respective outer boundaries for each bay or estuary as defined in 33 CFR 80.1 ecosystem.

3.16.2.2 Bioacoustic Environment

Ambient terrestrial noise levels measured within the areas surrounding Schuyler Heim Bridge were measured at between 50 dB(A) to 73 dB(A) (see Section 3.14). Ambient aquatic sound levels have not been measured in the vicinity of the project area, but based on the busy port environments, sound levels could be expected to be relatively high. Hawkins reported measured background sound levels in a busy harbor in the North East of Scotland within a range of 118 – 149 dB (Hawkins, 2006). Much of the noise was derived from maneuvering and stationary ships, a similar environment to the project site.

3.16.2.3 Jurisdictional Waters Including Wetlands

Two areas under the first and fourth spans of the Schuyler Heim Bridge contain areas that have established wetland plant species. These are plant species that are assigned rankings by the USFWS according to their probability for occurring in a wetland. USFWS ranked the hydrophytic plant species area as obligate wetland plants (OBL) (greater than 99 percent), facultative wetland plants (FACW) (66 to 99 percent), facultative plants (FAC) (33 to 66 percent), facultative upland plants (FACU) (0 to 33 percent), and obligate upland species (UPL) (less than 1 percent). The area underneath the first span (Site 1) contains tall flatsedge (FACW), and knotweed (varies on species). A small area under the fourth bridge span (Site 2) contains a low-density area of spreading alkaliweed (FACW). A wetland delineation was conducted for these two sites.

At Site 1, while some wetland plants were present, soils did not meet the criteria of wetland soils, lacking gleying or other reduced soil characteristics. At Site 2, a limited number of small pockets of slightly gleyed and mottled soils were present within up to 4 inches of the soil surface. Small patches of soil cracking were also observed in this area. Site 2 is depressed relative to the surrounding area. It is bordered on four sides by concrete bridge columns and elevated berms. This area is supported by surface water runoff from the bridge during precipitation events and the consistent shading under these bridge spans. Because of the column and berm impediments, water is trapped in this area until it evaporates. While each parameter of the test did establish limited evidence that Site 2 may be a wetland, it was determined that these parameters collectively did not exhibit sufficient strength to determine that this site would be considered a jurisdictional wetland by the USACE. In particular, it was determined that one FACW plant species was sparsely distributed within the site, and the abundance of this one species would not satisfy the 50/20 Rule for wetland vegetation.

A small wetland is present within the footprint of Alternative 3, on a low tidal terrace just above the riprap bank along the south side of Cerritos Channel, just to the east of the existing Schuyler Heim Bridge. The wetland is dominated by pickleweed, with additional species including alkali seaheath (*Frankenia salina*) and spreading alkalibush (*Cressa truxillensis*). It appears fully within the regular tidal inundation zone. In addition, pickleweed established in the intertidal zone is present in soil-filled crevices between riprap blocks along the Cerritos Channel east of the Schuyler Heim Bridge. Early site visits and air photos indicated this wetland was approximately 0.25 acre in size. During a survey on December 7, 2006, it was found that the wetland had been degraded by construction activities on Pier S. A portion of the wetland was filled and it now extends approximately 30.5 m (100 ft) in the east-west direction and approximately 15.2 m (50 ft) in the north-south direction, reducing the size of the wetland to approximately 0.11 acre. The western edge of the wetland is approximately 22.8 m (75 ft) east of the plane of the southern abutment of the Schuyler Heim Bridge.

Along SR-103 (north of Pacific Coast Highway), an approximate 1-acre tidal wetland/ stormwater drainage feature currently exists east of the roadway and adjacent to San Gabriel Street. This feature contains native species including alkali seaheath, and pickleweed, and appears to be a wetland under jurisdiction of the USACE. This feature continues and connects to the north with a narrow strip along (and east of) SR-103, extending north to the vicinity of a small community park area. This feature appears to be waters of the U.S. under jurisdiction of USACE; it is within the existing alignment of the SR-103. Non-native ruderal plant species (Jimson weed [*Datura* sp.], Russian thistle, and

brome [*Bromus* spp.]) are found along the top of the channel bank at this location. The channel areas, generally 1.8 to 2.4 m (6 to 8 ft) deep by 3.6 m (12 ft) wide, also are heavily vegetated with non-native ruderal species, including Mexican fan palm (*Washingtonia mexicana*), sunflower, iceplant, and non-native grasses. Native/domesticated trees, including western sycamore (*Platanus racemosa*), as well as non-native landscaping trees including fan palms and eucalyptus are present at the adjacent park. Similar stormwater channels line the west side of the SR-103 alignment in this vicinity and may also be jurisdictional waters of the U.S.

The Cerritos Channel and the Consolidated Slip/Dominguez Channel, because they are navigable waterways and because all or most of the channels are within the ordinary high water mark, are considered waters of the U.S., as defined by USACE, and a Navigable Waterway under Section 10 of the Rivers and Harbors Act. The Cerritos Channel and the Consolidated Slip/Dominguez Channel also may be jurisdictional under Section 1600 of the California Fish and Game Code. Indications are that CDFG considers the Dominguez Channel jurisdictional. However, these waters and jurisdictional areas have not been formally delineated. Figure 3.16-1 shows approximate locations of jurisdictional waters within the project area.

3.16.2.4 Special-Status Species

A list of special-status species with potential to occur in the regional vicinity was compiled by consulting the California Natural Diversity Database (CNDDB), as well as environmental documents, the USFWS, the California Department of Fish and Game (CDFG), and expert opinion. Specifically, a total of 29 of these species were documented to occur in the five U.S. Geologic Survey (USGS) quadrangle maps (Long Beach, San Pedro, Torrance, Los Alamitos, and Seal Beach) surrounding the project area from a 2005 CNDDB search. This was also checked against a 2007 CNDDB search.

Several additional species, including California brown pelican, American peregrine falcon, osprey (*Pandion haliaetus*), double-crested cormorant, tidewater goby (*Eucyclogobius newberry*), numerous bat species including western mastiff bat (*Eumops perotis californica*) and Yuma myotis (*Myotis yumanensis*), and a number of marine mammals have not been identified to occur within the adjacent quadrangle maps in recent CNDDB records, but have been identified in other environmental documents, or are known to occur in the regional vicinity. These species historically occurred in the region; and/or potential habitat for the species is present within the project area.

The list of special-status species potentially occurring in the region is presented in Table 3.16-1; this includes their general habitat requirements, status, and potential for occurrence on the project site. Specifically, the proposed project site was evaluated against specific habitat requirements of the species. If habitat is not present within the project site, then it was presumed the species was absent from the project site. Species with potential on the project site which were observed during field surveys are indicated. Only species with potential to occur on the project site are evaluated further in this document.

Table 3.16-2 provides information on the likely presence of special-status species on a per-alternative basis, indicating whether the species has either been observed on the alternative, or whether habitat for the species is present with potential for occurrence.

3.16.2.4.1 Federally Listed as Threatened or Endangered

This section provides information on species listed under the FESA as "threatened" or "endangered," and information on likely occurrence within the project site.

3.16.2.4.1.1 California Brown Pelican

During reconnaissance-level surveys of the project site, California brown pelicans (*Pelecanus occidentalis californicus*) were observed flying over the Cerritos Channel and roosting on the Schuyler Heim Bridge. Individuals are not expected to nest at the project site; however, there is potential for a stopover and foraging. Nesting colonies occur on the Channel Islands and islands off Baja California, generally on inaccessible sea cliffs. Brown pelicans forage in coastal waters for fish, and roost in coastal environments, generally in low, man-made structures such as jetties, piers, and bridges, or in a natural habitats such as coastal sand spits, islands, or coastal wetlands.

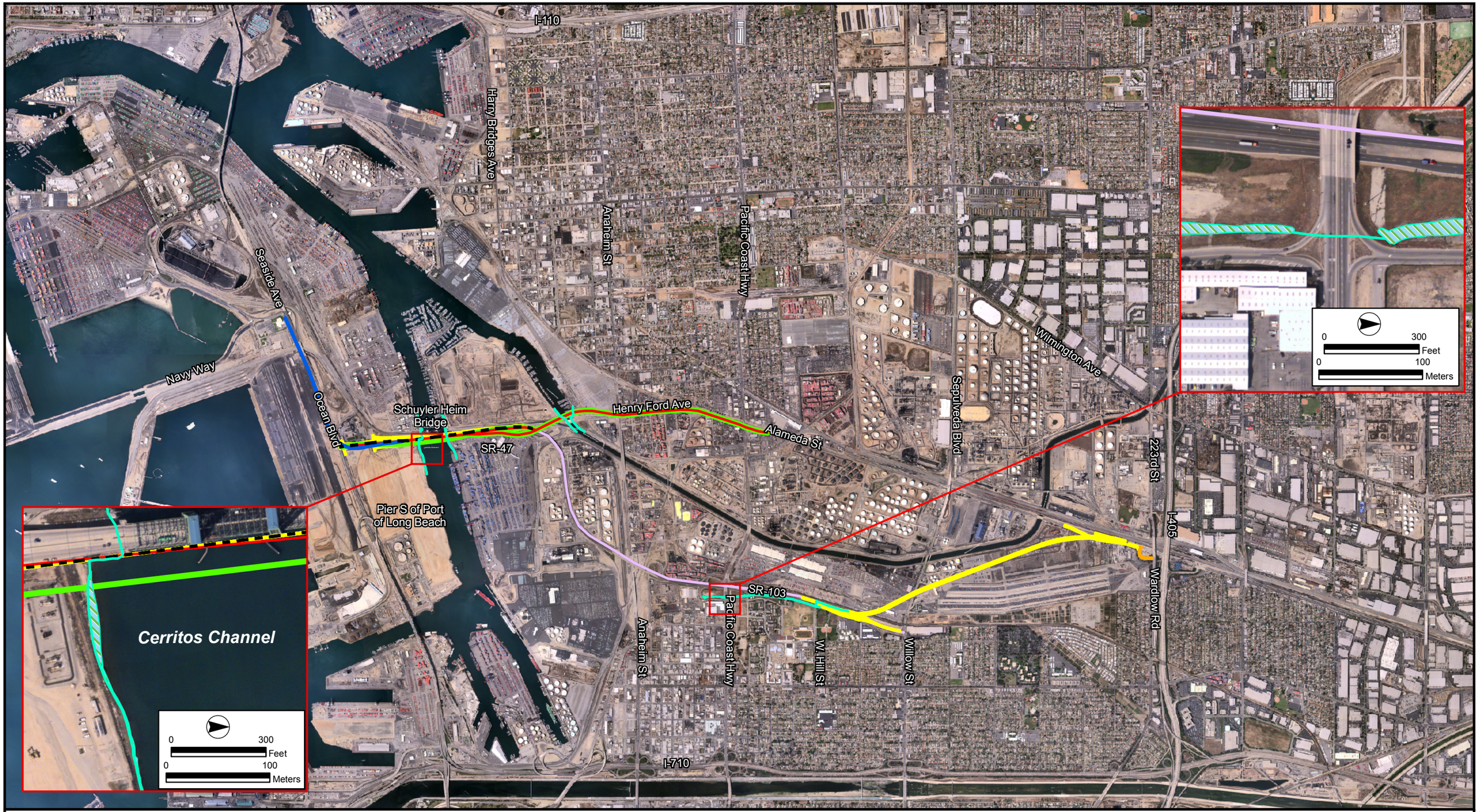
This species is also listed as State Endangered under the CESA. However, the California Fish and Game Commission (Commission) received a petition to delist the California brown pelican under provisions of the CESA on May 26, 2006. On December 22, 2006, the Commission published a Notice of Findings in the California Regulatory Notice Register declaring the brown pelican a candidate species for delisting, thereby starting the one year status review process. On November 14, 2008, the Commission made a finding that the petitioned action to remove the California brown pelican from the list of endangered species was warranted. A hearing to consider adoption relevant to this action was scheduled for February 5, 2009; however, the effective date of this regulation change is pending (Commission 2009).

The California brown pelican is also designated as "fully protected" by CDFG, and is also protected as a migratory bird under the federal Migratory Bird Treaty Act (MBTA).

3.16.2.4.1.2 California Least Tern

This species nests in open dunes, vacant lots, high marsh areas, berms, sand pits, and other open, generally barren habitats adjacent to the coast. It forages in coastal waters. During reconnaissance-level surveys California least terns (*Sterna antillarum browni*) were not observed; however, this does not verify species absence from the site. Potential nesting habitat for this species is present to the southeast of the project site on barren, open lots, but no records of nesting in this location have been documented; and the area is not currently used for nesting. Recent construction activities in the vicinity of these lots preclude current use for nesting. Recent and consistent observations of this species have been documented in a number of locations adjacent to the project area. This includes nesting sites in the southwestern area of Terminal Island (Pier T) and other locations in Huntington Beach, Long Beach, and Anaheim Bay.

The California least tern is also designated State Endangered under CESA, as "fully protected" by CDFG, and is protected as a migratory bird under the federal MBTA.



LEGEND

- Alternative 1: Bridge Replacement and SR-47 Expressway
- Alternative 2: SR-103 Extension
- Alternative 3: Bridge Demolition Avoidance
- Alternative 4: Bridge Replacement Only
- Wardlow Road/223rd Street Ramp
- Ocean Boulevard/SR-47 Flyover
- Existing SR-103
- Jurisdictional Waters
- Wetlands

0 2,800 Feet
0 1,000 Meters

Aerial Date: May 2002

Note: Project components not to scale

Figure 3.16-1
Jurisdictional Waters
Schuyler Heim Bridge Replacement and SR-47 Expressway

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
Plants						
Astragalus pycnostachyus var. *lanosissimus*	Ventura marsh milk-vetch	FE / SE /-/ 1A	Coastal salt marsh. Historically in coastal Southern California; now known at one site in Ventura County.	A	N	Historic collection in 1882. Occurrence not verified in 1987 and considered extirpated. Species not currently known in Los Angeles or Orange County. This habitat is not present at the project location. No effects to this species are anticipated.
Cordylanthus maritimus ssp. *Maritimus*	Salt marsh bird's beak	FE / SE /-/ 1B	Coastal salt marsh, coastal dunes, limited to the higher zones of the salt marsh habitat; 0 to 30 m (0 to 98 ft). Small population documented at Upper Anaheim Bay, Seal Beach (1983).	A	N	Historic occurrence from 1901. Surveys in 1980 concluded that this species is extirpated at this location (CDFG, 2002a). This habitat is not present at the project location. No effects to this species are anticipated.
Pentachaeta lyonii	Lyon's pentachaeta	FE / SE /-/ 1B	Chaparral, valley, and foothill grassland. Edges of clearings in chaparral. Usually at the ecotone between grassland and chaparral or edges of firebreaks; 30 to 630 m (98 to 2,067 ft).	A	N	Nondated occurrence documented at Point Fermin, San Pedro. This habitat is not present at the project location. No effects to this species are anticipated.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
Fremontodendron mexicanum	Mexican flannelbush	FE / R / - / 1B	Closed-cone coniferous forest, chaparral, cismontane woodland. Usually scattered along the borders of creeks or in dry canyons; sometimes on gabbro soils; 10 to 490 m (33 to 1,607 ft). Documented at Via Del Monte, Palos Verdes (1963).	A	N	This habitat is not present at the project location. No effects to this species are anticipated.
Aphanisma blitoides	Aphanisma	SC / - / - /1B	Coastal bluff scrub, coastal dunes, coastal scrub. On bluffs and slopes near the ocean in sandy or clay soils. In steep decline on the islands and the mainland; 1 to 305 m (3 to 1,000 ft). Documented to occur on the Palos Verdes peninsula.	A	N	This habitat is not present at the project location. No effects to this species are anticipated.
Atriplex pacifica	Southcoast saltscale	SC / - / - /1B	Coastal scrub, coastal bluff scrub, playas, chenopod scrub, alkali soils; 1 to 500 m (3 to 1,640 ft). Occurrences in San Pedro (1992, 1931, 1903).	A	N	This habitat is not present at the project location. No effects to this species are anticipated.
Atriplex parishii	Parish's Brittlescale	SC / - / - /1B	Alkali meadows, vernal pools, chenopod scrub, playas. Usually on drying alkali flats with fine soils; 4 to 140 m (13 to 459 ft). Observations on the Palos Verdes peninsula.	A	N	This habitat is not present at the project location. No effects to this species are anticipated.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
Dudleya virens ssp. *Virens*	Bright green dudleya	SC / - / - /1B	Chaparral, coastal scrub, coastal bluff scrub. On the channel islands and the mainland. Rocky outcrops on bluffs facing the ocean; 20 to 110 m (65 to 360 ft). Observed at Palos Verdes peninsular park (1992).	A	N	This habitat is not present at the project location. No effects to this species are anticipated.
Centromedia parryi ssp. *Australis*	Southern tarplant	SC / - / - /1B	Marshes and swamps (margins), valley and foothill grassland, vernal pools; from Southern California and Baja, often in disturbed sites near the coast; also in alkaline soils, sometimes with saltgrass; also vernal pools; 0 to 425 m (0 to 1,394 ft).	P	N	Historic occurrences in Long Beach (1930s) and recent occurrences in Bolsa Chica (1997, 1993). Potential exists for occurrence on disturbed sites. Species not observed onsite during surveys (CH2M HILL, 2002).
Lasthenia glabrata ssp. *Coulteri*	Coulter's goldfields	SC / - / - /1B	Coastal salt marshes, playas, valley and foothill grassland, vernal pools. Usually found on alkaline soils in playas, sinks, and grasslands; 1 to 1,400 m (3 to 4,593 ft).	A	N	This habitat is not present at the project location. No effects to this species are anticipated.
Sagittaria sanfordii	Sanford's arrowhead	SC / - / - /1B	Marshes and swamps. In standing or slow-moving freshwater ponds, marshes, and ditches; 0 to 610 m (0 to 2,001 ft). Southernmost collection of species in east Garden Grove, Seal Beach (1975).	A	N	This habitat is not present at the project location. No effects to this species are anticipated.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
Atriplex serenana var. *davidsonii*	Davidson's saltscale	- / - / - / 1B	Coastal bluff scrub, coastal scrub, alkaline soil; 3 to 250 m (10 to 820 ft).	A	N	Historic observation in 1906. This habitat is not present at the project location. No effects to this species are anticipated.
Symphyotrichum defoliatum	San Bernardino aster	- / - / - / 1B	Meadows and seeps, marshes and swamps, coastal scrub, cismontane woodland, grasslands; vernally mesic grassland or near ditches, streams and springs, 2 to 2,040 m (6 to 6,692 ft).	A	N	Historic observation in 1933; no recent records in vicinity and habitat is generally absent from the Project site.
Phacelia stellaris	Brand's phacelia	- / - / - /1B	Coastal scrub, coastal dunes. Southern California, and Baja. Open areas; 5 to 1,515 m (16 to 4,970 ft).	A	N	Historic occurrence in Redondo (1906). This habitat is not present at the project location. No effects to this species are anticipated.
Nemacaulis denudata var. *denudate*	Coast woolly-heads	- / - / - / 2	Coastal dunes; 0 to 100 m (0 to 328 ft). More recent occurrence at Bolsa Chica wetlands (1972).	A	N	Occurrences documented at Terminal Island (1905) and in Long Beach (undated reference in Jepson). This habitat is not present at the project location. No effects to this species are anticipated.
Sidalcea neomexicana	Salt spring checkerbloom	- / - / - / 2	Alkali playas, brackish marshes, chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub. Alkali springs and marshes; 0 to 1,500 m (0 to 4,921 ft).	A	N	Historic occurrence in Bryant Ranch, east of Long Beach (1936). This habitat is not present at the project location. No effects to this species are anticipated.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
Mammals						
*Antrozous pallidus**	Pallid bat	- / - / SC / -	Variety of open scrub, woodland, and forest habitats; forages in terrestrial habitats, often on the ground. Breeds and roosts in mines, tunnels, caves, crevices, buildings.	P	N	May roost in crevices or compartments of Schuyler Heim Bridge, SR-103 viaduct, or Ocean Avenue rail bridge.
*Macrotus californicus**	California leaf-nosed bat	- / - / SC / -	Desert riparian, succulent scrub, and other arid habitats. Roosts in mines, caves; generally far from human habitation.	A	N	Generally associated with arid habitats and does not associate with human habitation.
*Coryno rhinus townsendii townsendii**	Townsend's western big-eared bat	SC/ - / SC / -	Variety of open habitats; forages in the air; day and maternity roosts in caves, mines, tunnels, buildings, or other human-made structures.	P	N	May roost in crevices or compartments of Schuyler Heim Bridge.
*Choeronycteris mexicana**	Mexican long-tongued bat	- / - / SC / -	Forages on nectar, pollen, and occasionally fruit; roosts in dimly lit buildings or caves, mines, and other sites.	A	N	Although habitat exists, the project site is at the extreme northern limit of range, with only one record in Los Angeles County and one record in Ventura County.
*Myotis velifer**	Cave myotis	- / - / SC / -	Lowlands of the Colorado River and adjacent environs; roosts in caves and mines. Three records from Los Angeles County.	A	N	Although recorded in Los Angeles County, generally considered out of range for the species.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
*Myotis evotis**	Long-eared myotis	SC / - / - / -	Variety of scrub, woodland, and forest habitats; roosts in buildings, crevices, snags, and under tree bark.	P	N	May roost in crevices or compartments of Schuyler Heim Bridge or Ocean Avenue rail bridge.
*Myotis volans**	Long-legged myotis	SC / - / - / -	Most common in forested areas above 1,219 m (4,000 ft); also found in coastal scrub, chaparral, woodlands, and forests. Roosts in rock crevices, buildings, and under tree bark.	P	N	May roost in crevices or compartments of Schuyler Heim Bridge or Ocean Avenue rail bridge.
*Myotis yumanensis**	Yuma myotis	SC / - / - / -	Widespread in California; forages over water; roosts in buildings, mines, crevices, and in abandoned swallow nests under bridges.	P	N	May roost in crevices or compartments of Schuyler Heim Bridge or Ocean Avenue rail bridge.
*Eumops perotis californicus**	Western mastiff bat	SC / - / SC / -	In crevices in buildings and high cliff faces, tunnels, trees; from coast to Colorado Desert; in open, semiarid to arid habitats, coastal scrub, and urban areas.	P	N	May roost in crevices or compartments of Schuyler Heim Bridge or Ocean Avenue rail bridge.
Lasionycteris noctivagans	Silver-haired bat	- / - / SC / -	In coastal and montane forests foraging over streams, ponds, and open areas; roosts in hollow trees, beneath bark, or rarely under rocks.	A	N	Range generally limited to Northern California or higher elevations. CNDDB records in Southern California do occur, but records appear accidental and not consistent with other literature sources identifying limits on range.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
*Nyctinomops femorasaccus**	Pocketed free-tailed bat	- / - / SC / -	Utilizes open scrub, riparian, and desert habitats; roosts in rock crevices in cliff sites.	P	N	Range extensions identified into Los Angeles County.
*Nyctinomops macrotis**	Big free-tailed bat	- / - / SC / -	Found in open and urban habitats; forages on large moths over water sources; roosts in crevices in rock outcrops.	P	N	Range extensions identified into Los Angeles County.
Sorex ornatus salicornicus	Southern California saltmarsh shrew	- / - / SC / -	Found in coastal marshes in Los Angeles, Orange, and Ventura Counties; requires dense vegetation and woody debris for cover.	A	N	Suitable dense or extensive coastal salt marsh is not present on the Project site to support this species.
Perognathus longimembris pacificus	Pacific pocket mouse	FE / - / SC / -	Inhabits the narrow coastal plains from the Mexican border north to El Segundo, Los Angeles County; seems to prefer soils of fine alluvial sands near the ocean.	A	N	This habitat is not present at the project location. No effects to this species are anticipated. Records are dated from 1865 and 1931; presumed extirpated in the immediate project vicinity.
*Phoca vitulina**	Harbor seal	PM / - / - / -	Common along mainland and islands; remain close to shore in subtidal and intertidal waters; frequent harbors and rivers.	P	N	Cerritos or Dominguez Channel provides suitable harbor habitat.
*Zalophus californianus**	California sea lion	PM / - / - / -	Found in pelagic or nearshore waters; travel up rivers and bays; haul out on rocks or other structures.	P	Y	Observed in Cerritos Channel (CH2M HILL, 2002).

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
*Mirounga angustirostris**	Northern elephant seal	PM / - /FP/ -	Forage primarily in pelagic waters; breed in rookeries on Channel Islands and other locations.	A	N	Generally restricted to pelagic waters or rookery sites; do not venture into bays or harbors.
*Tursiops gillii**	Pacific bottlenose dolphin	PM / - / - / -	Frequent nearshore waters on the California coast south of San Francisco.	A	N	May infrequently enter harbors or bays, but generally rare in these situations.
*Lagenorhynchus obliquidens**	Pacific white-sided dolphin	PM / - / - / -	Frequents near-shore waters in winter, offshore in summer along Pacific coast.	A	N	May infrequently enter harbors or bays, but generally rare in these situations.
*Eschrichtius gibbosus**	Gray whale	D / - / - / -	Migrating whales pass near- and off-shore areas along the California coast in winter and again in late spring.	A	N	Generally restricted to near- or off-shore waters; rarely venture into bays or harbors.
Neotoma lepida intermedia	San Diego desert woodrat	SC / - / SC / -	Coastal Southern California from San Diego County to San Luis Obispo County. Moderate to dense canopies preferred. They are particularly abundant in rock outcrops and rocky cliffs and slopes.	A	N	This habitat is not present at the project location. No effects to this species are anticipated. Nineteen individuals trapped in prickly pear cactus on Palos Verdes peninsula in 1991.
Birds						
Rallus longirostris levipes	Light-footed clapper rail	FE / SE / - / -	Require dense growth of either pickleweed or cordgrass for nesting or escape cover; feeds on mollusks and crustaceans.	A	N	Sufficient pickleweed habitat is not present in the project area. No effects to this species are anticipated.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
Haliaeetus leucocephalus	Bald eagle	BE	Forages in open water bodies, inland and coastal; nests in snags or cliff faces near open water bodies.	A	N	Not regularly reported from Port vicinity. Introduced to Channel Islands. Not expected to breed, and no regularly reported wintering birds. Nearest reported wintering birds are in Lake Mathews in Riverside County.
*Pelecanus occidentalis californicus**	California brown pelican	FE / CD / FP / -	Nests on coastal islands of small to moderate size, which afford immunity from attack by ground-dwelling predators.	P	Y	Nesting not expected to occur at project location, but potential stopover or foraging in area may occur. Observed in project area (CH2M HILL, 2002; 2004).
Sterna antillarum browni	California least tern	FE / SE / FP / -	Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas.	P	N	Potential nesting habitat present southeast of the project area near the Schuyler Heim Bridge, but no records of nesting in this location; and currently not known to be used for nesting. Nesting colony present on southwest portion of Terminal Island. Foraging at site may occur.
Coccyzus americanus occidentalis	Western yellow-billed cuckoo	- / SE / - / -	Riparian forest nester along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	A	N	Historic occurrence in 1912 at the San Gabriel River near Artesia, but currently extirpated from region. No effects to this species are anticipated.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
*Falco peregrinus anatum** (nesting)	American peregrine falcon	D / CD / FP /-	Breeds near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, mounds; also, human-made structures. Nest consists of a scrape on a depression or ledge in an open site.	P	Y	Historic pattern of a pair nesting on Schuyler Heim or the Gerald Desmond Bridges. Observed on tower of Schuyler Heim Bridge (CH2M HILL, 2002), and reported nesting on south tower in 2004. Fledged three young in 2004.
Polioptila californica	California gnatcatcher	FT / - / SC / -	Obligate, permanent resident of coastal sage scrub below 762 m (2,500 ft) in Southern California.	A	N	Coastal sage scrub habitat not present onsite. Nesting not expected to occur at project location. No effects to this species are anticipated. Local occurrences have been documented.
*Charadrius alexandrinus nivosus**	Western snowy plover	FT / - / SC / -	Sandy beaches on marine and estuarine shores, also salt pond levees and the shores of large alkali lakes. Requires sandy, gravelly, or friable soil substrate for nesting.	P	N	Nesting habitat is not present at the project location. Nesting not expected to occur at project location, but potential stopover may occur.
*Passerculus sandwichensis beldingi**	Belding's savannah sparrow	SC / SE / - / -	Inhabits coastal salt marshes from Santa Barbara south through San Diego County. Nests in *Salicornia* sp. on and about margins of tidal flats.	A	N	Only limited pickleweed habitat is present in the project area and would not support this species; regional occurrences have been documented. No effects to this species are anticipated.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
Athene cunicularia	Burrowing owl	SC / - / SC / -	Subterranean nester in open country, grasslands, agricultural areas, deserts; dependent upon burrowing mammals, most notably the California ground squirrel.	P	N	Marginal habitat is present in the project area, consisting of vacant lots to the southeast of the project site. None observed (CH2M HILL, 2002).
Campylorhynchus brunneicapillus couesi	Coastal cactus wren	- / - / SC / -	Southern California coastal sage scrub. Wrens require tall *Opuntia* sp. cactus for nesting and roosting.	A	N	This habitat is not present at the project location. No effects to this species are anticipated.
*Pandion haliaetus**	Osprey	- / - / SC / -	Large nests built in tree tops within 24 km (15 mi) of good fish-producing body of water.	P	N	Potential nesting or stopover on Schuyler Heim Bridge or other portions of project area, but nesting not reported.
*Phalacrocorax auritus**	Double-crested cormorant	- / - / SC / -	Nest along coast on sequestered islets, usually on ground with sloping surface, or in tall trees along lake margins.	P	Y	Nesting not expected to occur at project location, but potential stopover or foraging may occur. Observed onsite (CH2M HILL, 2002; 2004).
Invertebrates						
Glaucopsyche lygdamus palosverdesensis	Palos Verdes blue butterfly	FE / - / - / -	Restricted to the cool, fog-shrouded, seaward side of Palos Verdes hills, Los Angeles County. Host plant is *Astragalus trichopodus* var. *lonchus* (locoweed).	A	N	This habitat is not present at the project location. No effects to this species are anticipated.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
Reptiles and Amphibians						
Phrynosoma coronatum blainvillei	San Diego horned lizard	SC / - / SC / -	Inhabits coastal sage scrub and chaparral in arid and semiarid climate conditions. Prefers friable, rocky, or shallow sandy soils.	A	N	This habitat is not present at the project location. No effects to this species are anticipated. Species records are substantiated from museum records. Species is considered extirpated at these locations.
Clemmys marmorata pallida	Southwestern pond turtle	- / - / SC / -	Inhabits permanent or nearly permanent bodies of water in many habitat types, below 1,829-m (6,000-foot) elevation, require basking sites such as partially submerged logs, vegetation mats, or open mud banks.	A	N	This habitat is not present at the project location. No effects to this species are anticipated.
Fishes						
Gila bicolor mohavensis	Mohave tui chub	FE / SE / - / -	Endemic to the Mohave River basin, adapted to alkaline, mineralized waters. Needs deep pools, ponds, or slough-like areas. Needs vegetation for spawning.	A	N	Experimental transplantation determined to be extinct in 1976. This habitat is not present at the project location. No effects to this species are anticipated.

Table 3.16-1
Regional Species and Habitats of Concern and Likelihood of Occurrence

Scientific Name	Common Name	Status Federal/State/ CDFG/CNPS	General Habitat Description	Habitat Present/ Anticipated to Occur	Observed in Project Site	Rationale
*Eucyclogobius newberry**	Tidewater goby	FE / - / SC / -	Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.	A	N	Ideal habitat not present onsite. Limited potential for occurrence. 1976 record locates species at South Coast Botanic Garden, Palos Verdes. Presence considered extirpated.

* Species not identified in CNDDB, but habitat present or other records suggest potential for presence.

A = Absent N = No
P = Present Y = Yes

U.S. Fish and Wildlife Service:
(FE) Federally Endangered (PE) Proposed Endangered (FT) Federally Threatened (FPE) Proposed Endangered (FPT) Proposed Threatened (SC) Species of Concern (C) Candidate (D) Delisted (PM) Protected under Marine Mammal Protection Act (BE) Protected under the Bald Eagle Protection Act

State of California:
(SE) State Endangered (ST) State Threatened (R) Rare (C) Candidate (CD) Candidate for Delisting

California Department of Fish and Game (CDFG):
(SC) Species of Special Concern, (FP) California Fully Protected

California Native Plant Society (CNPS):
(1A) Presumed extinct in California (1B) Rare, threatened, or endangered in California and elsewhere (2) Rare, threatened, or endangered in California, but more common elsewhere (3) More information is needed (4) Limited distribution

Sources:
CDFG 2001, 2002a, 2005, 2007; CNPS 2005; USFWS 2005, Commission 2009.

Table 3.16-2
Summary of Presence/Absence of Special-Status Species Habitat by Project Alternative

Scientific Name	Common Name	Specific Habitat Present					
		Alternative					
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Plants							
Centromedia parryi ssp. *australis*	Southern tarplant	P	P	P	P	A	N/A[(1)]
Mammals							
Phoca vitulina	Harbor seal	P	P	P	P	A	N/A
Zalophus californianus	California sea lion	P	P	P	P	A	N/A
Antrozous pallidus	Pallid bat	P	P	P	P	A	N/A
Corynorhinus townsendii townsendii	Townsend's western big-eared bat	P	P	A	P	A	N/A
Myotis evotis	Long-eared myotis	P	P	P	P	A	N/A
Myotis volans	Long-legged myotis	P	P	P	P	A	N/A
Nyctinomops femorasaccus	Pocketed free-tailed bat	P	P	A	P	A	N/A
Nyctinomops macrotis	Big free-tailed bat	P	P	P	P	A	N/A
Myotis yumanensis	Yuma myotis	P	P	P	P	A	N/A
Eumops perotis californicus	Western mastiff bat	P	P	P	P	A	N/A
Birds							
Pelecanus occidentalis californicus	California brown pelican	P	P	P	P	A	N/A
Sterna antillarum browni	California least tern	P	P	P	P	A	N/A
Falco peregrinus anatum (nesting)	American peregrine falcon	P	P	P	P	P	N/A
Charadrius alexandrinus nivosus	Western snowy plover	P	P	P	P	A	N/A
Athene cunicularia	Burrowing owl	P	P	P	P	A	N/A
Pandion haliaetus	Osprey	P	P	P	P	A	N/A
Phalacrocorax auritus	Double-crested cormorant	P	P	P	P	A	N/A

[(1)] Not applicable
P = Present
A = Absent

3.16.2.4.1.3 Western Snowy Plover

During reconnaissance-level surveys, western snowy plovers (*Charadrius alexandrinus nivosus*) were not observed; however, this does not verify species absence from the site. This species breeds in coastal areas and inland salt lakes in Northern California and other areas of western North America; the species winters along the coast of Southern California and Mexico, along beaches and the coastal strand. Individuals would not nest at the project site, and winter use in the area would be limited to the coastal strand. In general, they would not utilize the project area except for occasional stopover activity. Observations of this species have been documented nesting at the Sunset Aquatic Park, Huntington Beach (1971), and two historical records in 1907 at the mouth of Anaheim Bay and in 1916 at Sunset Beach. The 1907 site was reviewed in 1978 and considered unsuitable.

3.16.2.4.2 Marine Mammals

3.16.2.4.2.1 California Sea Lion, Harbor Seal

The California sea lion (*Zalophus californianus*) was observed during field visits either under or immediately adjacent to the eastern side of the Schuyler Heim Bridge. California sea lions are found from Vancouver Island, British Columbia, to the southern tip of Baja California in Mexico. They breed mainly on offshore islands, ranging from Southern California's Channel Islands south to Mexico, although a few pups have been born on Año Nuevo and the Farallon Islands in Central California. California sea lions are very social animals, and groups often rest closely packed together at favored haul-out sites on land, or float together on the surface of the ocean. California sea lions are opportunistic eaters, feeding on squid, octopus, herring, rockfish, mackerel, and small sharks.

Harbor seals (*Phoca vitulina*) are common, nonmigratory pinnepeds found along the entire Pacific coast from the Arctic south. They prefer to remain close to shore in tidal and subtidal waters, and they often swim into bays and harbors. They haul out in groups on emergent rocks, mudflats, sandbars, and sandy beaches. Females give birth on land at haul-out sites, and the precocial young are able to swim immediately.

Suitable habitat for both of these species is present in the Cerritos Channel and the Consolidated Slip/Dominguez Channel.

3.16.2.4.3 State-Listed as Threatened or Endangered

3.16.2.4.3.1 American Peregrine Falcon

A summary of the distribution, listing and recovery, and foraging ecology and life history of the American peregrine falcon (*Falco peregrinus anatum*) is presented below.

> **Distribution.** Peregrine falcons were formerly widespread in the continental United States; the subspecies American peregrine falcon historically nested from the North American boreal forest south into Mexico. They have suffered severe population declines, due to pesticide contamination of their food chain. Conservative estimates place the pre-World War II American peregrine falcon breeding population in California at 100 pairs. By the mid 1970s, only about 10 breeding pairs were known in California. Population levels (throughout its historical range), including California, have improved in recent years as a result of restriction on the use of DDT and intensive intervention to augment the natural species reproductive range.

A conservative estimate of the current falcon population in the State is 140 pairs, surpassing recovery goals for the subspecies in California.

Status. The American peregrine falcon was federally listed as endangered FESA on October 13, 1970 (35 CFR 16047). A recovery plan was prepared by the Pacific Coast American Peregrine Falcon Recovery Team in 1982. This recovery plan describes the biology, reasons for decline, and the actions needed for recovery of peregrine falcons in California, Nevada, Oregon, and Washington. In June 1995, the Service published an advanced notice of a proposal to remove the American peregrine falcon from the list of threatened and endangered species (60 FR 34406). The peregrine falcon was removed from the federal endangered species list in September 1999. The peregrine falcon was state-listed as endangered on June 27, 1971, under the California Endangered Species Act (CESA). The Commission received a petition to delist the American peregrine falcon under provisions of the CESA; the petition was accepted October 11, 2007. The Notice of Findings was published in the California Regulatory Notice Register, thereby initiating a one-year period of candidacy for delisting. CDFG completed the status review and submitted recommendations to the Commission, recommending delisting. On April 13, 2009, the Commission published a Notice of Availability and Intent to Adopt a Negative Declaration for the Proposed Amendment to Section 670.5 Pertaining to American Peregrine Falcon, which is the final step prior to delisting (Commission 2009).

The peregrine falcon is also designated as "fully protected" by CDFG. The peregrine falcon is also protected as a migratory bird under the federal MBTA.

Foraging Ecology and Life History. The peregrine falcon is a crow-sized raptor that feeds mostly on birds, is also known to prey on bats, and typically attacks its prey in the air. Peregrine falcons are monogamous, and pair bonds persist for the life of either bird. After the loss of a mate, the surviving bird typically mates again. In a natural setting, peregrine falcons nest almost exclusively on cliff ledges that are associated with suitable foraging areas. American peregrine falcons have also been observed nesting on man-made structures in heavily urbanized areas. Peregrine falcons exhibit nest site fidelity; however, new nest locations are often established if a bird mates again.

Breeding and Migratory Patterns. Peregrine falcons have historically been migratory, with North American populations wintering in Central and northern South America. However, many urban populations have become resident year round, as prey species such as rock doves and starlings are present throughout the year in urban locations. Populations in the port area are generally resident year round and may be augmented by wintering birds from other breeding areas in North America. Peregrines generally arrive on the breeding grounds in March. Birds are fledged by June, with post-breeding birds remaining in the area until September or later.

The habitat requirements of the American peregrine falcon have been summarized within the *American Peregrine Falcon Recovery Plan* (USFWS, 1984). This summary provides a succinct description of the variables and conditions that lead to occupation of an area by the peregrine. Their high mobility, extensive hunting areas, remote, rugged nest sites, and preferences of the individual pairs combine to make it difficult to stereotype and classify the typical peregrine falcon habitat. The peregrine falcon habitat requirements are summarized as follows:

> **Nesting Habitat.** A cliff, or series of cliffs, generally 61 to 91 m (200 to 300 ft) in height that tends to dominate the surrounding landscape. Mountain valleys and river gorges with precipitous cliffs also are preferred nest sites. Peregrines also make widespread use of buildings, bridges, and other man-made structures as nest sites. Nest sites are usually located below 2,996 m (9,500 ft) elevation. An adequate food source is normally found within 16 kilometers (km) (10 miles [mi]) of the nest site.
>
> **Hunting Habitat.** Those areas within 16 km (10 mi) of the nesting cliff that supply the major portion of the food source (birds) to the peregrine falcon. Other habitats within 16 to 32 km (10 to 20 mi) of the nesting cliff also may be important hunting areas, but they are often so interspersed or widespread that it is difficult to specifically delineate them. Essential foraging habitat within 16 km (10 mi) of an eerie site include wetlands and riparian habitats; coastal areas; meadows and parklands; crop lands such as hayfields, grain fields, and orchards; and areas such as gorges, mountain valleys, and lakes over which prey are vulnerable.
>
> **Sites suitable for occupancy and/or range expansion by the peregrine.** Sites (other than those occupied or historical sites) that exhibit the requirements or needs of the peregrine as described above. As the species recovers, and the best natural nest sites are reoccupied, artificial structures, such as buildings and bridges, are being used.
>
> **Migration and/or wintering habitat.** Wildlife (waterfowl) refuges or other habitats that concentrate food sources.

During reconnaissance-level surveys of the project site in 2002, this species was observed perched on the north tower and central portions of the Schuyler Heim Bridge. A pair of peregrine falcons was identified to be nesting on the tower in the past few seasons. There has historically been a pair nesting on the tower since the 1990s. A nesting box was installed on the tower in 1997 by the Santa Cruz Predatory Bird Group; prior to this time, there were reports of eggs rolling off of the ledge on the tower and falling. During the December 7, 2006, survey of the bridge vicinity, a single bird was observed leaving the nest platform location and perching on a ledge on the south tower of the Badger Avenue Bridge.

Several pairs of peregrines nest every year within the general project area. In addition to the Schuyler Heim Bridge, this includes the Long Beach City Hall, the Gerald Desmond Bridge, the Vincent Thomas Bridge, various shipping cranes in the harbor, and a tower at the Koch Carbon facility. While numerous territorial peregrine falcons reside in the port area throughout the year, their numbers are supplemented with migrants/vagrants during the non-breeding season (August to February).

Before 2004, biologists concluded that the Schuyler Heim Bridge towers and the Gerald Desmond Bridge were alternatively used as one nesting territory for one pair of peregrine falcons. Table 3.16-3 describes the occupation and nesting activities of the Schuyler Heim and Gerald Desmond Bridges. After the installation of the nesting box in 1997 on the north tower, young fledged from there each year except 2000. In 2000, there was a pair reported nesting on the Gerald Desmond Bridge which produced four young.

It appeared that one pair was alternating between the two nest locations but the movements and pairing by the resident adults often were difficult to determine. For example, at times it appeared that one male was paired with two different females at the two sites early in the nesting season, only to produce young with one of them. However, early in the season in 2002, a pair was nesting on the Schuyler Heim Bridge; and the pair that had been known to nest on the Long Beach City Hall building moved to the Gerald Desmond Bridge nest site.

Table 3.16-3
History of Peregrine Falcon Nesting on the Schuyler Heim and Gerald Desmond Bridges*

Year	Schuyler Heim Bridge		Gerald Desmond Bridge	
	Presence	Offspring	Presence	Offspring
1993	Pair	None		
1994	Pair	Possibly, but not confirmed	One adult	
1995	No information available			
1996			Pair	3
1997	Box installed; adults at Desmond moved to Schuyler Heim and use box.	4	Pair initially, but moved to Schuyler Heim.	
1998	Pair	2		
1999	Pair	3		
2000	Pair present, but moved to Desmond before egg-laying.		Pair	4
2001	Pair	3		
2002	Pair	3	Pair present that moved from City Hall nest site.	4 (late)
2003	Data available but not acquired			
2004	Pair	4 (3 fledged; 1 died)	Pair	Yes; number not acquired
2005	Data available but not acquired			

* Data provided by Carl Thelander (August 2, 2002b) and Jeff Sipple (October 11, 2004).

This was the first known time that a pair has been nesting simultaneously on the Schuyler Heim Bridge and on the Gerald Desmond Bridge. In general, the proximity of both bridges to one another, and the territorial nature of nesting peregrines, leads biologists familiar with their behavior to conclude that it cannot be predicted whether one or two of the bridges will be occupied in any given year.

3.16.2.4.4 Other Special-Status Species

3.16.2.4.4.1 Plants

3.16.2.4.4.1.1 Southern Tarplant

During reconnaissance-level surveys of the project site, southern tarplant (*Centromedia parryi* ssp. *australis*) was not observed; however, this does not verify absence of the species from the site. The site surveys were not conducted during the time when such species are known to bloom. Habitat for this species may be present. Estimated recent extant occurrences for this species are located at Huntington Beach (1970), Bolsa Chica (1997 and 1993), Long Beach (1997 and 1973), Ken Malloy Harbor Regional Park (1991), Madrona Marsh Nature Preserve (1997), Bixby Ranch (1997), and Seal Beach (1996).

3.16.2.4.4.2 Mammals

3.16.2.4.4.2.1 Pallid Bat

During reconnaissance-level surveys of the project area, pallid bats (*Antrozous pallidus*) were not observed in the project area; however, this does not verify species absence from the site. Habitat for this species may be present. This species is a year-long resident throughout lower elevations of California, utilizing open, dry habitats from grasslands, shrublands, woodlands, and forests. It typically forages close to the ground and may take prey on the ground. Day roosts are typically in caves, crevices, mines, buildings, and hollow trees. The species is social, often roosting in groups of 20 or more, ranging to well over 100, in many cases with other species; however, it also may be found individually. Maternity colonies form in early April and may contain from 12 to 100 individuals. Young are weaned in 7 weeks, and they are observed flying in July and August.

Limited records of this species are present in the CNDDB for the Southern California area; this includes records from rural areas of Orange County, including a 1993 record from Santiago Canyon near Orange involving one individual and 1997 and 1998 records from San Juan Creek and Coto de Caza near Mission Viejo involving small colonies. Barkley cites a museum record from the Long Beach area, but the origin or date of the record is not specifically indicated.

While no observations of bat colonies were made during field surveys of the project site, potential roost sites occur throughout the Schuyler Heim Bridge structure and other elevated portions of highway overpasses/structures were not accessible and/or visible at the time of the surveys. Roost sites may occur in small to large crevices, compartments, or under eaves on the Schuyler Heim Bridge and other elevated portions of highway structures.

3.16.2.4.4.2.2 Townsend's Western Big-Eared Bat

During reconnaissance-level surveys of the project area, Townsend's western big-eared bats (*Corynorhinus townsendii townsendii*) were not observed; however, this does not verify species absence from the site. Habitat for this species may be present. This species is a year-long resident throughout California; but it is generally quite rare, with numbers having declined steeply. It utilizes open, mesic habitats, foraging for moths, beetles, and other insects by echolocation or gleaning from foliage. It roosts in caves, mines, tunnels, and dark building caverns; and maternity colonies are typically fewer than 100 bats. Maternity colonies form in April, with births in May or June. Young may fly within 2 to 3 weeks,

and they are weaned in 6 weeks. The maternity colony may begin to break up by August. Maternity colonies are very sensitive to disturbance.

Limited records of this species are present in the CNDDB for the Southern California area, and the bulk of these are from desert regions. In 1992, a colony of 133 individuals was observed on Santa Cruz Island roosting in a building, in open, non-native grassland, and oak woodland.

Although there is limited potential habitat for this species at the Schuyler Heim Bridge site, it is unlikely to occur because the site is highly prone to disturbance and because the species is rare in urbanized settings. This species requires large caves or cavernous facilities to roost in, and its presence in the project area would be limited to the Schuyler Heim Bridge.

3.16.2.4.4.2.3 Long-Legged Myotis

During reconnaissance-level surveys of the project area, long-legged myotis (*Myotis volans*) were not observed; however, this does not verify species absence from the site. Habitat for this species may be present. This species is a year-long resident throughout California, absent only from the Central Valley and Mohave Deserts. It preys on flying insects and may forage over water, scrub, or woodland habitats. The species roosts in trees, under tree bark, in rock crevices, or buildings; and maternity roosts may number hundreds of individuals. Young are born in June and July, and they may begin flying in mid-July. They are weaned by September.

Limited records of this species are present in CNDDB for California, consisting of a handful of records in Riverside County and Siskiyou County. Museum records occur for the Pasadena area; however, the origin or date is not known.

While no observations of bat colonies were made during field surveys of the project site, potential roost sites occur throughout the bridge structure and other elevated portions of highway overpasses/structures; and they were not accessible and/or visible at the time of the surveys. Roost sites may occur in small to large crevices, compartments, or under eaves on the Schuyler Heim Bridge or other portions of elevated highway structures within the project site.

3.16.2.4.4.2.4 Long-Eared Myotis

During reconnaissance-level surveys of the project area, long-eared myotis (*Myotis evotis*) were not observed; however, this does not verify species absence from the site. Habitat for this species may be present. This species is a year-long resident throughout California, absent only from the Central Valley and Mohave Desert; it seems to prefer higher-elevation coniferous forests. It preys on flying insects or forages on the ground or in vegetation. The species roosts in trees, under tree bark, in rock crevices, in buildings, or in caves. Nursery colonies may number 12 to 30 individuals. Young are born May to July, with a peak in June. Young are flying by early August.

Limited records of this species are present in the CNDDB for California, consisting of a handful of records in western Riverside County and in central California. Museum records occur for the Pasadena area; however, the origin or date is not known.

While no observations of bat colonies were made during field surveys of the project site, potential roost sites occur throughout the bridge structure and other elevated portions of

highway overpasses/structures; and they were not accessible and/or visible at the time of the surveys. Roost sites may occur in small to large crevices, compartments, or under eaves on the Schuyler Heim Bridge or other portions of elevated highway structures within the project site.

3.16.2.4.4.2.5 Yuma Myotis

During reconnaissance-level surveys of the project area, Yuma myotis (*Myotis yumanensis*) were not observed; however, this does not verify species absence from the site. Habitat for this species may be present. This species is a year-long resident and generally common throughout California. It preys on flying insects, generally foraging over water sources. The species roosts in trees, under tree bark, in rock crevices, in buildings, in caves, or under bridges. Nursery colonies may number several thousand individuals. Young are born May to mid-June, with a peak in early June.

Limited records of this species are present in the CNDDB for California, consisting of a handful of records in central and northern California.

While no observations of bat colonies were made during field surveys of the project site, potential roost sites occur throughout the bridge structure and other elevated portions of highway overpasses/structures; but they were not accessible and/or visible at the time of the surveys. Roost sites may occur in small to large crevices, compartments, or under eaves on the Schuyler Heim Bridge or elevated portions of highway overpasses/structures.

3.16.2.4.4.2.6 Western Mastiff Bat

During reconnaissance-level surveys on January 7, 8, and 15, and February 26, 2002, September 30, 2004, and December 7, 2006, western mastiff bats (*Eumops perotis californicus*) were not observed; however, this does not verify species absence from the site. Habitat for this species may be present.

This species is an uncommon resident of interior and coastal regions of central and Southern California, occurring in a variety of open, arid habitats. It catches prey in flight, foraging over various habitats. The species roosts in cliff faces, high buildings, trees, and tunnels; nursery roosts are described as tight rock crevices at least 1 m (3 ft) deep and 50 millimeters (mm) (2 inches) wide. Parturition dates vary more for this species than other species, and they may occur from April through August or September.

No records for this species are present in CNDDB for Los Angeles County, but a single record of 20 individuals from 1993 is present for Orange County. There are numerous records of this species in Los Angeles County, taken from data collected from 1954 to the late 1990s, including several records for the lower Los Angeles Basin and Long Beach areas.

While no observations of bat colonies were made during field surveys of the project site, potential roost sites occur throughout the bridge structure and other elevated portions of highway overpasses/structures; and they were not accessible and/or visible at the time of the surveys. Roost sites may occur in small to large crevices, compartments, or under eaves on the Schuyler Heim Bridge and other elevated portions of highway overpasses/structures.

3.16.2.4.4.2.7 Pocketed Free-Tailed Bat

During reconnaissance-level surveys of the project area, pocketed free-tailed bats (*Nyctinomops femorasaccus*) were not observed; however, this does not verify species absence from the site. Habitat for this species may be present.

This species is an uncommon resident in arid regions of Southern California, occurring in desert scrub, riparian, and other habitats. It catches prey in flight, foraging over ponds, streams, or open habitats. The species roosts in rock crevices within cliff faces. The species roosts in small groups; young are born in June and July and are weaned by late August.

There are numerous records of this species in Los Angeles County, taken from data collected from 1954 to the late 1990s. This represents a known range extension; the species was formerly identified in Imperial and San Diego Counties.

While no observations of bat colonies were made during field surveys of the project site, limited potential roost sites occur throughout the bridge structure and other elevated portions of highway overpasses/structures; and they were not accessible and/or visible at the time of the surveys. Roost sites may occur in small to large crevices, compartments, or under eaves on the Schuyler Heim Bridge and other elevated portions of highway overpasses/structures.

3.16.2.4.4.2.8 Big Free-Tailed Bat

During reconnaissance-level surveys of the project area, big free-tailed bats (*Nyctinomops macrotis*) were not observed; however, this does not verify species absence from the site. Habitat for this species may be present.

This species is rare in Southern California, with previous records from urban areas in San Diego County, and one record in Long Beach from 1983. More recent records identify a range extension into Los Angeles and Orange Counties, with numerous records in the lower Los Angeles Basin. The species prefers rugged, rocky terrain, and forages in the air over water sources for large moths and other flying insects. Roosts are recorded in rocky crevices high on cliff faces. Young are born into small nursery colonies in June and July, and they are capable of flight in August to mid-September.

While no observations of bat colonies were made during field surveys of the project site, limited potential roost sites occur throughout the bridge structure and other elevated portions of highway overpasses/structures; and they were not accessible and/or visible at the time of the surveys. Roost sites may occur in small to large crevices, compartments, or under eaves on the Schuyler Heim Bridge and other elevated portions of highway overpasses/structures.

3.16.2.4.4.3 Birds

3.16.2.4.4.3.1 Burrowing Owl

Burrowing owls (*Athene cunicularia*) utilize grasslands, deserts, and other open areas where they nest in burrows, generally excavated from existing small mammal burrows. They forage on small mammals, insects, reptiles, and other prey items. During reconnaissance-level surveys of the project area, burrowing owls were not observed; however, this does not verify species absence from the site. Habitat for this species may be present on open, vacant lots in the area, although in general the habitat is degraded and would represent marginal

burrowing owl habitat. Local observations have been documented at the Seal Beach Naval Weapons Station (1983) and at the Bolsa Chica Ecological Reserve (1993).

3.16.2.4.4.3.2 Osprey

During reconnaissance-level surveys of the project area, osprey (*Pandion haliaetus*) were not observed; however, this does not verify species absence from the site. Individuals are not expected to nest at the project site; however, a limited potential for stopover may occur. Nearest known nest sites occur in Lake Casitas, Ventura County. Ospreys have been seen through the summer months at former or potential nesting areas such as West Pond (Imperial Dam), Salton Sea, Newport Bay, Buena Vista Lagoon (San Diego County), Big Bear Lake, and Lake Cachuma (Santa Barbara County).

3.16.2.4.4.3.3 Double-Crested Cormorant

Double-crested cormorants (*Phalacrocorax auritus*) are piscivorous (fish-eating) and thus require aquatic habitats for foraging. They dive from the water surface and pursue fish underwater, most often in water approximately 9 m (30 ft) deep. They also utilize nearby perching locations to dry their plumage. They require undisturbed nest sites near water, on islands, or on the mainland and near a dependable food supply. During reconnaissance-level surveys of the project site, double-crested cormorants were observed flying over the Cerritos Channel and the Consolidated Slip. Individuals are not expected to nest at the project site; however, a strong potential for a stopover or foraging exists.

3.16.2.4.4.4 Fish

3.16.2.4.4.4.1 Coast Pelagic Species

Coast Pelagic Species (CPS) include four finfish species: northern anchovy (*Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), Pacific sardine (*Sardinops sagax*), and chub mackerel (*Scomber japonicus*) as well as market squid (*Loligo opalescens*). These species are managed within the Coastal Pelagics Species FMP. This FMP is present within the Cerritos Channel including the segment spanned by the Schuyler Heim Bridge and within the Consolidated Slip/Dominguez Channel area. None of the CPS were observed during the aquatic site surveys of the proposed project site. However, during surveys conducted for the Ports of Long Beach and Los Angeles, MEC collected three of the CPS: northern anchovy (*Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), and Pacific sardine (*Sardinops sagax*) at the Cerritos Channel sampling location (LA6). No sampling was conducted within the Consolidated Slip/Dominguez Channel, but one or more of the CPS may also be present in that location as well.

The northern anchovy occurs primarily in coastal surface waters from northern British Columbia to Cabo San Lucas, Baja California. Tagging studies indicate that schools of anchovies move fairly long distances up and down the coast. This species swims in dense schools that are often visible from the surface of the water. An extremely important commercial fish, this species is also a major food source for other fishes, birds, and mammals. The northern anchovy spawns during the winter and early spring, and the pelagic eggs take between 2 and 4 days to hatch. This anchovy rarely lives longer than 4 years.

Pacific sardines (*Sardinops sagax*) are small schooling fish. At times, they have been the most abundant fish species in the California current. When the population is large, it is abundant from the tip of Baja California to southeastern Alaska and throughout the Gulf of Mexico.

In the north, sardines tend to appear seasonally. Sardines also form three (and possibly four) sub-populations. The northern sub-population of sardines is most important to U.S. commercial fisheries. Sardines may live as long as 13 years, but they usually are younger than 5 years. Like anchovies, they are taken by a wide variety of predators.

Jack mackerel (*Trachurus symmetricus*) are a schooling fish that range widely throughout the northeastern Pacific. They grow to about 60 centimeters (cm) and can live 35 years or longer. Much of their range lies outside the 200-mile U.S. EEZ. Small jack mackerel (up to 6 years of age) are most abundant in the Southern California Bight, where they are often found near the mainland coast and islands and over shallow rocky banks, artificial reefs, and shallow rocky coastal areas. Large fish rarely appear close to the southern shore. They remain near the bottom or under kelp canopies during daylight and venture into deeper surrounding areas at night. Young juvenile fish sometimes form small schools beneath floating kelp and debris in the open sea. Jack mackerel in Southern California are more likely to appear on offshore banks in late spring, summer, and early fall. Small jack mackerel taken off Southern California and northern Baja California eat large zooplankton, juvenile squid, and anchovy. Larvae feed almost entirely on plankton. The spawning season for jack mackerel off California extends from February to October, with peak activity from March to July.

The Pacific chub mackerel (*Scomber japonicus*) occurs from Mexico to southeastern Alaska. They are most abundant south of Point Conception, California, and usually appear within 32 km (20 mi) offshore. The "northeastern Pacific" stock of Pacific mackerel is harvested by fishers in the U.S. and Mexico. Like sardines and anchovies, mackerel are schooling fish; and they may school with other pelagic species such as jack mackerel and sardines. They are also heavily preyed upon by a variety of fish, mammals, and sea birds.

Market squid (*Loligo opalescens)* appear from the southern tip of Baja California to southeastern Alaska. They are most abundant between Punta Eugenio, Baja California, and Monterey Bay, California. They are harvested near the surface, but they can appear to depths of 800 m or more. They prefer the salinity of the ocean and are rarely found in estuaries, bays, or river mouths. Squid are short-lived (up to 10 months). They are important as forage foods to many fish; bird; and mammals such as king salmon, coho salmon, lingcod, rockfish, seals and sea lions, sea otters, porpoises, cormorants, and murres.

3.16.2.4.4.4.2 Groundfish

Groundfish (flat and rockfish) species were not observed during the aquatic site survey on January 9, 2002. A total of 82 groundfish species are identified on the Pacific groundfish FMP. This FMP is present within the Cerritos Channel under the Schuyler Heim Bridge and within the Consolidated Slip/Dominguez Channel area.

3.16.2.5 Invasive Species

3.16.2.5.1 Terrestrial Habitats

Non-native vegetation exists throughout the project area and include species of eucalyptus, ice plant, Brazilian pepper, tree tobacco, small-flowered ice-plant, mustard, ripgut brome, red brome, prickly lettuce, Russian thistle, spiny sowthistle, and other species normally considered invasive. Juvenile Mexican fan palm also is scattered throughout the project area. Invasive, exotic vegetation is common in the disturbed, urban environment which characterizes the project area.

3.16.2.6 Aquatic Species

The EIR for the Berth 206-209 Interim Container Terminal Reuse Project identified at least 46 invasive aquatic species that are established in waters of San Pedro Bay (Los Angeles and Long Beach Harbors). Invasive species include a Japanese brown alga (*Sargassum muticum*), bubble snail (*Philine auriformis*), Japanese mussel (*Musculista senhousia*), an isopod (*Sphaeroma quoyanum*), and yellowfin goby. A total of 32 non-native species were identified in the surveys performed in 2000. In the West Basin, 15 non-native species were found in the soft-bottom and riprap samples. These species included *Dipolydora socialis, Polydora cornuta, Pseudopolydora paucibranchiata, Eochelidium* sp. *A, Aricidea catherinae, Theora lubrica, Sigambra tentaculata, Levinsenia gracilis, Grandidierella japonica, Hydroides pacificus*, Pacific oyster, and Mediterranean mussel. The primary source of these organisms is likely to have been discharge of ballast water from cargo vessels, but they are also introduced by aquarists and the restaurant live fish trade.

3.16.3 Environmental Consequences

3.16.3.1 Evaluation Criteria

The criteria shown below are the basis for evaluating whether there are substantial adverse effects to biologic resources resulting from project development:

The proposed action would adversely affect biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species as recognized by the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, or any other federal agency.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in any federal plans, policies, or regulations, or by the U.S. Fish and Wildlife Service.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any other federal policies or ordinances protecting biological resources, such as migratory bird protection regulations.
- Conflict with the provisions of an adopted Habitat Conservation Plan, or other approved federal habitat conservation plan.
- Result in the introduction or promote the establishment of any noxious weed or invasive plant or animal.

3.16.3.2 Methodology

3.16.3.2.1 Studies Required

To comply with the provisions of CEQA, CESA, NEPA, and FESA, the potential for the occurrence of sensitive plant and animal species was initially investigated and documented by conducting a background database search using the CNDDB conducted in 2001, January 2002, March 2005, and July 2007. In addition, the California Native Plant Society's Inventory of Rare and Endangered Plants was reviewed (August 2005). These queries assisted in generating a list of special-status species that may have the potential to occur within the project study area. In addition, reconnaissance-level site surveys were conducted to review the terrestrial and aquatic habitats in the project study area, identify habitats present, and record all species observed onsite. This included underwater surveys of the Cerritos Channel. As part of this assessment, sediment samples were analyzed for chemical quality; and sediment resuspension was modeled as an estimate of potential construction effects to water quality in the Cerritos Channel. Existing water quality information was reviewed and analyzed for the Consolidated Slip/Dominguez Channel.

To comply with Section 404 of the CWA, Section 10 of the Rivers and Harbors Act, and Section 1600 of the Fish and Game Code, the project study area also was reviewed to determine the presence of jurisdictional waters of the U.S. or waters of the state, including wetlands and navigable waterways, as recognized by the USACE and Regional Board, respectively, and streambed and bank, as recognized by the CDFG. A wetland delineation was conducted for Alternative 1 under the initial bridge spans on the southern approach to the Schuyler Heim Bridge, and wetlands and waters of the U.S. extent was field estimated and mapped for the Alternative 3 alignment just east of the Schuyler Heim Bridge, the Alternative 2 alignment along SR-103, and Alternative 1 along the Consolidated Slip/ Dominguez Channel.

For the purposes of this document, the biological study area (project area) surveyed included the following areas:

- Schuyler Heim Bridge
- Adjacent Schuyler Heim bridge approach
- The new Ocean Boulevard/SR-47 Flyover alignment along Ocean Boulevard east of the Schuyler Heim Bridge
- The new SR-47 Expressway alignment from the northern Schuyler Heim Bridge approach to Alameda Street
- The existing SR-103 alignment and its extension to Alameda Street
- Submerged aquatic habitats immediately below and east of the Schuyler Heim Bridge
- The aquatic habitats at and west of the confluence of the Consolidated Slip/Dominguez Channel
- Terrestrial and aquatic habitats within range of potential dust, noise, or sediment plume range of the project

3.16.3.2.2 Sediment Characterization

A sediment characterization study, *Supplemental Report: Consolidated Slip Restoration Project Concept Plan, October, 2003*, was conducted within the Consolidated Slip in 2002 in association with the *Montrose Stormwater Pathways Confirmation Study* conducted by EPA Region IX. This sediment characterization study is incorporated by reference. The detailed *Water Quality Impacts Technical Study for the State Route 47/Schuyler Bridge Replacement Project* (Caltrans, 2007b) has been prepared and is hereby incorporated by reference.

3.16.3.2.3 Noise Characterization

Impacts of noise from construction, including pile driving, were evaluated on both terrestrial and aquatic species. Noise impacts were analyzed according to *The Effect of Highway Noise on Birds* (Dooling and Popper, 2007), *Effects of Sound on Fish* (Hastings and Popper, 2005), *Interim Criteria for Injury of Fish Exposed to Pile Driving Operations: A White Paper* (Popper *et al.*, 2006), *Compendium of Pile Driving Sound Data* (Illingworth & Rodkin, 2007), and NMFS Pile Driving Calculations 8-12-2008 (Woodbury, unpublished). Impacts were evaluated according to distance to potential receptors, attenuation through air or water, and proposed special attenuation measures.

3.16.3.2.4 Agency Coordination and Professional Contacts

A letter requesting a list of the special-status species that have the potential to be impacted by the project alternatives was submitted to the USFWS and the CDFG. The USFWS responded to this request with a species list on July 1, 2005 (*Natural Environment Study* [CH2M HILL, 2005]). In addition, the website of the Ventura Office of the USFWS was consulted in August 2005 to obtain a general (by County) species list. A copy of the distributed letters and the responses from these resource agencies are presented in Appendix D of the NES. An updated list was not requested from CDFG in 2005 since their policy is to refer project proponents to the most recent version of the CNDDB. The most current CNDDB (July 2007) was reviewed for this project.

3.16.3.3 Evaluation of Alternatives

3.16.3.3.1 Alternative 1: Bridge Replacement and SR-47 Expressway

3.16.3.3.1.1 Construction Effects

3.16.3.3.1.1.1 Direct

Natural Communities

Urban/Developed Areas

Individual native plants are present in the urbanized, developed landscape in the Alternative 1 area; however, intact communities of these native plants do not exist. Although these individual native plants may be removed permanently with bridge replacement, new bridge construction, flyover construction, and other project construction activities, the loss of these scattered individual plants would not represent an adverse effect to natural communities.

Brackish Intertidal and Non-tidal Wetlands

Brackish intertidal or non-tidal wetlands are not present in the Alternative 1 footprint.

Aquatic Communities

Construction activities that remove or destroy existing submerged aquatic habitat (existing bridge footings, pilings, piers, and riprap) will destroy associated, attached marine macro-algae; invertebrate communities; and their habitats. The loss of the attached invertebrate communities temporarily will affect local fish that feed on those organisms. In addition, it is expected that project-caused disturbance of the soft-bottom community will disrupt and remove the sediment macro and micro invertebrate communities. In some cases, fish and some highly mobile invertebrates (e.g., crabs) will freely escape construction-related effects. In addition, it is expected that all new hard surfaces and the newly settled sediment will be recolonized rapidly postconstruction with aquatic communities comparable to those impacted. These communities are commonly found throughout the inner harbor locations.

The construction of the new bridge footings in the Cerritos Channel and Consolidated Slip/ Dominguez Channel likely would require disturbance of existing channel bottom sediments. Any construction work will result in some variable amount of sediment resuspension and dispersal into the water columns of both channels. The type and duration of actual construction activities have yet to be determined. Regardless of the type of construction activities, there is sure to be some resuspension of fine-grained bottom sediments during the replacement, including demolition and replacement of the Schuyler Heim Bridge and the placement of bridge footings in the Consolidated Slip/Dominguez Channel, and other construction activities at either site. However, these impacts will be minimized by project design. For all in-water piles, a cast-in-steel-shell (CISS) method for smaller piles, or a cast-in-drilled-steel-hole (CIDH) pile for larger piles, will be used. In these designs, the outer shell acts to some extent as a cofferdam during clearing of sediments inside the pile shell. In addition, where a contained air bubble attenuation method is used for sound attenuation during underwater pile driving, the containment device (sometimes a larger diameter corrugated steel or plastic pipe) provides additional containment of sediments.

The construction of a replacement bridge for the Schuyler Heim Bridge, construction of the limited access expressway connecting to the bridge (State Route [SR-] 47 Expressway), and demolition of the existing Schuyler Heim Bridge have the potential to adversely affect water quality in the Cerritos Channel. The harbor sediments in the area of the bridges are primarily silt and finer-sized fractions and, if resuspended, are expected to stay in suspension for days. Tidal currents likely will disperse the resuspended sediments throughout the length of the Cerritos Channel and the Consolidated Slip. The footprint of the proposed flyover is not adjacent to any port waters or aquatic habitat.

Based on the range of maximum and average current velocities in the Cerritos Channel, the resuspended sediment plume will travel a distance of approximately 1,250 m (4,101 ft). upstream before the tide turns. The length of the Cerritos Channel between the Schuyler Heim Bridge and the western end is approximately 1,200 m (3,937 ft). This indicates that the turbidity plume will begin to turn back into the channel on the ebb tide once it reaches the end of the channel. Similar investigation shows that, on the ebb tide, the turbidity plume will not exit the channel, but rather will approach the end and then reverse direction with the rising tide.

Sediment contaminants of most concern for producing water quality effects to aquatic life in the Cerritos Channel include copper and zinc. Several polycyclic aromatic hydrocarbon (PAH) compounds may produce levels exceeding human health criteria; however, no

comparable aquatic life protection standards exist for these compounds. The range of potential water quality concentrations that may occur as a result of sediment resuspension and the dilutions required to meet water quality criteria (WQC) are shown in Table 3.16-4.

As the plume of resuspended sediment disperses with tidal currents, initial dilutions down the Cerritos Channel will be up to sixteenfold. The silty nature of the sediment suggests that exceedances of water quality may be expected to last on the order of at least a few days. The limited time of resuspended constituents in the water column indicates the potential for acute toxicity to invertebrates or fish but not chronic bioaccumulation or food-chain effects to birds or mammals. However, these predictions of potential water quality effects to aquatic life are based on uncontrolled sediment suspension and dispersion.

Table 3.16-4
Potential Resuspended Sediment Concentrations in Cerritos Channel

Sediment Constituent	Units	Range of Resuspended Sediment Concentrations	WQC	Range of Dilutions to Achieve WQC
Aluminum	mg/L	790	NC	NR
Arsenic	mg/L	0.24 - 0.26	0.069	3.5 - 3.7
Cadmium	mg/L	ND - 0.016	0.042	NR
Chromium	mg/L	1.36 - 2.32	1.1	1.7 - 2.1
Copper	mg/L	0.79 - 3.38	0.0048	165 - 705
Lead	mg/L	0.44 - 1.51	0.210	2.1 - 7.2
Mercury	mg/L	0.003 - 0.009	0.0018	1.8 - 5.2
Nickel	mg/L	0.61 - 1.11	0.074	8.3 - 14.9
Zinc	mg/L	2.28 - 6.29	0.090	25 - 70
4,4'-DDE	μg/L	0.026 - 0.645	0.130	NR - 5
Anthracene	μg/L	3.37 - 3.59	110,000	NR
Benzo(a)anthracene	μg/L	3.32 - 13.46	0.049	68 - 275
Benzo(a)pyrene	μg/L	2.69 - 16.52	0.049	55 - 337
Benzo(b)fluoranthene	μg/L	6.34 - 18.32	0.049	129 - 374
Benzo(g,h,I)perylene	μg/L	ND - 8.95	NC	NR
Benzo(k)fluoranthene	μg/L	2.18 - 8.74	0.049	45 - 178
Chrysene	μg/L	4.83 - 15.62	0.049	99 - 319
Fluoranthene	μg/L	10.53 - 19.29	370	NR
Indeno(1,2,3-cd)pyrene	μg/L	ND - 9.85	0.049	NR - 201
Phenanthrene	μg/L	3.29 - 7.43	NC	NR
Pyrene	μg/L	20.19 - 21.72	11,000	NR
Naphthalene	μg/L	ND - 1.49	NC	NR

WQC is for dichloro-diphenyl-trichloroethane (DDT) in water
NC = no criteria; ND = below detection limit; NR = no dilution required
mg/L = milligram(s) per liter; μg/L = microgram(s) per liter
Source: Caltrans, 2002.

It is likely that, with the flood tide current within the Consolidated Channel, any resuspended sediment plume will travel an unknown distance upstream into the Dominguez Channel before the tide turns. Similarly, it is likely that with the ebb tide current (and discharges from the Dominguez Channel), any resuspended sediment plume will travel an unknown distance downstream into the Consolidated Slip before the tide turns again. However, the length of the Consolidated Slip between the Alternative 1 footprint and the East Basin is approximately 914 m (3,000 ft); and it is likely that any turbidity plume would turn back within the Consolidated Slip on the ebb tide before it reaches the East Basin. Therefore, any plume would be contained within the Consolidated Slip and Dominguez Channel and not enter the East Basin.

Sediment contaminants of most concern (contaminants of concern [COCs]) for adversely impacting water quality for aquatic life in the Consolidated Slip include: metals (copper, lead, zinc, and mercury); total dichloro-diphenyl-trichloroethane (DDT) compounds; total polychlorinated biphenyl (PCB) compounds; and total PBC compounds. From the sediment characterization study within the Consolidated Slip, the range of concentrations in sediments within the Consolidated Slip, from the vicinity of the Alternative 1 footprint and obtained from up to 5.5 m (18 ft) of depth, are shown in Table 3.16-5. Also shown in Table 3.16-5 are the NOAA's sediment quality guideline (SQG) values (http://response.restoration.noaa.gov/cpr/sediment/SQGs.html) for effects to saltwater aquatic life for COCs identified in these sediments. Effects Range-Low (ERL) SQG values are indicative of concentrations below which adverse effects rarely occur. Similarly, Effects Range-Median (ERM) SQG values are indicative of concentrations above which adverse effects frequently occur. As seen in Table 3.16-5, there is some uncertainty of the extent of effects of concentrations of the COCs when the SQG values are >ERL and <ERM. However, in general, resuspension of metal and organic COCs in sediments up to 1.8 m (6 ft) deep are likely to result in adverse effects to aquatic life in the Consolidated Slip/Dominguez Channel.

Table 3.16-5
Approximate Range of Concentrations of Contaminants of Concern from Consolidated Slip/ Dominguez Channel Sediments[1] (CH2M HILL, 2005)

Sediment Constituent	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)	Mercury (µg/kg)	Total DDTs (µg/kg)	Total PCBs (µg/kg)	Total PAHs (µg/kg)
@ Depth: 0<0.5'	>540	<436	<820	<0.71	<46.1	<90	>89,584
Effects Range[2]:	**>ERM[3]**	**>ERM**	**>ERL<ERM**	**>ERL<ERM**	**>ERL<ERM**	**>ERL<ERM**	**>ERM**
@ Depth: 0.5' to 3'	>270	<436	<150	<0.71	>184.4	<90	>89,584
Effects Range:	**>ERM**	**>ERM**	<ERL	**>ERL<ERM**	**>ERM**	**>ERL<ERM**	**>ERM**
@ Depth: 3' to 6'	>135	>109	<150	<0.15	>23.5	<11.3	<44,792
Effects Range:	-	-	<ERL	<ERL	**>ERL<ERM**	<ERL	**>ERL<ERM**
@ Depth: 6' to 9'	34	>109	>210	<0.15	<23.05	<22.7	<4,022
Effects Range:	<ERL	-	-	<ERL	<ERL	<ERL	<ERL
@ Depth: 9' to 12'	34-135	23-46	<150	<0.15	<23.05	<22.7	<4,022
Effects Range:	<ERL	<ERL	<ERL	<ERL	<ERL	<ERL	<ERL

Table 3.16-5
Approximate Range of Concentrations of Contaminants of Concern from Consolidated Slip/ Dominguez Channel Sediments[1] (CH2M HILL, 2005)

Sediment Constituent	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)	Mercury (µg/kg)	Total DDTs (µg/kg)	Total PCBs (µg/kg)	Total PAHs (µg/kg)
@ Depth: 12' to 15'	-	<23	-	-	-	-	-
Effects Range:	<ERL	<ERL	<ERL	<ERL	-	<ERL	<ERL
@ Depth: 15' to 18'	-	-	-	-	-	-	-
Effects Range:	<ERL	<ERL	-	<ERL	-	-	-

[1] Collected Near Consolidated Slip Collection Station CS-1 (within Alternative 1 footprint) (CH2M HILL, 2005)
[2] Sediment Quality Effects Guideline (SQG) ranges (NOAA, 1999): ERL = Effects Range-Low; ERM = Effects Range-Median.
[3] Sediment Quality Guideline (SQG) values in **bold** may result in adverse effects to saltwater aquatic life.

Similar to the case within Cerritos Channel, any plume of resuspended sediment will disperse with tidal currents, and there will be an initial dilution within the Consolidated Slip. It is likely that the silty nature of the sediment would result in exceedances of water quality criteria for those COCs that may be expected to last on the order of at least a few days. It is likely that the limited time of resuspended constituents in the water column would result in some potential for acute toxicity to invertebrates or fish but not chronic, bioaccumulation, or food-chain effects to birds or mammals. These predictions of potential water quality effects to aquatic life are estimated on an uncontrolled sediment suspension and dispersion event.

The Schuyler Heim Bridge is assumed to contain lead compounds, which could cause a significant adverse effect to the channel water quality during paint removal activities or demolition.

The existing fender piles in the channel will be pulled out with a crane. A pile-driver will be used to install the new fender piles in the channel. Information on the size, number, and types of fender piles was not evaluated. However, in general fender piles for large bridge projects have been reported to be in the 14-inch size range (Illingworth and Rodkin, 2007).

Under preliminary designs, a total of 16 CIDH piles will be installed in the Cerritos Channel to support the new Schuyler Heim Bridge under Alternative 1, with four 144-inch (3.65-m) piles installed at each of four bents (Bents 13, 14, 15, and 16). Piles are likely to be driven with a hydraulic impact hammer, with total energy per strike up to 500 kilojoules (kJ). Typical duration for a single CIDH pile installation is estimated to be approximately 2 hours. During this period, actual striking time is approximately 45 minutes, with a strike occurring between every 1 to 2 seconds. As the pile is driven deeper, the time between strikes typically increases. Strike periods occur in intervals, with short breaks (e.g., up to ½ hour) between intervals, as adjustments are made or a diver is sent down to check the pile tip elevation. A total of between approximately 1,350 and 1,800 strikes or more may be required to drive each pile. The season of the pile installation has not been identified at the present time. The duration is estimated to be up to a total of 24 work days, but delays could extend this considerably. Tables 3.16-6a and b provides a summary of estimated pile driving information for the Cerritos Channel and the Dominguez Channel/Consolidated Slip for the various alternatives.

Table 3.16-6a
Preliminary Construction Details of Aquatic Environment Pile Driving for Project Alternatives - Cerritos Channel

	Alternatives 1, 2 , 4 - Schuyler Heim Bridge, Cerritos Channel				**Alternative 3 - Schuyler Heim Bridge, Cerritos Channel - Alternative Location**					**Alternative 1A - Schuyler Heim Bridge, Cerritos Channel - Haunch Design**	
Bent	**Bent 13**	**Bent 14**	**Bent 15**	**Bent 16**	**Bent 11**	**Bent 12**	**Bent 13**	**Bent 14**	**Bent 15**	**Bent 12**	**Bent 13**
Location	Cerritos Channel	Cerritos Channel	Cerritos Channel	Cerritos Channel	Cerritos Channel	Cerritos Channel	Cerritos Channel	Cerritos Channel	Cerritos Channel	Cerritos Channel	Cerritos Channel
Type	CIDH	CIDH	CIDH	CIDH	CIDH	CIDH	CIDH	CIDH	CIDH	CIDH	CIDH
Number of Piles	4	4	4	4	4	4	4	4	4	4	4
Size	144"	144"	144"	144"	144"	144"	144"	144"	144"	144"	144"
Driving Method	HIH	HIH	HIH	HIH	HIH	HIH	HIH	HIH	HIH	HIH	HIH
Drive Energy per Hit	500 kJ	500 kJ	500 kJ	500 kJ	500 kJ	500 kJ	500 kJ	500 kJ	500 kJ	500 kJ	500 kJ
Attenuation Method	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Total Duration/Pile	2 h	2 h	2 h	2 h	2 h	2 h	2 h	2 h	2 h	2 h	2 h
Total Striking Time/Pile	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m
Frequency of Hits	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s
Interpulse Interval	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s	1 - 2 s
Schedule Striking/ Non-striking	15 m on/ 30 m off	15 m on/ 30 m off	15 m on/ 30 m off	15 m on/ 30 m off	15 m on/ 30 m off	15 m on/ 30 m off	15 m on/ 30 m off	15 m on/ 30 m off	15 m on/ 30 m off	15 m on/ 30 m off	15 m on/ 30 m off
Total Duration/Bent	2 days	2 days	2 days	4 days	2 days	2 days	2 days	2 days	2 days	2 days	2 days
Depth of Water	15'	50'	50'	15'	6'	36'	48'	48'	24'	42'	48'
Anticipated Start (day, month)	unknown	Unknown	unknown	unknown	Unknown	unknown	unknown	unknown	unknown	unknown	unknown

kJ	kilojoule
HIH	Hydraulic Impact Hammer
CIDH	Cast in Drilled Steel Hole Pile
CISS	Cast in Steel Shell Pile
m	minutes
h	hours
s	seconds

Table 3.16-6b
Preliminary Construction Details of Aquatic Environment Pile Driving for Project Alternatives – Dominguez Channel/ Consolidated Slip

	Alternatives 1, 1A, 3 - SR-47 Expressway Bridge, Dominguez Channel/ Consolidated Slip	
Bent	**Bent 15**	**Bent 16**
Location	Dominguez Channel/ Consolidated Slip	Dominguez Channel/ Consolidated Slip
Type	CISS	CISS
Number of Piles	4	4
Size	39"	39"
Driving Method	HIH	HIH
Drive Energy per Hit	400 kJ	400 kJ
Attenuation Method	TBD	TBD
Total Duration/Pile	1 h	1 h
Total Striking Time/Pile	40 m	40 m
Frequency of Hits	1 - 2 s	1 - 2 s
Interpulse Interval	1 - 2 s	1 - 2 s
Schedule Striking/ Non-striking	20 m on/ 20 m off	20 m on/ 20 m off
Total Duration/Bent	2 days	2 days
Depth of Water	24'	24'
Anticipated Start (day, month)	unknown	Unknown

kJ kilojoule
HIH Hydraulic Impact Hammer
CIDH Cast in Drilled Steel Hole Pile
CISS Cast in Steel Shell Pile
m minutes
h hours
s seconds

Under preliminary designs, a total of eight CISS piles will be installed in the Dominguez Channel/Consolidated Slip to support the SR-47 Expressway under Alternative 1, with four 1-m (39- inch) piles installed at each of two bents. Piles are likely to be driven with a hydraulic impact hammer, with total energy per strike up to 400 kJ. Typical duration for a single CISS pile installation is estimated to be approximately 1 hour. During this period, actual striking time is approximately 30 to 40 minutes, with a strike occurring between every 1 to 2 seconds. As the pile is driven deeper, the time between strikes typically increases. Strike periods occur in intervals, with short breaks (e.g., up to 15 minutes) between intervals, as adjustments are made or a diver is sent down to check the pile tip elevation. A total of between approximately 800 and 1,200 strikes or more may be required to drive each pile. The duration is estimated to be up to a total of 4 work days, but delays could extend this considerably.

Sound measurements of a 150-inch (3.8-m) CISS pile installation at the Richmond-San Rafael Bridge seismic retro-fit project in San Francisco Bay were documented in Illingworth & Rodkin (2007); this likely represents the most comparable data identified for sound pressures associated with the 144-inch CIDH pile proposed for Schuyler Heim. During installation at 20 m distant from one of the piles, sound pressures were measured continuously and ranged from 215 dB peak and 200 root mean square (RMS) dB at the beginning of the drive to 205 dB peak and 193 dB RMS at the end of the drive. At 230 m distant, sound pressures were typically 192 dB to 189 dB peak and 178 dB to 180 dB RMS. For the second of two piles, peak sound pressures were approximately 203 dB at 50 m distant. Underwater sound levels were generally similar to those measured for a 126-inch (3.2-m) CISS pile installation at the same project site.

Sound measurements of 1m (40-inch-) diameter steel pipe piles were documented at the Bay Ship and Dock Company Project in Alameda, California (Illingworth & Rodkin, 2007); this likely represents the most comparable data identified for sound pressures associated with the 39-inch CISS piles proposed for Dominguez Channel/Consolidated Slip. During installation with an impact hammer using approximately 390 kJ of energy in approximately 12 m of water, peak sound from pile driving was measured at approximately 205 dB on average; RMS and Sound Exposure Level (SEL) sound levels were estimated to average 193 dB and 180 dB, respectively.

Sound measurements of installation of 0.2-m- (14–inch-) diameter steel pipe fender piles were also conducted at the Richmond-San Rafael Bridge project. At 22 m from the installation, peak sound pressures were measured at 190 to 196 dB, RMS at 178 to 182 dB, and an SEL of 170 dB.

Hastings and Popper (2005) provided a preliminary review of the effects of sound (primarily from pile driving) on fish. They identified numerous limitations to existing data on this matter, and while providing interim guidance for evaluation of pile driving sound effects on fish, recommend caution in implementing this guidance. Their preliminary criteria address physical injury and mortality and damage to auditory sensory cells in fish, and are reported in Popper *et al.* (2006).

Recently an accepted set of sound level effects threshold criteria for fish have been agreed upon by numerous federal and multi-state resource agencies (Federal Highways Administration, 2008). Using those criteria, the information in Table 3.16-6a and b above, and a pile driving calculator spread sheet developed by the NMFS (Woodbury, 2009, unpublished), effects to fish habitat were assessed. This information was used to estimate the approximate distances from pile driving source activities to which physiological an effects to aquatic species (fish) would no longer be expected to occur. The threshold criteria (FHWA, 2008) used to estimate effect distances are as follows:

- The peak (Peak) pressure level [206 decibels -dB] at which a single pile strike would be expected to cause the onset of physical injury to a nearby fish,
- Accumulated Sound Exposure Level (SEL) is an accumulated sound level at which the onset of physical injury to nearby fish would be expected to occur. SEL levels have been determined for large fish (> 2 gm) to be 187 dB; and for small fish (< 2 gm) to be 183 dB.

Using the above information, the expected acoustic effects from pile driving on fish habitat in the Cerritos Channel for Alternative 1 were assessed and summarized in Table 3.16-7a.

Table 3.16-7a
Estimated Distances (m) from Pile Driving Source Activities in Which Effects to Fish Habitat may be Expected to Occur within the Cerritos Channel

	Physical Injury		
		Cumulative SEL	
	Peak	Fish ≥ 2 g	Fish < 2 g
Effects Thresholds Criteria (dB):	**206**	**187**	**183**
Distance from source (m)			
Unattenuated	17 to 80	1,324 to 7,446	2,000 to 9,283
Attenuated (5 dB)[a]	8 to 37	615 to 3,456	928 to 4,309
Attenuated (10 dB)[b]	4 to 17	285 to 1,604	431 to 2,000

Notes:
[a] = assuming a 5 dB attenuation at source using air bubble curtains.
[b] = assuming a 10 dB attenuation at source using air bubble curtains.

As summarized in Table 3.16-7a, given the parameters shown in Table 3.16-6a, direct injuries to fish species within a distance of approximately 80 m may be expected to occur with a single unattenuated strike within the Cerritos Channel. Physical effects to fish would be expected to be reduced/minimized using attenuation methods (5 dB or 10 dB [as estimated for 150-inch CISS piles by Illingworth & Rodkin, 2007]). With 10 dB attenuation, this physical effect distance is reduced substantially to up to 17 m. With 10 dB attenuation, the daily cumulative effects of pile driving sound (SEL) may occur to larger fish (>2 gm) at distances of up to approximately 1604 m (1.0 mi) and small fish (<2 gm) up to approximately 2000 m (1.2 mi). These results are modeled based on a total of two pile driving events per day. Less than two pile driving events per day substantially reduce these effects, as cumulative results in SEL are not carried forward after a 12-hour suspension of pile driving. In general, these results would apply more accurately to line-of-sight distances. They do not account for variations in harbor bathymetry, channel shape, water temperature, currents, tide levels, or other physical factors which would constrain the extent, magnitude, and direction sound pressure waves will travel. Actual effects would likely be less than those predicted by the assessment model. Effects are likely to be greater if pile driving is conducted during sensitive life-history phases, such as during spawning or when eggs or fish larvae are present. However, peak reproductive periods for fish vary in the region. Generally, reproductive cycles for fish with northern affinities (e.g. northern anchovy [*Engraulis mordax*]) peaks from winter to spring. Reproductive cycles for fish with southern affinities (e.g. queenfish [*Seriphus politus*]) peaks from spring to summer (Cross and Allen, 1994). Life cycle duration from egg laying to larval transformation to juveniles varies from species to species. For northern anchovy, eggs hatch in 2 to 4 days, and larvae transform to juveniles in approximately 70 days.

Behaviorally, fish may be affected at much greater distances; however, behavioral effects are anticipated to be temporary for the duration of the pile driving, and long-term effects from behavioral changes are expected to be insubstantial on fish populations.

Based on the results from this analysis, it appears that effects on aquatic habitat in the vicinity of the operation may occur during pile-driving activities, with some fish injury and/or mortality. The extent of these effects is likely to be limited to the Cerritos Channel both east and west of the bridge location, portions of the East Basin in the POLA, the proximal end of the East Basin Channel in POLA, and portions of the POLB Long Beach Inner Harbor (including the proximal ends of Channels 2 and 3). This may result in some response in fish populations within these areas during the period of pile driving. The extent of this response is unknown, but with avoidance and minimization measures as described below under EFH, any suppression of the population would be anticipated to be temporary, with fish populations likely to recover to pre-disturbance levels after the pile driving portion of the project is completed.

Table 3.16-7b
Estimated Distances (m) from Pile Driving Source Activities in Which Potential Effects to Fish may be Expected to Occur within the Dominguez Channel/Consolidated Slip

	Physical Injury		
		Cumulative SEL	
	Peak	Fish ≥ 2 g	Fish < 2 g
Effects Thresholds Criteria (dB):	**206**	**187**	**183**
Distance from source (m)			
Unattenuated	9	612 to 741	1,000
Attenuated (10 dB)[a]	2	132 to 160	215

Notes:
[a] = assuming a 10 dB attenuation at source using air bubble curtains.

As summarized in Table 3.16-7b, given the parameters shown in Table 3.16-6, direct injuries to fish species within a distance of approximately 9 m may be expected to occur with a single unattenuated strike within the Dominguez Channel/Consolidated Slip. With 10 dB attenuation, this distance is reduced to 2 m. With 10 dB attenuation, the daily cumulative effects of pile driving sound (SEL) may occur to larger fish (>2 gm) at distances of up to approximately 160 m (0.10 mi) and small fish (<2 gm) up to approximately 215 m (0.13 mi). These results are analyzed based on a total of two pile driving events per day. Less than two pile driving events per day would substantially reduce these effects, as cumulative results in SEL are not carried forward after a 12-hour suspension of pile driving. In general, these results would apply more accurately to line-of-sight distances. They do not account for variations in harbor bathymetry, channel shape, water temperature, currents, tide levels, or other physical factors which would constrain the extent, magnitude, and direction sound pressure waves will travel. Actual effects would likely be less than those predicted by the assessment model. Effects are likely to be greater if pile driving is conducted during sensitive life-history phases, as described above. Behaviorally, fish may be affected at much greater distances; however, behavioral effects are anticipated to be temporary for the duration of the pile driving, and long-term effects from behavioral changes are expected to be insubstantial on fish populations.

Based on the results from this analysis, it appears that effects on aquatic habitat in the vicinity of the operation may occur during pile-driving activities, with some fish injury and/or mortality. The extent of these effects is likely to be limited to areas within the proximal edge of Consolidated Slip downstream, or the proximal edge of Dominguez Channel upstream, generally fairly close to the proposed operation. Effects would not be anticipated to extend as far downstream as the East Basin in the POLA. This may result in some response in fish populations within Dominguez Channel/Consolidated Slip during the period of pile driving. The extent of this response is unknown, but with avoidance and minimization measures as described below under EFH, any suppression of the population would be anticipated to be temporary, with fish populations likely to recover to pre-disturbance levels after the pile driving portion of the project is completed.

Generally, installation of fender piles, even without attenuation, is not expected to cause an extensive area of adverse effects to aquatic communities including fish. Sound pressure levels from the installation of fender piles comparable to those proposed under Alternative 1 are expected to be 190 to 196 dB peak, RMS at 178 to 182 dB, and an SEL of 170 dB (Illingworth & Rodkin, 2007). Even without attenuation, these levels are below the thresholds anticipated to result in physical injury to fish.

Open Water Communities

Temporary disruption of open water foraging areas adjacent to the existing Schuyler Heim Bridge would be expected with the level of construction activity associated with Alternative 1. However, terrestrial wildlife using these areas are accustomed to the noisy, urban environment, and are not anticipated to be adversely affected by these activities. Where noise or disturbance is substantial, other habitat is available nearby, and wildlife can potentially move off and utilize other port habitats.

Essential Fish Habitat

EFH in the vicinity of Alternative 1 would be subjected to the same types of water quality and acoustical effects described above under Aquatic Communities. As indicated, the resuspension of contaminated sediments from construction activities may have the potential for acute toxicity to invertebrates or fish. These predictions of potential water quality effects to aquatic life are estimated on an uncontrolled sediment suspension and dispersion event. Avoidance and minimization measures would reduce these effects.

The Coast Pelagic FMP does not specifically address or analyze the effects of pile driving and underwater sound, nor recommend conservation measures for these effects. The Pacific Groundfish FMP, specifically Appendix D, Nonfishing Effects on West Coast Groundfish, Essential Fish Habitat and Recommended Conservation Measures, does address potential effects from pile driving on Pacific Groundfish EFH. Recommended conservation measures to reduce pile driving impacts are proposed in the FMP. These measures would be implemented where feasible in this project, and would be expected to reduce direct impacts to species managed under the FMPs, including impacts to EFH. More detail on these protective measures is provided in Section 3.16.4 Avoidance and Minimization Measures, specifically Measure B-2, Protecting Aquatic Communities (including EFH, Coast Pelagic Species, Groundfish).

Implementing conservation measures as feasible would ensure compliance with the FMPs. Further coordination with the NMFS may be necessary to meet terms and conditions of the Magnusson-Stevens Fishery Conservation and Management Act, and would be conducted during the project permitting phase.

Jurisdictional Waters Including Wetlands

No jurisdictional wetlands are present within Alternative 1. However, an approximately 0.11-acre wetland is present east of the Schuyler Heim Bridge along the low tidal terrace on Cerritos Channel. This area will be avoided during construction, and avoidance and minimization measures will be implemented.

Special-Status Species

Federally Listed as Threatened or Endangered

California Brown Pelican

Some noise may occur during construction that potentially would affect areas within 152 m (500 ft) of the project site; this may disrupt roosting or foraging activities for California brown pelican, if present. Effects with most construction activities are anticipated to be of short-term duration and limited to areas immediately adjacent to the bridge. Because ample other aquatic habitats are present in the vicinity, the temporary effects related to the loss of this roosting and foraging habitat on the brown pelican are expected to be minimal.

Underwater noise resulting from pile-driving has been described above. Pile driving also has the potential to result in additional noise impacts within the terrestrial environment that could potentially disrupt activities of special-status species, including California brown pelican.

Ambient noise levels measured within the areas surrounding Schuyler Heim Bridge were measured at between 50 dB(A) to 73 dB(A) (see Section 3.14). Limited data is available for terrestrial sound levels associated with this activity, and their effects on wildlife. The EPA ("Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," December 31, 1971) reports that pile-driving operations can result in peak noise levels of 90 to 105 dBA at 15 m (50 ft); the higher end of this range would be appropriate for the large CIDH piles at the Schuyler Heim Bridge for Alternative 1, whereas the mid-range (100 dBA) would be appropriate for the pile driving of smaller piles proposed for the SR-47 Expressway crossing of Dominguez Channel. These levels would generally attenuate in air at a rate of 6 dBA per distance doubling, or 20*log(distance/reference distance). Based on a pile-driving noise level of 100 dBA at 15 m (50 ft), noise levels at other distances can be forecast. At a distance of 150 m (500 ft), the pile-driving noise might still be as high as 80 dBA. The pile-driving noise level will decrease as the distance from the source increases. Table 3.14-4 shows attenuation over distance from the pile driver (hard site assumed).

Under preliminary designs, a total of 61 CIDH piles (16 within the Cerritos Channel) will be installed along the length of the Schuyler Heim Bridge under Alternative 1, with between two and six 144-inch (3.65-m) piles installed at 15 bents (Bents 2 through 16). Bents requiring pile installation are located on Terminal Island and within the Cerritos Channel. Piles are likely to be driven with a hydraulic impact hammer, with total energy per strike up to 500 kJ. Typical duration for a single CIDH pile installation is estimated to be approximately 2 hours. During this period, actual striking time is approximately 45 minutes, with a strike occurring between every 1 to 2 seconds. As the pile is driven deeper, the time between strikes typically increases. Strike periods occur in intervals, with short breaks (e.g., up to

½ hour) between intervals, as adjustments are made or a diver is sent down to check the pile tip elevation (for aquatic installations). A total of between approximately 1,350 and 1,800 strikes or more may be required to drive each pile. The season of the pile installation has not been identified at the present time.

Under preliminary designs, a total of 28 CISS piles will be installed at the SR-47 Expressway bridge over the Dominguez Channel/Consolidated Slip to support the SR-47 Expressway, with four 1-m (39-inch) piles installed at each of seven bents. Piles are likely to be driven with a hydraulic impact hammer, with total energy per strike up to 400 kJ. Typical duration for a single CISS pile installation is estimated to be approximately 1 hour. During this period, actual striking time is approximately 30 to 40 minutes, with a strike occurring between every 1 to 2 seconds. As the pile is driven deeper, the time between strikes typically increases. Strike periods occur in intervals, with short breaks (e.g., up to 15 minutes) between intervals, as adjustments are made or a diver is sent down to check the pile tip elevation (in aquatic installations). A total of between approximately 800 and 1,200 strikes or more may be required to drive each pile.

Impacts to terrestrial wildlife from noise can be characterized as one of the following: (1) Permanent Threshold Shift (PTS) or permanent hearing damage; (2) Temporary Threshold Shift (TTS) resulting in recoverable damage to hearing; (3) masking – that is noise at sufficient levels to interfere with normal animal vocalization or hearing, but not enough to do any damage; and (4) any sound level that causes a potential behavioral or physiological response. Consideration of impacts from pile driving on sensitive wildlife receptors is limited in this analysis to the first two, PTS or TTS. Masking or other types of effects from pile driving or other construction noise may occur; however, terrestrial wildlife affected by increased construction sounds would be expected to move away from the noise source. Masking or other lesser effects are therefore expected to be temporary and insubstantial.

Dooling and Popper (2007) document preliminary research of effects of noise on birds. They report that impulse noise less than a level of about 125 to 140 dB(A), or continuous noise less than 110 dB(A) is not likely to cause PTS. Continuous noise levels less than 93 dB(A) are not likely to cause TTS. Continuous noise (in the 2 – 8 kHz level) below ambient levels (as measured) does not cause masking. Any audible noise may evoke a behavioral response in birds.

Based on this information, it is evident that pile driving associated with Alternative 1 is not likely to cause PTS in wildlife populations, including California brown pelican, even in the event pelicans were roosting in close vicinity to the construction area. Noise levels may be as high as 105 dBA near the construction site (within 15 m[50 ft]); however, this is still below the level which would cause PTS. While pile driving noise is not continuous, the 1 to 2 hour duration of drive events, with pile impact occurring every 1 to 2 seconds, would have a greater effect than short duration impulse sounds. However, it would be anticipated that any pelicans within the immediate vicinity of the pile driving activity would move out of the area when pile driving begins; therefore permanent hearing damage would not occur.

Dooling and Popper (2007) indicate TTS may occur in birds during continuous noise levels greater than 93 dB(A). While not continuous, pile driving at the Schuyler Heim Bridge would result in a persistent impulse noise spanning up to 2 hours an event of up to 105 dBA at 15 m (50 ft). The persistent impulse noise at the Dominguez Gap/Consolidated Slip

would be slightly less both in sound levels (up to 100 dBA) and duration (up to 1 hour per event). This could cause TTS in birds in the immediate vicinity. However, sound will attenuate below a level which can cause TTS within 50 m (164 feet) of the pile driving activity (see Table 3.14-4). It would be anticipated that birds, including California brown pelican, would move out of the area when pile driving begins. Any birds subjected to TTS impacts would be expected to recover once they move out of the area.

California Least Tern

Some noise and construction activity may occur during normal construction activities that potentially would affect least tern nesting colonies within 456 m (1,500 ft) of the project site; this may disrupt the breeding activities for California least tern, if present. With avoidance and minimization measures, this effect would be avoided. However, this species is not expected to be present, and no impacts are anticipated.

Potential noise impacts to birds from pile driving have been addressed above under California brown pelican, and would be similar for California least tern, if found in the area.

Because this species is not likely to occur in the project area and any potential impacts would be discountable and immeasurable, Caltrans anticipates that the ongoing consultation with the USFWS will result in a Not Likely to Adversely Affect determination. Consultation will be concluded before the Record of Decision is approved.

Marine Mammals

California Sea Lion, Harbor Seal

California sea lions were observed in the project area, and harbor seals are expected to occur. These species are highly mobile and would be expected to avoid and move out of the area if disturbed by construction activities. However, pile driving can be expected to potentially affect any pinnipeds that may be within the vicinity during operations.

At the present time NMFS uses the following thresholds to evaluate the acoustical effects of pile driving activities on pinniped species (NMFS, 2008):

- 160 dB RMS for behavioral disturbances,
- 190 db RMS for injury.

Similar to the approach for estimating the effects of pile driving on Aquatic Communities in Section 3.16.3.3.1.1.1, the analysis of acoustic effects of pile driving activities to pinnipeds in the Cerritos Channel are summarized in Table 3.16-8a.

As shown in Table 3.16-8a, injuries to pinniped species in the Cerritos Channel may occur up to between 55 m to 95 m from the source of the pile driving sound. By providing attenuation from pile driving sound using aggressive air bubble curtain methods, injuries to pinnipeds may be reduced to a distance of up to between 20 to 55 m from the source of the pile driving activity. Pinnipeds may still be affected behaviorally up to between 230 to 1000 m from the source of pile driving sound even with air-bubble attenuation methods applied. However, in general, these behavioral effects are anticipated to be temporary, limited to the duration of pile driving events. Furthermore, affected marine mammals are likely to leave the area and subsequently avoid it until the pile driving stops, with no long term effects on individuals or populations.

Table 3.16-8a
Estimated Distances (m) from Pile Driving Source Activities in Which Potential Effects to Pinnipeds may be Expected to Occur in the Cerritos Channel

	Effect
	Injury
Effects Threshold Levels (RMS dB)	**190**
Approximate Distance from source (m)	
Un-Attenuated	55 to 95 m
Attenuated (5 dB)[a]	20 to 55 m
Attenuated (10 dB)[b]	20 to 55 m

Notes:
[a] = assuming a 5 dB attenuation at source using air bubble curtains.
[b] = assuming a 10 dB attenuation at source using air bubble curtains.

Similar to the approach for estimating the effects of pile driving on pinniped species above, the results of the analysis of acoustic effects of pile driving activities to pinnipeds in the Dominguez Channel/Consolidated Slip are summarized in Table 3.16-8b.

Table 3.16-8b
Estimated Distances (m) from Pile Driving Source Activities in Which Potential Effects to Pinnipeds may be Expected to Occur in the Dominguez Channel/Consolidated Slip Channel

	Effect
	Injury
Effects Threshold Levels (RMS dB)	**190**
Approximate Distance from source (m)	
Un-Attenuated	~10m
Attenuated (10 dB)[a]	~2m

Notes:
[a] = assuming a 10 dB attenuation at source using air bubble curtains.

As shown in Table 3.16-8b, injuries to pinnipeds species at the Dominguez Channel/ Consolidated Slip may occur up to 10 m from the source of the unattenuated pile driving sound. By providing attenuation, potential for injuries to pinnipeds may be reduced to a distance of up to 2 m from the source of the pile driving activity. Pinnipeds may still be affected behaviorally up to 1,000 m from the source of pile driving sound with air-bubble attenuation methods applied. However, in general, these behavioral effects are anticipated to be temporary, limited to the duration of pile driving events. Furthermore, affected marine mammals are likely to leave the area and subsequently avoid it until the pile driving stops, with no long-term effects on individuals or populations.

At both the Cerritos and Dominguez Channel locations sound attenuation methods would be implemented to reduce potential for injuries to pinnipeds. Additional measures to avoid and minimize potential effects on marine mammals would be developed and implemented based on guidance developed by the NMFS (2008b). This would include development of a

marine mammal protection and hydroacoustic monitoring plan to provide ongoing monitoring of biological resources and the hydroacoustic environment. More detail on these protective measures is provided in Section 3.16.4 Avoidance and Minimization Measures, specifically Measure B-2, Protecting Aquatic Communities (including EFH, Coast Pelagic Species, Groundfish).

With this measure, it is anticipated that potential effects to pinnipeds can generally be avoided.

State-Listed as Threatened or Endangered

American Peregrine Falcon

It is unlikely that the designs of the new Schuyler Heim Bridge structure or the new bridge crossing at the Consolidated Slip will include any features consistent with typical peregrine nesting and perching sites on artificial structures. The plans for these bridges do not include the elevated vertical-lift structures or similar elevated structures currently present on the Schuyler Heim Bridge. The elevation of these existing structures creates nesting and perching habitats for the species. The adjacent Badger Avenue Bridge would be elevated above the new Schuyler Heim Bridge. It is unlikely that peregrines would nest adjacent to a taller structure. If elevated structures were constructed specifically for peregrine falcons on the new Schuyler Heim Bridge (engineering feasibility not determined), it is uncertain that individuals of this species would utilize them because this new site would be considerably different in structure; and peregrines are known to be selective about the locations of their nest and perch sites.

The removal and replacement of the Schuyler Heim Bridge would eliminate a known nest site for a breeding pair of peregrine falcons. Replacement of the Schuyler Heim Bridge with a concrete fixed bridge would result in the loss of a known nesting site for the peregrines. Disturbed and displaced, the peregrines would be forced to use another area for nesting. The nesting territory may continue to be used with alternative nesting on the Gerald Desmond. This is consistent with historical use of this vicinity, where nesting has alternated between the Schuyler Heim and Desmond Bridge. Only rarely have both bridges been used for nesting during the same year.

Peregrine falcons are very territorial. The density of pairs in any given area often reflects on the quality of the habitat to support nesting. Where suitable habitat exists many pairs will often attempt to define and defend territories in close proximity to one another, which appears to be the situation in the Los Angeles harbor area. A high number of territories are occupied and it would seem unlikely, though not impossible, for additional pairs to try and establish new territories within the currently active nesting territories. The pair dynamics and movements of individuals and pairs nesting in close proximity to one another can become complex and difficult to ascertain by biologists.

The removal of one known peregrine falcon nesting location on the Schuyler Heim Bridge in a territory that typically supports one pair but contains two alternate nesting locations would result in an adverse effect to the species.

Construction activities are likely to cause limited temporary resuspension of contaminated harbor sediments to the water column in Cerritos Channel and Consolidated Slip/ Dominguez Channel (see Section 3.16.2.1.3 Aquatic Communities). The limited time of

resuspended constituents in the water column indicates the potential for acute toxicity to invertebrates or fish but not chronic bioaccumulation or food-chain effects to aquatic birds or peregrine falcons, which forage on aquatic birds (See the *Draft Water Quality Effects Technical Study* [2005]). No long-term effects to the species are anticipated from resuspension of harbor sediments.

Potential noise impacts to birds from pile driving have been addressed above under California brown pelican, and would be similar for peregrine falcon.

Other Special-Status Species

Plants

Southern Tarplant. There is potential for individuals of this species to be present on the site. If individuals were present, and could not be avoided, they would be removed permanently as a result of construction. The removal of southern tarplant, if present on the project site, would be considered an adverse effect. However, this species is not expected to be present, and no impacts are anticipated.

Mammals

Pallid Bat. The loss of active roosts of this species of bat resulting from bridge removal would represent an adverse effect. However, with avoidance and minimization, effects to bat populations of this species are expected to be minimal. Ample other roost sites are present for bats utilizing this urban area, and alternative roosting colonies are expected to be established at the new bridges across the Cerritos Channel and the Consolidated Slip with the loss of colonies at the Schuyler Heim Bridge site. In addition, the factors that limit the population of pallid bat are probably more the lack of open foraging areas than roost sites.

Townsend's Western Big-Eared Bat. Although the species may occur at the Schuyler Heim Bridge site, the likelihood is low, given the species preference for undeveloped and/or undisturbed areas; and no adverse effects are anticipated.

Other Bats: Long-Legged Myotis, *Long-Eared Myotis*, *Yuma Myotis*, *Western Mastiff Bat*, *Pocketed Free-Tailed Bat*, *Big Free-Tailed Bat.* The loss of active roosts of these species of bats resulting from bridge removal would represent an adverse effect. However, with avoidance and minimization, effects to bat populations of this species are expected to be minimal. Ample other roost sites are present for bats utilizing this urban area, and alternative roosting colonies are expected to be established at the new bridges across the Cerritos Channel and the Consolidated Slip with the loss of colonies at the Schuyler Heim Bridge or other sites.

Birds

The loss of active nests or eggs resulting from bridge removal would represent an adverse effect. However, with avoidance and minimization measures, effects are anticipated to be minimal. Avoidance and minimization measures would consist of preconstruction surveys to identify potential nest sites, and exclusion or removal of nests from the Schuyler Heim Bridge prior to the nesting period. An onsite biological monitor will be present during construction activities in the nesting season to ensure that nests are not established within the construction zone. Nesting sites will be passively excluded with bird spikes, plywood, or other exclusion measures.

Burrowing Owl. Some noise may occur during normal construction activities that would potentially affect areas within 152 m (500 ft) of the project site; this may disrupt breeding activities for burrowing owl, if present. This would represent an adverse effect. However, with avoidance and minimization measures, this impact will be avoided.

Osprey. Some noise may occur during normal construction activities that potentially would affect areas within 152 m (500 ft) of the project site; this may disrupt roosting or foraging activities for osprey, if present. Project activities may render the area temporarily unsuitable for roosting or foraging, but ample other roosting or foraging areas are present in the vicinity of the project. Effects are anticipated to be minimal to roosting or foraging birds and of short-term duration.

Potential noise impacts to birds from pile driving have been addressed above for California brown pelican, and would be similar for other birds using the area.

Double-Crested Cormorant. Some noise may occur during normal construction activities that would potentially affect areas within 152 m (500 ft) of the project site; this may disrupt roosting or foraging activities for double-crested cormorant, if present. Project activities may render the area temporarily unsuitable for roosting or foraging, but ample other roosting or foraging areas are present in the vicinity of the project. Effects are anticipated to be minimal to roosting or foraging birds and of short-term duration.

Potential noise impacts to birds from pile driving have been addressed above for California brown pelican, and would be similar for other birds using the area.

Fish

Coast Pelagic Species/Groundfish. Uncontrolled construction activities in the Cerritos Channel and the Consolidated Slip/Dominguez Channel area are likely to cause limited temporary resuspension of contaminated harbor sediments to the water column and elevated underwater sound levels from pile driving. The harbor sediments in the area of the Schuyler Heim Bridge and in the Consolidated Slip/Dominguez Channel are primarily silt and finer-sized fractions and, if resuspended, are expected to stay in suspension for days. Tidal currents will likely disperse the resuspended sediments throughout the length of the Cerritos Channel and upstream and downstream in the Consolidated Slip/Dominguez Channel. Pile driving during demolition and construction within the Dominguez and Cerritos Channels would result in temporary elevated sound levels and effects as described in the Aquatic Communities and the EFH section above.

Cerritos Channel

Sediment COCs of most concern for producing water quality effects to aquatic life in the Cerritos Channel include copper and zinc. Several PAH compounds may produce levels exceeding human health criteria; however, no comparable aquatic life protection standards exist for these compounds. The range of potential water quality concentrations that may occur as a result of sediment resuspension and the dilutions in Cerritos Channel required to meet WQCs is shown in Table 3.16-4.

As the plume of resuspended sediment disperses with tidal currents within Cerritos Channel, initial dilutions down the channel will be up to sixteenfold. The silty nature of the sediment suggests that exceedances of water quality may be expected to last on the order of at least a few days. The limited time of resuspended constituents in the water column

indicates the potential for acute toxicity to invertebrates or fish species, but not chronic bioaccumulation or food-chain effects to birds or mammals. These predictions of potential water quality effects to aquatic life are based on uncontrolled sediment suspension and dispersion. However, the CIDH construction method would contain resuspended sediment during these construction activities, where the majority of sediment remains within the CIDH shell until removed prior to concrete installation. Additional containment may occur from use of a contained air bubble attenuation method for underwater noise attenuation during pile driving.

Consolidated Slip/Dominguez Channel

Sediment COCs for adversely impacting water quality for aquatic life in the Consolidated Slip/Dominguez Channel include: metals (copper, lead, zinc, and mercury); total DDT compounds; total PCB compounds; and total PBC compounds. The range of concentrations and the NOAA SQG values in sediments within the Consolidated Slip are shown in Table 3.16-5.

Any plume of resuspended sediment will disperse with tidal currents, and there will be an initial dilution within the Consolidated Slip. It is likely that the silty nature of the sediment would result in exceedances of water quality criteria for those COCs that may be expected to last on the order of at least a few days. It is likely, however, that the limited time of resuspended constituents in the water column would result in some potential for acute toxicity to invertebrates or fish but not chronic, bioaccumulation, or food-chain effects to birds or mammals. These predictions of potential water quality effects to aquatic life are based on uncontrolled sediment suspension and dispersion.

Measures have been proposed and described below to reduce the level of this effect. These include implementing the CISS method for in-water piles, whereby the outer shell acts as a cofferdam. This generally would contain resuspended sediment within the CISS shell until it is removed for concrete installation within the shell. Biological effects to fish species from the constituents have been documented for a number of fish species, but information regarding the northern anchovy or other CPS or groundfish, was not attained. In general, it is likely that, with uncontrolled sediment suspension and dispersion, there is potential for adverse effects on these fish species, including acute toxicity. This effect would be temporary and generally short-lived while sediment is dispersed. With mitigation measures to reduce the extent of uncontrolled sediment resuspension and dispersion, however, the effects of contaminated sediment within the Cerritos Channel and the Consolidated Slip/Dominguez Channel area would be reduced.

3.16.3.3.1.1.2 Indirect

Natural Communities

No additional indirect effects are anticipated on natural communities beyond those described as direct effects.

Jurisdictional Waters Including Wetlands

No wetlands are present in the vicinity of Alternative 1.

Special-Status Species

Federally Listed as Threatened or Endangered

California Brown Pelican

Construction activities are likely to cause limited temporary resuspension of contaminated harbor sediments to the water column at both Cerritos Channel and Consolidated Slip/ Dominguez Channel, with potential indirect effects to aquatic organisms, or species that forage on them, including brown pelican. The limited time of resuspended constituents in the water column indicates the potential for acute toxicity to invertebrates or fish but not chronic bioaccumulation or food-chain effects to birds that forage on aquatic resources, including brown pelican. As such, effects to brown pelican from sediment resuspension are expected to be minimal.

California Least Tern

Construction activities are likely to cause limited temporary resuspension of contaminated harbor sediments to the water column of both the Cerritos Channel and Consolidated Slip/ Dominguez Channel, with potential indirect effects to aquatic organisms or species that forage on them, including least tern. With avoidance and minimization measures, this effect would be minimized. If resuspended sediment escapes local controls, the limited time of resuspended constituents in the water column indicates the potential for acute toxicity to invertebrates or fish but not chronic bioaccumulation or food-chain effects to birds that forage on aquatic resources, including least tern. As such, no long-term effects to the species are anticipated from sediment resuspension.

During construction of Alternative 1, disturbances caused from construction activities may displace the local peregrine falcons and alter their foraging activities. There is limited potential that peregrine falcons may begin foraging on least terns, resulting in an indirect effect on the least terns, given abundant other prey sources in the area. In addition, another pair of Peregrine falcons is present at the Koch Carbon facility, which is much closer to the larger least tern breeding colony at Pier T, and may forage on birds from that colony from time to time. Because peregrine falcons are territorial, the Schuyler Heim birds would be challenged if they were to attempt foraging near the birds at the Koch Carbon facility.

Western Snowy Plover

Construction activities are likely to cause limited temporary resuspension of contaminated harbor sediments to the water column in Cerritos Channel and Dominguez Channel/ Consolidated Slip, with potential effects to aquatic organisms or species that forage on them, including snowy plover. Measures to minimize this effect have been described previously. If resuspended sediment escapes local controls, the limited time of resuspended constituents in the water column indicates the potential for acute toxicity to invertebrates or fish but not chronic bioaccumulation or food-chain effects to aquatic birds. Because snowy plovers would be expected to stop over only rarely in the vicinity of the project area, and generally would forage or roost in more open, beach intertidal areas, no adverse effects to the species are anticipated.

Marine Mammals

California Sea Lion, Harbor Seal

Construction activities are likely to cause limited temporary resuspension of contaminated harbor sediments to the water column at both the Cerritos Channel and the Consolidated Slip/Dominguez Channel. The limited time of resuspended constituents in the water

column indicates the potential for acute toxicity to invertebrates or fish but not chronic bioaccumulation or food-chain effects to marine mammals.

State-Listed as Threatened or Endangered

American Peregrine Falcon

Construction activities are likely to cause limited temporary resuspension of contaminated harbor sediments to the water column in Cerritos Channel and Consolidated Slip/ Dominguez Channel. The limited time of resuspended constituents in the water column indicates the potential for acute toxicity to invertebrates or fish but not chronic bioaccumulation or food-chain effects to aquatic birds or peregrine falcons, which forage on aquatic birds. No long-term effects to the species are anticipated from resuspension of harbor sediments.

Other Special-Status Species

Birds

Osprey/Double-Crested Cormorant. Construction activities are likely to cause limited temporary resuspension of contaminated harbor sediments to the water column in Cerritos Channel and Consolidated Slip/Dominguez Channel, with potential adverse effects to aquatic organisms or species that forage on them. Measures have been proposed to reduce the level of this effect, as previously described. This would include adherence to channel construction measures such as the CIDH or CISS method for all in-water piles, which would generally contain resuspended sediment until it is removed prior to concrete installation. If resuspended sediment escapes local controls, the limited time of resuspended constituents in the water column indicates the potential for acute toxicity to invertebrates or fish, but not chronic bioaccumulation or food-chain effects to birds that forage on aquatic resources. As such, no long-term effects to the species are anticipated from sediment resuspension.

Fish

No additional indirect effects are anticipated for fish, beyond direct effects discussed above.

Invasive Species

Terrestrial Species

Trucks and heavy equipment associated with construction of Alternative 1 may introduce or transport seeds from terrestrial, non-native vegetation, resulting in colonization of existing or newly created vacant spaces with exotic vegetation. Because there are no natural plant or wildlife communities in the vicinity of the project, this would not result in adverse effects to native biological resources. In addition, BMPs will be employed to minimize transport and distribution of non-native vegetation propagules (cuttings, seeds, spores).

Aquatic Species

Aquatic species have been introduced to Los Angeles and Long Beach Harbors through discharge of ballast water, or sometimes through live fish trade. Construction activities in aquatic habitats associated with Alternative 1 may involve barges or other watercraft; however, generally watercraft of this size would not utilize ballast water, and would originate from local harbor waters. As such, new exotic or invasive species would not be introduced from these watercraft, or from any construction activities associated with Alternative 1.

3.16.3.3.1.2 Operations Effects

3.16.3.3.1.2.1 Direct

Urban/Developed

At the LADWP Substation No. DS 119 near Pier A Plaza, existing 4.8-kilovolt (kV) overhead lines east of the substation are in the path of elevated SR-47 structures, and would require relocation on taller steel poles. It is estimated that four high-voltage pole structures would be affected. A segment of an overhead feeder running from the West Basin Lead Track to a power pole immediately south of the Dominguez Channel would also require relocation to the west of SR-47. It is estimated that six steel poles would be required. Also, lines along the flyover alignment would require relocation on taller poles.

Utility poles or lines have the potential to result in bird mortality from collisions. Bird collisions with man-made structures have been reported in the scientific literature for over a century (see Avery *et al.*, 1980, Herbert and Reese, 1995; National Wind Technology Center [NWTC], 2006). Bird collision studies conducted at transmission lines indicate that the primary factor in determining the number of birds colliding with transmission lines is the number of birds moving about in the area. The visibility of the line also appears to influence the amount of collision mortality. Within a certain height range, there is no strong evidence to suggest taller utility poles or lines will pose a greater risk for avian collisions. Increased collisions do appear to occur when transmission lines are closer to sources of avian concentration, such as near water bodies (NWTC, 2006). Collisions are also more common under inclement weather conditions (NWTC, 2006).

There are local bird movements throughout the port area, including movements by special-status species. As such, there is some potential for collision and avian mortality at transmission lines installed as a part of Alternative 1. BMPs, such as the use of visual line enhancers, will be implemented as a part of all new transmission line installations. Construction design standards for avian protection will generally be followed where feasible, as provided in the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and USFWS *Avian Protection Plan Guidelines* (APLIC and USFWS, 2005), APLIC's *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (APLIC, 1996), or APLIC's *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994* (APLIC, 1994). With installation of BMPs, replacing towers and lines as a part of Alternative 1 is not expected to cause an increase in avian mortality over existing conditions.

Bird mortality at transmission towers and lines also occurs from electrocutions. This may occur when a bird completes an electric circuit by simultaneously touching two energized parts or an energized part and a grounded part of the electrical equipment. The greatest risk of electrocution is on medium-voltage distribution lines (4 to 34.5 kV), where the spacing between conductors may be small enough to be bridged by birds. Poles with energized hardware, such as transformers, may also be hazardous, as they may contain numerous, closely-spaced energized parts. "Avian-safe" structures provide adequate clearances to accommodate large birds between energized and grounded parts. Horizontal protection of 60 inches, and vertical separation of 48 inches is typically used as the standard for raptor protection (APLIC and USFWS, 2005). BMPs, such as the use of adequate conductor spacing, will be implemented as a part of all new transmission line installations. Construction design standards for avian protection will be generally followed where feasible, as provided in the documents specified (APLIC and USFWS, 2005; APLIC, 1996; APLIC, 1994).

Migrant bird mortality has also been reported at transmission, radio, or other towers, including mass mortality, although the reasons for this are not always evident. In some cases, it appears that nocturnal migrant birds may be attracted to solid red or pulsating red incandescent lights (USFWS, 2003), and during inclement weather (dense fog or cloud accompanied by precipitation) may become disoriented near lighted towers (NWTC, 2006). However, transmission lines are currently in place, and no change in lighting is proposed. No concentrations of nocturnal, migrant birds are known to use the areas proposed for transmission line replacement. As such, replacing these towers and lines, even when slightly taller than existing facilities, is not expected to cause an increase in avian mortality of migrant birds over existing conditions.

Aquatic Communities

Because the new proposed bridge would be a solid span compared to the existing grated span, the area beneath the new bridge structure would have less light than the existing bridge. The existing shading under the bridge reduces productivity of aquatic habitats. In addition, the area of the proposed new bridge is larger than the existing bridge. The existing bridge covers an area of approximately 1.54 acres of Cerritos Channel. The new bridge under Alternative 1 would cover an area of approximately 2.18 acres. Therefore the shading effect would increase under Alternative 1. The existing shading has already degraded aquatic habitats, with lowered productivity reported beneath the bridge. The shading from the new bridge would affect the already degraded aquatic system directly beneath the bridge, as well as approximately 0.64 additional acres.

3.16.3.3.1.2.2 Indirect

No indirect effects are anticipated from operation of Alternative 1.

3.16.3.3.1.3 Alternative 1A Construction Effects

3.16.3.3.1.3.1 Direct

Natural Communities

Direct effects of Alternative 1A on natural communities are expected to be similar to Alternative 1. However, Alternative 1A bridge design will have fewer piers placed in the Cerritos Channel, so effects to aquatic communities resulting from sediment disturbance during installation are expected to be slightly less under Alternative 1A. However, effects from construction involving demolition would be comparable. All other effects to natural communities under Alternative 1A will be comparable to Alternative 1.

Regarding the acoustic effects to aquatic communities, currently there are no data to support a fish tissue recovery allowance between pile strikes and therefore all pile strikes in any given day are counted, regardless of time between strikes. However, the modeling assumes that accumulated SEL values can be reset to zero after a lapse of 12 hours or more without pile driving; i.e. they are not cumulative after this lapse. Typically, values could be reset after an overnight lapse in pile driving. This is especially true in a tidally-influenced waterway when fish are likely to be moving (Woodbury, 2008). Therefore, the daily effects to the aquatic community and fish are likely to be similar to those estimated for Alternative 1 regardless of the fact that overall for the entire construction fewer piles would be driven for Alternative 1A. This is because, based on preliminary design, the same number and size of piles would be driven during days when piles are driven, regardless of alternative.

However, fewer piles are proposed for construction in the Cerritos Channel under Alternative 1A than under Alternative 1, resulting in fewer days of pile driving. Because of this, there would be an overall reduced effect on aquatic communities and fish within the vicinity of the proposed new bridge, even though the daily effects would be comparable.

Jurisdictional Waters Including Wetlands

Effects to jurisdictional waters under Alternative 1A will be comparable to Alternative 1.

Special-Status Species

Direct effects of Alternative 1A on special-status species are expected to be similar to Alternative 1. However, Alternative 1A bridge design will have fewer piers placed in the Cerritos Channel, so effects to aquatic communities resulting from sediment disturbance during installation, and subsequent effects on fish and wildlife, are expected to be slightly less under Alternative 1A. However, effects from demolition would be comparable. All other effects to special-status species under Alternative 1A will be comparable to Alternative 1.

Effects of pile driving on birds within the harbor area is expected to be comparable to effects described under Alternative 1, except, preliminary designs indicate there will be slightly fewer piles in Alternative 1A (56) than Alternative 1 (61), although pile size and installation would be comparable. Permanent effects to birds from pile driving are not anticipated under Alternative 1 or 1A. Temporary avoidance of the area, or TTS which is recoverable, may occur under Alternative 1A.

Similarly, effects on marine mammals under Alternative 1A would be comparable to effects under Alternative 1.

Invasive Species

Direct effects involving introduction of invasive species under Alternative 1A are expected to be similar to those described under Alternative 1.

3.16.3.3.1.3.2 Indirect

Indirect effects for Alternative 1A on biological resources are expected to be similar to Alternative 1. However, Alternative 1A bridge design will have fewer piers placed in the Cerritos Channel, so indirect effects to biological resources resulting from sediment disturbance during installation, and indirect effects on fish and wildlife, are expected to be slightly less under Alternative 1A. However, effects from demolition would be comparable. All other indirect effects to biological resources under Alternative 1A will be comparable to Alternative 1.

3.16.3.3.1.4 Alternative 1A Operations Effects

3.16.3.3.1.4.1 Direct

Urban/Developed

As with Alternative 1, several overhead utility poles and lines would require replacement. Impacts to birds from electrocution, collisions, or other sources of mortality at transmission lines were evaluated under Alternative 1, and would be comparable under Alternative 1A.

Aquatic Communities

Because the new proposed bridge would be a solid span compared to the existing grated span, the area beneath the new bridge structure would have less light than under the

existing bridge. The existing shading under the bridge reduces productivity of aquatic habitats. In addition, the area of the proposed new bridge is larger than the existing bridge. The existing bridge covers an area of approximately 1.54 acres of Cerritos Channel. The new bridge under Alternative 1A would cover an area of approximately 2.18 acres. Therefore, the shading effect would increase under Alternative 1A. The existing shading has already degraded aquatic habitats, with lowered productivity reported beneath the bridge. The shading from the new bridge would affect the already degraded aquatic system directly beneath the bridge, as well as approximately 0.64 additional acres.

3.16.3.3.1.4.2 Indirect

No indirect effects are anticipated from operation of Alternative 1A.

3.16.3.3.2 Alternative 2: SR-103 Extension to Alameda Street

3.16.3.3.2.1 Construction Effects

3.16.3.3.2.1.1 Direct

Natural Communities

Urban/Developed Areas

Survey results indicated that the majority of the plant species present in the Alternative 2 project area are non-native species. There are no native plant communities within the project Alternative 2 footprint. Individual native plants are present in the Alternative 2 project area; however, intact communities of native plants do not exist. Although individual native plants may be removed permanently with bridge replacement, new bridge construction, road construction of the extension of SR-103, and other project activities, the loss of these scattered individual plants would not represent an adverse effect to natural communities.

Brackish Intertidal and Non-tidal Wetlands

Brackish intertidal or non-tidal wetlands are not present in the Alternative 2 footprint.

Aquatic Communities

From the results of the marine survey, aquatic communities are present for Alternative 2 at the Cerritos Channel only. Project effects of Alternative 2 on aquatic communities in the vicinity of the existing Schuyler Heim Bridge would be comparable to those discussed for Alternative 1 with the following exception; there would be no effects to aquatic communities in the Consolidated Slip/Dominguez Channel because the alignment for Alternative 2 does not cross this feature.

Effects of pile driving on aquatic communities within the harbor area is expected to be comparable to effects described under Alternative 1, except, there would be no impacts at Dominguez Channel/Consolidated Slip under this alternative.

Open Water Communities

Temporary disruption of open water foraging areas under Alternative 2 would be the same as those described for Alternative 1, with effects limited to the Cerritos Channel.

Essential Fish Habitat

Effects to EFH from resuspension of contaminated sediments and impacts from underwater noise from pile driving would be the same under Alternative 2 as Alternative 1, limited to the Cerritos Channel.

Jurisdictional Waters Including Wetlands

Although wetlands under jurisdiction of the USACE are present along SR-103, they are not within the direct Alternative 2 impact area. The wetland along SR-103 near San Gabriel Street will be avoided. Some effects may occur to roadside drainages, which may be jurisdictional as waters of the U.S. The permitting requirements have been previously described. Native plant communities are not present in these drainages. Compliance with permit conditions will result in appropriate avoidance and minimization of disturbance related to construction.

Special-Status Species

Plants

Southern Tarplant

There is potential for individuals of this species to be present on the site. If individuals were present, and could not be avoided, they would be removed permanently as a result of construction. The removal of southern tarplant, if present on the project site, would be considered an adverse effect.

Animals

The effects from Alternative 2 to special-status species, including federal- and state-listed species, would be the comparable to effects to special-status species described for Alternative 1. However, there would be no effects to harbor seal seals, California sea lions, coastal pelagic species, and groundfish for this alternative in the vicinity of the Consolidated Slip/Dominguez Channel because the alignment for this alternative would not affect those species at that location.

Effects of pile driving on birds within the harbor area is expected to be comparable to effects described under Alternative 1, except, there would be no impacts at Dominguez Channel/ Consolidated Slip under this alternative. Similarly, effects of underwater noise on marine mammals from pile driving would be similar to effects described under Alternative 1, except there would be no impacts at Consolidated Slip/Dominguez Channel.

Invasive Species

Direct effects involving introduction of invasive species under Alternative 2 are expected to be similar to those described under Alternative 1. Specifically, introduction in terrestrial habitats is expected to be minimized by construction BMPs, and would not adversely affect biological resources because intact native plant or wildlife communities are not present on the project site. Introduction of invasive species to aquatic communities is not anticipated.

3.16.3.3.2.1.2 Indirect

Natural Communities

No effects are anticipated on Natural Communities beyond those described as direct effects.

Jurisdictional Waters Including Wetlands

No wetlands are present in the vicinity of Alternative 2.

Special-Status Species

Indirect effects to special-status species from Alternative 2, which include effects from sediment resuspension, would be comparable to those described under Alternative 1 for the Cerritos Channel only.

3.16.3.3.2.2 Operations Effects

3.16.3.3.2.2.1 Direct

Urban/Developed

As with Alternative 1, several overhead utility poles and lines along the flyover, bridge, and expressway alignments would require replacement. Several existing high-voltage (66-kV and 240-kV) SCE transmission lines would conflict with the proposed SR-103 highway structure. In order to accommodate the new alignment, the existing towers would need to be raised an average 13.7 m (45 ft). The towers are currently 13.7 to 15.2 m (45 to 50 ft) high. Each tower installation would consist of four towers, three of which would carry the 240-kV lines, plus a single tower that would carry the 66-kV line.

Impacts to birds from electrocution, collisions, or other sources of mortality at transmission lines were evaluated under Alternative 1. Generally, any new impacts beyond existing conditions would be avoided by implementation of BMPs during design and installation of new towers and lines. Specifically, the use of adequate conductor spacing and line visibility enhancements will be implemented as a part of all new transmission line installations. Construction design standards for avian protection will be generally followed where feasible, as provided in the documents specified (APLIC and USFWS, 2005; APLIC, 1996; APLIC, 1994).

Aquatic Communities

Operations effects resulting from shading under Alternative 2 would be comparable to those described under Alternative 1.

3.16.3.3.2.2.2 Indirect

No indirect effects are anticipated from operation of Alternative 2.

3.16.3.3.3 Alternative 3: Bridge Demolition Avoidance

3.16.3.3.3.1 Construction Effects

3.16.3.3.3.1.1 Direct

Natural Communities

Urban/Developed Areas

Survey results indicated that the majority of the plant species present in the Alternative 3 project area are non-native species. The loss of these non-native species and scattered individual native plants would not represent an adverse effect to natural communities. Effects to urban/developed areas along the SR-47 route would be comparable to those described under Alternative 1.

Brackish Intertidal and Non-tidal Wetlands

A small wetland is present within the footprint of Alternative 3, on a low tidal terrace just above the riprap bank along the south bank of Cerritos Channel, just east of the existing Schuyler Heim Bridge. The wetland is about 0.11-acre, dominated by pickleweed. It appears fully within the regular tidal inundation zone, and is characteristic of tidal wetlands in brackish or saline conditions. It is anticipated that this wetland would be adversely affected by Alternative 3, since the proposed alignment is directly in line with the wetland location.

Aquatic Communities

From the results of the marine survey, aquatic communities are present for Alternative 3 at the Cerritos Channel and the Consolidated Slip/Dominguez Channel. Project effects of Alternative 3 on aquatic communities in the vicinity of the Cerritos Channel and the Dominguez Channel would be comparable to those discussed for Alternative 1. There would be less of an effect to aquatic communities at the Cerritos Channel compared to Alternative 1 because there would be no demolition of the existing Schuyler Heim Bridge. Effects to the aquatic community at the Cerritos Channel would occur only from construction of the new replacement bridge and seismic retrofit activities.

Regarding the acoustic effects to aquatic communities/fishes from implementation of Alternative 3, as previously stated for the effects of pile driving for Alternative 1 and 2, all pile strikes in any given day are accumulated for that day, regardless of time between strikes. The accumulated SEL (cumulative injury estimate) values would be reset to zero overnight and therefore, the daily impacts to the aquatic community/fishes are likely to be similar to that estimated for those in Alternative 1. If a greater number of piles/day were to be driven in a single day for Alternative 3 then the area of impact for that day would be greater for larger fish (> 2 gm) due to an increased SEL value for that size group. However, the impacts to the remaining aquatic community/small fishes (< 2 gm) would be similar to that for Alternatives 1 and 2 given that circumstance.

Open Water Communities

Temporary disruption of open water foraging areas under Alternative 3 would be the same as those described for Alternative 1.

Essential Fish Habitat

Effects to EFH from resuspension of contaminated sediments for Alternative 3 at Cerritos Channel and the Consolidated Slip/Dominguez Channel would be the similar to those described under Alternative 1; however, effects would be reduced since there would be no demolition of the existing Schuyler Heim Bridge. Effects to the aquatic community at the Cerritos Channel would occur only from construction of the new replacement bridge and seismic retrofit activities..

Jurisdictional Waters Including Wetlands

Design specifics for the bridge span across the Cerritos Channel would be required to determine whether the wetland on the tidal terrace east of the Schuyler Heim Bridge would be affected. However, it is likely to be infeasible or impracticable to avoid the wetland; and it is likely to be removed under Alternative 3.

Special-Status Species

Plants

Southern Tarplant

There is potential for individual southern tarplant to be present on the site. If individuals were present, and could not be avoided, they would be removed permanently as a result of construction. The removal of southern tarplant, if present on the project site, would be considered an adverse effect.

Animals

The effects from Alternative 3 to special-status species would be comparable to but less than those described for Alternative 1 with the following exception. There would be less of an

effect to harbor seals, California sea lions, coastal pelagic species, and groundfish for this alternative in the vicinity of the Cerritos Channel because the existing Schuyler Heim Bridge would not be demolished. There would be less of an effect to American peregrine falcons because the existing nesting/roosting area on the Schuyler Heim Bridge would remain. However, there would continue to be an effect to American peregrine falcon because construction of the replacement bridge to the east of the existing Schuyler Heim Bridge may provide some disturbance of the falcon nest site on Schuyler Heim Bridge, as would seismic retrofit activities. Effects to bats would still potentially occur during retrofit activities required in Alternative 3, although the effects would be less than under Alternative 1, which requires complete demolition of the existing bridge.

Effects of pile driving on birds within the harbor area are expected to be comparable to effects described under Alternative 1. Although the bridge is proposed for a slightly different location, there are only slight differences in the number of bents and piles being driven between the two alternatives and preliminary designs indicate they would have the same pile size and drive methods. Similarly, effects of underwater noise on marine mammals would be comparable to those described under Alternative 1.

Invasive Species

Direct effects involving introduction of invasive species under Alternative 3 are expected to be similar to those described under Alternative 1. Specifically, introduction in terrestrial habitats is expected to be minimized by construction BMPs, and would not adversely affect biological resources because intact native plant or wildlife communities are not present on the project site. Introduction of invasive species to aquatic communities is not anticipated.

3.16.3.3.3.1.2 Indirect

Natural Communities

No effects are anticipated on Natural Communities beyond those described as direct effects.

Jurisdictional Waters Including Wetlands

The wetland east of Schuyler Heim Bridge is expected to be removed under Alternative 3; as such, no additional indirect effects would be anticipated.

Special-Status Species

Indirect effects to special-status species from Alternative 3, which include effects from sediment resuspension, would be comparable to those described under Alternative 1.

3.16.3.3.3.2 Operations Effects

3.16.3.3.3.2.1 Direct

Natural Communities

Urban/Developed

Impacts to birds from electrocution, collisions, or other sources of mortality at transmission lines were evaluated under Alternative 1, and would be the same for Alternative 3, which requires transmission line removal and replacement along SR-47 and the flyover. Construction design standards for avian protection will be generally followed where feasible, reducing impacts from new lines or towers.

Aquatic Communities

Operations effects resulting from shading under Alternative 3 would result from construction of the new bridge structure. Impacts of this nature already occur under the existing bridge; under Alternative 3, the impacts under the existing bridge structure would continue unchanged. Impacts would be increased overall as an additional area of approximately 2.55 acres of the Cerritos Channel would be shaded by the new bridge structure to the east of the existing bridge. This would represent an adverse effect to aquatic communities in the Cerritos Channel. However, the habitat affected by the shading would represent a small percentage of the available aquatic habitat in the Cerritos Channel.

Essential Fish Habitat

Operations effects to aquatic communities resulting from shading under the new bridge in Alternative 3 would also represent an effect to EFH.

3.16.3.3.3.2.2 Indirect

No indirect effects are anticipated from operation of Alternative 3.

3.16.3.3.4 Alternative 4: Bridge Replacement Only

3.16.3.3.4.1 Construction Effects

3.16.3.3.4.1.1 Direct

Natural Communities

Urban/Developed Areas

Survey results indicated that the majority of the plant species present in the Alternative 4 project area are non-native species. The loss of these non-native species and scattered individual native plants would not represent an adverse effect to natural communities. Effects to urban/developed areas near Schuyler Heim Bridge would be comparable to those described under Alternative 1, as related to replacement of the bridge only.

Brackish Intertidal and Non-tidal Wetlands

Brackish intertidal or non-tidal wetlands are not present in the Alternative 4 footprint.

Aquatic Communities

From the results of the marine survey, aquatic communities are present for Alternative 4 at the Cerritos Channel only. Effects of Alternative 4 on aquatic communities in the vicinity of the existing Schuyler Heim Bridge would be comparable to those discussed for Alternative 1 with the following exception. There would be no effects to aquatic communities in the Consolidated Slip/Dominguez Channel because the alignment for Alternative 4 does not cross this feature.

Open Water Communities

Temporary disruption of open water foraging areas under Alternative 4 would be the same as described for Alternative 1 as related to replacement of the Schuyler Heim Bridge only; effects would be limited to the Cerritos Channel.

Essential Fish Habitat

Effects to EFH from resuspension of contaminated sediments and from underwater noise from pile driving would be the same under Alternative 4 as Alternative 1 as related to replacement of the Schuyler Heim Bridge only, effects would be limited to the Cerritos Channel.

Jurisdictional Waters Including Wetlands
There are no jurisdictional wetlands in the footprint of Alternative 4.

Special-status Species
Plants

Southern Tarplant

There is potential for individuals of this species to be present on the site. If individuals were present, and could not be avoided, they would be removed permanently as a result of construction. The removal of southern tarplant, if present on the project site, would be considered an adverse effect.

Animals

The effects from Alternative 4 to special-status species, including federal- and state-listed species, would be comparable to effects to special-status species described for Alternative 1 as related to replacement of the Schuyler Heim Bridge only. However, there would be no effects to harbor seals, California sea lions, coastal pelagic species, and groundfish for this alternative in the vicinity of the Consolidated Slip/Dominguez Channel because the alignment for this alternative would not affect those species at that location.

Invasive Species
Direct effects involving introduction of invasive species under Alternative 4 are expected to be similar to those described under Alternative 1 as related to replacement of the Schuyler Heim Bridge only. Specifically, introduction in terrestrial habitats is expected to be minimized by construction BMPs, and would not adversely affect biological resources because intact native plant or wildlife communities are not present on the project site. Introduction of invasive species to aquatic communities is not anticipated.

3.16.3.3.4.1.2 Indirect
Natural Communities
No effects are anticipated on Natural Communities beyond those described as direct effects.

Jurisdictional Waters Including Wetlands
No wetlands are present in the vicinity of Alternative 4.

Special-Status Species
Indirect effects to special-status species from Alternative 4, which include effects from sediment resuspension, would be comparable to those described under Alternative 1 as related to replacement of the Schuyler Heim Bridge only. Effects would be limited to the Cerritos Channel.

3.16.3.3.4.2 Operations Effects

3.16.3.3.4.2.1 Direct
Urban/Developed

Impacts to birds from electrocution, collisions, or other sources of mortality at transmission lines were evaluated under Alternative 1, and would be similar for Alternative 4, which requires transmission line removal and replacement along SR-47. Specifically, an existing segment of two 34.5-kV feeders and two 4.8-kV feeders would conflict with the proposed SR-47 roadway and would require relocation to taller steel poles. Construction design

standards for avian protection will be generally followed where feasible, as described under Alternative 1, reducing impacts from new lines or towers.

Aquatic Communities

Operations effects resulting from shading under Alternative 4 would be comparable to those described under Alternative 1.

3.16.3.3.4.2.2 Indirect

No indirect effects are anticipated from operation of Alternative 4.

3.16.3.3.5 Alternative 5: Transportation System Management

3.16.3.3.5.1 Construction Effects

3.16.3.3.5.1.1 Direct

Natural Communities

Native terrestrial communities are not present on the project site. Native aquatic communities are present for this alternative only at the Cerritos Channel at the existing Schuyler Heim Bridge and replacement bridge site only. This alternative consists of traffic management measures and would require minimal, if any, construction; therefore, it would not affect native terrestrial or aquatic communities. There would be no adverse effects to terrestrial and aquatic communities from implementation of Alternative 5.

Jurisdictional Waters Including Wetlands

Jurisdictional wetlands are present to the east of the Schuyler Heim Bridge along a low tidal terrace on Cerritos Channel. There would be minimal construction, however, under Alternative 5. No effects to these wetlands would occur.

Special-status Species

Plants

During reconnaissance-level surveys, southern tarplant was not observed within the project area. However, this does not verify absence of the species from the site. There would be minimal construction, however, under Alternative 5. No adverse effect to this species, if it is present, would be anticipated to occur.

Animals

During reconnaissance-level surveys of the project area, special-status species were identified in the project vicinity, including California sea lion, California brown pelican, American peregrine falcon, and double-crested cormorant. However, neither aquatic nor terrestrial habitat for special-status species would be affected by elements of this project alternative. There would be minimal construction under Alternative 5. No adverse effects to special-status animal species, if present, would be anticipated to occur.

Invasive Species

Direct effects involving introduction of invasive species are not anticipated from the minimal construction activities under Alternative 5.

3.16.3.3.5.1.2 Indirect

No indirect effects are anticipated under Alternative 5.

3.16.3.3.5.2 Operations Effects

3.16.3.3.5.2.1 Direct

No direct effects are anticipated from operation of Alternative 5.

3.16.3.3.5.2.2 Indirect

No indirect effects are anticipated from operation of Alternative 5.

3.16.3.3.6 Alternative 6: No Build

3.16.3.3.6.1 Construction Effects

3.16.3.3.6.1.1 Direct

Natural Communities

There would be no project effects to native terrestrial or aquatic communities from the No Build alternative.

Jurisdictional Waters Including Wetlands

Jurisdictional wetlands are present to the east of the Schuyler Heim Bridge along a low tidal terrace on Cerritos Channel. There would no construction under the No Build alternative, and no effect to these wetlands would occur.

Special-Status Species

There would be no construction under the No Build alternative. No effect to special-status plant or animal species, if present, would occur.

3.16.3.3.6.1.2 Indirect

There would be no construction under the No Build alternative. No indirect temporary effects to biological resources would occur.

3.16.3.3.6.2 Operations Effects

3.16.3.3.6.2.1 Direct

There would be no change to operation of the existing Schuyler Heim Bridge under the No Build alternative. Current direct effects of the bridge operations include shading of aquatic habitats beneath the bridge (affecting approximately 1.54 acres), and provision of a nesting platform for peregrine falcons on the south tower of the bridge. These effects would continue under the No Build alternative. Specifically, nesting on the south tower of the bridge provides limited success for Peregrine falcons, and provides fledging of young on an annual basis.

3.16.3.3.6.2.2 Indirect

There would be no construction under the No Build Alternative. No indirect effects to biological resources would occur.

3.16.3.3.7 CEQA Consequences

Based on the information provided in the above analysis, in accordance with California Environmental Quality Act (CEQA) criteria, potentially significant impacts to biological resources would be less than significant after mitigation. Under Alternatives 1, 2, 3, and 4, potential significant impacts to peregrine falcon, special-status plant species, and burrowing owl would be mitigated to less than significant. Other impacts that would occur with these alternatives would be less than significant. Under Alternative 3, significant impacts to

wetlands also would be mitigated to less than significant. There would be no impact to biological resources under Alternatives 5 and 6.

Under Alternatives 1 through 4, impacts to related to movement of fish or wildlife species of EFH would be less than significant, while under Alternatives 5 and 6, there would be no impact. Under Alternatives 1 through 6, there would be no impact to local policies or ordinances protecting biological resources.

Potential impacts of the proposed project alternatives related to Biological Resources are addressed in the context of CEQA criteria in Chapter 4.0 – CEQA Analysis. Significant impacts are addressed in Section 4.3 – Mandatory Findings of Significance, Section 4.4 – Significant Environmental Effects of the Proposed Project, Section 4.5 – CEQA Analysis of Alternatives, Table 4-1 - Significant Environmental Impacts and Mitigation Measures, and Table 4-2 - CEQA Unavoidable Adverse Impacts. A CEQA Checklist is provided in Appendix A (IV, Biological Resources).

3.16.4 Avoidance, Minimization, and/or Mitigation Measures

3.16.4.1 Avoidance and Minimization Measures

3.16.4.1.1 Construction

3.16.4.1.1.1 Alternatives 1, 1A, 2, and 4

B-1 Wetland Avoidance

To avoid the wetlands present to the east of the Schuyler Heim Bridge along the low tidal terrace on Cerritos Channel and along SR-103 near Gabriel Street, construction staging, traffic, and vehicle access would be excluded from these areas to the extent feasible. Caution fencing would be installed to protect the small wetlands, and construction activities would be modified to avoid them.

The above also would be implemented, as necessary, to avoid adverse effects to jurisdictional waters.

B-2 Protecting Aquatic Communities (including EFH, Coast Pelagic Species, Groundfish)

Sediment resuspension would be minimized by adherence to the CIDH or CISS design of all in-water piles, whereby the outer shell would act as a coffer dam during construction and contain resuspended sediment onsite until it is removed from within the shell prior to concrete pile installation.

Measures that would be implemented during construction (including retrofit [Alternative 3 only], demolition, and/or new bridge installation) to minimize sediment resuspension effects include:

- Channel bank work would include bank protection (riprap, concrete walls) to eliminate the possibility of enhanced bank erosion.

To reduce effects to channel water quality from lead compounds in paint during removal or during bridge demolition, the following measures in some combination would be implemented:

- Erect shrouds around working areas and suspend nets and tarps below bridges to catch debris from abrasive removal of old paint, where wind conditions permit.
- Anchor tarps to barges below and enclose the bridge above to confine debris, where the bridge deck is not too far above water level.
- Use barges and booms to capture fugitive floating paint chips, and custom-built enclosures to confine and capture the abrasives, old paint chips, and paint.
- Use vacuum or suction shrouds on blast heads to capture grit and old paint.
- Perform lead-based paint removal offsite, following demolition of steel members.

To reduce the effects of elevated underwater and terrestrial sound levels on aquatic habitats and EFH during construction from bridge pile driving and related activities, the following measures would be implemented:

- Attenuation of pile driving sound would be developed during the PS&E stage; this is likely to include a contained air bubble curtain on larger pile installations and dewatering casings for smaller piles. Performance criteria for sound attenuation would be developed to achieve maximum practicable reductions in underwater sound levels.
- A hydroacoustic monitoring plan would be developed, which would include appropriate sampling point locations, frequency, and methodology to be implemented during pile driving. The results of the hydroacoustic monitoring would be analyzed real time to identify appropriate safety isopleths and monitoring zones for sensitive resources.
- Evaluate potential to modify pile driving operational procedures to reduce noise effects, such as ramping up of pile driving energy levels to allow mobile organisms to exit the area; evaluating potential use of vibratory versus impact hammers under certain conditions; using less force of the hydraulic impact hammer; and limiting pile driving to no more than 2 piles a day, with a minimum 12 hours interval between daily driving, to minimize cumulative exposure levels (SEL).
- Evaluate potential for seasonal or daily time constraints, such as pile driving during a time of year when larval and juvenile stages of fish species with designated EFH are not present, driving piles during low tide periods when located in intertidal and shallow subtidal areas, and driving piles when the current is reduced (i.e., centered around slack current) in areas of strong current.

To reduce and/or avoid potential impacts of elevated underwater sound levels on marine mammals during construction from pile driving the following additional measures would be implemented:

- A detailed marine mammal monitoring/protection plan would be developed in coordination with NMFS; this would include use of biological monitors with authority to suspend pile driving activities should sensitive organisms be present or enter the area. Details of the plan would be developed, and would include methods to identify safety zone limits, numbers and locations of monitors, and conditions when pile driving would be suspended to protect resources.

B-3 Protecting Special-Status Plants

Preconstruction surveys for southern tarplant would be conducted prior to construction. Surveys would be conducted during the blooming period for this plant, between June and October. If identified on site:

- The feasibility of avoiding areas that support the species would be evaluated and, if feasible, the area would be avoided during construction.
- If avoidance is infeasible, then mitigation would be required (see Mitigation Measure B-13).

B-4 Protecting Special-Status Bat Species

Avoidance and minimization measures apply to the following species: pallid bat; long-legged myotis; long-eared myotis; Yuma myotis; western mastiff bat; pocketed free-tailed bat; big free-tailed bat.

To avoid or minimize effects to these species, the following measures would be employed relative to bridge or highway deconstruction or, under Alternative 3, seismic retrofit:

- Four quarterly bat surveys would be conducted in the 12 months prior to start of construction to determine the presence or absence of the species, as determined appropriate by a qualified biologist. Surveys may include, but are not limited to the following:
  - Exit surveys of potential roost sites conducted by survey biologists stationed around the bridge or highway with binoculars and echolocation meters at nightfall
  - Surveys of all accessible potential roost sites on the bridge conducted by biologists permitted by CDFG for bat survey and handling
- In the event any of the above special-status bat species are identified during field surveys, the following would be conducted:
  - Exclusion of active roost sites by appropriate barriers, installed during the nonbreeding season from September to March
  - Taking appropriate steps to exclude roosts when vacant during nighttime foraging periods when identified during construction

  - If the exclusion measures above fail, delay of construction where maternity roosts are encountered, until after the young have weaned and are in flight

- Education of construction workers to identify potential roost sites, to avoid activity when identified, and to advise biological monitors when roosts are encountered.

B-5 Protecting Bird Nests and Eggs

Preconstruction surveys to identify potential nest sites for birds will be conducted within all construction areas on the bridge prior to the nesting season. Potential nest sites will be passively excluded with bird spikes, plywood, or other means, as necessary. An onsite biological monitor will be present during construction activities to ensure that nests are not established within the construction zone, and to implement passive exclusion as necessary.

B-6 Protecting California Least Tern

Prior to construction, potential breeding habitat for least tern in the vicinity of the build alternatives (Alternatives 1 through 4) would be surveyed for the presence of least tern during the April 15 to September 15 survey period for nesting birds. If they are found to be present, the avoidance and minimization measures determined through consultation with the USFWS will be adhered to.

B-7 Protecting American Peregrine Falcon

- Historical nesting sites on the Schuyler Heim Bridge would be made unsuitable prior to the nesting season (January 15 to July 30) to avoid direct effects to individuals or an active nest site during construction. This may include positioning exclusion materials, such as plywood, on these nest sites prior to the nesting season to render the sites unsuitable.

- Site monitoring during the construction period would be conducted to observe the pair's movements and document its activities. This may assist in identifying nesting attempts by the pair on adjacent structures or within the construction zone. If this occurs, and the nest site is at risk or could be at risk during the nesting season, the site can be excluded. This includes risk from egg loss which may occur on a less than optimal nest site. If the nesting attempt site is not anticipated to be at direct risk from construction disturbance during the upcoming nesting season, then the pair will be allowed to nest, and nesting success will be monitored.

- Efforts will be made to coordinate the construction schedule of the Schuyler Heim Bridge with the construction schedule of the future Gerald Desmond Bridge replacement project. If these two schedules do not overlap, then the Gerald Desmond Bridge may provide a nesting location for one peregrine pair to breed at the Schuyler Heim/Gerald Desmond bridge complex, which has generally been the case in past years. Coordination meetings with the Gerald Desmond Bridge project team are ongoing.

B-8 Protecting Burrowing Owl

To avoid effects on burrowing owls, preconstruction surveys of potential breeding sites would be conducted onsite within 152 m (500 ft) of construction activities. Burrowing owl individuals present within the construction area would be flushed from active burrows during the non-nesting season (August to January) and burrows excluded. These activities would be conducted in a manner consistent with the *Burrowing Owl Survey Protocol and Mitigation Guidelines*, prepared by The California Burrowing Owl Consortium in 1997. Exclusions would require maintenance and monitoring to assure that individuals do not return.

B-9 Protecting Against Invasive Species

To avoid the introduction or spread of noxious weeds into previously uninfested areas, Caltrans and/or its contractors will implement the following measures:

- Educate construction supervisors and managers on weed identification and the importance of controlling and preventing the spread of noxious weed infestations.
- Clean construction equipment at designated wash stations before entering the construction area.
- Landscaping and erosion control included in the project would use species that are not listed as noxious weeds.
- Seed all disturbed areas with certified weed-free native mixes. Use only certified weed-free straw or rice mulch in uplands only.
- Conduct a follow-up inventory of the construction area during the first spring following the completion of construction to verify that construction activities have not resulted in the introduction of new noxious weed infestations.
- If new noxious weed infestations are located during the follow-up inventory, contact the appropriate resource agency to determine species-specific treatment methods.

3.16.4.1.1.2 Alternative 3

See **B-2** through **B-9**, above.

3.16.4.1.1.3 Alternatives 5 and 6

Avoidance and minimization measures are not required.

3.16.4.1.2 Operations

3.16.4.1.2.1 Alternatives 1, 1A, 2, and 4

B-10 Protecting Avian Species at Transmission Towers

To protect against operational impacts to birds moving about or utilizing new transmission towers, construction design standards for avian protection will be followed, including use of visual line enhancers and adequate spacing between energized parts. No lighting will be associated with new transmission towers. Design standards for avian protection will be developed from the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and USFWS *Avian*

Protection Plan Guidelines (APLIC and USFWS, 2005), APLIC's *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (APLIC, 1996), or APLIC's *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994* (APLIC, 1994).

3.16.4.2 Mitigation Measures

3.16.4.2.1 Construction

3.16.4.2.1.1 Alternatives 1, 1A, 2, 3, and 4

B-12 Mitigating for Loss of Peregrine Falcon Nest

This measure may include the following, as appropriate, pending coordination with CDFG:

- Create a new nest site by placing a nesting box (and potential additional support material) on a tower of the Badger Avenue Bridge or other elevated structure, as determined by a qualified biologist. Because the Badger Avenue Bridge is located adjacent to the Schuyler Heim Bridge, and is approximately the same height, there is the potential that it could provide a suitable vantage point and nesting location to peregrine falcons. The peregrine pair has never nested on this bridge in the past but this may be due to an absence of suitable nesting platforms and substrate. Further evaluation of any design changes or nesting ledge installations by a qualified peregrine expert would be conducted.
- Offsite mitigation. The goal of the offsite mitigation would be to augment existing peregrine populations. This could be accomplished by purchasing approximately 10 nestling peregrines from a captive breeding facility and having those young released (hacked) in an area of California where, when they disperse, they will possibly create a new nesting pair.
- The local peregrine falcon population (approximately five pairs) would be monitored for 2 years. The pair located on the Schuyler Heim Bridge would be monitored to determine if they nest on the Badger Bridge, or if they integrate into other territories by filling a vacancy in another pair, or by usurping existing individuals in a pair. If offsite mitigation is conducted, hacked (removed) peregrine falcons would be monitored to determine their fate and if a new nesting pair is established. An experienced peregrine falcon biologist would conduct monitoring of the hacked peregrine falcons.

B-13 Mitigating for Loss of Special-Status Plant Species

Surveys for special-status plant species shall be conducted during flowering season prior to construction, at the PS&E stage. If special-status plant species are found and cannot be avoided during project construction, then seed and/or propagules of the species would be collected and replanted at an alternative location. These activities will be conducted in coordination with the resource agencies.

- Mitigation measures would be refined in coordination with the resource agencies and standard practices for this species. Measures may include the following: Areas determined to have appropriate hydrology and soil chemistry (salinity) shall be reseeded with seed collected from populations of southern tarplant.

Southern tarplant is restricted to saline, vernally mesic areas, often along the margins of estuaries or areas of high salinity.

- Prior to construction, southern tarplant and/or other special-status seed shall be collected by personnel experienced in collection of native seeds. Seed collection shall be conducted during successive years from September through December. One-half of the first year's collected seed shall be hand-broadcast at the reintroduction site with the remaining one-half stored in appropriate conditions for introduction the following year. Seed collected during the second season shall be stored for potential later use in the event that success standards are not met following the seeding during years one and two.
- Because southern tarplant is an annual species, population numbers are expected to naturally fluctuate from year to year depending upon environmental conditions. Reseeded areas shall be monitored for three years following the initial seeding. Establishment shall be considered successful if plant densities during any of the three years of monitoring are comparable to densities of the impacted populations based on sampling quadrants. If established populations do not achieve comparable densities of impacted populations, additional reintroduction sites shall be identified and stored seed, obtained during the collection period, shall be introduced into additional sites over a two-year period (as in the initial reintroduction program described above).

B-14 Mitigating for Burrowing Owl

If flushing of individual birds and exclusions of burrows fail, construction activities would be delayed within 152 m (500 ft) of nest sites until after the breeding season for these species (February to July).

3.16.4.2.1.2 Alternative 3

B-15 Mitigating Loss of Wetland

Under Alternative 3, the wetland east of the Schuyler Heim Bridge would be impacted, and mitigation would be required, as follows:

Under Section 404 of the Clean Water Act, a permit would be required from USACE prior to impacting waters of the U.S. including wetlands. This is anticipated to be achieved through the Nationwide Permit system. Compliance to permit conditions would be required. The permit is likely to require implementation of mitigation to offset effects to waters of the U.S., including wetlands. This may include creation of offsite wetlands, or payment of fees into existing mitigation banks. Complying with these mitigation measures contained in the permit, once acquired, would provide mitigation for the effect.

3.16.4.2.1.3 Alternatives 5 and 6

No mitigation measures are required for Alternatives 5 and 6.

3.16.4.2.2 Operations

No mitigation measures are required for project operations.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2730 Loker Avenue West
Carlsbad, California 92008

In Reply Refer To:
FWS-LA-2668.1

Ronald J. Kosinski
Deputy District Director
Division of Environmental Planning
California Department of Transportation
120 South Spring Street (MS 16A)
Los Angeles, California 90012

FEB 28 2002

Re: Notice of Preparation of a Draft Environmental Impact Report for the Schuyler Heim Bridge Replacement and Alameda Corridor Truck Expressway Project, Cities of Long Beach and Los Angeles, Los Angeles County, California

Dear Mr. Kosinski:

We have reviewed the notice of preparation (NOP) for a draft environmental impact report (DEIR) received in this office on January 31, 2002, for the Schuyler Heim Bridge Replacement and Alameda Corridor Truck Expressway Project, Cities of Long Beach and Los Angeles, Los Angeles County, California. The proposed project consists of the replacement of the Schuyler Heim Bridge over the Cerritos Channel at the Port of Long Beach and construction of an elevated truck expressway between the Schuyler Heim Bridge and Pacific Coast Highway in the Wilmington community of Los Angeles.

We offer the following comments and recommendations regarding project-associated biological impacts based on our review of the NOP and our knowledge of declining habitat types and species within Los Angeles County. We provide these comments in keeping with our agency's mission to work "with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people." Specifically, we administer the Endangered Species Act of 1973 (Act), as amended. Section 7 of the Act requires Federal agencies to consult with the Fish and Wildlife Service (Service) should it be determined that their actions may affect federally listed threatened or endangered species. Section 9 of the Act prohibits the "take" (e.g., harm, harassment, pursuit, injury, kill) of federally listed wildlife. "Harm" is further defined to include habitat modification or degradation where it kills or injures wildlife by impairing essential behavioral patterns including breeding, feeding, or sheltering. Take incidental to otherwise lawful activities can be permitted under the provisions of sections 7 (Federal consultations) and 10 (permits) of the Act. We also provide comments on public notices issued for a Federal permit or license affecting the Nation's waters pursuant to the Clean Water Act.

To facilitate the evaluation of the proposed project from the standpoint of fish and wildlife protection, we request that the DEIR contain the following specific information.

1. A description of the environment in the vicinity of the project from both a local and regional perspective, including an aerial photograph of the area with the project site outlined.

2. A complete discussion of the purpose and need for the project and each of its alternatives.

3. A complete description of the proposed project, including the limits of the project area. This project description should include all practicable alternatives that have been considered to avoid and minimize project impacts, to the maximum extent practicable, to sensitive habitats (e.g., eelgrass) and endangered, threatened, and sensitive species, as well as measures to mitigate unavoidable impacts.

4. Quantitative and qualitative assessments of the biological resources and habitat types that will be impacted by the proposed project and its alternatives. An assessment of direct, indirect, and cumulative project impacts to fish and wildlife associated habitats. All facets of the project (i.e., construction, implementation, operation, and maintenance) should be included in this assessment. Proposed developments in the surrounding area should be addressed in the analysis of cumulative impacts.

   This assessment should include a list of Federal candidate, proposed, or listed species; State-listed species; and locally sensitive species that are on or near the project site, including a detailed discussion of these species and information pertaining to their local status and distribution. We are particularly interested in any and all information and data pertaining to potential impacts to populations of federally listed species, including the endangered California brown pelican (*Pelecanus occidentalis*), endangered California least tern (*Sterna antillarum (=albifrons) browni*), and threatened western snowy plover (*Charadrius alexandrinus nivosus*). The peregrine falcon (*Falco peregrinus*), recently delisted from the list of endangered species, has also been found to nest at the bridge. The rare southern tarplant (*Centromadia parryi* var. *australis*) has been documented to occur in disturbed areas in the region. The DEIR should disclose all impacts to these sensitive resources and proposed measures to be taken to avoid, minimize, and mitigate these impacts. Measures to avoid, minimize, and mitigate impacts should be spelled out separately from the effects analysis.

5. An assessment of potential impacts to wetlands and jurisdictional waters of the United States. Section 404 of the Clean Water Act prohibits the unauthorized discharge of dredged or fill material into such waters, including wetlands. This section also provides that the U.S. Army Corps of Engineers (Corps) may issue permits for discharges of dredged or fill material into jurisdictional waters and wetlands. Potential areas of Corps jurisdiction should be evaluated and wetlands should be delineated using the methodology set forth in the *1987 U.S. Army Corps of Engineers Wetland Delineation Manual*. The DEIR should disclose all impacts to jurisdictional waters, including wetlands, and propose measures to avoid, minimize, and mitigate such impacts.

Ronald J. Kosinski (FWS-LA-2668.1) 3

We appreciate the opportunity to comment on the referenced NOP for potential impacts on sensitive and endangered species and wetland resources. If you should have any questions pertaining to these comments, please contact Fish and Wildlife Biologist Kevin Clark of my staff at (760) 431-9440.

Sincerely,

Karen A. Evans
Assistant Field Supervisor

cc: Brad Henderson, CDFG,

06/03/02 WED 08:20 FAX 7144292050 CH2M HILL/SCO 001

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2730 Loker Avenue West
Carlsbad, California 92008

In Reply Refer To:
FWS-LA-2668.2

MAY 31 2002

Carolyn Washburn, Ph.D.
CH2M HILL
3 Hutton Centre Drive
Santa Ana, California 92707

Re: Request for Information on Proposed, Threatened, and Endangered Species in the Vicinity of Schuyler Heim Bridge, Ports of long Beach and Los Angeles, Los Angeles County, California

Dear Dr. Washburn:

This letter is in response to your inquiry received May 7, 2002, concerning federally endangered, threatened, and proposed species that may occur in the vicinity of Schuyler Heim Bridge, Los Angeles County, California. To assist you in evaluating the potential occurrence of these species within the area of interest, we are providing the enclosed list, which identifies federally listed endangered, threatened, and proposed species that occur in the general region.

Section 7 of the Endangered Species Act of 1973 (Act), as amended, requires Federal agencies to consult with us, the U.S. Fish and Wildlife Service, should it be determined that their actions may affect federally listed threatened or endangered species. Section 9 of the Act prohibits the "take" (e.g., harm, harassment, pursuit, injury, kill) of federally listed wildlife. "Harm" is further defined to include habitat modification or degradation where it kills or injures wildlife by impairing essential behavioral patterns including breeding, feeding, or sheltering. Take incidental to otherwise lawful activities can be authorized under sections 7 (Federal consultations) and 10 (habitat conservation plans) of the Act.

If a proposed project is authorized, funded, or carried out by a Federal agency and may affect a listed species, then the Federal agency must consult with us on behalf of the applicant, pursuant to section 7 of the Act. In other words, any activity on private land that requires Federal involvement (such as the issuance of a section 404 permit under the Clean Water Act by the U.S. Army Corps of Engineers) and may affect listed species must be reviewed by us to insure that the continued existence of the species would not be jeopardized. During the section 7 process, measures to avoid and minimize project effects to listed species and their habitat will be identified and incorporated into a biological opinion that includes an incidental take statement that authorizes incidental take by the Federal agency and applicant.

If a proposed project does not involve a Federal agency, but is likely to result in the take of a

listed animal species, then the landowner or project proponent should apply for an incidental take permit, pursuant to section 10 of the Act. When an application is made for an incidental take permit, measures to avoid, minimize, or mitigate for effects to listed species and their habitat will be identified and incorporated into a habitat conservation plan. If the habitat conservation plan and the application for the permit meet the issuance criteria, a permit authorizing incidental take is issued.

We do not have site-specific information for this area. Therefore, we recommend that project proponents seek assistance from a biologist familiar with the habitat conditions and associated species in and around their project site to assess the actual potential for direct, indirect and cumulative impacts likely to result from the proposed activity.

In addition to the organisms specified on the enclosed list, we are also concerned for the following habitat community types that could potentially occur in the area and are becoming more rare. These include coastal salt marsh, eelgrass, and intertidal communities.

Please contact the California Department of Fish and Game (CDFG) for other State-listed and sensitive species that may occur in the area of the project. State-listed species are protected under the provisions of the California Endangered Species Act. Rare plant species that may occur in the project area are included in the California Native Plant Society's (CNPS) inventory of rare and endangered vascular plants in California. The rare southern tarplant (*Centromadia parryi* var. *australis*) has also been documented to occur in disturbed areas in the region. The peregrine falcon (*Falco peregrinus*), recently delisted from the list of endangered species, has been found to nest at the bridge. State-listed and CNPS species require full consideration under the California Environmental Quality Act. The Natural Diversity Data Base of CDFG should also be contacted for a list of taxa that are known to occur in the project vicinity.

Should you have any questions regarding the species list provided, or your responsibilities under the Act, please contact Fish and Wildlife Biologist Kevin Clark of my staff at (760) 431-9440.

Sincerely,

Anne Hecker
for

Karen A. Evans
Assistant Field Supervisor

Enclosure

Federally Endangered, Threatened, Proposed, and Candidate Species that May Occur in the Vicinity of Schuyler Heim Bridge, Ports of Los Angeles and Long Beach, Los Angeles County, California May 31, 2002

Common Name	Scientific Name	Status
BIRDS		
California least tern	*Sterna antillarum (=albifrons) browni,*	E
California brown pelican	*Pelecanus occidentalis*	E
Western snowy plover	*Charadrius alexandrinus nivosus*	T

E: Endangered
T: Threatened

STATE OF CALIFORNIA - THE RESOURCES AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF FISH AND GAME

South Coast Region
4949 Viewridge Avenue
San Diego, California 92123
(858) 467-4201
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March 1, 2002

Comments on the Notice of Preparation of a Draft Environmental Impact Report for the Schuyler Heim Bridge Replacement and Alameda Corridor Truck Expressway Project, Cities of Long Beach and Los Angeles, Los Angeles County (SCH#2002021009)

Ronald Kosinski
Department of Transportation, District 7
120 South Spring Street (MS 16 A)
Los Angeles, CA 90012

Dear Mr. Kosinski:

The Department of Fish and Game (Department) appreciates this opportunity to comment on the above-referenced project, relative to impacts to biological resources. The Department is both a Trustee and Responsible Agency pursuant to the California Environmental Quality Act (CEQA), Sections 15386 and 15381 respectively. As a Trustee Agency, the Department must be consulted by the Lead Agency during the preparation and public review for project specific CEQA documents. The Department is responsible for the conservation, protection, and management of the state's biological resources, including rare, threatened, and endangered plant and animal species pursuant to the California Endangered Species Act (CESA). The Department also administers the Natural Community Conservation Program (NCCP).

The proposed project consists of replacement of the Schuyler Heim Bridge over the Cerritos Channel at the Port of Long Beach and construction of an elevated truck expressway from the Schuyler Heim Bridge to SR-1. The purpose of the project is to bring the bridge up to current seismic standards and improve the SR-47/Henry Ford Avenue/Alameda Street transportation corridor. It has been determined that bridge replacement is more economically feasible than retrofit and maintenance of the existing bridge. A wider concrete fixed bridge would replace the existing steel vertical lift bridge. Bridge alternatives include only variations in the horizontal alignment, vertical clearance and channel-widths. Although this area is highly developed and includes land uses such as industrial shipyards, oil wells and refineries, potentially significant impacts to biological resources have been identified. Biological resources in the vicinity include peregrine falcons, which currently use the towers of the bridge as a nest site and hunting perch, a California brown pelican feeding area, habitat for Pacific pocket mouse and salt marsh bird's beak; there is also potential for several other listed, sensitive or special-status species.

To enable Department staff to adequately review and comment on the proposed project, we recommend the following information be included in the Draft Environmental Impact Report (DEIR):

1. A complete description of the proposed project, including all staging areas, access routes, utility relocations, etc.

2. A complete list and assessment of the flora and fauna within and adjacent to the project area, with particular emphasis on identifying endangered, threatened, and candidate species, State Protected and Fully Protected species, California Species of Special Concern, and locally unique species and sensitive habitats.

   a. A thorough assessment of rare plants and rare natural communities, following the Department's May 1984 Guidelines (revised August 1997) for Assessing Impacts to Rare Plants and Rare Natural Communities (Attachment 1).

   b. Surveys for eelgrass in the vicinity (area of potential affect) of the Schuyler Heim Bridge must be included, along with an assessment of impacts to this habitat type, if it is present.

   c. A detailed discussion, including both qualitative and quantitative analyses, of the potentially affected species (fish, wildlife, plants), and their habitats, including information pertaining to their local status and distribution. The anticipated impacts of the project on these species and habitats should be fully addressed. Seasonal variations in use of the project area should also be addressed.

   d. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the Department and the U.S. Fish and Wildlife Service.

   e. Rare, threatened, and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition (see CEQA Guidelines, § 15380).

   f. The Department's California Natural Diversity Data Base in Sacramento should be contacted at (916) 327-5960 to obtain current information on any previously reported sensitive species and habitats, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code.

3. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts should be included.

   a. CEQA Guidelines, § 15125(a), direct that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region.

   b. Project impacts should be analyzed relative to their effects on off-site habitats. Specifically, this should include nearby public lands, open space, adjacent natural habitats, and riparian ecosystems. Impacts to, and maintenance of, wildlife corridor/movement areas, including access to undisturbed habitat in adjacent areas should be fully evaluated and provided.

   c. Discussion of potential conflicts resulting from wildlife-human interactions, potential adverse impacts from lighting, noise, vibration, human activity, changes in drainage patterns, polluted runoff, hazardous materials spills, soil erosion and/or sedimentation, with mitigation measures proposed to alleviate such impacts must be included.

   d. A cumulative effects analysis should be developed as described under CEQA Guidelines, § 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

   e. If applicable, the document should include an analysis of the effect that the project may have on completion and implementation of regional and/or subregional conservation programs. Under § 2800-§ 2840 of the Fish and Game Code, the Department, through the Natural Communities Conservation Planning (NCCP) program, is coordinating with local jurisdictions, landowners, and the Federal Government to preserve local and regional biological diversity.

4. An appropriate range of alternatives should be analyzed to ensure that alternatives to the proposed project which would avoid or substantially lessen significant effects on fish, wildlife and native plants of the state are fully considered and evaluated. In order for the Department to utilize the final document as a responsible agency, the alternatives must include those which avoid or otherwise minimize impacts to sensitive biological resources that are regulated by Fish and Game Code.

5. Mitigation measures for adverse project-related impacts to sensitive plants, animals, and habitats should be discussed. Mitigation measures should emphasize avoidance and where avoidance is infeasible, reduction of impacts. For unavoidable impacts, the selection of on-site or off-site restoration and/or enhancement, or habitat acquisition and preservation should be determined based on a thorough analysis of the context of each impact and how the proposed compensation measure(s) will completely mitigate for all lost habitat functions and values.

   a. The Department considers Rare Natural Communities as threatened habitats having both regional and local significance. Thus, these communities should be fully avoided and otherwise protected from project-related impacts (Attachment 2).

   b. The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Department studies have shown that these efforts are experimental in nature and largely unsuccessful.

   c. Areas reserved as mitigation for project impacts must be conserved as habitat in perpetuity and should be protected from future direct and indirect impacts. Potential issues to be considered include limitation of access, conservation easements, monitoring and management programs, control of illegal dumping, water pollution, and fire.

   d. Plans for restoration and revegetation should be prepared by persons with expertise in southern California ecosystems and native plant revegetation techniques. Each plan should include, at a minimum: 1) the location of the mitigation site; 2) the plant species to be used, container sizes, and seeding rates; 3) a schematic depicting the mitigation area; 4) planting schedule; 5) a description of the irrigation methodology; 6) measures to control exotic vegetation on site; 7) specific success criteria; 8) a detailed monitoring program; 9) contingency measures, should the success criteria not be met; and 10) identification of the party responsible for meeting the success criteria and providing for conservation of the mitigation site in perpetuity.

6. A California Endangered Species Act (CESA) Permit must be obtained, if the project has the potential to result in "take" of species of plants or animals listed under CESA, either during construction or over the life of the project. CESA Permits are issued to conserve, protect, enhance, and restore State-listed threatened or endangered species and their habitats. Early consultation is encouraged, as significant modification to a project

and mitigation measures may be required in order to obtain a CESA Permit. Revisions to the Fish and Game Code, effective January 1998, may require that the Department issue a separate CEQA document for the issuance of a 2081 permit unless the project CEQA document addresses all project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of a 2081 permit. For these reasons, the following information is requested:

a. An analysis and discussion demonstrating that: 1) each impact has been minimized and fully mitigated, 2) all mitigation measures are capable of successful implementation, and 3) adequate funding is ensured for implementation, and for monitoring compliance with, and effectiveness of, the mitigation measures.

b. The analysis of the impacts of the taking must include all impacts on the species that result from any act that would cause the proposed taking.

c. An evaluation of the impacts that includes a discussion of the potential to jeopardize the continued existence of the species. This shall include consideration of the species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of: 1) known population trends, 2) known threats to the species, and 3) reasonably foreseeable impacts on the species from other related projects and activities.

d. Biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for a CESA Permit.

e. A Department-approved Mitigation Agreement and Mitigation Plan is required for plants listed as rare under the Native Plant Protection Act.

f. Include an evaluation of the potential to create suitable nesting and perching habitat for peregrine falcon on the new bridge structure, along with an assessment of the value in providing that habitat. Address the potential impacts to other species that would result if peregrine habitat is maintained at this location vs. removing it.

7. The Department cannot authorize take of Fully Protected Species, which include the peregrine falcon and brown pelican. The DEIR should address how potential impacts to these species will be avoided and include specific measures that will be implemented to ensure this.

8. The Department has responsibility for wetland and riparian habitats and opposes any alteration of a natural watercourse that would result in a reduction of wetland acreage or wetland habitat values. Alterations include, but are not limited to: conversion to subsurface drains, placement of fill or building of structures within the wetland and channelization or removal of materials from the streambed. All wetlands and watercourses, whether intermittent or perennial, should be retained and provided with substantial setbacks which preserve the riparian and aquatic values and maintain their value to on-site and off-site wildlife populations.

   a. A jurisdictional delineation of lakes, streams, and associated riparian habitats should be included in the DEIR, including a wetland delineation pursuant to the United States Fish and Wildlife Service definition (Cowardin 1979). Please note that wetland and riparian habitats subject to the Department's authority may extend beyond the jurisdictional limits of the U.S. Army Corps of Engineers.

   b. The Department may require a Lake or Streambed Alteration Agreement, pursuant to Section 1600 *et seq.* of the Fish and Game Code, prior to the commencement of any activity that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank (which may include associated riparian resources) of a river, stream or lake, or use material from a streambed. The Department's issuance of a Lake or Streambed Alteration Agreement for a project that is subject to CEQA will require CEQA compliance actions by the Department as a responsible agency. The Department as a responsible agency under CEQA, may consider the local jurisdiction's (lead agency) Negative Declaration or EIR for the project. To minimize additional requirements by the Department pursuant to Section 1600 *et seq.* and/or under CEQA, the document should fully identify the potential impacts to the lake, stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the agreement. A Streambed Alteration Agreement form may be obtained by writing to The Department of Fish and Game, 4949 Viewridge Avenue, San Diego, California 92123, by calling (858) 636-3160, or by accessing the Department's web site at www.dfg.ca.gov/1600.

Thank you for this opportunity to comment. Questions regarding this letter and further coordination on these issues should be directed to Pam Beare at (858) 467-4229.

Sincerely,

William E. Tippets
Environmental Program Manager

Attachments

cc: State Clearinghouse

File: Chron
file: Co. Los Angeles\SchuylerHeimbridgeNOP.wpd

Literature Cited

Cowardin, Lewis M., V. Carter, G. C. Golet, and E. T. La Roe. 1979. Classification of wetlands and deepwater habitats of the United States. Fish and Wildlife Service, U.S. Department of the Interior. U. S. Government Printing Office, Washington, D. C.

Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities

State of California
THE RESOURCES AGENCY
Department of Fish and Game
December 9, 1983
Revised May 8, 2000

The following recommendations are intended to help those who prepare and review environmental documents determine **when** a botanical survey is needed, **who** should be considered qualified to conduct such surveys, **how** field surveys should be conducted, and **what** information should be contained in the survey report. The Department may recommend that lead agencies not accept the results of surveys that are not conducted according to these guidelines.

1. Botanical surveys are conducted in order to determine the environmental effects of proposed projects on all rare, threatened, and endangered plants and plant communities. Rare, threatened, and endangered plants are not necessarily limited to those species which have been "listed" by state and federal agencies but should include any species that, based on all available data, can be shown to be rare, threatened, and/or endangered under the following definitions:

   A species, subspecies, or variety of plant is "endangered" when the prospects of its survival and reproduction are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, or disease. A plant is "threatened" when it is likely to become endangered in the foreseeable future in the absence of protection measures. A plant is "rare" when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.

   Rare natural communities are those communities that are of highly limited distribution. These communities may or may not contain rare, threatened, or endangered species. The most current version of the California Natural Diversity Database's List of California Terrestrial Natural Communities may be used as a guide to the names and status of communities.

2. It is appropriate to conduct a botanical field survey to determine if, or to the extent that, rare, threatened, or endangered plants will be affected by a proposed project when:

   a. Natural vegetation occurs on the site, it is unknown if rare, threatened, or endangered plants or habitats occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
   b. Rare plants have historically been identified on the project site, but adequate information for impact assessment is lacking.

3. Botanical consultants should possess the following qualifications:

   a. Experience conducting floristic field surveys;
   b. Knowledge of plant taxonomy and plant community ecology;
   c. Familiarity with the plants of the area, including rare, threatened, and endangered species;
   d. Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
   e. Experience with analyzing impacts of development on native plant species and communities.

4. Field surveys should be conducted in a manner that will locate any rare, threatened, or endangered species that may be present. Specifically, rare, threatened, or endangered plant surveys should be:

   a. Conducted in the field at the proper time of year when rare, threatened, or endangered species are both evident and identifiable. Usually, this is when the plants are flowering.

ATTACHMENT 2

Sensitivity of Top Priority Rare Natural Communities in Southern California

Sensitivity rankings are determined by the Department of Fish and Game, California Natural Diversity Data Base and based on either number of known occurrences (locations) and/or amount of habitat remaining (acreage). The three rankings used for these top priority rare natural communities are as follows:

S1.# Less than 6 known locations and/or on less than 2,000 acres of habitat remaining.

S2.# Occurs in 6-20 known locations and/or 2,000-10,000 acres of habitat remaining.

S3.# Occurs in 21-100-known locations and/or 10,000-50,000 acres of habitat remaining.

The number to the right of the decimal point after the ranking refers to the degree of threat posed to that natural community regardless of the ranking. For example:

S1.1 = very threatened
S2.2 = threatened
S3.3 = no current threats known

Sensitivity Rankings (February 1992)

Rank	Community Name
S1.1	Mojave Riparian Forest
	Sonoran Cottonwood Willow Riparian
	Mesquite Bosque
	Elephant Tree Woodland
	Crucifixion Thorn Woodland
	Allthorn Woodland
	Arizonan Woodland
	Southern California Walnut Forest
	Mainland Cherry Forest
	Southern Bishop Pine Forest
	Torrey Pine Forest
	Desert Mountain White Fir Forest
	Southern Dune Scrub
	Southern Coastal Bluff Scrub
	Maritime Succulent Scrub
	Riversidean Alluvial Fan Sage Scrub
	Southern Maritime Chaparral
	Valley Needlegrass Grassland
	Great Basin Grassland
	Mojave Desert Grassland
	Pebble Plains
	Southern Sedge Bog
	Cismontane Alkali Marsh

CDFG Attachment 2 for NOP Comment Letters

Page 1 of 2

3.17 The Relationship Between Local and Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

3.17.1 Methodology

The relationship between the short-term and long-term consequences of a proposed action is a required topic of discussion in an EIS under NEPA (40 Code of Federal Regulations [CFR] Part 1502). This regulation states that the discussion of environmental consequences

> *"…will include…the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity…"* (Section 1502.16).

As shown in the following discussions, there would be both benefits and adverse effects associated with the six project alternatives.

The proposed action would occur in an industrialized area within and adjacent to the Ports of Long Beach and Los Angeles. The local environment is utilized primarily for ports-related commerce and industry, plus residential uses. As a result, there are few natural areas in the project vicinity.

Short-term uses of environmental resources include the money required for the purchase of land and construction materials, payment of construction workers, consumption of materials for construction purposes, effects to natural resources, and disrupted community or economic activities.

Long-term uses of the environment include the use of right-of-way required by the proposed new bridge, expressway, and flyover, and ongoing use of facilities that remain after one of the alternatives is implemented.

3.17.2 Analysis

3.17.2.1 Alternative 1: Bridge Replacement and SR-47 Expressway

3.17.2.1.1 Alternative 1

Under this alternative, the existing Schuyler Heim Bridge would be demolished and replaced by a new, fixed-span bridge, a flyover would be constructed to divert traffic bound for northbound SR-47 directly onto the new bridge from eastbound Ocean Boulevard (Ocean Boulevard/SR-47 Flyover), and a new, elevated expressway would be constructed along the State Route (SR)-47 alignment between Terminal Island and Pacific Coast Highway. Also, south of the new bridge, New Dock Street would be realigned, and the intersection at New Dock Street and Ocean Boulevard would be improved to provide access to the new bridge. Connections to surface streets north of the bridge also would be realigned.

Short-Term

Short-Term Benefits

Short-term benefits of Alternative 1 include the employment of construction workers for the 2- to 3-year construction period, and a potential increase in local economic activity and

employment related to the purchase of goods and services. Alternative 1 would provide local construction jobs.

Short-Term Costs/Effects

The total construction cost (2007-2008 dollars) of Alternative 1 is estimated at approximately $706.3 million. This includes approximately $88.4 million for land acquisition and right-of-way, $31.2 million for utilities, and $72.9 million for engineering and project administration. These costs include some of the estimated costs of mitigation.

Short-term effects would occur as a result of demolition of the existing Schuyler Heim Bridge and construction of the new bridge, flyover, and expressway. These effects include disturbance to soils and sediments; sediment runoff; traffic disruptions; air quality, biological resources, and noise effects; and increased energy uses. A small amount of pickleweed may be affected.

Long-Term

Long-Term Benefits

Alternative 1 would utilize existing and new alignments for the new bridge across the Cerritos Channel, access to the bridge, the flyover, and for the new SR-47 Expressway. This alternative would add approximately 4.9 kilometers (km) (3.1 miles [mi]) of limited-access roadway, with the flyover along Ocean Boulevard and the expressway along Alameda Street (SR-47) between Terminal Island and Pacific Coast Highway. As a result, the circulation system in the project area would be improved. The new bridge, flyover, and expressway would make traffic movements more efficient.

Long-term benefits relate to improved traffic flow and reduced congestion that would result from improvements to the Ocean Avenue intersection south of the new bridge and the availability of a second option for travel along SR-47 between Terminal Island and Pacific Coast Highway. The new expressway also would improve safety, as it would be designed to current Caltrans standards for expressways. With Alternative 1, there would be less traffic at the five existing signalized intersections and at five at-grade rail crossings along the existing SR-47 alignment between Terminal Island and Pacific Coast Highway, as most traffic would be expected to use the elevated expressway rather than surface streets.

Over the long term, a number of new jobs, mostly associated with maintenance of the new bridge, flyover, and expressway, would be created. Also, the cost to maintain the new fixed-span bridge that would be built under this alternative would be considerably less than the cost of maintaining the existing lift-bridge. Because the existing Schuyler Heim Bridge would be demolished under this alternative, there would be no ongoing maintenance costs for the existing bridge.

Long-Term Costs/Effects

Long-term costs would be associated with maintenance of the new, fixed-span bridge, flyover, and SR-47 Expressway. Typical maintenance items for the type of bridge proposed are yearly flushing of the deck drains, blowing debris out of the joints and/or bearings, and every-other-year inspections. The maintenance costs are estimated to be approximately $100,000 per year for Alternative 1. These costs include treating collected stormwater from the elevated structure at four locations to remove solids and free-floating pollutants.

Other maintenance activities would be graffiti removal on noise barriers and other structures along the elevated SR-47 Expressway.

3.17.2.1.2 Alternative 1A

Alternative 1A provides a structural variation of the replacement bridge over the Cerritos Channel. Other aspects of this alternative would be the same as those described for Alternative 1.

Short-term and long-term benefits and costs/effects of Alternative 1A would be comparable to those described for Alternative 1.

3.17.2.2 Alternative 2: SR-103 Extension to Alameda Street

Under this alternative, the existing Schuyler Heim Bridge would be replaced, and the flyover would be constructed as described under Alternative 1. In addition, an elevated expressway would be constructed along a new SR-103 alignment between Pacific Coast Highway and Alameda Street, south of 223rd Street/Wardlow Road. Also, south of the replacement bridge, New Dock Street would be realigned, and the intersection at New Dock Street and Ocean Boulevard would be improved to provide access to the new bridge. Connections to surface streets north of the bridge also would be realigned.

3.17.2.2.1 Short-Term

Short-Term Benefits

Short-term benefits of Alternative 2 would be comparable to those described for Alternative 1.

Short-Term Costs/Effects

The total construction cost (2007-2008 dollars) of Alternative 2 is estimated at approximately $785.7 million. This includes approximately $135.3 million for land acquisition and right-of-way, $29 million for utilities, and $76.3 million for engineering and project administration. These costs include some of the estimated costs of mitigation.

Short-term effects of Alternative 2 would be comparable to those described for Alternative 1.

3.17.2.2.2 Long-Term

Long-Term Benefits

Alternative 2 would utilize existing and new alignments for the new bridge across the Cerritos Channel, access to the bridge, the flyover, and for the new, elevated SR-103 Extension. This alternative would add approximately1.6 km (0.96 mi) of limited-access flyover along Ocean Boulevard to SR-47, and 3.2 km (2.0 mi) of limited-access expressway between Pacific Coast Highway and Alameda Street, south of 223rd Street/Wardlow Road. As a result, the circulation system in the project area would be improved. The new bridge, flyover, and expressway would make traffic movements more efficient.

Long-term benefits relate to improved traffic flow and reduced congestion with improvements to the Ocean Avenue intersection south of the bridge and the availability of a second option for travel along SR-103 between Pacific Coast Highway and Alameda Street, south of 223rd Street/Wardlow Road. The addition of the expressway also would improve safety, as the expressway would be designed to current Caltrans standards.

With Alternative 2, there would be less traffic at the Willow Street intersection where the existing SR-103 surface alignment ends, as most traffic traveling between Alameda Street, south of 223rd Street/Wardlow Road, and Pacific Coast Highway would be expected to use the new SR-103 Extension.

Over the long term, a number of new jobs, mostly associated with maintenance of the new bridge, flyover, and expressway, would be created. Also, the cost to maintain the new fixed-span bridge that would be built under this alternative would be considerably less than the cost of maintaining the existing lift-bridge. Because the existing Schuyler Heim Bridge would be demolished under this alternative, there would be no ongoing maintenance costs for the existing bridge.

Long-Term Costs/Effects

Long-term costs/effects of Alternative 2 would be comparable to those described for Alternative 1.

3.17.2.3 Alternative 3: Bridge Demolition Avoidance

Under this alternative, a new, fixed-span bridge would be constructed adjacent to and east of the existing Schuyler Heim Bridge, and the flyover and SR-47 Expressway would be constructed as described under Alternative 1. Also, south of the bridge, New Dock Street would be realigned, and the intersection at New Dock Street and Ocean Boulevard would be improved to provide access to the new bridge. Connections to surface streets north of the bridge also would be realigned. Under Alternative 3, the existing Schuyler Heim Bridge would be left intact, but would not be operational. Additional maintenance costs would be necessary to prevent the existing bridge from deteriorating and collapsing into the Cerritos Channel.

3.17.2.3.1 Short-Term

Short-Term Benefits

Short-term benefits of Alternative 3 would be comparable to those described for Alternative 1.

Short-Term Costs/Effects

The total construction cost (2007-2008 dollars) of Alternative 3 is estimated at approximately $761.4 million. This includes approximately $122 million for land acquisition and right-of-way, $31.2 million for utilities, and $74.7 million for engineering and project administration. These costs include some of the estimated costs of mitigation.

Short-term effects would occur as a result of construction of a new bridge, flyover, and expressway. These effects include disturbance to soils and sediments; sediment runoff; traffic disruptions; air quality, biological resources, and noise effects; and increased energy uses. A small amount of pickleweed may also be affected. Additionally, up to 0.11 acre of impact to jurisdictional Waters of the U.S., including wetlands, would occur. Mitigation would reduce these effects.

3.17.2.3.2 Long-Term

Long-Term Benefits

Long-term benefits of Alternative 3 would be comparable to those described for Alternative 1.

Long-Term Costs/Effects

Long-term costs would be associated with maintenance of the new, fixed-span bridge, flyover, and SR-47 Expressway and would be the same as Alternative 1. In addition, the cost of maintaining the existing lift bridge would continue. Other effects would be operational noise effects of the SR-47 Expressway.

3.17.2.4 Alternative 4: Bridge Replacement Only

Under this alternative, the existing Schuyler Heim Bridge would be demolished and replaced by a new, fixed-span bridge. South of the bridge, New Dock Street would be realigned, and the intersection at New Dock Street and Ocean Boulevard would be improved to provide access to the new bridge. Connections to surface streets north of the bridge also would be realigned. With this alternative there would be no construction of the flyover, SR-47 Expressway (Alternatives 1 and 3), or the SR-103 Extension (Alternative 2).

3.17.2.4.1 Short-Term

Short-Term Benefits

Short-term benefits of Alternative 4 include the employment of construction workers for the 2- to 3-year bridge construction period, and the potential related increase in local economic activity and employment related to the purchase of goods and services. Alternative 4 would provide fewer construction jobs than Alternatives 1, 1A, 2, and 3.

Short-Term Costs/Effects

The total construction cost (2007-2008 dollars) of Alternative 4 is estimated at approximately $321.2 million. This includes approximately $27.2 million for land acquisition and right-of-way, $21.9 million for utilities, and $33.4 million for engineering and project administration. These costs include some of the estimated costs of mitigation.

Short-term effects would occur as a result of demolition of the existing Schuyler Heim Bridge and construction of the new bridge. These effects include disturbance to soils and sediments; sediment runoff; traffic disruptions; air quality, biological resources, and noise effects; and increased energy uses. There may be effects to a small amount of pickleweed. Mitigation would reduce these effects.

3.17.2.4.2 Long-Term

Long-Term Benefits

Alternative 4 would utilize existing and new alignments for the replacement bridge across the Cerritos Channel and access to the bridge. This alternative would improve the circulation system in the vicinity of the bridge. The new bridge and realigned approaches to the bridge would make traffic movements more efficient.

Long-term benefits would occur with improved traffic flow and reduced congestion at the fixed-span bridge. The new bridge also would improve safety at the north and south accesses to the bridge and across the channel, as the new construction would be designed to current Caltrans standards.

Over the long term, a number of jobs, mostly associated with maintenance of the new bridge, would be created. Also, the cost to maintain the new fixed-span bridge would be less than the cost of maintaining the existing lift-bridge. Because the existing Schuyler Heim

Bridge would be demolished under this alternative, there would be no ongoing maintenance costs for the existing bridge.

Long-Term Costs/Effects

Long-term maintenance costs would be associated with maintenance of the new bridge would be about $50,000.

3.17.2.5 Alternative 5: Transportation System Management

The Transportation System Management (TSM) alternative focuses on improvements to traffic routes that parallel SR-47 and that serve the same trips, including truck trips to and from the intermodal container transfer facility (ICTF), and trips to and from the Ports of Long Beach and Los Angeles via Alameda Street, Henry Ford Avenue, and SR-47. Measures would include, but not be limited to, electronic traffic monitoring, and improvements to existing roadways and intersections.

3.17.2.5.1 Short-Term

Short-Term Benefits

Short-term benefits of Alternative 5 include the employment of a small number of construction workers to implement the chosen system(s).

Short-Term Costs/Effects

The total construction cost (2007-2008 dollars) of Alternative 5 is estimated at approximately $22.6 million, including $2.7 million for engineering and project administration. (These costs do not include estimates for mitigation.) Costs for land acquisition and right-of-way, and utilities are assumed to be negligible. Most of the TSM actions would occur along existing roads and easements. It is expected that facilities that would be required for electronic measures would be leased from or provided by the ports.

Short-term effects would occur as a result of construction of the TSM alternative. These effects include disturbance to soils and sediments; runoff; traffic disruptions; air quality, biological resources, and noise effects; and increased energy use. These effects would be short-term and would occur within small portions of the project area, such as along several blocks of a street (for restriping or widening) or on street corners.

3.17.2.5.2 Long-Term

Long-Term Benefits

Alternative 5 would result in improvements to the circulation system in the project area, which would make traffic movements more efficient. Long-term benefits would result from improved traffic flow and reduced congestion. The addition of one or more TSM systems would be intended to improve safety for vehicles traveling in the project area and result in reduced travel time.

Over the long term, there would be some jobs, mostly associated with maintenance and implementation of the TSM systems. The cost to maintain the chosen TSM system(s) is expected to be nominal, based on the number and types of systems implemented.

Long-Term Costs/Effects

Long-term costs would be associated with maintenance and implementation of the new TSM systems. However, the cost to maintain the chosen TSM system(s) is expected to be nominal, based on the number and types of systems utilized.

3.17.2.6 Alternative 6: No-Build Alternative

With the No-Build alternative, there would be no change to the existing environment of the project area. Existing uses of the Schuyler Heim Bridge and local system of surface streets would remain the same as described under existing conditions.

3.17.2.6.1 Short-Term

Short-Term Benefits

The short-term benefit of this alternative would be an absence of change to the existing circulation system between Terminal Island and the mainland to the north. As a result, existing vehicular traffic would not experience detours or delays related to new construction.

Short-Term Costs/Effects

Under the No-Build alternative, no costs would be incurred, and there would be no short-term effects.

3.17.2.6.2 Long-Term

Long-Term Benefits

Under the No-Build alternative, the existing Schuyler Heim Bridge and roadway alignments in the project area, both on Terminal Island and the mainland, would continue to be utilized in their present configurations. There would be no changes to existing traffic flow and areas of congestion.

Long-Term Costs/Effects

There would be no direct costs to implementing Alternative 6. However, there would be long-term costs associated with the ongoing increase in congestion associated with projected increases in vehicular traffic to and from the ports in the project area and with ongoing maintenance of the existing Schuyler Heim Bridge.

Travel time would continue to increase over time, consistent with projected increases in traffic levels. There would be no changes to existing levels of safety. The Schuyler Heim Bridge would continue to operate as a lift bridge, with traffic delays during times the bridge is in the lifted position to allow marine traffic to pass underneath. In addition, the bridge would continue to be susceptible to physical damage and/or closure in the event of a major earthquake.

3.18 Irreversible and Irretrievable Commitment of Resources

3.18.1 Introduction

The discussion of irreversible and irretrievable commitments of resources is a required topic in an EIS under NEPA (40 Code of Federal Regulations [CFR] Part 1502). Section 1502.16 states that the discussion of environmental consequences: …

> *"will include…any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented."*

The discussion of irreversible and irretrievable commitments of resources also is a required topic in an EIR as directed under CEQA in the CEQA Guidelines, Section 15126[c], and as described in Section 15126.2[c], as *Significant Irreversible Environmental Changes Which Would Be Caused by the Proposed Project Should it Be Implemented*.

As described in the following discussions, resources would be used or removed by the project alternatives. These include the funds, materials, labor, and energy required to build and operate the project; land taken to build the project; environmental resources impacts resulting from the project; and public service capabilities used.

A specific discussion of Energy use is provided in this Final EIS/EIR under Section 3.15 – Energy.

3.18.2 Analysis

3.18.2.1 Alternative 1: Bridge Replacement and SR-47 Expressway

3.18.2.1.1 Alternative 1

Resources Used During Construction

The total estimated project capital outlay costs (2007-2008 dollars) for Alternative 1 are $706.3 million. These monies would be used for labor, construction materials, and energy, and could then not be spent for other transportation projects. In addition, construction materials (sand, cement, steel, wood, asphalt) would be used and energy (oil, gasoline, diesel fuel) would be expended to build the new bridge and expressway. These resources then would not be available for any other, future use.

Alternative 1 would require disposal of materials associated with demolition of the Schuyler Heim Bridge and excavation of the columns required for the bridge, expressway, and flyover (including excess soil and rock material that cannot be recycled). Because landfill capacity is finite, deposition of the total excess material in area landfills would be an irretrievable commitment of landfill capacity.

Resources Used During Maintenance and Operations

An undetermined amount of funds, labor, materials, and energy would be required to maintain and operate the bridge, expressway, and flyover under Alternative 1. These resources would be irretrievable. However, based on Caltrans operations of existing facilities, the materials and energy used to maintain and operate the bridge, expressway, and flyover are expected to be minimal. Further, operation of the new, fixed-span bridge would be less costly than operation of the existing Schuyler Heim Bridge.

Land Use

Right-of-way would be required for the new bridge, expressway, and flyover, and would require the taking of some commercial and some industrial land. Additionally, Alternative 1 would result in the taking of a number of boat slips within the Dominguez Channel due to construction of the SR-47 Expressway. Although relocation would be possible within the local area, the conversion of this land to right-of-way would be an irreversible commitment of land to transportation facilities for the life of the facilities.

Public Service Capacities

Refuse collected along the bridge, expressway, and flyover during routine maintenance would be disposed in existing landfills.

The new SR-47 Expressway would require commitment of law enforcement resources in addition to requirements on existing streets and highways. At the same time, there could be a beneficial effect on fire protection and other emergency services, as the limited-access expressway would provide an efficient route for emergency vehicles between Terminal Island and the area north of the ports. In addition, the flyover would provide more efficient access to northbound SR-47 from eastbound Ocean Boulevard.

Growth Inducement

Alternative 1 would not induce growth in localized areas, as the expressway would result in less accessibility to the specific parts of the project area where the expressway would be elevated above existing land uses. However, Alternative 1 could beneficially affect local transport of goods to and from the ports, as it would provide an improved route for transport along the Alameda Corridor between Terminal Island and areas north of the ports. The regional growth rate would be expected to remain the same, as under existing conditions, as the project is proposed to improve vehicular travel as a response to ongoing growth in the area.

Beneficial Effects

The commitment of resources for Alternative 1 is based on the concept that the transport of goods to and from the ports would benefit by a new bridge and improved transportation route. These benefits include improved accessibility and safety, savings in time, and reliable access for emergency services. These benefits are anticipated to outweigh the commitment of resources required for construction and maintenance of Alternative 1.

3.18.2.1.2 Alternative 1A

Resources Used During Construction, Maintenance, and Operations

The resources used during construction, maintenance and operation of Alternative 1A would be comparable to those used for Alternative 1.

3.18.2.2 Alternative 2: SR-103 Extension to Alameda Street

3.18.2.2.1 Resources Used During Construction

The resources used during construction of Alternative 2 would be comparable to those used for Alternative 1. However, Alternative 2 would not require taking of boat slips in the Dominguez Channel, as the proposed SR-103 Extension would not affect the Dominguez Channel. The total estimated project capital outlay costs (2007-2008 dollars) for Alternative 2 are $785.7 million.

3.18.2.2.2 Resources Used During Maintenance and Operations

The resources used during maintenance and operation of Alternative 2 would be comparable to those used for Alternative 1.

3.18.2.3 Alternative 3: Bridge Demolition Avoidance

3.18.2.3.1 Resources Used During Construction

The resources used during construction of Alternative 3 would be comparable to those used for Alternative 1. The total estimated project capital outlay costs (2007-2008 dollars) for Alternative 3 are $761.4 million.

3.18.2.3.2 Resources Used During Maintenance and Operations

The resources used during maintenance and operation of Alternative 3 would be comparable to those used for Alternative 1.

3.18.2.4 Alternative 4: Bridge Replacement Only

3.18.2.4.1 Resources Used During Construction

The resources used during construction of Alternative 4 would be comparable to those used for the bridge replacement under Alternative 1. However, there would be no expressway construction and no flyover construction under this alternative. Therefore, no resources would be affected in regard to construction of the SR-47 Expressway or flyover (Alternative 1, Alternative 3) or SR-103 Extension and flyover (Alternative 2). The total estimated project capital outlay costs (2007-2008 dollars) for Alternative 4 are $321.2 million.

3.18.2.4.2 Resources Used During Maintenance and Operations

The resources used during maintenance and operation of Alternative 4 would be comparable to those used for the bridge replacement under Alternative 1. No resources would be used for maintenance and operation of an expressway or flyover, as there would be no construction of these structures under this alternative.

3.18.2.5 Alternative 5: Transportation System Management

3.18.2.5.1 Resources Used During Construction

Minimal construction would be required under Alternative 5. As a result, the resources used would be minor compared to those used for Alternatives 1, 1A, 2, 3, and 4. The total estimated project capital outlay costs (2007-2008 dollars) for Alternative 5 are $22.6 million.

Resources Used During Maintenance and Operations

Alternative 5 would require minimal maintenance and operations activities. Therefore, resources used would be minor compared to those used for Alternatives 1, 1A, 2, 3, and 4.

3.18.2.6 Alternative 6: No Build Alternative

Under the No Build alternative, there would be no demolition or construction activities. As a result, there would be no irreversible or irretrievable commitment of resources under this alternative. There would be no construction costs associated with Alternative 6.

Chapter 4.0 CEQA Evaluation

4.1 Determining Significance Under CEQA

The proposed project is a joint action by the Federal Highway Administration (FHWA) and California Department of Transportation (Caltrans) and is subject to federal and state environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The FHWA's responsibility for environmental review, consultation, and any other action required in accordance with NEPA and other applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327 (July 1, 2007). Caltrans is the lead agency under CEQA and NEPA.

One of the primary differences between NEPA and CEQA is the way significance is determined. Under NEPA, significance is used to determine whether an Environmental Impact Statement (EIS), or some lower level of documentation, will be required. NEPA requires that an EIS be prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment." The determination of significance is based on context and intensity. Some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, once a decision is made regarding the need for an EIS, it is the magnitude of the impact that is evaluated and no judgment of its individual significance is deemed important for the text. NEPA does not require that a determination of significant impacts be stated in the environmental document.

CEQA, on the other hand, requires the lead agency (Caltrans) to identify each "significant effect on the environment" resulting from the project and ways to mitigate each significant effect. If the project may have a significant effect on any environmental resource, then an Environmental Impact Report (EIR) must be prepared. Each and every significant effect on the environment must be disclosed in the EIR and mitigated, if feasible. In addition, the CEQA Guidelines list a number of mandatory findings of significance, which also require preparation of an EIR. There are no types of actions under NEPA that parallel the findings of mandatory significance under CEQA.

This chapter discusses the effects of this project and their significance in accordance with Section 15126.2(a) of the CEQA Guidelines.

4.2 Discussion of Significance of Impacts

The following sections provide discussions of the environmental impacts that have been determined to be significant after analysis of each of the six project alternatives. There are environmental resources for which significant effects have been identified. For each of these significant effects, the criteria used as the basis of the significance evaluations are set forth as

provided in Appendix G of the CEQA Guidelines (CEQA Checklist) (Title 14, Section 15000, *et seq.*) (See Appendix A of this document).

Those resources where impacts would be significant are addressed in Section 4.4 – Significant Environmental Effects of the Proposed Project and analyzed in accordance with CEQA criteria in Section 4.5. Those resource areas where impacts would be significant, even with mitigation, are addressed in Section 4.6 – Unavoidable Significant Environmental Effects. Mitigation measures are addressed in Section 4.7 and are shown in Table 4-1.

The information in this chapter is provided in accordance with Section 15126.2(a) of the CEQA Guidelines, which states:

> *An EIR shall identify and focus on the significant environmental effects of the proposed project. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effect…*

A discussion of significant irreversible environmental changes is required by CEQA and is provided in Section 3.18 of this Final EIS/EIR – Irreversible and Irretrievable Commitment of Resources. Growth-inducing impacts, also required by CEQA, are addressed in Final EIS/EIR Section 3.2 – Growth.

4.3 Mandatory Findings of Significance

In accordance with Section 15065 of the CEQA Guidelines, a project would be considered to have a significant effect on the environment if any of the following conditions would occur:

- The project would substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of an endangered, rare or threatened species; or eliminate important examples of the major periods of California history or prehistory.
- The project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
- The project has possible environmental effects that are individually limited but cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.
- The environmental effects of the project would cause substantial adverse effects on human beings, either directly or indirectly.

Based on the analyses provided in Chapter 3.0 of this Final EIS/EIR and in the following sections of this chapter, the project would result in mandatory findings of significance for at least one environmental resource under Alternatives 1, 1A, 2, 3, and 4 (the "build" alternatives); certain impacts related to Air Quality and Cultural Resources could not be mitigated to less than significant levels and, therefore, would be considered to substantially degrade the quality of the environment. As a result, these Air Quality and Cultural Resources impacts would be considered mandatory findings of significance.

4.4 Significant Environmental Effects of the Proposed Project

This section provides a description of the significant environmental effects of the project alternatives. Mitigation measures would be implemented to minimize these effects to below levels of significance, to the extent feasible, in accordance with Section 15126.4 of the CEQA Guidelines.

In accordance with CEQA criteria, it was determined that the proposed project would not have the potential to affect Agriculture Resources. Therefore, this topic is not addressed in the environmental analysis provided in Chapter 3.0 of this Final EIS/EIR and is not addressed in the following discussions.

It was determined that project-related impacts to the following environmental resources would be less than significant when evaluated in accordance with CEQA criteria and, therefore, would not require mitigation: Aesthetics; Geology and Soils; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; Mineral Resources; Population and Housing; Public Services; Recreation; Traffic and Transportation; and Utilities and Service Systems. Therefore, these topics are not further addressed in this chapter. These topics, and their relation to the project alternatives, are addressed in detail in Chapter 3.0 of this Final EIS/EIR.

Based on the analyses set forth in the CEQA Checklist and in Chapter 3.0, it was determined that one or more of the project alternatives would have the potential to result in significant impacts to: Air Quality, Biological Resources, and Cultural Resources. Impacts related to these environmental resources are addressed below, in accordance with CEQA criteria. The discussion that follows focuses on the specific environmental resources where there would be a significant impact. Other environmental resources are addressed in the CEQA Checklist in Appendix A. The significant impacts described below would require mitigation which, in most cases, would reduce the impacts to a level that is less than significant. Mitigation measures are shown in Table 4-1. Impacts that could not be reduced to less than significant, even with mitigation, are shown in Table 4-2.

4.5 CEQA Analysis of Significance of the Alternatives

The analysis below follows the same order of environmental resources and specific CEQA criteria as the CEQA Checklist (Appendix A). However, in compliance with Caltrans guidelines, only significant environmental impacts are addressed in this chapter. In order to avoid repetition within this document, for those environmental resources where there would be no impact from the proposed project, or where impacts would be less than significant, the reader is referred to the CEQA Checklist (Appendix A), the appropriate

section of Chapter 3.0, and the cumulative impact discussion in Chapter 5.0. For each environmental resource where impacts would be significant for at least one of the CEQA criteria, discussion is provided for each of the six project alternatives addressed in this Final EIS/EIR.

4.5.1 Air Quality

Detailed discussion of the air quality issues addressed below is provided in Section 3.13 – Air Quality and Chapter 5.0 – Cumulative Impacts of this Final EIS/EIR. Also see Appendix A – CEQA Checklist (III, Air Quality).

4.5.1.1 Alternative 1

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

Because project would be in conformance with the 2006 Regional Transportation Plan (RTP) and Regional Transportation Implementation Plan (RTIP), it would therefore not conflict with SCAQMD's Air Quality Management Plan (AQMP), which is incorporated into the SIP. Therefore, this potential impact would be less than significant.

b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

4.5.1.1.1 Construction Impacts

The direct sources of construction emissions would be from construction equipment exhaust and fugitive dust. The direct emissions of carbon monoxide (CO), nitrogen oxides (NO_X), reactive organic gases (ROG), sulphur oxide (SO_X), and particulate matter less than 10 microns in aerodynamic diameter (PM_{10}) are predicted to exceed daily significance thresholds during construction of Alternative 1. This would be considered a temporary significant impact to air quality.

The indirect source of construction emissions would be from marine vessels having to detour around Terminal Island during construction of the new bridge. The indirect marine vessel emissions exceed the South Coast Air Quality Management District (SCAQMD) NO_X threshold. Therefore, marine vessel NO_X emissions would result in a temporary, significant air quality impact. Mitigation would be implemented and would reduce the indirect marine vessel emissions to a level that is below the SCAQMD significance threshold for construction emissions.

The combined direct and indirect emissions of CO, NO_X, ROG, SO_X, and PM_{10} are predicted to exceed daily significance thresholds during project construction and, therefore, would result in a temporary significant impact to air quality and require mitigation. Even with mitigation, construction emissions would be expected to remain in excess of daily significance thresholds and, therefore, remain a temporary significant impact.

4.5.1.1.2 Operations Impacts

Indirect operation emissions for Alternative 1 would result from marine vessel detours around Terminal Island, where daily emissions of NO_X exceed the SCAQMD threshold. In addition, bridge traffic during project operation would result in a net increase in emissions greater than the SCAQMD thresholds for NO_X. Therefore, although it would be an indirect impact of the project alternative, the net increase in NO_X emissions from marine vessel

detours and bridge traffic would result in a significant air quality impact; mitigation is required. However, even with mitigation, operation emissions would remain significant.

c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Impacts during project operation would be cumulatively significant for NO_X.

d) Would the project expose sensitive receptors to substantial pollutant concentrations?

ACTA determined from the HRA that the project would produce substantial regional benefits that would reduce air toxic emissions and the resulted health risks in the majority of the study area. Caltrans has determined that there is not adequate or satisfactory evidence to support a determination of a significant impact associated with Alternative 1 due to exposure to air toxics. While ACTA has determined that cancer risk impacts associated with Alternative 1 would be significant at a number of homes, these localized impacts would be less than significant after mitigation (Mitigation Measure AQ-13).

e) Would the project create objectionable odors affecting a substantial number of people?

During project construction, objectionable odors would potentially occur related to operation of diesel-powered equipment and to road-building activities, such as paving and asphalt placement activities. Objectionable odors may occur as a result of construction in marine sediments for demolition of the existing Schuyler Heim Bridge and construction of the new bridge, as well as drilling and augering activities on land for the support piers. Construction will be conducted in compliance with SCAQMD Rule 1166, which limits volatile organic compounds (VOC) emissions. In addition, construction activities will be located within fenced, secured sites as far from receptors as feasible, with no public access. Impacts would be less than significant.

4.5.1.2 Alternative 2

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

This potential impact would be the same as described for Alternative 1 and would be less than significant.

b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Construction and operation impacts would be the same as described under Alternative 1. Mitigation would be implemented and would reduce indirect construction emissions to less than significant. However, even with mitigation, total emissions are expected to remain significant during construction and operation of Alternative 2.

c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

This impact would be the same as described for Alternative 1 and would be significant.

d) Would the project expose sensitive receptors to substantial pollutant concentrations?

ACTA's HRA results indicated that the project would produce regional benefits that would reduce air toxic emissions and the result in health risks in the majority of the study area. Caltrans has determined that there is not adequate or satisfactory evidence to support a determination of a significant impact due to exposure to air toxics associated with Alternative 2. ACTA has determined that cancer risk impacts associated with Alternative 2 would be significant at a number of residential receptors as well as school workers and recreational users in the project vicinity. ACTA evaluated mitigation measures to reduce the cancer risks and determined that retrofits of HVAC units would be a feasible mitigation measure to reduce the incremental cancer risks for residential and school worker receptors. However, since recreational user exposure occurs outdoors at Hudson Park, the HVAC retrofits would not be an effective approach. Therefore, ACTA has determined that the cancer risk for recreational users at Hudson Park would remain significant.

e) Would the project create objectionable odors affecting a substantial number of people?

Under Alternative 2, potential odor impacts would be the same as Alternative 1 and would be less than significant.

4.5.1.3 Alternative 3

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

This would be the same as for Alternative 1 and would be less than significant.

b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Under Alternative 3, construction and operation impacts would be comparable to those described for Alternative 1, even though the existing Schuyler Heim Bridge would not be demolished under this alternative. Mitigation is required and would reduce indirect construction emissions to less than significant. However, even with mitigation, total emissions are expected to remain significant during construction and operation of Alternative 3.

c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Under Alternative 3, this impact would be considered significant, the same as for Alternative 1.

d) Would the project expose sensitive receptors to substantial pollutant concentrations?

Caltrans has determined that there is not adequate or satisfactory evidence to support a determination of a significant impact associated with Alternative 3 due to exposure to air toxics. Under Alternative 3, ACTA has determined that the potential impact for health risks would be similar to Alternative 1 and that impacts would be less than significant after mitigation (Mitigation Measure AQ-13).

e) Would the project create objectionable odors affecting a substantial number of people?

Under Alternative 3, potential impact would be similar to Alternative 1, and would be less than significant.

4.5.1.4 Alternative 4

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

This potential impact would be the same as described for Alternative 1 and would be less than significant.

b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Under Alternative 4, direct and indirect construction emissions would be the same as described for Alternative 1 for bridge demolition and replacement. Temporary air quality impacts from this activity would be significant under CEQA criteria. Mitigation is required and would reduce indirect construction emissions to less than significant. However, even with mitigation, total emissions are expected to remain significant during construction.

Operation emissions for Alternative 4 would be the same as for Alternative 1 and would result in a significant air quality impact. Mitigation is required, but impacts would remain significant.

c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Under Alternative 4, this impact would be considered significant, the same as would occur under Alternative 1.

d) Would the project expose sensitive receptors to substantial pollutant concentrations?

The operational effects of Alternative 4 would be the same as Alternative 6 (no-build). Health risk impacts of Alternative 4 were not evaluated in ACTA's HRA against the 2003 condition. However qualitative consideration of traffic and other air quality studies suggests that truck traffic would be closer to sensitive receptors and operating under higher-emitting urban street conditions, leading to potential health impacts of the no build option that would be higher than those of the build alternatives.

e) Would the project create objectionable odors affecting a substantial number of people?

Under Alternative 4, potential impacts of criteria pollutants concentrations and odor (d, e, above) would be similar to Alternative 1, but solely for replacement of the Schuyler Heim Bridge. Impacts would be less than significant.

4.5.1.5 Alternative 5

The amount of construction that would be required under the TSM alternative would be considerably less than under the build alternatives and would consist of activities such as widening roadways, adding turn lanes, and installing electric signs. These activities would occur within portions of the project area that are already developed and utilized for

transportation uses. Therefore, due to the location and minimal extent of activities related to the TSM alternative, impacts to air quality would be less than significant.

d) Would the project expose sensitive receptors to substantial pollutant concentrations?

Health risk impacts due to Alternative 5 were not evaluated but would be anticipated to be the same as Alternative 6, the no-build alternative.

4.5.1.6 Alternative 6

Under the No Build alternative, there would be no change to the existing environment and, therefore, no impact to air quality.

However, at some point in the future, the existing bridge may need to be demolished and replaced due to safety considerations. If this occurred, air quality impacts would be comparable to those described under Alternative 1 for replacement of the Schuyler Heim Bridge.

4.5.2 Biological Resources

Detailed discussion of the biological issues addressed below is provided in Section 3.16 – Biological Resources and Chapter 5.0 – Cumulative Impacts of this Final EIS/EIR. Also see Appendix A – CEQA Checklist (IV, Biological Resources).

4.5.2.1 Alternative 1

a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

State Listed Threatened or Endangered Species

American Peregrine Falcon. Removal and replacement of the Schuyler Heim Bridge would eliminate a known nest site for a breeding pair of peregrine falcons, and the peregrines would be forced to use another area for nesting. Historically, nesting has alternated between the Schuyler Heim Bridge and the Gerald Desmond Bridge. The removal of one known peregrine falcon nesting location on the Schuyler Heim Bridge in a territory that typically supports one pair but contains two alternate nesting locations would likely result in a significant impact to the species. Mitigation would reduce impacts to less than significant.

Other Special-Status Species

Southern Tarplant. There is potential for individuals of southern tarplant or other special-status plant species to be present on the site. If individuals were present, and could not be avoided, they would be removed permanently as a result of project construction. The removal of southern tarplant and other special-status plant species would be considered a significant adverse impact of Alternative 1. Mitigation would be required and would reduce impacts to less than significant.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

This potential impact would be less than significant under CEQA criteria.

c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Wetlands present in the general project area would be avoided. Therefore, no impact to federally protected wetlands would occur.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or state habitat conservation plan?

Potential impacts (d, e, f, above) would be less than significant.

4.5.2.2 Alternative 2

a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

Under Alternative 2, impacts would be the same as described for Alternative 1 and would be significant. Mitigation is required and would reduce impacts to less than significant.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

Marine Environment

Project impacts of Alternative 2 on aquatic communities in the vicinity of the existing Schuyler Heim Bridge would be comparable to those discussed for Alternative 1 and would be less than significant. However, there would be no impacts to aquatic communities in the Consolidated Slip/Dominguez Channel because the alignment for Alternative 2 does not cross this feature.

Terrestrial Environment

Under Alternative 2, impacts to the terrestrial environment would be the same as discussed under Alternative 1 and would be less than significant.

c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Under Alternative 2, impacts to wetlands would be the same as described for Alternative 1 and would be less than significant.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Alternative 2 would not involve construction in the Consolidated Slip/Dominguez Channel, so impacts to aquatic communities or fish movement resulting from sediment disturbance would be limited to the Cerritos Channel. Impacts to the Cerritos Channel would be comparable to Alternative 1 and would be less than significant.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Potential impacts (e, f, above) of Alternative 2 would be the same as Alternative 1 and would be less than significant.

4.5.2.3 Alternative 3

a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

Plants

If southern tarplant individuals were present, and could not be avoided, they would be removed permanently as a result of construction. The removal of southern tarplant or other special status plant species would be considered a significant impact. Mitigation would be required (e.g., plant salvaging and transplanting) and would reduce impacts to less than significant.

Animals

Impacts of Alternative 3 to special-status wildlife species would be comparable to, but less than, those described for Alternative 1. There would be less of an impact to American peregrine falcons because the existing nesting/roosting area on the Schuyler Heim Bridge would remain. However, construction of the replacement bridge to the east of the existing Schuyler Heim Bridge may disturb the falcon nest site on Schuyler Heim Bridge. Mitigation would be required and would reduce impacts to less than significant.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

A small wetland (about 0.11 acre) is present on the tidal terrace east of the Schuyler Heim Bridge and is within the footprint of Alternative 3. Implementation of Alternative 3 would result in the loss of this wetland, which would be a significant adverse impact. Mitigation would be required and would reduce this impact to less than significant.

Indirect effects on terrestrial or aquatic communities may occur from introduction of exotic, invasive species. Impacts would be comparable to those described under Alternative 1 and would be less than significant.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Potential impacts (d, e, f, above) would be the same as described under Alternative 1. These impacts would be less than significant.

4.5.2.4 Alternative 4

a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

Plants

Under Alternative 4, potential impacts to southern tarplant and other special-status plant species from project construction would be the same as described for replacement of the Schuyler Heim Bridge under Alternative 1. Impacts to these plant species could be significant. Mitigation would reduce impacts to less than significant.

Animals

Impacts from Alternative 4 to special-status animal species would be comparable to impacts described for Alternative 1 for replacement of the Schuyler Heim Bridge and would be considered significant. There would be no impacts to species in the vicinity of the Consolidated Slip/Dominguez Channel because the Alternative 4 bridge replacement does not occur at that location. Mitigation would be required and would reduce impacts to less than significant.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Under Alternative 4, potential impacts (b, c, above) would be comparable to those described under Alternative 1 for replacement of the Schuyler Heim Bridge. These impacts would be considered significant. Mitigation is required and would reduce impacts to less than significant.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or state habitat conservation plan?

Under Alternative 4, potential impacts (d, e, f, above) would be the same as Alternative 1 for replacement of the Schuyler Heim Bridge. Impacts would be less than significant. Therefore, no mitigation measures would be required.

4.5.2.5 Alternative 5

The amount of construction that would be required under the TSM alternative would be considerably less than under the build alternatives and would consist of activities such as widening roadways, adding turn lanes, and installing electric signs. These activities would occur within portions of the project area that are already developed and utilized for transportation uses. Therefore, due to the location and minimal extent of activities related to the TSM alternative, impacts to biological resources would be less than significant.

4.5.2.6 Alternative 6

Under the No Build alternative, there would be no change to the existing environment and, therefore to impacts to biological resources.

However, at some point in the future, the existing bridge may need to be demolished and replaced due to safety considerations. If this occurred impacts to biological resources would be comparable to those described under Alternative 1 for replacement of the Schuyler Heim Bridge.

4.5.3 Cultural Resources

Detailed discussion of the cultural resources issues addressed below is provided in Section 3.8 – Cultural Resources and Section 3.11 - Geology/Soils/Seismicity/ Paleontology/Topography/Mineral Resources. Also see Appendix A – CEQA Checklist (V, Cultural Resources).

4.5.3.1 Alternative 1

a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

Alternative 1 would demolish the Schuyler Heim Bridge and replace it with a new bridge. This would destroy a bridge that has been determined to be a historical resource. The Schuyler Heim Bridge was determined to be eligible for listing on the NRHP under Criterion C in engineering as the highest vertical lift bridge in the western United States and one of the most significant vertical bridges in the state of California. As the Schuyler Heim Bridge is considered to be a historic property and eligible for the NRHP, the bridge is therefore eligible for inclusion in the CRHR under Criterion 3 and is considered a historical resource for the purposes of CEQA. Therefore, under CEQA, this alternative would result in a substantial adverse change in the significance of the historical resource, and would constitute a significant impact on the Schuyler Heim Bridge, under Significance Criteria 2(A) of Section 15064.5. Mitigation would be required. However, even with mitigation, impacts would remain significant.

The CEQA Guidelines, Section 15126.4(b)(2) recognize that mitigation cannot reduce all impacts to less than significant, as follows:

In some circumstances, documentation of an historical resource, by way of historic narrative, photographs, or architectural drawings, as mitigation for the effects of demolition of the resource will not mitigate the effects to a point where clearly no significant effect on the environment would occur.

Therefore, even with implementing the mitigation measures shown in Table 4-1, demolition of the existing Schuyler Heim Bridge would be considered a significant environmental impact.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

No historic or prehistoric archaeological sites have been recorded within the project APE. Therefore, impacts to archaeological resources from ground-disturbing activities associated with project construction within the project area would be less than significant. Mitigation is not required.

c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Excavation for bridge column footings and, at depths greater than 1.5 m (5 ft) below the current ground surface, any footing for elevated roadways, including on-ramps, off-ramps, and bridge approaches, could encounter fossil remains at previously unrecorded fossil sites north of Anaheim Street. Soils located south of Anaheim Street are primarily historic artificial fill. Significant impacts to paleontological resources could occur if any such resources were encountered during construction. If paleontological resources were discovered, minimization measures (such as salvaging, cataloguing, reporting) would be required. These measures would reduce impacts to less than significant.

d) Would the project disturb any human remains, including those interred outside of formal cemeteries?

Alternative 1 is not expected to disturb human remains. In the event excavation should unearth any human remains, impacts would be considered less than significant. However, measures would be implemented in accordance with California Health and Safety Code Section 7050.5.

4.5.3.2 Alternative 2

a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

Under Alternative 2, the potential for impacts to the historical Schuyler Heim Bridge would be the same as under Alternative 1 and would be considered significant. Mitigation would be required. However, the loss of this historic resource would remain a significant adverse impact.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Under Alternative 2, the potential for significant impacts to archaeological and paleontological resources (b, c, above) would be the same as under Alternative 1 and would be less than significant. Mitigation is not required.

d) Would the project disturb any human remains, including those interred outside of formal cemeteries?

Under Alternative 2, the potential to disturb human remains would be the same as discussed under Alternative 1, and would be less than significant. Mitigation is not required.

4.5.3.3 Alternative 3

a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

Under Alternative 3, the potential for impacts to the Schuyler Heim Bridge, a designated historical resource, would be less than significant, as this alternative would preserve the existing bridge.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Under Alternative 3, the potential for impacts to archaeological and paleontological resources (b, c, above) would be the same as for Alternative 1 and would be less than significant. Mitigation is not required.

d) Would the project disturb any human remains, including those interred outside of formal cemeteries?

Under Alternative 3, the potential to disturb human remains would be the same as discussed under Alternative 1, and would be less than significant. Mitigation is not required.

4.5.3.4 Alternative 4

a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

Under Alternative 4, the potential for significant impacts to the historical Schuyler Heim Bridge would be the same as under Alternative 1 and would be significant. Mitigation would be required. However, the impact of demolition of this historic resource would remain a significant adverse impact.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Under Alternative 4, the potential for impacts to cultural resources (b, c, above) would be the same as for Alternative 1 and would be less than significant. Mitigation is not required.

d) Would the project disturb any human remains, including those interred outside of formal cemeteries?

Under Alternative 2, the potential to disturb human remains would be the same as discussed under Alternative 1, and would be less than significant. Mitigation is not required.

4.5.3.5 Alternative 5

The amount of construction that would be required under the TSM alternative would be considerably less than under the build alternatives and would consist of activities such as widening roadways, adding turn lanes, and installing electric signs. These activities would occur within portions of the project area that are already developed for transportation uses. Therefore, due to the location and minimal extent of activities related to the TSM alternative, there would be no impact to cultural resources.

4.5.3.6 Alternative 6

Under Alternative 6, there would be no changes to the existing environment and, therefore, no impact to cultural resources.

However, at some point in the future, the existing bridge may need to be demolished and replaced due to safety considerations. If this occurred impacts to cultural resources would be comparable to those described under Alternative 1 for replacement of the Schuyler Heim Bridge.

4.5.4 Noise

Detailed discussion of the noise resources issues addressed below is provided in Section 3.14 - Noise and Chapter 5.0 – Cumulative Impacts of this Final EIS/EIR. Also see Appendix A – CEQA Checklist (XI, Noise).

4.5.4.1 Alternative 1

The NEPA analysis is based on the Caltrans *Traffic Noise Analysis Protocol for New Highway Construction and Highway Reconstruction Projects* (Protocol) (1998), which states that a noise impact that requires consideration of noise abatement measures occurs when:

- There is a substantial noise increase, described as 12 dBA, Leq(h) or more over existing levels, and/or
- Noise levels approach or exceed the Noise Abatement Criteria (NAC) shown in Table 3.14-2.

Under CEQA, the assessment entails looking at the setting of the noise impact and then how large or audible any project-related noise increase would be in a given area. Key considerations include: the uniqueness of the setting, the sensitive nature of noise receptors, the magnitude of the noise increase, the number of residences affected, and the absolute noise level.

a) Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

During project construction, noise from pile driving is expected to exceed the noise abatement criteria (NAC) at the Anchorage Way Marinas and Leeward Bay Marina. Pile driving would be restricted to daylight hours only, and residents would be offered hotel vouchers for a local hotel during the time that pile driving is being conducted in the Cerritos Channel or Consolidated Slip, as appropriate. With these abatement measures, impacts would be less than significant. For additional discussion, see Section 4.5.4.1 d, below.

b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Under Alternative 1, this potential impact would be less than significant under CEQA criteria.

c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Anchorage Way Marinas

At the Anchorage Way Marinas, peak-hour noise levels from operation of Alternative 1 are expected to increase by up to 1 dBA, ranging from 68 to 70 dBA (Table 3.14-5). Under existing conditions, peak-hour traffic noise levels range from 67 to 71 dBA. The increase of up to 1 dBA under Alternative 1 would not be audible to the human ear. Therefore, the operations impacts would be considered less than significant at the Anchorage Way Marinas.

Leeward Bay Marina

As shown in Table 3.14-7, under Alternative 1, the loudest peak-hour traffic noise levels at Leeward Bay Marina would increase from 1 to 10 dBA over existing conditions. This would be a considerable increase and would result in peak-hour noise levels of 61 to 67 dBA. Therefore, noise impacts would be considered significant. Noise abatement in the form of a noise barrier would be implemented and would result in a 5- to 7-dBA decrease in peak-hour noise levels. As a result, noise impacts would be considered less than significant at this location.

Wilmington Neighborhood

As shown in Table 3.14-9, under Alternative 1, the peak-hour traffic noise levels at the Wilmington Neighborhood would increase by 5 to 13 dBA. This noise increase would be considered a potentially significant impact under CEQA criteria and would result in noise levels at some locations within the receiver area that would approach or exceed NAC for residential areas. This would be considered a significant impact. Noise abatement in the form of two noise barriers would be implemented and would result in a 5 to 9 dBA decrease in peak-hour noise levels. As a result, noise impacts would be considered less than significant at this location.

d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Pile driving that will occur during Alternative 1 construction has the potential to be the loudest and most intrusive of the various construction activities that will be employed. However, pile driving is generally limited to those areas requiring a pier or vertical support structure. Pile driving operations are responsible for very high peak or impact noise levels during construction. The EPA document, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* (1971), reports that pile driving operations can result in peak noise levels of 90 to 105 dBA at 15 m (50 ft), with 100 dBA being typical. The angle of the noise impact on some pile drivers is such that topography and buildings that block the line of sight for noise from grading equipment and general construction equipment may not block noise from pile driving. As a result, intervening topography or structures may not necessarily reduce noise from pile driving activities.

Based on a pile driving noise level of 100 dBA at 15 m (50 ft), noise levels at other distances can be forecast. At a distance of 150 m (500 ft), pile-driving noise could still reach levels as high as 80 dBA, but the noise level will decrease as distance from the source increases. Table 3.14-4 shows noise attenuation over distance from the pile driver (hard site assumed). Based on the attenuation shown in the table, pile-driving noise would be considered significant at the Anchorage Way Marinas and the Leeward Bay Marina. Pile driving activities for the Cerritos Channel are expected to last approximately 2 weeks (10 days) for each of the two stages of falsework pile driving. Falsework pile driving for the Consolidated Slip is expected to last less than 2 weeks (10 days). Both the Anchorage Way Marinas in the Cerritos Channel and the Leeward Bay Marina in the Consolidated Slip would be subject to significant short-term noise impacts from pile driving activities. Based on the attenuation shown in Table 3.14-4, and an estimated distance of 174 m (570 ft) between the north end of the new bridge across the Cerritos Channel and the Anchorage Way Marinas, the noise level from pile driving would be approximately 80 dBA. Based on an estimated distance of 60 m (200 ft) between the north end of the new SR-47 Expressway across the Consolidated Slip/ Dominguez Channel and the Leeward Bay Marina, and attenuation shown in Table 3.14-4, the noise level from pile driving would be approximately 88 dBA.

Noise abatement would be implemented. Pile driving would be restricted to daylight hours only, and residents would be offered hotel vouchers for a local hotel during the time that pile driving is being conducted in the Cerritos Channel or Consolidated Slip, as appropriate. With these abatement measures, impacts would be less than significant.

e) For a project located within a land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The project site is not within an airport land use plan, is not located within 3.3 km (2 mi) of a public airport, and is not in the vicinity of a private airstrip. The nearest airport is Long Beach Airport, approximately 12.9 km (8 mi) northeast of the project site. A heliport used by Island Express Helicopters for trips in conjunction with the Catalina Terminal is located at Slip 93 along the Main Channel in the Port of Los Angeles. A second heliport, one that is seldom used, is located approximately 4.0 km (2.5 mi) southwest of the Schuyler Heim Bridge, at Ports O' Call, also along the Main Channel in the Port of Los Angeles. As a result of distance from the project site, there is minimal potential for persons in the project area to be exposed to excessive noise.

Based on the above, potential impacts (e, f, above) of Alternative 1 would be less than significant under CEQA criteria.

4.5.4.2 Alternative 2

a) Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

For Alternative 2, impacts from project construction noise would be the same as discussed under Alternative 1 for the Anchorage Way Marinas. Noise abatement measures would be implemented and would reduce impacts from construction noise to less than significant.

b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

For Alternative 2, this impact would be the same as Alternative 1 and would be less than significant.

c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Anchorage Way Marinas

Under Alternative 2, operations noise impacts would be the same as Alternative 1 and would be less than significant at the Anchorage Way Marinas.

Long Beach Neighborhood/SR-103 Extension

As shown in Table 3.14-13, under Alternative 2, peak-hour noise levels would either decrease (by 1 to 4 dBA), increase (1 to 2 dBA), or remain the same as under existing conditions. Because noise levels would continue to approach or exceed the NAC for residential areas at some locations, this alternative would result in a significant noise impact under CEQA. Noise abatement in the form of noise barriers would be implemented and would reduce peak-hour noise levels by 1 to 14 dBA. With implementation of noise abatement, no locations within the Long Beach Neighborhood/SR-103 Extension receiver area would approach or exceed the NAC for residential areas. Noise impacts would be considered less than significant.

Leeward Bay Marina

This receiver area would not be affected by Alternative 2 operations.

Wilmington Neighborhood

This receiver area would not be affected by Alternative 2 operations.

d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

For Alternative 2, noise impacts from pile driving during project construction would be the same as described for Alternative 1 at the Anchorage Way Marinas. Noise abatement would be implemented and would reduce impacts to less than significant. Under Alternative 2, there would be no impact to the Leeward Bay Marina, or other receiver areas, as pile driving would not occur at those locations.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Potential impacts (e, f, above) of Alternative 2 would be the same as for Alternative 1 and would be less than significant.

4.5.4.3 Alternative 3

a) Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

For Alternative 3, impacts from project construction noise would be the same as discussed under Alternative 1 for the Anchorage Way Marinas. Noise abatement measures would be implemented and would reduce impacts from construction noise to less than significant.

b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Under Alternative 3, this potential impact would be the same as discussed under Alternative 1 and would be less than significant.

c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Anchorage Way Marinas

Under Alternative 3, peak-hour traffic noise levels at the Anchorage Way Marinas would decrease by 1 to 3 dBA (Table 3.14-13). Impacts would be considered less than significant.

Leeward Bay Marina

Under Alternative 3, potential impacts to the Leeward Bay Marina would be the same as discussed under Alternative 1 (Table 3.14-7) and would be significant. Noise abatement would be implemented as described under Alternative 1.

Wilmington Neighborhood

Under Alternative 3, potential impacts to the Wilmington Neighborhood would be the same as discussed under Alternative 1 and would be considered potentially significant. Noise abatement would be implemented and would reduce impacts to less than significant.

Long Beach Neighborhood/SR-103 Extension

This receiver area would not be affected by Alternative 3 operations.

d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Under Alternative 3, construction impacts would be the same as described for Alternative 1. Impacts from pile driving would be significant at the Anchorage Way Marinas and the Leeward Bay Marina. Noise abatement would be implemented, and impacts would be less than significant.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Under Alternative 3, potential impacts (e, f, above) would be the same as for Alternative 1 and would be less than significant.

4.5.4.4 Alternative 4

a) Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

For Alternative 4, construction impacts would be comparable to those for Alternative 1 for the Cerritos Channel only, as Alternative 4 consists solely of replacement of the Schuyler Heim Bridge. Impacts of pile driving would be mitigated to less than significant at the Anchorage Way Marinas.

b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

This potential impact would be the same as Alternative 1 for replacement of the Schuyler Heim Bridge and would be less than significant.

c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Anchorage Way Marinas
Under Alternative 4 operations, peak-hour noise levels would decrease by 2 to 5 dBA, and impacts would be considered less than significant.

Leeward Bay Marina, Long Beach Neighborhood/SR-103 Extension, Wilmington Neighborhood
These three noise receiver areas would not be affected by operation of Alternative 4.

d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Anchorage Way Marinas
Under Alternative 4, construction impacts would be the same as described for Alternative 1 for activities related to replacement of the Schuyler Heim Bridge. Impacts from pile driving would be less than significant at the Anchorage Way Marinas after abatement.

Leeward Bay Marina, Long Beach Neighborhood/SR-103 Extension, Wilmington Neighborhood
These three noise receiver areas would not be affected by construction of Alternative 4.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Under Alternative 4, potential impacts (e, f, above) would be the same as described under Alternative 1 and would be less than significant.

4.5.4.5 Alternative 5

a) Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Under Alternative 5, potential impacts (a, b, above) would not occur.

c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Anchorage Way Marinas, Leeward Bay Marina

Under Alternative 5, future noise levels would be the same as under Alternative 6, the No Build alternative (see Tables 3.14-5 and 3.14-6). Peak-hour noise levels would increase by 4 dBA at the Anchorage Way Marinas and by 3 to 4 dBA at the Leeward Bay Marina, due to projected increases in traffic volume. This would not be considered a significant impact under CEQA, but all receiver locations would either approach or exceed the applicable NAC by Year 2030. Noise abatement may be required in the future due to increases in background traffic volumes. No noise abatement measures are proposed at this time.

Wilmington Neighborhood

Under Alternative 5, future noise levels would be the same as under Alternative 6, the No Build alternative (see Table 3.14-8). Peak-hour noise levels would increase by 7 to 9 dBA, due to an increase in traffic volume. This would not be considered a significant impact, but some receiver locations would approach or equal the NAC by Year 2030. Noise abatement may be required in the future due to increases in background traffic volumes. No noise abatement measures are proposed at this time.

Long Beach Neighborhood/SR-103 Extension

Under Alternative 5, future noise levels would be the same as under Alternative 6, the No Build alternative (see Table 3.14-11). Peak-hour noise levels would either equal the existing condition or increase by 1 to 2 dBA due to an increase in traffic volume. This would not be considered a significant impact, but a number of areas would either approach or exceed the NAC by Year 2030. Noise abatement may be required in the future due to increases in background traffic volumes. No noise abatement measures are proposed at this time.

d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Under Alternative 5, potential impacts (d, e, f, above) would not occur.

4.5.4.6 Alternative 6

a) Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Under Alternative 6, potential impacts (a, b, above) would not occur.

c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Under Alternative 6, potential impacts to the Anchorage Way Marinas, Leeward Bay Marina, Wilmington Neighborhood, and Long Beach Neighborhood/SR-103 Extension would be less than significant (Tables 3.14-5, 3.14-6, 3.14-8, and 3.14-11). However, within these noise receiver areas, noise levels would approach or exceed the NAC by Year 2030. Noise abatement may be required in the future die to increases in background traffic volumes. No noise abatement measures are proposed at this time.

d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Under Alternative 6, potential impacts (d, e, f, above) would not occur.

4.5.5 Transportation/Traffic

Detailed discussion of the noise resources issues addressed below is provided in Section 3.5 – Traffic and Transportation and Chapter 5.0 – Cumulative Impacts of this Final EIS/EIR. Also see Appendix A – CEQA Checklist (XV, Transportation/Traffic).

4.5.5.1 Alternative 1

a) Would the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

b) Would the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

e) Would the project result in inadequate emergency access?

Potential impacts (a, b, c, d, e, above) of Alternative 1 would be less than significant. Mitigation is not required.

f) Would the project result in inadequate parking capacity?

During project construction, Alternative 1 would have temporary impacts to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S terminals. Construction would take up to 820 off-street employee parking spaces and 54 marine terminal equipment spaces. The project includes provision of temporary parking spaces prior to construction as part of project design.

During project operation, Alternative 1 is anticipated to have permanent impacts to approximately 15 employee parking spaces at the Port of Long Beach Pier S Terminal. Compensation for this loss of parking capacity will be provided as part of the project, based on an agreement between Caltrans and the Port of Long Beach.

Based on the above, potential impacts would be less than significant.

g) Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

No bike racks, bike lanes, or bus turnouts are anticipated to be impacted by Alternative 1, and no conflict is anticipated to occur with adopted policies, plans, or programs supporting alternative transportation. Alternative 1 is not projected to interrupt or cause any change or delay in the existing or future transit ridership or transit routes. Further, Alternative 1 is not anticipated to interfere with the Los Angeles River bike path. Impacts would be less than significant.

4.5.5.2 Alternative 2

a) Would the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

b) Would the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

e) Would the project result in inadequate emergency access?

Potential impacts (a, b, c, d, e, above) of Alternative 2 would be the same as under Alternative 1 and would be less than significant. Mitigation is not required.

f) Would the project result in inadequate parking capacity?

During project construction, Alternative 2 would have temporary impacts to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S terminals. Construction would take up to 820 off-street employee parking spaces and 54 marine terminal equipment spaces. The project includes provision of temporary parking spaces prior to construction as part of project design.

During project operation, Alternative 2 is anticipated to have permanent impacts to approximately 15 employee parking spaces at the Port of Long Beach Pier S Terminal. Compensation for this loss of parking capacity will be provided as part of the project, based on an agreement between Caltrans and the Port of Long Beach.

Based on the above, potential impacts would be less than significant.

g) Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Under Alternative 2, potential impacts related to alternative transportation would be the same as under Alternative 1 and would be less than significant. Mitigation is not required.

4.5.5.3 Alternative 3

a) Would the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

b) Would the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

e) Would the project result in inadequate emergency access?

Potential impacts (a, b, c, d, e, above) of Alternative 3 would be the same as under Alternative 1 and would be less than significant. Mitigation is not required.

f) Would the project result in inadequate parking capacity?

During project construction, Alternative 3 would have temporary impacts to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S terminals. Construction would take up to 977 off-street employee parking spaces and 167 marine terminal equipment spaces. The project includes provision of temporary parking spaces prior to construction as part of project design.

During project operation, Alternative 3 would not affect any permanent parking spaces.

Based on the above, potential impacts would be less than significant.

g) Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Under Alternative 3, potential impacts related to alternative transportation would be the same as under Alternative 1 and would be less than significant. Mitigation is not required.

4.5.5.4 Alternative 4

a) Would the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

b) Would the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

e) Would the project result in inadequate emergency access?

Potential impacts (a, b, c, d, e, above) of Alternative 4 would be the same as under Alternative 1 and would be less than significant. Mitigation is not required.

f) Would the project result in inadequate parking capacity?

During project construction, Alternative 4 would have temporary impacts to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S terminals. Construction would take up to 587 off-street employee parking spaces and 54 marine terminal equipment spaces. The project includes provision of temporary parking spaces prior to construction as part of project design.

During project operation, Alternative 4 is anticipated to have permanent impacts to approximately 15 employee parking spaces at the Port of Long Beach Pier S Terminal. Compensation for this loss of parking capacity will be provided as part of the project, based on an agreement between Caltrans and the Port of Long Beach.

Based on the above, potential impacts would be less than significant.

g) Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Under Alternative 4, potential impacts related to alternative transportation would be the same as under Alternative 1 and would be less than significant. Mitigation is not required.

4.5.5.5 Alternative 5

a) Would the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

b) Would the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

e) Would the project result in inadequate emergency access?

Potential impacts (a, b, c, d, e, above) of Alternative 5 would be the same as under Alternative 1 and would be less than significant. Mitigation is not required.

f) Would the project result in inadequate parking capacity?

Potential loss of parking under Alternative 5 is undetermined at this time. However, if loss of parking should occur, impacts would be expected to be less than significant.

g) Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Alternative 5 is not expected to impact alternative transportation. In the event impact should occur, it is expected to be less than significant.

4.5.5.6 Alternative 6

a) Would the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

Under Alternative 6, existing traffic delays would continue, and are expected to increase, concurrent with projected increases in traffic volumes in the ports area. The Ocean Boulevard/SR-47 intersection is expected to operate at a deficient level of service at year 2030. No mitigation is proposed at this time.

b) Would the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

Under Alternative 6, levels of service would either stay the same or decrease, concurrent with projected increases in traffic volumes in the ports area. No mitigation is proposed at this time.

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Under Alternative 6, potential impacts (c, d, above) would not occur.

e) Would the project result in inadequate emergency access?

This alternative would have no effect on existing emergency response times in the project area. However, the existing Schuyler Heim Bridge would remain seismically deficient and could be damaged during a major seismic event, with subsequent effects to land- and water-based emergency response routes and times.

f) Would the project result in inadequate parking capacity?

Under Alternative 6, there would be no change to existing conditions. Therefore, there would be no impact to alternative transportation policies or facilities.

4.5.6 Mandatory Findings of Significance

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

4.5.6.1 Cultural Resources

4.5.6.1.1 Alternatives 1, 2, and 4

Potentially significant: These alternatives would demolish the Schuyler Heim Bridge and replace it with a new bridge. This would destroy a bridge that has been determined to be a historical resource. The Schuyler Heim Bridge was determined to be eligible for listing on the NRHP under Criterion C in engineering as the highest vertical lift bridge in the Western United States and one of the most significant vertical bridges in the state of California. As the Schuyler Heim Bridge is considered to be a historic property and eligible for the NRHP,

the bridge is therefore eligible for inclusion in the CRHR under Criterion 3 and is considered a historical resource for the purposes of CEQA. Therefore, under CEQA, this alternative would be considered a substantial adverse change in the significance of the historical resource, and would constitute a significant impact on the Schuyler Heim Bridge, under Significance Criteria 2(A) of Section 15064.5. Mitigation would be required. However, even with mitigation, impacts would remain significant.

4.5.6.1.2 Alternatives 3, 5, and 6

Potentially significant: Under these alternatives, the Schuyler Heim Bridge would remain in place, unaltered except through routine maintenance and upkeep. However, the bridge's overall condition would be expected to continue to deteriorate. This could be considered an indirect effect under Adverse Effect Criteria 2(iv) and 2(vi) (36 CFR 800.5(a).

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

4.5.6.2 Air Quality

4.5.6.2.1 Alternatives 1, 2, 3, and 4

Potentially significant: Under these alternatives, construction would result in adverse effects to air quality, even after mitigation. Therefore, these impacts, plus those of other, concurrent, construction projects would be expected to be adverse. Therefore, project construction would contribute to cumulatively adverse effects to air quality.

During project construction and operations, significant emissions of NO_X would occur as a result of marine vessel detours around Terminal Island. These emissions would contribute to cumulatively significant impacts to air quality.

4.5.6.2.2 Alternatives 5 and 6

No impact: There would be minimal impacts of Alternative 5 construction and no impacts of Alternative 5 operations or Alternative 6. Therefore, these alternatives would not contribute to cumulative impacts to air quality.

4.5.6.3 Traffic and Transportation

4.5.6.3.1 Alternatives 1, 2, 3, 4, and 5

No impact: These alternatives would contribute to improved traffic flow in the project area and, therefore, would not result in cumulative impacts to traffic and transportation.

4.5.6.3.2 Alternative 6

Potentially significant: This No Build alternative would make no changes to improve deficient transportation flow in the project area. With Alternative 6, congestion from queuing at the Schuyler Heim Bridge and from delays at the Ocean Boulevard/SR-47 intersection would continue, with projected increases in delays. As a result, when considered with other development projects, the No Build alternative could be considered to contribute to ongoing cumulative effects to Traffic and Transportation in the project area.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

4.5.6.4 Air Quality

4.5.6.4.1 Alternatives 1, 2, 3, and 4

Potentially significant:

Construction Impacts

During project construction, emissions would be from construction equipment exhaust and fugitive dust. The direct emissions of CO, NO_X, ROG, SO_X, and PM_{10} are predicted to exceed daily significance thresholds during construction of the Alternatives 1, 2, 3, or 4. This would be considered a temporary significant impact to air quality. Impacts to sensitive receptors near construction areas would decrease with distance from the source of the impact. Although construction laydown areas would be located as far from sensitive receptors as the project would allow, impacts could be significant. Mitigation is required.

In addition, indirect emissions would emanate from marine vessels having to detour around Terminal Island during construction of the new bridge. The indirect marine vessel emissions exceed the SCAQMD NO_X threshold. Therefore, marine vessel NO_X emissions would result in a temporary, significant air quality impact. Mitigation is required.

Together, the direct and indirect emissions of CO, NO_X, ROG, SO_X, and PM_{10} are predicted to exceed daily significance thresholds during project construction and, therefore, would result in a temporary significant impact to air quality. However, even with mitigation, construction emissions would be expected to remain in excess of daily significance thresholds and, therefore, be a temporary significant impact.

Operations Impacts

Indirect operation emissions would result from marine vessel detours around Terminal Island. Daily emissions of NO_X exceed the SCAQMD threshold. In addition, bridge traffic during project operation would result in a net increase in emissions greater than the SCAQMD thresholds for NO_X. Therefore, although an indirect impact of the project alternative, the net increase in NO_X emissions from marine vessel detours and bridge traffic would result in a significant air quality impact; mitigation is required. However, even with mitigation, operation emissions would remain significant.

Cancer risk impacts associated with Alternatives 1, 2, and 3 would be significant at a limited number of the residential receptors. Alternative 2 would have significant impacts on cancer risks for a number of residential receptors, parks, and workers in the project vicinity. Mitigation is required. After mitigation, cancer risks for Alternatives 1 and 3 are expected to be reduced to below the significance thresholds. The proposed mitigation measure for Alternative 1 would not be feasible for Alternative 2.

4.5.6.4.2 Alternative 5

Less than significant: Under the TSM alternative, construction would be minimal and there would be no effect to marine vessel operations, so there would be minimal contributions to, and no violations of, existing or projected air quality standards.

The TSM alternative would be designed to improve traffic flow and reduce delays, which would be expected to reduce vehicle emissions. Also, the Schuyler Heim Bridge would not be replaced, so marine vessel operations would not change. Therefore, under this alternative, operations would not violate any air quality standard or contribute substantially to an existing or projected air quality violation

4.5.6.4.3 Alternative 6

No impact: Under Alternative 6, there would be no changes to the existing environment. This alternative would not result in violation of an air quality standard or contribute substantially to an existing or projected air quality violation.

4.6 Unavoidable Significant Environmental Effects

This section addresses the unavoidable significant environmental effects of the proposed project alternatives. These are significant impacts that, even with mitigation, cannot be reduced to a level that is less than significant. For each potential impact evaluated, the CEQA criteria are utilized to assess whether or not the impact can be mitigated to a level that is less than significant. The conclusions that the impacts identified in this section cannot be mitigated to less than significant is based on analyses provided in Chapter 3.0 and in Section 4.2.2, above, as applied to the CEQA criteria.

In this section, Table 4-2 identifies the unavoidable adverse impacts by environmental resource and project alternative. As shown in the table, one environmental resource area, Air Quality, would result in unavoidable significant environmental effects for Alternatives 1, 1A, 2, 3, and 4. In addition, implementation of Alternatives 5 or 6 could result in significant impacts related to Noise and Traffic. One environmental resource area, Cultural Resources, would result in unavoidable significant environmental effects related to a historic resource (Schuyler Heim Bridge) for Alternatives 1, 1A, 2, 3, and 4. As described in Section 4.2.2, above, and as shown in Table 4-1, for all other resource areas and alternatives, potentially significant impacts would be mitigated to a level that is less than significant.

4.7 Climate Change

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to greenhouse gas (GHG) emissions reduction and climate change research and policy have increased dramatically in recent years.

In 2002, with the passage of Assembly Bill (AB) 1493, California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the state level. AB 1493 requires the California Air Resources Board (CARB) to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year; however, to enact the standards, California needed a waiver from the U.S. Environmental Protection Agency (EPA). The waiver was denied by EPA in December 2007. See California v. Environmental Protection Agency, 9th Cir. Jul. 25, 2008, No. 08-70011. However, on January 26, 2009, it was announced that EPA will reconsider its decision regarding the denial of California's waiver.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order (EO) S-3-05. The goal of EO S-3-05 is to reduce California's GHG emissions to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by the year 2050. In 2006, this goal was

further reinforced with the passage of AB 32, the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals as EO S-3-05, while further mandating that CARB create a plan, including market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." EO S-20-06 directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

Climate change and GHG reduction is also a concern at the federal level; however, at this time, no legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change. California, in conjunction with several environmental organizations and several other states, sued to force the EPA to regulate GHGs as a pollutant under the Clean Air Act (Massachusetts vs. Environmental Protection Agency et al., U.S. Supreme Court No. 05–1120. 549 U.S. [2007]. Argued November 29, 2006, Decided April 2, 2007). The court ruled that GHGs fit within the Clean Air Act's definition of a pollutant and that EPA has the authority to regulate GHGs. Despite the Supreme Court ruling, there are no promulgated federal regulations to date limiting GHG emissions.

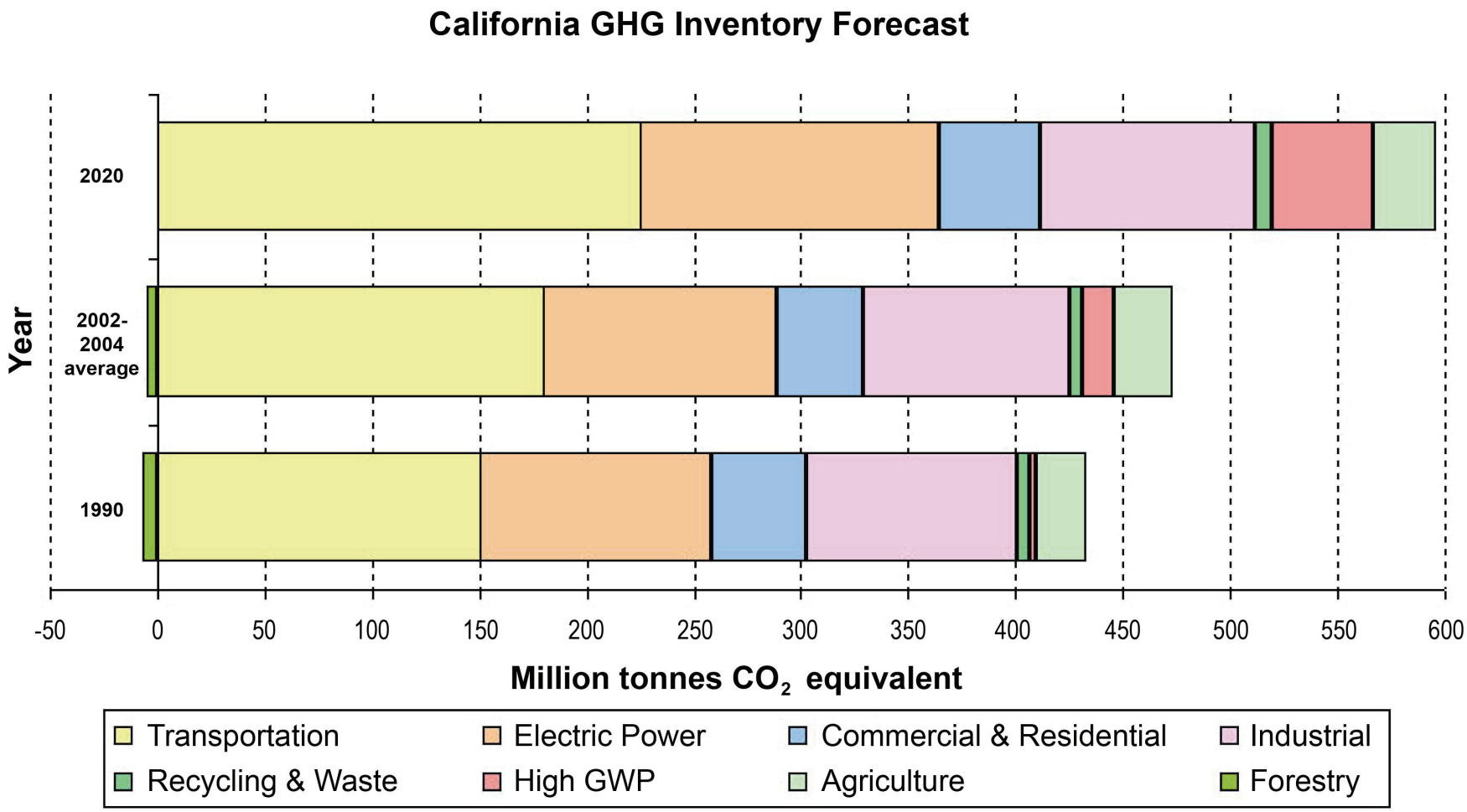
4.7.1 Affected Environment

An individual project does not generate enough GHG emissions to significantly influence global climate change, which is a cumulative impact of GHG emissions. A project participates in this potential impact through its incremental contribution, combined with the cumulative impact of all other sources of GHG (AEP, 2007).

As part of its supporting documentation for the Draft Scoping Plan, CARB recently released an updated version of the GHG inventory for California (June 26, 2008). Figure 4-1 depicts a graph from that update showing the total GHG emissions for California for 1990, 2002 to 2004 average, and 2020 projected if no action is taken.

Caltrans and its parent agency, the Business, Transportation, and Housing Agency, have taken an active role in addressing GHG emissions reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human-made GHG emissions are from transportation, Caltrans has created and is implementing the Climate Action Program at Caltrans (2006).

One of the main strategies in the Caltrans Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (0 to 25 miles per hour [mph]) and speeds over 55 mph. Relieving congestion by enhancing operations and improving travel times in high congestion travel corridors will lead to an overall reduction in GHG emissions.



Source: http://www.arb.ca.gov/cc/inventory/data/forecast.htm

Figure 4-1
California Greenhouse Gas Inventory Forecast
Schuyler Heim Bridge Replacement and SR-47 Expressway

4.7.2 Project Analysis

The proposed project is designed to reduce traffic congestion and vehicle time delays along the Alameda Corridor between Ocean Boulevard on Terminal Island and I-405 on the mainland to the north, on local surface streets, and along the portions of I-110 and I-710 that extend northward from the ports area. The flyover specifically would reduce congestion for traffic bound for northbound SR-47 from Ocean Boulevard, enabling this traffic to avoid the signalized intersection and Ocean Boulevard and SR-47.

The Traffic Study prepared for the proposed project (MMA, 2007) addressed 22 intersections within the study area. Without the project, by 2030, more than one-half of these intersections would operate at LOS E or LOS F during one or more peak hours. Additionally, traffic on surface streets would be subject to delays from at-grade rail crossings. Project alternatives 1, 2, and 4 would by-pass six at-grade rail crossings, thereby eliminating congestion and delays at these locations (Section 2.2.2).

The existing transportation system in the ports area is becoming increasingly constrained with cargo traffic and other vehicular traffic. A POLA/POLB study forecast that the amount of cargo entering the ports is expected to nearly double between 2010 and 2020. At the same time, the amount of port-related truck traffic is expected to double. These increases would result in further congestion between the ports and the regional freeway system (Section 1.2.2.2.1).

The proposed project is included in the Regional Transportation Plan and the Regional Transportation Improvement Program which discuss improved traffic flow for the region. As a result, carbon dioxide emissions should be reduced, despite what may be an increase in regional vehicle miles traveled (VMT).

With the current science, project-level analysis of GHG emissions is limited. Numerous key GHG variables are likely to change dramatically during the design life of the proposed project and would thus dramatically change the projected CO_2 emissions.

Vehicle fuel economy is increasing. The EPA's annual report, *Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2008* (EPA, 2008), provides data on the fuel economy and technology characteristics of new light-duty vehicles including cars, minivans, sport utility vehicles, and pickup trucks. The report confirms that average fuel economy has improved each year beginning in 2005 and is now the highest since 1993.

Most of the increase since 2004 is due to higher fuel economy for light trucks, following a long-term trend of slightly declining overall fuel economy that peaked in 1987. These vehicles also have a slightly lower market share, peaking at 52 percent in 2004, with projections at 48 percent in 2008.

Table 4-3 (end of section) shows the alternatives for vehicle fuel economy increases currently being studied by the National Highway Traffic Safety Administration in its *Draft Environmental Impact Statement for New Corporate Average Fuel Economy Standards* (NHTSA, 2008).

Near-zero carbon vehicles will come into the market during the design life of this project. According to a March 2008 report released by University of California Davis, Institute of Transportation Studies:

> *Large advancements have occurred in fuel cell vehicle and hydrogen infrastructure technology over the past 15 years. Fuel cell technology has progressed substantially resulting in power density, efficiency, range, cost, and durability all improving each year. In another sign of progress, automotive developers are now demonstrating over 100 fuel cell vehicles in California – several in the hands of the general public – with configurations designed to be attractive to buyers. Cold-weather operation and vehicle range challenges are close to being solved, although vehicle cost and durability improvements are required before a commercial vehicle can be successful without incentives. The pace of development is on track to approach pre-commercialization within the next decade.*
>
> *A number of the U.S. Department of Energy 2010 milestones for fuel cell vehicles development and commercialization are expected to be met by 2010. Accounting for a five to six year production development cycle, the scenarios developed by the U.S. DOE suggest that 10,000s of vehicles per year from 2015 to 2017 would be possible in a federal demonstration program, assuming large cost share grants by the government and industry are available to reduce the cost of production vehicles*. Cunningham et al, (2008.)

As previously stated, California has recently adopted a low-carbon transportation fuel standard. CARB was scheduled to release draft regulations for low-carbon fuels in late 2008 with implementation of the standard to begin in 2010.

Driver behavior has been changing as the U.S. economy and oil prices have changed. In its January 2008 report, *Effects of Gasoline Prices on Driving Behavior and Vehicle Market*, the Congressional Budget Office found the following results based on data collected from California.

- Freeway motorists have adjusted to higher gas prices by making fewer trips and driving more slowly.
- The market share of sports utility vehicles is declining.
- The average prices for larger, less-fuel-efficient models have declined over the past 5 years as average prices for the most-fuel-efficient automobiles have risen, showing an increase in demand for the more fuel-efficient vehicles.

Taken from *Draft Environmental Impact Statement for New Corporate Average Fuel Economy Standards* (NHTSA, 2008), Figure 4-2 illustrates how the range of uncertainties in assessing GHG impacts grows with each step of the analysis.

> *Cascade of uncertainties typical in impact assessments showing the "uncertainty explosion" as these ranges are multiplied to encompass a comprehensive range of future consequences, including physical, economic, social, and political impacts and policy responses.*

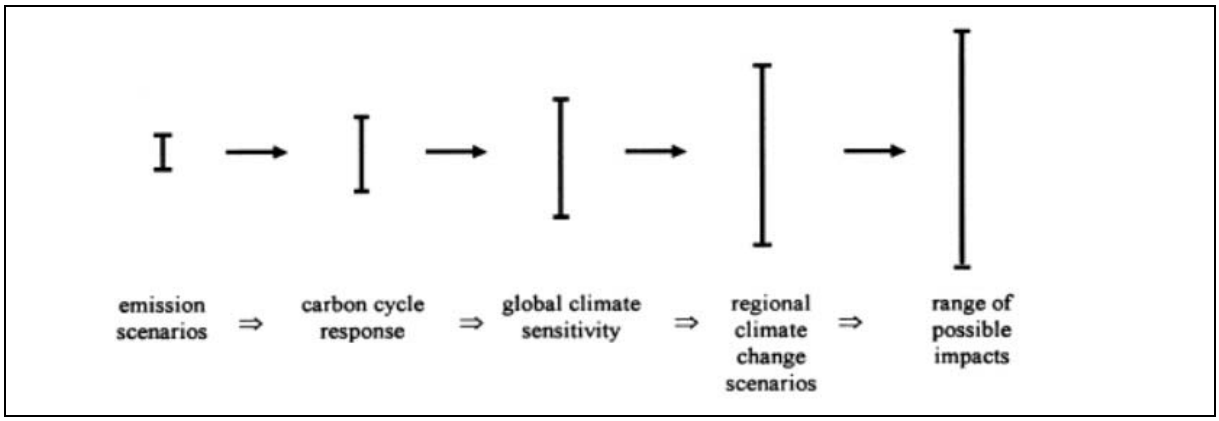


FIGURE 4-2
Cascade of Uncertainties

Much of the uncertainty in assessing the impact of an individual project on climate change surrounds the global nature of the climate change. Even assuming that the target of 1990 levels of emissions is achieved, no regulatory framework is in place that would allow for a ready assessment of what the modeled 11.4- to 20.9-ton increase in CO_2 emissions would mean for climate change, given the overall California GHG emissions inventory of approximately 430 million tons of CO_2 equivalent. This uncertainty only increases when viewed globally.

The IPCC has created multiple scenarios to project potential future global GHG emissions, as well as to evaluate potential changes in global temperature, and other climate changes with associated effects on human and natural systems. These scenarios vary in terms of the type of economic development, the amount of overall growth, and the steps taken to reduce GHG emissions. Nonmitigation IPCC scenarios project an increase in global GHG emissions by 9.7 up to 36.7 billion metric tons CO_2 from 2000 to 2030, which represents an increase of between 25 and 90 percent. (IPCC, 2007)

The assessment is further complicated by the fact that changes in GHG emissions can be difficult to attribute to a particular project because the projects often cause shifts in the locale for some type of GHG emissions, rather than causing "new" GHG emissions. Although some of the emission increases might be new, a net global increase, reduction, or no change is uncertain and no models are approved by regulatory agencies that operate at the global or even statewide scale.

The complexities and uncertainties associated with project-level impact analysis are further borne out in the draft environmental impact statement completed by the NHTSA. As the text quoted below shows, even when dealing with GHG emission scenarios on a national scale for the entire passenger car and light truck fleet, the numerical differences among alternatives is very small and well within the error sensitivity of the model.

> *In analyzing across the Corporate Average Fuel Economy 30 alternatives, the mean change in the global mean surface temperature, as a ratio of the increase in warming between the B1 (low) to A1B (medium) scenarios, ranges from 0.5 percent to 1.1 percent. The resulting change in sea level rise (compared to the No Action Alternative) ranges, across the*

alternatives, from 0.04 centimeter to 0.07 centimeter. In summary, the impacts of the MY 2011-2015 Corporate Average Fuel Economy alternatives on global mean surface temperature, sea level rise, and precipitation are relatively small in the context of the expected changes associated with the emission trajectories. This is due primarily to the global and multi-sectoral nature of the climate problem. Emissions of CO_2, the primary gas driving the climate effects, from the United States automobile and light truck fleet represented about 2.5 percent of total global emissions of all greenhouse gases in the year 2000 (EPA, 2008; CAIT, 2008). While a significant source, this is a still small percentage of global emissions, and the relative contribution of CO_2 emissions from the United States light vehicle fleet is expected to decline in the future, due primarily to rapid growth of emissions from developing economies (which are due in part to growth in global transportation sector emissions)." (NHTSA, 2008; pp.3-77 to 3-78)

4.7.2.1 CEQA Conclusion

Based on the above, Caltrans has determined that, in the absence of further regulatory or scientific information related to GHG emissions and CEQA significance, it is too speculative to make a determination regarding the project's direct impact and its contribution on the cumulative scale to climate change. However, as previously stated, Caltrans anticipates a reduction in GHG emissions with the project. Nonetheless, Caltrans is taking further measures to help reduce energy consumption and greenhouse gas emissions. These measures are outlined in the following section.

4.7.2.2 AB 32 Compliance

Caltrans continues to be actively involved on the Governor's Climate Action Team as CARB works to implement AB 1493 and helps achieve the targets set forth in AB 32. Many of the strategies Caltrans is using to help meet the targets in AB 32 come from the California Strategic Growth Plan, which is updated each year. Governor Arnold Schwarzenegger's Strategic Growth Plan calls for a $222 billion infrastructure improvement program to fortify the state's transportation system, education, housing, and waterways, including $107 billion in transportation funding during the next decade.

As shown in Figure 4-3, the Strategic Growth Plan targets a significant decrease in traffic congestion below today's level and a corresponding reduction in GHG emissions. The Strategic Growth Plan proposes to do this while accommodating growth in population and the economy. A suite of investment options has been created that together yield the promised reduction in congestion. The Strategic Growth Plan relies on a complete systems approach of a variety of strategies: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements.

As part of the Climate Action Program at Caltrans (December 2006), Caltrans is supporting efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies. These strategies include job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. Caltrans is working closely with local jurisdictions on planning activities; however, Caltrans does not have local land use planning authority.

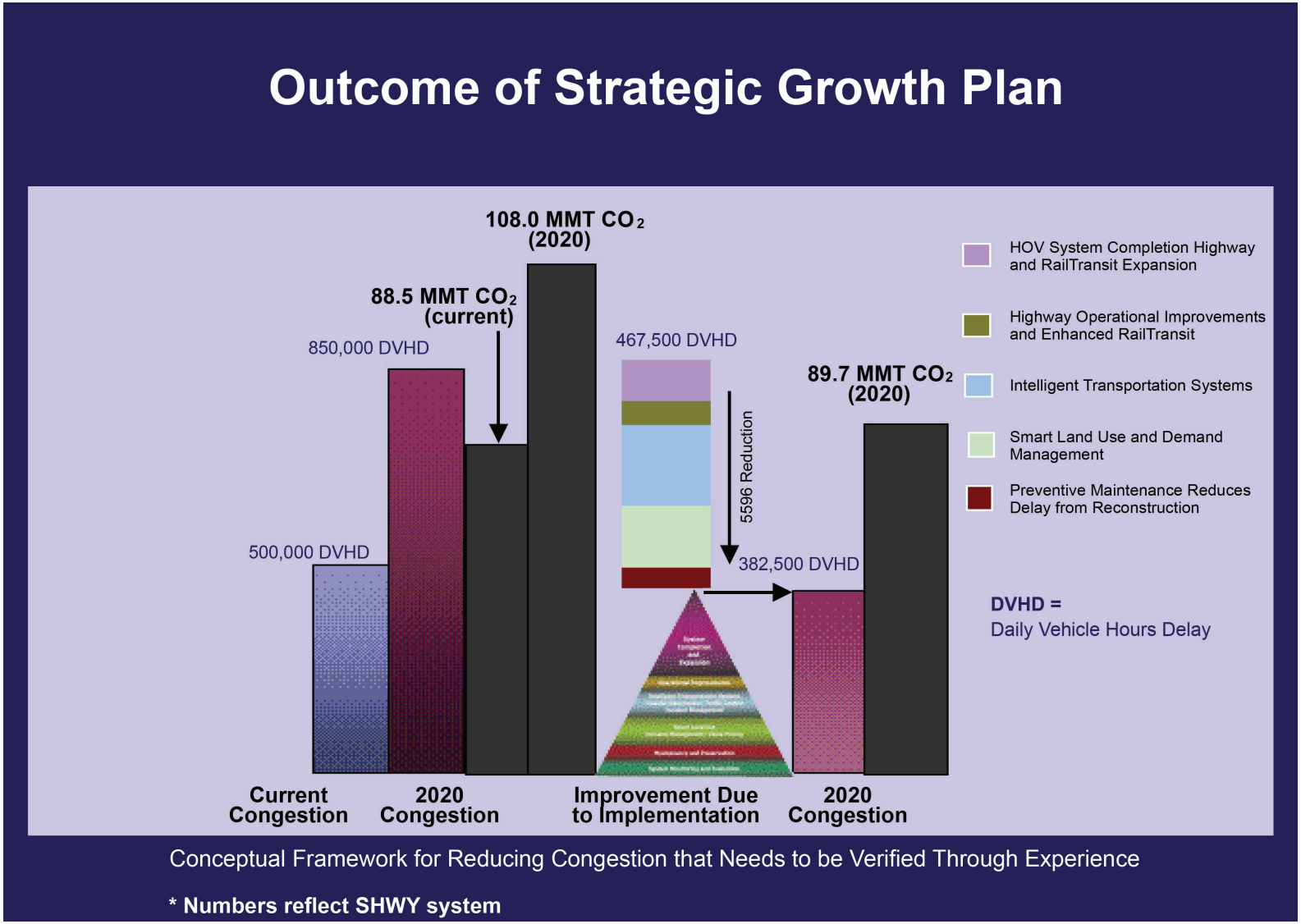


Figure 4-3
Outcome of Strategic Growth Plan
Schuyler Heim Bridge Replacement and SR-47 Expressway

Caltrans is also supporting efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks; Caltrans is doing this by supporting ongoing research efforts at universities, by supporting legislation efforts to increase fuel economy, and by its participation on the Climate Action Team. It is important to note that the control of the fuel economy standards is held by the EPA and CARB.

Also, the use of alternative fuels is being considered. Caltrans is participating in funding for alternative fuel research at the University of California at Davis.

Table 4-4 (end of section) summarizes the statewide efforts that Caltrans is implementing to reduce GHG emissions (December, 2006).

Finally, additional measures have the potential to reduce GHG emissions. These measures include using reclaimed water, landscaping, energy efficient lighting, and idling restrictions. The following presents a brief discussion of these measures.

- Reclaimed Water - It is estimated that 30 percent of the electricity used in California is used for the treatment and delivery of water. Using reclaimed water helps conserve energy and reduces GHG emissions from electricity production. Reclaimed water would be used, if available, during construction and operation of the proposed project.
- Landscaping - Landscaping would reduce surface warming and through photosynthesis would decrease carbon dioxide. Two avoidance and mitigation measures included with Section 3.7 (VR-3 and VR-4) incorporate landscaping as elements of the proposed project design. Implementation of these measures would also have the potential to reduce GHG emissions.
- Energy efficient lighting - Energy efficient street lights and LED traffic signals would be incorporated, to the extent feasible, in the final design of the proposed project.
- Idling restrictions for trucks - Section 3.13 included a mitigation measure (AQ-6) that would prohibit truck idling in excess of 2 minutes during construction. This measure would be expected to also reduce GHG emissions during construction.

Implementation of these measures has the potential to reduce GHG emissions in addition to the reductions expected from operation of the proposed project.

4.7.3 Conclusion

Caltrans recognizes the concern that carbon dioxide emissions raise for climate change. However, modeling and gauging the impacts associated with an increase in GHG emissions levels, including carbon dioxide, at the project level is not currently possible. No federal, state or regional regulatory agency has provided methodology or criteria for GHG emissions and climate change impact analysis. Therefore, Caltrans is unable to provide a scientific or regulatory based conclusion regarding whether the project's contribution to climate change is cumulatively considerable.

Caltrans continues to be actively involved on the Governor's Climate Action Team as CARB works to implement AB 1493 and AB 32. Caltrans is supporting efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies as part of the

Climate Action Program at Caltrans (2006). These include job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. Caltrans is working closely with local jurisdictions on planning activities; however, Caltrans does not have local land use planning authority. Caltrans is also supporting efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars and light- and heavy-duty trucks. However, it is important to note that control of fuel economy standards is held by the EPA and CARB. Lastly, the use of alternative fuels is also being considered. Caltrans is participating in funding for alternative fuel research at the University of California, Davis.

4.8 Environmentally Superior Alternative

Section 15126.6(e)(2) of the state CEQA Guidelines requires an EIR to identify the "Environmentally Superior Alternative" among the alternatives considered. It states that, if the No-Build alternative does not meet the project objectives, an Environmentally Superior Alternative is to be identified from the build alternatives. Each of the "build" alternatives (Alternatives 1, 2, 3, and 4) considered in this Final EIS/EIR are likely to result in unavoidable significant adverse impacts (construction air quality impacts, operations air quality impacts from marine vessel emissions due to detours, cultural resources impacts from removal of the historic Schuyler Heim Bridge or bridge approaches).

Although the No Build alternative (Alternative 6) and Transportation System Management Alternative (Alternative 5) would generally result in the least environmental impacts, they would be associated with the greatest traffic impacts and accompanying noise and air quality impacts. There also would be higher energy use related to vehicular fuel consumption, as there would be no new expressway to relieve existing and future traffic congestion at the Schuyler Heim Bridge and surface street intersections and to facilitate traffic flow to and from Terminal Island. Also, Alternatives 5 and 6 would result in a potential geologic hazard as, with these alternatives, the seismically unstable Schuyler Heim Bridge would remain standing and in service, subject to seismic collapse. In addition, neither Alternative 5 nor Alternative 6 would fulfill the project purpose and need or provide the benefits of the build alternatives. These benefits include a new bridge across the Cerritos Channel, improvements to local and interregional access, decreased congestion and improved traffic circulation. Additionally, Alternatives 5 and 6 would be inconsistent with the Port Master Plans and the Southern California Association of Government's Regional Transportation Plan. Consequently, Alternatives 1, 2, 3, and 4 would be considered superior to Alternatives 5 and 6.

When compared to the other build alternatives, Alternative 4 would only involve replacement of the existing Schuyler Heim Bridge over the Cerritos Channel, while Alternatives 1, 2, and 3 would include the same bridge, plus a new expressway and flyover. Therefore, Alternative 4 would result in fewer and less extensive impacts than Alternatives 1, 2, and 3, as there would be no air quality, relocations, noise, and visual resources impacts associated with a new expressway and flyover. However, under Alternatives 1, 2, and 3, these impacts would be either temporary/construction impacts or would be mitigated and minimized as part of project design. Alternative 4, on the other hand, would result in long-term impacts related to traffic congestion on local streets and at intersections, and

worsened air quality. Under Alternative 4, vehicles would continue to be subject to backups and delays, as there would be no roadway improvements to facilitate traffic.

Among the build alternatives that include the bridge replacement, flyover, and expressway (Alternatives 1, 2, and 3), the greatest traffic improvements would occur with Alternative 1; the least air quality impacts would occur with Alternatives 1 and 3; and the least impacts to water quality/runoff would occur with Alternatives 1 and 2. The greatest hazardous waste impacts would occur under Alternative 2, which would include excavation of an inactive landfill and the potential to unearth hazardous waste, and the greatest biological impacts would occur under Alternative 3, which would involve destruction of a wetland adjacent to the Cerritos Channel. Therefore, Alternative 1 is considered to be the environmentally superior alternative from among the build alternatives.

4.9 Mitigation Measures for Significant Impacts under CEQA

Mitigation measures that will be implemented for impacts determined under CEQA to be significant are shown in Table 4-1. A complete list of the avoidance, minimization, and mitigation measures for the proposed project are set forth in the Summary (Table S-1) and in the environmental resource discussions in Chapter 3.0.

Table 4-1
Significant Environmental Impacts and Mitigation Measures

Environmental Resource/Project Alternative/ Significant Impacts	Mitigation Measures*	Level of Significance After Mitigation
AIR QUALITY		
CONSTRUCTION Alternatives 1, 1A, 2, 3, 4 The direct sources of construction emissions would be from construction equipment exhaust or fugitive dust. Direct emissions of CO, NO_X, ROG, SO_X, and PM_{10} are predicted to exceed daily significance thresholds during construction.	Mitigation Measures for Fugitive PM_{10} /$PM_{2.5}$ AQ-1 Apply nontoxic soil stabilizers to all inactive construction areas (previously graded areas inactive for 10 days).	Significant
The indirect source of construction emissions would be from marine vessels having to detour during construction. Emissions from marine vessels would exceed the SCAQMD NO_X threshold. *Total* Total emissions (direct plus indirect) of CO, NOx, ROG, SOx, and PM_{10} are predicted to exceed daily significance thresholds during project construction.	AQ-2 Replace ground cover in disturbed areas as quickly as possible.	Significant
	AQ-3 Reduce traffic speed on all unpaved roads to 15 mph or less.	Significant
	Mitigation Measures for Exhaust Emissions of CO, ROG, NOx, SOx, and PM_{10} /$PM_{2.5}$ AQ-4 Develop and implement a trip reduction plan to achieve a 1.5 average vehicle ridership for construction employees.	Significant
	AQ-5 Implement a shuttle service for construction workers to and from retail services and food establishments during lunch hours.	Significant
	AQ-6 Prohibit truck idling in excess of 2 minutes. Employ periodic, unscheduled inspections to limit unnecessary idling. The SCAQMD has not quantified the efficiency of this mitigation measure.	Significant
	AQ-7 Suspend use of all construction equipment operations during second-stage smog alerts.	Significant
	AQ-8 Use electricity, if feasible, from power poles rather than temporary diesel- or gasoline-powered generators.	Significant

Table 4-1
Significant Environmental Impacts and Mitigation Measures

Environmental Resource/Project Alternative/ Significant Impacts	Mitigation Measures*	Level of Significance After Mitigation
	AQ-9 Heavy Duty Truck Buyback Program The purpose of the buyback program would be to accelerate the modernizing of the heavy duty engine fleet operating in the South Coast Air Basin. By removing the older engines in the fleet and requiring replacement with newer, cleaner vehicles, a net reduction of NOx emissions (and other combustion pollutants) would occur. This reduction would help offset marine vessel detour emissions. The protocols to be used would be consistent with the Carl Moyer Program, which is already being administered by the SCAQMD. However, this program is not available to projects such as Schuyler Heim Bridge Replacement and could not be used to actually implement this project's buy-back program. The Gateway Cities Diesel Fleet Modernization Program would be an example of a buyback program with similar reduction goals. Also, the POLA/POLB Clean Air Action Plan has a heavy duty truck buy back component. While participating in already existing programs might be preferable (and possible), it would not be necessary in order to accomplish heavy duty truck buy back. The heavy duty truck buy back could be done independently, though it would have to adhere to already accepted protocols (SCAQMD). A heavy duty truck buyback program would consist of three steps 1) identify target vehicles based on year of make; 2) provide incentives for operators to participate 3) establish a means to ensure that replacements meet the net improvement forecasted. The construction phase of this project is where the greatest impact of increased emission levels occurs. Therefore, the buyback program would be designed to mitigate the NOx emissions during that time. Based on recent buyback programs, the program for the proposed project would cost from $25,000 to $50,000 /ton of NOx reduced. This cost can vary significantly and will continue to increase as time passes. The number of tons mitigated would be based on marine vessel detour NOx emissions during construction. The rerouting of shipping vessels during project construction would amount to 132.8 lbs NOx per day, which is equivalent to 24.2 tons NOx per year. The indirect marine vessel emissions would be mitigated to a level that is below the SCAQMD significance threshold for construction emissions. It is estimated that each truck replacement would reduce an average of 0.55 tons per year of NOx and 0.12 tons per year of PM. This is based on emission factors representative of current buyback programs such as the Gateway Cities Diesel Fleet Modernization Program. These emission reductions would continue for 3 to 5 years, depending on the year of the truck updated. This timeframe would exceed the duration of the project construction phase.	Less than Significant

Table 4-1
Significant Environmental Impacts and Mitigation Measures

Environmental Resource/Project Alternative/ Significant Impacts	Mitigation Measures*	Level of Significance After Mitigation
	AQ-10 To the extent feasible, utilize construction equipment equipped with Tier 2 or new engines will be used. AQ-11 Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to ensure that construction equipment is properly maintained, tuned, and modified to established specifications. AQ-12 Prohibit tampering with engines and require continuing adherence to manufacturer's recommendations.	
OPERATIONS Alternatives 1, 1A, 2, 3, 4 Indirect emissions would result from marine vessel detours during operation of the new bridge. Daily emissions of NO_X would exceed the SCAQMD threshold. Operation of the new bridge would result in a net increase in emissions greater than the SCAQMD thresholds for NO_X.	No mitigation measure is proposed for project operations.	Significant
Alternative 1, 1A, and 3 ACTA has determined that Cancer risk impacts associated with Alternatives 1, 1A, and 3 would be significant for a limited number of residential receptors.	ACTA will adopt the mitigation measure below as a condition of its approval for the proposed project. AQ-13 New heating, ventilating, and air conditioning (HVAC) units, or retrofit of existing HVAC units, will be installed in residences within the vicinity of the significant impact zone.	Less than significant
Alternative 2 ACTA has determined that Alternative 2 would have significant impacts on cancer risks for a number of residential receptors, parks, and workers in the project vicinity.	The proposed mitigation measure for Alternative 1 would not be feasible for Alternative 2.	Significant

Table 4-1
Significant Environmental Impacts and Mitigation Measures

Environmental Resource/Project Alternative/ Significant Impacts	Mitigation Measures*	Level of Significance After Mitigation
BIOLOGICAL RESOURCES		
CONSTRUCTION Alternatives 1, 1A, 3 The project would result in the removal of one known peregrine falcon nesting location on the Schuyler Heim Bridge, in a territory that typically supports one pair but contains two alternate nesting locations.	B-12 Mitigating Loss of Peregrine Falcon Nest This measure may include the following, as appropriate, pending coordination with CDFG: • Create a new nest site by placing a nesting box (and potential additional support material) on a tower of the Badger Avenue Bridge or other elevated structure, as determined by a qualified biologist. Because the Badger Avenue Bridge is located adjacent to the Schuyler Heim Bridge, and is approximately the same height, there is the potential that it could provide a suitable vantage point and nesting location to peregrine falcons. The peregrine pair has never nested on this bridge in the past but this may be due to an absence of suitable nesting platforms and substrate. Further evaluation of any design changes or nesting ledge installations by a qualified peregrine expert would be conducted. • Offsite mitigation. The goal of the offsite mitigation would be to augment existing peregrine populations. This could be accomplished by purchasing approximately 10 nestling peregrines from a captive breeding facility and having those young released (hacked) in an area of California where, when they disperse, they will possibly create a new nesting pair. The local peregrine falcon population (approximately five pairs) would be monitored for 2 years. The pair located on the Schuyler Heim Bridge would be monitored to determine if they nest on the Badger Bridge, or if they integrate into other territories by filling a vacancy in another pair, or by usurping existing individuals in a pair. If offsite mitigation is conducted, hacked peregrine falcons would be monitored to determine their fate and if a new nesting pair is established. An experienced peregrine falcon biologist would conduct monitoring of the hacked peregrine falcons.	Less than significant
Alternatives 1, 1A, 2, 3, 4 Construction activities could result in removal of Southern Tarplant.	B-13 Mitigating Loss of Special Status Plant Species Surveys for special-status plant species shall be conducted during flowering season prior to construction, at the PS&E stage. If special-status plant species are found and cannot be avoided during project construction, then seed and/or propagules of the species would be collected and replanted at an alternative location. These activities will be conducted in coordination with the resource agencies. – Mitigation measures would be refined in coordination with the resource agencies and standard practices for this species. Measures may include the following: Areas determined to have appropriate hydrology and soil chemistry (salinity) shall be reseeded with seed collected from populations of southern tarplant. Southern tarplant is restricted to saline, vernally mesic areas, often along the margins of estuaries or areas of high salinity.	Less than significant

Table 4-1
Significant Environmental Impacts and Mitigation Measures

Environmental Resource/Project Alternative/ Significant Impacts	Mitigation Measures*	Level of Significance After Mitigation
	– Prior to construction, southern tarplant and/or other special-status plant seed shall be collected by personnel experienced in collection of native seeds. Seed collection shall be conducted during successive years from September through December. One-half of the first year's collected seed shall be hand-broadcast at the reintroduction site with the remaining one-half stored in appropriate conditions for introduction the following year. Seed collected during the second season shall be stored for potential later use in the event that success standards are not met following the seeding during years one and two. – Because southern tarplant is an annual species, population numbers are expected to naturally fluctuate from year to year depending upon environmental conditions. Reseeded areas shall be monitored for three years following the initial seeding. Establishment shall be considered successful if plant densities during any of the three years of monitoring are comparable to densities of the impacted populations based on sampling quadrants. If established populations do not achieve comparable densities of impacted populations, additional reintroduction sites shall be identified and stored seed, obtained during the collection period, shall be introduced into additional sites over a two-year period (as in the initial reintroduction program described above).	
Noise from project construction activities could disrupt breeding activities of the burrowing owl.	B-14 Mitigating for Burrowing Owl If flushing of individual birds and exclusions of burrows fail, construction activities would be delayed within 152 m (500 ft) of nest sites until after the breeding season for these species (February to July).	Less than significant
CONSTRUCTION Alternative 3 A small (about 1/4-acre) wetland is present within the footprint of Alternative 3, along the south bank of Cerritos Channel, just east of the existing Schuyler Heim Bridge. This wetland is likely to be removed under Alternative 3, as the proposed bridge alignment is directly in line with the wetland location.	B-15 Mitigating Loss of Wetland Under Section 404 of the Clean Water Act, a permit would be required from USACE prior to impacting waters of the U.S., including wetlands: • This is anticipated to be achieved through the Nationwide Permit system. • Compliance to permit conditions would be required. • The permit is likely to require implementation of mitigation to offset effects to waters of the U.S., including wetlands. This may include creation of offsite wetlands, or payment of fees into existing mitigation banks. Complying with these mitigation measures contained in the permit, once acquired, would provide mitigation for the effect.	Less than significant

Table 4-1
Significant Environmental Impacts and Mitigation Measures

Environmental Resource/Project Alternative/ Significant Impacts	Mitigation Measures*	Level of Significance After Mitigation
CULTURAL/PALEONTOLOGICAL RESOURCES		
CONSTRUCTION Alternatives 1, 1A, 2, 4 Demolition and replacement of the existing Schuyler Heim Bridge would constitute an Adverse Effect on the bridge, under Adverse Effect Criterion 2(i), 36 CFR 800.5(a). In addition, demolition of the Schuyler Heim Bridge would be considered an adverse effect under significance Criterion 2(A), Section 15064.5 of the CEQA Guidelines.	CR-3 The bridge shall be offered for sale for reuse in an alternate location to interested public agencies and non-profits. A marketing plan shall be prepared for the sale of the bridge including: a notification letter, fact sheet, list of intended recipients, as well as provisions for the salvage of smaller components in the case that there is no interest in re-use of the bridge. Advertisements shall be placed in appropriate newspapers of record. The offer shall run for 6 months. If no acceptable bids are received after 6 months this stipulation shall be deeded to have been met. The above shall be done in accordance with the U.S. Department of Transportation Historic Bridge Program 23USC144(o)(4)(A) and (B).	Significant
If the US Coast Guard requires demolition of the Schuyler Heim Bridge following implementation of Alternative 3, ground-disturbing activities associated with bridge demolition have the potential to affect as yet unknown archaeological resources within the project APE.	CR-4 Informative permanent metal plaques shall be installed at both ends of the new bridge at public locations that provide a brief history of the original bridge, its engineering features and characteristics, the reasons for its demolition, and a statement of the characteristics of the replacement structure.	Significant
	CR-5 Pursuant to Section 110(b) of the NHPA, before the Bridge is demolished, the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) shall be contacted to determine what level and kind of recordation is required for the property. All documentation shall be completed and accepted by HABS/HAER before the Bridge is demolished.	Significant
	CR-6 Copies of the HABS/HAER report shall be disseminated to the City of Los Angeles Public Library and the City of Long Beach Public Library.	Significant
	CR-7 Information from the HABS/HAER report shall be available to the public for 10 years on an appropriate internet website.	Significant

Table 4-1
Significant Environmental Impacts and Mitigation Measures

Environmental Resource/Project Alternative/ Significant Impacts	Mitigation Measures*	Level of Significance After Mitigation
	CR-8 A documentary (motion picture or video) shall be produced and shall address the history of the Bridge, its importance and use within the history of the Port of Long Beach and Port of Los Angeles, and demonstrate its operation and function. The motion picture or video will be of broadcast quality, of sufficient length for a standard 30-minute time period and will be made available for local broadcast stations to public access channels in local cable systems and to schools/libraries.	Significant
	CR-9 Traveling museum exhibits shall be prepared and shall address the history of the Bridge, its importance and use within the history of the Port of Long Beach and the Port of Los Angeles, and demonstrate its operation and function, appropriate for display in small museums, or for use in schools.	Significant
	CR-10 Artifacts removed from the Bridge during preliminary stages of the demolition process shall be offered to local museums, and provide for their delivery to accepting institutions. Examples of such artifacts may include, but not be limited to, control panels, instruments, structural members, railings, signage, plaques or other identifying ornamentation, street lights, navigation lights, etc.	Significant
	CR-11 Measures CR-3, CR-5, CR-8, and CR-10, above, shall be completed prior to demolition of the Bridge. All stipulations shall be completed within 1 year of demolition, unless an extension of time is agreed upon.	Significant

Table 4-1
Significant Environmental Impacts and Mitigation Measures

Environmental Resource/Project Alternative/ Significant Impacts	Mitigation Measures*	Level of Significance After Mitigation
NOISE		
CONSTRUCTION Alternatives 1, 1A, 3 Both the Cerritos Channel and Consolidated Slip marinas would be subject to substantial noise effects from pile driving construction activities. Pile driving activities for the Cerritos Channel are expected to last approximately 2 weeks (10 days) for each of the two stages of falsework pile driving. Falsework pile driving for the Consolidated Slip is expected to last less than 2 weeks (10 days).	N-2 During project construction, pile driving will occur during daylight hours only. N-3 Residents identified as being impacted by noise from pile driving in Cerritos Channel or Consolidated Slip may obtain hotel vouchers for a local hotel so they can temporarily move. This mitigation measure would apply only during the time that pile driving is being conducted in the Cerritos Channel or Consolidated Slip. Some residents may, however, choose to stay and tolerate the noise. No other mitigation or compensation measure would be provided to residents.	Less than significant
CONSTRUCTION Alternatives 2, 4 The Cerritos Channel marinas would be subject to substantial noise effects from pile driving construction activities. Pile driving activities for the Cerritos Channel are expected to last approximately 2 weeks (10 days) for each of the two stages of falsework pile driving.	See N-2 and N-3, above.	Less than significant
OPERATION Alternatives 1, 1A, 3 Leeward Bay Marina The peak-hour traffic noise levels would increase by 1 to 10 dBA over existing conditions. Without abatement, the predicted loudest hourly noise levels would range from 61 to 67 dBA $L_{eq}(h)$. This alternative would result in noise levels at some locations that would approach the Noise Abatement Criteria (NAC) for residential areas.	N-4 Leeward Bay Marina For the Leeward Bay Marina, a barrier along the SR-47 Expressway, with an approximate length of 239 m (785 ft) and an average height of 2.44 m (8 ft) would be constructed to abate future traffic noise levels by 5 to 7 dBA at 65 benefited noise-sensitive receivers. Preliminary reasonableness calculations indicate the estimated barrier cost would be approximately $23,400 per benefited residence, which is within the allowance per residence of $50,000 to $54,000.	Less than significant
Wilmington Neighborhood The peak-hour traffic noise levels would increase from 5 to 13 dBA over existing conditions. Without abatement, the predicted loudest hourly noise levels would range from 61 to 69 dBA $L_{eq}(h)$. This alternative would result in noise levels at some locations that would exceed the NAC for residential areas.	N-5 Wilmington Neighborhood For the Wilmington neighborhood, a barrier along the SR-47 Expressway and another on ground level along Alameda Street, with an approximate combined length of 1,405 m (4,610 ft) and height of 3.66 m (12 ft) to 5.49 m (18 ft) would be constructed to abate future traffic noise levels by 5 to 7 dBA at 56 benefited noise sensitive receivers. Preliminary reasonableness calculations indicate that the estimated barrier cost would be approximately $37,500 per benefited residence, which is within the allowance per residence of $48,000.	Less than significant

Table 4-1
Significant Environmental Impacts and Mitigation Measures

Environmental Resource/Project Alternative/ Significant Impacts	Mitigation Measures*	Level of Significance After Mitigation
OPERATION Alternative 2 Long Beach Neighborhood/SR-103 Extension The loudest hourly traffic noise level would either decrease by 1 to 4 dBA, increase by 1 to 2 dBA, or equal existing conditions. Without abatement, the predicted peak-hour noise levels at this location would range from 62 to 72 dBA L_{eq}(h). The new noise levels would approach the NAC at many locations within this residential receiver area.	N-6 Long Beach Neighborhood/SR-103 Extension Caltrans and FHWA will incorporate noise abatement in the form of two barriers along SR-103 with an approximate combined length of 835 m (2,740 ft) to abate traffic noise levels. The two barriers would be 3.66 m (12 ft) high, the barrier section along the northbound off-ramp would be 4.57 m (15 ft) high. The barriers would reduce noise levels in the receiver areas to below the NAC and would reduce noise levels by 1 to 14 dBA for 27 equivalent frontage units. Preliminary reasonableness calculations indicate that the barriers would cost approximately $37,100 per benefited unit, which is below the allowance per residence of $44,000 to $52,000. The locations of the noise barriers are based on preliminary engineering plans and, as such, are considered to be approximate. The exact locations of these barriers would be determined during final design based on safety, engineering, and feasibility.	Less than significant

Table 4-2
CEQA Unavoidable Adverse Impacts

Environmental Resource	Applicable Alternative	Unavoidable Adverse Impact
Air Quality	Alternatives 1, 1A, 2, 3, and 4.	Short-term construction activities will result in unavoidable adverse air quality impacts for ROG, NO_x, CO, and PM_{10}. Long-term air emissions from project operation and detoured marine vessels will result in unavoidable adverse air quality impacts for NO_x.
Cultural Resources	Alternatives 1, 1A, 2, and 4.	Demolition of the existing Schuyler Heim Bridge, which has been determined to be a historical resource and is eligible for listing on the NRHP and in the CRHR, would be an unavoidable adverse impact.
	Alternative 3	The bridge approaches would be removed, and the bridge would no longer used for vehicular traffic. While this alternative retains the historic property in place, it would change the character of the bridge's original use, which would be considered an unavoidable adverse impact.
Traffic	Alternative 6	Existing traffic delays would increase, and the Ocean Boulevard/SR-47 intersection is expected to operate at a deficient level of service by 2030, an unavoidable adverse impact of this alternative.

Table 4-3
Required Miles Per Gallon by Alternative
2015 Required Miles per Gallon (mpg) by Alternative

	No-Build	25% Below Optimized	Optimized (Preferred)	25% Above Optimized	50% Above Optimized	Total Costs Equal Total Benefits	Technology Exhaustion
Cars	27.5	33.9	35.7	37.5	39.5	43.3	52.6
Trucks	23.5	27.5	28.6	29.8	30.9	33.1	34.7

Table 4-4
Climate Change Strategies

Strategy	Program	Partnership		Method/ Process	Estimated CO_2 Savings (MMT)	
		Lead	Agency		2010	2020
Smart Land Use	Intergovernmental Review (IGR)	Caltrans	Local Governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies and other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	0.975	7.8
Operational Improvements & Intelligent Trans. System (ITS) Deployment	Strategic Growth Plan	Caltrans	Regions	State ITS; Congestion Management Plan	.007	2.17
Mainstream Energy & Greenhouse Gas into Plans and Projects	Office of Policy Analysis & Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational & Information Program	Office of Policy Analysis & Research	Interdepartmental, CalEPA, CARB, CEC		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening & Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	0.0045	0.0065 0.45 .0225
Non-vehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	0.117	.34
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5 % limestone cement mix 25% fly ash cement mix > 50% fly ash/slag mix	1.2 .36	3.6
Goods Movement	Office of Goods Movement	Cal EPA, CARB, BT&H, MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					2.72	18.67

Chapter 5.0 Cumulative Impacts

5.1 Introduction

The National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) both require analysis of the cumulative effects or impacts of a proposed project and other projects that occur in the same general geographic area. A definition of cumulative impacts under NEPA can be found in 40 CFR, Section 1508.7 of the Council on Environmental Quality (CEQ) Regulations. The definition of cumulative impacts under CEQA can be found in Section 15355 of the CEQA Guidelines.

Cumulative impacts are the collective impacts that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the proposed project. Cumulative impacts can result from impacts that can be individually minor, but, when added to those from other projects or activities, can be substantial.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development. These land use activities can degrade habitat and diversity of species that may be in the area, through consequences such as displacement and fragmentation of habitats, alteration of hydrology, disruption of migration corridors, changes in water quality through contamination, erosion, or sedimentation, and introduction or promotion of predators. Cumulative impacts also can contribute to effects such as changes in community character, traffic patterns, housing availability, and employment.

Construction and operation of one of the six project alternatives evaluated in this EIS/EIR could result in direct and/or indirect impacts that, when combined with other projects, would contribute to cumulative impacts. Alternatives 1, 1A, 2, 3, and 4 are referred to as the "build" alternatives. Although Alternative 5 (Transportation Management System) would result in some minor construction, it is not considered a "build" alternative, given its relatively small scope when compared to Alternatives 1 through 4. Under Alternative 6, the No Build alternative, no changes would occur to the existing environment described in Chapter 3.0.

5.1.1 Federal Requirements

The analysis in this chapter employs the following definition of cumulative impact from the CEQ regulations governing implementation of NEPA (40 CFR 1508.7):

> *"Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time*
> (CEQ Regulation 1508, Sec. 1508.7).

The analysis of cumulative effects also was assessed in accordance with the Federal Highway Administration (FHWA) (FHWA, 1992). The following principles were applied to the assessment of cumulative effects of the proposed project alternatives:

- Cumulative effects typically are caused by the aggregate effects of past, present, and reasonably foreseeable actions. These are the effects (past, present, and future) of the proposed action on a given resource *and* the effects (past, present, and future), if any, caused by all other related actions that affect the same resource.
- When other related actions are likely to affect a resource that is also affected by the proposed action, it does not matter who (federal, non-federal, or private) has taken the related action(s).
- The scope of cumulative effects analyses can usually be limited to reasonable geographic bounds and time periods. These boundaries should extend only so far as the point at which a resource is no longer substantially affected or where the effects are so speculative as to no longer be truly meaningful.
- Cumulative effects can include the effects (past, present and future) on a given resource caused by similar types of actions (e.g., air emissions from several individual highway projects) and/or the effects (past, present and future) on a given resource caused by different types of actions (e.g., air emissions from a highway project, a solid waste incinerator, and a mining facility).

5.1.2 State Requirements

The CEQA Guidelines, Section 15130, describe when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts.

The federal CEQ definition is consistent with the definition of cumulative impact provided in the CEQA Guidelines where:

> *"Cumulative impacts" refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.*
>
> *(a) The individual effects may be changes resulting from a single project or a number of separate projects.*
>
> *(b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time* (CCR Title 14, Chapter 3, Section 15355, as amended September 7, 2004).

5.2 Related Projects Contributing to Cumulative Projects

Both the FHWA methodology and CEQA Guidelines list two methods of identifying cumulative projects. One method is based on projections, such as those in an adopted general plan or adopted/certified environmental document. This method considers adopted

projections within a given geographic area. The other method is based on a list of past, present, and probable future projects that could result in cumulative impacts in combination with the project analyzed in the environmental document.

For this Final EIS/EIR, the primary method of analyzing cumulative impacts is based on the second method, a list of past, present, and probable future projects in the study area. These projects were identified from the Port of Los Angeles (POLA), Port of Long Beach (POLB), Southern California Association of Governments (SCAG), Los Angeles County Metropolitan Transportation Authority (MTA), and the Cities of Los Angeles and Long Beach. They are located within the Port of Long Beach, Port of Los Angeles, City of Long Beach, City of Carson, and in the San Pedro and Wilmington Districts of the City of Los Angeles. All are within the study area for the alternatives analyzed in this Final EIS/EIR. The cumulative projects for this analysis have been proposed by formal public notices (Notice of Intent, Notice of Preparation), have pending environmental documentation, and/or are awaiting regulatory reviews or approvals.

In general, the study area for cumulative impacts is the same as for the proposed project alternatives. That is, the cumulative impact study area consists of the land and water that lie within and north of the POLA and POLB, south of State Route (SR-) 91, east of Interstate (I-) 110, and west of I-710. The cumulative projects include, but are not limited to, other bridge and roadway projects, container terminals, schools, hotels, commercial and residential developments, and manufacturing and warehouse facilities. The locations of the cumulative projects are shown in Figure 5-1. Lists of the projects, with brief project descriptions and recent status, are provided in Tables 5-1, 5-2, and 5-3.

5.2.1 Rationale for Selection of Projects

Cumulative projects within the study area are of a similar nature, could affect similar resources, and are located in close geographic proximity to the proposed project alternatives. These projects have the potential to generate environmental impacts that, when considered collectively with a project alternative, could result in, or contribute to, cumulative adverse environmental impacts.

This analysis utilizes the best available information to assess the identified cumulative projects and their potential impacts. The status of the individual projects determines the level of information that is available. Public documents, conceptual plans or applications, and consultations with project applicants and government agencies were the primary sources of information for this analysis. Some environmental documents did not include analysis of all environmental resource areas. Where this occurred, the assumption was made that there would be no impacts related to that resource area. When no environmental document was available for a project, general assumptions were made about the potential impacts of the project in the context of this cumulative impacts analysis.

5.2.2 Projects and Descriptions

Projects identified in Table 5-1 were included for analysis of environmental parameters such as surface and marine traffic, air quality, noise, visual, and water quality. These projects have known impacts and were incorporated in the analyses for the technical studies completed for the project alternatives evaluated in this EIS/EIR. In some cases, projects are

listed but not incorporated, due to insufficient data, the speculative nature of the project, or being identified subsequent to the Notice of Preparation for the proposed project alternatives.

Transportation projects identified in Tables 5-2 and 5-3 were obtained from SCAG and the MTA, and are already included in the regional and basin budgets for transportation and air quality. The projects selected were those that added additional transportation capacity (lane addition, new roadway, etc.), or were sufficient trip generators that could influence local traffic conditions (intersection levels of service).

5.3 Cumulative Impact Analysis

The existing environmental conditions in the study area are provided in Chapter 3.0 of this Final EIS/EIR; the analysis of impacts within each environmental resource area provides the basis for the analysis of cumulative impacts.

The following sections provide an evaluation of potential cumulative impacts for each alternative for each environmental resource. As noted in the analyses, the cumulative impacts do not necessarily apply equally to each alternative or each resource.

5.3.1 Land Use, Recreation, and Coastal Zone

5.3.1.1 Alternatives 1 and 1A

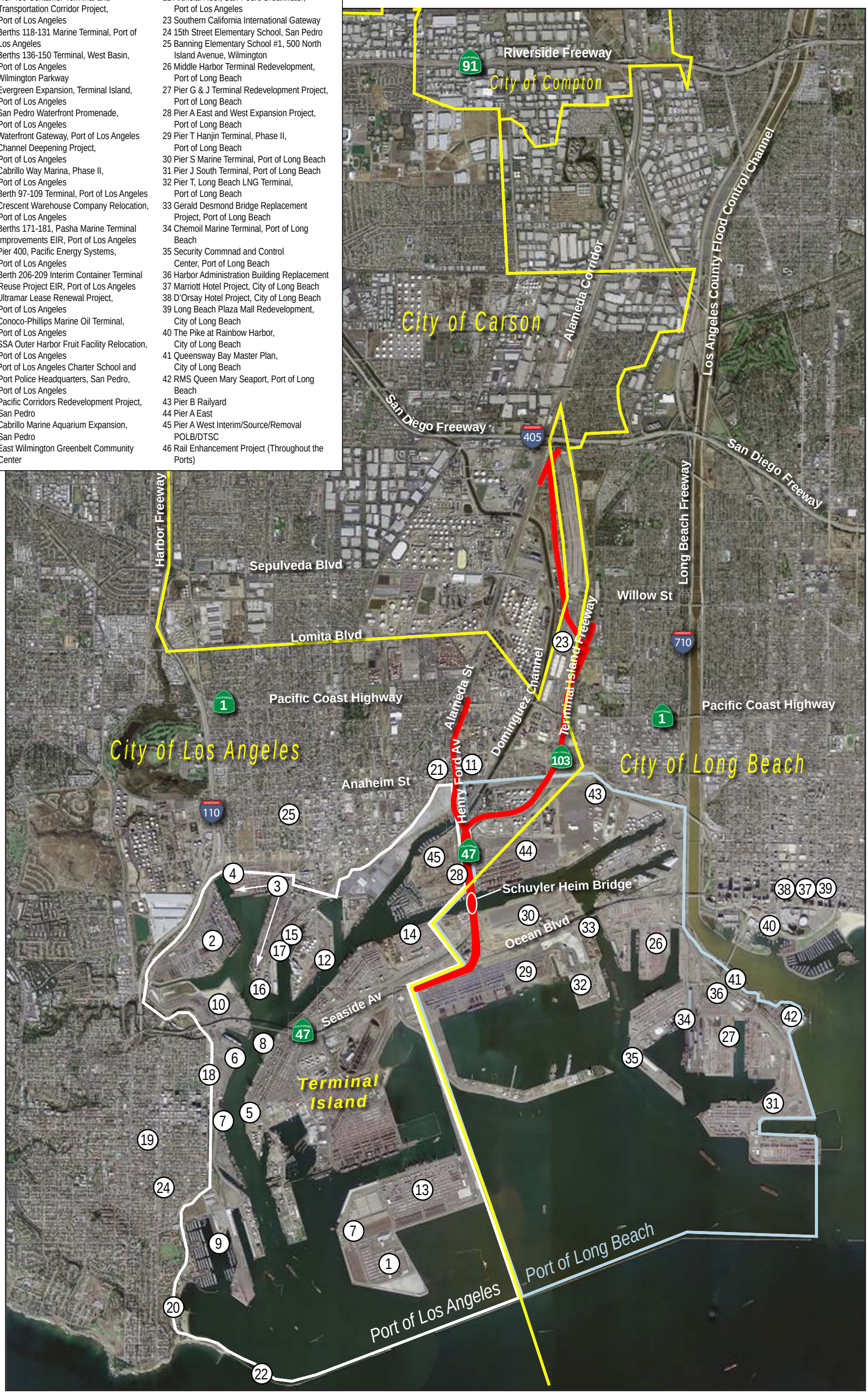
5.3.1.1.1 Land Use

Although the residential portions of the study area, like the study area in general, already coexist with the nearby major transportation corridors, the effects of the proposed project must be considered within the context of the effects of other past, past present, and reasonably foreseeable transportation-related changes in the area. Roadway and rail improvements associated with the Alameda Corridor have introduced substantial new construction activities throughout the area in recent years, as have the increasing level of port-related operations that can be expected to see robust growth into the future. If these development projects, in conjunction with Alternative 1, were to disrupt the pattern and/or rate of land use and development in the study area, a cumulative impact could result.

In the present case, both the pattern and rate of land development are driven more directly by the modification and expansion of port facilities than by the provision of ancillary transportation improvements. To the extent that transportation projects facilitate some of the port improvements, they may be contributing, in part, to overall land development trends. Nonetheless, port development is expected to continue with or without Alternative 1 and/or other transportation improvements.

KEY TO RELATED PROJECTS

1 Pier 400 Container Terminal and Transportation Corridor Project, Port of Los Angeles
2 Berths 118-131 Marine Terminal, Port of Los Angeles
3 Berths 136-150 Terminal, West Basin, Port of Los Angeles
4 Wilmington Parkway
5 Evergreen Expansion, Terminal Island, Port of Los Angeles
6 San Pedro Waterfront Promenade, Port of Los Angeles
7 Waterfront Gateway, Port of Los Angeles
8 Channel Deepening Project, Port of Los Angeles
9 Cabrillo Way Marina, Phase II, Port of Los Angeles
10 Berth 97-109 Terminal, Port of Los Angeles
11 Crescent Warehouse Company Relocation, Port of Los Angeles
12 Berths 171-181, Pasha Marine Terminal Improvements EIR, Port of Los Angeles
13 Pier 400, Pacific Energy Systems, Port of Los Angeles
14 Berth 206-209 Interim Container Terminal Reuse Project EIR, Port of Los Angeles
15 Ultramar Lease Renewal Project, Port of Los Angeles
16 Conoco-Phillips Marine Oil Terminal, Port of Los Angeles
17 SSA Outer Harbor Fruit Facility Relocation, Port of Los Angeles
18 Port of Los Angeles Charter School and Port Police Headquarters, San Pedro, Port of Los Angeles
19 Pacific Corridors Redevelopment Project, San Pedro
20 Cabrillo Marine Aquarium Expansion, San Pedro
21 East Wilmington Greenbelt Community Center
22 Artificial Reef, San Pedro Breakwater, Port of Los Angeles
23 Southern California International Gateway
24 15th Street Elementary School, San Pedro
25 Banning Elementary School #1, 500 North Island Avenue, Wilmington
26 Middle Harbor Terminal Redevelopment, Port of Long Beach
27 Pier G & J Terminal Redevelopment Project, Port of Long Beach
28 Pier A East and West Expansion Project, Port of Long Beach
29 Pier T Hanjin Terminal, Phase II, Port of Long Beach
30 Pier S Marine Terminal, Port of Long Beach
31 Pier J South Terminal, Port of Long Beach
32 Pier T, Long Beach LNG Terminal, Port of Long Beach
33 Gerald Desmond Bridge Replacement Project, Port of Long Beach
34 Chemoil Marine Terminal, Port of Long Beach
35 Security Commnad and Control Center, Port of Long Beach
36 Harbor Administration Building Replacement
37 Marriott Hotel Project, City of Long Beach
38 D'Orsay Hotel Project, City of Long Beach
39 Long Beach Plaza Mall Redevelopment, City of Long Beach
40 The Pike at Rainbow Harbor, City of Long Beach
41 Queensway Bay Master Plan, City of Long Beach
42 RMS Queen Mary Seaport, Port of Long Beach
43 Pier B Railyard
44 Pier A East
45 Pier A West Interim/Source/Removal POLB/DTSC
46 Rail Enhancement Project (Throughout the Ports)



LEGEND:
- City Boundary
- (#) Related Project
- Proposed Project Alignment

No Scale

Source: U.S.G.S. Aerial Map Service, Los Angeles Harbor Department, 2004

Figure 5-1
Related Projects in the Vicinity of the Project Alternatives
Schuyler Heim Bridge Replacement and SR-47 Expressway

Table 5-1
Port Area Projects

Port Area Projects		
Project	**Description/Status**	**Estimated Completion Date**
Port of Los Angeles		
Pier 400 Container Terminal and Transportation Corridor Project	Element of the 2020 Deep Draft Navigation Improvements Plan: dredging, land filling, and marine terminal construction. The entire Pier 400 site is on a recently constructed landfill in the Port of Los Angeles Outer Harbor. The project is a two-phase development of Pier 400 into a 345-acre container terminal with rail, highway, and utility access. Phase I consists of construction of rail and highway access and the first 174 acres of a marine container terminal, including buildings, a wharf, and an intermodal rail yard. Phase II consists of construction of the remaining 171 acres into a container terminal. Landfill construction was recently completed. The EIR certified for the project identified significant air, transportation, noise, and vibration impacts.	Approved project. Stage I construction completed. Stage II construction underway.
Berths 118-131 Marine Terminal West Basin	Element of the West Basin Transportation Improvement Projects. Reconfiguration of wharves and backlands. Joint operations of the Yang Ming and China Shipping terminals.	EIR being completed.
Berths 136-147 Marine Terminal West Basin	Element of the West Basin Transportation Improvement Projects; Reconfiguration of wharves and backlands. Expansion and redevelopment of the TraPac Terminal.	NOI/NOP released in October 2004. Draft EIS/EIR released in March 2007.
Wilmington Parkway	The realignment and widening of Harry S. Bridges Boulevard, acquisition/ condemnation of properties, expansion of container terminal backlands, construction of a berm and associated recreational facilities.	EIS/SEIR being completed. Harry Bridges will no longer be realigned except directly adjacent to the C-Street interchange.
Evergreen Expansion, Terminal Island, POLA	Expansion of the Evergreen Marine Terminal. Lease boundary changes, gate improvements, wharf modifications, cranes, and new buildings.	EIR to be prepared.
Waterfront Promenade, San Pedro	Construction of a waterfront promenade or pedestrian walkway along the western shore of the Main Channel south of the Vincent Thomas Bridge.	Design and planning initiated. Environmental work about to proceed.
Waterfront Gateway	This is part of the San Pedro Waterfront Promenade Project. Development initiated for waterfront promenade between Vincent Thomas Bridge and Fire Station 112.	Approved project. Phase I construction underway.

Table 5-1
Port Area Projects

Port Area Projects		
Project	**Description/Status**	**Estimated Completion Date**
Channel Deepening Project	Dredging and sediment disposal. This project would deepen the Port of Los Angeles' Main Channel to a maximum-55 ft. MLLW (lesser depths are considered as project alternatives) by removing between 3.9 million and 8.5 millions cy of sediments. The sediments would be disposed of several sites.	Approved project. Construction underway. Draft SEIS/SEIR released in July 14, 2008
Cabrillo Way Marina, Phase II, San Pedro	Redevelop the old marinas in the Watchorn Basin and development of the backland areas for a variety of commercial and recreational uses.	EIR certified. 12/02/2003
Berths 97-109 Container Terminal Project, West Basin	Development and operation of a container terminal at Berths 97-109.	EIR being completed.
Crescent Warehouse Company Relocation	Relocate Crescent Warehouse Company from Port Warehouses 1, 6, 9, and 10 to an area of southeast Wilmington along Henry Ford and East I Street (tentative).	Draft EIS/EIR re-circulated in April 2008.
Berths 171-181, Pasha Marine Terminal Improvements EIR	Redevelopment of existing facilities at Berths 171-181 as an omni (multi-use) facility.	Draft EIR being prepared
Pier 400, Pacific Energy Systems	Proposal to construct Crude Oil Receiving Facility on Pier 400 with tanks on Terminal Island, with pipelines between berth, tanks, and pipeline system.	SEIS/EIR under preparation. NOI/NOP released in June 2004.
Berth 206-209 Interim Container Terminal Reuse Project EIR	Proposal to allow interim reuse of former Matson Terminal. Change in tenant; no substantial change in operations.	Final EIR released November 2005.
Ultramar, Valero Lease Renewal	Lease renewal EIR for liquid bulk (petroleum) terminal.	New Project EIR to be prepared.
Conoco-Phillips Marine Oil Terminal	Lease renewal EIR for marine oil terminal.	New Project EIR to be prepared.
SSA Outer Harbor Fruit Facility Relocation	Proposal to relocate the existing fruit import facility at 22nd and Miner to Berth 153.	EIR to be prepared.
Charter High School and Port Police Headquarters, San Pedro	Proposal to develop a Charter High School "Port of Los Angeles High School of International Business and Maritime Studies." Development of a new headquarters building for the Port Police.	EIR to be prepared. NOP for EIR release possible in January 2004.
Pacific Corridor Redevelopment Project, San Pedro	Development of commercial/retail, manufacturing, and residential components.	Studies completed.
Cabrillo Marine Aquarium Expansion, San Pedro	Expansion of existing Cabrillo Marine Aquarium.	Construction underway.

Table 5-1
Port Area Projects

Port Area Projects		
Project	**Description/Status**	**Estimated Completion Date**
East Wilmington Greenbelt Community Center	Construction of a new 10,000-square-foot community building, a 25-space parking lot, and landscaped areas.	Project approved; construction to begin in April 2004.
Fishing Reef, San Pedro Breakwater	Development of an artificial reef site south of the San Pedro Breakwater. Provides opportunity for suitable reuse of clean construction materials, and to create bottom topography to promote local sport fishing.	Negative Declaration adopted and approved.
Southern California International Gateway[1]	Increased use of rail and increased near-dock rail facilities for movement of both existing and future containerized cargo to help address the need for increased near-dock facilities and to provide an efficient connection to the Alameda Corridor.	Notice of Preparation released September 2005.
Intermodal Transport Container Facility[1]	Expansion of current facility	This project has not submitted an NOP.
Los Angeles Unified School District		
15th Street Elementary School San Pedro	LAUSD's construction of additional classrooms at 15th Street Elementary School. Construction scheduled to begin by late 2003.	Construction underway.
Banning Elementary School	Banning Elementary School #1 is a two-building elementary school consisting of one two-story classroom building with subterranean parking garage and a one-story multipurpose building. Located in Wilmington, the school will provide over 2 acres of playground and green space.	Construction underway.
Port of Long Beach		
Middle Harbor Terminal Redevelopment	Expansion of an existing marine container terminal in the Middle Harbor area. The project will involve consolidation of two existing container terminals into one 345-acre terminal. Construction will include creation of approximately 51 acres of landfill, dredging, wharf construction; construction of an intermodal rail yard; and reconstruction of terminal operations buildings. The Initial Study prepared for this project identified potentially significant air, public health, transportation, biological, and water quality impacts.	NOI/NOP released in 2005.Draft EIS/EIR released on May 19, 2008.

Table 5-1
Port Area Projects

Port Area Projects		
Project	**Description/Status**	**Estimated Completion Date**
Piers G & J Terminal Redevelopment Project	Redevelopment of two existing marine container terminals into one terminal. The Piers G and J redevelopment project is in the Southeast Harbor Planning District area of the Port of Long Beach. The project will develop a marine terminal of up to 315 acres by consolidating portions of two existing terminals on Piers G and J and several surrounding parcels. Construction is now underway and will occur in four phases; it will include creation of approximately 53 acres of landfills, dredging, concrete wharves, rock dikes, and road and railway improvements. The EIR prepared for this project identified potentially significant impacts to air quality, geology, groundwater, and soils.	Approved project. Construction underway.
Pier A East and West Expansion Project	Expansion of an existing marine container terminal. The Pier A expansion project would be located north of Cerritos Channel on both sides of the Terminal Island Freeway. The project consists of the development of approximately 90 acres of oil production land, including remediation of soil and groundwater contamination, relocation of oil wells, filling, paving, and utilities. Additionally, an underpass linking the existing Pier A site to the expansion site would need to be constructed under the Terminal Island Freeway, just north of the Schuyler Heim Bridge.	Conceptual project. No environmental documentation has been prepared by the Port of Long Beach.
Pier T, T.T.I (formerly Hanjin) Terminal, Phase III	Expansion of a 300-acre marine container terminal to 375 acres on Terminal Island.	Approved project. Under construction.
Pier S Marine Terminal	Development of a 150-acre container terminal and construction of navigational safety improvements to the Back Channel.	EIS/EIR to be prepared.
Pier J South Terminal	Development of a 385-acre marine terminal. Dredge and fill activities required to consolidate two existing terminals.	Final SEIS/EIR to be released.
Pier T, Long Beach LNG Import Terminal	Construction of a 25-acre liquefied natural gas (LNG) import terminal facility, including pipeline and wharf construction on a portion of Pier T.	Project disapproved by BHC January 2007.
Gerald Desmond Bridge Replacement Project, POLB/Caltrans/FHWA[1]	Replacement of existing 4-lane Gerald Desmond Bridge over the Port of Long Beach Back Channel with a new six- to eight-lane bridge.	EIR/EA being prepared.
Chemoil Marine Terminal, Tank Installation, Port of Long Beach	Construction of two petroleum storage tanks and associated relocation of utilities and reconfiguration of adjoining marine terminal uses between Berths F210 and F211 on Pier F.	EIR to be prepared.

Table 5-1
Port Area Projects

Port Area Projects		
Project	**Description/Status**	**Estimated Completion Date**
Security Command and Control Center	Construction new 5-story security center with rooftop helipad.	Environmental document in preparation.
Administration Building Replacement Project	Replacement of the existing Port Administration Building with a new facility on an adjacent site.	FEIR released in November 2008.
RMS Queen Mary Seaport, City/POLB	Construction of a variety of retail and entertainment uses and parking. The Queen Mary Seaport project is a 54-acre, phased development adjacent to and incorporating the Queen Mary in the Port. Phase I includes onboard upgrades to the Queen Mary and surface parking improvements. Phase II includes construction of retail and entertainment-based uses, a parking structure, a hotel, and new infrastructure. Phase III includes events, park improvements, a major attraction, and additional retail and restaurant uses.	Approved project. Construction underway.
Pier B Intermodal Rail Yard/Expansion	Expand Pier B St intermodal rail yard to facilitate additional rail shipments. Also realign and widen Pier B St.	
Pier A East	Redevelopment of 32 acres of existing auto-storage area into container terminal backlands.	EIR to be prepared.
Pier A West Interim/Source Removal POLB/DTSC	Removal and off-site disposal of contaminated soil from 19 sumps including oil wells, filling, and paving.	Cleanup and Abatement Order
Rail Enhancement Project	Multiple rail transportation plan projects in and around Harbor District.	EIR to be prepared.
City of Long Beach Projects		
Marriott Hotel Project	Development of a 430-room hotel on the southeast corner of Ocean Boulevard and the Promenade.	Approved project. Construction underway.
D'Orsay Hotel Project	Development of a 162-room boutique-style hotel on the northwest corner of Broadway and the Promenade.	Approved project. Construction underway.

Table 5-1
Port Area Projects

Port Area Projects		
Project	**Description/Status**	**Estimated Completion Date**
Long Beach Plaza Mall Redevelopment	Development of commercial and residential space at the former Long Beach Plaza Mall, downtown between 3rd and 6th Streets and between Long Beach Boulevard and Pacific Avenue. Redevelop the former mall area and two blocks of vacant land east of Long Beach Boulevard with approximately 450,000 square feet of commercial space and up to 200 residential units. The EIR prepared for this project identified significant air quality impacts.	Approved project. Construction underway.
The Pike at Rainbow Harbor	Development of residential units and an office building or hotel. Project site is south of Ocean Boulevard on the site of the former Pike Amusement Park between Pine and Magnolia Avenues. Project will include approximately 770 residential units, a 500-room hotel, and 25,000 square feet of commercial space. The EIR prepared for this project identified significant air quality, cultural resources, noise, public service, and transportation impacts.	Approved project. Construction underway.
Queensway Bay Master Plan	Construction of Long Beach Aquarium, new urban harbor, office building, and entertainment complex. This project, designed to create a major waterfront attraction in downtown Long Beach, includes a recreational harbor, 150,000-square-foot aquarium, 125,000-square-foot entertainment complex, 59,000 square feet of restaurant/retail space, an 800-room hotel, 95,000 square feet of commercial/office space, and 487 boat slips in and around Queensway Bay. The recreational harbor and aquarium have been completed. The EIR certified for this project identified significant transportation impacts.	Approved project. Construction underway.

[1] These projects, while listed here, were not included in the cumulative analysis, as they were not reasonably foreseeable at the time of issuance of the Notice of Preparation for the project alternatives. Exclusion of these projects also represents a worst-case scenario with respect to surface traffic. These projects have not been approved and are not included in the air quality conformity plan or traffic modeling.

Table 5-2
Transportation Projects

LA MTA Short Range Transportation Plan for LA County		
Project	**Description/Status**	**Estimated Completion Date**
Avalon Blvd at I-405 Freeway[1]	Reconfigure interchange to meet future traffic loads; widen NB off-ramp at Avalon.	2006
Artesia on-ramp at I-405	Modify the NB on-ramp at Artesia by adding a third lane.	2006
Wilmington at I-405[1]	Widen the SB off-ramp at Wilmington to two lanes; widen the intersection at off-ramp and Wilmington.	2006
Avalon Blvd at I-405[1]	Modify the SB on-ramp at Avalon Blvd and I-405.	2006
Downtown/Shoreline Drive Adaptive Traffic Management System	Deployment of ITS elements in the Long Beach downtown area to provide an adaptive traffic management system to respond to special generator traffic.	2007

[1]Project also appears in the Draft 2004 SCAG Regional Transportation Plan.

Table 5-3
Projects Used for Southern California Association of Governments Projections

2004 SCAG Regional Transportation Plan		
Project	**Description/Status**	**Estimated Completion Date**
Baseline Projects		
Water Street/Figueroa Street/Fries Avenue	New 4-lane roadway	Under Study
Mormon Island Access Grade Separation	Grade separation at the railroad crossing	Under Study
Plan Projects		
Mormon Island Access Grade Separation	Harry Bridges Blvd to Fries Ave, provide 1- or 2-lane grade separation	Under Study
I-110 Freeway HOV	HOV lanes from I-405 to SR-91	Under Study
Other Unconstrained Projects		
SR-91/I-110 Freeway	From east to south and east to north, provide HOV connectors	Unknown
I-710 Freeway	At Wardlow Road, reconstruct connector bridge	Unknown

Note:
These projects were not incorporated in model for background growth, but are listed for cumulative impact analysis. Other Related Projects that are already included in the SCAG model are not individually analyzed.

It is noted that Alternative 1 would improve an existing transportation corridor and would link it to other existing transportation corridors (i.e., the Alameda Corridor, I-405, SR-91). It would not require substantial new land acquisition in areas devoted to nontransportation uses. Thus, no adverse cumulative land use impacts are anticipated.

5.3.1.1.2 Recreation

Alternative 1 would not have an effect on recreation resources. Therefore, there would be no cumulative contribution to potential recreation effects that might result from other projects.

5.3.1.1.3 Coastal Zone

Alternative 1 and other related projects within the Coastal Zone would be required to obtain Coastal Development Permits from the Ports of Long Beach and/or Los Angeles, the City of Los Angeles, and/or the California Coastal Commission. Because all coastal permits issued for projects in the Coastal Zone would ultimately fall under the jurisdiction of the California Coastal Commission and would be conditioned where necessary, substantial cumulative impacts to Coastal Zone land use are not anticipated.

5.3.1.2 Alternatives 2, 3, and 4

Under Alternatives 2, 3, and 4, cumulative impacts related to land use, recreation, and the Coastal Zone would be similar to those discussed under Alternative 1.

5.3.1.3 Alternative 5

Implementation of Alternative 5 would not result in land use changes or conflicting land uses. Improvements would not likely be within the Coastal Zone, and would not conflict with plans and policies. Alternative 5, when considered in conjunction with other related projects within the vicinity, is not expected to contribute to a cumulative impact to land use, recreation, or the Coastal Zone.

5.3.1.4 Alternative 6

This No Build Alternative would maintain existing conditions and would thus not contribute to cumulative impacts to land use, recreation, or the Coastal Zone.

5.3.2 Growth

5.3.2.1 Alternative 1

The project is intended to respond to both current congestion in the area and to help accommodate planned growth at the Ports of Los Angeles and Long Beach. Port growth is a result of international market forces and will occur regardless of whether the project is implemented. Implementation of the project is one of a wide variety of infrastructure and policy improvements underway in the region in response to forecasted growth in port activities. To the extent that the project contributes to the management of such growth, it could be considered to accommodate growth, rather than to induce growth. Therefore, the project addressed in this Final EIS/EIR would not contribute to cumulative growth impacts in the project study area.

5.3.2.2 Alternatives 2, 3, 4, and 5

Under Alternatives 2, 3, 4, and 5, cumulative impacts related to growth would be similar to those discussed under Alternative 1.

5.3.2.3 Alternative 6

Under the No Build alternative, there would be no construction or other changes to the existing environment. As a result, Alternative 6 would not contribute to cumulative impacts to Growth.

5.3.3 Community Impacts

5.3.3.1 Alternatives 1 and 1A

Under Alternative 1, there could be cumulative community impacts, as other projects also could result in the acquisition of businesses and displacement of employees. However, some of the same related projects would provide commercial and retail space, in addition to what already exists, to meet the relocation needs of displaced businesses and employees. It is expected that all projects would comply with relocation and acquisition guidelines of the regulating agency. Thus, no adverse cumulative impacts would occur as a result of acquisitions and displacements.

Alternative 1 would not result in partial or full acquisition of any residential properties. Since no residents would be displaced, the project would not contribute to cumulative impacts regarding residential displacement or residential relocations.

Implementation of Alternative 1 would have offsetting benefits for the community as a whole—a safer and more reliable bridge, and improvement to the local and regional circulation system.

This alternative would not result in a disproportionately high and adverse impact to minority and/or low income population groups. Therefore, the project would not contribute to cumulative adverse impacts related to issues of environmental justice.

5.3.3.2 Alternatives 2, 3, and 4

Under Alternatives 2, 3, and 4, cumulative impacts would be the same as those described under Alternative 1.

5.3.3.3 Alternative 5

Alternative 5 would improve traffic circulation within the project area, which would benefit the entire community. Alternative 5 would not have adverse impacts to the local community and, therefore, would not contribute to cumulative adverse community impacts.

5.3.3.4 Alternative 6

Under this No Build alternative, there would be no construction or other changes to the existing environment. As a result, Alternative 6 would not contribute to cumulative impacts to community resources.

5.3.4 Utilities and Public Services

5.3.4.1 Alternative 1

5.3.4.1.1 Utilities

Alternative 1, in conjunction with other related projects, would require numerous utility relocations (electrically, natural gas and oil lines, telecommunications, water, and wastewater) in the immediate project vicinity and extended area. Because utility relocations are a common occurrence in heavily urbanized areas, service disruptions are minimal. Therefore, cumulative impacts of utility relocations would not be adverse. Also, excavation activities of the proposed project and cumulative projects are required to coordinate with a service such as Underground Service Alert (USA) to minimize accidental service disruptions.

Construction of Alternative 1 would result in a reduction of solid waste municipal landfill capacity; however, this capacity reduction is not expected to be substantial because a minimum of 50 percent of construction and demolition debris would be diverted in accordance with AB 75, to which cities, counties, and regional agencies are subject. Recyclable materials would be hauled to local recycling facilities or inert landfills. Alternative 1 and related projects would be required to implement waste diversion methods. This would minimize the use of Los Angeles County solid waste landfills and, therefore, minimize project-related and cumulative impacts to landfill capacity. With the primary use of recycling facilities and inert landfills, capacities at existing permitted municipal solid waste facilities would not be adversely impacted by disposal needs of the cumulative projects.

5.3.4.1.2 Public Services

Construction Impacts

Construction activities for Alternative 1 would require closures of the Schuyler Heim Bridge and the Cerritos Channel at various times during the project construction period. As a result, land-and water-based public and emergency services that rely upon the Schuyler Heim Bridge and Cerritos Channel as their primary emergency routes would be required to use alternative emergency response routes. Alternative routes for land- and water-based emergency response would be developed prior to construction, and average response times for would not be substantially affected. It is anticipated that related projects would utilize the same procedures so that there would be no cumulative effects to public services.

Operations Impacts

Operational effects to utilities are not anticipated, as relocations would have occurred during project construction. Further, project operations would have no effects on public services and, therefore, would not contribute to cumulative impacts to public services. Alternative 1 would not increase public services demand because such demand is primarily attributable to increased commercial and residential development rather than transportation projects. Also, with improvements to the local transportation system, operation of Alternative 1 would be beneficial and would not contribute to cumulative impacts to emergency services.

5.3.4.2 Alternatives 2 and 3

Under Alternatives 2 and 3, cumulative impacts to utilities and public services would be the same as those discussed under Alternative 1.

5.3.4.3 Alternative 4

Under Alternative 4, cumulative impacts to Utilities and Public Services would be the same as described under Alternative 1 for replacement of the Schuyler Heim Bridge only, as no flyover or expressway would be constructed under this alternative.

5.3.4.4 Alternative 5

Alternative 5 would result in the same types of cumulative impacts as Alternative 1. However, the scope of such potential impacts would be minimal, as Alternative 5 would involve only minor construction activities.

Alternative 5, when considered in conjunction with other related projects within the vicinity, is not expected to contribute to a cumulative impact to utilities and services. No utility relocations would be required under this alternative, and the services demand would not be affected.

5.3.4.5 Alternative 6

Under this No Build alternative, there would be no construction or other changes to the existing environment. As a result, Alternative 6 would not contribute to cumulative impacts to Utilities and Public Services.

5.3.5 Traffic and Transportation

5.3.5.1 Alternative 1

Alternative 1 would improve traffic flow in the project area, eliminate queues at the Schuyler Heim Bridge and, with the flyover, provide for improved traffic flow from eastbound Ocean Boulevard to northbound SR-47. As a result, Alternative 1 would improve traffic in the study area and, therefore, would not contribute to cumulative impacts to Traffic and Transportation.

There are no pedestrian or bicycle facilities that would be affected by Alternative 1, and this alternative would not affect or create a need for new pedestrian and bicycle facilities. Therefore, Alternative 1 would not contribute to cumulative impacts related to pedestrian and bicycle facilities.

5.3.5.2 Alternatives 2 and 3

Under Alternatives 2 and 3, cumulative impacts to traffic and transportation would be the same as described under Alternative 1.

5.3.5.3 Alternative 4

With Alternative 4, a fixed-span bridge would be constructed to replace the existing Schuyler Heim Bridge. As a result, this alternative would alleviate queues at the bridge. With this alternative, however, no new expressway to facilitate traffic flow or flyover to improve the Ocean Boulevard/SR-47 intersection would be constructed. Therefore, the

levels of service in the project area would continue to decline, as under existing conditions. Alternative 4 would not result in adverse impacts to traffic in the study area and, therefore would not contribute to cumulative impacts.

Alternative 4 would not contribute to cumulative impacts to pedestrian and bicycle facilities in the project area.

5.3.5.4 Alternative 5

Alternative 5 would provide relatively small-scale improvements to provide for better traffic flow in the project area. Therefore, it would not contribute to cumulative impacts to Traffic and Transportation.

Alternative 5 would not contribute to cumulative impacts to pedestrian and bicycle facilities in the project area.

5.3.5.5 Alternative 6

The No Build alternative would make no changes to improve deficient transportation flow in the project area. With Alternative 6, congestion from queuing at the Schuyler Heim Bridge and from delays at the Ocean Boulevard/SR-47 intersection would continue, with projected increases in delays. As a result, when considered with other development projects, the No Build alternative could be considered to contribute to ongoing cumulative effects to Traffic and Transportation in the project area.

Alternative 6 would not contribute to cumulative impacts to pedestrian and bicycle facilities in the project area.

5.3.6 Marine Vessel Transportation

5.3.6.1 Alternative 1

There would be short- and long-term disruptions to marine vessel transportation during construction and operation of the new fixed-span bridge. The Port of Long Beach is proposing to replace the Gerald Desmond Bridge, which provides a west-east connection from Terminal Island to Long Beach over the Inner Harbor. Both the Schuyler Heim Bridge and Gerald Desmond Bridge project schedules indicate that construction could overlap, while operation of the new fixed-span bridge would occur prior to operation of the new Gerald Desmond Bridge.

5.3.6.1.1 Construction

Alternative 1 may result in adverse cumulative impacts to marine vessel transportation during project construction, as activities to replace the Schuyler Heim Bridge may occur at the same time as activities to replace the Gerald Desmond Bridge. The cumulative result could have temporary impacts on marine vessel access to the harbor area north of the Gerald Desmond Bridge.

5.3.6.1.2 Operations

While replacement of the Schuyler Heim Bridge would result in decreased vertical clearance for marine vessels, replacement of the Gerald Desmond Bridge would result in increased vertical clearance for marine vessels. Therefore, operational impacts of the two projects would be individual and would not be cumulative. No other projects in the vicinity are

expected to affect marine vessel transportation in the Cerritos Channel. Therefore, there would be no cumulative impacts to marine vessel transportation in the Cerritos Channel.

5.3.6.2 Alternatives 2, 3, and 4

Under Alternatives 2, 3, and 4, cumulative impacts to marine vessel transportation would be comparable to those described for Alternative 1, due to construction activities in the Cerritos Channel.

5.3.6.3 Alternative 5

Under Alternative 5, there would be no impacts to marine vessel transportation. Therefore, Alternative 5 would not contribute to cumulative impacts.

5.3.6.4 Alternative 6

Under Alternative 6, there would be no construction and, therefore, no impacts to marine vessel transportation. Therefore, Alternative 6 would not contribute to cumulative impacts.

5.3.7 Visual Resources/Aesthetics

5.3.7.1 Alternatives 1, 2, 3, and 4

Past port-related and other projects in the vicinity of the proposed project have had the effect of establishing the existing visual character of the project area.

In general, due to the nature of port-related activities, the cumulative projects are proposed in areas with existing high levels of activity (conducted up to 24 hours each day), development, and light and glare. Changes related to cumulative projects would be implemented over a period of years, likely in such a manner that construction schedules would vary, although simultaneous construction could occur. Also, projects would occur in different portions of the study area, which would disperse impacts, thereby minimizing the potential for cumulative visual impacts.

The cumulative projects would be consistent with the generally industrialized character of the study area. The projects would have the potential to alter the existing visual quality of the area by introducing additional man-made facilities and infrastructure, as well as providing new sources of light and glare. However, due to the existing industrialized nature of each of the landscape units, the generally industrialized character and "low" visual quality of each of the key views, it is anticipated that these impacts would not be different from the existing nature of the project area. As a result, there would be little cumulative effect.

Considering the existing nature of port and transportation development, in addition to the varied timing and location of the cumulative projects, adverse cumulative impacts to the visual character and quality of the project area are not anticipated. Under Alternatives 1, 2, 3, and 4, the architectural details on project features would be designed in coordination with a Caltrans landscape architect. Visual impacts from construction and operation of the proposed project alternatives would not be adverse and, as a result, would have little potential to contribute to cumulative impacts related to other projects. As a result, cumulative visual impacts related to project construction and operation would be minor.

5.3.7.2 Alternative 5

Under Alternative 5, the scope of visual impacts would be minimal, as this alternative would involve only minor surface construction activities. It would not contribute to cumulative impacts to Aesthetics and Visual Resources within the project area.

5.3.7.3 Alternative 6

Under the No Build alternative, there would be no construction or other changes to the existing environment. As a result, Alternative 6 would not contribute to cumulative impacts to Aesthetics and Visual Resources.

5.3.8 Cultural Resources

5.3.8.1 Alternative 1

It is reasonable to project that, if Alternative 1 or any of the projects listed in Tables 5-1, 5-2, and 5-3 should unearth cultural resources, the project would implement analysis of the resource(s) to assess their significance. If necessary, testing and evaluation would follow, in accordance with Section 106 of the National Historic Preservation Act. If appropriate, significant archaeological deposits would be recovered in accordance with existing laws and regulations. As a result, there would be no cumulative impacts among the related projects. Further, none of the projects listed in the tables is likely to impact the Schuyler Heim Bridge, the only historic resource that would be adversely affected as a result of Alternative 1. Therefore, Alternative 1 would not contribute to cumulative impacts related to Cultural Resources.

5.3.8.2 Alternatives 2, 3, and 4

Under Alternatives 2, 3, and 4, cumulative impacts to Cultural Resources would be the same as those described for Alternative 1. Therefore, no cumulative impacts are anticipated.

5.3.8.3 Alternative 5

Alternative 5 is not anticipated to result in impacts to Cultural Resources. However, if cultural resources were discovered, procedures would be the same as those described under Alternative 1. Therefore, Alternative 5 would not contribute to cumulative impacts to Cultural Resources.

5.3.8.4 Alternative 6

Under the No Build alternative, there would be no construction or other changes to the existing environment. As a result, Alternative 6 would not contribute to cumulative impacts to Cultural Resources.

5.3.9 Hydrology, Floodplains, and Oceanography

5.3.9.1 Alternative 1

Each Los Angeles and/or Long Beach Harbor project is subject to regulatory standards related to Hydrology, Floodplains, and Oceanography that must be achieved during project construction and operation. Therefore, Alternative 1 and the cumulative projects listed in Tables 5-1, 5-2, and 5-3 that occur in the Los Angeles and Long Beach Harbor are subject to

these standards. Accordingly, avoidance and minimization measures for these cumulative projects would be incorporated and would be expected to reduce effects to less than significant. Therefore, cumulative impacts related to hydrology, floodplains, and oceanography are not anticipated.

5.3.9.2 Alternatives 2 and 3

Cumulative impacts related to Hydrology, Floodplains, and Oceanography under Alternatives 2 and 3 would be the same as those described for Alternative 1.

5.3.9.3 Alternative 4

Under Alternative 4, cumulative impacts to Hydrology, Floodplains, and Oceanography would be the same as described under Alternative 1 for replacement of the Schuyler Heim Bridge only, as no flyover or expressway would be constructed under this alternative.

5.3.9.4 Alternative 5

Alternative 5 would provide relatively small-scale improvements to provide for better traffic flow in the project area. Therefore, it would not contribute to cumulative impacts to Hydrology, Floodplains, and Oceanography.

5.3.9.5 Alternative 6

Under the No Build alternative, there would be no construction or other changes to the existing environment. As a result, Alternative 6 would not contribute to cumulative impacts to Hydrology, Floodplains, and Oceanography.

5.3.10 Water Quality and Stormwater Runoff

5.3.10.1 Alternative 1

5.3.10.1.1 Construction Impacts

There is the potential for cumulative impacts to surface water quality in the Cerritos Channel during construction of Alternative 1. Such effects would depend on the construction schedules of other, related projects located along the Cerritos Channel. It is anticipated that the primary cumulative impact could occur during replacement of the Gerald Desmond Bridge in the Port of Long Beach, due to the relatively large scale of that project, its location across the Back Channel, which intersects the Cerritos Channel on the east end of Terminal Island, and its proximity to the Schuyler Heim Bridge. Other projects that, collectively, could result in cumulative impacts during construction of Alternative 1 are Berth 206-209 Interim Container Terminal Reuse, Berth 171-181 Pasha Marine Terminal Improvements, Ultramar Lease Renewal, SSA Outer Harbor Fruit Facility Relocation, Channel Deepening, San Pedro Waterfront Promenade, Waterfront Gateway, and Evergreen Expansion. These projects are all located in the Port of Los Angeles.

Alternative 1 would not conduct active dewatering during construction, so adverse impacts to groundwater quality and groundwater movement are not anticipated. As a result, Alternative 1 would not contribute to cumulative effects to groundwater.

5.3.10.1.2 Operations Impacts

Under Alternative 1, impacts from project operations are not expected to substantially differ from existing conditions, as the project area already is largely covered by impervious surface. As a result, effects related to stormwater runoff and surface water quality are expected to be minimal, and no effects to groundwater are anticipated. Therefore, cumulative effects to surface and groundwater quality during Alternative 1 operations also would be minimal.

5.3.10.2 Alternative 2

5.3.10.2.1 Construction Impacts

Under Alternative 2, cumulative impacts to surface and groundwater quality during project construction would be comparable to those described for Alternative 1 for replacement of the Schuyler Heim Bridge.

Cumulative impacts to surface and groundwater quality from construction of the expressway for the SR-103 Extension are not anticipated, as the SR-103 Extension is located north of the ports of Long Beach and Los Angeles. Alternative 2 is not anticipated to result in impacts and, therefore, would not contribute to cumulative impacts.

5.3.10.2.2 Operations Impacts

Under Alternative 2, cumulative impacts to surface and groundwater quality would be the same as described for Alternative 1.

5.3.10.3 Alternative 3

Under Alternative 3, temporary and permanent cumulative impacts to surface and groundwater quality would be comparable to those described for Alternative 1 for construction of the fixed-span bridge, flyover, and SR-47 Expressway. However, there would be no potential for cumulative impacts related to demolition of the Schuyler Heim Bridge, as existing the bridge would not be demolished under this alternative.

5.3.10.4 Alternative 4

Under Alternative 4, cumulative impacts to surface and groundwater quality would be comparable to those described for Alternative 1 as related to replacement of the Schuyler Heim Bridge. There would be no cumulative impacts related to construction of the flyover, SR-47 Expressway, or SR-103 Extension, as none of these features would be constructed under Alternative 4.

5.3.10.5 Alternative 5

Alternative 5 would provide relatively small-scale improvements to provide for better traffic flow in the project area. Therefore, it would not contribute to cumulative impacts to Water Quality and Stormwater Runoff.

5.3.10.6 Alternative 6

Under the No Build alternative, there would be no construction or other changes to the existing environment. As a result, Alternative 6 would not contribute to cumulative impacts to Water Quality and Stormwater Runoff.

5.3.11 Geology/Soils/Seismicity/Paleontology/Topography/Mineral Resources

5.3.11.1 Alternatives 1, 2, 3, and 4

5.3.11.1.1 Geology/Soils/Seismicity/Topography

Geology/Soils/Seismicity/Topography

None of the components of the project alternatives would result in disturbance to existing geologic, soils, seismic, or topographic hazards. Potential geologic, soils, and seismic impacts to project components would be addressed through incorporation of geotechnical recommendations, engineering standards, and applicable regulations and practices; all structures would be built to meet UBC standards and/or to withstand a major earthquake. It is anticipated that related projects would be implemented in a similar manner and that no cumulative impacts would occur.

However, there remains the potential for the proposed project and related projects to be adversely affected during a major seismic event; such potential cannot be precluded or mitigated. As a result, as related to geologic, soils, and seismic resources, there remains the potential for unavoidable cumulative impacts.

5.3.11.1.2 Mineral Resources

No impacts to mineral resources would occur from implementation of Alternative 1, 2, 3, or 4. Therefore, the project would not contribute to cumulative impacts to mineral resources.

5.3.11.1.3 Paleontology

Implementation of one of the build alternatives or related projects could unearth paleontological resources. Should this occur, it is reasonable to assume that the project would implement analysis of the resource(s) to assess significance. If necessary, testing and evaluation would follow and, if appropriate, paleontological deposits would be recovered in accordance with the Paleontological Resource Impact Mitigation Program (Jones & Stokes, 2005). As a result, there would be no cumulative impacts related to paleontological resources.

5.3.11.2 Alternative 5

Alternative 5 would provide relatively small-scale improvements to provide for better traffic flow in the project area. Therefore, it would not contribute to cumulative impacts to Geology/Soils/Seismicity/Paleontology/Topography/Mineral Resources.

5.3.11.3 Alternative 6

Under the No Build alternative, there would be no construction or other changes to the existing environment. As a result, Alternative 6 would not contribute to cumulative impacts to Geology/Soils/Seismicity/Paleontology/Topography/Mineral Resources.

5.3.12 Hazardous Waste/Hazardous Materials

5.3.12.1 Alternative 1

The primary types of hazardous material-related impacts attributable to Alternative 1, in conjunction with construction of related projects, are from the handling of contaminated soil and groundwater that may be encountered during project construction. Each Los Angeles/ Long Beach Harbor project is subject to regulatory standards that must be achieved during

construction and operation. Similar to Alternative 1, all related projects in the area would be evaluated on a project-by-project basis and would incorporate measures to reduce potential impacts. These measures would be expected to be consistent with applicable standards, regulations, and permits to reduce potential impacts from hazards and hazardous materials. Incorporation of these measures would be expected to reduce impacts to less than significant. Therefore, Alternative 1 would not contribute to cumulative impacts relative to Hazardous Waste/Hazardous Materials.

5.3.12.2 Alternatives 2, 3, and 4

Under Alternatives 2, 3, and 4, cumulative effects related to Hazardous Waste/Hazardous Materials would be as described for Alternative 1.

5.3.12.3 Alternative 5

Alternative 5 would provide relatively small-scale improvements to provide for better traffic flow in the project area. Therefore, it would not contribute to cumulative impacts to Hazardous Waste/Hazardous Materials.

5.3.12.4 Alternative 6

Under the No Build alternative, there would be no construction or other changes to the existing environment. As a result, Alternative 6 would not contribute to cumulative impacts to Hazardous Waste/Hazardous Materials.

5.3.13 Air Quality

5.3.13.1 Alternative 1

5.3.13.1.1 Construction Impacts

Construction of Alternative 1 would result in adverse effects to Air Quality, even after mitigation. Therefore, impacts of Alternative 1, plus those of other, concurrent, construction projects would be expected to be adverse. Therefore, Alternative 1 would contribute to cumulatively adverse effects to Air Quality during construction.

5.3.13.1.2 Operations Impacts

Alternative 1 operations were shown to have a minor impact on localized CO levels near intersections. Therefore, the cumulative effect of Alternative 1 operations would not contribute to cumulative effects to CO.

During project operation, vehicles would emit mobile source air toxics (MSAT) such as diesel particulate matter. Implementation of the project would result in improving regional air quality through improving the efficiency of truck movement through potentially affected communities, such as Wilmington, Carson, and Long Beach. The SCAQMD recently completed the Multiple Air Toxics Exposure Study III (MATES-III), which is a monitoring and risk evaluation study conducted periodically in the South Coast Air Basin (SCAQMD, 2008). The MATES-III study establishes the existing risk from exposure to air toxics for receptors located in the South Coast Air Basin. Although the study showed exposures to emissions of air toxics are being reduced overall, the study concludes that the risks remain unacceptable, and are higher near areas such as the ports and transportation corridors (SCAQMD, 2008). The project is expected to improve the efficiency of truck traffic flow.

Also, the Port of Los Angeles and Port of Long Beach have committed to measures to reduce emissions from diesel trucks by 2012 through the San Pedro Ports Clean Air Action Plan, and the California Air Resources Board adopted regulations to reduce emissions from diesel fueled port trucks on December 24, 2008. As a result, MSAT emissions would be expected to decline in future years.

Based on the ACTA HRA evaluation, Caltrans does not believe that there is adequate or satisfactory evidence to support a determination of a significant impact due to exposure to air toxics. However, ACTA has determined that the HRA modeling results have indicated that the proposed project would have substantial regional benefits that would reduce health risks in the majority of the study area, and that therefore, there would be a net benefit to the cumulative health risk impacts. Although the maximum increase in cancer risk at some locations would exceed the 10 in a million threshold, it would only affect a limited number of homes, and the impacts would be mitigated to the level of less than significant through ACTA's proposed mitigation measure. Also, as a result of adopted CARB measures to reduce emissions of DPM from on-road trucks and the Clean Truck Program adopted as part of the ports' Clean Air Action Plan, emissions from trucks using the proposed project and the risk from exposure to air toxics would be expected to decrease in the future. Therefore, ACTA has determined that the project would be expected to have a less than significant adverse cumulative impact to human health risks. Non-cancer acute and chronic risks would decrease within the study area resulting in a less than significant cumulative impact.

Indirect operations impacts, due to marine vessel detours, would result in significant emissions of NO_X. Therefore, the combined impacts from Alternative 1 with other nearby projects would result in cumulatively significant impacts for NO_X emissions. Under Alternative 1, emissions of CO, ROG, SO_2, PM_{10}, and $PM_{2.5}$ due to marine vessel detours would be minimal and would be unlikely to contribute significantly to the cumulative impacts. The minor increase in diesel particulate matter emissions (2.5 lb/day PM_{10} and 2.3 lb/day $PM_{2.5}$) from the marine vessel detours would not be expected to contribute significantly to cumulative impacts. The diesel particulate matter emissions were based on conservative assumptions and current emissions factors. In addition, the types of marine vessels detoured due to the proposed action would be required to comply with the measure recently approved by CARB to reduce emissions from commercial harbor craft. Therefore, the diesel particulate matter emissions from the marine vessel detours during construction and operation would be expected to be less than the values presented in Tables 3.13-11, 3.13-12, and 3.13-14 (Draft EIS/EIR, Chapter 3.13 Air Quality).

5.3.13.2 Alternative 2

Cumulative impacts due to criteria and MSAT emissions from the project construction and operation would be the same as Alternative 1.

Based on the ACTA HRA evaluation, Caltrans does not believe that there is adequate or satisfactory evidence to support a determination of a significant impact due to exposure to air toxics. However, ACTA has determined that the HRA results for Alternative 2 indicated that cancer risk would increase at some of the residential and recreational users and school worker receptors. Cumulative impacts from Alternative 2 would be greater than Alternative 1. Recreational user cancer risks would remain significant after mitigation. Non-cancer acute

and chronic risks would decrease within the study area resulting in a less than significant cumulative impact.

5.3.13.3 Alternative 3

Cumulative impacts under Alternative 3 would be the same as those described for Alternative 1.

5.3.13.4 Alternative 4

There would be no cumulative health risk impacts under Alternative 4.

5.3.13.5 Alternative 5

5.3.13.5.1 Construction Impacts

There would be minimal construction under the TSM alternative. With this alternative, there would be no emissions associated with marine vessel detours, as no new bridge would be constructed, and marine vessels would not be required to detour around Terminal Island. Therefore, there would be no direct or indirect project impacts to air quality during construction, and this alternative would not contribute to cumulative construction impacts.

5.3.13.5.2 Operations Impacts

Operation of the TSM Alternative would be expected to result in improvements to local traffic, with related improvements (decreases) in air emissions. Therefore, Alternative 5 operations would not contribute to adverse cumulative Air Quality impacts in the project area.

5.3.13.6 Alternative 6

The impact of Alternative 6 on localized CO levels near intersections was determined to be less than significant. With this alternative, there would be no emissions associated with marine vessel detours, as no new bridge would be constructed, and marine vessels would not be required to detour around Terminal Island. Therefore, Alternative 6 operations would not contribute to cumulative Air Quality impacts.

5.3.14 Noise

5.3.14.1 Alternative 1

5.3.14.1.1 Construction Impacts

Noise impacts from construction activities are by nature temporary and localized. For a cumulative impact to occur, construction activities would have to take place at the same time and in the same vicinity, as noise dissipates over distance. However, noise is not additive. For example, if construction activities for Alternative 1 and a nearby project generated approximately the same amount of noise, this would result in only a 3-dB increase in noise levels, which is a barely perceptible difference. If one project generated noise that exceeded the noise produced by a second project, the louder noise would essentially mask the noise of the second project. Even if construction activities for a related project occurred at the same time as those of Alternative 1, the overall increase in noise levels would be minor and temporary; potential cumulative impacts would be minor.

5.3.14.1.2 Operations Impacts

Noise impacts for project operations are based on a future traffic forecast for the year 2030. This forecast already includes foreseeable development, which includes Alternative 1 and related projects (see Tables 5-1, 5-2, and 5-3). Therefore, no additional cumulative traffic noise impacts would occur.

5.3.14.2 Alternatives 2, and 3

Under Alternatives 2, and 3, temporary and permanent noise impacts would be the same as those described for Alternative 1.

5.3.14.3 Alternative 4

Under Alternative 4, temporary and permanent noise impacts would be the same as those described for Alternative 1, but related only to replacement of the Schuyler Heim Bridge, as no flyover or expressway would be constructed under this alternative. This alternative would not contribute to additional cumulative noise impacts.

5.3.14.4 Alternative 5

5.3.14.4.1 Construction Impacts

This alternative would involve minimal construction compared to the build alternatives. Therefore, construction noise also would be minimal and is not expected to contribute to cumulative noise impacts.

5.3.14.4.2 Operations Impacts

Under Alternative 5, cumulative operations impacts would be the same as those described for Alternative 1.

5.3.14.5 Alternative 6

5.3.14.5.1 Construction Impacts

No construction would occur under this alternative. Therefore, it would not contribute to cumulative noise impacts.

5.3.14.5.2 Operations Impacts

Under Alternative 6, cumulative operations impacts would be the same as those described for Alternative 1.

5.3.15 Energy

For purposes of this Final EIS/EIR, cumulative impacts to energy would occur if the selected alternative, in conjunction with other related projects, collectively resulted in excessive and/or inefficient energy use.

5.3.15.1 Alternative 1

5.3.15.1.1 Construction

Alternative 1 would require the use of energy resources during construction. Energy impacts involve one-time, non-recoverable energy use associated with construction activities and the use of materials. Energy use for construction would be a short-term impact and would represent a small percent of the total energy consumed in the region during the period of

project construction. As a result, Alternative 1 is not anticipated to result in an adverse impact on the overall supply of or demand for energy during project construction and, therefore, would not contribute to adverse cumulative impacts to energy resources.

5.3.15.1.2 Operations Impacts

Development of related projects in the ports area would have a tendency to result in increased energy consumption, whereas Alternative 1 and other transportation-related projects are expected to result in improved or reduced energy consumption associated with more efficient traffic flow. In either case, due to the relatively high cost of energy, cumulative energy consumption related to Alternative 1 operations is not expected to be excessive or inefficient. Alternative 1 would not result in an adverse impact to fuel consumption. Therefore, Alternative 1 operations would not contribute to cumulative impacts to energy resources.

In the long term, during operation of Alternative 1, energy will be used for vehicles operating on the roadways. Replacement of the existing Schuyler Heim Bridge with a fixed-span bridge would have indirect impacts on fuel consumption by affecting marine traffic in the Cerritos Channel. Replacing the lift-span bridge with a fixed-span bridge would force taller marine vessels to take a longer route around Terminal Island and would delay vessels with adjustable mast heights. This increase in trips and travel time for the marine vessels would result in increased fuel consumption. However, the increased consumption is not expected to be excessive or inefficient, as the relatively high cost of fuel serves to regulate demand. Therefore, there would be no adverse impact of Alternative 1 on fuel consumption in the long term, and it would not contribute to a cumulative adverse effect on Energy.

5.3.15.2 Alternatives 2, 3, and 4

Cumulative impacts of Alternatives 2, 3, and 4 would be the same as described for Alternative 1.

5.3.15.3 Alternative 5

Alternative 5 would require minimal construction. Therefore, energy use also would be minimal and would likely be offset by efficiencies in roadway operations. No cumulative impacts are expected.

5.3.15.4 Alternative 6

Under Alternative 6, there would be no construction and no change to ongoing operation of local roadways. Therefore, this alternative would not contribute to cumulative impacts to Energy.

5.3.16 Biological Resources

5.3.16.1 Alternatives 1 and 1A

5.3.16.1.1 Natural Communities

Significant adverse effects could occur to aquatic communities and essential fish habitat (EFH) in the Cerritos Channel and Consolidated Slip/Dominguez Channel from sediment resuspension, blasting, and pile driving. However, avoidance and minimization measures would be implemented to reduce these adverse effects.

The silty nature of the sediment suggests that exceedances of water quality may be expected to last on the order of at least a few days. With implementation of measures to prevent uncontrolled suspension and dispersion, actual effects are expected to be much less.

Because of the limited geographic extent and short duration of potential impacts, cumulative effects from sediment suspension and dispersion are not anticipated. Any potential effects from Alternative 1 would be temporary. As such, cumulative impacts are not expected. Projects that are proposed in Long Beach and Los Angeles Harbors which may result in resuspension and dispersion of sediments are shown in Table 5-4. These projects are not anticipated to overlap with Alternative 1 in either geographic area or time frame (Alternative 1 construction is anticipated from 2009 to 2011. The closest project with the potential for overlap with Alternative 1 is the Pier S Marine Terminal along Cerritos Channel just west of the Schuyler Heim Bridge. This project involves realignment of the rip rap channel dikes on Cerritos Channel and placement of a concrete-pile supported wharf in Cerritos Channel. However, this project is expected to be completed by the time Alternative 1 would be constructed.

Table 5-4
Port Area Projects with Potential to Generate Sediment Resuspension and Dispersion

Project	Location	Estimated Completion Date
Port of Los Angeles		
Pier 400 Container Terminal and Transportation Corridor Project	Outer Harbor, several miles southwest	Approved project. Stage I construction completed. Stage II construction underway.
Berths 118-131 Marine Terminal West Basin	Approximately 2 miles west, in West Basin	EIR being completed.
Berths 136-150 Marine Terminal West Basin	Approximately 2 miles west, in West Basin	NOI/NOP released in October 2004. EIR being completed.
Evergreen Expansion, Terminal Island, POLA	Approximately 2 miles west, on Terminal Island	EIR to be prepared. NOP for new EIR release possible in January 2004.
Channel Deepening Project,	Approximately 2 miles west, on POLA Main Channel	Approved project; Construction underway. EIR being completed.
Port of Long Beach		
Middle Harbor Terminal Redevelopment	Middle Harbor of the Port of Long Beach, approximately 1 mile east	EIS/EIR under preparation. NOI/NOP released in 2005.
Piers G & J Terminal Redevelopment Project	Approximately 2 miles east, in the Southeast Harbor Planning District of the Port of Long Beach	Approved project. Construction underway.
Pier S Marine Terminal	Just east of Schuyler Heim Bridge on Cerritos Channel (within 1/2 mile)	EIS/EIR to be prepared.
Pier J South Terminal	Approximately 2 miles east, in Long Beach Harbor	Final SEIS/EIR to be released for public review in October 2006.
Gerald Desmond Bridge Replacement Project, POLB/Caltrans/FHWA	Less than a mile east, and on a different side of Terminal Island than the Schuyler Heim Bridge	EIR/EA being prepared.

Adverse effects could occur to aquatic communities in the Cerritos Channel and Consolidated Slip/Dominguez Channel from lead paint distribution during dismantling of the existing Schuyler Heim Bridge. This effect would be mitigated by adherence to construction practices to limit the potential discharge of lead compounds into Cerritos Channel. With implementation of these avoidance and minimization measures during construction, the effects of lead paint to water quality are expected to be reduced.

The Gerald Desmond Bridge Replacement Project may also result in introduction of lead into harbor waters. This project is located about 1 mile south of Alternative 1 on the east side of Terminal Island. The construction schedule for this project is unknown. However, it is presumed that measures would be employed to reduce the potential effects from lead paint introduction into harbor waters.

With measures to reduce the effects of lead paint on Alternative 1, and comparable measures used on other projects where there is lead paint removal, no cumulative impacts to aquatic communities or EFH are anticipated.

5.3.16.1.2 Special-Status Species

California Least Tern

Impacts to least tern are not anticipated unless a breeding colony were to establish on potential habitat just west and south of the Schuyler Heim Bridge. This site, the Pier S Marine Terminal, is currently under construction. Barring periods of construction inactivity, terns are not likely to establish. Should terns establish, appropriate mitigation would be implemented to reduce Alternative 1 construction impacts.

The potential for other proposed projects in the harbor area to affect least terns is not known. However, successful mitigation for least terns has been implemented at Pier T, where an established breeding colony is protected and monitored on an annual basis. It is presumed that other projects with potential effects on least terns also would implement appropriate mitigation to reduce impacts on the species and ensure population stability in the harbor area.

With measures to reduce the impacts of Alternative 1 on least terns, and comparable measures on other projects that may affect least terns, no cumulative impacts are anticipated.

American Peregrine Falcon

Removal of an occupied peregrine falcon nest would be avoided by measures intended to avoid take of an active nest, including nest exclusion during the non-nesting season. However, the active nest site would still be permanently removed, representing a significant impact. This impact would be lessened if the alternative nest site on the Gerald Desmond Bridge remained available at the time of nest exclusion on the Schuyler Heim Bridge.

With the proposed Gerald Desmond Bridge Replacement Project, it is not certain that the alternative nest site would be available. The potential loss of both nest sites would represent an adverse cumulative impact.

Mitigation for this cumulative impact would include mitigation measure B-6, Protecting American Peregrine Falcon. Specifically, this mitigation measure includes a program of monitoring both nest sites during construction and excluding nest sites if they would be at

risk or if they could be at risk during the nesting season. This measure would reduce project-related impacts to less than significant, and Alternative 1 then would not contribute to cumulative adverse effects related to the peregrine falcon.

Plant Species

Impacts to southern tarplant or other special-status plant species are not anticipated unless such species are identified during pre-construction surveys. Should special-status plant species be identified, they would be avoided if possible, or appropriate mitigation to protect or reestablish the population elsewhere would be implemented. It is presumed that other projects with potential effects on special-status plant species also would implement appropriate measures to reduce impacts.

Due to the developed nature of the port environment, there is a low likelihood of impacts on special-status plants. Based on this factor, plus implementation of measures to reduce the impacts of Alternative 1 on special-status plants, and comparable measures on other projects, no cumulative impacts are anticipated.

Bat Species

Under Alternative 1, the loss of occupied bat roosts from demolition of the Schuyler Heim Bridge would be a significant impact, requiring mitigation. Mitigation involves exclusion of bat roosts during the non-breeding season. If active roosts with young are encountered during construction, the roosts would be left alone, if feasible, until the young have weaned and are in flight. It is presumed that ample other bat roosts are present in the port vicinity, including areas on existing causeways, the Badger Avenue Bridge, Gerald Desmond Bridge, various warehouse facilities, or other structures.

Other proposed projects in the port vicinity may also affect roosting bats. The Gerald Desmond Bridge project may remove potential roost sites. It is presumed that appropriate mitigation also would be implemented during that project and other projects to reduce effects on roosting bats.

With measures to reduce the effects of Alternative 1 on roosting bats, and comparable measures on other projects that may affect roosting bats, no cumulative impacts are anticipated.

Burrowing Owl

Unless burrowing owl are identified during pre-construction surveys, impacts are not anticipated. Should burrowing owl be identified, appropriate mitigation to protect them during the breeding season, or exclude burrows for relocation of the population, would be implemented. Because of the developed nature of the port environment, neither Alternative 1 nor other proposed projects in the vicinity have a high likelihood of affecting burrowing owl. The only potential habitat near Alternative 1 is currently under construction (Pier S Marine Terminal). It is presumed that other projects with potential effects on burrowing owl also would implement appropriate mitigation to reduce impacts.

With the low likelihood of impacts on burrowing owl, measures to reduce the effects of Alternative 1 on the species, and comparable measures used on other projects, no cumulative impacts are anticipated.

Coast Pelagic Species and Groundfish

Impacts to these species would occur as impacts to EFH, and would be the same as impacts to aquatic communities. Therefore, no cumulative impacts regarding coast pelagic species and groundfish are anticipated.

Invasive Species

There is limited potential for adverse impacts resulting from dispersion and establishment of invasive species because sensitive terrestrial communities are absent from the Alternative 1 site. In addition, avoidance and minimization measures would be implemented to reduce the likelihood of dispersion and establishment of invasive species. Similar measures would be anticipated on other projects. As such, no cumulative impacts resulting from introduction of invasive species are anticipated under Alternative 1.

5.3.16.1.3 Jurisdictional Waters Including Wetlands

With wetland avoidance measures under Alternative 1, impacts to the tidal wetland east of the Schuyler Heim Bridge on the south side of Cerritos Channel would be avoided. Because of the low likelihood of impacts from Alternative 1, no cumulative impacts to wetlands are anticipated under Alternative 1.

5.3.16.2 Alternative 2

The cumulative impact analysis of Alternative 2 related to Biological Resources would be comparable to that discussed for Alternative 1, with the following exception: there would be no impacts to aquatic communities or EFH in the Consolidated Slip/Dominguez Channel because the alignment for Alternative 2 does not cross this feature.

5.3.16.3 Alternative 3

The cumulative impact analysis of Alternative 3 would be comparable to that discussed for Alternative 1, with the following exceptions: there would be less potential for cumulative impacts to aquatic communities at the Cerritos Channel because, under Alternative 3, there would be no demolition of the existing Schuyler Heim Bridge. Potential impacts to the aquatic community at the Cerritos Channel would occur only from construction of the new, fixed-span bridge.

Wetland mitigation measures would be required under Alternative 3, because of the probable loss of the tidal wetland east of the Schuyler Heim Bridge on the south side of Cerritos Channel. It is unknown if other projects in the port vicinity would affect wetlands. Many of the POLA projects have historically mitigated for wetland losses because of impacts to stands of pickleweed along rip rap banks, and it is likely that many of the currently proposed projects involving marine terminal or wharf improvements would have similar impacts. Mitigation of POLA projects has been negotiated with appropriate agencies. Mitigation measures include using credits from saltmarsh mitigation banks, including areas in Anaheim Bay or other high quality salt marsh habitats. Generally, the mitigation areas provide more opportunity for high quality wetland and wildlife habitat than the impacted area, and the exchange is beneficial.

Because impacts from Alternative 3 would be mitigated as appropriate, and because other projects in the port area involving wetland impacts also would be mitigated, there are no cumulative impacts anticipated from Alternative 3.

5.3.16.4 Alternative 4

Under Alternative 4, the cumulative impact analysis for Biological Resources would be comparable to that discussed for Alternative 1 with the following exception: there would be no impacts to aquatic communities or EFH in the Consolidated Slip/Dominguez Channel because Alternative 4 involves only replacement of the Schuyler Heim Bridge and the extent of construction does not cross this feature.

5.3.16.5 Alternatives 5 and 6

There are no anticipated project impacts to biological resources from implementation of Alternatives 5 and 6. As such, no cumulative impacts are anticipated.

Chapter 6.0 Summary of Comments and Coordination

Early and continuing coordination with the general public and public agencies is an essential part of the environmental process to determine the scope of environmental documentation, level of analysis, potential impacts and mitigation measures, and related environmental requirements. Agency consultation and public participation for the proposed project have been accomplished through a variety of formal and informal methods, including but not limited to: public scoping meetings, project development team meetings, interagency coordination meetings, and Native American Heritage Commission (NAHC) notification. This chapter summarizes the results of efforts by the California Department of Transportation (Caltrans) to fully identify, address, and resolve project-related issues through early and continuing coordination.

6.1 Public Scoping

6.1.1 Scoping Activities – 2002

In 2002, Caltrans and the Alameda Corridor Transportation Authority (ACTA) began formal public scoping and initiation of environmental studies for a previous project that included replacement of the Schuyler Heim Bridge and construction of an elevated SR-47 Expressway between Terminal Island and Alameda Street, at Pacific Coast Highway. Notice letters were sent to federal, state, and local agencies on January 28, 2002. Notices were published in local newspapers advertising the public scoping and open house, held on February 13, 2002, at the Port of Long Beach Administrative Building. The scoping meeting was held from 2:30 p.m. to 4:30 p.m., with the open house from 4:30 p.m. until 7:30 p.m. Public comments were received until February 28, 2002. These included 9 comments provided on the information cards at the scoping meeting and 15 letters received from agencies and the general public.

A review of subsequent environmental studies led the Federal Highway Administration (FHWA) to conclude that an Environmental Impact Statement (EIS) would be required for the project. Budgetary constraints then led Caltrans to temporarily suspend the project.

6.1.2 Scoping Activities – 2004

For the project addressed in this Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR), the formal scoping process began when a Notice of Intent (NOI) to prepare an EIS/EIR was published in the *Federal Register* on June 8, 2004, with notices sent to the appropriate local, state, and federal agencies. Then, an NOI to prepare an EIS for the project proposed in this document was published in the *Federal Register* on July 26, 2004, and notices were sent to the appropriate local, state, and federal agencies. In September 2004, a scoping notice to inform the general public of the proposed project was published in the following newspapers: *Los Angeles Times*, *Long Beach Press Telegram*, and *Daily Breeze* (Wednesday, September 1, 2004); *La Opinion* (Thursday, September 2, 2004), and *The*

California Journal (Philippine paper) (Friday, September 3, 2004) (see Appendix F for copies of these notices).

Also, scoping letters and briefings were provided to elected officials and staff including, but not limited to: U.S. senators and house members, the California governor's office, state senators and assembly members, and local officials from the County of Los Angeles, City of Los Angeles, City of Long Beach, City of Carson, and City of Compton. In addition, presentations were made to stakeholder groups, including the Wilmington Neighborhood Council, Port of Los Angeles Port Community Advisory Committee, and Wilmington Chamber of Commerce. Scoping letters also were sent to individuals who requested notice of projects in the community.

Copies of the NOI, and the NOP are included in Appendix F of this Final EIS/EIR. The scoping notice, scoping letter, and distribution list are included in the Scoping Summary Report (Caltrans, 2006).

Two formal scoping meetings/open houses were held on September 9, 2004, one at 2:30 p.m., and one at 5:30 p.m., in a conference room at the Wilmington Senior Citizens Center. The purpose of the meetings was to introduce the project to responsible and coordinating agencies and members of the public, and to solicit their comments and concerns. Displays of the Schuyler Heim Bridge Replacement and SR-47 Expressway project alternatives and sign-in sheets were provided. At each meeting, Caltrans provided an overview of the project.

Caltrans and the FHWA were identified as the lead agencies; the Port of Long Beach, and Port of Los Angeles were named as responsible agencies; and U.S. Coast Guard and U.S. Army Corps of Engineers were identified as cooperating agencies. Participants in the project development team were described as Caltrans District 7, FHWA, and ACTA.

The project responsibilities were delineated, and the proposed project was described as replacement of the Schuyler Heim bridge as an "essential service" structure and construction of a four-lane elevated expressway (SR-47) linking the bridge to Alameda Street. The limits of the project were shown as extending from Ocean Boulevard on Terminal Island to Alameda Street just north of Pacific Coast Highway (SR-1).

Alternatives to the project were presented: (1) Schuyler Heim Bridge Replacement and SR-47 Expressway; (2) SR-103 extension to Alameda Street; (3) avoidance of removing the existing bridge (historical preservation); (4) Schuyler Heim Bridge replacement only; (5) traffic system management (TSM), and (6) no build.

Comments received at the 2:30 Scoping Meeting primarily reflected concerns regarding: effects on City of Carson residential areas, specifically noise, air quality, health, and traffic; placement of vehicle ramps to I-405 and SR-103; effects to the Leeward Bay Marina and, during construction, access to Leeward Bay Marina; maintenance/ landscaping of the expressway; potential conflicting use of property along the SR-103 alignment as a rail facility; and source of funding for a new bridge.

At the 5:30 Scoping Meeting, concerns were expressed regarding the Dominguez and Lincoln residential communities in the City of Carson, specifically truck traffic, air quality, and businesses along Alameda Street; Port growth; exit ramps from the proposed expressway; impacts to traffic on Pacific Coast Highway; funding of the expressway;

potential connection to eastbound Highway 91; and ability of the public to propose additional alternatives to the proposed project.

Based upon the comment letters received from Latham & Watkins, PCR Services Corporation, and representatives from Watson Land Company, additional public noticing and commenting opportunities were provided to clarify the project alternatives and study area. An additional display ad was advertised in the *California Crusader News* from February 24, 2005, through March 2, 2005.

6.1.3 Scoping Comments

Scoping comments received in letters from agencies and other interested parties are summarized in Table 6-1. As shown in the table, the major concerns were traffic, air quality, and community health. Other concerns included the peregrine falcon, project visibility (aesthetics), and public notification of the proposed project.

Major traffic concerns include the potential for an increase in truck traffic and for the expressway to become a high-speed freeway for truck traffic. Air quality issues include concerns that the combination of diesel fumes from trucks and trains will cause air quality to fall below safe levels for residents in the City of Carson. Other community health issues include concerns regarding pedestrian safety, and an increase in noise.

6.1.4 Areas of Interest

The following areas of interest were raised in comments received in response to the NOI or comments submitted to the project team during the course of the environmental evaluation:

- **Marine Vessel Detours and Economic Impacts**. The proposed replacement bridge is designed for a fixed vertical clearance of 14.3 m (47 ft). Potential adverse effects could occur with respect to marine vessels traveling in Cerritos Channel that are too tall to clear the 14.3-m (47-ft) vertical limit. Such vessels would be required to detour through the outer harbor, with a consequent economic impact.
- **Historic Schuyler Heim Bridge Property**. The existing Schuyler Heim Bridge is considered eligible for listing in the National Register of Historic Places and the California Register of Historic Resources. Demolition of the existing bridge or obstruction of views of the existing bridge behind the replacement bridge would constitute a substantial change in the significance of a historical resource.
- **Pier S and Pier A Property Acquisitions**. Property acquisitions required in areas of Pier S and Pier A would alter the planned physical layout and operation of the Pier S and Pier A Terminals, which are operated by the Port of Long Beach.
- **Health Risk Concerns. Toxic Air Contaminants**. Health risk concerns are related to the increased diesel truck traffic in proximity to the Wilmington community as a result of the expressway.
- **Community Concerns.** Numerous comments have been raised by various community groups in the Wilmington area in opposition to the project. These relate to redirection of truck traffic closer to the Wilmington area, with resulting air emissions, noise, light and glare, and traffic issues, and concern for the effects to the aesthetics of the commercial and residential neighborhood.

Table 6-1
Scoping Comments Received

Letter From	Date of Letter	Comment
Environmental Protection Agency, Region IX NEPA Office	9-Sept-04	1. Commenter had questions regarding the scoping effort.
		2. Commenter requested to be contacted regarding questions about EPA requirements.
United States Fish and Wildlife Service (USFWS) Carlsbad	20-Sept-04	1. Commenter had questions about peregrine falcons (that roost at Schuyler Heim Bridge), and the Cerritos Channel relative to the footprint of the new piers.
	21-Sept-04	1. Pier and abutment fills in the channel would need to be consistent with the Ports/USFWS mitigation agreement.
		2. Compliance with CDFG requirements for the peregrine falcons would satisfy concerns of the USFWS in regard to MBTA.
Los Angeles Unified School District	21-Sep-04	1. Concern that the project will negatively impact pedestrian routes for students attending Wilmington Park Elementary School.
City of Carson	29-Sep-04	1. The effect of the elevated expressway on the health and well-being of Carson residents and businesses on or near the Alameda Corridor.
		2. Concern about air quality (particularly PM10 and PM 2.5) related to additional truck traffic and associated diesel emissions.
		3. The project would disrupt existing street circulation feeding onto Alameda Street.
		4. The project would disrupt vehicle and pedestrian flow between local neighborhoods and create another barrier toward isolating the East Carson community.
		5. The project would impact the health of east Carson residents, result in increased noise and pollution levels, disrupt small businesses along Alameda Street, decrease property values, result impacts to traffic circulation patterns, and create safety issues.
		6. Caltrans should consider alternatives, including the no-build alternative, connect rail lines directly to the ports, other methods of container/goods deliveries, and alternative truck routes.

Table 6-1
Scoping Comments Received

Letter From	Date of Letter	Comment
United States Coast Guard	28-Feb-06	1. A bridge over navigable waters of the U.S. may only exist by virtue of a federal permit. When no longer used for the permitted purpose of providing for land transportation, a bridge is no longer in compliance with its permit and shall be removed from the waterway, by and at the expense of the bridge owner. Therefore, if the proposed Schuyler Heim Drawbridge replacement, is permitted, the requirement to remove all parts of the existing bridge, not used in the replacement bridge, would be included as a condition in the federal permit for the replacement bridge.
Dominguez Area Property Owners Association	13-Sep-04	1. Opposition to any changes to SR-47 that would result in increased truck traffic on Alameda Street. 2. Concern about effects to air quality from diesel fumes from trucks and trains. 3. Concern about the amount of noise generated by trucks and trains. 4. Project plans for most of the trucks to exit Alameda Street at the I-405 or 91 freeway would result in gridlock.
Wilmington Neighborhood Council Transportation Committee	27-Sep-04	1. Commenter expressed concern that truck traffic could be redirected to local streets at terminus of expressway south of Pacific Coast Highway PCH). Commenter suggested: – Reconfiguring the PCH/Alameda Street/SR-47 intersection to prevent trucks from turning west onto PCH. – Evaluate relative to Port Transportation Master Plan objective to direct all truck traffic around the community of Wilmington. 2. Support pilings of expressway crossover at Henry Ford Avenue could impact Leeward Bay Marina. Commenter suggested: – Keep marina intact. – During construction, provide unobstructed and clearly marked detours at Henry Ford Avenue which provides the only entrance/exit to eleven (11) Wilmington marinas. 3. The project would have aesthetic impact to business and residential areas between Anaheim Street and PCH by an increase in truck traffic. Commenter suggested: – The project included landscaping (decorative fencing, trees, vines, shrubs) and energy-efficient, non-glare, overhead light fixtures.
Latham & Watkins LLP	29-Sep-04	1. The project could involve property several miles from the project boundary provided in the NOI/NOP. 2. Commenter asserted that public notice of the project has been inadequate.

Table 6-1
Scoping Comments Received

Letter From	Date of Letter	Comment
Jody Jones	30-Sep-04	1. The project will impact the quality of life of those who live in the Harbor communities. 2. Decisions related to port expansion should be weighed with regard to effects on the community's health.
PCR Services Corporation	30-Sep-04	1. Commenter asserted that an alternative alignment would begin more than 1 mile northeast of the Pacific Coast Highway terminus of the proposed project and terminate 2 miles to the north. – As a result, the commenter asserted that the NOI/NOP was inadequate in informing the public or affected property owners of the locations of significant possible improvements under the proposed project and therefore, of the likely distribution of associated impacts. 2. Commenter asserted that the extension of SR-103 Extension to Alameda Street alternative could cost twice as much as the SR-47 Expressway. 3. Commenter asserted that construction impacts will be greater with the SR-103 Extension alternative than with the SR-47 Expressway. 4. The SR-103 Extension alternative would result in serious disruption to ICTF operations.
Verbal Comment From	**Date of Comment**	**Comment**
U.S. Environmental Protection Agency: Liz Varnhagen	09-Sep-04	1. Commenter had questions regarding the scoping effort. 2. Commenter requested to be contacted regarding questions about EPA requirements.
U.S. Fish and Wildlife Service:	20-Sep-04	1. Commenter had questions about peregrine falcons (that roost on the Schuyler Heim Bridge), and the Cerritos Channel relative to the footprint of the new piers.
Jonathon Snyder	21-Sep-04	1. Commenter stated that pier and abutment fills in the channel would need to be consistent with the Ports/USFWS mitigation agreement. 2. Commenter stated that compliance with CDFG requirements for the peregrine falcons would satisfy concerns of the USFWS in regard to MBTA.

6.2 Ongoing Public Involvement

Additional public involvement occurred with the circulation period for the Draft EIS/EIR to agencies and the public, submittal of comments on the document, and public hearing on the Draft EIS/EIR, held September 25, 2007. After the public circulation period, all comments were considered and received written responses. This Final EIS/EIR addresses public comments on the Draft EIS/EIR and includes the Caltrans preferred alternative and the final determination of the project's effect on the environment.

In accordance with CEQA, Caltrans will certify that the project complies with CEQA, prepare findings for all significant impacts identified, prepare a Statement of Overriding Considerations for impacts that cannot be mitigated below a level of significance, and certify that the findings and Statement of Overriding Considerations have been considered prior to project approval. Caltrans will then file a Notice of Determination with the State Clearinghouse that will identify whether or not: the selected project alternative will have significant impacts, mitigation measures were included as conditions of project approval, findings were made, and a Statement of Overriding Considerations was adopted.

In accordance with NEPA, and based on the information provided in the Final EIS/EIR, Caltrans has identified a preferred alternative and will issue a Record of Decision (ROD) to notify the public of the selected alternative and the reasons for that decision.

6.3 Agency Coordination

Below is a list of federal, state, and regional agencies and individuals who were consulted during the scoping process and contributed information for inclusion in the text and/or technical reports prepared in conjunction with the EIS/EIR. Coordination with federal, state, and regional agencies will continue prior to and during construction of the project, as appropriate, to ensure that impacts identified in the EIS/EIR are minimized and properly mitigated.

6.3.1 Federal Agencies

National Marine Fisheries Services
United States Coast Guard
United States Army Corp of Engineers
United States Fish and Wildlife
United States Environmental Protection Agency

6.3.2 State Agencies

California Department of Fish and Game
California Department of Conservation, Division of Oil and Gas, District 2
California Regional Water Quality Control Board, Los Angeles, Region 4
California State Parks and Recreation
California Transportation Commission
California Coastal Commission
Department of Toxic Substances Control, Cypress office
State Historic Preservation Office

6.3.3 Regional Agencies

Metropolitan Transportation Authority
Southern California Association of Governments
South Coast Air Quality Management District

6.3.4 Local Agencies

City of Carson
City of Carson, Department of Health
City of Commerce, Department of Health and Services, Public Health Investigation
City of Los Angeles
City of Los Angeles, Department of Building and Safety
City of Los Angeles, Bureau of Sanitation, Industrial Waste Management Division
City of Long Beach
City of Long Beach, Department of Health, Hazardous Materials
City of Long Beach Department of Health and Human Services
Long Beach Parks, Recreation and Marine
Long Beach Unified School District
Los Angeles City Fire Department

6.3.5 Tribal (Section 106)

Native American Consultation

In accordance with Section 106 of the National Historic Preservation Act, a request was made to the NAHC for a review of the *Sacred Lands Inventory* to determine if any known cultural properties are present within or adjacent to the project Area of Potential Effect. (APE). The NAHC responded, stating that no Native American cultural resources are known to exist within or adjacent to the project APE. In addition, the NAHC provided a list of Native American groups and individuals for further consultation.

During the period of May through June 2002, the project solicited information and comments regarding cultural resources in the Schuyler Heim Bridge project area from local governments, public and private organizations, and other parties likely to have knowledge of or concerns about such resources, as described in the *Negative Archaeological Survey Report* (NASR, 2002). Letters requesting information were sent to the following:

- The Gabrielino/Tongva Tribal Council of the Gabrielino Tongva Nation
- The Los Angeles City/County Native American Indian Commission
- Ms. Cindi Alvitre, Ti'At Society
- Mr. John Jeffredo, Island Gabrielino Group
- Mr. Robert Dorame, Gabrielino Tongva Indians of California Tribal Council
- Mr. Anthony Morales, Gabrielino/Tongva Tribal Council
- Mr. Jim Velasques
- Mr. Samuel Dunlap
- Mr. John Valenzuela
- Mr. Craig Torres
- Mr. Alfred Valenzuela
- Ms. Angela Louise Lassos-Sanchez

A second round of consultation with the NAHC for the SR-103 Extension to Alameda Street was conducted in 2004; the NAHC again responded, stating that no Native American cultural resources are known to exist within or adjacent to the APE for the SR-103 Extension. On October 19, 2004, the following groups and individuals were again contacted regarding the SR-103 portion of the project:

- The Gabrielino/Tongva Tribal Council of the Gabrielino Tongva Nation
- The Los Angeles City/County Native American Indian Commission
- Ms. Cindi Alvitre, Ti'At Society
- Mr. Robert Dorame, Gabrielino Tongva Indians of California Tribal Council
- Mr. Anthony Morales, Gabrielino/Tongva Tribal Council
- Mr. Jim Velasques
- Mr. Samuel Dunlap
- Mr. Craig Torres
- Mr. John Tomy Rosas, Gabrielino Tongva Indians of California Tribal Council
- Ms. Susan Frank, Gabrielino Band of Mission Indians of California
- Mercedes Dorame, Gabrielino Tongva Indians of California Tribal Council

No response from these individuals or organizations was received following consultation.

6.3.6 Other Coordination Activities

In addition to the above, during project design and development, there have been ongoing coordination meetings between ACTA, ACET, the Port of Long Beach, and the Port of Los Angeles. These meetings have addressed environmental and engineering issues associated with the proposed project alternatives to assure that the project does not interfere with ongoing operations and planned development at the ports.

Also, the Project Development Team (PDT) conducts monthly coordination meetings to address design issues of all the alternatives in accordance with the needs of the various entities. Agencies in attendance at the PDT meetings include ACET, ACTA, representatives from Caltrans headquarters and Caltrans District 7, City of Carson, Federal Highway Administration, City of Los Angeles Department of Transportation, POLA and POLB.

6.3.7 Professional Contacts

Peregrine Falcon Monitor: Carl G. Thelander, assisted by Jeff Sipple
Project Consultant: Kathy Keane

6.4 Project Design and Development

In addition to the above, during project design and development, there have been ongoing coordination meetings with the Port of Long Beach, ACTA, and ACET. These meetings have addressed environmental and engineering issues associated with the proposed project alternatives to assure that the project does not interfere with ongoing operations and planned development at the ports, particularly at Pier S, Pier A, and Pier T. As a result of these meetings, the project alternatives have been designed to accommodate the interests of the ports and the pier operators. At Pier S, the issues addressed include, but are not limited to, advance planning for potential effects to the existing oil wells near Cerritos Channel, avoidance of the remediation cells, and compensation for loss of vehicular and equipment

parking space. At Pier A, the SR-47 Expressway has been designed so the support columns avoid the operations buildings and avoid the alignment of a planned tunnel under SR-47. In addition, the design of the project alternatives is consistent with planned development at Pier A and Pier S. At Pier T, elements of project alternatives south of the Schuyler Heim Bridge and along Ocean Avenue, including the flyover, have been designed to avoid impacts to existing and future terminal operations.

6.5 Draft EIS/EIR

6.5.1 Notice of Completion and Notice of Availability

A Notice of Completion was prepared and submitted to the California State Office of Planning and Research (State Clearinghouse) pursuant to CEQA. The 60-day public review period for the Draft EIS/EIR was specified in the notice as beginning on August 17, 2007, and ending October 16, 2007.

A Notice of Availability (NOA)/Notice of Public Meeting also was prepared and issued on August 17, 2007. The NOA was published in the Federal Register on Friday, August 24, 2007. The Notice of Completion and NOA are provided in Appendix J.1.

6.5.2 Public Circulation of Draft EIS/EIR

6.5.2.1 Public Comment Period

The Draft EIS/EIR and Notice of Completion stated that additional public involvement for the Draft EIS/EIR would include a 60-day circulation period for the document to agencies and the public, submittal of comments on the document, and a public hearing. In response to public input, Caltrans distributed a letter, dated October 15, 2007, which extended the comment period beyond the 60 days, until early November, for those who requested an extension. A copy of this letter is provided in Appendix J.2.

Additionally, although not required by state and federal regulation, informal comments and responses were handled by telephone and written documentation between Caltrans, ACTA, and members of the public during the extended comment period.

6.5.2.2 Public Outreach

Letters announcing the availability of the Draft EIS/EIR and public hearing (Notice of Availability/Notice of Public Hearing) were sent to approximately 561 elected officials, federal, state, regional, and local agencies, local school districts, and interested individuals. The letter provided a summary of the proposed project, details about the public comment period and public hearing, a description of the property involved, and potential significant impacts. In addition, the letter provided the names and addresses of the libraries and other locations where the Draft EIS/EIR and technical reports were available for review, plus Caltrans and ACTA websites where the Draft EIS/EIR could be viewed. Information regarding the purchase of CDs or hard copies of the Draft EIS/EIR and technical reports also was provided. Advertisements of the public hearing for the draft document were published in the following local newspapers on August 17, 2007, and again on September 15, 2007:

- Los Angeles Times (in the main news section)
- Long Beach Press-Telegram

- Daily Breeze
- Watts Times (August 23, 2007, and September 17, 2007)
- La Opinion (in Spanish) (see Appendix J.3)

The newspaper advertisements described the project and the time and place of the public hearing and were published in English and Spanish. The advertisement was placed in newspapers covering the project area (see Appendix J.3). The advertisement was in a clear, easy-to-read format and published as a 3 ½ X 9 ½-inch column. The advertisement provided a map and a brief synopsis of the project alternatives and encouraged attendance at the public hearing. The advertisement also encouraged the public to submit written comments before or after the public hearing and no later than October 16, 2007. The advertisement also identified 11 locations where copies of the Draft EIS/EIR and technical studies could be reviewed, including nine libraries in Carson, Compton, East Rancho Dominguez, Harbor City, San Pedro, Wilmington and Long Beach, Caltrans District 7 Headquarters and the Alameda Corridor Transportation Authority (ACTA). The advertisement also provided a website for accessing the Draft EIS/EIR and other project information, and a telephone contact at Caltrans District 7.

In addition to the above, flyers describing the project were distributed to homes and businesses in the vicinity of project Alternative 1 and Alternative 2. The flyers were distributed through an agency (South Bay Vocational Center) in Harbor City. A copy of the flyer and a map of the distribution area are provided in Appendix J.4.

6.5.3 Public Hearing

6.5.3.1 Overview

The public hearing for the project was held at Banning's Landing, on September 25, 2007, beginning at 6:00 p.m. Attendance at the public hearing was 62 people having signed in. Upon arrival, members of the public were asked to sign in and then were directed to the map viewing area, where they were greeted by a team of Caltrans staff and consultants. The map viewing area provided the public with an opportunity to view the maps of the various alternatives, as well as an opportunity to have their questions and concerns addressed one-on-one by Caltrans staff and project consultants. In addition, Caltrans had on display models of the proposed designs for a new fixed-span bridge to replace the existing Schuyler Heim Bridge.

The public then was directed to the main area for the formal portion of the public hearing, which consisted of a presentation by Caltrans followed by the public comment period. The complete transcript of the public hearing is provided in Appendix K. The public hearing provided the opportunity for more than 20 persons to speak. Both Spanish and Tagalog (Pilipino dialect) translators were present for simultaneous translation of the proceedings. For those in attendance who required Spanish or Pilipino interpretation, headsets were available with which to listen to simultaneous translation of the public hearing.

In an effort to disseminate complete project information and to encourage public comment on the Draft EIS/EIR, Caltrans and the consultant team made available to the public a comprehensive set of public information materials. These materials were available at the sign-in area and are provided in Appendix J.5:

- Sign-in sheet
- Meeting agenda
- Fact sheet
- Comment cards

Hard copies of the Draft EIS/EIR also were available.

6.5.3.2 Public Comments and Responses

The public hearing included an open forum for individuals to come to the microphone to comment on the Draft EIS/EIR. Attendees completed comment cards and indicated if they would like to speak. Each attendee who requested to speak was called to the microphone, and the comments were recorded in the hearing transcript. Table 6-2 provides a summary of oral comments provided by the public. The table includes the comment number and transcript page where the entire comment and response appear. The public hearing transcript is provided in its entirety in Appendix K. Table 6-3 provides a summary of comments from the comment cards. The comment cards are provided in their entirety in Appendix K. The comment numbers shown on the table are the same as on the transcript and comment cards in Appendix K. Table 6-4 provides a summary of other comments and responses.

Table 6-2
Draft EIS/EIR Comments
Public Hearing Transcripts Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
Jim Dear	Mayor, City of Carson	TR1-1	Project will impact the city greatly but would likely be supported if adequate mitigation measures are taken into consideration to protect the community.
		TR1-2	Address noise impacts on Carson residents east of Alameda Street and north of I-405.
		TR1-3	Draft EIS/EIR must identify appropriate noise mitigation measures.
		TR1-4	Employ local people to work on project.
		TR1-5	Does not support Alternative 2. Supports Alternative 1.
		TR1-6	Address noise impacts from increased traffic on residential community east of Alameda Street.
		TR1-7	Include mitigation measures for noise impacts to residences, churches, and schools east of Alameda Street.
		TR1-8	Additional investigations are required regarding environmental justice issues, resulting from noise impacts on residents along Alameda Street.
		TR1-9	Address noise impacts to residents east of Alameda Street resulting from traffic increases along Alameda Street, north of the I-405.
Sheri Repp-Loadsman	City of Carson	TR1-10	Need sound wall to protect residents east of Alameda Street.
		TR1-11	Traffic impacts on Alameda north of I-405 are underestimated.
Dan Hoffman	Wilmington Chamber of Commerce	TR1-12	Project would improve movement of traffic and access to and from Terminal Island.
		TR1-13	Concerned that northbound traffic, based on Alternative 1, may enter the Wilmington community.
Elizabeth Warren	FuturePorts	TR1-14	Supports Alternative 1 of the proposed project.

Table 6-2
Draft EIS/EIR Comments
Public Hearing Transcripts Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
Larry Keller	International Business Association of the Long Beach Chamber of Commerce	TR1-15	Supports Alternative 1 of the proposed project.
		TR1-16	Supports any of the mitigations requested by the City of Carson regarding quality of life issues on the east side.
Jesse Marquez	Coalition for a Safe Environment	TR1-17	Opposes proposed project.
		TR1-18	Wants movement of goods to be done in an efficient, clean, green, nonpolluting way that causes no public harm-not via trucks.
Melissa Lin Perrella	Natural Resources Defense Council	TR1-19	Relation of project to port growth and associated air quality impacts.
		TR1-20	EIS/EIR should analyze impacts from project's potential cause of port growth.
		TR1-21	Questions traffic emission estimates in Draft EIS/EIR.
		TR1-22	Draft EIS/EIR fails to address climate changes.
		TR1-23	Urges revised draft of EIS/EIR to analyze environmental and public health impacts.
Donna Ellington	WNC and PCAC	TR1-24	Concerned that Alternative 1 removes many properties from Wilmington.
		TR1-25	Concerned about cumulative traffic impacts.
		TR1-26	Concerned that project would eliminate property taxes, businesses, and employment in Wilmington.
Hudson Warren	Foreign Trade Association and Propeller Club of Long Beach	TR1-27	Supports Alternative 1.

Table 6-2
Draft EIS/EIR Comments
Public Hearing Transcripts Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
Colleen Callahan	American Lung Association of California	TR1-28	Critical that Draft EIS/EIR analyze the project's environmental and public health impacts.
		TR1-29	Concerned that project would increase traffic, which she believes Draft EIS/EIR does not address.
Richard Garland	City of Carson	TR1-30	Questions traffic projections indicating a reduction in automobile traffic volume on Alameda Street and requests reevaluation of forecast.
		TR1-31	Noise impacts could be reassessed following reevaluation of traffic modeling forecast.
Andrea Hricko	Keck School of Medicine, University of Southern California	TR1-32	Need to present traffic volumes in understandable way for layperson.
		TR1-33	Explain in greater detail the estimates regarding the number of trucks being taken off I-710 Freeway.
		TR1-34	Freeway proximity and adverse health impacts should be incorporated into the Draft EIS/EIR.
		TR1-35	M-7 analysis stating that there would be slightly higher mobile source air toxic emissions should also provide estimates of health effects.
		TR1-36	Questions how building the Heim Bridge and SR-47 Expressway would result in lower VMT than current situation.
		TR1-37	Where is the evidence in the Draft EIS/EIR showing that congestion will be reduced in the long-term?
		TR1-38	Draft EIS/EIR should be redone and recirculated or an extension given for the submittal of public comments.
Robert Peral	Leeward Bay Marina	TR1-39	Supports Alternative 2.
		TR1-40	Concerned that bridge would divert water flow into the marina.

Table 6-2
Draft EIS/EIR Comments
Public Hearing Transcripts Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
		TR1-41	Worried that one bridge will not be sufficient and people in the marinas will be trapped, and emergency services will be unable to get in.
Marie Castle	Drawbridge Operator	TR1-42	Extension at the Alameda to I-405 is a good idea.
		TR1-43	Effects of new bridge on marine traffic.
		TR1-44	Harbor needs the bridge as a lift span, not as expanded.
Ray Park	Dominguez Area Property Owners Association	TR1-45	Draft EIS/EIR states there will be no environmental impacts at PCH and Alameda but in the next sentence states that trucks will drive all the way to the SR-91 Freeway.
		TR1-46	Draft EIS/EIR needs to include mitigation measures pertaining to noise and air quality for residents of the Dominguez Lincoln Village area.
Bill Gaskill	Carson Resident	TR1-47	Wants to see nonmotorized traffic routes addressed relating to the bridge.
		TR1-48	Too many signals proposed for the transition between Alameda Street and the southbound I-405.
Pilar Hoyos	Watson Land Company	TR1-49	Supports Alternative 1 and opposes Alternative 2.
		TR1-50	Reiterates the need to mitigate potential impacts on residential areas.
William Lyte	Harbor Association of Industry and Commerce	TR1-51	Supports Alternative 1.
Alex Pugh	Los Angeles Chamber of Commerce	TR1-52	Supports Alternative 1.
Juan Carmona	Coalition for a Safe Environment	TR1-53	Clarify project funding.
		TR1-54	Who benefits most from the proposed project?
		TR1-55	Will subsidence be a continuing problem for the Schuyler Heim Bridge?

Table 6-2
Draft EIS/EIR Comments
Public Hearing Transcripts Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
		TR1-56	The community does not want the visual effects, noise, odor or air quality impacts associated with the bridge.
Andrea Hricko	Keck School of Medicine, University of Southern California	TR1-57	Were there any notices given to the residents of the most impacted areas?
		TR1-58	Questions a table in air quality technical study that shows total daily traffic volume in millions of vehicles, and that shows no increase in number of vehicles going across bridge from 2003-2011.
		TR1-59	Will there be an extension for public comments?
		TR1-60	Is there someone the public could talk to regarding the traffic analyses or data, following the public hearing?

Table 6-3
Draft EIS/EIR Comments
Comment Cards Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
Jim Dear	Mayor, City of Carson	CC1-1	Request to speak.
		CC1-2	Project-related impacts to City of Carson.
Harold Williams	City of Carson Council Member	CC2-1	Request to speak.
		CC2-2	Project-related impacts to City of Carson.
Sheri Repp	City of Carson Planning Manager	CC3-1	Request to speak.
		CC3-2	Project-related impacts to City of Carson.
Dan Hoffman	Wilmington Chamber of Commerce	CC4-1	Request to speak.
		CC4-2	In support of project.
Elizabeth Warren	FuturePorts	CC5-1	Request to speak.
		CC5-2	Supports project.
Larry Keller	Long Beach International Business Association	CC6-1	Request to speak.
		CC6-2	In favor of project.
Jesse N. Marquez	Coalition for a Safe Environment	CC7-1	Request to be added to mailing list.
		CC7-2	Request to have comment filed in the record.
		CC7-3	Request to speak.
		CC7-4	Opposes project as proposed.

Table 6-3
Draft EIS/EIR Comments
Comment Cards Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
		CC7-5	Recommends that alternative technologies be used to transport cargo.
Melissa Lin Perella	Natural Resources Defense Council	CC8-1	Request to speak.
		CC8-2	Address potential for project to result in additional port growth.
		CC8-3	Address climate change impacts.
		CC8-4	Re-do analysis or explain why DEIR predicts reduction in vehicle/truck emissions.
Donna Ellington	WNC and PCAC	CC9-1	Request to speak.
Hudson Warren	Propeller Club of LA/Long Beach and Foreign Trade Association of So. Cal.	CC10-1	Request to be added to mailing list.
		CC10-2	Request to speak.
		CC10-3	Request to speak on behalf of the organizations he represents.
Colleen Callahan	American Lung Association of CA	CC11-1	Request to speak.
		CC11-2	Concerned with health issues of proposed project.
Richard Garland	City of Carson	CC12-1	Request to speak.
		CC12-2	Questions auto traffic projections regarding the “with project” and “without project” scenarios as the “with project” scenario shows fewer vehicles.
Andrea Hricko	Keck School of Medicine, University of Southern California	CC13-1	Request to speak.
Robert Perel	Leeward Bay Marina	CC14-1	Request to be added to mailing list.
		CC14-2	Request to have comment filed in the record.

Table 6-3
Draft EIS/EIR Comments
Comment Cards Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
		CC14-3	Request to speak.
		CC14-4	Effects of bridge support in the Consolidated Slip on water flow into and out of the marina.
Marie Castle	Draw Bridge Operator	CC15-1	Request to speak.
		CC15-2	Is opposed to the fixed bridge and would prefer a movable bridge.
Ray Park	Dominguez Area Property Owners Association	CC16-1	Request to be added to mailing list.
		CC16-2	Request to have comment filed in the record.
		CC16-3	Lack of mitigation for residents living north of the I-405.
Bill Gaskill	Carson Resident	CC17-1	Request to speak.
Pilar Hoyos	Watson Land Company	CC18-1	Request to be added to mailing list.
		CC18-2	Request to have comment filed in the record.
		CC18-3	Request to speak.
		CC18-4	Supports Alternative 1 and opposes Alternative 2.
		CC18-5	Sensitivity to mitigation of noise and visual impacts on residential area north of I-405 Freeway. Suggests soundwall/landscape screening to mitigate these impacts on residential area.
William Lyte	Harbor Association	CC19-1	Request to speak.
		CC19-2	Supports Alternative 1 because it is most cost-effective, it replaces Heim bridge, and it gives direct access to and from Terminal Island, enhancing emergency services' response times.
Alex Pugh	LA Chamber of Commerce	CC20-1	Request to speak.

Table 6-3
Draft EIS/EIR Comments
Comment Cards Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
Juan Carmona	Coalition for a Safe Environment	CC21-1	Request to be added to mailing list.
		CC21-2	Request to speak.
		CC21-3	General monetary questions regarding project, such as who benefits and who pays.
Andrea Hricko	Keck School of Medicine, University of Southern California	CC22-1	Were residents near Henry Ford Avenue and Alameda notified for the public hearing?
		CC22-2	Will an extension of the public comment period be granted?
		CC22-3	Table 1 in the air quality report is confusing.
Jesse N. Marquez	Coalition for a Safe Environment	CC23-1	Request to be added to mailing list.
		CC23-2	Request to have comment filed in the record.
		CC23-3	Requests 90 day extension of the public comment period.
Zak Gonzalez	City of Carson	CC24-1	Please provide copy of noise analysis.
Susan Prichard	Wilmington	CC25-1	Request to have comment filed in the record.
		CC25-2	Supports both Alternatives 1 and 2.
		CC25-3	Wilmington Park School needs to be considered.
		CC25-4	Families in the area of the SR-47 Expressway need to be considered.
		CC25-5	Trucks should be smog-checked monthly and tires should be checked regularly too.
		CC25-6	When is Alameda between Henry Ford Ave. and Anaheim to be repaved?

Table 6-4
Draft EIS/EIR Comments
Other Comments and Responses

Commenter	Affiliation	Major Comments/Areas of Interest	Response to Comments
Unknown	Unknown	When was the last time the bridge was painted?	The entire bridge was last painted in 1978. One span of the southern approach was painted in 1999/2000.
Unknown	AQMD	Where does the Draft EIS/EIR discuss funding relating to transportation conformity?	Funding information is provided in the Summary (S-7 Project Funding) of the Draft EIS/EIR.

6.6 Draft Supplemental Environmental Impact Statement/ Recirculated Draft Environmental Impact Report

As a result of the comments received after the public review period for the Draft EIS/EIR, the ACTA Board, as a Responsible Agency under CEQA, directed its staff to conduct a Health Risk Assessment (HRA). In response to this new report, Caltrans arranged for a review and analysis of ACTA's HRA by the University of California Davis (UCD).

It was determined that for this particular project, the results of ACTA's HRA study and the UCD analysis comprise significant new information. Caltrans, as the Lead Agency, made the decision to disclose this new information to the public by preparing and circulating a Draft Supplemental Environmental Impact Statement/Recirculated Draft Environmental Impact Report (SDEIS/RDEIR). The CEQA Guidelines (15088.5[c]) allow for the lead agency to recirculate an environmental document that has been modified and address the new information that is the basis for the recirculation. Under FHWA regulation 23 CFR 771.130[a(2)], a draft EIS may be supplemented if there is new information relevant to environmental concerns. This SDEIS/RDEIR only included sections from Chapter 3.0, the Air Quality (3.13) and Community Resources (3.3.3) sections, and portions of other chapters (Chapter 4.0, CEQA Evaluation; and Chapter 5.0, Cumulative Impacts) that were modified as the result of the new information.

6.6.1 SDEIS/RDEIR Public Comment Period

A Notice of Completion was prepared and submitted to the California State Office of Planning and Research (State Clearinghouse) pursuant to CEQA. The 45-day public review period for the Draft EIS/EIR was specified in the notice as beginning on November 21, 2008, and ending January 5, 2009.

The Notice of Availability (NOA) for the SDEIS/RDEIR was published in the Federal Register on Friday, November 21, 2008.

The public was provided with a 45-day review period of the SDEIS/RDEIR, beginning the day the NOA was published in the Federal Register. The 45-day public review period for the SDEIS/RDEIR was specified in the notice as beginning on November 28, 2008, and ending January 12, 2009. This period was extended to January 30, 2008, upon request. Caltrans did, however, respond to comment letters received by February 13, 2009.

Reviewers were requested to limit their comments to only information provided in the SDEIS/RDEIR. Comments received on the SDEIS/RDEIR were responded to and these responses are provided in this Final EIS/EIR along with the responses to comments on the original Draft EIS/EIR. It should be noted that all responses to the public comments on HRA or its discussions were provided by ACTA.

6.6.2 SDEIS/RDEIR Public Outreach

Letters announcing the availability and copies of the SDEIS/RDEIR were sent to officials, federal, state, regional, and local agencies, local school districts, and interested individuals. The mailing was completed on Wednesday, November 19, 2008. The document was distributed to 11 libraries on Wednesday, November 19, 2008. Flyers in English and Spanish were delivered on Friday, November 21, 2008, to the residential and commercial areas adjacent to the Project.

Public notices were published in the following newspapers:

- Los Angeles Times
- Long Beach Press-Telegram
- Daily Breeze
- Watts Times
- La Opinion

An electronic downloadable PDF version of the SDEIS/RDEIR was posted on the ACTA website.

The revisions in the sections listed above were included in this Final EIS/EIR following receipt of comments on the SDEIS/RDEIR. The responses to this set of comments received on the SDEIS/RDEIR are included at the end of this section.

6.6.3 Public Hearing

6.6.3.1 Overview

ACTA conducted a public meeting on January 27, 2009, at Banning's Landing. A notice of the pubic meeting was published in the newspaper, and a flyer was distributed to inform the community of the meeting. The meeting was attended by the local community, including residents and interested parties. Prior to the public meeting on January 27, 2009, representatives met with the current residents of the affected properties.

6.6.3.2 Public Comments and Responses

The public hearing included an open forum for individuals to come to the microphone to comment on the SDEIS/RDEIR. Attendees completed comment cards and indicated if they would like to speak. Each attendee who requested to speak was called to the microphone, and the comments were recorded in the hearing transcript. A summary of the transcripts comments is included in Table 6-5. A summary of the comment cards is included in Table 6-6. The transcripts of the meeting and comment cards are included in Appendix K with respective responses.

Table 6-5
SDEIS/RDEIR Comments
Public Hearing Transcripts Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
Bill Walles for Anthony Misetich	Harbor Association of Industry and Commerce	TR2-1	Supports Schuyler Heim Bridge Replacement and SR-47 Expressway Project.
Bill Walles	Technoplex Group	TR2-2	Supports Schuyler Heim Bridge Replacement and SR-47 Expressway Project.
John Cross	West Long Beach Association	TR2-3	Questions traffic study assumptions.
		TR2-4	Utility bills should be paid for the eight homes to be retrofitted with HVAC.
		TR2-5	Questions traffic study assumptions.
Dan Hoffman	Wilmington Chamber of Commerce	TR2-6	Supports project because it creates jobs.
		TR2-7	Supports project because of traffic benefits to local residents.
Elizabeth Warren	FuturePorts	TR2-8	In support of project.
Andrea Hricko	Keck School of Medicine, University of Southern California	TR2-9	Questions if project would divert truck traffic from local streets and reduce truck traffic on surface streets.
		TR2-10	ICTF is full and cannot handle anymore trucks unless it expands.
		TR2-11	Concerned HRA does not adequately account for trucks going to the SCIG.
		TR2-12	Questions traffic study assumptions.
		TR2-13	Questions traffic study assumptions and states that HRA should be redone.
		TR2-14	Has no confidence in HRA because of error in traffic data.
Alfred Carrillo	Pastor and Resident	TR2-15	Concerned about health risks to children playing outside and at Wilmington Park Elementary School.

Table 6-5
SDEIS/RDEIR Comments
Public Hearing Transcripts Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
Joan Greenwood	Wrigley Area Neighborhood Alliance	TR2-16	Supports Alternative 1.
		TR2-17	HRAs are a valuable tool for ranking alternatives
		TR2-18	Supports Alternative 1 with reservations about the mitigation.
David Pettit	Natural Resources Defense Council	TR2-19	Questions HRA conclusions regarding affected residences.
		TR2-20	The project's health risk impacts will depress property values.
		TR2-21	Questions the confidence of the conclusions of the HRA.
		TR2-22	Traffic assumptions in the traffic study are different than in the HRA.
		TR2-23	HRA does not account for truck trips moving from SR-103 to SR-47.
		TR2-24	Questions assumptions made about future truck trip distribution.
		TR2-25	Traffic assumptions make the HRA unreliable.
		TR2-26	Questions conclusions of the HRA.
Marie Castle	Caltrans Bridge Operator	TR2-27	Concerned about congestion at Ocean Boulevard and SR-47.
		TR2-28	Bridge replacement would result in extra pollution of tugs and barges and more congestion and accidents in the outer harbor.
Alex Pugh	Los Angeles Area Chamber of Commerce	TR2-29	Supports Alternative 1.
Elena Rodriguez-Gutierrez	Long Beach Alliance for Children with Asthma	TR2-30	Concerned about project effects to children.
		TR2-31	Concerned project will depress property values.

Table 6-5
SDEIS/RDEIR Comments
Public Hearing Transcripts Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
Elina Green	Long Beach Alliance for Children with Asthma	TR2-32	Concerned about project health risks to schools in west Long Beach.
		TR2-33	Questions why the project does not just fix bridge efficiency.
		TR2-34	Should look into feasibility of on-dock railway.
		TR2-35	Questions project benefits for the community.
		TR2-36	HRA does not include evaluation of asthma, decreased lung function, or mortality and other health impacts.
Jesse Marquez	Coalition for a Safe Environment	TR2-37	How many feet away from the expressway is the farthest of the eight homes determined to be impacted in the HRA?
		TR2-38	There are about 700 residents living within 500 feet of the project.
		TR2-39	Traffic assumptions are inaccurate.
		TR2-40	Should conduct a public health survey of the area.
		TR2-41	Requests completion of a Health Impact Assessment.
Carl Kemp	PMSA	TR2-42	Supports proposed project.
Ray Park	Dominguez Homeowners Association	TR2-43	Concerned about health impacts to the Dominguez area.
		TR2-44	No discussion of freeway onramps or transition ramps.
		TR2-45	Should include additional residential areas in the HRA.
Teresa Hurtado	Resident	TR2-46	Concerned about health risk Mahar Avenue.
		TR2-47	Opposes proposed project.

Table 6-6
SDEIS/RDEIR Comments
Comment Cards Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
Anthony Misetich	Harbor Association of Industry and Commerce	CC26-1	Request to speak.
		CC26-2	In support of project.
Bill Walles	Technoplex Group	CC27-1	Request to speak.
		CC27-2	In support of project.
John Cross	West Long Beach Association	CC28-1	Request to speak.
		CC28-2	Request to speak.
Dan Hoffman	Wilmington Chamber of Commerce	CC29-1	Request to speak.
		CC29-2	In support of project.
Elizabeth Warren	FuturePorts	CC30-1	Request to speak.
		CC30-2	In support of project.
Andrea Hricko	Keck School of Medicine, University of Southern California	CC31-1	Request to speak.
Alfred Carrillo	Pastor and Resident	CC32-1	Request to speak.
Joan Greenwood	Wrigley Area Neighborhood Alliance	CC33-1	Request to speak.
		CC33-2	In support of project.
David Pettit	Natural Resources Defense Council	CC34-1	Request to speak.

Table 6-6
SDEIS/RDEIR Comments
Comment Cards Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
Marie Castle	Caltrans Bridge Operator	CC35-1	Request to be added to mailing list.
		CC35-2	Request to speak.
Alex Pugh	Los Angeles Area Chamber of Commerce	CC36-1	Request to speak.
		CC36-2	In support of project.
Elena Rodriguez-Gutierrez	Long Beach Alliance for Children with Asthma	CC37-1	Request to speak.
Elina Green	Long Beach Alliance for Children with Asthma	CC38-1	Request to speak.
Jesse Marquez	Coalition for a Safe Environment	CC39-1	Request to have comments filed in the record.
		CC39-2	Request to speak.
		CC39-3	HRA is not accurate because no public health survey was conducted.
		CC39-4	HRA is not accurate because truck distribution assumptions are not accurate.
		CC39-5	HRA is not accurate.
Carl Kemp	PMSA	CC40-1	Request to speak.
		CC40-2	In support of project.
Ray Park	Dominguez Homeowners Association	CC41-1	Request to speak.
Teresa Hurtado	Resident	CC42-1	Request to have comments filed in the record.

Table 6-6
SDEIS/RDEIR Comments
Comment Cards Summary

Commenter	Affiliation	Comment Number	Major Comments/Areas of Interest
		CC42-2	Request to speak.
		CC42-3	Opposes proposed project.
		CC42-4	What magnitude of earthquake would knock down existing bridge?
		CC42-5	Where is funding coming from?
		CC42-6	Not clear what the cancer risk is associated with the proposed project.
		CC42-7	HRA does not include evaluation of heart attacks, asthma, insurance costs, and other health impacts.
		CC42-8	Will the proposed project provide jobs to Wilmington? Where will the employer be from?
		CC42-9	Trucks will continue taking same routes through community.
Laura Espinoza	Madres de Wilmington	CC43-1	Request to have comments filed in the record.
		CC43-2	In support of project. Requests that jobs associated with project be given to local residents from Wilmington and Long Beach.
Becky Hurtado-Torres	Resident	CC44-1	Concerned about health risks associated with proposed project.
Hector Aguilar	Resident	CC45-1	Request to be added to mailing list.
		CC45-2	Request to have comments filed in the record.
		CC45-3	HRA is not accurate because it does not contain data on industrial, locomotive, non-truck, and boat emissions.
		CC45-4	Funding for project should be used for reducing diesel emissions.
Garlyn Gallard	Resident	CC46-1	Request to have comments filed in the record.
		CC46-2	Health risks should be reevaluated.
Andrea Hricko	Keck School Medicine, University of Southern California	PP1	Concerns about assumptions and traffic estimates included in HRA and consideration of latest scientific research findings.

Draft EIS/EIR
Comment Letters and Responses

Elected Officials

Letter EO1. Signatory – Bonnie Lowenthal

Response to Comment EO1-1

The travel demand forecasting model used to forecast future traffic volumes in the Draft EIR was based on the Ports of Long Beach and Los Angeles Transportation Study model, which was developed in 2001, approved by the Ports of Long Beach and Los Angeles for port area Transportation Planning Studies and environmental studies, and is based on the regional model of the Southern California Association of Governments (SCAG). The model was updated in 2004 for the analysis of this project, as well as for other port area transportation planning studies. The 2004 update includes incorporation of the most current regional model data and the most current port data. The SCIG and ICTF expansion projects were figured into the models growth scenario. Please see Response to Comment OB14-6 for more in depth discussion on this issue.

Response to Comment EO1-2

Future truck volumes are based on the most current Ports of Los Angeles and Long Beach forecasts of TEU throughput for 2030, which is approximately 44.7 million TEU. Compared to the 2003 TEU throughput of 11.8M, it is assumed that port growth will be 32.9 million TEU. The TEU assumptions are used to generate port-related truck traffic volumes. The background vehicle traffic volumes, including regional autos and heavy duty trucks for year 2030, are obtained from the SCAG 2004 Regional Transportation Plan (RTP).

For a more detailed description of SCAG 2004 RTP, please refer to the following web site: <http://www.scag.ca.gov/rtp2004/2004/>. Also see Response to Comment OB14-6.

Response to Comment EO1-3

The Port model generates only AM, MD and PM traffic volumes. Conversion factors were applied to peak hour volumes to obtain projected daily volumes for purposes of air quality analyses but are not used in traffic calculations.

Heim Bridge EIR/EIS Inquiries

- I have been approached by members of the environmental community who share my concern for the health and welfare of the residents and school children who may be impacted by the Heim Bridge project.
- It is important (critical?) for this board and Caltrans to make sure that concise, consistent and accurate information is provided to allow for the community and public interest groups to understand the potential impacts of the various project alternatives.
- I commend Caltrans for meeting with public health officials from the USC Keck School of Medicine and trying to sort through the data and correctly assign traffic volumes to alternatives, growth scenarios and ultimately to impacts. I encourage this sort of collaboration as I think we will get the data regarding potential impacts required to make an informed decision about this project.
- Additional work needs to be done and I would appreciate clarification in the following areas:

EO1-1 EO1-2 EO1-3 EO1-4 EO1-5 EO1-6

1. What are the Ports growth scenarios used? Is the SCIG and the UP ICTF expansion figured into the growth scenario?
2. What were the growth parameters used to predict future truck volumes?
3. The AADT (Annual Average Daily Traffic) for the current number of trucks and Automobiles as well as the future is not clear in the report.
4. Will the reconstructed bridge result in a reduction in traffic or will it increase as it removes traffic from the I-110 and I-710 freeways.
5. Identification of AQ impacts from the build alternatives because of the proximity to schools along the SR-47. The report is apparently unclear as to whether there will be any denigration of AQ under the alternatives.
6. Address all of the apparent inconsistencies with vehicle and truck impacts in the various project scenarios.

Comments from Bonnie Lowenthal (ACTA Board Chair and Long Beach City Council Member and Vice Mayor).

Letter EO1. Signatory - Bonnie Lowenthal
Page 2

Response to Comment EO1-4

Existing and projected changes to traffic on the Schuyler Heim Bridge are shown in figures provided in the Draft and the Final EIS/EIR Section 3.5, Traffic and Transportation. Figure 3.5-3 shows existing bridge traffic. Traffic on the bridge from implementation of Alternative 1 is shown in Figures 3.5-7, 3.5-8, and 3.5-9 for the AM, MD, and PM peak hour periods, and Figure 3.5-10 for all three periods. Traffic on the bridge from implementation of Alternative 2 is shown in Figures 3.5-14, 3.5-15, and 3.5-16 for the AM, MD, and PM peak hour periods, and Figure 3.5-17 for all three periods.

Traffic volumes and levels of service specific to the Schuyler Heim Bridge during project construction are discussed in Section 3.5.3.3.1.1 and Tables 3.5-6 and 3.5-7.

The traffic impacts discussed in the Draft and the Final EIS/EIR for project operations are based on intersection analyses rather than numbers of vehicles on various roadway segments, such as the bridge. If considered alone, vehicle counts could be misleading in a traffic analysis, as the same number of vehicles could result in free-flowing traffic at one intersection, and delays at another intersection, based on the type of traffic controls and roadway capacity. Therefore, the actual vehicle numbers were used as a basis to determine intersection capacity at the various intersections within the study area.

Response to Comment EO1-5

Your comments regarding the clarity of the air quality impact analysis are acknowledged. The analyses required by FHWA, EPA, and Caltrans to evaluate air quality impacts from transportation projects cannot identify the specific location of these impacts. However, additional text has been added to each alternative discussion in Chapter 5.0, Section 5.3.13, to qualitatively discuss the potential cumulative air quality impacts in relation to the sensitive receptors.

See also Response to Comment AJ11-2.

Response to Comment EO1-6

We are not aware of any inconsistencies regarding vehicle and truck impacts under the various project scenarios.

Agencies and Jurisdictions Letters

Letter AJ1. Signatory – Department of Conservation

Response to Comment AJ1-1

Information related to oil and gas wells within and near the project ROW has been discussed and presented in the SR-47 Initial Site Assessment (ISA). The material below is taken from the ISA and provides a summary of information that was obtained during the ISA phase.

Alternatives 1, 3, and 4

A large number of oil and gas wells were identified within a 1.6-km (1-mile) radius of the Subject Property. This information was obtained from Map Nos. 126, 127, and 128, published by the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. A copy of the oil and gas wells maps is provided in Appendix G.

During site reconnaissance of the Subject Property, two active oil wells were observed on the east side of the Schuyler Heim Bridge on-ramp and south of Cerritos Channel in the area of Pier S, Port of Long Beach (see Photograph 10 in Appendix H).

Alternative 2

The oil- and gas-related features shown within 1 mile of the Subject Property (SR-103 extension to Alameda Street) are two plugged and abandoned dry holes that were drilled. One well was drilled in 1950 to a depth of 8,335 feet bgs. The 1950 well is located approximately 4,250 feet northwest of the Subject Property (see Appendix E). The other well was drilled in 1954 to a depth of 4,273 feet bgs. The 1954 well is located approximately 4,500 feet west of Subject Property (see Appendix F). This information was obtained from Map No. W1-6 published by the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. A copy of the map of oil and gas wells is provided in Appendix G.

STATE OF CALIFORNIA, RESOURCES AGENCY — ARNOLD SCHWARZENEGGER, GOVERNOR

DEPARTMENT OF CONSERVATION

DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

5816 Corporate Avenue, Suite 200, Cypress, CA 90630-4731

PHONE 714/816-6847 • FAX 714/816-6853 • WEB SITE conservation.ca.gov

August 21, 2007

Mr. Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, California 90012

RECEIVED
AUG 23 2007
By

Subject: Draft Environmental Impact Statement / Environmental Impact Report (EIR/EIS) for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project in the Ports of Long Beach and Los Angeles, California

Dear Mr. Kosinski:

The Department of Conservation's (Department) Division of Oil, Gas, and Geothermal Resources (Division) has reviewed the above referenced project. The Division supervises the drilling, maintenance, and plugging and abandonment of oil, gas, and geothermal wells in California.

AJ1-1 The proposed project is located in the administrative boundaries of the Wilmington oil field. There are numerous active, idle, plugged and abandoned wells within or in proximity of the project boundaries. The wells are identified on Division map 126 and in Division records. The Division recommends that all wells within or in close proximity to project boundaries be accurately plotted on future project maps.

AJ1-2 Building over or in the proximity of idle or plugged and abandoned wells should be avoided if at all possible. If this is not possible, it may be necessary to plug or re-plug wells to current Division specifications. Also, the State Oil and Gas Supervisor is authorized to order the reabandonment of previously plugged and abandoned wells when construction over or in the proximity of wells could result in a hazard (Section 3208.1 of the Public Resources Code). If abandonment or reabandonment is necessary, the cost of operations is the responsibility of the owner of the property upon which the structure will be located. Finally, if construction over an abandoned well is unavoidable an adequate gas venting system should be placed over the well.

AJ1-3 Furthermore, if any plugged and abandoned or unrecorded wells are damaged or uncovered during excavation or grading, remedial plugging operations may be required. If such damage or discovery occurs, the Division's district office must be contacted to obtain information on the requirements for and approval to perform remedial operations.

Letter AJ1. Signatory - Department of Conservation
Page 2

The wells identified on Division map 129 and in Division records will be plotted as appropriate during final design.

Response to Comment AJ1-2

During construction of the project, the contractor will be required to prepare workplans that will provide procedures for construction near idle, plugged, or abandoned wells that meet the requirements of the Division of Oil, Gas, and Geothermal Resources specifications. The work plans will be submitted for review and approval prior to implementation.

Response to Comment AJ1-3

During construction of the selected alternative, the contractor will be required to contact the Division of Oil, Gas, and Geothermal Resources for appropriate requirements if any wells are affected by project construction.

Response to Comment AJ1-4

During construction of the selected alternative, the contractor will provide the Division of Oil, Gas, and Geothermal Resources with applicable building plans for review and approval. These documents will be prepared in accordance with the requirements outlined in the "Construction Project Site Review and Well Abandonment Procedure."

Mr. Ronald J. Kosinski, Deputy District Director, Division of Environmental Planning
August 21, 2007
Page 2

AJ1-4 To ensure proper review of building projects, the Division has published an informational packet entitled, "Construction Project Site Review and Well Abandonment Procedure" that outlines the information a project developer must submit to the Division for review. The Department of Transportation should contact the Division Cypress district office for a copy of the site-review packet. The local planning department should verify that final building plans have undergone Division review prior to the start of construction.

Thank you for the opportunity to comment on the Draft Environmental Impact Report. If you have questions on our comments, or require technical assistance or information, please call me at the Cypress district office: 5816 Corporate Avenue, Suite 200, Cypress, CA 90630-4731; phone (714) 816-6847.

Sincerely,

Paul Frost

Paul Frost
Associate Oil & Gas Engineer
Division of Oil, Gas and Geothermal Resources
District 1

Letter AJ2. Signatory – County of Los Angeles Public Library

Response to Comment AJ2-1

Your comment that the project will not impact library services in the surrounding communities served by the County of Los Angeles Public Library is acknowledged.

County of Los Angeles Public Library
7400 East Imperial Hwy., P.O. Box 7011, Downey, CA 90241-7011
(562) 940-8461, TELEFAX (562) 803-3032

Library

MARGARET DONNELLAN TODD
COUNTY LIBRARIAN

September 24, 2007

RECEIVED
SEP 26 2007

Mr. Ronald Kosinski
Deputy District Director
Caltrans – District 7
Division of Environmental Planning
100 S. Main Street
Los Angeles, CA 90012

Subject: **PROPOSED SCHUYLER HEIM BRIDGE REPLACEMENT AND SR-47 EXPRESSWAY PROJECT DRAFT ENVIRONMENTAL IMPACT REPORT**

Dear Mr. Kosinski:

This is to respond to your request for comments on the Proposed Schuyler Heim Bridge Replacement and SR-47 Expressway Project

AJ2-1 The project site is located primarily within the cities of Los Angeles and Long Beach, with only a small portion in the industrial area of Carson. Further, the project does not include residential development. Therefore, this project will not impact library services in the surrounding communities served by the County of Los Angeles Public Library.

Thank you for the opportunity to provide comments on this project. If you have any questions or need additional information, please contact me at (562) 940-8422 or Malou Rubio at (562) 940-8450.

Sincerely,

Robert Seal

Robert Seal
Assistant Library Administrator
Capital Projects

DF:MR:lh
U:\STAFFSERVICES\DEVELOPER FEE\EIR\Schuyler Heim Bridge Repl - SR-47 ExpresswayEIR.doc

c: Malou Rubio, Staff Services

Letter AJ3. Signatory – Native American Heritage Commission

Response to Comment AJ3-1

The California Historic Resources Information Center at CSU Fullerton was contacted regarding the project. Record searches were conducted in 2002 and 2004.

Response to Comment AJ3-2

A Historic Property Survey Report (HPSR), a Historical Resource Evaluation Report (HRER), and Archaeological Survey Report (ASR), with supplements, have been prepared for the project to Caltrans standards.

Response to Comment AJ3-3

The Native American Heritage Commission (NAHC) conducted a search of the Sacred Lands Files for the project, and appropriate Native American groups and individuals were contacted regarding the project.

Response to Comment AJ3-4

Mitigation measures in the Draft and the Final EIS/EIR specify that unanticipated discoveries will be evaluated and treated. The project area has been evaluated as having a low archaeological sensitivity, and no monitoring is recommended. Disposition of artifacts and remains, if any are found, will be as specified by Caltrans, in consultation with affiliated Native Americans, and as required by in Health and Safety Code 7050.5 and Public resources Code 5097.98.

Response to Comment AJ3-5

Mitigation measures in the Draft and the Final EIS/EIR specify that Native Americans will be contacted if human remains are found within the APE, and that these remains will be treated as specified in Health and Safety Code 7050.5 and Public resources Code 5097.98.

STATE OF CALIFORNIA — Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

RECEIVED
SEP 10 2007

September 5, 2007

Mr. Ronald J. Kosinski, Deputy District Director RK
CALIFORNIA DEPARTMENT OF TRANSPORTATION
100 S. Main Street, MS-16A
Los Angeles, CA 90012

Re: SCH#2002021009; Joint NEPA/CEQA Document: draft Environmental Impact Statement/ draft Environmental Impact Report (DEIS/DEIR) for 07-LA-47 PM 2.7/5.8; Schuyler Heim Bridge Replacement and SR-47 Expressway Project; EA 238500; Caltrans – Ports of Long Beach and Los Angeles Area; Los Angeles County, California

Dear Mr. Kosinski:

The Native American Heritage Commission is the state's Trustee Agency for Native American Cultural Resources. The California Environmental Quality Act (CEQA) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per CEQA guidelines § 15064.5(b)(c). In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE)', and if so, to mitigate that effect. To adequately assess the project-related impacts on historical resources, the Commission recommends the following action:

AJ3-1
√ Contact the appropriate California Historic Resources Information Center (CHRIS). Contact information for the Information Center nearest you is available from the State Office of Historic Preservation (916/653-7278) http://www.ohp.parks.ca.gov/1068/files/IC%20Roster.pdf The record search will determine:
- If a part or the entire APE has been previously surveyed for cultural resources.
- If any known cultural resources have already been recorded in or adjacent to the APE.
- If the probability is low, moderate, or high that cultural resources are located in the APE.
- If a survey is required to determine whether previously unrecorded cultural resources are present.

AJ3-2
√ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
- The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
- The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.

AJ3-3
√ Contact the Native American Heritage Commission (NAHC) for:
- A Sacred Lands File (SLF) search of the project area and information on tribal contacts in the project vicinity that may have additional cultural resource information. Please provide this office with the following citation format to assist with the Sacred Lands File search request: USGS 7.5-minute quadrangle citation with name, township, range and section: .
- The NAHC advises the use of Native American Monitors to ensure proper identification and care given cultural resources that may be discovered. The NAHC recommends that contact be made with Native American Contacts on the attached list to get their input on potential project impact (APE). In some cases, the existence of a Native American cultural resources may be known only to a local tribe(s).

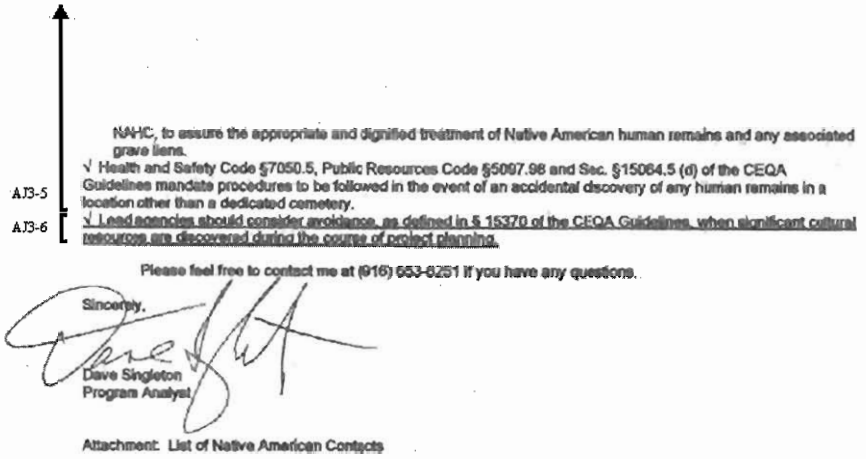
AJ3-4
√ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
- Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5 (f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
- Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.

AJ3-5
√ Lead agencies should include provisions for discovery of Native American human remains or unmarked cemeteries in their mitigation plans.
- CEQA Guidelines, Section 15064.5(d) requires the lead agency to work with the Native Americans identified by this Commission if the initial Study identifies the presence or likely presence of Native American human remains within the APE. CEQA Guidelines provide for agreements with Native American, identified by the

Letter AJ3. Signatory - Native American Heritage Commission
Page 2

Response to Comment AJ3-6

No archaeological resources have been discovered in the project APE. The only significant cultural resource known at present within the APE is the Schuyler Heim Bridge, and Avoidance is one of the Project alternatives considered.



NAHC, to assure the appropriate and dignified treatment of Native American human remains and any associated grave liens.

AJ3-5 √ Health and Safety Code §7050.5, Public Resources Code §5097.98 and Sec. §15064.5 (d) of the CEQA Guidelines mandate procedures to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

AJ3-6 √ Lead agencies should consider avoidance, as defined in § 15370 of the CEQA Guidelines, when significant cultural resources are discovered during the course of project planning.

Please feel free to contact me at (916) 653-6251 if you have any questions.

Sincerely,

Dave Singleton
Program Analyst

Attachment: List of Native American Contacts

Letter AJ3. Signatory - Native American Heritage Commission
Page 3

Los Angeles County
September 6, 2007

Charles Cooke
32835 Santiago Road
Acton , CA 93510
(661) 269-1422
(661) 733-1812
Chumash
Fernandeno
Tataviam
Kitanemuk

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Administrator
4712 Admiralty Way, Suite 172
Marina Del Rey , CA 90292
310-570-6567
Gabrielino Tongva

Beverly Salazar Folkes
1931 Shadybrook Drive
Thousand Oaks , CA 91362
805 492-7255
Chumash
Tataviam
Fernandeno

Gabrieleno/Tongva Tribal Council
Anthony Morales, Chairperson
PO Box 693
San Gabriel , CA 91778
ChiefRBwife@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 Fax
Gabrielino Tongva

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th Street, Rm. 403
Los Angeles , CA 90020
(213) 351-5324
(213) 386-3995 FAX

Gabrieleno/Tongva Council / Gabrielino Tongva Nation
Sam Dunlap, Tribal Secretary
761 Terminal Street Bldg 1, 2nd floor
Los Angeles , CA 90021
office @tongvatribe.net
(213) 489-5001 - Officer
(909) 262-9351 - cell
(213) 489-5002 Fax
Gabrielino Tongva

Ti'At Society
Cindi Alvitre
8602 Zelzah Avenue
Reseda , CA 91335
calvitre@yahoo.com
(714) 504-2468 Cell
Gabrielino

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Tribal Chair/Cultural Resources
5450 Slauson, Ave, Suite 151 PMB
Culver City , CA 90230
gtongva@verizon.net
562-761-6417 - voice
562-920-9449 - fax
Gabrielino Tongva

Letter AJ3. Signatory - Native American Heritage Commission
Page 4

Los Angeles County
September 6, 2007

Gabrielino Tongva Indians of California Tribal Council
Mercedes Dorame, Tribal Administrator
20990 Las Flores Mesa Drive
Malibu , CA 90265
Pluto05@hotmail.com

Gabrielino Tongva

Letter AJ4. Signatory – Southern California Association of Governments

SOUTHERN CALIFORNIA
ASSOCIATION of GOVERNMENTS
Main Office
818 West Seventh Street
12th Floor
Los Angeles, California
90017-3435
t (213) 236-1800
f (213) 236-1825
www.scag.ca.gov

Officers: President: Gary Ovitt, San Bernardino County • First Vice President: Richard Dixon, Lake Forest • Second Vice President: Harry Baldwin, San Gabriel • Immediate Past President: Yvonne B. Burke, Los Angeles County

Imperial County: Victor Carrillo, Imperial County • Jon Edney, El Centro

Los Angeles County: Yvonne B. Burke, Los Angeles County • Zev Yaroslavsky, Los Angeles County • Richard Alarcon, Los Angeles • Jan Perry, Los Angeles • Mike Antonovich, Antelope Valley • Tony Cardenas, Los Angeles • Gene Daniels, Paramount • Mike Dispenza, Palmdale • Don Knabe, Long Beach • Paul Krekorian, Los Angeles • Bonnie Lowenthal, Long Beach • Ramon Miramontes, El Segundo • Pam O'Connor, Santa Monica • Richard Riordan, Los Angeles • Nicholas Pacheco, Los Angeles • Dennis Washburn, Calabasas • Jack Weiss, Los Angeles • Herb J. Wesson, Jr., Los Angeles • Dennis Zine, Los Angeles

Orange County: Chris Norby, Orange County • Christine Barnes, La Palma • John Beauman, Brea • Lou Bone, Tustin • Debbie Cook, Huntington Beach • Cathy Green, Mission Viejo • Richard Dixon, Lake Forest • Tony Edgar, Los Alamitos • Paul Glaab, Laguna Niguel • Robert Hernandez, Anaheim • Shawn Nelson, Fullerton

Riverside County: Jeff Stone, Riverside County • Thomas Buckley, Lake Elsinore • Bonnie Flickinger, Moreno Valley • Ron Loveridge, Riverside • Greg Pettis, Cathedral City • Ron Roberts, Temecula

San Bernardino County: Gary Ovitt, San Bernardino County • Lawrence Dale, Barstow • Paul Eaton, Montclair • Lee Ann Garcia, Grand Terrace • Tim Jasper, Town of Apple Valley • Larry McCallon, Highland • Deborah Robertson, Rialto • Alan Wapner, Ontario

Tribal Government Representatives: Andrew Masiel Sr., Pechanga Band of Luiseño Indians

Ventura County: Linda Parks, Ventura County • Glen Becerra, Simi Valley • Carl Morehouse, San Buenaventura • Toni Young, Port Hueneme

Orange County Transportation Authority: Art Brown, Buena Park

Riverside County Transportation Commission: Robin Lowe, Hemet

Ventura County Transportation Commission: Keith Millhouse, Moorpark

x.2/07

October 1, 2007

Mr. Ronald J Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation – District 07
100 S. Main Street MS-16A
Los Angeles, Ca 90012

RE: SCAG Comments on the Draft Environmental Impact Report/Statement for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project - SCAG No. I 20070516

Dear Mr. Kosinski,

Thank you for submitting the Draft Environmental Impact Report/Statement (DEIR/DEIS) for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project - SCAG No. I 20070516 for review and comment. SCAG is the authorized regional agency for Inter-Governmental Review of Programs proposed for federal financial assistance and direct development activities, pursuant to Presidential Executive Order 12372 (replacing A-95 Review). Additionally, pursuant to Public Resources Code Section 21083(d) SCAG reviews Environmental Impacts Reports of projects of regional significance for consistency with regional plans per the California Environmental Quality Act Guidelines, Sections 15125(d) and 15206(a)(1). SCAG is also the designated Regional Transportation Planning Agency and as such is responsible for both preparation of the Regional Transportation Plan (RTP) and Regional Transportation Improvement Program (RTIP) under California Government Code Section 65080 and 65082. As the clearinghouse for regionally significant projects per Executive Order 12372, SCAG reviews the consistency of local plans, projects, and programs with regional plans. This activity is based on SCAG's responsibilities as a regional planning organization pursuant to state and federal laws and regulations. Guidance provided by these reviews is intended to assist local agencies and project sponsors to take actions that contribute to the attainment of regional goals and policies.

SCAG staff has reviewed this project and determined that the proposed project is regionally significant per the California Environmental Quality Act (CEQA) Guidelines (Section 15125 and 15206).

The Policies of SCAG's Regional Comprehensive Plan and Guide (RCPG), Regional Transportation Plan (RTP), and Compass Growth Vision (CGV) may be applicable to your project. We have evaluated this project based on these plans. The RCPG, RTP and CGV can be found on the SCAG web site at: http://scag.ca.gov/igr

The attached detailed comments are meant to provide guidance for considering the proposed project within the context of our regional goals and policies. If you have any questions regarding the attached comments, please contact James R. Tebbetts at (213) 236-1915. Thank you.

Sincerely,

Huasha Liu, Manager
Program Development and Evaluation Division

DOCS# 140374v1

Letter AJ4. Signatory - Southern California Association of Governments
Page 2

Response to Comment AJ4-1

The comment and information supporting the project's consistency with SCAG Policy 3.01 are acknowledged. Policy 3.01 and supporting language are included in the Final EIS/EIR. The numbers in the text have been revised to be consistent with Table 3.2-5. Table 3.2-5 is consistent with the adopted SCAG forecasts. These changes, however, are minor and largely editorial in nature. They do not change the conclusions presented in the Draft and the Final EIS/EIR.

1 October 2007
Mr. Ronald J Kosinski
Page 2

COMMENTS ON DRAFT ENVIRONMENTAL IMPACT REPORT/STATEMENT FOR SCHYLER HEIM BRIDGE REPLACEMENT AND SR-47 EXPRESSWAY PROJECT - SCAG No. I 20070516

PROJECT DESCRIPTION

As addressed in the DEIS/DEIR, the project consists of six alternatives:

Alternative 1/1A: Bridge Replacement and SR-47 Expressway
Alternative 2: SR-103 Extension to Alameda Street
Alternative 3: Bridge Demolition Avoidance
Alternative 4: Bridge Replacement Only
Alternative 5: Transportation System Management
Alternative 6: No Build

Alternatives 1 through 4 are considered the "build" alternatives, as shown in Figure S-1 of the executive summary. The project area addressed in the Draft EIS/EIR generally lies between Terminal Island on the south and SR-91 (Artesia Freeway) on the north, and between I-710 (Terminal Island Freeway) on the east and I-110 (Harbor Freeway) on the west. This project area includes portions of the Port of Long Beach, Port of Los Angeles, Wilmington District of the City of Los Angeles, southern part of the City of Carson, and western portion of the City of Long Beach.

CONSISTENCY WITH REGIONAL COMPREHENSIVE PLAN AND GUIDE POLICIES

The **Growth Management Chapter (GMC)** of the Regional Comprehensive Plan and Guide (RCPG) contains the following policies that are particularly applicable and should be addressed in the FEIR/EIS for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project.

AJ4-1

3.01 The population, housing, and jobs forecasts, which are adopted by SCAG's Regional Council and that reflect local plans and policies shall be used by SCAG in all phases of implementation and review.

Adopted SCAG Regionwide Forecasts

	2010	2015	2020	2025	2030
Population	19,208,661	20,191,117	21,137,519	22,035,416	22,890,797
Households	6,072,578	6,463,402	6,865,355	7,263,519	7,660,107
Employment	8,729,192	9,198,618	9,659,847	10,100,778	10,527,202

Adopted County of Los Angeles Forecasts

	2010	2015	2020	2025	2030
Population	10,718,007	11,113,772	11,501,884	11,870,934	12,221,799
Households	3,404,016	3,582,693	3,763,875	3,942,753	4,120,270
Employment	5,022,215	5,198,739	5,366,865	5,520,139	5,660,992

Adopted City of Los Angeles Forecasts

	2010	2015	2020	2025	2030
Population	4,090,125	4,147,285	4,203,702	4,257,771	4,309,625
Households	1,372,873	1,438,731	1,505,615	1,571,712	1,637,475
Employment	1,994,358	2,057,435	2,117,623	2,172,642	2,223,338

DOCS# 140374v1

Letter AJ4. Signatory - Southern California Association of Governments
Page 3

Response to Comment AJ4-2

The comment and information supporting the project's consistency with SCAG Policy 3.03 are acknowledged. Policy 3.03 and supporting language are included in the Final EIS/EIR.

1 October 2007
Mr. Ronald J Kosinski
Page 3

Adopted City of Long Beach Forecasts

	2010	2015	2020	2025	2030
Population	503,450	518,627	533,590	547,937	561,694
Households	171,723	178,252	184,906	191,482	198,040
Employment	213,998	222,549	230,774	238,440	245,647

Adopted City of Carson Forecasts

	2010	2015	2020	2025	2030
Population	97,532	100,628	103,678	106,604	109,412
Households	26,296	27,366	28,449	29,525	30,597
Employment	68,552	70,482	72,302	73,932	75,398

* The 2004 RTP growth forecast at the regional, county and subregional level was adopted by RC in April, 2004. City totals are the sum of small area data and should be used for advisory purposes only.

Staff Comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG. This Policy was not included in this listing nor appears to have been evaluated in the DEIR/DEIS. Section 3.1.3.3.1.3 (Operations Effects - Compatibility with Existing Land Use and Recreation) states that Alternative 1 would not increase population and employment in the project area. Section 3.2.2.1 (Regional Area Demographics) to include Sections 3.2.2.1.1 (Existing Population) and 3.2.2.1.2 (Housing) discusses Population and Housing at the Countywide level, along with the Cities of Los Angeles, Long Beach, and Carson. Section 3.2.2.2 (Local Area Demographics) to include Sections 3.2.2.2.1 (Existing Population) and 3.2.2.2.2 (Housing) discusses Population and Housing in those Census Tracts adjacent to the proposed Project. Section 3.2.2.3 (Forecasted Population and Housing) discusses growth of population and households at the Countywide level, along with the Cities of Los Angeles, Long Beach, and Carson. As noted in the General Comments Section, there appears to be a difference between the expected percentage of growth population and housing as found in the EIR/EIS and the adopted SCAG forecasts. Once the conflict between the percentages are clarified, the project would be consistent with Policy 3.01.

AJ4-1

3.03 *The timing, financing, and location of public facilities, utility systems, and transportation systems shall be used by SCAG to implement the region's growth policies.*

SCAG staff comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG and notes that this project is included in the Southern California Association of Government's (SCAG) 2004 Regional Transportation Plan (RTP) and the 2006 Regional Transportation Improvement Program (RTIP). Based on the CMIA Supplemental Application, construction is expected to take approximately four (4) years and perhaps begin construction in 2009. Therefore, the proposed project would be consistent with SCAG Policy 3.03.

AJ4-2

GMC POLICIES RELATED TO THE RCPG GOAL TO IMPROVE THE REGIONAL STANDARD OF LIVING.

The Growth Management goals to develop urban forms that enable individuals to spend less income on housing cost, that minimize public and private development costs, and that enable firms to be more competitive, strengthen the regional strategic goal to stimulate the regional economy. The following policies are intended to guide local jurisdictions efforts toward achievement of such goals and do not infer regional interference with local land use powers

Letter AJ4. Signatory - Southern California Association of Governments
Page 4

Response to Comment AJ4-3

The comment and information supporting the project's consistency with SCAG Policy 3.10 are acknowledged. Policy 3.10 and supporting language are included in the Final EIS/EIR.

Response to Comment AJ4-4

The comment and information supporting the project's consistency with SCAG Policy 3.18 are acknowledged. Policy 3.18 and supporting language are included in the Final EIS/EIR.

Response to Comment AJ4-5

The comment and information supporting the project's consistency with SCAG Policy 3.20 are acknowledged. Policy 3.20 and supporting language are included in the Final EIS/EIR.

1 October 2007
Mr. Ronald J Kosinski
Page 4

AJ4-3

3.10 Support local jurisdictions' actions to minimize red tape and expedite the permitting process to maintain economic vitality and competitiveness.

SCAG staff comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG and notes that this project anticipates cooperation from local and regional agencies in development and permitting. The DEIR/DEIS will permit reduced processing of environmental documents by State and City Staffs, as environmental issues have previously been identified. This will aid Caltrans in reducing the time for design and permitting of the project, as general environmental issues were previously identified within the Project area. As such, based on the information provided in the EIR/EIS, the project is consistent with Policy 3.10.

GMC POLICIES RELATED TO THE RCPG GOAL TO IMPROVE THE REGIONAL QUALITY OF LIFE

The Growth Management goals to attain mobility and clean air goals and to develop urban forms that enhance quality of life, that accommodate a diversity of life styles, that preserve open space and natural resources, and that are aesthetically pleasing and preserve the character of communities, enhance the regional strategic goal of maintaining the regional quality of life. The evaluation of the proposed project in relation to the following policies would be intended to provide direction for plan implementation, and does not allude to regional mandates.

AJ4-4

3.18 Encourage planned development in locations least likely to cause adverse environmental impact.

SCAG Staff Comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG and notes that this project will be constructed in an urbanized area. Table S-1 (Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures) provides a summary and identifies areas of impacts and proposed ways to avoid, minimize, or mitigate the impacts. The project is located in a highly urbanized area. The project expects to have impacts to the community, utilities and public services, traffic and transportation, visual resources, cultural resources, hydrology, floodplains, and oceanography, water quality and stormwater runoff, geology, soils, seismicity, paleontology, topography, and mineral resources, hazardous waste and materials, air quality, noise, and biological resources during either construction or operational activities, or both. Mitigation measures are proposed for all impacts to reduce the impacts to a less than significant level. Therefore, the proposed project would be consistent with SCAG Policy 3.18.

AJ4-5

3.20 Support the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and animals.

SCAG Staff Comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG and notes that this project would protect or relocate affected resources. Section 3.16.2.1 (Natural Communities) notes that Wetland and aquatic habitats are present within the project area, and support native and non-native communities. Intertidal wetlands are present in isolated locations along Cerritos Channel and in other locales. Two areas under the first and fourth spans of the Schuyler Heim Bridge contain areas that have established wetland plant species. Chapter 3.16 (Biological Resources) notes that a number of unique and endangered plants and animals are located within the project area. There are no groundwater recharge, woodlands or production lands within the project area. Table S-1 (Potential Project

DOCS# 140374v1

Letter AJ4. Signatory - Southern California Association of Governments
Page 5

Response to Comment AJ4-6

The comment and information supporting the project's consistency with SCAG Policy 3.21 are acknowledged. Policy 3.21 and supporting language are included in the Final EIS/EIR.

Response to Comment AJ4-7

The comment and information supporting the project's consistency with SCAG Policy 3.22 are acknowledged. Policy 3.22 and supporting language are included in the Final EIS/EIR.

Effects and Avoidance, Minimization, and/or Mitigation Measures) provides a summary and identifies areas of impacts and proposed ways to avoid, minimize or mitigate the impacts to wetlands and land containing unique and endangered plants and animals. Therefore, the proposed project would be consistent with SCAG Policy 3.20.

AJ4-5

3.21 *Encourage the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites.*

SCAG Staff Comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG and notes that this project would document the bridge's history and if found document unearthed archaeological resources. Section 3.8.3.2.1 (Record Search) notes that an archaeological records and literature search was conducted and no historical or prehistoric archaeological sites have been recorded within the combined project APE. One recorded historic built environment is located within the project study area. This resource consists of a complex of wood-frame storage and office buildings built to accommodate oil production workers and machinery for the Tidelands Oil production facility. Section 3.8.3.2.4 (SR-47 Architectural/Historical Resources Identified) indicates that in 1998, the bridge was re-evaluated as part of a proposed seismic retrofit project. At that time, the Schuyler Heim Bridge was determined to be eligible for listing on the National Register of Historic Places (NRHP) under Criterion C in engineering as the highest vertical lift bridge in the Western United States and one of the most significant vertical bridges in the state of California. The bridge was also found to meet the eligibility criteria for inclusion in the California Register of Historic Resources (CRHR) under Criterion 3 and is considered an historical resource for the purposes of CEQA. Table S-1 (Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures) provides a summary and identifies areas of impacts and proposed ways to avoid, minimize or mitigate the impacts to recorded and unrecorded cultural and archaeological sites. Therefore, the proposed project would be consistent with SCAG Policy 3.21.

AJ4-6

3.22 *Discourage development, or encourage the use of special design requirements, in areas with steep slopes, high fire, flood, and seismic hazards.*

SCAG Staff Comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG and notes that this project and would be designed in accordance with applicable design and safety standards. Section 1.2.2.1.1.1 (Seismic Deficiency) notes that the nearest fault is the Palos Verdes Fault, which is located approximately 2.7 kilometers (km) (1.7 miles [mi]) from the bridge and is believed to be capable of an M 7.0 earthquake. The Bridge has previously been identified as being seismically deficient and in need of retrofit. Caltrans identified the Schuyler Heim Bridge as one of three seismic retrofit projects requiring replacement of existing major bridge structures. Any new facilities would be designed and constructed to meet expected seismic hazards. Section 3.9.2.2 (Floodplain) notes that the northern approaches to the Bridge and the Expressway area were removed from the 100-year floodplain on February 25, 2000. The project area is located within a 500-year flood plain. There are no steep slopes or high fire hazards in the project area. Table S-1 (Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures) provides a summary and identifies areas of impacts and proposed ways to avoid, minimize or mitigate the impacts to recorded and unrecorded cultural and archaeological sites. Therefore, the proposed project would be consistent with SCAG Policy 3.21.

AJ4-7

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Response to Comment AJ4-8

The comment and information supporting the project's consistency with SCAG Policy 3.23 are acknowledged. Policy 3.23 and supporting language are included in the Final EIS/EIR.

Response to Comment AJ4-9

The comment and information supporting the project's consistency with SCAG Policy 5.11 are acknowledged. Policy 5.11 and supporting language are included in the Final EIS/EIR.

Response to Comment AJ4-10

The comment and information supporting the project's consistency with SCAG RTP Goals and Policies are acknowledged. The RTP Goals 1 through 5 and Policies P1 and P2 and supporting language are included in the Final EIS/EIR.

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3.23 *Encourage mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and to develop emergency response and recovery plans.*

AJ4-8

SCAG staff comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG and notes that this project will mitigate any identified impacts. Table S-1 (Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures) provides a summary and identifies areas of impacts and proposed ways to avoid, minimize or mitigate the impacts to recorded and unrecorded cultural and archaeological sites. Therefore, the proposed project would be consistent with SCAG Policy 3.23.

AIR QUALITY CHAPTER

The **Air Quality Chapter** core actions related to the proposed project include:

5.11 *Through the environmental document review process, ensure that plans at all levels of government (regional, air basin, county, subregional, and local) consider air quality, land use, transportation, and economic relationships to ensure consistency and minimize conflicts.*

AJ4-9

SCAG Staff Comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG and notes that this project has addressed consistency with applicable plans and policies. Sections 3.1 (Land Use, Recreation, and Coastal Zone), 3.2 (Growth), 3.3 (Community Resources), 3.5 (Traffic and Transportation), 3.6 (Marine Vessel Transportation) and 3.13 (Air Quality) have incorporated comments from a variety of agencies concerned with air quality, land use, transportation, and economic relations. Therefore, the proposed project would be consistent with SCAG Policy 5.11.

REGIONAL TRANSPORTATION PLAN

The **2004 Regional Transportation Plan (RTP)** also has goals and policies that are pertinent to this proposed project. This RTP links the goal of sustaining mobility with the goals of fostering economic development, enhancing the environment, reducing energy consumption, promoting transportation-friendly development patterns, and encouraging fair and equitable access to residents affected by socio-economic, geographic and commercial limitations. The RTP continues to support all applicable federal and state laws in implementing the proposed project. Among the relevant goals and policies of the RTP are the following:

Regional Transportation Plan Goals

RTP G1 Maximize mobility and accessibility for all people and goods in the region.
RTP G2 Ensure travel safety and reliability for all people and goods in the region.
RTP G3 Preserve and ensure a sustainable regional transportation system.
RTP G4 Maximize the productivity of our transportation system.
RTP G5 Protect the environment, improve air quality and promote energy efficiency.

AJ4-10

Regional Transportation Plan Policies

RTP P1 Transportation investments shall be based on SCAG's adopted Regional Performance Indicators.

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Response to Comment AJ4-11

The comment and information supporting the project's consistency with SCAG Regional Growth Visioning Principles, specifically Principle 1 - GVP 1.1 and GVP 1.4; Principle 3 - GVP 3.5, and Principle 4 - GVP 4.4 are acknowledged. These principles and supporting language are included in Section 3.1.1 of the Final EIS/EIR.

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RTP P2 *Ensuring safety, adequate maintenance, and efficiency of operations on the existing multi-modal transportation system will be RTP priorities and will be balanced against the need for system expansion investments.*

SCAG Staff Comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG, but these RTP Goals and Policies were not included in this listing nor appears to have been evaluated in the DEIR/DEIS. This project is included in the Southern California Association of Government's (SCAG) 2004 Regional Transportation Plan (RTP) and the 2006 Regional Transportation Improvement Program (RTIP). Based on the CMIA Supplemental Application, construction is expected to take approximately four (4) years and perhaps begin construction in 2009. Section S.4.2 (Project Purpose) will provide a structurally and seismically safe vehicular connection along the critical north-south corridor between Terminal Island and the mainland that can remain in service following a major earthquake to ensure that ground and vessel transportation are maintained. Improve operational and safety design features of the crossing to facilitate the movement of people, freight, and goods, while meeting current design standards to the maximum extent feasible. Reduce traffic congestion on local surface streets (between Terminal Island and Pacific Coast Highway), as well as on I-110 and I-710. Improve safety by providing a limited-access route between Terminal Island and I-405 that would eliminate at-grade railroad crossings and signalized intersections and connect the Schuyler Heim Bridge with an emergency service route that would facilitate movement to and from the ports following a major earthquake. Table S-1 (Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures) provides a summary and identifies areas of impacts and proposed ways to avoid, minimize or mitigate the impacts to recorded and unrecorded cultural and archaeological sites. Therefore the proposed project would be consistent with these RTP Goals and Policies.

AJ4-10

GROWTH VISIONING

The fundamental goal of the Compass Growth Visioning effort is to make the SCAG region a better place to live, work and play for all residents regardless of race, ethnicity or income class. Thus, decisions regarding growth, transportation, land use, and economic development should be made to promote and sustain for future generations the region's **mobility, livability** and **prosperity**. The following "Regional Growth Principles" are proposed to provide a framework for local and regional decision making that improves the quality of life for all SCAG residents. Each principle is followed by a specific set of strategies intended to achieve this goal.

Principle 1: Improve mobility for all residents
GV P1.1 Encourage transportation investments and land use decisions that are mutually supportive.
GV P1.4 Promote a variety of travel choices
Principle 3: Enable prosperity for all people
GV P3.5 Encourage civic engagement.
Principle 4: Promote sustainability for future generations
GV P4.4 Utilize "green" development techniques

AJ4-11

SCAG Staff Comments: Table 3.1-1 (Project Consistency with Local and Regional Plans/Policies) provides a summary evaluation of the consistency of the proposed project with pertinent goals and policies of SCAG's RCPG. These CGV Goals and Policies were not included in this listing nor appear to have been evaluated in the DEIR/DEIS. This project is included in the Southern California Association of Government's (SCAG) 2004 Regional Transportation Plan (RTP) and the 2006 Regional Transportation Improvement Program (RTIP). Sections S.8.1 (Previous Public Involvement) and S.8.2 (Ongoing Public Involvement) notes that

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Response to Comment AJ4-12

The last two sentences of Final EIS/EIR Section 1.1 (Introduction) have been updated to read as follows:

> The proposed Schuyler Heim Bridge Replacement and SR-47 Expressway (Project ID: LA0D45) is included in the final Southern California Association of Governments (SCAG) 2008 Regional Transportation Improvement Program (RTIP) that was adopted in July 2008 and the conforming 2008 Regional Transportation Plan (RTP).

This change also has been made to Final EIS/EIR Section 3.13.3.4.1 Transportation Conformity.

Response to Comment AJ4-13

The Final EIS/EIR, Section 3.1.1.1 (SCAG Regional Comprehensive Plan and Guide) has been corrected to say there are 14 subregions.

Response to Comment AJ4-14

The Final EIS/EIR, Section 3.13.3.4.1 (Transportation Conformity), has been updated to indicate that the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway Project (Project ID: LA0D45) is included in the Southern California Association of Governments (SCAG) conforming 2008 RTP and final 2008 RTIP that was adopted by SCAG on July 17, 2008. Federal approval of the 2008 RTIP was issued on November 17, 2008.

Response to Comment AJ4-15

The first paragraph of Section 3.13.3.4.1.1 (Vehicle Operations Emissions) has been corrected to indicate that the Schuyler Heim Bridge/SR-47 project is consistent with the federal approved 2008 RTP and 2008 RTIP.

Response to Comment AJ4-16

The mailing address and personnel for SCAG has been corrected in the Final EIS/EIR.

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since 2002, Caltrans and ACTA began formal public scoping and initiation of environmental studies for a previous project that included replacement of the Schuyler Heim Bridge and construction of an elevated SR-47 Expressway between Terminal Island and Alameda Street at Pacific Coast Highway. Public involvement included, but was not limited to notices in local newspapers, meetings with elected officials at the local, regional, state, and federal levels, neighborhood and business groups, and individual community groups. Sections 2.2.1.2.1.8 (Bridge Demolition) and 3.18.2.1.1 (Alternative 1 - Resources Used During Construction) and Table 3.4-4 (Los Angeles County Construction and Demolition Debris Recyclers (Concrete, Asphalt, and Metal Materials)) describe the recycling of construction and demolition debris from this project and listing of recyclers that have the capability to accept such debris. Therefore the proposed project would be consistent with the mobility principle, in the promotion of a variety of travel choices, the prosperity principle, and in the promotion of sustainability of these Growth Visioning Principles. AJ4-11

GENERAL COMMENTS

Page 1.1 - Section 1.1 (Introduction), 5th Paragraph states: The changes will be included in the 2006 RTIP as amended by July/August 2008. In addition, the changes in the project scope will be identified in the 2008 RTP that is expected to be adopted by the SCAG Regional Council in March 2008. The text should be re-written to the following: The changes will be included in the 2006 RTIP as amended by *Summer* ~~July/August~~ 2008. In addition, the changes in the project scope will be identified in the 2008 RTP that is expected to be adopted by the SCAG Regional Council in *Spring* ~~March~~ 2008. AJ4-12

Page 3.1-1 - Section 3.1.1.1 (SCAG Regional Comprehensive Plan and Guide) notes that within the SCAG region there are 13 subregions, there are actually 14 subregions: Arroyo Verdugo Cities; City of Los Angeles; Coachella Valley Association of Governments (CVAG); Gateway Cities Council of Governments (GCCOG); Imperial Valley Association of Governments (IVAG); Las Virgenes Malibu Council of Governments; North Los Angeles County; Orange County Council of Governments (OCCOG); San Bernardino Associated Governments (SANBAG); San Gabriel Valley Council of Governments (SGV/COG); South Bay Cities Council of Governments (SBCCOG); Ventura Council of Governments (VCOG); Western Riverside Council of Governments (WRCOG); and Westside Cities Council of Governments (WCCOG). AJ4-13

Page 3.13-11 – Section 3.13.3.4.1 (Transportation Conformity) states: It is expected that changes to the project scope will be included in the draft 2008 RTP in October or November of 2007, with the final RTP approval in March 2008. The text should be re-written to the following: It is expected that changes to the project scope will be included in the *Draft* 2008 RTP ~~in October or November of 2007~~, with the final RTP approval expected in *Spring 2008*. ~~March 2008~~. AJ4-14

Page 3.13-12 – Section 3.13.3.4.1.1 (Vehicle Operations Emissions) states: The Schuyler Heim Bridge/SR-47 project is consistent with the proposed 2008 RTP that will be adopted by SCAG in March 2008 and with amendments to the 2006 RTIP anticipated in July/August 2008. The text should be re-written to the following: The Schuyler Heim Bridge/SR-47 project is consistent with the *Draft* ~~proposed~~ 2008 RTP that *is expected to be adopted by SCAG in Spring 2008* ~~will be adopted by SCAG in March~~ 2008 and with amendments to the 2006 RTIP *anticipated to be adopted in Summer 2008*. ~~in July/August~~ 2008. AJ4-15

Page 8-16 - Chapter 8.0 (Distribution List for the Draft EIS/EIR) makes reference to distribution of the DEIR/DEIS and sent to employees of SCAG (Peter Greenwald, Susan Nakamura) but addressed to the Offices of the SCAQMD (21865 Copley Drive Diamond Bar, CA 91765). You may wish to correct the name of the Agency the DEIR/DEIS was sent to. Also, Jeffery Smith is no longer with SCAG. The FPEIR should be sent to the IGR Section of SCAG. AJ4-16

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Response to Comment AJ4-17

The source identified in the comment (City of Los Angeles, 2002) is cited in EIS/EIR Section 3.11 as a reference for information about the Malibu-Santa Monica- Hollywood-Raymond Hill Fault System, shown in Table 3.11-2 (Active Faults in the Project Area).

Response to Comment AJ4-18

Comment acknowledged.

Response to Comment AJ4-19

In accordance with requirements of CEQA and NEPA, all feasible mitigation measures have been identified in the document and in the Environmental Commitment Record (Appendix H). These measures will be implemented and monitored.

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AJ4-17 Page 9-9 - Section 3.11 (Geology/Soils/Seismicity/Paleontology/Topography/ Mineral Resources) makes reference to the following resource: City of Los Angeles, Department of Public Works. 2000. *Northeast Interceptor Sewer – Eagle Rock Interceptor Sewer Draft Environmental Impact Report.* SCH No. 2000021078. SCAG No I20000060. June. This project relates to the provision of additional wastewater conveyance capacity to eliminate sewage overflows from the Eagle Rock area. The Eagle Rock area is approximately 32 miles north of the project site, am not sure need for inclusion of this document as a reference.

CONCLUSIONS

AJ4-18 1. SCAG commends the efforts of CALTRANS District 07 for including in its analysis a review of the policies contained in SCAG's RCPG, RTP, and CGV, as noted.

AJ4-19 2. All feasible measures needed to mitigate any potentially negative regional impacts associated with the proposed project should be implemented and monitored, as required by CEQA and NEPA.

Letter AJ5. Signatory – Long Beach Unified School District

Response to Comment AJ5-1

The commenter's perception that the various environmental analyses do not necessarily appear to be at the same level of detail for Alternative 2 as they are for Alternative 1 is understandable. To some extent, this is due to impacts associated with replacement of the Schuyler Heim Bridge. Because these impacts would be the same for Alternative 2 as they are for Alternative 1, they are addressed only once, under Alternative 1, and then they are referenced in the discussion of Alternative 2. For many of the environmental resources, due to the characteristics of the study area and the relative proximity of the alignments for the SR-47 Expressway and the SR-103 Extension, potential impacts would be the same and, therefore, are simply referenced where appropriate, rather than being repeated. Separate discussions are provided for the environmental resources where impacts would be different under Alternatives 1 and 2, as described below:

3.1 Land Use - The same criteria are applied in determining impacts for each alternative. Only where impacts would be different for Alternative 2 are they delineated.

3.2 Growth - The study area assessed for this discussion encompasses the areas for all the alternatives. Therefore, impacts are the same for Alternative 2 as they are for Alternative 1.

3.3 Community Resources - Section 3.3.3 provides detailed and alternative-specific analyses of Community Character and Cohesion (Section 3.3.1) and Relocations (Section 3.3.2). The Environmental Justice analysis does not differ between the alternatives.

3.4 Utilities and Public Services - This section contains detailed and specific effects to utilities and services that would occur during project construction. However, as stated in the Draft and the Final EIS/EIR Section 3.4.3.3.2, project operations would not result in

long beach unified school district

BUSINESS DEPARTMENT - Business Services
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2425 Webster Ave., Long Beach, CA 90810
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October 12, 2007

Via Fax and Hand Delivery
Mr. Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation District 7
100 South Main Street MS-16A
Los Angeles, CA 90012

Re: SCHUYLER HEIM BRIDGE REPLACEMENT AND SR-57 EXPRESSWAY PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT AND SECTION 4(f) EVALUATION

Dear Mr. Kosinski:

The Long Beach Unified School District (LBUSD or District) appreciates the opportunity to comment on the Schuyler Heim Bridge Replacement and SR-57 Expressway Project Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) prepared by the California Department of Transportation (Caltrans).

While the District was originally established in 1885 with fewer than a dozen students meeting in a borrowed tent, it is now responsible for providing school facilities and public education services to more than 95,000 students in 95 public schools in the cities of Long Beach, Lakewood, Signal Hill, and Avalon on Catalina Island. It is the third-largest school district in the state of California and employs more than 8,000 teachers and staff, making it the largest employer in the City of Long Beach.

In addition to establishing high standards of academic excellence for its students, LBUSD is committed to providing a safe environment and school facilities for its students and employees. Thus, LBUSD's primary concern in its review of the DEIS/EIR is to distinguish the environmental impacts which must be properly addressed, analyzed, and mitigated to assure an environment conducive to learning.

AJ5-1 The District is not opposed to the replacement of the Schuyler Heim Bridge and SR-47 expressway construction proposed under Alternative 1. The District also does not have any serious comments with respect to Alternatives 3 through 6 since they would have minimal impacts on LBUSD facilities. However, based on the review of the proposed alternatives and the DEIS/EIR analysis, the District is very concerned with the implementation of Alternative 2 that involves construction of State Route 103 (SR-103) extension. LBUSD is especially concerned with the Alternative 2 impacts on Hudson K-8 School, Cabrillo High School, and the Bethune Transitional Center that abut SR-103 directly. The DEIS/EIR's analysis focuses primarily on Alternative 1 and dismisses many of the Alternative 2 analysis as being similar to that of the Alternative 1 analysis and provides insufficient data to support the findings. This approach is flawed and inadequate because Alternative 2 includes a site (the SR-103

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adverse effects under any of the build alternatives. Therefore, Alternative 2 is not specifically addressed.

3.5 Traffic and Transportation - Generally, construction and operations effects on traffic are provided in detail, including numerous tables and figures for Alternative 2.

As stated in Section 3.5.3.3.1.1 (Construction Effects), a more detailed traffic analysis and Transportation Management Plan would be prepared during the design phase of the selected alternative. Therefore, additional detail is not provided for Alternative 2.

3.6 Marine Vessel Transportation - Potential impacts to marine vessel transportation are specific to activities associated with construction of a new bridge across the Cerritos Channel and would be the same for Alternatives 1, 2, 3, and 4.

3.7 Visual Resources - This section provides separate and detailed analyses of construction and operations effects to the visual environment for Alternative 1 and Alternative 2.

3.8 Cultural Resources - Impacts under Alternative 2 are the same as with Alternatives 1 and 4. Therefore, the three Alternatives are addressed together.

3.9 Hydrology, Floodplains, and Oceanography - This section provides specific reference to the location of Alternative 2 within a 500-year floodplain. Other impacts are the same as Alternative 1.

3.10 Water Quality and Stormwater Runoff - Impacts that would be specific to Alternative 2 are addressed separately, in Section 3.10.3.3.2.

3.11 Geology - Impacts of Alternative 2 would be the same as those under Alternatives 1 and 3. As a result, they are addressed together in the Draft and the Final EIS/EIR.

3.12 Hazardous Waste/Hazardous Materials - Impacts specific to Alternative 2 are addressed separately, in Section 3.12.3.3.2.

3.13 Air Quality - Construction emissions would be different for Alternative 2. These are provided in Table 3.13-15.

3.14 Noise - Impacts specific to Alternative 2 are provided in detailed tables that show noise levels at specific locations along the proposed SR-103 alignment.

3.15 Energy - Projected differences in energy required for project construction and operation are provided in detailed Tables 3.15-2 through 3.15-8.

3.16 Biological Resources - Impacts specific to Alternative 2 are addressed in detail in Section 3.16.3.3.2.

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Response to Comment AJ5-2

The study area evaluated in the Health Risk Assessment (HRA) included all of the schools listed in the comment. Risks to individual schools listed in the District's comment were evaluated, based on the modeled receptor points on or nearest to each facility. There was no significant risk identified at any of the schools listed in the comments for Alternative 1, the preferred alternative, for students or workers. For Alternative 2, there was no student risk over 10 in a million for any of the schools listed in the comment. There was however, staff exposure risk predicted above 10-in-one million for Alternative 2 at Cabrillo High School. Staff exposure risk was below the threshold at all other listed schools.

The schools most likely to experience adverse impacts associated with noise are the Bethune Transitional Center just north of West Williams Street, the athletic fields and facilities of Cabrillo High School located on the north side of West Hill Street, and the playground of the Elizabeth Hudson Elementary School, located south of West Burnett Street. These facilities front directly onto the existing SR-103, and the latter two abut sections of the highway that would be improved and upgraded under Alternative 2.

Details of the analysis carried out for these noise sensitive receptors are presented in Section 3.14.3.3.2.2 of the Final EIS/EIR. With implementation of noise mitigation, construction of two overlapping noise barriers, impacts at each of these noise sensitive receptors will be less than significant.

right-of-way) that is not included in Alternative 1, therefore, affects additional sensitive receptors not
AJ5-1 analyzed under Alternative 1.

Overview of Potential Project Impacts on the School District

The LBUSD understands that the proposed project is a joint project by Caltrans and the Federal Highway Administration (FHWA) and has been prepared in compliance with both the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). Caltrans is the lead agency under CEQA.

The proposed project described in the DEIS/EIR would occur between Terminal Island on the south and State Route 91 (SR-91) (Artesia Freeway) on the north, and between Interstate 710 (I-710) (Terminal Island Freeway) on the east and Interstate 110 (I-110) (Harbor Freeway) on the west. The project area includes the Port of Long Beach, Port of Los Angeles, Wilmington District of the City of Los Angeles, southern part of the City of Carson, and western portion of the City of Long Beach.

The DEIS/EIR identifies the following six project alternatives.

- Alternative 1: Bridge replacement and State Route 47 (SR-47) Expressway extension.
- Alternative 2: Bridge replacement and State Route 103 (SR-103) extension to Alameda.
- Alternative 3: Bridge demolition avoidance.
- Alternative 4 Bridge replacement only.
- Alternative 5: Transportation system management
- Alternative 6: No build.

The LBUSD owns and operates eight educational facilities and one maintenance yard west of I-710 and south of Interstate 405 (I-405) (San Diego Freeway). Based on our review of the project alternatives, we believe that at least three schools (Bethune Transitional Center, Hudson K—8 School, and Cabrillo High School) would be directly impacted by the proposed alternatives, depending upon which of the six
AJ5-2 alternatives is selected. School facilities east of SR-103 and west of I-710 that may be directly and/or indirectly impacted by the Lead Agency's action are listed below:

1. Bethune Transitional Center (#5): 2021 San Gabriel Ave., Long Beach CA 90810
2. Garfield ES (#20): 2240 Baltic Avenue, Long Beach, CA 90810
3. Muir ES (#41): 3038 Delta Ave., Long Beach, CA 90810
4. Webster ES (#52): 1755 West 32nd Way, Long Beach, CA 90810
5. Hudson K—8 (& Maintenance Facility) (#64). 2335 Webster Avenue
6. Stephens MS (#75): 1830 W. Columbus Street, Long Beach, CA 90810
7. Cabrillo HS (#79): 2001 Santa Fe Avenue, Long Beach, CA 90810
8. Child Development Center (#100) 2200 Seabright Avenue, CA 90810
9. Maintenance Yard (#102)

(See attached Figure Schuyler Heim Bridge Replacement and Nearby LBUSD Schools)

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Response to Comment AJ5-3

It is acknowledged that specific comments submitted by the Long Beach Unified School District pertain only to Alternative 2, as Alternatives 1, 3, 4, 5, and 6 would have minimal environmental, health, and safety impacts on LBUSD facilities. Potential impacts to Bethune Transitional Center, Hudson K-8 School, and Cabrillo High School are analyzed in the Health Risk Assessment completed by Alameda Corridor Transportation Authority (ACTA) and the analysis is provided in the Final EIS/EIR (primarily in 3.1 Land Use; 3.4 Utilities and Public Services; 3.13 Air Quality; and 3.14 Noise).

Response to Comment AJ5-4

Section 3.13.1.3 has been updated to reference the 2007 AQMP approved in June 2007.

Response to Comment AJ5-5

Subsection 3.13.2.4 has been updated to include Cabrillo High School.

Response to Comment AJ5-6

The Lead Agency has not adopted localized significance thresholds under CEQA. Therefore, a localized significance analysis beyond the CO and PM hotspot analyses was not added to the air quality analysis. See also responses to comments AJ5-2, AJ7-2, and EO1-5.

Response to Comment AJ5-7

The localized PM_{10} and $PM_{2.5}$ hotspot analysis is a requirement of the federal Transportation Conformity Rule. The analysis compares to the federal standards because the analysis is to demonstrate conformity to the federal standards not the California standards.

Response to Comment AJ5-8

The MSAT analysis is intended to be a tool to provide a relative comparison of the alternatives rather than to relate the MSAT emissions to health risk. In response to comments received on the

Specific Concerns Under Alternative 2

AJ5-3 In the paragraphs that follow, the LBUSD identifies the specific concerns, including the deficient analysis contained within the DEIS/EIR under Alternative 2. Comments pertaining to Alternatives 1, 3, 4, 5, and 6 are not included in this section because the District determined that they would have minimal environmental, health, and safety impacts on LBUSD facilities. .

Air Quality

AJ5-4 **Page 3.13-5: Subsection 3.13.1.3, Regional and Local Requirements.** The Final EIR/EIS should disclose that the most recent AQMP in the South Coast Air Basin (SoCAB) is now the 2007 Air Quality Management Plan, adopted by the South Coast Air Quality Management District (SCAQMD) on June 1st, 2007.

AJ5-5 **Page 3.13-9: Subsection 3.13.2.4, Sensitive Receptors.** The list of schools within the vicinity of the project analyzed in the Air Quality analysis omits Cabrillo High School, which is included in the list of sensitive receptors in Chapter 3.14, Noise. Sensitive receptor locations at District facilities include classroom and outdoor athletic fields, playfields, and hardcourts where students, faculty, and staff would be present.

AJ5-6 **Page 3.13-11: Subsection 3.13.3.3, Regional and Local Evaluation Criteria.** The SCAQMD now requires a project to evaluate localized concentrations of air pollutants on nearby sensitive receptors during both construction and operation. The regional and local evaluation criteria should list all thresholds used in the analysis. In addition, the analysis should include an evaluation of the SCAQMD's Localized Significance Thresholds (LSTs) for sites five acres or smaller; or for construction sites larger than five acres, the SCAQMD requires dispersion modeling for air pollutant concentrations evaluated against the California Ambient Air Quality Standards (AAQS) for the purposes of CEQA.

In addition, for toxic air compounds (TACs), the SCAQMD has adopted an acceptable incremental risk threshold of ten additional cancer per million people. For risks associated with truck traffic, the project should analyze the potential health risks from placing travel lanes of the SR-103 (or any source of air emissions) closer to District facilities.

AJ5-7 **Page 3.13-16 through 3.13-17: Subsection 3.13.3.4.1.3, Localized PM_{10} and $PM_{2.5}$.** The existing protocol is based on the federal AAQS of 150 micrograms per cubic meter ($\mu g/m^3$); the California AAQS are more stringent with 50 $\mu g/m^3$. Consequently, the impact analysis provided does not address whether the state's annual standard would be exceeded.

AJ5-8 **Page 3.13-20 through 3.13-23: Subsection 3.13.3.4.3, Mobile Source Air Toxics.** The Mobile Source Air toxics (MSAT) analysis should relate project-related TACs to health risk. This is important because school-aged children have higher respiratory rates compared to the general public and are more sensitive to TACs.

While project-related incremental health risk should be based on the SCAQMD's thresholds of significance, it is important to establish the existing baseline conditions in the SoCAB. The Multiple Air Toxics Exposure Study (MATES-II) discloses that the majority of health risk in the SoCAB is a result of diesel-particulate matter (DPM) emissions, and the majority of DPM is associated with goods movement from the ports. Because of the integral relationship of the proposed project with goods movement from the ports of Los Angeles and Long Beach, the Air Quality section should disclose the baseline environmental setting and the project's cumulative contribution to an increased health risk in the SoCAB.

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Draft EIS/EIR, ACTA, a joint powers authority of which both the City of Los Angeles and the Port of Los Angeles are members, elected to conduct an HRA as part of its funded portion of the proposed project. The HRA is included in the Final EIS/EIR. See also Response to Comment AJ7-2 and AJ11-2.

Response to Comment AJ5-9

Your comments on the statements in the Draft EIS/EIR regarding the current techniques for exposure assessment are acknowledged. However, the MSAT analysis presented is consistent with FHWA guidance for evaluating MSAT emissions from transportation projects. ACTA conducted an HRA, which is included as part of the Final EIS/EIR. A discussion of the HRA's results is presented in Response to Comment AJ7-2.

Response to Comment AJ5-10

The 29.6 µg/m^3 value reported was based on following a qualitative analysis for PM_{10} hotspots to demonstrate project-level Transportation Conformity for the project. This value is not intended to be used for evaluating health risk but rather to evaluate whether the project would exceed the PM_{10} National Ambient Air Quality Standard. See also Response to Comment AJ5-9 and AJ7-2.

Response to Comment AJ5-11

The text has been revised to explain that both NO_x and ROG can be precursors to ozone and $PM_{2.5}$ formation. The federal and California attainment status is clearly presented in Table 3.13-3 for ozone, PM_{10}, and $PM_{2.5}$. In Final EIS/EIR Section 3.13.3.5.1.1, under Direct, Criteria Pollutants, the last sentence of the first paragraph has been revised to delete the term "CO".

Response to Comment AJ5-12

The CEQA evaluation of the project alternatives, which evaluates whether the project's construction activities would result in substantial pollutant concentrations, is presented in Chapter 4, Section 4.5.1 of the Draft and the Final EIS/EIR. See also response to comment EO1-5.

AJ5-9 **Page 3.13-22 Mobile Source Air Toxics:** Carcinogenic Health Impacts. The DEIR/DEIS stated that "...shortcomings in current techniques for exposure assessment and risk analysis preclude the analysis from reaching meaningful conclusions about project-specific health impacts..." This statement regarding carcinogenic risk from DPM exposure is not true. The Office of Environmental Health Hazard Assessment (OEHHA) recommends conducting a 70-year lifetime exposure duration for cancer risk and supplementing this analysis with shorter exposure durations of 9 and 30 years for residents and school-aged children. The analysis of the proposed project's air quality impacts needs to follow the guidance and methodologies recommended by the OEHHA's Air Toxic Hot Spots Program Risk Assessment Guidelines and the SCAQMD's Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis. These documents provide the methodology for characterizing cancer risk at sensitive residential and school uses located near the proposed project sites.

AJ5-10 **Page 3.13-22 Mobile Source Air Toxics:** Non Cancer Chronic Health Impacts. Noncancer-related chronic health impacts also need to be evaluated for project-related diesel particulate matter (DPM) concentrations, because diesel exhaust is the primary factor driving project-related health risk. The OEHHA has established a significance threshold for chronic DPM health risks of 5 µg/m^3. The DEIR/DEIS used a PM_{10} concentration of 29.6 µg/m^3. While this PM_{10} concentration would not solely be comprised of DPM. DPM would constitute a substantial portion of the total PM_{10} concentration and would be expected to exceed the 5 µg/m^3 OEHHA threshold for DPM. Consequently, the DEIR/DEIS needs to evaluate the noncancer related health risk for DPM.

AJ5-11 **Page 3.13-23 through 3.13-27: Subsection 3.13.3.4.3: Construction Emissions.** For the direct impacts of project related emissions of criteria pollutants during construction, the analysis should state that ROG and NO_x emissions contribute to the formation of ozone and that NO_x emissions contribute to $PM_{2.5}$ formation. Since the SoCAB is designated as nonattainment for ozone, coarse inhalable particulate matter (PM_{10}), and fine inhalable particulate matter ($PM_{2.5}$) under both the California and federal AAQS, this should be clearly stated. Also, on page 3.13-25, please note that the entire SoCAB has been designated as attainment for CO by the USEPA as of June 11, 2007.

AJ5-12 On page 3.13-25, under Sensitive Receptors, the project should evaluate whether the project's construction activities would result in substantial pollutant concentrations that exceed the AAQS. While construction activities are short-term, for the purposes of CEQA the SCAQMD requires a project to evaluate the project's impacts at nearby sensitive receptors. It is not accurate to state that sensitive receptors would not be exposed to substantial pollutant concentrations during construction just because it is short-term, especially when construction activities could continue over the course of a couple of years. The project should evaluate the potential for construction activities occurring along the SR-103 extension to elevate the concentrations of air pollutants at the District facilities, in accordance with SCAQMD protocols.

AJ5-13 **Page 3.13-36 through 3.13-37, Subsection 3.13.4.2, Mitigation Measures: Construction.** Caltrans should consider the following mitigation to reduce substantial concentrations of NO_x and PM exhaust during construction activities: "Use construction equipment that is Tier 2 or newer to reduce construction exhaust emissions from heavy-duty construction equipment."

AJ5-14 **Appendix Files: Air Quality.** The air quality technical study, which included the EMFAC2002 model runs and emission rates for construction equipment (AP 42), was not included in the appendices during public review of the Draft EIR/EIS. Consequently, modeling inputs used for the air quality analysis could not be reviewed.

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Response to Comment AJ5-13

The suggested mitigation measure has been added to the list of mitigation measures for construction in Section 3.13.4.2.1 of the Final EIS/EIR: "To the extent feasible, construction equipment equipped with Tier 2 or new engines will be used."

Response to Comment AJ5-14

The Air Quality Technical Study was deemed too large and too technical to be included as an appendix to the EIS/EIR.

Consistent with the requirements of CEQA, it was determined that only supplemental information with a broad base of interest would be included as appendices to the EIS/EIR, and that highly specialized and technical information would be made available to the public as separate reports. The introduction to Chapter 3.0 of the EIS/EIR listed the technical studies, including the Air Quality Technical Study, and informed readers that they were available for review at Caltrans District 7 Headquarters.

In addition, the technical studies were made available at various libraries and later posted on the ACTA website. The Notices of Availability, issued August 17, 2007, and November 28, 2008, provided a list of libraries and websites where the Draft EIS/EIR and Supplemental Draft EIS/Recirculated Draft EIR (SDEIS/RDEIR) were available for review and provided a contact for those requesting additional information.

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Response to Comment AJ5-15

The noise analysis has been conducted consistent with the Caltrans Traffic Noise Analysis Protocol, which was updated in August 2006.

Response to Comment AJ5-16

The 52 dBA Leq noise abatement criterion that was applied to the interior of school classrooms is the standard that is required by the Caltrans Traffic Noise Analysis Protocol. A 55 dBA L_{10} limit was an alternative criterion proposed by FHWA, and is rarely utilized in noise evaluations.

Response to Comment AJ5-17

Short-term noise measurements were conducted throughout the day, from early morning to midday to late afternoon. The school measurements were done during school hours. Concurrent traffic counts, including truck counts, were obtained during each measurement. The noise model was validated by using the field traffic data and comparing the predicted noise levels with measured levels. The model, combined with existing peak-hour traffic data, was then utilized to estimate existing peak-hour noise levels. Such levels represent the highest existing hourly noise levels at the selected receptor locations in the project area.

Response to Comment AJ5-18

FHWA and Caltrans define an interior noise level below 51 dBA Leq (h) during the peak-hour as acceptable for the interior of classrooms. Although many factors affect speech intelligibility, with signal-to-noise ratio being a chief factor, such levels would ordinarily afford an acceptable environment for classroom communication. Further, since a noise barrier has been identified as feasible and reasonable for the school area, interior sound levels from the highway are expected to be far below the Caltrans criterion after the barrier construction.

Noise

AJ5-15 **Page 3.14-3: Subsection, 3.14.1.2, State Requirements.** In August 2006, the Federal Highway Administration (FHWA) adopted Caltrans' 2006 Traffic Noise Analysis Protocol. Use of this new guidance document is required for all noise studies started on or after October 1, 2006. Please indicate any deviations from the 2006 Traffic Noise Analysis Protocol used in this analysis or cite this as the protocol if used in the project analysis.

AJ5-16 **Page 3.14-3: Subsection, 3.14.1.2, State Requirements.** Impacts to schools were based on Section 216 et seq. of the California Streets and Highways Code. According to the California Streets and Highways Code, impacts to school classroom facilities are based on an interior noise threshold of 52 dBA L_{eq}. However, this section also requires a project to assess future ambient noise levels to a threshold of 55 dBA L_{10}. It should be noted that many of the LBUSD's schools were constructed prior to operation of Terminal Island as a shipping port for goods movement. For example, Garfield Elementary School was constructed in 1915. Consequently, it is not just the increase in noise levels from construction activities, but substantial cumulative increases in traffic noise levels.

AJ5-17 **Page 3.14-4: Subsection, 3.14.2.2, Existing Noise Environment.** The Noise analysis does not indicate the time noise measurements were taken. According to Section 216 et seq. of the California Streets and Highways Code, noise monitoring must be done during regular school hours. In addition, traffic levels on SR-103 are highly dependent on the amount of traffic from the ports. Traffic levels vary substantially throughout the day depending on the level of activity at the ports. Consequently, noise monitoring should be done during peak port activities in order to accurately portray a worst-case existing noise environment experienced at the school campus. The analysis should state the percentage of truck traffic on SR-103 during a peak hour when noise measurements were taken.

AJ5-18 **Page 3.14-15: Subsection, 3.14.3.1, Evaluation Criteria.** While the Caltrans' evaluation criteria listed in Table 3.14-2, Activity Category and Noise Abatement Criteria (NAC), is based on the California Streets and Highways Code (interior noise levels) and the FHWA's Highway Traffic Noise Analysis Abatement Policy and Guidance (exterior noise levels), CEQA requires a lead agency to consider applicable thresholds of those agencies that may be affected by the impacts of the proposed project. The District's applicable noise thresholds for interior noise compatibility are as follows:

For interior noise, the District applies the applicable thresholds of the state of California for classroom construction of 45 dBA. Caltrans' interior noise threshold for highway construction/expansion is less conservative and exceeds the state's own requirement for interior building construction for schools by 7 dB. The 45 dBA interior noise threshold is codified in the California Building Code and Noise Insulation Standards and was established by Division of the State Architect for classroom learning. Interior noise levels that exceed 45 dBA may disrupt classroom activities by affecting the speech intelligibility of the teacher in a typical classroom learning environment. The project should evaluate classroom noise compatibility based on the applicable noise threshold of the agency affected, in accordance with the requirements of CEQA. If the project would result in a substantial increase in noise levels such that the classroom would exceed 45 dBA (interior), noise abatement should be applied. Because many of the District's facilities were constructed prior to operation of the ports for goods movement, the project's cumulative contribution to interior classroom noise levels should also be assessed where interior noise levels would exceed 45 dBA.

AJ5-19 **Page 3.14-28 through 32: Subsection, 3.14.3.3.2, Alternative 2: SR-103 Extension to Alameda Street: Construction Effects.** The analysis of the construction noise impacts for Alternative 2 tiers off the analysis of the construction impacts for Alternative 1. Alternative 1 and 1A would not result in construction noise or vibration impacts to the school facilities since it does not include realignment of

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Response to Comment AJ5-19

Comment is noted. The Noise analysis in the Final EIS/EIR (Section 3.14) has been updated to explicitly acknowledge and address temporary construction noise impacts at the school facilities. Noise from construction activities is typically stated in general terms in the environmental document, but its mitigation is specified in contract documents with the contractor during the construction phase.

Response to Comment AJ5-20

The proposed pile driving would occur for Alternatives 1, 2, 3, and 4. The proposed pile driving would occur west of the LADWP Power Station, between the ACTA railroad tracks and Pier Plaza Way north of Cerritos Channel, and south of the SR-47 terminus at Henry Ford Avenue. Pile driving may occur for falsework. Without pile driving at any locations near the schools, there is no potential for vibration effects.

Response to Comment AJ5-21

Noise from construction of the proposed project, particularly noise from pile driving, has been identified as an unavoidable impact. Caltrans standard specifications would require contractors to comply with all local sound control and noise level rules, regulations, and ordinances. Caltrans construction noise control provisions strive to minimize the effects of construction noise on sensitive receptors to the extent feasible.

Response to Comment AJ5-22

In the areas near the Long Beach schools, train noise is sporadic and happens on a single-event basis, while traffic noise is continuous during the peak-hour, particularly if the SR-103 alignment is the chosen alternative. Further, the railroad tracks are in excess of 450 feet west of the nearest classroom buildings (same side as the highway), which is more than twice the distance from the classrooms to the highway. As such, traffic is expected to be the prevalent and dominant source of noise during peak traffic hours. Therefore, abating future traffic noise by building a noise barrier would best address potentially significant noise impacts at the identified schools.

SR-103. However, for this project-level Draft EIR/EIS, the project should have evaluated the potential increase in ambient noise environment from construction activities occurring adjacent to the Cabrillo High School and Elizabeth Hudson Elementary School. Section 3.3.1.3.3.2, Construction of SR-103 Extension to Alameda Street, lists these two schools as being impacted by construction activities but

AJ5-19 Chapter 3.14, Noise, does not evaluate noise and vibration impacts at these sensitive receptors.

AJ5-20 Furthermore, Chapter 3.14 has no vibration impact analysis from construction activities. The noise analysis should state the approximate length of time necessary for construction of the proposed improvements and if pile drivers would be used to construct the SR-103 fly-over. Vibration impacts should be based on the potential for construction equipment to result in perceptible levels of vibration at the Elizabeth Hudson Elementary School that would result in human annoyance, based on the close proximity of the classroom structures.

AJ5-21 While construction noise and vibration impacts are often considered temporary, construction of roadway projects often last longer than a couple of months and noise and vibration impacts from construction operating adjacent to the District's facilities could impact a large proportion of the school year. Because construction noise is often difficult to mitigate, the project should consider the increase in ambient noise level caused by construction equipment operating in proximity to the Cabrillo High School and Elizabeth Hudson Elementary School and the duration of construction activity when determining the significance of the noise and vibration construction impact.

AJ5-22 **Page 3.14-28 through 32: Subsection, 3.14.3.3.2, Alternative 2: SR-103 Extension to Alameda Street: Operational Effects.** The Cabrillo High School and Elizabeth Hudson Elementary School are listed as noise-sensitive receptors in Section 3.14.2.1, Location of Noise Sensitive Receptors. Subsection, 3.14.3.3.2, Alternative 2: SR-103 Extension to Alameda Street, evaluates noise impacts at the Long Beach Neighborhood/SR-103 Extension section (page 3.14-30 through 3.14-32). According to the DEIR, existing ambient noise levels in the Long Beach Neighborhood along the SR-103 extension ranged from 62 to 73 dBA L_{eq} during noise monitoring. However, the analysis provided in Table 3.14-11 and 3.14-12 does not differentiate between the affected land use and the noise threshold being applied at the affected land use. Furthermore, the analysis does not include background noise levels from other transportation noise sources, such as train traffic. Since the primary ambient noise environment is comprised of transportation noise from both vehicle and train traffic, the noise impact analysis should add in the contribution from train traffic in order to accurately represent the future ambient noise environment at the District facilities. Consequently, it is not possible to determine the potentially significant impacts and cumulative impacts from the project, and to what threshold each potentially significant impact is being mitigated. For schools, this is important since a different threshold applies to interior and exterior areas.

AJ5-23 Unlike typical Caltrans' roadway projects, where traffic noise is comprised of a mix of light duty automobiles and medium and heavy duty trucks, traffic on the SR-103 is primarily from heavy, heavy duty truck traffic. Consequently, to adequately mitigate potential project-related noise impacts from the elevated northbound SR-103 ramps and impacts from the closest travel lanes on the SR-103 to the school site, Caltrans should consider sound walls that are no less than 11.5 feet high along the entire boundary of the school site in order to block line-of-sight of the truck exhaust stack to nearby noise sensitive receptors. Any sound wall less than the height of the truck exhaust stack does not adequately address the unique noise environment and consequences of the project. It is difficult to ascertain from Figure 3.14-7 if the 15-foot at-grade sound walls would be constructed along the entire Cabrillo High School and Elizabeth Hudson Elementary School site. Because outdoor athletic activities occur near the western boundary of both school sites, and projected noise levels from highway traffic (and cumulative noise sources – such as the railroad – although not accounted for in this chapter) exceed

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AJ5-23 the District's acceptable noise compatibility criteria, the District agrees that sound walls would be necessary to provide an adequate and safe learning environment for students in the Long Beach area.

AJ5-24 The noise-sensitive outdoor areas at the Elizabeth Hudson Elementary School do not appear to be modeled at the worst-case receptor near the edge of the hardcourts, but at points farther away from the nearest travel lanes of the SR-103.

AJ5-25 Section 3.14.2.1, Location of Noise Sensitive Receptor, lists the classrooms at Hudson Elementary School as 450 feet east of the SR-103. However, it is unclear whether or not this is the distance to the centerline of nearest lane of travel or the centerline of the SR-103. The noise impact analysis should state the existing distance of the outdoor areas and the classrooms at the school site from the centerline of the nearest lane of travel in order to accurately portray the future noise environment and how far trucks would be from the boundary of the school site.

AJ5-26 **Appendix Files: Noise.** The noise technical study, which included the Traffic Noise Model (TNM) noise datasheets, was not included in the Appendices during public review of the Draft EIR/EIS. Consequently, modeling inputs used for TNM modeling (speed, percent trucks, trucks per lane, incline and elevation of the SR-103 extension, proximity of nearest travel lane, sensitive receptor locations) could not be reviewed.

Traffic and Transportation

AJ5-27 We concur with the DEIS/EIR traffic analysis that under Alternative 1, during bridge closure for construction, traffic volumes would decrease on SR-103 and Henry Ford Avenue because most of the traffic affected by bridge closure (especially trucks) is expected to use the I-110 and I-710 to get in and out of the port area. Therefore although we believe that added traffic on I-710 would result in added congestion and delays and indirectly impact LBUSD schools in close proximity to I-710 the construction impact would be temporary and would not require a detailed construction impact analysis on the school area roadways. Once Alternative 1 construction is complete, it is anticipated that the truck volumes on the two nearby freeways and on Willow Street would decrease as a result of the project, while little or no impact on traffic conditions would occur for local streets that provide direct access to the school properties. Therefore, LBUSD has no further comments on Alternative 1.

AJ5-28 The District believes that Alternative 2, which includes the bridge replacement and an extension of SR-103 from Willow Street to Alameda Street, would result in an increase in traffic volumes on the Schuyler Heim Bridge, on SR-103, and on Alameda Street while the traffic volumes would decrease on I-710 and on the segment of Willow Street between SR-103 and I-710. However, the DEIS/EIR does not provide any traffic information on the roadway system east of SR-103. (Traffic section should also provide a figure that shows the studied intersection.) Therefore, meaningful analysis on traffic conditions for the roadway system serving the LBUSD schools could not be prepared. The DEIS/EIR should include analysis on intersections and segments east of SR-103 and north of Pacific Coast Highway.

AJ5-29 Additionally, the construction impact analysis under Alternative 2 indicates that the same types of construction effects would occur along SR-103 as along SR-47 under Alternative 1. This type of analysis is flawed because the impacted roadway intersections and segments are different under SR-47 construction and SR-103 construction sites. Impacted roadway intersections under Alternative 1 are generally located along Alameda Street and construction impacts relating to SR-103 extension would not be limited to Alameda Street alone.

Response to Comment AJ5-23

In accordance with the Caltrans Traffic Noise Analysis Protocol, soundwalls evaluated for abatement of highway noise must block the line-of-sight from impacted receivers to truck exhaust stacks. The noise analysis has taken this factor into account in determining the feasibility of soundwalls in the identified impact areas.

Response to Comment AJ5-24

Receivers 17, 18, and 19 along SR-103 are placed at locations nearest to the highway, where play activities would typically and reasonably occur. If the receivers were located too close to the evaluated noise barrier, they would be within the barrier "shadow zone," where the barrier noise reduction would show as being much greater than at other areas within the playgrounds.

Response to Comment AJ5-25

The noise models of existing and future scenarios take the distances from highway travel lanes and the receivers into account for every location. Therefore, distances are inherent in the analysis.

Response to Comment AJ5-26

The Noise Technical Study was deemed too large and too technical to be included as an appendix to the EIS/EIR.

Consistent with the requirements of CEQA, it was determined that supplemental information with a broad base of interest would be included as appendices to the EIS/EIR and that highly specialized and technical information would be made available to the public as separate reports. The introduction to Chapter 3.0 of the EIS/EIR listed the technical studies, including the Noise Technical Study, and informed readers that they were available for review at Caltrans District 7 Headquarters.

In addition, technical studies were made available for review at various libraries and later posted on the ACTA website. The Notices of Availability for both the Draft EIS/EIR and SDEIS/RDEIR

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provided a list of libraries and websites where the technical studies were available for review, and provided a contact for those requesting additional information.

Response to Comment AJ5-27

The commenter's concurrence with conclusions of the Alternative 1 traffic analysis is acknowledged.

Response to Comment AJ5-28

As stated in Section 3.5 of the Draft and the Final EIS/EIR, the traffic study analyzed the traffic conditions within the project area and the potential effects of the project alternatives on those conditions. Specifically, the analysis assumed replacement of the Schuyler Heim Bridge with either the new SR-47 Expressway or SR-103 Extension. The purpose of the traffic study was not to analyze every street and intersection in the project area, but the ones that would be most affected by the project. Specifically, the analysis includes the SR-47 Expressway mainline, ramps, 20 intersections in the immediate vicinity of the project, and intersections north and south of the project.

Response to Comment AJ5-29

The construction period traffic analysis was performed primarily to study the impact of closing lanes on the Schuyler Heim Bridge during construction, which is the same under Alternative 2 as would occur under Alternative 1. A more detailed traffic analysis for other areas of construction will be performed during preparation of Traffic Management Plan (TMP) during the design phase of the selected alternative.

Response to Comment AJ5-30

The commenter is referred to response AJ5-1, which addresses the treatment of impacts for Alternative 1 and Alternative 2.

Summary of Concerns Under Alternative 2

AJ5-30

These comments reflect the areas of concern to the District with respect to Alternative 2. The District believes that implementation of Alternative 1, which is the bridge replacement and the SR-47 Expressway project, would have minimal impacts on the LBUSD facilities and has no further comments. The District also does not have serious concerns pertaining to actions proposed under Alternatives 3 through 6. However, LBUSD operates several schools in close proximity to SR-103, including three schools immediately adjacent to the construction site under Alternative 2, and is very concerned about its impact on the welfare of the students and staff they house. Therefore, if Caltrans opts to proceed with Alternative 2, the DEIS/EIR should fully disclose and analyze the magnitude of impacts on school facilities, especially in the area of air, noise, and traffic per our comments, and provide feasible mitigation measures, if applicable. The qualitative analysis provided for Alternative 2 in the DEIS/EIR is inadequate; impacts should be quantified by using appropriate thresholds and with the same level of detail as Alternative 1.

Thank you for the opportunity to respond to the DEIS/EIR. We believe that the Caltrans and the LBUSD can work together to resolve all school facility, student, and staff health and safety concerns in a collaborative manner. The LBUSD would also be happy to meet with Caltrans and its consultants to discuss the impact of the project on the District's facilities, students, and staff and potential mitigation measures to offset such impacts. If you have any questions or would like to arrange a meeting to discuss our concerns, please feel free to contact me at (562) 997-7550.

Sincerely,

Carn M. Matsumoto
Executive Director
Facilities Development and Planning
Long Beach Unified School District

cc: Chris Steinhauser – LBUSD
Kim Stallings – LBUSD

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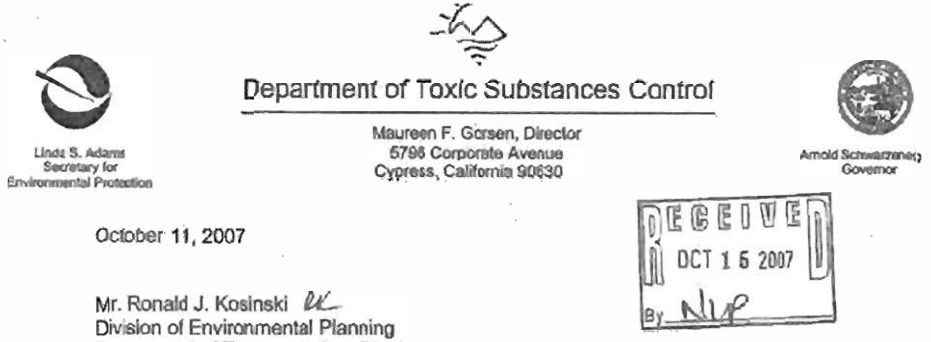
Letter AJ6. Signatory – Department of Toxic Substances Control

Response to Comment AJ6-1

The commenter's support of the proposed project is acknowledged.

Response to Comment AJ6-2

Requested information has been provided in the Final Initial Site Assessment (ISA) for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project (October 2005) under Sections 3.1.1 and 3.1.2. The ISA evaluates sites with releases or potential releases and identifies them as Recognized Environmental Conditions (RECs). The document was prepared as part of the technical study supporting the EIS/EIR report to evaluate hazardous waste conditions within the project ROW and areas in the vicinity.



Department of Toxic Substances Control

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By NIP

October 11, 2007

Mr. Ronald J. Kosinski
Division of Environmental Planning
Department of Transportation, District 7
100 South Main Street MS-16A
Los Angeles, California 90012

SITE-SPECIFIC STUDY OF A DRAFT ENVIRONMENTAL IMPACT REPORT (EIR) FOR SCHUYLER HEIM BRIDGE REPLACEMENT AND SR-47 EXPRESSWAY PROJECT

Dear Mr. Kosinski:

The Department of Toxic Substances Control (DTSC) has received your submitted EIR document for the above-mentioned project. As stated in your document: "The Schuyler Heim Bridge Replacement and SR-47 Expressway Project is being advanced through a joint partnership between Caltrans and the Alameda Corridor Transportation Authority (ACTA) The project proposes to replace the seismically deficient Schuyler Heim Bridge over Cerritos Channel and add a four-lane elevated roadway connection to Alameda Street that will bypass three signalized intersections and five at-grade railroad crossings. The Heim Bridge is an essential service link between Terminal Island and the mainland in Wilmington.

This project will provide an alternative route from Terminal Island, a major generator of port related truck traffic, and provide direct access to local distribution centers and warehousing facilities in the South Bay area, as well as I-405 and SR-91, thereby relieving congestion on the Harbor and Long Beach freeways.

AJ6-1 The Schuyler Heim Bridge Replacement and SR-47 project will enhance the efficient, secure movement of goods at the nation's largest port complex, as well as reduce congestion and improve mobility".

Based on the review of the submitted Notice of Preparation DTSC has the following comments:

AJ6-2 1. The draft EIR needs to identify and determine whether current or historic uses at the Project site have resulted in any release of hazardous wastes/substances at the Project area.

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Response to Comment AJ6-3

The databases listed were reviewed for known and potentially contaminated sites within the project area. Requested information has been provided in the Final Initial Site Assessment for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project (October 2005) under Sections 3.1.1 and 3.1.2. This document was prepared as part of the technical study supporting the EIS/EIR report to evaluate hazardous waste conditions within the project ROW and areas in the vicinity.

Response to Comment AJ6-4

As indicated in section 3.12.4.1. (HAZ-1) of the EIS/EIR, upon approval of the project, a detailed Phase II Soil Investigation will be conducted for the properties that have been identified as areas of concern and that have the potential to impact the project ROW. This investigation will be conducted to evaluate the site conditions at that time. If contaminated areas are found during the Phase II process, these areas will then be further evaluated for remediation. These phases of investigation will be conducted prior to the start of the project construction. All investigation work will be done in accordance with an approved Workplan and Health and Safety Plan.

Mr. Ronald J. Kosinski
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2. The draft EIR needs to identify any known or potentially contaminated sites within the proposed Project area. For all identified sites, the draft EIR should evaluate whether conditions at the site pose a threat to human health or the environment. Following are the databases of some of the regulatory agencies:

   - National Priorities List (NPL): A list is maintained by the United States Environmental Protection Agency (U.S.EPA).
   - CalSites: A Database primarily used by the California Department of Toxic Substances Control.
   - Resource Conservation and Recovery Information System (RCRIS): A database of RCRA facilities that is maintained by U.S. EPA.
   - Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS): A database of CERCLA sites that is maintained by U.S.EPA.
   - Solid Waste Information System (SWIS): A database provided by the California Integrated Waste Management Board which consists of both open as well as closed and inactive solid waste disposal facilities and transfer stations.
   - Leaking Underground Storage Tanks (LUST) / Spills, Leaks, Investigations and Cleanups (SLIC): A list that is maintained by Regional Water Quality Control Boards (RWQCB's).
   - Local County and City maintain lists for hazardous substances cleanup sites and leaking underground storage tanks.

AJ6-3

3. The draft EIR should identify the mechanism to initiate any required investigation and/or remediation for any site that may be contaminated, and the government agency to provide appropriate regulatory oversight. If hazardous materials or wastes were stored at the site, an environmental assessment should be conducted to determine if a release has occurred. If so, further studies should be carried out to delineate the nature and extent of the contamination, and the potential threat to public health and/or the environment should be evaluated. It may be necessary to determine if an expedited response action is required to reduce existing or potential threats to public health or the environment. If no immediate threat exists, the final remedy should be implemented in compliance with state laws, regulations and policies.

AJ6-4

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Response to Comment AJ6-5

If any areas are identified during the Phase II investigation as being impacted by pesticide or herbicide residue, then appropriate remedial steps will be taken to clean the site prior to construction if determined necessary.

Response to Comment AJ6-6

Your review comment is acknowledged. Coordination with regulatory agencies will be made for soil investigation, sampling, and/or remediation. This is included in mitigation measure HAZ-8, Section 3.12.4.1 of the Draft and the Final EIS/EIR for Alternative 2. It has also been added for the other alternatives in mitigation measure HAZ-1.

Response to Comment AJ6-7

Your review comment is acknowledged. This information has been included in measure HAZ-1 of Section 3.12.4.1 in the Draft and the Final EIS/EIR.

Response to Comment AJ6-8

Pursuant to Health and Safety Code 25221, the Border Zone Property designation is applicable for building structures identified in Health and Safety Code 25232,(b). This project is proposing to construct a freeway, not a structure for residential, hospital, or school use.

Response to Comment AJ6-9

The workplan that will be prepared for project construction will include elements that will require: evaluation of the potential for release of hazardous materials during construction; and steps to mitigate any such potential release.

Response to Comment AJ6-10

Your review comment is acknowledged and will be implemented as directed. Any hazardous waste generated or identified during project

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AJ6-5 4. If the subject property was previously used for agriculture, or if weed abatement occurred, onsite soils could contain pesticide or herbicide residues. Proper investigation and remedial action may be necessary to ensure the site does not pose a risk to the future residents.

AJ6-6 5. All environmental investigations, sampling and/or remediation should be conducted under a Workplan approved and overseen by a regulatory agency that has jurisdiction to oversee hazardous waste cleanup. The findings and sampling results from the subsequent report should be clearly summarized in the EIR.

AJ6-7 6. Proper investigation, sampling and remedial actions, if necessary, should be conducted at the site prior to the new development or any construction, and overseen by a regulatory agency.

AJ6-8 7. If any property adjacent to the project site is contaminated with hazardous chemicals, and if the proposed project is within 2,000 feet from a contaminated site, then the proposed development may fall within the "Border Zone of a Contaminated Property." Appropriate precautions should be taken prior to construction if the proposed project is within a "Border Zone Property

AJ6-9 8. Human health and the environment of sensitive receptors should be protected during the construction or demolition activities. A study of the site overseen by the appropriate government agency might have to be conducted to determine if there are, have been, or will be, any releases of hazardous materials that may pose a risk to human health or the environment.

AJ6-10 9. If it is determined that hazardous wastes are, or will be, generated by the proposed operations, the wastes must be managed in accordance with the California Hazardous Waste Control Law (California Health and Safety Code, Division 20, chapter 6.5) and the Hazardous Waste Control Regulations (California Code of Regulations, Title 22, Division 4.5). If so, the facility should obtain a United States Environmental Protection Agency Identification Number by contacting (800) 618-6942.

AJ6-11 10. If hazardous wastes are (a) stored in tanks or containers for more than ninety days, (b) treated onsite, or (c) disposed of onsite, then a permit from DTSC may be required. If so, the facility should contact DTSC at (818) 551-2171 to initiate pre application discussions and determine the permitting process applicable to the facility.

AJ6-12 11. Certain hazardous waste treatment processes may require authorization from the local Certified Unified Program Agency (CUPA). Information about the requirement for authorization can be obtained by contacting your local CUPA.

construction will be managed and disposed in accordance with regulatory requirements.

Response to Comment AJ6-11

Your review comment is acknowledged. Consistent with standard construction specifications, the contractor will contact DTSC, as appropriate.

Response to Comment AJ6-12

Your review comment is acknowledged. It will be implemented as suggested in the comment.

Response to Comment AJ6-13

Your comment is acknowledged. Appropriate SWPPPs will be prepared during the construction phase of the project, and applicable NPDES permits will be obtained to comply with stormwater regulations during construction.

Response to Comment AJ6-14

Your review comment is acknowledged and the suggestion in the comment will be followed. Also, please see response AJ6-4.

Response to Comment AJ6-15

Your review comment has been acknowledged. If any structures containing ACM and LBP are found to be located within the project ROW, they will be abated and removed prior to construction of the selected alternative (see HAZ-4, HAZ-5, and HAZ-6).

AJ6-13 12. If the project plans include discharging wastewater to a storm drain, you may be required to obtain a wastewater discharge permit from the overseeing Regional Water Quality Control Board.

AJ6-14 13. If during construction/demolition of the project, soil and/or groundwater contamination is suspected, construction/demolition in the area should cease and appropriate health and safety procedures should be implemented. If it is determined that contaminated soil and/or groundwater exist, the EIR should identify how any required investigation and/or remediation will be conducted, and the appropriate government agency to provide regulatory oversight.

AJ6-15 14. If structures on the Project Site contain potentially hazardous materials, such as; asbestos-containing material, lead-based paint, and mercury- or PCB-containing material, such materials should be removed properly prior to demolition, and disposed of at appropriate landfills or recycled, in accordance with the regulatory guidance provided in California Code of Regulation (CCR) and following the requirements of the Universal Waste Rule (40 CFR part 9).

If you have any questions regarding this letter, please contact Mr. Al Shami Project Manager, at (714) 484-5472 or at "ashami@dtsc.ca.gov".

Sincerely,

Greg Holmes
Unit Chief
Southern California Cleanup Operations Branch - Cypress Office

cc: Governor's Office of Planning and Research
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044

Mr. Guenther W. Moskat, Chief
Planning and Environmental Analysis Section
CEQA Tracking Center
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

Letter AJ7. Signatory – U.S. Environmental Protection Agency

Response to Comment AJ7-1

The EPA's rating of the Draft EIS/EIR as EC-2 is acknowledged.

Detailed responses to issues related to cumulative impacts, environmental justice, and air quality are provided in the responses that follow.

See also Response to Comment EO1-5 and AJ11-2.

Response to Comment AJ7-2

Your suggestion to perform dispersion modeling for the major MSATs is acknowledged. In response to comments received on the Draft EIS/EIR, the Alameda Corridor Transportation Authority (ACTA), a joint powers authority of which both the City of Los Angeles and the Port of Los Angeles are members, elected to conduct an HRA as part of its funded portion of the proposed project. The methodology and results of the HRA were presented in the SDEIS/RDEIR, released November 28, 2008, and incorporated into this Final EIS/EIR. ACTA's HRA indicated that the proposed project would have regional benefits that would reduce health risks in the majority of the study area; therefore, the proposed project would result in a net benefit with respect to cumulative health risk impacts. The maximum increase of cancer risks would exceed 10-in-a-million at limited number of homes within the study area. ACTA has committed to mitigate the cancer risk increase to the level of less than 10-in-a-million by retrofitting the HVAC systems of impacted homes. The discussion in Subsection 3.13.2.2.1 has been revised to discuss the number of exceedances of the new 24-hour standard for $PM_{2.5}$. The three years of monitoring station data presented in Table 3.13-2 have exceeded the new 24-hour standard each year.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

October 12, 2007

Mr. Ron Kosinski
California Department of Transportation
100 South Main Street
Los Angeles, California 90012-3606

Subject: Draft Environmental Impact Statement (FEIS) for the Schuyler Heim Bridge Replacement and State Route 47 Expressway Project (CEQ # 20070361)

Dear Mr. Kosinski:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the Schuyler Heim Bridge Replacement and State Route (SR) 47 Expressway Project (Project), Ports of Los Angeles and Long Beach, Los Angeles County, California. Our comments are provided under the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act. Based upon our review, we have rated the proposed action as *Environmental Concerns- Insufficient Information (EC-2)*. See attached "Summary of the EPA Rating System" for a description of the rating. The basis for the rating is summarized below and further detailed in our enclosed comments.

AJ7-1

Cumulative Impacts

EPA is aware of a number of forthcoming EISs in the port area over the next few years, which, if implemented, will lead to substantial cumulative environmental impacts in an already highly impacted area. We note that the neighboring low income and minority communities have historically sustained extensive impacts to air quality and water quality from goods movement-related operations. For this reason, it is critical that the environmental documentation for this project, and all future projects in the Port of Los Angeles and Port of Long Beach area, reflect the level of historical, current, and future direct, indirect, and cumulative environmental impacts. In particular, this project's contributions to cumulative effects must be clearly defined along with proposed mitigation. EPA recommends that the FEIS include a more robust cumulative impact assessment that effectively discloses the health of the current environment, the trends that have contributed to impacts and/or losses to these resources, and the Project's cumulative effects.

AJ7-2

Air Quality

EPA has concerns with the Project's impacts to air quality, including mobile source air toxics (MSATs). EPA recommends, given the likelihood of a shift in localized MSAT impacts in an area that is already highly impacted by air toxics, that Caltrans perform dispersion modeling for major MSATs to identify areas that may experience an increase in MSATs. Caltrans should provide additional mitigation for any adverse MSATs impacts and commit to these mitigation measures in the FEIS and Record of Decision (ROD). The mitigation plan developed for the

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Response to Comment AJ7-3

Your concerns regarding the environmental justice issues related to potential air quality impacts of the project are acknowledged.

The Environmental Justice analysis acknowledges that the community where the project is located is both low-income and minority and that the community would be affected by project-related impacts. Further, benefits of the project, such as reduced congestion and better traffic flow in the Port area, are benefits that will be borne by the same community. The construction air quality impacts of this project are typical of projects of similar size and magnitude; the proposed project would not result in a disproportionately high impact due to its location within a predominantly minority and low-income community. Further, all feasible mitigation measures have been proposed for the project without any discrimination based on the age, color, race, or socioeconomic status of the affected community. See the Draft and the Final EIS/EIR Section 3.3.3 for the Environmental Justice evaluation.

The air quality discussion in Section 3.13 of the Draft and the Final EIS/EIR acknowledges the existing poor air quality conditions at the Port and neighboring communities. The lead agency has identified all feasible mitigation measures to minimize project-related localized air quality impacts during construction. The existing poor air quality at the Port and cumulative impacts of the project and other related projects occurring in the Port area are acknowledged in the Draft and the Final EIS/EIR Section 3.13, Air Quality, and Chapter 5.0, Cumulative Impacts.

Also see responses AJ7-1, AJ11-2, AJ7-25, AJ7-28, and EO1-5.

Response to Comment AJ7-4

The commenter's concern for the construction effects on resuspended sediment is acknowledged. Resuspension of sediments during construction will be mitigated by project design. For all in-water piles, Caltrans will use a cast-in-steel-shell (CISS) design, whereby the outer

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Project should 1) further minimize impacts from construction; 2) be consistent with the Clean Air Action Plan (CAAP, approved on November 20, 2006); and 3) identify specifically how measures identified in the CAAP can be both expanded upon and implemented earlier. EPA also recommends that the FEIS include additional monitoring data and studies performed in the project area and identify exceedances of the new 24-hour national ambient air quality standard for particulate matter less than 2.5 microns in diameter (PM2.5).

AJ7-2

Environmental Justice

AJ7-3 EPA is concerned that the project may result in disproportionately high and adverse air quality impacts to low income and minority populations. EPA recommends that Caltrans re-assess these potential impacts as detailed in the enclosed comments. Mitigation should be proposed, as necessary, to reduce any identified environmental justice impacts.

Water Quality

AJ7-4 EPA is concerned that proposed construction work in the Cerritos Channel and Consolidated Slip/Dominguez Channel will resuspend fine-grained bottom sediments and may exceed state water quality standards and the proposed silt/turbidity curtains may not be fully effective to reduce impacts from resuspended sediments, given tidal influences and the depth of the channel. Also, the DEIS does not accurately characterize the current conditions in the area surrounding the bridge. EPA recommends including recent testing results from complete Tier 1 and Tier 2 sediment sampling in the area surrounding the bridge in the Cerritos Channel and implementing additional best management practices (BMPs) and a construction monitoring program to ensure containment of resuspended sediments.

AJ7-5 The enclosed Detailed Comments include additional recommendations to coordinate with EPA's Superfund Program for work proposed in Consolidated Slip and with the U.S. Fish and Wildlife Service and the California Department of Fish and Game to address impacts to the American peregrine falcon nesting pair on the Schuyler Heim Bridge.

AJ7-6 We appreciate the opportunity to review this DEIS and are available to further discuss all recommendations provided. When the FEIS is released for public review, please send two hard copies and three electronic copies to the address above (Mail Code: CED-2). If you have any questions, please contact me at 415-972-3846 or Susan Sturges, the lead reviewer for this project. Susan can be reached at 415-947-4188 or sturges.susan@epa.gov.

Sincerely,

Connell Dunning

for Nova Blazej, Manager
Environmental Review Office

Enclosures:
EPA's Detailed Comments
Summary of EPA Rating Definitions

cc: Karl Price, California Department of Transportation
Steve Healow, Federal Highway Administration
Mark Cohen, U.S. Army Corps of Engineers

shell acts as a coffer dam during construction. Because both the Cerritos Channel and Consolidated Slip sediments are well characterized for chemical quality, and construction-associated resuspended sediments will be effectively contained, no further testing of sediments should be required at this time.

Water quality data used for the *Water Quality Impacts Technical Study* and Final EIS/EIR was obtained from the Port of Los Angeles. The time that would be required to obtain and evaluate the Tier 1 and Tier 2 data would adversely affect the project schedule. Further, the information would not change the findings of the water quality analysis.

Response to Comment AJ7-5

The recommendations associated with coordination with the EPA superfund program in Consolidated Slip and with federal and state wildlife agencies for impacts to nesting peregrine falcons are acknowledged and addressed in response to Comments AJ7-31, AJ7-32, AJ7-37, and AJ7-38. Full coordination with the appropriate agencies will be conducted throughout the planning, design, and construction phases of the project.

Both the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG) were contacted during the Natural Environment Study (NES) development in 2002. CDFG was contacted again in 2006. In addition, both agencies were requested to identify special-status species of concern for the project, and CDFG was specifically requested to review and comment on peregrine falcon impacts and mitigation. Both agencies were provided the Notice of Preparation and the NES to assist them in providing review and comments.

The CDFG and USFWS were again contacted by letter in February 2008. To date, neither agency has responded with specific comments or concerns regarding the displacement of the peregrine falcon within the Ports of Los Angeles and Long Beach, or proposed mitigation. The Final EIS/EIR includes copies of agency coordination on this and other species.

Response to Comment AJ7-6

As requested, two hard copies and three CDs of the Final EIS/EIR have been sent to:

Nova Blazej, Manager
Environmental Review Office
U.S. Environmental Protection Agency, Region IX
San Francisco, CA 94105-3901

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Response to Comment AJ7-7

Chapter 5.0 of the Draft and the Final EIS/EIR addresses the cumulative impacts associated with the Project. The analysis was completed to adhere to the National Environmental Policy Act (NEPA), per 40 CFR, Section 1508.7, of the Council on Environmental Quality (CEQ) Regulations, and the California Environmental Quality Act (CEQA), as defined in Section 15355 of the CEQA Guidelines. The analysis of cumulative effects also was assessed in accordance with the Federal Highway Administration (FHWA) *Position Paper on Secondary and Cumulative Impact Assessment* (FHWA, 1992). NEPA and CEQA both require analysis of the cumulative effects or impacts of a proposed project, plus other projects that occur in the same general geographic area. The study area for the cumulative impact analysis includes the Port of Long Beach, Port of Los Angeles, City of Long Beach, City of Carson, and in the San Pedro and Wilmington Districts of the City of Los Angeles.

The Draft and the Final EIS/EIR cumulative analysis utilize the best available information to assess the identified cumulative projects and their potential impacts. The status of the individual projects determines the level of information that is available. Public documents, conceptual plans or applications, and consultations with project applicants and government agencies were the primary sources of information for this analysis.

The project contribution to the cumulative effects for air quality is discussed in the Draft and the Final EIS/EIR, Chapter 4.0 CEQA Evaluation (Section 4.5.6.2 Air Quality) and Chapter 5 Cumulative Impacts (Section 5.3.13 Air Quality). During project construction and operations, significant emissions of NO_x would occur as a result of marine vessel detours around Terminal Island. These emissions would contribute to cumulatively significant impacts to air quality.

The following revisions to the text in Section 5.3.13 have been made:

- The text in Section 5.3.13 stated that "emissions of CO, ROG, and PM_{10} due to marine vessel detours would be minimal and would

EPA'S DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE SCHUYLER HEIM BRIDGE REPLACEMENT AND STATE ROUTE 47 EXPRESSWAY PROJECT IN THE PORTS OF LOS ANGELES AND LONG BEACH, OCTOBER 12, 2007

Cumulative Impacts

The cumulative impacts section of the Draft Environmental Impact Statement (DEIS) for the Schuyler Heim Bridge Replacement and State Route 47 Expressway Project (Project) in the Ports of Los Angeles and Long Beach identifies multiple current and future projects to be constructed in the ports area. A second document, the recently completed DEIS for the TRAPAC terminal also identifies multiple capacity increasing and infrastructure projects. Based on information contained in both documents, an estimated 14 combined Environmental Impact Report (EIR)/EISs, and almost twice as many EIRs, are to be developed in support of infrastructure projects over the next few years. This large volume of future proposed projects in the ports, if implemented, will lead to substantial cumulative construction- and operation-related environmental impacts in an already highly impacted area. We note that the neighboring low income and minority communities have historically sustained extensive impacts to air quality and water quality from goods movement-related operations.

The high volume of proposed projects combined with a highly urbanized setting, with low-income and minority communities in an already highly impacted area, demands a thorough cumulative impacts assessment with extensive proposed mitigation. Specifically, all feasible mitigation should be proposed and committed to along with timeframes for implementation.

The DEIS includes a brief qualitative discussion of cumulative impacts for each resource area, but does not provide an appropriate context for cumulative impacts. The DEIS does not include the historical extent of resource losses and impacts and instead, relies on baseline conditions described in the Affected Environment sections of the document for the analysis.

AJ7-7 Given the historically sustained extensive cumulative impacts to air and water quality from goods movement-related operations, EPA strongly recommends a more comprehensive analysis of cumulative impacts to resources of concern. The Final EIS (FEIS) should include a more robust cumulative impact assessment that effectively discloses: 1) a defined study area for each resource; 2) the health or status of the resource and the historical extent of losses and/or impacts to the resource; 3) the trends associated with those losses and/or impacts; 4) how reasonably foreseeable actions may impact those resources; 5) the Project's contributions to these cumulative effects; and 6) a mitigation strategy and timeframe of implementation to reduce impacts.

Recommendation:

AJ7-8 • Include a more robust cumulative impact analysis in the FEIS. EPA recommends Caltrans follow the June 2005 *Guidance for Preparers of Cumulative Impact Analysis* prepared jointly by Caltrans, Federal Highway Administration, and the EPA for this additional analysis. The guidance is a useful reference and is available on-line at http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm

AJ7-9 • Include a mitigation strategy to reduce impacts from the proposed project and include timeframes for implementation of all proposed mitigation.

be unlikely to contribute significantly to the cumulative impacts." This text has been revised to state that: "emissions of CO, ROG, SO_2, PM_{10}, and $PM_{2.5}$ due to marine vessel detours would be minimal and would be unlikely to contribute significantly to the cumulative impacts."

- The following text has been added after the revised sentence above: "The minor increase in diesel particulate matter emissions (2.5 lb/day PM_{10} and 2.3 lb/day $PM_{2.5}$) from the marine vessels detours would not be expected to contribute significantly to cumulative health impacts. The diesel particulate matter emissions were based on conservative assumptions and current emissions factors. In addition, the types of marine vessels detoured due to the proposed action would be required to comply with the measure recently approved by CARB to reduce emissions from commercial harbor craft. Therefore, the diesel particulate matter emissions from the marine vessel detours during construction and operation would be expected to be less than the values presented in Tables 3.13-11, 3.13-12, and 3.13-14" (Draft and Final EIS/EIR, Chapter 3.13 Air Quality).

Section 5.3.10 of the Draft and the Final EIS/EIR addresses the project's cumulative water quality and stormwater runoff impacts. Cumulative water quality impacts could occur during replacement of the Gerald Desmond Bridge in the Port of Long Beach, due to the relatively large scale of that project, its location across the Back Channel, which intersects the Cerritos Channel on the east end of Terminal Island, and its proximity to the Schuyler Heim Bridge. Other projects that, collectively, could result in cumulative water quality impacts during construction of Alternative 1 are Berth 206-209 Interim Container Terminal Reuse, Berth 171-181 Pasha Marine Terminal Improvements, Ultramar Lease Renewal, SSA Outer Harbor Fruit Facility Relocation, Channel Deepening, San Pedro Waterfront Promenade, Waterfront Gateway, and Evergreen Expansion. These projects are all located in the Port of Los Angeles.

The project specific mitigation measures listed in the Draft and the Final EIS/EIR Sections 3.10.4 and 3.13.4 and Chapter 4 (CEQA Evaluation) identify the avoidance, minimization, and mitigation measures necessary to reduce project-specific impacts. It was determined that the cumulative air quality impacts from construction would remain adverse even with implementation of project-specific mitigation measures. There also is the potential for cumulative impacts to surface water quality to occur during project construction, if there are concurrent construction projects along the Cerritos Channel.

Response to Comment AJ7-8

The cumulative analysis presented in the Draft and the Final EIS/EIR Chapter 5.0 was prepared to adhere to state and federal regulations under NEPA (40 CFR, Section 1508.7 of the CEQ), CEQA (Section 15355 of the CEQA Guidelines), and FHWA, including the FHWA *Position Paper on Secondary and Cumulative Impact Assessment* (FHWA, 1992). The intent of the *June 2005 Guidance for Preparers of Cumulative Impact Assessments* is to provide guidance for preparing cumulative impact analyses in accordance with NEPA (40 CFR, Section 1508.7 of the CEQ) and CEQA (Section 15355 of the CEQA Guidelines). In this respect, because the cumulative analysis included in the Draft and Final EIS/EIR was prepared to adhere to these federal and state regulations, it is consistent with the intent of the *June 2005 Guidance for Preparers of Cumulative Impact Assessments*. Please see response AJ7-7 regarding the cumulative scope of analysis and findings.

Response to Comment AJ7-9

The proposed avoidance, minimization, and mitigation measures for the project are identified in the Draft and the Final EIS/EIR Summary (Table S-1), Chapter 4.0 CEQA Evaluation (Table 4-1), environmental resource discussions in Chapter 3.0, and Appendix H.

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Response to Comment AJ7-10

Your suggestion to follow the March 2007 report *Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process* is acknowledged. The MSAT analysis contained in the Draft EIS/EIS meets the requirements for an MSAT analysis. See also responses EO1-5 and AJ7-2.

Air Quality

Mobile Source Air Toxics

The project area includes the Wilmington District of the City of Los Angeles, which is already one of the most heavily impacted areas for air quality in the nation. In addition to being adjacent to the Ports of Los Angeles and Long Beach (where marine vessels, cargo handling equipment, diesel trucks, and locomotives all contribute mobile source air toxics (MSAT) emissions), Wilmington is also the location of several oil refineries and other major air toxics emitters.

A 2001-2003 California Air Resources Board monitoring study (http://www.arb.ca.gov/ch/reports/wilmington_sb25_report.pdf) adjacent to Wilmington Park Elementary School (1115 Mahar Avenue, Wilmington, CA), approximately 1000 feet from the proposed Project area where Henry Ford Avenue meets Alameda Street, found high levels for several air toxics. Predicted increased cancer risks due to air toxics at the site were 277 in a million, which is much higher than the level EPA generally considers unacceptable (EPA uses >100 in a million risk as unacceptable for stationary sources; see the Benzene NESHAP, 54 FR 38044, September 14, 1989). The majority of the increased cancer risk was due to 1,3-butadiene and benzene, both primarily emitted by mobile sources. The 277 in a million risk was from only nine air toxics. Including the impacts of diesel particular matter (PM) would make the actual risks much higher.

AJ7-10

Given the significant concerns about adverse health effects from mobile source pollutants and the project's potential for emissions in close proximity to residential communities and sensitive receptors, EPA recommends performing an analysis of potential MSAT impacts that informs decision-making between project alternatives and informs avoidance, minimization, and mitigation options. When considering appropriate and useful levels of analysis, EPA recommends that the lead agency consider the following:

- The likelihood of impact and potential magnitude of the effect, including both the magnitude of emissions and the proximity of the project emissions to potential residential and sensitive receptors, such as schools, hospitals, day care facilities, and nursing homes;
- The severity of existing conditions;
- Whether the project is controversial and whether air toxics concerns have been raised by the public for this project or for other projects in the area in the past;
- Whether there is a precedent for analysis for projects of this type, either under NEPA or other environmental laws; and
- Whether the analysis could be useful for distinguishing between alternatives, informing design changes, and targeting mitigation.

For most transportation projects, EPA generally recommends that the following levels of analysis be considered (in order of increasing complexity):

1. Qualitative discussion,
2. Quantify emissions,
3. Toxicity-weight emissions.

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4. Dispersion modeling, and
5. Risk assessment.

These analyses are further described in the March 2007 report entitled "Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process" conducted for the American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on the Environment and funded by the Transportation Research Board (http://www.trb.org/NotesDocs/25-25(18)_FR.pdf). Procedures for toxicity-weighting, which EPA has found to be especially useful for the targeting of mitigation, are described in EPA's Air Toxics Risk Assessment Reference Library (Volume 3, Appendix B, beginning on page B-4, http://epa.gov/ttn/fera/data/risk/vol_3/Appendix_B_April_2006.pdf).

The DEIS acknowledges the need for quantitative MSAT analysis, stating (page 3.13-20):

"(1) the project would serve diesel trucks with the potential to concentrate diesel particulate matter; and
(2) sensitive receptors are within the project area and near the project site."

EPA agrees that a quantitative MSAT analysis is appropriate in this situation. The Project may result in shifting or exacerbating MSAT impacts in an area that is already heavily impacted, causing a concern with both direct and cumulative impacts. While the DEIS acknowledges the need for quantitative MSAT analysis, the analysis presented is inadequate to fully understand how MSAT impacts may vary between project alternatives. The regional emissions analysis, presented in Table 3.13-9, does not have sufficient information to describe how MSAT impacts will change, given that MSAT impacts are usually very localized (i.e. "hotspot").

Monitoring studies and epidemiological research have found that the largest impacts from vehicle-related pollutants generally occur within the first 1000 feet of a major roadway (see Section 3 of EPA's "Regulatory Impact Analysis: Control of Hazardous Air Pollutants from Mobile Sources," February 2007, http://www.epa.gov/otaq/regs/toxics/fr-ria-sections.htm). The DEIS acknowledges that there are a number of sensitive receptors, including residences and schools, that are closer than 1000 feet, some even within 100 feet of the proposed Project location. Thus, any change in traffic density resulting from the proposed Project alternatives (for example, the shifting of truck traffic from State Route 103 (SR-103) or Interstate 710 (I-710) to State Route 47 (SR-47)/Alameda Street) is likely to lead to both an increase in MSAT impacts at one location and a decrease in MSAT impacts at another location. The net result of this change may be either unacceptable or beneficial, and is especially dependent on the relative locations of sensitive receptors, but is difficult to determine without further quantitative analysis of changes in ambient concentration as a result of each alternative.

AJ7-10

Response to Comment AJ7-11

See response AJ7-2.

Table 4-1 of the Draft and Final EIS/EIR identifies significant and unavoidable construction impacts. Reporting the predicted change in ambient concentration that would result from construction would not provide a more meaningful conclusion. Therefore, dispersion modeling will not be used to evaluate changes in ambient concentrations from construction emissions, as dispersion modeling was not conducted. Instead, the MSAT analysis for the Final EIS/EIR was conducted based on roadway segments within the boundary of State Route 91 (SR-91) to the north, Interstate 110 (I-110) to the west, Interstate 710 (I-710) to the east, and Ocean Boulevard to the south. The MSAT analysis provided in the Draft EIS/EIR was based on the entire project study area as defined in Section 3.5.

Response to Comment AJ7-12

Your comments regarding the clarity of the air quality impact analysis are acknowledged. The analyses required by FHWA, EPA, and Caltrans to evaluate air quality impacts from transportation projects cannot identify the specific location of these impacts. However, additional text has been added to each alternative discussion in Chapter 5, Section 5.3.13, to qualitatively discuss the potential cumulative air quality impacts in relation to the sensitive receptors.

See also Response to Comment AJ7-2.

Response to Comment AJ7-13

See Response to Comment AJ7-2 and AJ18-2.

Response to Comment AJ7-14

Your comment that the Draft EIS/EIR reports the correct nonattainment designations is noted. The Heavy-Duty Truck Buyback Program mitigation measure will be consistent with and support either the Gateway Cities or the Clean Air Action Plan heavy duty truck buyback program. Please also see Response to Comment AJ17-12.

Recommendations:

AJ7-11
- Given the likelihood of a shift in localized MSAT impacts in an area that is already highly impacted by air toxics, EPA recommends that Caltrans perform dispersion modeling of each of the MSATs listed in Table 3.13-9 for inclusion in the FEIS. Maps of ambient concentration should be presented in the FEIS for both the base year (2003, no build) and fully-operational facility (all alternatives). If construction emissions are not fully mitigated, the predicted changes in ambient concentration that would result from construction activity should be presented as well.

AJ7-12
- The FEIS should discuss areas where alternatives may lead to increased MSAT impacts or provide environmental benefits. For example:
  - Would changes to SR-47 lead to increased impacts near Henry Ford Avenue and Alameda Street? For alternatives that may lead to increased MSAT impacts, the MSAT analysis will be critical for distinguishing between build alternatives, identifying whether specific design changes or mitigation would be necessary or beneficial, and targeting mitigation efforts.
  - Would the proposed SR-103 Extension result in decreases in truck traffic along Willow Street to I-710, providing an environmental benefit for this heavily-residential area?

AJ7-13
- If the project will result in increased MSAT impacts, then Caltrans should propose MSAT mitigation measures. In order to be most helpful for targeting mitigation, the emissions should be further reported by project segment and smaller geographic locations. The benefits of proposed MSAT mitigation measures should be quantified and discussed in terms of the ability of mitigation to minimize or eliminate any potential adverse localized impacts.

AJ7-14

National Ambient Air Quality Standards

The Project is located in the South Coast Air Basin (SCAB). The SCAB is classified by EPA as serious nonattainment of the National Ambient Air Quality Standards (NAAQS) for particulate matter less than ten microns in diameter (PM10), nonattainment for particulate matter less than 2.5 microns in diameter (PM2.5), severe nonattainment for 8-hour ozone, and maintenance for CO. The SCAB has the worst 8-hour ozone and $PM_{2.5}$ problems in the nation, and attainment of these National Ambient Air Quality Standards (NAAQS) will require massive reductions from mobile sources, given the rapid growth in this emissions category and the long lifespan of diesel engines. The DEIS accurately reflects the SCAB nonattainment designations made by EPA for the NAAQS.

San Pedro Bay Ports Clean Air Action Plan

The San Pedro Bay Ports Clean Air Action Plan (CAAP), approved on November 20, 2006, identifies the measures that the Port of Los Angeles and the Port of Long Beach will take to reduce the emissions from Port operations. The CAAP includes recommendations and measures to reduce emissions 45% by 2011 through control measures for ocean-going vessels, heavy duty vehicles, cargo-handling equipment, harbor craft, and locomotives. The measures included are anticipated to reduce diesel particulate matter by 80% over the next five years (p. 4-39). Construction equipment and heavy duty truck emissions are expected to be a substantial

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Response to Comment AJ7-15

As occurred with the Draft EIS/EIR, the Air Quality, Traffic, and other technical studies will be provided electronically and at selected locations for review with the Final EIS/EIR. These studies are so large that it is not practicable to include them with distribution of each EIS/EIR. The public will be notified of the locations where hard copies of these studies will be made available once the Final EIS/EIR is released.

The commenter is also referred to Response to Comment AJ5-14 and AJ5-26.

Response to Comment AJ7-16

The federal approvals required for the project were reviewed, in addition to the General Conformity rule and the Transportation Conformity rule. Based on the definition of a the term "federal action" in the Transportation Conformity rule (40 CFR 93.152), it was determined that only transportation conformity would apply to the federal approvals required for the project. Therefore, the General Conformity applicability analysis has been removed from the air quality analysis in Section 3.13 of the Final EIS/EIR. However, the indirect emissions from marine vessel detours were not removed from the analysis.

Response to Comment AJ7-17

The discussion of Transportation Conformity in Draft EIS/EIR Section 3.13.3.4.1 has been revised to clarify that the project's design and scope have not changed significantly from the design and scope that were included in the 2008 RTP and 2008 TIP. This revision is included in the Final EIS/EIR.

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portion of the emissions associated with the proposed project. EPA recommends that any
AJ7-14 mitigation for the project's emissions impacts be consistent and support the CAAP.

Traffic and Air Quality Technical Studies

The Air Quality section references the Traffic and Air Quality technical studies but does not include these studies in the DEIS. These studies contain considerable technical information that augments the conclusions of the DEIS.

AJ7-15

Recommendation:
Include the Traffic and Air Quality technical studies as attachments to the FEIS.

Conformity

The description of the applicable conformity requirements in several different sections of the DEIS provide conflicting conclusions as to which conformity requirements apply to the various aspects of the proposed project. Federal Actions that require Federal Highway Administration (FHWA) funding or approval are subject to the Transportation Conformity requirements [40 CFR part 93, subpart A]; other Federal Actions are subject to the General Conformity requirements [40 CFR part 93, subpart B]. Further, if the proposed project involves bridge retrofit, modification, or replacement and requires a permit from any Federal Agency other than FHWA, General Conformity would apply to the construction (i.e., equipment, barge, tugboat, etc.) emissions and operational emissions associated with the modifications to the
AJ7-16 Schuyler Heim Bridge.

Recommendation:
Clarify in the FEIS which aspects of the project are subject to transportation conformity, and which to general conformity. For General Conformity, the FEIS should describe the specific Federal Action that triggers the General Conformity requirements and include an analysis of the direct and indirect emissions associated with that Federal Action that are subject to the General Conformity requirements. For the General Conformity applicability analysis shown in Table 3.13-4, in addition to the column labeled "10% of the Emission Inventory", EPA also recommends specifically listing the emissions of each pollutant for which General Conformity is applicable and for which year this analysis is performed.

The DEIS states that the originally proposed project was included in the SCAG 2004 Regional Transportation Plan (RTP) and the SCAG 2006 Regional Transportation Improvement Program (RTIP) (pp. 3.13-11 – 3.13-12) and that the changes to the project scope are expected to be approved into the 2008 RTP in March 2008.

AJ7-17

Recommendation:
To demonstrate that the proposed project meets the transportation conformity requirements in 93.115(a) and 93.115(b)(1), clarify in the FEIS that the project's design and scope have not changed significantly from those which were included in the 2004 RTP and 2006 TIP.

Response to Comment AJ7-18

See Response to Comment AJ7-16.

Response to Comment AJ7-19

An additional three years of monitoring data have been added to Table 1 contained in the $PM_{2.5}$ hotspot analysis (Appendix M to the Air Quality Impacts Technical Study). The additional data supports the trends previously shown using three years of data and therefore were representative of long-term trends.

Response to Comment AJ7-20

Monitoring stations are typically located away from sources of air pollutants, such as roadways, since monitoring stations are intended to measure concentrations of pollutants in ambient air rather than to evaluate hotspots. However, the following discussion has been added to Section 3.13.3 of the Final EIS/EIR to demonstrate that $PM_{2.5}$ concentrations at the North Long Beach monitoring station are representative of the project area.

The traffic data near the North Long Beach monitoring station and the Long Beach-East Pacific Coast Highway monitoring station were reviewed to evaluate the relationship between traffic conditions and monitoring data. The Long Beach-East Pacific Coast Highway station was selected for comparison since it is located closer to the project area than the North Long Beach station. However, because the Long Beach-East Pacific Coast Highway station has only been operating since 2003, data from this station were not used in the hotspot analysis.

The annual average daily traffic (AADT) and truck percentages near the North Long Beach monitoring station were reviewed. The North Long Beach station is located approximately 0.5 mile north of I-405 and one mile east of the I-405/I-710 junction. For the year 2006, the AADT at the I-405/I-710 junction was 290,000 (Caltrans, 2008). In addition, the truck AADT for the largest trucks (5 axles) was 6,856, or 2.4 percent of the total AADT (Caltrans, 2008). For

AJ7-18

PM Hot Spot Analysis

A PM2.5 hot spot analysis is only required for the portion of the project that will be funded or approved by FHWA. However, the PM2.5 hot spot analysis in the DEIS also includes marine vessel emissions (pp. 3.13-17) that are elsewhere described as covered under general conformity (pp. 3.13-5).

Recommendation:
Clarify in the FEIS the relevant requirements for the emissions associated with the various elements of the project, and specify which emissions should be included in the PM2.5 hot spot analysis.

AJ7-19

The PM2.5 and PM10 hot spot analyses are based upon three years of monitoring data (2004-2006) at the North Long Beach monitoring site. However, short-term ambient air quality trends may be influenced by variations in meteorology and not accurately reflect the longer-term ambient air quality trends.

Recommendation:
Base the conclusions of the hot spot analyses for PM10 and PM2.5 on six years of ambient air quality data, rather than three years, so that conclusions about ambient air quality trends is not based upon potential impacts of short-term meteorological trends.

AJ7-20

The monitoring data presented in the PM hot spot analysis is from the North Long Beach site, the closest monitoring site to the project location. However, the traffic at the North Long Beach monitoring site may not reflect the same traffic conditions as at the project location since the project's area is heavily impacted by heavy duty truck traffic.

Recommendation:
If possible, include a discussion in the PM hot spot analyses of PM trends at monitors in locations with the percentage of truck traffic similar to that of the project area. This analysis would determine if PM concentrations are higher at these locations, exhibit different trends, or whether those concentrations are significantly influenced by roadway emissions.

AJ7-21

PM10

A 2001-2003 CARB monitoring study (http://www.arb.ca.gov/ch/reports/wilmington_sb25_report.pdf) adjacent to the Wilmington Park Elementary School, approximately 1000 feet from the proposed Project area, found that PM10 levels were higher at the CARB study's Wilmington monitoring site than at the North Long Beach monitoring site. These results suggest that the air quality near the Wilmington School may be influenced by local sources not captured at the North Long Beach site.

Recommendation:
In addition to the air quality analysis presented in the DEIS, include results of the CARB study in the FEIS. Revise the air quality section to take into account the CARB study's conclusions about the air quality in the vicinity of the proposed project. If necessary, re-evaluate the DEIS' conclusions regarding the proposed project's impact on the local air quality conditions.

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comparison, the Long Beach-East Pacific Coast Highway monitoring station is located approximately 1 mile east of the Pacific Coast Highway (PCH) /I-710 junction. For the year 2006, the AADT at the PCH/ I-710 junction was 48,000 (Caltrans, 2008). In addition, the truck AADT for the largest trucks (5 axles) was 5,130, or 11 percent of the total AADT (Caltrans, 2008). A review of the traffic data has shown that the largest truck volumes are similar for both monitoring stations.

The $PM_{2.5}$ monitoring values at the Long Beach-East Pacific Coast Highway monitoring station are similar to those at the North Long Beach monitoring station (see table below). Therefore, since the truck percentages and monitoring data at the North Long Beach station and Long Beach-East Pacific Coast Highway station are similar, the North Long Beach station reflects the same traffic conditions as at the project location, and the monitoring data are shown to be representative of ambient air quality for the project area.

Year	**24-hour $PM_{2.5}$ (ug/m^3)**	
	North Long Beach Monitoring Station	**Long Beach - East Pacific Coast Highway Station**
2004	66.6	59.7
2005	53.8	50.8
2006	58.5	53.6

Reference

Caltrans. 2008. Traffic Volumes for the Year 2006, <http://traffic-counts.dot.ca.gov/>
Accessed March 17, 2008.

Response to Comment AJ7-21

The health risk discussion in the CARB 2001-2003 monitoring study has been added to the Final EIS/EIR as a subsection under Section 3.13.2 to reflect the existing setting for air quality in the vicinity of the proposed project.

See also Response to Comment EO1-5 and AJ11-2.

Response to Comment AJ7-22

The data contained in the Final EIS/EIR is reflective of the time period between 2001 and 2006. The new standard did not become effective until December 2006, which is why the number of exceedances reported in Table 3.13-2 reflects exceedances of the old standard (see Final EIS/EIR, p. 3.13-7).

Response to Comment AJ7-23

The health risk discussion in the CARB 2001-2003 monitoring study has been added to the Final EIS/EIR as a subsection under Section 3.13.2.

Also see Response to Comment AJ7-1 and AJ7-21.

Response to Comment AJ7-24

The heading under Section 3.13.4.2.1.1 of the Draft EIS/EIR has been changed to "Mitigation Measures for Fugitive $PM_{10}/PM_{2.5}$".

The heading under Section 3.13.4.2.1.1 has been changed to "Mitigation Measures for Exhaust Emissions of CO, ROG, NOx, and $PM_{10}/PM_{2.5}$." Many of the mitigation measures presented would reduce particulate matter emissions, as stated. Therefore, the particulate matter emissions presented will not be separated by exhaust and fugitive dust emissions since the mitigation measures already include reducing exhaust emissions.

Section 3.13.3.5.1.1 (Criteria Pollutants) of the Draft and the Final EIS/EIR states that construction would be subject to the control measures in SCAQMD Rule 403. The following sentence has been added in the Final EIS/EIR after Rule 1186: "Construction activities will also be subject to compliance with Caltrans Standard Construction Specifications."

The *Fugitive Dust Source Controls* suggested are consistent with the SCAQMD Rule 403 BACMs. Therefore, these controls have not been added as these would be included with compliance with SCAQMD Rule 403.

AJ7-22

PM2.5

In the discussion of the air quality at the North Long Beach monitoring site (page 3.13-7), the DEIS references the number of exceedances of the 65 micrograms per cubic meter (ug/m^3) 24-hour PM2.5 NAAQS in recent years, but does not describe exceedances of the new 24-hour PM2.5 NAAQS of 35 ug/m^3. The new standard should be used as the threshold for NEPA evaluation purposes, as described in the memorandum by Anne Norton Miller, Director, EPA Office of Federal Affairs ("Reflecting the Revised PM2.5 National Ambient Air Quality Standard in NEPA Evaluations", June 25, 2007). This new standard was exceeded numerous times at the North Long Beach and Long Beach stations, as shown in the chart below. As demonstrated in this chart, the two Long Beach monitoring locations do show overall progress, but the PM2.5 35 ug/m^3 24-hour standard has not been attained at either monitoring location.

Number of PM2.5 35 ug/m^3 24-hour exceedances per year:

	2000	2001	2002	2003	2004	2005	2006
North Long Beach:	35	47	36	25	21	13	5
Long Beach:				15	17	10	7

Recommendation:
To most accurately represent the air quality conditions in the Long Beach area, include in the FEIS an updated discussion of the PM2.5 air quality conditions at the nearby monitoring stations and compare the PM2.5 concentrations to the new PM2.5 24-hour NAAQS.

AJ7-23

Monitoring Studies near the San Pedro Bay Ports

SCAQMD has an ongoing ambient monitoring project in the vicinity of the Ports of Los Angeles and Long Beach. The study will measure criteria pollutants, air toxics and PM with speciation. In addition, SCAQMD currently is analyzing data from the MATES-III monitoring program which will soon provide air toxics monitoring data, including PM2.5 speciation at monitoring locations closer to the Ports.

Recommendation:
Where relevant, include in the FEIS the results of these two micro-scale monitoring studies to determine whether any updates to the air quality discussion in the DEIS are necessary in order to provide the most accurate and current assessment of the air quality conditions in the proposed project area.

AJ7-24

Construction Emissions and Mitigation:

The project construction is expected to result in significant emissions of CO, NOx, ROG, PM10, and PM2.5, such as demonstrated in Table 13.10 for Alternative 1. In addition, emissions from diesel-powered equipment are expected. The MATES-II study in South Coast found that 70% of all cancer risk is attributed to diesel particulate emissions. The DEIS should evaluate the specific potential for increased diesel emissions, separate from other mobile-source emissions. EPA recommends consideration of the following additional mitigation measures to reduce the impacts resulting from future construction associated with this project.

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The *Mobile and Stationary Source Controls* have been added under the revised heading, "Mitigation Measures for Exhaust Emissions of CO, ROG, NOx, and $PM_{10}/PM_{2.5}$."

Regarding the fifth bullet points under *Administrative Controls*, requirement for a Construction Traffic Management Plan is included in the document. Please see Section 3.5.4, Traffic and Transportation, measures T-1 and T-2; and Air Quality Section 3.13.4, measures AQ-3 to AQ-6.

Regarding the sixth bullet point: The location and type of sensitive receptors are identified in the MSAT analysis for the environmental document. Please see Section 3.13.2.4 for more details.

State Air Resources Board (ARB), California Code of Regulations (Section 93114), requires that off-road diesel fuel meet all on-road diesel fuel standards, including those for sulfur content. These regulations apply to diesel fuel used by Caltrans contractors in construction work based on Standard Specifications Section 7-1.01F. Section 3.13.3.5.1.1, p. 3.13-37, states "Construction activities will also be subject to compliance with Caltrans Standard Construction Specifications."

State ARB regulations require, starting in 2009 for large fleets, that construction equipment be retrofitted or replaced on a phase-in basis. Contractors carrying out construction of this project are subject to the ARB off-road fleet regulations, and must meet the requirements based on fleet size and year, based on Standard Specifications 7-1.01F as well as the regulation itself.

State ARB regulations prohibit idling of on-road diesel vehicles exceeding 10,000 pounds GVW for more than 5 minutes, with certain exceptions (CCR Title 13, Section 2485), and with additional restrictions within 100 feet of a residential property. Additional idling restrictions for commercial motor vehicles within 100 feet of a school are at CCR Title 13, Section 2480. These idling regulations are

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Recommendations:
Due to the serious nature of the PM_{10} and $PM_{2.5}$ conditions in the SCAB and the significant cancer risk attributed to diesel emissions in the South Coast, EPA recommends that the best available control measures (BACM) for these pollutants be implemented at all times and that the FEIS and ROD incorporate the Construction Mitigation Plan. We recommend that (1) all applicable requirements under SCAQMD Rules, (2) the Caltrans Standard Construction Specifications and recommended measures listed on pages 3.13-36 and 3.13-37 of the DEIS, and (3) the following additional and/or revised measures be incorporated into a Construction Mitigation Plan.

Fugitive Dust Source Controls:
- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

Mobile and Stationary Source Controls:
- Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications.
- Prohibit any tampering with engines and require continuing adherence to manufacturers recommendations
- If practicable, lease newer and cleaner equipment meeting the most stringent of applicable Federal or State Standards (see table: http://arb.ca.gov/msprog/ordiesel/documents/Off-Road%20Diesel%20Stds.xls). In general, only Tier 2 or newer engines should be employed in the construction phase, given the scale of the construction project, the level of the exposed population, and the high background levels of pollutants in the area.
- Utilize EPA-registered particulate traps and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutants at the construction site.

Administrative controls:
- Identify all commitments to reduce construction emissions and update the air quality analysis to reflect additional air quality improvements that would result from adopting specific air quality measures.

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enforceable as part of the construction contract under Standard Specifications 7-1.01F.

Caltrans cannot commit to the remaining measures since they are not required by law/regulation and they would affect or limit the types of equipment used by a contractor and the methods of construction. Requiring the contractor to do anything beyond normal practice regarding equipment is not allowed by law.

The minimization measures proposed have not been rejected based on economic infeasibility, but due to lack of authority.

- Identify where implementation of mitigation measures is rejected based on economic infeasibility.
- Prepare an inventory of all equipment prior to construction and identify the suitability of add-on emission controls for each piece of equipment before groundbreaking. (Suitability of control devices is based on: whether there is reduced normal availability of the construction equipment due to increased downtime and/or power output, whether there may be significant damage caused to the construction equipment engine, or whether there may be a significant risk to nearby workers or the public.)
- Utilize cleanest available fuel engines in construction equipment and identify opportunities for electrification. Use low sulfur fuel (diesel with 15 parts per million or less) in engines where alternative fuels such as biodiesel and natural gas are not possible.
- Develop a construction traffic and parking management plan that minimizes traffic interference and maintain traffic flow.
- Identify sensitive receptors in the project area, such as children, elderly, and infirm, and specify the means by which you will minimize impacts to these populations. For example, locate construction equipment and staging zones away from sensitive receptors away from fresh air intakes to buildings and air conditioners.
- Reflect the SCAQMD's BACMs for fugitive dust mitigation listed in Tables 3-13.11 – 3-13.13 in the Mitigation Reporting Plan (i.e., should be enumerated as mitigation measures in the monitoring report on p. 264 and 265). Moreover, given the severity of the PM problem in the area and the size of the construction activity associated with the proposed project, commit to implement during all construction phases more than the minimum of one BACM in each category in order to reduce PM emissions to the minimum.

AJ7-24

Environmental Justice

EPA is concerned that the project may result in disproportionately high and adverse air quality impacts to low income and minority populations. Executive Order 12898 addresses environmental justice in minority and low income populations, and the CEQ has developed guidance concerning how to address Environmental Justice in the environmental review process (http://ceq.eh.doe.gov/nepa/regs/ej/justice.pdf). The project area is characterized by substantial proportions of both minority and low-income persons (82 percent minority and as many as 77 percent of persons below the poverty threshold in some areas), which is much greater that in either the City or County of Los Angeles.

As analyzed in the DEIS, the reference population is too narrowly defined and is not appropriated used for comparison to the affected population. The DEIS bases its determination of no disproportionately high and adverse air quality impacts to low income and minority populations, in part, because the DEIS indicates the effects of this project are not markedly different in severity or magnitude compared to other past or present highway improvements projects in the region (page 3.3-30). The DEIS further indicates that even though low-income

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Response to Comment AJ7-25

Section 3.3 of Final EIS/EIR, Community Resources, assessed the potential for Environmental Justice impacts resulting from the project. As described in that section, the affected community for purposes of the analysis included the eastern half of the Wilmington community of the City of Los Angeles, the northern section of the Port of Los Angeles, the western part of the City of Long Beach, and the southern part of the City of Carson. The affected community area includes all tracts adjacent to the project alignments, and includes all communities and cities anticipated to be directly impacted by the project (see Section 3.3, p. 3.3-1).

The following text has been added to EIS/EIR Section 3.3.3.2 to clarify the Affected and Reference Communities evaluated for environmental justice concerns.

> The reference community consists of the population that will benefit from the proposed project and is used in the environmental justice analysis to determine whether there are disproportionately high and adverse human health or environmental impacts when effects to the reference community are compared to those experienced by the affected community. To assist in the environmental justice analysis, the reference community for the project has been identified as the entire Southern California region, although it is potentially conceivable to include areas outside California within the reference community as well. The project is a project of regional significance and would have a beneficial impact on the movement of goods in the region.

In comparing the impacts on the affected community to those of the reference community; the temporary and construction-period impacts such as access disruption, detours, noise from construction, presence of construction equipment, and reduced localized air quality would be predominantly borne by the affected community. However, these effects are either temporary or not high and adverse and the project

and minority groups would bear a large part of the burden associated with the project, it is due only to their proximity to short-term construction activities and is the same as for any community that would be similarly affected by proximity to construction (page 3.3-31). These arguments do not take into consideration the already existing ambient concentrations of air emissions and resulting increased cancer risk on minority and low-income populations in neighboring communities or other degraded environmental conditions associated with proximity to major port and industrial facilities. EPA recommends that Caltrans re-assess these potential impacts by

AJ7-25 more broadly defining the reference community (comparison group) to include the population that will benefit from the proposed project and comparing the benefits and impacts borne by both the affected community and the reference community.

Recommendations:

AJ7-26
- Define the potential environmental justice concerns in the FEIS, which is the first step in an environmental justice analysis. Include a discussion of any environmental justice issues raised during the scoping meetings. If there are any additional environmental justice issues identified, then add them to Section 3.3.3.3.2 *Adverse Effects to Overall Population*. This section might be more appropriately named *Potential Environmental Justice Issues*.

AJ7-27
- Define the reference community, which, combined with defining the affected community, is an important step in the environmental justice analysis. This is a critical step since the definitions are used to analyze whether there are disproportionately high and adverse human health or environmental impacts by comparing the impacts to the affected population with the impacts to the reference community. The affected community is defined in Section 3.3.3.2 *Affected Environment*. The reference community (or comparison group) is generally defined as the population that will benefit from the proposed project.

AJ7-28
- Add a discussion of MSAT impacts, discuss the likelihood of a shift in localized MSAT impacts, and identify populations affected by MSATs, in Section 3.3.3.3.2 *Adverse Effects to Overall Population, Air Quality*.

AJ7-29
- Revise Section 3.3.3.3.3 *Disproportionately High and Adverse Impacts to Minority and Low-Income Populations* to include a discussion of the impacts to the affected community as compared to the reference community. The impacts that are significant after mitigation, such as the air quality impacts due to temporary construction and air quality impacts due to diversion of marine vessels around Terminal Island, are impacts that are predominately borne by minority and low-income populations and should be identified as environmental justice impacts in Section 3.3.3.4 *Environmental Justice Determination*.

AJ7-30
- Identify additional mitigation to address these environmental justice impacts.

Water Quality

As noted in Table S-1: *Potential Project Effects and Avoidance, Minimization and/or Mitigation Measures*, Alternatives 1, 1A, 2, 3 and 4 would all involve the resuspension of fine-grained bottom sediments during 1) replacement and demolition of the Schuyler Heim Bridge in the Cerritos Channel, 2) placement of bridge footings in the Consolidated Slip/Dominguez Channel, and 3) other construction activities. The harbor sediments in the area of the bridges are

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included measures designed to minimize these effects (see Table S-1). Additionally, it is reasonable to assume that the affected community would be most benefited by the project due to reduction in existing congestion conditions in the area and a safer bridge.

The affected community and the reference community would both experience regional air quality impacts related to deteriorated air quality in the basin.

Response to Comment AJ7-26

In response to the comment, information regarding the issues raised during scoping regarding environmental justice, and potential effects to the overall population have been added to the Environmental Justice discussion. Please see Section 3.3.3 of the Final EIS/EIR.

Response to Comment AJ7-27

Please see response AJ7-25, which addresses the reference community and its relation to the environmental justice evaluation.

Response to Comment AJ7-28

The following text has been added in Section 3.3.3.3 Evaluation of Alternatives, under Air Quality - Alternatives 1, 1A, 2, 3, and 4:

> During operation, vehicles would emit mobile source air toxics (MSAT) such as diesel particulate matter. Implementation of the project would result in improving regional air quality through improving the efficiency of truck movement through potentially affected communities, such as Wilmington, Carson, and Long Beach. However, there would also be localized impacts from MSAT emissions to communities located adjacent to the corridor. Depending on the alternative selected, there may be a localized incremental increase in MSAT emissions at some locations, while there may also be an incremental benefit at other locations when compared to existing conditions. However, implementation of regulations, such as the ARB's Draft Regulation to Control Emissions from In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks (compliance deadlines would begin in the year 2009), would be expected to reduce localized impacts by decreasing MSAT emissions.

An HRA was also completed as part of the project. The HRA concluded that with the project, overall risk in 2015 will be 90 percent lower than the risk level in 2003. Please also refer to Response to Comment AJ11-7 and TR2-20.

Response to Comment AJ7-29

A discussion about impacts to the affected community compared to the reference community has been added in Section 3.3.3.3.3 of the Final EIS/EIR. Air quality impacts related to construction are temporary in nature; the lead agencies are confident that they have made their best effort to identify all feasible mitigation measures to minimize project-related localized air quality impacts during construction. Air quality impacts from marine vessel detours would also be offset by the emissions achieved by the Truck Buy-Back Program (see Table S-1 of the Final EIS/EIR, Air Quality, Operations).

Since the Draft EIS/EIR was distributed for public review, the air quality analyses for mobile source air toxics (MSAT) and EMFAC2007 have been revised or updated. Additional air quality mitigation measures were not proposed; all feasible mitigation measures to reduce air quality impacts will be implemented for this project.

Additionally, the benefits of the project, such as reduced congestion and better traffic flow in the Port area, are benefits that will be borne by the local community. The construction air quality impacts of this project are typical of projects of similar size and magnitude; the proposed project would not result in a disproportionately high impact due to its location within a predominantly minority and low-income community. Similarly, all feasible mitigation measures have been proposed for the project without any discrimination based on the age, color, race, or socioeconomic status of the affected community. The existing poor air quality at the Port and cumulative impacts of the project and other related projects occurring in the Port area are acknowledged in the Draft and the Final EIS/EIR Section 3.13 and Chapter 5.0, respectively.

Response to Comment AJ7-30

Since the Draft EIS/EIR was distributed for public review, the air quality analyses for mobile source air toxics (MSAT) and EMFAC2007 have been revised or updated. Additional air quality mitigation measures were not proposed; all feasible mitigation measures to reduce air quality impacts as identified in the Draft and the Final EIS/EIR will be implemented for this project.

Also see Response to Comment AJ7-29.

Response to Comment AJ7-31

Caltrans will coordinate directly with the EPA Project Manager (see Response to Comment AJ7-32) regarding any activities affecting the Consolidated Slip and its sediment and potential sediment resuspension. Sediment removal will be managed according to state and federal guidelines for hazardous waste (as appropriate, following testing). However, the management of removed sediment is not listed as a direct impact to the study area.

Response to Comment AJ7-32

The EPA Remedial Project Manager will be contacted before any sediment disturbing activities are performed in the Consolidated Slip.

Also see responses to Comments AJ7-33 and AJ7-35.

Response to Comment AJ7-33

We do not believe that additional testing in the area of work is warranted. Resuspension of sediments during construction will be mitigated by project design. For all in-water piles, Caltrans will use a cast-in-steel-shell (CISS) design, whereby the outer shell extends above the water line during construction and acts as a cofferdam. Therefore, the sediment will remain essentially where it was originally. The sediment will not be removed or disposed of during the course of construction. In addition, both the Cerritos Channel and Consolidated Slip sediments have been recently characterized for chemical quality.

primarily silt and finer-sized fractions and, if resuspended, are expected to stay in suspension for days, resulting in exceedances of state water quality standards.

Dominguez Channel/Consolidated Slip

The DEIS incorporates sampling data from 2002 to characterize the sediments contained in the area around Consolidated Slip. The sediments in Consolidated Slip are highly contaminated with heavy metals including copper, lead, zinc, and mercury, total DDT compounds, total PCB compounds, and total PBC compounds. Consolidated Slip is part of Operable Unit 2 (OU2) of the Montrose Superfund Site. Montrose manufactured DDT at their plant upstream in Torrance from 1947 to 1982. DDT contaminated waste water flowed from the Montrose plant through subsurface storm drains and open channels, passing through the Dominguez Channel and Consolidated Slip on its way to the ocean. Consolidated Slip is currently listed on EPA's 303(d) list for 10 pollutants (including DDT) and has been designated by the Los Angeles Regional Water Quality Control Board (LARWQCB) as a Toxic Hot Spot under the Bay Protection and Toxic Cleanup Program. AJ7-31

Recommendation:

- Because OU2 is part of a Superfund Site, which is currently under remedial investigation, any activities that could potentially disturb sediments within the Site must be coordinated and approved through the EPA Superfund program process. DDT contaminated sediment in the Consolidated Slip would need to be managed as state and federal listed hazardous waste.

- EPA recommends that sediment sampling be conducted prior to any physical disturbance of sediment in Consolidated Slip to determine whether DDT is present in sediments in the work area. Please contact Richard Hiett, Remedial Project Manager, of our Superfund Program at 415-972-3170 for project coordination with the Superfund Site. AJ7-32

Cerritos Channel

The supplemental report, *Final State Route 47 Expressway and Schuyler Bridge Replacement Project Water Quality Impacts Technical Study* (July 2007) (Technical Study) relies on two sources of data to characterize the sediments in the Cerritos Channel underneath the Schuyler Heim Bridge. Surface sediment was characterized by looking at samples of the top 6 inches from a study performed in 2002 by CH2M Hill, and deeper strata were characterized from a 1994 Los Angeles Harbor Department Study. Because of the high rate of sedimentation in this area (the Ports of Los Angeles and Long Beach routinely conduct maintenance dredging in the area to maintain channel depth), the DEIS may not accurately characterize the current conditions in the area surrounding the bridge. AJ7-33

Recommendation:

The FEIS should include recent testing results from a complete Tier 1 and 2 sediment sampling, in accordance with the procedures set forth in EPA's Inland Testing Manual (http://www.epa.gov/waterscience/itm/ITM/) in the area surrounding the Schuyler Heim Bridge in the Cerritos Channel. Testing should fully characterize the chemical and physical properties of the sediment to the proposed project depth.

Construction Effects – Silt/Turbidity Curtains

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As stated in the DEIS, sediment contaminants have the ability to impact aquatic life in both the Cerritos Channel and Dominguez Channel. The construction of new bridge footings and the removal of the old foundation will resuspend channel bottom sediments creating a turbidity plume that can be expected to stay in suspension for days and travel as far 1,250 meters upstream before the tide turns. As stated in the Technical Study, the sediment plume may contain constituents (copper, zinc, and PAHs) at potentially toxic concentrations. These concentrations will exceed State of California water quality criteria (WQC) and may cause acute toxicity to aquatic organisms. Additional contamination is possible from removal of lead-based paint from the existing structures. The DEIS proposes to utilize cofferdams and turbidity curtains to mitigate sediment resuspension (Section 3.16.4.1.1.1).

The loss of contaminants to the surrounding waters is of particular concern when dredging or relocating contaminated sediments. The sediment grain size distribution within the Consolidated Slip indicates that 80.12% of the material is composed of fines (silt and clays). Sediment samples taken from the Cerritos Channel also indicate a significant percentage (greater than 80 percent) of coarse silt and fines. This is of concern because sediment contaminants are generally bound to the fine particles, which are most easily resuspended during construction activities.

While the U.S. Army Corps of Engineers and other Federal Agencies have designated the use of silt or turbidity curtains a Best Management Practice to help protect environmental resources, there is little published literature that demonstrates how effective silt curtains have been in meeting project objectives.[1] The effectiveness of silt curtains depends on many factors such as 1) nature of operation, 2) quantity and type of material in suspension within or upstream of the curtain, and 3) characteristics, construction, and condition of the curtain as well as the area and configuration of the barrier enclosure (e.g. partial or full depth containment, either solid or permeable).

A 1978 study on silt curtains, performed by JBF Scientific Corporation for the U.S. Army Corps of Engineers Dredged Material Research Program, concluded that high currents and energy environments cause curtains to flare, thus reducing the curtain's effective depth. The study also noted that tidal currents that dominate the hydrodynamic regime may cause the fluid mud to be resuspended, especially if the curtain is not properly deployed and stated that "with respect to overall effectiveness and deployment considerations, a current velocity of approximately 1 knot appears to be a practical limiting condition for silt curtains."[2]

These conclusions are further supported by a 1994 EPA report which states that, "As a generalization, silt curtains and screens are most effective in relatively shallow, quiescent water. As the water depth increases and turbulence caused by currents and waves increases, it becomes increasingly difficult to effectively isolate the dredging operation from the ambient water. The

[1] Francingues, N. R., and Palermo, M. R. (2005). "Silt curtains as a dredging project management practice," *DOER Technical Notes Collection* (ERDC TN-DOER-E21). U.S. Army Engineer Research and Development Center, Vicksburg, MS. http://el.erdc.usace.army.mil/dots/doer/doer.html.
[2] JBF Scientific Corporation. (1978). "An analysis of the functional capabilities and performance of silt curtains," Technical Report D-78-39, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

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Response to Comment AJ7-34

The requested details are normally part of the final design, which is where specifications incorporating BMPs and mitigation measures are prepared during the PS&E phase. However, it is envisioned that silt/turbidity curtain(s) will not be required for construction in the Cerritos Channel or Consolidated Slip. Resuspension of sediments during construction will be mitigated by project design. For all in-water piles, Caltrans will use a cast-in-steel-shell (CISS) design, which acts as a cofferdam. The outer shell extends above the water line during construction and is cut to below the water line once construction is complete. This design mitigates for construction-related turbidity and the resulting resuspension of sediments.

Response to Comment AJ7-35

Silt/turbidity curtain(s) are no longer planned to be used during construction in the Cerritos Channel or Consolidated Slip. Resuspension of sediments during construction will be mitigated by project design. For all in-water piles, Caltrans will use a cast-in-steel-shell design, whereby the outer shell extends above the water line during construction and acts as a cofferdam.

Response to Comment AJ7-36

The requested details are normally part of final design, which is where specifications incorporating BMPS and mitigation measures are prepared during the PS&E phase. The monitoring plan will be developed following final design, as the structures will affect the flow and therefore determine where the monitoring should take place. It is envisioned that monitoring of turbidity will occur continuously inside the containment and at pre-determined upstream and downstream locations from the work area(s) once final design has been completed and evaluated (both directions [tidal] for Cerritos Channel; up/downstream for Consolidated Slip[tidal and flow effects]). Additionally, water quality samples will be obtained, and suspended solids analyses will be performed to determine the correlation

St. Lawrence Center (1993) advises against the use of silt curtains in water deeper than 6.5 meters or in currents greater than 50 centimeters/second."[3]

AJ7-34

Recommendation:

- Provide more information in the FEIS about the measures (including silt/turbidity curtains) that will be implemented during construction to minimize sediment resuspension. This should include information regarding the length, depth, and placement of curtains that will be utilized in both the Cerritos Channel and near Consolidated Slip. Given the tidal influences, and depth of channel (>50 feet), there is a high likelihood for failure. Please clarify in the FEIS whether the curtains in the Cerritos Channel will cross the entire channel (blocking navigation) or if it will be placed just around the bridge pilings.

AJ7-35

- The DEIS states that curtains would be used during "pile-driving operations in the channel." If curtains are chosen as the best method to contain suspended sediments, then they should be utilized during *all* construction activities, not just pile-driving operations, that have the potential to alter sediments. Additionally, it may be appropriate to utilize two separate barriers to contain sediments: a primary *and* a secondary barrier.

AJ7-36

Sediment Resuspension Monitoring

In addition to silt curtains, another key consideration to minimize sediment resuspension involves the selection and operation of the dredge/construction equipment. The keys to an effective and environmentally safe dredging operation are (EPA 1994): 1) selection of compatible equipment with the conditions at the site and the constraints of the project, 2) use of highly skilled operators, and 3) close monitoring and management of the dredging operation.

Recommendation:

- Include a monitoring plan to measure the level of sediment resuspension caused by the project in the FEIS and the ROD. Include in the monitoring plan measurements of turbidity or suspended solids to help track contaminant transport and the efficacy of the barriers put into place. Specify that water samples be collected at one location upstream and several locations downstream from the construction activity.

Biological Resources – American Peregrine Falcons

As noted in Table 3.16-3 the Schuyler Heim Bridge is currently home to a year-round nesting pair of American peregrine falcons. It is also shown that Peregrine falcons have nested at the nearby Gerald Desmond Bridge. It appears that in some years, the two bridges were alternatively used as nesting territory.

In the evaluation of direct effects from construction (Section 3.16.3.3.1.1.1), the DEIS states that the removal and replacement of the Schuyler Heim Bridge would eliminate a known nest site for a breeding pair of peregrine falcons. The DEIS suggests that it is likely the disturbed

[3] US Environmental Protection Agency. 1994. ARCS Remediation Guidance Document. EPA 905-B94-003. Chicago, IL: Great Lakes National Program Office.

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between contaminants and turbidity readings. The frequency of sampling will be determined during the PS&E phase of the project, following evaluation of the final design.

As suggested by the reviewer, proper dredging equipment and trainer operators will be required for any sediment removal operations. The final monitoring design will help ensure the effectiveness of resuspended sediment containment BMPs.

Response to Comment AJ7-37

The reader is referred to Response to Comment AJ7-5.

Response to Comment AJ7-38

Mitigation measures for the peregrine falcon are provided in the Draft and the Final EIS/EIR, Section 3.16.4, including measure B-6 for protecting individuals during construction, and B-12 for mitigating the loss of the nesting site on Schuyler Heim Bridge. Measure B-12 includes potential development of an alternative nesting platform on the adjacent Badger Avenue Bridge, and augmentation of peregrine falcon populations through hacking at an offsite location. In addition, long-term monitoring of peregrine use within the port environment or the success of hacking efforts would be conducted to document results of mitigation.

and displaced peregrines would utilize their alternative nesting location at the Gerald Desmond Bridge. To minimize impacts to the falcons from construction, Point B-7 (3.16.4.1.1.1) of the DEIS mentions that efforts will be made to coordinate construction schedules of the future Gerald Desmond Bridge Replacement Project to prevent overlap.

Recommendations:

AJ7-37
- Prior to completing the FEIS, consult with the U.S. Fish and Wildlife Service and the California Department of Fish and Game regarding the displacement of the peregrine falcons within the Ports of Los Angeles and Long Beach.

AJ7-38
- Include mitigation measures in the FEIS and ROD to ensure a long-term home for this species within the project area. The construction of the proposed project will result in the direct loss of habitat for a breeding pair of American peregrine falcons. It is unclear from the DEIS if replacement of this habitat has been considered other than to suggest that the pair might migrate over to their alternative nesting site at the Gerald Desmond Bridge. Potential migration to the Gerald Desmond Bridge may not address the long-term habitat requirements of the falcons since the Gerald Desmond Bridge is also undergoing replacement.

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This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

Letter AJ8. Signatory – City of Carson

Response to Comment AJ8-1

The Draft and the Final EIS/EIR describes the study area for the proposed project as the area bounded by I-710 on the east, I-110 on the west, Terminal Island on the south, and SR-91 on the north.

The *Noise Technical Report* was prepared to address noise associated with construction and operation of the proposed project and provided the information to prepare the noise analysis for the Draft and the Final EIS/EIR (Section 3.14 Noise). The technical report was prepared in compliance with Title 23, Part 772 of the Code of Federal regulations (CFR), *Procedures for Abatement of Highway Traffic Noise* and the Caltrans *Traffic Noise Analysis Protocol*. Specific receiver areas were identified based on their proximity to the alternative alignments, sensitivity to noise, and potential to experience noise increases that would exceed federal and state noise thresholds.

The limits of the noise analysis in the *Noise Technical Report* (and, therefore, the Draft and the Final EIS/EIR), adhere to the Caltrans practice of limiting noise assessments to approximately 150 m (492 ft) from the roadway under consideration. Therefore, receptors evaluated were those in the vicinity of the alignments of the proposed SR-47 Expressway, proposed SR-103 Extension, and the Schuyler Heim Bridge replacement. These receptors included inhabited boats in the nearby marinas, residential neighborhoods, schools, and commercial/industrial developments. As a result of the noise analysis, measures are proposed to abate project construction noise. In addition, sound walls are proposed at various locations to abate direct impacts of traffic noise from the new expressway during project operations.

In addition, the noise analysis was based on results of the traffic study, which analyzed traffic throughout the designated study area, as well as further north, to SR-91, as shown in Draft and the Final EIS/EIR Section 3.5 (Traffic and Transportation). As a result of the traffic analysis, under Alternative 1, along Alameda Street from I-405

CITY OF CARSON

October 16, 2007

Mr. Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, CA 90012

Re: City official response to the Draft EIR/EIS for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project in the Ports of Long Beach and Los Angeles, California

Dear Mr. Ronald J. Kosinski:

In response to the California Department of Transportation (Caltrans) "Notice of Public Hearing and Availability of Environmental Impact Report/Statement" dated August 17, 2007, please accept the following as the official comments from the City of Carson ("Carson") to the Draft EIR/EIS for the above proposed project ("Project").

AJ8-1 On September 25, 2007, Carson Mayor Jim Dear, Councilmember Harold C. Williams and staff attended Caltran's public hearing held at the Banning Community Center, in Wilmington, CA. These Carson representatives testified that the Draft EIR/EIS was deficient insofar as it does not address potential significant adverse effects on Alameda Street north of the I-405 freeway or provide mitigation measures in the form of a soundwall barrier to protect residential properties east of Alameda Street between Dominguez Street and the 219th Street alignment to minimize noise impacts from projected significant increases in diesel truck traffic.

AJ8-2 Of utmost concern to Carson is that the Draft EIR/EIS did not analyze Alameda Street between Dominguez Street and the I-405 as being part of the "affected project area". While Carson appreciates the seismic safety need for the Project to protect the public's health and welfare and to maintain a safe port transport route that will sustain a major earthquake, the Draft EIR/EIS, must acknowledge cumulative significant adverse environmental impacts to residents living east of said location. Specifically, the Draft EIR /EIS should evaluate increases in noise volumes resulting from expected increases in diesel and vehicular traffic and identify appropriate mitigation measures as were identified for the "Wilmington Neighborhood" and the "Leeward Bay Marina area".

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to SR-91, there is a projected increase in truck traffic that is accompanied by a decrease in automobile traffic. As a result, by the year 2030, the overall traffic, as assessed by PCE (passenger car equivalent) would increase by two percent (2%) during the peak morning hours and decrease by two percent (2%) during the peak mid-day and evening hours. These changes for project Alternative 1 are shown in Figures 3.5-7, 3.5-8, and 3.5-9 of the Draft and the Final EIS/EIR.

The traffic analysis also found that, under Alternative 2, by year 2030, a projected decrease in automobile traffic and concurrent increase in truck traffic along Alameda Street from I-405 to SR-91 would result in a 4 to 6 percent (4-6%) increase in peak hour traffic as measured by PCE. This is shown in Figures 3.5-14, 3.5-15, and 3.5-16 of the Draft and the Final EIS/EIR. Also shown in these figures is that the increase in traffic along Alameda Street north of I-405 is far less than in the project area south of I-405 where noise mitigation is planned.

Based on the above, a project-related increase in noise that would suggest a need for noise mitigation is not shown for the area north of I-405.

However, we are aware of the existing noise level in the area mentioned by the commenter. This noise level exists with or without the project. We understand that ACTA is working with the City of Carson and other local agencies to address this noise issue independently of the proposed project.

Response to Comment AJ8-2

See Response to Comment AJ8-1.

The Draft EIR/EIS was also found deficient in the following areas:

Traffic Impacts:

AJ8-3
- The traffic modeling used does not accurately account for future vehicular trips and does not account for the growth inducing impacts of the Project. Traffic on Alameda Street will also significantly increase when there are accidents or construction projects involving the I-710 freeway and traffic is re-routed to Alameda Street.

AJ8-4
- Table 3.5-1, which shows the existing traffic volumes, cites data for the year 2003. Current data should be used, such as the Caltrans traffic volumes that are available for the year 2006. The combination of a flawed traffic model and incorrect baseline data suggest significant inaccuracies in the Draft EIR/EIS.

AJ8-5
- Figures 3.5-7, 3.5-8, and 3.5-9 indicate that the traffic volumes for other vehicles (non Port trucks) on Alameda Street north of Sepulveda Boulevard would decrease as a result of Alternative 1. It seems more likely that the traffic volumes would increase on Alameda Street after the Project becomes operational and provides a direct link between Terminal Island and Alameda Street. The Draft EIR/EIS should acknowledge this impact and analyze appropriate mitigation measures.

AJ8-6
- Tables 3.5-12, 3.5-13, and 3.5-14 indicate that the volume/capacity ratios would be reduced and that the levels of service would improve at the intersections along Alameda Street as a result of the Alternative 1. This seems illogical because the Project would provide a more direct link between Terminal Island and Alameda Street and would most likely result in an increase in traffic volumes on Alameda Street.

AJ8-7
- The same issues, as identified in the above 2 bullet points, are applicable to Figures 3.5-14, 3.5-15, and 3.5-16 and Tables 3.5-18, 3.5-19, and 3.5-20 for Alternative 2.

AJ8-8
- On pages 3.5-32 and 3.5-61, the Draft EIR/EIS provides that geometric improvements would be made to the Alameda Street/223rd Street intersections to mitigate the project-related impacts and that these improvements would be included as a component of the Project. These proposed geometric improvements should be described.

Safety Concerns:

AJ8-9
- The Draft EIR/EIS does not evaluate the increased risk between Dominguez Street and the I-405 to pedestrian foot traffic, vehicles exiting commercial/industrial uses along Alameda Street and residential vehicular trip movements to Alameda Street that will occur from the expected increases in diesel truck and passenger vehicular trips along Alameda Street as a result of this project's implementation.

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Response to Comment AJ8-3

The traffic study prepared as part of the Final EIS/EIR forecasts future traffic volumes based on the Ports of Long Beach and Los Angeles Transportation Study model and adequately accounts for future year trips that will handle the growth in containers that has been projected by the ports. For further discussion on this issue please refer to Response to Comment OB14-6.

The Ports traffic model generates traffic forecasts for average AM, MD, and PM peak hours. It does not include special circumstances such as accidents or incidents on a roadway segment such as I-710, I-110, or the Gerald Desmond Bridge.

Response to Comment AJ8-4

The Traffic Study was initiated in 2004; available Caltrans data at the time was for year 2003.

Response to Comment AJ8-5

Under the No Build Alternative/Base case, by 2030, the Alameda Street roadway capacity is fully utilized during the AM, MD, and PM peak hours. Under Alternative 1, the roadway capacity is fully utilized by additional trucks and a reduced number of autos during the peak hours. Because the capacity of the roadway is finite, as more trucks use Alameda Street and the roadway becomes more crowded, the autos and non-port trucks will utilize other routes. Using Passenger Car Equivalent (PCE) vehicles, under Alternative 1, compared to the No Build Alternative, the 2030 traffic volumes show a net increase of 2 percent and 5 percent for the AM and PM peak hours, and a net decrease of 2 percent for the MD peak hour.

Response to Comment AJ8-6

The forecast volume/capacity ratio for a few locations decreases, and the level of service improves for the project compared to the No Build alternative. For intersections of SR-47 ramps and Henry Ford Avenue and Anaheim Street, the improvement is due to the SR-47 Expressway providing a more attractive route for north/south traffic, therefore greatly reducing the trips at those intersections.

The volume/capacity ratio marginally improves at a few other locations north of the proposed SR-47 Expressway. This is because the project primarily contributes added traffic to the north/south through movements exclusively, and these north/south movements are grade-separated. The model predicts that, in some locations, the turning movements to/from Alameda Street actually would be reduced slightly, primarily due to the increase in north/south through-truck volume.

Response to Comment AJ8-7

The commenter is referred to Response to Comment AJ8-6, which also applies to the figures and tables specified in this comment.

Response to Comment AJ8-8

The requested information is provided in the Draft and the Final EIS/EIR as follows:

Alternative 1 (Section 2.2.1.1.2)

Northbound Alameda Street will be modified to provide dual right-turn lanes to the 223rd Street/Wardlow Road connector ramp, and southbound Alameda Street will be modified to provide dual left-turn lanes to the connector ramp. In addition, the connector ramp will be modified to add an optional left- or right-turn lane onto 223rd Street/Wardlow Road (Figure 2-4e). These changes will be made by restriping the ramp and Alameda Street and resignalization of the intersection.

Alternative 2 (Section 2.2.1.2)

Northbound Alameda Street will be modified to provide dual right-turn lanes to the 223rd Street/Wardlow Road connector ramp, and southbound Alameda Street will be modified to provide dual left-turn lanes to the connector ramp. In addition, the connector ramp will be modified to provide: dual right-turn lanes from the connector ramp onto northbound Alameda Street;

dual left-turn lanes from the connector ramp onto southbound Alameda Street; and an optional left- or right-turn lane onto 223rd Street/Wardlow Road (Figure 2-9f). These changes will be made by restriping the ramp and Alameda Street and resignalization of the intersection.

Alternative 3 would have the same modifications as Alternative 1.

Alternatives 4, 5, and 6 would not include these modifications.

Response to Comment AJ8-9

A discussion of safety for pedestrians between I-405 and SR-91 has been added to the Final EIS/EIR. See Section 3.5.3.3.1.2 for details.

AJ8-10

- Furthermore, the Draft EIR/EIS does not recognize or evaluate safety risks to an existing church and residences located on Alameda Street between Dominguez and Carson Streets that will occur from the expected increases in diesel truck and passenger vehicular trips along Alameda Street as a result of this project's implementation.

Air Quality Impacts:

AJ8-11

- The Draft EIR/EIS does not identify the residences located between Dominguez Street and the I-405 as "sensitive receptors" being impacted with a deterioration of air quality. However, the Wilmington neighborhood and the Leeward Bay Marina areas were identified as being "sensitive receptors". The Draft EIR/EIS must acknowledge that the Carson residences are also subject to air quality adverse impacts associated with expected increases in diesel truck and vehicular trips along Alameda Street due to this Project's implementation.

AJ8-12

- Section 3.13.3.4.3 "Mobile Source Air Toxics" identified that a quantitative MSAT analysis was prepared for the Project because major arterials affected by the project serve a large number of diesel trucks and there would be a potential to concentrate high levels of diesel particulate matter. Further, the Wilmington community is mentioned as being within the vicinity of the Project but the Carson residential community is not discussed. Since diesel trucks will continue to travel north from the ports via Alameda Street to the 91 Freeway at an increased rate as a result of the Project, the Draft EIR/EIS is deficient insofar as the MSAT analysis does not include the Carson impacted area along the major arterial of Alameda Street between Dominguez Street and the I-405,.

AJ8-13

- Section 3.13.3.5.1/.1 Alternative 1 & 1A/Construction Affects "Sensitive Receptors" identified that construction activities may expose sensitive receptors in the vicinity to short-term elevated diesel PM-10 levels. However, the PM-10 concentrations would be considered less than substantial because the risk posed by diesel PM-10 is based on long-term exposure. This statement does not take into account the fact that the operational aspect of implementing the Project will generate increased diesel truck and vehicular trips on Alameda Street between Dominguez Street and the I-405 with increases in diesel truck exhaust organic gases/emissions which are known by EPA as being "hazardous/toxic air pollutants" on a long term exposure period.

AJ8-14

Furthermore, the Draft EIR/EIS operational discussions under "Operational Effects" Section 3.13.3.5.1.2 states that no permanent direct air quality effects would be expected under Alternative 1. However, this analysis ignores the fact that approximately 16,000 trucks (manufactured before 1994/San Pedro Bay Ports Clean Air Action Plan-2006) working at the ports do not meet the proposed "Clean Truck Program" guidelines identified by the Port's "Clean Air Action Plan". The significant adverse impacts to Carson residents from the continued operation of old diesel trucks emitting exhaust organic gases, which are known to be hazardous/toxic air pollutants by EPA, must be evaluated within this Draft EIR/EIS before reaching conclusions that Alternative 1 will not have a "permanent" direct air quality effect on the affected environment.

3

Response to Comment AJ8-10

The comment is acknowledged. The commenter is referred to discussion of the project area in Response to Comment AJ8-2, traffic in Response to Comment AJ8-3 through AJ8-8, health and safety in Response to Comment AJ8-9 and AJ8-10, air quality is Response to Comment AJ8-11 through AJ8-14, and noise issues in Response to Comment AJ8-15 through AJ8-19,

Response to Comment AJ8-11

Your comment regarding the residences located between Dominguez and I-405 is acknowledged. The purpose of the sensitive receptor list was to identify sensitive receptors within the project study area. However, based on the comment, the sensitive receptor discussion has been revised to include residences in the City of Carson located between Dominguez Street and I-405.

Response to Comment AJ8-12

The MSAT analysis is not intended to evaluate impacts to specific locations but is a tool to evaluate the relative differences in MSAT emissions between alternatives. A health risk assessment was conducted by ACTA and this assessment included receptors along Alameda Street north of I-405. See also Response to Comment AJ7-2 and AJ8-11.

Response to Comment AJ8-13

Section 3.13.3.5.1 is intended to only address construction effects, not to discuss operational impacts. Therefore, operation impacts were not included in the impact conclusion. See also Response to Comment EO1-5.

Response to Comment AJ8-14

Your objection to the impact conclusion is acknowledged. However, the conclusion regarding the project's impact from the operation emissions was not intended to take health risk into account. The conclusion was intended to evaluate the project's impact to the project

study area from criteria pollutant emissions. See also Response to Comment EO1-5 and AJ7-2.

As noted by the commenter, emissions from trucks working at the Ports will be partially addressed by goals of the Port's CAAP. In addition, CARB adopted a regulation, *Regulation to Control Emissions from In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks*, that addresses diesel particulate matter emissions from these trucks (http://www.arb.ca.gov/msprog/onroad/porttruck/porttruck.htm). This regulation became effective December 24, 2008.

These programs would be expected to contribute to reducing diesel truck emissions in the project area in the next ten years, which is consistent with the timing of project implementation. Therefore, regardless of which project Alternative is selected, diesel truck emissions will decrease through compliance with CARB regulation, availability of Proposition 1B funds, and the goals of the Port's CAAP. Please see Response to Comment AJ17-2 for further discussion of these and other programs expected to reduce heavy-duty truck emissions in future years.

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Response to Comment AJ8-15

Residences of concern in Carson, namely those located east of Alameda Street between Dominguez Street and I-405, and the church and homes between Dominguez and Carson Streets, are considered to be outside the project study area in regard to noise analysis. According to the Caltrans Traffic Noise Protocol, the study area encompasses locations where the proposed SR-47 project would cause actual physical changes to the roadway system. Nonetheless, ACTA is currently conducting a separate noise study, independent of this project, to address the concerns of Carson residents in the above areas.

In addition, ACTA conducted a health risk assessment (HRA) that covers the surrounding communities including Dominguez, Lincoln Village, Long Beach, Wilmington, and Carson. A discussion of the HRA results has been incorporated in the cumulative impact section and throughout the Final EIS/EIR. ACTA's HRA indicated that the proposed project would have regional benefits that would reduce health risks in the majority of the study area; therefore, the proposed project would result in a net benefit with respect to cumulative health risk impacts. Although the maximum increase of cancer risks would exceed the 10-in-a-million threshold, it would only affect a limited number of homes, and ACTA has proposed mitigation that would reduce the impacts to less than significant level. Therefore, the project would be expected to have a less than significant adverse cumulative impact to air quality and human health risks.

Response to Comment AJ8-16

Please refer to Response to Comment AJ8-15.

Response to Comment AJ8-17

Please refer to Response to Comment AJ8-15.

Response to Comment AJ8-18

Please refer to Response to Comment AJ8-15.

Noise Impacts:

AJ8-15
- The "Cumulative Impact Section" does not address potential significant adverse environmental cumulative effects to residents living east of Alameda Street between Dominguez Street and I-405 resulting from expected increases in high volumes of diesel truck and vehicular traffic trips as a direct result of this Project's implementation. The Draft EIR/EIS must acknowledge and address the "cumulative impacts" to Carson residents in compliance with CEQA and NEPA requirements. Cumulative adverse impacts do not stop south of the I-405, insofar as diesel trucks traveling from the ports will continue north on Alameda to the 91 Freeway..

AJ8-16
- The environmental checklist identified noise impacts as being less than significant with mitigation incorporation. However, no mitigation was incorporated for noise impacts to residents east of Alameda Street between Dominguez Street and the I-405, although noise impacts and mitigation measures were identified for the Wilmington neighborhood and the Leeward Bay Marina (Table S-1). The Draft EIR/EIS must acknowledge noise impacts to Carson residents as a result of this Project's implementation and propose adequate mitigation.

AJ8-17
- Recent Carson noise studies between Dominguez Street and the I-405 (with Ldn reading of 71 dBA & Leq reading of 70 dBA) indicate that if Carson neighborhoods had been included in the Project's affected limits, noise mitigation would have been evaluated and, following Caltrans guidelines, found to be both reasonable and feasible.

AJ8-18
- Furthermore, the Draft EIR/EIS does not recognize "Sensitive Noise Receptors" along Alameda Street between Dominguez and Carson Streets that include the Carson Bethel Church and existing residences. These existing sensitive noise receptors must be acknowledged and the expected significant increases in higher noise levels from this project's implementation must be evaluated with adequate mitigation proposed.

AJ8-19
- Furthermore, the 1996 Final EIS for the Alameda Corridor, prepared for the Federal Highway Administration, Federal Railroad Administration and Caltrans, identified the need for operational mitigation measures between Dominguez Street and the I-405 in the form of noise barriers or soundwalls (Section 4.7.3.4). However, the proposed Draft EIR/EIS did not acknowledge this previous identified noise impact mitigation.

Environmental Justice:

AJ8-20
- The Draft EIR/EIS states that there is no "Environmental Justice" issue. We disagree with this conclusion. Additional investigation of environmental justice issues is required to mitigate the potential significant adverse effects of increased noise levels resulting from this Project to identified residents.

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Response to Comment AJ8-19

Please refer to Response to Comment AJ8-15. ACTA will address identified noise mitigation for other projects separately.

Response to Comment AJ8-20

The Draft and the Final EIS/EIR acknowledge the increase in noise levels during construction and operation of the proposed project. All feasible and reasonable mitigation measures have been included in the Draft and the Final EIS/EIR to reduce increase in noise as a result of the project. Additionally, the benefits of the project, such as reduced congestion and better traffic flow in the Port area, are benefits that will be borne by the local community. The construction noise impacts of this project are typical of projects of similar size and magnitude; the proposed project would not result in a disproportionately greater impact due to its location within a predominantly minority and low-income community. Similarly, all feasible mitigation measures available have been proposed for the project without any discrimination based on the age, color, race or socioeconomic status of the affected community. The cumulative impacts of the proposed project and other related projects occurring in the Port area are acknowledged in Chapter 5.0 of the Draft and the Final EIS/EIR.

Response to Comment AJ8-21

The proposed project does not exclude the possibility for some components of Alternative 5 to be implemented for traffic management in the project area. For the purpose of the environmental analysis provided in the Draft and the Final EIS/EIR, it was useful to provide a transportation system management alternative that involved roadway and other improvements that could be implemented easily, at relatively minor cost, to determine the associated environmental impacts and the extent to which such measures would fulfill the project purpose and need.

Although the improvements described under Alternative 5 are desirable and have minor environmental impacts, they do not fulfill the project purpose and need described in Chapter 1 of the Draft and the Final EIS/EIR.

Response to Comment AJ8-22

The comment is acknowledged. The commenter is referred to discussion of the project area in Response to Comment AJ8-2, traffic in Response to Comment AJ8-3 through AJ8-8, health and safety in Response to Comment AJ8-9 and AJ8-10, air quality is Response to Comment AJ8-11 through AJ8-14, and noise issues in Response to Comment AJ8-15 through AJ8-19.

General Comment:

AJ8-21

- Section 2.2.5 of the Draft EIR/EIS identifies some "easily implementable improvements to transportation" under Alternative No. 5 to the Project. These improvements include travel demand management ("TDM") techniques to reduce traffic demand in the corridor, including measures to improve capacity and traffic circulation at the Ports of Long Beach and Los Angeles through policy changes and use of the latest technologies. These technologies, including the Intelligent Transportation Systems ("ITS"), are described as improvements aimed at improved traffic circulation through "traffic control, incident management, traffic surveillance and dissemination of traffic information." Given the identified need for improvements to truck traffic using the Ports, Carson finds it incumbent upon Caltrans to include components of this Alternative No. 5 in the Project insofar as such components seem consistent with the Project and could reduce traffic congestion at the Ports and neighboring communities such as Carson through relatively low-cost mitigation measures.

AJ8-22

In closing, the City of Carson thanks Caltrans for this opportunity to comment and is prepared to work with Caltrans and the Alameda Transportation Authority to make this Project a success. However, the success of the Ports of Los Angeles and Long Beach can not sacrifice the health and safety of our local businesses and residents. Therefore, the Draft EIR/EIS must acknowledge through empirical analysis, Alameda Street between Dominguez Street and the I-405 as being within the "affected project area" and not ignore the expected significant adverse effects to Carson residents from increases in diesel truck/ vehicular trips, noise levels, and air quality impacts. We do not expect this Project to mitigate all the existing and future impacts within Carson. We do, however, expect this Project to assume a "fair share" of the responsibility in addressing and directing the necessary mitigation to Carson.

If you may have any questions on this matter please feel free to phone Sheri Repp, Planning Manager or Zak Gonzalez II, Associate Planner at (310) 952-1761.

Sincerely,

Jerome G. Groomes, City Manager

Attachment: Letter to Mr. R. J. Kosinski, dated September 29, 2004

cc: Mayor Jim Dear and City Councilmember's
M. Victor Rollinger, Development Services General Manager
Farrokh Abolfathi, Principal Engineer
Richard Garland, City Traffic Engineer
Sheri Repp, Planning Manager
Zak Gonzalez II, Associate Planner

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CITY OF CARSON

September 29, 2004

Mr. Ronald J. Kosinski
Deputy District Director
Division of Environmental Planning
(LA 47 KP 4.5/8/5 [PM 2.8/5.3])
CALTRANS
120 S. Spring Street (MS 16A)
Los Angeles, CA 90012

RE: SCHUYLER HEIM BRIDGE REPLACEMENT AND SR-47 EXPRESSWAY

Dear Mr. Kosinski:

This letter provides written comments on the abovementioned projects. The City does not oppose the replacement of the seismically-deficient Schuyler Heim Bridge, but does question the need for a new four lane, elevated expressway connecting SR-47 directly to Alameda Street.

While the new expressway may help ease truck traffic on the overly congested I-710 Freeway and accommodate projected port growth, it would come at a great cost to the health and well being of Carson residents and businesses located on or near the Alameda Corridor.

Background

The eastern area of Carson consists of two predominantly single family residential neighborhoods, Dominguez and Lincoln Village. Dominguez and Lincoln Village are bordered by the Alameda Corridor to the west, Dominguez Street to the north, I-710 Freeway to the east, and the 405 Freeway to the south. The neighborhoods are comprised of over 2,400 single family homes and apartments with over 9,000 residents, many who are long time owner occupants.

Along Alameda Street there is an area of land, approximately 75 feet in depth, zoned ML (Manufacturing, Light), consisting of small businesses with a 15 foot wide alley located at the rear and paralleling Alameda Street. The neighborhoods are surrounded by heavy industrial land uses to the west of the Alameda Corridor and to the north of Dominguez Street. Residents are further impacted by heavy truck traffic from the I-710 Freeway, the

Letter AJ8. Signatory - City of Carson
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Alameda Corridor, the 405 Freeway and the proximity to the ports of Long Beach and Los Angeles.

Carson residents in these two affected neighborhoods have an active homeowners association, the Dominguez Area Property Owners Association. In addition, they recently formed the Community Advisory Committee (CAC) in response to the I-710 Major Corridor Study. The CAC has actively participated in numerous meetings at the Tier I and Tier II level, offering critical recommendations to the Oversight Policy Committee (OPC). The CAC has provided valuable recommendations toward immediate and long range solutions in dealing with the projected ports' growth and increased truck traffic impacts to air quality, circulation, noise and overall quality of life issues.

Concerns

The City of Carson has grave concerns with the negative impacts the proposed SR-47 four lane, elevated expressway will have on the east Carson area. The proposed expressway would generate an exorbitant amount of daily truck trips in addition to the existing rail trips generated within the Alameda Corridor.

There are already 35,000 truck trips leaving the ports daily. During the next two decades that number is expected to triple to approximately 91,000 per day. Given that our region has become the primary trade gateway to the rest of the nation, there is tremendous strain on our transportation infrastructure and air quality. Carson residents in the Dominguez and Lincoln Village are subject to air pollution from stationary and existing mobile sources generated from truck and vehicle traffic along the I-710 and 405 Freeways, the Alameda Corridor rail and port related activities.

Added truck traffic generated from the proposed four lane, elevated expressway would further degrade the quality of life of these residents by increasing diesel emissions and particulate matter (PM 10 and PM 2.5), among other contaminants. Recent AQMD studies reveal that 70% of the regions toxic air pollution is directly attributed to diesel emissions, a known carcinogen, and attributed to increased hospital admissions for respiratory diseases, chronic lung disease, heart diseases and premature deaths.

In addition to the impacts on air quality, the City has concerns that the expressway would become a high speed "freeway" for truck traffic with virtually no existing traffic lights on Alameda Street within the City of Carson. This will in turn "choke" the existing street circulation feeding onto Alameda Street by disrupting vehicle and pedestrian flow from the small businesses and adjacent single family neighborhoods. The increased truck traffic generated from the expressway will create yet another barrier isolating the east Carson community.

The City has concerns that, if this project goes forward, it would create an unfair shared burden to the east Carson area, impacting the health of residents; increasing noise and

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pollution levels; disrupting the small businesses along Alameda Street by diminishing their viability; decreasing property values; creating serious impacts to the traffic circulation patterns for businesses and residents; and creating safety issues.

Alternatives

The City of Carson would like Caltrans to explore other alternatives to the proposed SR-47 expressway such as a No Build Alternative; connecting rail lines directly into the ports to accommodate existing and projected port growth; consideration of alternative methods of container/goods deliveries or truck routes which will reduce negative impacts to an already over burdened area in east Carson. There are many alternatives which need to be explored before the City would, as a "last resort", accept this preferred alternative.

Recommended Mitigation

In response to the currently proposed SR-47 expressway, the City of Carson respectfully requests that the abovementioned concerns be clearly addressed in the draft EIR/EIS. Assuming the suggested alternatives, after careful and serious consideration, are found not to be viable, the City suggests the following mitigation measures:

- The City requests an Economic Impact Analysis which will determine the impacts the new expressway will have on existing businesses along the Alameda Corridor due to increased truck traffic. Such report shall also include analysis of the overall decline in property values.
- The City requests a detailed Traffic Impact Analysis depicting estimated increase in truck/vehicle trips within the next 20 years and impacts to circulation, air quality and health.
- The Draft EIR/EIS should contain a section on Cumulative Impacts on Air Quality this project will generate, including projected growth at the ports of Long Beach and Los Angeles, the projected I-710 Freeway expansion and any other regional expansion projects being proposed within the next 20 years.
- The Draft EIR/EIS should address the California Air Resources Board Environmental Justice initiatives and policies.
- Caltrans should provide an explanation as to why the four lane expressway is warranted at this time and why there is only one selected route onto Alameda Street.
- Consideration should be given to alternative routes for the new expressway, including connecting the expressway directly onto the 405 Freeway and bypassing Alameda Street.

The City of Carson and its residents will actively be participating in this process in order to address any concerns that will impact the east Carson neighborhoods.

Please continue providing us information on upcoming meetings, public hearing notices and other communication associated with the SR-47 expressway. We also

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request that the Dominguez and Lincoln Village neighborhoods and businesses along Alameda Street, be notified of any future meetings and/or communication regarding these projects. Notification to include property owners and tenants. City of Carson staff representatives are Farrokh Abolfathi, Principal Engineer, at (310) 952-1700, ext. 1811 and Rocio Lopez, Associate Planner, at (310) 952-1700, ext. 1365.

Respectfully,
CITY OF CARSON

JEROME G. GROOMES
CITY MANAGER

JGG:RL

cc: Mayor Jim Dear
Mayor Pro Tem Kay A. Calas
Elito M. Santarina, Councilmember
Julie Ruiz Raber, Councilmember
Juanita Millender-McDonald, U.S. Representative Congresswoman 37th District
Debra Bowen, State Senator 28th District
Jenny Oropeza, State Assemblymember 55th District
Veronica Zendejas, Senior Field Representative for Jenny Oropeza
Yvonne Brathwaite Burke, Los Angeles County Board of Supervisors 2nd District
Mike Lansing, Board of Education LAUSD 7th District Boardmember
Myrna Rivera, LAUSD
Barry Wallerstein, Phd., Executive Officer, AQMD
Arthur B. Goodwin, P.E., Alameda Corridor Transportation Authority
Dan Davis, Force Account Manager, Alameda Corridor Engineering Team
Gwen Butterfield, Butterfield Communications
Community Advisory Committee
Dominguez Area Property Owners Association, Chair Ray Park
Victor Rollinger, Carson Acting Development Services Group General Manager
Sheri Repp, Carson Planning Manager
Farrokh Abolfathi, Carson Principal Engineer
Rocio Lopez, Carson Associate Planner

Letter AJ11. Signatory – South Coast Air Quality Management District

Response to Comment AJ11-1

Your comments on the Draft EIS/EIR are appreciated. The proposed project provides an alternative route for existing and projected future traffic to and from the Ports, traffic that currently uses local streets and nearby freeways. There is no evidence that the project will result in increased transportation of goods to and from the Ports.

The commenter is referred to Response to Comment TR1-20 for a discussion of the relationship of the proposed project to projected increases in port traffic.

Response to Comment AJ11-2

The commenter's concerns are acknowledged. The following items have been added to the Final EIS/EIR in Section 3.13.3.4 under Limitations of MSAT Analysis: 1) summary of health effects from exposure to MSAT compounds as stated in Section 4.4.6 of the *Air Quality Impacts Technical Study*, and 2) a summary list of the studies cited in the comment letter. ACTA conducted a health risk assessment, and diesel PM impacts were addressed in the analysis. See Section 3.13.3.4.3 for a discussion of the analysis.

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

E-MAILED: NOVEMBER 08, 2007

November 08, 2007

Mr. Ronald J. Kosinski
Department of Transportation, District 7
Division of Environmental Planning
100 South Main Street, MS-16A
Los Angeles, CA 90012

Dear Mr. Kosinski:

Draft Environmental Impact Statement /Environmental Impact Report (DEIS/EIR) for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project

AJ11-1 The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. The SCAQMD staff recognizes the need to replace the Schuyler Heim Bridge to address safety issues; however, this bridge replacement project will also result in increased transportation of freight and goods to and from the Ports of Los Angeles and Long Beach. The location of this project is in an area currently experiencing cancer risks in excess of 500 in a million[1]. In addition, the proposed project is located within 100 feet of residences and near about ten schools.

AJ11-2 The SCAQMD staff is concerned with the Lead Agencies disregard to recognize the health effects of diesel particulate matter. In the state of California, diesel particulate matter is classified as a toxic air contaminant for its cancer and non-cancer health effects. The California Air Resources Board (CARB) identified particulate matter (PM) from diesel-fueled engines as a toxic air contaminant (TAC) in 1998, following an exhaustive 10-year scientific assessment process. In addition, as part of the identification process, the Office of Environmental Health Hazard Assessment (OEHHA) evaluated the potential for diesel exhaust to affect human health. OEHHA found that exposure to diesel PM resulted in an increased risk of cancer and an increase in chronic non-cancer health effects including a greater incidence of cough, labored breathing, chest tightness, wheezing, bronchitis, and asthma.

[1] California Air Resources Board. April 2006. "Diesel Particulate Matter Exposure Assessment Study for the Ports of Los Angeles and Longbeach."

Letter AJ11. Signatory - South Coast Air Quality Management District
Page 2

Response to Comment AJ11-3

ACTA conducted a health risk assessment, and diesel PM impacts were addressed in the analysis. See Section 3.13.3.4.3 for a discussion of the analysis.

Response to Comment AJ11-4

Your suggestion to have a program in place to reduce emissions from port drayage trucks prior to approval of the project and to provide funding for the San Pedro Bay Ports Clean Trucks Program is acknowledged. The ports' Clean Truck Program is now in effect and the first phase has resulted in the banning of pre-1989 trucks from calling at port terminals. Subsequent stages will go into effect prior to the start of operation. In addition, CARB adopted a regulation, *Regulation to Control Emissions from In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks*, that calls for accelerated fleet turnover and addresses diesel particulate matter emissions from diesel trucks (http://www.arb.ca.gov/msprog/onroad/porttruck/porttruck.htm). This regulation became effective December 24, 2008.

The first phase of the regulation requires compliance by December 31, 2009, and the second phase would require compliance by December 2013. In addition, Senate Bill (SB) 974 was approved in August 2008. This bill requires the Ports of Los Angeles and Long Beach to collect a $30 container fee for cargo moved through the ports. The bill also requires that half of the funds go to the San Pedro Bay Ports Congestion Relief Trust Fund and half go to the San Pedro Bay Ports Mitigation Relief Trust Fund. These funds would be used to fund projects that improve goods movement in Southern California and mitigate air pollution caused by container movement.

The commenter is referred to mitigation measure AQ-9, Heavy Duty Truck Buyback Program, in Draft and the Final EIS/EIR Section 3.13.4.2. The purpose of the program would be to accelerate the modernizing of the heavy duty engine fleet operating in the South Coast Air Basin by removing older engines in the fleet and requiring

There are a number of studies[2] that show a correlation of adverse health impacts of diesel PM and proximity to roadways. CARB recommends avoiding development of urban roads with 100,000 vehicles/day, within 500 feet of sensitive land uses due to increased cancer risk from diesel PM.[3] The health effects from diesel PM can and must be quantified in the DEIS/EIR. There are a variety of air dispersion models available, including but not limited to CAL3QHC and AERMOD, to conduct air dispersion modeling of mobile source emissions. The California Air Resources Board in its Staff Report for proposed regulation for Evaluation of Port Trucks and Possible Mitigation Strategies used CAL3QHC to quantify the potential nearby cancer risks to nearby receptors. Please refer to Attachment A for additional tools that are available to quantify the health risk from mobile sources. AJ11-2 AJ11-3

The bridge replacement project will result in increased transportation of freight and goods to and from the Ports of Los Angeles and Long Beach. The amount of port-related truck traffic is expected to double between 2010 and 2020.[4] In addition, proposed expansion of the Union Pacific Intermodal Container Transfer Facility and proposed development of the Burlington Northern and Santa Fe Railroad Southern California Intermodal Gateway near-dock rail yard projects will further increase truck traffic in the proposed project area. As a result, it is therefore necessary that a program to reduce emissions from port drayage trucks be in place prior to approval of the proposed Schuyler Heim Bridge project. Specifically, existence of the San Pedro Bay Ports Clean Trucks Program, to turnover heavy duty port drayage trucks to current emissions standards by 2012, should be a pre-condition of project approval. In addition, the Lead Agencies should provide funding for the San Pedro Bay Ports Clean Trucks Program as this truck program will mitigate emissions from trucks that use the Schuyler Heim Bridge and the proposed expressway. AJ11-4

Attachment A includes additional and more detailed comments. The SCAQMD staff believes that the DEIS/EIR is fundamentally inadequate precluding the public of a meaningful review of the potential adverse environmental impacts from the proposed project. Specifically, the DEIS/EIR is technically flawed and lacks quantification of air quality and health risks. Pursuant to CEQA Guidelines §15126.4, the DEIS/EIR must describe feasible measures which could minimize significant adverse impacts. The DEIS/EIR concludes significant impacts for construction but lacks sufficient measures to minimize significant adverse impacts. In addition, if quantifying the health risk shows a significant impact, the Lead Agencies will be required to include feasible mitigation AJ11-5

[2] Green RS, Smorodinsky S, Kim JJ, et al. Proximity of California Public Schools to Busy Roads. January 2004. *Environmental Health Perspectives* 2004; 112:61-66. Available at http://www.ehponline.org/members/2003/6566/6566.pdf.
Kim JJ, Smorodinsky S, Lipsett M, et al. Traffic-Related Air Pollution Near Busy Roads. The East Bay Children's Respiratory Health Study. June 2004. *Am J Respir Crit Care Med* 2004; 170:520-526.
Zhu Y, Hinds W, Kim S, Sioutas C. Concentration and Size Distribution of Ultrafine Particles Near a Major Highway. *Journal of Air & Waste Management Association*. September 2002. 52:1032-1042.

[3] California Air Resources Board. April 2005. "Air Quality and Land Use Handbook: A Community Health Perspective." Accessed at http://www.arb.ca.gov/ch/landuse.htm

[4] State of California, Department of Transportation. August 2007. Schuyler Heim Bridge Replacement and SR-47 Expressway Project – Draft Environmental Impact Statement/Environmental Impact Report and Section 4(f) Evaluation.

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replacement with newer, cleaner vehicles. See also Response to Comment AJ17-12.

Response to Comment AJ11-5

Your comment on the impact analysis and mitigation measures is noted. However, the air quality analysis was prepared to meet the EPA requirements under transportation conformity, the FHWA requirements under NEPA, and the Lead Agency requirements under CEQA.

However, in response to comments received on the Draft EIS/EIR, the Alameda Corridor Transportation Authority (ACTA), a joint powers authority of which both the City of Los Angeles and the Port of Los Angeles are members, elected to conduct an HRA as part of its funded portion of the proposed project. The methodology and results of the HRA were presented in the SDEIS/RDEIR, released November 28, 2008, and incorporated into this Final EIS/EIR.

Regarding mitigation measures for construction impacts, the project proposes mitigation measures for impacts during construction. See measures AQ-1 through AQ-11 in Section 3.13.4.2 and Table S-1 of the Draft and the Final EIS/EIR. A mitigation measure based on the outcome of the HRA has also been proposed to address localized operation impacts. (See Section 3.13.4.3)

AJ11-5

measures. The SCAQMD staff would like to remind the Lead Agencies of Section 15088.5 of the CEQA Guidelines that establishes requirements for recirculation of an EIR prior to certification. The SCAQMD would be available to work with the Lead Agencies to address these issues and any other questions that may arise. Please contact me at (909) 396-3105 if you have any questions regarding these comments.

Sincerely

Susan Nakamura

Susan Nakamura
Planning Manager
Planning, Rule Development & Area Sources

Attachment

SN:EK

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Control Number

Letter AJ11. Signatory - South Coast Air Quality Management District
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Response to Comment AJ11-6

See Response to Comment AJ11-3 and AJ11-5.

Attachment A
Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project

AIR TOXIC ANALYSIS/HEALTH RISK ANALYSIS

Air toxic emissions for the proposed project were estimated for diesel PM, benzene, 1,3-butadiene, acetaldehyde, acrolein, and formaldehyde utilizing the Mobile Source Air Toxics (MSAT) Tool. However, the air quality analysis, page 3.13-22 and 23 of the DEIS/EIR states that no modeling and health risk were determined because (1) dispersion models (CALINE3 and CAL3QHC) are more accurate for predicting maximum concentrations during specific instances when time and geographic location of the project impact are known; (2) the methods of communicating MSAT health impacts in the (National Environmental Policy Act) NEPA process and general public are under development and not available for this study; and (3) lack of monitoring data. SCAQMD staff acknowledges the reasoning by the Lead Agencies with respect to NEPA. Nevertheless, for CEQA purposes, SCAQMD staff urges the Lead Agencies to include a health risk assessment (HRA) that includes air dispersion modeling, quantified health risk, and a significance determination in the Final EIS/EIR. Below is a discussion to assist the Lead Agencies in developing a HRA for the proposed project.

AJ11-6

Dispersion Model. While CALINE3 and CAL3QHC are the current EPA regulatory models for estimating maximum CO concentrations at roadways, there are other tools that can be used to estimate health risk along roadways and projects that contain roadway and non-roadway sources like the proposed project. While acute non-carcinogenic health risk is based on maximum concentrations, as stated in the air quality analysis, it is not true for carcinogenic and chronic non-carcinogenic health risk. Carcinogenic risk is estimated based on annual average concentrations over 70 years for residential and sensitive receptors and 40 years for worker receptors. Chronic non-carcinogenic risk is also estimated based on annual average concentrations. CAL3QHCR can be used to estimate carcinogenic health risk for roadway risks.

AERMOD and ISCST3 can be used to estimate carcinogenic health risk for both roadway and non-roadway sources. AERMOD is the current EPA approved model for general air dispersion modeling. Since CAL3QHCR and AERMOD are the current EPA approved models, FHWA may request that either be used for air dispersion modeling. For CEQA modeling, SCAQMD staff recommends use of any of these models (AERMOD, ISCST3, or CAL3QHCR) or HARP, which uses ISCST3.

Health Risk Assessment (HRA). There are several guidance documents available for air dispersion modeling and HRAs: SCAQMD's Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis(http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html), both Ports of Los Angeles and Long Beach have SCAQMD approved HRA protocols, ARB has air dispersion guidance in Appendix 7 of the Diesel Risk Reduction Plan (http://www.arb.ca.gov/diesel/documents/rrpapp.htm), and HARP can be downloaded from the ARB website at http://www.arb.ca.gov/toxics/harp/harp.htm.

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Page 5

Response to Comment AJ11-7

The commenter requested preparation of an HRA, and an HRA has been prepared. The comment further suggests that "[t]he HRA should ultimately determine the incremental increase in health effects values due to the proposed project by estimating the net change in impacts between the proposed project and the CEQA baseline condition. The incremental health effects value should then be compared to the health risk significance thresholds, demonstrating that the proposed project will not exceed the applicable thresholds for cancer risk at Maximum Individual Cancer Risk (MICR), hazard indices or cancer burden. The MICR should not exceed 10 in one million at any receptor location, when compared to the pre-project risk."

Table TR2-1 includes the baseline comparison requested by the comment. As illustrated by the Table, cancer risk under the baseline scenario would have been less than significant. The residential risk for the 2003 baseline ranges from 356 to 630 in a million. The residential risk for Alternative 1 in 2015 ranges from 50.3 to 97.6 in a million. Thus, there is a significant decrease in risk from baseline conditions using SCAQMD criteria, which are also consistent with CEQA Guidelines, and risk attributed to the project is less than significant.

However, SCAQMD guidance was developed for stationary sources. No recognized HRA protocols have been identified for transportation projects. In attempting to apply the stationary source guidance to a transportation project, ACTA elected for purposes of the proposed project HRA to compare risk attributed to the proposed project to the No Build scenario in a comparable year. This approach resulted in a far more conservative analysis.

Response to Comment AJ11-8

See Response to Comment AJ11-7.

If the SCAQMD's *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis* is used, the health risk estimates should be completed according to OEHHA's cancer potency methodology instead of the unit risk factor methodology. In addition, since the HRA would have both on-road and marine traffic elements, SCAQMD staff suggests that Lead Agencies model concentrations using a protocol similar to that used by either Port of Los Angeles or Port of Long Beach. Lead Agencies should contact FHWA and SCAQMD staff for additional assistance with developing an air dispersion and risk assessment protocol.

AJ11-7 The air toxic analysis appears to compare the alternatives to the future No Build option instead of baseline. Significance determinations in the Final EIS/EIR should be made based on comparing the proposed project and alternatives to the baseline pursuant to CEQA Guidelines §15125(a). The Final EIS/EIR should clearly establish the baseline, and distinguish between baseline and no build options.

AIR TOXICS SIGNIFICANCE THRESHOLDS

Page 4-43 of the *Quality Impacts Technical Study*, Revised July 2007, indicates that "currently, significance criteria have not been established to evaluate the significance of air toxic emissions from individual transportation projects." This statement is not true. SCAQMD has significance thresholds for air toxic emissions independent of the project type, including transportation projects.

AJ11-8 As mentioned above, SCAQMD staff requests that the Lead Agencies prepare a HRA to determine significance. The HRA should ultimately determine the incremental increase in health effects values due to the proposed project by estimating the net change in impacts between the proposed project and the CEQA baseline condition. The incremental health effects value should then be compared to the health risk significance thresholds, demonstrating that the proposed project will not exceed the applicable thresholds for cancer risk at Maximum Individual Cancer Risk (MICR), hazard indices or cancer burden. The MICR should not exceed 10 in one million at any receptor location, when compared to the pre-project risk. The cumulative increase in total chronic hazard index for any target organ system should not exceed 1.0 at any receptor location, when compared to the pre-project risk. The cumulative increase in total acute hazard index for any target organ system should not exceed 1.0 at any receptor location, when compared to the pre-project risk. The cumulative increase in cancer burden for any target organ shall not exceed 0.5, when compared to the pre-project risk.

AIR QUALITY ANALYSIS

Peak Daily Emissions for Construction. Table 12 on Page 4-13, Section 4.3.4.4 (Total Construction Impacts) of the *Air Quality Impacts Technical Study*, Revised July 2007

AJ11-9 shows total daily emissions of direct and indirect emissions. The Lead Agencies should show the total direct and indirect peak daily emissions that could occur on a given day.

AJ11-10 In addition, SCAQMD staff requests that mitigated (in addition to unmitigated) peak daily emissions also be quantified and analyzed on the same table for comparison purposes to the SCAQMD daily significance thresholds in the Final EIS/EIR. By

Table TR2-1 Summary of Cancer Risks

Alternative 1

All risks are expressed in number per million population

		UTM Coordinates[2]			2015 Emission Scenario Residential Risk						
Residential Regions	**Receptor[1]**	**East (m)**	**North (m)**	**2003 Baseline[3]**	**Baseline**	**Alt 1**	**Increase[4]**				
Dominguez	2535	386,675	3,744,275	630	87.8	97.6	9.8				
Lincoln Village	2389	386,525	3,743,825	612	84.9	95.0	10.1				
Long Beach	2274	386,675	3,743,375	411	52.5	57.9	5.4				
Wilmington	1548	384,975	3,740,025	356	39.7	50.3	10.6				

		UTM Coordinates[2]			2015 Emission Scenario Worker Risk				2015 Emission Scenario Adjusted Recreational Risk		
Recreational Areas	**Receptor[1]**	**East (m)**	**North (m)**	**2003 Baseline[3]**	**Baseline**	**Alt 1**	**Increase[4]**	**2003 Baseline[3]**	**Baseline**	**Alt 1**	**Increase[4]**
Hudson Park	1677	386,825	3,740,375	151	10.9	11.3	0.4	227	16.4	17.0	0.6

		UTM Coordinates[2]			2015 Emission Scenario 40-year Staff Risk				2015 Emission Scenario Adjusted 13-year Student Risk		
School Areas	**Receptor[1]**	**East (m)**	**North (m)**	**2003 Baseline[3]**	**Baseline**	**Alt 1**	**Increase[4]**	**2003 Baseline[3]**	**Baseline**	**Alt 1**	**Increase[4]**
Cabrillo High School	1623	386,775	3,740,225	152	10.8	11.2	0.4	35	2.5	2.6	0.1
Hudson Elementary School	1766	386,925	3,740,625	153	11.3	11.7	0.4	36	2.6	2.7	0.1

Alternative 2

All risks are expressed in number per million population

		UTM Coordinates[2]			2015 Emission Scenario Residential Risk						
Residential Regions	**Receptor[1]**	**East (m)**	**North (m)**	**2003 Baseline[3]**	**Baseline**	**Alt 2**	**Increase[4]**				
Dominguez	2535	386,675	3,744,275	630	87.8	94.1	6.3				
Lincoln Village	2389	386,525	3,743,825	612	84.9	91.8	6.9				
Long Beach	1736	387,125	3,740,525	532	50.1	66.2	16.1				
Wilmington	1189	384,325	3,738,725	281	26.7	26.4	None				

		UTM Coordinates[2]			2015 Emission Scenario Worker Risk				2015 Emission Scenario Adjusted Recreational Risk		
Recreational Areas	**Receptor[1]**	**East (m)**	**North (m)**	**2003 Baseline[3]**	**Baseline**	**Alt 2**	**Increase[4]**	**2003 Baseline[3]**	**Baseline**	**Alt 2**	**Increase[4]**
Hudson Park	1677	386,825	3,740,375	151	10.9	20.3	9.4	227	16.4	30.5	14.1

		UTM Coordinates[2]			2015 Emission Scenario Worker Risk				2015 Emission Scenario Adjusted Recreational Risk		
School Areas	**Receptor[1]**	**East (m)**	**North (m)**	**2003 Baseline[3]**	**Baseline**	**Alt 2**	**Increase[4]**	**2003 Baseline[3]**	**Baseline**	**Alt 2**	**Increase[4]**
Cabrillo High School	1623	386,775	3,740,225	152	10.8	22.7	11.9	35.3	2.5	5.3	2.8
Hudson Elementary School	1749	386,925	3,740,575	143	10.857	15.4	4.5	33.2	2.5	3.6	1.0

NOTES

[1] - Multiple receptors may share maximum risk increase; receptor listed is lowest-numbered.

[2] - Universal Transverse Mercator projection, Zone 11, NAD 83

[3] - For informational purposes only. Cancer risks of 2003 were estimated based on 2003 emisssions.

[4] - 2015 Baseline values used to calculate incremental risk.

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Response to Comment AJ11-9

The values reported in Table 7 (formally Table 12) represent peak daily emissions. Therefore, the Table 7 (formally Table 12) heading and text have been revised to state the emissions reported represent peak daily emissions.

Response to Comment AJ11-10

The text following Table 12 states, "After mitigation, construction emissions would be expected to remain a temporary significant impact." Therefore, mitigated emissions will not be calculated, as the results would not change this impact conclusion.

Response to Comment AJ11-11

The air quality emission calculations have been updated using EMFAC2007 emission factors.

Response to Comment AJ11-12

The idle emission factors from EMFAC2007 have been used to revise the CO hotspot analysis.

Response to Comment AJ11-13

The text in Section 3.13.4.4 of the Final EIS/EIR states that emissions for Alternative 1 and 3, rather than Alternative 1 and 2, would be lower than emissions from the No Build Alternative. Although the traffic volume in the ports area is projected to increase, the distance the vehicles travel would differ depending on the alternative evaluated. Therefore, the VMT reflects the distance vehicles would travel under each alternative within the project study area.

Response to Comment AJ11-14

Figure 3.5-3 of the Draft and the Final EIS/EIR shows the current traffic volume on the Schuyler Heim Bridge.

providing this additional comparison, the magnitude of the significance from the associated construction impact can be determined.

EMFAC2002. Page 4-5 and 4-21 of the *Air Quality Impacts Technical Study*, Revised July 2007 states that the Lead Agencies used EMFAC2002 for air quality analysis. However, the Sate of California Air Resources Board (CARB) released EMFAC2007 in November 2006. Therefore, SCAQMD staff recommends that the Lead Agencies use the most current EMFAC2007 model in the proposed project, as emissions factors differ from EMFAC2002, providing a more conservative and approved approach to the air quality analysis. AJ11-11

Page 4-26 of the *Air Quality Impacts Technical Study*, Revised July 2007 states that the idling emission factors were estimated by multiplying the EMFAC2002 emission factor for three miles per hour, in grams per second, by the speed per MOBILE5 guidance. Idling emission factors should be developed using the EMFAC2007 idling emission factors instead of the three mile per hour emission factors. AJ11-12

Project Traffic Emissions. The Lead Agencies claim on page 3.13-12 in the DEIS/EIR that emissions from Alternatives 1 and 2 are lower than the emissions from the No Build alternative because there will be a decrease in vehicle miles traveled (VMT) in the study area for 2011, 2015 and 2030. It is not explained why building the new bridge would necessarily reduce VMT in Alternatives 1 and 2 given that there is a projected increase in vehicular traffic in the ports area whether or not the new bridge is built. AJ11-13

The DEIS/EIR provides traffic data including level of service, volume/capacity ratios, density and traffic flows on freeways I-710 and I-110 and on the street intersections in the study area both before and during project construction. It also provides data on changes in AM, Mid-day (MD) and PM traffic on the SR-47 and on- and off-ramps. Table 3.5-1 on page 3.5-7 of the DEIS/EIR sums up the 2003 Traffic Volumes for the study area major roadways. The table does not show the current traffic volume on the Schuyler Heim Bridge. The Lead Agencies also do not provide a similar table showing the projected traffic for 2011, 2015 and 2030 for these major roadways. AJ11-14

Peak Daily Emissions for Operation. Unlike construction impacts, the total operational impacts are not determined in the *Air Quality Impacts Technical Study*, Revised July 2007 or the DEIS/EIR. SCAQMD staff request that the Lead Agencies provide a detailed table showing the direct, indirect, total operational emissions on an annual basis using peak daily data for each source type/activity/project scenario in the Final EIS/EIR. The peak total daily mitigated and unmitigated operational emissions should also be compared to the 2003 baseline emissions. The incremental increase over the baseline should be compared to the SCAQMD daily significance thresholds. Furthermore, if there are overlapping emissions for construction and operations, which is possible in 2015 (construction year for the Ocean Blvd. / SR-47 Flyover) per Figure 2-3 (Project Construction Schedule), the construction and operational emissions must be combined for the overlapping years and also evaluated with regards to the baseline (no build) and the SCAQMD daily significance threshold. AJ11-15 AJ11-16 AJ11-17

Response to Comment AJ11-15

Table 14 summarizes the direct operation emissions from vehicles and Table 15 summarizes the indirect marine vessel emissions. These emissions were not summed because direct operation emissions from transportation projects are included in the RTP/RTIP conformity determination while the indirect emissions would not be included in the RTP/RTIP conformity determination.

Response to Comment AJ11-16

A table has been added to the air quality impact analysis in the Final EIS/EIR (Section 3.13.3) summarizing peak daily direct and indirect operations emissions (see Table 3.13-4 Peak Daily Vehicle Emissions for the Project Study Area). In addition, explanatory text has been added to compare future (2015 and 2030) emissions to 2003 baseline emissions. However, as shown in Table 3.13-4, future emissions would be less than baseline emissions. Therefore, no comparison to SCAQMD thresholds was made. Further, because future emissions would be less than the baseline, mitigation would not be required for project operations.

Response to Comment AJ11-17

The SCAQMD has separate significance thresholds for construction and operation. Therefore, the sum of construction and operation emissions could not be compared to an SCAMQD threshold. In addition, a summary of the overlap of construction and operation emissions is not included because this would not change the impact conclusions presented in the *Air Quality Impacts Technical Study*.

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Response to Comment AJ11-18

The VMT for vehicles and port trucks have been reviewed and were confirmed by Meyer Mohaddes and Associates.

The air quality analysis contained in the Final EIS/EIR is based on the traffic analysis that is also contained in the Final EIS/EIR. Accordingly, emissions from cumulative projects including SCIG and the ICTF expansion were included in emission calculations. For further discussion on this issue, please see Response to Comment OB14-6.

Also see Response to Comment EO1-1 and OB9-18.

Response to Comment AJ11-19

See Response to Comment AJ11-2.

Response to Comment AJ11-20

See Response to Comment AJ5-6.

Port Truck Emissions. Appendix L, Table L2: Vehicle Operational Emission Calculations (A. Project Area VMT) of the *Air Quality Impacts Technical Study*, Revised July 2007 indicates that daily vehicle miles traveled (VMT) of Port Trucks will increase by approximately 32 percent when comparing years 2003 through 2015. However, based on the Mercer 2001 cargo forecast, project cargo volume growth for the San Pedro Bay Ports (Port of Long Beach and Port of Los Angeles) have been estimated to be approximately 123 percent when comparing years 2003 through 2015.[5] According to the San Pedro Bay Ports Rail Study Update (Rail Study) "Capacity of off-dock, near-dock, and on-dock rail yards will not meet projected demand ...so the Ports are considering additional potential projects," which consist of the development of the Southern California International Gateway (SCIG) Project and the expansion of the Intermodal Container Transfer Facility (ICTF).[6] Both of these projects alone are expected to more than double the TEU (Twenty-foot Equivalent Units) capacity by 3.7 million TEUs, most likely utilizing the proposed project traffic route. Also, when comparing peak truck traffic data found on Figures 3.5-3 (current or 2003) and 3.5-10 (year 2030) of the DEIS/EIR, the percentage increase range from 250 to 400%. SCAQMD staff recommends that the Lead Agencies reevaluate the Vehicle Operational Emissions calculations in the Final EIS/EIR, especially for the Port Truck VMT. The VMT estimates should be consistent with Peak scenario conditions and be consistent with industry accepted forecasted assumptions. In addition, projects that would cumulatively increase impacts such as the future SCIG and ICTF projects should also be considered when calculating the project operational emissions.

AJ11-18

Decrease in Vehicle Emissions. Table 3.13-5 (Daily Vehicle Emissions for the Project Study Area) on Page 3.13-12 of the DEIS/EIR provides data showing a decrease in vehicle emissions for future years. The DEIS/EIR attributes the decrease in emissions over time to EPA and ARB regulations that would require cleaner fuels and cleaner engines in future years. SCAQMD staff is aware that the EMFAC 2007 model takes into account the ARB approved regulations and associated phase-ins for fuel and engine standards, however, it is appropriate that the Lead Agencies cite those regulations that would contribute to the future emission reductions. SCAQMD staff recommends that the Lead Agencies provide a descriptive list of the regulations and assumptions that would contribute to the vehicle operational emission reductions in the Final EIS/EIR.

AJ11-19

LOCALIZED SIGNIFICANCE THRESHOLDS

The DEIS/EIR completes CO and PM10 hotspots analyses according to FHWA methodology to determine localized significance. The DEIS/EIR does not include a localized significance threshold (LST) analysis as required by SCAQMD for both construction and operational activities. The SCAQMD's LST methodology differs from

AJ11-20

[5] Mercer Management Consulting, Inc. (Mercer). 2001. San Pedro Bay Long-Term Cargo Forecast Update. July.

[6] Parsons. 2006. San Pedro Bay Ports Rail Study Update. Executive Summary. Prepared for the Port of Los Angeles and Port of Long Beach. December. Website: http://www.portoflosangeles.org/DOC/REPORT_SPB_Rail_Study_ES.pdf

Response to Comment AJ11-21

On November 15, 2007, CARB approved a measure to reduce emissions from commercial harbor craft. Also, Caltrans will adhere to its Standard Specifications 7/1.01F, which require the contractors to comply with local air quality regulations. Therefore, this mitigation measure was not added to the Final EIS/EIR.

Response to Comment AJ11-22

The compliance schedule in the proposed CARB Regulation to Reduce Emissions of Diesel Particulate Matter, and Other Pollutants, From In-Use Heavy-Duty Diesel Fueled Vehicles, requires meeting the Phase 1 Best Available Control Technology (BACT) beginning in 2010. The timing of compliance with this regulation would be during the construction of the project. Also, Caltrans will adhere to its Standard Specifications 7/1.01F, which require the contractors to comply with local air quality regulations. Therefore, this mitigation measure was not added to the Final EIS/EIR.

Please see Response to Comment AJ17-12 for further discussion of regulations and programs that will reduce emissions from heavy-duty diesel fueled vehicles in future years.

Response to Comment AJ11-23

The CARB In-Use Off-road Diesel Vehicle Rule was approved on July 26, 2007. This regulation would apply to the construction equipment used for the project. Large and medium construction fleets are required to comply with the regulation by 2010 and 2013, respectively. Also, Caltrans will adhere to its Standard Specifications 7/1.01F, which require the contractors to comply with local air quality regulations. Therefore, this mitigation measure was not added to the Final EIS/EIR.

Response to Comment AJ11-24

Mitigation Measure AQ-6 was changed to include inspections to limit unnecessary idling. In addition, mitigation measures AQ-10, AQ-11, and AQ-12 were added to the Final EIS/EIR. Construction equipment would be required to be maintained according to manufacturer's

Mr. Ronald Kosinski - 8 - November 08, 2007

the FHWA and includes all sources that may be considered "local" to a project, such as construction equipment, which are not required to be analyzed by the FHWA hotspots analyses. Methodology for the LST analysis can be found on the SCAQMD site at http://www.aqmd.gov/ceqa/handbook/LST/LST.html. The Final EIS/EIR should include an LST analysis for both construction and operation. AJ11-20

MITIGATION MEASURES

Construction Mitigation. The SCAQMD staff believes that there are additional mitigation measures that are feasible that the Lead Agencies are obligated to implement pursuant to CEQA Guidelines §15126.4. Therefore, SCAQMD staff recommends the following additional feasible mitigation measures be proposed for the project to assist in reducing the emissions below the daily significance thresholds:

- Harbor Craft Mitigation Measure – This measure should require all harbor craft used during the construction phase of the project to, at a minimum, have been repowered to meet the cleanest existing marine engine emission standards (in effect at the time of use) or the proposed United States Environmental Protection Agency (U.S. EPA) Tier 3 (which are proposed to be phased-in beginning 2009), whichever is cleaner. In addition, to the extent that harbor craft powered engine meeting the proposed U.S. EPA Tier 4 marine engine standards are available, these harbor craft should be used. AJ11-21
- On-road Truck Mitigation Measure – As part of this mitigation measure, the Lead Agencies should use the cleanest available trucks for construction. According to Figure 2-3 (Project Construction Schedule) of the DEIS/EIR, construction of the Schuyler Heim Bridge and SR-47 Expressway is expected to occur between 2009 to 2011 and construction of the Ocean Blvd./SR-47 Flyover is expected to occur during 2015. Due to the phased approach in construction, SCAQMD staff recommends that during the 2009 – 2011 construction phase, on-road trucks meet the lowest certified emissions levels, but no greater than the U.S. EPA 2007 emissions standards. In addition, during any construction occurring after 2014, construction on-road trucks should meet U.S. EPA 2010 emission standards. AJ11-22
- Construction Equipment Mitigation Measure – SCAQMD staff recommends that the 2009 – 2011 construction equipment should meet U.S. EPA Tier 3 emission standards in combination with highest level of CARB Verified Diesel Emission Control System (VDECS). In addition, during any construction occurring after 2014, construction equipment should meet U.S. EPA Tier 4 emission standards. AJ11-23
- Best Management Practices (BMPs) – In addition to mitigation measure AQ-6, prohibiting truck idling in excess of 2 minutes, the Lead Agencies should also implement a process by which to select additional BMPs to further reduce emissions during construction if it is determined that the proposed construction equipment exceed any SCAQMD significance threshold. The following types of measures should be required on construction equipment: a) use of diesel oxidation catalysts and catalyzed diesel particulate traps (certified to the highest CARB VDECS available); b) maintain equipment according to manufacturers' specifications; c) restrict idling of construction equipment (separate measure from AJ11-24

specifications. Also, Caltrans will adhere to its Standard Specifications 7/1.01F, which require the contractors to comply with local air quality regulations. Furthermore, it is assumed that construction equipment would be operated to comply with the ARB in-use offroad diesel vehicle regulation. This regulation states, "No vehicle or engines subject to this regulation may idle for more than 5 consecutive minutes." These idling limits became enforceable on June 15, 2008. Also, Air Quality Mitigation Measure (AQ-6) prohibits truck idling in excess of 2 minutes during project construction. Therefore, the suggested mitigation measures to require the construction equipment to restrict idling to a maximum of five minutes, use diesel oxidation catalysts, and VDECS were not added.

Response to Comment AJ11-25

Mitigation measure AQ-9 (Truck Buyback Program) would reduce short-term indirect marine vessel emissions during project construction to a level below the SCAQMD significance threshold. The truck buyback program would mitigate these emissions by replacing or retrofitting the number of trucks necessary to offset 24.2 tons NOx/year. Based on the reductions achieved with the Gateway Cities Diesel Truck Modernization program (0.55 ton NOx/year/truck), it is estimated that mitigation measure AQ-9 would result in approximately 44 trucks being replaced/retrofitted to mitigate the 24.2 ton NOx/year from indirect marine vessel emissions.

As mentioned in Final EIS/EIR Section 3.13 Air Quality, the increase in indirect marine vessel emissions also would be offset through implementation of the Heavy Duty Truck Buyback Program.

Response to Comment AJ11-26

Section 3.13.3.5 of the Final EIS/EIR states, "The detoured ships primarily would be non-ocean going ships, such as tugboats, fishing boats, yachts, and harbor operation vessels."

AJ11-24 AQ-6 for truck idling to a maximum of 5 minutes per proposed CARB regulation.

Indirect Marine Vessel Emissions. Page 4-4, Section 4.5.1.1.1 (Construction Impacts) of the DEIS/EIR states that a "mitigation would be implemented and would reduce the indirect marine vessel emissions to a level that is below the SCAQMD significance threshold for construction emissions." However, the mitigation measure is not clearly identified in the text. SCAQMD staff requests the Lead Agencies clearly identify the mitigation measure that would reduce the indirect marine vessel emission to a level that is below the SCAQMD significance threshold for construction emissions. In addition, SCAQMD staff requests that the Lead Agencies specifically define the term "marine vessel" to mean either an Ocean Going Vessel (OGV) or Harbor Craft and differentiate the "Ship Types," accordingly.

AJ11-25

AJ11-26

Mitigation Measure AQ-9, Heavy Duty Truck Buyback Program. Table 4-1 of Page 4-33 of the DEIS/EIR identifies a proposed mitigation measure AQ-9, Heavy Duty Truck Buyback Program. However, limited information is provided in the table with regards to the proposed Mitigation Measure AQ-9. SCAQMD staff requests additional information be provided with regards to the implementation strategy of the mitigation measure such as the managing agency, committed funding source, funding amount, length of program, and buyback eligibility/qualification in the Final EIS/EIR. Providing commitments up front in the Final EIS/EIR is essential to the success of this mitigation measure. Moreover, SCAQMD staff requests a detailed evaluation in the Final EIS/EIR quantifying the emission reductions for this mitigation measure.

AJ11-27

AJ11-28

Operational Mitigation. The proposed project will result in increased transportation of freight and goods to and from the Ports of Los Angeles and Long Beach. The amount of port-related truck traffic is expected to double between 2010 and 2020.[7] In addition, proposed expansion of the Union Pacific Intermodal Container Transfer Facility (UP ICTF) and proposed development of the Burlington Northern and Santa Fe Railroad Southern California Intermodal Gateway (BNSF SCIG) near-dock rail yard projects will more than double container capacity and truck traffic. As a result, it is therefore necessary that a program to reduce emissions from port drayage trucks be in place prior to approval of the proposed Schuyler Heim Bridge project. Specifically, existence of the San Pedro Bay Ports Clean Trucks Program, to turnover heavy duty port drayage trucks to current emissions standards by 2012, should be a pre-condition of project approval. In addition, the Lead Agencies should provide funding for the San Pedro Bay Ports Clean Trucks Program as this truck program will mitigate emissions from trucks that use the Schuyler Heim Bridge and the proposed expressway. Lastly, SCAQMD staff urges the Lead Agencies to actively participate in the CEQA process and monitor the UP ICTF expansion and BNSF SCIG near-dock rail yard projects to minimize impacts.

AJ11-29

AJ11-30

AJ11-31

[7] State of California, Department of Transportation. August 2007. Schuyler Heim Bridge Replacement and SR-47 Expressway Project – Draft Environmental Impact Statement/Environmental Impact Report and Section 4(f) Evaluation.

Response to Comment AJ11-27

Please see Response to Comment AJ17-12 for further information on this mitigation measure.

Response to Comment AJ11-28

See Response to Comment AJ11-27.

Response to Comment AJ11-29

See Response to Comment AJ11-4.

Response to Comment AJ11-30

See Response to Comment AJ11-4.

Response to Comment AJ11-31

Your comment regarding the UP ICTF and BNSF SCIG projects is acknowledged. This information has been forwarded to the Caltrans CEQA Intergovernmental Review Section that is responsible for actively reviewing environmental documents that are prepared by other agencies and are sent to Caltrans.

Response to Comment AJ11-32

The Final EIS/EIR concludes that transportation projects, such as the proposed project that will relieve congestion by enhancing operations and improving travel times in high congestion travel corridors, will lead to an overall reduction in CO2 emissions (Final EIS/EIR, p. 3.13-12). By relieving congestion and improving travel times, the project is anticipated to reduce GHG emissions from the mobile sources that will travel on the proposed bridge and expressway (*Id.*).

The following additional project measures have the potential to further reduce GHG emissions and are incorporated into Final EIS/EIR Section 3.13.2.2.3:

> Reclaimed Water. Using reclaimed water during construction and operation of the proposed project will conserve energy and reduces GHG emissions from electricity production.
>
> Landscaping. Two avoidance and mitigation measures, included in the EIS/EIR, incorporate landscaping as elements of the project design. Project landscaping would reduce surface warming and, through photosynthesis, would decrease carbon dioxide, thereby reducing GHG emissions.
>
> Energy Efficient Lighting. To the extent feasible, energy efficient streetlights and LED traffic signals will be incorporated in the final design of the project.
>
> Truck Idling Restrictions. Air Quality Mitigation Measure (AQ-6) prohibits truck idling in excess of 2 minutes during project construction. Implementation of the measure will reduce GHG emissions resulting from implementation of the project.

Additionally, other agencies, such as the United States Environmental Protection Agency and the California Air Resources Board, have or will be considering regulations to improve vehicle efficiency for the purpose of reducing GHG. Any such regulations will further reduce GHG emissions from mobile sources that will utilize the project.

GREENHOUSE GAS EMISSIONS

Page 4-30 of the DEIS/EIR states "The project's inclusion in the Regional Transportaion Plan and/or Regional Transportation Improvement Program and improved traffic flow for the region would result in improved traffic flow. As a result, carbon dioxide emission should be reduced, despite what may be an increase in vehicle miles traveled (VMT)."

AJ11-32 SCAQMD staff recommends the Lead Agencies quantify the greenhouse gas emissions and provide specific data to show that the carbon dioxide emissions would be reduced as a result of the proposed project in the Final EIS/EIR.

CONFORMITY

One of the criteria for demonstrating conformity is that the design and scope of the proposed project not change from what was in the approved SCAG Regional Transportation Plan. See page 3.13-4 of the DEIS/EIR. In the section on Conformity, the Lead Agencies state on page 3.13-12 of the DEIS/EIR "The Schuyler Heim Bridge/SR-47 is consistent with the proposed 2008 RTP that will be adopted by SCAG in March 2008 with amendments to the 2006 RTIP anticipated in July/August 2008." It adds "It is expected that changes to the project scope will be included in the draft 2008 RTP in October or November 2007 with the final RTP approval in March 2008."

AJ11-33 SCAQMD staff recommends the Lead Agencies provide a conformity analysis showing consistency with the adopted 2004 RTP and the 2006 RTIP (Regional Transportation Improvement Program) rather than an "anticipated" 2008 RTP and 2006 RTIP amendment. However, if the Lead Agencies insist on providing a conformity analysis with the anticipated 2008 RTP and 2006 RTIP amendment, the Lead Agencies should discuss in detail, which of the six alternatives presented in the current DEIS/EIR are included in the SCAG March 2008 RTP and any proposed changes to the original Schuyler Heim Bridge/SR-47 enhancement project. Given that each of the six alternatives have different air quality impacts, it is therefore not clear how the Lead Agencies could conclude that the proposed project is consistent with the RTP and therefore with the AQMP.

SCAQMD staff recommends the following changes as it relates to transportation conformity for the proposed project:

- AJ11-34 All references to ISTEA and TEA-21 should be deleted from both the Environmental Impact Statement/Report and the Air Quality Impacts Technical Study and replaced with SAFETEA LU;
- AJ11-35 ***Air Quality Impacts Technical Study***, Section 2.2.1., Regional Conformity Determination, should reflect the new RTP update cycle in accordance to SAFETEA LU;
- AJ11-36 ***Air Quality Impacts Technical Study***, Section 2.2.1, Regional Conformity Determination, the following sentence should read as follows: "In meeting the requirements of a conformity determination, both the RTP and the RTIP must demonstrate consistency with the SIP emission budgets." The change is deleting "and the Transportation Control Measures (TCMs)."

Moreover, since the project will accommodate port-generated traffic, additional GHG reductions will occur through implementation of the Settlement Agreement entered into between the Port of Los Angeles and the Attorney General's office. Among other things, the Settlement Agreement requires that when approving future projects the Port of Los Angeles must adopt any of the following mitigation measures feasible:

Anti-idling measures;
In-terminal truck electrification;
Terminal user GHG mitigation fees;
Fleet modernization incentives;
Mandatory tire check/inflation programs;
HFC leak inspections;
HFC mitigation fees;
Requirements for use of alternative refrigerants; and
Commuter incentives.

All of these Settlement Agreement measures will further reduce GHG emissions from mobile sources that will utilize the project.

Based upon the foregoing, impacts related to greenhouse gas emissions including carbon dioxide emissions are anticipated to be less than significant.

Response to Comment AJ11-33

At the time the Draft EIS/EIR was prepared, the RTP/RTIP were in the process of being updated. The Final EIS/EIR has been updated to indicate that the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway Project (Project ID: LA0D45) is included in the Southern California Association of Governments (SCAG) conforming 2008 RTP and final 2008 RTIP that was adopted by SCAG on July 17, 2008. Federal approval of the 2008 RTIP was issued on November 17, 2008. The final RTP/RTIP conformity determination will be included in the Notice of Determination and Record of Decision for the project.

Response to Comment AJ11-34

The EIS/EIR Section 3.13 and the Air Quality Technical Impact Study have been revised to replace references to ISTEA and TEA-21 with SAFETEA-LU.

Response to Comment AJ11-35

Section 2.2.1 of the *Air Quality Impacts Technical Study* has been revised to reflect the new RTP cycle and SAFETEA-LU.

Response to Comment AJ11-36

In Section 2.2.1 of the *Air Quality Impacts Technical Study*, the text "and the Transportation Control Measures (TCMs)" has been deleted.

Response to Comment AJ11-37

The first sentence in Section 2.2.1.2 of the *Air Quality Impacts Technical Study* has been revised to include $PM_{2.5}$ SIPs.

AJ11-37

- ***Air Quality Impacts Technical Study***, Section 2.2.1.2, Timely Implementation of Transportation Control Measures, the first sentence should also include PM2.5 SIPs.

Letter AJ12. Signatory – The Port of Long Beach

Response to Comment AJ12-1

The commenter's support of the proposed project is acknowledged.

Response to Comment AJ12-2

The new fixed-span bridge is primarily within the same alignment as the existing Schuyler Heim Bridge and as far to the west as feasible. The replacement bridge is designed to incorporate the existing Schuyler Heim Bridge right-of-way, but would extend further east, as it would be approximately 13 meters (43 feet) wider than the existing bridge. The new bridge is located to avoid impacts to the Badger Avenue railroad bridge west of the Schuyler Heim Bridge and would be constructed to avoid potential conflicts with current or future development of Pier A or Pier S.

Additional detail and graphic illustrations are provided in the Draft and the Final EIS/EIR Section 2.2, Project Alternatives.

Response to Comment AJ12-3

The flyover design shows that, at its closest point, the flyover is one-third mile from the road that branches from Ocean Boulevard to the Pier T (Terminal T referenced in the comment) entrance, and is more than 50 feet above the Pier T ground elevation. Where the flyover joins SR-47, there is no impact to Pier S, as this location is 25 feet west of Pier S and approximately 45 feet above the Pier S ground elevation. Thus, the proposed flyover design for Alternatives 1, 2, and 3 does not impact either Pier T or Pier S.

Response to Comment AJ12-4

Section S.7 of the Final EIS/EIR has been revised to reflect that the project will be funded by Caltrans and ACTA. Caltrans has agreed to contribute $250 million to the bridge replacement portion of the project. This funding is sought through Grant Anticipation Revenue Vehicle (GARVEE) bonds. The Alameda Corridor Expressway portion of the project is intended to be funded by ACTA, which is seeking funding through Trade Corridor Improvement Funds (TCIF).

The Port of Long Beach

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November 14, 2007

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By NLP

Ronald J. Kosinski
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, CA 90012

Subject: Comments on Schuyler Heim Bridge Replacement and SR-47 Expressway Project Draft Environmental Impact Statement/Environmental Impact Report and Section 4(f) Evaluation

Dear Mr. Kosinski:

Thank you for including the Port of Long Beach (POLB) in the environmental review process for the subject document. The POLB has completed its review of the EIS/EIR and offers the following comments:

General Comments

AJ12-1 The Port supports the proposal to replace the existing Schulyer Heim Lift Bridge with a fixed span bridge. The replacement bridge should be within the same alignment or as
AJ12-2 far to the west as feasible to avoid impacting the operations of the existing marine terminal on Pier A or a potential marine terminal on Pier S. In addition, the Ocean
AJ12-3 Boulevard/SR-47 flyover discussed in Section 2.1.3 conflicts with proposed development plans on Pier S and should be located so as to minimize any disruption to the existing marine terminal gate on Pier T.

AJ12-4 The Port's governing body, the Board of Harbor Commissioners, has not made any commitment to provide funds for this project. The EIR/EIS should clarify potential funding and confirmed funding sources.

AJ12-5 Proposed construction and maintenance projects for the Gerald Desmond Bridge and Vincent Thomas Bridge could occur during the construction of the Heim Bridge Replacement. Traffic congestion would be unacceptable if more than one of the three bridges to Terminal Island were closed at the same time. It is critical to avoid closing more than one of these bridges at the same time. As proposed in the current draft EIR/EIS, the Heim Bridge would be closed for two 2-week periods during construction,

PRESIDENT'S "E" AND "E-STAR" AWARDS FOR EXCELLENCE IN EXPORT

Letter AJ12. Signatory - The Port of Long Beach.
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Response to Comment AJ12-5

The commenter's view is acknowledged and agreed with. Two or more bridges connected to Terminal Island should not be closed at the same time. Caltrans and ACTA will implement the necessary scheduling arrangements to assure that ingress and egress for the Port of Long Beach and Port of Los Angeles are maintained to the maximum extent possible during the construction phase of the project. Further, per the September 19-20, 2007, California Transportation Commission (CTC) meeting, Caltrans was allotted capital construction funds in Fiscal Year (FY) 2008-09 for the Schuyler Heim Bridge Replacement Project, while the Gerald Desmond Bridge Replacement Project was tentatively allotted capital construction funds for four years later, or in FY 2012-13. Since construction of the new Schuyler Heim Bridge is scheduled to occur over a period of two years, the new Schuyler Heim Bridge will be constructed and in operation before construction of the new Gerald Desmond Bridge begins.

The project engineer estimates that the Schuyler Heim Bridge will be closed several times at night and during non-holiday weekends for a total period of two weeks. These planned closures during nights and weekends will minimize impacts to the public during project construction.

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Response to Comment AJ12-6

Potential temporary parking relocation sites for Alternatives 1, 1A, 2, 3, and 4 are addressed in Draft and the Final EIS/EIR Section 3.5.4, Avoidance, Minimization, and/or Mitigation Measures. Specifically, Mitigation Measure T-1 states:

> Prior to construction, temporary parking spaces will be provided to replace existing parking capacity that will not be available during project construction. Caltrans will coordinate with the Port of Long Beach and the Port of Los Angeles to identify replacement parking for the Pier A East and Pier S Terminals. Exact locations will be determined after consultation with responsible parties, including property owners. Considerations of feasibility will include, but not be limited to, vehicle capacity, time of availability, distance from terminal(s), and the need for employee shuttles.

Parking losses associated with Alternative 3 are quantified in Draft and the Final EIS/EIR Section 3.5.3.3.3, Bridge Demolition Avoidance, and shown on Table 3.5-9.

The Draft and the Final EIS/EIR states that, "During project construction, Alternative 3 is expected to have temporary effects to off-street employee parking and marine terminal equipment parking at the Port of Long Beach Pier A East and Pier S Terminals. Up to 977 off-street employee parking spaces and 167 marine terminal equipment spaces would be affected... On-street parking is not expected to be affected by project construction."

The Draft and the Final EIS/EIR also states that, "During project operations, Alternative 3 is anticipated to have permanent effects to approximately 45 employee parking spaces at the Port of Long Beach Pier S Terminal."

Response to Comment AJ12-7

The topic of subsidence associated with oil extraction is addressed in Draft and the Final EIS/EIR Chapter 3.11. To reduce subsidence in the

AJ12-5 therefore it is critical that Caltrans and ACTA coordinate and avoid multiple simultaneous closures.

AJ12-6 Project construction impacts on Port facility parking are identified as adverse under Alternatives 1 and 2. Each alternative would result in the temporary loss of up to 820 off-street employee spaces and an additional 54 equipment spaces at Pier A East and Pier S. Potential temporary parking relocation sites should be identified in the evaluation of construction impacts. Parking losses associated with Alternative 3 do not appear to be quantified, and perhaps would be worse, given the more southerly alignment of the bridge replacement under that scenario than under Alternatives 1 and 2.

Comments by Section

Section S.4.1.1 Schuyler Heim Bridge

AJ12-7 Historical ground subsidence is mentioned in this section. Although water is injected into the formation to mitigate subsidence issues, continued oil extraction activities in the area have the potential to cause further ground subsidence in the project area. This issue should be discussed in the EIR/EIS.

Section S.4.2 Project Purpose

AJ12-8 The purpose should state that the bridge should provide immediate service after an earthquake and it should be designed as an "Important Bridge". This would accommodate critical emergency vehicle egress/access to Terminal Island. If designated as an "Ordinary Bridge" it could be out of service for several months following an earthquake. Both Ports are on record supporting an "Important Bridge" designation for state and national economic reasons.

Section S.5.1.1.4 Bridge Replacement Only

AJ12-9 Please indicate whether the existing ramps to Henry Ford Avenue would be retained.

Section S.9.6 Other Coordination Activities

It is noted that the project will place its support columns so as to not interfere with a crossing under SR-47 providing contiguous access connecting Pier A to Pier A West.

AJ12-10 The ground elevation under the Heim bridge approach at Pier A should be raised. The existing utilities as well as new utilities in this area including the area drainage should be evaluated, designed and constructed in conjunction with the construction of the Heim Bridge replacement, the connection from Pier A to Pier A West, and a raised

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Long Beach and Wilmington areas, pilot water flooding was begun in 1953, and full-scale re-pressurization was underway by 1960. More recent data indicate that rates of subsidence have been greatly reduced, and the direction of movement has been reversed. Total rebound of more than 1 foot has been recorded in the Schuyler Heim Bridge area. The re-pressurization program continues, and adjustments are made annually to minimize elevation changes.

Avoidance and minimization measure GEO-3 would be implemented during construction. The measure involves monitoring during construction by a licensed geologist or engineer to verify that construction occurs in compliance with features, standards, and practices included in final design to reduce potential effects from earthquake damage; slope and/or foundation instability; erosion, sedimentation, and flooding; land subsidence; and volcanic hazards.

Response to Comment AJ12-8

Only two bridges in California have been designated by Caltrans as "important." The designations were influenced by the availability of alternative routes and the depths at which the columns are submerged in water. These factors are not significant in the case of the Schuyler Heim Bridge.

The bridge replacement will be designed in accordance with the Caltrans Seismic Design Criteria for ordinary bridges. However, to acknowledge the importance of the Schuyler Heim Bridge to state and national economic interests, the design will incorporate additional seismic enhancements and go beyond the requirements of the Caltrans Seismic Design Criteria. These enhancements will focus mainly on the joint seal assemblies and bearings at abutment expansion joints and superstructure longitudinal hinges. By reducing the risk of damage to these components, the bridge is more likely to remain in service after an earthquake.

Response to Comment AJ12-9

Alternatives 1 through 4 of the proposed project will retain existing ramps to Henry Ford Avenue and other existing ramps and access. The text in Section S.5.1.1.1 (Alternative 1) and Section 2.2.1.1.1 (Bridge Replacement) has been revised to provide this clarification.

Response to Comment AJ12-10

A separate future project will regrade the depressed area under the Schuyler Heim Bridge approach at Pier A. Caltrans Division of Structures has been informed of this future grade change so they may make the necessary design changes to the proposed new fixed-span bridge.

Filling the depressed area would reduce the lengths of the proposed bridge columns (exposed section of pier) in this area and increase the bridge pile (buried section of pier) lengths; the poor local soil properties require pier lengths of approximately 140 to 160 feet. A reduction in the column lengths would not result in a cost saving. On the contrary, additional import material, drainage, and regrading would increase the project cost.

Response to Comment AJ12-11

The commenter is referred to response AJ12-8.

Response to Comment AJ12-12

The referenced Port of Long Beach permit in Table 2-1 (Permits and Approvals) has been corrected to read, "Application Summary Report."

Response to Comment AJ12-13

The commenter is referred to response AJ12-3.

Response to Comment AJ12-14

The text in EIS/EIR Section 2.2.1.1.1 (Bridge Replacement) has been revised to confirm that bridge construction will not conflict with any future tunnel on Pier A.

Response to Comment AJ12-15

The commenter is referred to response AJ12-10.

Response to Comment AJ12-16

Alternatives 1 through 4, specifically sheets L-001 through L-002, will be updated to show the new MSE wall and new storm water pump station as soon as the as-built drawings become available. ACET will contact the Port of Long Beach for the pertinent drawings.

Mr. Kosinski
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AJ12-10 ground elevation under the Heim Bridge approach. This would reduce the bridge column heights and overall project costs.

Section 1.2.1 Project Purpose

AJ12-11 Clarify that the bridge should remain in service **immediately** after a major earthquake. It should be designed as an "Important Bridge".

Table 2-1 Permits and Approvals

AJ12-12 The Port of Long Beach prepares an "Application Summary Report" not an Application-for-Development Permit.

Section 2.1.3 Ocean Boulevard SR-47 Flyover

AJ12-13 The flyover conflicts with a planned building on Pier S, which is proposed to be constructed before the flyover.

Section 2.2.1.1.1 Bridge Replacement

The following comments apply to several alternatives:

AJ12-14 The document should mention that this alternative will be constructed so as to avoid conflicts with any future tunnel on Pier A.

AJ12-15 Appendix B-1.1 page 6 shows that the ground elevation will not be raised under the bridge approach on Pier A. The elevation is currently below sea level. The existing seawall leaks and there is need for continual pumping. There is an existing pump station next to the seawall. In 1996 when the Port constructed the Pier A Marine Terminal it had applied to Caltrans to raise the grade on Port property adjacent to the bridge approach right-of-way. Caltrans objected because of the potential for the fill to down drag the bridge piles. The replacement bridge would be built on this property. The bridge replacement is the appropriate project for raising the ground level under the bridge approach to slightly above sea level, to eliminate long-term drainage and pumping. It would also reduce bridge column heights and overall project costs.

AJ12-16 Show the recently built storm water pump station on Pier S, and the existing mechanically stabilized embankment wall on Pier S to the east of the Heim Bridge The selected design should avoid impacting these features.

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Response to Comment AJ12-17

The text of EIS/EIR Section 2.2.1.2.1 (Bridge Construction) has been revised to reflect the information provided in this comment.

Response to Comment AJ12-18

The commenter's view is appreciated and agreed with. Existing pile caps and piles determined to be deep enough and not conflicting with proposed bridge bents, drainage facilities, and utilities should remain in place and be documented in the project's as-built plans.

Response to Comment AJ12-19

The comment is acknowledged. The Transportation System Management (TSM) alternative was described in the Draft and the Final EIS/EIR and evaluated as a feasible alternative to accomplish the project purpose and need. The Advanced Transportation Management Information System (ATMIS) described in Section 2.2.5 of the Draft and the Final EIS/EIR is one element of the entire TSM alternative. The ATMIS contains a variety of independent systems, including changeable message signs to transmit traffic information, including train blockages, to motorists. The Draft and the Final EIS/EIR concludes that, of itself, the TSM alternative would not meet the project purpose and need.

Response to Comment AJ12-20

Alternative 5, Transportation Systems Management (TSM), Sections 5.F.1.1 and 5.F.1.3 of the December 2007 Draft Project Study Report/Project Report (PSR/PR) already include Henry Ford/ Alameda and Alameda/PCH. The referenced Anaheim and PCH have been added to the Final PSR/PR.

Response to Comment AJ12-21

The comment is acknowledged. The Transportation System Management (TSM) alternative was described in the Draft and the Final EIS/EIR and evaluated as a feasible alternative to accomplish the project purpose and need. The Advanced Transportation

Section 2.2.1.2.1.8 Bridge Demolition

AJ12-17 There is no existing steel recycling mill in the Port of Long Beach. There are several scrap metal exporting terminals in the ports of Long Beach and Los Angeles.

AJ12-18 The Port does not object to leaving the existing bridge pile caps in place, provided they are cut off and appropriately as-built marked.

Section 2.2.5.1.1 Intelligent Transportation Systems

This section describes two current projects as future projects in a Transportation Systems Management (TSM) Alternative.

AJ12-19 A project is described that includes an "advanced detection system for trains approaching rail crossings between the Henry Ford Avenue/SR-47 interchange and Anaheim Street, so that train blockages of those tracks would be detected in advance of and during the blockage. That information would be used to direct vehicular traffic to routes without blockages, such as SR-47/103, I-710, etc."

ACTA is currently constructing a "Long Train Warning System" for at-grade crossings along Henry Ford Avenue between the SR-47 and Anaheim Street. See City of Los Angeles Bureau of Engineering BC Permit 600313. The project includes three changeable message signs at the intersection of Anaheim Street and Henry Ford Avenue.

AJ12-20 The TSM alternative should include expanding the detection zone of the current ACTA project to include Henry Ford Ave/Alameda Street between Anaheim Street and Pacific Coast Highway.

AJ12-21 The ports of Long Beach and Los Angeles, and ACTA are funding and developing a project for an Advanced Transportation Management Information System.

3.1 Land Use, Recreation, and Coastal Zone

AJ12-22 Figure 3.1-2b is out-of-date. Pier T no longer has piers.

Section 3.1.1.9.2 Port of Long Beach: Port Master Plan

AJ12-23 The Port of Long Beach Port Master Plan (PMP) was certified in 1978 by the California Coastal Commission. Certification of the PMP requires that it conform with the policies of chapters 3 and 8 of the California Coastal Act. Two updates, 1983 and 1990, have

Management Information System (ATMIS) described in Section 2.2.5 of the Draft and the Final EIS/EIR is but one element of the entire TSM alternative and contains a variety of independent systems. The Draft and the Final EIS/EIR concludes that, of itself, the TSM alternative would not meet the project purpose and need.

Response to Comment AJ12-22

Figure 3.1-2b has been revised to indicate that Pier T no longer has piers. The revised figure is included in Final EIS/EIR Section 3.1.

Response to Comment AJ12-23

The text of Draft EIS/EIR Section 3.1.1.9.2 has been revised. Existing text has been replaced with the text provided in this comment.

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been completed and certified by the California Coastal Commission. Since the 1990 update, there have been 12 certified amendments to the PMP.

The Port Master Plan covers the Port of Long Beach Harbor District, which is generally harbor area land that is contained within the City of Long Beach. The area consists of nearly 2,700 acres of land and over 4,500 acres of water. The PMP divides the Harbor District into ten planning districts and defines a total of 13 land and water uses that are allowed in the Harbor District.

Port goals, objectives, policies, and statement of permitted uses guide future development within each Harbor Planning District. A finding of consistency with the PMP is required prior to any development within the Harbor District. The harbor development permit (HDP) is the primary vehicle for evaluating Port projects and determining PMP compliance.

The project falls within two harbor planning districts: District 3-the Northwest Harbor District and District 4-the Terminal Island District. The allowable uses in each area are:

Northwest Harbor District
- Oil Production
- Primary Port Facilities
- Utilities
- Ancillary Port Facilities

Terminal Island District
- Primary Port Facilities
- Hazardous Cargo Facilities
- Port Related
- Oil Production
- Navigation
- Federal Uses
- Utilities
- Ancillary Port Facilities
- Non-Port uses for 3-acre Homeless Service Center
- Non-Port uses for 15-acre City of Long Beach Police Department headquarters and training academy

AJ12-23

The project addressed in this Draft EIR/EIS is consistent with the Port Master Plan.

Response to Comment AJ12-24

EIS/EIR Section 3.4.2.1.2 (Natural Gas and Liquid Commodities) has been revised in accordance with information provided in this comment.

Response to Comment AJ12-25

EIS/EIR Section 3.10.2.1.4 (Area 4 [Pier S]) has been revised in accordance with information provided in this comment.

Response to Comment AJ12-26

A description of the small tidal wetland east of the Schuyler Heim Bridge adjacent to the Pier S improvements is provided in Section 3.16.2.1.2 of the Draft and the Final EIS/EIR. Formal wetland delineation per the U.S. Army Corps of Engineers Wetland Delineation Manual (WDM; 1987; http://www.wetlands.com/regs/tlpge02e.htm) has not been performed. However, the preliminary field investigation indicated that this wetland had greater than 60 percent coverage of pickleweed (*Salicornia* sp.); all species of pickleweed with potential to occur in this area are obligate wetland plants (OBL) according to the U.S. Fish and Wildlife Service National List of Plants that Occur in Wetlands (1996; <http://library.fws.gov/Pubs9/ wetlands_plantlist96.pdf>); OBL occur in wetlands 99 percent of the time.

In addition, the site is within the regular tidal inundation zone, indicating it has wetland hydrology per the WDM. While tidal elevations have not been established by field measures in this area, regular inundation of the site from normal tidal fluctuations has been observed during field visits. Soil sampling has not been conducted, but would be expected to show hydric characteristics based on the site hydrology.

Caltrans would agree that impacts to this wetland area reduce the desirability of selecting Alternative 3 as the preferred alternative.

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Any future development would need to be consistent with the Port Master Plan and would require a specific environmental analysis.

AJ12-23 The project area is zoned "IP", Port-related Industrial and is covered by the City of Long Beach Municipal Code.

Section 3.4.2.1.2 Natural Gas and Liquid Commodities

AJ12-24 The oil fields are owned by the City and the State; they are operated for the City by Tidelands Oil Company. The oil pipelines have varied ownership.

Section 3.10.2.1.4 Area 4 Pier S

AJ12-25 Pier S is not being developed. It is being remediated, graded, and utilities are being installed for potential use, should the Board of Harbor Commissioners approve an EIR for future development.

Section 3.16.2.2 Jurisdictional Waters Including Wetlands

AJ12-26 The description of the small wetland along the south side of the Cerritos Channel and east of the Schuyler Heim Bridge provides incomplete information to confirm that it may be potentially subject to federal jurisdiction. Additional information should be provided to support that conclusion. The Port is not aware of this particular "wetland". If in fact it is a legal wetland, subject to federal jurisdiction under the Clean Water Act, the likelihood that Alternative 3 would displace this feature makes that alternative even less desirable as a build option in the Port's view.

Section 3.16.3.3.1.1.1 Direct Construction Effects

AJ12-27 The conclusion that a known breeding pair of American peregrine falcons would be displaced by construction activities on the Schuyler Heim Bridge but would be expected to use the Gerald Desmond Bridge as an alternate nesting location makes it especially important that the construction schedules for these two bridge replacement projects not overlap. Otherwise a significant adverse impact to the peregrines would likely occur.

3.18 Irreversible and Irretrievable Commitment of Resources

AJ12-28 Figure 3.18-1 incorrectly shows wetlands along the Pier S waterfront east of the bridge.

5.0 Cumulative Impacts

AJ12-29 Please see the attached Table entitled "Related Projects in the Vicinity of the Project Alternatives" for an updated Port project list.

Response to Comment AJ12-27

The commenter's observation regarding the construction schedules for replacement of the Schuyler Heim Bridge and Gerald Desmond Bridge is acknowledged. As stated in Draft and the Final EIS/EIR Section 3.16.4, Measure B-7, efforts will be made to coordinate the construction schedules of the two bridge projects. In the event the construction schedules for the two projects cannot be coordinated, appropriate mitigation for the adverse impact to peregrine falcons has been provided (Draft and the Final EIS/EIR Section 3.16.4, mitigation measure B-12).

Response to Comment AJ12-28

The referenced Figure 3.16-1 approximates the location of the wetland as shown on the aerial photograph. Formal delineation of this wetland has not been conducted; therefore, more precise mapping cannot be provided at this time. Since the date of this aerial photograph, some reduction in the size of this wetland has occurred. Also see response AJ12-26.

Response to Comment AJ12-29

Table 5-1 of the Final EIS/EIR has been revised in accordance with information provided on the attached comment table "Related Projects in the Vicinity of the Project Alternatives."

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Response to Comment AJ12-30

EIS/EIR Section 5.3.10.1.1 (Construction Impacts) has been revised. Reference to the LNG Terminal Project has been deleted.

Response to Comment AJ12-31

Comment noted. Reference to the Pier S Marine Terminal remediating wetlands along the south side of the Cerritos Channel has been removed in the Final EIS/EIR.

Response to Comment AJ12-32

The Key Map Drawing RW100 was corrected to reference drawings RW102-106A. This drawing and RW-119, RW-120 and RW-121A also have been corrected. These drawings are provided in Appendix I of the Final EIS/EIR.

Response to Comment AJ12-33

The commenter's view is acknowledged and agreed with. Aerial easements were selected over highway easements. The right-of-way plans will be reviewed to maximize aerial easements and allow the land under the proposed viaduct to be used for parking.

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Section 5.3.10.1.1 Construction Impacts

AJ12-30 Please remove references to the POLB Liquefied Natural Gas (LNG) terminal project which has been cancelled.

5.3.16.1.3 Jurisdictional Waters Including Wetlands

AJ12-31 Please remove references to Pier S Marine Terminal remediating wetlands along the south side of Cerritos Channel.

Appendix I Rights-of-Way (ROW)

AJ12-32 The key map sheet RW100 refers to detailed maps RW203, RW204, RW205, RW206 for the ROW along Ocean Boulevard. The individual detailed maps are numbered RW102, RW103, RW 104, RW105, and RW 106. There is an inconsistency in the map numbering system.

AJ12-33 These and other ROW maps show aerial easements and highway easements. Some of the areas shown as highway easements should be aerial easements. Aerial construction should be used to the fullest extent feasible over marine terminals. The land under the structures could be used for local streets and employee parking within the marine terminals. In our discussions with the Project Development Team, the land under the aerial structures in the marine terminals had always been intended to be used for parking.

If you have any questions please contact James Vernon, of my staff, at (562) 590-4160.

Sincerely,

Richard D. Cameron
Director of Environmental Planning

JBV:s

cc: John Doherty, ACTA CEO
Robert Kanter, Managing Director of Environmental Affairs and Planning
Doug Thiessen, Managing Director of Engineering

Letter AJ12. Signatory - The Port of Long Beach
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Related Projects in the Vicinity of the Project Alternatives			
No. in Figure 5-1	Project Title	Project Description	Project Status
34	Middle Harbor Terminal Redevelopment, (Proposed Project)	Expansion of an existing marine container terminal in the Middle Harbor area. The Project would involve consolidate of two existing container terminals into one 345-acre terminal. Construction would include creation of approximately 51 acres of landfill, dredging, wharf construction; construction of an intermodal railyard; and reconstruction of terminal operations buildings. The Initial Study prepared for this project identified potentially significant air, public health, transportation, biological, and water quality impacts. *(Proposed Project analyzed in this EIS/EIR.)*	EIS/EIR under preparation. NOI/NOP released in 2005. (2009-2019)
27	Piers G & J Terminal Redevelopment Project	Redevelopment of two existing marine container terminals into one terminal. The Piers G and J redevelopment project is in the Southeast Harbor Planning District area of the Port of Long Beach. The project will develop a marine terminal of up to 315 acres by consolidating portions of two existing terminals on Piers G and J and several surrounding parcels. Construction is now underway and will occur in four phases; it will include creation of approximately 53 acres of landfills, dredging, concrete wharves, rock dikes, and road and railway improvements. The EIR prepared for this project identified potentially significant impacts on air quality, geology, groundwater, and soils.	Approved project. Construction underway. (2005-2015)
29	Pier T, T.T.I. (formerly Hanjin)Terminal, Phase III,	Expansion of a 300-acre marine container terminal to 375 acres on Terminal Island.	Approved project. Under construction. (2000-2007)
30	Pier S Marine Terminal	Development of a 150-acre container terminal and construction of navigational safety improvements to the Back Channel.	EIS/EIR to be prepared. (2007-2012)

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Related Projects in the Vicinity of the Project Alternatives			
No. in Figure 5-1	**Project Title**	**Project Description**	**Project Status**
32	Pier T, Long Beach LNG Import Terminal	Construction of a 25-acre liquefied natural gas (LNG) import terminal facility including pipeline and wharf construction on a portion of Pier T. * This project was not included in determining cumulative impacts because the project cannot proceed without approval by the BHC.	Project Disapproved by BHC January 2007*.
28	Pier A East	Redevelopment of 32 acres of existing auto storage area into container terminal backlands.	EIR to be prepared
34	Chemoil Marine Terminal, Tank Installation, Port of Long Beach	Construction of two petroleum storage tanks and associated relocation of utilities and reconfiguration of adjoining marine terminal uses between Berths F210 and F211 on Pier F.	EIR to be prepared. (2008-2009)
33	Gerald Desmond Bridge Replacement Project, POLB/ Caltrans/FHWA	Replacement of the existing four-lane bridge with a new six-to eight-lane bridge.	EIR/EA being prepared. (2009-2012)
36	Administration Building Replacement Project	Replacement of the existing Port Administration Building with a new facility on an adjacent site.	EIR being prepared. (2007-2010)
128	Pier A West Interim/source Removal POLB/ DTSC	Removal and off-site disposal of contaminated soil from 19 sumps including oil wells, filling, and paving.	Cleanup and Abatement Order. (2008-2009).
11	Rail Enhancement Project	Multiple rail transportation plan projects in and around Harbor District.	EIR to be prepared.

Letter AJ13. Signatory – California Transportation Commission

Response to Comment AJ13-1

For the proposed project, Caltrans has agreed to contribute $250 million from the State Highway Operation and Protection Program (SHOPP) for replacement of the Schuyler Heim Bridge. This funding is sought through Grant Anticipation Revenue Vehicle (GARV) bonds. The Alameda Corridor Expressway portion of the project is intended to be funded by the Alameda Corridor Transportation Authority (ACTA), who is seeking funding through Trade Corridor Improvement Funds (TCIF).

JAMES C. [illegible], Chair
JOHN CHALKER, Vice Chair
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JOSEPH TAMARLOND
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January 18, 2008

Mr. Ron Kosinski
Deputy District Director
Department of Transportation
District 7, Division of Environmental Planning
100 South Main Street
MS 16A
Los Angeles, CA 90012

RE: Comment on Draft Environmental Impact Report for Route 47 Expressway Project and Schuyler Heim Bridge Replacement in Los Angeles County

Dear Mr. Kosinski:

The California Transportation Commission, as a responsible agency, reviewed the Draft Environmental Impact Report for the Route 47 Expressway project and the Schuyler Heim Bridge Replacement in Los Angeles County. The Commission notes that the project alternatives, excluding the no build and low cost alternatives, range in cost from $388.5 million to $733.9 million. Some funding is secured/programmed by Caltrans and the Alameda Transportation Authority, but the project alternatives are not fully funded.

AJ13-1

The Commission requests that:

- Caltrans and its partners identify and secure the funding sources needed to complete the alternative selected.

If you have questions, please call me at 916-653-2090.

Sincerely,

Robert Caung

Robert Caung
Deputy Director
California Transportation Commission

Organizations and Businesses Letters

Letter OB1. Signatory – Wilmington Chamber of Commerce

Response to Comment OB1-1

The commenter's support for project Alternative 1 is acknowledged.

Response to Comment OB1-2

With implementation of Alternative 1, a number of changes in traffic flows, routes, and volumes can be anticipated. These changes include the following: northbound traffic to Pacific Coast Highway is increased under Alternative 1 compared to the No-Build alternative; southbound traffic to Pacific Coast Highway is decreased for AM and MD peak hours; net traffic accessing Pacific Coast Highway is decreased for Alternative 1 compared to the No-Build Alternative; and, during the PM peak hour, the net traffic to Pacific Coast Highway is increased by approximately 118 vehicles (PCE).

Specific routes within the community of Wilmington are designated and signed for truck use. Disregard for prohibitive signage can result in traffic citations issued by local law enforcement personnel.

Post Office Box 90 Wilmington, California 90748

Wilmington Chamber of Commerce

September 13, 2007

Mr. Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, CA 90012

Subject: Shuyler Heim Bridge Replacement and SR-47 Expressway Project

Dear Mr. Kosinski:

The Wilmington Chamber of Commerce has had the opportunity to review the Draft Environmental Impact Report (DEIR) for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project ("the Project") and would like to make the following comments.

The Wilmington Chamber of Commerce has represented business and other organizations in the area for over 100 years. Our diverse membership includes large Fortune 500 companies, medium sized regional and local corporations, and small businesses. Our membership also includes non-profits who receive our financial support through a variety of programs and sponsorships.

OB1-1 Our membership and support of the community is all consistent with our Mission Statement: "The Wilmington Chamber of Commerce promotes, supports and enhances a positive business environment and improves the quality of life in the community."

We believe the Project is also generally consistent with our Mission Statement. We support the replacement of the seismically deficient (although historically significant) Schuyler Heim lift bridge as well as the elevated expressway which will have the purpose of directing traffic (especially truck traffic) away from non grade separated rail crossings and off of local intersections. This will alleviate congestion and pollution by allowing the free flow of traffic away from the port area.

The Project will also ensure an uninterrupted access route to and from Terminal Island which will be beneficial to the port community as well as an emergency escape route in the event of a natural disaster.

OB1-2 We do have a concern, however, with the prospect that some of the northbound truck traffic (Alternative 1 and 1A) may enter the community of Wilmington by accessing Pacific Coast Highway north of the expressway connection to Alameda. Wilmington has historically been

(310) 834-8586 • Fax (310) 834-8687

Letter OB1. Signatory - Wilmington Chamber of Commerce
Page 2

Response to Comment OB1-3

Your support for the proposed sound walls for mitigation of noise and light is acknowledged.

burdened with a disproportionate amount of truck traffic due to its central location between the Port of Los Angeles and the Port of Long Beach. We seek assurance that some method will be implemented to prevent trucks from taking advantage of the free flow of traffic on the expressway portion of the Project only to enter the community unnecessarily.

OB1-2

OB1-3 We do appreciate the thought that has gone into the mitigation of noise and light with the proposed sound walls in the area of the marina and area proximate to neighboring residents.

We look forward to participating in the process of moving the Project forward. If the Wilmington Chamber of Commerce can help in any way, please do not hesitate to contact me.

Regards,

Patrick Wilson
President

Cc: The Honorable Janice Hahn, Councilwoman, 15th District, City of Los Angeles
John Doherty, Chief Executive Officer, Alameda Corridor Transportation Authority

Letter OB2. Signatory – Union Pacific Railroad

Response to Comment OB2-1

The commenter's description of the project alternatives is acknowledged. Among the options addressed in the Draft and the Final EIS/EIR, Alternative 3 would have virtually the same highway construction and connections as Alternative 1. However, Alternatives 1 and 3 are different regarding the bridge over the Cerritos Channel. Under Alternative 1, the Schuyler Heim Bridge would be demolished and replaced with a new bridge. Under Alternative 3, the Schuyler Heim Bridge would remain in place, and a new bridge would be constructed immediately east of the existing bridge.

Response to Comment OB2-2

The commenter's support for project Alternative 1 is acknowledged.

Response to Comment OB2-3

The commenter's interest in the proposed project is appreciated. The commenter will be added to the project mail list for future contacts.

10/15/2007 14:25 626-935-7622 UNION PACIFIC LASALE PAGE 01/01

October 15, 2007

Ronald J. Kosinski
Deputy District Director
Division of Environmental Planning
Caltrans District 7
100 South Main Street (MS16A)
Los Angeles, CA 90012
Fax: (213) 897-0685

Subject: Schuyler-Heim Bridge/SR-47 Reconstruction & Union Pacific Railroad

Dear Mr. Kosinski:

OB2-1 Union Pacific is keenly aware of Caltrans' on-going plans to reconstruct the Schuyler-Heim Bridge and SR-47 highway connection to the north. We understand that up to five options are under consideration but that only two options, Alternative No. 1 and Alternative No. 2 impacted the local highway network. The highway connection under Alternative No. 1 ties directly into Alameda Street whereas the SR-47 highway connection displayed in Alternative No. 2 ties into SR-103 and then onto a new highway connection north of Willow that passes by our Intermodal Container Transfer Facility (ICTF) facility before connecting with Alameda Street just south of I-405.

OB2-2 Union Pacific Railroad is in the process of planning modernization of ICTF, which is located in the northeast quadrant of Alameda Street and East Sepulveda Blvd. While our design effort at this facility is on-going, Union Pacific Railroad's plans for facility expansion are best supported by Alternative No.1. It avoids the significant impacts to our gate operations that would be caused by Alternative No. 2.

OB2-3 We wish to remain in contact with the Schuyler-Heim team to make sure we understood the design process as it moves forward. Please feel free to contact me if you have questions, or if you want HDR involvement, contact Greg Chiodo, HDR Engineering at (925) 974-2504. We look forward to working with you.

Sincerely,

Scott Moore

cc: Barry Michaels, UPRR
Gary Luxenberg, UPRR
Mike Christensen, Port of LA
Doug Thiessen, Port of LB
John Doherty, ACTA
John Shiner- Holme Roberts & Owen LLP
Gregory Chiodo – HDR One Company

Scott D. Moore
V.P. Public Affairs (West)

UNION PACIFIC RAILROAD
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sdmoore@up.com

Letter OB3. Signatory – Dominguez Area Property Owner's Association

Response to Comment OB3-1

As appropriate, the EIS/EIR addresses those communities adjacent and near the location of the proposed project. Because no project-related construction activities are proposed north of I-405, detailed analyses of that area were not conducted. However, the traffic analysis for Alameda Street did extend north to SR-91.

Also see response I2-1.

Response to Comment OB3-2

Noise barriers and aesthetic treatments are proposed for some locations north of Pacific Coast Highway under Alternative 2. In addition, for Alternatives 1, 1A, and 2, the substantially impacted intersection north of Pacific Coast Highway is the intersection of Alameda Street and 223rd Street. Mitigation at this intersection is incorporated as an element of the project, as described in Section 2.2.1.1.2 and shown on Figure 2-4e of the Draft and the Final EIS/EIR.

Based on the results of the traffic analysis, the project-related change to traffic in the most northerly portion of the project area (I-405 to SR-91) would not require mitigation.

Dominguez Area Property Owner's Association

21156 S. Santa Fe Ave, Carson, Ca 90810

October 10, 2007

Mr. Ronald J. Kosinski
Deputy District Director
Caltrans- District 7
Division of Environmental Planning
100 South Main Street
Los Angles, CA 90012

RE: SCHUTYLER HEIM BRIDGE REPLACEMENT AND SR-47 EXPRESSWAY.

Dear Sir:

OB3-1 After reviewing the Draft EIS/EIR for The Schuyler Heim Bridge and SR-47 Expressway Project. We find it very incomplete and do not adequately portray the local communities that are along the SR-47 Route that runs next to the Alameda train tracks which is also know as the Alameda Corridor.

OB3-2 In one section of the EIS/EIR states "Any environmental effects on the communities as a result of the bridge replacement and the SR-47 Expressway stops at the intersection of PCH highway". While in another section the EIS/EIR states that the trucks using the Alameda Corridor will proceed north to the 405 freeway and the 91 Freeway. Nowhere in the EIS/EIR is any type of mitigation measures for the area north of the PCH highway.

The Dominguez/Lincoln Village is located north of the 405 freeway. There are 2400 single family homes and apartments with over 9000 residents. The neighborhood is surrounded by heavy industrial land use to the west of the ALAMEDA Corridor and to the north of Dominguez Street. The residents are further impacted by heavy truck traffic from the I-710 Freeway, The Alameda Corridor, the 405 freeway and heavy truck traffic on Santa Fe Ave.

Letter OB3. Signatory - Dominguez Area Property Owner's Association
Page 2

Response to Comment OB3-3

The air quality analysis presented in Section 3.13.3.4.1.3 of the Final EIS/EIR, Localized PM_{10} and $PM_{2.5}$, concludes that the projected PM_{10} increment of 2 µg/m³ attributable to the project is less than the allowable increment of 17 µg/m³ and, thus, no violation of standards is anticipated. Similarly, potential localized increase in $PM_{2.5}$ levels associated with the project would be offset by reduced traffic congestion and idling made possible by the project. Localized concentrations of $PM_{2.5}$ would not exceed applicable standards. In addition, and as discussed in Section 3.13.4, the project incorporates all possible measures designed to minimize impacts related to PM_{10} and $PM_{2.5}$ (measure AQ-1 through AQ-3). Thus, implementation of the project is not expected to degrade quality of life through increased emissions. Please see Response to Comment AJ17-12 for adopted measures to reduce emissions from truck traffic.

Response to Comment OB3-4

All key intersections on Alameda Street north of Pacific Coast Highway to SR-91, including freeway ramps, are analyzed for existing conditions and year 2030. The commenter is referred to the Traffic Study report for a detailed analysis.

Response to Comment OB3-5

An air quality monitoring program is not required as part of the project. However, many existing and on-going studies in the area have been conducted by the SCAQMD and CARB. In addition, CARB maintains ambient monitoring stations throughout the South Coast Air Basin. See Response to Comments AJ7-1, AJ7-21, and AJ11-2.

Response to Comment OB3-6

The commenter is referred to response AJ8-15 relative to noise mitigation for Carson residences east of Alameda Street.

Dominguez Area Property Owner's Association

21156 S. Santa Fe Ave., Carson, Ca 90810

OB3-3 In the next 20 years the truck traffic is expected to exceed 91,000 trucks leaving the ports daily. Carson residents in the Dominguez/Lincoln Village area are subject to air pollution from stationary and existing mobile sources generated from truck and vehicle traffic along the I-710 and 405 freeways, the Alameda Corridor rail and port related activities. With the increase truck traffic generated from the proposed four lanes, elevated expressway would further DEGRADE the QUALITY OF LIFE for these residents by increasing diesel emissions and particulate matter (PM 10 and PM 2.5) among other contaminates. AQMD studies state that over 70 percent of the regions toxic air pollution is directly attributed to diesel emissions.

RECOMMENDATIONS

OB3-4 1. Accomplished a complete traffic survey from PCH north to the City of Compton boundaries. This survey will include projections of the number of trucks will use the 405 east and west on ramps, 91 freeway west and east ramps and how many trucks will proceed north to Los Angles thru the City of Compton. This survey to include projections to the year 2027.

OB3-5 2. Accomplish a compressive air quality sampling along Alameda Street from PCH to the City of Compton with projections on what the air quality will be in the year 2027.

OB3-6 3. Provide mitigation in the form of a sound wall or some type of provisions to reduce the noise levels at residential homes up to 500 feet east of Alameda Street.

OB3-7 4. Provide mitigation to filter the ambient air quality at residential homes up to 500 feet east of the Alameda Street.

In closing I ask this question: if you have included mitigation measures to insure the safety of a few birds why can you provide mitigation measures to insure the safety and quality of life for over 9,000 residents?

Raymond L. Park
President

Letter OB3. Signatory - Dominguez Area Property Owner's Association
Page 3

Response to Comment OB3-7

The mitigation measures required to mitigate significant impacts from the project are identified in Table 4-1 of the Draft and the Final EIS/EIR. These measures are not intended to address a specific location but to reduce emissions at the project level. However, based on its conclusions as a Responsible Agency, ACTA will adopt the following mitigation measure as a condition of its approval for the proposed project:

AQ-13 Retrofits of heating, ventilating and air conditioning (HVAC) units. New heating, ventilating, and air conditioning (HVAC) units, or retrofit of existing HVAC units, will be installed in schools and residences that have a significant increase in cancer risk as demonstrated by the HRA.

Please see Response to Comment AJ17-12 for adopted measures to reduce emissions from truck traffic.

Letter OB4. Signatory – Coalition for a Safe Environment

Response to Comment OB4-1

The bridge replacement will be designed in accordance with the Caltrans Seismic Design Criteria for ordinary bridges. However, to acknowledge the importance of the Schuyler Heim Bridge to state and national economic interests, the design will incorporate additional seismic enhancements and go beyond the requirements of the Caltrans Seismic Design Criteria. These enhancements will focus mainly on the joint seal assemblies and bearings at abutment expansion joints and superstructure longitudinal hinges. By reducing the risk of damage to these components, the bridge is more likely to remain in service after an earthquake.

The state of California has adopted the International Building Code (IBC), based on the previous Uniform Building Code (UBC), for implementation in 2007. The IBC includes regulations for construction to avoid geotechnical hazards such as expansive soil, settlement, and slope instability. The code also includes standards and general parameters for seismic design.

The requisite design criteria, standards, and procedures contained in state and local jurisdiction standards and specifications would be applied during final design of the project. These standards and specifications perform the function of reducing potential effects to a structure in the event of seismic activity, slope and/or foundation instability; erosion, sedimentation, and flooding; and land subsidence.

A geotechnical study would be completed for all areas associated with load-bearing features, and areas with potential for slope failure and soil subsidence, and a geotechnical report would be prepared, with project-specific recommendations consistent with standards established by state and local jurisdictions for the specific conditions to be encountered by the project. Geotechnical report recommendations would be incorporated into final project design.

Coalition For A Safe Environment
P.O. Box 1918, Wilmington, California 90744
wilmingtoncoalition@prodigy.net 310-704-1265

October 16, 2007

Ronald J. Kosinski
Caltrans-District 7 Division of Engineering Planning
100 South Main Street
Los Angeles, CA 90012

Re: Schuler Heim Bridge Replacement & SR-47 Expressway Project
Draft Environmental Impact Report (DEIR)/
Draft Environmental Impact Statement (DEIS)
SCH No. 20021009
FHWA-CA-EIS-2007-07-01D
07-LA-47-KP 4.4/9.3 (PM 2.7/5.8)
Ea: 238500

Su: Schuler Heim Bridge & SR-47 Expressway Project Public Comments

The Coalition For A Safe Environment wishes to submit the following Schuyler Heim Bridge & SR-47 Expressway Project Draft EIR/Draft EIS Public Comments:

1. The DEIR/DEIS provides no specific information that any of the new proposed fixed span bridge alternatives would meet seismic requirements for a major earthquake and for what earth quake category. In fact, no information is provided which defines a major earthquake and what is the building criteria that would be used to assure that the bridge would not collapse or in any way be impaired after a major earthquake. Does the building criteria meet any US or International seismic building standards? The DEIR/DEIS refers to the International Building Code (IBC) and mentions that it includes standards and general parameters for seismic design, but does not provide adequate information as to whether the bridge meets specific standards or while be built to specific criteria due to the unique water-land liquefaction base of the bridge port area. Will the bridge withstand a tsunami, what speed, force, height and length of time? What seismic forecast analysis was performed for the ports, adjacent community land areas, boat marinas, wetlands and for the structural inlegrity of each proposed bridge alternative? OB4-1

OB4-2 One of the stated project purposes is to improve operational and safety design features of the crossing to facilitate the movement of people, when in fact the general public will receive little to no benefit that does not already exist. The new bridge is being primarily built to allow more trucks to move cargo containers from the Port of Long Beach and the Port of Los Angeles by creating more truck lanes. You are using public funds to build an expanded goods movement

Monitoring during construction would be performed by a licensed geologist or engineer to verify construction occurs in compliance with features, standards, and practices included in final project design.

Response to Comment OB4-2

The purpose of replacing the Schuyler Heim Bridge, as stated in Chapter 1.0 of the Draft and the Final EIS/EIR, is primarily related to the bridge's seismic deficiency and, therefore, risk of collapse in the event of an earthquake. The project will be constructed in accordance with state and federal requirements, which incorporate provisions for the earthquake concerns of coastal California. It is believed that a safe bridge is a public benefit.

The project as a whole is proposed in response to ongoing and projected growth at the Port complex. As reflected in the existing and projected traffic conditions described in Section 3.5, Traffic and Transportation, of the Draft and the Final EIS/EIR, growth and traffic at the Port complex will continue in response to increases in international shipping, with or without the proposed project.

Combined, the ports of Los Angeles and Long Beach play a significant role in the economy of Southern California and, as such, provide the basis of much employment. It has been estimated that approximately 475,000 jobs in Southern California are associated with international trade. Additionally, the "logistics" sector of the regional economy is increasingly providing a supply of well-paying blue-collar jobs that replace the diminishing number of manufacturing jobs.

A recent study prepared for ACTA, the Port of Los Angeles and the Port of Long Beach estimated that trade passing through the ports (imports and exports) in 2005 was valued at $256 billion and supported 3.3 million jobs throughout the nation. The goods passing through the ports generated over $28 billion in state and local taxes throughout the nation, most of which ($26 billion) were associated with imports. Customs duties collected in 2005 on all waterborne cargo imported through the two ports totaled $7.2 billion.

Additionally, a stated purpose of the project is to reduce congestion on local streets in the area. Congestion reduction is believed to benefit the general public.

transportation corridor road primarily for private business importers, distributors, shipping companies and big box retailers like Walmart, Kmart, Costco, Sams Club etc.. The DEIR/DEIS fails to contain a public cost-benefit analysis of the project, a cost-benefit analysis
OB4-2 of earthquake provisions of building codes to be used, a vulnerability assessment, and a earthquake risk assessment of the proposed transportation system.

3. The DEIR/DEIS fails to state that no state or federal funds currently exist or have been approved or authorized for the building and construction of the new bridge. In fact, a Caltrans
OB4-3 representative lied at the public hearing held in Wilmington when they claimed that funds were available. Caltrans can provide no evidence, budget allocations report, approved legislation, approved bond funds or a guarantee that all necessary construction funds are or will be available in the near future. A DEIR/DEIS can not be approved without project funding approval.

4. The DEIR/DEIS states that an additional purpose is to provide a high-capacity alternative route for traffic between Terminal Island, I-110, I-405, Sr-103, SR-91 and Alameda Street which it
OB4-4 does not. In fact, with the Port of Long Beach and Port of Los Angeles tripling in container through-put, port truck traffic will only further congest all existing truck routes which are already at maximum design capacity. The project proposals provide no new high-capacity or efficiency because they use standard common carrier trucks which can not increase speed, velocity, container volume and through-put. The DEIR/DEIS fails to provide any study that validates its claim of increased high-capacity and uninterrupted transport and traffic flow on public surface streets, highways, freeways and bridges.

5. The DEIR/DEIS fails to state that the best, most efficient and less environmental, public health, public safety and traffic impacting freight transportation system is a rail or alternative
OB4-5 technology intermodal transportation system. The DEIS/DEIR fails to include an assessment of alternative technology intermodal transportation systems such as but nor limited too electric train rail, electric train monorail, electric truck rail, mag-lev, linear induction, underground tunnel systrems and underground gravitational transportation systems. CEQA requires an assessment of all feasible alternatives and land uses.

6. If Caltrans is concerned about seismic safety of public transportation routes and systems, than why is there no project proposals for the improving the general public transportation systems
OB4-6 and public safety for the I-405, I-110 and SR-91 freeways. The bottom line reason is that private industry is lobbying to move their imported merchandise and have no concern for the public. The protection of the public is a priority over containers. Only a few hundred public cars a day use the bridge today at the most as well as in the future vs thousands of trucks today and tens of thousands in the future if the bridge is built and expanded. There are no residents who live on Terminal Island vs millions of residents who live near and drive on the I-710, I-110 and SR-91 freeways. Therefore, this project provides little to no public benefit.

OB4-7 The DEIR/DEIS fails to contain a Health Risk Assessment (HRA) as required by CEQA law and no EIR can legally be approved without it. CFASE requests that the HRA be based on a Public Health Survey conducted in the identified project zones which would include as a

Response to Comment OB4-3

Funding for the Bridge replacement portion comes from the Grant Anticipation Revenue Vehicle (GARVEE) bond and is included in the 2008 State Highway Operation and Protection Program (SHOPP), which was approved by CTC on March 13, 2008. Funding for the Expressway portion is included in the Trade Corridor Improvement fund (TCIF) program adopted by CTC on April 10, 2008. A part of the funding for the Expressway portion also comes from ACTA's Demonstration fund, Port fee, and ACTA bond.

Prior to the issuance of any permits required for the construction of the proposed project, all necessary federal (NEPA) and state (CEQA) environmental documentation must be completed. This environmental compliance culminates in the issuance of a federal Record of Decision (ROD) and certification of the EIR by the lead agency. This compliance and decision-making process is independent of funding approval.

Response to Comment OB4-4

As stated in the EIS/EIR, the anticipated increase in volume of trucks serving the ports of Los Angeles and Long Beach has the potential to seriously compromise essential north-south connectivity between the ports and the regional freeway system. Implementation of the proposed project would reduce congestion at a number of highly congested intersections on surface streets, by-pass at-grade railroad crossings, and expedite the movement of vehicles between the ports and nearby freeways. In the absence of these infrastructural improvements, intersections would experience failure at peak hours, the potential for road-rail accidents would increase, and the general efficiency of the transport system would degrade. The proposed improvements increase the capacity of the highway system and extend the time during which acceptable levels of service would be experienced by users.

Alternative 1 results in reduced truck traffic on I-710 and I-110 and re-routing of some of this truck traffic to Alameda Street. With Alternative 1, compared to the No-Build alternative, the vehicle miles traveled (VMT) and VHT are reduced for the study area, which includes the local streets. The reduced VMT and VHT represent the improved efficiency of the system within the study area.

Response to Comment OB4-5

The purpose of the project is to ensure safe vehicular connection between Terminal Island and the mainland, reduce congestion, and provide a high-capacity limited-access route for traffic between Terminal Island and I-405. All reasonable and feasible alternatives were considered during project scoping and are addressed in Chapter 2 of the Draft and the Final EIS/EIR. The alternative electric intermodal systems mentioned in the comment would not be feasible within the scope of this project, which involves the use of conventional means of transportation.

The proposed project was not designed to address alternative technology for the port complex intermodal transportation system. The potential feasibility and use of rail and alternative technologies for transport to and from the ports are beyond the scope of this project and are currently under evaluation by the Ports of Long Beach and Los Angeles.

Please also see Response to Comment OB17-18.

Response to Comment OB4-6

The public highway system is an essential component of any regional economy and is designed to accommodate, among other things, the safe, efficient and effective movement of people and goods. Following the 1994 Northridge Earthquake, every bridge structure in the state underwent a thorough seismic safety evaluation. Of the bridges identified as seismically deficient, the Schuyler Heim Bridge is one of only two bridges that have not been replaced or retrofitted. The project is proposed to address this need. The structures on the I-405, I-110, and SR-91 either met current seismic safety standards or have already been retrofitted to meet those standards. If these structures need improvement, these improvements would be proposed separately, as they are not within the scope of this project.

Response to Comment OB4-7

ACTA conducted a Health Risk Assessment (HRA) for the proposed project. It is noted that, currently under California law, an HRA is not a requirement for a linear project. See also Response to Comments AJ7-2 and AJ11-2.

minimum Wilmington, West Long Beach, Carson and the Long Beach Freeway I-710 Transportation Corridor Communities. We further request that a Public Health Baseline be established for the current public health impacts and that they be projected for the increase in toxic air pollution exposure, stress, blight, noise, light and glare. There is no Public Risk & Liability Assessment from the increase in danger from trucks and their closer proximity to residents and elementary schools due to vehicle accidents, explosions & fires, accidental toxic chemical spills, diesel fuel & other alternative fuel air pollution emissions, additional homeland security measures and earthquakes.

OB4-7

8. The DEIS/DEIS fails to include and identify all carcinogenic, toxic and hazardous chemicals and substances that residents, children, truck drivers and dock workers are currently being exposed to and that will be increased due to increased truck traffic diesel exhaust. Diesel exhaust contains over 40 chemicals that are listed by the USEPA and California Air Resources Board as toxic air contaminates, known carcinogens, probable human carcinogens, reproductive toxicants or endocrine disrupters. In addition to those listed in the DEIR/DEIS these would include VOC's (volatile organic compounds), PAH's (polycyclic aromatic hydrocarbons), aldehydes, ketones, cyanides, phenols, metals, and ammonia, arsenic, benzene, dioxins, toluene, xylene, 1,3-butadiene, formaldehyde, nickel and including 3-nitrobenzanthrone and 1,8-dinitropyrene the two most carcinogenic chemicals ever discovered.

OB-8

The DEIR/DEIS fails to mitigate public exposure to all known carcinogenic, toxic and hazardous chemicals and substances, fails to adequate mitigate all noise, fails to mitigate light and glare. The DEIR/DEIS failed to recommend that

OB-9

10. The DEIR/DEIS failed to include an Environmental Justice Analysis and does not comply with Executive Order 12898, Council on Environmental Quality (CEQ) *Guidance for Environmental Justice Under NEPA* (CEQ, 1997), nor consistent with California law regarding Environmental Justice.

OB4-10

The DEIS/DEIR fails to include and identify all negative and cumulative environmental, public health, public safety, biological resources and traffic impacts, assess technologies, equipment and alternatives than can mitigate the numerous significant negative impacts that were identified in Public Comments during the NOP/NOI Public Comment Period and as identified in this written Public Comment.

OB-11

The projects as proposed and DEIR/DEIS does not comply with the U.S. Civil Rights Act, *Clean Air Act*, *Clean Water Act*, NEPA and CEQA as described in this public comment letter.

OB4-12

As a result of Caltrans being unable to mitigate the projects significant negative and cumulative impacts and their failure to invest in and incorporate existing, new and emerging alternative intermodal transportation technologies, the Coalition For A Safe Environment requests that the DEIS/DEIR be denied and rescinded.

OB4-13

The DEIR/DEI fails to include, identify and assess all Environmental Justice "affected communities" and cities. The DEIR/DEIS must identify all bridge, port, transportation

OB-14

Response to Comment OB4-8

Your objection to the Draft EIS/EIR not specifying all the pollutants that make-up diesel exhaust is noted. The EPA has identified a subset of priority MSATs; these are the chemicals required by the FHWA to be addressed in the MSAT analysis.

See also response AJ11-2.

Response to Comment OB4-9

The purposes of environmental documents prepared under CEQA and NEPA are to: inform governmental decision-makers and the public about potential significant environmental effects of proposed activities; identify ways to avoid or significantly reduce environmental damage; prevent significant avoidable damage to the environment when feasible; disclose reasons a government agency approves a project, even though it would result in one or more significant effects.

In the event a project would result in one or more significant impacts that could not be mitigated, the lead agency is required to provide a statement of overriding considerations, which would set forth the reasons the project was approved, even with the significant impact(s).

Based on the above, it is clear there is no requirement to mitigate all changes that might result from implementing a proposed project or even all significant changes or effects of a proposed project. For the proposed Schuyler Heim Bridge and SR-47 Expressway Project, feasible avoidance, minimization, and mitigation measures are recommended and will be implemented for the chosen alternative, as set forth in Table S-1 of the Final EIS/EIR.

Measures related to carcinogenic, toxic, and hazardous chemicals and substances are described in the Draft and the Final EIS/EIR Section 3.12.4 (Hazardous Waste and Hazardous Materials) and Section 3.13.4 (Air Quality). Noise mitigation is described in Section 3.14.4. The subject of light and glare is addressed in the

analysis of Visual Resources/Aesthetics in the Draft and the Final EIS/EIR Sections 3.7.3.3.8 and 4.4. As stated in Section 3.7.3.3.8: "... due to the existing developed industrial character of the project site, none of the proposed alternatives would... create a new source of substantial light or glare." As stated in Section 4.4, project-related impacts to aesthetics (which includes consideration of light and glare) would be less than significant. Based on the results of the environmental analysis, mitigation for light and glare is not required.

Response to Comment OB4-10

The referenced environmental justice analysis is provided in the Draft and the Final EIS/EIR Section 3.3.3 (Environmental Justice). The environmental justice information provided in the (Draft and the Final) EIS/EIR is based on the Environmental Justice analysis provided in the Community Impact Assessment, one of the 12 technical studies that was provided in support of the Draft and the Final EIS/EIR and available for public review.

As stated in Section 3.3.3.3.1 (Evaluation Criteria) of the Draft and the Final EIS/EIR and in Section 5.3 (Environmental Justice) of the Community Impact Assessment, "*The environmental justice analysis has been prepared in accordance with the applicable guidance for addressing environmental justice, including: DOT Order 5610.2 (April 15, 1997); FHWA Order 6640.23 (December 2, 1998); and FHWA Western Resource Center Interim Guidance (March 2, 1999). Consistent with this guidance, the environmental justice analysis evaluates the proposed project based on:*

- *Potential adverse effects on the project area population, including minority and low income population groups; and*
- *Disproportionately high and adverse effects on minority and low-income population groups.*"

Response to Comment OB4-11

The Draft and the Final EIS/EIR provide detailed discussions of the potential environmental impacts of the six project alternatives (which include the No Build alternative), in compliance with the requirements of NEPA and CEQA. Each alternative is evaluated in terms of the affected environment and impacts of project construction and operation. Measures to avoid, minimize, and/or mitigate effects of the project are identified for each alternative, as appropriate. In addition, effects that cannot be avoided, minimized, or mitigated also are identified. The commenter is referred to Chapter 5.0 for discussion of potential cumulative impacts associated with the project. Further, the Draft and the Final EIS/EIR were prepared to address comments raised during the public scoping phase of the project.

Response to Comment OB4-12

The Draft and the Final EIS/EIR were prepared to comply with federal, state, and local regulatory requirements. In addition, the analyses under each of the 17 environmental resource sections in the document include a discussion of compliance with appropriate regulations. The reader is referred to the regulatory setting discussion presented at the beginning of each of these -- Sections 3.2 through 3.18.

Response to Comment OB4-13

The Draft and the Final EIS/EIR discuss and incorporate feasible minimization and mitigation measures in order to lessen potential adverse impacts associated with the proposed project. Please see Response to Comment OB17-18 for more information on alternative intermodal transportation technologies.

Response to Comment OB4-14

Both the Community Impact Analysis and Environmental Justice analysis followed the methodology recommended in the *Caltrans Environmental Handbook*, Volume 4, June 1997. Chapter 5 of the Draft and the Final EIS/EIR, Cumulative Impacts, evaluates the impacts of the proposed project in relation to other, related projects that are proposed, planned, and/or recently completed. Please see Tables 5-1, 5-2, and 5-3 for lists of related projects that are considered in the analysis of cumulative impacts.

Letter OB4. Signatory - Coalition for a Safe Environment
Page 7

corridors, intermodal facilities, railroad yard facilities, rail road tracks, distribution centers and communities and cities that are impacted by the bridge and expressway projects currently and as proposed in the future.

OB4-14

12 The DEIS/DEIS fails to comply with Executive Order 12898, U.S. EPA, State of California, City of Los Angeles and South Coast Air Quality Management District in that it does not achieve environmental justice, does not adequately identify, address and mitigate disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations, people of color and low-income populations.

OB4-15

Caltrans failure to include Environmental Justice allowed no public health survey of the "affected communities" in order to establish a public health baseline of impacted Environmental Justice Communities public health problems and premature deaths in order to establish a valid Health Risk Assessment (HRA) and as a result have significantly under-estimated public health impacts and premature deaths.

OB4-16

Wilmington and other Environmental Justice "affected communities" have not received a fair treatment or meaningful involvement with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Caltrans past and current history and this DEIR/DEIS has shown that they fail to adopt mitigation to significantly reduce its past, current and future environmental, public health, public safety, biological resources and traffic impacts.

OB4-17

Caltrans prevented "meaningful involvement" by their failure to adequately notify EJ Communities of public hearings in English and Spanish. Placing a few classified advertisements in a limited number of newspapers does not provide adequate or meaningful involvement. They made no special effort to improving accessibility of public meetings, crucial documents and notices. Developed no effective public participation strategies and did not seek to overcome linguistic, cultural, institutional, geographic barriers to participation.

OB4-18

Caltrans released a 1,500+ page DEIR/DEIS which is impossible for the average EJ Community member and resident to interpret without significant technical and legal assistance. The allocated public comment period is inadequate time for the public to review and prepare meaningful public comment. A minimum six months public comment time should have been allocated and technical consultants should have been made available to attend community meetings and provide one-on-one assistance in English and Spanish.

OB4-19

Wilmington and other Environmental Justice "affected communities" have not had "fair treatment" and have borne a disproportionate share of the negative environmental consequences resulting from industrial, municipal and commercial operations or the execution of federal, state, local and tribal programs and policies. EJ Communities have the highest cancer, non-cancer risks and public health impacts.

Response to Comment OB4-15

The Draft and the Final EIS/EIR Table S-1, Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures, provides a list of measures that would reduce the potential effects of the proposed project. All feasible measures available were evaluated for inclusion in the project.

The Environmental Justice analysis acknowledges that the community where the project is located is both low-income and minority and that the community would be affected by construction-period impacts.

Please see the Draft and the Final EIS/EIR Section 3.3.3 for the Environmental Justice evaluation, Section 3.13 for the Air Quality analysis, and Response to Comment AJ7-25 and AJ7-28.

Response to Comment OB4-16

Environmental Justice is addressed in the Draft and the Final EIS/EIR, Section 3.3.3. The Environmental Justice analysis follows the methodology recommended in the *Caltrans Environmental Handbook*, Volume 4, June 1997.

An HRA was completed by ACTA and its conclusions are included in the Final EIS/EIR. Because the Final EIS/EIR discloses environmental impacts, including health risk impacts, of the proposed project, an additional HIA is not required. In a letter dated January 28, 2009, the EPA stated that a port-wide health impact assessment may be "beyond the scope of any one Port project NEPA document" (Goforth, Kathleen; EPA; 2009; letter to U.S. Army Corps of Engineers; January 28). Please see Response to Comment OB20-5.

Also see Response to Comments AJ7-2, AJ7-28, AJ7-29, and AJ11-2.

Response to Comment OB4-17

The commenter's view is acknowledged. However, the mitigation measures provided in the environmental resource sections of the Draft and the Final EIS/EIR were developed to reduce impacts in the study area to the extent feasible.

Also see Response to Comment OB4-18.

Response to Comment OB4-18

The Draft EIS/EIR was released for public review on August 17, 2007, and a public hearing was held on September 25, 2007, for the purpose of receiving comments on the document. Notices of the public hearing were published on August 17, 2007, and again on September 15, 2007, in the following local newspapers:

- Los Angeles Times (in the main news section)
- Long Beach Press-Telegram
- Daily Breeze
- Watts Times (August 23 and September 17)
- La Opinion (in Spanish) (see Attachment 1 to this response)

In addition to the newspaper publications, notices describing the project and the time and place of the public hearing were published in English and Spanish. Also, flyers describing the project were distributed to homes and businesses in the vicinity of Alternative 1 and Alternative 2. As shown, the boundary for Alternative 1 is, from Opp Street on the south, along Watson Avenue, and north to East L, connecting back to Robidoux Street. The flyers were distributed through an agency (South Bay Vocational Center) in Harbor City. A copy of the flyer and distribution area is provided as Attachment 2 to this response.

The public hearing was held September 25, 2007, at Banning's Landing, beginning at 6:00 p.m. and provided the opportunity for more than 20 persons to speak. At the public hearing, both Spanish and Tagalog (Pilipino dialect) translators were present for simultaneous translation of the proceedings.

The Draft EIS/EIR stated that additional public involvement would occur with a 45-day circulation period for the document to agencies and the public, submittal of comments on the document, and a public hearing. However, due to input from the public, the 45-day comment period was extended to 60 days, ending October 16, 2007. In response to further public input, Caltrans distributed a letter, dated October 15, 2007, further extending the comment period until early November for those who requested an extension. A copy of this letter is provided in Appendix J of the Final EIS/EIR.

In further response to public comments, ACTA elected to conduct an HRA as part of its funded portion of the proposed project. The methodology and results of the HRA were presented in the SDEIS/RDEIR released November 28, 2008. The public comment period for the SDEIS/RDEIR provided further opportunity for public comment and was extended to January 30, 2009. Additionally, a public hearing on the SDEIS/RDEIR and HRA was held January 27, 2009 at Banning's Landing. Again, both Spanish and Tagalog translators were present for simultaneous translation of the proceedings.

Finally, although not provided by state and federal regulation, informal comments and responses were handled by telephone and written documentation between Caltrans, ACTA, and members of the public during both comment periods.

Response to Comment OB4-19

The commenter's view is acknowledged. Further, the technical complexity of many of the issues addressed in the Draft and the Final EIS/EIR also is acknowledged. Due to this complexity of issues, the analyses provided for the environmental resources in the Draft and the Final EIS/EIR are prepared by persons who are specialists in that specific environmental resource, the type of analysis required for an environmental document, the requirements of the specific governing agency, and the associated and federal and state regulations that govern the specific resource being addressed. It is acknowledged that

technical assistance may be required to provide a complete understanding of an analysis for someone who is unfamiliar with the environmental resource being analyzed.

It is noted that the purpose of a EIS/EIR is to disclose to the public and decision-makers the project alternatives, the potential adverse effects of those alternatives, measures to minimize or avoid the adverse effects and, if appropriate, reasons for project approval even if the project would have one or more adverse effects on the environment. The commenter is referred to the Summary and Tables S-1 and S-2 for a condensed presentation of the complex analyses provided in the body of the Draft and the Final EIS/EIR.

Also see Response to Comment OB4-20 for a discussion of public involvement and the extended comment period.

Response to Comment OB4-20

All impacts associated with the proposed project are discussed in appropriate technical sections of the Draft EIS/EIR, which was circulated to the public for review and comment.

As discussed in Chapter 6 of the Draft and the Final EIS/EIR, in accordance with CEQA and NEPA requirements, appropriate comment time during the project scoping process was provided to the public. Notices were sent to agencies and public at various times during the project scoping period: in January-February 2002; in June, July and August 2004, and posted in newspapers in February though March of 2005. Scoping meetings were also held to present the project and solicit input from the public in February 2002, and September 2004. Inputs from agencies and the public were received until the end of September 2004.

During circulation of the Draft EIS/EIR, agencies and the general public were provided 60 days to comment on the draft document, rather than the 45 days required by law. In addition, an extension from October 16 to early November was provided to members of the public who requested the extension.

OB4-20 Caltrans failed to allow "meaningful involvement" by limiting and with-holding significant environmental, public health, public safety, traffic impacts information, scope of project, off-port property impacts and establishing unreasonably limiting public comment time.

OB4-21 Caltrans failed to include and adopt any mitigation that would significantly reduce negative environmental, public health, public safety, biological resources and traffic in EJ Communities.

OB4-22 Caltrans failed to identify and seek out EJ Community organizations to facilitate their involvement and made no special effort to consult with affected EJ Community organizations in order to discuss problematic issues, review proposed mitigation, discuss land use and technology alternative recommendations and resolve significant negative impacts.

OB4-23 Caltrans failed to request Public Health Agency, Public Health Organization, Medical Hospital/Center and Academic Institutions assistance and participation to prevent and mitigate significant public health issues. Caltrans failed to establish a Public Health Care Trust Fund as requested or allocate any funds for assisting EJ Community families and residents with past and current health problems and premature deaths. They failed to assist in medical care, medicines, medical equipment, special medical needs, retraining costs or burial expenses.

OB4-24 Caltrans in collusion with the City of Los Angeles, City of Long Beach, Port of Long Beach, Port of Los Angeles, ACTA, California State Lands Commission and other state and federal agencies intentionally withheld information, misrepresented information and failed to act upon issues that would have significant and long lasting impacts on EJ Communities and the public.

13 OB4-25 The DEIR/DEIS Noise section contains incomplete and incorrect information and fails to include requested sound proofing mitigation recommendations that would offset significant and negative noise impacts. The first problem is in the definition of noise and existing noise standards. When viewed under an Environmental Justice and the U.S. Civil Rights Act perspective noise must be reevaluated and mitigated in all of its forms. Part of the noise impacts in EJ Communities is not just the loudness but the non-stop noise generation along the Goods Movement Transportation Corridors.

Wilmington residents have no cessation of noise, it is continual 24hrs. 7 days a week. One cannot sit on their front porch, under a tree in the back yard, watch television, listen to a radio or children do their homework in peace.

Annoying and disturbing truck sounds are engine ignition, acceleration, gunning, idling, street braking, frequent accidents, driving through residential neighborhoods and driving past residents homes on new truck routes to get to off-Port property related and indirect business activities.

The Pier Pass Program did not benefit Wilmington it only allowed noise and other environmental impacts to continue 24/7.

During circulation of the subsequent SDEIS/RDEIR, agencies and the general public were also provided more than 60 days to comment on the document. Moreover, they were given a second opportunity to comment at a public hearing January 27, 2009.

Finally, although not provided by state and federal regulation, informal comments and responses were handled by telephone and written documentation between Caltrans, ACTA, and members of the public during both comment periods. The public, therefore, has been provided sufficient opportunity to comment on the project.

Response to Comment OB4-21

The Draft and the Final EIS/EIR Table S-1, Potential Project Effects and Avoidance, Minimization, and/or Mitigation Measures, provides a list of measures that would reduce the potential effects of the proposed project. These measures have been proposed for the project without any discrimination based on the age, color, race, or socioeconomic status of the affected community. All feasible measures available were evaluated for inclusion in the project and will be implemented without discrimination.

Also see the Draft and the Final EIS/EIR Section 3.3.3 for the Environmental Justice evaluation, Section 3.13 for the Air Quality analysis, and Response to Comment AJ7-25 and AJ7-28.

Response to Comment OB4-22

Please see Response to Comment OB4-18 and OB4-20 for a discussion of community involvement and dissemination of information for this project.

Response to Comment OB4-23

Caltrans has conducted the preparation of the EIS/EIR in accordance with requirements of NEPA and CEQA. In the course of that preparation, a thorough environmental analysis of the potential impacts of the proposed project alternatives was conducted and presented in the Draft and the Final EIS/EIR and supporting technical studies.

The requests in this comment are outside the scope of the federal and state requirements for an analysis of a proposed project. Further, the public health impacts referenced in this comment are of a far greater scale than the potential impacts identified as a result of the proposed project.

Response to Comment OB4-24

One of the primary goals of NEPA and CEQA is to ensure that the decision-making process regarding proposed projects is transparent and inclusive. To this end, the Draft EIS/EIR discloses fully the range of potential impacts (both adverse and beneficial) associated with the construction and operation of the proposed project. Where potentially significant adverse impacts are identified, minimization/mitigation measures are proposed. With regard to the potential for project-related impacts to adversely affect minority and low income populations, this is addressed specifically in Section 3.3.3 Environmental Justice, of Section 3.3 Community Resources.

As part of public scoping for the project, Caltrans consulted with federal, state, and local agencies regarding the environmental effects, alternatives, and potential mitigation measures of the project. The consulted agencies helped to determine which project effects were significant, or were determined to be lessor (or none) to local communities and the public at large.

Response to Comment OB4-25

The noise evaluation has been conducted in accordance with Title 23, Part 772, of the Code of Federal Regulations (CFR), *Procedures for Abatement of Highway Traffic Noise* and the Caltrans *Traffic Noise Analysis Protocol* (August, 2006). The report addresses the existing noise environment and future noise environment with and without the proposed project, and considers noise abatement where noise impacts, as defined by the Protocol, would exist. Noise abatement measures are recommended where such measures are both feasible and reasonable to be constructed.

According to Caltrans Noise Protocol, soundproofing needs to be included if the increase in noise level is 30 dBA or more, or if noise levels remain higher than 75 dBA after noise abatement. However, as shown in Section 3.14 Noise of the Final EIS/EIR, neither would occur as a result of the proposed project. Further, as shown in Section 3.14.3, in many cases, noise levels would be higher under the No Build alternative than they would with the implementation of the project and construction of sound walls for noise abatement. Therefore, soundproofing is not required.

Response to Comment OB4-26

Night construction and/or weekend work at the intersections of Ocean Boulevard/SR-47, SR-47/Henry Ford Avenue, and Henry Ford Avenue/ Anaheim Street will be required to occur during periods of light traffic. These three intersections are not located adjacent to residential areas.

Response to Comment OB4-27

Dredging machines will not be utilized for any portion of project construction, and noise barriers are proposed to mitigate significant noise impacts to live-aboard marina residents at Leeward Bay Marina for Alternatives 1 and 3 during operations. During construction, temporary relocation of marina residents may be necessary during pile-driving activities. See response to OB4-33 for more details on construction noise and proposed mitigation.

Response to Comment OB4-28

The noise analysis has been prepared in accordance with requirements of the Caltrans Traffic Noise Analysis Protocol. There is available literature on research of the health and annoyance effects of noise. Such research has to a large degree been a basis for development of the noise criteria utilized in the analysis.

OE4-26 The DEIR/DEIS proposes construction work week hours that extend to 9:00pm at night and work on weekends, this is unacceptable. Residents come home from work and want to relax, students need quite time to study and children need to go to sleep per their schedule not based when construction stops.

OE4-27 The construction and operation of the bridge and expressway adjacent to Leeward Bay Marina will emit additional noise that currently does not exist. Wilmington Leeward Bay Marina live-on-board boat residents do not want additional noise. Recently the Port Of Los Angeles has provided docking space for dredging barges in Consolidated Slip. One named Valhalla obviously has a crew living on-board because they have the barges engines running 24/7 probably to provide electricity. The sound from the barge is loud, annoying and disturbing. Caltrans should use electric dredging machines should they be required.

OE4-28 The DEIR/DEIS fails to include any scientific or medical studies that research continuous noise as described above. Caltrans have not sponsored any of these types of studies to determine their short and long term health impacts and quality of life impacts.

OE4-29 The DEIR/DEIS mentions noise monitoring but fail to describe who will monitor, how many will be hired to monitor, what experience or training they must have, how they will monitor, what hours they will monitor, what criteria they will monitor, what authority do they have to stop noise & minimize noise, what penalties, sanctions and fines will be imposed and how can residents call & file a complaint, what type of incident reports will they prepare and how fast will someone get back to a residents complaint.

OE4-30 The DEIR/DEIS fails to provide adequate noise mitigation. The fact is that residents hear constant noise and we request that all resident homes, schools, convalescent care facilities, senior citizen centers, senior housing projects, public buildings etc. within three miles should all be sound proofed at Caltrans expense.

OE4-31 The truth is that rarely is construction equipment and port equipment ever muffled. The DEIR/DEIS fails to make it mandatory the use of muffling methods, fails to identify what types of muffling technology is available and there appropriate application.

The DEIR/DEIS fail to state who will monitor the muffling installation, how they will monitor its proper use, what authority do they have to stop noise & minimize noise, what penalties, sanctions and fines will be imposed and how can residents call & file a complaint, what type of incident reports will they prepare and how fast will someone get back to a residents complaint.

OE4 32 Solid fences, block wall or brick fences provide little to no effective sound proofing.

OE4-33 The Port of Los Angeles shall establish a mitigation fund to pay for the temporary relocation and expenses of residents that border construction areas that request this option.

OE4-34 It is requested that Caltrans establish an approved list of acceptable construction equipment that emit minimum noise.

Response to Comment OB4-29

The purpose of the noise analysis is not to outline and specify the noise monitoring and enforcement program during the construction phase. Such matters will be addressed between Caltrans/ACTA and the contractor before construction commences.

Response to Comment OB4-30

The noise analysis has evaluated noise mitigation/abatement in impacted areas, and it identifies noise abatement measures that would be feasible and reasonable to construct. The analysis is consistent with Caltrans noise policies and procedures.

Response to Comment OB4-31

Please refer to Response to Comment OB4-29.

Response to Comment OB4-32

The noise reducing effects of the noise barriers have been quantified in the noise section of the Draft and the Final EIS/EIR (Section 3.14). Walls made of concrete blocks, bricks, or other massive materials, without gaps or opening, would achieve the listed noise reduction levels.

Response to Comment OB4-33

As stated in the Draft and the Final EIS/EIR, Section 3.14.3.3.1.1 (Construction Effects), noise from pile driving has the potential to be the loudest and most intrusive of construction activities for the proposed project. An example of this would be noise from pile driving related to bridge construction over the Cerritos Channel and/or Consolidated Slip/Dominguez Channel. Both the Cerritos Channel and Consolidated Slip marinas (Anchorage Way Marinas and Leeward Bay Marina, respectively) would be subject to short-term noise impacts from pile-driving construction activities. As a result, the nearest receptors at the Anchorage Way Marinas could experience pile driving noise of 79 or 80 dBA. The nearest receptors at the Leeward Bay Marinas could experience pile driving noise up to 88 dBA.

Based on these estimates, during project construction, pile driving will be restricted to daylight hours only. Also, residents identified as being impacted by noise from pile driving in Cerritos Channel or Consolidated Slip may obtain hotel vouchers for a local hotel so they can temporarily move. This mitigation measure would apply only during the time that pile driving is being conducted in the Cerritos Channel or Consolidated Slip. Some residents may, however, choose to stay and tolerate the noise. No other mitigation or compensation measure would be provided to residents (see the Draft and the Final EIS/EIR Section 3.14.2.1.1).

There is no requirement for the Port of Los Angeles to provide mitigation for the proposed Caltrans/ACTA project.

Response to Comment OB4-34

Please refer to Response to Comment OB4-29.

OB4-35 The DEIR/DEIS fail to require the use of electric equipment wherever possible and low sulfur fuels whenever possible in all construction equipment.

OB4-36 An above ground tunnel or underground gravitation transportation system could easily be Wilmington's and the public choice of alternative intermodal transportation systems because there would be no noise, no vibration, no aesthetic impact, no diesel fuel locomotive exhaust fumes to smell, no PM, SOX, NOX and VOC's released into the air and no future land use impacts. While the cost would be more, the benefits offset the costs. The key is let the public make the choice.

14
OB4-37 The DEIR/DEIS fails to mitigate the past, current and proposed increasing public health impacts to Wilmington, San Pedro, Harbor City, West Long Beach residents, Port goods movement transportation corridor residents and distribution center residents.

A recently completed UCLA Medical Center/Harbor General Hospital Wilmington Children's Asthma Study disclosed that 23.9% of all children in Wilmington have asthma and the current asthma rate of children in Long Beach is 19.3 %. CFASE based on the California Air Resources Board Emission Reduction Plan for Ports & International Goods Movement in California report estimates that a minimum of 3 Port of Los Angeles Harbor area residents die every day due to Port toxic air pollution. The Port of Los Angeles and Port of Long Beach contributes a minimum of 25% of all toxic air pollution in the Harbor area causing significant short term and long term public health problems to Port of Los Angeles Wilmington, San Pedro, Harbor City, City of Long Beach. transportation corridor and distribution center residents.

OB4-38 Caltrans has failed to notify Harbor residents, dock workers and the public of the life and health threatening nature of its goods movement transportation network and systems. Caltrans failed to provide to the public governmental agency, medical and scientific public health study information that it knew existed that could assist the public in preventing & minimizing health impacts, seeking health care and assist the public in participating in the Caltrans public hearing and meeting process where they could make public comments on the negative impacts of Caltrans goods movement and truck transportation networks and systems on public health and request mitigation.

Caltrans has failed to provide any medical financial assistance to the public or impacted families who are currently being impacted by Caltrans, Ports, Goods Movement industry and will be more impacted in the future.

OB4-39 CFASE requests that Caltrans establish an annual $ 50 million Environmental Mitigation Trust Fund as mitigation for past, current and future negative public health impacts. The Trust Fund will pay for the free installation of air purification systems, air conditioning & heating systems and sound proofing of every residents home, public school, private school, public college, public library, child care center, senior citizens center, youth community center, convalescent care facility, park facility, public facility and public building within 3 miles of the bridge, expressway & the Goods Movement Transportation Corridors.

Response to Comment OB4-35

The only diesel fuel available for use in California is ultra-low sulfur diesel which has a lower sulfur content than low sulfur diesel requested by the commenter. Construction equipment used for the project would only operate using ultra-low sulfur diesel; therefore, diesel fuel requirements were not included in the mitigation measures. The use of electricity during construction is addressed in mitigation measure AQ-8.

Response to Comment OB4-36

A "gravitation transportation" system is one that moves in only one direction and has limited velocity and limited acceleration. An underground system would create greater disruption to the project area than would the proposed project. Eradication of the listed emissions could be achieved only if existing transportation systems throughout the entire region, including cars, trucks, marine vessels, trains, and aircraft, were to switch to technology that eliminates emissions.

Please see Response to Comment OB17-18 for further discussion of why this alternative is not feasible.

Response to Comment OB4-37

Past or current activities related to public health are part of the baseline for the environmental analysis. Therefore, discussions of the impacts and mitigation related to these activities are outside the scope of this environmental document.

The Final EIS/EIR includes an analysis of mobile source air toxics (MSAT) emissions, which was prepared following the FHWA MSAT Interim Guidance. The FHWA Guidance does not support the use of dispersion modeling of MSAT emissions to evaluate their potential public health impacts. In response to comments received on the Draft EIS/EIR, ACTA conducted an HRA and identified a mitigation measure for significant impacts.

Letter OB4. Signatory - Coalition for a Safe Environment
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15. CFASE requests that Caltrans establish an annual $ 5 million Biological Resources Mitigation Trust Fund as mitigation for past, current and future impacts to the San Pedro Bay biological resources such as coastal tidelands, wetlands, native California plants, coastal wildlife, animal habitats and aquatic life. The Trust Fund shall pay for the following priority projects: Wetlands Restoration on the property north of Consolidated Slip and Leeward Bay Marina which is currently used as an import car parking lot which can be relocated to a non-coastal tideland property and for the purchase of the land owned by the Port of Long Beach in Wilmington for another Wetlands Restoration Project. OE4-40

16. CFASE requests that Caltrans establish an annual $ 25 million Intermodal Transportation Mitigation Trust Fund as mitigation for past, current and future negative goods movement transportation environmental, air pollution, noise, traffic congestion, community blight, land loss, economic development loss and aesthetic public impacts. The Trust Fund shall pay for the research & development, prototype building, design and construction of Alternative Non-Polluting Non-Fossil Fuel Intermodal Transportation Systems Technologies. The Mitigation Trust Fund shall pay for the immediate electric conversion of the Alameda Train Transportation Corridor as the first priority project until a new comprehensive regional non-fossil fuel system is adopted. OE4-41

OB4-42 CFASE requests that Caltrans use the most current EMFAC 2007 air quality model and not the outdated 2002 program model which underestimates the true statistics and impacts.

Environmental Justice For All,

Jesse N. Marquez

Executive Director

See Response to Comment EO1-5, AJ7-2, AJ11-2, and OB3-7.

Response to Comment OB4-38

The commenter is referred to Response to Comments OB4-18 and OB4-20 for a discussion regarding public participation and public noticing for the project. Existing conditions in the study area regarding noise, air quality, traffic conditions, and other elements of the environment may be considered relevant to health and safety. These existing conditions are described in the Draft and the Final EIS/EIR for each of the 16 environmental resources addressed (see Existing Environment for each section).

Response to Comment OB4-39

The basis for this funding request is unclear, as is the suggestion that Caltrans is responsible for providing such funds.

Also see Response to Comment OB4-23.

Response to Comment OB4-40

The measures proposed in this comment would mitigate for impacts resulting from numerous past, non-Caltrans projects. While Caltrans is sympathetic with the expressed desire to improve the environment, appropriate mitigation measures have been proposed in Section 3.16.4 of the Draft and the Final EIS/EIR that are specifically tailored to reduce impacts resulting from this project. These measures include on or off-site mitigation for wetland impacts under Alternative 3. Mitigation for impacts to other biological resources, including native California plants, coastal wildlife, animal habitats, and aquatic life, are also addressed in the Section 3.16.4 of the Draft and the Final EIS/EIR. Impacts that have been identified as adverse would be reduced to a less-than-significant level with mitigation.

The commenter is also referred to Response to Comment OB20-30.

Response to Comment OB4-41

The requested funding is outside the scope of the EIS/EIR prepared for the proposed project. Caltrans is responsible for funding mitigation related to impacts of the proposed project. It is not the responsibility of Caltrans to fund activities that are under the jurisdiction of the Port of Los Angeles/Port of Long Beach.

The commenter is also referred to Response to Comment OB4-40 and OB20-31.

Response to Comment OB4-42

EMFAC 2002 was used for the Transportation Conformity analyses because at the time the analyses were prepared for the Draft EIS/EIR, the regional emissions analyses were based on EMFAC2002. Therefore, the vehicle emissions for the proposed project were estimated using EMFAC 2002 in order to be consistent with the assumptions and methodology used in the 2006 RTIP.

However, the 2008 RTP was expected to be approved in May 2008. In order for the conformity analyses to be consistent with the 2008 RTP, the analyses for the Final EIS/EIR have been updated to EMFAC2007.

Letter OB5. Signatory – Sierra Club Harbor Vision Task Force

Response to Comment OB5-1

The commenter's concern regarding regional transportation issues is acknowledged. However, analysis of these regional transportation issues is outside the scope of the EIS/EIR for the proposed project. The purpose of this project-specific EIS/EIR is to assess alternatives to the current Schuyler Heim Bridge, which is functionally obsolete and seismically unsafe, and a new expressway. The purpose of the proposed project is to provide a safe and uninterrupted highway connection between Terminal Island and Alameda Street/I-405. Also see Response to Comment OB17-18.

The adequacy and continued processing of environmental documentation relative to analysis of the proposed project will be determined after issuance of the Final EIS/EIR.

Response to Comment OB5-2

The Port of Long Beach (POLB) and the Port of Los Angeles (POLA) are engaged in long-term planning to address issues related to traffic congestion associated with current port operations and the projected future growth in goods movement. Plans that are developed as a result of these efforts, including alternative forms of transportation, will be subject to environmental analysis and public review.

The purpose and need of the proposed project, however, is to address the immediate need to alleviate current and projected traffic congestion in the project area, using existing transportation modalities. The Schuyler Heim Bridge, which has become a vital transportation link between POLA/POLB and the mainland, is structurally deficient and functionally obsolete. To facilitate the continued movement of goods to and from the ports, a seismically safe vehicular connection is needed between Terminal Island and the mainland. In addition, a limited access, high capacity alternative route for traffic between Terminal Island and I-405 is proposed to meet traffic needs for the corridor.

Sierra Club Harbor Vision Task Force
October 16, 2007

Via Email and Facsimile

Ronald J. Kosinski
Deputy District Director
Division of Environmental Planning
Caltrans District 7
100 South Main Street (MS 16A)
Los Angeles, CA 90012
Fax: 213-897-0360
Email: ronald_kosinski@dot.ca.gov

Re: Schuyler Heim Bridge Replacement and SR-47 Expressway Project
EA 238500

Dear Mr. Kosinski:

35-1 Writing on behalf of the Sierra Club, via its Harbor Vision Task Force, a committee that deals with San Pedro Bay and goods movement issues in Southern California, I am adding our voice to the comments provided to you by the NRDC. We appreciate this opportunity to comment, but have grave concerns about not only the EIS but the context in which it is prepared. Deep problems in the EIS suggest that it should be withdrawn and replaced with a new EIS which deals with both with the issues immediately involved in the existing EIR and in regional transportation issues.

Dated transportation modality

The EIS proposes to increase of a vital link between the ports and the mainland which is centered around dated transportation modalities widely used in the goods movement industry today — that of conventional trucks and trains. These technologies are not up to 21st century challenges to move large volumes of goods. They are:

35-2
- Not sufficiently efficient and subject to severe bottlenecks
- Difficult to scale — reaching a point of diminishing returns measured in dollars per unit of transport
- Increasingly difficult to mitigate for toxic air pollution. Even the cleanest burning hydrocarbon fuel, natural gas (as CNG or LNG), has significant air pollution issues with respect to ultrafine particles which are among the most hazardous of the particulates.
- Hard to mitigate for climate changing pollution via a dependence on liquid fuels
- Hard to mitigate for noise — there is very little that can be done to reduce noise at the source for heavy-duty, combustion-based engines, and mitigations measures are not very effective at reducing wide area ambient noise
- Dependent on logistics methods which need large areas of land — which is already in short supply in the ports and urban core and will become in short supply in inland areas.
- Dependent on freeway and rail routes through the greater Los Angeles metropolitan area where there is no room to expand except at great cost with the use of eminent domain or through the use of double-deck freeways. Some freeways, like the I-110, have already been double-decked, leaving little room for additional expansion
- Dependent on use of inland ports to expand cargo handling capacity for goods bound to the immediate Los Angeles area.

Goods movement through the twin ports in San Pedro Bay will double or triple by 2030, with the possibility it may increase still further. Conventional freeways, rail lines, and tilt-up concrete warehouses are simply not up to the task of

Letter OB5. Signatory - Sierra Club Harbor Vision Task Force
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handling this much cargo, especially in a region where transportation routes are limited by urban built-out and mountainous terrain.

If port infrastructure triples by 2030, we'll need to build roughly twice as much infrastructure in 25 years as we build in the past 50 — on a landscape that is simply not conducive to such expansion. As we become increasingly pressed to keep up with the crush of cargo, we may find these efforts competing with the efforts to mitigate environmental problems.

Inland ports and 24x7 operation

The growth of inland ports has arisen because of the inability of our seaports and downtown area facilities to process the volume of cargo entering the ports.

As a result, these inland ports have become an in fact expansion of the seaports. This represents a substantial change in the way the seaports operate, with their emphasis changed from receiving and warehousing cargo, to simply being a giant intermodal facility, whose task is to transfer cargo between sea- to land-based transportation modes.

The ports have also changed from a dominantly week-day operation, running mostly during normal business hours, to a 24x7 operation, running at all hours of the day on all days of the week. The impact of this change is not limited to within the confines of the port—because the cargo that leaves the port needs to go somewhere. Though this process has definitely relieved some of the peak-hour congestion for infrastructure accessing the ports and has increased the land-use efficiency within the ports, it has other unfortunate consequences.

Among these consequences is the generation of noise and toxic air pollution on a 24x7 basis. There is some research that shows that particulate air pollution, one of the leading health concerns associated with goods movement, may be aggravated by the lower temperatures found at night. This is in contrast with types of air pollution more associated with "smog" in which exposure to higher temperatures and sunlight cooks pollutants and makes them more toxic.

It further means that there is no respite, either from noise or toxic air pollution, for people who live near these constant operations. Not in the seaports. Not along the transportation corridors and not in the inland ports. A constant exposure without reprieve is bound to compound psychological and physiological impacts because exposed individuals are never given an opportunity to recuperate between exposures.

Neither the change to 24x7 hours of operation or the change to the use of inland ports has been studied in an environmental review process (as part of CEQA or NEPA). These are regional systemic changes which will have great cumulative impacts, for which there may be health and environmental consequences, alternative designs and mitigations which have never been explored. We may well be lacking some of the basic research needed to the impacts of constant 24x7 exposure to toxic pollutants and noise compared to that of intermittent exposure.

Further, a heavy reliance on inland ports to absorb capacity which cannot be increased in the ports with existing transportation modalities, means that we may be systematically reducing regional cargo transportation efficiency. This is of grave environmental concern. If we need to move a unit of cargo one and a half times further to get it to market than we would have to using a more efficient model, it means we have multiplied the negative impacts of moving that cargo to market by a factor of one and a half.

This sort of impact will act as a multiplier on the impacts caused by a volume increase in the ports. So, if the ports increase by a factor of three over the next 23 years and the mileage efficiency falls by a factor of 1.5, the net effect will be a 4.5 increase in port impacts — not just a 3.0 fold increase. It means that all of the toxic, noise, greenhouse pollution and sprawl impacts caused by the ports will increase accordingly — and be that much harder to mitigate.

Any unit of cargo that is shipped to the inland ports in Mira Loma and beyond and which later doubles back toward

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Response to Comment OB5-3

Consistent with the requirements of NEPA and CEQA, the scope of this project-specific EIS/EIR is limited to an evaluation of alternative ways of providing a safe link between Terminal Island and Alameda/I-405 through replacement of the existing Schuyler Heim Bridge and provision of a new expressway. An environmental assessment of regional goods movement strategies is beyond the appropriate scope of analysis for this document.

Please also see Response to Comment OB17-18.

Response to Comment OB5-4

The commenter's view is acknowledged.

However, the proposed project is as described in Chapter 2 of the EIS/EIR. The potential impacts of both project construction and operation, and avoidance, minimization, and mitigation measures to minimize potential impacts to the extent feasible are described in the many sections of Chapter 3. An assessment of the proposed project specific to the California Environmental Quality Act is provided in Chapter 4. The associated technical studies provide detailed scientific and scholarly information to support the information provided in the EIS/EIR.

Therefore, the EIS/EIR is considered adequate to move forward.

Also see response OB5-3.

Los Angeles will be part regional cargo movement methodology which increases the distance a unit of cargo must travel to get to market.

The inefficiency may be further aggravated by a modality imbalance. If goods reach an inland port by train and then some are shipped back to the L.A. area by truck (rather than by train), the trucks and trains will both be more likely to make the obverse trip empty. That empty trip has the potential to double the impact of moving the cargo, where the cargo makes two one-way trips, but the trains and trucks must each make a two-way trip. Some of this could be mitigated by planing backhaul trips wisely, but with an inherent modality difference, the imbalance may be insurmountable.

We can speculate what percentage of cargo may double back, but without a study that looks at this seriously, we have no idea. Since this can have a significant impact on environmental impacts (and infrastructure requirements and costs), we are in no position to evaluate the impacts of a project like this project effectively. We are simply missing an important piece of data we need to know what the regional impacts of the project will be.

Further, without a study that looks at this, we may be overlooking important possible alternatives and making the wrong design and economic decisions with respect to the best way to handle goods movement. We may end up spending far more money to move cargo and to mitigate its negative environmental impacts than we need to. Looking form within the narrowly defined confines of a project like this EIS, we, once again, have no way to know.

Nor do we have anyway quantitative way to track how well we are doing. Any complex project like this is subject to errors in study, with respect to a variety of assumptions and projections that need to be made to conduct the study. If those assumptions and projections are articulated and quantified, we can measure our progress against them. But, if they are implicit, not studied and not enumerated and quantified, we have no way to measure. We will be in no position to learn from our existing work, by comparing projections to outcomes. We will be in no position to assure that we are indeed doing the best environmental work we can do—nor, ironically, doing the best we can to move cargo.

The systematic transference of cargo handling operations from within the seaports to inland ports, without an EIS (or EIR) to study the impacts, results in a large-scale piecemealing of the impacts of conducting the seaports' business. This is exemplified by seaport officials who offered an inland port model to seaport area residents as a way of reducing negative impacts in immediate San Pedro Bay area. Clearly, moving as much of the operations out of the Bay to inland areas can take those impacts off of the ports books by moving them to another location. It is for this very reason that the seaports should not be allowed to externalize these impacts to inland ports without considering them as part of the impacts which are enabled by port expansion projects. Further, without this transference, the seaports would simply not have been able to expand as much as they have.

35-3 This expansions proposed by this EIS are entirely support this systematic transference of seaport work to the inland ports — and this EIS should not proceed until this impact has been appropriately studied, either as part of this EIS, or more appropriately, as part of a regional goods movement EIS/R that looks at alternative regional goods movement strategies. The Southern California Association of Governments (SCAG) Regional Transportation Plan (*Destination 2030*) failed to look at the strategy of using an inland port as a deliberative decision, as a choice of different evaluated alternatives, but instead accepted the development of inland ports on an assumptive basis. It also failed to look at the impacts of moving cargo on a 24x7 basis. Also, the Pier Pass program, which introduced extended gate hours and 24x7 operation (effectively tripling seaport capacity) went into place without any such examination or even an environmental review. The SCAG study also categorically refused to consider climate change, indicating that the report didn't need to, since it wasn't part of SCAG's mandate to do so.

35-4 This EIS should simply not move forward. We do not have the needed groundwork to support it and to understand its true local and regional impacts.

Noise

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The change to 24x7 hours of operation means that residents in seaport communities, along goods movement corridors, and in inland port communities are exposed to noise during normal "quiet times" at night and on weekends. The health consequences of the noise are thereby amplified, because noise that disrupts sleep may be more unhealthful than noise that simply interferes with concentration during the course of the day. It also means that a sense of "relaxing" and "enjoying a quiet weekend at home" is much less serene with a constant level of noise.

Many areas of Southern California are subject to inversion layers, which trap not only air pollution but noise. The San Pedro Bay area is no exception. It can have particularly low-level inversion layers, with a marine layer lying low over a warmer inland air mass. Just as inversion layers trap air pollution, they also trap and reflect noise.

As a result, it is possible to hear operations at Port of Los Angeles terminals clearly in neighborhoods that are a mile and two away from the ports. The rumbling of port machinery, the clang of trains being built, other loud bangs and the constant beeping of trucks which are backing up can all be heard a mile and two away from the action in the ports. The soundscape is pretty much the same in these neighborhoods as it is near the seaports, except that the vibration from trains on tracks is absent and the volume is reduced. Also, the noise level is dependent on specific atmospheric conditions.

Ironically, it is the same low-inversion layer characteristics that lead to warm nights that increase noise. As a result, there is a conflict between wanting to open windows to keep the house cool at night and to close windows to keep out port noise.

Though sound walls, berms, and vegetation can decrease noise (to varying degrees) immediately near a facility, they will not do anything do decease sound which is reflect by an inversion layer. Nor will they do anything to reduce vibration which is transmitted by the ground, which is more prevalent from rail operations.

Almost nothing has been done to reduce the noise generated by internal combustion engines — regardless of the fuel source. Some manufacturers indicated a 10% decrease in noise with a change to a more modern engine, but this an imperceptible change in noise level, since people evaluate noise on a logarithmic scale. A minimally perceptible change requires about a 2:1 change, either a 50% reduction or a 100% increase. Starting with the explosion of fuel, the mechanics of internal combustion engines is inherently noise and would be even if they run on the cleanest possible fuel, hydrogen drawn from strictly renewable sources. The noise of wheels on the roadway can be significantly mitigated by reducing speed.

Conventional rail technology is also very noise. Some reductions in noise and vibration can be achieved by using continuous-welded track and restricting track curvature to large radius turns. However, the process of building trains is inherently noisy.

Ultrafine particulates

Research presented at the SCAQMD's Ultrafine Particulate Conference and in other venues, indicates that ultrafine particles may be the most dangerous of all particulates, even more dangerous than fine and coarse particulate matter. Further, it may be very difficult to control and the best way to measure the health impacts of these ultrafine particles is itself in need of further study. The danger of ultrafines arise from their ability to penetrate deep into the body, crossing the blood-brain barrier and penetrating mitochondria. This gives this toxic material far greater access to every part of the body than coarser particles have.

LNG is known also to have a significant ultrafine particulate pollution problem.

Even an internal combustion engine which runs on hydrogen will produce a variety of pollutants, because of the oils used to lubricate the engine.

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Response to Comment OB5-5

A discussion of truck driver wages/benefits and their effect on the economic viability of cargo movement by rail is outside the scope of the environmental analysis for the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway and alternatives. The purpose of this EIS/EIR is to evaluate the potential impacts of the proposed project only. The suggested discussion would be an entirely different and unrelated study.

Also see Response to Comments OB5-3 and OB5-4.

Further, some of the strategies we employed to reduce coarse particle pollution (using mass based measures) have had the unintended consequences of increasing ultrafine particle pollution (measured by either ultrafine particle mass or by ultrafine particle number).

We have some significant unknowns with respect to the future of internal combustion engines based on any type of fuel. It is foolish for us to assume that there will be an 85% reduction in pollution or more importantly health impacts between now and 2030.

For what we need to decrease is not the total mass of criteria pollutants, but the total health impact of those pollutants. Even if we decrease the total mass by 90%, if the most dangerous pollutants are not reduced, we have done very little to decrease the health impact. Worse yet, if the methods used to achieve the 90% overall pollution reduction inadvertently increase the most dangerous pollutants (because they have not had adequate study), we may the total health impact as a result.

We cannot shrug off what we don't know today, because we will pay the consequences of it tomorrow. We already have enough information as to the dangers of ultrafine particles to know that we need to take action to reduce them. Based on the precautionary principal, we should not engage in a strategy which may increase them because we have failed to regulate them. Even if our pollution control technology has no impact on ultrafine particles, we will triple their quantity by tripling the volume of traffic through the ports. This may overwhelm the health benefits obtained by other reductions yielding a loss in the quality of our health protection efforts.

It should be noted that 30 years ago we understood that particulate matter posed a health risk—but didn't study it that closely or pay that much attention to it. That is how today, we have reached a crisis stage with particulates. We should not now, repeat that same mistake with ultrafine particulate matter.

Trucking

It is no secret that the environmental and labor communities and many in the business community feel that port truckers are underpaid and unable to afford modernizing and maintaining their trucks to meet clean air and safety standards. Many further consider the current trucking system as unreliable—and there are disputes as to whether the current system will be able to provide the necessary number of workers to move containers in the future. There have already been spot shortages of truck drivers, and the number of containers moved through the port is growing about twice as fast as the local population from which truck drivers are drawn.

If port truckers manage to make livable wages and benefits, which could arise through trucker shortages or changes in the trucking system, the percentage of containers leaving the port by rail compared to truck may increase. Even without other more significant infrastructure modernization, we may find more containers moving by rail for a variety of reasons, including efforts to reduce toxic and climate-changing air pollution. Rail is cleaner, less global warming and uses less fuel per cargo-mile than trucking. Even fairly modest rail modernization efforts may also help make rail more attractive compared to trucking. Trucking does not have comparable modernizations compared to rail.

There are currently more than 15,000 port truckers, most of whom do not make livable wages and benefits. The environmental community sees livable wages and benefits as an important cornerstone of building livable cities, just as important as safe parks, good schools and decent public transportation. A depressed wage and benefits standard creates an enormous pressure on local governments to provide necessary municipal services and on renters and prospective home owners of having sufficient income to provide for the properties they live in. Both conditions contribute to urban blight and decay and in turn contribute to urban flight and urban sprawl.

35-5 The EIS should either consider the depressed wages and benefits the truck drivers who will use the proposed infrastructure as a significant environmental impact, or it should assume that the wages and benefits will rise to

Response to Comment OB5-6

Bridge replacement and expressway extension can be retrofitted for electric or renewable energy transportation systems. However, this three-mile project cannot dictate the region's preferred mode of transportation and energy sources. Such regional considerations are outside the scope of this environmental document.

Also see Response to Comments OB5-3, OB5-4, OB5-5 and OB17-18.

Response to Comment OB5-7

The commenter's remark on the current regulatory process is acknowledged. However, it is outside the scope of the proposed project to affect a change of existing regulations. Further, both Caltrans District 7 and ACTA are subject to the requirements and restrictions of the current regulatory process. Both agencies must be in compliance with current regulations for the proposed project to move forward.

The commenter is referred to Response to Comments OB5-6, OB5-8, and OB17-18, which address the feasibility of alternative modes of transportation to meet the needs of the proposed project.

acceptable levels and figure that this will shift more cargo to move by rail instead of by truck. Ideally, it should look at
OB5-5 both scenarios.

Alternatives

OB5-6 Among the alternatives that we must explore seriously is our ability to completely electrify goods movement and to deliver that power from strictly renewable sources: wind, solar, wave and geothermal.

Such a systemic restructuring may involve the use of three principal transportation modalities for goods movement:

1. All electric fleet trucks that do not need a gearbox for "the last mile" of goods movement.
2. Magnetic levitation guideway systems for goods moving between principal Southern California goods processing facilities.
3. Electrified, modernized, conventional rail for moving goods out-of the Southern California area.

These may be supported by interim technologies, such as:

1. Hybrid trucks with all-electric traction which can run modest distances on all electric power.
2. Dual-mode conventional locomotives which can run either on electricity drawn from a third rail or overhead line or from onboard diesel engines.

Regionally, this would be supported by land use reforms such as:

1. Ensuring high-capapcity goods movement facilities have direct guideway access (for intra-Southern California destinations) and direct modernized, electrified rail (for access beyond Southern California).
2. Building taller warehouses or distribution centers "in line" so that cargo can move progressively from source to destination without having to double back.

Additional reforms would center around information handling:

1. Establishment of a global and regional goods movement planning consortiums that optimize cargo movement (down to the contents of individual containers) so that goods can make it to market with the least distance needed (to minimize energy and infrastructure requirements).
2. Regional just-in-time delivery planning working over trucks, guideway and rail, to minimize the geographic footprint in the ports needed to move containers.

Most of these modernizations will not occur through incremental changes, and cannot be accomplished without a deliberate regional strategy.

OB5-7 Narrowly applying a current regulatory process—that is, simply going through the motions of checking off a series of mandated benchmarks for environmental review—can consistently permit us to skirt the issue of whether we are on the right course in continuing to build conventional roadways and rail lines. It can permit us to avoid this both at the single project level, such as with this EIS, or with a regional transportation plan.

It is easy enough to argue that all of the above technologies are not immediately available in a ready-to-deploy condition, while acknowledging that they may be useful at some future date.

The problem is that the same status-quo sort of argument can be used everywhere in the United States, so that we will never generate the needed changes to modernize our infrastructure—until the collapse of the current system is evident.

Only the wide-scale electrification of our infrastructure, along with the efficiency changes to make thrifty use of energy

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Response to Comment OB5-8

The proposed replacement of the Schuyler Heim Bridge replacement and construction of an expressway extension cannot be replaced with a three-mile mag lev system or electric locomotive or regenerative braking systems. These technologies are best suited for regional goods movement systems, such as those currently operated by the Ports, Union Pacific Railroad, Burlington Northern Santa Fe, Metrolink, and Metro. The scope of this comment is outside the evaluation of the proposed project. The commenter also is referred to Response to Comments OB4-5, OB5-3, OB5-4, OB5-5, OB5-6, and OB17-18.

and land, is capable of producing the sort of changes we need to address environmental issues and ultimately to move cargo economically and quickly. We simply cannot afford to squander land and energy the way we have. Nor can we squander the tax dollars needed to support such an outmoded system. Those squandered dollars will only takeaway from other public obligations, such as reinvigorating our failing public schools and youth programs.

It is our contention that all the basic technology we need to begin the work of this sort of modernization is in place today. There are magnetic levitation rail lines providing passenger service in nations with much less economic strength than the United States. Maglev has also been demonstrated for cargo use. An international internet consortium uses a network of independently-owened computers to cooperatively move more data "containers" (they're called packets) in a second than the the cargo handling world moves in a year. Dual-mode trains (which can run alternately on electricity or fuel) are in common use in Europe and used for commuter service on the Long Island commuter rail line. The Channel Tunnel train between England and France uses a 7 megawatt all-electric locomotive, argued by its proponents as the most powerful locomotive in the world. Switzerland uses regenerative breaking on its electric trains so that two downhill trains can power one uphill train (and we have significant mountain grades for our trains to cross). OB5-8

The elements of what we need to do are here and at hand. We need to do some systems integration, but can embark on a better way of moving cargo today.

We should never approve another EIS or EIR based on doing business as usual. We will box in our future if we don't, both environmentally and economically.

Sincerely,

Tom Politeo
co-chair
Harbor Vision Task Force
Sierra Club, Angles Chapter

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Letter OB6. Signatory – Natural Resources Defense Council

Response to Comment OB6-1

The commenter's view is acknowledged. Specific responses to your concerns follow in Response to Comments OB6-2 through OB6-12.

NATURAL RESOURCES DEFENSE COUNCIL
COALITION FOR CLEAN AIR
AMERICAN LUNG ASSOCIATION
CALIFORNIA SAFE SCHOOLS
COALITION FOR A SAFE ENVIRONMENT
COMMUNITIES FOR A BETTER ENVIRONMENT
COMMUNITIES FOR CLEAN PORTS
EAST YARD COMMUNITIES FOR ENVIRONMENTAL JUSTICE
ENVIRONMENTAL PRIORITIES NETWORK
HARBOR WATTS ECONOMIC DEVELOPMENT CORPORATION
LONG BEACH ALLIANCE FOR CHILDREN WITH ASTHMA
DR. JOHN G. MILLER, COMMUNITY ADVISORY COMMITTEE FOR
THE SAN PEDRO AND PENINSULA HOMEOWNERS COALITION

October 16, 2007

Via U.S. Mail, Facsimile and Email

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Re: Schuyler Heim Bridge Replacement and SR-47 Expressway Project
EA: 238500

Dear Mr. Kosinski:

On behalf of the undersigned organizations, we write to provide comments on the Schuyler Heim Bridge Replacement and SR-47 Expressway Project Draft Environmental Impact Statement / Environmental Impact Report and Section 4(f) Evaluation (the "EIS"). We appreciate the opportunity to provide comments on the EIS. However, the flaws in the EIS

OB6-1

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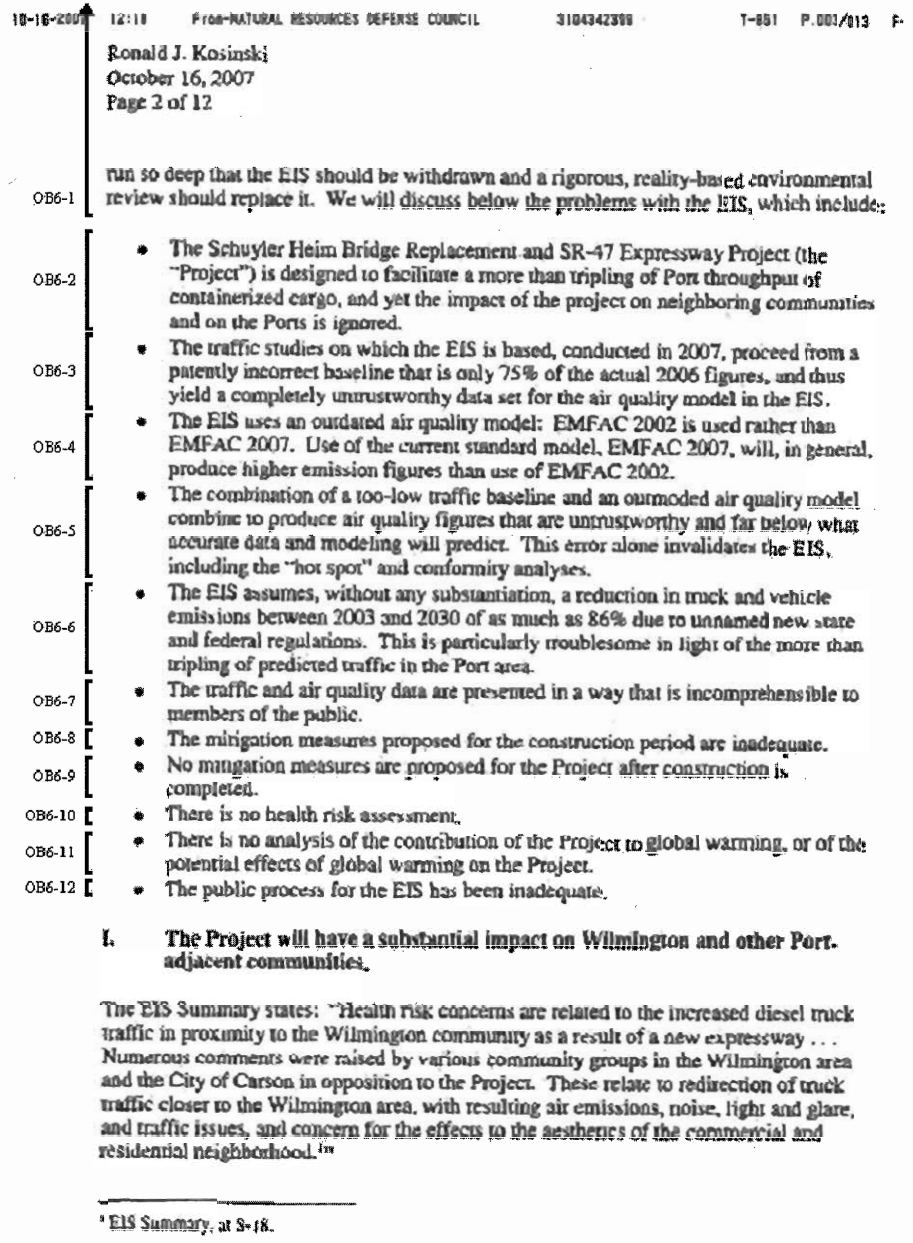
Response to Comment OB6-2

As stated in the Draft and the Final EIS/EIR Section 1.2.2.2, the existing transportation system within and adjacent to the Ports is becoming increasingly constrained with cargo traffic and other vehicular traffic. A Port of Long Beach/Port of Los Angeles study forecasting that the amount of cargo entering the two ports would nearly double between 2010 and 2020. During the same time period, the amount of port-related truck traffic also is expected to double. This large, and rapid, increase in truck volume has the potential to seriously compromise the essential north-south connectivity between the ports and the regional freeway system, thereby slowing and/or otherwise limiting the movement of people, freight, and goods.

The growth scenario used for the analysis in the Draft and the Final EIS/EIR is based on the Port of Long Beach/Port of Los Angeles Transportation Study model developed in 2001, which was based on the Southern California Association of Governments regional model and approved by the Ports for transportation planning and environmental studies. The model was updated in 2004 for the proposed project and other port area transportation planning. The 2004 update incorporates the most current regional and port data, which include the forecast twenty-foot equivalent units (TEU) throughput for 2030 of approximately 44.7 million TEU, with a peak-month estimate of 4.1 million TEU. This compares to the TEU throughput for 2003 of 11.8 million.

Based on the above, it can be seen that the project is proposed in response to considerable and expected growth at the ports.

The impacts to neighboring communities have been analyzed and are discussed in the Draft and the Final EIS/EIR. The entire Section 3.3, Community Resources, is devoted to the discussion of community impacts.



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Ronald J. Kosinski
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run so deep that the EIS should be withdrawn and a rigorous, reality-based environmental review should replace it. We will discuss below the problems with the EIS, which include:

OB6-1

- OB6-2 The Schuyler Heim Bridge Replacement and SR-47 Expressway Project (the "Project") is designed to facilitate a more than tripling of Port throughput of containerized cargo, and yet the impact of the project on neighboring communities and on the Ports is ignored.
- OB6-3 The traffic studies on which the EIS is based, conducted in 2007, proceed from a patently incorrect baseline that is only 75% of the actual 2006 figures, and thus yield a completely untrustworthy data set for the air quality model in the EIS.
- OB6-4 The EIS uses an outdated air quality model: EMFAC 2002 is used rather than EMFAC 2007. Use of the current standard model, EMFAC 2007, will, in general, produce higher emission figures than use of EMFAC 2002.
- OB6-5 The combination of a too-low traffic baseline and an outmoded air quality model combine to produce air quality figures that are untrustworthy and far below what accurate data and modeling will predict. This error alone invalidates the EIS, including the "hot spot" and conformity analyses.
- OB6-6 The EIS assumes, without any substantiation, a reduction in truck and vehicle emissions between 2003 and 2030 of as much as 86% due to unnamed new state and federal regulations. This is particularly troublesome in light of the more than tripling of predicted traffic in the Port area.
- OB6-7 The traffic and air quality data are presented in a way that is incomprehensible to members of the public.
- OB6-8 The mitigation measures proposed for the construction period are inadequate.
- OB6-9 No mitigation measures are proposed for the Project after construction is completed.
- OB6-10 There is no health risk assessment.
- OB6-11 There is no analysis of the contribution of the Project to global warming, or of the potential effects of global warming on the Project.
- OB6-12 The public process for the EIS has been inadequate.

I. The Project will have a substantial impact on Wilmington and other Port-adjacent communities.

The EIS Summary states: "Health risk concerns are related to the increased diesel truck traffic in proximity to the Wilmington community as a result of a new expressway . . . Numerous comments were raised by various community groups in the Wilmington area and the City of Carson in opposition to the Project. These relate to redirection of truck traffic closer to the Wilmington area, with resulting air emissions, noise, light and glare, and traffic issues, and concern for the effects to the aesthetics of the commercial and residential neighborhood."[1]

[1] EIS Summary, at S-18.

Response to Comment OB6-3

Section 3.5.3.2 of the Draft and the Final EIS/EIR provides the methodology for the traffic model utilized for the traffic and, therefore, air quality analyses for the project, as follows:

The travel demand forecasting (TDF) model used to forecast future traffic volumes is based on the Ports of Long Beach and Los Angeles Transportation Study model, which was developed in 2001, approved by the Ports of Long Beach and Los Angeles for Port area Transportation Planning Studies and environmental studies, and is based on the regional model of the Southern California Association of Governments (SCAG). The model was updated in 2004 for the analysis of the proposed project, as well as for other port area transportation planning studies. The 2004 update includes incorporation of the most current regional model data and the most current port data. The model was calibrated as part of the Joint Port Study. Details on model development and calibration are provided in the "Ports of Long Beach and Los Angeles Transportation Study," TRANSPLAN.

Response to Comment OB6-4

The commenter is referred to response OB4-42 regarding use of the appropriate EMFAC model for air quality analysis.

Response to Comment OB6-5

Your comment on the traffic data used and the air quality analysis is noted. However, the air quality analysis was prepared to meet the EPA requirements under transportation conformity, FHWA requirements under NEPA, and the Lead Agency requirements under CEQA.

Please see Response to Comment OB14-6 for further discussion of the traffic model used for the traffic and air quality analyses and the HRA.

Response to Comment OB6-6

The text in Section 3.13.3.4.3 has been revised to specify the regulations that would reduce emissions. Please see Response to Comment AJ11-4.

Response to Comment OB6-7

The commenter is referred to Response to Comment OB4-19 for a discussion of the complexities of the various environmental analyses provided in the EIS/EIR.

Response to Comment OB6-8

The commenter is referred to Response to Comments AJ5-13, AJ7-24, and AJ11-21 through AJ11-24.

Response to Comment OB6-9

Please see Response to Comment OB6-21.

Response to Comment OB6-10

An HRA was prepared by ACTA. Please see Response to Comment AJ7-2, AJ11-7 and OB14-7 for further discussion of its results and explanation of its conservative methodology.

Response to Comment OB6-11

A discussion of greenhouse gases has been added to Section 3.13.1.2 and 3.13.2.2 of the Final EIS/EIR. he Final EIS/EIR concludes that transportation projects, such as the proposed project that will relieve congestion by enhancing operations and improving travel times in high congestion travel corridors, will lead to an overall reduction in CO2 emissions(Final EIS/EIR, p. 3.13-12). Additionally, several proposed project measures and measures that will be implemented by: EPA; CARB; and the Port of Los Angeles through a settlement with the Attorney General's office, will further reduce GHG emissions from the mobile sources expected to utilize the project.

Please also refer to Response to Comment AJ11-32.

Response to Comment OB6-12

The commenter is referred to Response to Comment OB4-18 for a discussion of the public process for review of the Draft EIS/EIR, including extending the public comment period beyond that required by the regulations.

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Response to Comment OB6-13

Your comment regarding the deficiencies with the analyses in the Draft EIS/EIR is acknowledged. See Response to Comment AJ7-1, AJ7-21, AJ7-23, AJ11-2, and EO1-5.

Response to Comment OB6-14

The growth scenario used for the analysis in the Draft and the Final EIS/EIR is based on the Port of Long Beach/Port of Los Angeles Transportation Study model developed in 2001, which was based on the Southern California Association of Governments regional model and approved by the Ports for transportation planning and environmental studies. The model was updated in 2004 for the proposed project and other port area transportation planning. The 2004 update incorporates the most current regional and port data, which include the forecast twenty-foot equivalent units (TEU) throughput for 2030 of approximately 44.7 million TEU, with a peak-month estimate of 4.1 million TEU. This compares to the TEU throughput for 2003 of 11.8 million. See Response to Comments OB14-6, OB15-3 and OB15-12.

Indeed, the health impacts from Port activities are well documented. Of all the listed TAC's identified by the California Air Resources Board ("CARB"), diesel particulate matter ("DPM") is known to present the greatest health risks to Californians.[2] Dozens of studies have shown adverse impacts from DPM and NOx, including respiratory disease, cardiovascular mortality, cancer, and reproductive effects as well as an increase in regional smog and water contamination. CARB has determined that diesel exhaust is responsible for over 70% of the risk from breathing our air statewide and in the South Coast Air Basin ("SCAB").[3] In addition, the South Coast Air Quality Management District ("SCAQMD"), in the Multiple Air Toxics Exposure Study II ("MATES II") identified the communities of San Pedro and Wilmington as having among the highest cancer risks in the South Coast.[4] The MATES II study identified mobile sources, including trucks, to be the primary sources of toxic diesel particulate emissions.[5] Statewide, 2,400 premature deaths annually are linked to goods movement, mostly from particulate pollution, and 50% of these deaths are in the SCAB.[6]

Residents of Wilmington, Carson and San Pedro will face additional health risks due the increased diesel truck traffic facilitated by the Project. For sensitive populations, such as children and the elderly, and for those who live and work in close proximity to the Project, the risk will be even higher.[7]

OB6-13 The Project, particularly the SR-47 Expressway portion, proposes to add additional pollution that would not occur if the Project is not built. In this context, there are many critical deficiencies in the EIS that cannot be fixed short of withdrawal and recirculation.

ii. The EIS uses a baseline for Port throughput of containers that is less than 75% of the current figures.

OB6-14 In the traffic analysis for the EIS, a baseline figure of 11.8 TEUs (twenty-foot equivalent units) is used, based on 2003 data.[8] This old data is used in the EIS even though the EIS, and its supporting traffic study, were completed in 2007.[9] The Ports' own figures for 2006, the last year of reported figures, show a total of 15.8 million TEUs.[10]

[2] CARB, Emission Reduction Plan for Ports and Goods Movement in California (the "ERP") (2006), at 7
[3] ERP, at 7.
[4] SCAQMD, MATES II at ES-5.
[5] *Id.* at Es-3, ES-9.
[6] SCAQMD 2007 Air Quality Management Plan ("AQMP") at IV-A-146.
[7] The EIS describes some of the sensitive receptors in the Project area at Section 3.13.2.4. These include nursery schools, grammar schools, middle and high schools, a child development center, hospitals and residences.
[8] Final Traffic Study, Schuyler Heim Bridge Replacement and SR-47 Expressway Project (Meyer, Mohaddes Associates), July, 2007 at 9.
[9] The EIS is dated 5 ½ years after the date of the Notice of Preparation ("NOP").
[10] See: http://www.portoflosangeles.org/facts/figures_Annual.htm (Port of Los Angeles), http://www.polb.com/economics/port_stats/yearly_teus.asp (Port of Long Beach).

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Response to Comment OB6-15

Your comment regarding the version of EMFAC is acknowledged. See Response to Comments AJ11-11 and OB4-42.

Thus, the baseline data for the traffic study is woefully out of date. In addition, using such old data frustrates the basic purposes of CEQA to require reasonable mitigation of significant impacts on the environment, and to allow governmental decisionmaking bodies to make decisions that intelligently take into account the environmental consequences. *See, e.g., Mountain Lion Foundation v. Fish & Game Commission*, 16 Cal.4th 105 (1997). The usual rule that environmental conditions are analyzed as of the date of the NOP has no application in a case where, as here, the project proponent waits 5 ½ years after the NOP to complete its draft EIS/EIR.

The EIS, without citation, assumes a 14% per year growth rate.[11] Applying this growth rate to the correct 2006 figures, the 2030 container figure should be 53.2 million TEUs, not the 44.7 million assumed in the EIS. Thus, the 2030 traffic figures in the EIS are at least 18% too low.[12] This, in turn, throws off the accuracy of the air quality impacts that are modeled by the EMFAC program. As we discuss below, this problem is exacerbated in the EIS by using EMFAC 2002 rather than EMFAC 2007.

OB6-14

III. The EIS uses an outdated version of EMFAC and thus substantially underestimates the air quality impacts of the Project.

As noted above, the data that the Project proponents input in the EMFAC model is low by at least 18%. Exacerbating this problem, the EIS relies on the outdated EMFAC 2002 model even though EMFAC 2007 became available in 2006.

The differences between the two models can be substantial. For example, for the same data set, EMFAC 2007 can predict 30% more in $PM_{2.5}$, 17% for NOx, 8% for SOx and 3% for VOC than EMFAC 2002.[13] If the input numbers for EMFAC are increased by 21%[14] and the output increased, in the case of $PM_{2.5}$, by 30%, the percentage difference in $PM_{2.5}$ reported can increase over 50%. That degree of inaccuracy is completely unacceptable in an EIS/EIR.

OB6-15

Moreover, the "hot spot" and conformity analyses in the EIS are based on the same faulty data and obsolete modeling. There is simply no way to save this EIS – it needs to be withdrawn and redone with correct traffic data and air quality modeling.

[11] Over the 27 years from 2003 to 2030, the EIR predicts container growth from 11.8 TEUs to 44.7 TEUs. That is a rate of 14% increase per year.
[12] Moreover, in an April, 2004 report by Meyer, Mohaddes Associates, TEU throughput for the ports in 2025 was assumed to be 47,184,000 Port of Los Angeles Baseline Transportation Study, April 2004, at 25. This 2025 figure is 2.5 million TEU *higher* than the EIS estimate for 2030.
[13] See, e.g., www.aqmd.gov/gb_comit/aqmpadvgrp/20061213/NovAQMPMinutes.pdf, at 1.
[14] To 53.2 million TEUs from 44.7 million TEUs.

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Response to Comment OB6-16

See Response to Comments OB6-6, AJ11-4, and AJ17-12.

Response to Comment OB6-17

The commenter is referred to Response to Comment OB4-19 for a discussion of readability.

Response to Comment OB6-18

The first sentence of the Draft and the Final EIS/EIR Section 3.5 (Traffic and Transportation) states that the analysis in the document is a summary of the 2007 *Traffic Study: Schuyler Heim Bridge Replacement and SR-47 Expressway Project* prepared by Meyer Mohaddes Associates. Section 3.5.3.2 Methodology of the Final EIS/EIR has been updated with a description of the process used to determine traffic projections. The method from the consultant, as noted by the commenter, refers to a way of quick approximation; it is not an accurate methodology for estimation.

The basis for the projections presented in Section 3.5 is provided under Section 3.5.3.2 (Methodology); 3.5.3.2.1 (Traffic Volume Development); 3.5.3.2.1.1 (Year 2030 Traffic Volumes). As stated in Section 3.5.3.2.1.1, the travel demand forecasting (TDF) model used to forecast future traffic volumes is based on the *Ports of Los Angeles and Long Beach Transportation Study* model, which is based on the regional SCAG model. The discussion notes that the TDF model was updated in 2004 for the proposed project and for other port area planning studies, and that additional details on model development and calibration are provided in the *Ports of Los Angeles and Long Beach Transportation Study*. The commenter is referred to the Traffic Study itself for additional details on sources of data and methodologies.

Response to Comment OB6-19

Your frustration with the presentation of the traffic data and air quality analysis are acknowledged. However, these two sections are also required to fulfill federal and state requirements, which require

IV. The EIS contains a wholly unwarranted assumption that truck and vehicle emissions will be reduced by as much as 86% between 2003 and 2030.

OB6-16

The EIS, without substantiation, assumes that there will be a decrease in emissions over time "that can be attributed to EPA and ARB regulations that would require cleaner fuels and cleaner engines in future years." EIS section 3.13.3.4.1.1, at 3.13-2. Similarly, Table 3.13-5 predicts huge reductions in CO, NOx, ROG, SOx, PM_{10} and $PM_{2.5}$ between 2003 and 2030.[13]

There is no factual basis in the EIS or the accompanying technical reports for these assumptions. In view of the 400% increase in Port truck traffic that the EIS predicts, the assumptions of emission reductions are nothing more than wishful thinking.

V. The traffic and air quality data in the EIS are presented in a way that is incomprehensible to a lay reader.

OB6-17

An EIS/EIR is not supposed to be readable only by experts, but rather is supposed to inform the public and elected officials. This document fails to meet this standard with respect to the traffic and air quality data presented.

OB6-18

The EIS itself does not show the source of its traffic data nor the methodology for its estimates of future traffic. It was not until several communications with CalTrans staff and a conference call, and the late-September publication on the internet of the Final Traffic Study, did some of this information become apparent – and then only after explanation by a Project consultant, Mahmoud Ahmadi, who has a Ph.D in Engineering Mechanics. For example, as Dr. Ahmadi explained, to calculate the 2030 projected port truck traffic volume over the Schuyler Heim Bridge – a figure that, inexplicably, is not presented anywhere in the EIS – a reader has to go to the otherwise-incomprehensible map on page 34 of the Final Traffic Study, look at the columns of numbers just above the symbol for SR 47, add up the two numbers in the middle of the three rows of numbers, and then multiply the result by 10 to obtain the Traffic Study's estimate of 28,000 daily Port truck trips over the Bridge in 2030.

OB6-19

Almost all of the data in the EIS, the Traffic Study and the Air Quality Impacts Technical Study bearing on actual and projected Port truck traffic over the Bridge are equally user-unfriendly. Making matters even worse, the EIS uses different geographic scopes for air quality analyses in different parts of Chapter 3.13, making a coherent reading of the Chapter impossible. There is no way that a lay reader can be expected to understand the data presented and be able to compare it for reasonableness to other traffic information or projections, for example from the Ports themselves or from the Southern California Association of Governments ("SCAG").

[13] Taking the EIS methodology at face value, Table 3.13-5 predicts, for the no build alternative, reductions in CO of 81%, NOx 86%, ROG 80%, SOx 70%, PM_{10} 21%, and $PM_{2.5}$ 34%.

specific data and analysis. Therefore, these sections tend to be more technical than other sections of the environmental document. In an effort to reduce the technicality, in this final document, some of the traffic figures have been converted to tables for easy review by the general public. Please see the traffic section of the final document (Section 3.5) for references.

Response to Comment OB6-20

The commenter's dissatisfaction with the lack of response to her questions concerning potential health impacts, immediately following the public hearing, is acknowledged. While the comments were noted, it was not possible from a timing standpoint, nor was it required, to provide a response to those comments prior to the close of the public review period.

The public hearing on the Draft EIS/EIR was held at Banning's Landing on September 25, 2007. The public hearing provided a venue for all interested parties to comment on the project. While it was not the intent of, nor required of, Caltrans and ACTA to provide a rebuttal to questions or comments raised in the meeting, where possible, the lead agency and its technical consultants provided good faith responses, based on objective technical analysis and sound environmental planning practice. In addition, they conducted ongoing dialogues with interested parties throughout the public comment period. It is noted that, although responses to the initial inquiries were not sent to the commenter before October 16, 2007, they were sent before the end of the extension period that was granted to the commenter.

OB6-20 Moreover, CalTrans, the lead agency for the EIS, has been slow and balky in responding to public questions about the EIS. One of the undersigned (David Pettit) participated in a conference call with CalTrans and its EIS subcontractors (and counsel) on October 5, 2007, during which many questions posed about the EIS could not be answered. Following up the call, written questions were submitted to CalTrans (and its counsel) nine days before the October 16, 2007 EIS comment deadline. No substantive response has been received as of the date and time this letter is being submitted. Other members of the public have had similar experiences. This is not the nature or quality of public participation that CEQA requires.

VI. The EIS does not propose any mitigation measures for the projected 400% increase in diesel trucks using the Project.

OB6-21 Incredibly, although the EIS projects a 378% increase in diesel truck traffic, and a 400% increase in diesel truck traffic over the Schuyler Heim Bridge[16], there are no mitigation measures proposed for the Project after construction is completed. EIS at 3.13-38, Section 3.13.4.2.2.1. This is apparently because the EIS concluded that there will be "a predicted decrease in vehicle miles traveled (VMT) in the study area for 2011, 2015 and 2030." EIS at 3.13-12, Section 3.13.3.4.1.1.[17]

OB6-22 Regardless of whether VMT will decrease "in the study area," the EIS's own figures show that Port truck traffic going over the Schuyler Heim Bridge will quadruple by 2030. CEQA demands that the air quality impacts from that fourfold increase be quantified and that reasonable mitigation be proposed. Not having done that, the EIS is legally invalid and must be scrapped.

OB6-23 **VII. The EIS's Measures for Mitigating Construction Impacts are Insufficient.**

We are deeply concerned that construction of the proposed project, including mitigation, would exceed SCAQMD emission thresholds for NO_x, SO_x, PM_{10}, and $PM_{2.5}$ and that offsite ambient concentrations of NO_2, PM_{10}, and $PM_{2.5}$ would all exceed SCAQMD thresholds of significance.

These emissions must be mitigated to the maximum extent possible as outlined below. In particular, mitigation measures AQ1--AQ5 and AQ-18A for project construction do not achieve enough emission reductions to keep construction-related emissions below the

[16] Compare Traffic Study, page 14, with Traffic Study, page 34, keeping in mind Dr. Ahmadi's explanation of how to decipher the figures that appear there.
[17] Although there is no apparent source for this statement and the accompanying Table 3.13-5 in the EIS, the emission figures appear to come from Appendix L of the Air Quality Impacts Technical Study which, as noted above, is based on incorrect data run through an antiquated model.

Response to Comment OB6-21

The 378 percent or 400 percent increase in Port truck traffic referenced by the commenter is the increase in traffic volumes projected by the Ports for 2030 compared to existing traffic volumes. The impact the SR-47 Expressway would have on local traffic patterns is determined by comparing conditions in 2030 under the No Project alternative (2030 Base Alternative), where there would be no expressway, to conditions in 2030 with Alternative 1, where the SR-47 Expressway would be in operation. Figures 3.5-7, 3.5-8, and 3.5.9 of the Draft and the Final EIS/EIR illustrate the 2030 truck volumes on the Schuyler Heim Bridge, comparing conditions under Alternative 1 with conditions under the No Project alternative (Base Alternative). As shown, when compared to the No Project alternative, Alternative 1 would result in a projected increase in truck volumes of 15 percent, 11 percent, and 18 percent for the AM, MD, and PM peak hours, respectively.

For the purpose of improving traffic operation of the new bridge under Alternative 1, the following mitigations will be implemented as part of the proposed project: 1) A direct ramp from eastbound Ocean Boulevard to northbound SR-47 (flyover); and 2) the addition of an auxiliary lane in the southbound direction of the new bridge. These project elements are described in the Draft and the Final EIS/EIR Section 2.2.1.1 and illustrated on Figures 2-4b and 2-6.

See Response to Comments AJ17-12 for measures to reduce emissions from port-related trucks, and OB14-7 and TR2-20 for the reduction in health risk estimated to result from the implementation of these measures.

Response to Comment OB6-22

Although Port truck traffic will increase by 2030, this increase would also occur under the No Build alternative, meaning regardless of whether the project is implemented, the Port truck traffic will continue to increase. The emissions from both automobiles and Port trucks, based on VMT for the project study area, are presented in Table 3.13-4. Although the Port truck VMT would increase compared to the baseline condition, emissions in the future would be less than the baseline year (2003) emissions due to current regulations and port initiatives to reduce emissions from port trucks.

The emissions in Table 3.13-4 have been updated to EMFAC2007. Although the numerical values in Table 3.13-4 are higher using EMFAC2007 emission factors for the analysis, the conclusions and comparisons of emissions between the No Build and Build alternatives presented in the Draft EIS/EIR would not change.

Also see Response to Comment OB6-2, OB6-6, OB6-21 and AJ11-4.

Response to Comment OB6-23

See Response to Comment AJ5-13, AJ7-24, and AJ11-21 through AJ11-24.

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significance thresholds. The proposed truck buy-back policy also lacks such important details as how many trucks will be replaced, the amount of money needed, the source of funding, and the projected emissions reductions achieved. We propose that the construction mitigation measures must be improved per the following:

Construction Equipment
Equipment[19] greater than 25 horsepower must:
(1) Meet current emission standards[19] *and*
(2) Be equipped with Best Available Control Technology (BACT)[20] for emissions reductions of PM and NOx, *or*
(3) Use an alternative fuel such as natural gas or biodiesel.[21]

Diesel Trucks
On-road trucks used at construction sites, such as dump trucks, must:
(1) Meet current emission standards, *or*
(2) Be equipped with BACT[22] for emissions reductions of PM and NOx, *and*
(3) Any trucks hauling materials such as debris or fill, must be fully covered while operating off-site (i.e. in transit to or from the site).

Generators
Where access to the power grid is limited, on-site generators must:
(1) Meet the equivalent current off-road standards for NOx , *and*
(2) Meet a 0.01 gram per brake-horsepower-hour standard for PM, *or*
(3) Be equipped with Best Available Control Technology (BACT) for emissions reductions of PM.

Special Precautions Near Sensitive Sites
All equipment operating on construction sites within 1,000 feet of a sensitive receptor site (such as schools, daycares, playgrounds and hospitals)[23] would either:

[19] Equipment refers to vehicles such as excavators, backhoes, bulldozers propelled by an off-road diesel internal combustion engine.
[19] These standards are described in Division 3 Chapter 9, Article 4, Section 2423(b)(1)(A) of Title 13 of the California Code of Regulations, as amended. An explanation of current and past engine standards can also be accessed at http://www.dieselnet.com/standards/. Currently all new equipment are meeting the US EPA Tier II standards and most equipment also meets Tier III standards (an 100HP to 750HP equipment). Note that Tier IV standards would automatically meet the BACT requirement.
[20] Here BACT refers to the "Most effective verified diesel emission control strategy" (VDECS) which is a device, system or strategy that is verified pursuant to Division 3 Chapter 14 of Title 13 of the California Code of Regulations to achieve the highest level of pollution control from an off-road vehicle.
[21] Biodiesel is a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, meeting the requirements of ASTM D 6751.
[22] Here BACT also refers to most effective VDECS as defined by the California Air Resources Board (CARB).
[23] Sensitive sites are defined and described in the CARB Air Quality and Land Use Planning Guidelines, 2005, http://www.arb.ca.gov/ch/landuse.htm

OB6-23

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Response to Comment OB6-24

ACTA has prepared an HRA for the project and its conclusions are included in Final EIS/EIR. The commenter is referred to Response to Comments AJ7-2, AJ11-7 and OB14-7 for a discussion of the HRA's conservative methodology and conclusions.

Response to Comment OB6-25

Project-related impacts are addressed in the 15 environmental resource sections of the Draft and the Final EIS/EIR. Traffic, air, and health risk impacts of ongoing and projected growth at the ports. As shown, the project will generally lessen these traffic, air, and health risk impacts.

Contrary to the commenter's contention, cumulative growth including the proposed SCIG and ICTF projects was considered in the cumulative traffic and air quality analyses and the Health Risk Assessment. All three analyses were completed based on the Port of Long Beach/Port of Los Angeles Transportation Study model developed in 2001, and updated in 2004 for the proposed project and other port area transportation planning.

The commenter also is referred to Response to Comments OB6-2, OB6-11, and OB14-6.

(1) Meet US EPA Tier IV emission standards *or*
(2) Install ARB Verified "Level 3" controls (85% or better PM reductions), and
(3) Notify each of those sites of the project, in writing, at least 30 days before construction activities begin.[24]

Recommendations to Limit Global Warming Pollution from Construction:
(1) Prohibit all non-essential idling of equipment and vehicles onsite.
(2) Use the lowest carbon fuels possible (such as biodiesel or other alternative fuels).
(3) Electrify operations to the extent possible. Where access to the power grid is possible, this should be established instead of using stationary or mobile power generators. All cranes, forklifts and equipment that can be electrified, should be.
(4) All constructed buildings should meet the Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ including the use of locally sourced materials, where possible.[25]

OB6-23

VIII. The EIS does not include a health risk assessment.

OB6-24

When an environmentally significant increase in pollutants that are known to cause health impacts is projected, an EIS/EIR should include a health risk assessment. *See, e.g., Berkeley Keep Jets Over the Bay Committee v. Board of Port Comrs.*, 91 Cal.App.4th 1344, 1363-1371 (2001). Even though the EIS summary admits that: "Health risk concerns are related to the increased diesel truck traffic in proximity to the Wilmington community as a result of a new expressway," and the CEQA section states that traffic over the Bridge will cause an increase in NOx greater than the SCAQMD threshold,[26] no health risk assessment appears in the EIS. That is clear error.

OB6-25

IX. The EIS does not analyze the growth-inducing nature of the Project.

The EIS takes a myopic view of the growth that may be induced by the Project's construction. Regardless of whether the Bridge needs to be rebuilt, the purpose of the SR-47 Expressway is to facilitate the expansion of the Ports by creating an additional diesel truck route where none now exists. Indeed, the EIS Summary admits: "Independent of considerations related to the Schuyler Heim Bridge, an expressway was envisioned as part of a series of regional transportation improvements at the southern end of the Alameda Corridor to provide improved transportation, circulation, and goods movement to and from the Ports of Long Beach and Los Angeles."[27] ACTA's web site describes one of the benefits of the Project as: "Provides alternative route to the existing near-dock rail yard,"

[24] Notification shall include the name of the project, location, extent (acreage, number of pieces of equipment operating and duration), any special considerations (such as contaminated waste removal or other hazards), and contact information for a community liaison who can answer any questions
[25] For information on LEED standards, see the U.S. Green Building Council: http://www.usgbc.org/DisplayPage.aspx?CategoryID=19
[26] EIS at page page 4-4, sec 4.5.1.1.2.
[27] EIS at page S-5, Section S4.1.2.

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Response to Comment OB6-26

A discussion of greenhouse gases has been added to Section 3.13.1.2 and 3.13.2.2 of the Final EIS/EIR.

The commenter is also referred to responses AJ11-32, which discusses the project's potential to result in global warming impacts and project features and mitigation measures that ensure future project and cumulative impacts will be less than significant.

i.e. the ICTF facility.[25] As ACTA well knows, proposals are forthcoming to double the capacity of the ICTF facility and to build another enormous intermodal facility nearby (the SCIG project). In view of these substantial and deliberate growth inducing impacts, not to mention the effect of the other 82 upcoming Ports projects identified in the recent TraPac DEIR, the EIS for the Project needs to analyze the impact of the Project on Port development and the associated increases in traffic, air pollution, health risks, and global warming effects in the area near the Project and in Port area in general.

OB6-25

OB6-26

X. The EIS does not include an analysis of the effects of the Project on global warming, or the effects of global warming on the Project.

As the California Attorney General and many others (including the most recent DEIS/DEIR from the Port of Los Angeles and the United States Army Corps of Engineers) have recognized, CEQA requires an analysis of the global warming impacts of a project. Here, there is none, apparently on the theory that an individual project cannot impact global warming and that no methodology exists to evaluate the impact of a project on global warming. EIS Sections 4.7.1 – 4.7.2.

These excuses are incorrect as matters of law and fact. California has long rejected the argument that environmental analysis can be ignored if the contributions of a project to a large scale problem are small. See, e.g., *Kings County Farm Bureau v. City of Hanford*, 221 Cal.App.3d 692 (1990); *LAUSD v. City of Los Angeles*, 58 Cal.App.4th 1019, 1025 (1997); *Communities for a Better Environment v. Cal Resources Agency*, 103 Cal.App.4th 98, 120 (2002); and *Massachusetts v. EPA*, 127 S.Ct. 1438, 1457 (2007). In *Kings County*, the project proponent sought to build a cogeneration facility and argued that the proper standard for significance under CEQA is defined by the use of the word "incremental" in PRC 21083(b)(2), and thus the analysis should begin and end by measuring the amount by which the individual project would add to air quality problems. Since the facility's emissions would be relatively minor when compared with the existing environment, the proponent argued that the EIR properly concluded the project would have no significant impact on air quality. *Id.* at 720. The Court rejected that argument, holding that:

> "We find the analysis used in the EIR and urged by [the project proponent] avoids analyzing the severity of the problem and allows the approval of projects which, when taken in isolation, appear insignificant, but when viewed together, appear startling. Under [the proponent's] "ratio" theory, the greater the overall problem, the less significance a project has in a cumulative impacts analysis. We conclude the standard for a cumulative impacts analysis is defined by the use of the term "collectively significant" in Guidelines section 15355 and the analysis must assess the collective or combined effect of energy development. The EIR improperly focused upon the individual project's relative effects and omitted facts relevant to an

[25] http://www.acta.org/projects_planning_SR47.htm

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analysis of the collective effect this and other sources will have upon air quality." *Id.* at 721.[29]

Similarly, in *LAUSD v. City of Los Angeles*, a case involving the cumulative impacts of noise at a new high school, the Court, relying on *Kings County*, stated: "Assessment of a project's cumulative impact on the environment is a critical aspect of the EIR. " 'One of the most important environmental lessons evident from past experience is that environmental damage often occurs incrementally from a variety of small sources. These sources appear insignificant, assuming threatening dimensions only when considered in light of the other sources with which they interact.' "

Notably, in *Massachusetts v. EPA*, the Supreme Court specifically rejected the EPA's argument that the plaintiffs had no standing because, under the de minimis rule, the redressibility requirement for Article III standing was not met. The Court wrote: "But EPA overstates its case. Its argument rests on the erroneous assumption that a small incremental step, because it is incremental, can never be attacked in a federal judicial forum."

This is not to say that California recognizes a "one molecule" rule for significance. In *Communities for a Better Environment v. Cal Resources Agency*, 103 Cal.App.4th 98, 120 (2002), the Court recognized that: "In the end, the greater the existing environmental problems are, the lower the threshold should be for treating a project's contribution to cumulative impacts as significant." However, the Court also explained: "This does not mean, however, that *any* additional effect in a nonattainment area for that effect *necessarily* creates a significant cumulative impact; the "one [additional] molecule rule" is not the law." *Id.* at 119. For what it's worth, a single pound of CO_2 contains 6.21×10^{24} molecules.

Here, with proper modeling, the additional CO2 emissions caused by a quadrupling of truck traffic over the Bridge can be estimated. Moreover, the potential effects of global warming such as an increase in sea levels and an increase in temperature may have an effect on the Project can and should be considered. At minimum, the EIS should analyze the effect of the Project on compliance with AB32, California Executive Order S-3-05 (which requires all State agencies to "consider and implement strategies to reduce their greenhouse gas emissions"), and the global warming / climate change action plan prepared by the Villaraigosa administration in May, 2007.

OB6-26

[29] CEQA Guidelines Section 15355, headed "Cumulative Impacts," reads:
"Cumulative impacts" refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.
(a) The individual effects may be changes resulting from a single project or a number of separate projects.
(b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

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XI. Conclusion

We appreciate the opportunity to review the EIS. We hope that ACTA and CalTrans will continue to solicit input from environmental and community groups in subsequent versions of this EIS.

Sincerely,

David Pettit
Senior Attorney
Natural Resources Defense Council

Tom Plenys
Research and Policy Manager
Coalition for Clean Air

Colleen Callahan
Advocacy Manager
American Lung Association

Robina Suwol
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California Safe Schools

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Communities for Clean Ports

Angelo Logan
East Yard Communities
for Environmental Justice

Lillian Light
President
Environmental Priorities Network

Frank O'Brien
Executive Director
Harbor Watts Economic Development
Corporation

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Elina Green
Project Manager
Long Beach Alliance For Children With Asthma

Dr. John G. Miller
Community Advisory Committee for the San Pedro and Peninsula Homeowners Coalition

cc: Karl Price (via email only: karl_price@dot.ca.gov)

Letter OB9. Signatory – University of Southern California, Southern California Environmental Health Sciences Center, Keck School of Medicine

Response to Comment OB9-1

The commenter is referred to Response to Comments OB6-2 and OB6-25 for a discussion of growth, the project, and air pollution.

Response to Comment OB9-2

The commenter is referred to Response to Comment OB4-18 for a discussion regarding the public review and input process of the Draft EIS/EIR and Response to Comment OB4-20 for a discussion of the adequacy of the Draft EIS/EIR.

Community Outreach and Education Program
Southern California Environmental Health Sciences Center
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1540 Alcazar Street CHP 236
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October 16, 2007

Via Email and FAX

Ronald J. Kosinski
Deputy District Director
Division of Environmental Planning
California Department of Transportation District 7
100 South Main Street (MS 16A)
Los Angeles, CA 90012

Re: Heim Bridge Replacement and SR-47 Expressway Project (the "Project")

Dear Mr. Kosinski:

I write to provide comments on the Heim Bridge Replacement and SR-47 Expressway Project (the "Project") Draft Environmental Impact Statement/Environmental Impact Report (the "EIR/EIS"). As stated at the recent public hearing concerning this EIR/EIS, I believe that the Project will increase air pollution through at least a tripling of truck volume, induce port growth and cause potential adverse health effects on nearby residents that will not be mitigated, despite conclusions drawn by Caltrans. I reiterate my comments that the deficiencies in the EIR/EIS, and the process in allowing the public to review it, are so serious, that the EIR/EIS should be withdrawn, rewritten, and recirculated for comment. This is necessary so that the EIR/EIS reflects a true evaluation of the Project's impacts on health. Below, are details of my concerns, including:

OB9-1

OB9-2

1. Many deficiencies in the EIR/EIS, such as
   a. the process of its execution, release, and review;
   b. questions about changing the "scope" of the project midstream; and
   c. key deficiencies, including methodologies for health impact analyses.
2. Current research findings on the health impacts of air pollution and noise that I believe must be considered in the revised EIR/EIS.

My primary concerns about the deficiencies in this document revolve around the potential health impacts from this Project for residents who already live in degraded environmental conditions due to truck, rail, ship and other port-related emissions, in Wilmington, West Long Beach and Carson, and who will be further exposed to diesel exhaust, including its mobile source air toxic components, and to noise as a result of the Project.

Letter OB9. Signatory - University of Southern California, Southern California Environmental Health Sciences Center, Keck School of Medicine
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Response to Comment OB9-3

It is acknowledged that the project will result in air quality and noise impacts during project construction and operation. Appropriate mitigation has been included for identified impacts. The commenter is referred to Table S-1, Section 3.13-Air Quality, 3.14-Noise, and Chapter 4.0-CEQA Evaluation for the avoidance, minimization, and mitigation measures that will be implemented for air quality and noise impacts. It is noted that impacts are mitigated to the extent feasible.

Response to Comment OB9-4

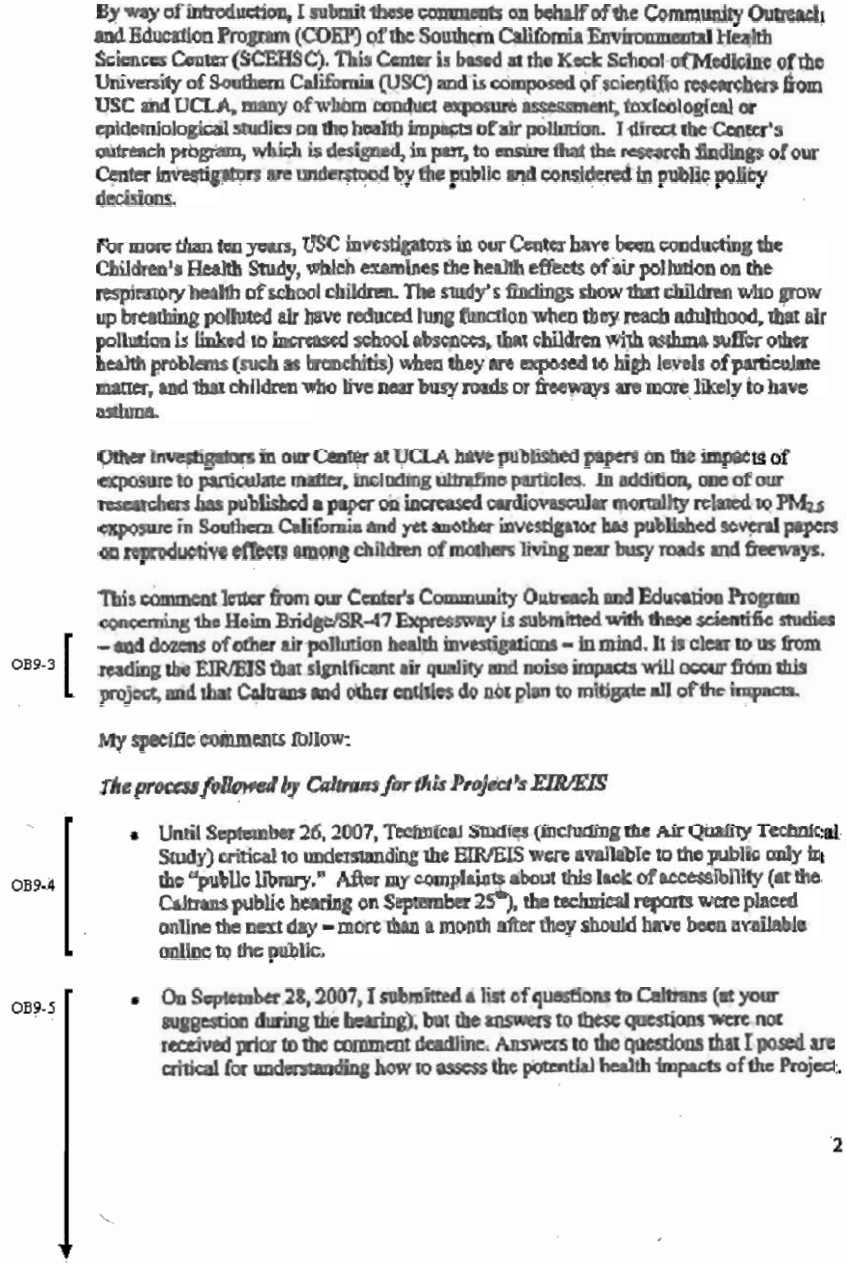
The Draft EIS/EIR informed readers that the technical studies, including the Air Quality Technical Study, were available for review at Caltrans District 7 Headquarters. In addition, technical studies were made available at various libraries in proximity to the proposed project: Carson Regional Library, Victoria Park Library, Compton Library, East Rancho Dominguez Library, Harbor City - Harbor Gateway Branch Library, San Pedro Regional, Wilmington Library, Long Beach Main Library, and Mark Twain Neighborhood Library.

The Notices of Availability, issued August 17, 2007 and November 28, 2008, provided a list of libraries and websites where the Draft EIS/EIR was available for review and provided a contact for those requesting additional information.

Subsequently, the technical studies were made available on-line after the public hearing, at the urging of certain community members. This was done as a good faith response to public comments and is not a requirement of CEQA or NEPA.

Response to Comment OB9-5

The commenter's dissatisfaction with the lack of response to her questions immediately following the public hearing concerning potential health impacts is acknowledged. While the comments were



By way of introduction, I submit these comments on behalf of the Community Outreach and Education Program (COEP) of the Southern California Environmental Health Sciences Center (SCEHSC). This Center is based at the Keck School of Medicine of the University of Southern California (USC) and is composed of scientific researchers from USC and UCLA, many of whom conduct exposure assessment, toxicological or epidemiological studies on the health impacts of air pollution. I direct the Center's outreach program, which is designed, in part, to ensure that the research findings of our Center investigators are understood by the public and considered in public policy decisions.

For more than ten years, USC investigators in our Center have been conducting the Children's Health Study, which examines the health effects of air pollution on the respiratory health of school children. The study's findings show that children who grow up breathing polluted air have reduced lung function when they reach adulthood, that air pollution is linked to increased school absences, that children with asthma suffer other health problems (such as bronchitis) when they are exposed to high levels of particulate matter, and that children who live near busy roads or freeways are more likely to have asthma.

Other investigators in our Center at UCLA have published papers on the impacts of exposure to particulate matter, including ultrafine particles. In addition, one of our researchers has published a paper on increased cardiovascular mortality related to $PM_{2.5}$ exposure in Southern California and yet another investigator has published several papers on reproductive effects among children of mothers living near busy roads and freeways.

This comment letter from our Center's Community Outreach and Education Program concerning the Heim Bridge/SR-47 Expressway is submitted with these scientific studies – and dozens of other air pollution health investigations – in mind. It is clear to us from reading the EIR/EIS that significant air quality and noise impacts will occur from this project, and that Caltrans and other entities do not plan to mitigate all of the impacts.

OB9-3

My specific comments follow:

The process followed by Caltrans for this Project's EIR/EIS

- Until September 26, 2007, Technical Studies (including the Air Quality Technical Study) critical to understanding the EIR/EIS were available to the public only in the "public library." After my complaints about this lack of accessibility (at the Caltrans public hearing on September 25th), the technical reports were placed online the next day – more than a month after they should have been available online to the public.

OB9-4

- On September 28, 2007, I submitted a list of questions to Caltrans (at your suggestion during the hearing), but the answers to these questions were not received prior to the comment deadline. Answers to the questions that I posed are critical for understanding how to assess the potential health impacts of the Project.

OB9-5

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noted, it was not possible from a timing standpoint, nor was it required, to provide a response to those comments prior to the close of the public review period.

The public hearing provided a venue for all interested parties to comment on the project. While it was not the intent of, nor required of, Caltrans and ACTA to provide a rebuttal to questions or comments raised in the meeting, the lead agency and their technical consultants provided a good faith response, based on objective technical analysis and sound environmental planning practice, where possible. In addition, they conducted ongoing dialogues with interested parties throughout the public comment period.

Responses to inquiries at and after the public hearing were provided directly to the commenter. In addition, an extension to the public comment period was provided to the commenter and to others who requested such extension. Additional detail is provided in Response to Comment OB4-18.

Further, per CEQA and NEPA requirements for processing, certification, and approval of a final document, all written comments pertinent to the proposed project and submitted within the public review period have been adequately addressed, using sound science and planning methods. As such, this Final EIS/EIR includes well-reasoned responses to written comments that are relevant to the project.

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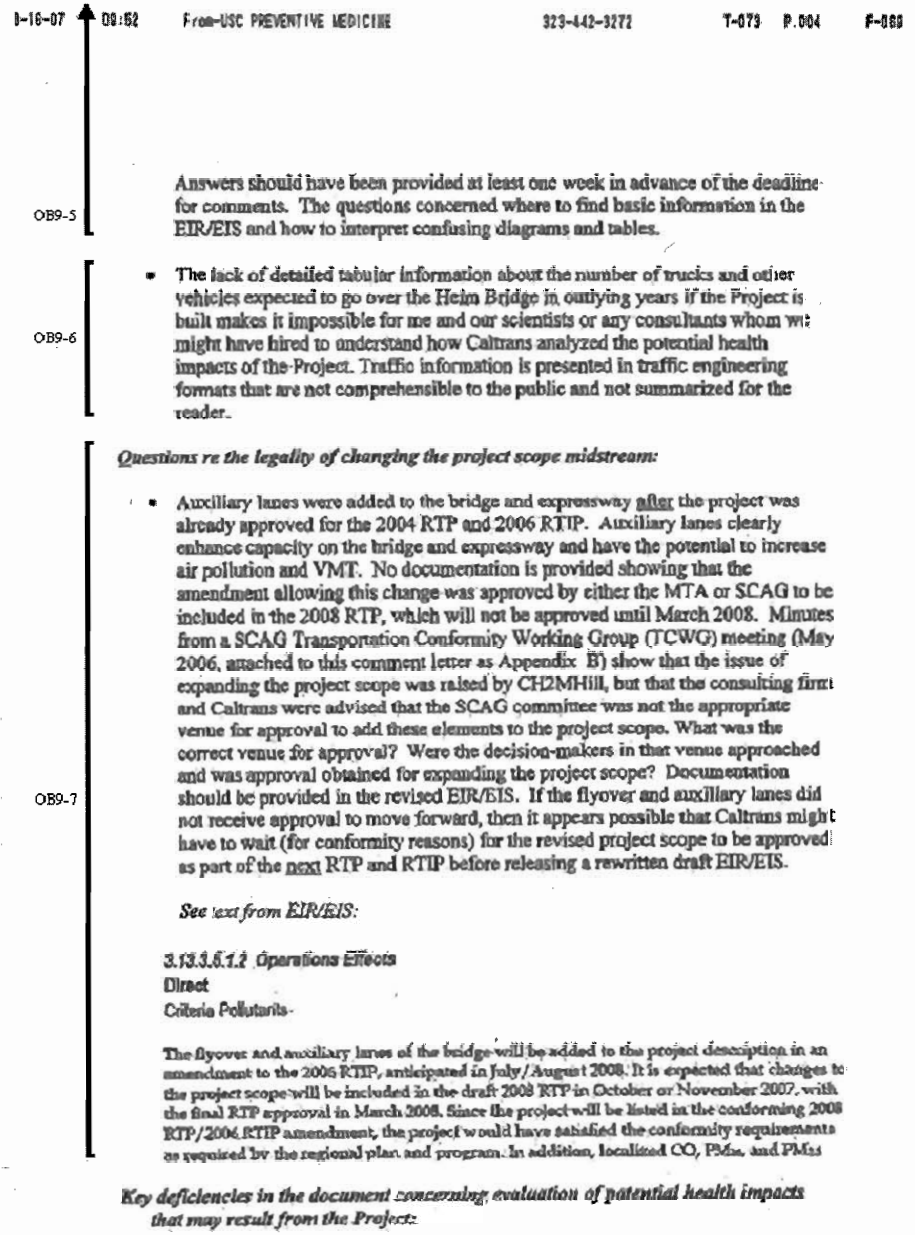
Response to Comment OB9-6

The number of vehicles across the Heim Bridge was provided in Figures 3.5-3, 3.5-10, and 3.5-17 of the Draft and the Final EIS/EIR. The *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study* has been revised to include tables summarizing the traffic data by segment for each analysis year and alternative. This traffic data was used to update the MSAT analysis.

Response to Comment OB9-7

The originally proposed Schuyler Heim Bridge Replacement and SR-47 Expressway (Project ID: LA0D45) was included in the approved SCAG 2006 RTIP and the 2004 RTP, as amended in 2006 by the Metropolitan Transportation Authority (MTA) and the Southern California Association of Governments (SCAG). As the commenter noted, revisions to the scope of the project, namely the addition of auxiliary lanes, has occurred since the original project was approved by the 2006 RTIP and 2004 RTP. SCAG and MTA have been consulted on this project revision. Changes to the project scope have been included in the 2008 RTP and 2008 RTIP. This is noted in Sections 1.1 and 3.13.3.4 of the Final EIS/EIR.

Also see Response to Comment AJ4-12.



9-16-07 09:52 From-USC PREVENTIVE MEDICINE 323-442-3272 T-079 P.004 F-068

OB9-5

Answers should have been provided at least one week in advance of the deadline for comments. The questions concerned where to find basic information in the EIR/EIS and how to interpret confusing diagrams and tables.

OB9-6

- The lack of detailed tabular information about the number of trucks and other vehicles expected to go over the Heim Bridge in outlying years if the Project is built makes it impossible for me and our scientists or any consultants whom we might have hired to understand how Caltrans analyzed the potential health impacts of the Project. Traffic information is presented in traffic engineering formats that are not comprehensible to the public and not summarized for the reader.

OB9-7

Questions re the legality of changing the project scope midstream:

- Auxiliary lanes were added to the bridge and expressway after the project was already approved for the 2004 RTP and 2006 RTIP. Auxiliary lanes clearly enhance capacity on the bridge and expressway and have the potential to increase air pollution and VMT. No documentation is provided showing that the amendment allowing this change was approved by either the MTA or SCAG to be included in the 2008 RTP, which will not be approved until March 2008. Minutes from a SCAG Transportation Conformity Working Group (TCWG) meeting (May 2006, attached to this comment letter as Appendix B) show that the issue of expanding the project scope was raised by CH2MHill, but that the consulting firm and Caltrans were advised that the SCAG committee was not the appropriate venue for approval to add these elements to the project scope. What was the correct venue for approval? Were the decision-makers in that venue approached and was approval obtained for expanding the project scope? Documentation should be provided in the revised EIR/EIS. If the flyover and auxiliary lanes did not receive approval to move forward, then it appears possible that Caltrans might have to wait (for conformity reasons) for the revised project scope to be approved as part of the next RTP and RTIP before releasing a rewritten draft EIR/EIS.

See text from EIR/EIS:

3.13.3.6.1.2 Operations Effects
Direct
Criteria Pollutants

The flyover and auxiliary lanes of the bridge will be added to the project description in an amendment to the 2006 RTIP, anticipated in July/August 2008. It is expected that changes to the project scope will be included in the draft 2008 RTP in October or November 2007, with the final RTP approval in March 2008. Since the project will be listed in the conforming 2008 RTP/2006 RTIP amendment, the project would have satisfied the conformity requirements as required by the regional plan and program. In addition, localized CO, PM10, and PM2.5

Key deficiencies in the document concerning evaluation of potential health impacts that may result from the Project:

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Response to Comment OB9-8

The commenter's concerns regarding the number of trucks and proximity to sensitive receptors are acknowledged. Please see Response to Comments AJ7-2, OB6-2, and OB6-22.

Response to Comment OB9-9

See Response to Comment AJ11-2.

Response to Comment OB9-10

The EIS/EIR states in Subsection 3.13.3.4.1.3 that the PM_{10} hotspot analysis, not the $PM_{2.5}$ analysis, was completed prior to the March 2006 EPA guidance. As stated in the EPA *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (March 2006) on page 2, "any PM_{10} hot-spot analysis that was started prior to this release…may be completed with the previous guidance." Therefore, the PM_{10} hot-spot analysis was completed following previous guidance in the Draft EIR/EIS. However, according to 40 CFR 93.104(d), conformity must be re-determined if there is a three-year lapse since initiation of the environmental document for air quality purposes. Since final approval of the proposed project is expected beyond March 2009, the PM_{10} hot-spot analysis has been updated to follow the March 2006 guidelines.

The $PM_{2.5}$ hot-spot analysis was performed following the March 2006 guidance and followed the interagency consultation process and was submitted to the SCAG TCWG for review. The $PM_{2.5}$ hotspot analysis was completed to demonstrate transportation conformity of the project. The EPA did not make attainment designations based on the new $PM_{2.5}$ standard until December 2008 so the old $PM_{2.5}$ standard is used to make conformity determinations until one year after the designations have been approved or December 2009.

OB9-8

- The Project will place thousands (~24,000 a day in 2030) of big-rig trucks a day within 100 feet of homes and 700 feet of a school in Wilmington, yet the EIR/EIS claims there will be no significant health impacts, ignoring all current research findings on near-roadway health effects (as documented below with references in Appendix A). It is unwise for Caltrans (even if based on Federal Highway Administration guidance) to wait until the Health Effects Institute finishes a review of the literature on near-roadway effects for the agency to take prudent action to protect children and residents. It would be wise to consider implementing what one scientist has called a "no regrets" strategy.

OB9-9

- Diesel is described as "likely to be carcinogenic to humans." In fact, diesel particulate matter has been named a Toxic Air Contaminant in California based on its carcinogenicity, and this designation should be reflected in the EIR/EIS.

OB9-10

- The EIR/EIS states that the PM2.5 hot spots analysis was completed "prior to the release of March 2006 guidance" by U.S. EPA, the excuse provided for why the EIR/EIS relies on older (2005) guidance. This is clearly unacceptable. The consultant had 17 months in which to complete a new PM2.5 hot spots analysis using the more current March 2006 guidance. A new analysis using current guidance must be included in the revised EIR/EIS. Moreover, the localized PM2.5 impact analysis is based on an outdated U.S. EPA standard (65ug/m3) that was changed to 35 ug/m3 on December 17, 2006. The analysis must be redone using the current U.S. EPA standard, especially since this project is slated to be in the 2008 RTP. The U.S. EPA standard was revised to 35ug/m3 because that standard for PM2.5 is more health-protective.

OB9-11

- The EIR/EIS states that the PM10 impact analysis is based on an outdated U.S. EPA standard for PM10 that was revoked on December 17, 2006. The PM10 analysis also must be redone.

OB9-12

- Exposure to mobile source air toxics (MSATs) is a serious health concern. It appears that the MSAT analysis failed to utilize readily available air dispersion models. In addition, the traffic engineering data and the project analysis data used for the MSAT analysis are not understandable and are not presented in a comprehensible, tabular format. At a conference call in early October that included representatives from CH2MHill and Caltrans, no one from the consulting firm or the agency could even identify the units in the following table, making in impossible for us to review the analysis:

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Response to Comment OB9-11

See Response to Comment OB9-10.

Response to Comment OB9-12

See Response to Comment AJ7-2.

Response to Comment OB9-13

The MSAT analysis presented in Section 3.13.3.4.2 of the Final EIS/EIR has been updated with revised traffic data.

In response to comments received on the Draft EIR/EIS, ACTA prepared an HRA, which was included in the Supplemental Draft Environmental Impact Statement/ Recirculated Draft Environmental Impact Report, released in November 2008, and incorporated in this Final EIS/EIR. Please see Response to Comments AJ7-2, AJ11-7, and OB14-7.

Response to Comment OB9-14

The monitoring data presented in the Draft and the Final EIS/EIR are from stations with long-term data maintained and reported by CARB. The Port of Long Beach monitoring data represents only one year of data. Therefore, any conclusions made using this ambient air quality data would be based on short-term meteorological trends.

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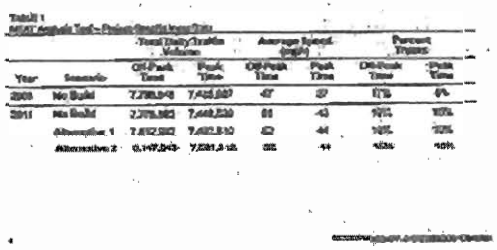
OB9-12



OB9-13

- In addition, the EIR/EIS states that commenters requested a Health Risk Assessment, but that a Mobile Source Air Toxics (MSAT) analysis was done instead. An HRA is needed, as well as a properly-conducted MSAT "hot spots" analysis. Moreover, the MSAT analysis appears to rely on flawed traffic forecast data.

OB9-14

- Air monitoring data from North Long Beach were used in the EIR/EIS, but air monitoring data from the Port of Long Beach (which is closer in location and which also shows a large number of exceedances) were not used. See figures below on PM2.5 and PM10 at the Inner Harbor monitoring station of the Port of Long Beach (one year of data, September 1, 2006 to September 1, 2007.

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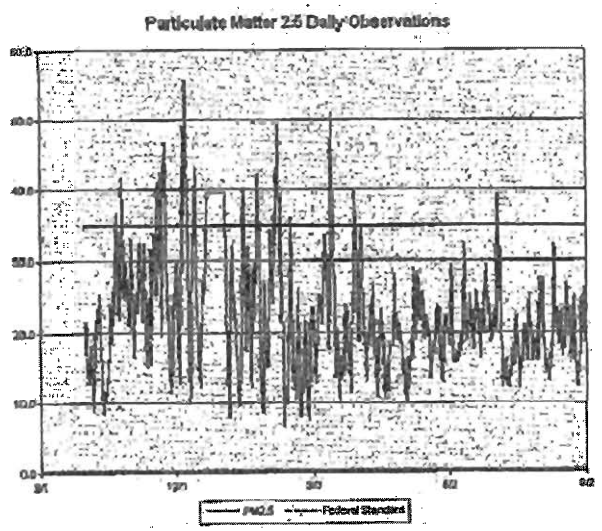

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OB9-14

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Response to Comment OB9-15

The commenter is referred to Response to Comment AJ7-21 for a discussion on the use of CARB data for Wilmington Park Elementary School.

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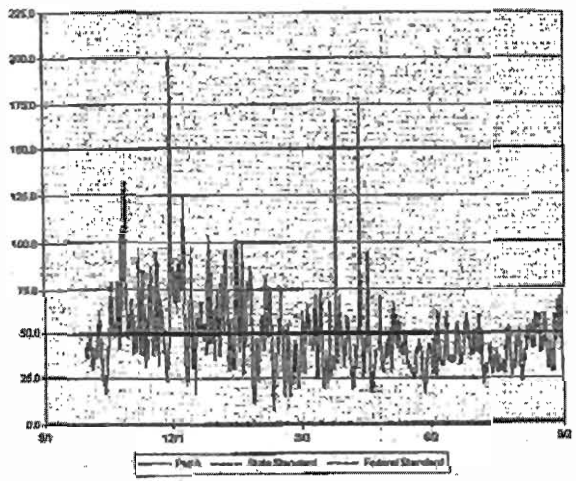

OB9-14 Citation for both graphs above: Port of Long Beach air quality monitoring data, 9/1/2006-9/1/2007 "Inner Harbor" from www.polb.org

OB9-15 • Wilmington Park Elementary School is within 700 feet of the planning SR-47 Expressway. With regard to air toxics, information from sampling conducted in 2002 at Wilmington Park Elementary School by the California Air Resources Board should have been considered. The sampling shows higher levels of benzene and 1,3-butadiene in the Wilmington Park School area than in central Los Angeles during the same seasons. The sampling also shows higher levels of fine particulate at Wilmington Park Elementary School than in downtown L.A. during the same season. See graphs below.

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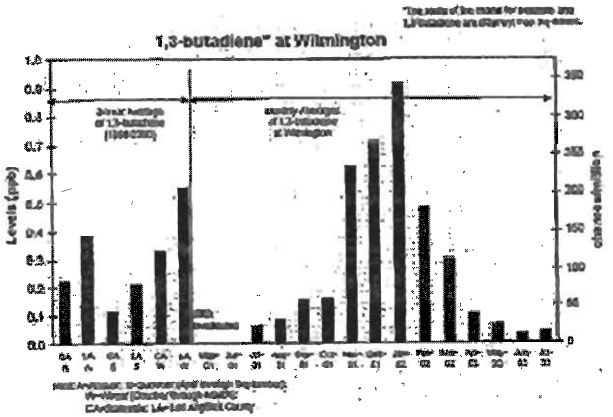

Citation for above 1,3-butadiene graph:
http://www.arb.ca.gov/ch/aq_result/wilmington/wm_buta_graph.pdf

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OB9-15

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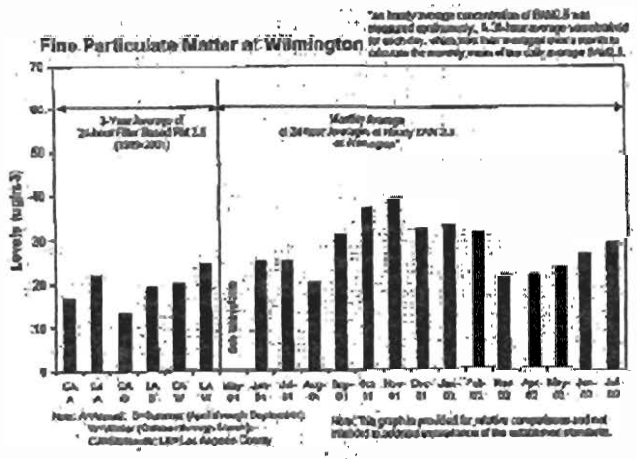
Response to Comment OB9-16

Your opposition to Alternative 2 is noted. The SCAQMD monitoring data from Hudson School was reviewed and has been included to establish the existing setting in Section 3.13.2.2 of the Final EIS/EIR.

See Response to Comment EO1-5.

6-18-07 10:59 From-USC PREVENTIVE MEDICINE 323-442-3272 T-071 P.010



OB9-15 Citation for above graph "Fine Particulate Matter at Wilmington": http://www.arb.ca.gov/ch/aq_result/wilmington/wm_pm25_graph.pdf

OB9-16

- Also not reviewed are ~10 years of air quality monitoring data from sampling conducted by the South Coast AQMD Hudson School – directly across from Alternative 2. The air monitoring at Hudson School consistently shows elemental carbon levels much higher than for other area schools. SR-103 is adjacent to Hudson School, with trucks on it mostly heading to the UP Intermodal Container Transfer Facility (ICTF). Alternative 2 is basically a state expressway designed to speed trucks to a private facility, the UP ICTF. This Alternative would add more pollution to the Hudson School area because of greatly increased volume of trucks on the flyover and increased volume of idling trucks (as well as more locomotives) at the UP ICTF. These are not accounted for in the EIR/EIS. Please consider withdrawing this alternative altogether because it would further impact Hudson School and the neighborhoods of West Long Beach.

- The summary of the Project Benefits on the www.acta.org home page states the following:

  Project Benefits

  1. Replaces the seismically-deficient Schuyler Heim moveable bridge with a new safer fixed bridge

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Response to Comment OB9-17

As the commenter indicated, the expanded I-710 Freeway project would be required to comply with NEPA and CEQA laws and regulations. As such, an analysis of construction and operations impacts associated with development of that project would be conducted independently of this project. A discussion of the effects of the I-710 Freeway project is outside of the scope of this environmental evaluation.

Response to Comment OB9-18

The commenter's concern is acknowledged and clarified in Response to Comment OB14-6.

Response to Comment OB9-19

To analyze the traffic impact of the proposed SR-47 Expressway, the Ports Transportation Model, a travel demand forecasting model, was used to forecast the auto and truck volumes on the local roadway network. The travel demand model assigns autos and trucks onto the network based on the most feasible and available routes and then generates/forecasts the traffic volumes on local streets and nearby freeways. The model was run both with and without the SR-47 Expressway for AM, MD, and PM peak hours. The results were compared across major corridors and are presented in Figures 3.5-7, 3.5-8, and 3.5-9 of the Draft and the Final EIS/EIR. As shown on the figures, results indicate that, with the SR-47 Expressway, Port truck volumes are reduced between 2 percent and 11 percent on I-110 and I-710, respectively.

Additional information regarding the model is provided in the Traffic Study (see Traffic Volume Development, page 8).

2. Creates an expressway between Ocean Blvd. on Terminal Island and Alameda St. at Pacific Coast Highway
3. Enhances mobility on local freeways by diverting 5-8% of the port-related trucks
4. Diverts trucks from certain local arterials and commercial and residential areas
5. [redacted]
6. [redacted]
7. Eliminates traffic conflicts at 5 at-grade rail crossings and 3 traffic signals

OB9-17

- With regard to Project benefit #5, there is no analysis in the EIR/EIS evaluating potential impacts on local residents of the SR-47 Expressway being used as a type of mitigation measure for truck traffic during the proposed I-710 Freeway expansion construction project. Caltrans must do an analysis of how many additional trucks will be using the Heim Bridge and SR-47 Expressway during the years of construction of an expanded I-710 Freeway.

OB9-18

- With regard to Project benefit #6, we note that nowhere in the document is there a discussion of the expansion of the UP ICTF and building of a new BNSF intermodal facility. [Note that at the October 11th ACTA meeting, someone apparently stated that an analysis of BNSF's proposed facility is included in the EIR/EIS; we have searched carefully and can find no mention of BNSF or the SCIG project in the EIR/EIS, although we welcome being corrected if someone can point us to the correct pages. We do see the BNSF SCIG project on a map in Figure 5-1 "Related Projects in the Vicinity of the Project Alternatives" but nowhere else in the EIR/EIS can we find the SCIG mentioned. Nor can we find any analysis of the proposed UP ICTF expansion and what it means to this Project or this Project means to it, and no analysis of the proposed BNSF SCIG and what that intermodal facility would mean to this Project or this Project would mean to it. Please note, however, that the proposal for the expanded UP ICTF facility (submitted to the Joint Powers Authority) refers to the SR-47 Expressway as an expedited means of trucks reaching its facility.

  These two intermodal projects have been discussed by ACTA and Caltrans for years, but the EIR/EIS fails to analyze the potential growth-inducing properties of the facilities in terms of increasing traffic volumes on the bridge and SR-47 Expressway (and increasing locomotives at the two facilities). Together, the facilities will bring in 3 million containers a year – on the Heim Bridge and SR-47 Expressway, whereas today there are 750,000. The EIR/EIS must analyze the impact of these new facilities on the Project and of the Project on these facilities.

OB9-19

- No analyses are presented to document that trucks will actually be taken off the 110 and 710 freeways as a result of this Project. The statements that these reductions will occur must be based on evidence and that evidence must be provided for evaluation and review.

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Response to Comment OB9-20

The commenter is referred to Response to Comment OB4-42 for a discussion of the EMFAC model used in the air quality analysis.

Response to Comment OB9-21

See Response to Comment AJ8-11.

Response to Comment OB9-22

For discussions related to the Environmental Justice analysis in the EIS/EIR, the commenter is referred to Response to Comments OB4-10, OB4-14, OB4-15, OB4-16, OB4-19, OB4-21, and OB4-25.

OB9-20

- The AQMD recommends using EMFAC 2007, but the EIR/EIS used EMFAC 2002, with a non-persuasive rationale for why the older model was used.

OB9-21

- Impacts from noise and air pollution in Carson after trucks leave the Expressway and exit onto Alameda Street are ignored. The sound walls do not continue into Carson and an analysis of noise levels in that community must be included in the EIR/EIS.

OB9-22

- The EIR/EIS makes a determination that "given the results of technical studies thus far," "no minority or low-income population have been identified that would be adversely affected by the proposed project." (Sec. 3.3.3.4). In light of the demographics of the impacted neighborhoods, their immediate proximity to the Project, and the high volume of truck traffic that will be on the Bridge and Expressway, this required environmental justice analysis appears flawed.

Research findings about air pollution and its health impacts and noise exposure and its health impacts that should be reviewed in the EIR/EIS:

RESEARCH FINDINGS ON HEALTH IMPACTS FROM EXPOSURE TO AIR POLLUTION

A review of the scientific literature on the health impacts of mobile source noise and air pollution shows a growing body of scientific evidence indicating that:

--Children who grow up in polluted communities suffer reduced lung function and other respiratory effects.

USC studies in Southern California show that a package of mobile source pollutants (NOx, PM, acid vapor, and elemental carbon) correlate with reduced lung function. In one USC study, three times as many children in North Long Beach, where levels of elemental carbon (EC) are higher than in most of the communities in the study, had reduced lung function than children in less polluted communities. The study is important because medical experts believe that reduced lung function is a significant predictor of mortality from all causes in adults. The EIR/EIS must describe the USC and other research findings showing the respiratory health effects of mobile source air pollution. *(See Appendix A-1 for citations to scientific articles on this topic).*

--Living or going to school in close proximity to busy roads and freeways (close to mobile source exhaust) is linked to asthma and respiratory effects in children, as well as other effects in adults.

A growing body of evidence shows increased risk of asthma and other respiratory effects from living or going to school in close proximity to busy roads and freeways. *(See Appendix A-2 for citations to scientific articles on this topic).*

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Response to Comment OB9-23

See Response to Comment AJ11-2.

– Elevated levels of particulate matter are linked to cardiovascular disease and increased mortality.

In response to this growing body of evidence, the American Heart Association issued a scientific statement in 2004 concluding: "Exposure to air pollution contributes to the development of cardiovascular diseases." A recent study shows an increase in stroke among those living close to busy roads. Studies on increased cardiovascular disease and mortality from particulate exposure should be reviewed in the EIR/EIS. *(See Appendix A-3 for citations to scientific articles on this topic).*

– Pregnant women who live near busy roads and freeways (and who are exposed to current levels of air pollution in Los Angeles air) are more likely to give birth to low birth weight and premature infants; infant mortality has also been linked to air pollution levels.

Thousands of women of child-bearing age live in the vicinity of the San Pedro Bay Ports or along goods movement corridors in Southern California. Studies on increased reproductive problems and adverse birth outcomes must be described in the EIR/EIS. *(See Appendix A-4 for citations to scientific articles on this topic).*

– Increased lung cancer risks among workers exposed to diesel exhaust, including a recent study on railroad workers.

Based on studies of workers exposed to diesel exhaust, diesel particulate matter was declared a Toxic Air Contaminant in the state of California in 1998. A recent study on diesel and cancer risks authored by Dr. Eric Garshick states:

> *In > 35 studies of workers with occupational exposure to diesel exhaust, excess risk of lung cancer is consistently elevated by 20–50%.... These results [elevated cancer risk in railroad workers] indicate that the association between diesel exhaust exposure and lung cancer is real. These results along with previous studies of lung cancer and diesel exhaust support current efforts to reduce emissions in both occupational and general environmental settings. (See Appendix A-5 for citations to scientific articles on this topic).*

In addition, a cancer study by census tracts, conducted by Dr. Thomas Mack of USC, found an excess of oropharyngeal cancer near the Ports and along the I-710 Freeway, raising questions about diesel exhaust exposures. *(See reference to work by Dr. Thomas Mack in Appendix A-5.)*

OB9-23

– Diesel exhaust particles can enhance allergies and allergic asthma.

The EIR/EIS should describe studies showing the potential for enhancement of allergies and asthma from diesel exhaust emissions from trucks and trains delivering containers to other locations throughout the region. *(See Appendix A-1 for*

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Response to Comment OB9-24

See Response to Comment AJ11-2.

Response to Comment OB9-25

The noise analysis has been prepared in accordance with the Caltrans Traffic Noise Analysis Protocol. It is acknowledged that there is much available research literature related to the health, annoyance, and sleep disturbance effects of noise. In principle, some of such research has been a basis for development of the noise criteria adopted by Caltrans.

10-16-07 09:54 From-USC PREVENTIVE MEDICINE 323-442-3172 T-073 P.014

OB9-23

citations to scientific articles on the topic of diesel and allergies).

OB9-24

– The adverse health impacts of breathing ultrafine particles, including neurological effects.

Appendix A-3 includes citations to emerging data on exposure assessment for, and health effects of, ultrafine particles which should be evaluated in the EIR/EIS.

OB9-25

– Elevated noise levels are linked to worker hearing loss, learning issues in the classroom, as well as to cardiovascular disease and other impacts.

Noise is a significant impact that must be considered in any new projects and we are pleased that Caltrans recognizes that noise impacts will be significant from this project. We request that the final EIR/EIS evaluate the effects of noise on the health of both workers and residents, including hearing loss, cardiovascular disease, stress, sleep patterns, and the potential effects on students' learning. *(See Appendix A-6 for citations to scientific articles on this topic).*

Some of the above-mentioned research can be found in the California Air Resources Board's (CARB) Emission Reduction Plan for Ports and International Trade in California (CARB Emission Reduction Plan), which can be found at: http://www.arb.ca.gov/planning/gmerp/gmerp.htm.

RESEARCH FINDINGS ON THE HEALTH IMPACTS OF EXPOSURE TO NOISE

Noise is a serious, and often dismissed, public health problem, which causes numerous health and social effects, ranging from hearing to cardiovascular problems, and from learning problems in school to sleep disturbances at home. The following four points summarize a number of concerns and a review of the noise exposure and health effects literature should be included in the EIR/EIS.

a. Noise Exposure Causes Health and Psychosocial Impacts

Community and occupational health studies show that noise levels from goods movement activities can impact health and quality of life. For example, excessive noise disturbs restorative sleep; elevated noise levels affect children's mental health and classroom behavior, especially if children have an "early biological risk" (such as having been born prematurely); and chronic noise exposure may contribute to the progression of cardiovascular disease. Additional research findings are provided in Appendix A. Portions of abstracts from several selected studies are reprinted below to illustrate the causes for concern:

a1. "Disturbed Sleep Patterns and Limitation of Noise" by B. Griefahn et al. Noise and Health, Volume 6, Number 22, Jan - Mar 2004, pp. 27-33(7). ABSTRACT. "Due to the undisputable restorative function of sleep, noise-induced

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Response to Comment OB9-26

The commenter is referred to Response to Comments OB6-2 and OB6-22.

sleep disturbances are regarded as the most deleterious effects of noise. They comprise alterations during bedtimes such as awakenings, sleep stage changes, body movements and after-effects such as subjectively felt decrease of sleep quality, impairment of mood and performance.... Intermittent noise that is produced by air traffic, rail traffic and by road traffic during the night is particularly disturbing and needs to be reduced. Suitable limits are suggested."

a2. "Ambient neighbourhood noise and children's mental health" by P. Lercher et al. Occup Environ Med. 2002 Jun;59(6):380-6.
"OBJECTIVES: To investigate the relation between typical ambient noise levels (highway, rail, road) and multiple mental health indices of school children considering psychosocial and biological risk factors as potential moderators. CONCLUSIONS: Exposure to ambient noise was associated with small decrements in children's mental health and poorer classroom behaviour. The correlation between mental health and ambient noise is larger in children with early biological risk."

a3. "Noise burden and the risk of myocardial infarction" by SN Willich et al. Eur Heart J. 2006 Feb;27(3):276-82. Epub 2005 Nov 24.
"METHODS AND RESULTS: In a case-control study, patients consecutively admitted to all 32 major hospitals in Berlin with confirmed diagnosis of acute myocardial infarction were enrolled from 1998 to 2001 in the Noise and Risk of Myocardial Infarction study. Information was obtained on environmental and work noise annoyance. The sound levels of environmental and work noise were assessed using traffic noise maps as proxy and international standards for workplaces, respectively. Environmental sound levels were associated with increased risk in men and women .. CONCLUSION: Chronic noise burden is associated with the risk of myocardial infarction."

a4. "Neighbourhood inequalities in physical inactivity: the role of neighbourhood attractiveness, proximity to local facilities and safety in the Netherlands" by FJ van Lenthe et al. Soc Sci Med. 2005 Feb;60(4):763-75. In a study in the Netherlands, residents who lived in neighborhoods with the most traffic-related noise pollution seldom walked or cycled to shops or work. This study is relevant to residents in noise and traffic-related goods movement communities, especially at a time when obesity is becoming such a serious problem.

OB9-25

CONCLUSION

OB9-26

We are concerned that the California Department of Transportation intends to build a new bridge and port truck expressway that will result in 3-4 x as many trucks on the bridge in 2030 as exist now, with port trucks heading onto an expressway that is specifically designed to move them through East Wilmington, West Long Beach and Carson on their way to the UP or proposed BNSF intermodal facilities and local warehouses – and that the health impacts from the resultant air pollution have not been properly calculated nor are they intended to be mitigated. The proximity of this project to residents will result in potential air quality (and noise) impacts that must be addressed

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Response to Comment OB9-27

The commenter's remark on the Draft EIS/EIR is acknowledged. As noted in various responses above, the document has been prepared to meet CEQA and NEPA requirements. In response to public comments, ACTA elected to conduct an HRA as part of its funded portion of the proposed project. The methodology and results of the HRA were presented in the SDEIS/RDEIR released November 28, 2008. The public comment period for the SDEIS/RDEIR provided further opportunity for public comment and was extended to January 30, 2009. Additionally, a public hearing on the SDEIS/RDEIR and HRA was held January 27, 2009 at Banning's Landing. See Response to Comment OB4-18.

10-16-07 09:54 From-USC PREVENTIVE MEDICINE 323-442-3272 T-073 P.016

and mitigated in order for this project to be considered. If the project proceeds, we request that the most intensive efforts be made to mitigate all environmental health impacts, including during construction and future operations. OB9-26

Finally, due to the significant deficiencies in the EIR/EIS, we again request that it be rewritten and recirculated for public comment. OB9-27

Looking at this document in a broader perspective, I urge Caltrans to take the health and air pollution concerns of our group and others seriously, especially at a time when the California Department of Transportation is about to embark on a large freeway building/highway expansion campaign statewide using 1B Trade Corridor Improvement Fund bond money.

On behalf of our Community Outreach and Education Program, I would be happy to arrange a meeting of our research scientists with you and District 7 staff (and your consultants) to discuss appropriate ways to examine the current research findings on the health effects of air pollution, including near-road effects, and to discuss other analytical tools that would might facilitate your work on upcoming EIR/EIS analyses for future projects. For example, our Center's research scientists could assist Caltrans staff in understanding the emerging evidence on the health effects of exposure to ultrafine particles, which are not even mentioned in the EIR/EIS. [One of our scientists was accepted an invitation to do a similar briefing for the Port of L.A. Board of Harbor Commissioners and Port staff.] We are happy to provide an in-house briefing of Caltrans leadership and staff on the latest scientific research findings in hopes that such a training would facilitate your work on upcoming EIR/EIS analyses for projects.

Thank you for considering these comments.

Sincerely,

Andrea Hricko
Director, Community Outreach and Education
Southern California Environmental Health Sciences Center
Keck School of Medicine
University of Southern California

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APPENDIX A: Health Impact Studies

Appendix A-1: Respiratory and Children's Health Study

Barck, C., J. Lundahl, et al. (2005). "Brief exposures to NO2 augment the allergic inflammation in asthmatics." Environ Res 97(1): 58-66.

Delfino, R. J. (2002). "Epidemiologic evidence for asthma and exposure to air toxics: linkages between occupational, indoor, and community air pollution research." Environ Health Perspect 110 Suppl 4: 573-89.

Gauderman, W. J., R. McConnell, et al. (2000). "Association between air pollution and lung function growth in southern California children." Am J Respir Crit Care Med 162(4 Pt 1): 1383-90.

Gauderman, W. J., E. Avol, et al. (2004). "The effect of air pollution on lung development from 10 to 18 years of age." N Engl J Med 351(11): 1057-67.

Gauderman, W. J., E. Avol, et al. (2005). "Childhood asthma and exposure to traffic and nitrogen dioxide." Epidemiology 16(6): 737-43.

Gauderman, W. J. (2006). "Air Pollution and Children – An Unhealthy Mix." N Engl J Med 355(1): 78-79.

Gilliland, F. D., K. Berhane, et al. (2001). "The effects of ambient air pollution on school absenteeism due to respiratory illnesses." Epidemiology 12(1): 43-54.

Hall, J. V., V. Brajer, et al. (2003). "Economic valuation of ozone-related school absences in the South Coast Air Basin of California." Contemporary Economic Policy 21: 407-417.

Künzli, N., R. McConnell, et al. (2003). "Breathless in Los Angeles: the exhausting search for clean air." Am J Public Health 93(9): 1494-9.

McConnell, R., K. Berhane, et al. (2002). "Asthma in exercising children exposed to ozone: a cohort study." Lancet 359(9304): 386-91.

McConnell, R., K. Berhane, et al. (2003). "Prospective Study of Air Pollution and Bronchitic Symptoms in Children with Asthma." Am J Respir Crit Care Med 168(7): 790-797.

McConnell, R., et al. (2006). "Traffic, Susceptibility, and Childhood Asthma." Environ Health Perspect 114(5): 766–772.

Pandya, R. J., G. Solomon, et al. (2002). "Diesel exhaust and asthma: hypotheses and molecular mechanisms of action." Environ Health Perspect 110 Suppl 1: 103-12.

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Peden, D. B. (2002). "Pollutants and asthma: role of air toxics." Environ Health Perspect 110 Suppl 4: 565-8.

Pietropaoli, A. P., M. W. Frampton, et al. (2004). "Pulmonary function, diffusing capacity, and inflammation in healthy and asthmatic subjects exposed to ultrafine particles." Inhal Toxicol 16 Suppl 1: 59-72.

Appendix A-2: Traffic proximity

Brauer, M., G. Hoek, et al. (2002). "Air pollution from traffic and the development of respiratory infections and asthmatic and allergic symptoms in children." Am J Respir Crit Care Med 166(8): 1092-8.

Brunekreef, B. and J. Sunyer (2003). "Asthma, rhinitis and air pollution: is traffic to blame?" Eur Respir J 21(6): 913-5.

Cyrys, J., J. Heinrich, et al. (2003). "Comparison between different traffic-related particle indicators: elemental carbon (EC), PM2.5 mass, and absorbance." J Expo Anal Environ Epidemiol 13(2): 134-43.

Gauderman, W.J. et al. (2007) "Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study." Lancet 369(9561):571-7.

Gilliland, F., Saxon,A; Díaz-Sanchez, D. (2004). "Effect of glutathione-S-transferase M1 and P1 genotypes on xenobiotic enhancement of allergic responses: randomised, placebo-controlled crossover study." Lancet 363: 119.

Green, R. S., S. Smorodinsky, et al. (2004). "Proximity of California public schools to busy roads." Environ Health Perspect 112(1): 61-6.

Lee, Y. L., C. K. Shaw, et al. (2003). "Climate, traffic-related air pollutants and allergic rhinitis prevalence in middle-school children in Taiwan." Eur Respir J 21(6): 964-70.

Nicolai, T., D. Carr, et al. (2003). "Urban traffic and pollutant exposure related to respiratory outcomes and atopy in a large sample of children." Eur Respir J 21(6): 956-63.

van Vliet, P., M. Knape, et al. (1997). "Motor vehicle exhaust and chronic respiratory symptoms in children living near freeways." Environ Res 74(2): 122-32.

Zhu, Y., W. C. Hinds, et al. (2002). "Study of ultrafine particles near a major highway with heavy-duty diesel traffic." Atmospheric Environment 36: 4323-4335.

Zhu, Y., W. C. Hinds, et al. (2002)(2). "Concentration and Size Distribution of Ultrafine Particles Near a Major Highway." J Air & Waste Manage Assoc 52:1032-1042.

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Appendix A-3: Particulate Matter

Chalupa, D. C., P. E. Morrow, et al. (2004). "Ultrafine particle deposition in subjects with asthma." Environ Health Perspect 112(8): 879-82.

Charron, A. and R. M. Harrison (2003). "Primary particle formation from vehicle emissions during exhaust dilution in the roadside atmosphere." Atmos Environ.

Delfino, R. J., C. Sioutas, et al. (2005). "Potential role of ultrafine particles in associations between airborne particle mass and cardiovascular health." Environ Health Perspect 113(8): 934-46.

Environmental Protection Agency (2004). "Air Quality Criteria for Particulate Matter Providing the Scientific Foundation for EPA Decision Making." Volumes 1 and 2.

Fruin, S. A., A. M. Winer, et al. (2004). "Black carbon concentrations in California vehicles and estimation of in-vehicle diesel exhaust particulate matter exposures." Atmos Environ 38:4123-4133.

Garshick, E., F. Laden, et al. (2004). "Lung cancer in railroad workers exposed to diesel exhaust." Environ Health Perspect 112(15): 1539-43.

Hauck, H., A. Berner, et al. (2003). "AUPHEP—Austrian Project on Health Effects of Particulates—general overview." Atmos Environ

Health Effects Institute (HEI) (2003). "Research on Diesel Exhaust and Other Particles." Lippmann, M., M. Frampton, et al. (2003).

"The U.S. Environmental Protection Agency Particulate Matter Health Effects Research Centers Program: a midcourse report of status, progress, and plans." Environ Health Perspect 111(8): 1074-92.

Mudway, I. S., N. Stenfors, et al. (2004). "An in vitro and in vivo investigation of the effects of diesel exhaust on human airway lining fluid antioxidants." Arch Biochem Biophys 423(1): 200-12.

Nikasinovic, L., I. Momas, et al. (2004). "A review of experimental studies on diesel exhaust particles and nasal epithelium alterations." J Toxicol Environ Health B Crit Rev 7(2): 81-104.

Salmon, L. G., P. R. Mayo, et al. (2004). "Determination of Elemental Carbon and Organic Carbon Concentrations During the Southern California Children's Health Study, 1999-2001."

Saxon, A. and D. Diaz-Sanchez (2000). "Diesel exhaust as a model xenobiotic in allergic inflammation." Immunopharmacology 48(3): 325-7.

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Saxon, A. and D. Diaz-Sanchez (2005). "Air pollution and allergy: you are what you breathe." Nat Immunol 6(3): 223-6.

Froines, J. R. (2006). "Health Effects of Airborne Particulate Matter." Presentation to the Southern California Association of Governments May 17, 2006.

Siegel, P. D., R. K. Saxena, et al. (2004). "Effect of diesel exhaust particulate (DEP) on immune responses: contributions of particulate versus organic soluble components." J Toxicol Environ Health A 67(3): 221-31.

Singh, M., H. C. Phuleria, et al. (2005). "Seasonal and spatial trends in particle number concentrations and size distributions at the children's health study sites in Southern California." J Expo Anal Environ Epidemiol.

Sioutas, C. (2003). "Results from the Research of the Southern California Particle Center and Supersite (SCPCS)."

Sioutas, C., R. J. Delfino, et al. (2005). "Exposure assessment for atmospheric ultrafine particles (UFPs) and implications in epidemiologic research." Environ Health Perspect 113(8): 947-55.

Wallace, L. A., H. Mitchell, et al. (2003). "Particle concentrations in inner-city homes of children with asthma: the effect of smoking, cooking, and outdoor pollution." Environ Health Perspect 111(9): 1265-72.

Appendix A-4: Cardiovascular and Neurologic

Hong, Y. C., J. T. Lee, et al. (2002). "Effects of air pollutants on acute stroke mortality." Environ Health Perspect 110(2): 187-91.

Jerrett, M., R. T. Burnett, et al. (2005). "Spatial analysis of air pollution and mortality in Los Angeles." Epidemiology 16(6): 727-36.

Johnson, R. L., Jr. (2004). "Relative effects of air pollution on lungs and heart." Circulation 109(1): 5-7.

Krewski, D., R. Burnett, et al. (2005). "Mortality and long-term exposure to ambient air pollution: ongoing analyses based on the American Cancer Society cohort." J Toxicol Environ Health A 68(13-14): 1093-109.

Künzli, N., M. Jerrett, et al. (2005). "Ambient air pollution and atherosclerosis in Los Angeles." Environ Health Perspect 113(2): 201-6.

Maheswaran, R. and P. Elliott (2003). "Stroke mortality associated with living near main roads in England and wales: a geographical study." Stroke 34(12): 2776-80.

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Oberdorster, G. and M. J. Utell (2002). "Ultrafine particles in the urban air: to the respiratory tract--and beyond?" Environ Health Perspect 110(8): A440-1.

Oberdorster, G., Z. Sharp, et al. (2004). "Translocation of inhaled ultrafine particles to the brain." Inhal Toxicol 16(6-7): 437-45.

Peters, A. and C. A. Pope (2002). "Cardiopulmonary mortality and air pollution." Lancet 360(9341): 1184-5.

Pope, C. A., 3rd, M. J. Thun, et al. (1995). "Particulate air pollution as a predictor of mortality in a prospective study of U.S. adults." Am J Respir Crit Care Med 151(3 Pt 1): 669-74.

Pope, C. A., R. T. Burnett, et al. (2004). "Cardiovascular mortality and long-term exposure to particulate air pollution: epidemiological evidence of general pathophysiological pathways of disease." Circulation 109(1): 71-7.

Riediker, M., R. Williams, et al. (2003). "Exposure to particulate matter, volatile organic compounds, and other air pollutants inside patrol cars." Environ Sci Technol 37(10): 2084-93.

Riediker, M., W. E. Cascio, et al. (2004). "Particulate matter exposure in cars is associated with cardiovascular effects in healthy young men." Am J Respir Crit Care Med 169(8): 934-40.

University of Rochester - Particulate Matter Center (2004). "Ultrafine Particles: Characterization, Health Effects and Pathophysiological Mechanisms."
Weinhold, B. (2004). "Environmental cardiology: getting to the heart of the matter." Environ Health Perspect 112(15): A880-7.

Appendix A-5: Reproductive and Developmental

California Air Resources Board (2004). "Particulate Air Pollution and Infant Mortality." Presentation May 20-21, 2004.

Salam, M. T., J. Millstein, et al. (2005). "Birth outcomes and prenatal exposure to ozone, carbon monoxide, and particulate matter: results from the Children's Health Study." Environ Health Perspect 113(11): 1638-44.

Sokol, R. Z., P. Kraft, et al. (2005). "Exposure to Environmental Ozone Alters Semen Quality." Environ Health Perspect.

Wilhelm, M. and B. Ritz (2005). "Local variations in CO and particulate air pollution and adverse birth outcomes in Los Angeles County, California, USA." Environ Health Perspect 113(9): 1212-21.

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Appendix A-6: Cancer

Boffetta, P., M. Dosemeci, et al. (2001). "Occupational exposure to diesel engine emissions and risk of cancer in Swedish men and women." Cancer Causes Control 12(4): 365-74.

Cohen, A. J. (2003). "Air pollution and lung cancer: what more do we need to know?" Thorax 58(12): 1010-2.

Guo, J., T. Kauppinen, et al. (2004). "Risk of esophageal, ovarian, testicular, kidney and bladder cancers and leukemia among Finnish workers exposed to diesel or gasoline engine exhaust." Int J Cancer 111(2): 286-92.

Mack, T. (2006). "Cancers in the Urban Environment." Presentation to the Southern California Association of Governments, January 18, 2006. From his book with the same title published by Elsevier Academic Press.

Nafstad, P., L. L. Haheim, et al. (2003). "Lung cancer and air pollution: a 27 year follow up of 16,209 Norwegian men." Thorax 58(12): 1071-6.

Nicolich, M. J. and J. F. Gamble (2001). "Urban air pollution and lung cancer in Stockholm." Epidemiology 12(5): 590-2.

Pope, C. A., 3rd, R. T. Burnett, et al. (2002). "Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution." Jama 287(9): 1132-41

Roosli, M., N. Kunzli, et al. (2003). "Single pollutant versus surrogate measure approaches: do single pollutant risk assessments underestimate the impact of air pollution on lung cancer risk?" J Occup Environ Med 45(7): 715-23.

South Coast Air Quality Management District (AQMD) (1999). "Multiple Air Toxics Exposure Study (MATES-II)."

Vineis, P., F. Forastiere, et al. (2004). "Outdoor air pollution and lung cancer: recent epidemiologic evidence." Int J Cancer 111(5): 647-52.

Appendix A-7: Noise

Arnberg, P. W., O. Bennerhult, et al. (1990). "Sleep disturbances caused by vibrations from heavy road traffic." J Acoust Soc Am 88(3): 1486-93. Also see abstract from:

Griefahn, B. and M. Spreng (2004). "Disturbed sleep patterns and limitation of noise." Noise Health. 6(22): 27-33.

Babisch, W. (2005). "Noise and health." Environ Health Perspect 113(1): A14-5.

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Babisch, W., B. Beule, et al. (2005). "Traffic noise and risk of myocardial infarction." Epidemiology 16(1): 33-40.

Federal Highway Administration (Apr 2000). "Highway Traffic Noise in the United States."

Franssen, E. A., C. M. van Wiechen, et al. (2004). "Aircraft noise around a large international airport and its impact on general health and medication use." Occup Environ Med 61(5): 405-13.

Jarup, L., M. L. Dudley, et al. (2005). "Hypertension and Exposure to Noise near Airports (HYENA): study design and noise exposure assessment." Environ Health Perspect 113(11):1473-8.

Kawada, T. (2004). "The effect of noise on the health of children." J Nippon Med Sch 71(1): 5-10.

Landon, P., P. Breysse, et al. (2005). "Noise exposures of rail workers at a North American chemical facility." Am J Ind Med 47(4): 364-9.

Integrated Working Group Letter to EPA; BTH; CARB re: "...Impacts in Goods Movement Action Plan (Feb 28, 2006).

Miedema, H. M. and C. G. Oudshoorn (2001). "Annoyance from Transportation Noise: Relationships with Exposure Metrics DNL and DENL and Their Confidence Intervals." Environ Health Perspect 109(4): 409-416.

Miller, N. P. (2005). "Addressing the Noise from U.S. Transportation Systems, Measures and Countermeasures." TR News(240):4-16.

Skanberg, A. and E. Ohrstrom (2002). "Adverse Health Effects in Relation to Urban Residential Soundscapes." Journal of Sound and Vibration 250(1): 151-155.

Transportation Research Board, (2005) "Noise & Vibration Committee Conference" Transportation Research Board, "Transportation Noise: Measures and Countermeasures" TR NEWS Number 240 (Sep-Oct 2005)

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APPENDIX B TRANSPORTATION CONFORMITY WORKING GROUP
of the
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS'

September 26, 2006
Minutes

THE FOLLOWING MINUTES ARE A SUMMARY OF ACTIONS TAKEN BY THE TRANSPORTATION CONFORMITY WORKING GROUP. AN AUDIOCASSETTE TAPE OF THE ACTUAL MEETING IS AVAILABLE FOR LISTENING IN SCAG'S OFFICE.

The Transportation Conformity Working Group held its meeting at the SCAG office in Los Angeles.

In Attendance:

Jennifer Bergener	OCTA
Dan Phu	Parsons
Jack Meifert	Parsons
Harley Martin	CH2MHILL
Ayman Salama	CH2MHILL
Ken Lobeck	RCTC
Arnie Sherwood	ITS Berkley/SCAG
Lydia LaPoint	IBI Group
Anthony Ng	Caltrans
Hamid Teoosi	Caltrans
Thea Le	Caltrans
M. Ahmadi	MMA
Danny Wu	SCAG
Jessica Kirchner	SCAG
Dawn Kukla	Caltrans, Dist. 7
Eyvonne Sells	SCAQMD
Jonathan Nadler	SCAG
Sylvia Passouras	SCAG
Sheryll Del Rosario	SCAG
Kathryn Higgins	SCAQMD
Lori Huddleston	LA MTA
Matt Jones	Moore Greve Associates
Ali Cayir	Transtech/Pomona
Yunus Kahi	Transtech/Pomona
David Chow	IBI Group

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TRANSPORTATION CONFORMITY WORKING GROUP
of the
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS'

September 26, 2006
Minutes

Via Teleconference:	
Lisa Tye	City of Irvine
Maureen Harako	Caltrans, District12
Carol Gomez	So. Coast AQMD
Maria Kadez	RBF Consulting
Paul Fagan	Caltrans Dist. 8
Ben Cacatian	Ventura County APCD
Ilene Gallo	Caltrans
Sandy Johnson	Caltrans, District 11
Mike Brady	Caltrans Headquarters
Dennis Wade	CARB
Tom Perez	City of Santa Ana
Keith Lay	LSA Associates
Ted Matley	FTA Region 9
Jean Mazur	Federal Highway Administration
Mary Zaban	Riverside County Transportation
Tony Louka	Caltrans, District 8
Carla Walecka	Carla Walecka & Associates

1.0 CALL TO ORDER

The Honorable Jennifer Bergener, Chair, called the meeting to order at 10:05 a.m.

2.0 PUBLIC COMMENT PERIOD

There were no public comments.

3.0 CONSENT CALENDAR

3.1 Approval Item

5.1.1 Approve August 22, 2006 Meeting Minutes

MOTION was made to APPROVE the minutes were. MOTION SECONDED and UNANIMOUSLY APPROVED.

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TRANSPORTATION CONFORMITY WORKING GROUP
of the
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

September 26, 2006
Minutes

4.0 INFORMATION ITEMS

4.1 RTIP Update

There was no report this month.

4.2 RTP Update

There was no report this month.

4.3 TCM Update:

There was no report this month.

4.4 AQMP Update/Modeling:

Jonathan Nadler, SCAG, gave a brief overview of SCAG's portion on the 2007 AQMP for the South Coast Air Basin. The focus of the plan of the 2007 AQMP for the South Coast this time is on the PM 2.5 and the eight hour ozone standards. SCAG is required by law to develop a portion of the AQMP for the South Coast Air Basin. The three main components that SCAG provides are socio-economic data, transportation model activity data, and the transportation control measures. The deadline for submitting the State Implementation Plan (SIP) plan for the eight-hour ozone standard to U.S. EPA is June of 2007. While the PM2.5 SIP is due to U.S. EPA in April 2008, the PM2.5 SIP is being prepared on the same time schedule as the ozone SIP, and will be included as part of the June 2007 submittal. The preliminary draft AQMP will be released in October for public review.

Deng Bang Lee, Manager, SCAG Transportation and Modeling Division, provided an overview of SCAG's regional travel demand model. The model utilizes growth forecasts and transportation network data to generate output such as volume, speeds, and travel times. SCAG has been in the process of developing a new transportation model which uses the most up-to-date technology and data. The new model is still under development, including peer review and validation testing. To provide input for the 2007 AQMP for the South Coast Air Basin, SCAG developed an interim model that is

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intended to more closely duplicate what would be expected from running the new model.

4.5 Review of PM Hot Spot Interagency Review Forms

The TCWG considered nine interagency review forms to determine whether the projects were of air quality concern and required a qualitative PM hot spot analysis. The review concluded the following:

OR48: Not a POAQC - hot spot analysis not required
ORA125: Not a POAQC - hot spot analysis not required
RIV62015: Not a POAQC - hot spot analysis not required
LA0B408: To be discussed further at PM Hot Spot Subgroup meeting
LA996340: Not a POAQC - hot spot analysis not required
SBD31808: Not a POAQC - hot spot analysis not required
RIV060118: Not a POAQC - hot spot analysis not required
ORA000195: Not a POAQC - hot spot analysis not required
RIV050501: Not a POAQC - hot spot analysis not required

4.6 Qualitative PM Hot Spot Analysis Review

The TCWG considered three qualitative PM hot spot analyses (RTIP #s SBD20020812; ORA120332; and ORA120336). The TCWG decided that all three analyses should be further considered by the PM Hot Spot Subgroup.

4.7 PM Hot Spot Process

SCAG staff included two items: 1) a list of contacts to which project sponsors should submit their PM hot spot materials, and 2) a step-by-step instruction sheet for the PM hot spot conformity process in the SCAG region. Any comments on the process write-up should be sent to SCAG.

4.8 Review of Regional Significance

Harley Martin, CH2MHILL Project Manager for the environmental document for the SR-47 Expressway Project (Schuyler Heim Bridge Replacement), presented this item on behalf of Caltrans. Caltrans requested

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that the TCWG consider allowing the SR-47 Expressway Project to move forward with the addition of an auxiliary lane and an elevated ramp to the project description included in the 2006 RTIP.

The question was raised as to whether the addition of the auxiliary lane and elevated ramp is regionally significant and needs modeling to support the request to amend the RTP and RTIP to include these facilities as part of the project. The TCWG did not consider this meeting as the forum to make a determination regarding the proposed amendment, and Caltrans was asked to submit a formal amendment request to begin the review process.

5.0 CHAIR'S REPORT

6.0 INFORMATION SHARING

Ventura County APCD informed the committee that their Planning Manager and the Engineer Manager had been laid off for budgetary reasons.

Tony Louka, Caltrans District 8, stated that there will be a PM Hot Spot workshop on October 17, 2006 at San Bernardino City Hall.

7.0 ADJOURNMENT

The Honorable Jennifer Bergener, adjourned the meeting at 12:00 p.m.
The next Transportation Conformity Working Group meeting will be held on **Tuesday, October 24, 2006 at SCAG's office.**

Letter OB10. Signatory – Shell Pipeline Company, LP

Response to Comment OB10-1

ACTA intends to provide each utility/agency with copies of the current SR-47 utility drawings, along with an explanation of the utility plans and as-built information on the existing utilities. ACET will request each recipient to review the plans and provide comments. Based on the comments, ACET will coordinate/design the relocation or protection of utilities that require such action.

For Shell Oil, the plans will be forwarded to Shell Pipeline Company LP, Attn: Utility Coordinator, 20945 South Wilmington Avenue, Carson, CA 90810.

During the final design phase for the project, and when detailed plans are available, the Utility Coordinator for the Shell Pipeline Company will be contacted in the event there is the potential for Shell facilities to conflict with the project.

Response to Comment OB10-2

The following comment will be added to the SR-47 PS&E plans and specifications: 48 hours prior to the commencement of construction activities, contact Shell Pipeline Company Utility Coordinator to arrange for field marking of Shell's facilities. This notification is in addition to notification through Underground Service Alert.

Shell Pipeline Company, LP
20945 S. Wilmington Avenue
Carson, CA 90810

October 10, 2007

STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION
Attn: Ronald J. Kosinski
120 South Spring St
Los Angeles, CA 90012-3606

Dear Ronald J. Kosinski:

SUBJECT: Your Project: Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Shell's Pipelines: Carson Plant Line #25; Signal Hill Products Line
Shell's Inquiry Record No. 9822
Thomas Brothers Map Book Page 794 Grid G4/G5/J3

Please refer to your correspondence dated 8 /17/2007 concerning your subject project. Based on the information submitted, Shell Pipeline Company LP (Shell) is unable to determine if our facilities are in conflict with your project. When detailed plans are available, please send to:

OB10-1

Shell Pipeline Company LP
Attn: Utility Coordinator
20945 S. Wilmington Ave.
Carson, CA 90810

Enclosed for your review and further use are drawings Y-6493 to 6501 & Y-3467 to Y3467-02 depicting the approximate location of Shell's facilities.

OB10-2 Please include the following statement on your construction drawings: "48 hours prior to commencement of construction activities, contact to arrange for field markings of Shell's facilities. This notification is in addition to notification through Underground Service Alert."

For further information, please refer to the Dig Safely pamphlet Shell has enclosed. If you require additional information, please call the Utility Coordinator at (310)816-2063.

Sincerely,

Alex Morales
Project Coordinator

Enclosures

Letter OB10. Signatory - Shell Pipeline Company, LP
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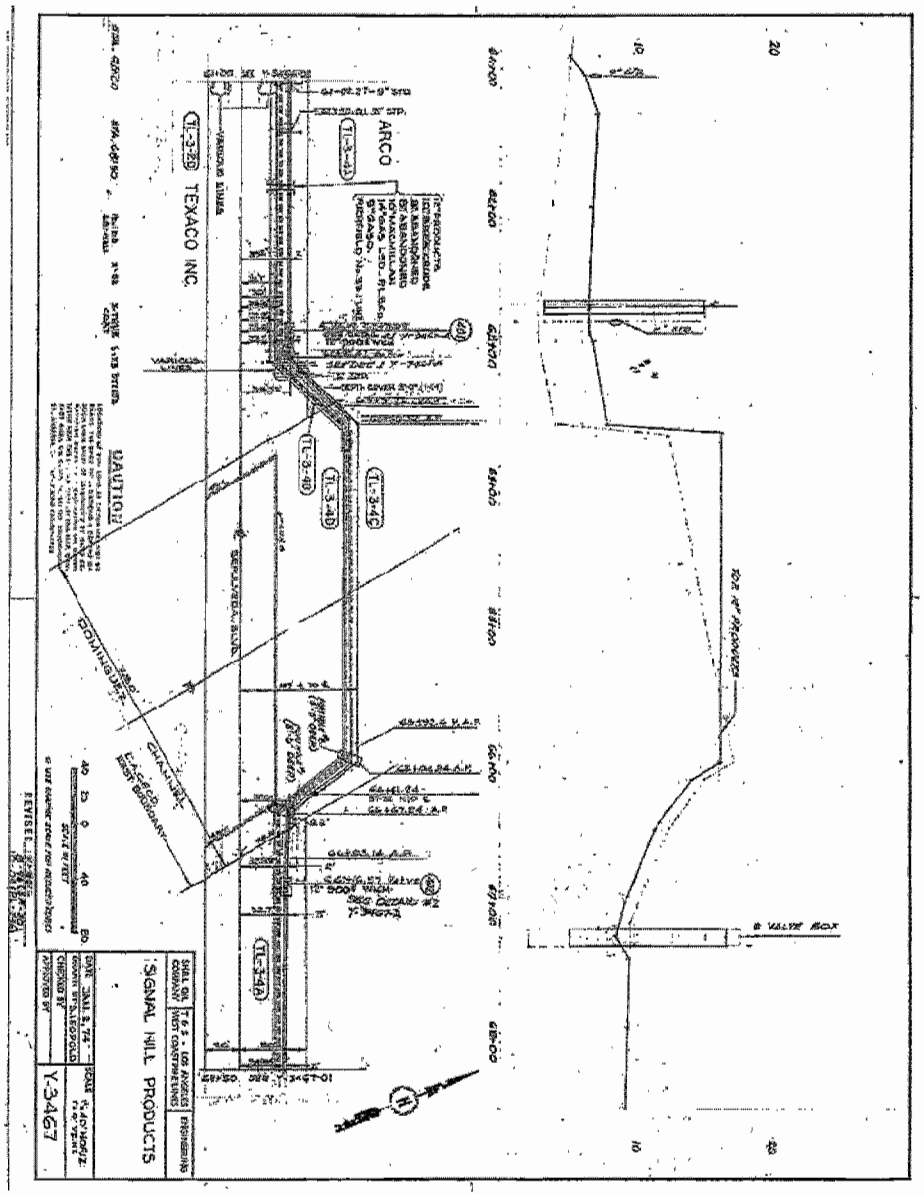

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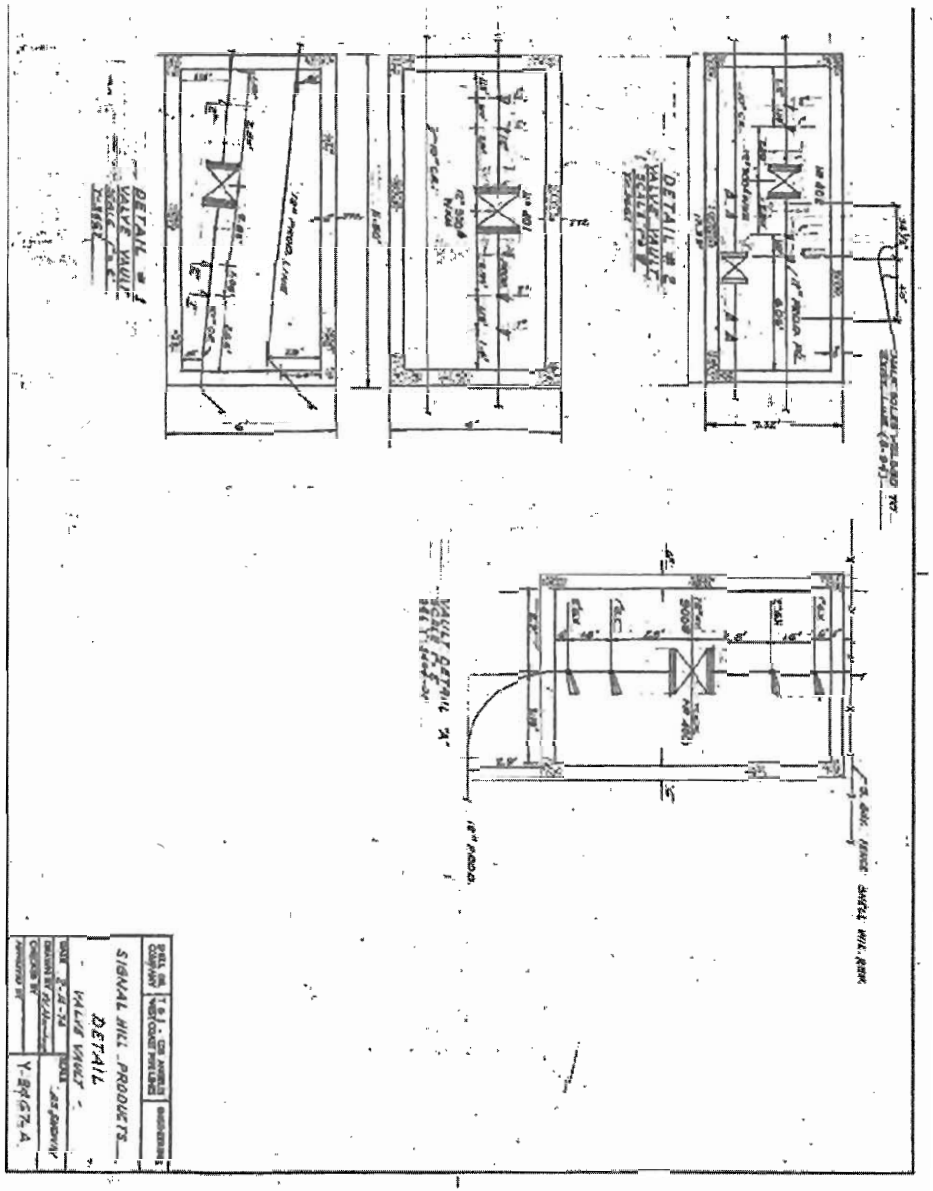

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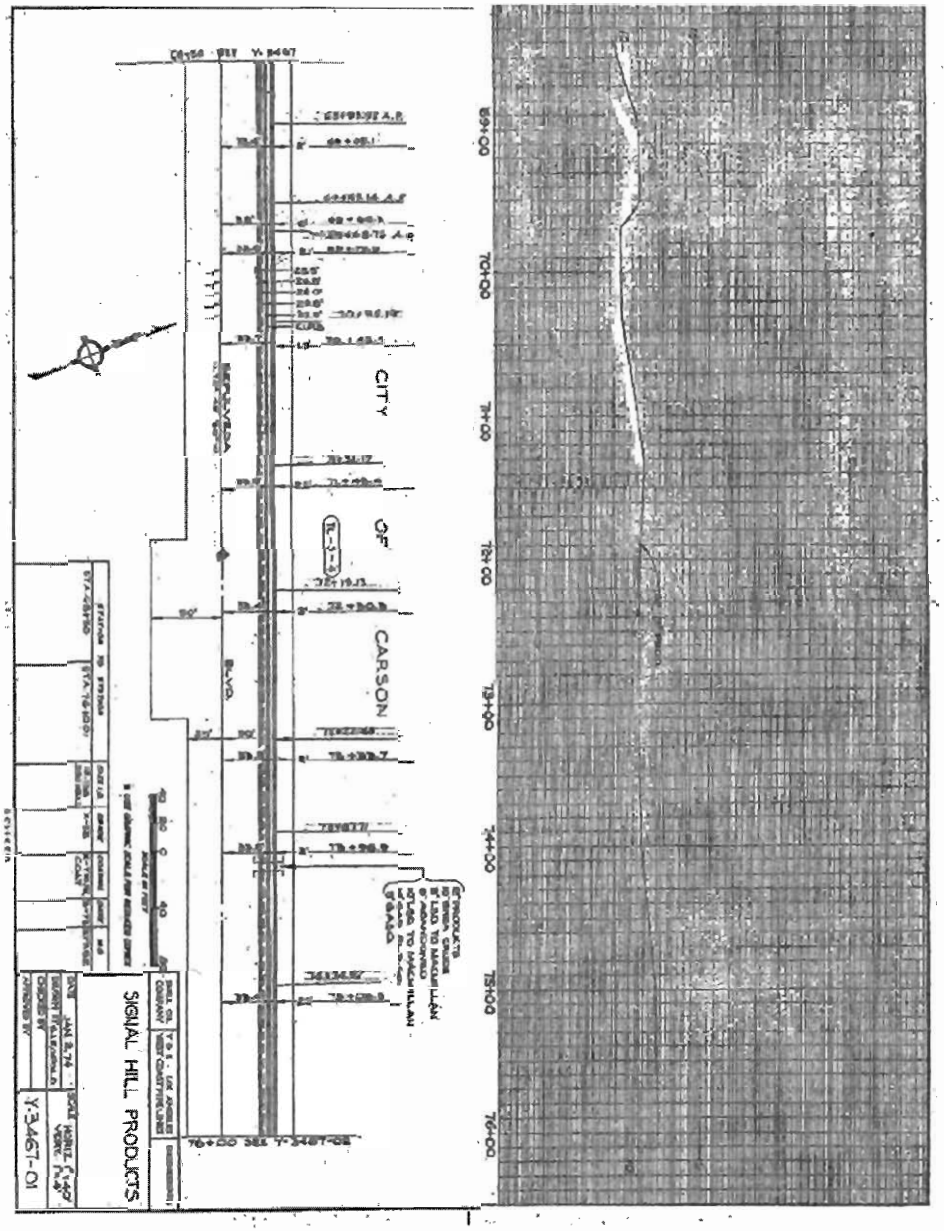

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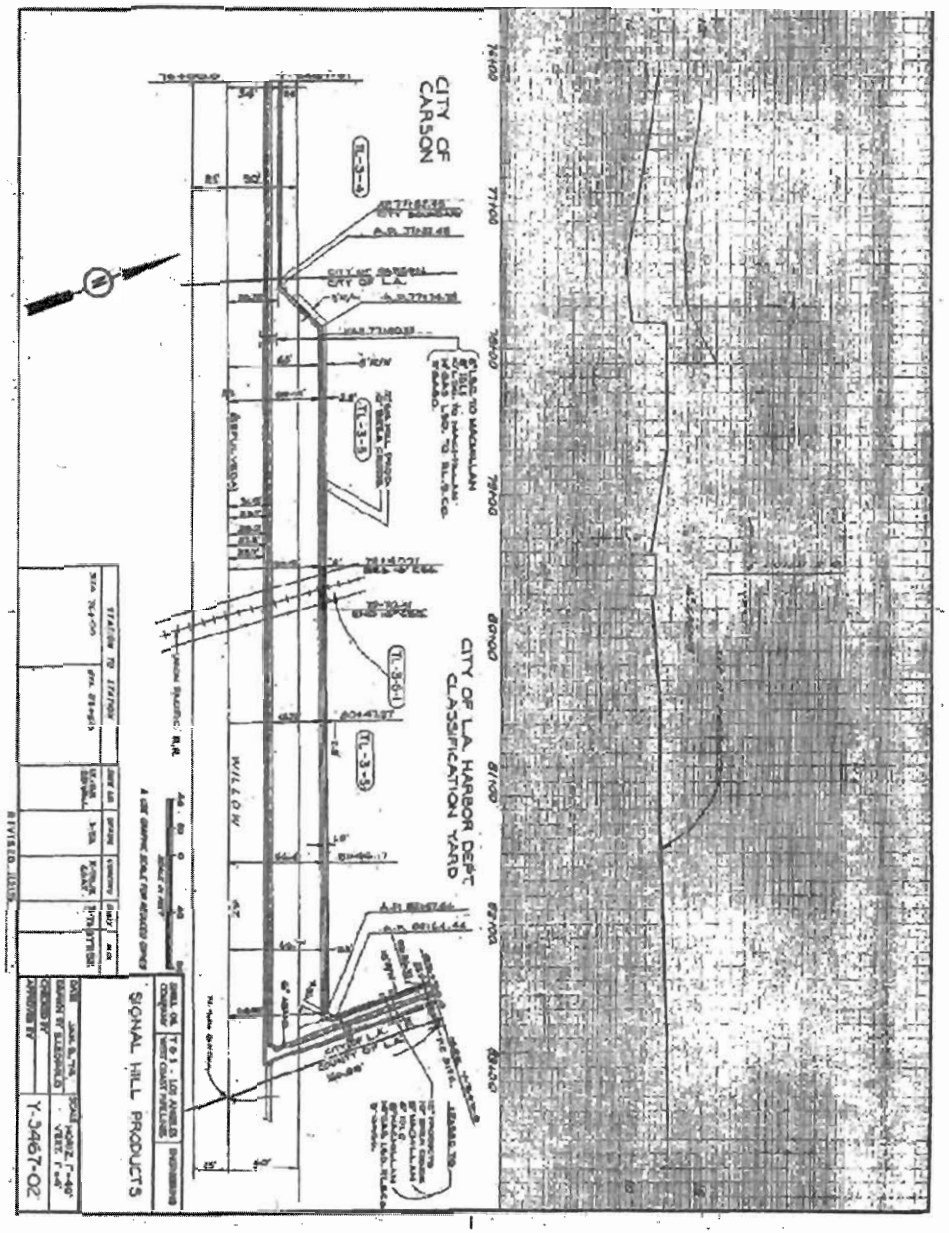

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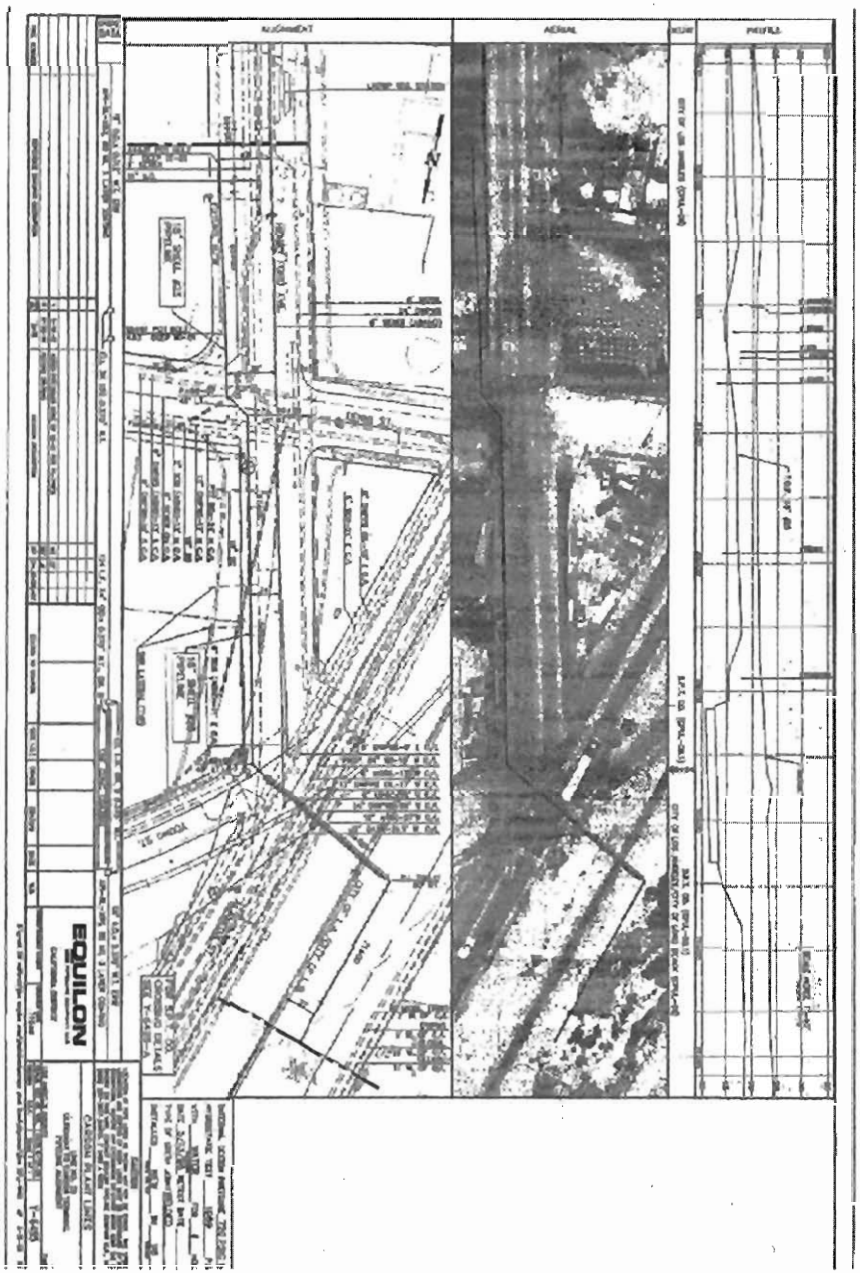

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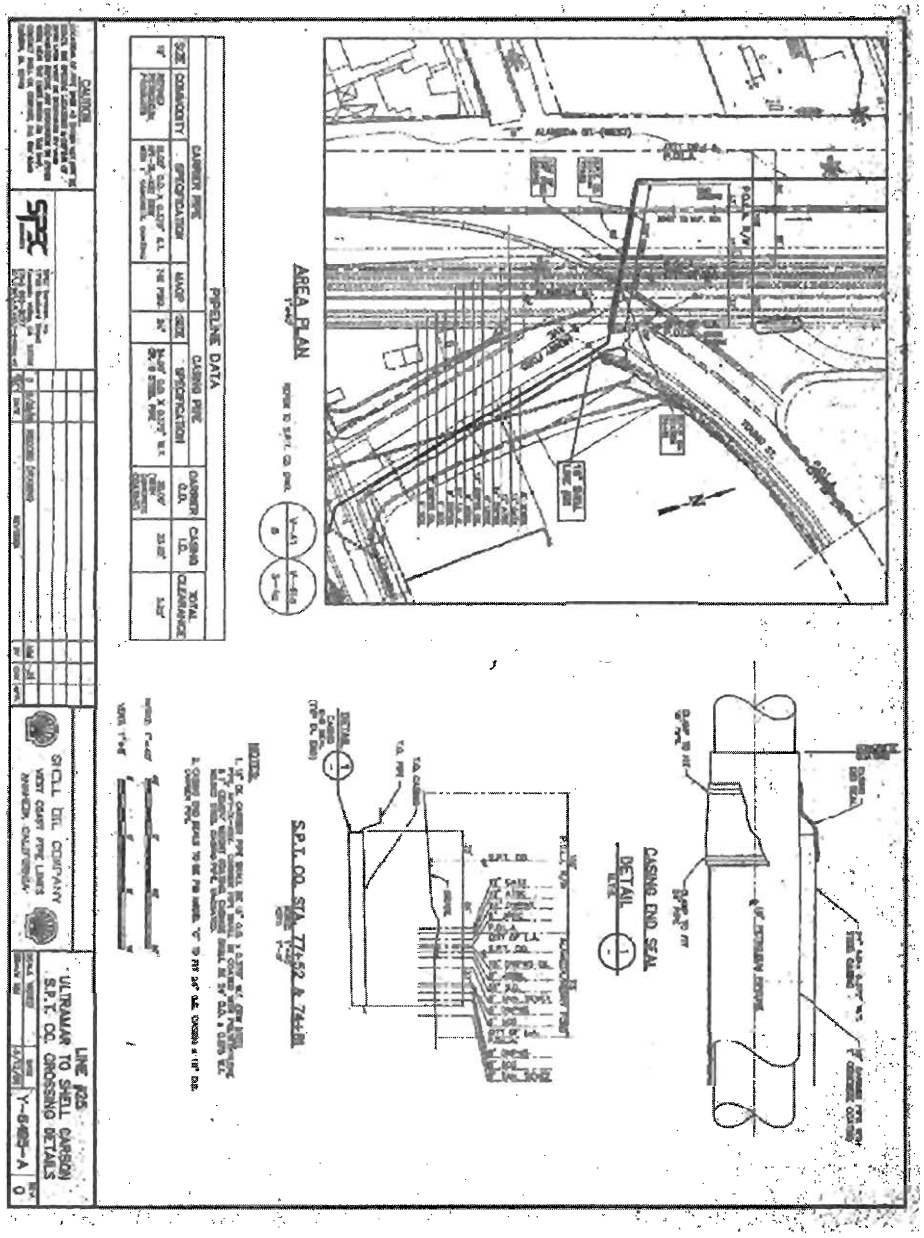

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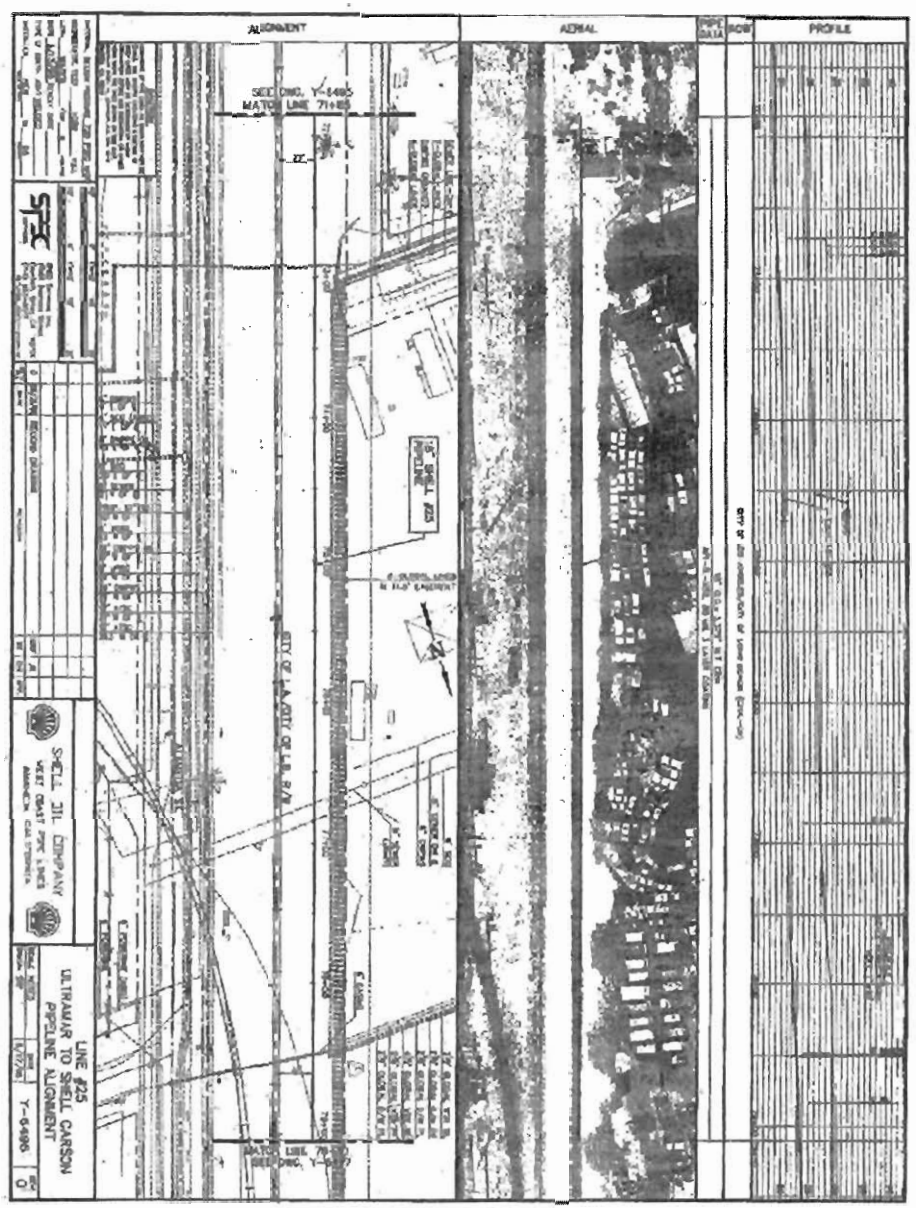

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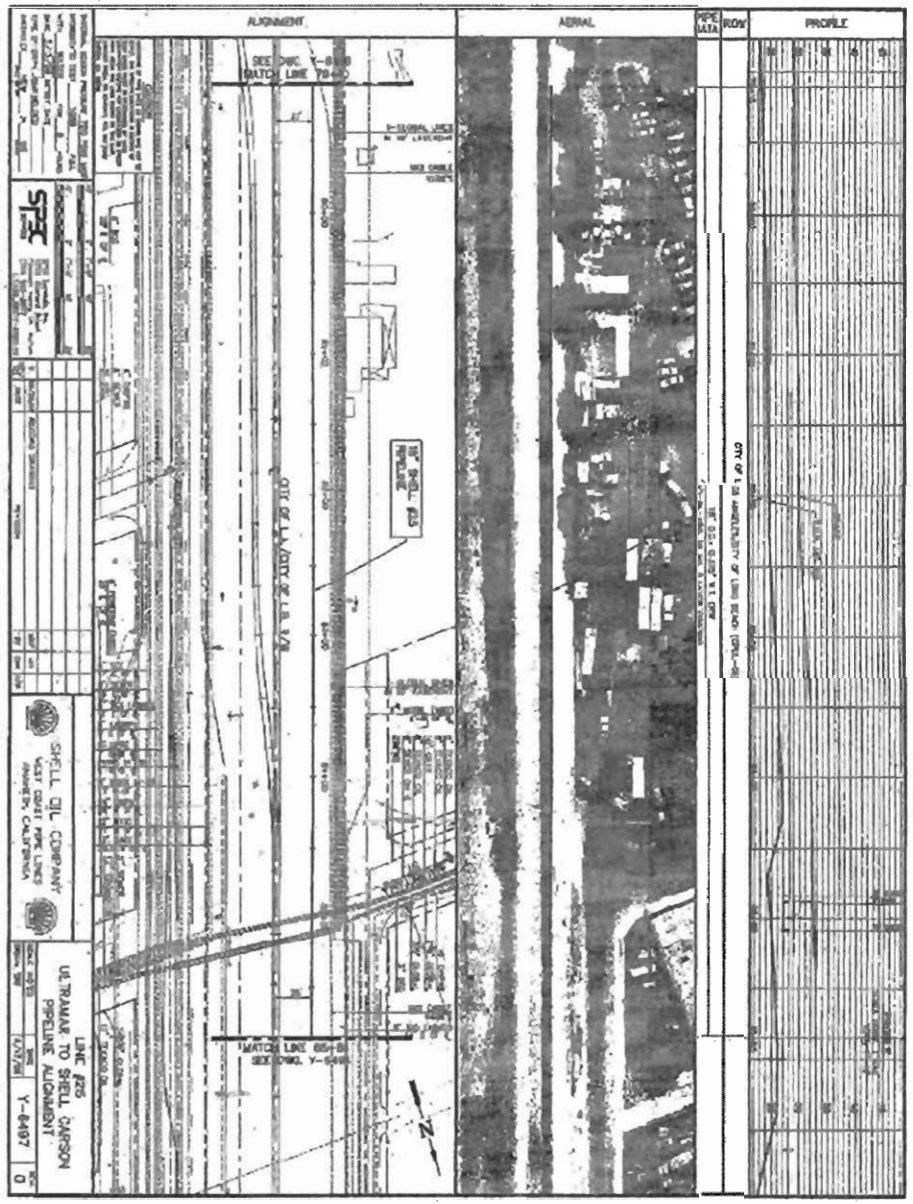

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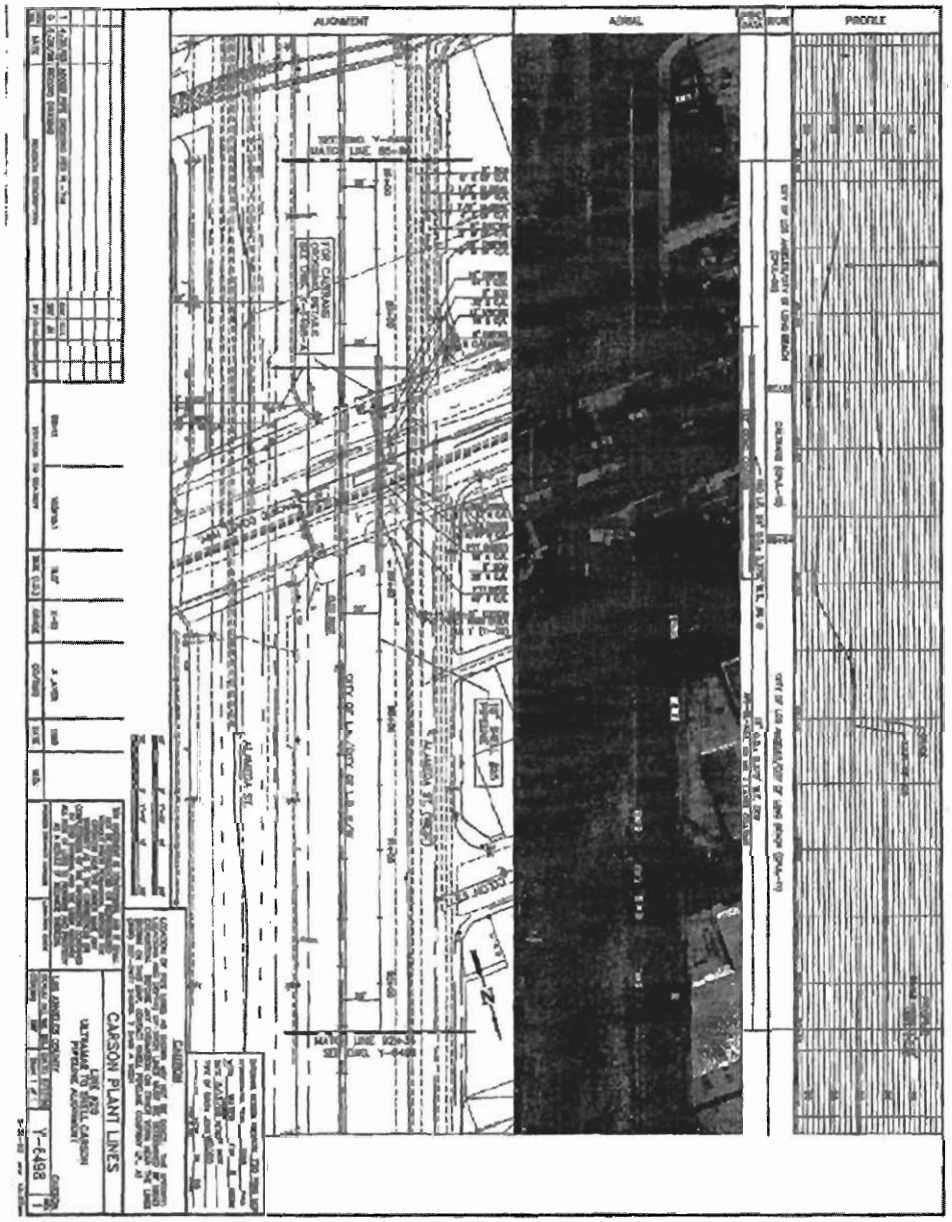

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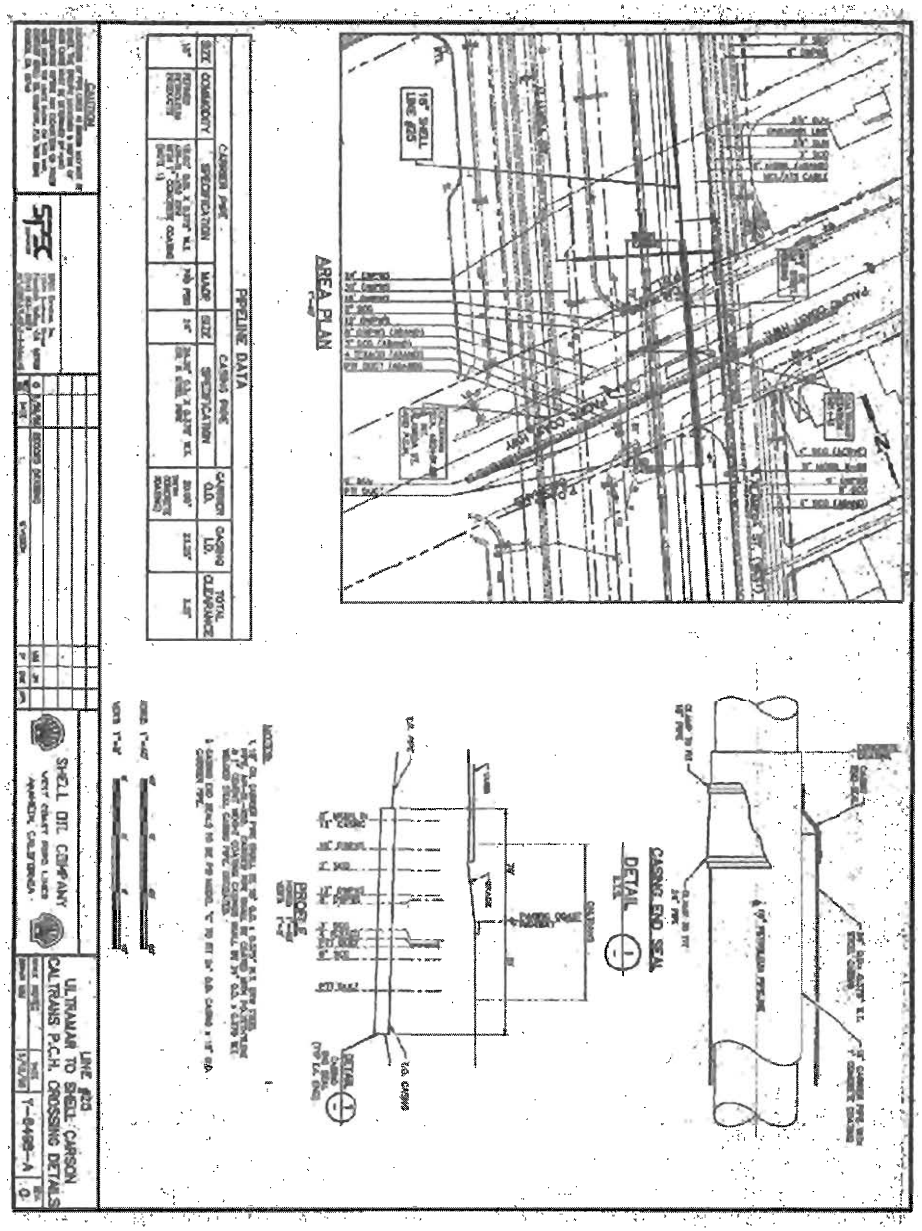

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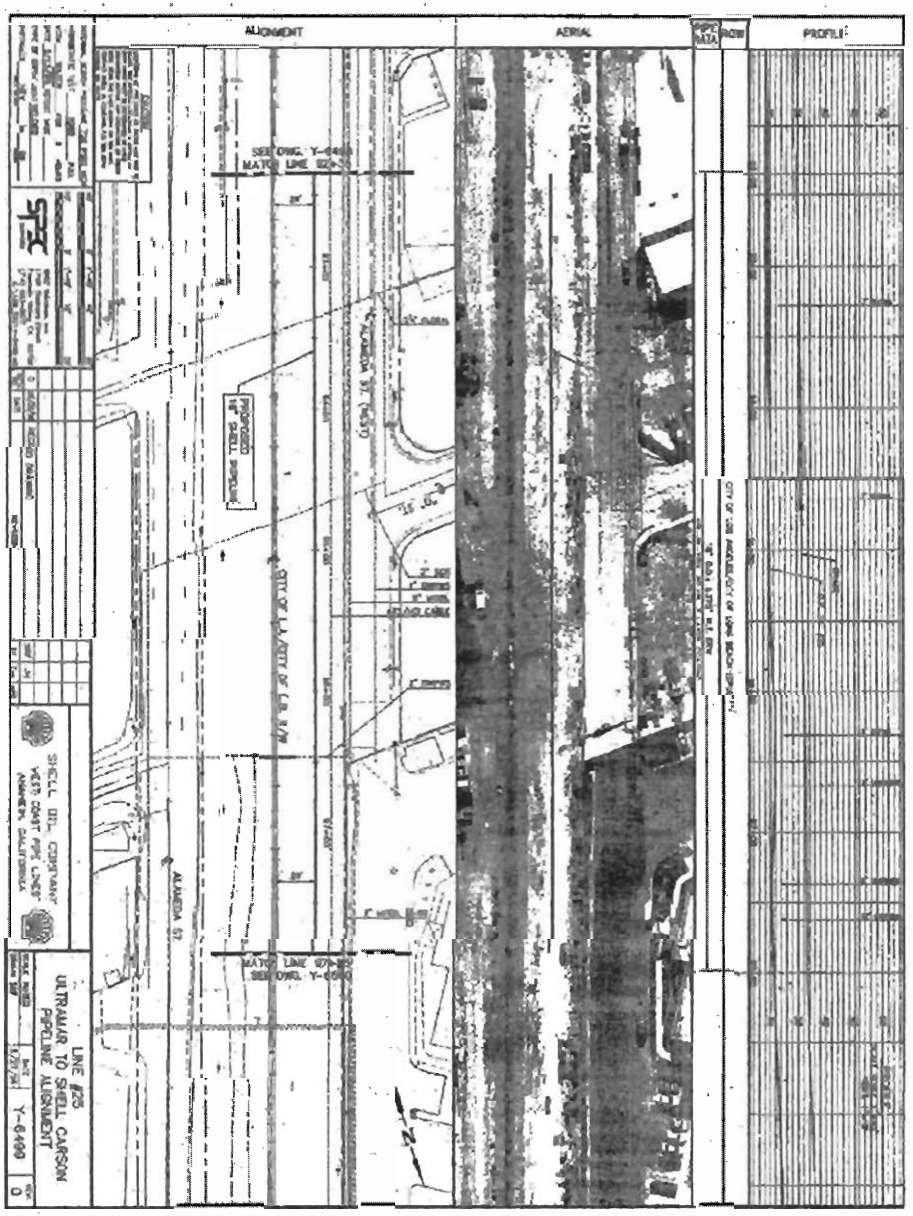

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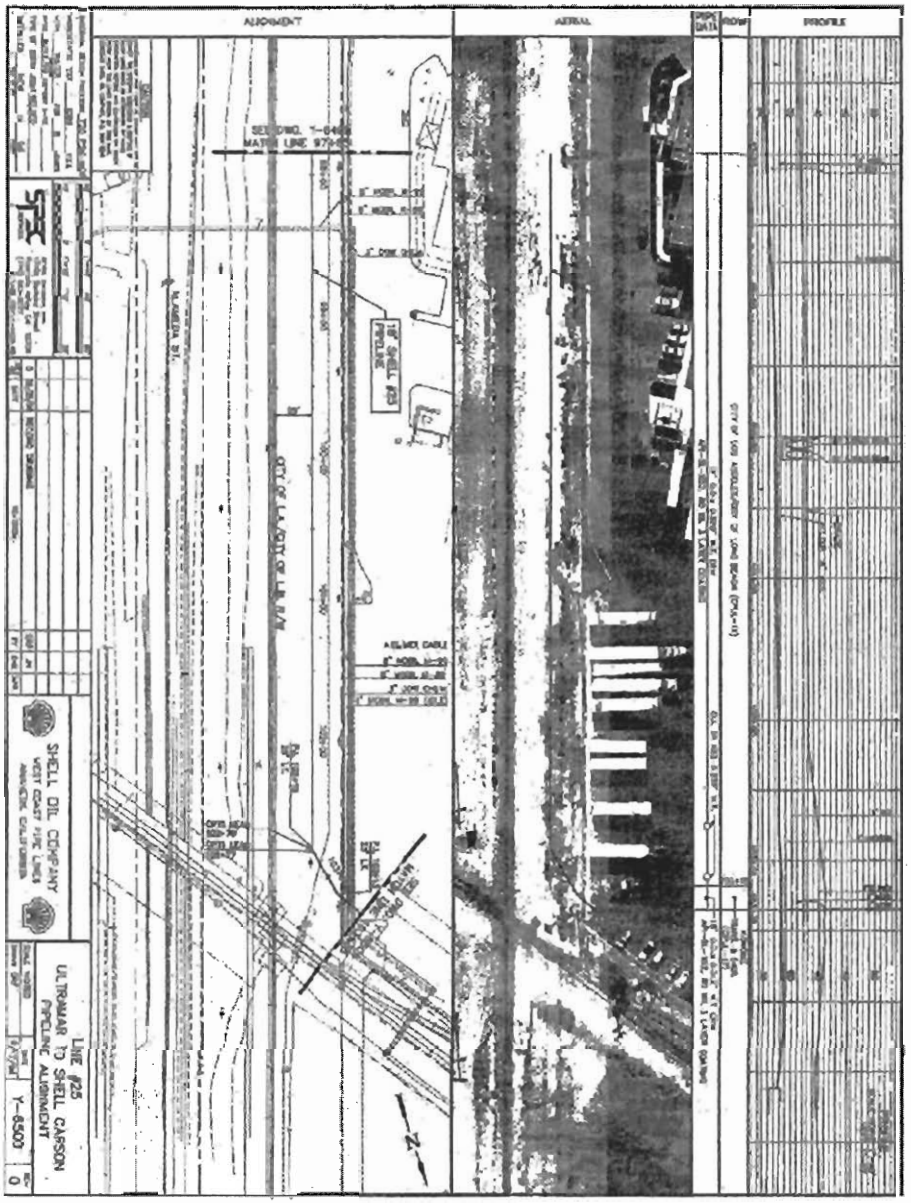

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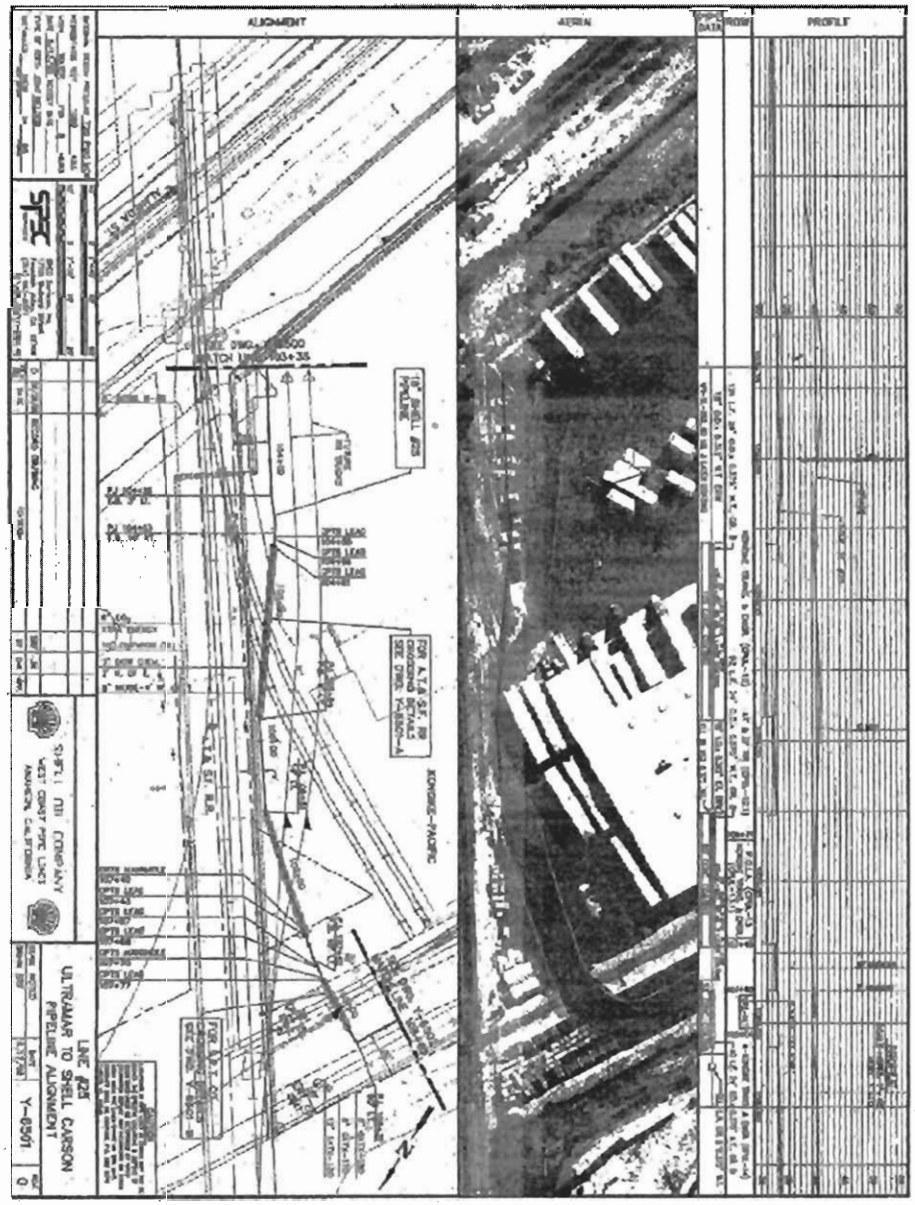

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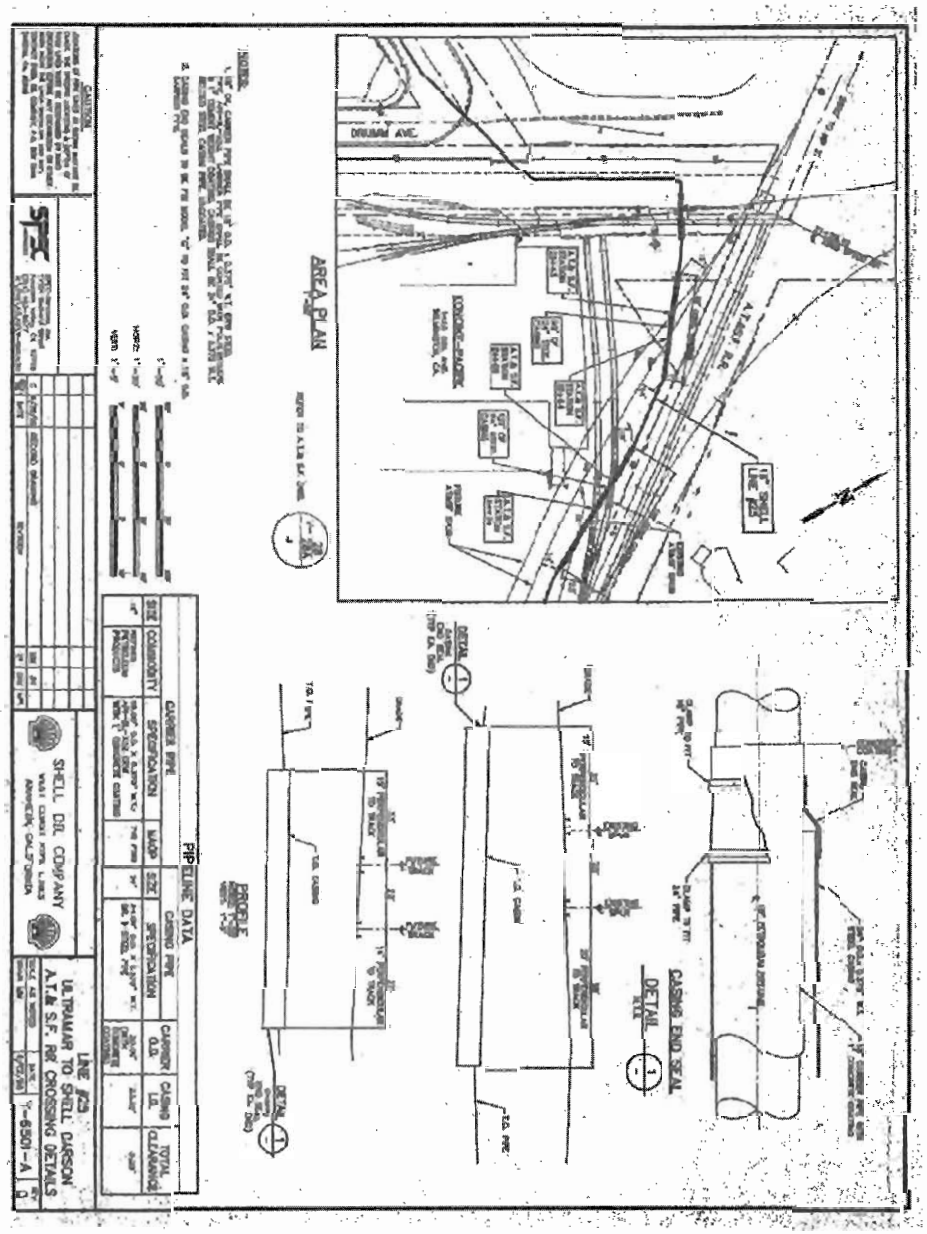

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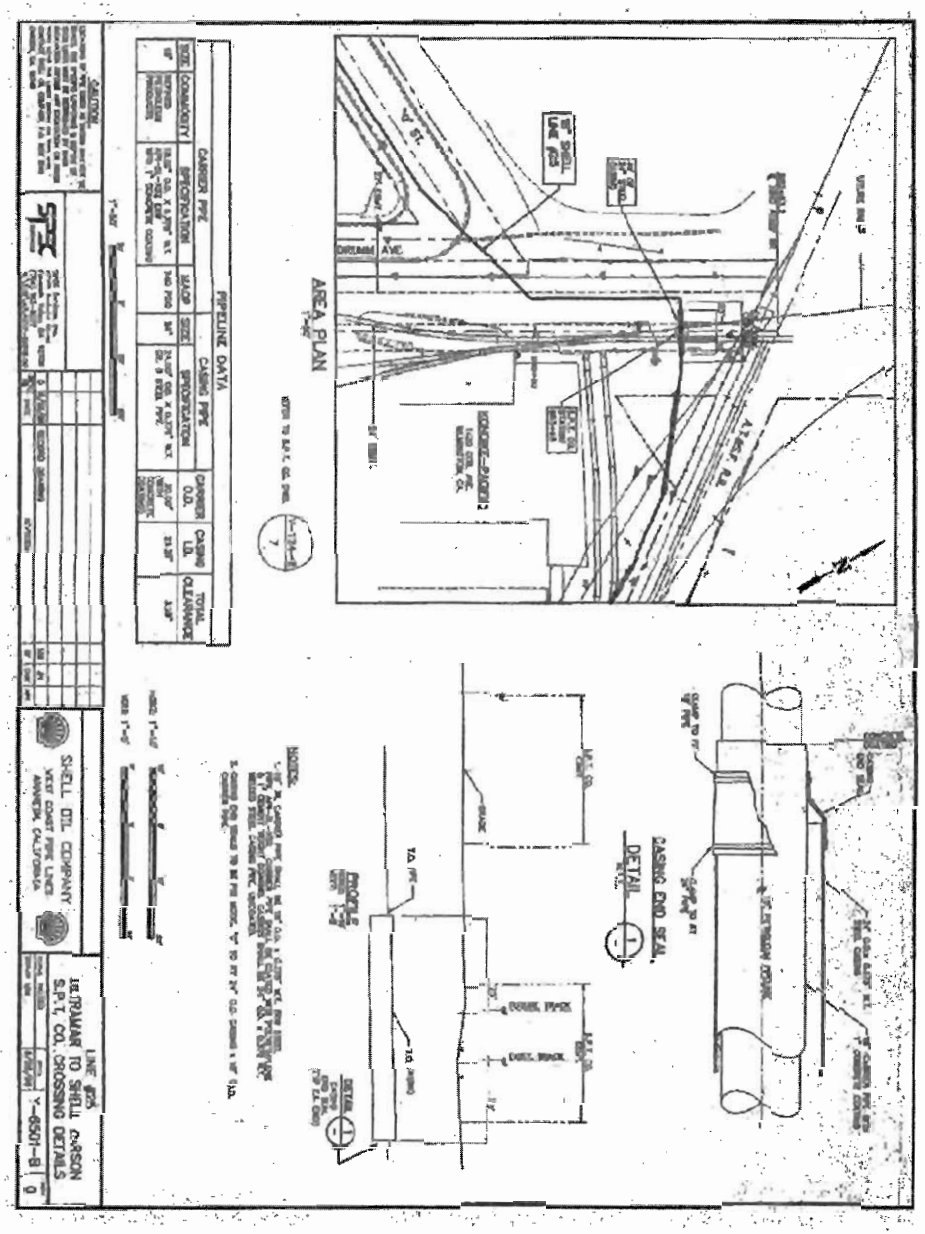

Letter OB12. Signatory – Wilmington Boat Owners Association

Response to Comment OB12-1

The Wilmington Boat Owners Association's support for Alternative 2 is acknowledged.

Wilmington Boat Owners Association
Berth 203 #9, Wilmington, CA 90744
(310) 549-8111 Fax (310) 549-5818

November 4, 2007

Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, CA 90012

Re: Schuyler Heim Bridge Replacement and SR-47 Expressway Project
File #07-LA-47 PM 2.7/5.8

Dear Mr. Kosinski,

OB12-1 Thank you for the opportunity to comment on the Heim Bridge replacement and Expressway project. After careful review of the six project alternatives the Wilmington Boat Owners' Association is recommending the Department of Transportation build Alternative 2. Please note that quotes from the DEIR, indicated in italics are used, in part as a basis for our comments.

1.2.2.2.1.2 Local Surface Street Congestion
'Currently, to connect from Terminal Island to Alameda Street, vehicles must travel 1.5 km (0.9 mi) on SR-47 north from Ocean Boulevard. They must then exit at the Anaheim Street off-ramp to Henry Ford Avenue and travel north through local streets, crossing three signalized intersections and five railroad crossings, for about 2 km (1.2 mi) before joining Alameda Street just south of Pacific Coast Highway. The use of surface streets and interference from the signalized intersections and railroad crossings lead to traffic congestion and delays.'

2.1.2.1 Proposed SR-47 Expressway Alignment
'Access to and exit from the expressway on the southern end would be available via Terminal Island from either Ocean Boulevard or New Dock Street, just north of Ocean Boulevard. At the northern end of the expressway, connections would occur directly from Alameda Street. There would be no other points of access or exit along the 2.7-km (1.7-mi) expressway.'

'The expressway would be elevated above surface streets, bypassing the existing signalized intersection at Henry Ford Avenue and Anaheim Street, the planned signalized intersection at Henry Ford Avenue and Denni Street, and the non-signalized intersections along Henry Ford Avenue at I Street, Opp Street, and Grant Street. Once at grade, the expressway would merge with the existing six travel lanes on Alameda Street.'

2.2.1.1.1 Bridge Replacement
'The bridge replacement would include a southbound off-ramp and northbound on-ramp at New Dock Street on Terminal Island, as well as a northbound off-ramp and southbound on-ramp at Henry Ford Avenue on the mainland (north) side of the bridge.'

Letter OB12. Signatory - WBOA
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Response to Comment OB12-2

The commenter is referred to Exhibits 7, 14, and 21 in the Traffic Study, which illustrate the traffic volumes on Henry Ford ramps. As shown on the exhibits, for the AM, MD, and PM peak hours, Alternative 1 (SR-47 Expressway) reduces truck volumes between 65% and 80%, and Alternative 2 (SR-103 Extension) reduces truck traffic volumes between 35 percent and 80 percent compared to the Base (Without Project). As a result, traffic is reduced at the at-grade-crossings under Alternative 1 and under Alternative 2.

Response to Comment OB12-3

The SR-47/Henry Ford ramps are addressed in the traffic analysis in the Draft and the Final EIS/EIR Section 3.5. Current conditions at this location during the morning (AM), midday (MD), and nighttime (PM) peak traffic hours are level of service B (LOS B) (see Table 3.5-3). By year 2030, if there is no project, the SR-47/Henry Ford ramps are expected to operate less effectively, at LOS D, F, and F during the AM, MD, and PM peak hours, respectively (Tables 3.5-12, 3.5-13, and 3.5-14). These tables also show that, under Alternative 1, the LOS would be better, at LOS B, B, and C during the AM, MD, and PM peak hours. Under Alternative 2 (Tables 3.5-18, 3.5-19, and 3.5-20), the LOS would be C, C, and E during the AM, MD, and PM peak hours. This would be an improvement over the No Project alternative, but not as good as under Alternative 1.

The potential effects from relocation of the PHL rail yard and additional rail line would be addressed in the environmental document prepared for that project. The analysis would address impacts to traffic on Henry Ford Avenue and the SR-47/Henry Ford ramps.

Response to Comment OB12-4

Alternatives 1, 1A, and 2 would improve accessibility to Henry Ford Avenue by emergency response units, as truck traffic would be reduced by approximately 50 percent. This reduction in truck traffic

3.4.2.2 Public Services

Port Police is headquartered in San Pedro at 425 South Palos Verdes. Access to Terminal Island is gained primarily across the Vincent Thomas Bridge and the Schuyler Heim Bridge. Port Police uses the Schuyler Heim Bridge as the primary route to respond to land-based emergency calls in Wilmington and East Wilmington.

In addition, several land-based fire stations are located within the Port of Los Angeles and the immediate vicinity, jointly responding to port-related emergencies with one or more of the four water-based fire stations, when required. These fire stations use the Schuyler Heim Bridge as their primary land-based response route between the City of Wilmington and western Terminal Island (LAFD, 2002).

3.5.2.1 Transportation System

'The Ports of Los Angeles and Long Beach, Caltrans, the MTA, and the cities of Los Angeles and Long Beach are currently developing several transportation improvement projects to alleviate freeway system congestion. Among these is the SR-47 Expressway, which would provide a four-lane elevated limited-access expressway, with auxiliary lanes at transition points with other roadways and at the Cerritos Channel crossing. The expressway would eliminate at-grade railroad crossings and signalized intersections between Terminal Island and Alameda Street/Pacific Coast Highway. The number of daily train crossings for Wilmington Wye East, Wilmington Wye West, Manual Subdivision (UPRR San Pedro), Henry Ford Bypass (ACTA3), and West Basin Lead (Leeward Bay Marina) are 15, 8, 79, 21, and 118 trains, respectively. Daily long trains (greater than 1,000 ft) on Wilmington Wye East and Wilmington Wye West are approximately 10 percent and 6 percent of traffic, respectively. The train traffic is estimated to increase by 8 percent per year.'

Traffic Condition Improvements

The purpose of building the SR-47 Expressway or the SR-103 Extension along with the Schuyler Heim Bridge replacement is to reduce traffic congestion on local surface streets between Terminal Island and Pacific Coast Highway or I-405, as well as on I-110 and I-710. The project would also improve traffic conditions by eliminating at-grade railroad crossings and signalized intersections.

OB12-2 Comments: Figure 3.5-10, Alternative 1, 2030 Mainline and Ramp Volumes, would appear to reduce traffic following the route defined in 1.2.2.2.1.2 but there is no way to tell how many vehicles are accessing the Henry Ford ramps or the SR-103. However, a comparison of the 2030 Peak Hour Volumes (PCE) indicates that building the SR-47 instead of the SR-103 would only reduce traffic at the Henry Ford on/off ramps by an average of 100 vehicles per peak hour. Alternatives 1 & 2 show comparable numbers of north-south vehicles at the Henry Ford/Anaheim intersection at all 2030 peak hours indicating that the majority of these vehicles are accessing local facilities. Therefore, neither alternative would make a difference at these at-grade crossings.

OB12-3 Because the SR-47 on/off ramps at Henry Ford Avenue will remain on the east side of all the rail lines, vehicles getting on or off the SR-47 at Henry Ford will have to cross these rail lines. Relocation of the PHL rail yard adjacent to Alameda, Anaheim and Henry Ford which proposes to add another east-west rail line across Henry Ford south of Anaheim will further increase congestion and delays on Henry Ford.

OB12-4 Where emergency services are concerned, none of the alternatives alter the configuration of the Henry Ford/rail intersection. Alternatives 1, 1A, 2 and 4 appear to modify the existing on/off

2

would facilitate access to the East Basin or East Wilmington area via the new fixed-span bridge or Henry Ford Avenue when there is no train crossing. In the event of a train crossing, emergency vehicles can access the East Basin and East Wilmington areas from Anaheim Street, Harry Bridges Boulevard, Avalon Boulevard, and Wilmington Boulevard.

Response to Comment OB12-5

Under Alternative 1, compared with the Base (No Project) alternative, total east-west traffic at the intersection of Anaheim Street/Henry Ford Avenue is reduced by 90, 360, and 140 vehicles during the AM, MD, and PM peak hours, respectively. A similar pattern exists for the Alameda Street/Anaheim Street intersection under Alternative 2. Hence, the traffic patterns of Anaheim Street would not change compared to the Base. Under Alternatives 1 and 2, traffic would be able to access Anaheim Street from the Henry Ford Avenue on/off ramps, the same as would occur under the No Project Alternative.

Under Alternative 1, truck traffic volume is reduced by 230 to 490 trucks, and auto traffic is increased by 360 to 470 autos on SR-103 south of Pacific Coast Highway during the AM, MD, and PM peak hours. The net effect is an approximate 1 percent increase to 10 percent reduction in passenger-car-equivalent (PCE) vehicle traffic on SR-103 south of Pacific Coast Highway. Hence, the SR-103 Anaheim/I Street on/off ramps were not analyzed.

Under Alternative 2, traffic volumes on the new fixed-span bridge and on SR-103 south of Pacific Coast Highway are 7,140 to 7,760 PCE and 6,810 to 7,310 PCE, respectively. It can be concluded that traffic on the new bridge stays mainly on SR-103 until it splits between the SR-103 extension and SR-103 to Sepulveda Boulevard. Hence, the SR-103 Anaheim/I Street on/off ramps were not analyzed.

ramps at Henry Ford Ave, but would not improve access to or through or from the East Basin or East Wilmington area by way of the Heim Bridge or Henry Ford. Police and fire dept response units can not get through this intersection from any direction if there is a train crossing Henry Ford.

OB12-4

Intersection Conditions, Tables 3.5-12 – 3.5-14 and Tables 3.5-18 – 3.5-20 for Alternatives 1 & 2 indicate a significant increase in east-west traffic on Anaheim Street with levels of service (LOS) of D, E & F at the Anaheim/Henry Ford and Anaheim/Alameda intersections at 2030 AM, MD & PM peak hours. Therefore it is reasonable to assume that without access to an elevated SR-47 on Anaheim a significant amount of east-west traffic will use the SR-103 north/south ramps at Anaheim/I Street to access Terminal Island or destinations north. Traffic volumes at the SR-103 Anaheim/I Street on/off ramps were not analyzed for this DEIR.

OB12-5

Traffic counts in Figures 3.5-11a-13a, Alternative 1, and 3.5-18a-20a, Alternative 2, show a significant amount of turns from Henry Ford Avenue and Alameda at Denni Street which tends to indicate an increase in the number of truck terminals in Far East Wilmington. Trucks and vehicles that are already in or are entering this area will not use the SR-47 on/off ramps on Henry Ford because of the at-grade train crossings whether Alternative 1 or 2 is built.

OB12-6

Therefore it is unlikely that an elevated expressway beginning on Terminal Island and ending south of PCH will eliminate traffic at the four Henry Ford at-grade crossings or on local surface streets.

These traffic counts also indicate a significant increase in northbound and southbound traffic on Alameda between Anaheim Street and PCH, much of which will be generated by the West Basin terminals and the proposed SCIG rail yard PCH gate entrance. Table 3.5-14, Alternative 1 indicates a 2030 PM peak LOS of D & F at the east and north connector ramps at the PCH/Alameda intersection potentially due to the convergence of this at-grade and elevated traffic. However, Table 3.5-20 indicates that if Alternative 2 were built these ramps would operate at a LOS of B & E at 2030 PM peak.

OB12-7

A comparison between the Changes in Peak Hour Volumes, Figures 3.5-7 thru 3.5-9 (Alt 1) and Figures 3.5-14 thru 3.5-16 (Alt 2) indicates that the extended SR-103 will take more traffic off the 710 and 110 freeways at all peak hours and will reduce traffic on Willow.

OB12-8

Figures 3.5-10 and 3.5-17 indicate that an average of 500 more autos would use one route or the other if Alternative 1 were an option, however approx half of all the north-south traffic to and from Terminal Island would be redirected off the SR-103 and onto the SR-47, approx 6500 – 7000 vehicles a day during the combined peak periods, which does not take into account 24-hour terminal operations. Changes in 2030 Peak Hour Volume (Alt 1) indicate southbound traffic would be redirected off the I-110 and east on Sepulveda and PCH through the Carson and Wilmington retail districts to access the SR-47.

OB12-9

According to the 2030 AM Peak Intersection Conditions, Alternative 1 would result in a LOS of B at the Alameda Street/I-405 NB ramps, where Alternative 2 would create a LOS of D. This indicates that the extended SR-103 would take far more vehicles off surface streets and the I-710 than would the SR-47.

OB12-10

We cannot see where Alternative 1 would reduce any street traffic in Wilmington and would potentially add more traffic. It appears that the only benefit of Alternative 1 would be a rail grade separation on Alameda at Young Street.

OB12-11

Response to Comment OB12-6

The impact of Alternative 1 and Alternative 2 would be a noticeable reduction of auto and truck traffic on Henry Ford Avenue; this would have a positive impact on traffic operation of Henry Ford Avenue. Therefore, Alternatives 1 and 2 result in improving the traffic operation of the roadways in the vicinity of Henry Ford Avenue and improving the traffic operation of East Wilmington.

Response to Comment OB12-7

The increase in northbound and southbound traffic on Alameda Street at the Alameda Street/O-Street intersection is due to the SR-47 Expressway (elevated structure) touching down on Alameda Street just south of Pacific Coast Highway. With the proposed southbound ramp from Alameda Street to Pacific Coast Highway, the traffic operation of the Pacific Coast Highway/Alameda Street connector ramps would be improved compared to the No Project Alternative.

Response to Comment OB12-8

The commenter is correct. Compared to Alternative 1, Alternative 2 would result in a greater reduction in truck traffic for I-110 and I-710.

Response to Comment OB12-9

Please note that Figure 3.5-17 refers to Alternative 2. Figure 3.5-10 refers only to the Alternative 1 traffic on the new fixed-span bridge and its splits to SR-103 and the SR-47 Expressway. To consider the impact of Alternative 1 on Pacific Coast Highway and Sepulveda Boulevard, please refer to Figures 3.5-7, 3.5-8 and 3.5-9. As shown, the traffic volumes on I-110 south of Pacific Coast Highway are reduced by approximately 210 to 390 PCEs and redirected to Alameda Street via the SR-47 Expressway. Further analysis of Pacific Coast Highway and Sepulveda Boulevard indicates that the southbound traffic on I-110 is not being re-routed via either Pacific Coast Highway or Sepulveda Boulevard to access the SR-47 Expressway.

During the AM, MD, and PM peak hours, traffic volumes on Pacific Coast Highway between I-110 and Alameda Street for the No Build alternative and Alternative 1 vary from 4,890 to 5300 Passenger-Car-Equivalents (PCEs) and from 3,490 to 4500 PCEs, respectively.

During the AM, MD, and PM peak hours, traffic volumes on Sepulveda Boulevard between I-110 and Avalon Street for the No Build alternative and Alternative 1 vary from 2,230 to 2,400 PCEs and from 2,050 to 2,350 PCEs, respectively. Hence, under Alternative 1, compared to the No Build alternative, the traffic volume on Sepulveda Boulevard and Pacific Coast Highway is not increased.

Response to Comment OB12-10

The commenter is correct. Compared to Alternative 1, Alternative 2 would result in less truck traffic on I-710.

Response to Comment OB12-11

The commenter's statement is noted. Traffic impacts associated with Alternative 1 were assessed using widely-accepted, standard traffic modeling for impacts to affected street segments and intersections. The purpose of the proposed project is to facilitate overall traffic improvement. It is possible that local trips, such as those related to local residents and those to and from local businesses, would not show an appreciable change as a result of Alternative 1.

The data provided on Tables 3.5-12, 3.5-13, and 3.5-14 show the effects to the 20 intersections analyzed during the AM, MD, and PM peak traffic hours. As shown on the tables, the levels of service either remain the same or improve with implementation of Alternative 1.

Similar results occur under Alternative 2, although some intersections show a declining LOS under this alternative.

Response to Comment OB12-12

The commenter's statement is noted. It is beyond the scope of the analysis for the proposed project to evaluate information provided in an Environmental Impact Report for another project (TraPac).

Further, the Port-wide Transportation Master Plan is under the jurisdiction of the Port of Los Angeles (POLA) and Port of Long Beach (POLB). The Schuyler Heim Bridge Replacement and SR-47 Expressway project is separate from the Port master plan.

Response to Comment OB12-13

The commenter is correct in noting that improvements at 223rd Street would be more costly under Alternative 2 than they would be under Alternative 1 or 1A, as the proposed improvements are different under Alternatives 1 and 1A or 2. Under Alternative 1 or 1A, northbound Alameda Street would be widened to accommodate one right turn-only-lane. Under Alternative 2, northbound Alameda Street would be widened to accommodate two right-turn-only lanes, and the north side of the ramp from Alameda Street to 223rd Street also would be widened.

Response to Comment OB12-14

The commenter is correct. Impacts to Pier A are greater for Alternative 1 than for Alternative 2. With Alternative 1, the northbound SR-47 two-lane viaduct requires several columns to be adjacent to Pier A Plaza Way that are not required in Alternative 2.

Response to Comment OB12-15

The commenter is correct. The columns for the proposed four-lane viaduct extending SR-103 will impact the Southern Pacific and SCE yard storage and parking. The surplus permanent easement areas with removed buildings could serve as additional storage and parking. When the right-of-way negotiations occur in the future, Corridor Properties and SCE will be allowed to exercise an option whereby buildings will be relocated or reimbursement for the demolished structures will be received.

2.2.1.1.2 SR-47 Expressway

'Alternative 1 would include surface-street lane improvements such as widening lane restriping, new curbs, and signal timing, on Alameda Street between Grant Street and Pacific Coast Highway, and on Young Street between Alameda Street and approximately 65 feet east of the elevated expressway. A new connector street would be constructed between Alameda Street and Denni and Grant Streets. Intersection signalization would be improved along the entire corridor.

OB12-12 Comments: According to the TraPac DEIR, Traffic and Circulation Mitigation Measures, the following intersection mitigation measure would be implemented to mitigate the significant impact of Project-related traffic. 'Trans #3: Alameda Street and Anaheim Street – Provide additional northbound and southbound through-lanes on Alameda Street, and provide a northbound free right turn lane from northbound Alameda Street to eastbound Anaheim Street. This measure shall be implemented by 2015.'

It appears that many necessary improvements along Alameda to accommodate the increase in West Basin traffic, access to truck terminals and elevated noise and emissions are relying on implementation of the SR-47. These improvement measures should be included in the Port-wide Transportation Master Plan rather than the SR-47 elevated expressway.

Northbound Alameda Street will be modified to provide dual right-turn lanes to the 223rd Street/Wardlow Road connector ramp, and southbound Alameda Street will be modified to provide dual left-turn lanes to the connector ramp. In addition, the connector ramp will be modified to add an optional left- or right-turn lane onto 223rd Street/Wardlow Road (Figure 2-4e). These changes will be made by restriping the ramp and Alameda Street and resignalization of the intersection.'

OB12-13 Comments: According to Appendix I, Rights-of-Way, improvements at 223rd Street are proposed in Alternatives 1, 1A and 2, however it is noted in RW208 – APN nos. 36-42 that cost estimates are included only in Alternative 2 which could make estimates for Alternatives 1 and 1A appear to be less costly.

OB12-14 On Attachment C, Alternative 2 exhibits RW212-RW214 and comparisons between RW101 and RW201, it appears that improvements at the southern end to the SR-103 connectors and on/off ramps at Henry Ford would not result in as great a loss of productive land on the Pier A terminal as would occur with Alternative 1.

OB12-15 At the northern end (Alt 2) it appears that placement of supporting columns of the elevated extension as shown in exhibits RW216-RW223 may eliminate some parking/storage spaces at the Southern Pacific and SCE yards. However, as noted in Appendix E, Draft Relocation Impact Report: *'Under Alternative 2, two buildings (not entire parcels) would be acquired as Permanent Highway Easements. One of these buildings is owned by Corridor Properties, and the other is an industrial building owned by Southern California Edison. In the after condition, the permanent and partial highway easements (118 partial takes) could allow for temporary uses, such as parking, temporary structures such as storage sheds or trailers, and storage of non-hazardous materials.'*

From an enlarged view of the Project Map, Appendix E, Attachment 2, it appears that the buildings owned by Corridor Properties and SCE that would be displaced could be relocated within these large parcels or on the owners' adjoining properties.

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Response to Comment OB12-16

The commenter is correct. Boat ownership is rapidly increasing, and available options for parking boats are decreasing. In fact, "one out of every three Americans takes part in some form of boating each year," according to the *Insurance Journal*.

If the environmental regulation and permitting agencies allow for mitigation of the 10 slips impacted, 10 new slips will be created at Leeward Bay Marina. If this is not the case, the 10 impacted slips will be removed, and the Leeward Bay Marina will receive monetary compensation.

Response to Comment OB12-17

The commenter's concern is acknowledged. The right-of-way acquisition agents will be directed to coordinate with the LACRA to find the most favorable areas for relocation of these businesses. Also please refer to Response to Comment OB12-18.

Response to Comment OB12-18

The commenter's view is acknowledged. Right-of-way acquisition agents will be directed to coordinate with the LACRA and, if feasible, support their strategy to create larger job-intensive manufacturing facilities. It is possible that the LACRA may already be implementing their strategy to create larger job-intensive manufacturing facilities by the time the SR-47 right-of-way acquisition occurs.

Response to Comment OB12-19

The commenter's concern is acknowledged. The Draft Relocation Impact Report (DRIR) identifies the loss of businesses as a consequence of the project. However, considering the small number of relocated businesses, in relation to the total number of businesses in the city, no significant adverse effect is anticipated in terms of loss of tax revenues to the city.

As stated in the DRIR and in Section 3.3.2.4 of the Draft and the Final EIS/EIR, for individuals, relocation assistance or compensation is available and will be provided to eligible persons and businesses in accordance with the federal Uniform Relocation Assistance and Property Acquisition Act of 1970 and with the California Relocation Act.

F. Estimated Displacement Units by Alignment: Under Alternative 1, *'there would be full acquisition of 11 Assessor-numbered parcels (6 ACTA numbered parcels, all privately owned); 5 APN-numbered parcels are vacant, and 6 businesses (employing an estimated 100 individuals) would require relocation. There would also be approximately 129 partial takes (aerial/highway easements), and six slips would be acquired at the Leeward Bay Marina.'*

OB12-16 Comments: The dock (A Dock) that would be acquired at Leeward Bay Marina has 10 slips and 1 side-tie along the main dock between A & B Docks. The 10 slips are occupied by 10 boats and 4 live-aboard tenants. There is a statewide shortage of boat slips, no vacant slips in Leeward Bay Marina and live-aboard status is not transferable to other marinas.

II. REPLACEMENT AREA - The businesses to be displaced under Alternative 1 *'require similarly zoned commercial/industrial land that allows uses such as recycling and auto body shops' and, 'If the businesses are relocated in the vicinity of their existing location, no impacts or, at most, minor impacts to employees would occur. However, if the businesses are relocated far from the displacement site, employees may need to relocate with the business or find new employers.'*

III. RELOCATION RESOURCES – The DEIR concludes that *'Adequate resources exist; the project is in an active industrial/commercial area'; and that 'suitable replacement sites are available in the market and would be adequate to meet the replacement needs generated by the project.'*

Operations Effects - Indirect
If the businesses are not able to relocate within the same jurisdiction, this could result in loss of tax revenue. However, no adverse effect is anticipated.

OB12-17 Comments: Wilmington has had an Interim Control Ordinance (ICO) in place for approx four years that prohibits relocating any of these displaced businesses west of Alameda, but does permit them to be located in Far East Wilmington east of Alameda. The Port of LA is in the process of acquiring property in Far East Wilmington for unspecified purposes and several businesses, machine shops, auto body shops and truck repair facilities that were in this acquisition area have relocated along Alameda or Henry Ford. The recycling facility is also subject to this ICO.

OB12-18 Concurrently the LACRA is in the process of acquiring small parcels in the Wilmington Industrial Park in order to redevelop approx 100 acres into larger job-intensive manufacturing facilities. Eliminating any available industrially zoned property in Far East Wilmington will make it difficult to relocate businesses similar to those being displaced to the only area in Wilmington in which they are permitted, potentially stifling economic development.

OB12-19 Wilmington cannot afford to lose any more land to state or federal entities. Government entities and the Port of LA already own so much Wilmington land that the community lacks sufficient property tax revenue to pay for essential City services such as street and sidewalk repairs and has no land to build needed schools and parks. After five years of opposition to tearing down homes or businesses the LAUSD is finally evaluating a community-supported site in East Wilmington for a planned K-8 school, which could face additional challenges if the expressway is built along Alameda.

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Air Quality - 3.13.1.1.1 Transportation Conformity

'Under the 1990 CAA Amendments, the U.S. Department of Transportation cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to the SIP for achieving the goals of the CAA at the regional and project level.

The originally proposed Schuyler Heim Bridge Replacement and SR-47 Expressway was included in the approved SCAG 2006 RTIP and the 2004 RTP, as amended in 2006 by the Metropolitan Transportation Authority (MTA) and the SCAG.

The flyover and auxiliary lanes of the bridge will be added to the project description in an amendment to the 2006 RTIP, anticipated in July/August 2008. It is expected that changes to the project scope will be included in the draft 2008 RTP in October or November 2007, with the final RTP approval in March 2008. Since the project will be listed in the conforming 2008 RTP/2006 RTIP amendment, the project would have satisfied the conformity requirements as required by the regional plan and program. In addition, localized CO, PM10, and PM2.5 emissions associated with operation of Alternative 1 were evaluated.'

3.13.1.1.1.2 Project-Level Conformity

The project must not cause a new local violation of the federal standards for CO, PM10, or PM2.5 or exacerbate an existing violation of the federal standards for CO, PM10, or PM2.5.

Vehicle Exhaust Emissions - *As shown in Table 3.13-5, criteria pollutant emissions from Alternatives 1 and 3 are lower than emissions from the No Build alternative due to a predicted decrease in vehicle miles traveled (VMT) in the study area for 2011, 2015, and 2030. CO emissions from Alternative 2 in 2011 and 2015 are slightly higher than the No Build alternative because Alternative 2 has a higher passenger car VMT. Increased VMT for Alternative 2 is attributable to increased capacity from the extension of SR-103. All future year scenarios have emissions less than the baseline 2003 conditions. This decrease in emissions over time can be attributed to EPA and ARB regulations that would require cleaner fuels and cleaner engines in future years.*

Marine Vessel Emissions

Replacing the lift-span bridge with a fixed-span bridge would force taller marine vessels to take a longer route around Terminal Island and would delay vessels with adjustable mast heights. The increased trip times for the marine vessels would result in increased PM_{10} and $PM_{2.5}$ emissions. Daily emissions resulting from marine vessel detours during operation of the proposed fixed-span Schuyler Heim Bridge are presented in Table 3.13-14 (see Section 3.13.3.5.1.2). The $PM_{2.5}$ emissions associated with the marine vessel detours are estimated to be 2.27 pounds per day. For Alternatives 1, 1A, 2, and 3, this emissions increase would be offset by the emissions decrease associated with the improved traffic conditions within the project area. Therefore, indirect emissions of $PM_{2.5}$ would not cause any new violation of the NAAQS at the project area.

Conclusion

Localized $PM_{2.5}$ Impacts - *it is unlikely that PM2.5 hot spots would be associated with the proposed project because local accumulation and delay of vehicles would be reduced by the project. LOS would improve with the build alternatives when compared to the No Build alternative. Potential localized PM2.5 increases associated with the slight increase in VMT would be offset by the increase of vehicle speed in the project area, which is an indication of reduced congestion and idling of vehicles. Thus, the project is not expected to cause any concern with respect to localized concentrations of PM2.5.*

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Localized PM_{10} Impacts - *Because ambient concentrations are less than 120 µg/m3 or 80 percent of the NAAQS, and no unusual circumstances are expected with the project compared to existing conditions, the proposed action would be unlikely to contribute to a violation of the 24-hour PM10 NAAQS.*

The project has demonstrated project-level conformity by its inclusion in the proposed 2008 RTP and the amended 2006 RTIP, and by the hot spot analyses showing the proposed project would not cause or contribute to a violation of the CO, PM_{10}, or $PM_{2.5}$ federal standards.

3.13.3.4.3 Mobile Source Air Toxics

The CAA identified 188 air toxics, also known as hazardous air pollutants. EPA has assessed this expansive list of toxics and identified a group of 21 as mobile source air toxics (MSATs), which are set forth in an EPA final rule, Control of Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17235). EPA also extracted a subset of this list of 21 that it now labels as the six priority MSATs. These MSATs are benzene, formaldehyde, acetaldehyde, diesel particulate matter (DPM)/diesel exhaust organic gases, acrolein, and 1,3-butadiene. FHWA has developed an interim guidance on how to analyze MSATs in the NEPA process for highways.

A quantitative MSAT analysis was prepared for the proposed project because major arterials affected by the project serve a large number of diesel trucks, and there would be a potential to concentrate high levels of diesel particulate matter. In addition, the community of Wilmington is just west of the proposed SR-47 Expressway and includes sensitive air quality receptors such as residences, schools, and hospitals. The nearest residences are approximately 100 feet west of the SR 47 Expressway near Alameda Street and Henry Ford Avenue. The school nearest to the proposed project is the Wilmington Park School at 1140 Mahar Avenue, approximately 700 feet west of the connection of proposed SR-47 and Alameda Street.

Residences are also located aboard moored vessels in the marina to the west of the Schuyler Heim and Henry Ford bridges and the Long Beach Silverado Senior Center is located near the project area at 1545 West 31st Street.

At this time, a quantitative MSAT analysis is intended to provide a method to compare alternatives rather than emphasizing the specific MSAT emission values or estimating health risk. The final subsection of the MSAT analysis provides a discussion of the limitations of the MSAT analysis.

Results - *The MSAT Tool was used to estimate the MSAT emissions presented in Table 3.13-10. As shown in Table 3.13-9, the MSAT emissions are predicted to significantly decrease over time, even though the traffic volumes and percentage of diesel trucks are expected to increase over time. The decrease in MSAT emissions for the alternatives analyzed is consistent with EPA projections that MSAT emissions will decrease over the next 15 years. In general, there would be minor differences in MSAT emissions between the build alternatives analyzed.*

Limitations of MSAT Analysis

Information that Is Unavailable or Incomplete - *Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the*

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Response to Comment OB12-20

Your comments regarding the emissions from the project are noted. However, the emissions presented in Table 3.13-5 represent vehicle emissions for the entire project study area and are not intended to be used to make conclusions regarding impacts of the project at a specific location or from a specific roadway segment. The localized impact analyses required for the project are presented in Subsection 3.13.3.4.1 of the Draft and the Final EIS/EIR.

estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

There have been studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes -- particularly respiratory problems. Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable performing a more comprehensive evaluation of the health impacts specific to this project.

Relevance of Unavailable or Incomplete Information – *'...because of the uncertainties, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow reasonable predictions of relative emission changes between alternatives for larger projects, the amount of MSAT emissions from each of the proposed project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. The current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects. Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."*

Mitigation Measures for PM10/PM2.5 - AQ-9 Heavy Duty Truck Buyback Program
The purpose of the buyback program would be to accelerate the modernizing of the heavy duty engine fleet operating in the South Coast Air Basin. By removing the older engines in the fleet and requiring replacement with newer, cleaner vehicles, a net reduction of NOx emissions (and other combustion pollutants) would occur. This reduction would help offset marine vessel detour emissions.

The construction phase of this project is where the greatest impact of increased emission levels occurs. Therefore, the buyback program would be designed to mitigate the NOx emissions during that time. Based on recent buyback programs, the program for the proposed project would cost from $25,000 to $50,000 /ton of NOx reduced.

It is estimated that each truck replacement would reduce an average of 0.55 tons per year of NOx and 0.12 tons per year of PM. This is based on emission factors representative of current buyback programs such as the Gateway Cities Diesel Fleet Modernization Program. These emission reductions would continue for 3 to 5 years, depending on the year of the truck updated. This timeframe would exceed the duration of the project construction phase.

OB12-20 Comments: According to Table 3.13-5, Daily Vehicle Emissions for the Project Study Area, Alternatives 1 & 2 would generate a total of 22+ tons of emissions per day in 2011, 16+ tons per day in 2015, and 7.6 tons per day in 2030 along a 1-2 mile stretch. The difference between the two alternatives for all years assessed is an average of 200 lbs/day. Thus, it appears that emissions generated on the parallel, 6-lane, at-grade Alameda Street truck route have not been included as a localized impact but as part of the regional air basin.

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OB12-21 The 6-lane truck route on Alameda Street will potentially generate 1/3 more emissions than the elevated 4-lane structure, therefore the localized impact could be considerably more when concentrated between Anaheim and PCH in 2011 and beyond. The TraPac DEIR does not include a localized emissions evaluation on Alameda north of Anaheim Street either even though a substantial increase in Port-related traffic is forecasted.

OB12-22 Emissions for D, E and F levels of service at the Alameda/Anaheim, Anaheim/Henry Ford and Alameda/PCH intersections are evaluated in ppm as potential 'hot spots' in order to meet regional conformity for the RTP rather than as chronic conditions that will contribute to localized impacts.

OB12-23 Neither this DEIR nor the TraPac DEIR accounts for a potential increase in the frequency and duration of north and southbound trains on the west side of Alameda between Anaheim and PCH, which will increase congestion and emissions at the Alameda/Anaheim rail crossing.

OB12-24 Table 3.13-5 apparently does not include all the diesel fuel components of Mobile Source Air Toxics (MSATs). The difference between the diesel particulate matter (PM) and Daily MSAT Emissions in Table 3.13-9 for Alt 1 in 2011 is 1,423 lbs/day.

OB12-25 Therefore, the total localized emissions impacts for Alternative 1 are understated by not including the 6-lane Alameda truck route, three congested intersections and exclusion of mobile source air toxics.

OB12-26 The gradual decrease in emissions assumes trucks will be replaced when it has not yet been determined how $1.8 billion in replacement costs will be funded between now and 2012 and again in 2017 when 16,800 trucks are 10 years old. Further, an increase in emissions due to closure of the Heim Bridge and rerouting of vessels during construction is dependent on truck replacement to offset these emissions.

OB12-27 Alternative 1 does not consider localized cumulative emissions from elevated and at-grade traffic on Henry Ford or congested Henry Ford/Anaheim intersection, emissions from ships' generators in the East Basin, trains, refinery(s), SE Resource Recovery Facility (LB incinerator) and the proposed 70-acre relocated PHL rail yard.

Noise - *The level of highway traffic noise depends on three things: (1) the volume of traffic, (2) speed of the traffic, and (3) the number of trucks in the flow of the traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds (although it takes a doubling of traffic to increase noise levels by only 3 dB), and greater numbers of trucks. Traffic noise levels are reduced by distance, terrain, vegetation, and natural and manmade obstacles.*

3.14.2.2 Existing Noise Environment

Short-term (15-minute) measurements were taken at each of the 11 locations and were accompanied by traffic volume counts. These were supplemented by long-term (24-hour) measurements at two of the monitoring locations: Anchorage Way Marinas and Leeward Bay Marina (at the dock nearest the Schuyler Heim Bridge and the dock nearest Henry Ford Avenue, respectively).

There is considerable train traffic in the study area, and trains, particularly when their horns sound at the at-grade crossings, are a major noise source. When trains are present, they often generate higher hourly noise levels than vehicular traffic. Train traffic is intermittent, however.

Response to Comment OB12-21

See response to comment OB12-20.

It is outside the scope of this document to respond to comments regarding the evaluations included in or excluded from another EIS/EIR.

Response to Comment OB12-22

The United States Environmental Protection Agency has designated Los Angeles County a carbon monoxide (CO) maintenance area. This means the project must be evaluated for the potential for CO hot spots under the federal Transportation Conformity Rule. The evaluation of CO hot spots is intended to determine whether emissions from the project would cause or contribute to any new localized CO violations. The localized impact is evaluated by determining whether the emissions would exceed the federal CO standards.

Response to Comment OB12-23

Your comment regarding the exclusion of trains and train emissions in the analysis is noted. However, implementing the project alternatives would not directly or indirectly change train operations. Therefore, train emissions were not included in the impact analysis.

It is outside the scope of this document to respond to comments regarding the evaluations included or excluded from another EIS/EIR.

Response to Comment OB12-24

The particulate matter emissions in Table 3.13-4 of the Draft and the Final EIS/EIR include exhaust emissions, tire wear, and brake wear. In addition, the particulate matter emissions in Table 3.13-4 represent emissions from both gasoline- and diesel-fueled vehicles. However, the MSAT emissions in Table 3.13-9 of the Final EIS/EIR only represent diesel particulate matter emissions. As noted in the comment,

in the Draft and the Final EIS/EIR, the PM emissions in Table 3.13-9 are higher than the PM emissions in Table 3.13-4.

Upon review of the traffic volumes used for the MSAT analysis, an error was found. The revised traffic volumes have been used to update the diesel particulate matter emissions presented in Table 3.13-9 of the Final EIS/EIR. As shown in the table, the revised diesel particulate matter emissions in Table 3.13-9 are lower than the particulate matter emissions shown in Table 3.13-4 of the Final EIS/EIR. (Table 3.13-5 has been changed to Table 3.13-4 in the Final EIS/EIR.)

Response to Comment OB12-25

Your comment that localized emissions are understated is acknowledged. However, the air quality analysis was prepared to comply with the federal Transportation Conformity Rule, which requires evaluating localized impacts from CO and particulate matter.

Response to Comment OB12-26

The commenter's statement is noted. While the Port's clean truck initiative will contribute to considerable reduction of air emissions, air quality impacts associated with construction and operation of the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway project did not account for a reduction in emissions assumed by the measurable goals of the clean truck program. Air quality impacts were assessed based on existing baseline conditions and anticipated future projects in the local air basin.

Response to Comment OB12-27

Your comment on the localized impact analysis for Alternative 1 is noted. However, the air quality analysis was prepared to meet EPA requirements under the Transportation Conformity Rule, FHWA requirements under NEPA, and the Lead Agency requirements under CEQA.

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Response to Comment OB12-28

The Draft EIR/EIS acknowledges that future traffic noise in the Anchorage Way Marina will increase due to increased traffic on SR-47. The report has evaluated noise barriers for this area and determined that a barrier would be feasible (i.e., a barrier would provide a noise reduction of 5 dBA or more for the live-aboard boats within the Marina). However, such a barrier has been determined to not be reasonable to construct based on the applicable cost criteria.

Please see Final EIS/EIR Section 3.14.3.3.2.2 of the Noise analysis for more details.

Response to Comment OB12-29

The proposed elevated SR-47 Expressway is expected to carry the bulk of the truck traffic and much of the vehicular traffic to and from the Ports area, and would therefore be the main contributor of noise to receivers within the Leeward Bay Marina. At the Wilmington neighborhood, the effects of both the proposed SR-47 and Alameda Street traffic have been included in the noise evaluation. As such, recommended noise barriers would reduce noise from both the elevated expressway and the surface street.

Therefore, to provide the most conservative analysis, the characterization of the noise environment assumes that no trains are present and that vehicular traffic is the primary noise source.

Within the Anchorage Way Marinas, the calculated loudest-hour L_{eq} ranged from 67 to 71 dBA; within the Leeward Bay Marina, the loudest-hour L_{eq} ranged from 57 to 62 dBA; within the Wilmington neighborhood, the loudest hour L_{eq} ranged from 50 to 63 dBA; and within the Long Beach neighborhood along the SR-103 Extension, the loudest hour L_{eq} ranged from 62 to 73 dBA.

3.14.3.3.1.2 Operations Effects

Leeward Bay Marina - *Table 3.14-6 summarizes the calculated existing and future traffic noise levels under Alternative 1 and No Build conditions at the Leeward Bay Marina. Without abatement, the predicted loudest hourly traffic noise levels at boat slips within the Leeward Bay Marina would range from 61 to 67 dBA $L_{eq}(h)$.*

For the Leeward Bay Marina, a barrier along the SR-47 Expressway, with an approximate length of 239 m (785 ft) and height of 2.44 m (8 ft) would be constructed to abate future traffic noise levels by 5 to 7 dBA at 65 benefited receivers.

Wilmington Neighborhood - *Table 3.14-8 summarizes the calculated existing and future traffic noise levels under Alternative 1 and No Build conditions at the Wilmington neighborhood. Without abatement, the predicted loudest hourly noise levels in the Wilmington neighborhood would range from 61 to 69 dBA $L_{eq}(h)$ under Alternative 1.*

For Alternative 1, two barriers, one along the SR-47 Expressway and another on ground level along Alameda Street, would be needed to abate future traffic noise. The approximate combined length of both barriers would be 1,405 m (4,610 ft). The height of the barriers would be between 3.66 m (12 ft) and 5.49 m (18 ft). Calculations based on preliminary design data indicate that the barrier would reduce noise levels by 5 to 9 dBA at approximately 56 residences.

Long Beach Neighborhood/ SR-103 Extension - *Table 3.14-11 summarizes the calculated existing and future traffic noise levels under Alternative 2 and No Build conditions at the Long Beach Neighborhood/SR-103 Extension. The predicted loudest hourly noise levels in this area would range from 62 to 72 dBA Leq(h) for Alternative 2.*

For this alternative, two overlapping noise barriers along the east side of SR-103, with an approximate combined length of 835 m (2,740 ft), would be needed to abate traffic noise levels at the Long Beach Neighborhood/SR-103 Extension. The two barriers would be 3.66 m (12 ft) high; the barrier section along the northbound off-ramp would be 4.57 m (15 ft) high. The two noise barriers would reduce noise levels by 5 to 14 dBA for 27 equivalent frontage units.

OB12-28 Comments: According to Tables 3.14-5 and 3.14-10, Anchorage Way Marinas, no sound barriers are proposed with any alternatives. Therefore noise will increase as traffic increases.

OB12-29 Tables 3.14-6 and 3.14-7, Leeward Bay Marina, and Tables 3.14-8 & 3.14-9, Wilmington Neighborhood are misleading. Because an elevated SR-47 does not currently exist, this expressway would just add another layer of noise of up to 61 dBA even with a sound barrier, while at-grade vehicular and rail noise will also be increasing.

Response to Comment OB12-30

The recommended noise barriers for the Wilmington neighborhood would reduce future traffic noise levels by up to 9 dBA (with most of the reductions between 5 and 7 dBA). With the project built, and the noise barriers constructed, traffic noise levels would still increase above existing noise levels, but would be well below the applicable noise abatement criteria. Without the project, future traffic noise levels in the Wilmington neighborhood are anticipated to increase above existing levels by 7 to 9 dBA. Therefore, noise in this area from project Alternatives 1, 2, 3, or 4, with the barriers built, would be less than would occur with the No-Build alternative (Alternative 6).

Response to Comment OB12-31

The comment is acknowledged. Improvements along Alameda Street addressed in the Draft and the Final EIS/EIR are related only to the proposed project. Any further improvements to accommodate the increase in Port-related traffic would be independent of the proposed project.

Response to Comment OB12-32

The comment is acknowledged. Under Alternative 2, noise levels at the referenced sites would be reduced to less than existing levels.

Response to Comment OB12-33

Comment is noted. Noise analysis results indicate that, under Alternative 2, with the noise barriers built, future traffic noise levels at the Long Beach neighborhoods and schools would be below existing traffic noise levels in those areas.

OB12-30 The proposed sound barrier along Alameda as depicted in Figure 3.7-9b (Key View 5 – Young Street Elevated Expressway) might buffer some of the added noise from an elevated SR-47, but a comparison between 2030 Peak Hour Noise Levels for Alternatives 1 & 3 and No Build (Table 3.14-8) indicates that the primary source of increased noise will be generated by Alameda Street traffic. Therefore the primary purpose of the street-level barrier is to reduce street-level noise, which according to Table 3.14-9 will be above existing levels even with this mitigation.

OB12-31 Again, any necessary improvements along Alameda to accommodate the increase in Port-related traffic, access to truck terminals and elevated noise and emissions should not rely on implementation of the SR-47.

OB12-32 According to Tables 3.14-11 & 3.14-12, Long Beach Neighborhood, noise levels generated by the existing SR-103 already exceed acceptable levels by 2-7dBA at 20 of the 28 sites evaluated. With the extension and sound barriers, noise levels at 22 of these sites would be reduced by 5-14 dBA below the existing levels.

OB12-33 According to Table 3.3-1, Existing Regional and Local Population Characteristics, Alternative 1 will increase noise and emissions above existing levels impacting several thousand residents in a densely populated, low income area and an elementary school. Alternative 2 will reduce noise and direct emissions below existing levels benefiting approx 270 low income residents in a '*neighborhood containing scattered residences and abandoned/incomplete construction,*' multiple acres of park and sports fields and an elementary school.

Therefore Alternative 2 will benefit the Long Beach Neighborhood by substantially reducing existing and future noise.

3.16 BIOLOGICAL RESOURCES

The construction of the new bridge footings in the Cerritos Channel and Consolidated Slip/ Dominguez Channel likely would require disturbance of existing channel bottom sediments. Any construction work will result in some variable amount of sediment resuspension and dispersal into the water column of both channels. The harbor sediments in the area of the bridges are primarily silt and finer-sized fractions and, if resuspended, are expected to stay in suspension for days.

The limited time of resuspended constituents in the water column indicates the potential for acute toxicity to invertebrates or fish but not chronic bioaccumulation or food-chain effects to birds or mammals. However, these predictions of potential water quality effects to aquatic life are based on uncontrolled sediment suspension and dispersion.

It is likely that, with the flood tide current within the Consolidated Channel, any resuspended sediment plume will travel an unknown distance upstream into the Dominguez Channel before the tide turns. Similarly, it is likely that with the ebb tide current (and discharges from the Dominguez Channel), any resuspended sediment plume will travel an unknown distance downstream into the Consolidated Slip before the tide turns again. However, the length of the Consolidated Slip between the Alternative 1 footprint and the East Basin is approximately 914 m (3,000 ft); and it is likely that any turbidity plume would turn back within the Consolidated Slip on the ebb tide before it reaches the East Basin. Therefore, any plume would be contained within the Consolidated Slip and Dominguez Channel and not enter the East Basin.

Response to Comment OB12-34

Sediments in the Consolidated Slip may be assumed to behave similarly to those that were evaluated and modeled for the Cerritos Channel. Resuspension of those sediments is assumed to result in impacts during project construction. However, these impacts will be mitigated by project design. For all in-water piles, Caltrans will use a cast-in-steel-shell (CISS) design, which acts as a cofferdam. The outer shell extends above the water line during construction and is cut to below the water line once construction is complete. This design mitigates for construction-related turbidity and the resulting resuspension of sediments.

Response to Comment OB12-35

The comment that Alternative 2 of the proposed project does not present a risk to the benthic community in the Consolidated Slip is acknowledged.

3.10.1.1.4 Water Quality Objectives

Other contaminants that can be carried into receiving waters in surface runoff include heavy metals, oil and grease, and chlorinated hydrocarbons. The heavy metals (mostly cadmium, chromium, copper, mercury, lead, nickel, silver, and zinc), oil, and grease likely result from runoff from a roadway or bridge structure. Historically, the main concern with respect to these contaminants is their tendency to become suspended in the harbor sediments, where they can smother bottom-dwelling animals and promote anaerobic conditions in the water column. These types of contaminants tend to be most prevalent during construction activities associated with roadways and bridges.

3.10.2.4.2 Consolidated Slip/Dominguez Channel

Based on sediment concentrations of dichlorodiphenyl trichloroethane (DDT), PCB, cadmium, copper, lead, mercury, zinc, dieldrin, chlordane (all exceed sediment quality guidelines), sediment toxicity, and degraded benthic infaunal community, the Consolidated Slip/Dominguez Channel is considered to be a toxic hot spot by the State Water Quality Control Board (SWQCB) Bay Protection and Toxic Cleanup Program (BPTCP). The Consolidated Slip currently is listed as a Clean Water Act Section 303(d) impaired water body.

3.16.3.3.2 Alternative 2: SR-103 Extension to Alameda Street

From the results of the marine survey, aquatic communities are present for Alternative 2 at the Cerritos Channel only. Project effects of Alternative 2 on aquatic communities in the vicinity of the existing Schuyler Heim Bridge would be comparable to those discussed for Alternative 1. However, there would be no effects to aquatic communities, harbor seals, California sea lions, coastal pelagic species, and groundfish in the Consolidated Slip/Dominguez Channel because the alignment for Alternative 2 does not cross this feature.

OB12-34 Comments: It is highly recommended that the Department of Transportation obtain dredging information from the Port of LA and EPA before disturbing any contaminated soil in the Consolidated Slip to avoid a repeat of the environmental devastation caused during construction of the Alameda Corridor railway and realignment of the Henry Ford Bridge. Whatever was in the construction runoff killed everything in the benthic community in the Consolidated Slip for an entire year. This was not a temporary impact.

OB12-35 Alternative 2 does not present a risk to the benthic community in the Consolidated Slip.

3.12 HAZARDOUS WASTE/HAZARDOUS MATERIALS

Based on the calculated accident rates probability, project-related truck trips during operations have a medium probability (once every 10 to 100 years) of resulting in the accidental release of hazardous materials. However, this is similar to the risk associated with the existing use of SR-47 because Alternative 1 does not increase/decrease the transport or volume of cargo. The same number of trucks will continue to use SR-47 to ingress/egress Terminal Island, as well as other Port areas. As discussed in the traffic analysis (Section 3.5.3 – Environmental Consequences), the traffic model predicts that, during peak hours, Alternative 1 would result in a reduction of port truck volumes on I-110 by as much as 5 percent, or 70 trucks (AM peak hour) and on I-710 by as much as 10 percent, or 430 trucks (MD peak hour). Therefore, implementation of Alternative 1 would not result in an adverse risk of upset effect.

With the SR-103 Extension under Alternative 2, the chances of an accidental release of hazardous materials into the environment will be increased along the alignment, as there would be additional traffic along the route.

Response to Comment OB12-36

The route taken by liquid bulk and other hazardous waste carriers would be determined by destination. It is expected that liquid bulk transporters would use the new SR-47 Expressway to reach local destinations. In such cases, liquid bulk carriers are already using SR-47 for local transport. Access to regional destinations is better provided via I-710 and I-110.

The commenter's concern for vehicle safety is acknowledged. It is noted, however, that the purpose of improvements to SR-47 is to provide for safer transport of goods through the project area. Therefore, the new SR-47 Expressway would be a safer vehicular route through the area than the existing roadway, as the expressway would not experience at-grade railroad crossings or signalized intersections. The overall design of the new expressway would be consistent with Caltrans standards, which include minimum lane widths, grade limitations, road shoulders, and roadside barriers. Utilizing these design standards would enhance vehicular safety compared to the existing roadway and enable the expressway to safely accommodate liquid bulk carriers and other hazardous materials transport.

Also see the Draft and the Final EIS/EIR Sections 1.2, Purpose and Need for the Project and 3.12, Hazardous Waste and Hazardous Materials.

There is the potential for spills of toxic and hazardous materials being transported on the facility proposed under Alternative 2. The potential for spills would be approximately the same as for spills on other existing roads and freeways in the project area. However, Alternative 2 would introduce the potential risk associated with highway transport of hazardous materials to areas not presently subject to this risk. There is the potential for a transportation accident involving hazardous materials to result in explosion, fire, physical contact by emergency response personnel, potential airborne exposure of the public to contaminants, and surface/groundwater contamination.

OB12-36

Comments: The above statements imply that Alternative 2 could somehow increase the transport or volume of cargo and that an accident involving hazardous materials along the SR-103 would be more severe than on other roads. If the same number of trucks, presumably carrying hazardous cargo will continue to use the SR-47, which is Alameda they're most likely accessing facilities between the Port and Wilmington or Carson. Building the SR-47 would potentially take liquid bulk carriers off the I-110 and reroute them to within 100 feet of a densely populated area on an elevated expressway that does not currently exist.

Trucks carrying hazardous cargo on the SR-103 would reduce the number of these trucks on the heavily congested I-710, thereby shifting them to a less congested roadway and reducing the risk to more populated areas along the I-710 corridor.

3.3.3.4 Environmental Justice Determination

Project Benefits

Implementation of one of the build alternatives would have offsetting benefits that would accrue to the community as a whole. Residents, businesses, and visitors would be afforded a safer and more reliable bridge. A critical link in the local and regional circulation system would be restored and would potentially assist in stimulating social and economic redevelopment projects proposed for the community.

Potential Disproportionately High and Adverse Effects

Although the effects of the project would occur within an area having a population that is both minority and low-income, these effects cannot reasonably be considered disproportionately high and adverse. All but one Census tract in the project study area. (Census tract 5657 along Ocean Boulevard) are composed of substantial proportions of minority and low-income populations. Even though these groups would bear a large part of the burden associated with the project, it is due only to their proximity to short-term construction activities, and is the same as for any community that would be similarly affected by proximity to construction.

The potential adverse effects resulting from the project would not be appreciably more severe or greater in magnitude on minority or low-income populations than they would be on the population as a whole. As noted above, most of the potential adverse effects could be satisfactorily avoided or minimized through implementation of avoidance, minimization, or mitigation measures. Because there has been no evidence to suggest that the efficacy of these measures would differ with respect to different population groups, the net result would be the same for all population groups for these resource areas. The adverse effects that have been identified as unavoidable even after implementation of mitigation would also not be appreciably more severe or greater in magnitude on minority or low-income populations.

Response to Comment OB12-37

The commenter's perspective is acknowledged. However, the purpose of the barriers is not to redirect heavy truck traffic adjacent to the referenced residential community. Rather, the purpose of the noise barriers (or soundwalls) along Alameda Street between Anaheim Street and Pacific Coast Highway, which would be constructed under project Alternative 1, is to reduce the traffic noise associated with the new SR-47 Expressway. This is explained and illustrated in Section 3.14.3 of the Draft and the Final EIS/EIR. As shown in Section 3.14.3.3.1.2, with installation of the referenced soundwalls, noise levels would be less under project Alternative 1 (SR-47 Expressway with noise barriers) than they would be under the No Build alternative.

The soundwalls are not expected to increase existing problems with graffiti, dumping, and homeless encampments in the area. Because the sound walls will be adjacent to the railroad right-of-way, access will be possible from only one direction and, therefore, more difficult for illegal dumping and unauthorized encampments. After installation of the soundwalls, the railroad right-of-way will be accessible only from the Alameda Street side, and will no longer be accessible from the residential community, such as on Young Street. Further, the railroad right-of-way and noise barrier will be in full view from Alameda Street, which will be a discouragement for unauthorized dumping or encampments.

As part of the aesthetic design features of the soundwalls, landscaping also will be used, to help to combat graffiti and to enhance public acceptance of the soundwall. Vines will be planted where feasible to cover the wall. Vandalism (graffiti) to the soundwall will be painted over to match the walls.

Response to Comment OB12-38

The Draft and the Final EIS/EIR acknowledges the increase in noise levels and emissions that would occur with implementation of the

Given the results of technical studies concluded thus far, and taking into consideration the following: (1) similarity of impacts to minority and low-income populations compared to the general population; (2) generally equivalent efficacy of proposed mitigation measures and project enhancements; and (3) off-setting benefits of the transportation facility, no disproportionately high and adverse effect on any minority and/or low-income populations would result from any of the build alternatives.

Community Cohesiveness

The assessment of whether, and to what extent, Alternative 1 would adversely affect the cohesiveness of the adjacent community depends largely on whether the project is likely to create a barrier to the community. Because the project remains for the most part within existing rights-of-way adjacent to, but not through, the nearby residential portions of the community, no physical barrier would be created. The community surrounding the Alternative 1 would, therefore, be anticipated to remain intact.

Because the SR-103 portion of Alternative 2 remains for the most part within existing rights-of-way adjacent to, but not through, the nearby residential portions of the community, no physical barrier would be created. The community surrounding the project would, therefore, be anticipated to remain intact. Community character would remain unchanged. Implementation of Alternative 2 would not result in the introduction of new uses where none currently exist.

OB12-37 Comments: Alternative 1 - Two 13- to -18-foot-high barriers along Alameda between Anaheim and PCH, one elevated and one at street-level are essentially walling-off the community in order to redirect heavy truck traffic adjacent to a densely populated, primarily low-income, minority residential area. This neighborhood is plagued with illegal dumping, graffiti and homeless encampments along both sides of existing fenced areas. Erecting any kind of barrier will exacerbate these problems.

OB12-38 Ten lanes of truck and vehicle traffic between two congested intersections, Anaheim/Alameda and PCH/Alameda, will increase noise and concentrate emissions well above existing levels impacting several thousand primarily low-income, minority residents.

OB12-39 The SR-47 will potentially add more east-west traffic between PCH and the I-110 with no proposed improvements along that route or at the PCH/I-110 on/off ramps. A substantial increase in traffic along PCH will have a negative economic impact on small minority-owned, retail businesses that account for approx 50% of the businesses along that PCH corridor, increase risks of accidents at the heavily-used Banning High School street crossing, and impact Banning Park and the Wilmington Senior Center.

OB12-40 This DEIR is obviously slanted toward implementation of the SR-47 however the localized emissions are grossly understated and the traffic studies do not justify spending $700 million on a project that will not reduce street traffic or congestion, will redirect more traffic into Wilmington, increase noise and substantially increase localized emissions.

OB12-41 The SR-103 extension reduces street and highway congestion and benefits the Long Beach Neighborhood by reducing existing and future noise and does not create localized emissions. Therefore, the Wilmington Boat Owners' Association supports Alternative 2.

Sincerely,
Donna Ethington , V.P.
Wilmington Boat Owners' Association

proposed project. Measures to emissions and noise to the extent feasible are provided for Air Quality and Noise in Sections 3.13.3 and Section 3.14.4, respectively, as Avoidance, Minimization, and/or Mitigation Measures. Further, additional mitigation measures to reduce air quality impacts have been identified and included in Section 3.13.4 of this Final EIS/EIR.

The Draft and the Final EIS/EIR acknowledges that the community containing the project area is predominantly minority and low-income. However, the community also benefits from implementation of the project through reduced traffic congestion and idling traffic. All feasible mitigation measures related to the project have been evaluated and proposed without any discrimination on the basis of the socioeconomic status of the community. The purpose of the proposed project is to reduce traffic congestion and provide for more efficient movement of goods to and from the Port area.

Response to Comment OB12-39

During the AM, MD, and PM peak hours, traffic volumes on Pacific Coast Highway between I-110 and Alameda Street for the No Build alternative and Alternative 1 vary from 4,890 to 5,300 Passenger-Car Equivalents (PCEs) and 3,490 to 4,500 PCEs, respectively. Peak hour ramp volumes at the I-110/Pacific Coast Highway interchange are increased only on the northbound on-ramp and southbound off-ramp by 33 and 18 PCEs, respectively. Hence, traffic volumes on Pacific Coast Highway, including the ramps, are not increased significantly under Alternative 1 compared to the No Build alternative.

Response to Comment OB12-40

The commenter's view is acknowledged.

The air quality analysis methodology and results are provided in the Air Quality Technical Study and Section 3.13 of the Draft and Final EIS/EIR.

The traffic analysis methodology and results are provided in the Traffic Study and Section 3.5 of the Draft and Final EIS/EIR. As indicated, the traffic analysis shows that the level of service (LOS) will be improved at most intersections (see Table 3.5-12 in the Draft and the Final EIS/EIR).

In addition, the noise analysis methodology and results are provided in the Noise Study and Section 3.14 of the Draft and Final EIS/EIR. As indicated, construction noise will be mitigated, and noise from project operations will be abated at sensitive receptors by noise barriers. As shown, with noise abatement in place, noise will generally be lower after implementation of the proposed project that under the No Build alternative.

Response to Comment OB12-41

The support of the Wilmington Boat Owners' Association for Alternative 2 is acknowledged.

Individual Letters

Letter I2. Signatory – George A. Martinez

George A. Martinez
2717 East Monroe Street
Long Beach, California 90810
Telephone: (310) 834 3358 Fax: (310) 830 7737

October 15, 2007

Mr. Ron Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS -16A
Los Angeles, California 90012

Subject: Comments on Draft EIR/EIS for proposed Caltrans Project for the Schuyler Heim Bridge Replacement and SR-46 Expressway Project

References: (1) Caltrans Draft Environmental Impact Report/Statement and Section 4 (f) Evaluation, August 2007
(2) Meyer, Mohaddec Associates Final Traffic Study: Schuyler Heim Bridge Replacement and SR-47 Expressway Project, July 2007

Dear Mr. Kosinski,

My name is George A. Martinez a resident of the City of Carson and a former City Planning Commissioner (1997-1999). I am a 1951 graduate of the School of Engineering, University of Southern California.

I have reviewed and studied the references and prepared written comments regarding the proposed project. These comments are discussed in an enclosure to this letter.

During my time on the Commission and in the seven years subsequent to the end of my term, I have become very familiar with the City and problems needing attention and correction. A major problem is the present and serious traffic condition - a condition that is directly traceable to the LB/LA ports and the operations conducted therein.

I am qualified to comment on the impacts of the proposed project on the City of Carson. My comments are limited to a discussion of the present traffic situation and those forecast for the future. Comments in other environmental areas (noise, air quality, health, etc.) are not discussed. These are left to others interested and more qualified to comment.

Respectfully submitted,

George A. Martinez

Encl.

cc City of Carson, Community Development Department
Attn: Sherri Repp
Faroukh Pabolfathi

Letter I2. Signatory - George A. Martinez
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Comments
on

PROPOSED CALTRANS PROJECT
for
REPLACEMENT OF SCHULYER HEIM BRIDGE & SR-47 EXPRESSWAY

Submitted by:

George A. Martinez
2717 East Monroe Street
Carson, California 90810

October 15, 2007

Response to Comment I2-1

The Draft and the Final EIS/EIR address the potential impacts of the proposed project within the project study area, shown on Figure 1-1 of the Draft and the Final EIS/EIR. As shown on Figure 1-1 and described in Section 1.1 of the Draft and the Final EIS/EIR, the study area is generally bounded by I-710 (Long Beach Freeway) on the east, I-110 (Harbor Freeway) on the west, Terminal Island on the south, and SR-91 on the north, an area that includes most of the City of Carson.

As stated in Section 3.5 of the Draft and the Final EIS/EIR, the traffic study analyzed traffic conditions in the project area and the potential effects of the project alternatives on those conditions. Specifically, the analysis assumes replacement of the Schuyler Heim Bridge, with either the new SR-47 Expressway or SR-103 Extension. The purpose of the study is not to analyze every street and intersection in the project area, but the ones that would be most affected by the project and project-related traffic. Specifically, the analysis includes the SR-47 Expressway mainline, ramps, 20 intersections in the immediate vicinity of the project, and major intersections north and south of the project.

Draft and Final EIS/EIR Section 3.5, Traffic and Transportation, addresses traffic impacts along the major arteries in the study area that would be affected by implementation of one of the project alternatives, including Alameda Street, north to SR-91.

Response to Comment I2-2

Please refer to Response to Comment I2-1.

Response to Comment I2-3

The traffic model used for this is study is the "Ports of Los Angeles and Long Beach Transportation Study Model." The model is based on the SCAG regional model. It was developed by disaggregating the SCAG zones in the Ports area and customizing the trip generation and distribution for the Port terminals. A detailed description of the Port model is provided in the Traffic Study.

Proposed Caltrans Schuyler Heim Bridge & SR-47 Expressway Project

1.0 Project Description

a. Purpose: The stated intents of the project are:
- to replace a seismically deficient bridge over the Cerritos Channel
- develop alternatives for improving traffic conditions in the Project Study Area

b.. Critique Methodology

The methodology used in this critique is simple and straight forward. It basically consists of: (1) noting items (of interest, concern or in need of explanation) identified from the review of the projects reports, and (2) commenting on them to express my concerns as the items are discussed.

2.0 Study Plan

I2-1 The Project Study Area is defined by I-110 on the west, I-710 on the east, the Port Area on the south and Sepulveda on the north. That there is repeated reference to reducing the congestion on I-110 and I-710. suggests this is a desired project goal. Minimal attention has been given to anything that occurs outside of this area. As is discussed in Section 3.0 an exception is the great interest shown in the traffic conditions on Alameda north of I-405. The traffic analysis paid detail attention to every street or intersection on Alameda up to I-91. It is conjectured it only received attention because it is a section of the Alameda Corridor

I2-2 In this study, the project planners appear to have defined the problem as one that exists totally within the described project study area. That this study totally ignored the City of Carson, a major South Bay industrial and warehousing center, suggests the problem is viewed as local one rather than a regional one. This is considered a very parochial view, a planning error that will skew the study findings and subject them to questioning.

I2-3 That they would hold this view is puzzling in that it was indicated the study relied on the Southern California Association of Governments (SCAG) Transportation Demand Model for assessing traffic congestion (level of service). The SCAG model is a regional model and not generally applicable for local city traffic analysis. Other concerns related to mathematical models are discussed in Section 3.0

a. Alternate Project Proposals

All of six project alternatives were reviewed. Alternatives 4 through 6 were rejected outright as having no merit. Alternatives 1 and 2, as designed do nothing to alleviate the traffic situation and only impact the City of Carson and the surrounding area in a negative way. However, in spite of the foregoing Alternatives 1 and 2 were studied considered because:

(1) because of the importance of the LB/LA ports importance to the National and Southern California economies..

(2) identification of negative impacts caused the project could lead to the development of acceptable mitigation methods.

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Response to Comment I2-4

The Ports model has a detailed highway network, with corresponding auto and truck trip tables. Trip diversions that would occur as a result of the proposed project were factored into the model.

Response to Comment I2-5

To analyze the impact of the SR-47 Expressway, the Ports travel demand model was utilized. This model generates and forecasts the traffic volumes on arterials and freeways. The model was run both with and without the SR-47 Expressway for AM, MD, and PM peak hours. The results were then compared across major corridors. These results are provided in Figures 3.5-7, 3.5-8, and 3.5-9 of the Draft and the Final EIS/EIR.

Response to Comment I2-6

The commenter is correct that, under Alternative 1 and Alternative 2, port truck traffic will increase on Alameda Street north of the merging points. Under Alternative 1, during the AM, MD, and PM and peak-hour traffic periods, there will be an increase in port trucks and a decrease in other vehicles on Alameda Street south of I-405 and south of SR-91. However, when cars and trucks are considered together, as "passenger car equivalents (PCE)," the overall traffic changes range from a 5 percent increase south of I-405 during the PM peak hour, to a 2 percent decrease south of I-405 and SR-91 during the MD peak hour, and south of SR-91 during the PM peak hour. This information is shown on Figures 3.5-7, 3.5-8, and 3.5-9 of the Draft and the Final EIS/EIR.

Under Alternative 2, the traffic analysis shows an increase in PCE on Alameda Street during all three peak hours, primarily south of I-405, where PCE would increase 30 percent during the AM and MD peak hours and 34 percent during the PM peak hours. South of SR-91, PCE would increase six percent during the AM peak hour and 4 percent during the MD and PM peak hours. This information is shown on Figures 3.5-14, 3.5-15, and 3.5-16 of the Draft and the Final EIS/EIR.

The report claims project benefits that are not proven and therefore questionable. Examples of these are:

I2-4 • project will provide an alternative route from Terminal Island , a major generator of for-related truck traffic and provide direct access to local distribution center and warehousing facilities in the South Bay area, as well as I-405 and SR-91, thereby relieving congestion on the Harbor and Long Beach freeways. In the eyes of the planners diverting of traffic off of freeways onto seem to solve their problem as if all the traffic suddenly fell into a black hole. No consideration was given to what happens to the already congested surrounding street networks that are being asked to accommodate the added traffic dumped on them. Ignored is the fact that once the cargo processed, it will be reloaded on trucks and reappear on the same freeways, from which they had previously been diverted from, en route to a delivery destination.

I2-5 • enhance mobility on local freeways by diverting 5-8% of the port related trucks . No information could be found to substantiate the claim.

I2-6 • diverts trucks from certain local arterial commercial areas and residential areas. If true, this statement is only applicable to the defined limited project study area. It is not true outside of this area. In fact, if either Alternative 1 or 2 is approved, the opposite will be the case due to the fact the designs incorporating wider high capacity lanes will only increase the traffic volume north of the merger point on Alameda Street.

I2-7 The Alameda Street-223rd Street-405 Fwy S interchange and all other City of Carson interchanges that connect to freeways are presently in a stressed condition that approach gridlock several times a day. The impact of the project in the City of Carson is seriously negative. This condition is directly attributable to LB/LA port operations, yet the study report offers no discussion on measures for mitigating the problem.

Simply stated the existing traffic situation, with and without the planned project, can be likened to trying to put 20 pounds of apples in a one pound bag. The traffic network is at capacity, it cannot accommodate the present traffic load much less the increased volume forecast for the future. There appear to be only two solutions to the problem: increasing the size of the bag or redesigning the troublesome interchange nodes, i.e. increasing their capacity to handle projected volumes. Neither which is planned for the project.

3.0 Traffic Analysis Study

I2-8 Several concerns were raised regarding the traffic analysis study. Some of these concerns relate to:

(1) the decision to focus on the project area, ignoring the City of Carson, and that the problem is a regional problem and not a local one.

(2) mathematical model used. Although it was implied that The SCAG Transportation Model was used, a description of the model was not sufficiently described. If the model design relied on the SCAG model, was it recognized the model was developed primarily to assess regional impacts not local impacts. Therefore the use of the model is limited because it treats all cities as being the same.

(3) Whether of not the data bases used are current is of concern . The SCAG model was updated in 2004. The Travel and Demand Model used in the EIR/EIS report is based on a LB/LA transportation model developed in 2001 and approved by Long Beach and LA

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Response to Comment I2-7

The Alameda Street/223rd Street connector ramp and 223rd Street and I-405 southbound and northbound ramps are analyzed as part of the project. The existing LOS analyses for AM, MD, and PM peak hours are C or better, with the exception of the Alameda Street/223rd Street connector intersection which is at D for the PM peak hour. In the 2030, the Alameda Street/223rd Street connector intersections are impacted; mitigation is provided as an element of the proposed project for Alternatives 1 and 2. No impact was identified for the I-405 northbound ramp.

These changes are described in Draft and the Final EIS/EIR section 2.2.1.1.2 for Alternative 1 and section 2.2.2.1.2 for Alternative 2. Under Alternative 3, changes would be the same as for Alternative 1. None of these improvements would occur under Alternatives 4, 5, or 6.

Response to Comment I2-8

The traffic model used for this is study is the "Ports of Los Angeles and Long Beach Transportation Study Model." The model is based on SCAG regional model. It was developed by disaggregating the SCAG zones in the Ports area and customizing the trip generation and distribution for the Port terminals. It was originally developed in 2001. It was updated to include the SCAG 2004 RTP model data, as well as the most current Port data. A detailed description of the Port model is provided in the Traffic Study.

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Response to Comment I2-9

As shown in Figures 3.5-7, 3.5-8, and 3.5-9, under Alternative 1, truck traffic volumes are decreased on parallel routes to Alameda Street, including I-110 and I-710. Traffic volumes on major east-west routes west of Alameda Street, such as Sepulveda Boulevard and Pacific Coast Highway are not increased significantly under Alternative 1 compared to the No Build alternative. During the AM, MD, and PM peak hours, traffic volumes on Pacific Coast Highway for the No Build alternative and Alternative 1 vary from 4,890 to 5,300 Passenger-Car-Equivalents (PCEs) and 3,490 to 4,500 PCEs, respectively. Traffic volumes on Sepulveda Boulevard for the No Build alternative and Alternative 1 vary from 2,230 to 2,400 PCEs and from 2,050 to 2,350 PCEs, respectively, during the three peak hour periods.

For the reasons outlined above, the intersections at streets parallel to Alameda Street are not analyzed since the forecast traffic volume either remains the same or decreases. However, key intersections along Alameda Street between Anaheim Street and Artesia Boulevard, including the I-405 and SR-91 ramps, are analyzed.

The intersections addressed in the traffic analysis are listed in the Draft and the Final EIS/EIR Section 3.5.2.1. Existing conditions at these intersections are shown in Table 3.5-3. The effects of the project alternatives on these intersections are addressed in Section 3.5.3.3.

I2-8

I2-9

Angeles for port transportation planning and environmental studies. The model is bas on the SCAG's regional model.

All of the above raise concern over the ability of the model to accurately measure the present condition of traffic networks, identify areas of traffic congestion, the cause of th congestion and possibility of recommending measures to mitigate the problem. If the study accomplished the above, it was not apparent how and when these findings were used to affect the design of the project. This issue is raised because it was indicated tha Traffic Movement Plan (TMD) will be prepared during the design phase of the selected Alternative. Since forecasts are usually published many months after the survey is complete there is doubt data will be available in time to influence design of the project.

The time spent in reviewing the traffic study was insufficient to address these concerns in detail All that can be said it is not known if the study had the ability to accomplish the items listed above. A useful output of the study is that traffic condition (degree of congestion) is determined according to the delay caused at a location. To def congestion, model designers use the ratio V/D where V represents Volume (Traffic Count) and D represents Delay (in seconds). The value of the ratio is compared to a standard which defines the level of congestion.

4.0 City of Carson

The City of Carson is major South Bay distribution and warehousing center. The extent of the city involvement in the movement and processing of cargo arriving in the the Port of Long Beach, is self evident by reference to Figures 1 and 2. Figure 1 is a space image looking down on a portion of central industrial area defined by the 91 Freeway on the north, Alameda Street (Alameda Corridor on the East, 405 Freeway/223rd Street on the south and Wilmington Avenue on the west.

Although the main purpose of Figure 2 relates to the traffic condition (congestion), an indication of the extent of the total environment (noise, air quality, mobility, health, etc. price the citizens must pay for living in the City of Carson.

(a) City of Carson Traffic Analysis:

Figure 2 identifies City of Carson areas impacted by the Planned Schulyer Bridge Replacement and SR-47 Expressway Project.

Particular attention is directed to the areas of greatest congestion. These are: Wilmington Ave - the main North/South transportation corridor and interchanges that merge traffic on and on and off the the regions Freeways, These are areas are stressed to capacity and so congested they are always near or at a gridlock condition.

To illustrate how congested Wilmington Ave is, it is only necessary to Figure 2 and the number of impact areas located on Wilmington Ave. Of the 12 areas listed, 6 involve Wilmington Ave. Other major areas experiencing traffic conditions as bad Wilmington Avenue are :

Area 2 Alameda Street-223 rd-405 Fwy Interchange (See Figure 3)
Area 5 Del Amo on-off ramps to 710 Fwy
Area 8 Wilmington Avenue - 223rd - 405 Fwy S Interchange (See Figure 4)

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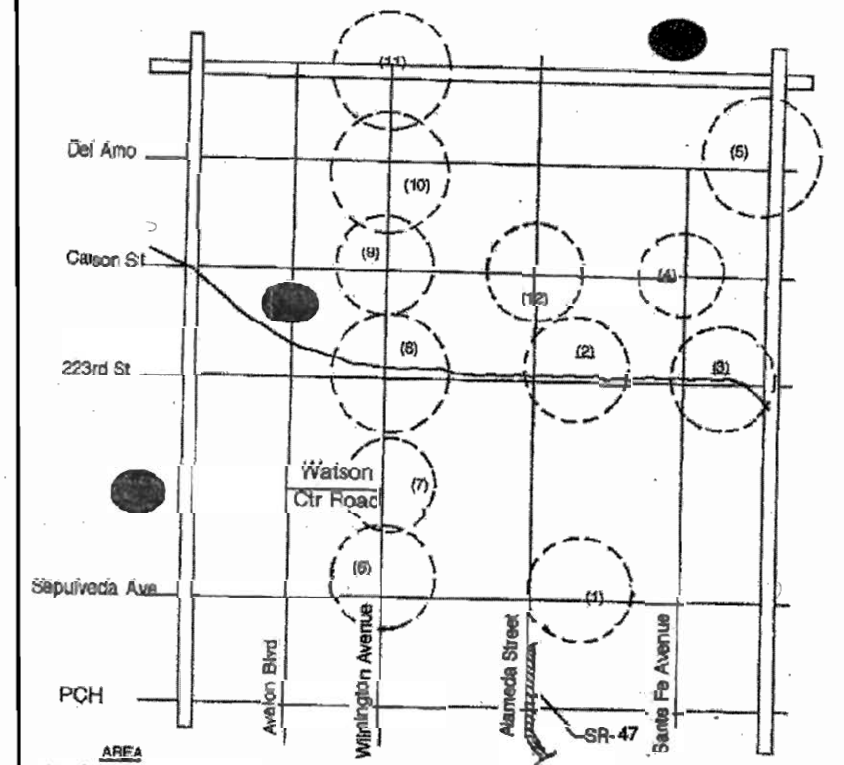

AREA
(1) Alameda Connector to Sepulveda Ave & Intermodal Container Transfer Facility
(2) Alameda Street-223rd-405 Freeway Interchange (See Figure 3.0)
(3) 405 Freeway South Off Ramp to 223rd St -Santa Fe Avenue
(4) Carson Street - Santa Fe Intersection
(5) 710 On-Off Ramps to Del Amo
(6) Wilmington Avenue - Sepulveda Intersection
(7) Wilmington Avenue - Watson Center Road Junction
(8) Wilmington Avenue - 223rd Street - 405 Freeway Interchange (See Figure 4.0)
(9) Wilmington Avenue - Carson Street Intersection
(10) Wilmington Avenue - Del Amo Intersection
(11) Wilmington Avenue - 91 Freeway Interchange
(12) Alameda Street - Carson Street Connection

Figure 2.0 City of Carson Areas Impacted by Planned Schuyler Bridge and SR-47 Express Way Project

Not to Scale

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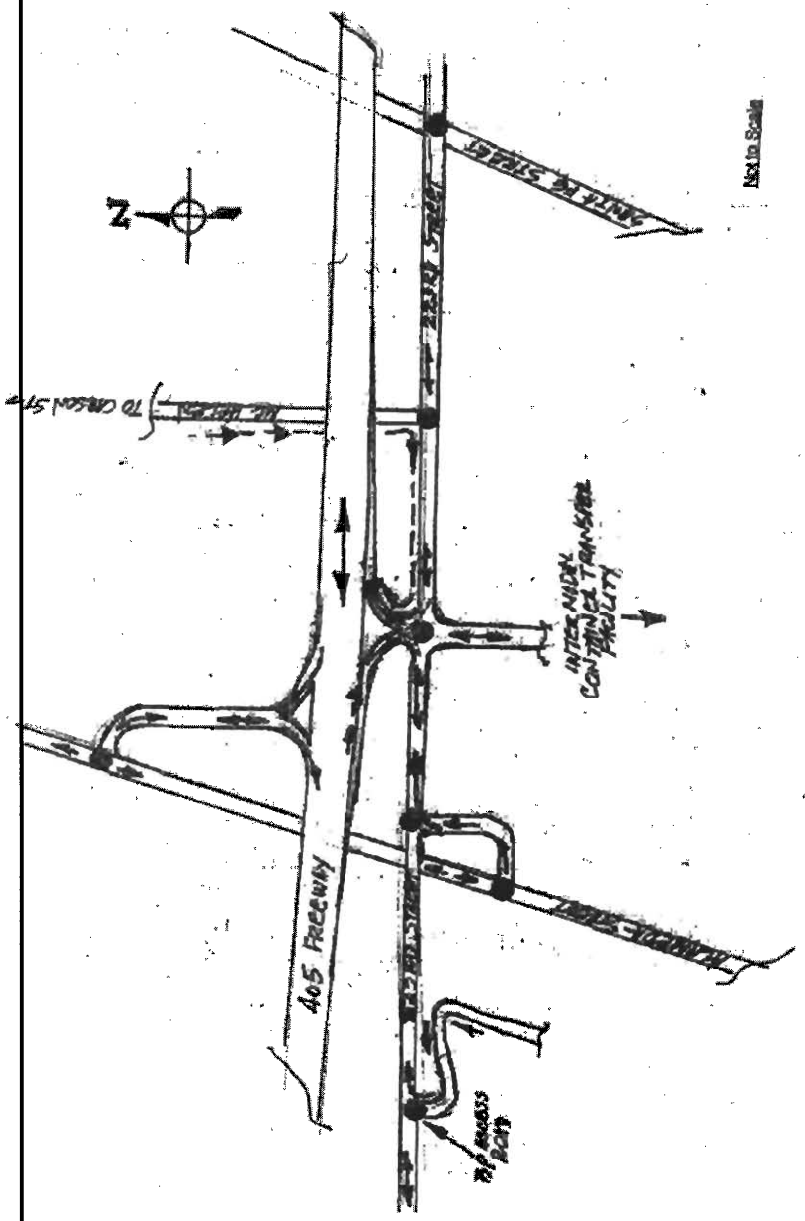

Figure 3.0 Traffic Flow and Congestion @ 405 Freeway-223rd Street - Interchange

- 6 -

I2-9

Letter I2. Signatory - George A. Martinez
Page 8

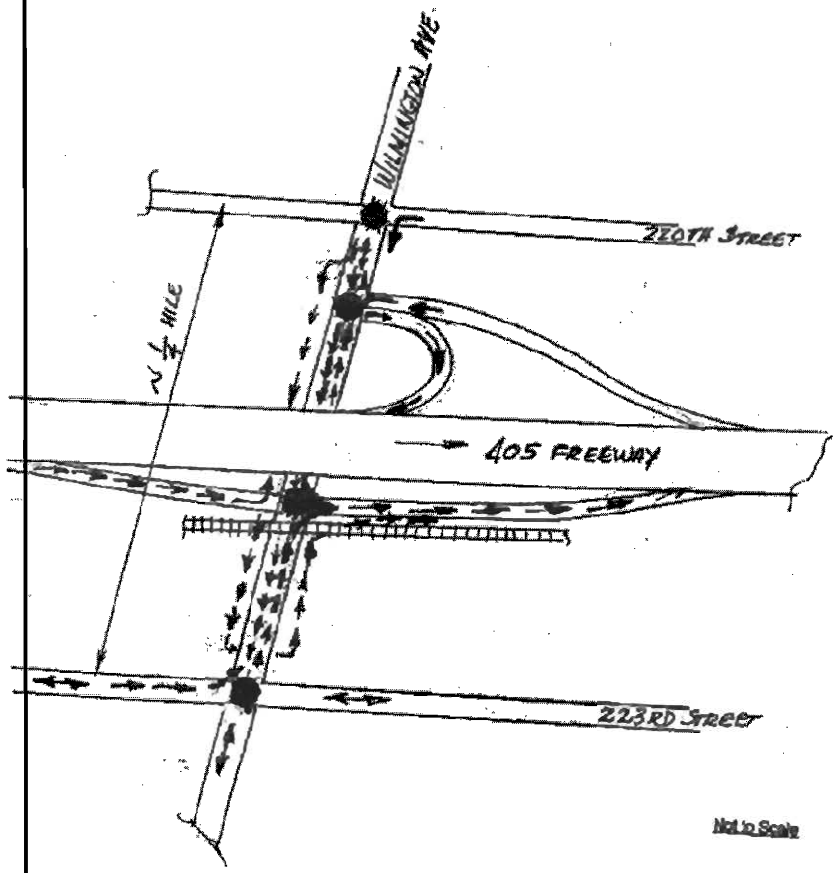

Figure 4.0 Traffic Flow and Congestion @ Wilmington Ave-405 Freeway-223rd Street Interchange

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I2-9

Letter I2. Signatory - George A. Martinez
Page 9

Response to Comment I2-10

Alternative 1 provides a better access to the origins and destinations on Alameda Street by reducing the travel time and distance as shown in reduced VMT and VHT for the study area bounded by Ports, I-405, I-710 and I-110.

Response to Comment I2-11

The commenter is referred to response I2-1.

Response to Comment I2-12

The intersection referenced in this comment will be improved as part of the proposed project. The specific improvements are described in the Draft and the Final EIS/EIR for Alternative 1 in Section 2.2.1.1.2 (page 2-26) and for Alternative 2 in Section 2.2.2.1.2 (page 2-57).

Improvements to this intersection are also addressed on pages 44 and 60 of the Traffic Study.

Response to Comment I2-13

Your opposition to the proposed project is acknowledged.

Area 10 Wilmington Avenue- Del Amo Intersection
Area 11 Wilmington Avenue - 91 Fwy Interchange

I2-9 The congestion is not only due the traffic volume but to the interchange design and the many signals placed is such close proximity that traffic backs up causing long delays. The congestion existent in the above listed impact areas is difficult to describe in words. Understanding the problem is facilitated by reference to the sketches in Figures 3 and 4.

I2-10 A point of sarcastic comment can be made by reference a benefit claimed for Alternative 1 previously made, i.e., it reduced freeway traffic by diverting the traffic to surface roads, and in doing so provided trucks direct access to central distribution centers and warehousing facilities. Ignored is the fact the diverted traffic will enter transportation network contributing to making a bad traffic situation in the City of Carson even worse.

5. Comments Summary

Comments on issues of concern identified during the review of the Final Draft EIR/EIS report and the Traffic Analysis Report are scattered throughout this memorandum. The principal ones are summarized as follows:

I2-11 In the conduct of the study a decision was made that the study would focus principally on the project area. As perceived, a principal goal of the study, other than solving the seismic problem of Schuyler Heim Bridge was improving the traffic conditions on the I-110 and I-710. Minimal attention was devoted to area between the I-110 and I-710 and north of Sepulveda. In fact the the City of Carson and the areas surrounding the Ports of Long Beach and Los Angeles. were totally ignored except for an isolated and cursory look at Alameda Street (Alameda Corridor) as it goes northward. It is naive to think the project would have no effect on the Freeway and street network in the region.

This decision essentially said the Study Planners did not view the project as a regional problem. This decision demonstrates a lack of understanding of how large infrastructure projects impact a region.

I2-12 The Project Alternatives proposed as solutions were simplistic and so poorly conceived that all but Alternatives I and 2 were rejected as having no merit Alternatives 1 an 2 because of their design (four-laned high capacity expressways) and where they merge onto Alameda Street, will severely and negatively impact the Alameda Street-223rd Street- 405 Fwy S Interchange. This interchange is at capacity and cannot accommodate any new volume. A discussion of this as a problem could not be found. It is inconceivable that the traffic analysis study team could not have known of this problem. If they knew, they had responsibility for calling attention to the problem and suggesting measures for mitigating it.

I2-13 For the reasons stated above and others discussed I cannot support this project. I will recommend to the City of Carson it oppose the project and fight to prevent it's construction.

George A. Martinez

- 8 -

Letter I3. Signatory – Louise D. Rubenstein

Response to Comment I3-1

The projects listed under Alternative 5 were current as of 2004. Since 2004, some of the projects listed may have become operational.

Response to Comment I3-2

Please see the Traffic Study report of the "Expansion of Long Train Warning System" (Page 65).

1519 S Fifth Avenue
Arcadia, CA 91006
October 15, 2007

Ronald J. Kosinski
Deputy District Director
Division of Environmental Planning
Caltrans District 7
100 South Main St (MS16A)
Los Angeles, CA 90012

Subject: Comments on Draft EIR SR-47 Heim Bridge Replacement

Dear Mr. Kossinski:

I3-1 Section 2.2.5.1.1 Intelligent Transportation Systems incorrectly describes a current ACTA project as a future project, which could be implemented under Alternative 5, Transportation Systems Management.

The ACTA Board has already funded a project for a "Long Train Warning System" that would detect trains blocking Henry Ford Avenue between Pier A Way and Anaheim Street for more than 4 minutes. The delay information would be displayed on changeable message signs at the intersection of Anaheim Street and Henry Ford Avenue. The project designs are described in City of Los Angeles Bureau of Engineering Permit BC 600313.

The Draft SR-47 EIR describes an "advanced detection system for trains approaching rail crossings between the Henry Ford Avenue/SR-47 interchange and Anaheim Street so that train blockages of those tracks would be detected in advance of and during the blockage. That information would be used to direct vehicular traffic to routes without blockages, such as SR-47/103, I-710, etc."

I3-2 The Draft EIR should be corrected to indicate that this portion of the proposed TSM improvement is already under construction. The SR-47 Heim Bridge Replacement Project should expand and improve the initial system. It could widen the detection zone to include Henry Ford Avenue/ Alameda Street between Anaheim Street and Pacific Coast Highway and the New Dock Street off-ramp. It could include all six at-grade railway highway at-grade crossings noted in other parts of the Draft EIR. It should include an additional changeable message sign at the current Henry Ford Avenue northbound off-ramp. The system could be tied into the LADOT traffic control management system so that the traffic signals are coordinated with the movement of short trains.

This system should be constructed in conjunction with each of the other alternatives. It would be especially useful during the construction phase.

Sincerely,

Louis D Rubenstein

Supplemental Draft EIS/Recirculated Draft EIR Comment Letters and Responses

Agencies and Jurisdictions Letters

Letter AJ14. Signatory – Air Resources Board

Air Resources Board

Mary D. Nichols, Chairman
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Linda S. Adams
Secretary for
Environmental Protection

Arnold Schwarzen
Governor

December 29, 2008

Mr. Ronald Kosinski
Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, California 90012

Dear Mr. Kosinski:

This letter provides the Air Resources Board's (ARB or CARB) comments on the Supplemental Draft Environmental Impact Statement/Recirculated Draft Environmental Impact Report (SDEIS/RDEIR) for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project. We limited our review to the Air Quality Mitigation Measure Section wherein the control measures and potential air emission impacts from the project are listed and discussed.

Specifically, our comments focus on the exhaust control measures for construction activities. With respect to construction related air emissions, the emission mitigation strategy outlined in the SDEIS/RDEIR proposes to:

- Develop and implement a trip reduction plan to achieve a 1.5 average vehicle ridership for construction employees.
- Implement a shuttle service for construction workers to and from retail services and food establishments during lunch hours.
- Prohibit truck idling in excess of two minutes.
- Suspend use of all construction equipment operations during second-stage smog alerts.
- Use electricity, if feasible, from power poles rather than temporary diesel or gasoline powered generators.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: http://www.arb.ca.gov.

California Environmental Protection Agency

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Letter AJ14. Signatory - Air Resources Board
Page 2

Response to Comment AJ14-1

As noted in your letter, the emission mitigation strategy includes the minimization measures you outlined, as AQ-3 through AQ-12 in the Final EIS/EIR. Construction activities would include compliance with federal, state, and local regulations. Any further minimization measures during construction will include those measures that are applicable and feasible.

Mr. Ronald Kosinski
December 29, 2008
Page 2

- Initiate a Heavy Duty Truck Buyback Program to accelerate the modernizing of the heavy duty engine fleet operating in the South Coast Air Basin. By removing the older engines in the fleet and requiring replacement with newer, cleaner vehicles, a net reduction of NOx emissions (and other pollutants) would occur.
- To the extent feasible, utilize construction equipment equipped with Tier 2 or new engines.
- Maintain and tune engines per manufacturer's specifications to perform at United States Environmental Protection Agency (EPA) certification levels and to perform at verified standards applicable to retrofit technologies.
- Prohibit tampering with engines and require continuing adherence to manufacturer's recommendations.

AJ14-1

Below we have identified for your consideration several additional mitigation measures that would further reduce emissions from the project activities. This is particularly important with respect to diesel particulate matter (diesel PM), since under certain circumstances even short-term exposure to diesel PM has the potential for elevated cancer risk. That being said, any mitigation measure to further reduce diesel PM emissions is a priority. We encourage you to explore the measures below and other feasible emission reduction measures to further reduce diesel PM, oxides of nitrogen, reactive organic gasses, and carbon monoxide emissions.

- To the extent feasible during project construction, utilize harbor craft with engines that meet the cleanest existing marine engine emission standards, EPA Tier 2 or Tier 3.
- Use electrified dredging equipment.
- Additional fleet modernization for on-road trucks:
  - Pre-2011: All on-road heavy duty trucks shall comply with EPA 2004 PM standards, and cleanest available NOx, if available, CARB verified best available control technology.
  - Post-2011: All on-road heavy duty trucks shall comply with EPA 2010 PM standards.
- Limit the size of construction equipment engines to the minimal practical size.
- Periodic review of new technology and regulations.

There are many examples, both within and outside of California, where these mitigation measures have been successfully undertaken at construction operations.

Letter AJ14. Signatory - Air Resources Board
Page 3

Mr. Ronald Kosinski
December 29, 2008
Page 3

Thank you for the opportunity to review the Supplemental Draft Environmental Impact/Recirculated Draft Impact Report. If you have any questions regarding our comments, please contact Mr. Todd Sterling, Air Pollution Specialist, at (916) 445-1034 or email tsterlin@arb.ca.gov or Ms. Cherie Rainforth, Manager, at (916) 327-7213 or email crainfor@arb.ca.gov.

Sincerely,

Robert D. Barham, Ph.D.
Assistant Chief
Stationary Source Division

cc: Cherie Rainforth, Manager
Control Strategies Section

Todd Sterling
Air Pollution Specialist
Control Strategies Section

Letter AJ15. Signatory – Long Beach Unified School District

long beach unified school district

BUSINESS DEPARTMENT - Business Services
Facilities Development & Planning Branch
Donald K. Allen Building Services Facility
2425 Webster Ave., Long Beach, CA 90810
(562) 997-7550 Fax (562) 595-8644

Read file

December 30, 2008

Via US Mail:
Via Facsimile: 213-897-0360

RECEIVED
DEC 31 2008

Mr. Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning
Caltrans - District 7
100 South Main Street MS-16A
Los Angeles, CA 90012

Re: Comments on Schuyler Heim Bridge Replacement and SR-47 Expressway Project Supplemental Draft Environmental Impact Statement/Re-circulated Draft Environmental Impact Report and Section 4(f) Evaluation

Dear Mr. Kosinski,

The Long Beach Unified School District (LBUSD) appreciates the opportunity to comment on the Schuyler Heim Bridge Replacement and SR-47 Expressway Project (Project) Supplemental Draft Environmental Impact Statement/Re-circulated Draft Environmental Impact Report (SDEIS/RDEIR) prepared by the California Department of Transportation (Caltrans) and circulated for public review in November 2008. The LBUSD previously submitted written comments on the Draft EIS/EIR circulated for public review in August 2007.

LBUSD is responsible for providing school facilities and public education services to approximately 88,000 students in over 90 public schools in the cities of Long Beach, Lakewood, Signal Hill, and Avalon on Catalina Island. In addition to establishing high standards of academic excellence for its students, LBUSD is committed to providing a safe environment and school facilities for its students and employees. Thus, the LBUSD's primary concern in its review of the SDEIS/RDEIR is to distinguish the environmental impacts which must be properly addressed, analyzed, and mitigated to assure an environment conducive to learning.

BACKGROUND

Six Project alternatives were proposed and analyzed in the Draft EIS/EIR. The SDEIS/RDEIR was prepared in response to new information from a Health Risk Assessment (HRA) performed to address comments on the Draft EIS/EIR. The HRA estimates health risks from traffic-generated air emissions associated with two of the project alternatives:

- Alternative 1 – Bridge Replacement and SR-47 Expressway; and
- Alternative 2 – Bridge Replacement and SR-103 Extension.

The HRA only considered alternatives 1 and 2 in detail because: a) Alternatives 4, 5 and 6 were defined as equivalent to the no build alternative in terms of traffic, and b) Alternative 3 was considered equivalent to Alternative 1 in terms of traffic.

Mary Stanton	Felton Williams	Michael Ellis	Jon Meyer	David Barton
District 1	District 2	District 3	District 4	District 5
Vice President	Member	Member	President	Member

Letter AJ15. Signatory - Long Beach Unified School District
Page 2

Response to Comment AJ15-1

Your comment is noted.

Response to Comment AJ15-2

Comment noted and "schools" will be added to the description of mitigation measure AQ-13 so as to read, "will be installed in schools and residences that have a significant increase in cancer risk as demonstrated by the HRA."

Response to Comment AJ15-3

The study area evaluated by ACTA in the Health Risk Assessment (HRA) included all of the schools listed in the comment. Risks to individual schools listed in the District's comment were evaluated, based on the modeled receptor points on or nearest to each facility. There was no significant risk identified at any of the schools listed in the comments for Alternative 1, the preferred alternative, for students or workers. For Alternative 2, there was no student risk over 10 in a million for any of the schools listed in the comment. There was however, staff exposure risk predicted above 10-in-one million for Alternative 2 at Cabrillo High School. Staff exposure risk was below the threshold at all other listed schools.

The risks of 2015 Emissions Scenario is presented below in Table TR2-1. This table is a variation on Table 3.13-17 of the SDEIS/RDEIR, p. 3.13-53. The 2003 baseline has been added for comparative purposes.

The SDEIS/RDEIR concludes that Alternative 2 results in higher predicted cancer risk and cancer burden than Alternative 1 due to the proximity of the Alternative 2 truck route to residential neighborhoods, parks, and schools (including LBUSD schools). In addition, the SDEIS/RDEIR identifies a mitigation measure to reduce Alternative 1 risk to a "less than significant" level, but indicates that mitigation is not available to reduce Alternative 2 risk to a less than significant level. Also, it is reported that the cost to implement Alternative 2 is greater than Alternative 1.

GENERAL COMMENTS

AJ15-1 Based on the evaluation and findings presented in the SDEIS/RDEIR, the LBUSD strongly opposes Alternative 2. Alternative 2 would lead to increased traffic on SR-103 and associated emissions of toxic air contaminants (TACs) that would result in significant adverse impacts to LBUSD school sites in West Long Beach.

We note that the SDEIS/RDEIR acknowledges that the predicted health risk levels in the document are based on uncertain assumptions. As a result of this uncertainty and other limitations of the HRA methodology, it is the LBUSD's opinion that the risk predictions in the SDEIS/RDEIR (and HRA) may underestimate the adverse impacts to students and staff at LBUSD schools in the vicinity of the Project.

AJ15-2 In addition, mitigation measure AQ-13 states that retrofits and new heating, ventilating and air conditioning (HVAC) units ***"will be installed in residences within the vicinity of the significant impact zone".*** The LBUSD requests that **schools** be added to the mitigation measure language along with residences within the impact zone.

SPECIFIC COMMENTS

Proximity to Schools

AJ15-3 **Comment: The LBUSD requests clarification, and verification that the LBUSD facilities listed below were included in the HRA evaluation.**

The LBUSD owns and operates eight school facilities and one combined Facilities and Maintenance Branch facility west of I-710 (Long Beach Freeway) and south of I-405 (San Diego Freeway). We believe that at least four schools (Bethune Transitional Center, Webster Elementary School, Hudson K-8 School, and Cabrillo High School) would be directly impacted by Alternative 2, and possibly other proposed alternatives depending upon which of the six alternatives is selected. School facilities east of SR-103 and west of I-710 that may be directly and/or indirectly impacted by the Lead Agency's action are listed below.

1. Bethune Transitional Center: 2021 San Gabriel Ave., Long Beach CA 90810
2. Garfield ES: 2240 Baltic Avenue, Long Beach, CA 90810
3. Muir K-8: 3038 Delta Ave., Long Beach, CA 90810
4. Webster ES: 1755 West 32nd Way, Long Beach, CA 90810
5. Hudson K-8 (& Maintenance Facility): 2335 Webster Avenue, CA 90810
6. Stephens MS: 1830 W. Columbus Street, Long Beach, CA 90810
7. Cabrillo HS: 2001 Santa Fe Avenue, Long Beach, CA 90810
8. Reid High School: 2153 W. Hill Street, CA 90810
9. Facilities Branch and Maintenance Branch: 2425 Webster Avenue, CA, 90810

Table TR2-1 Summary of Cancer Risks

Alternative 1

All risks are expressed in number per million population

Residential Regions	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario Residential Risk Baseline	Alt 1	Increase[4]
Dominguez	2535	386,675	3,744,275	630	87.8	97.6	9.8
Lincoln Village	2389	386,525	3,743,825	612	84.9	95.0	10.1
Long Beach	2274	386,675	3,743,375	411	52.5	57.9	5.4
Wilmington	1548	384,975	3,740,025	356	39.7	50.3	10.6

Recreational Areas	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario Worker Risk Baseline	Alt 1	Increase[4]	2003 Baseline[3]	2015 Emission Scenario Adjusted Recreational Risk Baseline	Alt 1	Increase[4]
Hudson Park	1677	386,825	3,740,375	151	10.9	11.3	0.4	227	16.4	17.0	0.6

School Areas	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario 40-year Staff Risk Baseline	Alt 1	Increase[4]	2003 Baseline[3]	2015 Emission Scenario Adjusted 13-year Student Risk Baseline	Alt 1	Increase[4]
Cabrillo High School	1623	386,775	3,740,225	152	10.8	11.2	0.4	35	2.5	2.6	0.1
Hudson Elementary School	1766	386,925	3,740,625	153	11.3	11.7	0.4	36	2.6	2.7	0.1

Alternative 2

All risks are expressed in number per million population

Residential Regions	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario Residential Risk Baseline	Alt 2	Increase[4]
Dominguez	2535	386,675	3,744,275	630	87.8	94.1	6.3
Lincoln Village	2389	386,525	3,743,825	612	84.9	91.8	6.9
Long Beach	1736	387,125	3,740,525	532	50.1	66.2	16.1
Wilmington	1189	384,325	3,738,725	281	26.7	26.4	None

Recreational Areas	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario Worker Risk Baseline	Alt 2	Increase[4]	2003 Baseline[3]	2015 Emission Scenario Adjusted Recreational Risk Baseline	Alt 2	Increase[4]
Hudson Park	1677	386,825	3,740,375	151	10.9	20.3	9.4	227	16.4	30.5	14.1

School Areas	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario Worker Risk Baseline	Alt 2	Increase[4]	2003 Baseline[3]	2015 Emission Scenario Adjusted Recreational Risk Baseline	Alt 2	Increase[4]
Cabrillo High School	1623	386,775	3,740,225	152	10.8	22.7	11.9	35.3	2.5	5.3	2.8
Hudson Elementary School	1749	386,925	3,740,575	143	10.857	15.4	4.5	33.2	2.5	3.6	1.0

NOTES

[1] - Multiple receptors may share maximum risk increase; receptor listed is lowest-numbered.

[2] - Universal Transverse Mercator projection, Zone 11, NAD 83

[3] - For informational purposes only. Cancer risks of 2003 were estimated based on 2003 emisssions.

[4] - 2015 Baseline values used to calculate incremental risk.

Response to Comment AJ15-4

CARB (2008) has utilized OEHHA's Air Toxics Hot Spot Program guidance for the evaluation of diesel PM risk. OEHHA acknowledges that there is a great deal of uncertainty associated with the risk assessment process and therefore many of the assumptions in the guidelines are designed to be conservative on the side of health protection in order to avoid underestimation of risk to the public. Further, they assert that the best use of the risk estimates are as a tool to compare relative risk of one alternative from another and for comparing the potential risks to target levels to determine the level of mitigation needed. The HRA was conducted following the CARB adopted guideline, and its objectives are consistent with OEHHA's recommended use of the HRA results.

Response to Comment AJ15-5

Health risks from Ultrafine Particles (particles less than 0.1 micron aerodynamic diameter, also referred to as UFP) are, as stated in the District's comment, an emerging issue of public health concern with respect to their propensity to produce sub-chronic health effects. Sub-chronic health effects are ones that may manifest at exposure time scales longer than the acute scale (several hours) but less than the chronic scale (lifetime). No OEHHA guidance, or federal or state requirement, exists for quantifying sub-chronic health effects frequently attributed to UFP.

However, a qualitative argument can be made that a regional benefit similar to that seen for $PM_{2.5}$ would be expected with regard to UFP since more trucks will travel along the proposed SR-47 Expressway rather than on surface streets.

ACTA's proposed mitigation measure of HVAC retrofit, which include high efficiency HEPA filters, is designed to mitigate the principal modeled impacts due to DPM and it would also mitigate localized impacts from UFP.

AJ15-3

State Route 103 -- a major source of TAC emissions, especially under Project Alternative 2 -- is located immediately adjacent to the playgrounds and athletic fields of Hudson (K-8) School and Cabrillo High School, and 1,450 feet from Stephens Middle School. The LBUSD Facilities and Maintenance complex (2425 Webster, Long Beach) also is located immediately east from SR-103. It is not clear whether each of these school facilities adjacent to SR-103 was fully evaluated in the HRA. For example, summary risk estimates on Tables 3-1 and 3-2 list Cabrillo HS but no other schools.

HRA Methodology

The methodology used for the HRA and reported in the SDEIS/RDEIR is not inconsistent with generally accepted practice and guidelines. The SDEIS/RDEIR notes that the methodology is subject to significant uncertainty, including the general possibility that results are overly conservative. However, the SDEIS/RDEIR does not describe with equal emphasis the general possibility that -- and specific scenarios where -- the HRA methodology may be *non-*conservative.

AJ15-4

The LBUSD agrees that the HRA methodology is subject to inherent limitations. We further understand that these limitations may lead to significant *underestimation* of quantified risks and hazards associated with Project emissions. As noted, these limitations are not necessarily unique to the HRA prepared for the Project. Nevertheless, the LBUSD believes the final HRA should include greater efforts to ***emphasize*** these limitations in prominent locations of the HRA document and discuss their implications. In particular, qualifying statements based on professional judgment should be presented in conjunction with risk/hazard estimates where there is reason to believe the HRA methodology underestimates or fails to identify likely or possible risks/hazards. Examples of the limitations of the HRA methodology that may be non-conservative include the following:

- ***Ultra-fine Particles***

AJ15-5

Comment: The LBUSD requests that the HRA address risks from Ultra-fine Particles.

Research conducted and reviewed over the past 6 or 7 years by investigators at the University of California at Los Angeles (UCLA) and the Southern California Particle Center (SCPC) and elsewhere indicates significant new health concerns associated with exposure to Ultra-fine Particles. As noted by South Coast Air Quality Management District (SCAQMD) and the California Air Resources Board (CARB) and others, children are especially susceptible to air pollution – including Ultra-fine Particles -- because their bodies are still developing and they breathe more rapidly than adults.

- ***Non-cancer Chronic Risk***

AJ15-6

Comment: The LBUSD requests that the Hazard Index reported for non-cancer health risk be qualified appropriately in the HRA.

The HRA uses a non-cancer Reference Exposure Level (REL) for diesel Particulate Matter (PM) in the calculation of non-cancer chronic Hazard Indices (HI). The HI is presented in the HRA as a measure of the potential for non-cancer chronic public health risks to occur. The REL for diesel PM used in the HRA (5 ug/m^3) is "*essentially the U.S. EPA Reference Concentration first developed in the early 1990s based on histological*

Response to Comment AJ15-6

The HRA relied on the currently available accepted regulatory guidelines. The health effects values of diesel PM and other air toxics used in the HRA were those in the latest version of the HARP model, which embodies the latest regulatory guidance from OEHHA. Sub-chronic effects are not specifically addressed by the HARP model.

Adverse impacts of diesel PM, such as cardiovascular and respiratory disease as noted in the comment, are not specifically addressed by the OEHHA guideline or HARP model. However, it is generally accepted that PM concentrations lower than the REL can affect cardiovascular and respiratory systems. The Final EIS/EIR has been revised to indicate that the HI calculations for air toxics were based on acute and chronic non-cancer effects but do not explicitly include other effects such as cardiovascular and respiratory disease and deaths, exacerbation of asthma, or enhancement of allergic response.

Response to Comment AJ15-7

As noted in the response to AJ15-6, the HRA relied on the latest CARB/OEHHA adopted risk values and regulatory guidance.

New technical information may be present in OEHHA's Technical Support Documents (TSDs). However, as correctly noted elsewhere in the District's comments, the TSDs are stepping stones along the way to the destination of adopting new risk assessment methodologies pursuant to the statutory mandates placed on OEHHA. In lieu of accepting the uncertainties in relying on draft TSD methodologies still under development, the latest accepted methodologies in HARP were used for the HRA.

Response to Comment AJ15-8

SB25 (signed into law in October 1999) generally sought to modify California's air toxics standards and ambient monitoring programs to be more protective of infants and children. It directs the Air Resources Board to specifically consider infants and children in reference to ambient air quality standards (State Health and Safety Code Section 39606) and recommendations regarding air toxics (State Health and Safety Code Section 39660).

AJ15-6

changes in rats," as reported in a footnote (on page 3) of the Health Risk Assessment for the UP Intermodal Container Transfer Facility (ICTF) and Dolores Rail Yards prepared by the CARB on April 22, 2008. The CARB footnote further states: "*...it should be noted that the REL does not reflect the adverse impacts of particulate matter on cardiovascular and respiratory disease and deaths, exacerbation of asthma, and enhancement of allergic response.*" The information in this footnote is ***central*** to the issue of non-cancer health hazard estimation and should be ***emphasized*** in the HRA. In summary, the Hazard Indices calculated for non-cancer health impacts do not account for many of the health impacts known to occur from PM.

- ***Diesel PM Reference Exposure Level***

AJ15-7

Comment: The LBUSD requests that Caltrans acknowledge in the HRA the implications of the absence of a revised REL for diesel PM -- and OEHHA's future schedule for developing a revised REL for diesel PM exhaust.

In a 2001 report (Prioritization of Toxic Air Contaminants Under the Children's Environmental Health Protection Act) the Office of Environmental Health Hazard Assessment (OEHHA) identified diesel exhaust particulate matter as one of the five "Tier 1" toxic air contaminants that may cause infants and children to be especially susceptible to illness. OEHHA is required by statute to develop guidelines for use in conducting health risk assessments under the Air Toxics Hot Spots Program (Health and Safety Code Section 44360 (b) (2)). In response to this statutory requirement OEHHA has developed a number of Technical Support Documents (TSDs) (including two in 1999-2000) which described acute and chronic RELs. In November 2007, OEHHA published a TSD in draft form entitled: Air Toxics Hot Spots Program Technical Support Document for the Derivation of Non-cancer Reference Exposure Levels. Unfortunately, despite the long recognized importance of diesel PM exhaust as a pollutant, the recent draft TSD developed by OEHHA did not include a revised REL for diesel PM.

- ***Receptor Sensitivity***

AJ15-8

Comment: The LBUSD requests that Caltrans confirm that it has considered and utilized the latest RELs developed by OEHHA and that the status of the development of revised RELs pursuant to Senate Bill 25 be reflected in the HRA.

Numerous studies have shown that among those most vulnerable to toxic air contaminants (TACs) are school children. The LBUSD believes it is critically important to consider differential effects of toxic air contaminants on the health of students and other sensitive subpopulations when assessing health risks from toxic air emissions. The recent draft TSD by OEHHA discussed above represents an important step in developing a health risk assessment methodology that specifically considers children and other sensitive populations. Toward that end, the Children's Environmental Health Protection Act (Senate Bill 25) requires OEHHA to consider the following in its efforts: 1) exposure patterns among infants and children that result in disproportionately high exposure; 2) special susceptibility of infants and children; 3) effects of simultaneous exposure to compounds with the same mechanisms of action; and, 4) any interactions of air pollutants.

Section 39660 as amended by SB25 does not require OEHHA to recommend air toxics health reference concentrations for specific air toxics on a specific timetable. SB25 does, however, outline a generic process of beginning the promulgation process for individual air toxics in batches of 15 per year (Section 39669.5).

As previously stated in the responses to AJ15-7, specific regulatory health effects values were needed to perform the HRA, and the most recent (incorporated in HARP) values were utilized. Thus, the adopted levels used in the HRA reflect the degree to which the agencies had progressed towards fulfilling the requirements imposed by SB25 when the HRA was prepared.

Response to Comment AJ15-9

The HRA does not specifically identify receptor locations as indoor or outdoor activity areas at schools. Risks to individual schools were evaluated based on the modeled receptor points on or nearest to each facility regardless of whether the receptor was indoors or outdoors. However, the HRA included different exposure scenarios and breathing rates to distinguish between schoolchildren and school workers. For example, the exposure scenario for school children assumes that children will be present at the school site for 6 hours per day, 180 days per year at the same location from K through 12th grade. The daily breathing rate (581 L/kg-day) utilized for the school population is the high end breathing rate in OEHHA's guideline that is applicable to children and includes both indoor and outdoor activities.

Response to Comment AJ15-10

The air dispersion modeling for the HRA was focused on estimating average ambient air concentrations. The scope of the HRA air dispersion modeling was limited to vehicle emission rates at average vehicle speeds as predicted in the traffic study and only on the routes modeled. The HRA air dispersion modeling did not take into account short-term emissions variations due to localized traffic patterns, including truck idling.

Receptor Locations and Activities

AJ15-9

Comment: The LBUSD requests that the SDEIS/RDEIR indicate whether it addresses sensitive receptor locations and the various outdoor activities that occur at school sites.

Sensitive receptor locations at LBUSD facilities include classroom and outdoor athletic fields, playfields, and hard courts where students, faculty, and staff would be present. The HRA does not clearly indicate whether it accounts for receptor locations and activities on the playgrounds and athletic fields, especially those in the immediate proximity of SR-103.

Truck Staging and Idling

AJ15-10

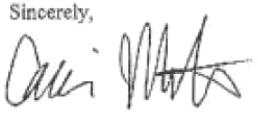
Comment: The LBUSD requests that the SDEIS/RDEIR indicate whether idling trucks, including those on SR-103, are fully accounted for in the evaluation of TAC emissions, exposure and risks to adjacent schools.

Idling trucks on SR-103, and in staging areas around facilities associated with this route (e.g., the ICTF rail yard), represent a significant source of diesel emissions that can have adverse *localized* impacts on community health, especially on sensitive populations such as school-aged children. The HRA and SDEIS/RDEIR do not clearly indicate whether idling trucks, including those on SR-103, are fully accounted for in the evaluation of TAC emissions, exposure and risks to adjacent schools.

CONCLUSION

The LBUSD appreciates the opportunity to comment on the Schuyler Heim Bridge Replacement and SR-47 Expressway Project SDEIS/RDEIR. We look forward to working with Caltrans to resolve all school facility, student, and staff health and safety concerns in a collaborative manner. The LBUSD would be happy to meet with Caltrans and its consultants to discuss the impact of the Project on the LBUSD's facilities, students, and staff and potential mitigation measures to offset such impacts. If you have any questions or would like to arrange a meeting to discuss our concerns, please feel free to contact me at (562) 997-7550.

Sincerely,



Carri M. Matsumoto
Executive Director
Facilities Development & Planning Branch
Long Beach Unified School District

cc: Chris Steinhauser – LBUSD Superintendent of Schools
Kim Stallings – LBUSD Chief Business & Financial Officer
Karl Rodenbaugh – The Planning Center
Facilities File

Letter AJ16. Signatory – Office of Planning and Research/California State Land Commission

STATE OF CALIFORNIA
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT

ARNOLD SCHWARZENEGGER
GOVERNOR

CYNTHIA BRYANT
DIRECTOR

December 30, 2008

Karl Price
Department of Transportation, District 7
Division of Environmental Planning
100 S. Main Street, MS 16A
Los Angeles, CA 90012

Subject: Schuyler Heim Bridge Replacement and SR-47 Expressway Project
SCH#: 2002021009

Dear Karl Price:

The State Clearinghouse submitted the above named Joint Document to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on December 29, 2008, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Letter AJ16. Signatory - Office of Planning and Research/California State Land Commission
Page 2

State Clearinghouse Data Base

SCH#	**2002021009**
Project Title	Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Lead Agency	Caltrans #7
Type	**JD** Joint Document
Description	The proposed Schuyler Heim Bridge Replacement and SR-47 Expressway project would replace the seismically-deficient vertical lift bridge with a fixed span bridge across the Cerritos Channel, and either construct an elevated four lane expressway from Terminal Island to Alameda Street, or construct an elevated four lane extension of SR-103 to Alameda Street. Six alternatives are evaluated in the Draft Recirculated EIR/Draft Supplemental EIR.

Lead Agency Contact

Name	Karl Price
Agency	Department of Transportation, District 7
Phone	213-897-1839 ***Fax***
email	
Address	Division of Environmental Planning 100 S. Main Street, MS 16A
City	Los Angeles ***State*** CA ***Zip*** 90012

Project Location

County	Los Angeles
City	Long Beach, Los Angeles, City of
Region	
Lat / Long	
Cross Streets	
Parcel No.	
Township	5S/4S ***Range*** 13W ***Section*** ***Base***

Proximity to:

Highways	SR 47, SR-1
Airports	
Railways	UPRR, PHL, ACTA
Waterways	Cerritos Channel; Dominguez Channel
Schools	Wilmington ES, Hudson ES, Cabrillo HS
Land Use	

Project Issues Air Quality; Cumulative Effects; Other Issues

Reviewing Agencies Resources Agency; California Coastal Commission; Department of Conservation; Department of Fish and Game, Region 5; Department of Parks and Recreation; Department of Water Resources; California Highway Patrol; Air Resources Board, Transportation Projects; Integrated Waste Management Board; Regional Water Quality Control Board, Region 4; Department of Toxic Substances Control; Native American Heritage Commission; Public Utilities Commission; State Lands Commission

Date Received 11/14/2008 ***Start of Review*** 11/14/2008 ***End of Review*** 12/29/2008

Note: Blanks in data fields result from insufficient information provided by lead agency.

Letter AJ16. Signatory - Office of Planning and Research/California State Land Commission
Page 3

Response to Comment AJ16-1

Your letter is included as part of the public record.

STATE OF CALIFORNIA — ARNOLD SCHWARZENEGGER, *Governor*

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

PAUL D. THAYER, *Executive Officer*
(916) 574-1800 FAX (916) 574-1810
Relay Service From TDD Phone **1-800-735-2929**
from Voice Phone **1-800-735-2922**

Contact Phone: **(916) 574-1900**
Contact FAX: **(916) 574-1885**

December 29, 2008

File Ref: SCH# 2002021009

Department of Transportation
District 7
Division of Environmental Planning
Attn: Karl Price
100 S. Main Street, MS 16A
Los Angeles, Ca 90012

Clear JD 12-29-08 C

RECEIVED
DEC 29 2008
STATE CLEARING HOUSE

Subject: Schuyler Heim Bridge Replacement and Sr-47 Expressway Project

Dear Mr. Price:

AJ16-1 The proposed SR-47 Expressway project within the city of Los Angeles will be located on lands granted to the city of Los Angeles pursuant to Chapter 656, Statutes of 1911, and as amended. All tide and submerged lands, as well as navigable rivers, sloughs, etc., are impressed with the Common Law Public Trust. The Public Trust is a sovereign public property right held by the Sate or its delegated trustee for the benefit of all people. This right limits the uses of these lands to waterborne commerce, navigation, fisheries, open space, recreation, or other recognized Public Trust purposes. Any development, leases or franchises, involving said lands must be consistent with the terms of the legislative grant and the Common Law Public Trust.

This letter is without prejudice to any future assertion of state ownership or public rights, should circumstances change, or should additional information come to our attention.

Letter AJ16. Signatory - Office of Planning and Research/California State Land Commission
Page 4

If you have any jurisdictional questions, please contact Grace Kato, Public Land Management Specialist, at (916) 574-1811 or by e-mail at katog@slc.ca.gov.

Sincerely,

Monica R. Brown

for Gail Newton, Chief
Division of Environmental Planning
and Management

cc: Office of Planning and Research
G. Kato - CSLC

Letter AJ17. Signatory – U.S. Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

January 12, 2009

Mr. Ron Kosinski
California Department of Transportation, District 7
Division of Environmental Planning
100 South Main Street, SM-16A
Los Angeles, California 90012

Subject: Supplemental Draft Environmental Impact Statement (SDEIS) for the Schuyler Heim Bridge Replacement and State Route 47 Expressway Project (CEQ # 20070361)

Dear Mr. Kosinski:

The U.S. Environmental Protection Agency (EPA) has reviewed the Supplemental Draft Environmental Impact Statement (SDEIS) for the Schuyler Heim Bridge Replacement and State Route (SR) 47 Expressway Project (Project), Ports of Los Angeles and Long Beach, Los Angeles County, California. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. Based upon our review, we have rated the proposed action as *Environmental Concerns- Insufficient Information (EC-2)*. See attached "Summary of the EPA Rating System" for a description of the rating. The basis for the rating is summarized below and further detailed in our enclosed comments.

We rated the original Draft Environmental Impact Statement (DEIS) for the project as *Environmental Concerns-Insufficient Information* (EC-2) due to concerns regarding the project's impacts to air and water quality and its contribution to cumulative impacts to neighboring low income and minority communities that have historically sustained extensive impacts from goods movement-related operations. EPA commends the California Department of Transportation (Caltrans) for including additional mobile source air toxics (MSAT) analysis and, specifically, a health risk assessment (HRA), in the SDEIS. EPA provides additional comments on the project related to this analysis, including the HRA, and other air quality-related changes to the document. Since the SDEIS only includes changes to the original DEIS relative to the additional HRA prepared by the Alameda Corridor Transportation Authority, our comments are specific to the air quality portions of the SDEIS and the supporting appendices. EPA has decided not to comment on the Environmental Justice and Cumulative Impacts Sections of the SDEIS at this time as there is very limited information provided in this document. Please refer to our previous comments, provided on October 12, 2007, on environmental justice, cumulative impacts and other matters that were not addressed in this SDEIS.

We appreciate the opportunity to review this SDEIS and are available to further discuss all recommendations provided. When the FEIS is released for public review, please send two hard copies and three electronic copies to the address above (Mail Code: CED-2). If you have

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any questions, please contact me, at 415-972-3521, or Susan Sturges, the lead reviewer for this project. Susan can be reached at 415-947-4188 or sturges.susan@epa.gov.

Sincerely,

Kathleen M. Goforth, Manager
Environmental Review Office (CED-2)

Enclosures:
EPA's Detailed Comments
Summary of EPA Rating Definitions

cc: Karl Price, California Department of Transportation
Steve Healow, Federal Highway Administration
Mark Cohen, U.S. Army Corps of Engineers

Letter AJ17. Signatory – U.S. Environmental Protection Agency
Page 3

Response to Comment AJ17-1

Your support for the model selection is appreciated. Since approved regulatory guidance is not available from EPA or the California Air Resources Board regarding the use of other dispersion models for dispersion of particulate matter or air toxics, the approved regulatory models, AERMOD and HARP, were used for the HRA.

Response to Comment AJ17-2

The assumption was utilized because programs are in place requiring model year 2007 or newer heavy duty port trucks in the coming years.

CEQA Guidelines 15091(a) states that

> …no public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant environmental effects of the project unless the public agency makes one or more written findings for each of those significant effects, …that changes or alterations have been required in, or incorporated into, the project which avoid or substantially less the significant environmental effects as identified in the final EIR… [or that] such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding.

In California, local and regional authorities have the primary responsibility for the control of air pollution "from all sources other than vehicular sources" and the control of vehicular sources is the responsibility of the California Air Resources Board (Health & Safety Code sec. 39002). The federal government also adopts standards for motor vehicles, but CARB standards are generally more stringent.

The air quality impacts associated with project operations are generally attributable to emissions from the motor vehicles that will use the bridge and expressway. The following is a summary of key federal, state, and local air quality rules, policies, and agreements that apply to motor vehicles and support the conclusion that Port trucks in the years 2015 and 2030 will have model year 2007 newer engines and will have fewer emissions.

EPA'S DETAILED COMMENTS ON THE SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE SCHUYLER HEIM BRIDGE REPLACEMENT AND STATE ROUTE 47 EXPRESSWAY PROJECT IN THE PORTS OF LOS ANGELES AND LONG BEACH, JANUARY 12, 2009

Air Quality
Air Toxics and the Health Risk Assessment

EPA appreciates the willingness of the California Department of Transportation (Caltrans) to include further analysis on mobile source air toxics (MSAT) impacts for the proposed Project in the Supplemental Draft Environmental Impact Statement (SDEIS), especially the addition of a health risk assessment (HRA) that can be used to meaningfully distinguish between project alternatives. The data presented in Figures 3-1 and 3-2 and the related discussion of diesel-related human health impacts are particularly notable, given the significant differences in where project impacts and benefits would occur for each alternative. Also, the document is commendable for identifying sensitive land uses and receptors, such as schools, that may experience these project impacts and benefits disproportionately.

With respect to the specific HRA methodology, EPA will reserve major comments on the traffic analysis, emissions and dispersion modeling, and risk scenarios at this time. As you know, EPA is a cooperating agency and member of the Agency Air Technical Working Group (AATWG) for the proposed Interstate 710 expansion project. As a part of that group, EPA is working with Caltrans and other partners to identify appropriate HRA methodology for transportation projects under NEPA. The technical discussions and consensus reached within the AATWG will be directly applicable to future analyses similar to those conducted for this Project.

AJ17-1 At this time, EPA agrees with the general approach of applying EMFAC2007 to quantifying project emissions, AERMOD to model dispersion, and California's *Air Toxics Hot Spots Program Risk Assessment Guidelines* to inform risk scenario guidelines. However, with respect to dispersion modeling specifically, EPA notes that the AATWG has discussed the use of dispersion models such as CALINE4 as a compliment to AERMOD, in order to more accurately identify potential impacts in the near-road environment.

EPA notes the following discrepancies and deficiencies related to MSATs and the HRA in the SDEIS, and makes the following associated recommendations:

Recommendations:

AJ17-2
- The SDEIS indicates, on page 3.13-26, that "it was conservatively assumed that Port trucks in the years 2015 and 2030 would be heavy duty diesel trucks with model year 2007 or newer engines." This does not appear to be a conservative assumption, since pre-2007 trucks have higher emissions. Clarify this comment, providing justification, as needed, for the assumption that no pre-2007 trucks would be operating in 2015.

AJ17-3
- The original discussion of region-wide impacts, found on page 3.13-27, second paragraph, under "Results" is outdated and confusing. Local impacts for this project are clearly the primary concern, so consideration of project-wide emissions could be misleading. EPA recommends that this section be removed for the Final Environmental Impact Statement (FEIS).

Federal Regulations:

Emissions standards for on-road trucks

To reduce emissions from on-road, heavy-duty diesel trucks, USEPA established a series of increasingly strict emissions standards for new engines, starting in 1988. The USEPA promulgated the final and cleanest standards with the 2007 Heavy-Duty Highway Rule (USEPA, 2001). The PM emission standard of 0.01 gram per horsepower-hour (g/hp-hr) is required for new vehicles beginning with model year 2007. Also, the NOx and non-methane hydrocarbon (NMHC) standards of 0.20 g/hp-hr and 0.14 g/hp-hr, respectively, would be phased in together between 2007 and 2010 on a percent of sales basis: 50 percent from 2007 to 2009 and 100 percent in 2010. Currently, the strictest standards will be phased in starting in 2007 (USEPA, 2001).

Highway Diesel Fuel Rule

USEPA set sulfur limitations for on-road diesel fuel to 15 ppm starting June 1, 2006 (USEPA, 2006).

State Regulations:

California Diesel Fuel Regulations

The CARB sets sulfur limitations for diesel fuel sold in California for use in on-road and off-road motor vehicles. Since 2006, diesel fuel has been limited to 15-ppm sulfur.

AB 1493 -- Vehicular Emissions of Greenhouse Gases

California Assembly Bill 1493 (Pavley), enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. Regulations adopted by CARB will apply to 2009 and later model year vehicles. CARB estimates that the regulation will reduce climate change emissions from light duty passenger vehicle fleet by 18 percent in 2020 and 27 percent in 2030.

Executive Order S-3-05

California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, statewide GHG emission reduction targets as follows: by 2010, reduce GHG emissions to 2000 levels, by 2020 reduce GHG emissions t 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

AB 32 -- California Global Warming Solutions Act of 2006

The purpose of AB 32 in to reduce statewide GHG emissions to 1990 levels by 2020. This enactment instructs the CARB to adopt regulations that reduce emissions from significant sources of GHGs and establish a mandatory GHG reporting and verification program by January 1, 2008. AB 32 requires the CARB to adopt GHG emission limits and emission reduction measures by January 1, 2011, both of which are to become effective on January 1, 2012.

Executive Order S-01-07

Executive Order S-01-07 was enacted by the Governor on January 18, 2007. Essentially, the order mandates the following: 1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and 2) that a Low-Carbon Fuel Standard for transportation fuels be established for California.

Local Regulations and Agreements:

Through the attainment planning process, the SCAQMD develops the SCAQMD Rules and Regulations to regulate sources of air pollution in the South Coast Air Basin. The emissions sources associated with project operations are mobile sources and therefore are not subject to the SCAQMD rules that apply to stationary sources. However, the Health & Safety Code gives SCAQMD the authority to regulate fleets of vehicles (Health & Safety Code sec. 40447.5).

SCAQMD PublicFleet Rules

SCAQMD has adopted rules requiring that the purchasing of new vehicles for certain fleets must meet emission standards or be clean fuel vehicles (e.g. LNG, CNG). The regulated fleets are Light and Medium Duty Public Fleet Vehicles, On-Road Transit Buses, On-Road Residential and Commercial Refuse Collection Vehicles, On-Road School Buses, and On-Road Heavy-Duty Public Fleet Vehicles.

San Pedro Bay Ports Clean Air Action Plan (CAAP)

The CAAP was approved by both the Los Angeles and Long Beach Board of Harbor Commissioners on November 20, 2006. The CAAP focuses on reducing emissions with two main goals: 1) reduce Port-related air emissions in the interest of public health and 2) accommodate growth in trade. The Plan includes near-term measure implemented largely through the CEQA/NEPA process, tariffs, and new leases at both Ports. Port terminals, as leases are granted or modified, will have mitigation measures imposed to reduce emissions associated with their activities, including those involving trucks calling at such facilities. In addition, the Ports have adopted the Clean Truck Program that calls for accelerated turn over of trucks that call at port facilities. Effective October 1, 2008, all pre-1989 trucks are banned from entering the Port. On January 1, 2010, all 1989 to 1993 trucks will be banned and 1994 to 2003 trucks must be retrofitted with emissions control devices or be banned from entering the ports. On January 1, 2012 all trucks that do not meet the 2008 Federal Clean Truck Emissions Standards will be banned from the Port. In addition as part of the Clean Truck Program, a Clean Truck Fee of $35 on each loaded 20-foot container ($70 for each 40-foot container) is imposed on all non-exempt trucks to help purchase clean trucks.

The Concession agreement portion of the Clean Truck Program was challenged by the American Trucking Associations, and the Ninth Circuit Court of Appeals sent back that portion for further consideration by the District Court on March 20, 2009. However, the truck ban portion of the Program discussed above, and relied upon in the Final EIR Health Risk Assessment was not challenged in the lawsuit and is not in jeopardy (American Trucking Associations, Inc. v. The City of Los Angeles, 2009 WL 723993, 12 [C.A.9(Cal.)].

Response to Comment AJ17-3

The SDEIS/RDEIR presents both the project-wide emissions comparison with the MSAT analysis and the localized impact analysis with the HRA. The purpose of the MSAT analysis is to compare project-wide emissions by alternative rather than to analyze localized impacts. The MSAT analysis follows the FHWA guidance and Caltrans continues to support the use of the FHWA interim guidance for NEPA evaluation of MSATs. Therefore, the MSAT analysis will not be removed from the Final EIS/EIR.

Letter AJ17. Signatory – U.S. Environmental Protection Agency
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Response to Comment AJ17-4

Although an HRA has been added to the SDEIS/RDEIR, Caltrans continues to support the use of the FHWA guidance to evaluate MSAT impacts. As stated on page 3.13-30, the HRA was prepared per instruction by ACTA to evaluate health risks of the project. The discussion on pages 3.13-47 through 3.13-50 explains the reasons Caltrans does not agree with the use of the risk assessment other than for use in comparing alternatives. This discussion supports the "Limitations of the MSAT Analysis" discussion; therefore, this section will not be removed from the Final EIS/EIR. See also response to AJ17-3.

Response to Comment AJ17-5

Diesel PM reduction in 2030 would come from a combination of the LCFS, increased fuel efficiency, and vehicle hybridization strategies outlined in ARB's proposed scoping plan for AB32. A 12 to 47 percent reduction rate in PM (or a 35 percent average) is expected from using biodiesel fuel. The alternative fuel provisions of AB32 would likely result in a variety of fuel types such as ethanol or LNG, which would have higher percentages of reduction in DPM than biodiesel.

Because using biodiesel would have higher diesel PM emissions compared to other alternative fuel types and retrofits, it was assumed that 100 percent of the trucks would be using biodiesel fuel in 2030. Therefore, the corresponding 35 percent reduction of diesel PM was a conservative assumption used in the HRA to account for implementation of the AB32 alternative fuels program.

Response to Comment AJ17-6

The use of AERMOD was mandated for use in this project by EPA and CARB. AERMOD was designated as the model of choice in this application in terms of its ability to simulate regional impacts and its more sophisticated approach to simulating meteorological conditions.

AJ17-4

- The section entitled "Limitations of MSAT Analysis" (pages 3.13-28 through 30) is incorrect and is longer relevant to the analysis in this document. The section describes why emissions, dispersion, and exposure tools are not available for a quantitative MSAT analysis, but Caltrans has disproved this assertion by including that exact analysis in the expanded HRA. This discussion is from prototype language included in the Federal Highway Administration (FHWA) interim guidance (February 2006) on MSAT analysis for transportation projects under NEPA. While there are positive elements to this guidance, especially the willingness to acknowledge potential MSAT concerns, EPA continues to disagree, nationally, with major elements of this approach. EPA recommends that this section and other similar references to limitations of MSAT analysis in the document be removed for the FEIS.

AJ17-5

- The assumption of 100% of remaining trucks being converted to biodiesel (found on page 16 of Appendix A, i.e. the Health Risk Assessment) has not been justified. This assumption may lead to an underestimate of the project impacts. The document should provide justification for the assumption of a 35% reduction in diesel particulate matter. If there is a possibility that the 100% threshold will not be met, the FEIS should quantify the project impacts with a more conservative assumption, or a range of assumptions.

AJ17-6

- The discussion of AERMOD (page 23 of Appendix A) should include a mention of the use of additional near-roadway models, including CALINE4 and CAL3QHCR, as a future consideration.

Particulate Matter with a Diameter of 2.5 Microns or Less (PM2.5)

AJ17-7

The new 24-hour PM2.5 national ambient air quality standard (NAAQS) of 35 ug/m^3 should be used as a significance threshold for NEPA evaluation purposes, as described in the memorandum by Anne Norton Miller, Director, EPA Office of Federal Affairs ("Reflecting the Revised PM2.5 National Ambient Air Quality Standard in NEPA Evaluations", June 25, 2007). This new standard was exceeded numerous times at the North Long Beach and Long Beach stations. The two Long Beach monitoring locations do show overall progress, but the PM2.5 35 ug/m^3 24-hour standard has not been attained at either monitoring location. The text in the Affected Environment section of the SDEIS appropriately discloses exceedences of the current federal 24-hour PM2.5 standard, but the new standard is not reflected in the project's impact analyses or tables. EPA notes that the former federal PM2.5 standard of 65 micrograms per cubic meter (ug/m^3) can still be used for conformity analyses until a year after the effective date of new designations, expected approximately in April 2010.

AJ17-8

Recommendation:

- To most accurately represent the air quality conditions in the Long Beach area, include in the FEIS a comparison of the PM2.5 concentrations to the new PM2.5 24-hour NAAQS. Update the analysis, results, and tables, including Table 3.13-2, to reflect this significance threshold.

2

Letter AJ17. Signatory – U.S. Environmental Protection Agency
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Where appropriate, CALINE4 and CAL3QHC Motor Vehicle Emission Simulator (MOVES) model can be considered for future applications.

Response to Comment AJ17-7

The tables and discussions in the EIS/EIR already use the new $PM_{2.5}$ standard, except those in the conformity analysis as indicated in the comment.

Response to Comment AJ17-8

The tables and discussions in the EIS/EIR already use the new $PM_{2.5}$ standard, except those in the conformity analysis as indicated in the comment.

Response to Comment AJ17-9

The PM_{10} hotspot analysis has been revised to the March 2006 guidance and was approved for circulation at the January 2009 Transportation Conformity Working Group meeting.

Response to Comment AJ17-10

The Final EIS/EIR has been revised as recommended in the comment.

Particulate Matter with a Diameter of 10 Microns or Less (PM10) Conformity Analysis

In March 2008, the entire project-level conformity analysis for PM2.5 was redone to reflect a change in the scope of the project (i.e., an additional two-lane, elevated flyover structure was added and Alternative 1 was selected as the preferred alternative). The PM10 analysis was not submitted at that time to the South Coast Association of Governments (SCAG) conformity workgroup for review. It appears that the PM10 analysis should have been added to the recirculated project-conformity analysis in March 2008.

AJ17-9

On March 10, 2006, EPA issued amendments to the Transportation Conformity Rule to address localized impacts of particulate matter: "PM2.5 and PM10 Hot-Spot Analyses in Project-level Transportation Conformity Determinations for the New PM2.5 and Existing PM10 National Ambient Air Quality Standards". The 2006 guidance states that analyses started for PM10 prior to its 2006 release can be completed following FHWA 2001 guidance. However, if the PM10 analysis was updated, as was the PM2.5 analysis, to accommodate a change in project scope, then the conformity analysis should have been revised per the newer EPA 2006 guidance.

Recommendation:

- Clarify the project's conformity process and any needed scope change, and update this information, accordingly, in the FEIS. If the PM2.5 project-level conformity analysis needed to accommodate a project scope change, then the PM10 project-level conformity analysis should have been revised per the newer EPA 2006 guidance.

Regional Conformity

EPA makes the following associated recommendations related to regional conformity:

Recommendations:

AJ17-10

- On page 3.13-3, under "Regional Conformity Determination", include a reference in the FEIS that the South Coast Air Basin is a maintenance area for nitrogen dioxide (NO2) and still requires conformity.
- In early 2008, the state of California made a formal request to change the classification for 8-hour ozone to "extreme". Include a reference to this request in the FEIS.
- On page 3.13-6, under "Regional and Local Requirements", include clarification that EPA did not make positive adequacy determinations on all the budgets in the 2007 South Coast Air Quality Management Plan (SCAQMP) and is being litigated on the adequacy finding on the PM2.5 budgets.

Other Available Monitoring Data

In our previous comments, EPA recommended that the FEIS report the results of other local air quality monitoring studies. The SDEIS now references these studies and sites, but does include a summary of the available data.

3

Letter AJ17. Signatory – U.S. Environmental Protection Agency
Page 8

AJ17-11

Recommendation:

- Where relevant, include in the FEIS the data and results of the monitoring studies to determine whether any updates to the air quality analysis are necessary to provide the most accurate and current assessment of the air quality conditions in the proposed project area.

Mitigation

EPA makes the following recommendations related to proposed air quality mitigation:

AJ17-12

Recommendations:

- On page 3.13-60, for mitigation measure AQ-1, add "if a site is anticipated to be inactive for 10 days".

- On page 3.13-61 to 3.13-62, for mitigation measure AQ-9, include additional information on the process and timing of the proposed truck replacements for the Diesel Truck Buyback Program. Clarify whether this mitigation measure relies on existing measures in the Clean Air Action Plan or whether the intent is to propose a program independent of the CAAP. Discuss who would implement the program and be the responsible party.

4

Response to Comment AJ17-11

Monitoring data from other studies have been reviewed and are referenced in the SDEIS/RDEIR. As shown on pages 3.13-10 through 3.13-11, references to monitoring studies have been provided along with a brief discussion of the results. The actual monitoring data from these studies will not be included in the Final EIS/EIR.

Response to Comment AJ17-12

The recommended language has been added to Mitigation Measure AQ-1.

To the extent that the Clean Air Action Plan and Gateway Cities truck buyback programs are already in existence, this mitigation measure relies on their existing provisions. There is no intent to propose or adopt a program independent of the Gateway Cities or CAAP truck buyback program. In order to meet its obligations under the measure, the project will make a contribution to the Gateway Cities or CAAP truck buyback program prior to the start of construction. The process and timing of proposed truck replacements is dictated by each program.

Letter AJ18. Signatory – South Coast Air Quality Management District

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

E-MAILED: FEBRUARY 13, 2009

February 13, 2009

Mr. Ronald J. Kosinski
Department of Transportation, District 7
Division of Environmental Planning
100 South Main Street, MS-16A
Los Angeles, CA 90012

Dear Mr. Kosinski:

Draft Supplemental Environmental Impact Statement/ Recirculated Environmental Impact Report and Section 4(f) Evaluation for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. The SCAQMD appreciates the additional time that Cal Trans has provided to comment on this important project. The SCAQMD staff recognizes the need to replace the Schuyler Heim Bridge to address safety issues; however, this bridge replacement project would also result in increased transportation of freight and goods to and from the Ports of Los Angeles and Long Beach. SCAQMD staff appreciates the changes that made to the Draft EIS/EIR to address issues raised by SCAQMD staff in our comment letter on the Draft EIS/EIR dated November 8, 2007. However, SCAQMD staff has additional concerns about assumptions and the analyses completed in the Draft Supplemental EIS(DSEIS)/Recirculate EIR.

It is the SCAQMD staff's understanding that the Schuyler Heim Bridge is a vital transportation link between the Ports or Los Angeles and Long Beach and the mainland. The SCAQMD staff believes that with the improvements, the Schuyler Heim Bridge will be the primary transportation link to the existing Union Pacific Intermodal Container Transport Facility (ICTF) and the proposed Burlington Northern Santa Fe (BNSF) Southern California International Gateway near-dock railyards. It is the SCAQMD staff's understanding that the analysis for the proposed project and its alternatives includes assumptions of increased truck trips associated

Letter AJ18. Signatory – South Coast Air Quality Management District
Page 2

Response to Comment AJ18-1

Increased truck trips associated with the proposed SCIG and ICTF expansion projects were analyzed as part of the project. Please see Response to Comment OB14-6 for further discussion on this issue.

Response to Comment AJ18-2

The discussion on page 3.13-55 of the SDEIS/RDEIR discusses the health impacts associated with implementation of Alternative 2, which has not been identified as the preferred alternative. The analysis for Alternative 1, which has been identified as the preferred alternative, does not indicate significant health impacts for any schools or other sensitive land uses, except for a limited number of residential receptors. For those potentially impacted residential receptors, ACTA has determined that the installation of new heating and air conditioning systems with high efficiency filters is a feasible mitigation measure. The efficiency of such systems to reduce diesel particulate is conservatively estimated at 90 percent, based on manufacturer's data (SDEIS/RDEIR, p. 3.1.3-63). Since the highest residential risks are less than 11 in one million (SDEIS/RDEIR, p. 3.13-53), such HVAC systems would be effective in mitigating health risk to below the level of significance.

AJ18-1 with the Proposed ICTF Expansion and Modernization Project. The SCAQMD staff recommends that the Lead Agencies also include in their analysis the proposed Southern California International Gateway project and the increased truck trips associated with this project. Air quality impacts and health risks should be quantified from the increased truck trips associated with these near-dock railyard projects for each the project alternatives.

AJ18-2 Based on the DSEIS/Recirculated EIR the estimated cancer risk for Alternatives 1, 1A, 2, and 3 are significant and exceed the SCAQMD's significance threshold of 10 in a million. Page 3.13-55 states that the "main areas of increased risk would be along existing SR-103." The SCAQMD staff is concerned about the elevated health risk in this area as there are a number of schools, residences, and other sensitive land uses. The SCAQMD staff has reviewed the mitigation measures in the DSEIS/Recirculated EIR and concludes that the DSEIS/Recirculated EIR has not considered all feasible mitigation measures as required pursuant to CEQA Guidelines §15126.4. Because the Lead Agency did not quantify the mitigated health risk, it is uncertain if installation of heating, ventilation, and air condition units for residences will reduce the cancer risk to a level less than significant. In addition, the DSEIS/Recirculated EIR did not consider any mitigation measures for the receptors at Hudson Park. The Lead Agency should at a minimum evaluate feasible mitigation measures that will reduce the exposure of diesel particulate matter through use of zero emission technologies such as electric trucks, zero emission transport systems (e.g. maglev), and reduced truck traffic on SR-103.

The SCAQMD staff is available to work with the Lead Agencies to address these issues and any other questions that may arise. Additional comments are provided in the attachment. Please contact me at (909) 396-3105 or Dr. Steve Smith at (909) 396-3054 you have any questions regarding these comments.

Sincerely,

Susan Nakamura
Planning Manager

Attachment

SS:JK

LAC070817-03
Control Number

Letter AJ18. Signatory – South Coast Air Quality Management District
Page 3

Response to Comment AJ18-3

As the commenter pointed out, Caltrans has not adopted thresholds of significance for CEQA. Significance is determined on a case-by-case basis based on the level of impact and project setting. For this particular project, with regards to certain emissions, the project team considered the project setting and determined to use SCAQMD recommended thresholds as criteria for determining significance under CEQA. The use of SCAQMD recommended thresholds for this project does not guarantee or imply its application for other Caltrans projects located wholly or partly in the SCAQMD's jurisdiction.

Response to Comment AJ18-4

Caltrans' conclusions with regard to the use of air models to determine health impacts from transportation projects are set forth in Section 3.13.3.6.1, SDEIS/RDEIR, and are supported by an evaluation of ACTA's HRA performed by the University of California at Davis – Caltrans Air Quality Project Team (Appendix B to the SDEIS/RDEIR). This conclusion is consistent with FHWA's Interim Guidance for Mobile Source Air Toxics and OEHHA's own guidance, which recognizes the substantial uncertainty associated with health risk assessments (*Air Toxics Hot Sots Program Guidance Manual for Preparation of Health Risk Assessments*, pp. 1-4 and 1-5 [OEHHA 2003]).

Attachment A
Draft Supplemental Environmental Impact Statement/
Recirculated Environmental Impact Report (DEIS/EIR)
for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Significance Thresholds
On page 3.13-14 the Lead Agency states the following, "As CalTrans has statewide jurisdiction, it has not and has no intention to develop thresholds of significance for CEQA. CalTrans made this decision because the setting for projects varies so extensively across the state and the significance of an effect depends on the environmental setting. Rather, CalTrans will continue to analyze significance on a case-by-case basis looking at the degree and intensity of the impacts."

The Lead Agency continues by stating, "CalTrans chooses to continue to look at significance on a case-by-case basis because its projects are scattered throughout the state and often cross jurisdictional lines… Even if a project is wholly within one jurisdiction, following an individual jurisdiction's thresholds will lead to CalTrans needing to defend its decision to accept certain thresholds in one location, yet not in another. In order to preserve its ability to determine the significance of impacts a specific project will have on the environment, CalTrans declines to follow local thresholds of significance."

In spite of the above statements the conclusions regarding the significance of air quality impacts appear to be based on the SCAQMD's recommended regional air quality significance thresholds (the City of Los Angeles' thresholds are also cited, but for air quality the City uses the SCAQMD's recommended significance thresholds). The lead agency should be aware that when determining significance for air quality impacts, significance thresholds must be tied to the effects on air quality in some way. Consequently, for CalTrans projects located wholly or partially within the SCAQMD's jurisdiction, the SCAQMD recommends using the significance thresholds located at the following URL: http://www.aqmd.gov/ceqa/handbook/signthres.pdf for all CalTrans projects. For projects partially located with the SCAQMD's jurisdiction, only the emissions from sources located within the SCAQMD's jurisdiction should be compared to the SCAQMD's recommended air quality significance thresholds. Any other thresholds used by the lead agency will be evaluated by staff to determine if they are appropriate and applicable.

AJ18-3

Health Risk Assessment
Page 3.13-60 of the Draft Supplemental EIS/Recirculated EIR states that the "Caltrans has determined that there is not adequate or satisfactory evidence to support a determination of a significant impact due to exposure to air toxics. The evidence provided in ACTA's HRA document is not sufficient to make the determination of a CEQA significance related to increased cancer risk for this project." The text then states that ACTA considers Alternative 1 and 2 to be significant for carcinogenic health risk.

AJ18-4

SCAQMD staff believes that Caltran's conclusion is not only incorrect, but potentially misleading. EMFAC2007 and ISCST3 (AERMOD) are currently used to estimate adverse health risk impacts from mobile source specific projects. EMFAC2007 and ISCST3 (AERMOD) have been used to estimate health risks from mobile sources related to LAUSD, City of Los Angeles and City of Long Beach Port projects. EMFAC2007 and ISCST3

Letter AJ18. Signatory – South Coast Air Quality Management District
Page 4

Response to Comment AJ18-5

When a new roadway or segment of roadway, such as the proposed project Alternative 1, 1A or 3, is added to a transportation network, it produces more overall capacity and efficiency in the local surface transportation system for auto and truck movements. Some trips which currently use more circuitous routes to a destination will now be able to use the new route to take a shorter path from their origin to their destination. Thus, the trip length is reduced for some trips. For example, for trips from the Port to warehousing destinations in the Carson area, the project would provide a more direct route and a less congested route of travel than is currently available. Also, by definition, the new route has less congestion than current routes which are already carrying significant traffic loads (or will be expected to by 2030). The new, uncongested route, would divert some existing trips, and would produce more direct travel paths. Please see Response to Comments OB1712 and OB17-13.

The comment incorrectly states that the new route would "attract new longer trips" but that is not the case. Overall, the system becomes more efficient as a result of the new capacity. The new facility will provide a place for more efficient and shorter trips from one place to another. For example, if there is only one road from an origin to a destination and all trips must use it, and then another route is added that is more direct, some trips choose to take the new more direct route rather than the old route (which before was the only choice).

The comment states that "existing congestion on the bridge" would somehow affect route choice with the project, but the project does not provide additional capacity on the bridge itself; thus, it is not a factor in route choice. Also, the analysis does take into account the future growth in Port traffic for all scenarios and alternatives. Finally, the project itself would not generate any new trips or result in any new trips (which could increase VMT), rather it will only more efficiently accommodate some of the currently less efficient and more circuitous trips on a more direct and efficient route. Please see Response to Comment AJ11-18.

AJ18-4

(AERMOD) have also been use to estimate health risk from vehicle traffic related to warehouse projects. In addition, SCAQMD staff as developed a methodology for estimating health risk from air toxic emissions from mobile sources that can be found at http://www.aqmd.gov/ceqa/handbook/mobile_toxic/diesel_analysis.doc, which was referred to in the SCAQMD's comment letter on the original Draft EIS/EIR for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project dated November 8, 2007.

Therefore, SCAQMD staff recommends that the use of the FHW's Interim Guidance for Mobile Source Air Toxics and the conclusions based on this Guidance regarding Caltran's conclusion be removed in the Final Supplemental EIS/Recirculated EIR and ACTA's discussion of analyzing air toxics from mobile sources and conclusion of significance for Alternatives 1 and 2 be retained.

AJ18-5

Decrease in Vehicular Emissions

The lead agencies state on pages 3.13-17 and 3.13-24 of the Draft Supplemental EIS/Recirculated EIR that vehicle emissions in Alternatives 1, 1A and 3 are lower than the No Build scenario, because VMT is lower in these scenarios. However, no explanation is provided why VMT is lower in Alternatives 1, 1A and 3 than the No Build Scenario. In addition, the difference between Alternatives 1, 1A and 3 and baseline is not discussed. In the November 8, 2007 comment letter on the Draft EIS/EIR for the proposed project, SCAQMD staff requested further information on the assumption that VMT would be reduced under all build and no build scenarios. The reduction in VMT assumption is included as part of the air quality analysis in the Draft EIS/EIR and the Draft Supplemental EIS/Recirculated EIR. There does not appear to be any data or other analysis supporting the assumption that VMT will decline in the future under all scenarios. SCAQMD staff requested information supporting the reduced VMT assumption and received the following response, "As congestion grows, adding more roadway capacity to the system would relieve the congestion and provide better and shorter routes to the drivers. With the build alternatives there would be less congestion so drivers would be expected to take a more direct route resulting in lower VMT than the No Build." This rationale doesn't make sense for the following reasons. First, relieving congestion may attract new longer trips for drivers desiring to avoid idling and congestion on other unimproved routes in addition to attracting drivers who currently take longer trips to avoid the existing congestion on the bridge. Second, the analysis does not appear to take into consideration future growth at the Ports that will substantially increase the traffic, a part of which would be expected to use the new bridge. Therefore, the Final Supplemental EIS/Recirculated EIR should detail the specific reasons for the assumption of reduced VMT. In addition, the Final Supplemental EIS/Recirculated EIR should describe the difference between the Alternatives 1, 1A and 3 and the baseline.

AJ18-6

Localized Significance Threshold Analysis

An LST analysis was preformed on CO, PM10 and PM2.5 emissions from operation in the Supplemental EIS/Recirculated EIR. However, no LST analysis was performed on construction activities. As stated in SCAQMD's comment letter on the Draft EIS/EIR, dated November 8, 2007, it is recommended that the lead agencies prepare a LST analysis on construction activities following SCAQMD's LST methodology, which can be downloaded at http://www.aqmd.gov/ceqa/handbook/LST/LST.html. The Final EIS/EIR should include LST analyses for both construction and operation.

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Page 5

Response to Comment AJ18-6

Please see the Response to Comment AJ5-6.

Response to Comment AJ18-7

The assumption regarding implementation of low carbon fuels does not assume the retrofit of 100 percent of the remaining truck fleet to bio-diesel. For 2015 DPM reductions, it was assumed that the Clean Truck Program's ban on older than 2007 trucks and LNG retrofits for 50 percent of port vehicles would be in place. For the remainder of the truck fleet, an AB32 early action measure, the CARB low carbon fuels regulations, was applied to heavy duty vehicles. The CARB Low Carbon Fuel Standard is scheduled for adoption on April 23-24, 2009. It is expected that a variety of low carbon fuels will be utilized to meet the regulation but that biofuels will be considered because of their lower life cycle carbon emissions. The switch from diesel to biofuels would be the compliance option that produces the least reduction in PM as other options (e.g., CNG, ethanol) produce substantially less PM. On average, the anticipated PM emissions reduction from switching to biofuels is 35 percent. Our assumption for 2015 emissions purposes is that the low carbon fuel measure would bring only an additional 10 percent reduction from the remaining 50 percent of non-retrofitted Port Trucks and a 10 percent reduction in PM from non-port heavy duty vehicles. Given the intention of EPA Administrator Jackson to regulate greenhouse gases under the Clean Air Act and the Obama administration's commitment to promulgate a low carbon fuel standard, it is likely that this requirement will be in place, regardless of whether the CARB promulgates the measure.

AJ18-6

Caltrans states on page 3.13-15 that it declines to follow local threshold of significance. Even if Caltrans declines to use the SCAQMD recommended LST significance methodology it is obligated to analyze all potential adverse impacts, make a determination of significant as required by CEQA Guidelines §15064, and implement mitigation measures as necessary.

CARB Diesel Particulate Matter Reductions

AJ18-7

On page 3.13-31 the lead agencies state that the analyses assumes a 10 percent reduction in diesel truck diesel particulate matter (DPM) emissions to account for two AB 32 discrete early action measures. Similarly, on page 3.13-32 the lead agencies state that by 2030 an additional 35 percent reduction in diesel truck DPM emissions is assumed based on strategies in CARB's Scoping Plan, which implements AB32. Further, the 35 percent reduction in DPM emissions is based on the assumption that 100 percent of this diesel truck fleet would operate using biodiesel fuel. There are two concerns with these assumptions used by the lead agencies. First, it is inappropriate for the analysis to rely on future regulatory approvals. Although it is likely that future emission standards will be come more stringent, the extent to which the emission standards will become more stringent and when the standards become affective are not certain. Second, although the lead agencies assumed a 35 percent reduction in DPM from using biodiesel, they do not appear to have accounted for the potential increase in NOx emissions averaging 10 percent to as high as 28 percent. Therefore, SCAMQD staff requests that the lead agencies eliminate the DPM reduction assumptions and revise the air quality and HRA analyses.

Mitigation Measures

AJ18-8

The lead agencies did not include any of the suggested mitigation measures recommended by SCAQMD in its November 8, 2008 comment letter or provide an explanation why these mitigation measures are not feasible. SCAQMD staff still suggest the following mitigation measures for the proposed project:

- Harbor Craft Mitigation Measure – This measure should require all harbor craft used during the construction phase of the project to, at a minimum, have been repowered to meet the cleanest existing marine engine emission standards (in effect at the time of use) or the proposed United States Environmental Protection Agency (U.S. EPA) Tier 3 (which are proposed to be phased-in beginning 2009), whichever is cleaner. In addition, to the extent that harbor craft powered engine meeting the proposed U.S. EPA Tier 4 marine engine standards are available, these harbor craft should be used.
- On-road Truck Mitigation Measure – As part of this mitigation measure, the Lead Agencies should use the cleanest available trucks for construction. According to Figure 2-3 (Project Construction Schedule) of the DEIS/EIR, construction of the Schuyler Heim Bridge and SR-47 Expressway is expected to occur between 2009 to 2011 and construction of the Ocean Blvd./SR-47 Flyover is expected to occur during 2015. Due to the phased approach in construction, SCAQMD staff recommends that during the 2009 – 2011 construction phase, on-road trucks meet the lowest certified emissions levels, but no greater than the U.S. EPA 2007 emissions standards. In addition, during any construction occurring after 2014, construction on-road trucks should meet U.S. EPA 2010 emission standards.
- Construction Equipment Mitigation Measure – SCAQMD staff recommends that the 2009 – 2011 construction equipment should meet U.S. EPA Tier 3 emission standards in

Letter AJ18. Signatory – South Coast Air Quality Management District
Page 6

Response to Comment AJ18-8

Please see Responses to Comment AJ11-21 through AJ11-24.

Response to Comment AJ18-9

Qualitative GHG analysis was included in the SDEIS/RDEIR. Additional clarification and discussion on EPA and CARB's GHG reduction measures was added to Final EIS/EIR, Section 3.13.2.2.3 as necessary.

However, the document concludes that transportation projects, such as the proposed project that will relieve congestion by enhancing operations and improving travel times in high congestion travel corridors, will lead to an overall reduction in CO2 emissions. (SDEIS/RDEIR, p. 3.13-12). By relieving congestion and improving travel times, the project is anticipated to reduce GHG emissions from the mobile sources that will travel on the proposed bridge and expressway (*Id.*).

Please see Response to Comment AJ11-32 for further discussion on this issue.

combination with highest level of CARB Verified Diesel Emission Control System (VDECS). In addition, during any construction occurring after 2014, construction equipment should meet U.S. EPA Tier 4 emission standards.

AJ18-8

- Best Management Practices (BMPs) – In addition to mitigation measure AQ-6, prohibiting truck idling in excess of 2 minutes, the Lead Agencies should also implement a process by which to select additional BMPs to further reduce emissions during construction if it is determined that the proposed construction equipment exceed any SCAQMD significance threshold. The following types of measures should be required on construction equipment: a) use of diesel oxidation catalysts and catalyzed diesel particulate traps (certified to the highest CARB VDECS available); b) maintain equipment according to manufacturers' specifications; c) restrict idling of construction equipment (separate measure from AQ-6 for truck idling) to a maximum of 5 minutes per proposed CARB regulation.

Greenhouse Gases

AJ18-9

A qualitative greenhouse gas discussion was included in the Supplemental EIS/Recirculated EIR on page 3.13-12. No GHG analysis was conducted for the proposed project. As stated in the comment letter on the Schuyler Heim Bridge Replacement and SR-47 Expressway Project dated November 8, 2007, SCAQMD staff suggested that the lead agencies quantify greenhouse gas emissions. In addition, in a number of comment letters on CEQA documents prepared y the California Attorney Generals Office, the Attorney General has unequivocally stated that GHG emission and global climate change are impacts that must be analyzed in CEQA documents. Further, a determination of significance must be made, even in the absence of established GHG signficiance thresholds. Finally, if GHG emissions are concluded to be significant, mitigation measures must be identified. Therefore, the discussion in the Final Supplemental EIS/Recirculated EIR should include a qualitative analysis of GHG emissions from the proposed project (i.e., construction as well as operation).

Letter AJ19. Signatory – City of Carson

OFFICE OF THE CITY MANAGER

CITY OF CARSON

February 12, 2009

Mr. Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, CA 90012

Re: City official response to the Supplemental Draft Environmental Impact Statement/Re-circulated Draft Environmental Impact Report for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project in the Ports of Long Beach and Los Angeles, California

Dear Mr. Kosinski:

Please accept the following as the City's official response to the SDEIS/REIR for the Schuyler Heim Bridge Replacement and SR 47 Expressway Project.

The subject SDEIS/REIR included a "Health Risk Assessment" (HRA) as a result of concerns related to air quality emission impacts and/ or associated health risks to the public as a result of the subject project's implementation. The HRA utilized a 70-year emissions scenario evaluating cancer risks assuming that the San Pedro Ports Clean Truck Program is in place by 2015, the CARB "On-Road Heavy Duty Diesel Vehicles Regulations" are approved, the California Air Resources Board low carbon fuels regulations are implemented by 2020, and no other related regulations are promulgated between 2020 and 2072.

The results of the HRA assessment concluded that the cancer risk for the maximum exposed residential receptors was calculated to be less than 14 in a million for Alternative 1 and predicted incremental cancer risks for commercial/industrial workers, recreational workers/users, students/school workers would be below the significance threshold of 10 in a million. Mitigation measures to reduce the cancer risks were evaluated and it was ACTA's determination that retrofits of heating, ventilating and air conditioning (HVAC) units would be a feasible means of reducing the incremental cancer risks when installed in residences within the vicinity of the significant impact zone. Further, the HRA "visual reconnaissance" identified that there were less than 30 homes within the "significant impact zone" with one home located in Carson.

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WEBSITE: ci.carson.ca.us

Letter AJ19. Signatory – City of Carson
Page 2

Response to Comment AJ19-1

Contrary to the comment, the SDEIS/RDEIR did in fact analyze the air quality and health risk not only in the area in question, but also as far north as SR-91.

The HRA conducted by ACTA covered an area extending approximately 7.5 miles north of the Schuyler Heim Bridge to the 91 Freeway, which is over 5 miles from the end of the proposed project (SDEIS/RDEIR, p. 3.13-30). This area includes Alameda Street between Dominquez Street and the 405 Freeway. The HRA did not predict impacts over the significance threshold in this area for either Alternative 1, the identified preferred alternative, or Alternative 2. The emissions from ICTF and Dolores Yard, which were studied by the California Air Resources Board in the health risk assessment for the UP Intermodal Container Transfer Facility (ICTF) and Dolores Railyard, were not analyzed in the cumulative impacts section of the document because these are existing facilities and their emissions are represented in the existing air quality for the project baseline.

The HRA utilized peak hourly and daily traffic projections from the Traffic Study prepared in connection with the EIS/EIR to analyze the potential for health risk impacts. The EIS/EIR traffic analysis utilized port growth projections contained in the TRANSPLAN study and considered increased traffic resulting from cumulative projects to the extent they are consistent with those projections (SDEIS/RDEIR, p. 3.5-24). Accordingly, the effects of cumulative projects are also considered in ACTA's HRA.

CEQA requires that the EIR include a reasonable analysis of the cumulative impacts of relevant projects, and that it examine reasonable, feasible options for mitigating or avoiding the *project's* contribution to any significant cumulative effect (14 CCR Section 15130(b)(5)). Insofar as the EIS/EIR traffic analysis considered the

The city of Carson appreciates the additional effort to identify ways to minimize impacts on residents who live near the ports or along the major transportation routes serving the ports. We have not had the opportunity to evaluate the referenced significant impact zone area since it was not included in the public document; however, we support the concept to retrofit homes and look forward to continued discussions with ACTA and Caltrans to develop a balanced program. The SDEIS/RDEIR did not analyze Alameda Street between Dominguez Street and the San Diego Freeway as being part of the affected significant impact zone area as being sensitive receptors. The HRA also did not evaluate related "cumulative environmental impacts" or the recent California Air Resources Board Health Risk Assessment for UP Intermodal Container Transfer Facility (ICTF) and Dolores Rail-Yards. We believe that any program for residential retrofits should consider the cumulative nature of port-related projects and should, to the extent feasible, provide for a collaborative effort with the various stakeholders.

AJ19-1

Carson continues to be concerned with the expected doubling of diesel truck and vehicles trip volumes (from 700,000 to 1,400,000) annually, via the proposed Alternative 1 (Preferred Alternative). As noted in our prior comments to the DEIS/DEIR, we question the traffic study and believe that additional trucks will continue northbound on Alameda Street in order to access the 91 Freeway. As a result, the expected traffic volumes on Alameda Street will intensify existing safety problems with residents exiting nine (9) residential streets onto Alameda Street between Dominguez and Carson Streets.

AJ19-2

While the city of Carson is prepared to work with Caltrans and the Alameda Transportation Authority to make this project a success, the success of this proposed project cannot sacrifice the health and safety of our local businesses and residents; therefore, the city of Carson is prepared to meet with Caltrans and ACTA to discuss how this proposed project can pay a "fair share" in implementing the necessary mitigation. If you have any questions on this matter please feel free to phone Sheri Repp Loadsman, Planning Manager, or Zak Gonzalez II, Associate Planner, at (310) 952-1761.

AJ19-3

Sincerely,

Jerome G. Groomes, City Manager

CC: Mayor Jim Dear and City Councilmember's
Cliff Graves, Economic Development General Manager
M. Victor Rollinger, Development Services General Manager
Sheri Repp Loadsman, Planning Manager
Zak Gonzalez II, Associate Planner

effects of cumulative projects, ACTA's HRA for the proposed project found that under CEQA, the project together with other cumulative projects could result in a potentially significant impact at a limited number of homes in the project study area (HRA, p. 46). The SDEIS/RDEIR includes mitigation proposed by ACTA that will reduce this potentially significant impact to a less than significant level (SDEIS/RDEIR, p. 5-1). CEQA does not require that the document discuss feasible options for mitigating another project's contribution to a significant cumulative impact. Accordingly, there is no requirement that mitigation be implemented in a collaborative manner.

Please see Response to Comment AJ11-7 and OB14-7 for further discussion of the HRA's conservative methodology.

Response to Comment AJ19-2

The traffic analysis indicates that there will be only a 1 percent and 4 percent increase in total vehicles for model years 2015 and 2030 respectively north of I-405 when comparing the project versus no-project volumes. If, as the commenter suggests, more vehicles chose to use this segment to/from SR-91 than projected, it would be reasonable to assume that decision would equally impact both the project and no-project scenarios resulting in little change to the percentage increase of total trips.

Response to Comment AJ19-3

Your comment is noted and ACTA will continue to work with the City of Carson regarding appropriate mitigation of impacts.

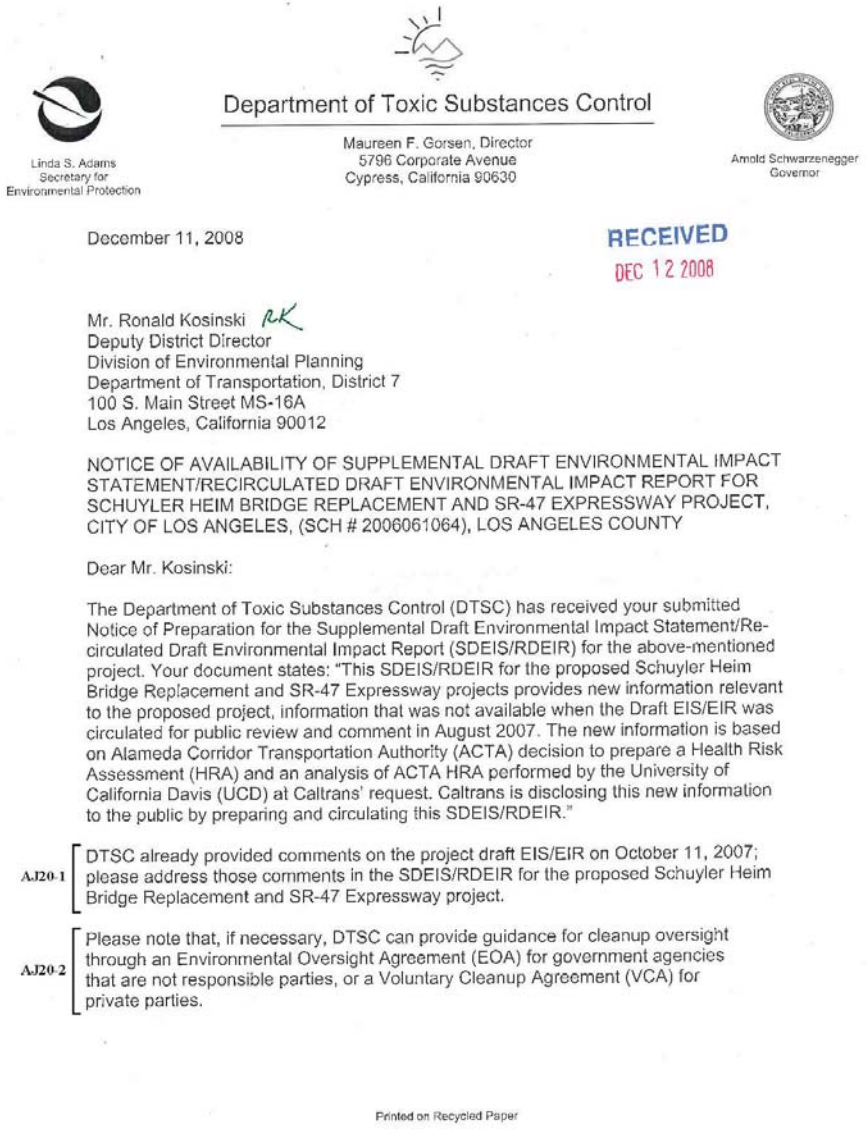
Letter AJ20. Department of Toxic Substances Control

Response to Comment AJ20-1

Your comment is noted.

Response to Comment AJ20-2

Please see Response to Comment AJ6.



Department of Toxic Substances Control

Linda S. Adams
Secretary for
Environmental Protection

Maureen F. Gorsen, Director
5796 Corporate Avenue
Cypress, California 90630

Arnold Schwarzenegger
Governor

December 11, 2008

RECEIVED
DEC 12 2008

Mr. Ronald Kosinski RK
Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, California 90012

NOTICE OF AVAILABILITY OF SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT/RECIRCULATED DRAFT ENVIRONMENTAL IMPACT REPORT FOR SCHUYLER HEIM BRIDGE REPLACEMENT AND SR-47 EXPRESSWAY PROJECT, CITY OF LOS ANGELES, (SCH # 2006061064), LOS ANGELES COUNTY

Dear Mr. Kosinski:

The Department of Toxic Substances Control (DTSC) has received your submitted Notice of Preparation for the Supplemental Draft Environmental Impact Statement/Re-circulated Draft Environmental Impact Report (SDEIS/RDEIR) for the above-mentioned project. Your document states: "This SDEIS/RDEIR for the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway projects provides new information relevant to the proposed project, information that was not available when the Draft EIS/EIR was circulated for public review and comment in August 2007. The new information is based on Alameda Corridor Transportation Authority (ACTA) decision to prepare a Health Risk Assessment (HRA) and an analysis of ACTA HRA performed by the University of California Davis (UCD) at Caltrans' request. Caltrans is disclosing this new information to the public by preparing and circulating this SDEIS/RDEIR."

AJ20-1 DTSC already provided comments on the project draft EIS/EIR on October 11, 2007; please address those comments in the SDEIS/RDEIR for the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway project.

AJ20-2 Please note that, if necessary, DTSC can provide guidance for cleanup oversight through an Environmental Oversight Agreement (EOA) for government agencies that are not responsible parties, or a Voluntary Cleanup Agreement (VCA) for private parties.

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For additional information on the EOA or VCA, please see www.dtsc.ca.gov/SiteCleanup/Brownfields, or contact Ms.Maryam Tasnif Abbasi, DTSC's Voluntary Cleanup Coordinator, at (714) 484-5489.

If you have any questions regarding this letter, please contact Mr. Rafiq Ahmed, Project Manager, at rahmed@dtsc.ca.gov or by phone at (714) 484-5491.

Sincerely,

Greg Holmes
Unit Chief
Brownfields and Environmental Restoration Program - Cypress Office

cc: Governor's Office of Planning and Research
State Clearinghouse
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Sacramento, California 95812-3044
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CEQA#2396

Organizations and Businesses Letters

Letter OB13. Signatory – Coalition for a Safe Environment, LBACA, ICO

Response to Comment OB13-1

The public comment period was extended to January 30, 2009. In addition, ACTA conducted a public meeting on January 27, 2009, at Bannings Landing.

Response to Comment OB13-2

A notice of the pubic meeting was published in the newspaper, and a flyer was distributed to inform the community of the meeting. The meeting was attended by the local community, including residents and interested parties. Transcripts of the meeting are included in the Final EIS/EIR with responses to comments made at that time. Prior to the public meeting on January 27, 2009, representatives met with the current residents of the affected properties.

December 22, 2008

Alameda Corridor Transportation Authority
c/o
John Dougherty,
One Civic Plaza, Suite 350
Carson, CA 90745

CALTRANS, District 7
c/o
Mr. Ronald Kosinski, Deputy District Director
Division of Environmental Planning
100 South Main Street
Los Angeles, CA 90012

Dear Alameda Corridor Transportation Authority and Caltrans, District 7:

Members of our organizations live in areas that recently received English/Spanish flyers about a new project of ACTA and Caltrans, the Schuyler Heim Bridge Replacement and SR-47 Expressway Project. Because they did not understand the flyers, and did not understand what the project is, they brought them to our attention. One member of LBACA, a monolingual Spanish speaker, went to her local Library to learn more about how the project might impact her community and located documents, but only in English.

We explained what we knew about the project to them, that there are several choices under consideration, and that different areas would be affected by different design choices.

We explained that it was unclear which choice would be adopted, but that Alternative 1 would impact Wilmington more while Alternative 2 would impact West Long Beach more. We looked online at the new document and saw mention of homes that would need to have HVAC installed and filtering and told them about that provision.

We are very concerned that our members do not understand why this project is being built, how it will affect their particular neighborhoods, what the risk is, and whether one of their homes is in the area that will be impacted.

We have several requests:

OB13-1
1. Please extend the comment period for two months;
2. Please hold a public meeting during January or February with residents of the community so that they might ask your institutions directly about the project details, rather than having to rely on reading through 100s of pages of technical documents;

OB13-2
3. Please send them a flyer about the meeting that they can understand and that talks about health risk in their neighborhoods;
4. Please meet with the residents whose houses will be most impacted before the public meeting so that they can provide written or public comments if they so choose.

Letter OB13. Coalition for a Safe Environment, LBACA, ICO
Page 2

Very truly yours,

Jesse Marquez
Coalition For A Safe Environment

Elina Green
Long Beach Alliance for Children with Asthma

Robert Hildebrand
Greater Long Beach Interfaith Community Organization (ICO)

Letter OB14. Signatory – Natural Resources Defense Council, et al.

Response to Comment OB14-1

This suggested alternative would not meet project objectives of reducing traffic congestion on local surface streets (between Terminal Island and I- 405) and I-110 and I-710 and improving safety by providing a limited-access aerial route between Terminal Island and 1-405 over at-grade railroad crossings and signalized intersections.

Prohibiting truck traffic on SR-103 north of the bridge would force nearly 18,000 more trucks onto Henry Ford Avenue where they would have to cross five at-grade railroad crossings and three signalized intersections prior to reaching Alameda Street. This is in conflict with the purpose of the project. More over, it would likely back up traffic onto the bridge and significantly increase idling emissions due to delays. Forcing truck traffic to exit the SR-103 at Anaheim Street is not possible, because there is no exit ramp for northbound traffic. Even if there were, it would cause traffic delays due to turns onto Anaheim Street. It would also cause 18,000 additional truck trips on Anaheim Street requiring a right turn at the signalized intersection at Henry Ford Avenue and involve two railroad crossings along Alameda Street to the north. While a restriction on SR-103 would move truck traffic away from local schools in that area, the resulting slower traffic speeds and increased idling would increase total emissions from trucks in the project area, impact different areas and schools, and not achieve the desired reduction in congestion. The alternative suggested by the commenter, therefore, is not reasonable.

NEPA requires that an EIS explore and objectively evaluate all reasonable alternatives (40 CFR § 1502.14.). CEQA requires that an EIR include a discussion of reasonable project alternatives that would feasibly attain most of the basic objectives of a project while avoiding

NATURAL RESOURCES DEFENSE COUNCIL
AMERICAN LUNG ASSOCIATION IN CALIFORNIA
CALIFORNIA SAFE SCHOOLS
COALITION FOR A SAFE ENVIRONMENT
COALITION FOR CLEAN AIR
COMMUNITIES FOR A BETTER ENVIRONMENT
COMMUNITIES FOR CLEAN PORTS
EAST YARD COMMUNITIES FOR ENVIRONMENTAL JUSTICE
HARBOR WATTS ECONOMIC DEVELOPMENT CORPORATION
LONG BEACH ALLIANCE FOR CHILDREN WITH ASTHMA

January 30, 2009

Via U.S. Mail, Facsimile and Email

Ronald J. Kosinski
Deputy District Director
Division of Environmental Planning
Caltrans District 7
100 South Main Street (MS 16A)
Los Angeles, CA 90012
Fax: 213-897-0360
Email: ronald_kosinski@dot.ca.gov

Re: Schuyler Heim Bridge Replacement and SR-47 Expressway Project
EA: 238500

Dear Mr. Kosinski:

On behalf of the undersigned organizations, we write to provide comments on the recirculated Schuyler Heim Bridge Replacement and SR-47 Expressway Project Draft Environmental Impact Statement / Environmental Impact Report (the "EIR"). We appreciate the opportunity to provide comments on the EIR. However, flaws remain that are too serious to allow the EIR to be approved. They are set out below.

OB14-1

Failure To Consider Feasible Alternative. The EIR fails to analyze a cheaper, feasible, environmentally-superior alternative: rebuilding the bridge and prohibiting truck traffic on SR 103 north of the bridge, or north of some other point such that trucks will not go by the schools that are near the 103. This would channel truck traffic onto Alameda,

Letter OB14. Natural Resources Defense Council, et al.
Page 2

or substantially reducing any of the significant effects of the project (CEQA Guidelines § 15126.6).

> CEQA establishes no categorical legal imperative as to the scope of alternatives to be analyzed in an EIR. Each case must be evaluated on its facts, which in turn must be reviewed in light of the statutory purpose… [A]n EIR for any project subject to CEQA review must consider a reasonable range of alternatives to the project… which: (1) offer substantial environmental advantages over the project proposal…; and (2) may be 'feasibly accomplished in a successful manner' considering the economic, environmental, social and technological factors involved. (Citizens of Goleta Valley v. Board of Supervisors, 52 Cal.3d 553, 566 (1990), emphasis added)

An exhaustive list of alternatives is not required, and the statutory requirements for consideration of alternatives must be evaluated against a rule of reason. (*Id.* at p. 565.)

The alternatives considered in the Final EIS/FEIR represent a reasonable range of alternatives as required by CEQA and NEPA. Alternative 1, by proposing the construction of SR-47 Expressway, would divert a portion of the truck traffic from SR-103 and thus would to some extent address the commenter's concern about trucks going by the schools. Therefore, as discussed in Chapter 2.0 of the EIS/EIR, the alternatives given detailed consideration in the document are reasonable, would be potentially feasible, and would be able to implement most basic project objectives.

For the foregoing reasons, the EIS/EIR analyzed a reasonable range of alternatives. The EIR need not look at every conceivable alternative and thus Caltrans and ACTA are not obliged to analyze the alternative mentioned in this comment.

Ronald J. Kosinski
January 30, 2009
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OB14-1 which is designed to handle it. Caltrans' response to Mr. Pettit's earlier question on this point argues that this route would not be environmentally superior to Alternative 1, but that does not relieve Caltrans from its obligation to analyze this alternative and disclose its results to the public in the EIR

OB14-2 *Inconsistent And Unreliable Traffic Numbers.* The July, 2007 Final Traffic Study shows that existing traffic over the bridge is 7,000 vehicles/day. It is projected for 7,400 vehicles in 2011, and for 2030 the "base" number is 24,200 vehicles and the Alternative 1 number is 28,100. If these numbers are correct, they call into question the wisdom of building the SR 43 or SR 103 road projects for an increase of 16% in traffic over the "base."

OB14-3 The traffic numbers, on which the Health Risk Assessment ("HRA") is based, are inconsistent in ways that calls their accuracy into question. For example, the traffic study in the initial DEIR shows 7,000 daily port truck trips over the existing bridge, and 4,970 trips up SR 103. But the traffic study in the HRA shows figures of 11,503 and 7,117 trips for those segments, respectively; this is a 64% increase for bridge traffic and a 43% increase for SR 103 traffic. The traffic consultant who was present at the January 27, 2009 public hearing in Wilmington told Mr. Pettit that the numbers in the initial DEIR were peak numbers and so could not be compared. But that is not correct: after the initial DEIR was released, Mr. Pettit participated in a telephone conference with Meyer Mohaddes professionals in which he was told how to convert peak hour figures into daily figures: multiply by 10. Caltrans personnel also participated in that call; no one contradicted Meyer Mohaddes.

OB14-4 As another example, the traffic consultant at the January 27, 2008 public hearing stated that the traffic study assumed expansion of off-dock rail facilities and that traffic was projected along a "balance of routes." However, Caltrans' January 16, 2009 comments to Mr. Pettit[1] in response to question about traffic modeling (copy attached) stated that 90% of this additional truck traffic was projected to use SR 103, but that if the ICTF facility is expanded, the project would "remove about 9,000 trips from the SR-103 in 2030." These numbers, which appear to have pulled out of thin air, are not reflected in the HRA.

OB14-5 In addition, the truck figures in Appendix C of the HRA are completely at odds with statements that are made in the EIS, on the ACTA website, in the LA City Council resolution, in the Caltrans/ACTA fact sheet and elsewhere. The newly released truck counts appear to demonstrate that the new Truck Expressway will not, in fact, have a "greening - reduced cancer effect" on the communities of Wilmington and West Long Beach as claimed in the HRA and elsewhere. Cancer risk will increase if the project is built.

[1] A copy of Caltrans January 16, 2009 email to me is attached to this letter as Exhibit "A".

Response to Comment OB14-2

From the traffic diagrams used for the HRA (2030 No-Build AADT – see HRA traffic appendices) there are 29,370 trips over the bridge in the 2030 "no-build" and 35,585 if Alternative 1 is built. This is a 21 percent increase in traffic. More importantly the project reduces truck traffic on the I-110 and I-710 freeways by 10 percent, which is significant and primary purpose for the project. (Draft EIS/EIR, p. 1-2.) It also reduces the truck traffic on Henry Ford Avenue by 50 percent, SR-103 south of PCH by 30 percent, and SR-103 by the schools by 15 percent.

Response to Comment OB14-3

It should be noted that the traffic analysis in the initial Draft EIS/EIR does not show daily figures for port truck trips. It only shows various peak hours volumes. These peak volumes were mentioned in the explanation by the consultant to Mr. Pettit. The 7,000 and 4,970 numbers mentioned in this comment are not shown anywhere in the traffic study or the Draft EIS/EIRDEIR.

In November 2007, a question was asked by the commenter as to how to convert the peak hour volumes shown in the Traffic Study of the Draft EIS/EIR to AADT. The traffic consultant responded that a "rule of thumb" (approximate) conversion factor was to multiply the peak hour traffic by 10. This factor varies widely depending on the nature and composition of the traffic. For example, where there is no real peaking the multiplier can theoretically be as high as 24–in other words the traffic every hour is the same. In the case of traffic near the Ports, truck trips are spread more uniformly over periods of time resulting in a factor of greater than 10.

The actual computation of AADT by the model does not involve a "rule of thumb" multiplier, but a dispersion of daily traffic across four periods totaling 24 hours. It then derives peak our traffic by interpolation methods. The AADT numbers in the diagrams are more accurate than the multiplier approximation results cited in the comment.

Please see Response to Comment OB14-6 for a discussion of cumulative traffic numbers and the HRA.

Response to Comment OB14-4

Please see Response to Comment OB14-6 for clarification on this issue.

Response to Comment OB14-5

The Draft EIS/EIR states that traffic with or without the project is projected to double:

> The existing transportation system within and adjacent to the ports is becoming increasingly constrained with cargo traffic and other vehicular traffic. A POLA/POLB study forecast that the amount of cargo entering the two ports would nearly double between 2010 and 2020. During the same time period, the amount of port-related truck traffic also is expected to double (Draft EIS/EIR, Section 1.2.2.2.1, Transportation Demand/Insufficient Capacity).

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The proposed project does not claim to reduce the number of truck trips. The increase in trips is attributable to projected growth in the amount of cargo entering the ports. The purpose of the project is to better accommodate this predicted growth by redirecting some of the projected trips from existing arterials that would otherwise have to handle the growth in trips to the more efficient truck expressway, thereby reducing congestion (Draft EIS/EIR, p. 1-2). Under the 2030 No Build alternative, Port trucks on SR-103 north of PCH are forecasted to increase by 6,024 trucks from 2003 to 2030 to a total of 11,605 without the project. With Alternative 1 for the same period, the Port trucks on SR-103 are reduced by 15 percent (1,712 trucks) adjacent to the Long Beach Schools and residences, when compared to the No Build alternative.

Please see Response to Comment OB15-1.

Response to Comment OB14-6

The principal purpose of the project is to reduce the future congestion that will occur in the port area based on growth projections to 44 million TEUs in 2030 regardless of whether additional near-dock rail capacity is added in the future (SCIG and ICTF expansion).

The CEQA Guidelines mandate that an adequate discussion of significant cumulative impacts contain either:

> (A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or
>
> (B) A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the Lead Agency. (CEQA Guidelines Section 15130 (b)(1)(A) & (B)).

Ronald J. Kosinski
January 30, 2009
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OB14-6 *Relationship of near-dock rail to the project.* One foreseeable effect of the project is to enhance access to the ICFT facility and the proposed SCIG facility. If SCIG is built and ICTF doubled, as currently proposed, those projects are expected to add 1.5 million lifts per year, which probably means 3 million new truck trips over the bridge. Doing the math, this adds over 8,200 truck trips per day. The Alternative 1 number would then be 36,300 vehicles per day, which is 29% over the number used in the DEIR, and 50% over the 2030 base. In this scenario, the traffic study itself is invalid because the predicted speeds and LOS levels are unlikely to be reached. In addition, the health risk assessment is invalid because its traffic and emissions assumptions are far too low. These numbers show that there is no need for the highway part of the project unless the highway will carry new truck trips to the near-dock railyards, in which case the EIR is inadequate.

OB14-7 *Inadequate Health Risk Analysis.* There is no scientific basis for the conclusion from the HRA that the boundary of the area that will suffer an increase in cancer risk of 10 in a million or higher can be drawn so precisely as to distinguish between two adjacent houses. But that is exactly what the HRA purports to do on Rubidoux Street in Wilmington.[2]

OB14-8 Moreover, as we have discussed above, the HRA is based on traffic projections that are, at best, inconsistent and unreliable. And the HRA does not analyze the potential shift of traffic from SR-103 to SR-47 that Caltrans suggests may occur, or the effect of the doubling of capacity at the ICTF facility and/or the planned SCIG intermodal facility.

OB14-9 The communities of Wilmington, Carson and West Long Beach are currently impacted by pollution coming from local rail yard facilities and freeways heavily trafficked by heavy duty diesel trucks carrying cargo from the ports, and are experiencing the impacts of truck-related pollution on their health. Other off-port impacts such as the 710 Freeway corridor, Washington Boulevard, and the railyard areas in the City of Commerce are ignored. To state that this project's impacts stay within the 10 in a million threshold is to deny the cumulative impacts on these communities, particularly in light of prior discussions of the faulty traffic data underestimating the risk of the HRA.

OB14-10 Furthermore, the HRA does not address or attempt to quantify the other health impacts from this project and their effects—asthma and other respiratory illness, resulting in missed school days for children, missed work days for caregivers, increased hospitalizations and emergency room visits and, of course, the potential increase in mortality from asthma, cardiovascular disease and mortality other than lung cancer, and reproductive/developmental problems. Nor does the HRA include the large body of scientific evidence on health impacts from living in close proximity to freeways, as published by UCLA, USC and other academic institutions.

[2] An aerial photo of Rubidoux Street and adjacent areas is attached to this letter as Exhibit "B". A box has been drawn to indicate the location of Rubidoux Street.

The traffic study prepared as part of the Final EIS/EIR uses the summary of projections method. The travel demand forecasting model used to forecast future traffic volumes in the Draft EIS/EIR was based on the Ports of Long Beach and Los Angeles Transportation Study model, which was developed in 2001, approved by the Ports of Long Beach and Los Angeles for port area Transportation Planning Studies and environmental studies, and is based on the regional model of the Southern California Association of Governments (SCAG). The model was updated in 2004 for the analysis of this project, as well as for other port area transportation planning studies. The 2004 update includes incorporation of the most current regional model data and the most current port data. The model was calibrated as part of the Joint Port Study and details on model development and calibration are provided in "Ports of Long Beach and Los Angeles Transportation Study"(*Schuyler Heim Bridge Replacement and SR-47 Expressway Project Traffic Study*, April 2007, Meyer, Mohaddes Associates, p. 8).

The model includes data and assumptions that project growth of containers in the ports to approximately 44.7 million TEUs by 2030 (*Id.*, p. 9). The estimate is based upon the estimated upper limit of the combined ports' physical capacities to handle additional containers. Thus, if near-dock facilities such as the proposed SCIG or expanded ICTF are approved and constructed to handle additional container movements, they will be handling some of the growth in containers that has been projected by the ports and will not contribute to additional container movements. Some of the growth in near-dock intermodal capacity was considered in the model, although at the time of the Draft EIS/EIR traffic analysis specific routing information was not available for either SCIG or ICTF. Accordingly, the additional container movements that will be handled by SCIG and/or ICTF, if approved, are considered in the Final EIS/EIR's cumulative traffic analysis even though there was not enough information available to predict the exact number of containers they would handle nor the routes the trucks might take to move the intermodal containers.

Because the Notice of Preparation ("NOP") for the proposed SCIG facility did not include any information about potential changes in traffic patterns resulting from the project (Southern California International Gateway Project, Notice of Preparation, p. A-3 [Port of Los Angeles, 2005]), and the ICTF NOP was not released until after the Draft EIS/EIR and SDEIS/RDEIR for the project were circulated for public review, certain assumptions were made about the two projects' potential traffic impacts when the expressway project traffic study was prepared. With the knowledge that near-dock intermodal capacity would likely expand in the future and in an effort to include the most conservative analysis, the cumulative trip distribution model was run without consideration of the existing cap on containers at ICTF in order to conservatively predict a large number of truck trips traveling to their proposed locations in future years via SR-103.

While the NOP for the ICTF expansion indicates that a new in-gate may divert proposed ICTF expansion truck trips from SR-103 to Alameda, and may alter future trip distribution assumptions contained in the Final EIS/EIR, Caltrans and FHWA had the discretion to set a reasonable cutoff date for determining which projects would be specifically analyzed in any of the Final EIS/EIR's cumulative analyses (*San Franciscans for Reasonable Growth v. City and County of San Francisco*, 151 Cal.App.3d 61, 74 (1984); *Gray v. County of Madera*, 167 Cal.App.4th 1099, 1128 [2008]). As the document indicates, the Final EIS/EIR cumulative analyses only specifically analyze projects that were proposed by formal public notices (Notice of Intent, Notice of Preparation) when the Draft EIS/EIR was being prepared (*Schuyler Heim Bridge Replacement and SR-47 Expressway Project Draft EIS/EIR*, p. 5-3). Not only had ICTF not been proposed by formal notice when the Draft EIS/EIR was released for public review, but it had not been proposed by formal notice when the SDEIS/RDEIR was circulated for public review more than 1 year later. If the ICTF expansion is ultimately approved, and the recently proposed in-gate

will divert future truck trips from SR-103 to Alameda, those impacts will be analyzed as part of the environmental review process for the ICTF expansion project.

The Final EIS/EIR traffic analysis together with port traffic projections and the aforementioned trip distribution assumptions were utilized to complete the cumulative air quality analysis and the Health Risk Assessment (HRA) prepared in connection with the Final EIS/EIR. Therefore, both analyses account for cumulative truck trips that may result from increased near-dock intermodal capacity such as might occur with the proposed SCIG and ICTF expansion projects, reflect a worst-case assessment of potential health risk on SR-103, and reflect maximum exposure to nearby schools.

Nonetheless, in response to public comments, ACTA elected to conduct a sensitivity analysis to calculate the health impacts if certain assumptions were made concerning the routes port trucks would take to an expanded ICTF and to the proposed SCIG facility. The sensitivity analysis does not change the port-wide TEU throughput assumptions used in the SDEIS/RDEIR. For the ICTF project, based on the Notice of Preparation it was assumed that there would be a new in-gate on Alameda Street and that traffic crossing the Schuyler Heim Bridge and using the truck expressway would be prohibited from using SR-103 on either the outbound or inbound trip. With regard to the proposed SCIG facility, since no traffic routing information was publically available, ACTA met with Port of Los Angeles environmental staff currently engaged in the preparation of the EIR for the proposed project. ACTA was informed that the in-gate for the proposed SCIG facility would be just west of the intersection of the SR-103 and Pacific Coast Highway and that traffic crossing the Schuyler Heim Bridge to the proposed SCIG facility would be required to use SR-103 and prohibited from using the expressway to Pacific Coast Highway. For purposes of the sensitivity analysis, it was assumed that both facilities would be in operation in 2015. Trucks coming from terminals in certain areas of the two ports would not be expected to cross the Schuyler Heim Bridge in order to travel to the ICTF or SCIG facilities because the bridge is not the most direct route. For those areas, the model was allowed to predict traffic data without any routing restrictions. For example, it was assumed that traffic coming from the terminals at the Port of Long Beach not located on Terminal Island would continue to travel along surface streets or the I-710 freeway, exiting at either Anaheim Street or Pacific Coast Highway and then turning right on to either SR-103 or Alameda Street. Likewise, traffic coming from the Port of Los Angeles terminals from the west would travel on Harry Bridges Boulevard directly to Alameda Street and would not use the expressway.

These routing assumptions were programmed into the traffic model for the sensitivity analysis to estimate the number of truck trips on the roadways in the study area. The traffic model, study area and all other inputs remained the same.

Based on the sensitivity analysis traffic model results, the HARP model was used to predict the cancer risk from diesel exhaust particulate based on the above assumptions, which is the best information available at this time. Other than the modified traffic data, the methodology for estimating air emissions, the HARP model and all model inputs remained the same. The HARP model was run for the preferred scenario of 2015 emissions.

The results of the HRA with the revised traffic assumptions show that with both facilities in operation, no significant incremental health risk over the 2015 No Build baseline is predicted at any of the schools in the study area (student or workers), for the worker population, or at recreational areas (see Table OB14-1). With regard to residential risk, the maximum incremental risk if the proposed project is built is less than significant under CEQA.

Table OB14-1
2015 Emissions
Alternative 1

(SCIG trucks to/from Terminal Island required to use SR-103 and ICTF trucks to/from Terminal Island required to use Expressway)

All risks are expressed in number per million population

		UTM Coordinates[b]		Residential Risk		
Residential Regions	**Receptor[a]**	**East (m)**	**North (m)**	**Baseline**	**Alt 1**	**Increase**
Dominguez	2535	386,675	3,744,275	79.1	84.7	5.6
Lincoln Village	2389	386,525	3,743,825	77.0	82.6	5.6
Long Beach	2274	386,675	3,743,375	49.9	51.9	2.0
Wilmington	1456	384,825	3,739,775	42.8	50.7	7.9
Wilmington[c]	1548	384,975	3,740,025	42.0	47.7	5.7

		UTM Coordinates[b]		Worker Risk			Adjusted Recreational Risk		
Recreational Areas	**Receptor[a]**	**East (m)**	**North (m)**	**Baseline**	**Alt 1**	**Increase**	**Baseline**	**Alt 1**	**Increase**
Hudson Park	1677	386,825	3,740,375	8.6	8.6	0.0	12.9	12.9	0.0

		UTM Coordinates[b]		40-year Staff Risk			Adjusted 13-year Student Risk		
School Areas	**Receptor[a]**	**East (m)**	**North (m)**	**Baseline**	**Alt 1**	**Increase**	**Baseline**	**Alt 1**	**Increase**
Wilmington Park Early Education Center	1274	384,725	3,739,075	7.2	8.4	1.2	1.7	2.0	0.3
Cabrillo High School	1623	386,775	3,740,225	8.5	8.5	0.0	2.0	2.0	0.0

NOTES

[a] - Multiple receptors may share maximum risk increase; receptor listed is lowest-numbered.

[b] - Universal Transverse Mercator projection, Zone 11, NAD 83

[c] - Previous maximum health risk impacts from Table 3.13-17

Response to Comment OB14-7

The HRA conducted by ACTA calculated emissions from the increased truck traffic along the proposed truck expressway and associated health impacts in terms of increased cancer risk and acute and chronic health impacts (non-cancer health risks). All non-cancer health risks were found to be less than the significance level of 1.0. The increased risk of cancer is considered significant by ACTA under CEQA if the difference in risk between the No Build scenario and the proposed project is greater than 10 in a million. The increased cancer risk was calculated for residences, commercial workers, recreational users and workers, and students and school workers. For Alternative 1, all impacts were found by ACTA under CEQA to be less than significant, except at a small number of residential receptors.

It is highly unlikely that more homes in the study area would have a risk higher than 10 in a million. The HRA uses very conservative assumptions concerning the emissions from the cars and trucks that will use the expressway and the amount of time people in the study area will be exposed to those emissions. With regard to vehicle emissions, it was assumed that there would be no further regulations requiring cleaner fuels or more efficient engine standards than those described in the HRA (Port Clean Truck Program, CARB On-road Heavy Duty Diesel regulations, CARB low carbon fuel regulations). For exposure assumptions, it was assumed that residents would be exposed to the projected level of emissions for an entire lifetime - 350 days per year, 24 hours per day, over 70 years. Since it is likely that emissions from cars and trucks will continue to be regulated and become cleaner over time, and that most people will not be exposed to the predicted level of emissions from the project continuously for 70 years, it is highly unlikely that even the residents of the small number of homes predicted by the HRA as having a *potential* health risk greater than 10 in a million will have an *actual* increase in cancer risk greater than 10 in a million. Other residents, even in close proximity to those houses identified in the HRA, will have even less risk. Because of the conservative assumptions mandated by OEHHA risk assessment guidelines, it is highly unlikely that additional residents would be exposed to a significant impact from the project.

Please also see Response to Comment AJ11-7 for an explanation of why the HRA is more conservative than required by the CEQA Guidelines and SCAQMD criteria.

Response to Comment OB14-8

As discussed in response OB14-6, the number of trucks on the SR-103 has been raised as a worst-case traffic condition in order to account for potential growth including both SCIG and the expanded ICTF facility. The HRA was prepared using the same transportation model projections and trip distribution assumptions.

While the recent NOP for the ICTF expansion indicates that if modernized, an in-gate will be constructed on Alameda Street and left turns banned from the exit gate on Sepulveda Boulevard, that impact did not require analysis in the Final EIS/EIR. Impacts resulting from that proposed change will be assessed in that project's environmental documents.

For further discussion, please see Response to Comments OB14-2, and OB14-6.

Response to Comment OB14-9

The comment is noted. ACTA's HRA evaluated the health risks of emissions from cars and trucks using the proposed expressway and compared those risks to the risks without the project. The difference is less than the significance level of 10 in a million, with the exception of a small number of residential receptor. (HRA, pp. 45-50 (2015 preferred emissions scenario). The HRA also predicts that the project would have substantial regional benefits in terms of reducing health risks in the majority of the study area (HRA, pp. 45-50 (2015 preferred emissions scenario). The results are illustrated in Figures 3-5 (Alternative 1) and 3-6 (Alternative 2) (HRA, pp. 47-48).

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The health risks posed by port-related operations have been widely discussed and measures have been identified in the San Pedro Bay Ports Clean Air Action Plan (CAAP) to reduce emissions from such activities. As a result of the CAAP measures and other measures aimed at reducing criteria pollutants and diesel emissions that have been adopted or proposed by the USEPA, CARB and the SCAQMD, health risk impacts from port operations are expected to decline from current levels. While ACTA does not have the authority to control the cars and trucks which are the sources of emissions, given the relatively small number of residences affected, ACTA has proposed to reduce the risks at the impacted residences by the installation of HVAC systems. Given the substantial regional benefits in terms of reduction of health risk and with imposition of proposed mitigation, cumulative risks were found to be less than significant (HRA, p. 5-1).

Please see Response to Comment TR2-18 for further discussion of clean truck measures.

The HRA does not underestimate health risk. Please see Response OB14-7 and AJ11-7.

Response to Comment OB14-10

The HRA used the HARP model to estimate acute and chronic health effects and the methodology developed by the California Office of Environmental Health Hazard Assessment (OEHHA). We are aware of no other recognized methodology to study the health impacts listed in the comment. See Response to Comment TR2-36.

Response to Comment OB14-11

Based on monitoring conducted between 2004-2006, the SCAQMD has estimated the cancer risk in the South Coast Air Basin at approximately 1,200 in a million, with higher risks estimated for the ports and along freeways and other transportation corridors

Ronald J. Kosinski
January 30, 2009
Page 4 of 5

Finally, the "Caltrans Perspective" that was handed out at the January 27, 2009 meeting is an insult to the community and rejection of decisionmaking based on science and fact. You can be sure that this document[3] will be a prominent exhibit should there be litigation over this project.

OB14-11

Inadequate Mitigation Of Health Risks. The proposed SR 47 project will, by its terms, depress or destroy property values and increase cancer risk. The proposed mitigation – installation of HVAC systems[4] in eight homes – will not remedy this. Given the high level of emissions generated by the project (which are underestimated), HVAC systems alone will not sufficiently protect the affected community, and thus project alternatives must be considered absent additional mitigation being incorporated into the project. Moreover, as noted above, the science behind the HRA is not adequate to distinguish between neighboring homes. If any home in the area projected to have any higher cancer risk is given HVAC equipment, they all should.

Sincerely,

David Pettit
Senior Attorney
Natural Resources Defense Council

Colleen Callahan
Manager of Air Quality Policy and Advocacy
American Lung Association in California

Robina Suwol
Executive Director
California Safe Schools

Jesse Marquez
Executive Director
Coalition for a Safe Environment

Candice Sung Kim
Senior Campaign Associate
Coalition for Clean Air

Shana Lazrow
Staff Attorney
Communities For A Better Environment

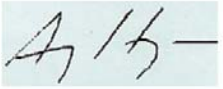
[3] A copy of the "Caltrans Perspective" is attached to this letter as Exhibit "C".
[4] Left unsaid by Caltrans is who will pay for maintenance, repair and replacement of these HVAC systems.

Letter OB14. Natural Resources Defense Council, et al.
Page 10

(MATES III, at p. ES-2-4). The MATES III study found that 84 percent of the risk is attributable to diesel exhaust (MATES III, at ES-3). The health risks in the project area are well known and largely attributable to diesel exhaust emissions from port operations. The proposed project will contribute only a comparatively small additional risk in limited areas. Thus, it is unlikely that the project will depress or destroy property values due to the projected increase in cancer risk. The HRA found that the construction of Alternative 1 would produce substantial regional benefits in terms of reducing cancer risk (HRA, pp. 38-49). The reduced health risk is due to reduced congestion, less idling, and less starting and stopping of vehicles. For the limited number of residences where the health impacts are predicted to be greater than 10 in a million, ACTA has found that it would be feasible to reduce the risks at those residences by the installation of HVAC systems. The HRA estimated that such systems would be 90 percent effective in removing diesel particulate, which in all cases would reduce risk at the affected residences to less than significance (HRA, p.53). CEQA requires mitigation of significant risks. For residences outside the area of significant risk, no mitigation is proposed. See response to OB14-7 regarding the potential for other homes to be significantly impacted. See Response to Comment TR-20 for further discussion on property value.

Ronald J. Kosinski
January 30, 2009
Page 5 of 5

Ryan Wiggins
Campaign Associate
Communities for Clean Ports



Angelo Logan
Executive Director
East Yard Communities for Environmental Justice

Frank O'Brien
Executive Director
Harbor Watts Economic Development Corporation

Elina Green
Project Manager
Long Beach Alliance For Children With Asthma

Cc (w/encl): ACTA Governing Board
Mr. John Doherty, P.E.
Ms. Sharon Rubalcava

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Page 11

Pettit, David

From: Fornelli, Charles [Fornelli@TrenchTeam.com]
Sent: Friday, January 16, 2009 6:08 PM
To: Pettit, David
Cc: Doherty, John; Karl Price; Thoa Le; Ron Kosinski; michelle.rather@ch2m.com; Kenagy, Duane; Rivera, Connie
Subject: SR47 HRA
Importance: High
Attachments: NRDC RESPONSES.pdf

Attached are our responses to your December 23, 2008 comments/questions.

Charles R. Fornelli
Deputy Program Manager
Alameda Corridor Engineering Team
One Civic Plaza, Suite 350
Carson, CA 90745
Ofc. (310) 816-0460
Fax (310) 816-0464
E-mail: Fornelli@trenchteam.com

1/29/2009

Exhibit A

Letter OB14. Natural Resources Defense Council, et al.
Page 12

Response to NRDC Comments dated December 23, 2008

January 16, 2009

#1 Alternatives. It seems to me that there is a cheaper, feasible alternative that has not been considered: rebuilding the bridge and prohibiting truck traffic on SR 103 north of the bridge, or north of some other point such that trucks will not go by the schools that are near the 103. This would channel truck traffic onto Alameda, which it is designed to handle it.

Response:

ACTA lacks the authority to restrict truck traffic on SR 103. However, even if ACTA had the authority, this alternative would not meet project objectives of reducing traffic congestion on local surface streets (between Terminal Island and I-405) and I-110 and I-710 and improving safety by providing a limited-access aerial route between Terminal Island and 1-405 over at-grade railroad crossings and signalized intersections.

Prohibiting truck traffic on SR103 north of the bridge would force nearly 18,000 more trucks onto Henry Ford Avenue where they would have to cross five at-grade railroad crossings and three signalized intersections prior to reaching Alameda Street. This would likely back up traffic onto the bridge and significantly increase idling emissions due to delays. Forcing truck traffic to exit the SR103 at Anaheim Street is not possible, because there is no exit ramp for northbound traffic. Even if there were, it would cause traffic delays due to turns onto Anaheim Street. It would also cause 18,000 additional truck trips on Anaheim Street requiring a right turn at the signalized intersection at Henry Ford Avenue and involve two railroad crossings along Alameda Street to the north.

While a restriction on SR103 would move truck traffic away from local schools in that area, the resulting slower traffic speeds and increased idling would increase total emissions from trucks in the project area, impact different areas and schools, and not achieve the desired reduction in congestion.

#2 Traffic numbers. I looked back at the July, 2007 Final Traffic Study after our confusion at the meeting about what the VMT numbers meant. If I read the charts correctly, existing traffic over the bridge is 7,000 vehicles/day. It is projected for 7,400 vehicles in 2011, and for 2030 the "base" number is 24,200 vehicles and the Alternative 1 number is 28,100. If these numbers are correct, they call into question the wisdom of building the SR 43 or SR 103 road projects for an increase of 16% in traffic over the "base."

Response:

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From the traffic diagrams used for the HRA (2030 No-Build AADT – see HRA traffic appendices) there are 29,370 trips over the bridge in the 2030 "no-build" and 35,585 if Alt 1 is built. This is a 21% increase. More importantly the project reduces traffic on the I-110 and I-710 freeways by 10%, Henry Ford Ave. by 50%, SR-103 south of PCH by 30%, and SR-103 by the schools by 15%.

#3 Relationship of near-dock rail to the project. One foreseeable effect of the project is to enhance access to the ICFT facility and the proposed SCIG facility. If SCIG is built and ICTF doubled, as currently proposed, those projects are expected to add 1.5 million lifts per year, which probably means 3 million new truck trips over the bridge. Doing the math, this adds over 8,200 truck trips per day. The Alternative 1 number would then be 36,300 vehicles per day, which is 29% over the number used in the DEIR, and 50% over the 2030 base. In this scenario, the traffic study itself is likely invalid because the predicted speeds and LOS levels are unlikely to be reached. In addition, the health risk assessment is probably invalid because its traffic and emissions assumptions are way too low. What these numbers suggest to me is that there is no need for the highway part of the project unless the highway will carry new truck trips to the near-dock railyards, in which case the DEIR is inadequate.

Response:

The principal purpose of the project is to reduce the future congestion that will occur in the port area based on growth projections to 44 million TEUs in 2030 regardless of whether additional near-dock rail capacity is added in the future (SCIG and ICTF expansion). The traffic analysis assumed that growth would occur as the Port has projected and that the containers would be transported to off-dock rail locations to the extent that the numbers exceed the capacity of on-dock rail. The traffic analysis assumes that the increased traffic will follow current traffic patterns through the port area.

Regarding SCIG, the most direct route to the proposed SCIG will be SR103, even if the SR47 project is built. The traffic analysis does not account for SCIG per se, but if it did, the port truck trips over the Heim Bridge then along SR-103 up to PCH would increase by about 6,000 and the increase on the Expressway would be nominal.

Regarding ICTF, the traffic model for SR-47 conservatively includes about 10,000 ICTF trips in 2030 (5,300 in 2015) to account for incremental growth in usage throughout the planning period. Ninety percent (90%) of these trips were assigned for analysis to the SR103. If the ICTF is expanded and the new in-gate for the modified facility is built on Alameda Street, the proposed SR-47 Project would remove about 9,000 trips from the SR-103 in 2030 (4500 trips that support the existing ICTF capacity and 4500 trips due to the increased ICTF capacity). Therefore, the Heim Bridge traffic estimate that you question requires no adjustment for the 2030 analysis if the ICTF is expanded because the potential growth has been accounted for. Similarly, the HRA also conservatively includes

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Page 14

10,000 truck trips in 2030 on the SR-103 resulting in a worst case assessment of the SR-103 area health risk. If the ICTF is not expanded or if incremental growth does not occur, expected truck trips on SR-103 would actually be 4,500 less for both the no-build and Alt. 1 2030 SR-47 scenarios.

#4 Hot-spot analysis. Why does the hot-spot conformity analysis it uses as a benchmark the old standard of 65 ug/m3 rather than the current standard of 35 ug/m3? Also, will project conform to the 35 ug/m3 standard?

Response:

Transportation conformity for the 24-hour $PM_{2.5}$ standard of 35 ug/m^3 does not apply until one year after the effective date of nonattainment designations that consider that standard (see Clean Air Act section 176(c)(6)). The attainment designations for the new $PM_{2.5}$ standard were not released by EPA until December 22, 2008[1], after the Recirculated Draft EIS/EIR was out for public review. The Recirculated Draft EIR/EIS was submitted on November 20, 2008, and published in the Federal Register on November 28, 2008 (see 73 FR 72477). Therefore, the old $PM_{2.5}$ standard ($65ug/m^3$) was used in the $PM_{2.5}$ conformity hotspot analysis.

Over the past five years, the $PM_{2.5}$ concentrations measured at the North Long Beach monitoring station have exceeded the both the old and new $PM_{2.5}$ standard. If the $PM_{2.5}$ hotspot analysis were revised to evaluate the new $PM_{2.5}$ standard, the conclusion in the analysis would be the same. This conclusion, as stated in the $PM_{2.5}$ hotspot analysis reviewed and approved by the Southern California Association of Governments Transportation Conformity Working Group in October 2008, is that the project would not be expected to result in an increase in localized $PM_{2.5}$ concentrations when compared to the No Build Alternative (see Recirculated Draft EIR/EIS Subsection 3.13.3.4.1.3, page 3.13-25).

[1] Reference: United States Environmental Protection Agency (EPA). 2008. Air Quality Designations for the 2006 24-hour Fine Particulate Standard ($PM_{2.5}$) National Ambient Air Quality Standard. December 22. Accessed January 14, 2009. http://www.epa.gov/pmdesignations/2006standards/documents/2008-12-22/FR_Final_24hr_PM2.5_Designations_010609.pdf

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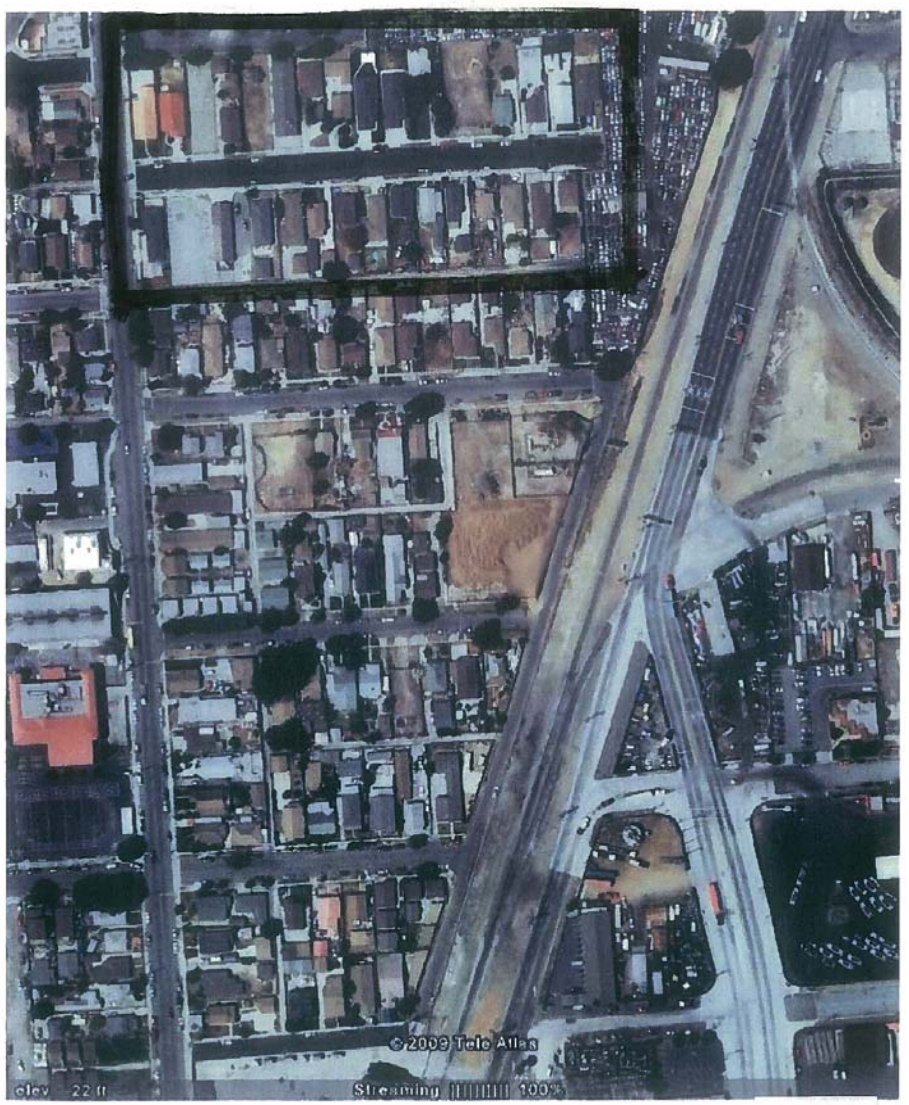

Exhibit B

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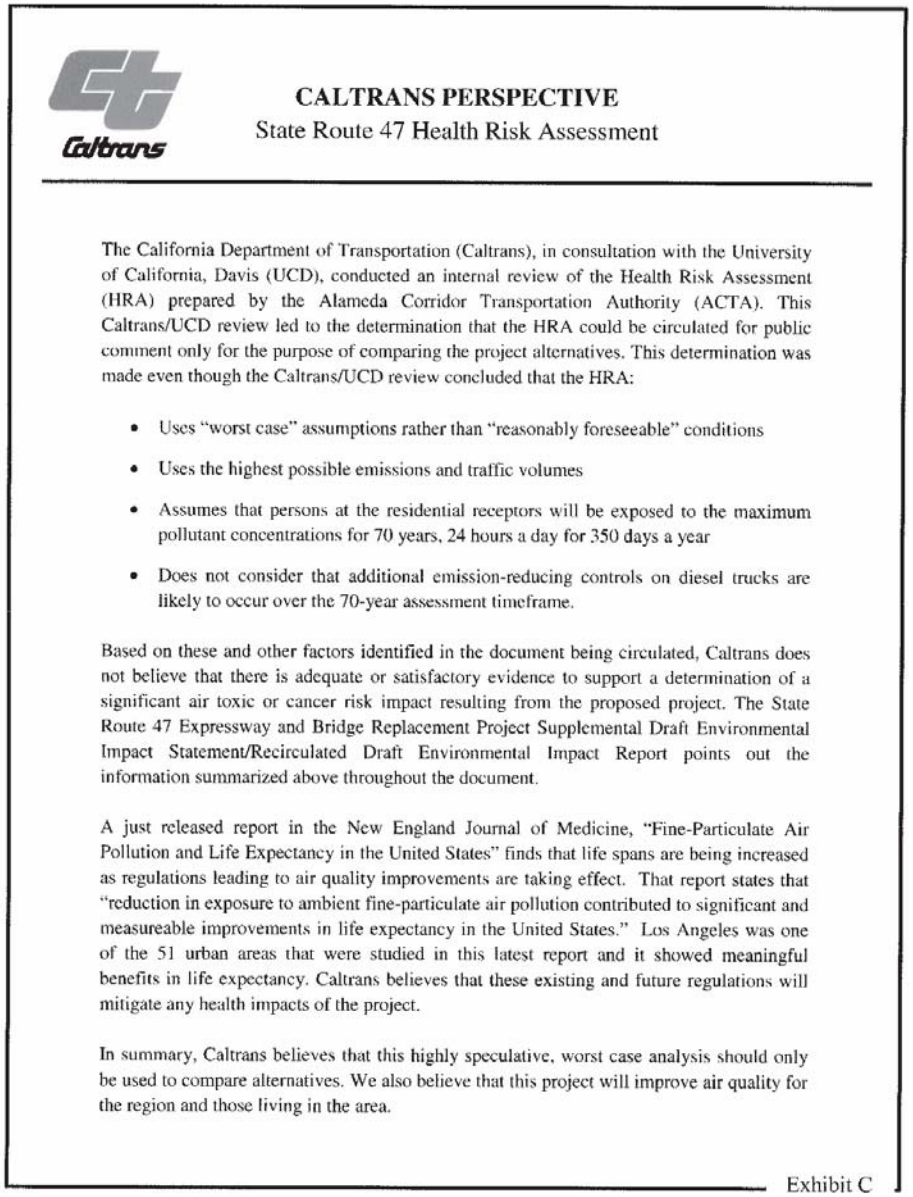
Page 16



CALTRANS PERSPECTIVE
State Route 47 Health Risk Assessment

The California Department of Transportation (Caltrans), in consultation with the University of California, Davis (UCD), conducted an internal review of the Health Risk Assessment (HRA) prepared by the Alameda Corridor Transportation Authority (ACTA). This Caltrans/UCD review led to the determination that the HRA could be circulated for public comment only for the purpose of comparing the project alternatives. This determination was made even though the Caltrans/UCD review concluded that the HRA:

- Uses "worst case" assumptions rather than "reasonably foreseeable" conditions
- Uses the highest possible emissions and traffic volumes
- Assumes that persons at the residential receptors will be exposed to the maximum pollutant concentrations for 70 years, 24 hours a day for 350 days a year
- Does not consider that additional emission-reducing controls on diesel trucks are likely to occur over the 70-year assessment timeframe.

Based on these and other factors identified in the document being circulated, Caltrans does not believe that there is adequate or satisfactory evidence to support a determination of a significant air toxic or cancer risk impact resulting from the proposed project. The State Route 47 Expressway and Bridge Replacement Project Supplemental Draft Environmental Impact Statement/Recirculated Draft Environmental Impact Report points out the information summarized above throughout the document.

A just released report in the New England Journal of Medicine, "Fine-Particulate Air Pollution and Life Expectancy in the United States" finds that life spans are being increased as regulations leading to air quality improvements are taking effect. That report states that "reduction in exposure to ambient fine-particulate air pollution contributed to significant and measureable improvements in life expectancy in the United States." Los Angeles was one of the 51 urban areas that were studied in this latest report and it showed meaningful benefits in life expectancy. Caltrans believes that these existing and future regulations will mitigate any health impacts of the project.

In summary, Caltrans believes that this highly speculative, worst case analysis should only be used to compare alternatives. We also believe that this project will improve air quality for the region and those living in the area.

Exhibit C

Letter OB15. Signatory – Andrea Hricko

Response to Comment OB15-1

[Note: The delineated comments in this letter were originally shaded by the commenter. Shading has been removed for reading clarity.]

A review of various informational materials indicates that one of the many project benefits listed was either that it reduced "traffic congestion" on streets between Terminal Island and Alameda Street (the Draft EIR/EIS), or that it "diverts trucks from certain local arterials" (e.g., the flyers for both public meetings). These statements are accurate and quantified in the Draft EIR/EIS.

Chapter 1 of the Draft EIR/EIS (Section 1.2.2.2) defines this proposed new "high capacity route" as necessary due to "insufficient freeway capacity" and the expected doubling of "port-related truck traffic." It also refers to the assessment of "current and future traffic in the project area," which is delineated in Section 3.5 (Traffic) where in Tables 3.5-3 and 3.5-14 it is shown that, at the 20 intersections evaluated, 16 get more congested between 2003 and 2030 without the project and 7 of these 16 can be decongested with the project.

Every effort has been made to make it known that the intent of the project is to provide an alternative route to the freeways by construction of an aerial structure connected to Alameda Street north of PCH. This will not only attract up to 10 percent of the trucks at any point in time away from the freeways but also substantially reduce the growth rate of trucks on Henry Ford Avenue.

Response to Comment OB15-2

Please see Response to Comment OB15-1 and OB14-5.

Andrea Hricko responses to Caltrans dated January 30, 2009 – BELOW IN LARGE FONT

In response to a January 16, 2009 document sent to Andrea Hricko from ACTA and Caltrans entitled "Responses to Preliminary Comments from Andrea Hricko Email 31 Dec 08 to Caltrans and ACTA"

January 16, 2009

1) Comment:
Ms. Hricko states the "data are baffling in light of the conclusions of Caltrans in its DEIR/EIS and of ACTA in its HRA, which both claim that the project will reduce traffic on arterial streets by diverting that traffic to the new expressway, that the data do not support the claims."

1) Response from Caltrans/ACTA:
The DEIS/DEIR states on page 1-7, that traffic with or without the project is projected to double: The existing transportation system within and adjacent to the ports is becoming increasingly constrained with cargo traffic and other vehicular traffic. A POLA/POLB study forecast that the amount of cargo entering the two ports would nearly double between 2010 and 2020. During the same time period, the amount of port-related truck traffic also is expected to double. (DEIS/DEIR, Section 1.2.2.2.1 Transportation Demand/Insufficient Capacity)

The doubling of trucks from 5,581 to 11,605 between 2003 and 2030 is based upon the Ports total TEU projections of 11.8 million in 2003, and 44.7 million in 2030. The statement that the project will reduce traffic on arterial streets was not intended to mean that it would reduce future truck trips to less than current levels of truck traffic. Rather, the statement means that upon project completion, traffic would be diverted from arterial streets that would otherwise have seen even greater increases due to port-related growth. As the diagram shows (from HRA traffic appendix), the numbers of diverted trips varies based upon expected traffic patterns.
Our team has checked the data and verified that port trucks are reduced on arterial streets, as compared to future years without the project, with the exception of Alameda Street under Alternative 1. Port trucks are reduced on PCH, Sepulveda, Harry Bridges, Henry Ford, and Del Amo Blvd. for 2030 No Build and 2030 Alternative 1.

1) RESPONSE FROM ANDREA HRICKO SUBMITTED TO RECORD 01-30-09

OB15-1 Nearly every document associated with this project states that the project will "reduce traffic on arterial streets." Nowhere in the DEIR, HRA or recirculated DEIR does the document state that even with the Expressway in place, truck traffic will be nearly twice what it is now. The promotional

OB15-2 materials, press releases, fact sheets, and other public relations materials about this project all mislead the public, which was consistently led to believe that the project will reduce traffic from the congestion that exists now. In fact, that congestion will be nearly twice as bad in 2030, whether or not the Expressway is built.

2) Comment:
Ms Hricko poses the following: "Please note on both the tables and the figures that despite claims to the contrary, with Alternative I in place, the numbers of trucks in the West Long Beach area on the Terminal Island Freeway (SR 103, between PCH and Willow) would nearly double

Letter OB15. Andrea Hricko
Page 2

Response to Comment OB15-3

Please see Response to Comment OB15-1.

Response to Comment OB15-4

Please see Response to Comment OB14-6. The HRA was based on reasonable trip distribution assumptions, including significant new trips on SR-103 in future years. Thus, it does reflect an accurate assessment of the potential for cancer risk resulting from the project.

between 2003 and 2030 (from 5581 to 9893 per day)."

2) Response:
The proposed project does not claim to reduce the number of truck trips. The increase in trips is attributable to projected growth in the amount of cargo entering the ports. The purpose of the project is to better accommodate this predicted growth by redirecting some of the projected trips from existing arterials that would otherwise have to handle the growth in trips to the more efficient truck expressway, thereby reducing congestion (DEIS/DEIR, 2007; pg 1-2). Under the 2030 No-Build Alternative, Port trucks on SR-103 north of PCH are forecasted to increase by 6,024 trucks from 2003 to 2030 to a total of 11,605 without the project. With Alternative 1 for the same period, the Port trucks on SR-103 are reduced by 15% (1,712 trucks) adjacent to the Long Beach Schools and residences, when compared to the No Build Alternative.

2) RESPONSE FROM ANDREA HRICKO SUBMITTED TO RECORD 01-30-09

OB15-3 The project can make no claim to "reducing congestion" on arterial streets when, with the new project in place, the traffic on those streets is doubled! Can you imagine what it will mean to have nearly 10,000 trucks a day going past Hudson School – when the new expressway (designed to reduce congestion on arterial streets) is already built? Again, the language used by

OB15-4 Caltrans and ACTA misleads the public. The only way that the Expressway can reduce this traffic is to have that traffic on the SR-47 Expressway. If the traffic is on that Expressway, then the HRA must reflect the additional diesel cancer risk it will create.

3) Comment:
Ms. Hricko raises the question regarding the Union Pacific ICTF, stating the following: "...it is currently at capacity. Without expanding, it cannot handle a larger volume of trucks arriving with containers. Thus, it is baffling to see calculations showing a doubling of truck traffic in 2030 on Sepulveda Blvd approaching the Union Pacific ICTF (No Build scenario), since the ICTF expansion proposal is mentioned nowhere else in either the HRA nor in any versions of the DEIR/DEIS."

3) Response:
The principal purpose of the project is to reduce the future congestion that will occur in the port area based on growth projections to 44 million TEUs in 2030 regardless of whether additional near-dock rail capacity is added in the future (SCIG and ICTF expansion). The traffic analysis assumed that growth would occur as the Port has projected and that the containers would be transported to off-dock rail locations to the extent that the numbers exceed the capacity of ondock rail. The traffic analysis assumes that the increased traffic will follow current traffic patterns through the port area. Regarding SCIG, the most direct route to the proposed SCIG will be SR103, even if the SR47 project is built. The traffic analysis does not account for SCIG per se, but if it did, the port truck trips over the Heim Bridge then along SR-103 up to PCH would increase by about 6,000 and the increase on the Expressway would be nominal.

Regarding ICTF, the traffic model for SR-47 conservatively includes about 10,000 ICTF trips in 2030 (5,300 in 2015) to account for incremental growth in usage throughout the planning period. Ninety percent (90%) of these trips were assigned for analysis to the SR103. If the ICTF is expanded and the new in-gate for the modified facility is built on Alameda Street, the proposed SR-47 Project would remove about 9,000 trips from the SR-103 in 2030 (4500 trips that support the existing ICTF capacity and 4500 trips due to the increased ICTF capacity). Therefore, the

Response to Comment OB15-5

The statement regarding "current traffic patterns through the port area" refers primarily to the routes taken by port-generated trucks to get to their off-port destinations, such as the ICTF, downtown rail-yards and local and regional warehouses.

In the case of the ICTF, the "old route" would apply in both the 2015 and 2030 scenario unless the proposed modernization that calls for a new in-gate on Alameda Street is approved. Until such time, SR-103 (the "old route") is the most direct route to the existing facility even with the Expressway in place. Furthermore, as discussed in Response to Comment OB14-6, the ICTF expansion NOP was not released until after the SDEIS/RDEIR was circulated for public review. Accordingly, it was reasonable to make trip distribution assumptions that did not account for the new in-gate when the traffic study was completed.

Response to Comment OB15-6

Please see Response to Comment OB15-5.

Response to Comment OB15-7

Please see Response to Comment OB15-5.

Response to Comment OB15-8

In the case of SCIG, even if its development is approved, SR-103 is the most direct route because the new facility's PCH entrance is a few hundred feet from SR-103, but nearly a mile from Alameda Street.

Response to Comment OB15-9

Please see Response to Comment OB14-6, OB15-5, and OB15-8.

Future trip distribution assumptions were made based upon the data available when the traffic study was commissioned.

Heim Bridge traffic estimate that you question requires no adjustment for the 2030 analysis if the ICTF is expanded because the potential growth has been accounted for. Similarly, the HRA also conservatively includes 10,000 truck trips in 2030 on the SR-103 resulting in a worst case assessment of the SR-103 area health risk. If the ICTF is not expanded or if incremental growth does not occur, expected truck trips on SR-103 would actually be 4,500 less for both the no-build and Alt. 1 2030 SR-47 scenarios.

3) RESPONSE FROM ANDREA HRICKO SUBMITTED TO RECORD 01-30-09

OB15-5

It is almost unfathomable that a traffic analysis for a $600 million + expressway would state that: *"The traffic analysis assumes that the increased traffic will follow current traffic patterns through the port area."* In other words, traffic engineers actually claim that with the new Expressway in place in 2030 trucks would continue to use the "old routes" they used in 2008 before the Expressway was built! This is foolish at best, purposefully deceptive at worst. This is like saying that the I-405 Freeway is adding carpool lanes, but the traffic study assumes that all the cars on the freeway will continue to follow their current traffic patterns, so they will not be using the newly added lanes. How can such unscientific, unsound, and unbelievable statements be put forward as fact?

OB15-6

ICTF:
This statement is made in the Caltrans' response: "If the ICTF is expanded and the new in-gate for the modified facility is built on Alameda Street, the proposed SR-47 Project would remove about 9,000 trips from the SR-103 in 2030." Please note that nothing in the HRA shows this additional 9000 truck trips on the SR-47.

OB15-7

That makes the calculations for the HRA completely faulty. The traffic estimates must be redone to show where the truck traffic will go if the ICTF is built and where it will go if the ICTF is not built, as suggested to ACTA at a meeting at NRDC several months ago. In both cases, trucks traveling to the ICTF would use the new Expressway, an assumption not used in the HRA, which underestimates the number of trucks on the Expressway and therefore underestimates the diesel cancer risk.

OB15-8

SCIG: The response from Caltrans would have us try to accept the latter statement: "Regarding SCIG, the most direct route to the proposed SCIG will be SR103, even if the SR47 project is built. The traffic analysis does not account for SCIG per se, but if it did, the port truck trips over the Heim Bridge then along SR-103 up to PCH would increase by about 6,000 and the increase on the Expressway would be nominal." How can the most direct route to the SCIG possibly be the SR 103 when the entrance for the SCIG is proposed for PCH – and the route of Expressway is directly from the Port to PCH?

OB15-9

This unscientific statement by the traffic engineers is at best inaccurate. As suggested to ACTA at a meeting at NRDC several months ago, the HRA

Letter OB15. Andrea Hricko
Page 4

Response to Comment OB15-10

Please see Response to Comment OB14-6, OB15-5, OB15-8, and OB15-9.

Response to Comment OB15-11

Please see Response to Comments OB14-6, OB15-5, OB15-8, and OB15-9.

OB15-9

must include a calculation for the level of traffic on the SR-103 and the SR-47 with and without the SCIG in place. It must show that there would be 11,000 more trucks on the Expressway if the SCIG were in place (not 9000) – the same number that the analysis shows for the ICTF, since they will be the same capacity if both expand.

OB15-10

With the current trucks from the ICTF using the Expressway when built, and the additional trucks from the SCIG and the ICTF counted on the Expressway, the HRA will clearly show a higher diesel cancer risk than it currently shows.

4) Comment:
Ms. Hricko states: "...an LA City Council resolution, the ACTA website, and the ACTA/Caltrans fact sheet on the project state that having an "alternate route" to the near dock railyard will be a benefit of the SR-47 Expressway. But the traffic diagrams indicate that the traffic to the ICTF (after the Expressway is built) would continue to approach the ICTF almost exclusively from the Terminal Island Freeway, as it does today. Trucks (in fact, nearly twice as many of them in the "Build Alternative I scenario) heading to the ICTF would continue to go past Hudson and Cabrillo Schools.

4) Response:
The traffic study reflects the fact that the most direct route to the ICTF is as currently configured on the SR-103. As discussed above, this situation may change if the ICTF expansion is approved and it changes the access to Alameda Street. However, even under current conditions, in 2030 daily Port truck traffic on SR-103 north of PCH is reduced by 1,700 trucks (15% reduction) under Alternative 1 when compared to the No Build (compare 2030 No-Build AADT to 2030 Alternative 1 AADT). In contrast, under Alternative 2, in 2030 Port truck peak hour volumes along SR-103 (s/o PCH) are projected to increase between 61% and 81% (DEIS/DEIR Table 3.5-18) when compared to the No Build 2030 condition (compare 2030 No-Build AADT to 2030 Alternative 2 AADT).

OB15-11

4) RESPONSE FROM ANDREA HRICKO SUBMITTED TO RECORD 01-30-09 – same as described above.

5) Comment:
Ms. Hricko states: "...in the No Build scenario 2030, there are 19,000 trucks on the leg of PCH from the Terminal Island Freeway to the I-710. Where are these 19,000 trucks heading?"

5) Response: The 19,563 is a single transfer error that was made when the final traffic data was copied to a spreadsheet and then provided for the air modeling use. The correct number is 9,775, which is consistent with truck movement in the area. The emissions model and Health Risk Assessment both used the 19,563 truck count and therefore overestimated truck emissions for that roadway segment. The traffic counts for other roadway segments were reviewed and this was the only incorrect input into the emissions model and Health Risk Assessment.
In the emission model, for the single segment of roadway (Pacific Coast Highway from the SR-103 to Interstate 710), the number of port trucks in the 2030 No-Build Scenario was changed from the value of 19,563 AADT to 9,775. Based on the analysis, it was determined that the correction of the traffic volume for this one roadway segment resulted in no changes in the conclusions regarding health risk and the overall conclusion of the study.

Response to Comment OB15-12

A rechecking of the AADT numbers on the diagrams indicated that this was the only significant input error into the HRA model. This single transfer error was made when the final traffic data was copied to a spreadsheet and then provided for the air modeling use. It was not an error in the traffic model, which contained the correct 9,775 number.

Regarding the 9,775 trucks on PCH, one cannot subtract the I-710 trips north and south of PCH and arrive at the number of trucks that get on or off at PCH. The diagram counts at any roadway intersections are two-way traffic and will not balance without turning count information. As a hypothetical example, if there were 72,000 trucks north of PCH and 72,000 trucks south of PCH, using this erroneous method one might conclude that no trucks got on or off the freeway at PCH. However, if 4,500 got off the freeway onto PCH and another 4,500 got on the freeway from PCH, then there would still be 72,000 on the freeway both north and south, and there would be 9,000 I-710 related trucks on PCH.

In answer to the question regarding why there are so many trucks on PCH in this segment, it is due primarily to trucks to/from the Port of Long Beach using the I-710 and cutting over to SR-103 on PCH to get to and from the ICTF as well as to local warehouses and storage yards along Sepulveda Boulevard.

Response to Comment OB15-13

Please see Response to Comment OB15-12.

5) RESPONSE FROM ANDREA HRICKO SUBMITTED TO RECORD 01-30-09

OB15-12

I questioned the accuracy of one particular traffic segment (out of perhaps 100 on the traffic maps). What a coincidence that the traffic engineers say that I discovered the "only" mistake on the entire map! In reality, it makes one question the accuracy of all the traffic data. The segment I questioned shows 19,000 trucks on the short segment of PCH between the SR-103 and the 710 Freeway. The traffic engineers state that this was a mistake; the maps should have shown only 9,000 trucks (a 10,000 truck a day error).

So, let's look at the 9000 trucks. Please explain where 9000+ trucks a day are going, when they leave the SR-47 and turn right on PCH, and then do not get on the 710 Freeway (since there are not 9000 trucks entering the freeway either or north or south from this location)? And if there were 9000 trucks coming off of the 710 freeway, the figures on the 710 don't work either (because there is no decrease of 9000 trucks a day "off" the 710 at this location. What are these 9000 trucks a day doing here? Where are they going? Please explain.

OB15-13

If the 9000 trucks are going to the SCIG (which makes no sense, since the SCIG would be on the other side of the 103), then it means that the traffic engineers assumed the SCIG would be built, even though ACTA says that this assumption was not part of the DEIR or HRA.

Again, please explain what the 9000 trucks are doing on that single segment and how the adjacent traffic figures reflect the addition or subtraction of these 9000 trucks.

Note: Table 1 below was provided by Ms. Hricko with specific comments. A column of Responses has been added and are summarized in the above discussion.

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December 30, 2008

John Doherty, ACTA
Ron Kosinski and Karl Price, Caltrans

Re: Impacts of the SR-47 Expressway project; request for 6 week extension of comments and public informational hearing on traffic data and HRA

Dear Mr. Doherty, Mr. Kosinski and Mr. Price:

I am concerned about the potential public health impacts that emissions from trucks on the proposed SR-47 Expressway will have on residents and school children in Wilmington, West Long Beach and Carson. As you know, our scientists at USC and UCLA have demonstrated health impacts from air pollution, with particular impacts in children who live or go to school close to busy roads and freeways.

Thus, I have spent considerable time reviewing the environmental documents on the SR-47 Truck Expressway that your agencies propose to build which would increase truck traffic volumes in Wilmington, West Long Beach and Carson and impact the health of residents and school children in those three communities. Specifically, I have reviewed the traffic volume (AADT) data supplied in the SR-47 HRA Appendices. Those data are baffling in light of the conclusions of Caltrans in its DEIR/EIS and of ACTA in its HRA, which both claim that the project will reduce traffic on arterial streets by diverting that traffic to the new expressway. The data in the table and figures do not support those claims. In fact, they seem to throw into question many of the basic assumptions in the DEIR/DEIS as well as the accuracy of the HRA. Claims that the project will reduce traffic on arterial streets have been made repeatedly by both ACTA and Caltrans. See, for example:

From an ACTA press release in 2003:

Preliminary studies indicate that replacing the Commodore Schuyler Heim Bridge and building an elevated connection between the north side of the new bridge and Alameda Street at Pacific Coast Highway would reduce truck traffic on the Long Beach (710) and Harbor (110) freeways, as well as surface streets. The proposed project would improve traffic safety and congestion in the Wilmington area

From an ACTA/Caltrans current Fact Sheet on the Heim/SR-47 Project, describing benefits:

- Diverts trucks from certain local arterials and commercial and residential areas
- Facilitates future improvements to the Long Beach I-710 Freeway
- Provides alternative route to the existing near-dock rail yard

From p. 8 of the HRA: '...since trucks will be more heavily concentrated along the improved expressway, less truck traffic will occur on surface streets."

From Appendix M. "The proposed action is to improve traffic conditions between Terminal Island and majortraffic arterials on the mainland to the north, primarily within the cities of Long Beach and Los Angeles."

Claims that the SR-47 Expressway will reduce cancer risk in the project area are also repeatedly made:

> Quotes from the HRA:
>
> **"3.2.1 Cancer Risk – 70-year Average Emissions Scenario (For Information Purposes)**
>
> The main areas of increased cancer risk are along Alameda Street and the new SR-47 expressway. There are also small regions of cancer risk increases above 10 in one million in the Lincoln Village and Dominguez neighborhoods. Because truck traffic is diverted from SR-103, which will remain unchanged under Alternative 1, the areas of Long Beach adjacent to SR-103 see decreases in cancer risk from modeled sources."
> ---
>
> *"HRA Results of the 70-year Emission Scenario (for information only)*
> The 70-year average emissions scenario indicates that Alternative 1 would result in substantial regional benefits of reduced cancer risks in the majority of the study area."

The attached tables and figures are extracted from the SR-47 HRA Appendices. Please note on both the tables and the figures that despite claims to the contrary, with Alternative I in place, the numbers of trucks in the West Long Beach area on the Terminal Island Freeway (SR 103, between PCH and Willow) would nearly double between 2003 and 2030 (from 5581 to 9893 per day).

They also show that despite having Alternative I in place, the numbers of trucks along Alameda Street immediately north of Harry Bridges Blvd/south of Anaheim Street in Wilmington would more than double (from 2984 to 6680).

How can either of these scenarios be evidence that the SR-47 Expressway will reduce traffic on arterial streets, relieve congestion, or reduce cancer risk by "greening" the project area?

The data in these tables and figures raise serious questions.

First, the traffic volume data would appear to call into question/make incorrect all the calculations/claims about a "regional benefit" and "reduction in cancer risk" due to trucks being "diverted" to the new expressway. For example, the AADT data show that the volume of trucks near Hudson School nearly doubles by 2030 compared to 2003 if the project is not built, and it also nearly doubles if the project is built. Can someone please provide an explanation of how this demonstrates a reduction in traffic volumes and cancer risk in the project area as a benefit of building the SR-47 Expressway?

Second, the Union Pacific ICTF is currently at capacity. Without expanding, it cannot handle a larger volume of trucks arriving with containers. Thus, it is baffling to see

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calculations showing a doubling of truck traffic in 2030 on Sepulveda Blvd approaching the Union Pacific ICTF (No Build scenario), since the ICTF expansion proposal is mentioned nowhere else in either the HRA nor in any versions of the DEIR/DEIS. Please explain these serious discrepancies that impact all of the DEIR/EIS/HRA assumptions.

Third, an LA City Council resolution[1], the ACTA website, and the ACTA/Caltrans fact sheet on the project state that having an "alternate route" to the near dock railyard will be a benefit of the SR-47 Expressway. But the traffic diagrams indicate that the traffic to the ICTF (after the Expressway is built) would continue to approach the ICTF almost exclusively from the Terminal Island Freeway, as it does today. Trucks (in fact, nearly twice as many of them in the "Build Alternative I scenario) heading to the ICTF would continue to go past Hudson and Cabrillo Schools, where elemental carbon and particulate pollution levels are already some of the highest in the area, making it incomprehensible how the HRA could claim that this West Long Beach area would be "greener" or have a "reduced cancer risk" after the SR-47 Expressway is built. Can someone please explain if (and how) the HRA claims – and the maps/diagrams showing a "greening" of the region after the project is built – are accurate?

Fourth, in the No Build scenario 2030, there are 19,000 trucks on the leg of PCH from the Terminal Island Freeway to the I-710. Where are these 19,000 trucks heading? Please see my questions as annotated in yellow notes on the attached documents. It might appear that the trucks are heading to the I-710, except that there is no dramatic/equal jump in the number of trucks at that segment of the I-710. In fact, there are more than 19,000 trucks on PCH near the I-710 and an increase of less than 1000 trucks on the 710 at that location. What are the explanations for these discrepancies and for others highlighted on my yellow notes on the traffic diagrams? How can this number of trucks be explained or is this simply a major error? Also note that from 2003 to 2015 (12 years) the number of trucks at this segment is depicted as basically identical (5762 to 5678). Then the volume is shown to triple in the next 15 years to more than 19,000 trucks a day. Please explain what phenomenon is going to occur that would so dramatically increase traffic on only this one stretch of road.

I respectfully request that someone offer an explanation for these and other discrepancies in the traffic data, the DEIR/EIS analysis and the HRA. As we have commented repeatedly, if the traffic data are wrong, clearly all the analyses that rely on them are wrong, and the DEIR/DEIS and HRA would have to be redone and recirculated (again).

Because of these ongoing issues with the traffic data, it is impossible for me to review the HRA and submit comments without an explanation. If I am reading these tables/figures incorrectly, please promptly advise me (in writing) of my error. Otherwise, I respectfully request that Caltrans extend the comment period deadline of January 5, 2009 by at least six weeks, and I request that during those six weeks Caltrans hold a well-publicized public meeting at which Caltrans, ACTA, Caltrans traffic engineers and Meyer Mohaddes consultants would make a presentation and directly answer questions from the public so that those who are concerned about the SR-47 Expressway project in terms of its potentially significant public health impacts can have accurate data with which to

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Letter OB15. Andrea Hricko
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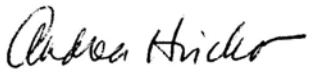
analyze its impacts. Before that hearing, I suggest that Caltrans/ACTA also provide maps describing which neighborhoods will have the most elevated cancer risks due to this project and which are going to require HVAC systems to protect residents when they are inside their homes. Of course, as I earlier remarked verbally to Mr. Doherty, I suggest a door to door distribution of more readily understandable notices about the nature of the public hearing and the health risks of this project. Residents who received the earlier notices did not understand that they pertained to the health risks of the project.

Please see Table I below and the Attachments with annotations.

Thank you for your consideration.



Andrea Hricko
Assoc. Prof. Prev. Medicine
Keck School of Medicine, USC
Director, Community Outreach and Education Program
Southern California Environmental Health Sciences Center

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Table I

Some questions about traffic volumes based on comparisons of 2003 Baseline ADTs with 2030 AADTs* for "No Build" and "Build Alternative I"

Note: Surface street conditions are supposed to improve with the project in place, by diversion of traffic. This is not evident from any of the figures below.

AADT=Average annual daily traffic

Segment				
	2003 Baseline AADT – port trucks	**2030 No Build AADT – port trucks**	**2030 Build Alternative I AADT – port trucks**	**Comments**
103 North of PCH; West Long Beach [traffic goes past schools and homes]	5581	11,605	9893	**With Alt. I, traffic nearly doubles on the TI Freeway**
Alameda Street South of Anaheim; Wilmington [traffic goes past homes and schools]	2984	7076	**6680** **+**	**With Alt I in place, traffic more than doubles on this segment of Alameda.**
Henry Ford Blvd	2984	7076	**7291 +**	With Alt I in place, traffic more than doubles on Henry Ford Blvd.
SR-47 Expressway	**0**	**0**	**20,135** **=** **34,106 trucks will be traveling in this small geographic**	**Combined with the traffic on Alameda Street south of Anaheim and the traffic on Henry Ford**

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			area in 2030	**Boulevard (detailed above), a total of more than 34,000 trucks a day will travel in close proximity to Wilmington homes and Wilmington Park Elementary School. This is more than the number of trucks on the I-710 Freeway today. This is 20,000 more trucks a day in this neighborhood than in the No Build Scenario. The map appears to show this area as "greener" after the Expressway is built.**
PCH between the 103 and I-710 [traffic goes past the transitional school for homeless children and Cabrillo Villages, abd housing for homeless veterans]	5762 NOTE: # of trucks in 2015 with Build Alt I: 3182 # of trucks in 2015	19,560* **(Document offers no explanation for the sudden tripling + of the number of trucks on this segment) (see below).**	8461	**Also, note that from 2003 to 2030, with the SR-47 Expressway in place, truck traffic along this segment of PCH (with many homes) will increase by 1.5 times.**

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	with No Build: 5678			
		***This figure is incompre-hensible; where are these 19,560 trucks going? Clearly not to the I-710, since the diagram shows only a 1,000 truck volume increase at this segment of the highway**		

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[1] * Please see this link to Resolution below from LA City Council File: http://cityclerk.lacity.org/lacityclerkconnect/index.cfm?fa=ccfi.viewrecord&cfnumber=07-1005&CFID=5505251&CFTOKEN=6bf6081209500d16-43167224-956A-62F8-055C7F7004AB6255&jsessionid=f03027e6f3ec77fe3f7f12ea23b6e6e2f6e6

***Council File: 07-1005**

Title
SCHUYLER HEIM BRIDGE REPLACEMENT AND SR-47 PROJECT
Subject
Resolution - WHEREAS, the volume of cargo handled at the Ports of Los Angeles and Long Beach is expected to more than double by the year 2020, which potentially more than doubles the amount of port-related truck traffic on the region's freeways as well as in the neighboring communities; and WHEREAS, the Alameda Corridor Transportation Authority (ACTA) and the ports recently completed a Trade Impact Study which determined that the Ports of Los Angeles and Long Beach are a true national asset that in 2005 generated $256 billion in trade value and 3.3 million jobs nationwide; and WHEREAS, ACTA adopted an Expanded Mission which includes several projects that improve the region's road and rail infrastructure to facilitate the flow of cargo from the ports of Los Angeles and Long Beach, relieve truck traffic and improve air quality throughout Southern California; and WHEREAS, one of the projects that ACTA has identified is improving State Route 47 (SR-47), which includes a 2.2 mile expressway and replacement of the seismically deficient Schuyler Heim Bridge that will connect the port complex on Terminal Island to Alameda Street in order to access near-dock rail facilities, local warehouses and other transportation corridors; ...

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Email – Andrea Hricko OB16

Response to Comment OB16-1

Your comment is noted.

Response to Comment OB16-2

The degradation of "new" 2007 compliant trucks over time is factored into the HRA as is replacement of all model year trucks as they age. The fleet turnover assumptions are consistent with recognized local/state air agency protocols for such analyses. Contrary to the comment, there is both a local and regional air quality benefit despite the doubling of trucks because the newer replacement trucks are nearly 90 percent cleaner than those replaced through the port and state mandated accelerated turn-over programs. Even with degradation over time, their emissions are significantly cleaner than the trucks that they replaced. Please see Response to Comment AJ17-2 for further discussion of why it was reasonable to factor in 2007 compliant trucks over time.

The traffic model does not assume the diversion of ICTF trucks to the Expressway, because as discussed in response OB14-6, for purposes of the Final EIS/EIR, it was reasonable to assume that the most direct route to the ICTF would remain SR-103. The ICTF expansion NOP discussing the proposed in-gate was not released until after the SDEIS/RDEIR was circulated for public review. This no-diversion assumption produces a far more conservative health risk calculation along SR-103 for the purposes of analyzing potential necessary mitigation than were the diversion to be assumed, in which case the health risk along SR-103 would be greatly reduced.

Response to Comment OB16-3

Please see Response to Comment OB14-6.

Response to Comment OB16-4

Please see Response to Comment OB14-6.

Dear Mr. Doherty and Mr. Kosinski:

I am concerned about the potential public health impacts of the SR-47 Expressway on residents and school children in Wilmington and West Long Beach. As you both know, our scientists at USC and UCLA have demonstrated health impacts from air pollution, with particular impacts in children who live or go to school close to busy roads and freeways.

Thus, I have spent considerable time reviewing the environmental review documents on the SR-47 Truck Expressway that your agencies propose to build. As I have attempted to write comments, I have reviewed the traffic volume (ADT) data supplied in the SR-47 HRA Appendices. Those data are extremely confusing in light of the conclusions in the DEIR/EIS and HRA. In fact, they seem to throw into question many of the basic assumptions in the DEIR/DEIS as well as the accuracy of the HRA.

OB16-1 The attached tables and figures are extracted from the SR-47 HRA Appendices. Please note on both the tables and the figures that despite having Alternative I in place, the numbers of trucks in the West Long Beach area on the Terminal Island Freeway (SR 103, between PCH and Willow) would nearly double from 2003 to 2030 (from approximately 6,000 to 11,000 trucks per day).

There are several problems with interpreting these figures and the other highlighted figures that I have attached from extracted pages.

OB16-2 First, the traffic volume data would appear to call into question/make incorrect all the calculations/claims about a "regional benefit" and "reduction in cancer risk" due to trucks being diverted to the new expressway from West Long Beach (especially since the HRA argues that by 2030 we can no longer be sure that the "new trucks" from the ports are "still new.") A doubling of truck volume in West Long Beach AFTER the new expressway is in place logically cannot result in a regional air quality benefit nor a reduction in cancer risk. Nor can it be an indication that trucks from the "project area" are being diverted to the new Expressway. In fact, the ADT data show that the volume of trucks near Hudson School nearly doubles if the project is not built and it nearly doubles if the project is built, according to the traffic charts. How can these discrepancies be explained?

OB16-3 Second, the current Union Pacific ICTF is currently at capacity. It cannot handle any more trucks without an expansion. Thus, a doubling of truck traffic on the Terminal Island Freeway and on Sepulveda Blvd approaching the Union Pacific ICTF indicates that the EIR/EIS assumes that the UP ICTF by 2030 has doubled in capacity, as is currently proposed. (Note that the traffic figures clearly indicate that most trucks are going in and out of the ICTF). Yet the ICTF expansion proposal is mentioned nowhere else in either the HRA or in any versions of the DEIR/DEIS. How can that be explained?

OB16-4 Third, the traffic diagrams indicate that the traffic to the ICTF (after the Expressway is built) is primarily approaching the ICTF from the Terminal Island Freeway, as it does

Letter OB16. Email – Andrea Hricko
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currently. How can that it be possible that after the SR-47 Expressway is built, most of the truck traffic approaches the ICTF from the east (the Terminal Island Freeway side) rather than from the west (the Alameda Street side), in light of the fact that the DEIR/DEIS says that the Expressway is going to "divert traffic" from the residential areas in West Long Beach? Isn't the traffic to the ICTF supposed to go up the SR-47 Expressway to Alameda and over to the ICTF, to supply a more direct route to the "near-dock railyard" as the ACTA website and a resolution from the L.A. City Council describe? Why would most of the traffic to the ICTF still be going past Hudson and Cabrillo Schools with the new Expressway in place? And again, how can the HRA claim that this 2030 Alternative I, Build Expressway approach will "green" the area around Hudson and Cabrillo Schools? **OB16-4**

Can anyone offer any explanation for these discrepancies in the traffic data, the DEIR/EIS analysis and the HRA? If the traffic data are wrong, clearly all the analyses that rely on them are wrong. **OB16-5**

It is impossible to review the HRA and submit comments without an explanation. I urge you to extend the comment period by at least six weeks and during that time to hold a public meeting at which Caltrans, ACTA, Caltrans traffic engineers and Meyer Mohaddes consultants make a presentation and answer questions so that those of us who are concerned about the SR-47 Expressway project in terms of its potentially significant public health impacts can have accurate data with which to analyze its impacts. **OB16-6**

Thank you for your consideration. Andrea Hricko

Response to Comment OB16-5

Please see Response to Comment OB16-1 to OB16-4.

Response to Comment OB16-6

The SDEIS/RDEIR including the HRA was released for public review on November 28, 2009. The public period was extended from 45 to 60 days and did not end until January 30, 2009. In addition, ACTA conducted a public meeting on January 27, 2009, at Bannings Landing. Please see Response to Comment OB13-2.

Letter OB17. Signatory – Natural Resources Defense Council

Ronald J. Kosinski
Division of Environmental Planning
Caltrans District 7
100 South Main Street (MS 16A)
Los Angeles, CA 90012
Email: ronald_kosinski@dot.ca.gov

Re: Schuyler Heim Bridge Replacement and SR-47 Expressway Project
EA: 238500

Dear Mr. Kosinski:

On behalf of the Natural Resources Defense Council, we are writing to provide supplemental comments on the conformity analysis contained within the recirculated Schuyler Heim Bridge Replacement and SR-47 Expressway Project Draft Environmental Impact Statement / Environmental Impact Report (the "EIR"). Based on deep flaws in the analysis, commenters believe the hotspot conformity analysis does not meet the mandates of section 176 of the Clean Air Act ("CAA"). Section 176(c)(1) of the CAA requires a determination that emissions from a transportation project –…will not –

(i) cause or contribute to any new violation of any standard in any area;
(ii) increase the frequency or severity of any existing violation of any standard in any area; or
(iii) delay timely attainment of any standard or any required interim emissions reductions or other milestones in any area.

The conformity analysis contained within the EIR fails to meet these tests as described in detail below. Most important, the analysis fails to include the data required to be considered in the analysis by EPA's conformity rule, fails to apply the methodologies required by EPA's rule, and fails to demonstrate that all of the statutory conformity tests in § 176(c)(1) will be met.

The air quality analysis also unlawfully fails to include any assessment of the impact emissions will have on compliance with the current 24-hour NAAQS for PM2.5 as required by NEPA and 23 USC § 109(h).

I. Conformity Determinations Must Be Made According to EPA's Procedures.

The CAA mandates that EPA "with the concurrence of the Secretary of Transportation, shall promulgate criteria and procedures for demonstrating and assuring conformity in the case of transportation plans, programs, and projects." 42 U.S.C. § 7506(c)(4)(B). The United States Court of Appeal for the D.C. Circuit has determined that the conformity section establishes "the unqualified requirement in the statute that the federal government not approve a transportation activity unless that activity has complied with the conformity rules." *Sierra Club v. EPA*, 129 F.3d 137, 140 (D.C. Cir. 1997).

The conformity rule requires that a hot spot determination demonstrate that "[t]he FHWA/[Federal Transit Authority] project must not cause or contribute to any new localized ... PM2.5 violations or increase the frequency or severity of any existing . . . PM2.5 violations in ... PM2.5 nonattainment and maintenance areas." 40 C.F.R. § 93.116(a). The rule prescribes the

Letter OB17. Natural Resources Defense Council
Page 2

Response to Comment OB17-1

In March 2006, FHWA released the "Transportation Conformity Guidance for Qualitative Hot-spot Analysis in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas." The requirements in 40 CFR 93.123(b)(2) are specifically applicable to $PM_{2.5}$ and PM_{10} analyses, and a quantitative analysis (such as through dispersion modeling) is not currently required. Such a quantitative analysis would only be required when and if EPA releases an appropriate methodology. Since guidance for quantitative modeling of $PM_{2.5}$ and PM_{10} hot-spots has not been released, the general requirements of 40 CFR 93.123(c) must be demonstrated qualitatively. As stated in the Draft FHWA guidelines, "a qualitative assessment is done by considering data from existing monitor(s) and a thorough consideration of local data that may influence $PM_{2.5}$ and PM_{10} concentrations in the project area. This qualitative assessment meets the requirements of 40 CFR 93.123(c) until the EPA requires a quantitative hot-spot analysis in this context." The qualitative analysis is based on considering the data from existing monitor(s) as was done in the $PM_{2.5}$ hot-spot analysis for this project.

Response to Comment OB17-2

The method for estimating future $PM_{2.5}$ concentrations at specific receptors locations would be a quantitative method (i.e., dispersion modeling), which is not required under 93.123(b)(4) until EPA releases guidance. Therefore, since EPA has not released this guidance, under 93.123(b)(2), a qualitative analysis of local factors is used for the analysis. Also, while specific receptors locations near the proposed project are known, in the absence of modeling guidelines, it is not possible to estimate concentrations at specific locations or add these concentrations to future background concentrations to compare to the NAAQS. Furthermore, 40 CFR 93.123 (c) does not require that current background concentrations be determined at the hotspot locations. This could only be accomplished if there were existing monitors established at each receptor location. Rather, the existing monitoring network serves to represent the existing background concentrations.

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January 30, 2009
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method that must be used to make the demonstration. FHWA may make this demonstration for projects listed in § 93.123(b)(1) only—

> if it is demonstrated that during the time frame of the transportation plan (or regional emissions analysis) no new local violations will be created and the severity or number of existing violations will not be increased as a result of the project. The demonstration *must be* performed according to the consultation requirements of Sec. 93.105(c)(1)(i) and *the methodology requirements of Sec. 93.123.*

Id. (emphasis added). The analysis fails to comply with the prescribed methodology requirements because it fails to include data relevant to making the findings required by § 93.123(c).

OB17-1

Section 93.123(b) establishes the methods to be performed for the analysis of PM2.5, and § 93.123(c) establishes the "general requirements" to be applied in conformity determinations for all pollutants. The DEIS correctly notes that the quantitative method prescribed by § 93.123(b) is not yet mandated by the hot spot rule. 40 C.F.R. § 93.123(b)(4). During the interim period before EPA issues quantitative guidance pursuant to § 93.123(b)(4), only "[t]he requirements for quantitative analysis contained in this paragraph (b) will not take effect until EPA releases modeling guidance on this subject and announces in the Federal Register that these requirements are in effect." *Id.* The EIR acknowledges that the analysis is performed based on EPA's informal guidance for "qualitative" analysis. Neither the language of the rule nor EPA's qualitative guidance exempts FHWA from applying the general requirements in § 93.123(c). Only the quantitative requirements of § 93.123(b) have been deferred pending further action by EPA.Therefore the directive in § 93.116 requires the use of the methods prescribed by § 93.123(c), including quantitative analytical steps required by § 93.123(c).

The obligation created under NEPA to obtain the information necessary to make a reasoned choice among alternatives, 40 C.F.R. § 1502.22, is not affected by the hot spot rule and also applies to agency decisions in this case. The general requirements prescribed by § 93.123(c), therefore, provide the minimum requirements that must be satisfied to make the demonstration required by § 93.116(a). The EIR's failure to perform the conformity determination in accord with the criteria and procedures promulgated in § 93.123(c) is contrary to law.

A. The EIR's Conformity Analysis Conflicts with the Hot Spot Rule.

OB17-2

The conformity determination method used by ACTA and CalTrans conflicts with EPA's hot spot rule because it fails to provide the data needed to perform the calculations required by the rule, and does not make the findings required by the rule. The comparison method used in the EIR is not even similar to the general requirements adopted by EPA. The regulatory method is based exclusively on: determining the baseline air quality *at the hot spot locations*; estimating the additional pollution that will result from the proposed Project by calculating and comparing the ratios between current traffic and future traffic after the Project opens for service, with the emission factors that represent the best estimate of emissions from current and future vehicles using the facility; adding the expected change in vehicle emissions to a future background concentration; and then comparing the resulting air quality with the NAAQS.

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The methodology used to prepare the conformity analysis for the project, as set forth in the EIS/EIR, is consistent with EPA's March 2006 final rule entitled, "$PM_{2.5}$ and PM_{10} Hot-Spot Analyses in Project-Level Transportation Conformity Determinations for the New $PM_{2.5}$ and PM_{10} National Ambient Air Quality Standards ("Hot Spot Final Rule")" and EPA's associated March 2006 guidance document entitled, "Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (EPA420-B-06-902) ("EPA Guidance"). Section 93.123(b) of the transportation conformity regulations requires a quantitative analysis of the emissions associated with a proposed project that is within certain listed categories, provided that EPA has published guidance on conducting such quantitative analysis. Because EPA has not yet published such guidance, the Hot Spot Final Rule requires that a qualitative, rather than a quantitative analysis, be conducted for the proposed project. See 40 C.F.R. §93.123(b).

EPA Guidance requires a qualitative $PM_{2.5}$ conformity analysis to include a summary of the method and data used, such as:

- A description of the proposed project, including where the project is located, the project's scope (adding an interchange, widening a highway, expanding a major bus terminal, etc.), when the project is expected to be open to traffic, and what part of 40 CFR 93.123(b)(1) is applicable;
- A description of the method chosen to conduct the hot-spot analysis;
- A description of the type of $PM_{2.5}$ or PM_{10} emissions from the proposed project that are considered in the qualitative hot-spot analysis;
- A description of existing conditions pertaining to the project and project location;
- A description of the changes in these factors that will result from the project for future scenarios, including changes in the surrounding environment that will affect $PM_{2.5}$ or PM_{10} air quality, changes in traffic and emissions trends;
- A description of the analysis year(s) that is examined;
- A discussion of any mitigation measures that will be implemented and their expected effects; and
- A conclusion for how the proposed project meets 40 CFR 93.116 and 93.123 conformity requirements for the $PM_{2.5}$ and/or PM_{10} air quality standards. (EPA Guidance at p. 12.)

The conformity analysis for PM25 hot spots in the SDEIS/RDEIR addresses each of these suggested requirements as follows:

- Project description. The conformity analysis provides a description of the proposed project (see Appendix C of the SDEIS/RDEIR, *Final Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study*, Appendix M, pp. 2 - 6).
- Description of method for conducting hot-spot analysis. The SDEIS/RDEIR describes the method used to evaluate potential impacts to $PM_{2.5}$ hot spots (see Appendix C of the SDEIS/RDEIR, *Final Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study*, Appendix M, pp. 6 through 8 and p. 12).
- Type of $PM_{2.5}$ emissions. The SDEIS/RDEIR specifies that the $PM_{2.5}$ hot spot analysis is based on directly emitted emissions, including tailpipe, brake wear and tire wear emissions, as well as re-entrained road dust. The analysis does not include construction-related emissions or secondary $PM_{2.5}$ (see Appendix C of the SDEIS/RDEIR, *Final Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study*, Appendix M, pp. 6 - 7).

- Existing air quality conditions. The SDEIS/RDEIR describes the existing air conditions ~~a~~based on data obtained from the North Long Beach Monitoring Station, the closest monitoring station that could provide 6 years of data. While the Long Beach-East Pacific Coast Highway monitoring station is closer to the project area, the station began operation in 2003. Therefore, the station cannot provide sufficient data for the previous 6-year period needed for the hot spot analysis (see Appendix C of the SDEIS/RDEIR, *Final Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study*, Appendix M, pp. 7 - 8). While 6 years of monitoring is not specified in EPA's March 2006 final rule (71 FR 12468) or EPA's associated March 2006 guidance document (EPA420-B-06-902), the requirement for 6 years of data has resulted from EPA's comment on another transportation improvement project (see EPA's February 23, 2007 comments on the DEIS for the I-5 Corridor Improvement Project, from SR 91 to I-605, Los Angeles and Orange Counties, California). Furthermore, 6 years of monitoring data has repeatedly been requested in qualitative analyses during the interagency consultation review.
- Changes in existing air quality conditions associated with the project. The analysis addresses the specific changes expected to result from the project (*e.g.*, decreased LOS at six intersections in the project area, fewer vehicle miles traveled in the project area and an overall decrease in vehicle emissions in the project area), and how the changes will affect local $PM_{2.5}$ air quality (see Appendix C of the SDEIS/RDEIR, *Final Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study*, Appendix M, pp. 8 - 14).
- Years examined. Tables 3 through 5 in Appendix M to the Air Quality Impacts Technical Study specify the years for which the data were evaluated (see Appendix C of the SDEIS/RDEIR, *Final Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study*, Appendix M, pp. 11 - 13).
- Mitigation measures. The analysis does not take credit for any mitigation measures to be implemented in connection with the project. Accordingly, the discussion is unnecessary.
- Requirements under 40 C.F.R. §§93.116 and 93.123 for $PM_{2.5}$. The analysis provides an explanation of how the project satisfies the requirements under Sections 93.116 and 93.123 of the transportation conformity regulations (see Appendix C of the SDEIS/RDEIR, *Final Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study*, Appendix M, p. 14).
- Contrary to NRDC's comment, the methodology for the $PM_{2.5}$ conformity analysis in the EIS/EIR is consistent with the requirements of EPA's Hot Spot Final Rule and Guidance. The analysis qualitatively evaluates the emission burdens of the alternatives in comparison to the existing burdens – and resulting ambient concentrations – at the monitoring locations.

Consistent with EPA's March 2006 guidance document (EPA420-B-06-902), the Long Beach-East Pacific Coast Highway monitoring station was selected as most representative monitoring data. Details of the PM_{10} and $PM_{2.5}$ hot spot analyses are summarized in Section 3.13.3.4.1.3 of the Final EIS/EIR and in appendixes to the Air Quality Technical Study (Caltrans, 2009).

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Response to Comment OB17-3

Currently, the Transportation Conformity Rule does not require an estimate of future localized $PM_{2.5}$ concentrations as this could only be accomplished using quantitative methods. The requirement to perform a quantitative analysis of $PM_{2.5}$ concentrations is specifically not required under 40 CFR 93.123(b)(4) until EPA releases guidance. In the absence of such guidance, $PM_{2.5}$ concentrations at specific receptor locations cannot be quantified. Please see Response to Comment OB17-2.

The $PM_{2.5}$ analysis calculated the current background concentration of $PM_{2.5}$ at appropriate receptor locations in the area substantially affected by the project. Data from two monitoring stations maintained by the South Coast Air Quality Management District (SCAQMD) were evaluated for use in the analysis. The two monitoring stations are the two closest SCAQMD stations to the project area and are used by the SCAQMD for purposes of determining compliance with the NAAQS and in preparing the Air Quality Management Plan for demonstrating how the region will attain the NAAQS for PM_{10} and $PM_{2.5}$.

The North Long Beach monitoring station is located approximately 5 miles northeast of the Schuyler Heim Bridge. The Long Beach-East Pacific Coast Highway station is actually closer to the project area than the North Long Beach station. However, because it has only been operating since 2003, data from the station was not used in the hot spot analysis. It was simply used for comparison purposes (see Appendix C of the SDEIS/RDEIR, *Final Schuyler Heim Bridge Replacement and SR-47 Expressway Project Air Quality Impacts Technical Study*, Appendix M, p. 7).

While the North Long Beach monitoring station is farther away from the project site than the Long Beach-East Pacific Coast Highway station, the analysis explains that the station's data is representative of ambient air quality in the project area (*Id.* at p. 8). This methodology is

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By contrast, the method used in the Heim analysis compares minor changes in aggregate emissions between the no-build and build alternatives across a large study area, among different roadways, with different traffic levels, at different locations where monitored pollution can be affected by contributions from different types of nearby sources besides the traffic pollution, where the wind directions from each roadway to the nearest monitor will be different (thereby affecting the comparability of impacts from each roadway because monitors downwind from the highway in the direction of the most persistent winds will be downwind more often than other monitors not in the direction of the most persistent winds), and where the monitors at each location are always different distances from each roadway source.

OB17-2

EPA's required method demands a comparison of the before-and-after impact of emissions from traffic at the same receptor locations with and without the Project, and only at the "appropriate receptor locations" located in "the area substantially affected by the project." The unavoidable multiple variables involved in comparing different monitors—each at a different distance from multiple roadways, each of which carry different traffic loads with a different mix of cars and diesel trucks—will inevitably make it scientifically impossible to draw credible inferences from the data regarding pollutant levels at each "receptor location" in "the area substantially affected by the project."

EPA's prescribed method takes away much of this uncertainty by eliminating all variables related to location of the highway in relation to the monitor, such as distance and wind direction, while allowing the determination to focus on whether a net increase in emissions will occur as a result of increasing traffic and whether the net change in emissions when added to background concentrations will cause or contribute to violations of the NAAQS in the area substantially affected by the project. The reliability, precision, and scientific credibility of the method EPA required by rule is much greater than the method applied by ACTA and CalTrans. In addition, the much less credible method applied by ACTA and CalTrans is simply not consistent with the "criteria and procedures" promulgated by EPA.

B. The Facts Needed to Perform the Calculations Required by EPA's Rule Have Not Been Developed, Disclosed or Used in Making the Conformity Determination.

OB17-3

In preparing the conformity analysis for the Schuyler Heim Bridge, ACTA and CalTrans failed to obtain the data needed or perform the analyses required to comply with the rule. ACTA and CalTrans did not calculate or even estimate "likely future localized . . . PM2.5 pollutant concentrations" at each hot spot location for comparison with the PM2.5 NAAQS; did not obtain critical information needed to perform this calculation such as determining the "current background" concentration of PM2.5 at the "appropriate receptor locations in the area substantially affected by the project" for the purpose of calculating "future background" as required by the formula in § 93.123(c)(2).

supported by EPA guidance which states that while monitors closer to a project location are ideal, "[i]n the absence of a nearby monitor, other appropriate monitors in the nonattainment or maintenance area can also be used" (EPA Guidance at p. 12). Nothing in the Guidance suggests that a new monitoring station must be established within close proximity to a proposed project. In fact, the Guidance states that the conformity rule "provides flexibility so that state and local resources are used efficiently." Requiring a new monitoring station within 5 to 15 meters of new transportation projects would be inconsistent with this purpose. The determination that the North Long Beach monitoring station was an "other appropriate monitor in the nonattainment or maintenance area" was affirmed through Interagency Consultation concluded in October 2006, for the original submittal; and in April 2008, for the re-submittal contained in the EIS/EIR (See *Id.*). EPA staff participated in the Interagency Consultation process.

The entire project study area was determined to constitute the "appropriate receptor locations substantially affected by the project" (see 40 CFR § 93.123(c)), "because the proposed improvements along the Schuyler Heim Bridge, SR-47, or SR-103 corridors would likely affect vehicle traffic patterns on other nearby roads, not just along the roadways with proposed improvements" (SDEIS/RDEIR, Appendix C: *Air Quality Impacts Technical Study*, Appendix M, p. 12). Accordingly, the entire study area was relevant and considered when calculating future background concentrations (*Id*. at p.13). Future background concentrations in the study area are calculated in Table 5 (*Id.*). Based upon the foregoing, the facts needed to perform the analysis required by the Hot Spot rule have been developed, disclosed and used in making the conformity analysis.

Furthermore, the PM_{10} hot-spot process has been done according to EPA's March 2006 final rule (71 FR 12468) and EPA's associated March 2006 guidance document (EPA420-B-06-902).

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Response to Comment OB17-4

According to 40 CFR 51 Appendix W Section 8.2.1, "Background air quality includes pollutant concentrations due to: (1) Natural sources; (2) nearby sources other than the one(s) currently under consideration; and (3) unidentified sources."

According to this definition, defining the background concentration of a pollutant or establishing the baseline air quality for a transportation project would rely on data from a monitor that would not be influenced by the project. Rather, the background concentration would be a measure of the air quality in the absence of the project. Therefore, the North Long Beach monitoring station could be used to establish the background concentrations to evaluate the proposed project's impacts.

See Response to Comment OB17-2.

Because the entire study area was determined relevant when calculating future background concentrations, the analysis provides LOS data for every study area intersection in order to analyze the potential for hot spots arising at each (SDEIS/RDEIR, Appendix C: *Air Quality Impacts Technical Study*, Appendix M, p. 9). Study area intersections were chosen because of their potential to be impacted by the project. Accordingly, they are the intersections where an NAAQS violation is most likely to occur. Thus, they are the intersections where project changes, including LOS changes, are relevant to the qualitative $PM_{2.5}$ analysis. Contrary to the commenter's contention, the $PM_{2.5}$ conformity analysis does determine the baseline $PM_{2.5}$ at each study area intersection because it includes conclusions about existing $PM_{2.5}$ concentrations in the entire project study area, which encompasses each location. (*See Id.* at p. 7.) For the reasons discussed above, the existing conditions at the North Long Beach monitoring station are indicative of conditions at each study area intersection and the project area, as a whole. Similarly, future background conditions

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1. ACTA and CalTrans Failed to Identify "Appropriate Receptor Locations" for the PM2.5 Conformity Analysis, And Neglected to Determine the Baseline PM2.5 Concentrations for those Locations.

The rule provides that "[t]he total concentration must be estimated and analyzed at appropriate receptor locations in the area substantially affected by the project." 40 C.F.R. § 93.123(c)(1). The identification of "appropriate receptor locations" must be consistent with the statutory objective to "assur[e] air quality within the entire geographic area comprising such State . . . in which national primary and secondary ambient air quality standards will be achieved and maintained." 42 U.S.C. § 7407(a). The appropriate locations for estimating the air quality impacts of a project must include all areas where NAAQS violations may occur, including those where the expected impacts will be greatest. EPA observed in the hot spot rulemaking that "the critical factor for establishing PM2.5 and PM10 hotspot criteria is whether or not a project's direct PM2.5 or PM10 emissions could actually cause a new violation or worsen an existing air quality violation." 71 Fed. Reg. 12,492.

OB17-4

In this EIR, ACTA and CalTrans either failed to identify the appropriate receptor locations that must be used to determine NAAQS compliance according to the conformity requirements, or identified appropriate receptor locations and failed to determine the baseline and expected future pollutant concentrations at those locations. While the conformity analysis provides a series of intersections and Level of Service ("LOS") estimates for 2030, it fails to synthesize this data to truly pick the hot spots that will arise from this project. In fact, ACTA and CalTrans identified appropriate receptor locations because the EIR identifies these locations in other parts of the analysis. For example, Appendix L—Evaluation of Potential Localized CO impacts—was prepared to make the conformity determination for carbon monoxide, another major pollutant emitted from motor vehicles. In the Appendix, ACTA and CalTrans identified a specific intersection within the project area that would be presumably the "worst case scenario" as the "appropriate receptor locations." The intersection of Henry Ford and Anaheim Street was chosen for that analysis. In addition, the Health Risk Assessment, identifies several receptor locations where the public would be most exposed to PM2.5 emitted from the Project. In fact, eight homes have been identified as exceeding the Clean Air Action Plan significance threshold for cancer risk of 10 in a million. Finally, the Coalition for a Safe Environment has submitted several pieces of data outlining receptors located close to this proposed project. [Attached as Exhibit I]. These are the locations of the "appropriate receptors in the area substantially affected by the project" for which both "future background" and "current background" concentrations must be determined to perform the analysis required by the rule. 40 C.F.R. § 93.123(c)(1), (2).

Identifying the appropriate receptor locations is merely the starting point for the analysis prescribed by the rule. The hot spot receptor locations identify the points of greatest impact where compliance with the NAAQS must be demonstrated. To demonstrate NAAQS compliance, the rule requires that the "current background" air quality be determined at the *hot spot locations*. 40 C.F.R. § 93.123(c)(1).

are estimated for the entire study area, including all study area intersections (*Id.* at p. 12). The $PM_{2.5}$ conformity analysis contained in the Draft EIS/EIR is clear about the reasoning behind its approach. (*Id.*) Moreover, 40 CFR § 93.123(c)(1) or EPA guidance does not preclude calculating "current background" and "future background" concentrations in this manner.

Response to Comment OB17-5

The requirements under 40 CFR 93.123(c) do not require that background concentrations be established at each sensitive receptor. Please see Response to Comment OB17-4.

The $PM_{2.5}$ conformity analysis does not dispute the fact that monitoring took place at a station that could be considered outside the "area substantially affected by the project" (SDEIS/RDEIR, Appendix C: *Air Quality Impacts Technical Study*, Appendix M. at p. 8). In completing the analysis, data taken at the North Long Beach station was compared to data taken at the Long Beach – East Pacific Coast Highway station in order to determine if the data would be representative of ambient air quality in the project area (*Id.*). As discussed above, the comparison supported a determination that North Long Beach monitoring data reflects traffic conditions in the proposed project area and, therefore, constitutes credible evidence of baseline concentrations in the project study area and at "appropriate receptor locations." Specifically, the $PM_{2.5}$ conformity analysis evaluated the relationship between traffic conditions and monitoring data at both stations, concluding that large truck volumes and the 2004, 2005, and 2006 24-hour $PM_{2.5}$ concentrations at the two stations were similar. This comparison method is consistent with the qualitative methods identified in Section 4.1 of the EPA Guidance. Moreover, the Long Beach-East Pacific Coast Highway station could not be utilized because it had only been operating since 2003. (*Id.* at p. 7.) Accordingly, the use of North Long Beach data was appropriate under the circumstances.

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a. Baseline Air Quality is Critical to the Statutory Scheme.

Determining the background PM2.5 concentrations at the receptor locations is critical to the implementation of the entire statutory scheme because the applicability of the statutory conformity tests turn on whether the baseline air quality violates the NAAQS, or meets the NAAQS. If the current air quality meets the NAAQS, then approval of the project requires only a showing that emissions from traffic after the Project is opened for service "will not (i) cause or contribute to any new violation." 42 U.S.C. § 7506(c)(1)(B)(i). When current air quality complies with the NAAQS, and this is the only relevant statutory test, then the accurate determination of baseline air quality at the hot spot locations is important for the purpose of estimating whether any increase in traffic associated with the opening of the Project can be accommodated at that location without causing a new NAAQS violation. But if baseline air quality violates the NAAQS at the receptor locations, as is the case in the area of the proposed project, then Project Proponents must also show that project emissions "will not (ii) increase the frequency or severity of any existing violation..., or (iii) delay timely attainment of any standard." Id. § 7506(c)(1)(B)(ii) and (iii). If emissions in the project area must be reduced to attain the NAAQS, then the fourth statutory conformity test also comes into play, requiring "conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations." Id. § 7506(c)(1)(A).

OB17-5

Both EPA's general requirements for performing the conformity determination and NEPA guidance regarding the development of baseline data highlight the importance of obtaining data representative of the locale affected by the proposed project. EPA's "Transportation Conformity Guidance for Qualitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas," discusses the importance of air quality data from the area affected by the project:

> Existing and future air quality information should be considered to assess the probability of the project causing or contributing to an air quality violation. Analysts and reviewers should be aware of the existing air quality conditions so that they can understand the relative impact that the proposed project is likely to have.

Sec. 4.3, at 19 (Mar. 2006).

NEPA and California Environmental Quality Act ("CEQA") also require that an agency obtain data that accurately describes the baseline condition of the environment affected by a project. NEPA requires analysis of the cumulative effects of a proposed action. 42 C.F.R. § 1508.8; *see also* CEQA Guidelines § 15355. In determining the environmental consequences of cumulative effects, it is necessary for the lead agency to establish a pre-project baseline condition against which the predicted post-project condition can be compared. As Council on Environmental Quality ("CEQ") guidance on NEPA explains, "[t]he critical element . . . is defining an appropriate baseline or threshold condition of the resource, ecosystem, and human community beyond which adverse or beneficial change would cause significant degradation or enhancement of the resource, respectively." According to CEQ, this comparison "is critical to the NEPA process." Courts have also recognized the importance of establishing an accurate baseline: "Without establishing the baseline conditions which exist in the vicinity of [the proposed action],

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Response to Comment OB17-6

Please see Response to Comment OB17-4.

For the reasons discussed on page 8 of the $PM_{2.5}$ conformity analysis and above, $PM_{2.5}$ concentrations at the North Long Beach monitoring station do represent "current background" conditions in the project study area and "appropriate receptor locations." Therefore, it is representative of conditions located within 300 to 500 meters of the highway.

there is simply no way to determine what effect the proposed [project] will have on the environment and, consequently, no way to comply with NEPA." *Half-Moon Bay Fisherman's Marketing Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988); *see also Save Our Peninsula Committee v. Monterey County Board of Supervisors*, 87 Cal.App.4th 99 (6th Dist. 2001).

OB17-5

In this case, ACTA and CalTrans cannot know whether the statutory tests that apply in areas where the NAAQS is being violated will be met without knowing the extent to which baseline air quality is violating the NAAQS in the hot spot locations affected by current emissions from the Alameda Street corridor. ACTA and CalTrans have not established monitors at any of the receptor areas identified in the EIR. Instead, they attempt to make their determination based upon air quality measured at monitors outside the "area substantially affected by the project." Just as there is no way to comply with NEPA and CEQA without knowing the baseline condition in the area affected, there is no way to comply with the CAA conformity tests without knowing how the project will impact air quality in the project area. Accordingly, the conformity analysis is flawed and not in compliance with the CAA because reliable and credible evidence of baseline concentrations at the "appropriate receptor locations" were not obtained.

b. PM2.5 Concentrations at the North Long Beach Monitor Do Not Represent "Current Background" at the Receptor Locations in the Area Substantially Affected by the Project.

The EIR conformity analysis uses the North Long Beach Monitoring Station as the baseline for which to compare projected future emissions at the Schuyler Heim Bridge. The EIR notes that this monitor is located "approximately 5 miles northeast of Schuyler Heim Bridge." Appendix M, at 7. The EIR further notes that the monitor is located "approximately 0.5 mile north of I-405 and one mile east of the I-405/I-710 junction." *Id.* at 8. The major difference between this monitor and the project area does not reflect the current conditions in the project area substantially affected by emissions from the project—namely, the area in the near-highway environment where SR-47 will traverse.

OB17-6

ACTA and CalTrans did not determine either the current or future background concentrations for an actual receptor location. Instead of attempting to measure the current background air quality next to the proposed SR-47 to determine current levels of PM2.5 pollution at the receptor locations in the area substantially affected by the project, ACTA and CalTrans attempted to infer the impacts of current highway emissions by using a measurement of air quality collected at a monitor 5 miles away from Schuyler Heim Bridge. Moreover, the EIR uses a very large geographic area where it is claimed Vehicle Miles Traveled ("VMT") will be lower when comparing the build scenario to the no-build scenario. This approach does not reflect the evidence from the scientific studies showing that highly localized elevated PM2.5 concentrations caused by emissions from this project occur within 300 to 500 meters of the highway. Using monitor data from a monitor that is more than 500 meters from any heavily trafficked highway is not relevant to determining the baseline air quality in the high pollution zone established by the credible scientific evidence that shows increased levels of PM2.5 in the near-highway environment.

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Response to Comment OB17-7

Data comparisons completed in connection with the conformity analysis demonstrate that North Long Beach monitoring data is indicative of the near-highway environment (SDEIS/RDEIR, Appendix C: *Air Quality Impacts Technical Study*, Appendix M, p. 8.). Furthermore, the decision to use the data was validated during the Interagency Consultation process. While the commenter's evidence that highway emissions have a significant impact on air quality in the near-highway environment is noted, applicable regulations do not require a quantitative analysis of the potential for increased $PM_{2.5}$ concentrations resulting from a project (see 40 CFR § 93.123(b)(2)) Therefore, the qualitative analysis currently contained in the EIS/EIR is sufficient to satisfy applicable requirements.

Additionally, a Health Risk Assessment was completed by ACTA in order to assess the potential for significant health risk impacts resulting from the project. The Health Risk Assessment is contained in the recirculated SDEIS/RDEIR (see SDEIS/RDEIR, Appendix A).

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i. Reliable Scientific Evidence Shows Elevated PM2.5 in the Near-Highway Environment.

The evidence that highway emissions have a significant impact on air quality in the near-highway environment is not new. MATES-II first identified the importance of highway emissions in 2000. Multiple Air Toxics Exposure Study – II (South Coast Air Quality Management District, March 2000) [*Available at* http://www.aqmd.gov/matesiidf/matestoc.htm]. MATES-II revealed that diesel particulate is the largest source of cancer risk in the air basin, and also provided important findings that demonstrated that significantly higher levels of diesel pollution occur near highways. The Report found the greatest exposure to diesel PM at locations where "the dominance of mobile sources is even greater than at other sites." It also found that "model results, which are more complete in describing risk levels…than is possible with the monitored data, show that the higher risk levels occur… near freeways." "Results show that the higher pollutant concentrations generally occur near their emission sources." These findings provided evidence that neighborhoods near highways experience higher concentrations than the regional averages. Based on these observations, MATES-II concluded that "[f]or mobile source compounds such as benzene, 1-3 butadiene, and particulates associated with diesel fuels, higher concentration levels are seen along freeways and freeway junctions." This work identified the near-highway environment as a high risk environment where elevated levels of PM would be expected because of emissions from diesel vehicles.

OB17-7

This triggered further research in the region. A team from USC conducted seminal studies to measure the concentrations of highway pollutants as a function of distance from the I-710 and I-405 freeways. [Attached as Exhibit A] Both studies included measurements of concentrations of carbon monoxide (CO) and black carbon (BC) at increasing distances from the freeway. CO and BC were intentionally selected because their ambient concentrations are strongly related to vehicle emissions. Black carbon, also measured as elemental carbon (EC) in the monitoring reported in MATES-II and MATES-III [*Available at* http://www.aqmd.gov/prdas/matesIII/MATESIIIFinalReportSept2008.html], is a species of PM2.5 that was used in the MATES-II study as a measure of diesel PM in the Air Basin. The MATES-III study reported more recent investigations showing that elemental carbon is an inadequate measure of diesel PM, and that other methods show that total diesel PM is at least 72% greater than elemental carbon alone. MATES-III, p. 2-9. The Air Quality Management Plan for PM2.5 adopted by the South Coast Air Quality Management District in 2007 relies on the MATES-III data to identify elemental carbon as one of the six major species of PM2.5 in the South Coast air shed that contribute significantly to PM2.5 nonattainment.

The freeway studies show the dramatic increase in BC/EC in the near-highway environment. The studies measured concentrations at five distances downwind from the freeway and at a background location upwind from the freeways. By comparing the upwind measurements which provide a good estimate of regional carbon concentrations in the Air Basin with the downwind measurements, these studies provide strong evidence of the increase in concentrations of primary carbon particles emitted from highways in the vicinity of major highways compared to regional concentrations measured at other locations in the urban air shed.

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The BC measurements from each of the freeway studies are summarized separately below along with measured upper and lower limits, and the observed difference between the comparable upwind and downwind BC concentrations:

Measured Average (and Upper and Lower Limit) BC Concentrations at Increasing Distances from the 405 Freeway

Downwind Distance (m)	BC (µg/m3)	BC (µg/m3) Downwind-Upwind Average Concentration
30	5.4 (3.4-10.0)	4.75
60	3.2 (3.0-3.5)	2.55
90	2.5 (2.4-2.6)	1.85
150	1.6 (1.1-2.0)	0.95
300	1.3 (1.1-1.5)	0.65

Measured Average (and Upper and Lower Limit) BC Concentrations at Increasing Distances from the 710 Freeway

Downwind Distance (m)	BC (µg/m3)	BC (µg/m3) Downwind-Upwind Average Concentration
200 m (upwind)	4.6 (3.1-5.9)	N/A
17 m	21.7 (20.3-24.8)	17.1
20	19.4 (16.5-21.6)	14.8
30	17.1 (12.6-19.3)	12.5
90	7.8 (4.5-9.3)	3.2
150	6.5 (3.9-9.2)	1.9
300	5.5 (3.5-7.7)	0.9

OB17-7

Notice the large increase in the near-highway concentrations of BC downwind of the I-710 compared to the I-405. The Interstate 710 study was conducted in part because the freeway has a much higher percentage of heavy-duty diesel truck travel than the Interstate 405 freeway. Average traffic flow during sampling periods was 12,180 vehicles per hour with more than 25 percent of vehicles being heavy-duty diesel trucks. This is perhaps the highest density of diesel truck traffic anywhere in the U.S. Measurements were taken at 17, 20, 30, 90, 150 and 300 meters downwind and 200 meters upwind from the center of the freeway. As with the 405 freeway study, relative concentrations of CO and BC downwind from the freeway were found to be many micrograms per cubic meter greater than upwind concentrations and tracked each other well with increased distance from the freeway.

These studies show that in the impact zone downwind of a heavily traveled freeway in the Air Basin with average truck traffic (I-405), emissions of BC from the freeway will add 4.75 µg/m3 to PM2.5 at 30 meters from the freeway dropping off to 0.65 µg/m3 greater than the regional concentration at 300 meters, and that a freeway with heavy truck traffic will add 12.5 µg/m3 at 30 meters dropping off to a 1.9 µg/m3 increase above the regional levels at 300 meters.

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OB17-7

The incremental effect of highway emissions downwind from the I-710 have been confirmed in 2008 by data released as part of the deployment of Mobile Monitoring Platform Results in the I-710 corridor. See Mobile Monitoring Platform Update and Results reported by CARB, April17, 2008, at the HCMS Community Meeting, Wilmington Senior Center. [Attached as Exhibit B]. These results include BC concentrations within the so-called buffer zone 500 feet from the freeway compared with results measured beyond the 500 feet buffer. Concentrations measured in West Long Beach residential area on the morning of July 17, 2007, show nearly a four-fold greater BC level within 500 feet from the 710 freeway compared to the same neighborhood outside the 500 feet zone (18 vs 5 µg/m3). This difference of 13 µg/m3 is highly consistent with the upwind/downwind results reported in the original 710 study.

These results were supported by measurements made in other regions. A study in Seattle, WA (Curtis, Gilroy, and Harper, 2004) measured the relationship between BC levels at an urban near-roadway monitoring site, and a heavily traveled freeway. [Attached as Exhibit C] This study showed that there were frequently peak evening rush hour BC levels of 5 µg/m3 or above near I-5. The BC data was obtained from the Olive Street monitoring site located at the EPA-designated microscale within the I-5 traffic corridor. The traffic volumes and BC readings correlate well, supporting the hypothesis that traffic is a major contributor to PM2.5 at the site, given that BC originates from motor vehicle exhausts as ultrafine or fine particles. The Olive Street air monitoring site is about 20 meters west of the southbound lane of I-5 in the CBD. This area of I-5 contains express lanes along with several high use overpasses which all contribute to the area traffic. Daily volumes along this section of I-5 average 284,700 vehicles per day (in 2003). Light-duty traffic has peak weekday flows above 10,000 vehicles per hour, with diesel traffic of about 1,000 vehicles per hour (10%). BC tends to peak during weekdays with high traffic volumes, and is sharply lower on weekends. This reduction parallels the significantly lower weekend diesel traffic volumes. Peak BC measurements occur during the afternoon rush hour (4-6 pm). Correlations between light-duty vehicle volumes and BC peaks (readings above 5 µg/m3) are better than those between diesel truck volumes and BC peaks. This may occur because light-duty volumes overwhelm diesel truck volumes during this peak period (93 percent of the traffic volume is from light-duty vehicles).

The Seattle study also measured BC at a Beacon Hill site about 600 meters from a major freeway, which is used as the urban background for Seattle. Hourly BC readings during the study period stayed within the range of 0 to 2 µg/m3, with readings mostly below 1.0 µg/m3. Comparing these sites demonstrates results similar to the data obtained from the I-405 study with BC concentrations in the near-highway environment being about 4 µg/m3 greater than the urban regional concentration.

The East Bay (California) Children's Respiratory Health study (Kim et al., 2004), conducted with support from Cal EPA's Office of Environmental Health Hazard Assessment, obtained measurements of PM2.5 concentrations at monitors located in the schoolyards of 10 middle schools in communities across the East Bay. [Attached as Exhibit D] This study reported the distance of each monitor from major freeways, the traffic density on the nearest freeway, and whether the school was located downwind of the traffic source. The PM2.5 measured at the school closest to (60 meters), and downwind from a major freeway, was 15 µg/m3 which was 3 µg/m3 greater than the 12 µg/m3 PM2.5 concentrations reported at the regional air district network monitor located about 1 mile from major traffic sources.

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Response to Comment OB17-8

Although the impact zone for elevated $PM_{2.5}$ concentrations occurs near the highway, the baseline concentrations should be established outside of this zone. As defined above, the background concentration should be a measure of air quality in the absence of the project. Therefore, baseline conditions should be established outside the impact zone.

Please see Response to Comment OB17-4.

For the reasons discussed above, $PM_{2.5}$ concentrations at the North Long Beach monitoring station do adequately represent the baseline concentration in the project study area, a near-highway pollution zone. Accordingly, the fact that the station is more than 1 kilometer away from the highway impact zone or more than 5 to 15 meters from the closest traffic lane that will be impacted by the project is irrelevant. The data comparisons discussed on page 8 of the $PM_{2.5}$ conformity analysis are the evidence used to support the determination that the monitoring values at North Long Beach provide sufficient evidence of the pollutant concentration expected within the project study area.

Moreover, 40 CFR part 58 and the Settlement Agreement referenced are not relevant for purposes of the $PM_{2.5}$ conformity analysis at issue. The regulations and the Settlement Agreement are relevant to an analysis of the impacts of $PM_{2.5}$ exposure, not completing a $PM_{2.5}$ conformity analysis for NEPA purposes. These tasks are mutually exclusive; moreover, 40 CFR part 58's provisions regarding the siting of $PM_{2.5}$ monitors are not referenced in 40 CFR part 93 applicable to conformity analysis. As discussed above, the method for conducting a quantitative $PM_{2.5}$ analysis has yet to be developed. For that reason, only a qualitative analysis is necessary, and applicable EPA guidance indicates that while monitors closer to a project location are ideal for purposes of the qualitative analysis, other appropriate monitors in the nonattainment or maintenance area can also be used. For the foregoing reasons, use of a monitor more than 5 to 15 meters from the closest traffic lane is not fatal to the conformity analysis.

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The recently released West Oakland Health Risk Assessment conducted by the ARB provides similar results from a modeling study that shows highly elevated concentrations of diesel PM in a neighborhood downwind of the Port of Oakland and surrounded by heavily traveled major freeways. [Attached as Exhibit E—but appendicies A through E not attached and available at http://www.arb.ca.gov/ch/communities/ra/westoakland/westoakland.htm]. The risk assessment showed that despite the significant contribution of emissions from ocean going vessels, local watercraft, railyard and port activities, the emissions from non-port related on-road truck operations accounted for 80% of the diesel PM in West Oakland.

These and other studies provide credible evidence that PM2.5 concentrations in the near-highway environment are expected to range from 3 µg/m3 to as much as 13 µg/m3 greater than concentrations measured at regional monitors located outside the high impact zone of heavily traveled freeways.

OB17-7

Data from these highway studies were expressly relied upon by US EPA to decide that it must establish a transportation conformity program to review the localized impacts of PM2.5 emissions from individual highway projects. See Transportation "hot spot" rule, 71 Fed. Reg. 12,468, 12494 (March 10, 2006). EPA concluded that the evidence of localized impacts from highways was sufficiently compelling to require that "it is essential that a quantitative PM2.5 or PM10 hot-spot analysis be performed for all projects of air quality concern." *Id.* If the evidence of localized impacts was sufficient to justify this national regulatory program to protect against NAAQS violations caused by new or expanded highways, it is also compelling enough to require a quantitative analysis to ensure that emissions from the proposed project will not cause localized NAAQS violations.

ii. Highway Studies Demonstrate That Concentrations Measured Outside the Near-Highway High Pollution Zone Are Not Relevant to Determining the Baseline Concentration.

The evidence summarized above demonstrates that 1) significantly higher concentrations of the key pollutant from diesel trucks occur within 300 meters of the proposed project; 2) monitored concentrations measured outside the high pollution zone near highways are not relevant to determining the baseline concentration at receptors in the "area substantially affected by the project"; and 3) PM2.5 measurements collected from near the I-405 are not relevant to determining the baseline concentrations in a highway with much greater truck traffic.

OB17-8

The PM2.5 concentrations measured at the monitor located "approximately 0.5 mile north of I-405 and one mile east of the I-405/I-710 junction" does not provide evidence that is relevant to determining the baseline concentration at the hot spot receptors in the area substantially affected by emissions from the proposed project. First, a monitor located one-half mile away from a highway is beyond the distance where incremental concentrations are expected to be found, and is not within the high pollution zone of that highway. Thus even if emissions from the I-405 could be shown to be comparable to those currently occurring on the SR 47, the monitor located one-half mile away does not detect the high pollution concentrations caused by emissions from the I-405.

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Second, the traffic on the I-405 is not representative of traffic on the SR 47. During the monitoring study conducted along the I-405, diesel trucks only represented less than 5% of the traffic, whereas on the SR 47 trucks are expected to be 14.8% in 2011, 16% in 2015, and 18% by 2030. Comparing the black carbon concentrations downwind from the I-405 and I-710, it is clear that this difference in truck share of total VMT would makes the PM2.5 measured within the high pollution next to the I-405 not relevant to determining the baseline concentrations in the high pollution zone next to the SR 47.

Third, a monitor located in the high pollution zone next to the I-710 might more accurately serve as a surrogate for concentrations expected next to the SR 47 because of the high truck traffic on both routes, but the monitor used is 1 mile from the intersection with the I-710. ACTA and CalTrans offer no evidence to support an inference that a monitor 1 mile from a highway can provide useful data regarding the pollutant concentrations expected within the high pollution zone next to the highway.

iii. FHWA Agrees Monitor One Kilometer Away Will Not Be in Highway Impact Zone.

OB17-8

FHWA has acknowledged in settling a legal challenge to an inadequate air quality analysis based on FHWA's alleged failure to assess the impact of PM2.5 emissions, that a monitor located more than 1 kilometer from a highway would be located beyond the air quality impact zone of highway emissions. In the settlement agreement, with the Sierra Club that resolved the US 95 litigation,[1] FHWA agreed that a monitor located more than 1000 meters from a freeway provides useful information only with respect to the general urban background and that such a distance does not reflect the impact of emissions from a highway. See US 95 Settlement Agreement, Appendix A ¶ 2.a (attached as Exhibit F).

c. EPA's Monitor Siting Guidance for Roadway Impacts on PM2.5 Requires Monitors Within 5-15 Meters.

The scientific evidence of the impact zone for highway emissions is reflected in the regulatory criteria EPA developed for the purpose of determining the proper siting of monitors to measure the impact of emissions from highways. 40 C.F.R. Part 58. EPA's regulation prescribes the proximity of a monitor that is intended to measure the impact of highway emissions on PM2.5 concentrations in the ambient air. EPA's rule requires that monitors sited for this purpose be located 5-15 meters from the closest traffic lane to detect impacts at the "microscale"[2] distance

[1] Sierra Club v. FHWA, No. 04-16155 (9th Cir. 2005). Settlement was reached after an emergency panel of the Court of Appeals stayed FHWA's approval of the US 95 project on July 27, 2004, pending disposition on the merits, but before decision by the merits panel. The Settlement Agreement was entered by the Nevada District Court on June 30, 2005, as the "Final Adjudication" of the case.

[2] 40 C.F.R. Part 58, Appendix E ¶ 8.3 reads:

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Response to Comment OB17-9

As the commenter points out, the quantitative $PM_{2.5}$ hot spot analysis requirements of 40 CFR § 93.123(b)(1) are deferred (by 40 CFR 93.123(b)(4)). It makes no sense that the quantitative analysis requirements contained in 40 CFR § 93.123(a) and Appendix W would remain applicable, where no quantitative analysis is required. Moreover, the requirements in Section 93.123 are applicable to CO only. 40 CFR §93.123(b) only requires that a project-level $PM_{2.5}$ conformity analysis contain a description of existing air conditions and a description of how the project will affect $PM_{2.5}$ air quality in the future (EPA Guidance at p. 12). For reasons clearly explained in the $PM_{2.5}$ conformity analysis and above, the North Long Beach monitoring station does reflect ambient air quality in the project area and adequately depicts existing air conditions for purposes of the qualitative $PM_{2.5}$ conformity analysis.

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from the highway. "Microscale—defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters." 40 C.F.R. Part 58, Appendix D ¶ 1. Thus, to measure the impact of emissions from the SR-47 on ambient air concentrations of PM2.5 within the 100 meter impact zone, the monitor must be sited in compliance with the criteria for a microscale site. These monitoring criteria apply to any special purpose monitors used by "owners or operators of proposed sources." 40 C.F.R. § 58.3(c).

OB17-8

It is not consistent with EPA's siting criteria to use measurements at the North Long Beach Monitor located approximately 5 miles from the receptor locations to characterize the "current background" at the receptor locations next to the proposed project. To determine whether current highway emissions are causing violations at the receptor locations, or whether additional emissions from the project will cause or contribute to NAAQS violations at those locations, monitors must be sited in accordance with EPA's criteria. Reliance upon the data from the North Long Beach site for this purpose is contrary to EPA's guidance.

d. EPA's Guideline for Assessing Impacts of New Sources on NAAQS Requires Properly Sited Monitors.

The conformity rule requires that "[t]he demonstrations required by § 93.116 . . . must be based on quantitative analysis using the applicable air quality models, data bases, and other requirements specified in 40 C.F.R. part 51, Appendix W (Guideline on Air Quality Models)." 40 C.F.R. § 93.123(a). Although EPA has deferred the use of dispersion models required for quantitative analysis by § 93.123(b)(1), it has not deferred the obligation to comply with those portions of Appendix W that specifically describe the procedures agencies must follow when determining source impacts using monitoring rather than dispersion modeling. In this case,

OB17-9

The intent is to locate category (a) [national air monitoring station] sites in areas of highest concentrations whether it be from mobile or multiple stationary sources. If the area is primarily affected by mobile sources and the maximum concentration area(s) is judged to be a traffic corridor or street canyon location, then the monitors should be located near roadways with the highest traffic volume and at separation distances most likely to produce the highest concentrations. For the microscale traffic corridor station, the location must be between 5 and 15 meters from the major roadway. For the microscale street canyon site the location must be between 2 and 10 meters from the roadway. For the middle scale station, a range of acceptable distances from the roadway is shown in Figure 2. This figure also includes separation distances between a roadway and neighborhood or larger scale stations by default. Any station, 2 to 15 meters high, and further back than the middle scale requirements will generally be neighborhood, urban or regional scale. For example, according to Figure 2, if a PM sampler is primarily influenced by roadway emissions and that sampler is set back 10 meters from a 30,000 ADT road, the station should be classified as a micro scale, if the sampler height is between 2 and 7 meters. If the sampler height is between 7 and 15 meters, the station should be classified as middle scale. If the sample is 20 meters from the same road, it will be classified as middle scale; if 40 meters, neighborhood scale; and if 110 meters, an urban scale.

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where there will likely be hot spots resulting from conglomerating diesel truck traffic on one road, the measurement of baseline concentrations must be developed in compliance with the requirements in Appendix W ¶ 10.2.2.[3]
In the EIR draft Conformity Determination, monitoring data was used from the North Long Beach monitor, a monitor not sited in accordance with any of the criteria in Appendix W. This is especially troublesome because Appendix W ensures that monitors sites are "designed to locate points of maximum concentration." Id. ¶ 10.2.2.b.ii. The North Long Beach monitor is located

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[3] Section 10.2.2 reads:

10.2.2 Use of Measured Data in Lieu of Model Estimates

a. Modeling is the preferred method for determining emission limitations for both new and existing sources. When a preferred model is available, model results alone (including background) are sufficient. Monitoring will normally not be accepted as the sole basis for emission limitation. In some instances when the modeling technique available is only a screening technique, the addition of air quality data to the analysis may lend credence to model results.

b. There are circumstances where there is no applicable model, and measured data may need to be used. However, only in the case of a NAAQS assessment for an existing source should monitoring data alone be a basis for emission limits. In addition, the following items (i–vi) should be considered prior to the acceptance of the measured data:

i. Does a monitoring network exist for the pollutants and averaging times of concern?

ii. Has the monitoring network been designed to locate points of maximum concentration?

iii. Do the monitoring network and the data reduction and storage procedures meet EPA monitoring and quality assurance requirements?

iv. Do the data set and the analysis allow impact of the most important individual sources to be identified if more than one source or emission point is involved?

v. Is at least one full year of valid ambient data available?

vi. Can it be demonstrated through the comparison of monitored data with model results that available models are not applicable?

c. The number of monitors required is a function of the problem being considered. The source configuration, terrain configuration, and meteorological variations all have an impact on number and placement of monitors. Decisions can only be made on a case-by case basis. Guidance is available for establishing criteria for demonstrating that a model is not applicable?

d. Sources should obtain approval from the appropriate reviewing authority (paragraph 3.0(b)) for the monitoring network prior to the start of monitoring. A monitoring protocol agreed to by all concerned parties is highly desirable. The design of the network, the number, type and location of the monitors, the sampling period, averaging time as well as the need for meteorological monitoring or the use of mobile sampling or plume tracking techniques, should all be specified in the protocol and agreed upon prior to startup of the network.

Response to Comment OB17-10

As discussed above, the Draft uses the broad study area that "includes the area between Interstates 710, 110, 405, and Ocean Boulevard," precisely because this broader study area is the area anticipated to be "substantially affected by the project" (SDEIS/RDEIR, Appendix C: *Air Quality Impacts Technical Study*, Appendix M, p. 12). The larger study area encompasses the homes where the Health Risk Assessment demonstrates pollutant exposures are anticipated to result in increased health risk, and it was approved through Interagency Consultation that occurred in October of 2006 and April of 2008. Moreover, 40 CFR §93.123(b) or EPA guidance does not preclude the use of this study area in the EIS/EIR's qualitative $PM_{2.5}$ analysis.

Response to Comment OB17-11

The conformity analysis' conclusion that it is unlikely that $PM_{2.5}$ hot-spots would be associated with the proposed action is supported by evidence contained in the record. As discussed above, the study area for purposes of the conformity analysis included the area between Interstates 710, 110, 405, and Ocean Boulevard. Within this study area, the conformity analysis concluded that LOS would improve at six more intersections than under the No Build scenario (see $PM_{2.5}$ Hot-spot Project-Level Conformity Analysis for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project, p. 9.). Furthermore, the analysis concluded that Alternative 1 would result in fewer vehicle miles traveled than the No Build alternative (*Id.* at p. 10). Finally, the analysis concluded that vehicle emissions in the study area would be slightly lower than those from the No Build alternative in future years 2011, 2015, and 2030 (*Id.* at p. 13). All three of these conclusions constitute the detailed analysis of changes expected to result from the project and how they will affect $PM_{2.5}$ air quality required

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too far from any major highway—.05 mile north of I-405 and 1 mile east of I-405/I710 junction—to be useful in characterizing background air quality at the receptor locations identified for the Schuyler Heim hot spot analyses and does not represent a point of "maximum concentration" pursuant to Appendix W. In the absence of a monitor that has been sited to provide data for determining concentrations at the point of greatest impact, Appendix W calls for the establishment of a monitoring network that includes the collection of meteorological data in order to obtain the data needed to identify the point of greatest impact from existing sources. The Appendix W Guideline recognizes that the cumulative impact of new emissions from the Project cannot be determined without reliable information to establish the existing baseline. The Guideline requires that the network be established after consultation with appropriate air quality expert agencies. None of these steps were followed by ACTA or CalTrans. Instead, they attempt to rely on monitors far removed from the conditions where current emissions from existing highways have their greatest impact on PM 2.5 concentrations, in clear violation of the conformity rule requirement that the analysis "be based on quantitative analysis using the applicable air quality models, data bases, and other requirements specified in 40 CFR part 51, Appendix W (Guideline on Air Quality Models)." 40 C.F.R. § 93.123(a).

e. The Study Area Used to Show Conformity Does Not Comply with EPA Regulations.

OB17-10

The EIR uses an exceedingly broad study area that "includes the area between Interstates 710, 110, 405, and Ocean Boulevard," instead of identifying the areas "substantially affected by the project." EIR, Appendix M, at 12. Even the crude Health Risk Assessment in the EIR related to this project shows that there will be homes and other places where pollutant exposures will result in increased health risk as a result of this project. HRA, at 47. In fact, ACTA and CalTrans have identified eight homes to place HVAC systems to mitigate the impacts from this increased cancer risk. The approach taken by CalTrans and ACTA is flawed because this large study area does not amount to the "appropriate receptor locations" located in "the area substantially affected by the project." Instead, ACTA and CalTrans have used a large area to avoid measuring the impacts of PM2.5 levels on key areas that will likely see increased PM2.5 levels when Alameda Street is converted from an "underutilized" six lane road to a primary diesel freeway route that connects the ports to a nearby railyard.

f. Even Using the Unlawful Conformity Methodology in the EIS, The Analysis Fails to Demonstrate Conformity.

OB17-11

The conformity analysis states "[i]t is unlikely that PM2.5 hot-spots would be associated with the proposed action because local accumulation and delay of vehicles would be reduced by the project." EIR, Appendix M, at 10. First, there will be a location where emissions from traffic on the project are greatest—usually at an interchange where traffic is concentrated. Wherever that point is, there is a hot spot that must be analyzed under the procedures prescribed by the conformity rule. Whether or not it is a hot spot where emissions will violate the NAAQS is the purpose of the hot spot analysis. A lawful analysis cannot be avoided by assuming that the analysis will not show a violation.

by 40 CFR 93.123(b)(2) and applicable EPA guidance. The analysis does not dispute, rather it acknowledges that the level of service at 223rd/Alameda St. Connector Ramp e/o Alameda St." and "223rd St. & I-405 SB Ramps" would be worse when compared to the No Build scenario (*Id.* at p. 9). However, this increase does not support a conclusion that the *study area* will experience $PM_{2.5}$ emission increases. There are six other intersections where LOS is projected to improve.

Response to Comment OB17-12

Data taken from the Port area travel demand model were used to calculate Average Daily Traffic (ADT) on all roadway links with the study area. For this purpose, Average Daily Traffic is defined as the typical amount of traffic during a 24-hour weekday period (thus not including weekends when travel is lower). The study area for this purpose is defined as an area bounded by the Ports on the south, I-110 on the west, I-710 the east, and I-405 on the north. The SCAG/Port area model incorporates detailed truck and auto movements to and from the Ports, and also incorporates all of the regional auto travel since it includes the entire transportation modeling area of the SCAG region. To obtain estimated Vehicle Miles Travelled (VMT) within the focused study area (area noted above), the ADT for each roadway link in this area was multiplied by the length of the roadway in miles or fractional miles. This is done separately for trucks and autos, resulting in VMT calculations for trucks and autos. In the study area, truck trips are forecast to increase from 2003 to 2011 due to forecast increases in port activity and cargo throughput. Those truck trips, by definition, have a trip end in the port area and must use roadways within the study area to reach their destination. Thus, between 2003 and 2011 port truck trips, and resulting port truck VMT, increase within the study area.

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OB17-11 This assumption that there are no hot spots is refuted by the very evidence provided by ACTA and CalTrans to show claimed improvements of Level of Service ("LOS"). Level of service is a measure of travel delay caused by traffic congestion. For example, the 2030 Peak PM Intersection Conditions for the "223rd St /Alameda St Connector Ramp e/o Alameda St" and "223rd St & I-405 SB Ramps" both show a decrease in LOS moving from an LOS of E to F for the former and B to C for the latter in 2030. EIR, Appendix M, at 10. Thus, even under the flawed scheme used in the EIR to demonstrated conformity, the agencies cannot demonstrate conformity by refusing to perform the analyses required to demonstrate conformity.

g. The EIR Fails To Show Conformity Based on § 176(c)(1)(B)(iii).

The emissions analysis in Appendix M, at p. 14, concludes that:

> Based on the current ambient $PM_{2.5}$ concentrations in the project area, the project is not expected to have significant localized $PM_{2.5}$ concentration increase when compared to the No Build alternative. The proposed action is unlikely to cause new violations or increase the frequency or severity of any existing violations, or delay timely attainment of the $PM_{2.5}$ NAAQS. Therefore, the project meets the conformity hot-spot requirements in 40 CFR §93.116 and §93.123 for $PM_{2.5}$.

OB17-12 This analysis is limited to a comparison of emissions from the proposed project compared to emissions from the existing highway and bridge. This analysis concludes that emissions from the proposed project will be slightly less (4 lb/d) in 2011, and even smaller difference (3 lb/d) in 2015. These estimated reductions in emissions are not supported by the evidence in Appendix M.

First, the EIR asserts that the reduction are attributed to increased speeds and changes in VMT. The increase in speeds can only be justified based upon a reasonable expectation that traffic in the corridor will decrease. The emission analysis for 2011 estimate that total truck traffic VMT in the study area will increase by 59,011 miles per day compared to 2003,[4] but that auto traffic will be reduced by 78,922 vehicle miles per day. The EIR provides no explanation or reasonable justification to estimate that auto traffic will decrease after the project is opened for service. This assumption is not justified because freight traffic through the port is expected to increase, and employment in the port area is expected to increase as well. Without a sound technical analysis to support this assumption, it is arbitrary and capricious to assume that auto traffic will be lower in 2011 for the no-build scenario than in 2003.

OB17-13 Second, the estimate that emissions will be reduced between the build and no-build scenarios are not justified or supported by the evidence in the record. The reduction in traffic between these two scenarios is not demonstrated by the data in the record. For 2011, auto traffic is projected to increase by 13,096 VMT/day if Alt. 1 is built, while port truck traffic is projected to decrease by 13,515. There is no net change in VMT shown by the traffic data in the EIR.

OB17-14 Third, the projected reduction in truck traffic between the no-build and alternative scenarios is not supported by any evidence in the record. The entire projected change is in port trucks, not

[4] Combined port truck VMT and "other" VMT. Appdx M, Attachment 1, Table 1.A.

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Trucks operate differently than passenger autos; they take up more roadway capacity due to their longer length and also slower acceleration characteristics. Within the model trucks are assigned a "Passenger Car Equivalent" (PCE) factor. This PCE factor accounts for the fact that trucks take up more capacity. In the SCAG/Port area model, a factor of 2.0 PCE is applied to convert container trucks to auto equivalents, and a PCE factor of 1.1 is used for bobtails (power unit only no chassis or container). This means that each truck is the equivalent of up to two cars within the model. Thus, when trucks are added to the local area roadway (due to forecast port growth), each new truck actually takes up twice the roadway capacity of autos if a container truck, or 1.1 if a bobtail.

The trucks must use the local area roadways (they are going to and from the Port which is inside the study area), but there are regional auto trips that can take other routes and avoid the routes used by the trucks. The SCAG regional model accounts for this and demonstrates that as more Port trucks are added, some "regional" autos are displaced to other routes, thus avoiding the port study area. This displacement/diversion of auto trips is actually compounded by the fact that trucks have the PCE of two autos. While it is also true that Port employment will increase due to port growth, the concurrent increase in port employment auto-related travel is more than offset by the displacement/diversion of regional auto trips from the study area. The SCAG model has historically reported this displacement/ diversion on key routes in the study area including Ocean Boulevard/ Seaside Way, Pacific Coast Highway and even the freeway system. Regional autos have more route choices while port trucks have few and are limited to the key roadways in the study area near the port.

The commenter points out that auto VMT goes down by more miles than truck VMT goes up. This is directly attributable to the Passenger Car Equivalent factors noted in this response. Any time trucks are added to a system and they displace/divert auto trips, more auto trips will be diverted than truck trips are added due to the fact that trucks take up more capacity (one truck equals up to two autos). Thus, it is fully expected and a reasonable model result to see auto VMT reduce more than truck VMT increases. The actual affect of truck versus auto VMT will vary by roadway link depending on the level of congestion on that link; the more congested the link, the more the model will seek alternative routes for auto trips and the less congested the link, the more likely that some autos will stay on the link along with the increase in trucks. For example, on a roadway link that is not very congested and has a good level of service, an increase in trucks may have little effect on the existing auto flow; it may remain the same and show little or no diversion; however, on a more congested link at a poorer level of service, the model will seek alternative routes for autos when truck trips are added to that roadway. This is how traffic behaves on all types of roadways; there is little benefit to motorists diverting and seeking alternate routes when the flow is good and speeds are good, but when congestion occurs and poor service levels develop, then drivers will seek alternative paths. Thus, although the auto VMT goes down more than the truck VMT goes up, it is not a perfect 1 to 1 or even 2 to 1 ratio, it would be somewhere in between those two levels, as the model results indicate. This is again an expected result from the model based on the PCE factors (ranging from 1.1 to 2.0 depending on truck type) and varying levels of congestion on various roadways.

In summary, the projected increase in imports and exports at the ports will require more truck trips to move the cargo. More truck trips on the roads in the study area will result in both more truck VMT in the study area and less car trips (and less car VMT) in the study area. This is because the truck trips must be in the study area; however, some drivers of cars can and will choose to take routes to avoid the study area as the roads become more and more congested with trucks. Because a truck takes up more roadway than a car, there is not a one-to-one increase in truck VMT for every decrease in car VMT. The difference in the amount of roadway taken up by a truck as compared to a car is accounted for in the SCAG regional transportation model by the PCE parameter, as explained earlier.

The commenter also refers to emissions reductions attributable to increased speeds. As mentioned in Response to Comment OB17-13, when a new roadway or segment of roadway, such as proposed project Alternative 1, 1A, or 3, is added to the transportation network within the study area, it produces more overall capacity and efficiency in the local surface transportation system for auto and specifically truck movements. In the case of the Port area and the roadways serving the Port, the roadways carry a very high percentage of truck trips compared to all other roadways in the region. Truck trips for large trucks such as serve the Port also have limited choices of routes due to the fact that many routes are truck restricted. Also, port-related truck trips are generally fixed in terms of their origin and destination since each truck has a specific destination outside of the Port. Overall, the system becomes more efficient as a result of the new capacity, thus reducing truck VMT and also increasing speeds since a better volume-to-capacity ratio usually results in improved operations and improved speeds. As expected based on creating a more efficient system, average vehicle speeds for the entire study area are shown by the model to increase slightly with the project. This is due to the fact that the project adds capacity, provides a shorter and less congested route of travel for truck trips and results in an overall more efficient local roadway system for all trips on the system. That more efficient system with higher capacity serves the same number of trips since the project itself does not generate any new trips; it simply accommodates the trips that will be there with or without the physical transportation system improvement.

Please also refer to Response to Comment OB17-2.

Response to Comment OB17-13

The conclusion that emissions will be reduced between the build and no build scenarios is supported by the evidence in the record. The data supporting the conclusion and contained in Table 3 of the conformity analysis was provided by Meyer, Mohaddes Associates, the EIS/EIR traffic consultant, and confirms that there will be a net decrease in truck VMT with construction of Alternative 1 (see SDEIS/RDEIR, Appendix C: *Air Quality Impacts Technical Study*, Appendix M, p. 11). For Alternative 1, VMT increase from cars traffic would be similar to the VMT decrease from trucks traffic in future years, resulting in a total VMT similar to no build. However, particulate matter emissions per VMT from diesel trucks are 3 to 7 times higher than those from cars. Therefore, increase of particulate matter emissions due to additional car VMT are much less than the emission reduction due to port truck VMT decrease. As a result, the overall particulate matter emissions would decrease for Alternative 1 when compared to no build. Please also refer to Response to Comment AJ18-5.

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Response to Comment OB17-14

When a new roadway or segment of roadway, such as the proposed project Alternative 1, 1A or 3, is added to a transportation network, it produces more overall capacity and efficiency in the local surface transportation system for auto and truck movements.

Some trips which currently use more circuitous routes to a destination will now be able to use the new route to take a shorter path from their origin to their destination. Thus, the trip length is reduced for some trips. For example, for trips from the Port to warehousing destinations in the Carson area, the project would provide a more direct route and a less congested route of travel than is currently available. Also, by definition, the new route has less congestion than current routes which are already carrying significant traffic loads (or will be expected to by 2030). The new, uncongested route, would divert some existing trips, and would produce more direct travel paths. The system becomes more efficient as a result of the new capacity. The new roadways will provide a place for more efficient and shorter trips from one place to another. For example, if there is only one road from an origin to a destination, all trips must then use it; when a new, less congested, and more direct route is introduced to the same system, some vehicles choose to take the new and more direct route rather than the old route (which before was the only choice).

The project itself would not generate any new trips or result in any new trips (which could increase VMT), rather it will only more efficiently accommodate some of the currently less efficient and more circuitous trips on a more direct and efficient route (which will decrease VMT). This does not mean there would be fewer truck shipments from the ports, rather it means constructing the project would allow the port trucks to travel shorter distances and increase the overall efficiency of the local truck network and transportation system compared to the No Build. Please see Response to Comment OB17-12 and Response to Comment OB17-13 for more details, especially why the project would result in a decrease in the displacement/diversion of auto trips by truck trips.

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OB17-14

other trucks. There is no reasonable justification for concluding that construction of the project will reduce truck shipments from the port through the project area. If the effect of building the project were to reduce truck traffic from the ports, the project would not be needed.

Fourth, even if the emissions analysis were justified and provided a legitimate rationale for concluding that the conformity tests in § 176(c)(1)(B)(i) and (ii) are satisfied (i.e., that emissions from the proposed project will not cause new, more frequent or more severe violations), the analysis provides no basis for concluding that emissions will not delay timely attainment of the NAAQS at receptors in the area substantially affected by emissions from the project. To satisfy the conformity test in § 176(c)(1)(B)(iii), the analysis must also show that emissions from the project will not cause or contribute to NAAQS violations in the attainment year (2014), and during the years of the transportation plan after the attainment year. 40 CFR § 116(a).

OB17-15

The data in the emissions analysis provides no basis for concluding that violations being recorded at monitors in the Wilmington community will not continue after the project is opened for service. The analysis shows that emissions will be virtually identical to the emissions expected if the project were not built. There is no analysis to show that emissions for either the no-build scenario or the alternatives will not cause or contribute to violations of the NAAQS during and after the attainment year. Without such a demonstration, the finding required by § 176(c)(1)(B)(iii) cannot be made, and a conformity determination cannot be made for the project.

Nor may a conformity determination lawfully be made without satisfying the 176(c)(1)(B)(iii) test based upon EPA's failure to include the § 176(c)(1)(B)(iii) test in 40 CFR § 93.116(a). This regulatory omission was challenged in the D.C. Circuit Court of Appeals in *Environmental Defense v. EPA*, F.3d (D.C. Cir. 2007). The Court held that EPA's omission of the (B)(iii) conformity test from the rule was unlawful. Unless EPA revises its rule to provide some lawful basis for exempting the (B)(iii) statutory test from hot spot conformity determinations, it is unlawful for FHWA to make a conformity determination without demonstrating that the proposed project satisfies this statutory conformity requirement. The current emissions analysis fails to satisfy this test because it provides no information that supports a finding that emissions from the project will not cause or contribute to violations of the PM2.5 NAAQS at receptors in the area substantially affected by emissions from the project beginning in the attainment year and continuing during the period of the transportation plan.

h. NEPA Requires an Analysis of Impacts on the Revised 24-Hour NAAQS.

OB17-16

The conformity analysis is based solely on attainment of the annual NAAQS and the 24-hour NAAQS (65 µg/m3) in effect for PM2.5 at the time the area was designated nonattainment for PM2.5. Conformity with the revised 24-hour NAAQS (35 µg/m3) is not required until one year after the area is designated nonattainment for the revised NAAQS. But during this period prior to the effective date of the conformity requirement for the revised NAAQS, NEPA requires that the impact of emissions from the project be analyzed, and mitigation considered to prevent violations of the revised NAAQS.

Response to Comment OB17-15

The project is included in the Southern California Association of Governments 2008 RTIP regional emissions analysis. This also means that the project emissions were considered in the South Coast Air Quality Management District Air Quality Management Plan. This plan evaluates how the region would achieve timely attainment of the NAAQS. Inclusion in the regional emissions planning demonstrates the project would not delay timely attainment of the $PM_{2.5}$ standard.

Moreover, the conformity analysis demonstrates that the project can satisfy the conformity test contained in Clean Air Act §176(c)(1)(B)(iii). Section 176(c)(1)(B)(iii) requires that a conformity analysis demonstrate a project will not "delay timely attainment of any standard or any required interim emission reductions or other milestones in any area." While the requirements of §176(c)(1)(B)(iii) are not contained at 10 CFR § 93.116(a), the project-level conformity analysis demonstrates that the project will not delay timely attainment of the $PM_{2.5}$ NAAQS in the study area. As discussed above, the conformity analysis contained in the EIS/EIR supports the conclusion that the project will improve LOS, reduce vehicle miles traveled, and will reduce overall vehicle emissions in the study area when compared to the No Build alternative.

Based upon these conclusions, the analysis concludes that the project is unlikely to delay timely attainment of the $PM_{2.5}$ NAAQS (see SDEIS/ RDEIR, Appendix C: *Air Quality Impacts Technical Study*, Appendix M, p. 11). Contrary to the commenter's contention, the conformity analysis supports a conclusion that the project is likely to accelerate the attainment process compared to the No Build Alternative.

Response to Comment OB17-16

The project is included in the Southern California Association of Governments 2008 RTIP regional emissions analysis. Therefore, the project emissions were included in the regional evaluation for how the region would attain the $PM_{2.5}$ standard. It should be noted that the 2008 RTIP analysis utilized the 1997 $PM_{2.5}$ standard, on which the current nonattaiment designations are based. As of April 24, 2009, nonattainment area designations for the 2006 $PM_{2.5}$ standard revision have not yet been finalized or published in the Federal Register. Consequently, even though the 2006 standard – under which the South Coast Air Basin is expected to be in nonattainment - is relevant for NEPA/CEQA air quality analyses, it is not yet the appropriate standard for conformity analyses.

The Health Risk Assessment (HRA) evaluated the impacts of the project on human health. The HRA was prepared following established ARB and OEHHA guidance for evaluating health risk. A comparison of pollutant concentrations from the project to the NAAQS would not assess the impact of exposure to criteria pollutants. As stated above, the criteria pollutant emissions from the project were included in the SCAG 2008 RTIP regional emissions analysis which demonstrates that project was considered in the attainment strategy for the region.

As discussed above, the conformity analysis contained in the Draft EIS/EIR was completed in accordance with applicable federal regulations (see SDEIS/RDEIR, Appendix C: *Air Quality Impacts Technical Study*, Appendix M), and EPA Guidance. Even if the project were required to demonstrate conformity with the revised 24-hour NAAQS as the commenter suggests, the appropriate methodology for doing so would be the same qualitative approach utilized in the EIS/EIR conformity analysis. As discussed above, the qualitative approach does not require a quantitative discussion of whether a project will violate the 24-hour NAAQS, but rather, a qualitative discussion demonstrating that a project is not likely to increase $PM_{2.5}$ concentrations or delay attainment of the 24-hour NAAQS in the relevant study area. As demonstrated in the Draft EIS/EIR's conformity analysis and discussed above, the project will not adversely affect the human environment by contributing to increased $PM_{2.5}$ concentrations in the study area or delay attainment of the NAAQS, regardless of whether the study area is subject to the existing or revised 24-hour NAAQS.

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For the foregoing reasons, the conformity analysis is sufficient to demonstrate that the project will not result in significant impacts under either the existing or revised 24-hour NAAQS.

In addition, the SDEIS/RDEIR fully assesses the $PM_{2.5}$ emissions associated with the proposed project (direct and indirect emissions) and demonstrated a net decrease in emissions when compared to existing conditions (2003 baseline) (SDEIS/RDEIR Table 3.13-13). In addition, emissions from Alternative 1, the preferred alternative, are lower in future years when compared to the No Build scenario (*Id.*).

Response to Comment OB17-17

While the brief cited by the commenter may provide an argument for demonstrating the TIP and RTP are not conforming, there is no binding authority that supports the position. As discussed in the project-level conformity analysis, the RTP and TIP which contain this project do in fact have a currently valid conformity determination by FHWA and FTA (November 17, 2008). For that reason, the lead agency can legally proceed based upon the assumption that the TIP and RTP are legally adequate and that the project is included in a currently conforming plan.

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> NEPA includes the obligation to "provide" to the decisionmaker and the public --full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.

40 C.F.R. § 1502.1. This obligation includes, at a minimum, a full assessment of whether emissions from the Project will violate the CAA by causing or contributing to violations of the revised NAAQS, whether the Project will adversely affect the human environment by contributing to the kinds of adverse health effects associated with exposure to PM2.5 concentrations greater than the revised NAAQS, and the full mixture of mobile vehicle-related pollutants that have been identified in the recent health effects research, and whether alternatives are available to avoid or minimize these adverse impacts, or even "enhance" the human environment.

> Environmental impact statements shall state how alternatives considered in it and decisions based on it will or will not achieve the requirements of sections 101 and 102(1) of the Act and *other environmental laws and policies*. 40 C.F.R. § 1502.2(d)[emphasis added].

OB17-16

EPA's revision of the 24-hour NAAQS is based upon "significant new circumstances or information relevant to environmental concerns" that bear on the impacts of the proposed Project. EPA's revision of the NAAQS reflects new evidence obtained from nearly 2000 health effects studies conducted since 1996 when EPA last completed its review of the health effects of PM2.5. EPA's revision of the NAAQS for $PM_{2.5}$ presents a benchmark for identifying significant environmental impacts not evaluated in the original EIR, namely the likelihood that emissions from the project will violate the revised 24-hour NAAQS for $PM_{2.5}$. The term "significantly" is defined by the NEPA regulation to include actions that threaten to violate a federal, state, or local law designed to protect the environment. *See* 40 CFR § 1508.27(b)(2), (b)(10). The NEPA regulation also requires that an agency disclose whether an action will interfere with or violate requirements of environmental laws such as the CAA. 40 C.F.R. § 1502.2(d).

These "significant environmental impacts" are not evaluated in the EIR, either by determining whether emissions from the project will cause or contribute to violations of the NAAQS, or the extent to which emissions will cause exposure to PM2.5 among residents and school children near the highway that are known to cause serious adverse health impacts.

Modeling tools are now available and suitable for the purpose of assessing the impacts of exposure to some of these pollutants on human health. Therefore commenters request that further action to implement the Project be withheld until an EIR is prepared to fully disclose these impacts, and consider the alternatives and mitigation options available to eliminate, avoid or minimize these impacts as required by NEPA and 23 U.S.C. § 109(h).

II. The Schuyler Heim Project Does Not Come From a Conforming Plan.

OB17-17

Another flaw of the conformity analysis is the assumption that this project is included in a currently conforming plan. As ACTA and CalTrans are aware, projects must be included in a

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Response to Comment OB17-18

The purpose of the project is to ensure safe vehicular connection between Terminal Island and the mainland, reduce congestion, and provide a high-capacity limited-access route for traffic between Terminal Island and I-405. All reasonable and feasible alternatives were considered during project scoping and are addressed in Chapter 2.0 of the Draft and the Final EIS/EIR.

The implementation of large-scale modern container transportation systems, are not feasible alternatives to the project. Such systems generally require very large capital investments, have extensive geographical coverage, and are disproportionate to the impacts of an individual project. Caltrans has no means to implement such system-wide transportation improvements. Alternative transportation systems are better implemented on a Port-wide or regional basis. Caltrans has no jurisdiction or control over the Port or the region as a whole.

NEPA requires that an EIS explore and objectively evaluate all reasonable alternatives (40 CFR § 1502.14). CEQA requires that an EIR include a discussion of reasonable project alternatives that would feasibly attain most of the basic objectives of a project while avoiding or substantially reducing any of the significant effects of the project (CEQA Guidelines § 15126.6). "CEQA establishes no categorical legal imperative as to the scope of alternatives to be analyzed in an EIR. Each case must be evaluated on its facts, which in turn must be reviewed in light of the statutory purpose… [A]n EIR for any project subject to CEQA review must consider a reasonable range of alternatives to the project… which: (1) offer substantial environmental advantages over the project proposal…; and (2) may be 'feasibly accomplished in a successful manner' considering the economic, environmental, social and technological factors involved" (*Citizens of Goleta Valley v. Board of Supervisors*, 52 Cal.3d 553, 566 [1990], emphasis added). An exhaustive list of alternatives is not required, and the statutory requirements for consideration of alternatives must be evaluated against a rule of reason (*Id.* at p. 565).

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OB17-17

conforming transportation plan and Transportation Improvement Program ("TIP") before they can be approved. *See* 40 C.F.R. §§ 93.114, .115. The most recently approved TIP and Regional Transportation Plan ("RTP") for the South Coast Air Basin rely on Motor Vehicle Emissions Budgets ("MVEB") that were unlawfully approved by the EPA. The attached comments provide the technical basis for demonstrating the legal deficiencies in the MVEBs for the South Coast Air Basin for PM2.5. *See* Exhibit G. The attached brief for the Petitioners in *Natural Resources Defense Council et. al. v. EPA*, Case No. 08-72288 (9th Cir.), provides the legal arguments establishing that EPA's adequacy determination for the PM2.5 MVEB was contrary to law. *See* Exhibit H. The RTP and TIP do not conform because the conformity determination relies exclusively on this unlawful adequacy determination by EPA. Accordingly, until this issue has been resolved by the United States Court of Appeals for the Ninth Circuit, this project may not be approved because it fails to come from a conforming plan and TIP. Moreover, even if it is determined that the near highway issue is not a problem to establishing adequate conformity budgets, the MVEBs are still deficient because they rely on commitments to adopt enforceable control measures that have been identified in the SIP as necessary to reduce PM2.5 to achieve the reductions called for in the demonstration in the adopted SIP. These missing measures include the most important measure for reducing emissions from highways – the diesel truck fleet rule. Until the missing rules are submitted to EPA, the adequacy determination is not based on adopted measures. Based on this record, if FHWA makes a conformity determination for this project, it will be unlawful because the conformity determination for the RTP and TIP impermissibly relies on inadequate and unlawfully approved motor vehicle emissions budgets.

III. The EIR Provides an Inadequate Alternatives Analysis Under CEQA and NEPA.

OB17-18

An adequate alternatives analysis is a crucial component of complying with CEQA/NEPA. The CEQ has labeled the alternatives requirement as the "heart" of the EIS.[5] Further, NEPA contains a clear mandate that alternatives must be explored in depth and with the same level of detail as the proposed action.[6] The analysis of the alternatives throughout the document fails in this respect.

Perhaps one of the most notable deficiencies in the alternatives assessment was overlooking utilizing a modern container transport system. A critical component of the CAAP was a section on "Green Container" Transport Systems.[7] The CAAP states that "the ultimate goal is a 21st century electric powered system that will move cargo from our docks to the destinations within 200 miles that today are moved by truck. It may take 20 years to complete such a system but it will always be 20 years away unless in the next five years we build and test a demonstration prototype and perfect a detailed plan for widespread construction."[8] In addition, the Southern California Association of Governments ("SCAG"), the designated Metropolitan Planning

[5] 40 C.F.R. § 1502.14; *see also Monroe County Conservation Council, Inc. v. Volpe*, 472 F.2d 693, 697-98 (2d. Cir. 1972)("The requirement for a thorough study and a detailed description of alternatives…is the linchpin of the entire impact statement."); Cal. Pub. Res. Code § 21002; 14 Cal. Code Regs. § 15126.6.
[6] *See* 40 C.F.R. § 1502.14 (a) and (b); *see also Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act* Regulations, 46 Fed. Reg. 18026 (Mar. 23, 1981)("The degree of analysis devoted to each alternative in the EIS is to be substantially similar to that devoted to the "'proposed action.'").
[7] CAAP TR, at 141.
[8] CAAP TR, at 141.

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The alternatives considered in the Final EIS/EIR represent a reasonable range of alternatives to the proposed project, as required by CEQA and NEPA. As discussed in Chapter 2.0 of the EIS/EIR, the alternatives given detailed consideration in the document are reasonable, would be potentially feasible, and would be able to implement most basic project objectives. For the foregoing reasons, the Final EIS/EIR analyzed a reasonable range of alternatives. The EIR need not look at every conceivable alternative, and the failure to analyze modern and green container transport systems does not contribute to an inadequate alternatives analysis under the circumstances.

OB17-18

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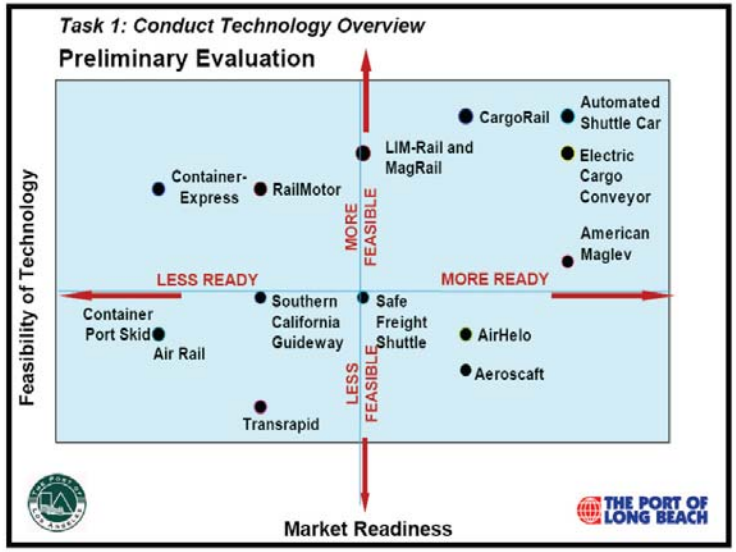
Organization for the area encompassing the Port, has determined that "the region is [] paying a high price in terms of the air pollution generated from [goods movement] activities."[9] In its declaration of a state of emergency due to severe air pollution impacts, SCAG called for pursuit of "all actions associated with implementation of an alternative clean freight movement system."[10] Thus, it is inconceivable why such a modern system was not even considered in the EIR for this project. Obviously, the key stakeholders have determined that such a system is potentially feasible and a desirable result, so we were exceptionally disappointed that an analysis of this type of technology was not included in the EIR.

In conjunction with the Port of Long Beach, the Port commissioned a study of Zero Emission Container Mover Systems. As the chart from a presentation to the Board of Harbor Commissioners demonstrates, there are several technologies that have been quantified as "More Feasible" and "More Ready."[11]



[9] SCAG, Press Release, SCAG Urges Declaration of Air Quality Emergency For South Coast Air Basin, *available at* http://www.scag.ca.gov/media/pdf/pressReleases/2007/pr029_SCAGAOCrisis.pdf.
[10] *Id.*
[11] Zero Emissions Container Mover System Evaluation Status Update, (September 6, 2007) *available at* http://www.portoflosangeles.org/DOC/Zero_Emissions_Container_Mover_System_Pres_090607.pdf.

Response to Comment OB17-19

The EIR/EIS specifically analyzes whether the proposed project complies with Section 109(h) of the Federal-Aid Highway Act (see *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Draft EIS/EIR* (2007) [Draft EIS/EIR], p. 3.3-1). In order to effectuate the public interest determination required by Section 109(h), Section 3.3 of the Draft EIS/EIR, the Community Resources Analyses, and the other issue area analyses in the document address the potential for adverse economic, social and environmental effects related to the proposed project (See *Id.*). The Draft EIS/EIR and the SDEIS/RDEIR do address "air pollution" (see Draft EIS/EIR, pp. 3.13-1 to 3.13-36 (2007); see also SDEIS/RDEIR, p. 3.13-1 to 3.13-65) and environmental justice issues including "disruption of desirable community and regional growth" (see Draft EIS/EIR, pp. 3.3-1-3.3-27 (2007); see also SDEIS/RDEIR, p. 3-65), as the commenter suggests, is necessary. Moreover, each impact analysis in Chapter 3.0 of the EIS/EIR and in Chapter 3.0 of the SDEIS/RDEIR include a discussion of avoidance, minimization, and/or mitigation measures that are intended to address any adverse affects.

OB17-18

The EIR needs to address the EIR's deficiency of failing to analyze one or more of these more efficient systems of transportation.

IV. The EIR Fails To Comply with § 109(h) by Failing to Make a Legally Adequate Determination that the Project is in the Best Overall Public Interest.

Section 109(h) of the Federal-Aid Highway Act requires for all new highway projects eligible for federal funding, 23 C.F.R. § 771.107(b), a three-step evaluation of adverse impacts and mitigation measures to ensure that "final decisions on the project are made in the best overall public interest." 23 U.S.C. § 109(h). The first step is to determine the "possible adverse economic, social and environmental effects relating to any proposed project." *Id.* The second step is to determine "the costs of eliminating or minimizing such adverse effects," including "air pollution" and "disruption of desirable community and regional growth." *Id.* The third step is to evaluate "the costs of eliminating or minimizing such adverse effects" against "the need for fast, safe and efficient transportation" to determine whether the project is "in the best overall public interest." *Id.* Section 109(h), therefore, imposes a substantive duty on Defendants to determine whether the selected alternative is in the "best overall public interest" based on consideration of the relevant factors defined by the statute. *See Sierra Club v. U.S. Dep't of Transp.*, 310 F. Supp. 2d 1168, 1204 (D. Nev. 2004) (describing requirements imposed by § 109(h)). The facts involved in this cost and benefit determination must be disclosed, 40 C.F.R. § 1502.23, and properly documented in the EIS, 23 C.F.R. § 771.105(a) (requiring that "compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation"). The ROD "shall identify and discuss all [relevant] factors . . .which were balanced by the agency in making its decision and state how those considerations entered into its decision." 40 C.F.R. § 1505.2(b); *State Farm*, 463 U.S. at 43. Here, there has been a failure to satisfy the demands of reasoned decision-making because the EIR has not considered relevant factors defined by § 109(h) and its implementing regulations, and they have not explained the basis for their determination that the proposed project is in the "best overall public interest."

OB17-19

It is also relevant to note that simple compliance with NEPA, CEQA and the Clean Air Act does not satisfy the requirements of compliance with section 109(h). NEPA is the "basic national charter for protection of the environment." 40 C.F.R. § 1500.1(a). NEPA is a procedural statute, *Vt. Yankee Nuclear Power Corp. v. Natural Res. Def. Council, Inc.*, 435 U.S. 519, 558 ("NEPA does set forth significant substantive goals for the Nation, but its mandate to the agencies is essentially procedural."); *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 443 (4th Cir. 1996), designed to ensure that the significant impacts of major federal actions are adequately considered and evaluated by federal agencies, 40 C.F.R. § 1502.1. The plain language of § 109(h) of the Federal-Aid Highway Act and its regulations impose a number of substantive duties that go well beyond NEPA. *Ayes v. Dep't of Veterans Aff.*, 473 F.3d 104,108 (4th Cir. 2006) ("In interpreting a statute, a court should always turn first to one, cardinal canon [of construction] before all others: the plain meaning rule.") (internal quotation omitted). Section 109(h) imposes a substantive duty on federal agencies to ensure that projects selected are in the "best overall public interest." 23 U.S.C. § 109(h); 23 C.F.R. § 771.105(b). FHWA regulations implementing § 109(h) also impose obligations that go beyond NEPA, requiring that "[m]easures necessary to mitigate adverse impacts be incorporated into the action." 23 C.F.R. § 771.105(d).

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The commenter also concludes that "[a] ROD 'shall identify and discuss all [relevant] factors…which were balanced by the agency in making its decision and state how those considerations entered into its decision [with respect to § 109(h)]." The ROD for the project has yet to be released. Accordingly, it will provide a second opportunity to address the requirements of § 109(h) and to reiterate EIS/EIR conclusions about why the project meets the "best overall public interest" test.

Response to Comment OB17-20

See Response to Comment OB17-1.

For the reasons discussed in OB17-1 above, the conformity analysis currently contained in the EIS/EIR satisfies applicable regulatory requirements.

Exhibits A through G are part of the administrative record for the Natural Resources Defense Council letter, January 30, 2009. Copies are available upon request.

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OB17-19

Even if § 109(h) and its regulations were somehow ambiguous, a suggestion that they impose no duties beyond those required by NEPA runs contrary to another "cardinal rule of statutory construction that, to the extent possible, a legislative enactment is to be so read as to give operation to all of its parts." *Am. Fed'n of Gov't Employees v. FLRA*, 944 F.2d 922, 932 (D.C. Cir. 1991). It is contrary to this important canon to suggest that Congress would intend by enacting two separate laws using different language and applying different relevant factors, where one applies solely to highway projects and the other to all major federal actions, for each to impose the exact same duties. This interpretation also violates the well-settled rule that "Congress is presumed to legislate consistently with existing law." *United States v. Tomlinson*, 67 F.3d 508, 513 n.9 (4th Cir. 1995). NEPA, enacted in January 1970, generally governs all environmental reviews, while § 109(h), enacted twelve months later, imposes a public interest determination and requires federal transportation agencies to consider additional factors, including the cost of mitigation, not found in NEPA. Section 109(h), as a more specific statutory provision, adds to the general provisions in NEPA. *Dekoladenu v. Gonzales*, 459 F.3d 500, 505 (4th Cir. 2006). Accordingly, the specific, substantive public interest determination required of the Secretary by § 109(h) cannot be satisfied by mere compliance with the general procedural requirements of NEPA.

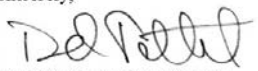
The implementing rules bars federal approval of a highway project unless documents show—that the development of the project has taken into consideration the need for fast, safe, and efficient transportation together with highway costs, traffic benefits and public services . . . and other economic, social and environmental effects . . . includ[ing]: (A) Identification of the adverse effects, (B) Appropriate measures to eliminate or minimize the adverse effects, (C) The estimated costs (expressed in either monetary, numerical or qualitative terms) of the measures considered. 23 C.F.R. Part 790, 39 FED. REG. 41,804 (Dec. 2, 1974). Since the EIR fails to provide this analysis, it does not comply with § 109(h).

Conclusion

OB17-20

In sum, the conformity analysis in the EIR is lacking and must be remedied before this project can go forward. We appreciate your consideration of these comments, and please do not hesitate to contact us if you have further questions about these comments.

Sincerely,



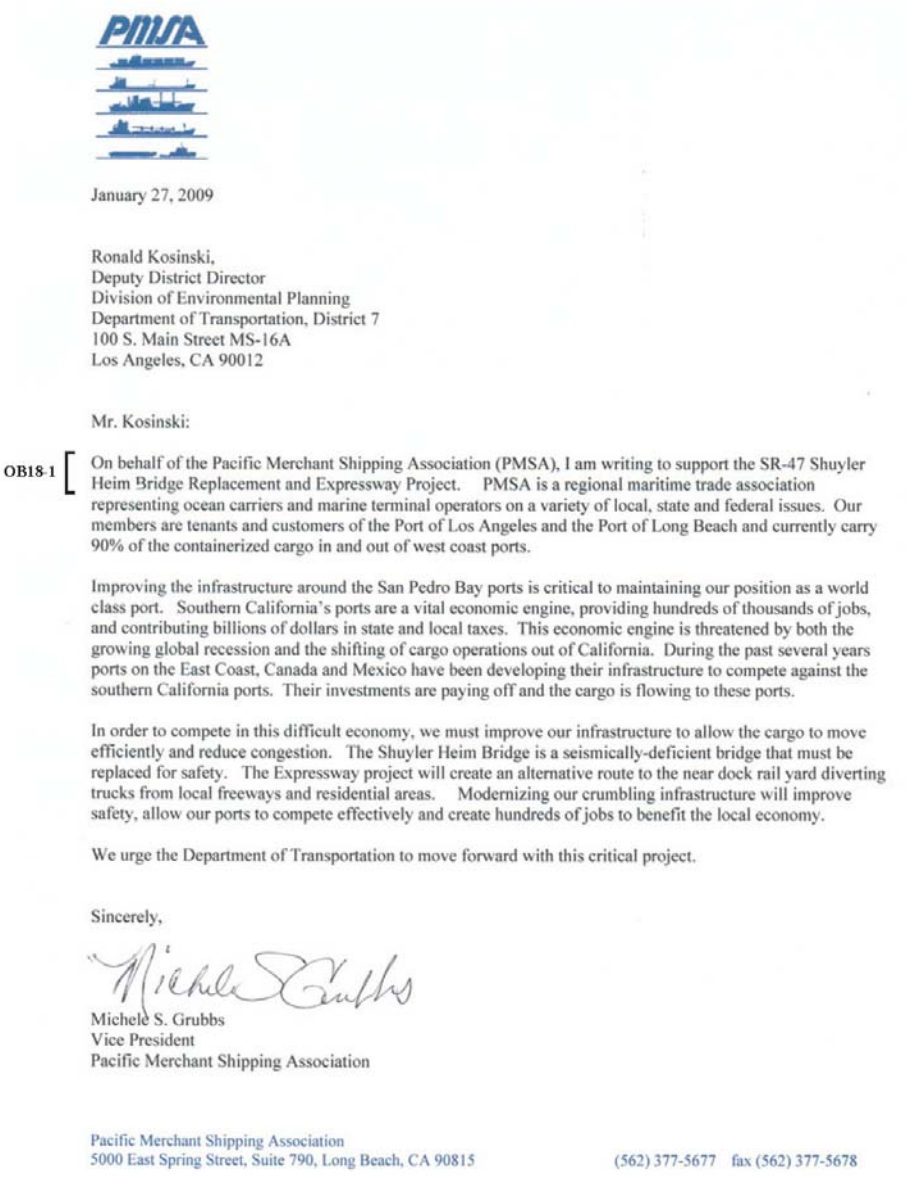
David Pettit, Senior Attorney
Adrian Martinez, Project Attorney
Natural Resources Defense Council
(310) 434-2300

Bob Yuhnke
Consultant
Robert Yuhnke & Associates

Letter OB18. Signatory – Pacific Merchant Shipping Association

Response to Comment OB18-1

Your support of the proposed project is acknowledged.



PMSA

January 27, 2009

Ronald Kosinski,
Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, CA 90012

Mr. Kosinski:

OB18-1 On behalf of the Pacific Merchant Shipping Association (PMSA), I am writing to support the SR-47 Shuyler Heim Bridge Replacement and Expressway Project. PMSA is a regional maritime trade association representing ocean carriers and marine terminal operators on a variety of local, state and federal issues. Our members are tenants and customers of the Port of Los Angeles and the Port of Long Beach and currently carry 90% of the containerized cargo in and out of west coast ports.

Improving the infrastructure around the San Pedro Bay ports is critical to maintaining our position as a world class port. Southern California's ports are a vital economic engine, providing hundreds of thousands of jobs, and contributing billions of dollars in state and local taxes. This economic engine is threatened by both the growing global recession and the shifting of cargo operations out of California. During the past several years ports on the East Coast, Canada and Mexico have been developing their infrastructure to compete against the southern California ports. Their investments are paying off and the cargo is flowing to these ports.

In order to compete in this difficult economy, we must improve our infrastructure to allow the cargo to move efficiently and reduce congestion. The Shuyler Heim Bridge is a seismically-deficient bridge that must be replaced for safety. The Expressway project will create an alternative route to the near dock rail yard diverting trucks from local freeways and residential areas. Modernizing our crumbling infrastructure will improve safety, allow our ports to compete effectively and create hundreds of jobs to benefit the local economy.

We urge the Department of Transportation to move forward with this critical project.

Sincerely,

Michele S. Grubbs
Vice President
Pacific Merchant Shipping Association

Pacific Merchant Shipping Association
5000 East Spring Street, Suite 790, Long Beach, CA 90815 (562) 377-5677 fax (562) 377-5678

Letter OB19. Signatory – Propeller Club of Los Angeles-Long Beach

Response to Comment OB19-1

Your support of the proposed project is acknowledged.

PROPELLER CLUB OF LOS ANGELES-LONG BEACH
P.O. Box 4250, Sunland, CA 91041
Phone: 818.951.2841 * Fax: 818.353.5976
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January 29, 2009

Mr. Ronald Kosinski
Deputy District Director,
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street, MS-16A
Los Angeles, CA 90012

Dear Mr. Kosinski:

The Propeller Club of the United States is an international trade association with over 17,000 members in the United States and worldwide. The organization was established in 1923 and is dedicated to the enhancement and well-being of all interests of the maritime transportation community on a national and international basis. One of the major objectives of the Los Angeles-Long Beach chapter is to provide a forum for discussion and to promote public education regarding critical issues which affect this industry. Our local membership is comprised of over 250 maritime transportation executives in the San Pedro Bay area.

OB19-1 The Propeller Club of Los Angeles-Long Beach would like to go on record as supporting the SR-47 Expressway Project and the Schuyler Heim Bridge Replacement. The new SR-47 Expressway would eliminate traffic conflicts at five at-grade railroad crossings and three signalized intersections. Under this alternative, the existing connectivity to SR-103 would be maintained.

Improving the infrastructure around the San Pedro Bay ports is critical to maintaining our position as having two world class ports in Los Angeles and Long Beach. Southern California's ports are a vital economic engine, providing hundreds of thousands of jobs and contributing billions of dollars in state and local taxes. This economic engine is threatened by both the growing global recession and the shifting of cargo operations out of California, to our neighbor in the north, Canada, and to our neighbor in the south, Mexico. The infrastructure development projects these countries have invested in are paying off with cargo now being diverted from California.

Letter OB19. Propeller Club of Los Angeles-Long Beach
Page 2

In order to compete in our current economy, we must improve our infrastructure to allow the cargo to move efficiently and reduce congestion. The Schuyler Heim Bridge is a seismically-deficient bridge that must be replaced for safety reasons. The Expressway projects will create an alternative route to the near dock rail year diverting trucks from local freeways and residential areas. Modernizing our crumbling infrastructure will not only improve safety and allow our ports to compete effectively, but also create hundreds of jobs to benefit our local economy.

We respectfully urge the Department of Transportation to quickly move forward with this critical project.

Sincerely,

Gary L. Gregory
President

Letter OB20. Coalition For A Safe Environment

Response to Comment OB20-1

The HRA used the HARP model to estimate acute and chronic health effects using the methodology developed by the California Office of Environmental Health Hazard Assessment (OEHHA). This is the same methodology used by the SCAQMD in their most recent Multiple Air Toxics Exposure Study III (MATES III). We are aware of no other recognized methodology to study the other health impacts described in the comment.

Conducting a Public Health Survey and preparing a Public Health Baseline would not yield useful information about the proposed project's impacts. The causes of cancer are not all known and environmental impacts are thought to contribute a relative small percentage to the overall cancer numbers. Likewise, the causes of respiratory disease and other health problems are not all known nor can they be all attributed to environmental factors such as motor vehicle emissions. In order to account for people who are already weakened from other forms of disease, overly conservative exposure assumptions were utilized as well as a carcinogenic risk factor for DPM that incorporates a safety factor to account for sensitive persons.

The homes identified as being significantly impacted were determined based on the modeling study reported in the HRA. The methodology for that study is described in Section 2.0 of the HRA (SDEIS/RDEIR; HRA, Appendix A, Section 2.0).

Response to Comment OB20-2

As stated above, impacted homes were identified based on the methodology described in the HRA.

The recommendation is noted. The cited California Air Resources Board ("CARB") and South Coast Air Quality Management District ("SCAQMD") guidelines are advisory documents that provide suggested policies. The documents do not establish regulatory standards of any kind. (See Air Quality and Land Use Handbook:

Coalition For A Safe Environment

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January 30, 2009

Ronald J. Kosinski, Deputy District Director
Division of Engineering Planning
Department of Transportation, District 7
100 South Main Street
Los Angeles, CA 90012

Re Schuler Heim Bridge Replacement & SR-47 Expressway Project
Supplemental Draft Environmental Impact Report (DEIR)/
Supplemental Draft Environmental Impact Statement (DEIS)
SCH No. 20021009
FHWA-CA-EIS-2007-07-01D
07-LA-47-KP 4.4/9.3 (PM 2.7/5.8)
EA: 238500

Su: Schuyler Heim Bridge & SR-47 Expressway Project Public Comments

The Coalition For A Safe Environment (CFASE) wishes to submit the following Schuyler Heim Bridge & SR-47 Expressway Project Supplemental Draft EIR/Draft EIS Public Comments:

OB20-1

1. The SDEIR/SDEIS Health Risk Assessment (HRA) conclusions and data are not accurate because it was not based on a comprehensive Public Health Survey (PHS) of the project impact communities and a Public Health Baseline (PHB) of the project impact communities. Without a PHS DOT Caltrans does not know exactly how many people have cancer, what types of cancer, who has what respiratory or other health problem that can be exasperated or contribute to premature death. DOT Caltrans also does not know exactly where they live.

   That is why the HRA conclusion that only 8 residences will be significantly impacted is arbitrary and not based on factual data. The HRA, staff and consultants refuse to disclose how they determined only these 8 homes and the unsafe distances.

OB20-2

The CFASE Schuyler Heim Bridge and SR-47 Expressway Project Proposal - Wilmington Residential Community Impact Zone Assessment Research Report disclosed that there were significantly more residences that would be impacted. See attachment document.

Based on the California Air Resources Board (CARB) Land Use Guideline and the South Coast Air Quality Management District (SCAQMD) both recommend that there be a 500' buffer between projects, highways etc. and because numerous scientific public health medical

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Page 2

A Community Health Perspective, p. 3 [California Air Resources Board, 2005]; see also Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning, p. 1 [South Coast Air Quality Management District, 2005]). While both documents recommend that residences and other sensitive land uses be cited more than 500 feet from a freeway, they also recognize that land use decisions are not within the jurisdiction of either agency and; therefore, that recommendations in each respective document are not binding on agencies exercising land use authority. (Air Quality and Land Use Handbook: A Community Health Perspective, supra, pp. 2 and 4.; See also Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning, supra, p. 1.) Accordingly, while a 500-foot guideline is suggested in both documents, Caltrans and FHWA have the authority to deviate from the suggested guideline.

Most of Alternative 1 is located in an industrial or commercial area, but the comment is accurate in noting that there may be homes within 500 feet of the proposed project. However, the HRA shows that the health risk of the proposed project is not significant at any residences, except those that have been noted.

Please also see Response to Comment TR2-38.

Response to Comment OB20-3

The HRA identified the sensitive land uses in the study area, including residential area and schools, as well as parks and marinas. A denser receptor grid was overlain these areas in order to ensure the maximum concentrations were delineated from modeling outputs. The refined receptor grid extended over 1,000 feet on either side of the SR 47 Expressway. In addition, incremental cancer risks were predicted for commercial/industrial workers, recreational workers and users, and school workers and students. See HRA, Figures 2-2 and 2-3, pp. 26-27.

OB20-2 research has shown that the most significantly health impacted are residents living less than 500'. Based on these facts, CFASE research has disclosed that there are 97 residences less than 500' from the SR-47 Expressway who could be significantly impacted and would require special and additional mitigation. Public health and environmental justice advocacy organizations recommend larger buffer distances, lower and less significant health impacts be considered and adopted.

OB20-3 The HRA did not adequately consider health impacts to residents, school children and workers less than 1000' from the project. CFASE research has disclosed that there are 160 residences, over 30 boat marina residents, over 500 workers and over 1,800 children less than 1,000' from the SR-47 Expressway who could be significantly impacted and would require special and additional mitigation. No labor force study was performed to determine the current workforce of the project impact area and any projected workforce growth, port and non-port related.

OB20-4 We request that a Public Health Mitigation Fund be established and that a per truck fee be charged.

OB20-5 2. The SDEIR/SDEIS did not consider conducting a Health Impact Assessment to ascertain and mitigate all the environmental, land use and socio-economic impacts. This would include public health care costs, health care facility availability, loss of income from loss school days due to illness, loss of income from temporary and long term disabilities, increased health insurance, deductables & prescriptions, increased car insurance due to increased truck accidents, loss of police and fire department response time and repair maintenance and replacement of traffic infrastructure. Both the Los Angeles County Health Department and the US Environmental Protection Agency support the inclusion of Health Impact Assessments.

OB20-6 3. The SDEIR/SDEIS air quality and meteorological data is not accurate because there was not ne A/Q station set-up along the impacted areas in order to determine an accurate baseline. The St. Peter & Paul School site is more than 3 miles away and the SCAQMD Long Beach test station on Long Beach Blvd. is also about 3 miles away. A/Q stations should have been set-up fence-line to Rubidoux Street and Carson residents. The SDEIR/SDEIS failed to

OB20-7 incorporate the air pollution dispersion data from the CARB Wilmington Air Tracer Study. The project fails to significantly reduce air pollution and will cause the SCAQMD to continue to be in non-attainment of national ozone standards and jeopardizes California receiving federal transportation funds in the near future.

OB20-8 4. SDEIR/SDEIS recommends the installation of HVAC air purification systems for 8 residences. While this is a good and laudable mitigation measure it does create a regressive aspect in that the residents will not be able to pay the significant increase in electric costs which could easily triple. DOT, Caltrans and/or the Ports would have to pay the extra costs and be responsible for the maintenance, repair and replacement of the HVAC system.

The mitigation measure also assumes that people will be locked up inside their homes all the time which is not reality. Residents have a right to breathe clean air outside, recreate

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Response to Comment OB20-4

Through a Memorandum of Understanding, the Port of Los Angeles has agreed to establish a Port Community Mitigation Trust Fund to address off-port impacts caused by Port operations. In addition, the Ports have adopted a Clean Truck Program that includes a $35 gate fee per twenty-foot container unit (TEU) to generate funds for the replacement of the existing port truck fleet with cleaner, lower-emitting engines. By January 1, 2012, all drayage trucks operating in the port complex will be required to meet 2007 federal emissions standards. This will reduce port related truck pollution by an estimated 80 percent.

Response to Comment OB20-5

Your comment is noted**.** According to the World Health Organization (WHO), a Health Impact Assessment ("HIA") is "A combination of procedure, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population." HIA recommendations are produced for decision makers and stakeholders, with the aim of maximizing a proposed project's positive health effects and minimizing the negative health effects. In a letter dated January 28, 2009, the EPA stated that a port-wide health impact assessment may be "beyond the scope of any one Port project NEPA document" (Goforth, Kathleen; EPA; 2009; letter to U.S. Army Corps of Engineers; January 28.)

Because the Final EIS/EIR discloses environmental impacts, including health risk impacts, of the proposed project, an additional HIA is not required. Nonetheless, the Final EIS/EIR includes a number of health assessment tools including the HRA, criteria pollutant modeling, and Environmental Justice analysis that will assist the lead agency in comparing the benefits and costs among project alternatives.

Response to Comment OB20-6

The St. Peter and Paul School meteorological dataset is the approved dataset for port-related projects and is within the project area. ACTA was instructed to utilize that dataset by the Port of Los Angeles. Because the station has been in operation since 2005, it would be more reliable indicator of project area meteorology than any short term neighborhood monitoring program.

Response to Comment OB20-7

The nature of the proposed project is transportation infrastructure improvements and as such does not create pollution. It does change the location of emissions, which is the focus of this analysis. However, it will not interfere with the SCAQMD's ability to achieve attainment of ambient air quality standards or threaten future transportation funding for the region.

Response to Comment OB20-8

ACTA's decision to provide mitigation by retrofitting affected homes with HVAC will not include paying utility bills, operation, maintenance, or future replacements. There is no plan for DOT, Caltrans, or the ports to pay the extra costs or be responsible for maintenance, repair, and replacement. Regarding the commenter's concern that people in the homes to be mitigated will have to lock themselves in their homes to get benefit, this is not the case. As the maximum increased cancer risk of 10.6 is predicated on 24-hour exposure, 350 days per year over a 70-year duration, even if the person were confined to the property for the entire 70 years, spending just an hour in the house or away from the impact area each day would reduce the risk below significance.

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OB20-8 outside, have bar-b-ques, have birthday parties etc. Families will also become black listed as living in a diesel death zone and no one will want to visit them. They also will see a decrease in property values and will have difficulty selling their home.

OB20-9 5. The SDEIR/SDEIS failed to include a Public Risk & Liability Assessment from the increase in danger from trucks and their closer proximity to residents and elementary schools due to vehicle accidents, explosions & fires, accidental toxic chemical spills, diesel fuel & other alternative fuel air pollution emissions, additional homeland security measures and earthquakes. This would be part of the socio-economic impact analysis.

OB20-10 6. The SDEIR/DSEIS truck conclusions and data estimates are not accurate because they failed to identify and include numerous truck traffic arterial sources increases such as:

a. Truck trips in/out of container yards off-port property
b. Truck trips in/out of inspection facilities off-port property
c. Truck trips in/out of truck company facilities off-port property
d. Truck trips in/out of truck staging areas off-port property
e. Truck trips in/out of truck repair/maintenance garages off-port property
f. Truck trips in/out of truck parts/tires/oil/supply etc. retail stores off-port property
g. Truck trips in/out of chassis pick-up locations off-port property
h. Truck trips in/out of truck sales locations off-port property

There will be no decrease in arterial traffic as claimed in the SDEIR/SDEIS because any increase in truck traffic will automatically increase arterial traffic to off-port property truck destinations as listed above.

OB20-11 7. The SDEIR/SDEIS includes truck traffic growth and traffic flow via various freeways, highways and roads based on assumptions which are invalid because they assume truck drivers will drive to a destination that does not exist (SCIG) or ICTF which is at maximum capacity. This would slow down trucks, increase congestion, back-up traffic and increase accidents and arterial road use. This will in fact increase air pollution and public health impacts.

OB20-12 8. The SDEIR/SDEIS failed to include and consider numerous other Alternatives such us:

a. Requiring the ports to mandate that each container terminal client increase its use of the Alameda Corridor in order to decrease truck usage. This could be incorporated in the port lease agreements.
b. The approval of an electric MagLev Train Freight Transportation System to connect the ports to the ICTF and Alameda Corridor.
c. Building an underground or above ground tunnel exclusively for trucks, that would have its own HVAC system to service the ICTF and Alameda Corridor and cause no environmental or public health impacts.

OB20-13 9. The SDEIS/SDEIS fails to mitigate all identified carcinogenic, toxic and hazardous chemicals and substances that residents, children, truck drivers and dock workers are currently being

Response to Comment OB20-9

Environmental effects resulting from increased truck trips, including but not limited to: vehicle; accidents; explosions; fires; and accidental toxic chemical spills were considered in Section 3.12, Hazardous Waste/Hazardous Materials, of the Draft EIS/EIR (pp. 3.12-1 to 3.12-21). The Draft EIS/EIR determined that environmental effects would not be adverse (*Id*. at pp. 3.12-10 to 3.12-19). Potential air impacts and health risks associated with those environmental effects are also analyzed in the SDEIS/RDEIR, Section 3.13. The potential for earthquake-related effects was analyzed in Section 3.11, Geology and Soils, of the Draft EIS/EIR (*Id*. pp. 3.11-1 to 3.11-3.11-26 and Appendix A). The analysis concluded that the project had no potential to result in adverse effects related to earthquakes (*Id*.)

Response to Comment OB20-10

The primary purpose of the project is to divert trucks from the north-south freeways to Alameda Street for alternate access to off-dock rail facilities and freeways to their final destinations outside the project area. The local trips in the area referenced in the comment will grow with or without the project and are not driven by the nature of this project The project will also reduce future traffic on Henry Ford Ave by 50 percent below what would occur without the project because of the new elevated structure.

Response to Comment OB20-11

Please see Response to Comment OB14-6.

The traffic analysis made reasonable assumptions about traffic growth and distribution based on the information known at the time the Traffic Study was completed. In an effort to generate the most conservative traffic analysis, certain assumptions were made about future trips to the proposed SCIG and/or expanded ICTF facilities.

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OB20-13 exposed to and that will be increased due to increased truck traffic diesel exhaust. Diesel exhaust contains over 40 chemicals that are listed by the USEPA and California Air Resources Board as toxic air contaminates, known carcinogens, probable human carcinogens, reproductive toxicants or endocrine disrupters. In addition to those listed in the SDEIR/SDEIS these would include VOC's (volatile organic compounds), PAH's (polycyclic aromatic hydrocarbons), aldehydes, ketones, cyanides, phenols, metals, and ammonia, arsenic, benzene, dioxins, toluene, xylene, 1,3-butadiene, formaldehyde, nickel and including 3-nitrobenzanthrone and 1,8-dinitropyrene the two most carcinogenic chemicals ever discovered.

OB20-14 10. The DEIR/DEIS fails to mitigate the air pollution impacts to local and ocean water resources. We request that a Water Resources Mitigation Fund be established and that a per truck fee be charged.

OB20-15 11. The DEIR/DEIS fails to mitigate the air pollution impacts to local biological, wildlife and wildlife habitats. We request that a Wildlife Resources Mitigation Fund be established and that a per truck fee be charged.

OB20-16 12. The DEIR/DEIS fails to mitigate the noise impacts to residents, schools and sensitive receptors. Noise not only includes loud noise over 65db, but also non-stop and constant low level noise 40db-60db that exceeds more than one hour, during evening rest hours and sleep time hours. This includes honking, braking, acceleration, gunning of engines and stopped traffic congestion. We request sound proofing glass windows and doors with an STS rating of 95% or better and sound proof curtains during construction. We request that a Noise Mitigation Fund be established and that a per truck fee be charged.

OB20-17 13. The DEIR/DEIS failed to include an Environmental Justice Analysis and does not comply with Executive Order 12898, Council on Environmental Quality (CEQ) *Guidance for Environmental Justice Under NEPA* (CEQ, 1997), nor consistent with California law regarding Environmental Justice.

OB20-18 The SDEIS/SDEIR fails to include and identify all negative and cumulative environmental, public health, public safety, biological resources and traffic impacts, assess technologies, equipment and alternatives than can mitigate the numerous significant negative impacts that were identified in Public Comments during the NOP/NOI & DEIR/DEIS Public Comment Period and as identified in this written Public Comment.

OB20-19 The projects as proposed and SDEIR/SDEIS does not comply with the U.S. Civil Rights Act, Clean Air Act, Clean Water Act, NEPA and CEQA as described in this public comment letter.

OB20-20 As a result of Caltrans being unable to mitigate the projects significant negative and cumulative impacts and their failure to invest in and incorporate existing, new and emerging alternative intermodal transportation technologies, the Coalition For A Safe Environment requests that the SDEIS/SDEIR be denied and rescinded.

Response to Comment OB20-12

The project is primarily being built to provide an alternative route for trucks destined outside the project area. It will not increase trips to the existing rail yard.

Please see Response OB17-8, the proposed alternatives are not feasible for purposes of this project.

Response to Comment OB20-13

All toxic and carcinogenic pollutants associated with diesel exhaust were analyzed as part of the HRA (Section 2.1.1, p. 17). However, the focus of the report was on diesel particulate matter since that group of compounds drive cancer risk.

Response to Comment OB20-14

The Draft EIS/EIR assessed the potential for the project to result in adverse air quality effects using applicable NEPA and CEQA thresholds. There is no threshold that requires analysis of air quality impacts to local and ocean water resources (see Tit. 14 Cal. Code Regs. Appendix G). The Draft EIS/EIR for the proposed project analyzed the project's potential to result in adverse effects to water quality (Section 3.10, Water Quality and Stormwater Runoff, pp. 3.10-1 to 3.10-40) and biological resources (Section 3.16, Biological Resources, pp. 3.16-1 to 3.16-70). Both analyses required an assessment of the project's potential to adversely affect waters of the United States, including the ocean. The biological resources and water quality analyses concluded that with implementation of minimization and mitigation measures, effects would be minimal (pp. 3.10-39 and 3.16-63 to 3.16-70). For the foregoing reasons, adverse effects to ocean water resources are anticipated to be minimal and no mitigation is required.

Response to Comment OB20-15

As discussed in the Response to Comment OB20-14, the Draft EIS/EIR analyzed the proposed project's potential to adversely affect biological resources. The analysis concluded that with implementation of minimization and mitigation measures, environmental effects would be minimal (Section 3.10, pp. 3.10-1 to 3.10-40 and Section 3.16, Biological Resources, pp. 3.16-63 to 3.16-70). No further mitigation is required.

Response to Comment OB20-16

The proposed project's potential noise impacts were studied in the Draft EIS/EIR, Section 3.14, Noise, pp. 3.14-1 to 3.14-44 and Chapter 4.0, CEQA Evaluation, pp. 4-14 to 4-21). The Draft EIS/EIR analysis determined that with implementation of abatement/ minimization and mitigation measures, including noise barriers along the SR-47 Expressway and Alameda Street, adverse potential noise effects would be reduced at all locations in the project study area except Anchorage Way Marinas. For Anchorage Way Marinas, abatement is not reasonable (pp. 3.14-20 and 4-15). However, please note that under CEQA, the increase of up to 1 dBA under Alternative 1 would not be perceptible to the human ear. Therefore, the operations impacts would be considered less than significant at the Anchorage Way Marinas under CEQA.

Response to Comment OB20-17

Section 3.3, Community Resources, of the Draft EIS/EIR assessed the potential for environmental justice impacts resulting from the project.

Response to Comment OB20-18

The SDEIS/RDEIR was a supplemental report to the Draft EIS/EIR for the proposed project and included new information. As stated on p. 1-2 of the SDEIS/RDEIR:

> The CEQA Guidelines (15088.5[c]) allow for the lead agency to recirculate an environmental document that has been modified and address the new information that is the basis for the recirculation. Under Federal Highway Administration (FHWA) regulation 23 CFR 771.130a(2)], a draft EIS may be supplemented if there is new information relevant to environmental concerns.

The SDEIS/RDEIR only included sections from Chapter 3.0, the Air Quality (3.13) and Community Resources (3.3.3) sections, and portions of other chapters modified as the result of the new information. Please refer to the Final EIS/EIR for a full discussion of Environmental Justice.

Response to Comment OB20-19

Your comment on the SDEIS/RDEIR is noted. However, the document was completed in accordance with all applicable laws, including NEPA and CEQA.

Response to Comment OB20-20

Your comment on the SDEIS/RDEIR is noted. However, neither NEPA nor CEQA require that all significant impacts of a project be mitigated. They require that all potentially significant impacts be disclosed and that all feasible mitigation be implemented. The Final EIS/EIR discloses all potentially significant impacts of the project, proposes all feasible mitigation, and analyzes all reasonable alternatives.

For further discussion of the feasibility of proposed alternatives see Response to Comment OB17-18.

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OB20-21 14. The SDEIR/SDEI failed to adequately include, identify and assess all Environmental Justice "affected communities" and cities. The DEIR/DEIS must identify all bridge, port, transportation corridors, intermodal facilities, railroad yard facilities, rail road tracks, distribution centers and communities and cities that are impacted by the bridge and expressway projects currently and as proposed in the future.

OB20-22 15. The SDEIS/SDEIS fails to comply with Executive Order 12898, U.S. EPA, State of California, City of Los Angeles and South Coast Air Quality Management District in that it does not achieve environmental justice, does not adequately identify, address and mitigate disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations, people of color and low-income populations.

OB20-23 Caltrans failure to include Environmental Justice allowed no public health survey of the "affected communities" in order to establish a public health baseline of impacted Environmental Justice Communities public health problems and premature deaths in order to establish a valid Health Risk Assessment (HRA) or Health Impact Assessment and as a result have significantly under-estimated public health impacts and premature deaths.

OB20-24 Wilmington and other Environmental Justice "affected communities" have not received a fair treatment or meaningful involvement with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Caltrans past and current history and this DEIR/DEIS has shown that they fail to adopt mitigation to significantly reduce its past, current and future environmental, public health, public safety, biological resources and traffic impacts.

OB20-25 Wilmington and other Environmental Justice "affected communities" have not had "fair treatment" and have borne a disproportionate share of the negative environmental consequences resulting from industrial, municipal and commercial operations or the execution of federal, state, local and tribal programs and policies. EJ Communities have the highest cancer, non-cancer risks and public health impacts.

OB20-26 Caltrans failed to allow "meaningful involvement" by limiting and with-holding significant environmental, public health, public safety, traffic impacts information, scope of project, off-port property impacts and establishing unreasonably limiting public comment time.

OB20-27 Caltrans failed to include and adopt any mitigation that would significantly reduce negative environmental, public health, public safety, biological resources and traffic in EJ Communities.

OB20-28 Caltrans failed to request Public Health Agency, Public Health Organization, Medical Hospital/Center and Academic Institutions assistance and participation to prevent and mitigate significant public health issues. Caltrans failed to establish a Public Health Care Trust Fund

OB20-29 as requested or allocate any funds for assisting EJ Community families and residents with past and current health problems and premature deaths. They failed to assist in medical care, medicines, medical equipment, special medical needs, retraining costs or burial expenses.

Response to Comment OB20-21

Response to Comment OB20-18 explains how the SDEIS/RDEIR is supplemental to the Final EIS/EIR, which includes the Environmental Justice analysis in Section 3.3, Community Resources. Section 3.3 assessed the potential for Environmental Justice impacts resulting from the project. As described in that section, the study area for purposes of the analysis included the eastern half of the Wilmington community of the City of Los Angeles, the northern section of the Port of Los Angeles, the western part of the City of Long Beach, and the southern part of the City of Carson. The study area includes all tracts adjacent to the project alignments, and includes all communities and cities anticipated to be impacted by the project (see Section 3.3, p. 3.3-1).

Response to Comment OB20-22

Please see Response to Comment OB20-18. In addition, the SDEIS/RDEIR states:

> Caltrans and ACTA both determine that the potential adverse effects resulting from the project would not be appreciably more severe or greater in magnitude on minority or low-income populations than they would be on the population as a whole. As noted in Section 3.13 Air Quality (as amended), most of the potential adverse effects could be satisfactorily avoided or minimized through implementation of avoidance, minimization, or mitigation measures. Because there has been no evidence to suggest that the efficacy of these measures would differ with respect to different population groups, the net result would be the same for all population groups for these resource areas. (SDEIS/RDEIR, p. 3-65)

Please see Response to Comments AJ7-3, OB20-21.

Response to Comment OB20-23

Please see Response to Comments OB20-1, OB20-17, and OB20-18.

Response to Comment OB20-24

Please see Response to Comments OB20-21 and OB20-22.

Response to Comment OB20-25

Please see Response to Comments OB20-21 and OB20-22.

Response to Comment OB20-26

The Final EIS/EIR includes all information required under both NEPA and CEQA. Furthermore, Caltrans provided extended public comment periods for both the Draft EIS/EIR and the SDEIS/RDEIR.

Please also see Response to Comment OB4-18.

Response to Comment OB20-27

Please see Response to Comments OB20-9, OB20-14, OB20-15, OB20-16, OB20-21, and OB20-22.

Response to Comment OB20-28

The commenter's suggestions are not required under NEPA or CEQA. An HRA was prepared as part of the project and all impacts determined to be significant by under CEQA in the HRA will be mitigated by ACTA to a less than significant level.

See also Response to Comment OB4-23 and TR2-41.

Response to Comment OB20-29

Please see Response to Comment OB20-28, OB4-23 and TR2-41.

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Response to Comment OB20-30

As discussed in the responses to Comments OB20-14 and OB20-15, the Final EIS/EIR analyzed the project's potential to result in adverse environmental effects to biological resources. The analysis concluded that with implementation of minimization and mitigation measures, effect would be reduced. No further mitigation is required.

Response to Comment OB20-31

The Final EIS/EIR discloses the potentially adverse effects of the project and proposes all feasible minimization and mitigation measures for each effect. The mitigation requested in the comment is beyond the scope of the project, and is not required to satisfy the requirements of NEPA or CEQA.

Please also see Response to Comment OB4-41.

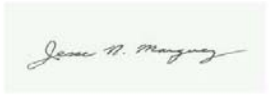
OB20-30

16. CFASE requests that Caltrans establish an annual $ 5 million Biological Resources Mitigation Trust Fund as mitigation for past, current and future impacts to the San Pedro Bay biological resources such as coastal tidelands, wetlands, native California plants, coastal wildlife, animal habitats and aquatic life. The Trust Fund shall pay for the following priority projects: Wetlands Restoration on the property north of Consolidated Slip and Leeward Bay Marina which is currently used as an import car parking lot which can be relocated to a non-coastal tideland property and for the purchase of the land owned by the Port of Long Beach in Wilmington for another Wetlands Restoration Project.

OB20-31

17. CFASE requests that Clatrans establish an annual $ 25 million Intermodal Transportation Mitigation Trust Fund as mitigation for past, current and future negative goods movement transportation environmental, air pollution, noise, traffic congestion, community blight, land loss, economic development loss and aesthetic public impacts. The Trust Fund shall pay for the research & development, prototype building, design and construction of Alternative Non-Polluting Non-Fossil Fuel Intermodal Transportation Systems Technologies. The Mitigation Trust Fund shall pay for the immediate electric conversion of the Alameda Train Transportation Corridor as the first priority project until a new comprehensive regional non-fossil fuel system is adopted.

Environmental Justice For All,



Jesse N. Marquez

Executive Director

Coalition For A Safe Environment

Schuyler Heim Bridge & SR-47 Expressway Project Proposal

Wilmington Residential Community Impact Zone Assessment

Research Report

January 30, 2009

Prepared By

Jesse N. Marquez
Executive Director

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Community Organizer

The Impact Project – Wilmington A-Team

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East Wilmington Residents

Distance To SR-47 Expressway Statistics

		<500'	<700'	<800'	<1,000'
Robidoux Street	# Residences	26	28	30	
" L " Street	# Residences	17	21	45	
Young Street	# Residences	26	28	28	
Denni Street	# Residences	23	23	23	
Grant Street	# Residences	5	5	5	
West Blinn Street	# Residences				27*
Total # Of Residences		97	105	133	160
Total # Of Impacted Residents **		388	420	532	640

30+ **Estimated # Of Consolidated Slip Boat Marina Live-On Board Residents < 1,000 ft. To Schuyler Heim Bridge & SR-47 Expressway**

500+ **Estimated # Of Workers In Nearby Businesses < 1,000 ft. To Schuyler Heim Bridge & SR-47 Expressway**

1,800+ **Estimated # Of Elementary School Children < 1,000 ft. To Schuyler Heim Bridge & SR-47 Expressway**

Note # 1: Churches 1 < 500'
2: Schools 1 < 500'
3: Estimated + 25/30 Residences Within 1,000 ft. * Across From Blinn Street West
4: Schools 1 < 1,000' Across From Blinn Street West
5: Conservative Average 4 Residents Per Household Adults & Children **

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Page 12

East Wilmington Residents

Fence-line Distance	Robidoux Street	
40.6'	1623	1622
80.6'	1621	1616
121'	1615	1612
161.6'	1619, 1617	1610
	Empty Lot	1606
227'	1639	1540,1540-1/2
281'	1537	1538
321'	1535	1534
361.6'	1531, 1533	1530
402.6'	1529	1522,1522-1/2
443'	1523 School	1520 A,B,C
524.6'	School Lot	1510,1508
603"	1517	1508 Church
	Empty Lot	Church Lot
644'	1507	1212 Blinn
684'	1501	1212 Blinn Corner
	Subtotal	Subtotal
	14 Residences 1 School	18 Residences 1 Church
	Residences Between Robidoux St. & " L " St. On Blinn Street	
	1212 Blinn	
	Total	
	32 Residences	

Note # 1: Estimated Distance From SR-47 Expressway/Alameda To Fence-line 120'
2: Only One Side Of The Street Residences Were Measured

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East Wilmington Residents

Fence-line Distance	" L " Street	
30'	1563	Warren E & P Oil Comp.
70.5'	1559	WEP
110'	1555	WEP
151'	1553	WEP
191.5'	1549	WEP
	Empty Lot	WEP
232'	1537	1538
275.5'	1533	1534,1534-1/2
313'	1531	1530
353'	1527,1529	
393.5'	1523	1524
434'	1519	
474.5'	1515,1515-1/2	
502'	1511	1510
622'	1509,1509-1/2	1508
662'	1503	1508

Subtotal Subtotal

18 Residences 8 Residences

Residences Between
" L " St. & Young St. On
Blinn Street

1154	1152,1150A,1150B	1138-1/2,1138
	1150C,1150D,1144A	1136-1.2,1136
	1146A,1146B,1146C	1134-1/2,1134
	1144B,1146D,1148	

Subtotal 19

Total

45 Residences

Note # 1: Distance From SR-47 Expressway/Alameda To Fence-line 87'
2: Only One Side Of The Street Residences Were Measured

Letter OB20. Coalition For A Safe Environment
Page 14

East Wilmington Residents

Fence-line Distance	Young Street	
	Warren E & P	1548
29'	1539, 1539-1/2,1541	1544
63'	1535	1538,1540
109.5'	1531	Warren E & P
156'	1525	1528
200'	1521,1521-1/2	1520
245'	1515,1515-1/2	1516
290.5'	1507	
336.5'	1505	
381'	1503	
511.5'	1501	1124 Blinn
	Subtotal	Subtotal
	14 Residences	8 Residences
	Residences Between Young St. & Denni St. On Blinn Street	
	1124,1116,1114,1110	
	Subtotal	
	6 Residences	
	Total	
	28 Residences	

Note # 1: Distance From SR-47 Expressway/Alameda To Fence-line 89'
2: Only One Side Of The Street Residences Were Measured

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Page 15

East Wilmington Residents

Fence-line Distance	Denni Street	
48.6'	1541, 1543	1532,1532-1/2
94.6'	1539,1537,1535	1534 A,B.C
139'	1531	1526
184'	1525	1524
230'	1521	1520
275'	1517	1516
338.6'	1512	
	Subtotal	Subtotal
	9 Residences	10 Residences

Residences Between
Denni St. & Grant St. On
Blinn Street

1048,1042,1036,1032

Subtotal

4 Residences

Total

23 Residences

Note # 1: Distance From SR-47 Expressway/Alameda To Fence-line 103.6'
2: Only One Side Of The Street Residences Were Measured

East Wilmington Residents

Fence-line Distance	Grant Street
38'	1529
82'	1527
127.6'	1521
173.6'	1517
315'	1036 Blinn
	Total
	5 Residences

Note: Distance From SR-47 Expressway/Alameda To Fence-line 105'

Letter OB21. Signatory – Long Beach Area Chamber of Commerce

Response to Comment OB21-1

Your support of the proposed project is acknowledged.

The Chamber
Long Beach Area Chamber of Commerce

January 28, 2009

Ronald Kosinski
Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16-A
Los Angeles, CA 90012

OB21-1 On behalf of the International Business Association, a committee of the Long Beach Chamber of Commerce, I a writing to support the SR-47 Shuyler Heim Bridge Replacement and Expressway Project. This project is critical to improving goods movement, minimizing environmental impacts, increasing public safety and reducing traffic congestion on our freeways.

The San Pedro Bay ports connecting infrastructure is the competitive edge that has made Southern California's ports number one in the nation, and enabled them to become the vital economic engine that provides hundreds of thousands of jobs and contributes billions of dollars in state and local taxes. In order to compete in this economy, we must continuously improve our infrastructure to support international trade, the industry that provides so many jobs to our area. The benefits of this project includes:

- Replacing the seismically-deficient Schuler Heim moveable bridge
- Diverting trucks from certain local arterials and commercial and residential areas
- Facilitating future improvements to the Long Beach I-710 Freeway
- Providing an alternative route to the existing near-dock rail yard
- Eliminating traffic conflicts at five at-grade rail crossings and three traffic signals

Once implemented, the SR-47 Port Access Expressway will divert more than 2,000 trucks from nearby freeways, as well as eliminate delays at key rail crossings and intersections near the harbor complex. Air quality benefits include more than 97,000 tons by the year 2030. We urge the Department of Transportation to support this project.

Regards,

Jill Morgan
President, International Business Association
Long Beach Chamber of Commerce

One World Trade Center, Suite 206, Long Beach, CA 90831-0206
(562) 436-1251 ■ FAX (562) 436-7099 ■ http://www.lbchamber.com

Email – Andrea Hricko OB22

Response to Comment OB22-1

Please note your submissions are part of the administrative record. Please see OB15, Responses 1 through 13. The PowerPoint presentation is included as PP-1.

Response to Comment OB22-2

All comments initially submitted on the Draft EIS/EIR are included in this Final EIS/EIR, as are comments submitted for the SDEIS/RDEIR.

From: Andrea Hricko [ahricko@usc.edu]
Sent: Friday, January 30, 2009 10:00 PM
To: 'Fornelli, Charles'
Cc: 'Doherty, John'; Sharon.Rubalcava@alston.com; 'Kenagy, Duane'; 'Hersh, Lucien'; 'Ron Kosinski'; 'Karl Price'; 'Thoa Le'; Rather, Michelle/SCO
Subject: Hricko Comments for recirculated DEIR Heim/DR-47

Attachments: Traffic Data from HRA Appendices.pdf; Letter to Caltrans ACTA re traffic data Dec 30 2008.doc; Responses to Preliminary Comments from Andrea Hricko Email 31 Dec 08 to.doc; Hricko responses to Caltrans comments 013009.doc; Hricko Jan 30 2009 Heim SR47 DEIR.ppt; Letter about traffic data errors.doc

OB-22-1 Dear All: Submitted to the record are (1) my letter to Caltrans of 12-30-09 (2) the response from Caltrans to my Dec. 30th letter; (3) my January 30, 2009 response to the Caltrans' 5esponse; and (4) my power point presentation at Banning's Landing hearing on January 27, 2009, raising concerns about the traffic statistics. I find it disturbing that Caltrans and ACTA are failing to use correct traffic estimates for estimating risk and that Caltrans refuses to accept as valid the latest scientific research findings about proximity to freeways and health risks. I

OB22-2 would expect that a more scientific approach would be used for such estimations. Please submit all the attached documents to the record of the Heim Bridge/SR-47 recirculated DEIR and the HRA. In addition, I request that Caltrans and ACTA respond to ALL comments submitted in this proceeding in the final EIR, as was stated in the notice for the recirculated document. I specifically request that my initial comments be responded to in the final DEIR. Sincerely, Andrea Hricko

Andrea M. Hricko

Assoc Prof Prev Med

Keck School of Med &

Director, Community Outreach and Education

Southern CA Env Health Sciences Ctr

1540 Alcazar Street CHP 236

L.A. CA 90033

323-442-3077

From: Fornelli, Charles [mailto:Fornelli@TrenchTeam.com]
Sent: Friday, January 16, 2009 7:21 PM
To: ahricko@usc.edu
Cc: Doherty, John; Sharon.Rubalcava@alston.com; Kenagy, Duane; Hersh, Lucien; Ron Kosinski; Karl Price; Thoa Le; michelle.rather@ch2m.com
Subject: HRA for SR47
Importance: High

Letter OB22. Email – Andrea Hricko
Page 2

Attached are our responses to your December 31, 2008 comments/questions.

Charles R. Fornelli
Deputy Program Manager
Alameda Corridor Engineering Team
One Civic Plaza, Suite 350
Carson, CA 90745
Ofc. (310) 816-0460
Fax (310) 816-0464
E-mail: Fornelli@trenchteam.com

Email – Andrea Hricko OB23

Response to Comment OB23-1

The potential for significant health risk impacts in connection with the project has been analyzed in the Final EIS/EIR. Your submission of 22 research articles is noted and included as part of the administrative record. Copies are available upon request. There is no requirement that the Final EIS/EIR include a summary of all studies submitted during the public comment period.

Please see Response to Comments AJ7-2, AJ11-7 and OB14-7 for a summary of the methodology and conclusions contained in the HRA prepared as part of the Final EIS/EIR.

From: Andrea Hricko [ahricko@usc.edu]
Sent: Friday, January 30, 2009 10:23 PM
To: 'Andrea Hricko'; 'Fornelli, Charles'
Cc: 'Doherty, John'; Sharon.Rubalcava@alston.com; 'Kenagy, Duane'; 'Hersh, Lucien'; 'Ron Kosinski'; 'Karl Price'; 'Thoa Le'; Rather, Michelle/SCO
Subject: RE: Hricko Comments for recirculated DEIR Heim/DR-47

Attachments: Gauderman 2004.pdf; McConnell Traffic Asthma 2006.pdf; Gauderman 2007.pdf; Zhu 2002 (2) 405Fwy.pdf; Zhu 2002 710Fwy.pdf; Brunekreef 2003.pdf; Wilhelm 2005.pdf; Babisch 2005 2.pdf; Mills 2007 cvd and diesel exhaust.pdf; CARB Diesel fact sheet 2006.pdf; nejm editorial 2007 ht dis diesel.pdf; Mills 2007 chd and diesel NEJM.pdf; Gauderman CHS Summary Research Findings.doc; Pope CA Rel of Ht Failur Hospitalization to Exp to Fine PM A J Cardiology 2008.pdf; salam mt traffic asthma pulm opin 2008.pdf; balbus.pdf; Holguin traffic air poll asthma review 2008.pdf; jerrett m traffic asthma ehp 2008.pdf
To: Ron Kosinski
From: Andrea Hricko

OB23-1 Please include the attached scientific articles in the record for the Heim Bridge/SR-47 Expressway recirculated EIR. The EIR must include a summary of adverse health effects from the Expressway. Caltrans/ACTA have failed to do so and must include a summary of the attached research findings, among others.

Please note: if you can only accept these as a hard copy, please advise and we will FEDEX a hard copy of each article to you. I thought that the .pdf's might be more useful for review. Thanks. Andrea Hricko

Andrea M. Hricko

Assoc Prof Prev Med

Keck School of Med &

Director, Community Outreach and Education

Southern CA Env Health Sciences Ctr

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L.A. CA 90033

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From: Andrea Hricko [mailto:ahricko@usc.edu]
Sent: Friday, January 30, 2009 10:00 PM
To: 'Fornelli, Charles'
Cc: 'Doherty, John'; 'Sharon.Rubalcava@alston.com'; 'Kenagy, Duane'; 'Hersh, Lucien'; 'Ron Kosinski'; 'Karl Price'; 'Thoa Le'; 'michelle.rather@ch2m.com'
Subject: Hricko Comments for recirculated DEIR Heim/DR-47

Letter OB23. Email – Andrea Hricko
Page 2

Dear All: Submitted to the record are (1) my letter to Caltrans of 12-30-09 (2) the response from Caltrans to my Dec. 30th letter; (3) my January 30, 2009 response to the Caltrans' 5esponse; and (4) my power point presentation at Banning's Landing hearing on January 27, 2009, raising concerns about the traffic statistics. I find it disturbing that Caltrans and ACTA are failing to use correct traffic estimates for estimating risk and that Caltrans refuses to accept as valid the latest scientific research findings about proximity to freeways and health risks. I would expect that a more scientific approach would be used for such estimations. Please submit all the attached documents to the record of the Heim Bridge/SR-47 recirculated DEIR and the HRA. In addition, I request that Caltrans and ACTA respond to ALL comments submitted in this proceeding in the final EIR, as was stated in the notice for the recirculated document. I specifically request that my initial comments be responded to in the final DEIR. Sincerely, Andrea Hricko

Andrea M. Hricko

Assoc Prof Prev Med

Keck School of Med &

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Southern CA Env Health Sciences Ctr

1540 Alcazar Street CHP 236

L.A. CA 90033

323-442-3077

From: Fornelli, Charles [mailto:Fornelli@TrenchTeam.com]
Sent: Friday, January 16, 2009 7:21 PM
To: ahricko@usc.edu
Cc: Doherty, John; Sharon.Rubalcava@alston.com; Kenagy, Duane; Hersh, Lucien; Ron Kosinski; Karl Price; Thoa Le; michelle.rather@ch2m.com
Subject: HRA for SR47
Importance: High

Attached are our responses to your December 31, 2008 comments/questions.

Charles R. Fornelli
Deputy Program Manager
Alameda Corridor Engineering Team
One Civic Plaza, Suite 350
Carson, CA 90745

Letter OB23. Email – Andrea Hricko
Page 3

Ofc. (310) 816-0460
Fax (310) 816-0464
E-mail: Fornelli@trenchteam.com

Letter OB23. Email – Andrea Hricko
Page 4

Response to Comment OB23-2

Please note your submission of research articles is a part of the administrative record. Copies are available upon request.

From: Andrea Hricko [ahricko@usc.edu]
Sent: Friday, January 30, 2009 10:25 PM
To: 'Andrea Hricko'; 'Fornelli, Charles'
Cc: 'Doherty, John'; Sharon.Rubalcava@alston.com; 'Kenagy, Duane'; 'Hersh, Lucien'; 'Ron Kosinski'; 'Karl Price'; 'Thoa Le'; Rather, Michelle/SCO
Subject: First 5 articles from Hricko

Attachments: Gauderman 2004.pdf; McConnell Traffic Asthma 2006.pdf; Gauderman 2007.pdf; Zhu 2002 (2) 405Fwy.pdf; Zhu 2002 710Fwy.pdf
To: Ron Kosinski
From: Andrea Hricko

OB23-2 Please include the attached scientific articles in the record for the Heim Bridge/SR-47 Expressway recirculated EIR. The EIR must include a summary of adverse health effects from the Expressway. Caltrans/ACTA have failed to do so and must include a summary of the attached research findings, among others.

Please note: if you can only accept these as a hard copy, please advise and we will FEDEX a hard copy of each article to you. I thought that the .pdf's might be more useful for review. Thanks. Andrea Hricko

Andrea M. Hricko

Assoc Prof Prev Med

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L.A. CA 90033

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Sent: Friday, January 30, 2009 10:00 PM
To: 'Fornelli, Charles'
Cc: 'Doherty, John'; 'Sharon.Rubalcava@alston.com'; 'Kenagy, Duane'; 'Hersh, Lucien'; 'Ron Kosinski'; 'Karl Price'; 'Thoa Le'; 'michelle.rather@ch2m.com'
Subject: Hricko Comments for recirculated DEIR Heim/DR-47

Dear All: Submitted to the record are (1) my letter to Caltrans of 12-30-09 (2) the response from Caltrans to my Dec. 30th letter; (3) my January 30, 2009 response to the Caltrans' 5esponse; and (4) my power point presentation at Banning's Landing hearing on January 27, 2009, raising concerns about the traffic statistics. I find it disturbing that Caltrans and ACTA are failing to use correct traffic estimates for estimating risk and that Caltrans refuses to accept as valid the latest scientific research findings about proximity to freeways and health risks. I

Letter OB23. Email – Andrea Hricko
Page 5

would expect that a more scientific approach would be used for such estimations. Please submit all the attached documents to the record of the Heim Bridge/SR-47 recirculated DEIR and the HRA. In addition, I request that Caltrans and ACTA respond to ALL comments submitted in this proceeding in the final EIR, as was stated in the notice for the recirculated document. I specifically request that my initial comments be responded to in the final DEIR. Sincerely, Andrea Hricko

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Sent: Friday, January 16, 2009 7:21 PM
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Subject: HRA for SR47
Importance: High

Attached are our responses to your December 31, 2008 comments/questions.

Charles R. Fornelli
Deputy Program Manager
Alameda Corridor Engineering Team
One Civic Plaza, Suite 350
Carson, CA 90745
Ofc. (310) 816-0460
Fax (310) 816-0464
E-mail: Fornelli@trenchteam.com

Letter OB23. Email – Andrea Hricko
Page 6

Response to Comment OB23-3

Please note your submission of research articles is a part of the administrative record. Copies are available upon request.

From: Andrea Hricko [ahricko@usc.edu]
Sent: Friday, January 30, 2009 10:25 PM
To: 'Andrea Hricko'; 'Fornelli, Charles'
Cc: 'Doherty, John'; Sharon.Rubalcava@alston.com; 'Kenagy, Duane'; 'Hersh, Lucien'; 'Ron Kosinski'; 'Karl Price'; 'Thoa Le'; Rather, Michelle/SCO
Subject: Second 5 articles for Heim Bridge/SR 47 record

Attachments: Brunekreef 2003.pdf; Wilhelm 2005.pdf; Babisch 2005 2.pdf; Mills 2007 cvd and diesel exhaust.pdf; CARB Diesel fact sheet 2006.pdf
To: Ron Kosinski
From: Andrea Hricko

OB23-3 Please include the attached scientific articles in the record for the Heim Bridge/SR-47 Expressway recirculated EIR. The EIR must include a summary of adverse health effects from the Expressway. Caltrans/ACTA have failed to do so and must include a summary of the attached research findings, among others.

Please note: if you can only accept these as a hard copy, please advise and we will FEDEX a hard copy of each article to you. I thought that the .pdf's might be more useful for review. Thanks. Andrea Hricko

Andrea M. Hricko

Assoc Prof Prev Med

Keck School of Med &

Director, Community Outreach and Education

Southern CA Env Health Sciences Ctr

1540 Alcazar Street CHP 236

L.A. CA 90033

323-442-3077

From: Andrea Hricko [mailto:ahricko@usc.edu]
Sent: Friday, January 30, 2009 10:00 PM
To: 'Fornelli, Charles'
Cc: 'Doherty, John'; 'Sharon.Rubalcava@alston.com'; 'Kenagy, Duane'; 'Hersh, Lucien'; 'Ron Kosinski'; 'Karl Price'; 'Thoa Le'; 'michelle.rather@ch2m.com'
Subject: Hricko Comments for recirculated DEIR Heim/DR-47

Dear All: Submitted to the record are (1) my letter to Caltrans of 12-30-09 (2) the response from Caltrans to my Dec. 30th letter; (3) my January 30, 2009 response to the Caltrans' 5esponse; and (4) my power point presentation at Banning's Landing hearing on January 27, 2009, raising concerns about the traffic statistics. I find it disturbing that Caltrans and ACTA are failing to use correct traffic estimates for estimating risk and that Caltrans refuses to accept as valid the latest scientific research findings about proximity to freeways and health risks. I

Letter OB23. Email – Andrea Hricko
Page 7

would expect that a more scientific approach would be used for such estimations. Please submit all the attached documents to the record of the Heim Bridge/SR-47 recirculated DEIR and the HRA. In addition, I request that Caltrans and ACTA respond to ALL comments submitted in this proceeding in the final EIR, as was stated in the notice for the recirculated document. I specifically request that my initial comments be responded to in the final DEIR. Sincerely, Andrea Hricko

Andrea M. Hricko

Assoc Prof Prev Med

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Sent: Friday, January 16, 2009 7:21 PM
To: ahricko@usc.edu
Cc: Doherty, John; Sharon.Rubalcava@alston.com; Kenagy, Duane; Hersh, Lucien; Ron Kosinski; Karl Price; Thoa Le; michelle.rather@ch2m.com
Subject: HRA for SR47
Importance: High

Attached are our responses to your December 31, 2008 comments/questions.

Charles R. Fornelli
Deputy Program Manager
Alameda Corridor Engineering Team
One Civic Plaza, Suite 350
Carson, CA 90745
Ofc. (310) 816-0460
Fax (310) 816-0464
E-mail: Fornelli@trenchteam.com

Letter OB23. Email – Andrea Hricko
Page 8

Response to Comment OB23-4

Please note your submission of research articles is a part of the administrative record. Copies are available upon request.

From: Andrea Hricko [ahricko@usc.edu]
Sent: Friday, January 30, 2009 10:26 PM
To: 'Andrea Hricko'; 'Fornelli, Charles'
Cc: 'Doherty, John'; Sharon.Rubalcava@alston.com; 'Kenagy, Duane'; 'Hersh, Lucien'; 'Ron Kosinski'; 'Karl Price'; 'Thoa Le'; Rather, Michelle/SCO
Subject: Final 7 articles for Heim SR-47 record

Attachments: nejm editorial 2007 ht dis diesel.pdf; Mills 2007 chd and diesel NEJM.pdf; Gauderman CHS Summary Research Findings.doc; Pope CA Rel of Ht Failur Hospitalization to Exp to Fine PM A J Cardiology 2008.pdf; salam mt traffic asthma pulm opin 2008.pdf; Holguin traffic air poll asthma review 2008.pdf; jerrett m traffic asthma ehp 2008.pdf
To: Ron Kosinski
From: Andrea Hricko

OB23-4 Please include the attached scientific articles in the record for the Heim Bridge/SR-47 Expressway recirculated EIR. The EIR must include a summary of adverse health effects from the Expressway. Caltrans/ACTA have failed to do so and must include a summary of the attached research findings, among others.

Please note: if you can only accept these as a hard copy, please advise and we will FEDEX a hard copy of each article to you. I thought that the .pdf's might be more useful for review. Thanks. Andrea Hricko

Andrea M. Hricko

Assoc Prof Prev Med

Keck School of Med &

Director, Community Outreach and Education

Southern CA Env Health Sciences Ctr

1540 Alcazar Street CHP 236

L.A. CA 90033

323-442-3077

From: Andrea Hricko [mailto:ahricko@usc.edu]
Sent: Friday, January 30, 2009 10:00 PM
To: 'Fornelli, Charles'
Cc: 'Doherty, John'; 'Sharon.Rubalcava@alston.com'; 'Kenagy, Duane'; 'Hersh, Lucien'; 'Ron Kosinski'; 'Karl Price'; 'Thoa Le'; 'michelle.rather@ch2m.com'
Subject: Hricko Comments for recirculated DEIR Heim/DR-47

Dear All: Submitted to the record are (1) my letter to Caltrans of 12-30-09 (2) the response from Caltrans to my Dec. 30th letter; (3) my January 30, 2009 response to the Caltrans' 5esponse; and (4) my power point

Letter OB23. Email – Andrea Hricko
Page 9

presentation at Banning's Landing hearing on January 27, 2009, raising concerns about the traffic statistics. I find it disturbing that Caltrans and ACTA are failing to use correct traffic estimates for estimating risk and that Caltrans refuses to accept as valid the latest scientific research findings about proximity to freeways and health risks. I would expect that a more scientific approach would be used for such estimations. Please submit all the attached documents to the record of the Heim Bridge/SR-47 recirculated DEIR and the HRA. In addition, I request that Caltrans and ACTA respond to ALL comments submitted in this proceeding in the final EIR, as was stated in the notice for the recirculated document. I specifically request that my initial comments be responded to in the final DEIR. Sincerely, Andrea Hricko

Andrea M. Hricko

Assoc Prof Prev Med

Keck School of Med &

Director, Community Outreach and Education

Southern CA Env Health Sciences Ctr

1540 Alcazar Street CHP 236

L.A. CA 90033

323-442-3077

From: Fornelli, Charles [mailto:Fornelli@TrenchTeam.com]
Sent: Friday, January 16, 2009 7:21 PM
To: ahricko@usc.edu
Cc: Doherty, John; Sharon.Rubalcava@alston.com; Kenagy, Duane; Hersh, Lucien; Ron Kosinski; Karl Price; Thoa Le; michelle.rather@ch2m.com
Subject: HRA for SR47
Importance: High

Attached are our responses to your December 31, 2008 comments/questions.

Charles R. Fornelli
Deputy Program Manager
Alameda Corridor Engineering Team
One Civic Plaza, Suite 350
Carson, CA 90745
Ofc. (310) 816-0460
Fax (310) 816-0464
E-mail: Fornelli@trenchteam.com

Letter OB24. Signatory – Foreign Trade Association

Response to Comment OB24-1

Your support of the proposed project is acknowledged.

Response to Comment OB24-2

Your request is noted.

FTA
Foreign Trade Association

Serving the international trade community since 1919

January 29, 2009

Mr. Ronald Kosinski
Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street, MS-16A
Los Angeles, CA 90012

Dear Mr. Kosinski:

The Foreign Trade Association (FTA), the oldest and most prestigious international trade association in California, was established in 1919 to promote international commerce and economic growth in Southern California and worldwide. Over the years, our members have worked closely with the federal and state legislators on issues that affect their ability to do business in the state. Issues such as port congestion, transportation infrastructure needs, workers' compensation, a balanced budget, and overall government efficiency and regulations, are just a few of the issues of interest to the trade community and to many other California businesses.

OB24-1 FTA would like to go on record as supporting the new SR-47 Expressway Project and the Schuyler Heim Bridge Replacement. The new SR-47 Expressway would begin on Terminal Island, extending north onto the new fixed-span bridge. It would continue north and join Alameda Street just south of Pacific Coast Hwy. The expressway would eliminate traffic conflicts at five at-grade railroad crossings and three signalized intersections. Under this alternative, the existing connectivity to SR-103 would be maintained.

The project benefits include:

- Replacing the seismically-deficient Schuyler Heim moveable bridge with a new safer fixed bridge
- Creating an expressway between Ocean Blvd. on Terminal Island and Alameda St. at Pacific Coast Highway
- Enhancing mobility on local freeways by diverting 5-8% of the port-related trucks
- Diverting trucks from certain local arterials and commercial and residential areas
- Facilitating future improvements to the Long Beach I-710 Freeway
- Providing an alternative route to the existing near-dock rail yard
- Eliminating traffic conflicts at 5 at-grade rail crossings and 3 traffic signals

Once implemented, the SR-47 Port Access Expressway will divert more than 2,000 trucks from nearby freeways, as well as eliminate delays at key rail crossings and intersections near the harbor complex. In terms of air quality benefits, it has been estimated that the project would result in more than 97,000 tons of emission reductions by the year 2030.

OB24-2 We strongly urge the Department of Transportation to move forward on this project without further delays.

Sincerely,

Caroline Brown
President

P.O. Box: 4250, Sunland, CA 91041
Phone: (818) 352-6753 • Fax: (818) 353-5976 • www.ftasc.org • e-mail: info@ftasc.org

Letter OB25. Signatory – Harbor Association of Industry & Commerce

Response to Comment OB25-1

Your support of the proposed project is acknowledged.

HARBOR ASSOCIATION OF INDUSTRY & COMMERCE
P.O. Box 4250 • Sunland, CA 91041
Phone: 818-951-6088 • Fax: 818-353-5976
Website: www.HarborAssn.com • E-Mail: info@harborassn.com

January 29, 2009

Ronald Kosinski
Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main St. MS-16A
Los Angeles, CA 90012

Mr. Kosinski:

The Harbor Association of Industry and Commerce (HAIC) is a non-profit trade organization that provides a collective voice on important issues pertaining to economic, environmental and public policy for the San Pedro Bay harbor business community. Our members include the Ports of Los Angeles and Long Beach, engineering and environmental firms, terminal operators, and shipping companies, to name a few.

OB-25-1 The HAIC would like to go on record as continuing to support the SR-47 Expressway Project and the Schuyler Heim Bridge Replacement. The new SR-47 Expressway would begin on Terminal Island, extending north on the new fixed-span bridge. It would continue north and join Alameda Street just south of Pacific Coast Highway. The expressway would eliminate traffic conflicts at five at-grade railroad crossings and three signalized intersections. Under this alternative, the existing connectivity to SR-103 would be maintained

Improving the infrastructure around the San Pedro Bay ports is critical to maintaining our position as a world class port. Southern California's ports are a vital economic engine, providing hundreds of thousands of jobs, and contributing billions of dollars in state and local taxes. This economic engine is threatened by both the growing global recession and the shifting of cargo operations out of California. During the past several years, ports on the East Coast, Canada and Mexico have been developing their infrastructure to compete against the southern California ports. Their investments are paying off and the cargo is flowing to these ports.

In order to compete in the difficult economy, we must improve our infrastructure to allow the cargo to move efficiently and reduce congestion. The Shuyler Heim Bridge is a seismically-deficient bridge that must be replaced for safety. The Expressway project will create an alternative route to the near dock rail yard diverting trucks from local freeways and residential areas. Modernizing our crumbling infrastructure will improve safety, allow our ports to compete effectively and create hundreds of jobs to benefit the local economy.

We urge the Department of Transportation to move forward with this critical project.

Sincerely,
Anthony Misetich
Anthony Misetich
President

It shall be the mission of the Harbor Association of Industry & Commerce to be a collective VOICE and advocate for the harbor business community on the issues pertaining to economic environmental and public policies.

Letter OB26. Signatory – San Pedro Chamber of Commerce

Response to Comment OB26-1

Your support of the proposed project is acknowledged.

Response to Comment OB26-2

Your request is noted.

San Pedro CHAMBER of COMMERCE

February 10, 2009

Mr. Ronald Kosinski
Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, CA 90012

Dear Mr. Kosinski:

OB26-1 On behalf of the San Pedro Chamber of Commerce, we are writing to express our support Schuyler Heim Bridge Replacement & SR-47 Expressway Project.

The project has significant benefits in that it replaces the seismically-deficient Schuyler Heim moveable bridge with a new safer fixed bridge. It also creates an expressway between Ocean Blvd. on Terminal Island and Alameda St. at Pacific Coast Highway. It will help divert trucks from local freeways, certain local arterials, and commercial and residential areas

The replacement of aging infrastructure is extremely important so that the Port of Los Angeles as well as the Port of Long Beach can remain competitively viable with other world ports, thus insuring increased economic stability for those who live and work within San Pedro and the other communities that surround these ports.

OB26-2 We urge that the Department of Transportation move forward with Schuyler Heim Bridge Replacement & SR-47 Expressway Project.

Sincerely,

Chairman, Board of Directors

President/CEO

390 West 7th Street, San Pedro, CA 90731 • Phone (310) 832-7272 • Fax (310) 832-0685 • www.sanpedrochamber.com

Individual Letters

Letter I4. Signatory – Tony Ringor

Response to Comment I4-1

Your support for Alternative 1 is acknowledged.

January 29, 2009

Ronald Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, CA 90012

Ron_kosinski@dot.ca.gov

Subject: Schuyler Heim Bridge Replacement & SR-47 Expressway Project

Dear Mr. Kosinski,

I support the approval of the SR-47 Expressway because it will reduce traffic on both the 710 and 110 Freeways, as well as reduce traffic on the local streets such as Henry Ford Avenue and Alameda Street. It will create a direct route to the Carson area that will allow trucks to move faster, creating less pollution. Also the retrofit of the Henry Ford Bridge must be done in order to ensure that the Ports can stay open in event of an earthquake. Also important are the jobs and local taxes that the construction will create. During this recession, these jobs will provide opportunity for the families of Wilmington and the surrounding communities.

Most importantly, I appreciate that ACTA conducted a Health Risk Assessment of the project and found that only eight homes will be minimally affected by Alternative #1 and those homes could be protected through the installation of HVAC systems in the homes. I believe that Alternative #1 is good for the ports, good for the economy and good for Wilmington and should be approved by Caltrans."

I4-1

Respectfully,

Tony Ringor
P.O. Box 6144
San Pedro, CA 90734

Chapter 7.0 List of Preparers

California Department of Transportation (Caltrans)

Ronald Kosinski
District Deputy Chief, Caltrans District 7; B.A. Geography, California State University, Long Beach; M.A. Urban and Regional Planning, California Polytechnic University, Pomona; 30 years of experience writing, reviewing and managing environmental documents; responsible for management of environmental document preparation.

Karl Price
Branch Chief, Central Area Projects, Caltrans District 7; B.S. Biological Sciences, California State Polytechnic University, Pomona; 8 years of experience in environmental planning and biological impact assessment; responsible for report preparation and resource agency coordination.

Thoa Le
Associate Environmental Planner; MSc. in Environmental Sciences, University of East Anglia, UK; 7 years of experience in environmental research and planning; responsible for environmental document review.

Kelly Ewing-Toledo
Associate Architectural Historian, Caltrans District 7; B.A. History, California State University, Sacramento; M.A. History, California State University, Fullerton; 8 years of experience in writing and reviewing environmental documents for compliance with Section 106 of the National Historic Preservation Act; responsible for review, approval, and submittal of Section 106 documents.

Steve Chan, P.E.
Branch Chief; B.S. Civil Engineering; 16 years of experience; hazardous waste Assessment oversight.

Penny Nakashima
Engineering Geologist; B.S. in Geology from California State University, Los Angeles; 26 years of experience in hazardous waste assessment and investigation and air pollution control. Initial Site Assessment oversight.

Andrew Teng
Transportation Engineer; B.S. in Civil Engineering, University of Utah; 9 years of experience in Micro-Simulation, Traffic Analysis, Traffic Forecasting; oversight of Micro-simulation and traffic forecasting.

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Branch Chief; B.S. Civil and Environmental Engineering, University of California, Los Angeles; 11 years of experience in environmental and transportation engineering; air quality analyses oversight.

Andy Woods
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Gary Iverson
Senior Environmental Planner, District Heritage Resource Coordinator; B.S. in Archaeology, California State University, Long Beach, 30 years experience; Cultural Resources Impact Assessment oversight.

Jin Lee
Branch Chief; noise impact analysis oversight.

Andy Woods
Transportation Engineer; air quality analysis oversight.

Ralph Thunstrom
Transportation Engineer. AA Degree in Engineering; 27 years in Noise and Vibration; noise impact analysis oversight.

Emmanuel Balanza, P.E.
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Duke Huynh
Transportation Engineer; construction traffic impact analysis oversight.

Alek Jakovljevic
Transportation Engineer; traffic safety oversight.

Jennifer Taira
Senior Landscape Architect; visual impact analysis oversight.

Glen Levstik
Visual impact analysis oversight.

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Federal Highway Administration (FHWA)

Steve Healow
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Alameda Corridor Engineering Team (ACET)

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Project Manager; B.S. Marine Biology, California State University, Long Beach; 24 years of experience in the preparation and project management of CEQA- and NEPA-mandated environmental documents for major transportation projects. Responsible for overall preparation of technical reports and EIS/EIR.

Carolyn Trindle
Task Leader; Bachelor of Journalism, University of Missouri; M.A., Education, University of Missouri; M.A., Business, Pepperdine University; 25 years of experience in environmental planning and environmental analysis for CEQA and NEPA documents. Responsible for management and quality control of EIS/EIR.

Matthew Gordon
M.S., Environmental Planning and Policy, California State University, Fullerton; B.A., Environmental Analysis and Design, University of California, Irvine; 10 years of experience in CEQA and NEPA analysis. Responsible for parts of Final EIS/EIR.

Michelle Rather
Task Lead; B.A. English, University of California, Irvine; 7 years environmental editing and publication of CEQA and NEPA documents. Responsible for management, task coordination, quality control, and technical editing of EIS/EIR.

Mark Bennett, Ph.D.
Senior Technologist; Ph.D., Chemical Engineering, Massachusetts Institute of technology, Cambridge, MA; B.S.E., Bioengineering, University of Pennsylvania, Philadelphia, PA; 19 years of experience in air quality and health risk analysis. Responsible for Air Quality Technical Report and EIS/EIR sections.

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Farshad Farhang
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Associate Engineer; M.S. Environmental Science and Engineering, California Institute of Technology, Pasadena; 9 years of experience in air quality and health risk analysis. Responsible for Air Quality Technical Report and EIS/EIR sections, Energy Technical Memorandum.

Dan Pitzler
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Tom Priestly
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Elizabeth Cutler
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James Gorham
Senior Biologist; B.S. Biology, Humboldt State University; 20 years of experience in assessment of biological resources in accordance with CEQA and NEPA criteria. Analyst and senior reviewer for Natural Environmental Assessment and EIS/EIR Biological Resources section.

Cindy Salazar
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Amy Clymo
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Tim Hamaker
Project Scientist; B.S., Fisheries Biology; 27 years of experience in fishery habitat and population investigations, aquatic toxicology and water quality evaluations. Responsible for water quality and oceanography.

Loren Bloomberg
Senior Transportation Engineer; M.E., Civil Engineering, University of California, Berkeley; M.S., Civil Engineering, University of California, Berkeley, B.S., Systems Engineering, University of Virginia; 16 years of experience. Responsible for traffic/transportation EIS/EIR section.

Jim Roldan
Project Planner; Civil Engineering, M.S.; 10 years of experience. Responsible for traffic/ transportation EIS/EIR section.

Hans Strandgaard, P.E.
Senior Bridge Engineer and Senior Technologist, Project Manager; M.S., Civil Engineering - University of California at Davis; B.S., Civil Engineering - University of California at Davis; 20 years of experience. Responsible for Schuyler Heim Bridge APS.

Rebecca Anhorn
Geographic Information System Analyst/Developer; B.A., Geography, California State University, Fullerton. Responsible for GIS development and application.

Jones & Stokes

Richard Starzak
Principal, Project Manager; M.A., Architecture: History, Criticism, and Analysis, University of California, Los Angeles; B.S. Biology, Brown University; 26 years of experience as an architectural historian, including 16 years as a project manager, specializing in consultation on behalf of public agencies for compliance with Section 106 of the National Historic Preservation Act. Responsible for Historic Resources, including Historic Property Survey Report, Memorandum of Agreement.

Shilpa Trisal
AICP, Environmental Specialist; M.A., Community Planning, University of Cincinnati; B.A., Planning, School of Planning and Architecture, New Delhi, India; 5 years of experience in environmental planning and management. Responsible for Section 4(f), Community Impact Assessment, Draft Relocation Impact Report, EIS/EIR sections for Utilities and Public Services, Growth, Environmental Justice, Land Use.

Mark Robinson
Senior Archaeologist; M.S., Anthropology, University of Oregon; M.A., English, University of Oregon; B.A., History and Geology, University of Montana; More than 20 years of experience in prehistoric and historical archaeology. Responsible for Archaeological Survey Report, Paleontological Survey Report, EIS/EIR sections for Archaeology and Paleontology.

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Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Final Environmental Impact Statement/ Environmental Impact Report and Section 4(f) Evaluation

Commodore Schuyler Heim Bridge (Br. No. 53-2618) and SR-47 in the Ports of Long Beach and Los Angeles, Los Angeles County, California

07-LA-47-KP 4.4/9.3 (PM 2.7/5.8)
EA: 238500

The environmental review, consultation, and any other action required in accordance with applicable federal laws for this project are being, or have been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327.

May 2009
Volume II

Caltrans

Appendices

VOLUME II FINAL EIS/EIR

A CEQA Checklist

B Elevations

C Section 4(f) Evaluation

D Title VI Policy Statement

E Relocation Impact Report

F NOP, NOI, Scoping Notices

G Project Scope Summary Report (Seismic Retrofit)

H Environmental Commitment Record (ECR for the Preferred Alternative)

I Rights-of-Way

J Public Notices

- J.1 Notice of Completion/Notice of Availability
- J.2 Comment Period Extension Letter
- J.3 Public Hearing Notices
- J.4 Informational Flyer
- J.5 Public Hearing Materials
- J.6 SDEIS – RDEIR Materials

K Public Hearing Transcripts and Comment Cards

L Memorandum of Agreement

M Final EIS/EIR Acronyms and Abbreviations

N UC Davis HRA Review

O Conformity Redetermination

APPENDIX A
CEQA Environmental Checklist Form

The CEQA checklist identifies the impacts of the alternatives for the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway Project. In most cases, technical studies determined the impacts of each environmental resource for each alternative of the proposed project. Further supporting documentation is provided in Chapter 3.0 of this Environmental Impact Statement/ Environmental Impact Report, where impacts, plus feasible avoidance, minimization, and/or mitigation measures are discussed for each environmental resource addressed. The indicated impact determination is based upon the worst-case alternative.

1. Project title:
   Schuyler Heim Bridge Replacement and SR-47 Expressway Project

2. Lead agency name and address:
   California Department of Transportation, District 7
   100 South Main Street
   Los Angeles, CA 90012

3. Contact person and phone number:
   Karl Price (213) 897-1839

4. Project location:
   Terminal Island and Commodore Schuyler F. Heim Bridge within the Ports of Long Beach and Los Angeles; SR-47 and SR-103 from Terminal Island generally to I-405

5. Project sponsor's name and address:
   Alameda Corridor Transportation Authority
   One Civic Plaza, Suite 350
   Carson, CA 91745

6. General plan designation: Industrial; Transportation & Utilities 7. Zoning:

8. Description of project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)
   The lead agency and project sponsor propose to replace the seismically deficient Schuyler Heim Bridge, construct an elevated four-lane expressway between Ocean Boulevard and Alameda Street just south of Pacific Coast Highway (SR-1), and construct a flyover from eastbound Ocean Boulevard to SR-47 at the Schuyler Heim Bridge.

9. Surrounding land uses and setting: Briefly describe the project's surroundings:
   The study area is highly developed, with heavy industrial, commercial, transportation, and some recreational uses. Some residential uses occur to the west of Alternative 1, and east of Alternative 2.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)
    FHWA, USCG, ACOE, USFWS, California Coastal Commission, CDFG, RWQCB, City of Los Angeles, City of Long Beach, County of Los Angeles

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture Resources	☒ Air Quality
☐ Biological Resources	☒ Cultural Resources	☐ Geology /Soils
☐ Hazards & Hazardous Materials	☐ Hydrology / Water Quality	☐ Land Use / Planning
☐ Mineral Resources	☒ Noise	☐ Population / Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities / Service Systems	☒ Mandatory Findings of Significance	

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

_____ _____

Signature Date

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.
   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:
   a) the significance criteria or threshold, if any, used to evaluate each question; and
   b) the mitigation measure identified, if any, to reduce the impact to less than significance

ISSUE CHECKLIST:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
I. AESTHETICS – Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐
II. AGRICULTURE RESOURCES – In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☒
III. AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐
IV. BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☒	☐
V. CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in '15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5?	☐	☐	☒	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
VI. GEOLOGY AND SOILS – Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
VII. HAZARDS AND HAZARDOUS MATERIALS Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒
VIII. HYDROLOGY AND WATER QUALITY – Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐
IX. LAND USE AND PLANNING – Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☒	☐
X. MINERAL RESOURCES – Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒
XI. NOISE – Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
XII. POPULATION AND HOUSING – Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
XIII. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒
XIV. RECREATION				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒
XV. TRANSPORTATION/TRAFFIC – Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Result in inadequate parking capacity?	☐	☐	☒	☐
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☒	☐
XVI. UTILITIES AND SERVICE SYSTEMS – Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
XVII. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

Appendix B
Elevations

B.1 Alternative 1

B.1-1 Bridge

B.1-2 SR-47 Expressway

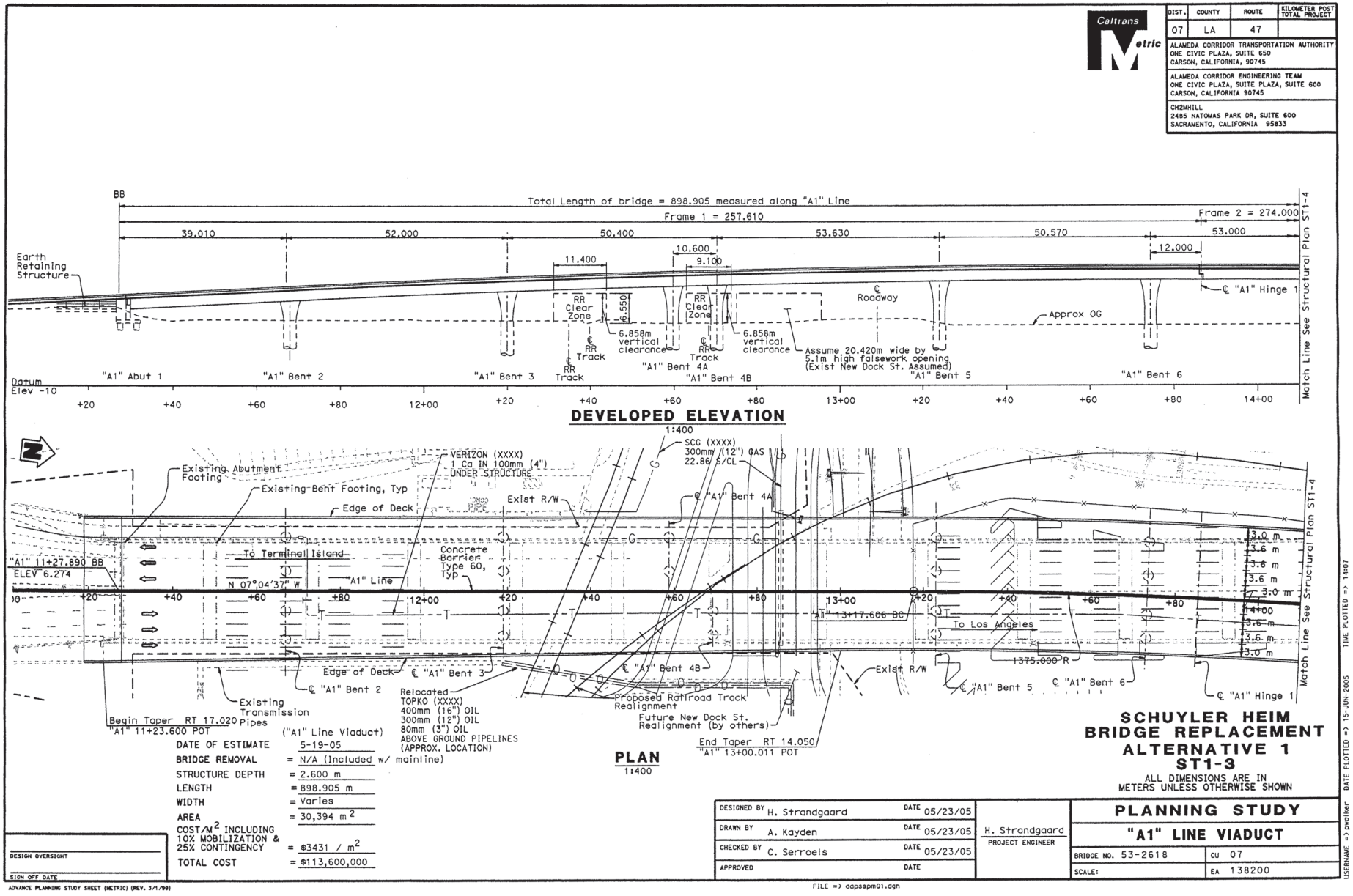
B.2 Alternative 1A – Bridge

B.3 Alternative 2 – SR-103 Expressway

B.4 Alternative 3 – Bridge

Appendix B.1
Alternative 1: Schuyler Heim Bridge and SR-47 Expressway

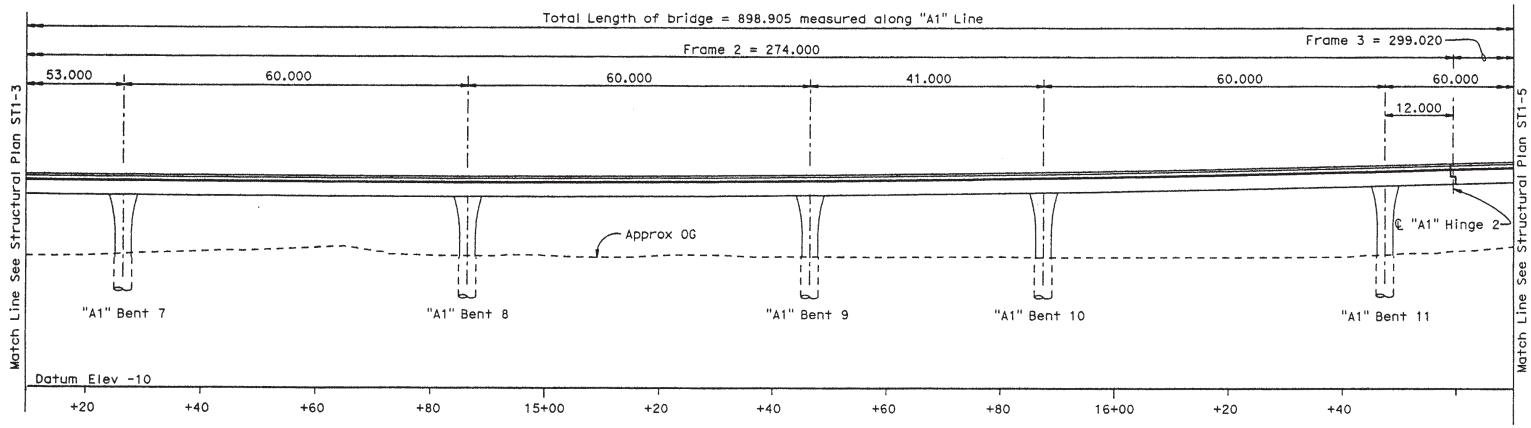
Appendix B.1-1
Bridge



Appendix B.1-1 page 1
Bridge
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



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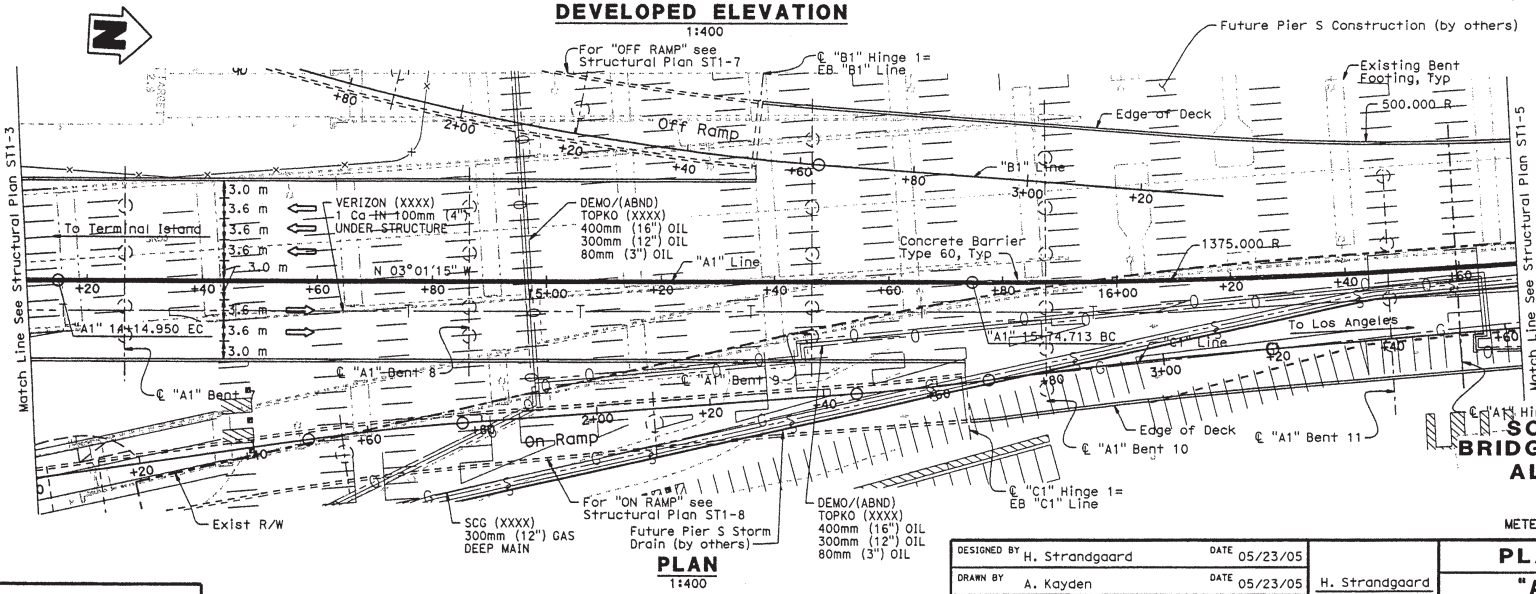
1:400



PLAN

1:400

SCHUYLER HEIM BRIDGE REPLACEMENT ALTERNATIVE 1 ST1-4

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA, 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

CH2MHILL
2485 NATOMAS PARK DR, SUITE 600
SACRAMENTO, CALIFORNIA 95833

DESIGNED BY	H. Strandgaard	DATE 05/23/05
DRAWN BY	A. Kayden	DATE 05/23/05
CHECKED BY	C. Serroels	DATE 05/23/05
APPROVED		DATE

H. Strandgaard
PROJECT ENGINEER

PLANNING STUDY

"A1" LINE VIADUCT

BRIDGE NO. 53-2618	CU 07
SCALE:	EA 138200

DESIGN OVERSIGHT

SIGN OFF DATE

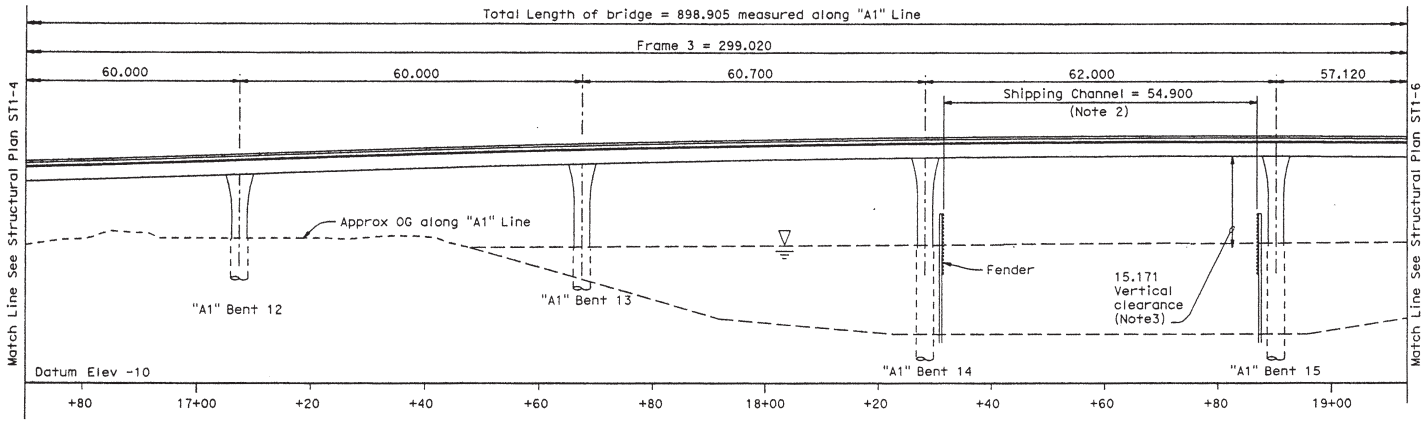
ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 3/1/99)

FILE => aapsspm02.dgn

USERNAME => pwalker DATE PLOTTED => 15-JUN-2005 TIME PLOTTED => 14:07

Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



DEVELOPED ELEVATION
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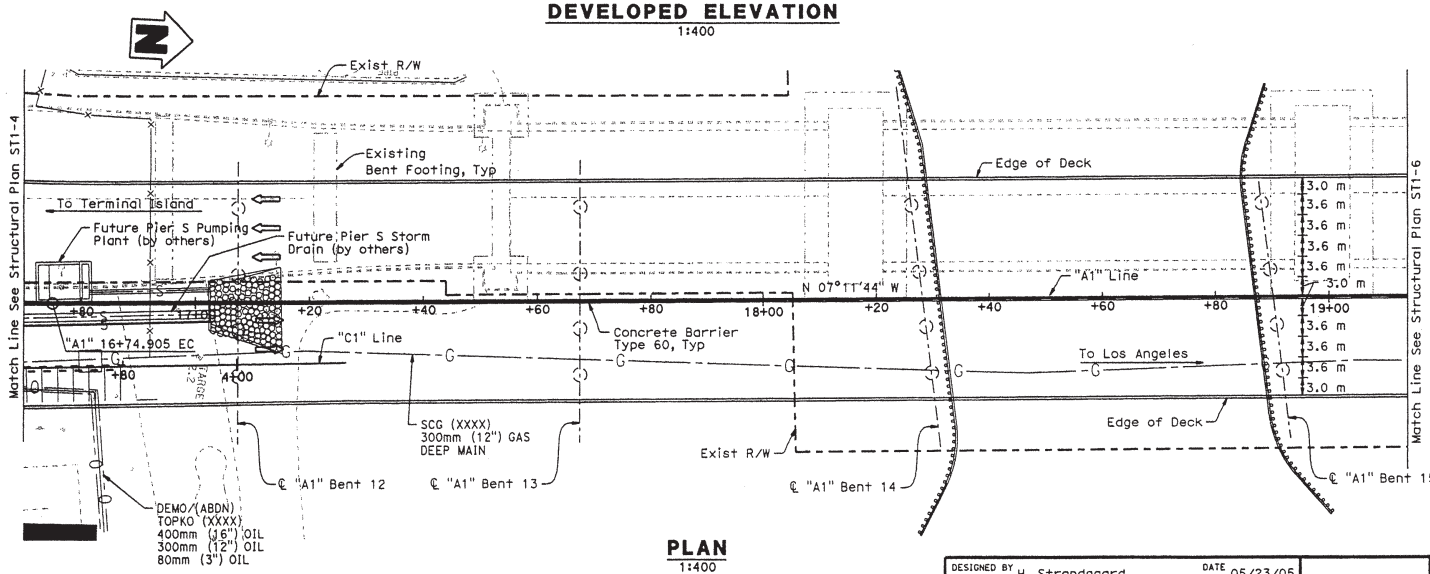

PLAN
1:400

Note:
1. Channel closed during construction.
2. Measured perpendicular to fenders.
3. Above mean higher high water level = +1.54 m.

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA, 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

CH2MHILL
2485 NATOMAS PARK DR, SUITE 600
SACRAMENTO, CALIFORNIA 95833

SCHUYLER HEIM BRIDGE REPLACEMENT ALTERNATIVE 1
ST1-5
ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY H. Strandgaard	DATE 05/23/05	H. Strandgaard PROJECT ENGINEER
DRAWN BY A. Kayden	DATE 05/23/05	
CHECKED BY C. Serroels	DATE 05/23/05	
APPROVED	DATE	

PLANNING STUDY
"A1" LINE VIADUCT

BRIDGE NO. 53-2618	CU 07
SCALE:	EA 138200

DESIGN OVERSIGHT
SIGN OFF DATE
ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 3/1/99)

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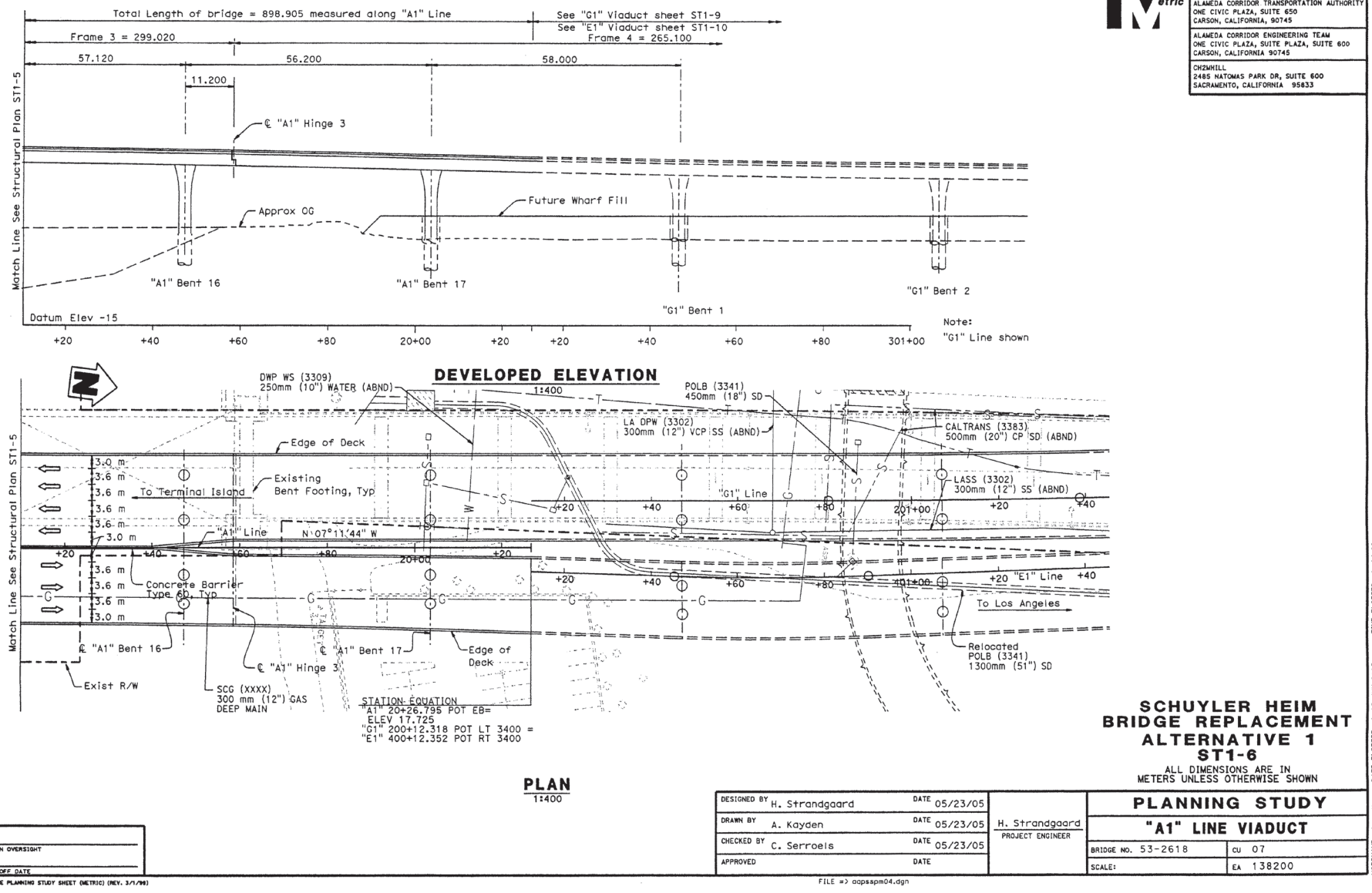
Appendix B.1-1 page 3
Bridge
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority

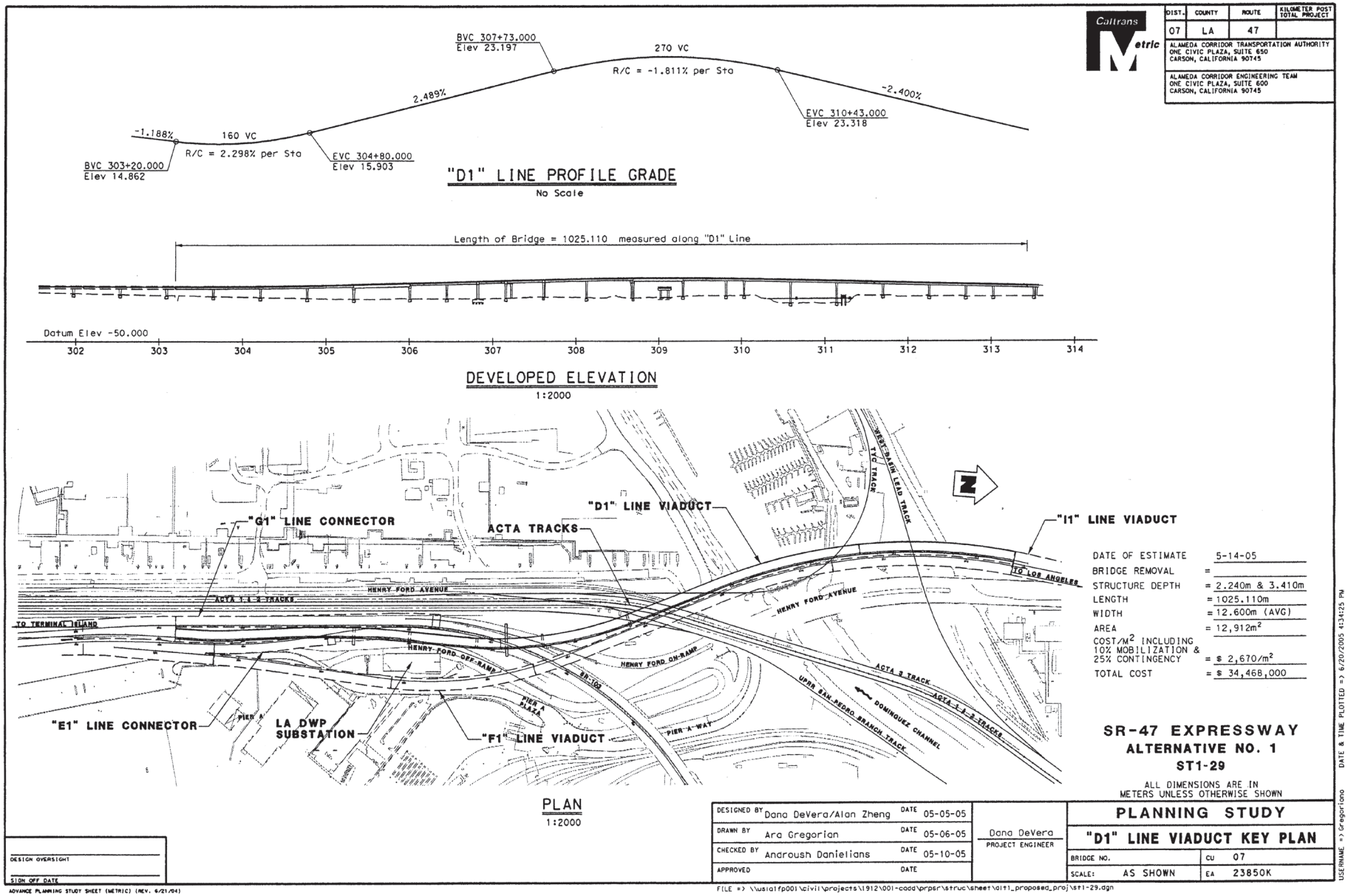
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



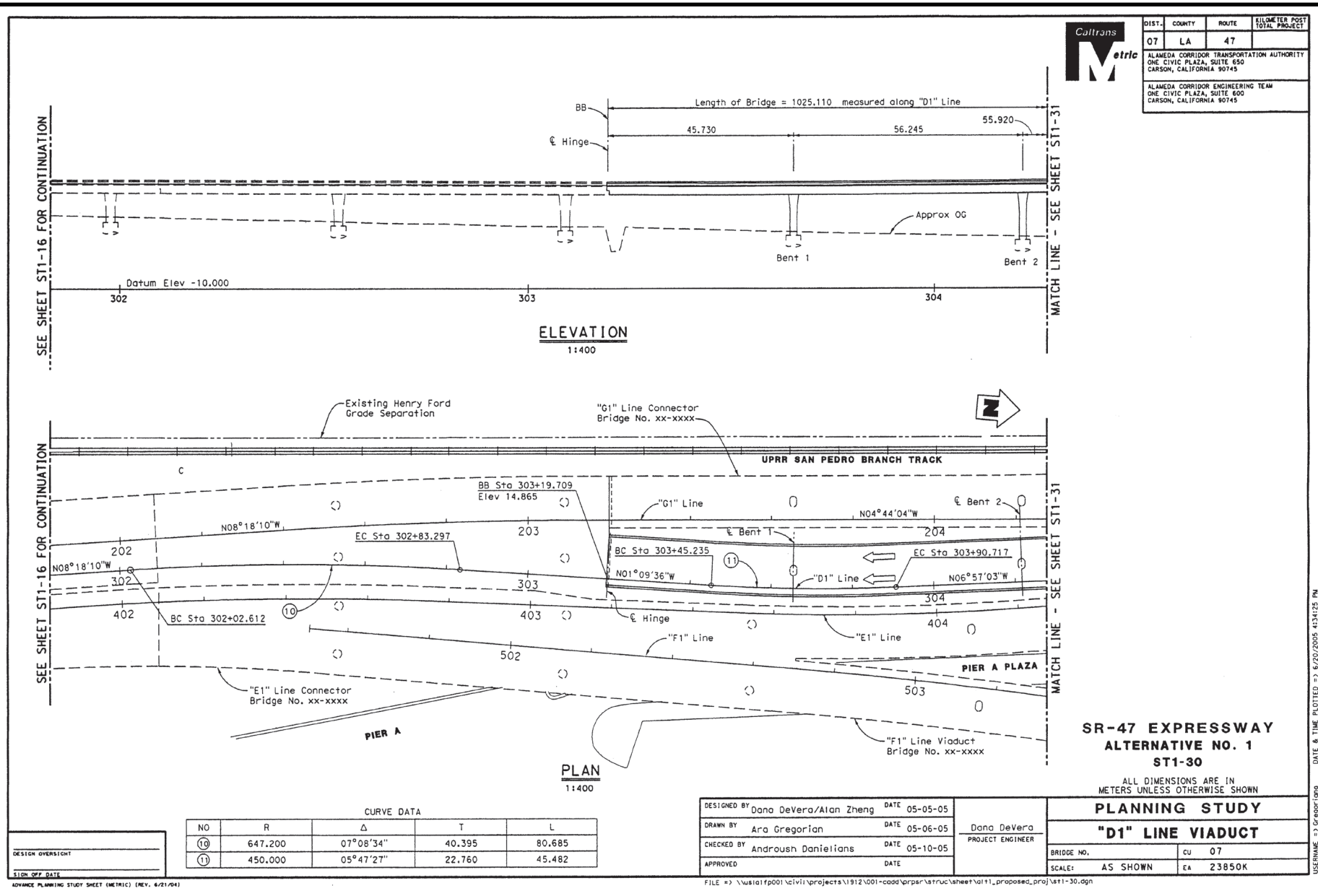
Source: Alameda Corridor Transportation Authority

Appendix B.1-2
SR-47 Expressway

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

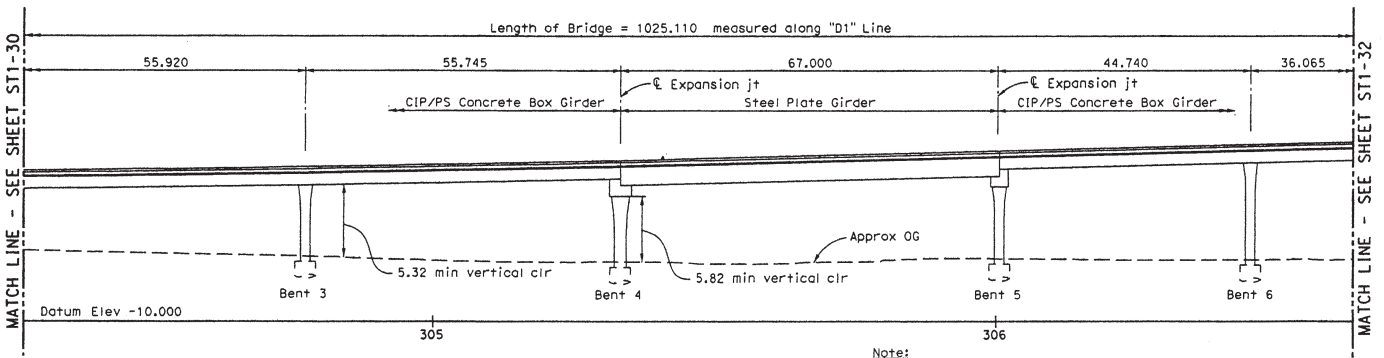


Source: Alameda Corridor Transportation Authority



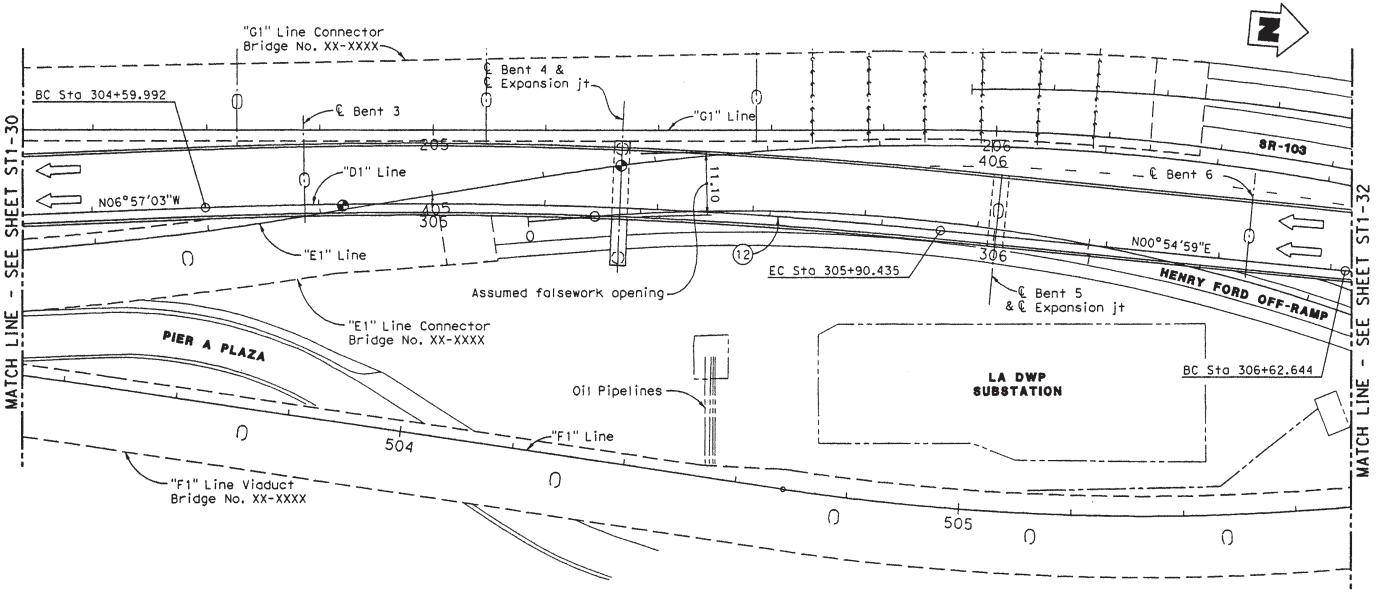
Appendix B.1-2 page 2
SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority



ELEVATION
1:400

Note:
Traffic will pass through construction.
(4.6m min vertical clearance required under falsework)



PLAN
1:400

CURVE DATA

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DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

Caltrans Metric

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 1
ST1-31

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

PLANNING STUDY

"D1" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

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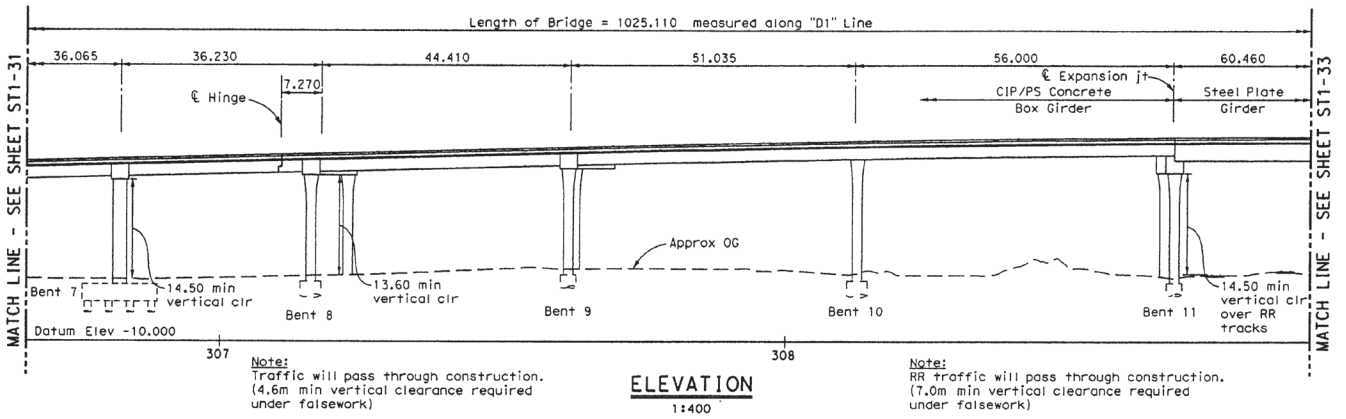
USERNAME => Gregoriano

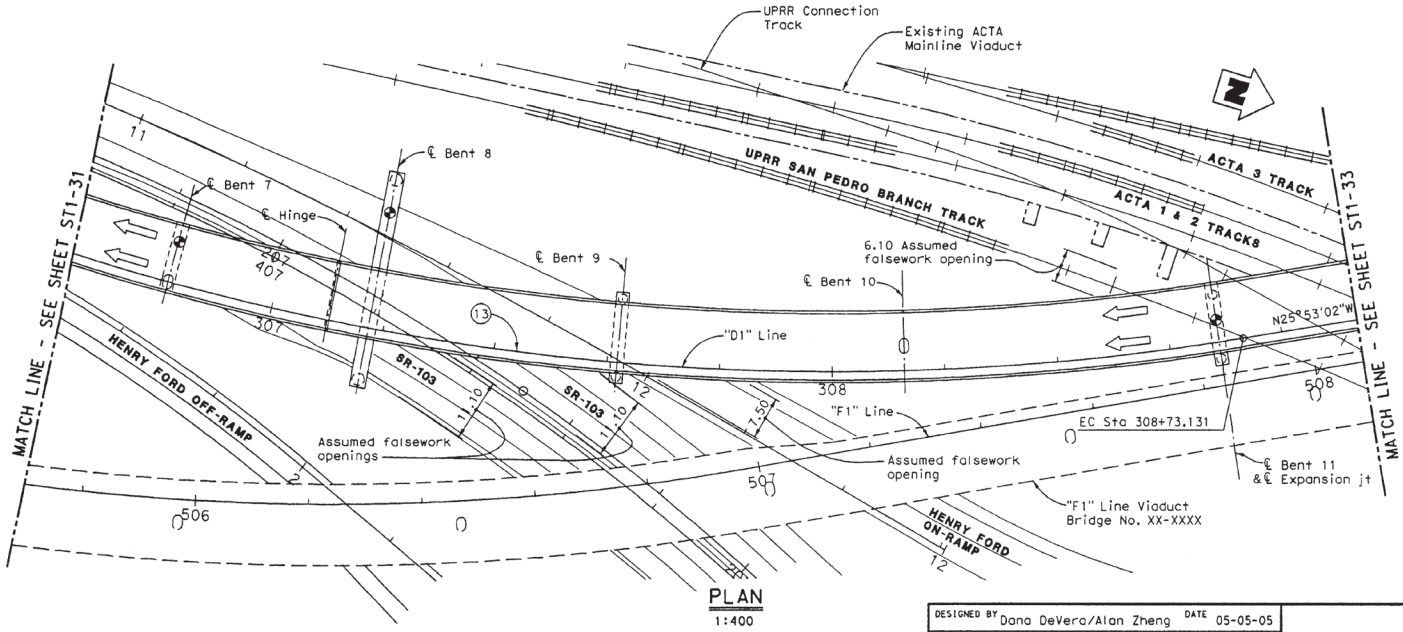
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



ELEVATION
1:400



PLAN
1:400

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DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 1
ST1-32

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

PLANNING STUDY
"D1" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

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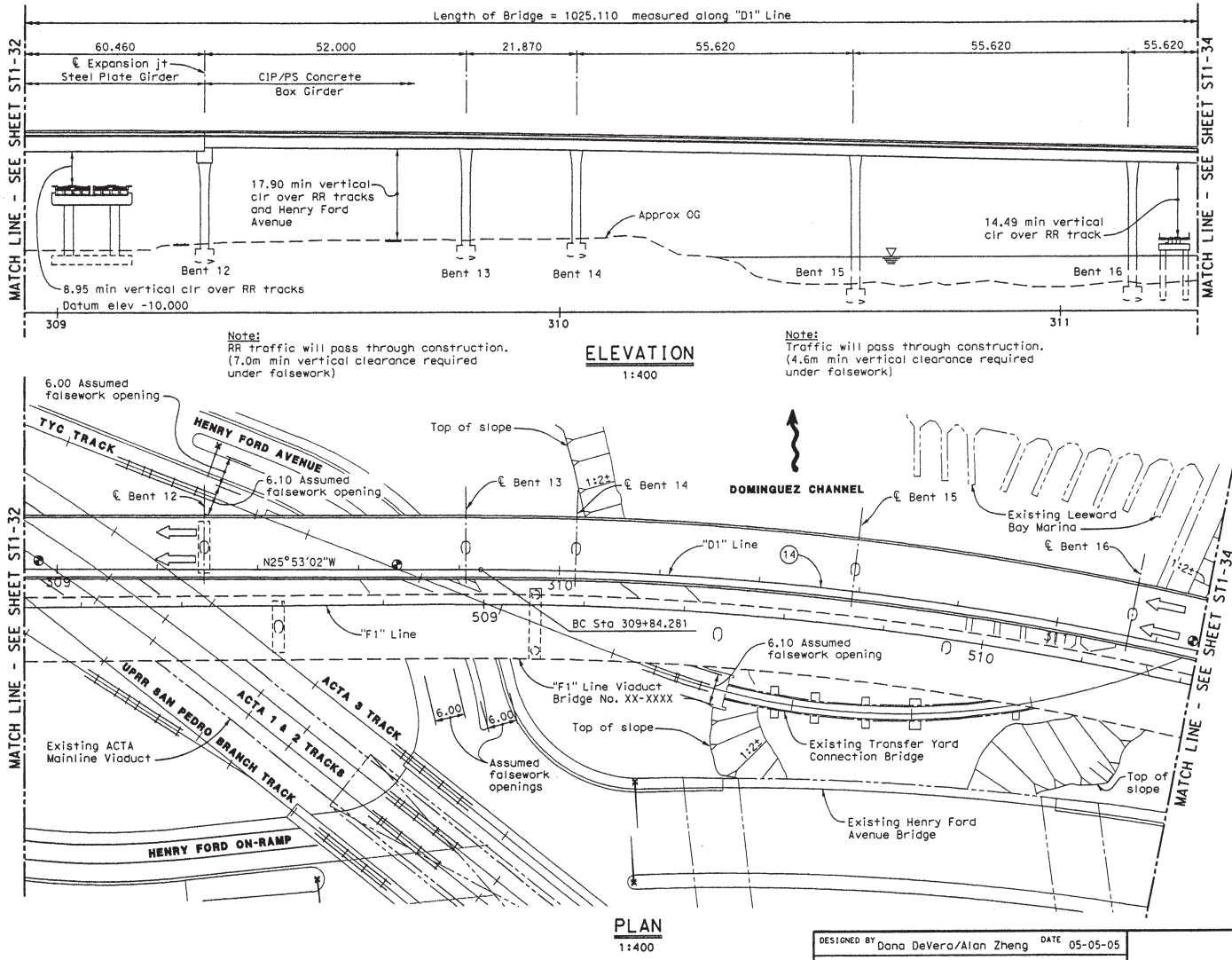
Appendix B.1-2 page 4
SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



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DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 1
ST1-33

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

PLANNING STUDY
"D1" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

DESIGN OVERSIGHT
SIGN OFF DATE

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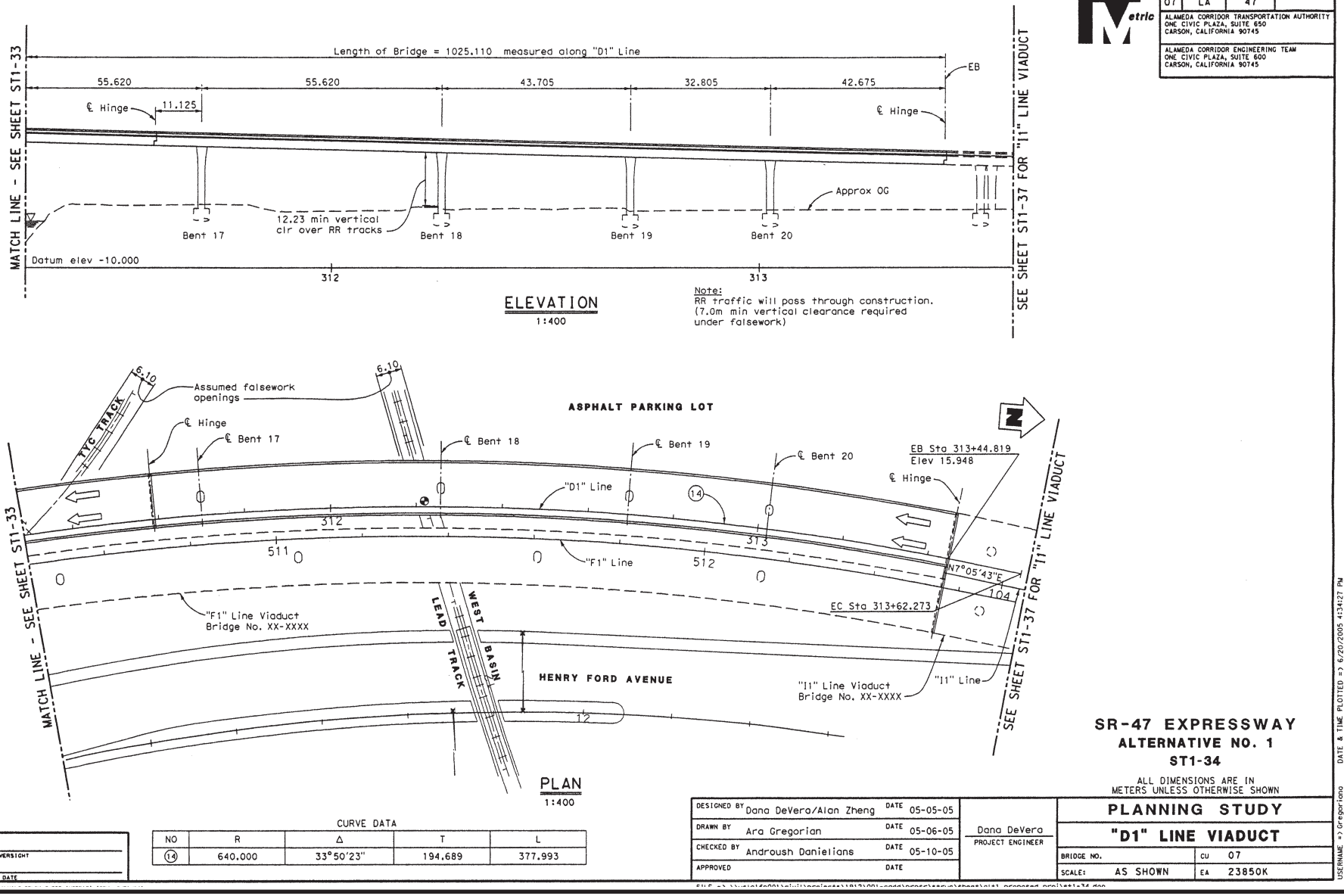
Appendix B.1-2 page 5
SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority



Appendix B.1-2 page 6
SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority

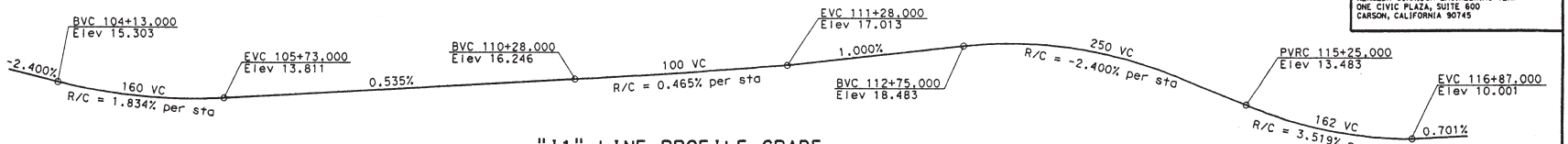
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans Metric

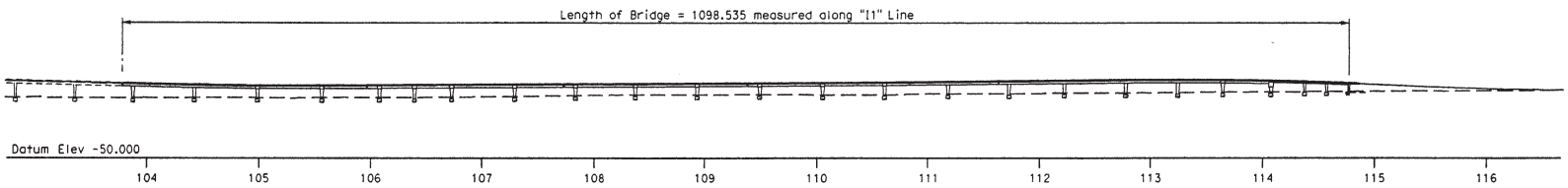
DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

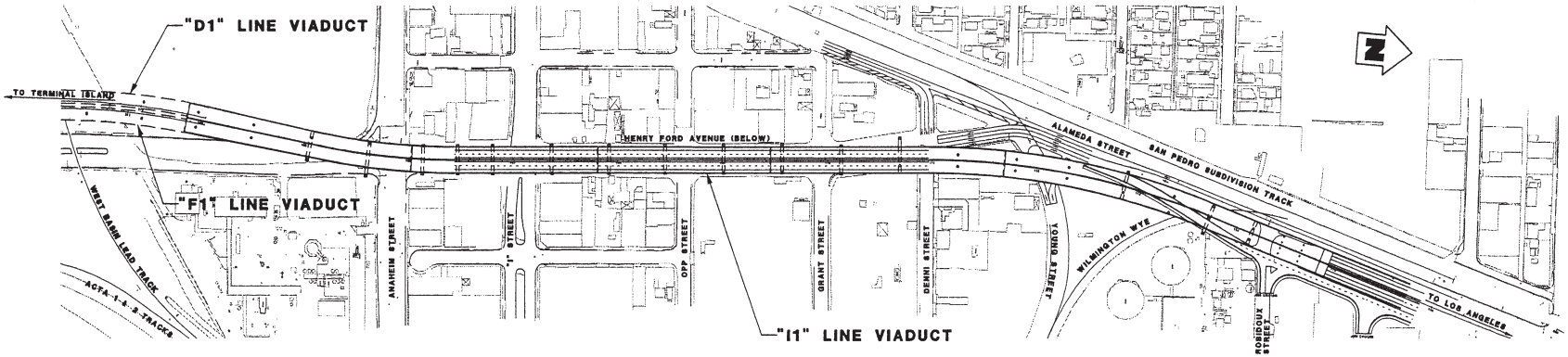
ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745



"I1" LINE PROFILE GRADE
No Scale



DEVELOPED ELEVATION
1:4000



PLAN
1:4000

DATE OF ESTIMATE		5-14-2005
BRIDGE REMOVAL	=	
STRUCTURE DEPTH	=	2.240m & 1.200m
LENGTH	=	1098.535m
WIDTH	=	25.000m (AVG)
AREA	=	27,474m^2
COST/M^2 INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	=	$ 2,124/m^2
TOTAL COST	=	$ 58,350,000

SR-47 EXPRESSWAY
ALTERNATIVE NO. 1
ST1-37

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

PLANNING STUDY
"I1" LINE VIADUCT KEY PLAN

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

DESIGN OVERSIGHT
SIGN OFF DATE

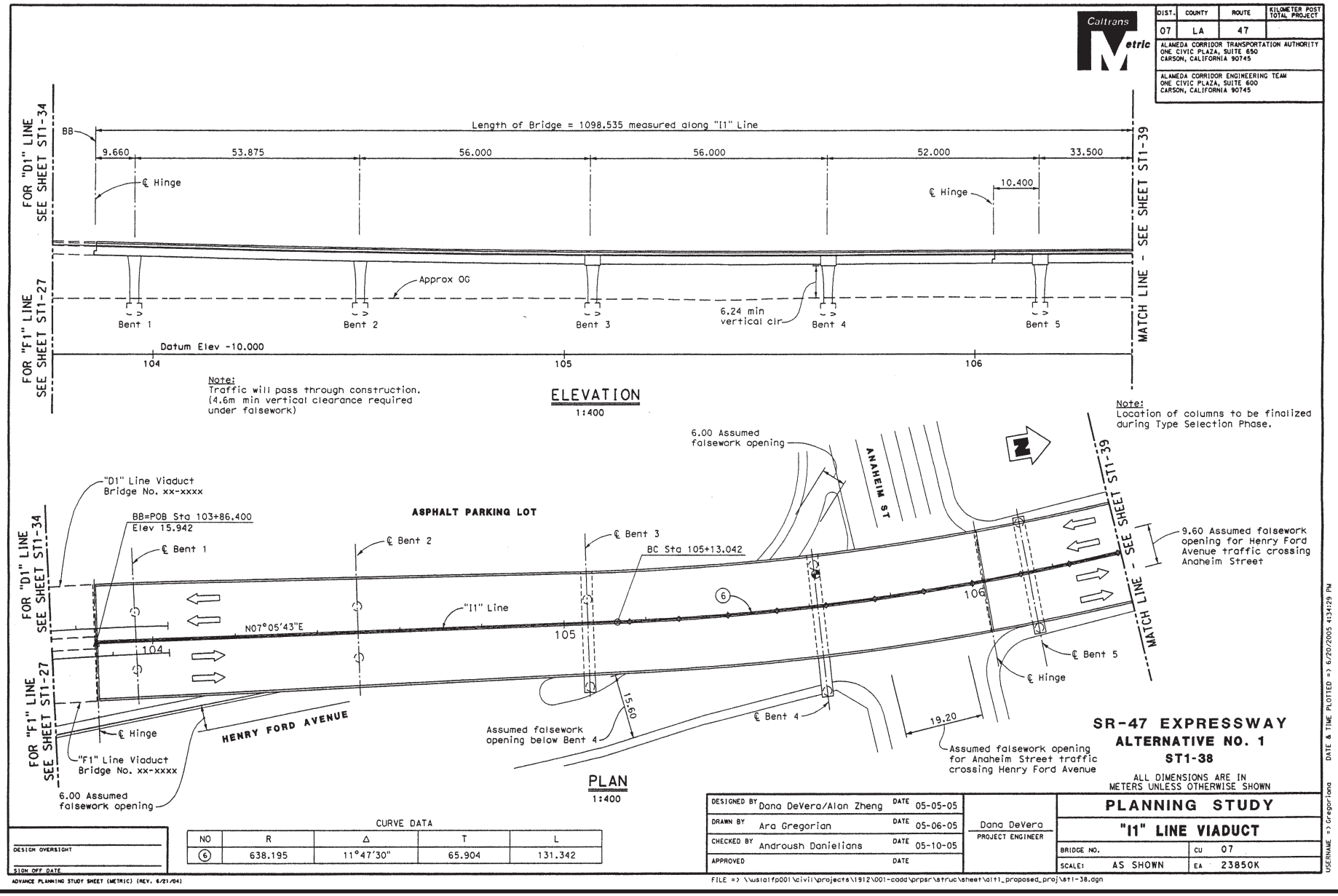
ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

FILE => \\usialfp001\civil\projects\1912\001-cadd\prpar\struc\sheet\alt1_proposed_proj\st1-37.dgn

USERNAME => Gregoriano DATE & TIME PLOTTED => 6/20/2005 4:34:28 PM

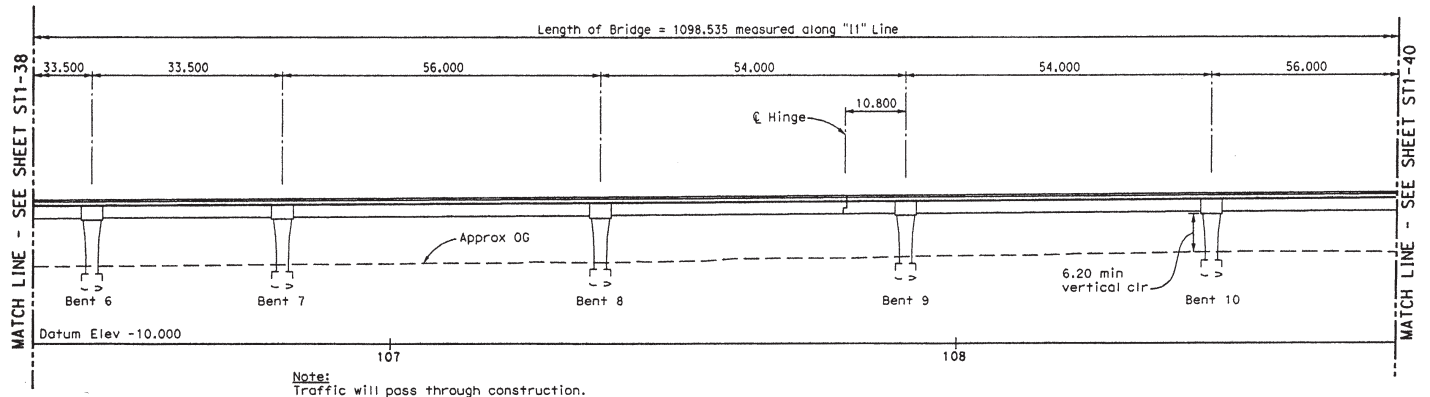
Appendix B.1-2 page 7
SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority



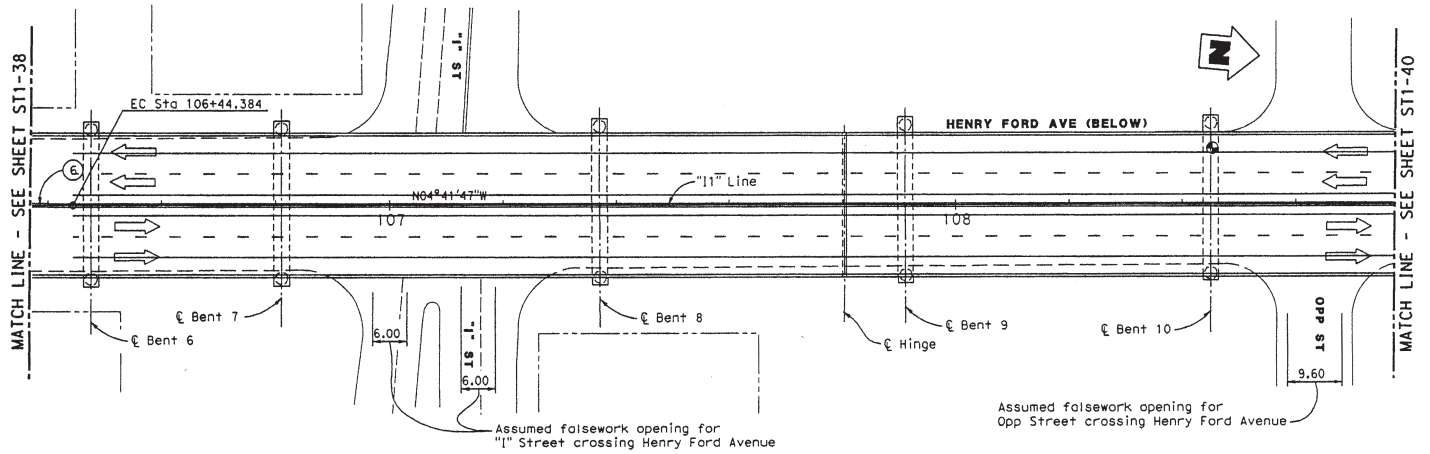
Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



Note:
Traffic will pass through construction.
(4.6m min vertical clearance required under falsework)

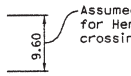
ELEVATION
1:400



PLAN
1:400

Assumptions:

1. Falsework openings shall be provided to access driveways along Henry Ford Avenue.



Assumed falsework opening for Henry Ford Avenue traffic crossing "I Street & Opp Street

Note:
Location of columns to be finalized during Type Selection Phase.

SR-47 EXPRESSWAY
ALTERNATIVE NO. 1
ST1-39

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

CURVE DATA

NO	R	Δ	T	L
⑥	638.195	11°47'30"	65.904	131.342

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

DESIGN OVERSIGHT
SIGN OFF DATE

PLANNING STUDY
"I1" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

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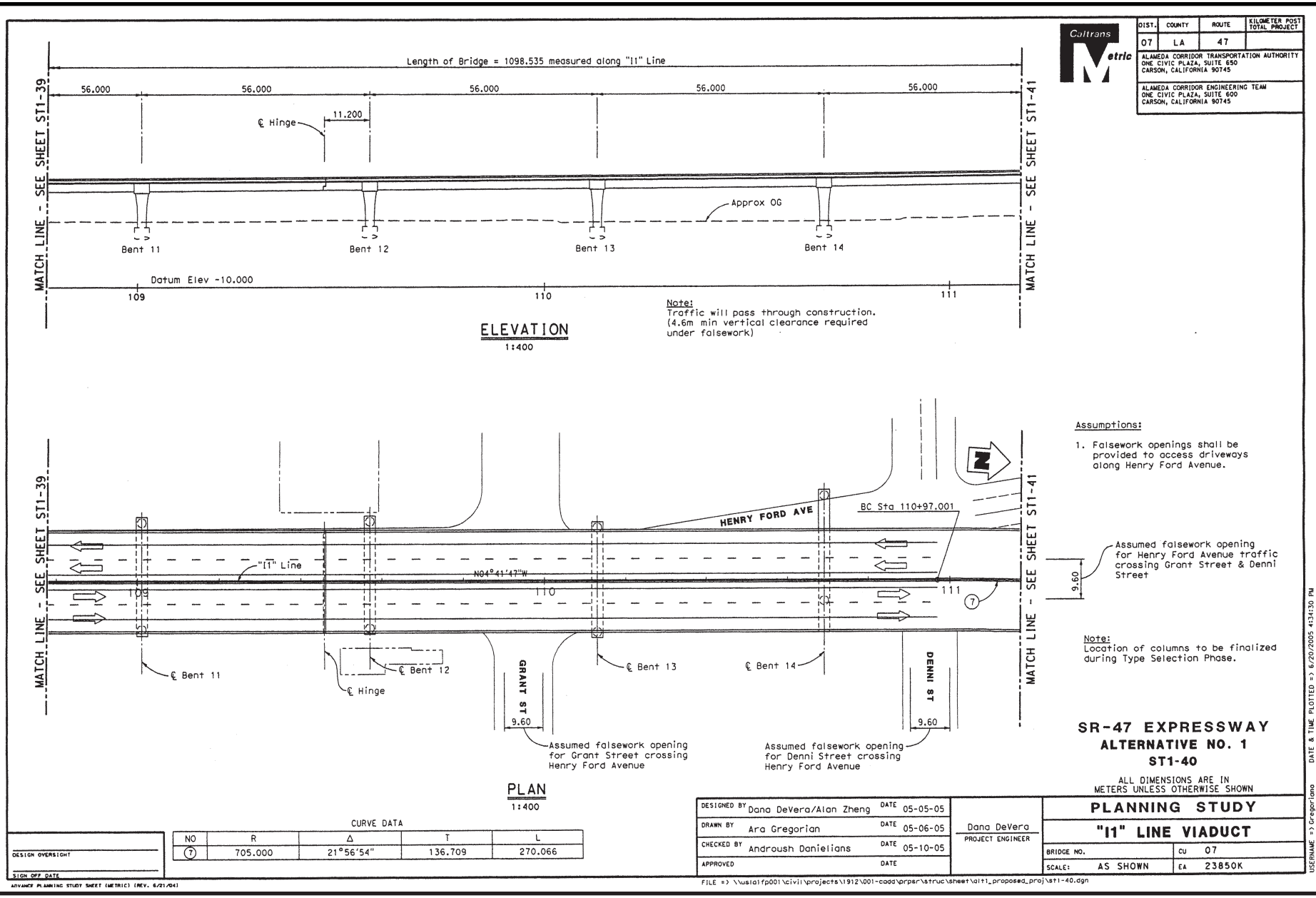
USERNAME => Gregoriano
DATE & TIME PLOTTED => 6/20/2005 4:34:29 PM

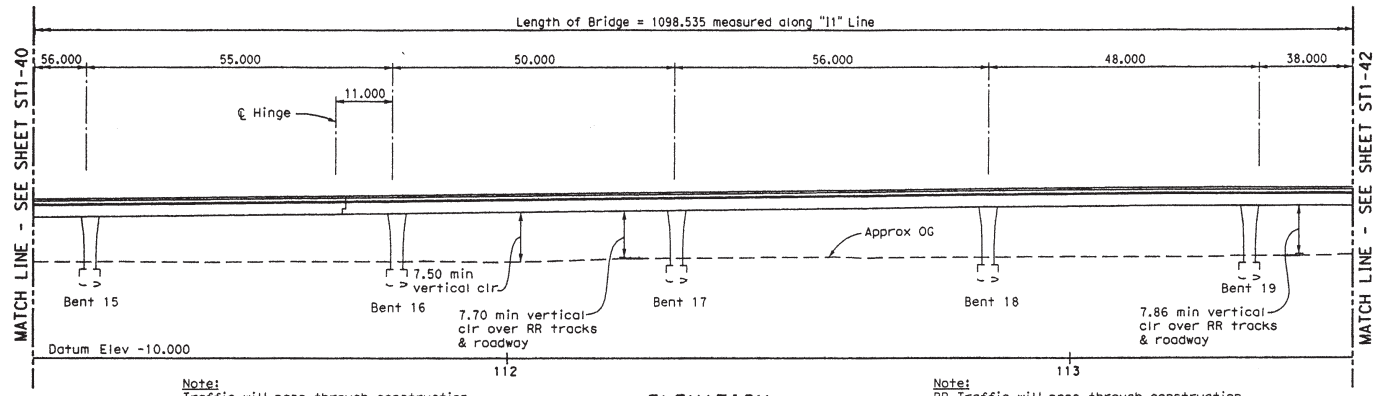
Appendix B.1-2 page 9
SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority



Source: Alameda Corridor Transportation Authority

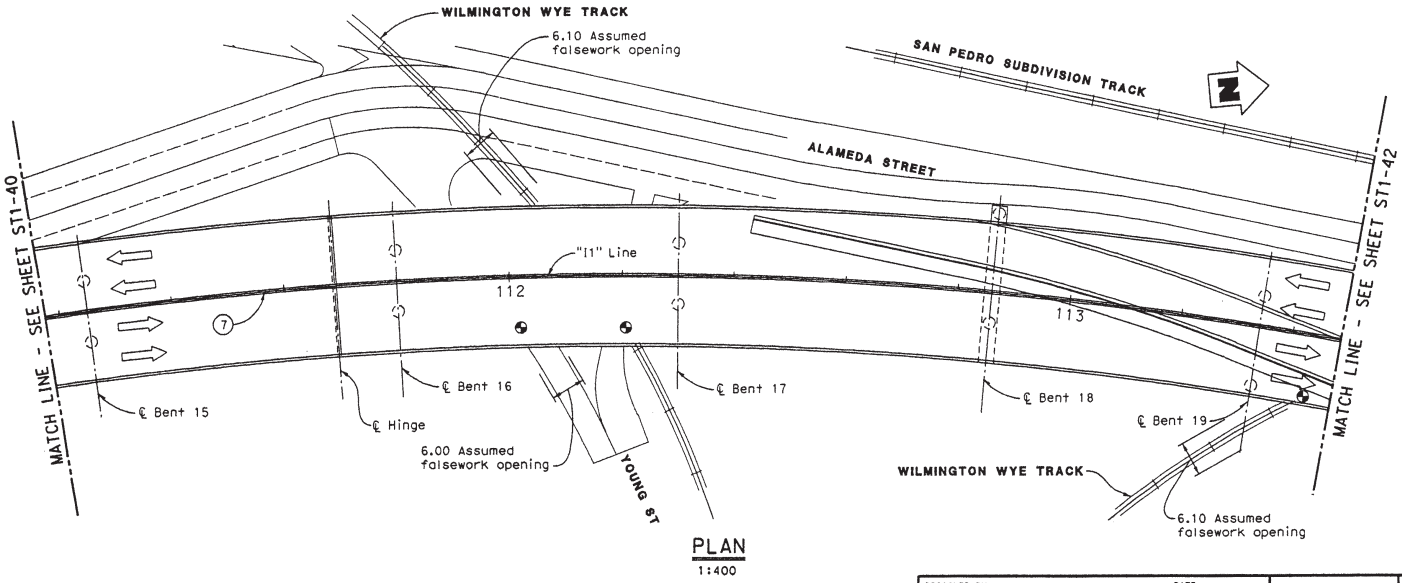
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



Note:
Traffic will pass through construction.
(4.6m min vertical clearance required under falsework)

ELEVATION
1:400

Note:
RR Traffic will pass through construction.
(7.0m min vertical clearance required under falsework)



PLAN
1:400

Assumptions:

1. Existing northbound lanes will be closed during construction of bridge and traffic will be detoured and share existing southbound lanes.

Note:
Location of columns to be finalized during Type Selection Phase.

CURVE DATA

NO	R	Δ	T	L
⑦	705.000	21°56'54"	136.709	270.066

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

DESIGN OVERSIGHT
SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

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Caltrans Metric

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 1
ST1-41

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

PLANNING STUDY
"I1" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

DATE & TIME PLOTTED => 6/20/2005 4:34:30 PM
USERNAME => Gregoriano

Source: Alameda Corridor Transportation Authority

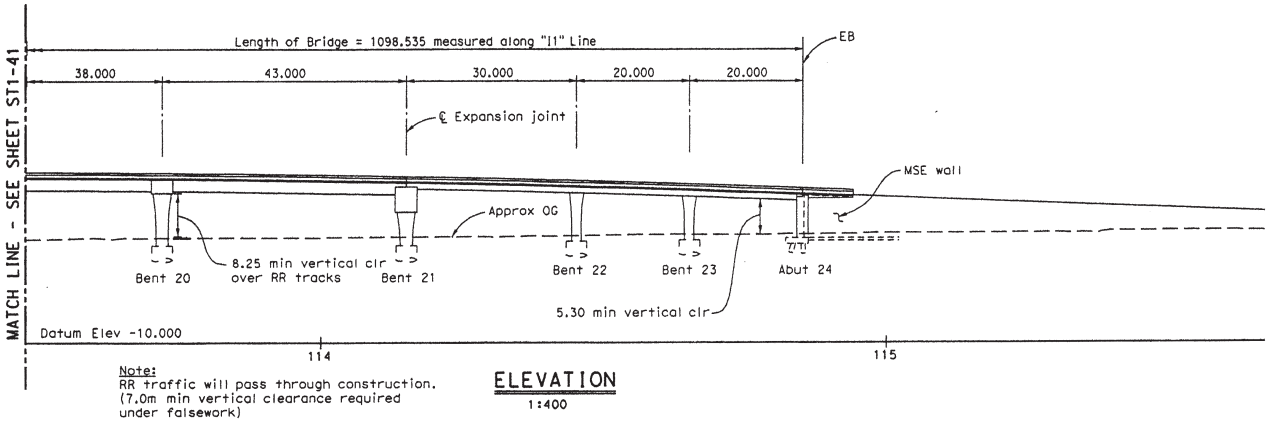
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans Metric

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

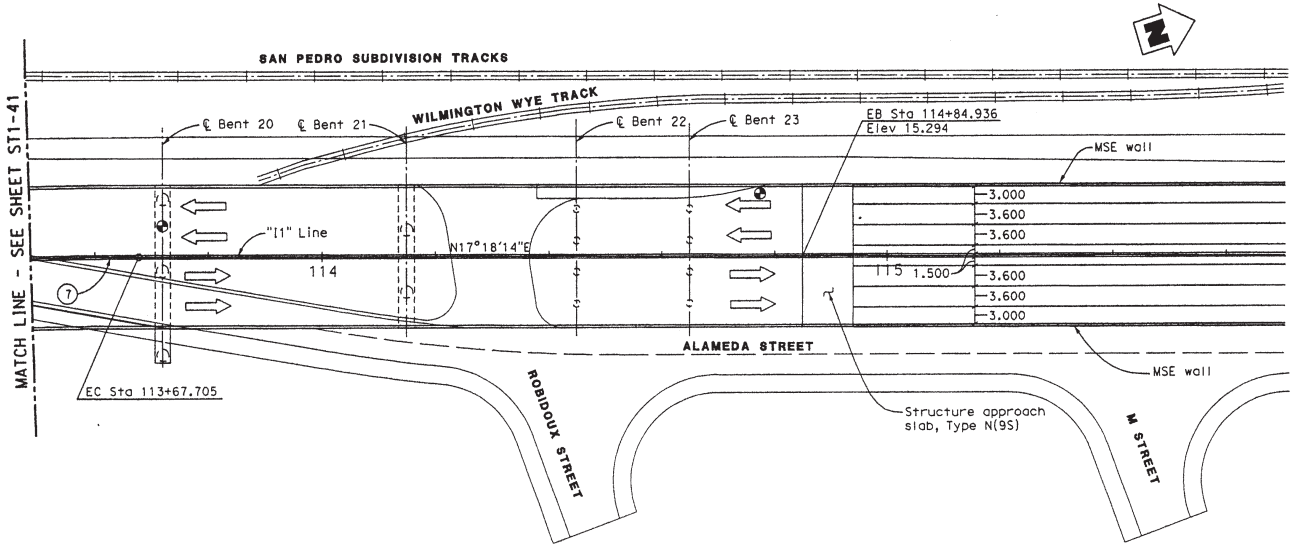
ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745



Note:
RR traffic will pass through construction. (7.0m min vertical clearance required under falsework)

ELEVATION
1:400



Note:
Location of columns to be finalized during Type Selection Phase.

Assumptions:

1. Existing northbound lanes will be closed during construction of bridge and retaining walls and traffic will be detoured and share existing southbound lanes.
2. Robidoux Street, M Street, and Mauretania Street will not have direct access to Alameda Street during construction of bridge and retaining walls.

PLAN
1:400

CURVE DATA

NO	R	Δ	T	L
⑦	705.000	21°56'54"	136.709	270.066

SR-47 EXPRESSWAY
ALTERNATIVE NO. 1
ST1-42

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

PLANNING STUDY
"I1" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

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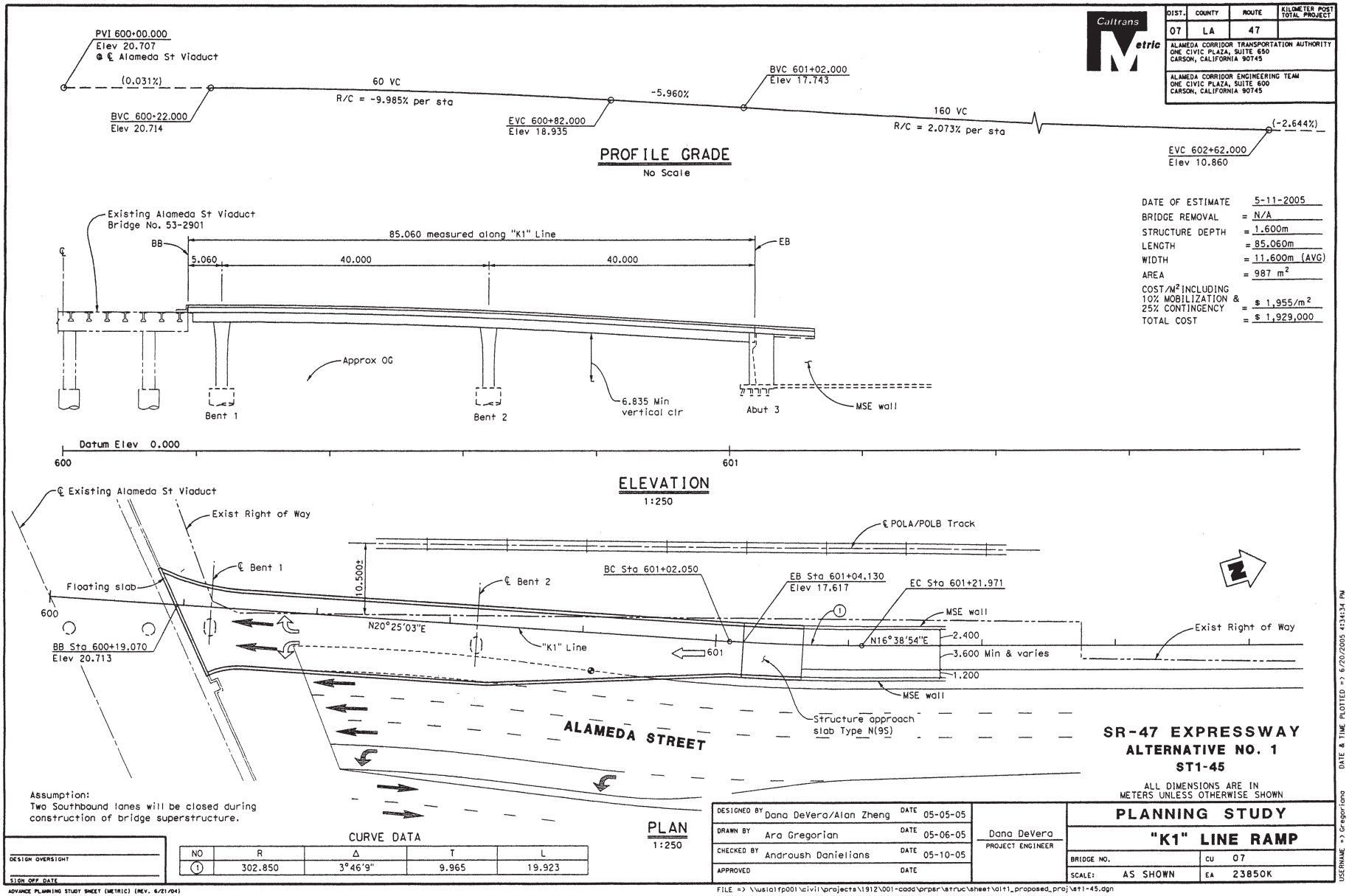
USERNAME => Gregoriano DATE & TIME PLOTTED => 6/20/2005 4:34:31 PM

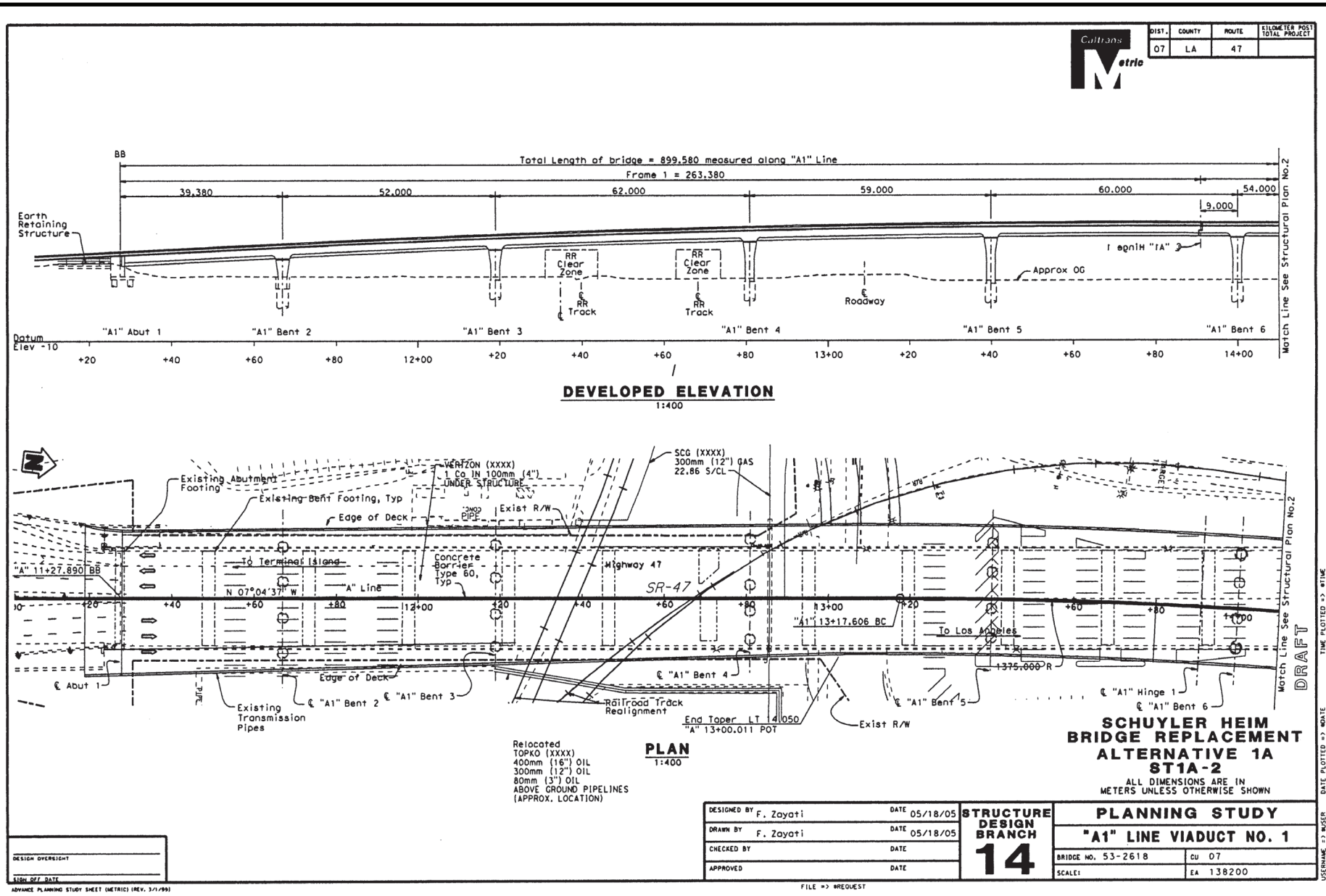
Appendix B.1-2 page 12
SR-47 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority



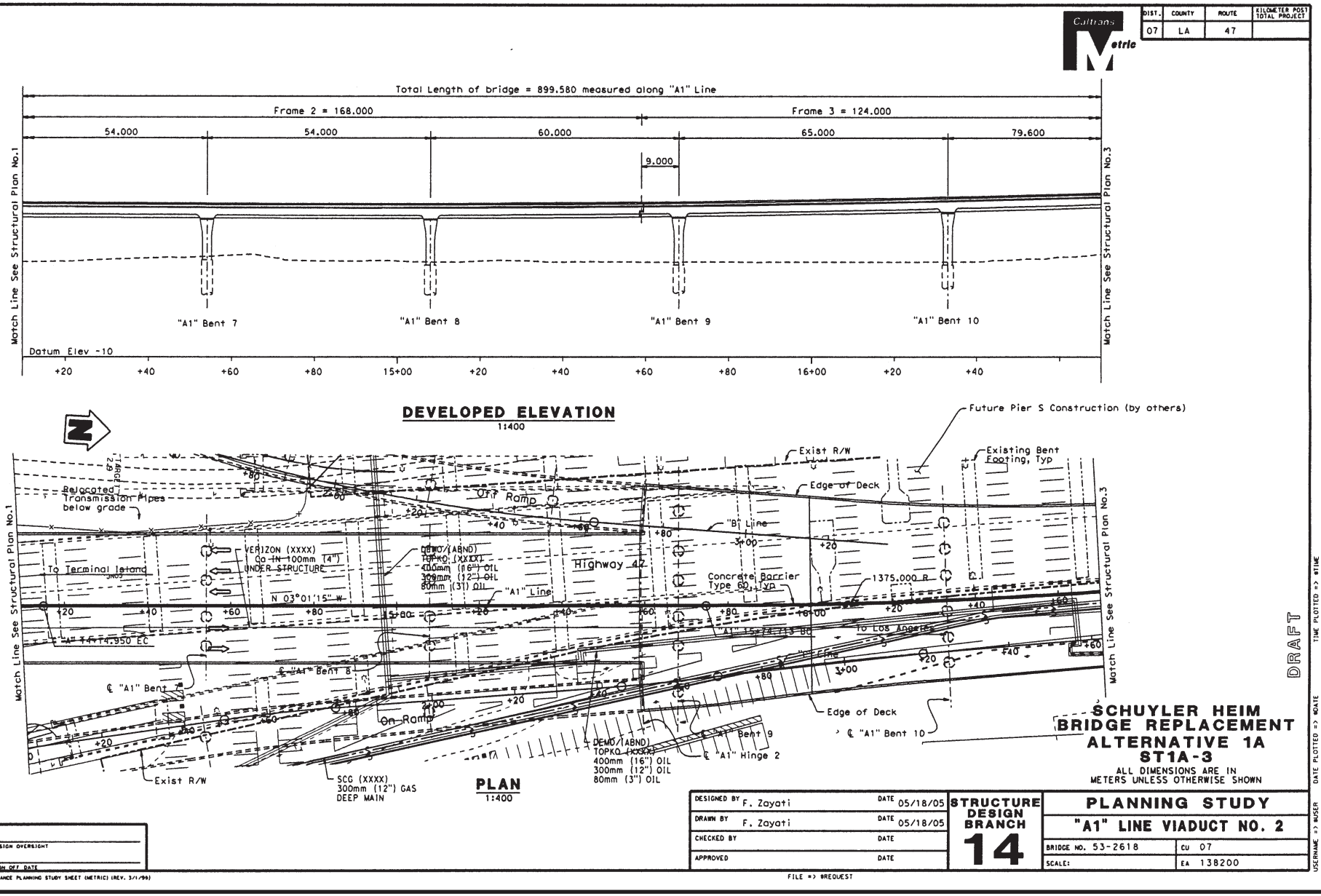
Source: Alameda Corridor Transportation Authority

Appendix B.2
Alternative 1A: Bridge



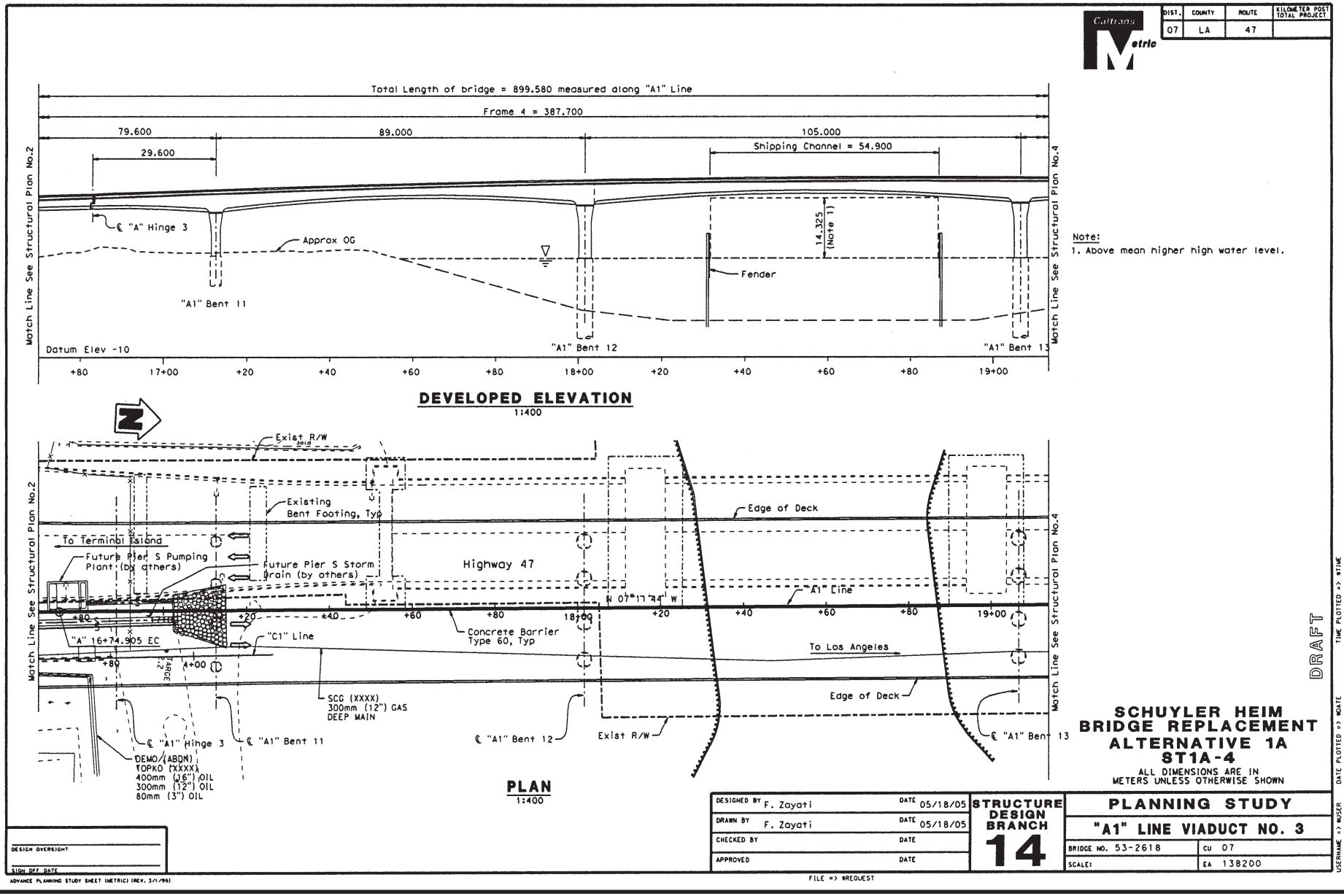
Appendix B.2 page 1
Alternative 1A: Bridge
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority



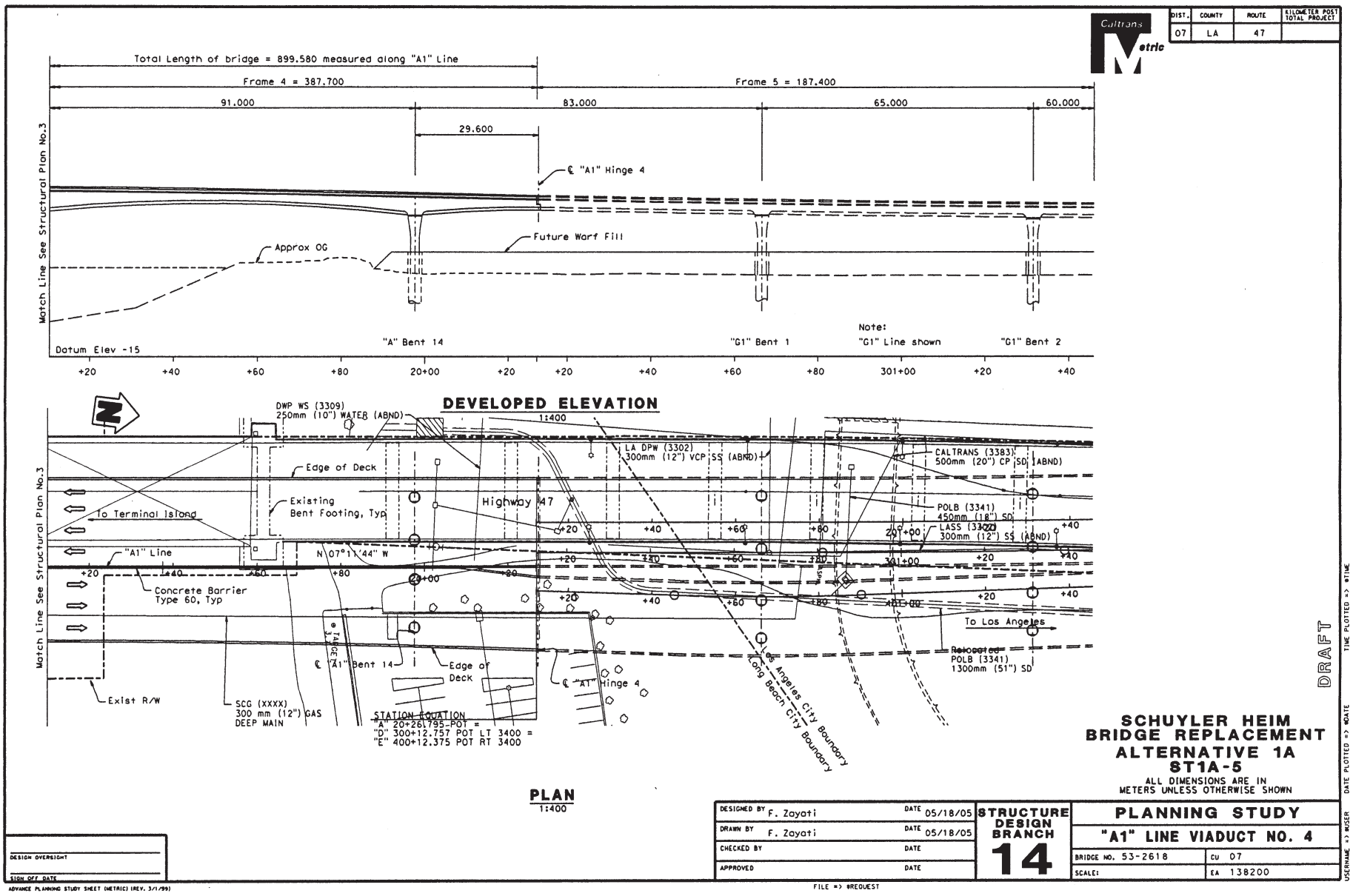
Appendix B.2 page 2
Alternative 1A: Bridge
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority



Appendix B.2 page 3
Alternative 1A: Bridge
Schuyler Heim Bridge Replacement and SR-47 Expressway

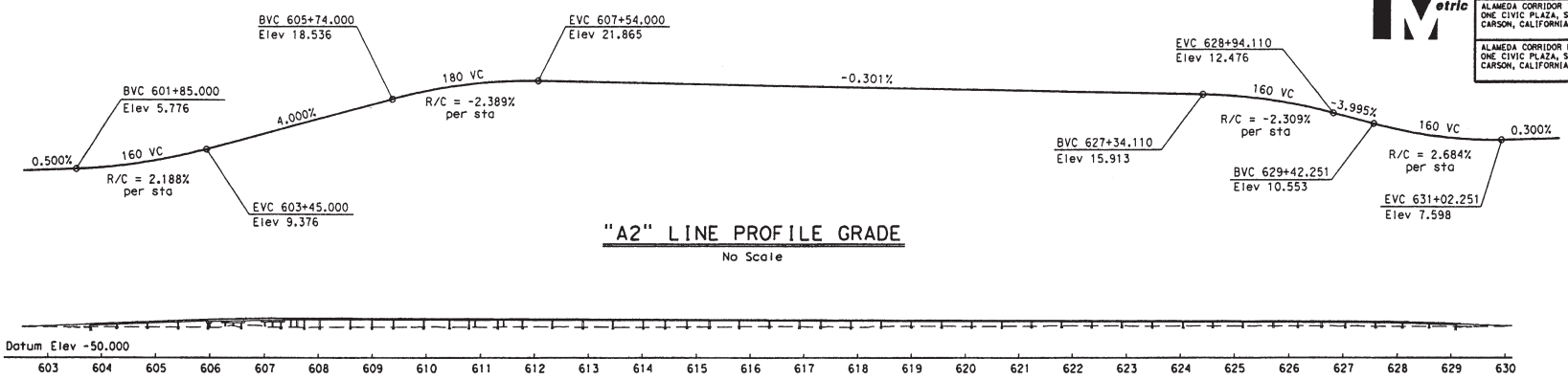
Source: Alameda Corridor Transportation Authority



Source: Alameda Corridor Transportation Authority

Appendix B.3
Alternative 2: SR-103 Expressway

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

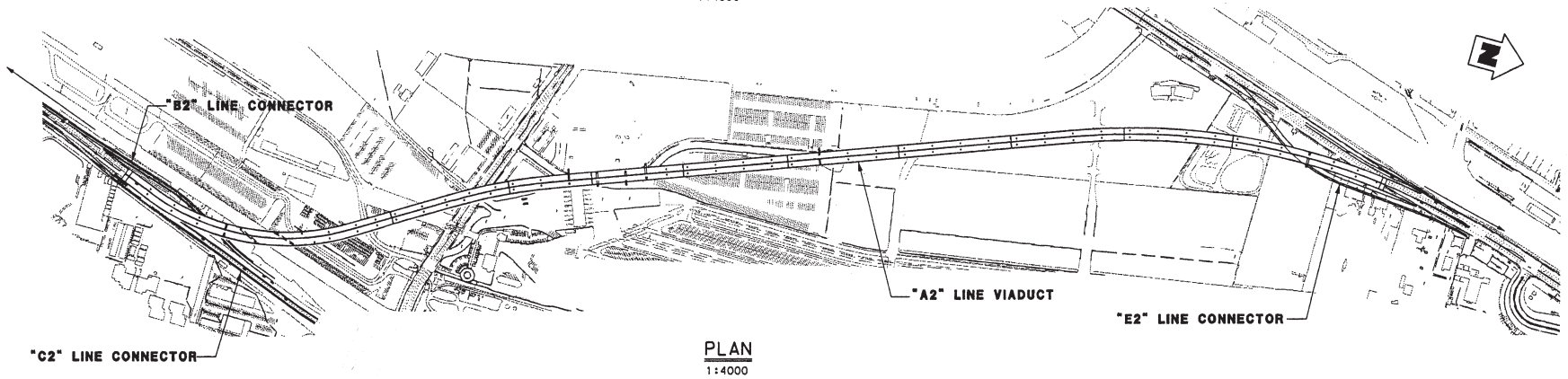


"A2" LINE PROFILE GRADE

No Scale

DEVELOPED ELEVATION

1:4000



PLAN

1:4000

DATE OF ESTIMATE		05-23-05
BRIDGE REMOVAL	=	
STRUCTURE DEPTH	=	2.240m & 3.685m
LENGTH	=	2530.770m
WIDTH	=	25.000m (AVG)
AREA	=	63,270m^2
COST/M^2 INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	=	$2192/m^2
TOTAL COST	=	$138,688,000

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

Caltrans Metric

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 2
ST2-13

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

PLANNING STUDY

"A2" LINE VIADUCT KEY PLAN

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

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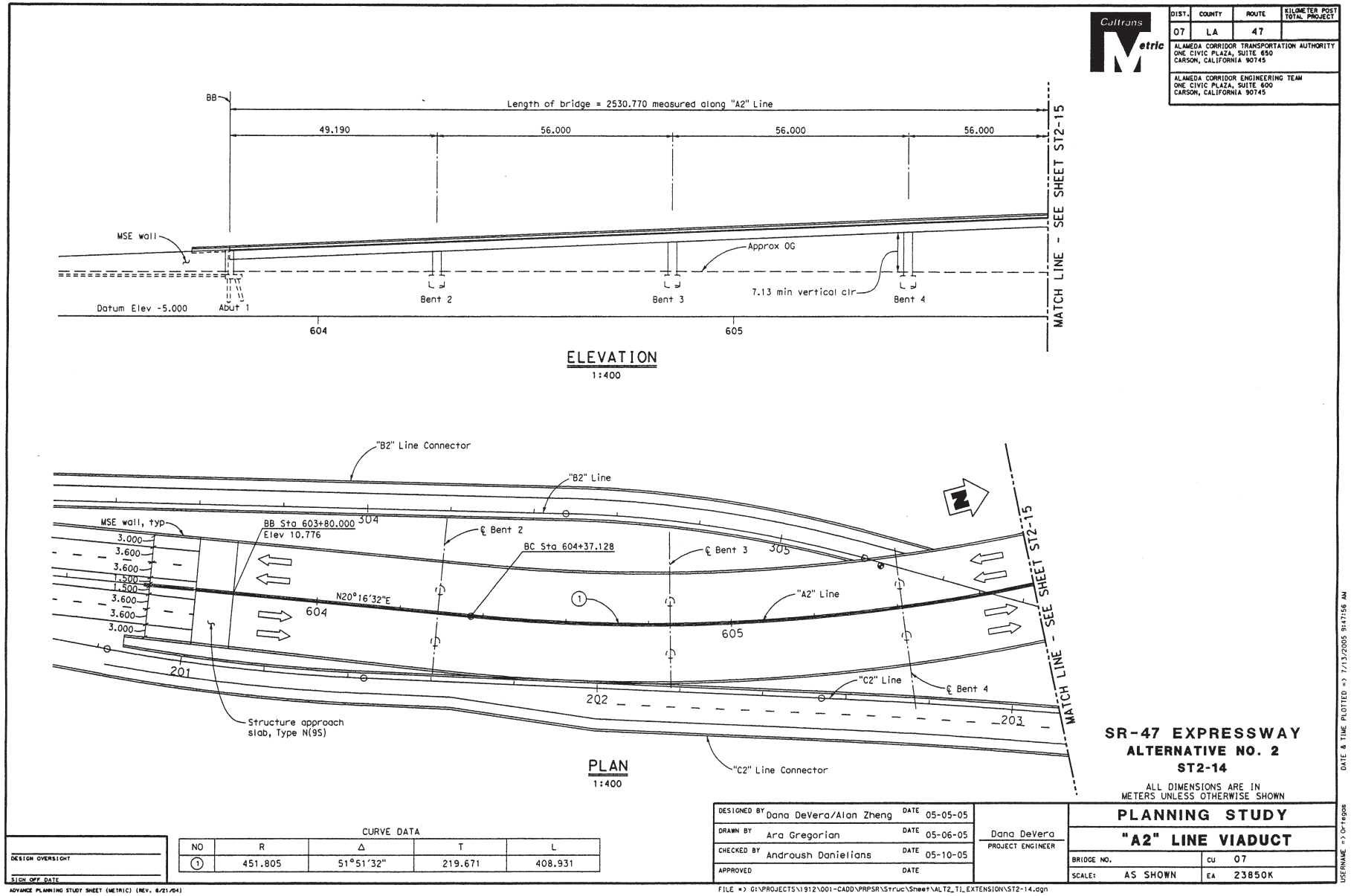
DATE & TIME PLOTTED => 7/13/2005 9:54:34 AM

USERNAME => Ortegas

Source: Alameda Corridor Transportation Authority

Appendix B.3 page 1
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway

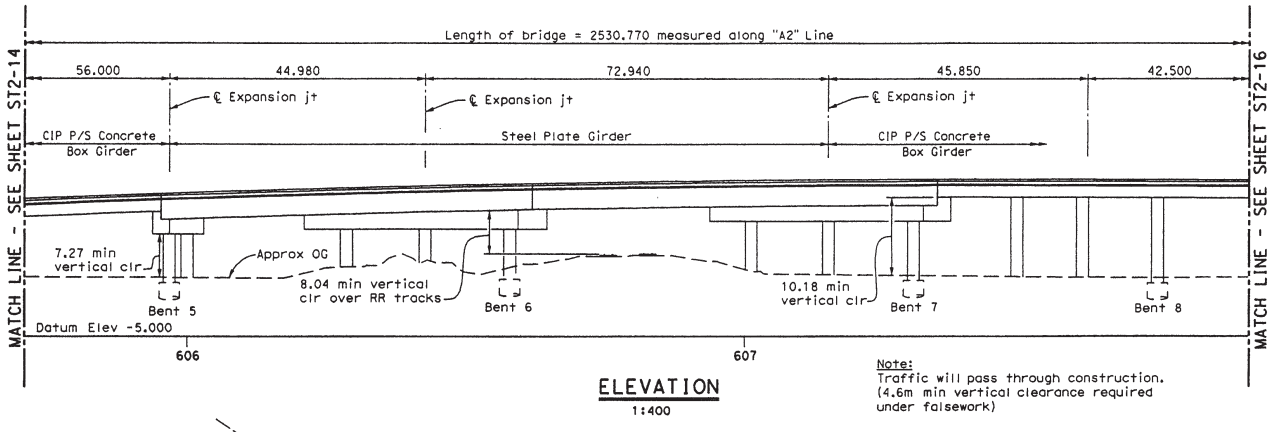
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



Appendix B.3 page 2
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway

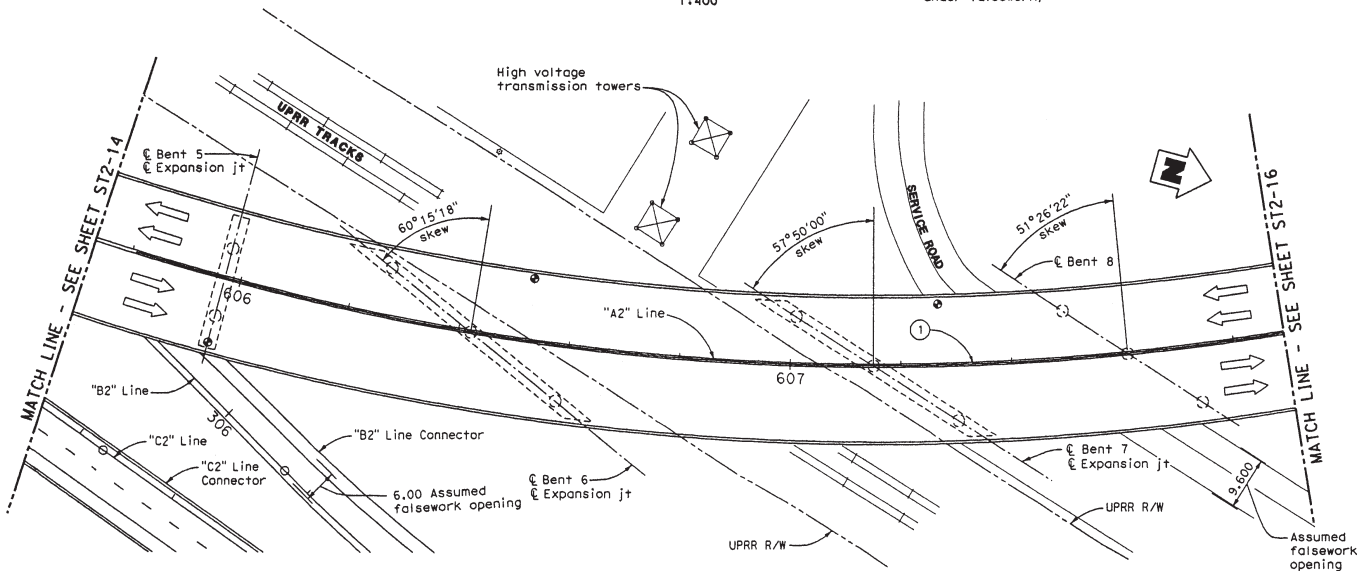
Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



ELEVATION
1:400

Note:
Traffic will pass through construction.
(4.6m min vertical clearance required under falsework)



PLAN
1:400

Note:
High voltage transmission towers need to be modified to provide required vertical clearance over viaduct.

CURVE DATA

NO	R	Δ	T	L
1	451.805	51°51'32"	219.671	408.931

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

DESIGNED BY	Dana DeVera/Alan Zheng	DATE 05-05-05
DRAWN BY	Ara Gregorian	DATE 05-06-05
CHECKED BY	Andraush Danielians	DATE 05-10-05
APPROVED		DATE

Dana DeVera
PROJECT ENGINEER

FILE => G:\PROJECTS\1912\001-CADD\PRPSR\Struc\Sheet\ALT2_TI_EXTENSION\ST2-15.dgn

Caltrans Metric

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 2
ST2-15

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

PLANNING STUDY
"A2" LINE VIADUCT

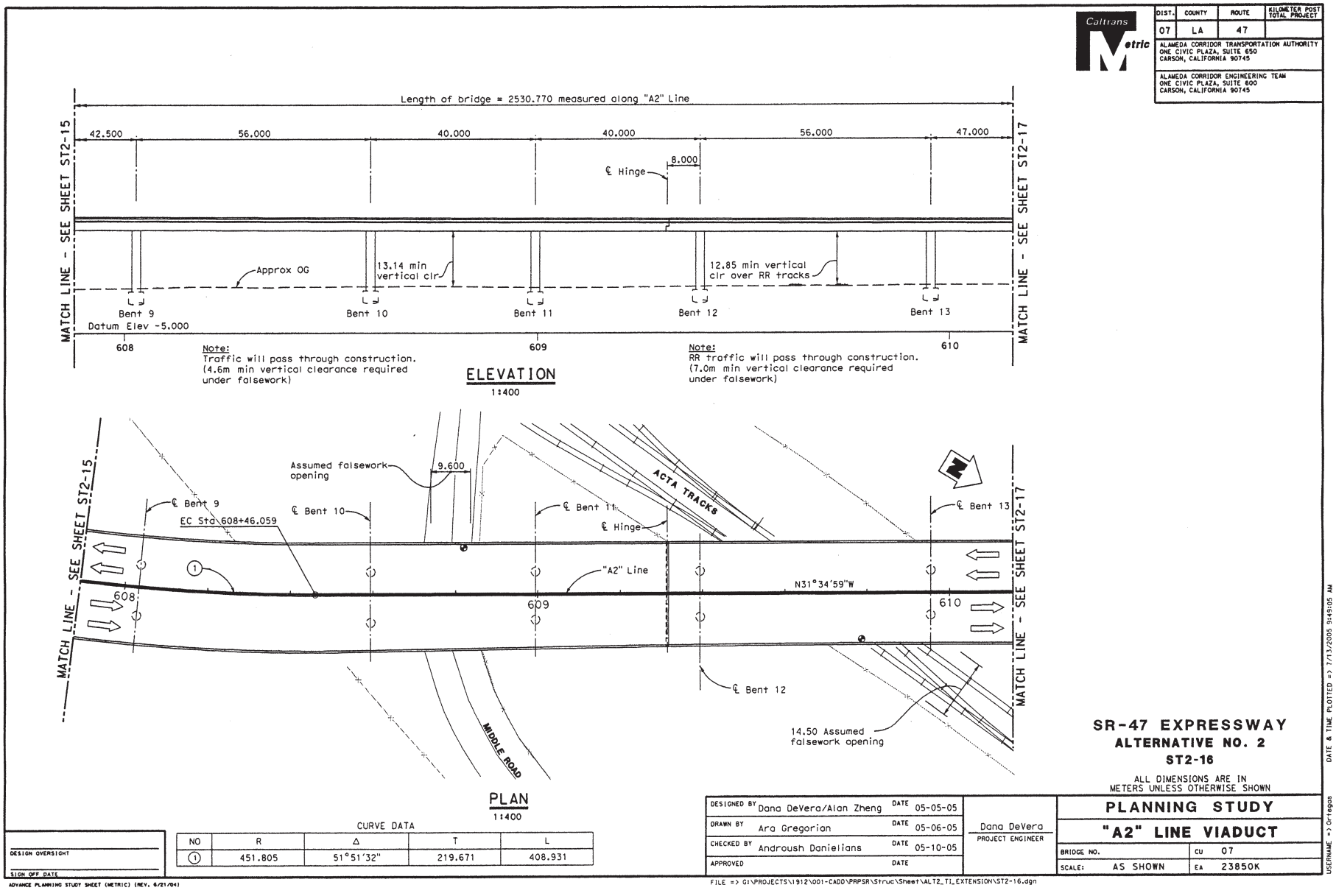
BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

DATE & TIME PLOTTED => 7/13/2005 9:48:30 AM
USERNAME => Ortegas

Appendix B.3 page 3
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement and SR-47 Expressway

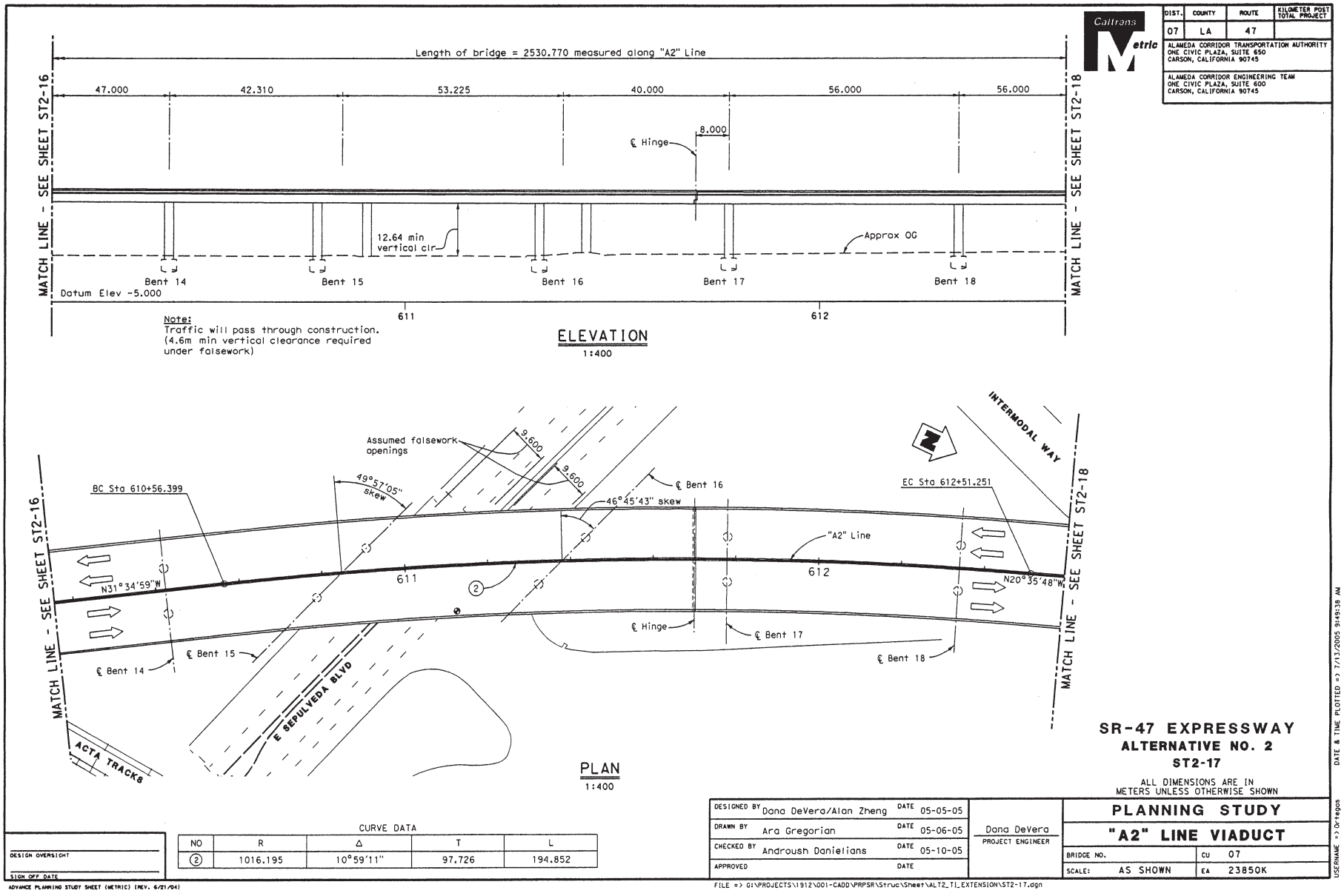
Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



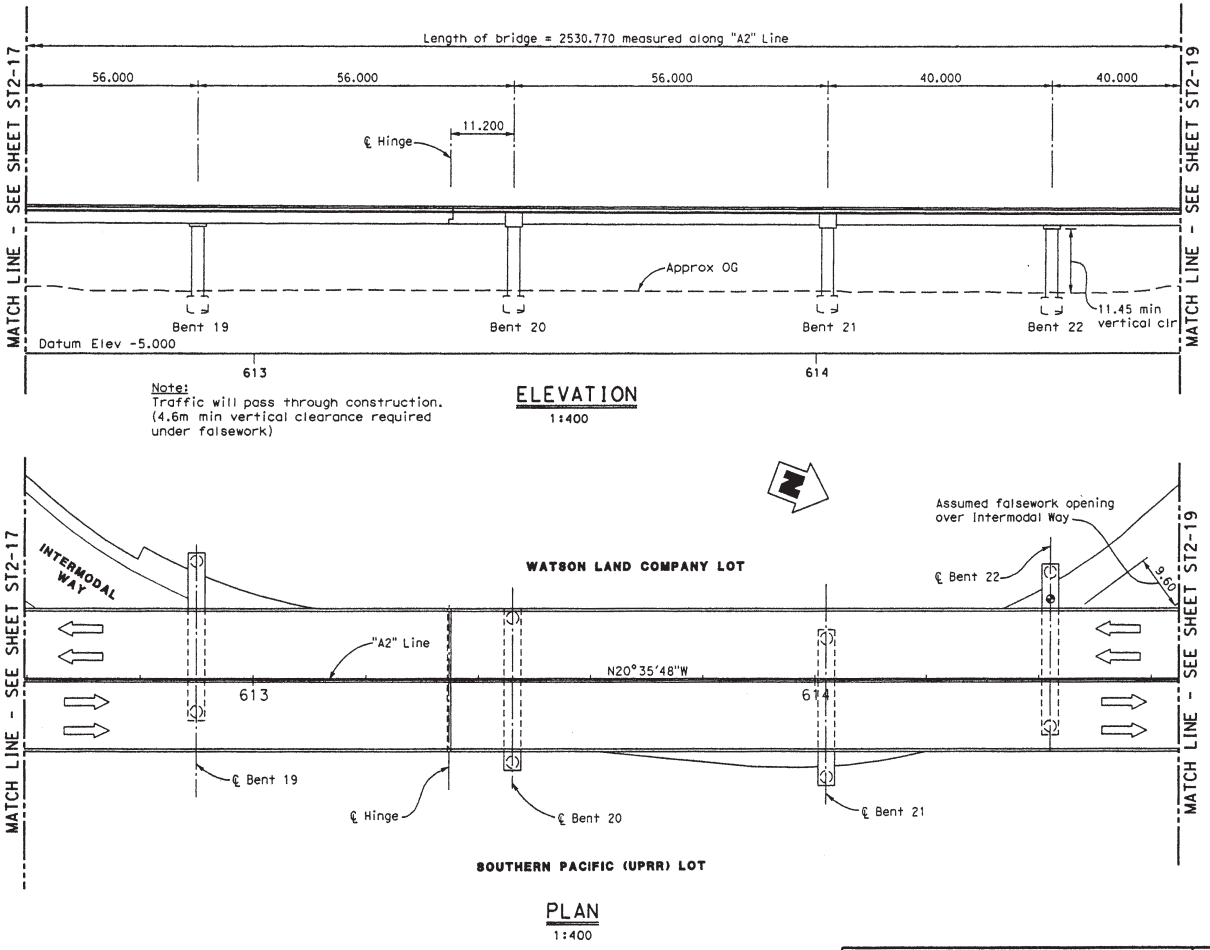
Source: Alameda Corridor Transportation Authority

Appendix B.3 page 4
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway



Appendix B.3 page 5
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway

Source: Alameda Corridor Transportation Authority



PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans Metric

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 2
ST2-18

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

PLANNING STUDY
"A2" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

DESIGN OVERSIGHT
SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

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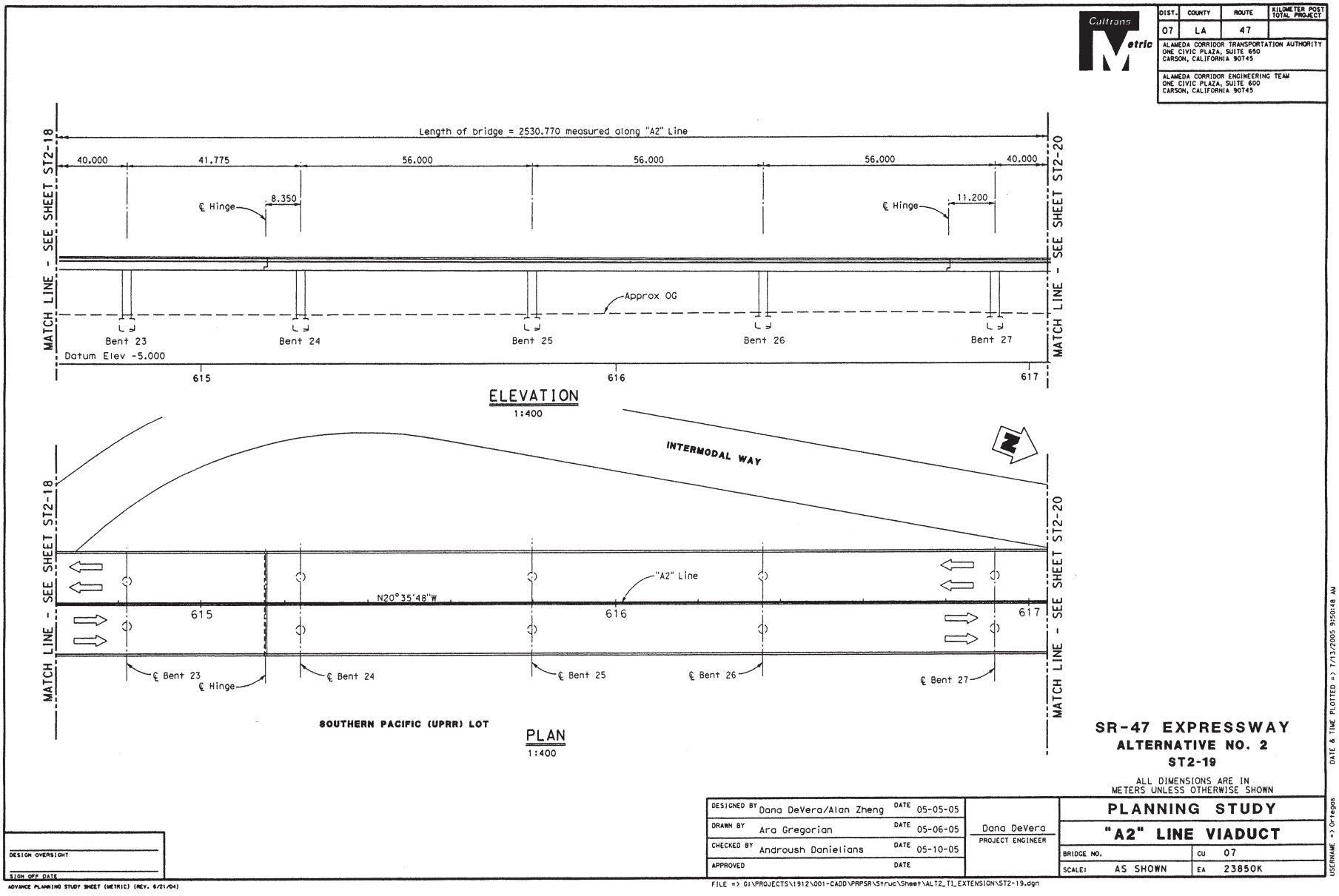
DATE & TIME PLOTTED => 7/13/2005 9:50:14 AM

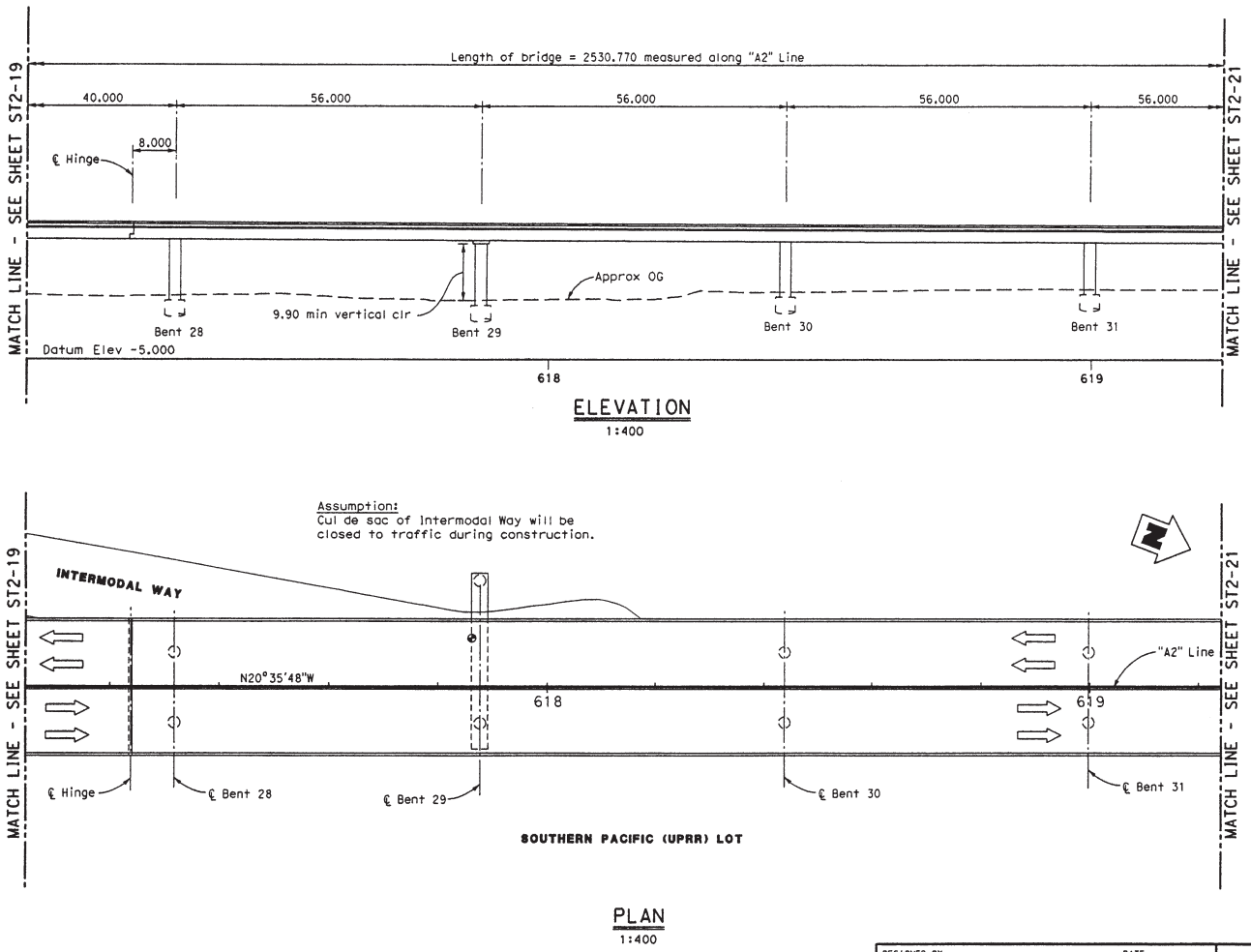
Source: Alameda Corridor Transportation Authority



Appendix B.3 page 7
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway

Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 2
ST2-20

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

PLANNING STUDY
"A2" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

DESIGN OVERSIGHT
SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

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USERNAME => Ortegas
DATE & TIME PLOTTED => 7/13/2005 9:51:20 AM

Source: Alameda Corridor Transportation Authority

Appendix B.3 page 8
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway

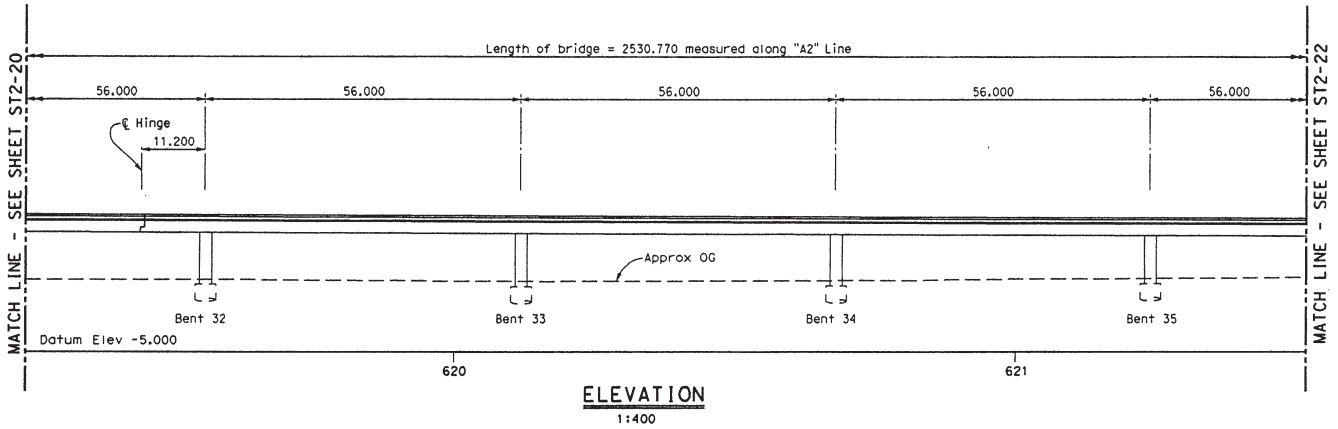
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans Metric

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745



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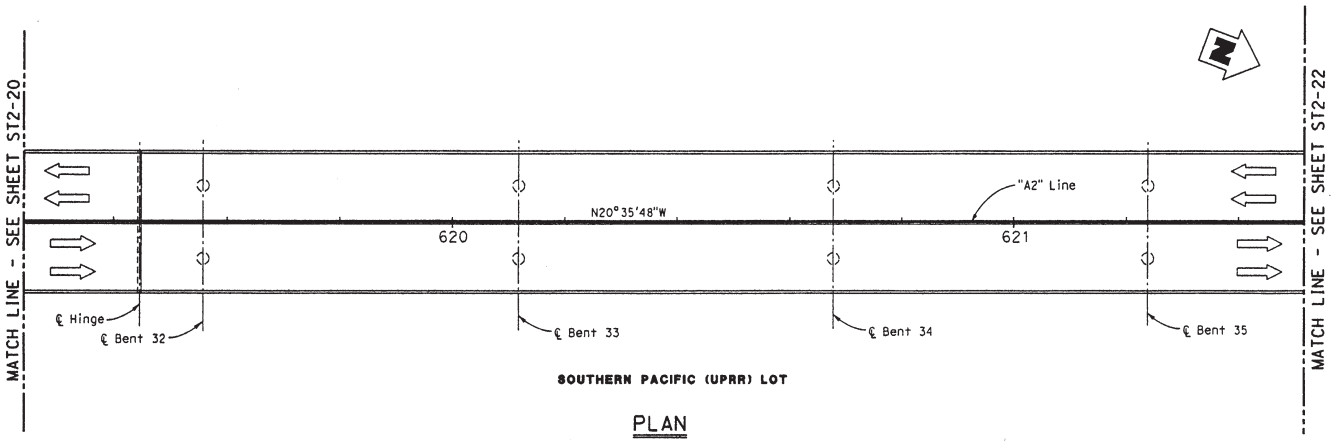

SOUTHERN PACIFIC (UPRR) LOT

PLAN
1:400

SR-47 EXPRESSWAY
ALTERNATIVE NO. 2
ST2-21

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

PLANNING STUDY
"A2" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

DESIGN OVERSIGHT
SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

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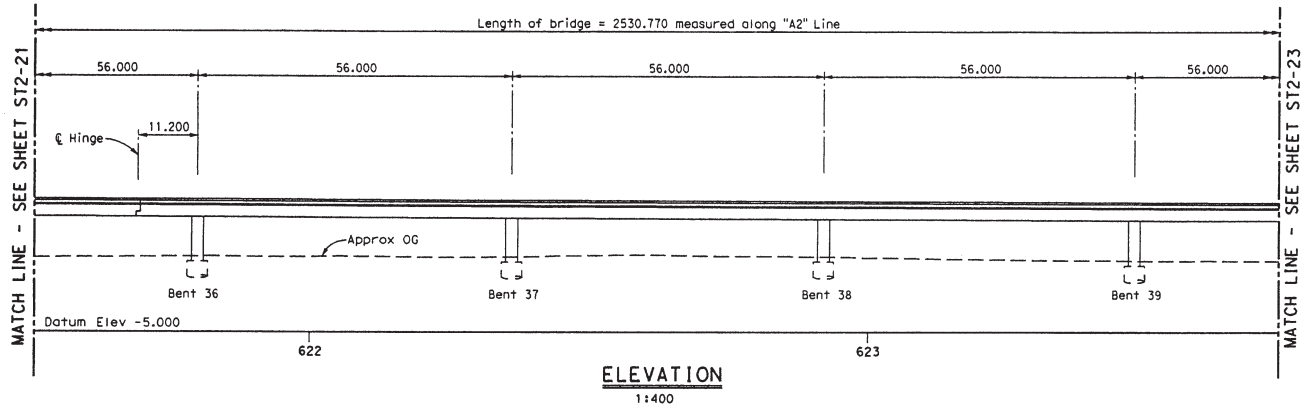
Appendix B.3 page 9
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway

Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



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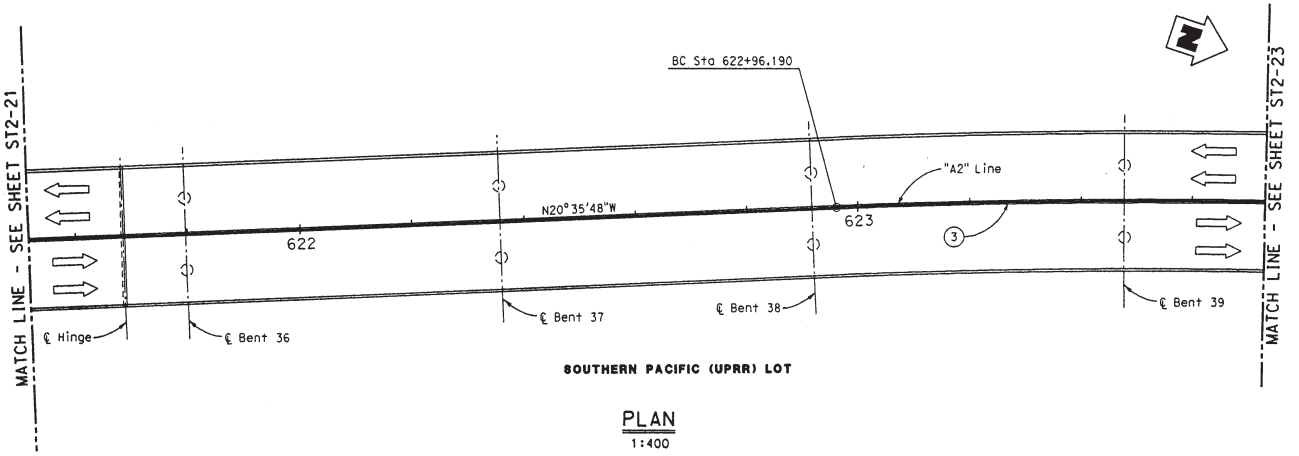

PLAN
1:400

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 2
ST2-22

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

CURVE DATA

NO	R	Δ	T	L
3	1309.005	32°59'0"	387.536	753.549

DESIGN OVERSIGHT
SIGN OFF DATE

DESIGNED BY	Dana DeVero/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Andoush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVero
PROJECT ENGINEER

PLANNING STUDY
"A2" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

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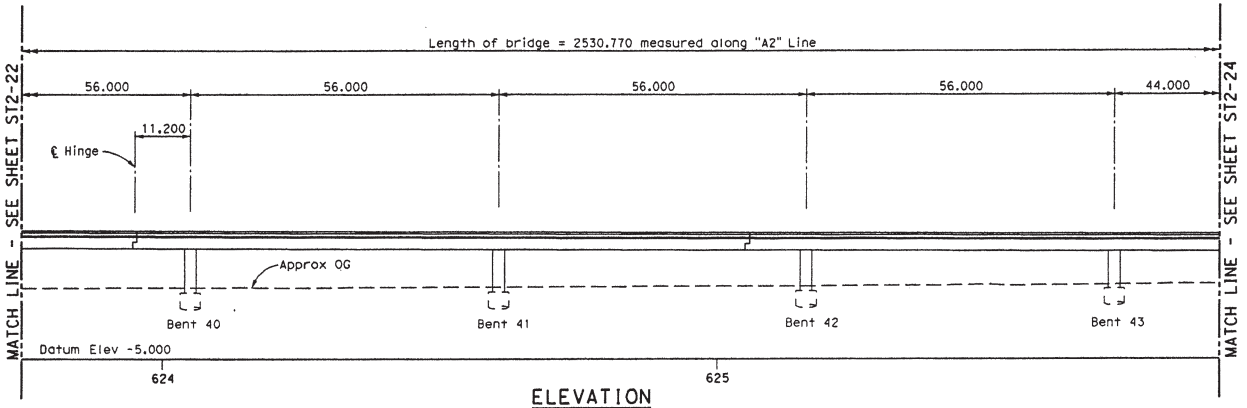
USERNAME => Ortega

Appendix B.3 page 10
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway

Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



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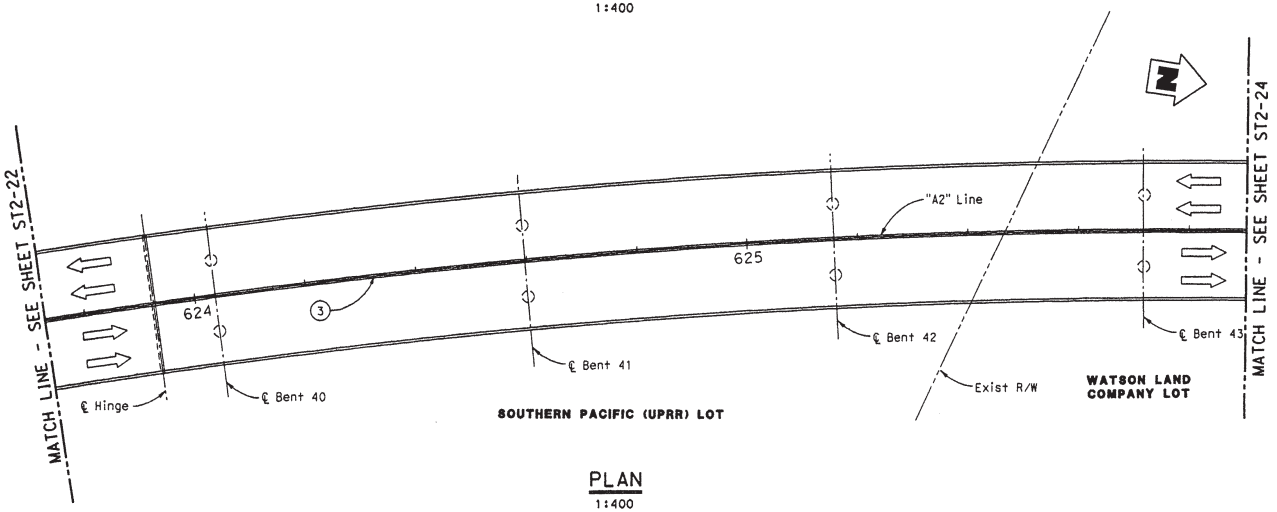

PLAN
1:400

CURVE DATA

NO	R	Δ	T	L
③	1309.005	32°59'0"	387.536	753.549

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 2
ST2-23

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY Dana DeVera/Alan Zheng	DATE 05-05-05	Dana DeVera PROJECT ENGINEER
DRAWN BY Ara Gregorian	DATE 05-06-05	
CHECKED BY Androush Danielians	DATE 05-10-05	
APPROVED	DATE	

PLANNING STUDY
"A2" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

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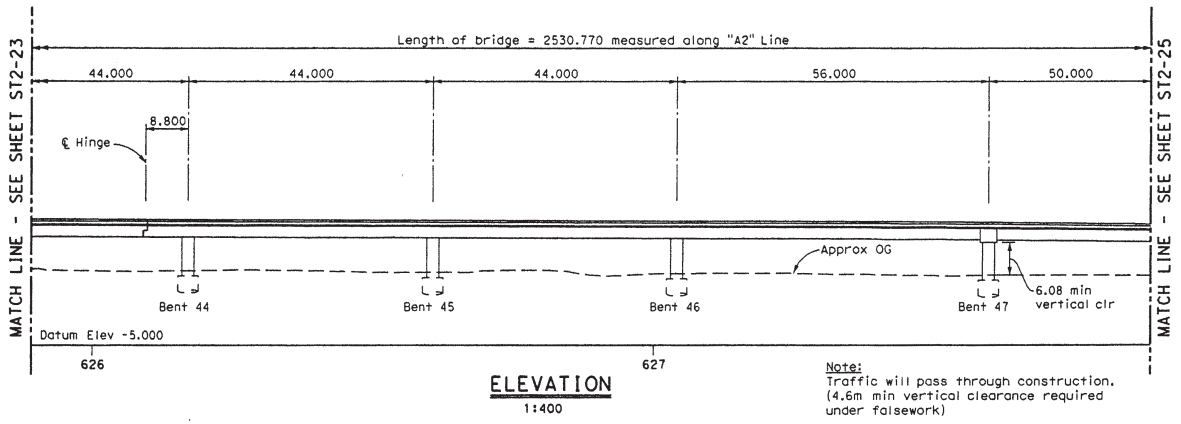
USERNAME => Ortegos

Appendix B.3 page 11
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway

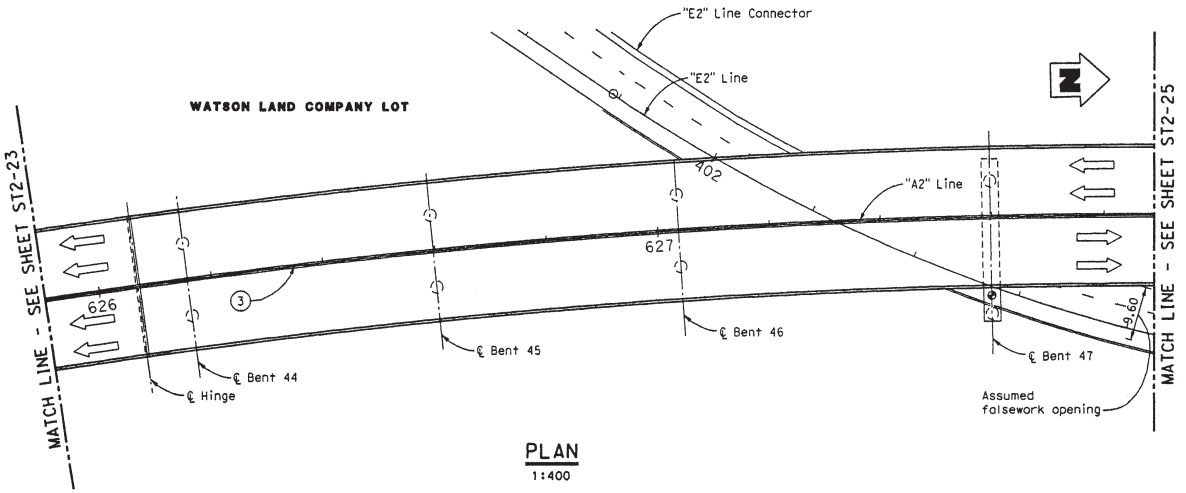
Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



ELEVATION
1:400

Note:
Traffic will pass through construction.
(4.6m min vertical clearance required under falsework)



PLAN
1:400

CURVE DATA				
NO	R	Δ	T	L
③	1309.005	32°59'0"	387.536	753.549

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

DESIGN OVERSIGHT
SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 2
ST2-24

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

PLANNING STUDY
"A2" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

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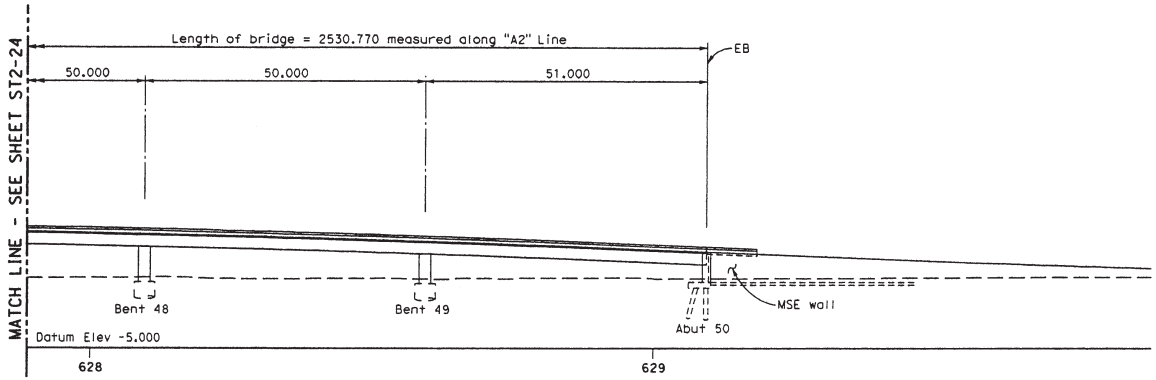
Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



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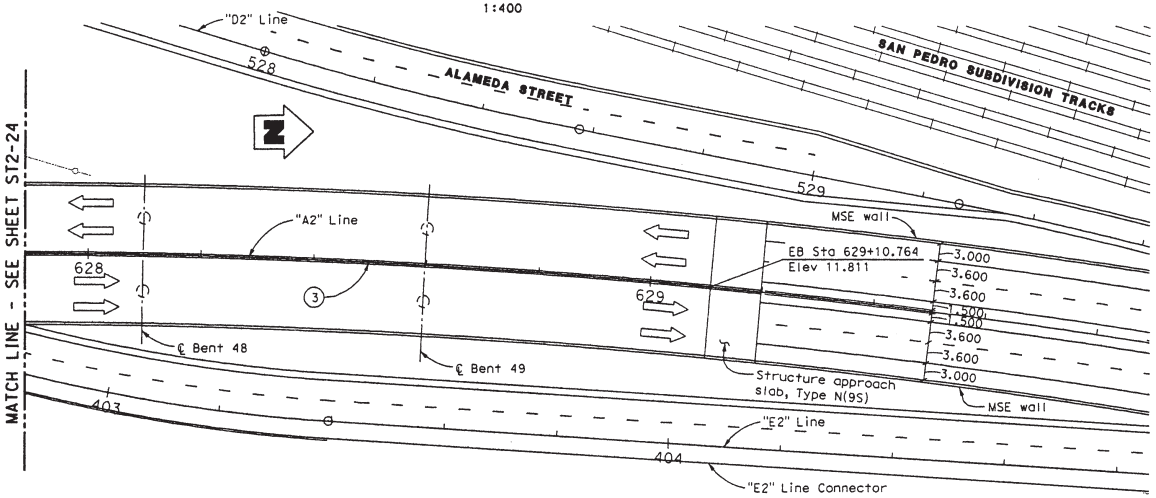

PLAN
1:400

CURVE DATA				
NO	R	Δ	T	L
③	1309.005	32°59'0"	387.536	753.549

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 2
ST2-25

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Androush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

PLANNING STUDY
"A2" LINE VIADUCT

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

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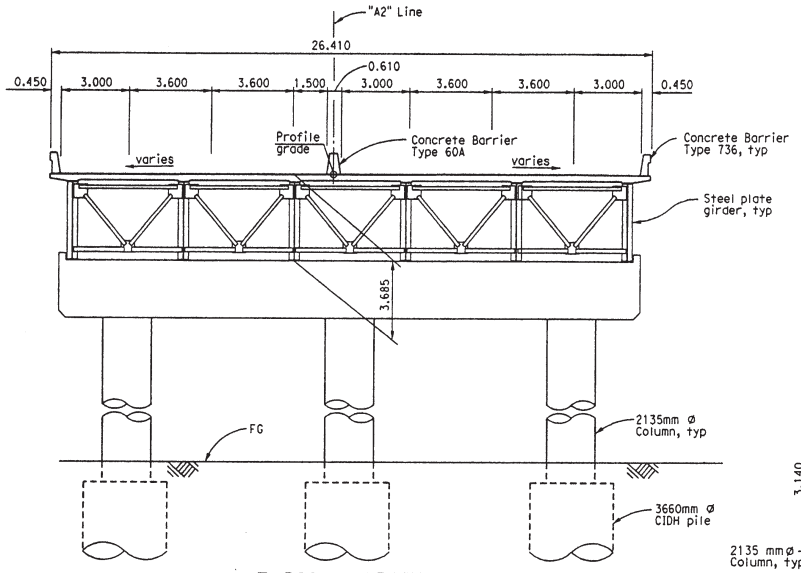
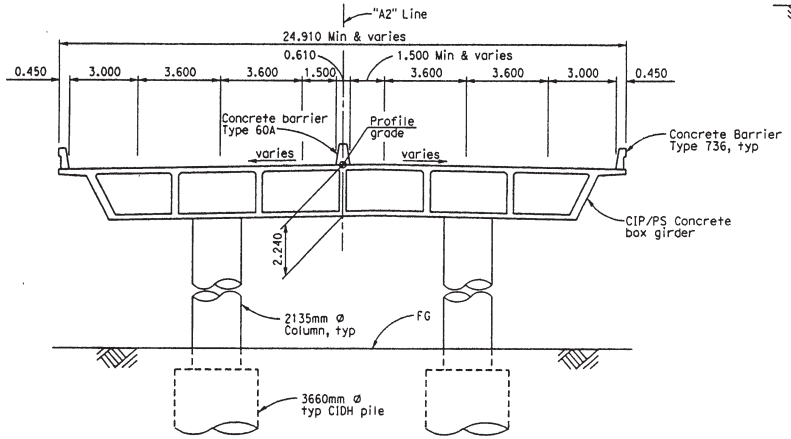
Source: Alameda Corridor Transportation Authority

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



TYPICAL SECTION
1:100
(BENT 6, BENTS 5 & 7 similar)



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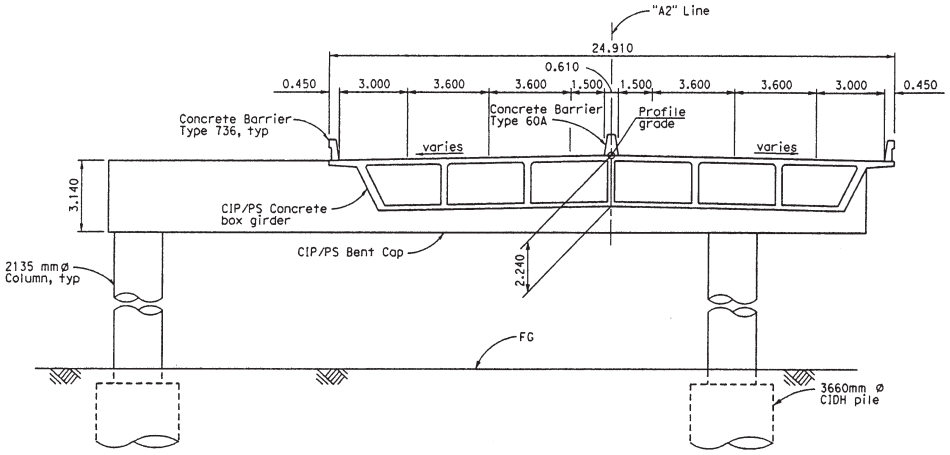
(BENTS 2-4, 9-18, 23-28, 30-46, 48 & 49, BENT 8 similar)



TYPICAL SECTION
1:100
(BENT 29, BENTS 19-22 & 47 similar)

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY
ALTERNATIVE NO. 2
ST2-26

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Dana DeVera/Alan Zheng	DATE	05-05-05
DRAWN BY	Ara Gregorian	DATE	05-06-05
CHECKED BY	Andrush Danielians	DATE	05-10-05
APPROVED		DATE	

Dana DeVera
PROJECT ENGINEER

PLANNING STUDY
"A2" LINE VIADUCT TYPICAL SECTIONS

BRIDGE NO.		CU	07
SCALE:	AS SHOWN	EA	23850K

DESIGN OVERSIGHT
SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 6/21/04)

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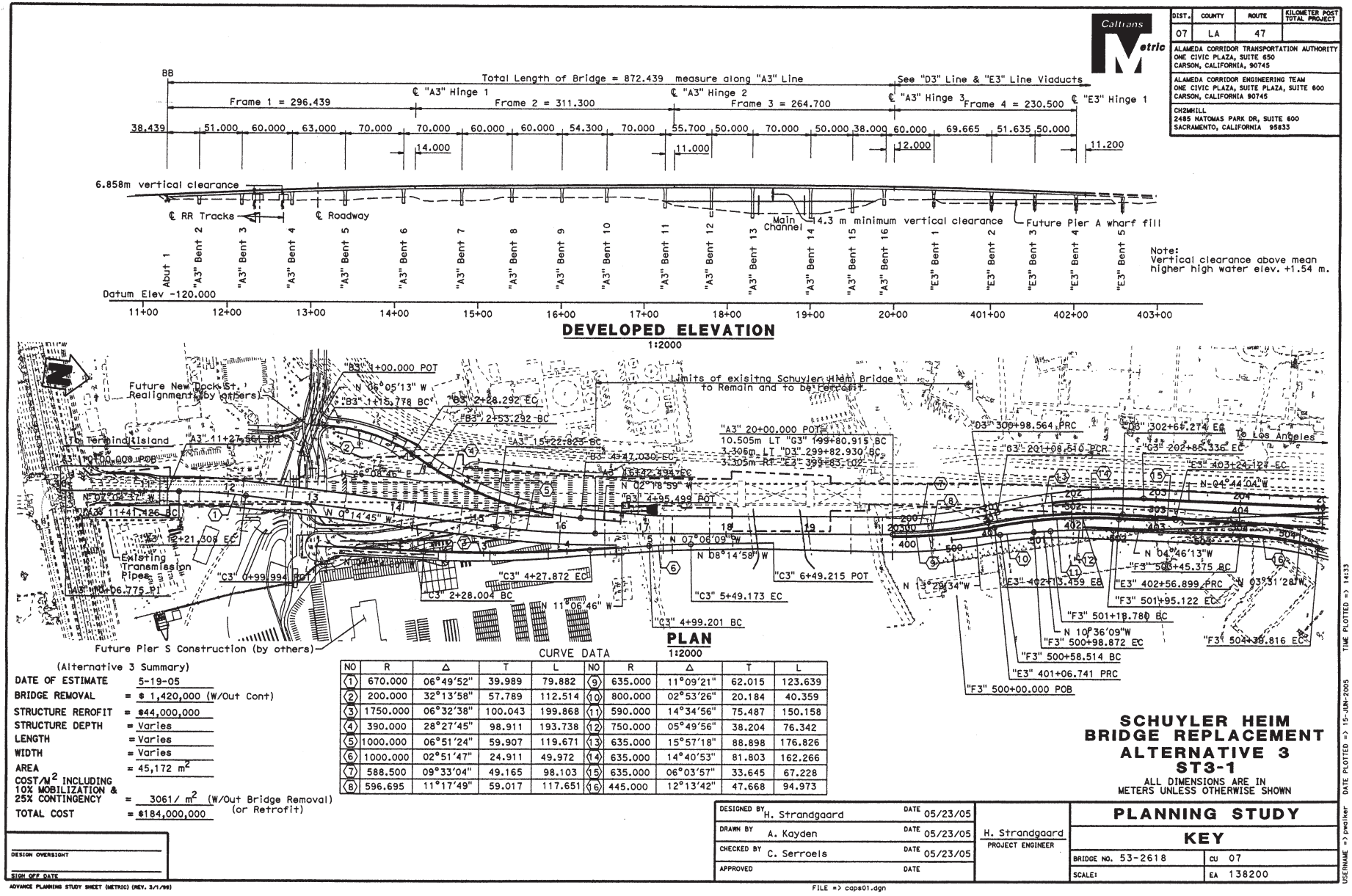
USERNAME => Ortegas

Appendix B.3 page 14
Alternative 2: SR-103 Expressway
Schuyler Heim Bridge Replacement
and SR-47 Expressway

Source: Alameda Corridor Transportation Authority

Appendix B.4
Alternative 3: Bridge

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



(Alternative 3 Summary)

DATE OF ESTIMATE	5-19-05
BRIDGE REMOVAL	= $ 1,420,000 (W/Out Cont)
STRUCTURE REROFIT	= $44,000,000
STRUCTURE DEPTH	= Varies
LENGTH	= Varies
WIDTH	= Varies
AREA	= 45,172 m^2
COST/M^2 INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	= 3061/ m^2 (W/Out Bridge Removal (or Retrofit)
TOTAL COST	= $184,000,000

CURVE DATA

NO	R	Δ	T	L	NO	R	Δ	T	L
1	670.000	06°49'52"	39.989	79.882	9	635.000	11°09'21"	62.015	123.639
2	200.000	32°13'58"	57.789	112.514	10	800.000	02°53'26"	20.184	40.359
3	1750.000	06°32'38"	100.043	199.868	11	590.000	14°34'56"	75.487	150.158
4	390.000	28°27'45"	98.911	193.738	12	750.000	05°49'56"	38.204	76.342
5	1000.000	06°51'24"	59.907	119.671	13	635.000	15°57'18"	88.898	176.826
6	1000.000	02°51'47"	24.911	49.972	14	635.000	14°40'53"	81.803	162.266
7	588.500	09°33'04"	49.165	98.103	15	635.000	06°03'57"	33.645	67.228
8	596.695	11°17'49"	59.017	117.651	16	445.000	12°13'42"	47.668	94.973

SCHUYLER HEIM
BRIDGE REPLACEMENT
ALTERNATIVE 3
ST3-1

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY H. Strandgaard	DATE 05/23/05	H. Strandgaard PROJECT ENGINEER	PLANNING STUDY
DRAWN BY A. Kayden	DATE 05/23/05		KEY
CHECKED BY C. Serroels	DATE 05/23/05		BRIDGE NO. 53-2618 / CU 07
APPROVED	DATE		SCALE: / EA 138200

DESIGN OVERSIGHT
SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 3/1/99)

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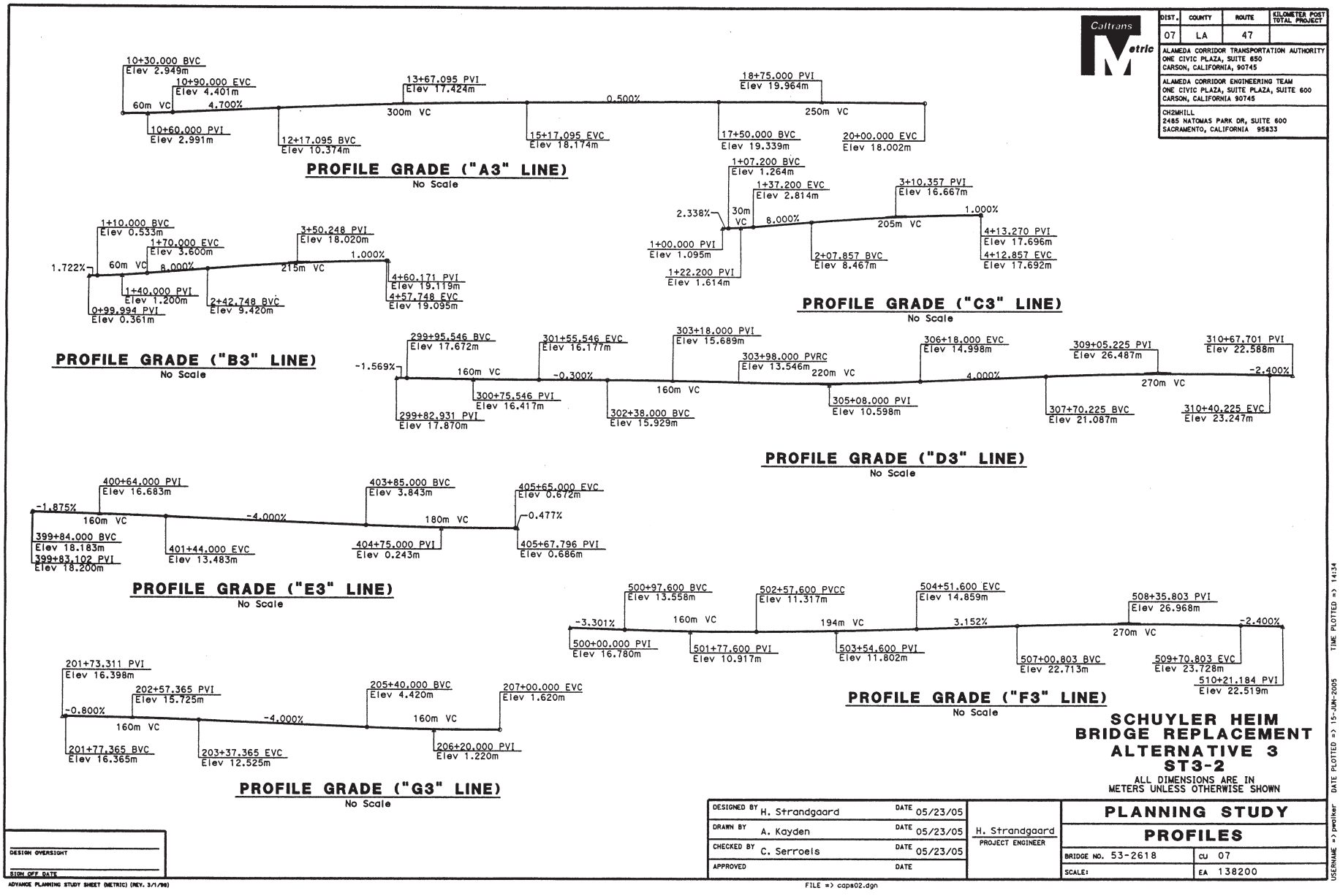
USERNAME => pwalker DATE PLOTTED => 15-JUN-2005 TIME PLOTTED => 14:33

Source: Alameda Corridor Transportation Authority

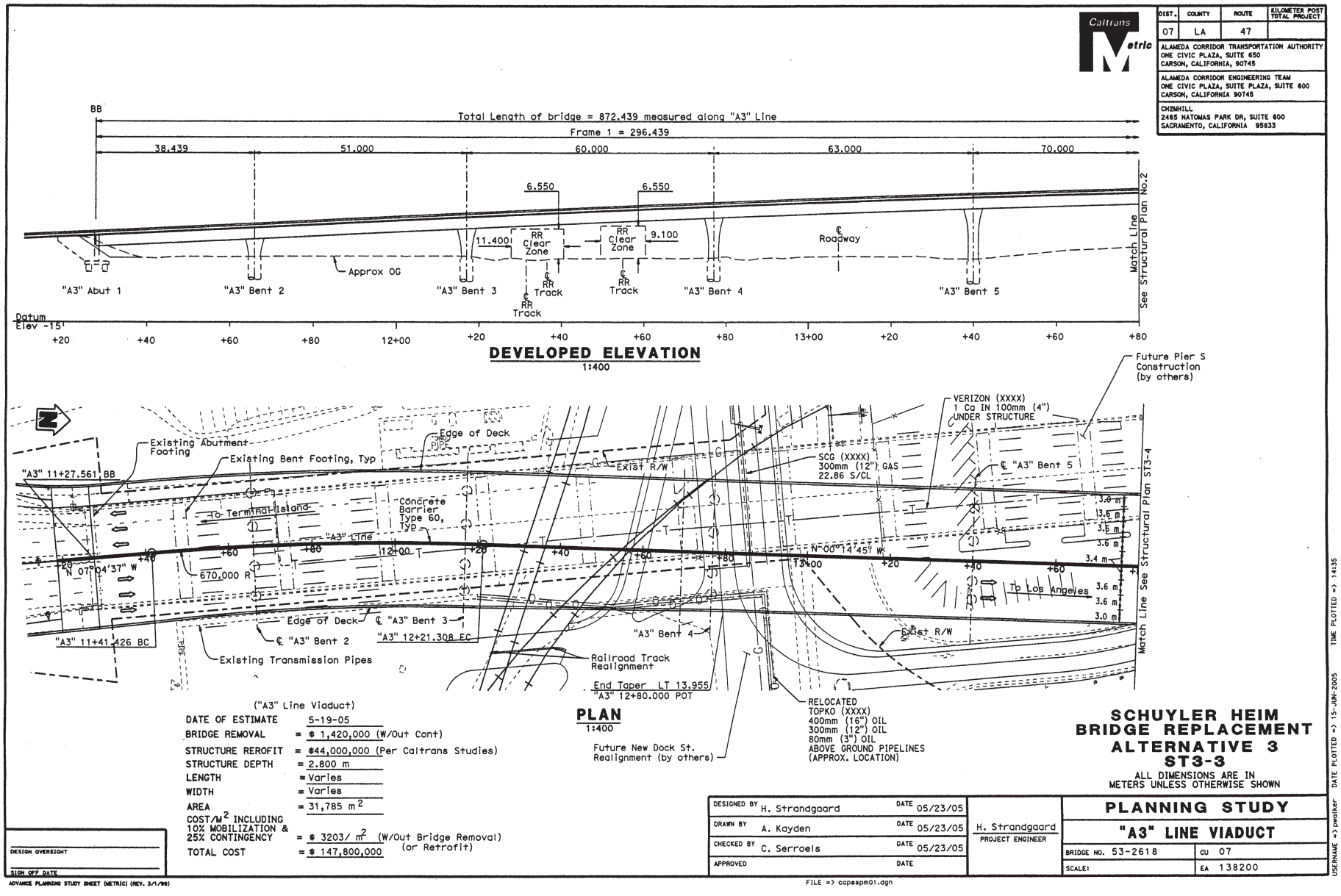
Appendix B.4 page 1
Alternative 3: Bridge
Schuyler Heim Bridge Replacement and SR-47 Expressway



Appendix B.4 page 2
Alternative 3: Bridge
Schuyler Heim Bridge Replacement
and SR-47 Expressway

Source: Alameda Corridor Transportation Authority

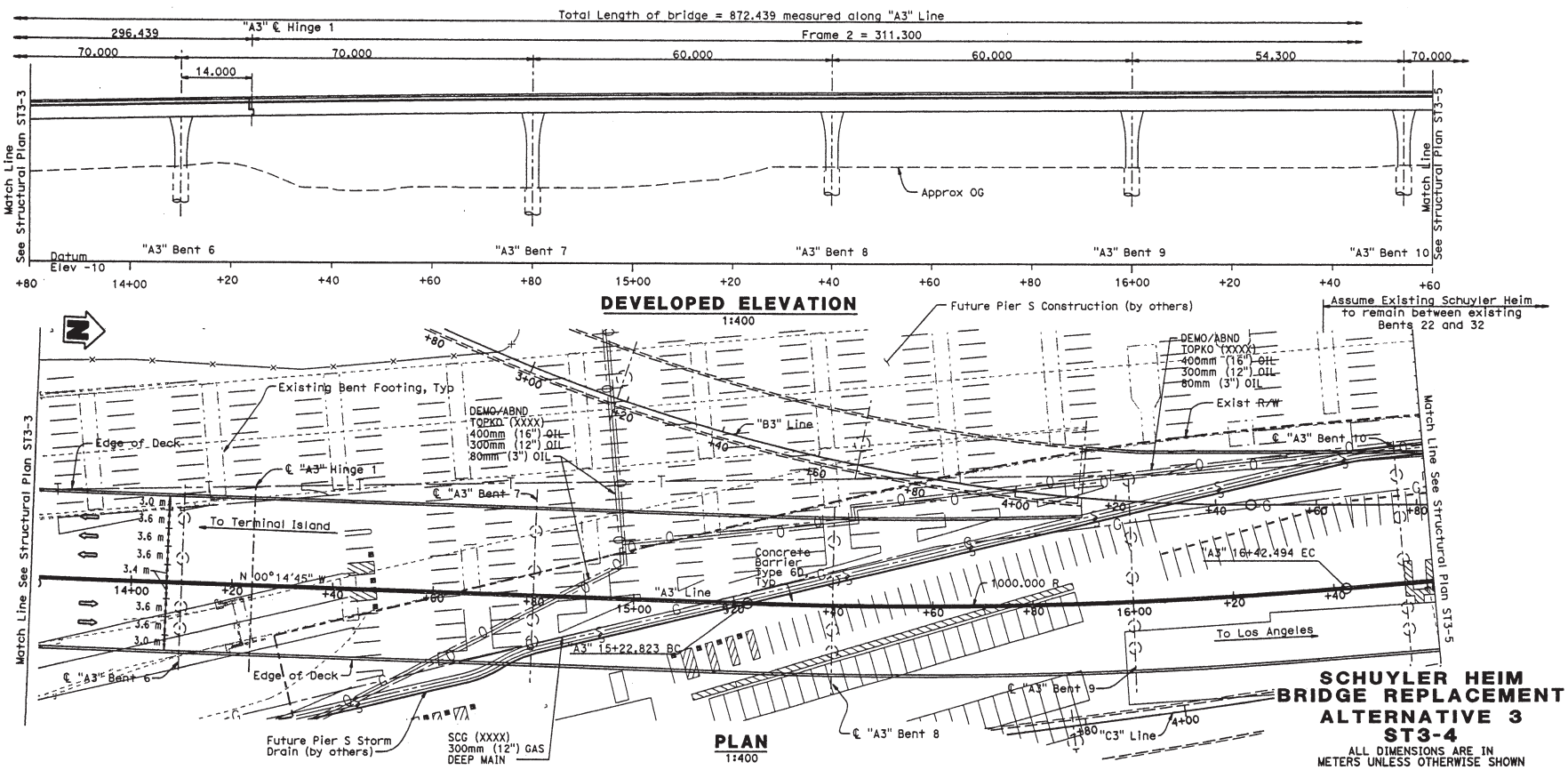
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



Source: Alameda Corridor Transportation Authority

Appendix B.4 page 3
Alternative 3: Bridge
Schuyler Heim Bridge Replacement and SR-47 Expressway

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



Caltrans Metric

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
07	LA	47	

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 650
CARSON, CALIFORNIA, 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE PLAZA, SUITE 600
CARSON, CALIFORNIA 90745

CH2MHILL
2485 NATOMAS PARK DR, SUITE 600
SACRAMENTO, CALIFORNIA 95833

SCHUYLER HEIM BRIDGE REPLACEMENT
ALTERNATIVE 3
ST3-4
ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY H. Strandgaard	DATE 05/23/05	H. Strandgaard PROJECT ENGINEER
DRAWN BY A. Kayden	DATE 05/23/05	
CHECKED BY C. Serroels	DATE 05/23/05	
APPROVED	DATE	

PLANNING STUDY
"A3" LINE VIADUCT

BRIDGE NO. 53-2618	CU 07
SCALE:	EA 138200

DESIGN OVERSIGHT
SIGN OFF DATE
ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 3/1/99)

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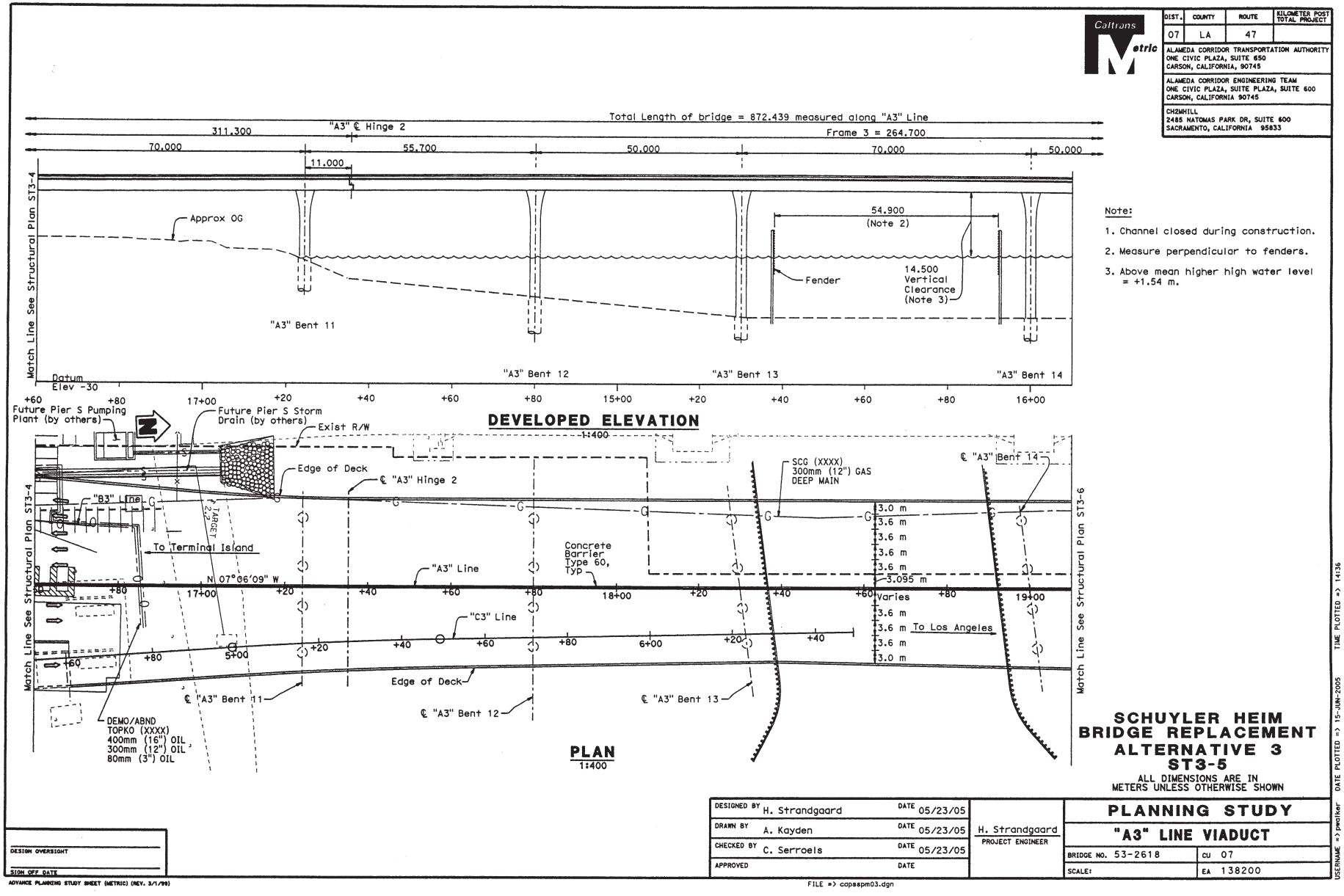
USERNAME => pwalker

Source: Alameda Corridor Transportation Authority

Appendix B.4 page 4
Alternative 3: Bridge
Schuyler Heim Bridge Replacement and SR-47 Expressway

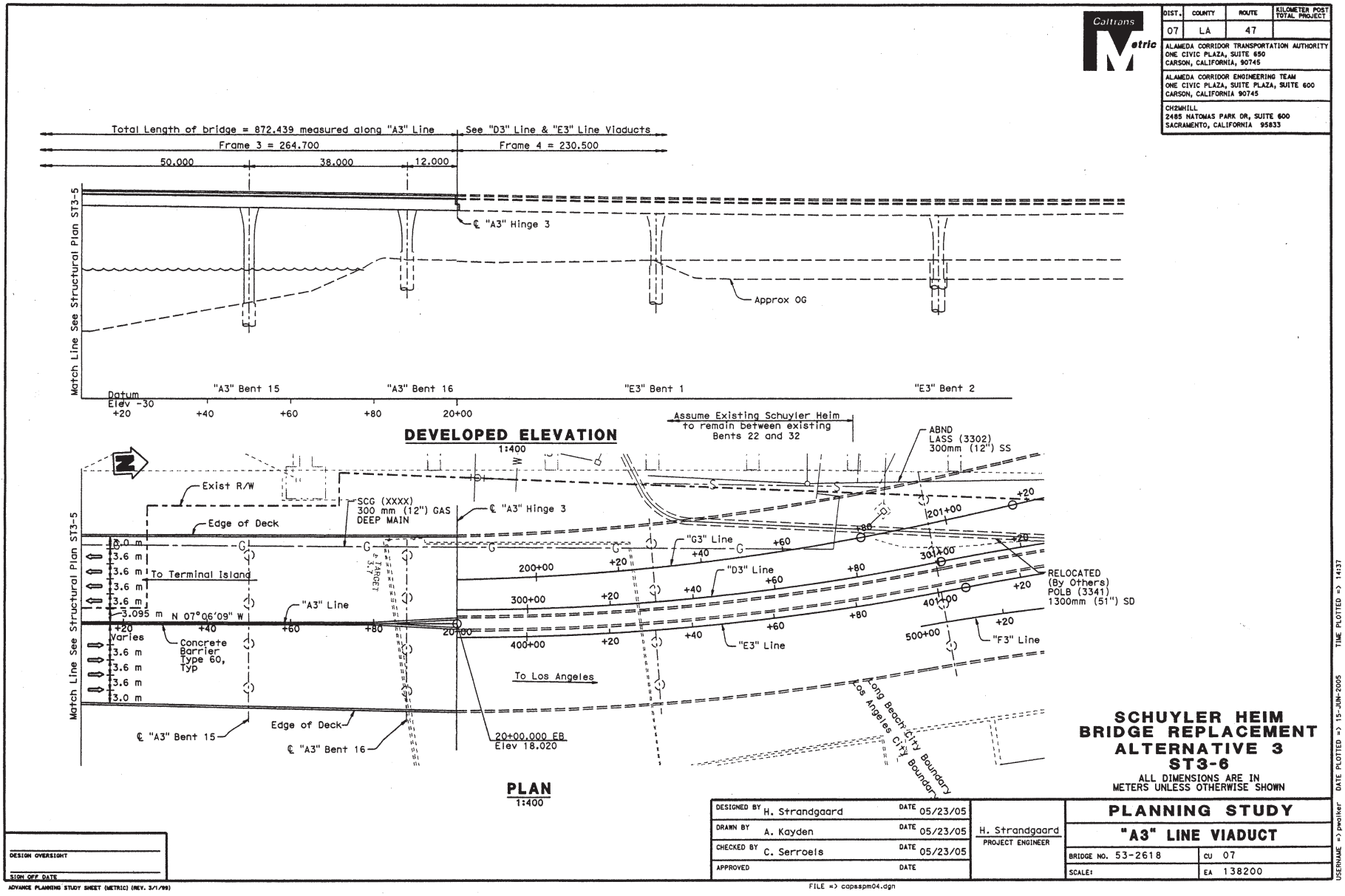
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



Source: Alameda Corridor Transportation Authority

Appendix B.4 page 5
Alternative 3: Bridge
Schuyler Heim Bridge Replacement
and SR-47 Expressway

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



Appendix B.4 page 6
Alternative 3: Bridge
Schuyler Heim Bridge Replacement and SR-47 Expressway

Source: Alameda Corridor Transportation Authority

Final
Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Section 4(f) Evaluation

Commodore Schuyler Heim Bridge (Br. No. 53-2618) and SR-47 in the Ports of Long Beach and Los Angeles, Los Angeles County, California

07-LA-47-KP 4.4/9.3 (PM 2.7/5.8)
EA: 238500

The environmental review, consultation, and any other action required in accordance with applicable federal laws for this project are being, or have been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327.

March 2009

Caltrans

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Final Section 4(f) Evaluation

Commodore Schuyler Heim Bridge Replacement (Br. No. 53-2618) and SR-47 Expressway in the Ports of Long Beach and Los Angeles, Los Angeles County, California

07-LA-47-KP 4.4/9.3 (PM 2.7/5.8)

EA: 238500

March 2009

Prepared By: _____ Date: March 2009

Richard Starzak, Senior Architectural Historian/Principal
Shilpa Trisal, AICP
Jones & Stokes
811 West 7th Street, Suite 800
Los Angeles, CA 90017

Reviewed By: _____ Date: March 2009

Karl Price
Environmental Planning, Central Area Projects Branch Chief
Caltrans District 7
100 S. Main Street
Los Angeles, CA 90012

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1.0 Section 4(f) Evaluation

1.1 Application of Section 4(f)

1.1.1 Introduction

Section 4(f) of the Department of Transportation Act of 1966, codified at 49 USC Section 303, declares that "[i]t is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

Section 4(f) specifies that

> [t]he Secretary [of Transportation] may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge or site) only if
>
> (1) there is no prudent and feasible alternative to using that land; and
>
> (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

Section 4(f) further requires consultation with the Department of Interior and, as appropriate, the involved offices of the Department of Agriculture and the Department of Housing and Urban Development, and relevant state and local officials, in developing transportation projects and programs that use lands protected by Section 4(f).

The proposed Schuyler Heim Bridge Replacement and State Route (SR)-47 Expressway Project (proposed project) alternatives, as described in Chapter 2.0, are a transportation project that may receive federal funding and/or discretionary approvals through the U.S. Department of Transportation (i.e., FHWA [Federal Highway Administration]); therefore, documentation of compliance with Section 4(f) is required.

This Section 4(f) evaluation has been prepared in accordance with the joint FHWA/ Federal Transit Administration (FTA) regulations for Section 4(f) compliance codified at 23 CFR Section 771.135. Additional guidance has been obtained from the FHWA Technical Advisory T 6640.8A (1987) and the revised FHWA Section 4(f) Policy Paper (2005).

1.1.2 Section 4(f) "Use"

As defined in 23 CFR Section 771.135(p), the "use" of a protected Section 4(f) resource occurs when any of the following conditions are met:

- Land is permanently incorporated into a transportation facility through partial or full acquisition (i.e., "direct use").

- There is a temporary occupancy of land that is adverse in terms of the preservationist purposes of Section 4(f).
- There is no permanent incorporation of land, but the proximity of a transportation facility results in impacts so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired (i.e., "constructive use").

Direct Use

A direct use of a Section 4(f) resource takes place when property is permanently incorporated into a proposed transportation project (23 CFR Section 771.135[p][1]). This may occur as a result of partial or full acquisition of a fee simple interest, permanent easements, or temporary easements that exceed regulatory limits noted below (23 CFR Section 771.135[p][7]).

Temporary Occupancy

A temporary occupancy of a Section 4(f) resource occurs when the temporary occupancy is considered adverse in terms of the preservationist purposes of the Section 4(f) statute. Under the FTA/FHWA regulations (23 CFR Section 771.135[p][7]), a temporary occupancy of property does not constitute a use of a Section 4(f) resource when the following conditions are satisfied:

- The occupancy is of temporary duration (i.e., shorter than the period of construction) and not involve a change in ownership of the property.
- The scope of work is minor, with only minimal changes to the protected resource.
- There are no permanent adverse physical effects on the protected resource, and there will be no temporary or permanent interference with the activities or purpose of the resource.
- The property being used will be fully restored to a condition that is at least as good as that which existed prior to the proposed project.
- There is documented agreement of the appropriate officials having jurisdiction over the resource regarding the foregoing requirements.

Constructive Use

A constructive use of a Section 4(f) resource happens when a transportation project does not permanently incorporate land from the resource, but the proximity of the project results in impacts (e.g., noise, vibration, visual, access, and/or ecological impacts) so severe that the protected activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired (23 CFR Section 771.135[p][2]). Substantial impairment occurs only if the protected activities, features, or attributes of the resource are substantially diminished.

This determination is made through the following practices:

- Identification of the current activities, features, or attributes of the resource that may be sensitive to proximity impacts.
- Analysis of the potential proximity impacts on the resource.

- Consultation with the appropriate officials having jurisdiction over the resource (23 CFR Section 771.135[p][6]).

1.2 Purpose and Need

The Federal Highway Administration (FHWA) and Caltrans identified the existing Schuyler Heim Bridge as not conforming to the current seismic criteria. Concurrently, the Alameda Corridor Transportation Authority confirmed the existing SR-47/SR-103 facilities do not comply with the State's Seismic Design Criteria or adequately serve as a high-capacity alternative route to SR-110 and SR-710 due to numerous at-grade railroad crossings and traffic signals.

The purpose of the proposed project is to: 1) provide a structurally and seismically safe vehicular connection between Terminal Island and the mainland that could remain in service following a major earthquake; and 2) provide a high-capacity alternative route between Terminal Island and I-405. The project includes replacement of the existing Schuyler Heim Bridge (lift-bridge) with a fixed-span bridge. The project is needed to provide for uninterrupted transport of people, freight, and goods between Terminal Island and the mainland after a major earthquake, and to improve safety and relieve congestion on the local street network.

1.3 Proposed Action

1.3.1 Description

The proposed project is to improve traffic conditions between Terminal Island, which is located within the Ports of Long Beach and Los Angeles, and major traffic arterials on the mainland to the north, primarily within the Cities of Long Beach and Los Angeles. The Commodore Schuyler F. Heim Bridge (Schuyler Heim Bridge) (Bridge No. 53-2618) is a major traffic route that connects Terminal Island within the Ports of Long Beach and Los Angeles to the mainland cities of Long Beach and Los Angeles. The bridge is owned by the California Department of Transportation (Caltrans) and is located within the City of Los Angeles and through property owned by the Port of Long Beach. The bridge spans the Cerritos Channel, through which ships serving both the Port of Los Angeles and Port of Long Beach pass. Six alternatives have been proposed for analysis in an Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the proposed project. There are four build alternatives, one Transportation System Management (TSM) alternative, and one No-Build alternative. These alternatives are described below. The four build alternatives are shown in Figure 1.

Alternative 1: Bridge Replacement and Expressway

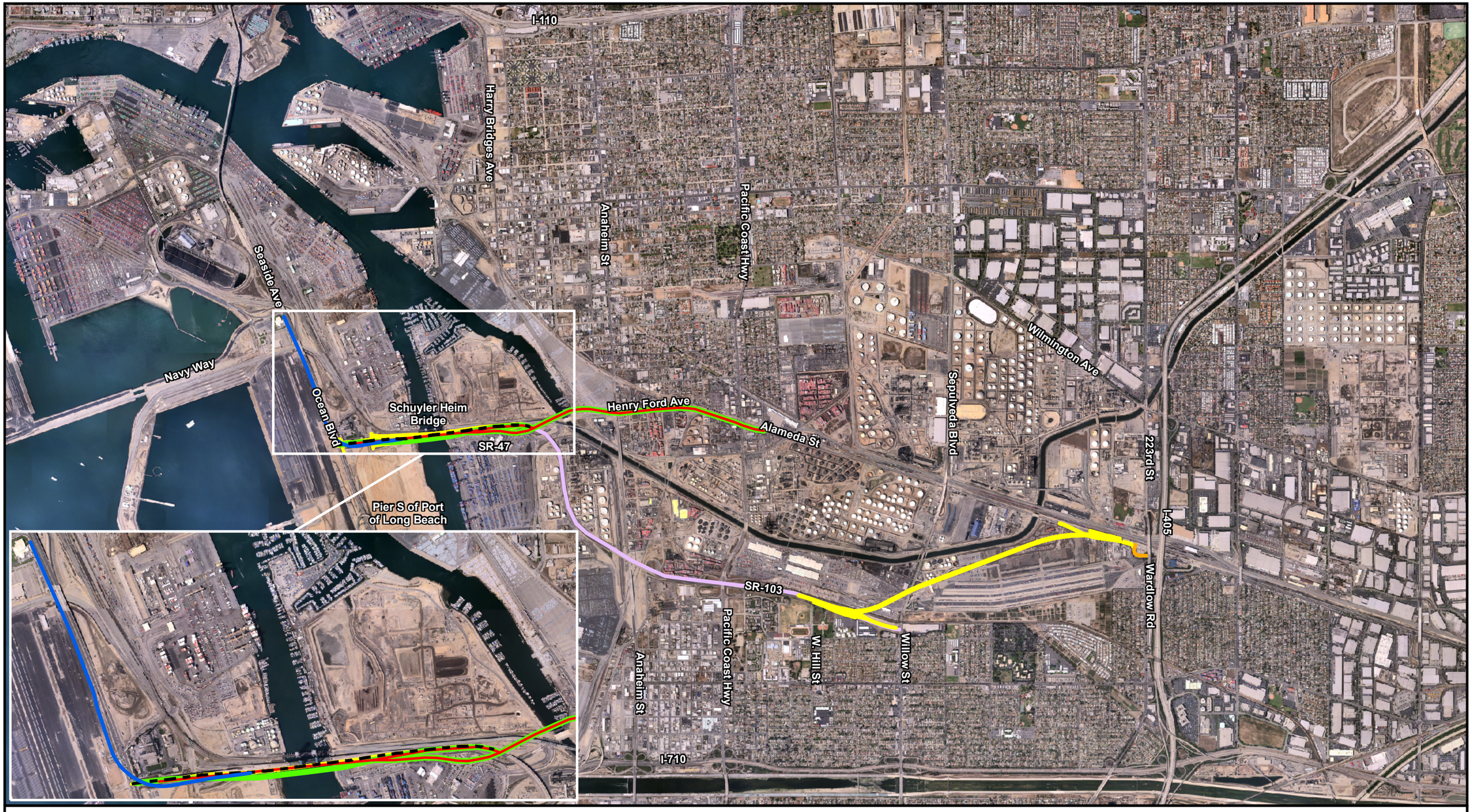
Alternative 1 would replace the existing Schuyler Heim Bridge (lift bridge) (built in 1946-1948) in order to meet current seismic criteria. The bridge would provide a route linking Terminal Island to the mainland and would be designed to remain in service and ensure ground and vessel transportation is possible immediately following a major earthquake. Alternative 1 would include a new SR-47 Expressway to provide a high-capacity alternative route along the Alameda Corridor for traffic between Terminal Island and Alameda Street,

at Pacific Coast Highway, as well as improvements to the Alameda Street/Wardlow Road connector ramp. In addition, Alternative 1 would provide the Ocean Boulevard/SR-47 Flyover (flyover) on Terminal Island. The flyover will be a two-lane, elevated structure to divert traffic bound for northbound SR-47 directly onto the new bridge from eastbound Ocean Boulevard. This traffic then would be able to avoid the signalized Ocean Boulevard/ SR-47 intersection.

With this alternative, the new fixed-span bridge would be constructed, primarily within the existing bridge right-of-way (ROW) (Caltrans Highway Easement [HE(C)]), but toward the east to avoid impacts to the railroad on the Badger Avenue Bridge, which is immediately west of the existing bridge.

The replacement bridge would be slightly wider (13 m [43 ft]) than the existing bridge due to the addition of standard shoulders, which are not present on the existing bridge. The replacement bridge would include three 3.6-m (12-ft) traffic lanes (two through-lanes and one auxiliary lane), and 3-m (10-ft) shoulders in the northbound direction, and four 3.6-m (12-ft) lanes (three through-lanes and one auxiliary lane), and 3-m (10-ft) shoulders in the southbound direction. Construction of the replacement bridge would include a southbound off-ramp and northbound on-ramp at New Dock Street on Terminal Island, as well as a northbound off-ramp and southbound on-ramp at Henry Ford Avenue on the mainland side of the bridge. With this alternative, the new bridge would be supported by four piers in the channel, with a minimum vertical clearance of 14.3 m (47 ft) over the mean high water level (MHWL). The existing navigable width of the channel is 54.9 m (180 ft), and would not change under this alternative. The navigable width is directly tied to the navigable width (54.9 m [180 ft]) of the Badger Avenue Bridge (rail) located immediately west of the Schuyler Heim Bridge.

The southern end of the new SR-47 Expressway would begin on Terminal Island, at the intersection of SR-47 and Ocean Boulevard, and extend north over New Dock Street and onto the replacement bridge. The expressway would extend northward to Alameda Street, at the intersection with Pacific Coast Highway, a distance of approximately 2.7 kilometers (km) (1.7 miles [mi]). The expressway would be a four-lane, limited access roadway. It would provide grade-separation at five at-grade railroad crossings and three signalized intersections along its length. A segment of the expressway would be constructed as an elevated roadway (viaduct) over Henry Ford Avenue and Alameda Street and return to grade at Alameda Street, just south of Pacific Coast Highway. Under this alternative, the current connectivity to SR-103 would be maintained. This alternative includes improvements to the Alameda Street/Wardlow Road connector and to Alameda Street north and south of the connector.



LEGEND

- Alternative 1: Bridge Replacement and SR-47 Expressway
- Alternative 2: SR-103 Extension
- Alternative 3: Bridge Avoidance
- Alternative 4: Bridge Replacement Only
- Wardlow Road/223rd Street Ramp
- Ocean Boulevard/SR-47 Flyover
- Existing SR-103

Aerial Date: May 2002

Note: Project components not to scale

0 2,800 Feet

0 1,000 Meters

Figure 1
Build Alternatives
Schuyler Heim Bridge Replacement and SR-47 Expressway

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Alternative 1A: Haunch Bridge Design

Alternative 1A is a structural variation of Alternative 1. The main purpose of this alternative is to improve the aesthetic appearance of the replacement bridge over the Cerritos Channel and to span a greater horizontal distance across the channel between columns. This is accomplished by increasing the span lengths over the channel and arching the superstructure soffits (the bottom of the bridge structure). Under this alternative, the new bridge would be supported by two piers (four columns) in the Cerritos Channel, compared to four piers (eight columns) under Alternative 1; and the minimum vertical clearance between the piers would be of 14.3 m (47 ft).

With this alternative, the new bridge would be supported by two piers in the channel, with a minimum vertical clearance of 14.3 m (47 ft) over the MHWL. The existing navigable width of the channel is 54.9 m (180 ft), and would not change under this alternative. The navigable width is directly tied to the navigable width (54.9 m [180 ft]) of the Badger Avenue Bridge (rail) located immediately west of the Schuyler Heim Bridge.

Other aspects of this alternative would be the same as Alternative 1.

Alternative 2: SR-103 Extension to Alameda Street

With this alternative, just as in Alternative 1, a new fixed-span bridge would be constructed, and the existing Schuyler Heim Bridge would be subsequently demolished. Additionally, modifications to the northbound and southbound approaches to the bridge would be constructed. Similar to Alternative 1, a new southbound off-ramp and northbound on-ramp at New Dock Street on Terminal Island would be constructed. This alternative would include the flyover and also would extend SR-103 from south of West Hill Street to the northwest on a four-lane viaduct to join Alameda Street between Sepulveda Boulevard and I-405. Improvements to SR-103 would begin approximately 3.2 km (2 mi) north of the Schuyler Heim Bridge and extend a distance of approximately 2.6 km (1.6 mi). The viaduct would cross over the Union Pacific Railroad manual yard and San Pedro Branch line, through the Southern California Edison (SCE) utility corridor, across the Los Angeles Harbor Department Warehouse 16/17 area, and over Sepulveda Boulevard, then turn parallel to the western boundary of the Intermodal Container Transfer Facility (ICTF) to the centerline of Alameda Street. The viaduct would return to grade south of the Wardlow Road ramps to I-405. Improvements would be made to the existing SR-103 to accommodate the southerly end connection of the viaduct and to SR-47 to accommodate the northerly end connection of the viaduct. This alternative also includes widening the Alameda Street/Wardlow Road connector and improvements to Alameda Street north and south of the connector.

Alternative 3: Bridge Avoidance

This alternative was developed specifically as a potential avoidance alternative for the purpose of Section 4(f) analysis. It was conceived to preserve the existing Schuyler Heim Bridge following construction of a new fixed-span bridge on an alignment east of the existing bridge. The Schuyler Heim Bridge would be seismically retrofitted before construction of the new bridge; however, the approaches of the old bridge would be demolished and the old Schuyler Heim Bridge would no longer be used for transportation purposes once the new span goes into operation. The retrofit would be for safety purposes, to avoid demolition of a historic resource and ensure that the existing bridge would not collapse and result in safety

hazards or damage to the new bridge or to the adjacent Badger Avenue Bridge. Under this alternative, the new bridge would have the same lane configuration as the replacement bridge for Alternative 1.

Other aspects of this alternative would be the same as Alternative 1.

The existing bridge may be required to be demolished to comply with U.S. Coast Guard permit requirements. In preliminary consultations held in December 2005, the U.S. Coast Guard stated that the bridge would not be allowed to remain in place if not used for transportation purposes. They further indicated that their permit to construct a replacement bridge would include a requirement for subsequent demolition of the Schuyler Heim Bridge.

Alternative 4: Bridge Replacement Only

This alternative would replace the existing Schuyler Heim Bridge with a fixed-span bridge, largely along the existing bridge alignment, as described under Alternative 1. With this alternative, the flyover would not be constructed, and no roadway improvements would occur. Therefore, the SR-47 Expressway described in Alternative 1 would not be constructed, the SR-103 extension to Alameda Street described in Alternative 2 would not be constructed, and there would be no improvements to the Alameda Street/Wardlow Road connector ramp.

Alternative 5: Transportation System Management

This alternative is designed to identify low-cost, easily implemented improvements as an alternative to construction of more expensive improvements. For this project, the TSM alternative focuses on improvements to routes that parallel the proposed SR-47 Expressway, and that serve the same trips. These trips include trucking drayage trips to and from the ICTF, and trips destined to and from the ports via Alameda Street, Henry Ford Avenue, and SR-47. The TSM alternative would include measures to improve capacity and traffic circulation at the Port of Long Beach and Port of Los Angeles through policy changes and use of the latest technologies. With this alternative, capital investment would be minimal compared to the previous alternatives addressed.

The TSM alternative for this project includes the following key elements:

- Intelligent Transportation Systems (ITS): Systems applications in and around the Port area, with special emphasis on truck movements. These include measures to improve traffic circulation through traffic control, incident management, traffic surveillance, and traffic information dissemination with the aid of intelligent transportation system devices and systems.
- Lower-cost roadway and intersection improvements: Measures include restriping to provide additional turn lanes and acceleration lanes and traffic signalization improvements, primarily within existing ROWs.
- Minor roadway widening: There also could be peak-hour parking prohibitions to remove midblock bottlenecks along selected roadways.

Alternative 6: No Build

Under this alternative there would be no changes to the existing Schuyler Heim Bridge or local roadway system. The existing Schuyler Heim Bridge would continue to be seismically

inadequate and subject to damage or collapse under strong seismic conditions. Maintenance activities would continue and would include application of protective coatings; lift mechanism repairs; deck resurfacing; and other, maintenance activities. The existing SR-47 roadway would function with current and increasing levels of congestion.

1.4 Description of Section 4(f) Resources

As noted above, properties subject to Section 4(f) consideration include publicly owned lands of a public park/recreation area; a wildlife and waterfowl refuge of national, state, or local significance; or a historic site of national, state, or local significance, whether publicly or privately owned. Only those resources within about 0.4 km (0.25 mi) of the proposed project alternatives have been identified as being potentially affected by project impacts and thus subject to detailed Section 4(f) evaluation. These include three parks and recreational areas: Hudson Park, Hudson Elementary School, and Cabrillo High School. One historic resource is also identified: the Schuyler Heim Bridge. Three other parks are within 0.8 km (0.5 mi) of the project alternatives, but have no potential to be affected. These are: Admiral Kidd Park, East Wilmington Park, and the East Wilmington Greenbelt. No other significant historic resources were identified within 0.5 mile of the project.

As described more fully below, the Section 4(f) resources in the vicinity of the proposed project alternatives are limited to publicly owned parks/recreation areas and one significant historic site. Figure 2 illustrates the location of these Section 4(f) resources. There are no significant wildlife or waterfowl refuges in the proposed project area.

1.4.1 Public Parks and Recreation Areas with No Potential 4(f) Use

Three parks (Admiral Kidd Park, East Wilmington Park, and East Wilmington Greenbelt) are over 0.4 km (0.25 mi) from the site and are buffered from the project alternatives by distance (i.e., about 1,000 feet) and the presence of intervening structures. There is no reasonable likelihood that any direct, temporary, or constructive use would occur.

1.4.2 Public Parks and Recreation Areas with Potential 4(f) Use

One public park and two public schools where playgrounds/athletic fields are used for public recreation (Hudson Park, Hudson Elementary School, Cabrillo High School) have been identified within about 0.4 km (0.25 mi) of the project alternatives. These three properties are immediately adjacent to the Alternative 2 alignment. Table 1 provides a summary listing of these resources. Detailed descriptions are provided in Section 1.5 - Effects on Section 4(f) Resources.

TABLE 1
Section 4(f) Resources – Public Parks and Recreation Areas

Map #	Name	Location
1	Hudson Park	2335 Webster Ave. Long Beach
2	Hudson Elementary School (Playground/Athletic Fields)	2335 Webster Ave. Long Beach
3	Cabrillo High School (Playground/Athletic Fields)	2001 Santa Fe Ave. Long Beach

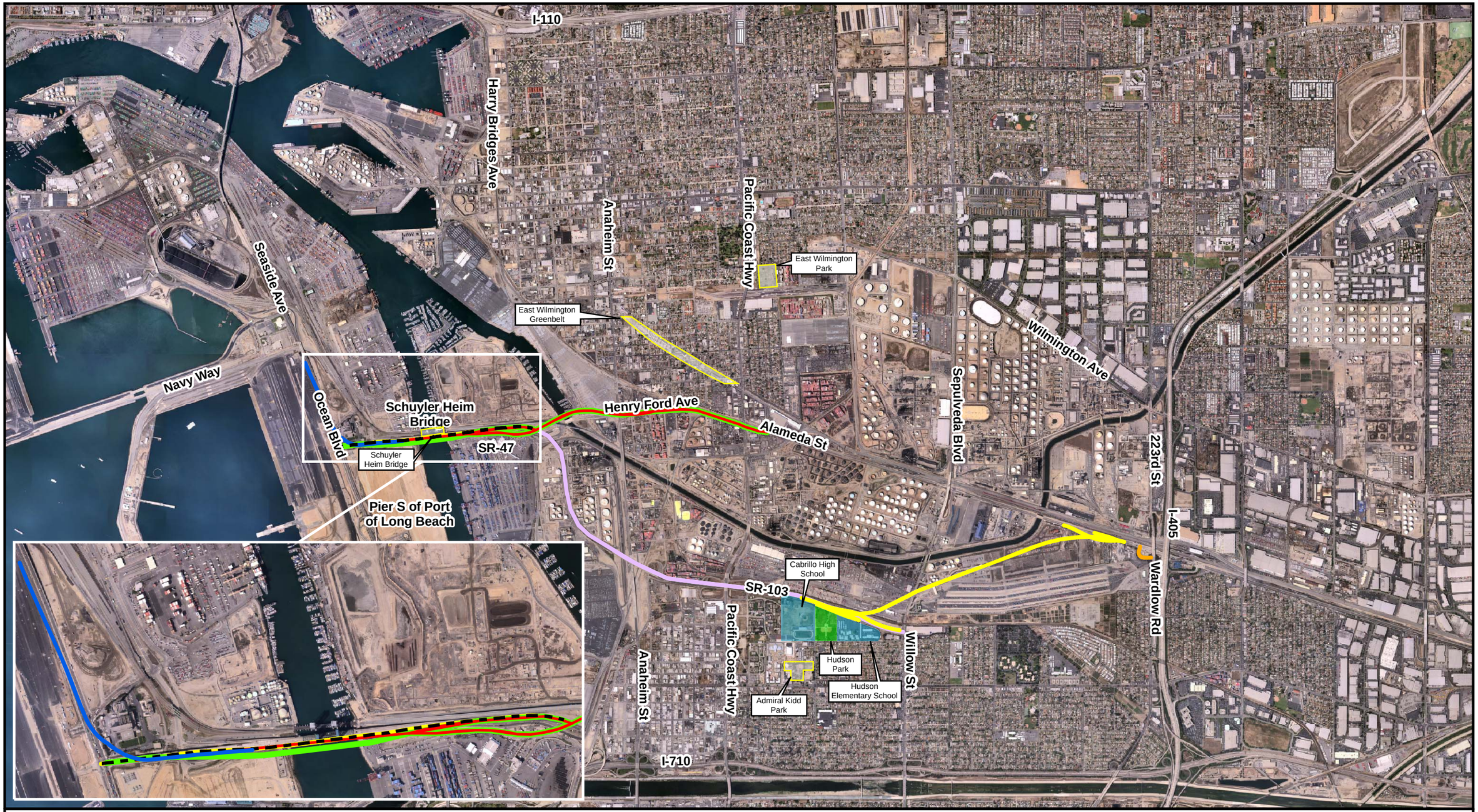
Source: Jones & Stokes, 2006.

1.4.3 Historic Sites

A total of 38 historic sites have been identified in the Area of Potential Effects (APE) for the proposed project alternatives. All of these sites are architectural resources. No prehistoric or historical archeological resources were identified within or adjacent to the APE. In accordance with FTA/FHWA regulations, Section 4(f) requirements are only applicable to *significant* historic sites (i.e., those sites on or eligible for the National Register of Historic Places [NRHP], or sites otherwise determined significant by the FHWA Administrator) (23 CFR Section 771.135[e]). Table 2 provides a summary of the characteristics of each historic site identified within the APE, along with a determination of which of these sites has been determined significant for Section 4(f) purposes (pending completion of Section 106 determinations of eligibility, and concurrence by State Historic Preservation Office (SHPO). A detailed description of the one significant historic site in the APE (the Schuyler Heim Bridge) is provided in Section 1.5 – Effects on Section 4(f) Resources.

1.5 Effects on Section 4(f) Resources

The following sections describe how the proposed project alternatives would affect Section 4(f) resources. A summary of potential effects is provided below in Table 3; additional analysis follows for each affected resource. This includes whether any permanent or temporary occupation of a property would occur, or whether the proximity of the project would cause any access disruption, noise, vibration, or aesthetic effects that would substantially impair the features or attributes that qualify the resource for protection under Section 4(f).



LEGEND

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- Existing SR-103

0 2,800 Feet

0 1,000 Meters

Aerial Date: February 2006, AirPhotoUSA

Note: Project components not to scale

Figure 2
Location of Section 4(f) Properties
Schuyler Heim Bridge Replacement and SR-47 Expressway

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TABLE 2
Summary of Historic Sites within the Area of Potential Effect

Map #	Name	Location	Significance under Section 4(f)*
Archaeological Resources (Significant / Potentially Significant)			
		*** None in APE ***	
Archaeological Resources (Not Significant)			
		*** None in APE ***	
Architectural Resources (Significant / Potentially Significant)			
8	Schuyler Heim Bridge	Ocean Blvd./SR-47	Eligible for NRHP (1998) Schuyler Heim Bridge Retrofit IS/EA
Architectural Resources (Not Significant)			
	Alameda Motel	1050 N. Alameda St.	Not eligible for CRHP or NRHP
	Kar's	1260 N. Alameda St.	Not eligible for CRHP or NRHP
	Alco Truck & Vans	1230 N. Alameda St.	Not eligible for CRHP or NRHP
	Jim's #2 Char-Broiled Hamburgers	1601 E. Anaheim St.	Not eligible for CRHP or NRHP
	Fast Truck & Tire Service	1625 E. Anaheim St.	Not eligible for CRHP or NRHP
	Residence	1539 E. Denni St.	Not eligible for CRHP or NRHP
	Savage Industries, Inc.	1634 E. Denni St.	Not eligible for CRHP or NRHP
	Push & Pull Express, Inc.	1609 E. Grant St.	Not eligible for CRHP or NRHP
	Union Mutualista De San Jose	1023-27 N. Henry Ford Ave.	Not eligible for CRHP or NRHP
	Wilmington Recyclers	1120 N. Henry Ford Ave.	Not eligible for CRHP or NRHP
	Residence	1041 N. Henry Ford Ave.	Not eligible for CRHP or NRHP
	House for Joaquin Fernandez	1563 E. L St.	Not eligible for CRHP or NRHP
	House for Joaquin Fernandez	1559 E. L St.	Not eligible for CRHP or NRHP
	Residence	1538 E. L St.	Not eligible for CRHP or NRHP
	Rooming House for Mrs. Inge C. Coe	1725-31 E. M St.	Not eligible for CRHP or NRHP
	House for D.G. Grant	1710 E. Mauretania St.	Not eligible for CRHP or NRHP
	House for Fred M. Yulk	1714 E. Mauretania St.	Not eligible for CRHP or NRHP
	JS Equipment	1674 E. Mauretania St.	Not eligible for CRHP or NRHP
	1733 Adivari Inc.	1733 E. Robidoux St.	Not eligible for CRHP or NRHP
	House for Frank Gonzalez	1621 E. Robidoux St.	Not eligible for CRHP or NRHP
	House for Frank M. Gonzalez	1617 E. Robidoux St.	Not eligible for CRHP or NRHP
	Frank M. Gonzalez Residence	1619 R. Robidoux St.	Not eligible for CRHP or NRHP
	Wrather Construction Company	1702 E. Robidoux St.	Not eligible for CRHP or NRHP
	Residence	1544 E. Young St.	Not eligible for CRHP or NRHP
	Residence	1539-41 E. Young St.	Not eligible for CRHP or NRHP

TABLE 2
Summary of Historic Sites within the Area of Potential Effect

Map #	Name	Location	Significance under Section 4(f)*
	Oil Wells	South side of the Cerritos Channel and east of the Schuyler Heim Bridge	Not eligible for CRHP or NRHP
	State Route 47	North and south of Schuyler Heim Bridge	Not eligible for CRHP or NRHP
	Business	916 N. Henry Ford Ave.	Not eligible for CRHP or NRHP
	Residence	1622 E. Robidoux St.	Not eligible for CRHP or NRHP
	Buddhist Temple	2100 W. Willow St., Long Beach	Not eligible for CRHP or NRHP
	Concession and Restroom facility	Hudson Park, Long Beach	Not eligible for CRHP or NRHP
	Chem and Oil Tanks	2365 Sepulveda Blvd., L.A.	Not eligible for CRHP or NRHP
	Business	22440 S. Alameda St., Carson	Not eligible for CRHP or NRHP
	Corridor Recycling	22440 S. Alameda St., Carson	Not eligible for CRHP or NRHP
	Carson Autowrecking	22606 S. Alameda St., Carson	Not eligible for CRHP or NRHP
	Hertz Equipment Rental	22422 S. Alameda St., Carson	Not eligible for CRHP or NRHP
	CIPLAS	2430 E. 223rd St., Carson	Not eligible for CRHP or NRHP

*A resource is considered to be "significant" for purposes of Section 4(f) if it is on or eligible for the NRHP (or otherwise determined important by the FHWA Administrator). Resources identified as "potentially eligible" and "not eligible" are awaiting concurrence from the SHPO.

Source: Jones & Stokes (2004).

TABLE 3
Summary of Potential Effects on Section 4(f) Resources

Alternative	Resource Name	Use			Remarks
		Direct Use	Temporary Occupancy	Constructive Use	
1-6	Hudson Park	No	No	No	*Direct Use* – None *Temporary Occupancy* – None *Constructive Use* – None
1-6	Hudson Elementary School (playground/athletic fields)	No	No	No	*Direct Use* – None *Temporary Occupancy* – None *Constructive Use* – None

TABLE 3
Summary of Potential Effects on Section 4(f) Resources

Alternative	Resource Name	Use			Remarks
		Direct Use	Temporary Occupancy	Constructive Use	
1-4	Schuyler Heim Bridge	Yes			*Direct Use* – Alternatives 1, 1A, 2, 3, and 4. The bridge would be demolished under Alternatives 1, 1A, 2, and 4 to prevent future safety impacts to the Cerritos Channel from long-term deterioration of the bridge. Loss of bridge approaches and loss of use as a vehicular bridge under Alternative 3 would result in a direct use. The bridge would be demolished under Alternative 3 to comply with requirements of the U.S. Coast Guard permit, also resulting in direct use of the resource.
1-6	Cabrillo High School (playground/athletic fields)	No	No	No	*Direct Use* – *None* *Temporary Occupancy* – None *Constructive Use* – None

Source: Jones & Stokes, 2005.

1.5.1 Public Parks and Recreation Areas

The discussion of Hudson Park, the Hudson Elementary School Playground/Athletic Field, and Cabrillo High School playground/athletic field is pertinent only to Alternative 2, which involves extension of SR-103. Alternatives 1, 1A, 3, 4, 5, and 6 do not propose improvements in the proximity of park/recreation areas. (Please see Figure 2 for location of alternatives and the park/recreation areas.)

1.5.1.1 Hudson Park

Description and Significance of Property

Type/Location/Size

Hudson Park occupies 13.06 acres at 2335 Webster Avenue in the City of Long Beach. The west side of the park is adjacent to SR-103.

Access/Facilities/Usage

Vehicular and pedestrian access to Hudson Park is from Webster Avenue. The facilities include two baseball fields, one soccer field, a picnic area, and play equipment. The park is used for active recreation and is popular for adult sports leagues.

Relationship to Similar Facilities in the Area

Hudson Park is located immediately south of the playground and athletic fields at Hudson Elementary School.

Ownership/Jurisdiction

Hudson Park is owned by, and subject to the jurisdiction of, the City of Long Beach.

Significance
Hudson Park is a City of Long Beach park and recreational resource.

Application of Section 4(f) Criteria for Use
Direct Use
The proposed project alternatives would not require any permanent use (property acquisition) of Hudson Park.

Temporary Occupancy
The proposed project alternatives would not require any temporary occupancy of Hudson Park.

Constructive Use
The proposed project alternatives 1, 3, 4, 5, and 6 would not impose constructive uses on Hudson Park.

Air Quality
Only Alternative 2 would have proximity impacts to air quality at Hudson Park. However, these impacts do not rise to the level of substantially impairing the activities. Please see Section 3.13, Air Quality, of the Final EIS/EIR.

Noise
Only Alternative 2 would affect this park. Alternative 2 would include construction of an elevated SR-103 expressway approximately 46 m (150 ft) from the west side of Hudson Park. The park is used for active sports and athletic sports activities that do not require quiet surroundings. Also, the existing park is located near a large industrial area; and a busy traffic corridor borders the western boundary of park. According to the noise study prepared for the project (Caltrans, February 2005), noise levels are expected to exceed the Noise Abatement Criteria (NAC) of 67 dBA in association with Alternative 2. Abatement measures, such as noise walls, have been proposed at locations where adverse impacts were identified. No noise impacts to park users were identified as a result of Alternative 2 after abatement.

Additional analysis is provided in the discussion of Noise (Section 3.14) of the Draft EIS/EIR for the proposed project.

Aesthetics
The analysis of aesthetic effects in the Draft Visual Impact Assessment prepared for the project reported that the extension of SR-103 to Alameda Street to the northwest as proposed under Alternative 2 would not result in a substantial adverse aesthetic effect at this park. Views to or from the park are not a feature or characteristic of the property.

However, under Alternative 2, the following measures would be implemented to enhance the aesthetics of the expressway along its entire length, including the portion of the expressway in the vicinity of Hudson Park.

- The surfaces of columns, roadway barriers, soundwalls, and gore points will receive surface color treatments at specified locations, as determined by a Caltrans Licensed Landscape Architect.

- Elements of the design of the proposed bridge and expressways, such as color, line, texture, and style, would be aesthetically pleasing and as unobtrusive as possible. During final design, particular attention would be paid to the vertical columns and soundwalls.
- All visual design elements, including landscaping, would be designed and implemented with the concurrence of the Caltrans landscape architect and in compliance with local policies and guidelines.
- Trees and vines will be planted along soundwalls at specified locations, as determined by a Caltrans Licensed Landscape Architect.
- Design of the elevated expressway would be compatible (scale and massing) with the existing Schuyler Heim Bridge or future bridge and the Badger Avenue/Henry Ford Railroad bridge.

Additional analysis is provided in the discussion of Visual Resources/Aesthetics (Section 3.7) of the Draft EIS/EIR for the proposed project.

Access

Alternative 2 would pass to the west of the park and would not affect vehicular or pedestrian access to the park. Access to the park is from the east via Webster Avenue.

Coordination/Consultation

Consultation has been initiated with the City of Long Beach. Consultation with the City of Long Beach is ongoing as part of the California Environmental Quality Act (CEQA) and NEPA process and is expected to continue throughout the duration of that process, as well as during the subsequent period of project design and construction. (Caltrans has sent a letter to the City of Long Beach Department of Parks, Recreation and Marine to initiate Section 4[f)] consultation for Hudson Park [Appendix A] and has received a response. Hudson Park has been found to be a significant recreation area by this Department and FHWA concurs with this finding.)

1.5.1.2 Hudson Elementary School Playground/Athletic Fields

Description and Significance of Property

Type/Location/Size

The Hudson Elementary School is located at 2335 Webster Avenue in the City of Long Beach. The west side of the playground and athletic fields is adjacent to SR-103.

Access/Facilities/Usage

Vehicular and pedestrian access to the Hudson Elementary School playground and athletic fields is from Webster Avenue. Facilities include two athletic fields. In addition, the school uses the athletic facilities at nearby Cabrillo School and the adjoining Hudson Park.

Relationship to Similar Facilities in the Area

The playground and athletic fields at Hudson Elementary School are adjacent to Hudson Park.

Ownership/Jurisdiction

The Hudson Elementary School playground and athletic fields are owned by, and subject to the jurisdiction of, the Long Beach Unified School District.

Significance

In a letter dated September 14, 2005, the Long Beach Unified School District stated that the athletic fields at both Hudson Elementary School and Cabrillo High School are significant publicly owned recreation areas, defined as having the function of a recreational area with the Park and Recreation objectives of the community (see Appendix A). Given that the Hudson School facilities are readily accessible to the general public during non-school hours, FHWA concurs with the district's position and has thus included the Hudson Elementary School in this Section 4(f) evaluation.

Application of Section 4(f) Criteria for Use

Direct Use

The proposed project alternatives would not require any permanent use (acquisition) of the Hudson Elementary School property.

Temporary Occupancy

The proposed project alternatives are not anticipated to require any temporary occupancy of Hudson Elementary School. At present, a construction easement is not anticipated. Nonetheless, at the time of construction of Alternative 2 or construction of the associated noise wall (abatement measure), if short-term use of a very small portion of the school land were required, it would be for a short period of time, the scope of work would be minor, no temporary or permanent change in activities would occur, and the property would be returned to a condition as good as or better than at present. Therefore, it would not amount to a Use (as defined under Section 4[f]) of a recreational property.

Constructive Use

The proposed project alternatives would not impose any constructive use of the Hudson Elementary School playgrounds or athletic fields.

Air Quality

The proximity impacts to this playground would be minimal. Please see Section 3.13, Air Quality, of the FEIS/FEIR.

Noise

Alternative 2 would construct an elevated expressway approximately 46 m (150 ft) from the west side of Hudson Elementary School. The types of athletic activities (baseball, softball games, etc.) that take place at the school's athletic fields do not require quiet surroundings. Also, a large industrial area and a busy traffic corridor border the western boundary of the school property. According to the noise study prepared for the project (Caltrans, February 2005), noise levels are expected to exceed the NAC of 67 dBA in association with Alternative 2. Abatement measures, such as noise walls, have been proposed at locations where adverse impacts were identified. No noise impacts to park users were identified as a result of Alternative 2 after abatement.

Additional analysis is provided in the discussion of Noise (Section 3.14) of the Draft EIS/EIR for the proposed project.

Aesthetics

The analysis of aesthetic effects in the Draft Visual Impact Assessment prepared for the project finds that the extension of SR-103 to Alameda Street to the northwest as proposed under Alternative 2 would not result in a substantial adverse aesthetic effect at this location.

Alternative 2 would not have aesthetic effects that would substantially impair the protected activities, features, and attributes that qualify this resource for protection under Section 4(f).

However, under Alternative 2, the following measures would be implemented to enhance the aesthetics of the expressway along its entire length, including the portion of the expressway in the vicinity of Hudson Elementary School Playground/Athletic Fields.

- The surfaces of columns, roadway barriers, soundwalls, and gore points will receive surface color treatments at specified locations, as determined by a Caltrans Licensed Landscape Architect.
- Elements of the design of the proposed bridge and expressways, such as color, line, texture, and style, would be aesthetically pleasing and as unobtrusive as possible. During final design, particular attention would be paid to the vertical columns and soundwalls.
- All visual design elements, including landscaping, would be designed and implemented with the concurrence of the Caltrans landscape architect and in compliance with local policies and guidelines.
- Trees and vines will be planted along soundwalls at specified locations, as determined by a Caltrans Licensed Landscape Architect.
- Design of the elevated expressway would be compatible (scale and massing) with the existing Schuyler Heim Bridge or future bridge and the Badger Avenue/Henry Ford Railroad bridge.

Additional analysis is provided in the discussion of Visual Resources/Aesthetics (Section 3.7) of the Draft EIS/EIR for the proposed project.

Access

The proposed project alternatives would not affect access to Hudson Elementary School. Access to the school is from the east along Webster Avenue.

Coordination/Consultation

Long Beach Unified School District provided correspondence which established that this facility is used for public recreation; therefore, it has been considered a Section 4(f) resource (see Appendix A). During the public review period of the Draft EIS/EIR, Long Beach Unified School District provided comments on the document. There were no specific comments on the Section 4(f) analysis. General comments on the document are addressed in Chapter 6.0 of the Final EIS/EIR.

1.5.1.3 Cabrillo High School Athletic Fields

Description and Significance of Property

Type/Location/Size

Cabrillo High School is located at 2001 Santa Fe Avenue in Long Beach. SR-103 traverses the western boundary of the school. The school's athletic fields are located along this western boundary.

Access/Facilities/Usage
Access to the Cabrillo High School athletic fields is provided from Monitor Avenue, Santa Fe Avenue, and Willard Street. Facilities include a baseball field, football field and play areas.

Relationship to Similar Facilities in the Area
The athletic fields at Cabrillo High School are part of the Long Beach Unified School District and are adjacent to Hudson Park. The Long Beach Unified School district has a Joint Use Agreement with the City of Long Beach Park and Recreation Department for use of the playground and its athletic fields. The Small Gym at Cabrillo High School is in Joint Use with the City of Long Beach and may be used after school hours and on weekends.

Ownership/Jurisdiction
The Cabrillo School athletic fields are owned by, and subject to the jurisdiction of, the Long Beach Unified School District.

Significance
In a letter dated September 14, 2005, Long Beach Unified School District determined that the fields at both Hudson School and Cabrillo High School are significant publicly owned recreation areas as defined having the function of the recreational area with the Park and Recreation objectives of the community (see Appendix A). Given that the Cabrillo High School facilities are readily accessible to the general public during non-school hours, FHWA concurs with the district's position and has thus included the Cabrillo High School in this Section 4(f) evaluation.

Application of Section 4(f) Criteria for Use
Direct Use
The proposed project alternatives would not require any permanent use of Cabrillo High School. All construction for the proposed project alternatives, including construction of noise abatement walls, would occur within the existing ROW.

Temporary Occupancy
The proposed project alternatives are not anticipated to require any temporary occupancy of Cabrillo High School. At present, a construction easement is not anticipated. Nonetheless, at the time of construction of Alternative 2 or construction of the associated noise wall (abatement measure), if short-term use of a very small portion of the school land were required, it would be for a short period of time, the scope of work would be minor, no temporary or permanent change in activities would occur, and the property would be returned to a condition as good as or better than at present. Therefore, it would not amount to a Use (as defined under Section 4[f]) of a recreational property.

Constructive Use
The proposed project would not require any constructive use of Cabrillo High School.

Air Quality
Only Alternative 2 would have proximity affects to air quality at Cabrillo High School Athletic Fields. However, these impacts do not rise to the level of substantially impairing the activities. Please see Section 3.13, Air Quality, of the Final EIS/EIR.

Noise

Alternative 2 would construct an elevated expressway adjacent to the west of the Cabrillo High School athletic fields. The types of athletic activities (baseball, softball games, etc.) that take place at the school's athletic fields do not require quiet surroundings. Also, a large industrial area and a busy traffic corridor border the western boundary of the school property. According to the noise study prepared for the project (Caltrans, February 2005), noise levels are expected to exceed the NAC of 67 dBA in association with Alternative 2. At-grade noise walls are proposed along the western extent of the Cabrillo High School athletic fields to abate any adverse noise impacts. No noise impacts to users of playground/ athletic fields were identified as a result of Alternative 2 after abatement.

Additional analysis is provided in the discussion of Noise (Section 3.14) of the Draft EIS/EIR for the proposed project.

Aesthetics

The analysis of aesthetic effects in the Draft Visual Impact Assessment prepared for the project finds that the extension of SR-103 to Alameda Street to the northwest as proposed under Alternative 2 would not result in a substantial adverse aesthetic effect at this location. Alternative 2 would not have aesthetic effects that would substantially impair the protected activities, features, and attributes that qualify this resource for protection under Section 4(f).

However, under Alternative 2, the following measures would be implemented to enhance the aesthetics of the expressway along its entire length, including the portion of the expressway in the vicinity of Cabrillo High School Athletic Fields.

- The surfaces of columns, roadway barriers, soundwalls, and gore points will receive surface color treatments at specified locations, as determined by a Caltrans Licensed Landscape Architect.
- Elements of the design of the proposed bridge and expressways, such as color, line, texture, and style, would be aesthetically pleasing and as unobtrusive as possible. During final design, particular attention would be paid to the vertical columns and soundwalls.
- All visual design elements, including landscaping, would be designed and implemented with the concurrence of the Caltrans landscape architect and in compliance with local policies and guidelines.
- Trees and vines will be planted along soundwalls at specified locations, as determined by a Caltrans Licensed Landscape Architect.
- Design of the elevated expressway would be compatible (scale and massing) with the existing Schuyler Heim Bridge or future bridge and the Badger Avenue/Henry Ford Railroad bridge.

Additional analysis is provided in the discussion of Visual Resources/Aesthetics (Section 3.7) of the Draft EIS/EIR for the proposed project.

Access

The proposed project alternatives would not affect access to Cabrillo High School.

Coordination/Consultation

Long Beach Unified School District provided correspondence which established that this facility is used for public recreation; therefore, it has been considered a Section 4(f) resource (see Appendix A).

1.5.2 Historic Sites with Potential Section 4(f) Use

1.5.2.1 Commodore Schuyler Heim Bridge

Description and Significance of Property

Through the Section 106 process, the Schuyler Heim Bridge has been determined to be eligible for listing on the National Register of Historic Places under Criterion C, as the highest vertical lift bridge in the Western United States and one of the most significant vertical bridges in the state of California. The bridge was also found to meet the eligibility criteria for inclusion in the *California Register of Historical Resources* (California Register).

Application of Section 4(f) Criteria for Use

Direct Use

Four build alternatives have been proposed: Alternatives 1 (and 1A), 2, 3, and 4. Under Alternative 1, Alternative 2, and Alternative 4, the Commodore Schuyler F. Heim Bridge would be demolished following construction of a replacement bridge. Demolition would be a direct use of the Section 4(f) resource.

Alternative 3, Bridge Avoidance, was developed for the purpose of this Section 4(f) evaluation. It was conceived to include seismic retrofit to preserve the historic span, but would discontinue use of the Schuyler Heim Bridge as a vehicular bridge. The loss of historic material (i.e., loss of bridge approaches) would result in a direct use. However, the U.S. Coast Guard stated during consultation meetings in December 2005 that the bridge would not be allowed to remain in place if not used for transportation purposes. They further indicated that their permit to construct a replacement bridge would include a requirement for subsequent demolition of the Schuyler Heim Bridge. Accordingly, in light of the U.S. Coast Guard position and permit requirement, Alternative 3 could also result in demolition of the bridge.

Alternative 5, the TSM Alternative, would leave the bridge in place and continue its use for vehicular traffic. The TSM Alternative provides only for minimal maintenance. Similarly, Alternative 6, No Build, would leave the bridge at its original location and continue its use for vehicular traffic. Under the No Build Alternative, the bridge would continue to require regular and routine maintenance.

Under Alternative 5 and Alternative 6, the bridge would retain its eligibility for the National Register and, accordingly, could be exempt from Section 4(f) in accordance with 23 CFR section 117.135 (f), which states:

> The Administration may determine that Section 4(f) requirements do not apply to restoration, rehabilitation, or maintenance of transportation facilities that are on or eligible for the National Register when:
>
> (1) Such work will not adversely affect the historic qualities of the facility that caused it to be on or eligible for the National Register, and

(2) The SHPO and the Advisory Council on Historic Preservation (ACHP) have been consulted and have not objected to the Administration finding in paragraph (f)(1) of this section.

Coordination/Consultation

Consultation with the SHPO and other cultural resources stakeholders has been initiated, and is described in the Section 106 documentation (*Historic Properties Survey Report* [HPSR], *Supplemental HPSR*, and *Draft Findings of Effect* [FOE]). SHPO was also consulted regarding the Section 106 FOE for this resource during circulation of the Draft EIS/EIR. A Memorandum of Agreement between Caltrans and SHPO has been completed. This MOA is included as Appendix L of the Final EIS/EIR.

Avoidance Alternatives

Alternatives 1, 1A, 2, and 4 would each result in demolition of the Schuyler Heim Bridge and, hence, the direct use of a Section 4(f) resource.

Alternative 6 (No Build Alternative), Alternative 5 (Transportation System Management), and Alternative 3 (Bridge Demolition Avoidance) are the avoidance alternatives to the proposed project that would avoid the use of the Section 4(f) resource, i.e., Schuyler Heim Bridge. The feasibility and prudence of these avoidance alternatives is discussed below.

Section 774.17 defines "prudent" and "feasible" using a balancing test. An alternative is not feasible if it cannot be built as a matter of sound engineering. An alternative is not prudent if it:

- Compromises the project so that it is unreasonable given the purpose and need;
- Results in unacceptable safety or operational problems;
- After reasonable mitigation, still causes:
  - Severe social, economic, or environmental impacts;
  - Severe disruption to established communities;
  - Severe environmental justice impacts; or
  - Severe impacts to other federally protected resources
- Results in additional construction, maintenance, or operational costs of an extraordinary magnitude:
  - Consider factors such as: the percentage difference in the costs of the alternatives; how the cost difference relates to the total cost of similar transportation projects in the applicant's annual budget; and the extent to which the increased cost for the project would adversely impact that applicants' ability to fund other transportation projects.
- Causes other unique problems or unusual factors; or
- Involves multiple factors listed above that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

Alternative 6: No Build Alternative

Feasibility: This alternative is considered feasible because there are no unique engineering challenges associated with this alternative.

Prudence:

- Purpose and Need: Under the No Build Alternative, there would be no physical change to the existing Schuyler Heim Bridge. The existing bridge would continue to be seismically inadequate and subject to damage or collapse under strong seismic conditions. Under this alternative, the traffic congestions and safety issues at the various study intersections and railroad crossing would not be improved. Therefore, this alternative would not meet the purpose and need for the project and therefore, would not be prudent.

- Unacceptable safety or operational problems: Under the No Build Alternative, even with continuing maintenance activities, the bridge is expected to deteriorate over time, as its useful life is eroded further and as various magnitude earthquakes are experienced, which may result in serious safety hazards and operational problems. Therefore, considering the safety of users and operational problems associated with this alternative, this alternative would not be prudent.

- Impacts after reasonable mitigation, cost of extraordinary magnitude, and unusual factors: This consideration is not applicable for this alternative.

- Involves multiple factors listed above that are individually minor but cumulatively considerable: The factors (related to not meeting the purpose and need for the project and resulting in safety and operational problems) are both individually significant and cumulatively considerable.

Based on the above analysis, the Alternative 6, No Build Alternative, is considered to be not prudent.

Alternative 5: Transportation System Management

Please refer to Section 1.3, Proposed Action, of this 4(f) evaluation and Chapter 2.0 of the EIS/EIR for more details about Alternative 5.

Feasibility: This alternative is considered feasible because there are no unique engineering challenges associated with this alternative.

Prudence:

- Purpose and Need: As described in Section 1.3, Proposed Action, of this 4(f) evaluation, in Chapter 2.0 of the EIS/EIR, and in the *Finding of Adverse Effect* (Caltrans, 2006), the TSM Alternative would not result in the demolition of or modification to the Schuyler Heim Bridge and thus would avoid the use of a Section 4(f) resource. However, it would not result in the increased ability of the bridge to withstand a major earthquake and thus it does not address the seismic deficiency of the bridge. In addition, the TSM Alternative would not be effective in reducing roadway demand or in redirecting Terminal Island traffic to other routes. Therefore, this alternative does not meet the purpose and need of the project.

- Unacceptable safety or operational problems: Similar to the No Build alternative, under Alternative 5, even with continuing maintenance activities, the bridge is expected to deteriorate over time as its useful life is eroded further and as various magnitude earthquakes are experienced, which may result in serious safety and

operational problems. Therefore, considering the safety of users and operational problems associated with this alternative, this alternative would not be prudent.

- Impacts after reasonable mitigation, cost of extraordinary magnitude, and unusual factors: This consideration is not applicable for this alternative as the cost for this alternative is low.
- Involves multiple factors listed above that are individually minor but cumulatively considerable: The factors (related to not meeting the purpose and need for the project and resulting in safety and operational problems) are both individually significant and cumulatively considerable.

Based on the above analysis, Alternative 5 is considered to be not prudent.

Alternative 3: Bridge Demolition Avoidance

Please refer to Section 1.3, Proposed Action, of this 4(f) evaluation and Chapter 2.0 of the EIS/EIR for more details about this alternative.

Feasibility: There are no unique engineering challenges associated with construction of this alternative. However, there are U.S. Coast Guard permit requirements that make the construction of this alternative infeasible. U.S. Coast Guard permit requirements would not allow the existing bridge to remain in place if not used for transportation purposes. In preliminary consultation with U.S. Coast Guard, it was noted that the permit to construct a replacement bridge would include a requirement for subsequent demolition of the Schuyler Heim Bridge. Therefore, this alternative is infeasible as the U.S. Coast Guard would not provide a permit to construct the new bridge while keeping the existing bridge intact for non-transportation uses.

Prudence:

- Purpose and Need: Alternative 3 was originally developed to avoid impact to the Schuyler Heim Bridge and thus avoid the use of a Section 4(f) resource. As detailed in Section 1.3 of this 4(f) analysis and Chapter 2.0 of the EIS/EIR, this alternative would provide a new fixed-span bridge on an alignment east of the existing bridge, along with seismic retrofit of the existing bridge, which would remain standing but unused. This alternative would correct the seismic deficiency of the existing bridge and provide a higher-capacity route between Terminal Island and northern arterials that would help reduce congestion and improve safety at rail crossings. Therefore, this alternative would meet the purpose and need of the proposed project.
- Unacceptable safety or operational problems: This consideration does not apply to this alternative.
- Impacts after reasonable mitigation: Although this alternative was perceived as an avoidance alternative, it actually does not completely avoid the use of a Section 4(f) resource. According to the *Finding of Adverse Effects* (Caltrans, 2006), this alternative would still result in an adverse effect to the Schuyler Heim Bridge due to the removal of the approaches, and thus would require removal of historic material and thereby result in a use of the Section 4(f) resource. In addition, this alternative would involve removal of around 0.11 acre of wetland east of the Schuyler Heim Bridge –

federally protected resources. This biological resources impact would not occur for the other build alternatives.

- Costs of Extraordinary Magnitude: Alternative 3 would result in additional construction costs of an extraordinary magnitude. The total cost of building the new bridge and retrofitting the old bridge (that would be kept standing but would provide no transportation function) for this alternative is $923.4 million, around $200 million, or over 27 percent, more than the cost for Alternative 2, and $260 million, or 39 percent more than the cost for Alternative 1. This cost is extraordinarily high and funding would not be available. Additionally, mitigation of impacts to federally protected wetlands would add additional cost to already high construction costs for Alternative 3.

  Other unique problems or unusual factors: In addition to the above, U.S. Coast Guard permit requirements would not allow the existing bridge to remain in place if not used for transportation purposes. In preliminary consultation with U.S. Coast Guard, it was noted that the permit to construct a replacement bridge would include a requirement for subsequent demolition of the Schuyler Heim Bridge. This requirement of the U.S. Coast Guard makes this alternative imprudent.

Because of extraordinary cost, impacts to wetlands and a historic resource, and unique problems/unusual factors, according to Section 774.17 above, Alternative 3 is considered not prudent or feasible.

Alternatives on the Same Location

There are no feasible and prudent alternatives available on the same location that would result in avoidance of bridge demolition.

Measures to Minimize Harm

The following measures to minimize harm are presented in the *"Memorandum of Agreement (MOA) between Caltrans and the California State Historic Preservation Officer, regarding the State Route 47 (SR-47) Expressway and the Schuyler Heim Bridge Replacement Project."* It has been agreed as follows:

For Alternatives 1, 1A, 2, and 4, Caltrans shall ensure the following stipulations are carried out and completed:

1. The Schuyler Heim Bridge (Bridge) shall be offered for sale for reuse in an alternate location to interested public agencies and non-profits. A marketing plan shall be prepared for the sale of the bridge, including: a notification letter, fact sheet, list of intended recipients, as well as provisions for the salvage of smaller components in the case that there is no interest in re-use of the bridge.

   Advertisements shall be placed in appropriate newspapers of record. The offer shall run for 6 months. If no acceptable bids are received after 6 months, this stipulation shall be deeded to have been met. The above shall be done in accordance with the U.S. Department of Transportation Historic Bridge Program 23 USC 144(o)(4)(A) and (B).

2. Informative permanent metal plaques shall be installed at both ends of the new bridge at public locations that provide a brief history of the original Bridge, its engineering features and characteristics, the reasons for its demolition, and a statement of the characteristics of the replacement structure.
3. Pursuant to Section 110(b) of the NHPA, before the Bridge is demolished, the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) shall be contacted to determine what level and kind of recordation is required for the property. All documentation shall be completed and accepted by HABS/HAER before the Bridge is demolished.
4. Copies of the HABS/HAER report shall be disseminated to the City of Los Angeles Public Library and the City of Long Beach Public Library.
5. Information from the HABS/HAER report shall be available to the public for 10 years on an appropriate internet website.
6. A documentary (motion picture or video) shall be produced and shall address the history of the Bridge, its importance and use within the history of the Port of Long Beach and Port of Los Angeles, and demonstrate its operation and function. The motion picture or video will be of broadcast quality, of sufficient length for a standard 30-minute time period and will be made available to local broadcast stations for public access channels in local cable systems and to schools/libraries.
7. Traveling museum exhibits shall be prepared and shall address the history of the Bridge, its importance and use within the history of the Port of Long Beach and the Port of Los Angeles, and demonstrate its operation and function, appropriate for display in small museums, or for use in schools.
8. Artifacts removed from the Bridge during preliminary stages of the demolition process shall be offered to local museums, and provide for their delivery to accepting institutions. Examples of such artifacts may include, but not be limited to, control panels, instruments, structural members, railings, signage, plaques or other identifying ornamentation, street lights, navigation lights, etc.

Least Harm Alternative

As discussed above, all the avoidance alternatives, including the No Build alternative (Alternative 6); Transportation Management System Alternative (Alternative 5); and Bridge Demolition Avoidance Alternative (Alternative 3), are considered not prudent. Alternative 3 is also not considered feasible.

Section 774.3(c) states: If there are no prudent and feasible avoidance alternatives, then the Administration can only approve the alternative that:

- Causes the least overall harm in light of the statutes preservation purposes. This is done by balancing the:
  - Ability to mitigate adverse impacts to each Section 4(f) resource
  - Relative severity of the remaining harm, after mitigation, to the protected activities and attributes or features
  - Relative significance of each Section 4(f) property

- Views of the officials with jurisdiction over each Section 4(f) property
- Degree to which each alternative meets the purpose and need
- After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
- Substantial differences in costs among alternatives

For this project, implementation of each of the remaining build alternatives (Alternatives 1, 1A, 2, and 4) involves the demolition of the Schuyler Heim Bridge. Table 4 below presents the balancing test for the overall harm caused by these alternatives.

TABLE 4
Comparison of Factors Considered in Overall Harm Among Alternatives

Alternatives	Alternative 1	Alternative 1A	Alternative 2	Alternative 4
Ability to mitigate adverse impacts to each Section 4(f) resource	Same with Alternative 1A, 2 and 4	Same with Alternative 1, 2 and 4	Same with Alternative 1, 1A, and 4	Same with Alternative 1, 1A, and 2
Relative severity of the remaining harm, after mitigation, to the protected activities and attributes or features	Same with Alternative 1A, 2 and 4	Same with Alternative 1, 2 and 4	Same with Alternative 1, 1A, and 4	Same with Alternative 1, 1A, and 2
Relative significance of each Section 4(f) property	Same with Alternative 1A, 2 and 4	Same with Alternative 1, 2 and 4	Same with Alternative 1, 1A, and 4	Same with Alternative 1, 1A, and 2
Views of the officials with jurisdiction over each Section 4(f) property	Same with Alternative 1A, 2 and 4	Same with Alternative 1, 2 and 4	Same with Alternative 1, 1A, and 4	Same with Alternative 1, 1A, and 2
Degree to which each alternative meets the purpose and need	Fully meets PN	Fully meets PN, but has low constructability	Fully meets PN	Meet only half PN
After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f)	Lower potential for Haz mat and air quality impacts	Same level of impact compared to Alternative 1	Higher Potential hazardous waste impacts due to going through the land fills; higher potential for air quality impact	Least impact
Substantial differences in costs among alternatives	2nd least cost	Higher cost	Highest cost	Least cost

Based on the comparison table above, each alternative would involve the minimization and mitigation for the loss of the bridge specified above; or in other words, the ability to mitigate for the loss of the bridge is the same for these alternatives. The relative severity of the remaining harm, after mitigation to the Section 4(f) resource would be the same for these alternatives.

However, the degree to which Alternative 4 meets purpose and need is less than the other alternatives because Alternative 4 only involves the replacement of the Bridge, it does not address the purpose and need for the expressway portion of the project.

In terms of differences in costs among the remaining alternatives, Alternative 2 would result in the highest cost compared to the remaining alternatives due to the involvement of higher clean-up cost for hazardous materials. Alternative 1A would also result in higher cost compared to Alternative 1 and Alternative 4, and has lower constructability.

Therefore, Alternative 1 is considered the least overall harm alternative. Alternative 1 is also the preferred alternative identified in the EIS/EIR for this project. (See Subsection 2.2.1 of the EIS/EIR for details about the preferred alternative.)

Conclusion

Based on the above considerations, there is no feasible and prudent alternative to the use of the Commodore Schuyler F. Heim Bridge. Alternative 1 is identified as the least harm alternative and it includes all possible planning to minimize harm to the Commodore Schuyler F. Heim Bridge resulting from such use.

1.6 Section 4(f) Consultation and Coordination

Information regarding potential Section 4(f) properties was sought from:

SHPO

City of Long Beach

Long Beach Unified School District

Copies of correspondence are included in Appendix A.

Consultation was conducted with the above and following agencies during circulation of the Draft EIS/EIR:

Department of Interior (consultation letter is included in Appendix A)

Native American consultation was conducted through letters sent to the California Native American Heritage Commission (NAHC) and to individual Native American contacts.

During the public review period of the Draft EIS/EIR, Long Beach Unified School District provided comments on the document. No specific comments on the Section 4(f) analysis were made. General comments on the environmental analysis were responded to in Chapter 6.0 of the Final EIS/EIR. No comments were received from the Department of Interior regarding the Section 4(f) Evaluation.

1.7 Section 6(f)(3) Considerations

Section 6(f)(3) of the Land and Water Conservation Fund Act (LWCF Act) (16 USC Section 460l-4) contains provisions to protect federal investments in park and recreational resources and the quality of those assisted resources. The law recognizes the likelihood that changes in land use or development may make park use of some areas purchased with LWCF funds obsolete over time, particularly in rapidly changing urban areas, and provides for conversion to other uses pursuant to certain specific conditions.

> Section 6(f)(3) – No property acquired or developed with assistance under this section shall, without the approval of the Secretary, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location.

This requirement applies to all parks and other sites that have been the subject of LWCF grants of any type and includes acquisition of parkland and development or rehabilitation of park facilities.

A review of the LWCF grants database indicates that no park and recreational resources in the project area were funded with LWCF grants. In addition, this project will not result in the acquisition of any parks or recreation lands. Therefore, Section 6(f)(3) does not apply to this project.

2.0 References

California Department of Transportation (Caltrans). 1999. *Schuyler Heim Bridge Update Summary*. June 8.

———. 2005. *Draft Schuyler Heim Bridge Replacement and SR-47 Expressway Project Noise Technical Study*. February.

City of Long Beach. 2005. Department of Parks, Recreation, and Marine. Facility and Park Locations. Available: <http://www.longbeach.gov/park/facilities/parks/default.asp>. Accessed: November.

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Appendix A

1) Caltrans Letter to Long Beach Unified School District
2) Long Beach Unified School District Letter to Caltrans
3) Caltrans Letter to City of Long Beach Department of Parks, Recreation and Marine
4) City of Long Beach Department of Parks, Recreation and Marine Letter to Caltrans
5) Caltrans Letter to Department of Interior

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
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August 23, 2005

Ms. Carrie Matsumoto
Executive Director of Facilities
Long Beach Unified School District
1515 Hughes Way
Long Beach, CA 90810

RE: Hudson School and Cabrillo High School Section 4(f) Consultation

Dear Ms. Matsumoto:

Pursuant to the requirements of the National Environmental Policy Act (NEPA), the California Department of Transportation (CALTRANS) and the Federal Highway Administration (FHWA) are currently preparing an Environmental Impact Statement (EIS) for the proposed SR-47 Schuyler Heim Bridge Replacement and SR-47 Expressway Project (SR-47). One of the Alternatives being considered would extend and improve the Terminal Island Freeway (SR-103) adjacent to Hudson School and Cabrillo High School. As part of the NEPA process, CALTRANS and FHWA are also preparing documentation required by Section 4(f) of the Department of Transportation Act of 1966 (*see* 49 USC §303) (hereinafter referred to as "Draft Section 4(f) Evaluation").

An important component of the Draft Section 4(f) Evaluation is the coordination and consultation effort conducted by CALTRANS and FHWA with those agencies having jurisdiction over public parks and recreation areas in the vicinity of the SR-47 and SR-103. The publicly owned parks and recreational areas that are considered as part of the Draft Section 4(f) Evaluation may include public school playgrounds and athletic fields, depending on whether the facilities in question serve only school activities and functions, or are also available for use by the general public. This correspondence serves as the formal initiation of the coordination and consultation specific to the Section 4(f) process. This formal consultation and coordination can be expected to continue throughout the duration of the NEPA process.

In order to properly characterize the District's playgrounds and athletic fields, and document the potential effects of the proposed project on those resources, CALTRANS and FHWA respectfully request your response to the following initial items:

(1) Please identify the name and title of the District official(s) to whom future correspondence should be directed.

002/003 12/14/2005 15:43 FAX

(2) Is the District the agency that "has jurisdiction over" the playgrounds and athletic fields at Hudson School and Cabrillo High School, as defined in 23 CFR §771.135(a)(2)(c)? Are any after-school recreational programs at these facilities administered by any other group(s) or agency(ies)?

(3) Are the playgrounds and athletic fields at Hudson School and Cabrillo High School used only for school activities and functions, or are they also available for use by the general public?

(4) Has the District determined that the playgrounds and athletic fields at Hudson School and Cabrillo High School are "significant" publicly owned recreational areas? For purposes of the Draft Section 4(f) Evaluation, the term "significant" means that, in comparing the availability and function of the recreational area (i.e., the playgrounds and athletic fields) with the park and recreation objectives of the community, the resource in question plays an important role in meeting those objectives.

Please feel free to forward to us any additional information that you believe CALTRANS and FHWA should consider as part of the Draft Section 4(f) Evaluation. Additionally, we would be happy to address any questions or concerns that you may have as this process moves forward.

On behalf of CALTRANS and FHWA, we sincerely appreciate your assistance with this important matter, and look forward to working with you.

Sincerely,

RON KOSINSKI
Deputy Director
Division of Environmental Planning

cc: Wendy Claflin, Principal
Hudson School
2335 Webster Avenue
Long Beach, CA 90810

Mel Collins/Cynthia Terry, Principals
Cabrillo High School
2001 Santa Fe Avenue
Long Beach, CA 90810

003/003 12/14/2005 15:43 FAX

SEP 27 2005

LONG BEACH UNIFIED SCHOOL DISTRICT
Facility Planning and Management Branch
2425 Webster Avenue, Long Beach, CA 90810
Tel: (562) 997-7550 Fax: (562) 595-8644

September 14, 2005

Department of Transportation
District 7
Attn: Ron Kosinski, Deputy Director
Division of Environmental Planning
100 Main Street, Suite 100
Los Angeles, CA 90012-3606

Subject: Hudson K-8 School and Cabrillo High School Section 4(f) Consultation – Terminal Island Freeway

Dear Mr. Kosinski:

This is in response to your letter of August 23, 2005 with reference to Environmental Impact Statement for the proposed SR-47 Schuyler Heim Bridge Replacement and SR-47 Expressway Project (SR-47) Alternatives extending and improving the Terminal Island Freeway (SR-103) adjacent to Hudson K-8 School and Cabrillo High School.

(1) The name and title of the District representatives to whom future correspondence should be directed are:

Ms. Carri Matsumoto	with copy to	Mr. Kim Stallings
Executive Director of Facilities		Chief Business and Financial Officer
Long Beach Unified School District		Long Beach Unified School District
2425 Webster Avenue		1515 Hughes Way
Long Beach, CA 90810		Long Beach, CA 90810

(2) The Long Beach Unified School District has jurisdiction over the playgrounds and athletic fields at Hudson School and Cabrillo School. In addition, at Cabrillo High School, the Long Beach Unified School District currently has a Joint Use Agreement with the City of Long Beach Park and Recreation Department for use of playground and its athletic fields.

(3) The Small Gym at Cabrillo High School is in Joint Use with the City of Long Beach and may be used after school hours and on weekends. Under the Civic Center Act, California Education Code Section 38130-38139, the District is required to make available its facilities for public and/or community use to organizations that are allowed use under the Civic Center Act. Organizations are required to submit a Use of Facilities Application Request with the District for approval.

(4) Long Beach Unified School District has determined that the fields at both schools Hudson K-8 and Cabrillo High School are significant publicly owned recreational areas as defined having the function of the recreational area with the Park and Recreation objectives of the community.

The two mentioned schools border the Terminal Island Freeway (SR-103) with Hudson School having the potential for more impacts by noise, traffic and construction activities. Hudson School property is approximately 150' from the freeway and within one quarter mile of the Schuyler Heim Bridge over Willow Avenue. Due to the close proximity of the freeway and bridge to our Hudson School site, the District would like the opportunity in evaluating the potential impact to school sites for development being proposed. Please forward any environmental documents and or other correspondence to my attention. Thank you for the opportunity to respond. We look forward to working with your office.

Sincerely,

Carri Matsumoto
Executive Director

cc: Kim Stallings
Principal Cabrillo High School
Principal Hudson K-8 School

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7 – DIVISION OF ENVIRONMENTAL PLANNING
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February 8, 2007

Mr. Phil T. Hester
Director, Long Beach Parks, Recreation and Marine
333 West Ocean Boulevard
Long Beach, CA 90802

RE: Hudson Park Section 4(f) Consultation

Dear Mr. Hester:

Pursuant to the requirements of the National Environmental Policy Act (NEPA), the Alameda Corridor Transportation Authority (ACTA) and the California Department of Transportation (CALTRANS) are currently preparing an Environmental Impact Statement (EIS) for the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway Project (SR-47). One of the Alternatives being considered would extend and improve the Terminal Island Freeway (SR-103) adjacent to Hudson Park. As part of the NEPA process, ACTA and CALTRANS are also preparing documentation required by Section 4(f) of the Department of Transportation Act of 1966 (*see* 49 USC §303) (hereinafter referred to as "Draft Section 4[f] Evaluation").

An important component of the Draft Section 4(f) Evaluation is the coordination and consultation effort conducted by ACTA and CALTRANS with those agencies having jurisdiction over public parks and recreation areas in the vicinity of the proposed SR-47 and SR-103 alignments. The publicly owned parks and recreational areas that are considered as part of the Draft Section 4(f) Evaluation may include publicly owned recreation areas, depending on whether the facilities in question are available for use by the general public. This correspondence serves as ongoing coordination and consultation specific to the Section 4(f) process. This formal consultation and coordination can be expected to continue throughout the duration of the NEPA process.

Previously, on August 23, 2005, Caltrans initiated Section 4(f) consultation with the Long Beach Unified School District regarding Hudson School and Cabrillo High School. The athletic fields at Cabrillo High School are part of the Long Beach Unified School District and are adjacent to Hudson Park. The Long Beach Unified School District has a Joint Use Agreement with the City of Long Beach Parks, Recreation, and Marine for use of the playground and its athletic fields.

In order to further characterize Long Beach Parks, Recreation and Marine's playgrounds and athletic fields, and document the potential effects of the proposed project on those resources, ACTA and CALTRANS respectfully request your response to the following:

(1) Please identify the name and title of the Long Beach Parks, Recreation and Marine official(s) to whom future correspondence should be directed.

(2) Is Long Beach Parks, Recreation and Marine the agency that "has jurisdiction over" Hudson Park, as defined in 23 CFR §771.135(a)(2)(c)?

(3) Has Long Beach Parks, Recreation and Marine determined that Hudson Park is a "significant" publicly owned recreational area? For purposes of the Draft Section 4(f) Evaluation, the term "significant" means that, in comparing the availability and function of Hudson Park with the park and recreation objectives of the community, the resource in question plays an important role in meeting those objectives.

Please feel free to forward to us any additional information that you believe ACTA and CALTRANS should consider as part of the Draft Section 4(f) Evaluation. Additionally, we would be happy to address any questions or concerns that you may have as this process moves forward.

On behalf of ACTA and CALTRANS, we sincerely appreciate your assistance with this important matter, and look forward to working with you.

Yours very truly,

Ron Kosinski
Deputy Director

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CITY OF LONG BEACH

DEPARTMENT OF PARKS, RECREATION & MARINE

2760 N. Studebaker Road, Long Beach, CA 90815-1697

(562) 570-3100 • FAX (562) 570-3109

www.lbparks.org

May 1, 2007

Ray Kosinski, Deputy Director
California Department of Transportation
District 7 – Division of Environmental Planning
100 Main Street, Suite 100
Los Angeles, CA 90012-3606

Subject: Hudson Park Section 4 (f) Consultation

Dear Mr. Kosinski:

In accordance with your requests for information, I have provided the following responses:

1.) Please address all future correspondence to:
Phil T. Hester, Director of Parks, Recreation and Marine
2760 Studebaker Road
Long Beach, CA 90815

2.) Yes, the Department of Parks, Recreation and Marine has jurisdiction over Hudson Park.

3.) Yes, Hudson Park is a significant publicly owned recreational facility. At 13.09 acres, Hudson Park is the 17th largest park of the 104 parks in Long Beach. All parks are significant to a degree, as the city has 5.4 acres of recreational open space per 1,000 residents, while seeking to achieve a goal of 8 acres per 1,000 residents. However, as Hudson Park is located in the west park statistical area, which has only 1 acre per 1,000 residents, it is especially important.

Additionally, as Long Beach is a fully subdivided and developed city, parcels of land large enough for sports fields are almost impossible to find and acquire. Hudson Park contains two baseball/softball fields and one soccer/football field. The Parks, Recreation and Marine Department's Strategic Plan indicates the city needs 32 more baseball/softball fields, and 55 more soccer/football fields for youth and adult sports leagues. Thus, it provides an irreplaceable role in the organized recreational leagues in several sports.

Thank you for the opportunity to provide information for your Section 4 (f) evaluation. If you have any questions or need additional information, please contact me, or Dennis Eschen, Manager of Planning and Development Bureau, at (562) 570-3130.

Sincerely,

Phil T. Hester,
Director of Parks, Recreation and Marine

PTH:dle
P:/07-053HudsonPark

STATE OF CALIFORNIA------ BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
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August 15, 2007

07-LA-47. PM 2.7/5.8
Document #: 2007-07-01D

Mr. Willie R. Taylor
Director, Office of Environmental Policy and Compliance
Department of the Interior
Main Interior Building, MS-2342
1849 C Street, NW
Washington, DC 20240

Attn: Ms. Ethel Smith

Dear Mr. Taylor:

The Memorandum of Understanding (MOU) between the Federal Highway Administration and the California Department of Transportation (Caltrans), which became effective July 1, 2007, was signed pursuant to Section 6005 of the 2005 Safe, Accountable, Flexible, efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). This MOU allows the Secretary of Transportation to assign, and the State of California to assume, FHWA's responsibilities under NEPA as well as consultation and coordination responsibilities under other Federal environmental laws. As this project is covered by the Pilot Program established by the MOU, FHWA has assigned and Caltrans has assumed FHWA's responsibility for environmental review, consultation, and coordination on this project.

Caltrans has completed the Draft Environmental Impact Report/Statement (EIR/EIS) and section 4(f) Evaluation for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project in the Ports of Long Beach and Los Angeles, California. There are six alternatives for the project that are discussed in the document.

Per your environmental review process guidelines, please find enclosed eighteen (18) electronic copies. The Section 4(f) Evaluation is found in Appendix B. There is one section 4(f) resource affected - the Schuyler Heim Bridge.

This document is forwarded for your review and comments pursuant to 23 CFR 771.135(i). Please provide your comments by the close of the public review period on October 16, 2007.

If you have any questions, please contact Karl Price, at (213) 798-1839.

Sincerely,

Ron Kosinski
Deputy District Director,
Caltrans-District 7- Division of Environmental Planning

Enclosures

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DEPARTMENT OF TRANSPORTATION
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January 14, 2005

TITLE VI
POLICY STATEMENT

The California Department of Transportation under Title VI of the Civil Rights Act of 1964 and related statutes, ensures that no person in the State of California shall, on the grounds of race, color, national origin, sex, disability, and age, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity it administers.

WILL KEMPTON
Director

Final

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Relocation Impact Report

Commodore Schuyler Heim Bridge (Br. No. 53-2618) and SR-47 in the Ports of Long Beach and Los Angeles, Los Angeles County, California

07-LA-47-KP 4.4/9.3 (PM 2.7/5.8)
EA: 238500

September 2006
Revised February 2007
May 2007
Revised August 2007

Caltrans

For individuals with sensory disabilities, this document is available in Braille, large print, on audiocassette, or computer disk. To obtain a copy in one of these alternate formats, please call or write to Caltrans, Attn: Karl Price, District 7, 100 South Main Street, Los Angeles, CA 90012; (213) 897-1839, or use the California Relay Service TTY number.

Relocation Impact Report

Commodore Schuyler Heim Bridge (Br. No. 53-2618) and SR-47 in the Ports of Long Beach and Los Angeles, Los Angeles County, California

07-LA-47-KP 4.4/9.3 (PM 2.7/5.8)

EA: 238500

December 2006

Revised February 2007

May 2007

Revised August 2007

Prepared By: Shilpa Trisal Date: August 3, 2007

Shilpa Trisal, AICP
Jones & Stokes
811 West 7th Street, Suite 800
Los Angeles, CA 90017

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ATTACHMENTS

Attachment 1: Regional Location Map
Attachment 2: Project Map
Attachment 3: Displacement Area Map – Location of Businesses to Be Relocated under Alternatives 1 and 1A
Attachment 4: Displacement Area Map – Location of Businesses to Be Relocated under Alternative 2

State of California
Department of Transportation
RELOCATION IMPACT REPORT

Schuyler Heim Bridge Replacement and
SR-47 Expressway Project
07-LA-47-KP 4.4/9.3 (PM 2.7/5.8)
EA: 238500

SUMMARY OF RELOCATION IMPACT REPORT

The proposed Schuyler Heim Bridge Replacement and SR-47 Expressway Project proposes full acquisition, permanent highway easements and permanent aerial easements, some of which would require the relocation of businesses. No residential property acquisitions are anticipated. All relocation activities would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation resources shall be available to all displacees without discrimination.

The area selected for the relocations is dependent upon the type of business to be relocated and the market availability of property (fee or leasehold). For example if the use is an auto repair shop then land zoned for this type of use is the area in which the business could be relocated. Because the market is dynamic, the area for relocation cannot be determined prior to relocation. In addition, the relocated business cannot be forced to accept the relocation as presented by the agency. In many cases, multiple potential relocation areas are proposed and rejected until the business accepts a suitable relocation.

The undersigned has reviewed this report of the above-referenced project and recommends approval of the report.

Right of Way Agent

The undersigned has reviewed and approved this report.

for Andrew P. Nickenberg

Distribution: Original File

cc: (as applicable) Region/District R/W Manager; Region/District R/W Branch Managers; Project Manager; Environmental Planning Branch-Design

Attachments:
Attachment 1: Regional Location Map
Attachment 2: Project Map
Attachment 3: Displacement Area Map – Full Acquisitions under Alternative 1 and 1A
Attachment 4: Displacement Area Map – Full Acquisitions under Alternative 2

SUMMARY AND PROJECT DATA

A. Purpose of Study

The purpose of this study is to provide the California Department of Transportation (Caltrans), local agencies, and the public with information regarding the effect the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway Project would have on non-residential occupants within the alignments of the project alternatives. Specifically, this report is concerned with potential problems that may be caused by the displacement of existing non-residential structures and their occupants. No residential properties would be displaced under the project alternatives.

B. Limits and Purpose of Project

The project alternatives are located in Los Angeles County, within and north of the Ports of Los Angeles and Long Beach, as shown in Attachments 1 and 2. In general, the project alternatives are located between Ocean Boulevard on the south, Alameda Street on the west, SR-103 on the east, and Interstate 405 on the north.

The purpose of the proposed project is to provide a limited-access, high capacity, structurally and seismically safe vehicular connection along the critical north-south corridor between Terminal Island and the mainland that will facilitate the movement of people, freight, and goods and reduce congestion on local roadways. The project would include Terminal Island, located within the Ports of Long Beach and Los Angeles, and major traffic arterials on the mainland to the north, primarily within the cities of Long Beach and Los Angeles. The existing Schuyler Heim Bridge is a vital transportation link, but does not meet current seismic criteria and poses a potential safety risk to motorists and to marine users of the Cerritos Channel. The purpose of the project is to provide an efficient, safe, and immediate service connection across the Cerritos Channel. For the purposes of discussion below, the terms "alternatives" and "alignments" are synonymous.

C. Description of Alignments Studied (2)

Alignment A (Alternative 1 – Bridge Replacement and Expressway): Alternative 1 would replace the existing Schuyler Heim Bridge (built in 1946-48) in order to meet current seismic criteria. The new bridge would provide a route linking Terminal Island to the mainland and would be designed to remain in service to ensure ground and vessel transportation immediately following a major earthquake. Alternative 1 also would construct a new SR-47 Expressway to provide a high-capacity alternative route along the Alameda Corridor for traffic between Terminal Island and Alameda Street, north of Pacific Coast Highway.

With this alternative, a new fixed-span bridge would be constructed, primarily within the existing bridge right-of-way (Caltrans Highway Easement), but toward the east to avoid impacts to the Badger Bridge, located west of the Schuyler Heim Bridge. The existing bridge would be demolished after construction of the new bridge was completed. The replacement bridge would be slightly wider (13 meters [m] [43 feet (ft)]) than the existing bridge due to the addition of standard width shoulder lanes, which are not present on the existing bridge. The replacement bridge would include three 3.6-m (12-ft) lanes (two through-lanes and one auxiliary lane), with 3-m (10-ft) shoulders in the northbound direction and three 3.6-m (12-ft) lanes, one 3.6-m (12-ft) auxiliary lane, and 3-m (10-ft) shoulders in the southbound direction. Construction of the replacement bridge would include a southbound off-ramp and northbound on-ramp at New Dock Street on Terminal Island, as well as a northbound off-ramp and southbound on-ramp at Henry Ford Avenue on the mainland side of the bridge. With this alternative, the new bridge would be supported by four piers in the channel, with a minimum vertical clearance of 14.3 m (47 ft) over the mean high water level (MHWL). The existing navigable width of the channel is 54.9 m (180 ft), and would not change under this alternative. The navigable width is directly tied to the navigable width (54.9 m [180 ft]) of the Badger Bridge.

The southern end of the new SR-47 Expressway would begin on Terminal Island, at the intersection of SR-47 and Ocean Boulevard, extending north over New Dock Street and onto the replacement bridge. The expressway would extend northward to Alameda Street, to the intersection with Pacific Coast Highway, a distance of approximately 2.7 kilometers (km) (1.5 miles [mi]). The expressway would be a four-lane, limited access roadway. It would provide grade-separation at five at-grade railroad crossings and

three signalized intersections along its length. A segment of the expressway would be constructed as a viaduct over Henry Ford Avenue and Alameda Street and return to grade at Alameda Street, just south of Pacific Coast Highway. Under this alternative, the current connectivity to SR-103 would be maintained.

Alternative 1 also includes construction of the Ocean Boulevard/SR-47 Flyover (flyover), a two-lane, elevated structure to divert traffic bound for northbound SR-47 directly onto the new bridge from eastbound Ocean Boulevard. The purpose of the flyover is to enable this traffic to avoid the signalized Ocean Boulevard/SR-47 intersection. The flyover would begin on Terminal Island, about 1,200 m (3,900 ft) west of the Ocean Boulevard/SR-47 intersection, extend eastward along the south side of Ocean Boulevard, then turn north, cross over Ocean Boulevard and onto the new bridge. The west end of the flyover would be at grade, then the structure would rise to a maximum elevation of 21 m (69 ft) to cross over Ocean Boulevard, then descend to an elevation of 12.9 m (42.4 ft) to join the new bridge**.** The flyover would have an overall length of 1,550 m (5,084 ft), ending at the northerly end point (gore point) of the northbound New Dock Street on-ramp onto the bridge. The left lane of the flyover would converge with the SR-47 through lane to the left; the right lane of the flyover would continue as a northbound SR-47 through lane and would continue to SR-47. The flyover would be located entirely within the City and Port of Long Beach.

Alignment B (Alternative 1A – Haunch Bridge Design): Alternative 1A is a structural variation of Alternative 1. The purpose of this alternative is to improve the aesthetic appearance of the replacement bridge over the Cerritos Channel and to span a greater horizontal distance across the channel between columns. This is accomplished by increasing the span lengths over the channel and arching the superstructure soffits (the bottom of the bridge structure). Under this alternative, the new bridge would be supported by two piers (four columns) in the Cerritos Channel, compared to four piers (eight columns) under Alternative 1; the minimum vertical clearance between the piers would be of 14.3 m (47 ft). With this alternative, the new bridge would be supported by two piers in the channel, with a minimum vertical clearance of 14.3 m (47 ft) over the mean high water level (MHWL), the same as Alternative 1.

Other aspects of this alternative would be the same as Alternative 1.

Alignment C (Alternative 2 – SR-103 Extension to Alameda Street): With this alternative, as with Alternative 1, the flyover would be constructed, a new fixed-span bridge would be constructed, and the existing Schuyler Heim Bridge would be demolished. Additionally, modifications to the northbound and southbound approaches to the bridge would be constructed. Similar to Alternative 1, a new southbound off-ramp and northbound onramp at New Dock Street on Terminal Island would be constructed.

This alternative also would extend SR-103 from south of West Hill Street to the northwest on a four-lane viaduct to join Alameda Street between Sepulveda Boulevard and I-405. Improvements to SR-103 would begin approximately 3.2 km (2 mi) north of the Schuyler Heim Bridge and extend a distance of approximately 2.6 km (1.6 mi). The viaduct would cross over the Union Pacific Railroad Manual Yard and San Pedro Branch line, through the Southern California Edison (SCE) utility corridor, across the Los Angeles Harbor Department Warehouse 16/17 area, and over Sepulveda Boulevard, then turn parallel to the western boundary of the Intermodal Container Transfer Facility (ICTF) to the centerline of Alameda Street. The viaduct would return to grade south of the Wardlow Road (and E. 223rd Street) ramps to I-405. Improvements would be made to the existing SR-103 to accommodate the southerly and northerly end connections of the viaduct.

The flyover would be the same as under Alternative 1 although with this alternative, after joining with SR-47, the right lane of the flyover would continue to SR-103.

Alignment D (Alternative 3 – Bridge Avoidance): This alternative was developed specifically as a potential avoidance alternative for the purpose of the Section 4(f) analysis. It was conceived to preserve the existing Schuyler Heim Bridge following construction of a new fixed-span bridge on an alignment east of the existing bridge. Under this alternative, the new bridge would have the same lane configuration as the replacement bridge for Alternative 1. The existing Schuyler Heim Bridge would be seismically retrofitted before construction of the new bridge; however, the Schuyler Heim Bridge would no longer be used for transportation purposes once the new span goes into operation. This alternative was conceived to include

seismic retrofit so that the existing Schuyler Heim Bridge could remain standing but unused. The retrofit would be for safety purposes, to ensure that the existing bridge would not collapse and result in safety hazards or damage to the new bridge or to the adjacent Badger Avenue Bridge and thus avoid demolition of a historic resource.

The existing Schuyler Heim Bridge may be required to be demolished to comply with U.S. Coast Guard (Coast Guard) permit requirements. In preliminary consultations held in December 2005, the Coast Guard stated that the bridge would not be allowed to remain in place but unused. The Coast Guard further indicated that their permit to construct a replacement bridge would include a requirement for subsequent demolition of the Schuyler Heim Bridge.

Alignment E (Alternative 4 – Bridge Replacement Only): This alternative would replace the existing Schuyler Heim Bridge (lift bridge) with a fixed-span bridge largely along the existing bridge alignment, as described under Alternative 1. With this alternative, no roadway improvements would occur. With this alternative, therefore, the SR-47 Expressway described in Alternative 1 would not be constructed; and the SR-103 extension to Alameda Street described in Alternative 2 would not be constructed.

Alignment F (Alternative 5 – Transportation System Management): The Transportation System Management (TSM) alternative is designed to identify low-cost, easily implemented improvements as an alternative to construction of more expensive improvements. For this project, the TSM alternative focuses on improvements to routes that parallel the proposed SR-47 Expressway, and that serve the same trips. These trips include trucking drayage trips to and from the ICTF, and trips destined to and from the Ports via Alameda Street, Henry Ford Avenue, and SR-47. The TSM alternative would include measures to improve capacity and traffic circulation at the Port of Long Beach and Port of Los Angeles through policy changes and use of the latest technologies. With this alternative, capital investment would be minimal compared to the previous alternatives addressed.

The TSM alternative for this project includes the following key elements:

- Intelligent Transportation Systems (ITS): Systems applications in and around the Ports area, with special emphasis on truck movements. These include measures to improve traffic circulation through traffic control, incident management, traffic surveillance, and traffic information dissemination with the aid of intelligent transportation system devices and systems.

- Lower-cost roadway and intersection improvements: Measures include restriping to provide additional turn lanes and acceleration lanes and traffic signalization improvements, primarily within existing rights-of-way.

- Minor roadway widening: There also could be peak-hour parking prohibitions to remove midblock bottlenecks along selected roadways.

Alignment G (Alternative 6 – No Build): Under the No-Build alternative, there would be no changes to the existing Schuyler Heim Bridge or local roadway system. The existing Schuyler Heim Bridge would continue to be seismically inadequate and subject to damage or collapse under strong seismic conditions. Maintenance activities would continue and would include application of protective coatings; lift mechanism repairs; deck resurfacing; and other, similar, maintenance activities. The existing SR-47 roadway would function with current and increasing levels of congestion.

1. Is there a "core" corridor common to all alternates? Yes ☒ No ☐
   The Schuyler Heim Bridge is common to all build alternatives.

D. Basis of Findings

The sources used in the preparation of this report were both primary and secondary in nature, and are identified in the References section at the end of this document. Information was gathered from the right-of-way studies conducted by Alameda Corridor Transportation Authority.

E. Describe the Displacement Area: (neighborhood, amenities, access, facilities, general occupancy characteristics)

No residential areas exist within the area of displacement; no residential properties would be displaced. Displacements of industrial/commercial businesses would occur. The majority of the businesses are machine shops, autobody shops, recycling facilities, and container storage type businesses.

The displacement area is along the project alignments within the Cities of Long Beach, Los Angeles and Carson. In general the displacement area is located along SR-47, north of Ocean Boulevard and south of Alameda Street. The area is highly developed with heavy industrial, commercial, and transportation uses associated with the nearby Ports of Los Angeles and Long Beach. Access to the areas is primarily via SR-47.

The local amenities within the immediate area and their distances from the project site include:

- Hudson Park, approximately 0.25 mile east of Alternative 2;
- Admiral Kidd Park, approximately 0.5 mile east of Alternative 2;
- East Wilmington Park, approximately 0.3 mile east of Alternative 1;
- Banning Park, approximately 1 mile west of Alternative 1; and
- East Wilmington Park, approximately 1 mile west of Alternative 1.

The schools in the area and their distances from the project site include:

- Hudson Elementary School, adjacent and to the east of Alternative 2;
- Cabrillo High School, adjacent and to the east of Alternative 2;
- Holy Family Grammar School, approximately 0.5 mile west of Alternative 1; and
- Wilmington Park Elementary School, approximately 0.7 mile west of Alternative 1.

None of the school or park properties would be acquired as part of the project.

F. Estimated Displacement Units by Alignment

Alignment A (Alternative 1 – Bridge Replacement and Expressway): Under Alternative 1, there would be no residential displacements. There would be full acquisition of 11 Assessor-numbered parcels (6 ACTA-numbered parcels, all privately owned); 5 APN-numbered parcels are vacant, and 6 businesses would require relocation. There would also be approximately 129 partial takes (aerial/highway easements) and 82 temporary construction easements. Nine slips would be acquired at the Leeward Bay Marina.

Alignment B (Alternative 1A – Haunch Bridge Design): The only difference between this alignment and Alignment A is the design of the new bridge, which would have no effect on the number or type of displacements. Therefore, as with Alternative 1, there would be no residential displacements. There would be full acquisition of 11 APN-numbered parcels (6 ACTA-numbered parcels, all privately owned); 5 APN-numbered parcels are vacant, and 6 businesses would require relocation. There would also be approximately 129 partial takes (aerial/highway easements) and 82 temporary construction easements. Nine slips would be acquired at the Leeward Bay Marina.

Alignment C (Alternative 2 – SR-103 Extension to Alameda Street): Under Alternative 2, there would be no residential displacements. There are 118 partial takes (aerial/permanent highway easements) and 73 temporary construction easements. Under Alternative 2, two businesses would require relocation as a result of permanent highway easements.

Alignment D (Alternative 3 – Bridge Avoidance): There would be no residential or non-residential displacements requiring relocation. This alternative would result in approximately 61 partial takes (aerial/highway easements) and 41 temporary construction easements. Nine slips would be acquired at the Leeward Bay Marina.

Alignment E (Alternative 4 – Bridge Replacement Only): Under Alternative 4, there would be no residential or non-residential displacements requiring relocation assistance. This alternative would result in 17 partial takes (aerial/highway easements) and 8 temporary construction easements.

Alignment F (Alternative 5 – Transportation System Management): Under the TSM Alternative, there would be minimal construction. Therefore, no relocations or displacements are anticipated.

Alignment G (Alternative 6 – No Build): Under the No-Build Alternative, no relocations or displacements would occur.

ALIGNMENTS

Residential:	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Owner occupants of single-family residences:	–	–	–	–	–	–	–
Tenant occupants of single-family residences:	–	–	–	–	–	–	–
Tenant occupants of multiple-unit residences:	–	–	–	–	–	–	–
Owner occupants of mobile homes:	–	–	–	–	–	–	–
Tenant occupants of mobile homes:	–	–	–	–	–	–	–
TOTAL RESIDENTIAL UNITS:	0	0	0	0	0	0	0
TOTAL PERSONS:	0	0	0	0	0	0	0
(average #/household)	-	-	-	-	-	-	-

ALIGNMENTS

Nonresidential:	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Commercial businesses:		–				–	–
Industrial/manufacturing business:	6	6	2	6	0	–	–
Nonprofit organizations:	–	–				–	–
Agricultural/farms:	–	–				–	–
TOTAL NONRESIDENTIAL UNITS:	6	6	2	6	0	0	0
TOTAL UNITS:	6	6	2	6	0	0	0
						–	–

ALIGNMENTS

G. Type of Displacement Improvements

	A	**B**	**C**	**D**	**E**	**F**	**G**
Single-family residence:	–	-	-	-	-	-	–
Duplex/triplex (multi-unit residences):	–	–	-	-	-	-	–
Apartments (multi-unit residences), 4 or more:	–	–	-	-	-	-	–
Sleeping rooms/shared quarters:	–	–	--	-	-	-	–
Mobile homes:	-	-	-	-	-	-	–
TOTAL UNITS:	0	0	0	0	0	0	0

H. Adequate Relocation Resources Exist for:

	Yes	No
Residential owners	☐	☐
Residential tenants	☐	☐
Mobile homes	☐	☐
Businesses	☒	☐
Nonprofit organizations	☐	☐
Agriculture	☐	☐

No residential properties, mobiles homes, nonprofit organizations, or agricultural areas would be acquired in association with implementation of this project.

1. *The closest replacement area identified is within Zip Codes 90744, 90810, and 90813. However, based on previous experience and current research, it is challenging to relocate the types of businesses that are being displaced as a result of this project. Given the declining percentage of land under manufacturing and industrial use in most cities, the availability of land for uses such as container storage, recycling facilities, landfill, trucking related businesses and other industrial uses is limited. Therefore, relocation sites outside the immediate vicinity would be considered.*
2. The relocation area is comparable in terms of amenities, public utilities, and accessibility to public services, transportation, and shopping. Yes ☒ No ☐

   The relocation area is an urban area with all amenities and public utilities in place.
3. The relocation resources (are) () affordable to residential displacees, given the use of replacement housing payments. However, *there are no residential displacements as a result of the project.*
4. *The project would not result in any typical residential displacements. Businesses in this area have been known to have resident caretakers on their properties. If any of the businesses that are being relocated include resident caretakers, appropriate relocation could be provided for these resident caretakers. The 9 slips that would be acquired at the Leeward Bay Marina could result in relocation of one resident.* [1] *However, these live aboard residents rent slips on a month-to-month basis. According to the rental agreements, the Port can give these tenants 30-day advance notice to vacate for any reason and the Port is not responsible to compensate its tenants. Other public projects that may require displacements (either residential or non-residential) in the area include Pier 400 Container Terminal and Transportation Corridor Project, Wilmington Parkway, Pacific Corridor Redevelopment Project, San Pedro, Southern California International Gateway, Piers D, E, F Terminal Redevelopment, Piers G & J Terminal Redevelopment Project, Pier A West Expansion Project, Pier S Marine Terminal, Pier J South Terminal, Pier T, Long Beach LNG Terminal, and Gerald Desmond Bridge Replacement Project. However, it is anticipated that these projects would undertake a study of relocations and abide by the regulations governing relocations.*
5. *The State's relocation program is adequate to successfully relocate all displacees.*
6. *The business and industries to be relocated are machine shops, autobody shops, recycling, container storage type uses. Given the nature of these businesses, they are not compatible with residential and office commercial uses. The area in the vicinity of the Ports has developed as an industrial area suitable for locating such businesses due to lack of residential uses in the vicinity. The amount of land under industrial uses has been on a decline in the Los Angeles area. Industrial uses are largely perceived as undesirable due to issues related to use of hazardous materials, contamination and noise/traffic nuisances. For this reason, the relocation of businesses would likely have to occur in close vicinity where other such and similar uses exist. If the uses cannot be relocated within the Port area, locations outside Los Angeles County would be considered. Acquisition and relocation alternatives would be evaluated once a preferred alternative is available. All efforts would be made to relocate the businesses within a suitable replacement area and/or just compensation would be provided.*
7. *Last Resort Housing Program payments are not anticipated, as no households would be relocated as a result of the project.*
8. *It is not anticipated that construction of replacement housing under the Last Resort Housing Program will be required.*
9. *A field office will not be required for this project.*

[1] Based on a conservative estimate, 15% of the boat slips within POLA and POLB contain live-aboard residents. To arrive at the number of live-aboards likely to be relocated as a result of Alternatives 1, 1A, and 3, calculating fifteen percent (15%) of the nine (9) slips would equate to possibly taking one (1) resident at the Leeward Bay Marina. Therefore, for the calculations in this DRIR, it is assumed that one live-aboard resident would be relocated. Source: Harley Martin, CH2MHILL, in conversation with Rick Adler at POLA Property Management Division and Larry Ditchkus at POLB Property Management Division on February 16, 2006.

DETAILED ANALYSIS

I. DISPLACEMENT AREA

1. Residential Displacements

The project would not result in any typical residential displacements. Businesses in this area have been known to have resident caretakers on their properties. If any of the businesses that are being relocated include resident caretakers, appropriate relocation could be provided for these resident caretakers. The 9 slips that would be acquired at the Leeward Bay Marina under Alternatives 1, 1A, and 3 could result in relocation of one resident.

2. Business and Nonprofit

1. Number of businesses directly impacted by the project.
Six businesses would be relocated as a result of alternatives 1, 1A, and 3; these include recycling facilities, transportation company repair shop, materials, transportation system and facilities management company. All of these businesses are on parcels zoned as commercial/industrial.

Under Alternative 2, two buildings (not entire parcels) would be acquired as Permanent Highway Easements, thereby denying them of their existing use. One of these buildings is owned by Corridor Properties, and the other is an industrial building owned by Southern California Edison. Note that in the after condition, the permanent and aerial highway easements could allow for temporary uses, such as parking, temporary structures such as storage sheds or trailers, and storage of non-hazardous materials.

Alternatives 4, 5, and 6 would not require relocation of any businesses and/or nonprofits.

	Alignments												
	A		**B**		**C**		**D**		**E**		**F**		**G**
Construction													
Manufacturing													
Retail													
Government													
Nonprofit													
Service	6		6		2		6		0		0		0
TOTAL	6		6		2		6		0		0		0

2. Age of business:

	Alignments												
	A		**B**		**C**		**D**		**E**		**F**		**G**
1–3 Years													
4–7 Years	6*		6*		2*		6*		0*		0*		0*
8–15 Years													
Over 15 Years													

*This is an estimate based on the average age of similar types of businesses in the area. Interviews with the businesses, to be conducted later in the process, would reveal the exact age of the business at its existing location.

3. Estimated number of employees:
   Note: Small business is defined as 500 or fewer employees. Over 500 = No reestablishment payment.

	Alignments												
	A		B		C		D		E		F		G
1–20	X (Max5x20=100)		X (Max5x20=100)		X (Max 2x20=40)		X (Max5x20=100)		-		-		-
21–100													
101–500													
Over 500													

Note: 1-20 employees for each business. Please note that this is a conservative estimate available at this time. Once a project alternative is selected, a detailed interview will take place with the business owners to obtain relevant information about their businesses.

4. There are no businesses impacted by the project that are assumed to be minority owned.

5. Number of the different type of facilities:

	Alignments												
	A		B		C		D		E		F		G
Strip commercial													
Small shop-center													
Regional center													
Single structure	6		6		2		6		0		0		0
Mixed residential													
Industrial park													
Low rent area													

Note: As shown above, only single structure buildings will be impacted.

3. Agricultural Impact: Analysis of farm operations, and how impacted, especially if part take and owners or tenants working will be displaced

1. Type of agriculture: *The proposed project would not result in any agricultural impacts.*

II. REPLACEMENT AREA

A. Describe in Relationship to the Local Town/Community and to the Displacement Area
The EIS/EIR for the project is currently under preparation and will evaluate the environmental impacts of the various alternatives for the project. Upon completion of the environmental review process, which includes opportunity for public input, a feasible alternative will be chosen. The acquisition process would begin once a preferred alternative has been adopted by the lead agency. No residential relocations are anticipated under any alignment. However, in the event replacement is needed, the replacement area would be determined based on the adopted alternative and available replacement housing.

1. Housing stock:
   a. Number of single-family residences: N/A____
   b. Number of multiple-family units: N/A____
   c. Number of mobile homes and other: N/A____
   d. TOTAL HOUSING UNITS (a+b+c): N/A____
   No residential acquisitions would occur.

2. Vacancy rate expressed as a percent:

	For Rent	For Sale
Single-family residences	N/A____	N/A____
Multiple-family units	N/A____	N/A____
Mobile homes	N/A____	N/A____

No residential acquisitions would occur.

3. Housing characteristics:
No residential acquisitions would occur.

4. Average prices of typical single-family homes that are DS&S for the displacement properties:
No residential acquisitions would occur.

B. Business and Nonprofit Replacement

1. Number of business sites that will be available for rent, purchase, or development
No business sites will be available for rent, purchase, or development as a result of the project alternatives.

	Alignments												
	A		**B**		**C**		**D**		**E**		**F**		**G**
Construction	-		-		-		-		-		-		-
Manufacturing	-		-		-		-		-		-		-
Retail	-		-		-		-		-		-		-
Government	-		-		-		-		-		-		-
Nonprofit	-		-		-		-		-		-		-
Service	-		-		-		-		-		-		-
Total	0		0		0		0		0		0		0

2. Discuss difficulties the businesses may encounter in finding replacement property because of:

   a. Replacement site requirements: *The businesses require similarly zoned commercial/industrial land that allows uses such as recycling and auto body shops. No other requirements exist.*
   b. Lease rates or purchase price: *No difficulties related to lease rates or purchase price are anticipated.*
   c. Financial capacity of the businesses to accomplish move: *No difficulties related to lease rates or purchase price are anticipated. All eligible businesses, as determined by the Uniform Relocation Act, will receive relocation assistance.*
   d. Special services that may be needed to assist businesses relocate (e.g. rezoning, reduced CUP costs, advanced payments, construction of replacement site, professional services to plan the move or obtain replacement site, business loans, special consideration by the local agency): *No special services have been identified. See response to 2.c., above.*

3. Discuss difficulties the employees may have if the business relocated as planned: *If the businesses are relocated in the vicinity of their existing location, no impacts or, at most, minor impacts to employees would occur. However, if the businesses are relocated far from the displacement site, employees may need to relocate with the business or find new employers. However, this remains undetermined at this point in the process and would be given due consideration once the relocations are finalized. Once a preferred alternative is selected, an interview process with the business owners would be initiated. As a result of the interview process, more detailed information regarding type of business and employees would become available.*

4. Discuss difficulties the employees may have if the business cannot relocate as planned: *See response to 3, above.*

C. Residential Replacement

1. Section 8 rental limits: *No Section 8 housing would be displaced.*
2. Replacement neighborhood is homogeneous to displacement area. *No residential displacements would occur.*
3. General condition of displacement neighborhood: *No residential displacements would occur.*
4. Condition of units being displaced:
   N/A Very Good ☐ Good ☐ Average ☐ Fair/Poor ☐
5. Compared to condition of units in replacement area:
   N/A Very Good ☐ Good ☐ Average ☐ Fair/Poor ☐
6. Number of mobile home parks directly impacted by the project 0.
7. Number of mobile homes directly impacted by the project 0 within the park.
8. Number of mobile homes directly impacted by the project 0 that are not in a mobile home park.

D. Comparative Data

Not applicable, as no residential displacements would occur.

	DISPLACEMENTS	PROJECT AREA	REPLACEMENT AREA
Total housing units	0	0	0
% owner occupied	0	0	0
% renter occupied	0	0	0
Total housing units vacant	0	0	0
Vacancy rate	0	0	0
Housing units for sale	0	0	0
Housing units for rent	0	0	0
Persons per household	0	0	0
Median housing value	0	0	0

III. RELOCATION RESOURCES

A. Adequate Resources (availability, funds, staffing, time) exist for all displacees

Adequate resources exist.

B. The Replacement Area Chosen and Used as a Basis for Relocation Resources

The project is in an active industrial/commercial area, and suitable replacement sites are available in the market.

C. Adequacy of Market Availability

Market availability is expected to be adequate to meet the relocation demands of the project alternatives.

IV. RELOCATION PROBLEMS AND PROGRAMS

A. Relocation Problems

No relocation problems related to the categories provided below are anticipated.

Elderly *	Yes ☐	No ☒	Minorities	Yes ☐	No ☒
Low income (30%)	Yes ☐	No ☒	Overcrowded residence	Yes ☐	No ☒
Low income (poverty)	Yes ☐	No ☒	Handicapped*	Yes ☐	No ☒
Last resort housing const.	Yes ☐	No ☒	Minority business	Yes ☐	No ☒
Marginal business*	Yes ☐	No ☒	Other	Yes ☐	No ☒
Lack of availability	Yes ☐	No ☒			

*All indicate special advisory assistance will be needed.

B. Housing Impact

This project will not impact the local housing stock for the community, as no residential displacements would occur.

C. Conclusion

The right-of-way surveys have recently been completed. Once the environmental review process is completed and public input has been sought, a preferred alternative will be chosen. Acquisition and relocation alternatives would be evaluated once a preferred alternative is available. All efforts would be made to relocate the businesses within a suitable replacement area and/or just compensation would be provided.

All relocation activities would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation resources shall be available to all displacees without discrimination.

FINAL CONCLUSION: *The project alternatives would not result in any residential displacements. Relocation of not more than 6 businesses would occur under any alternative studied in this report. The project is in an active industrial/commercial area. Suitable replacement sites are available in the market and would be adequate to meet the replacement needs generated by the project.*

REFERENCES

Printed References
Alameda Corridor Transportation Authority. 2005 and 2007. Draft Right-of-Way Drawings.

Thomas Bros Guide. 2005. Los Angeles County.

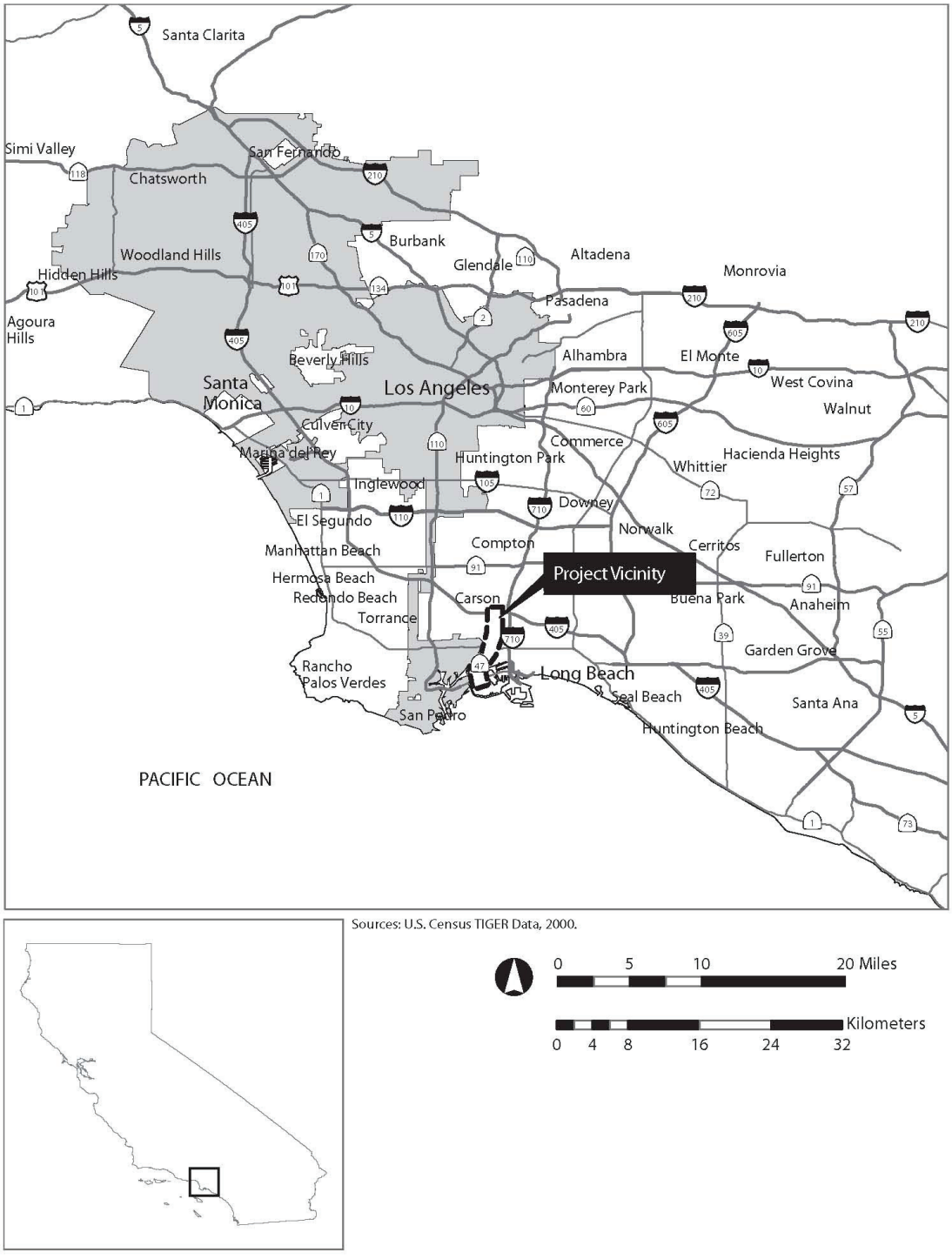
United States Bureau of Census. 2000. TIGER data files.

Personal Communications
Haney, Dean. Real Estate Agent. CB Richard Ellis, Los Angeles, CA. January 2006—telephone conversation.

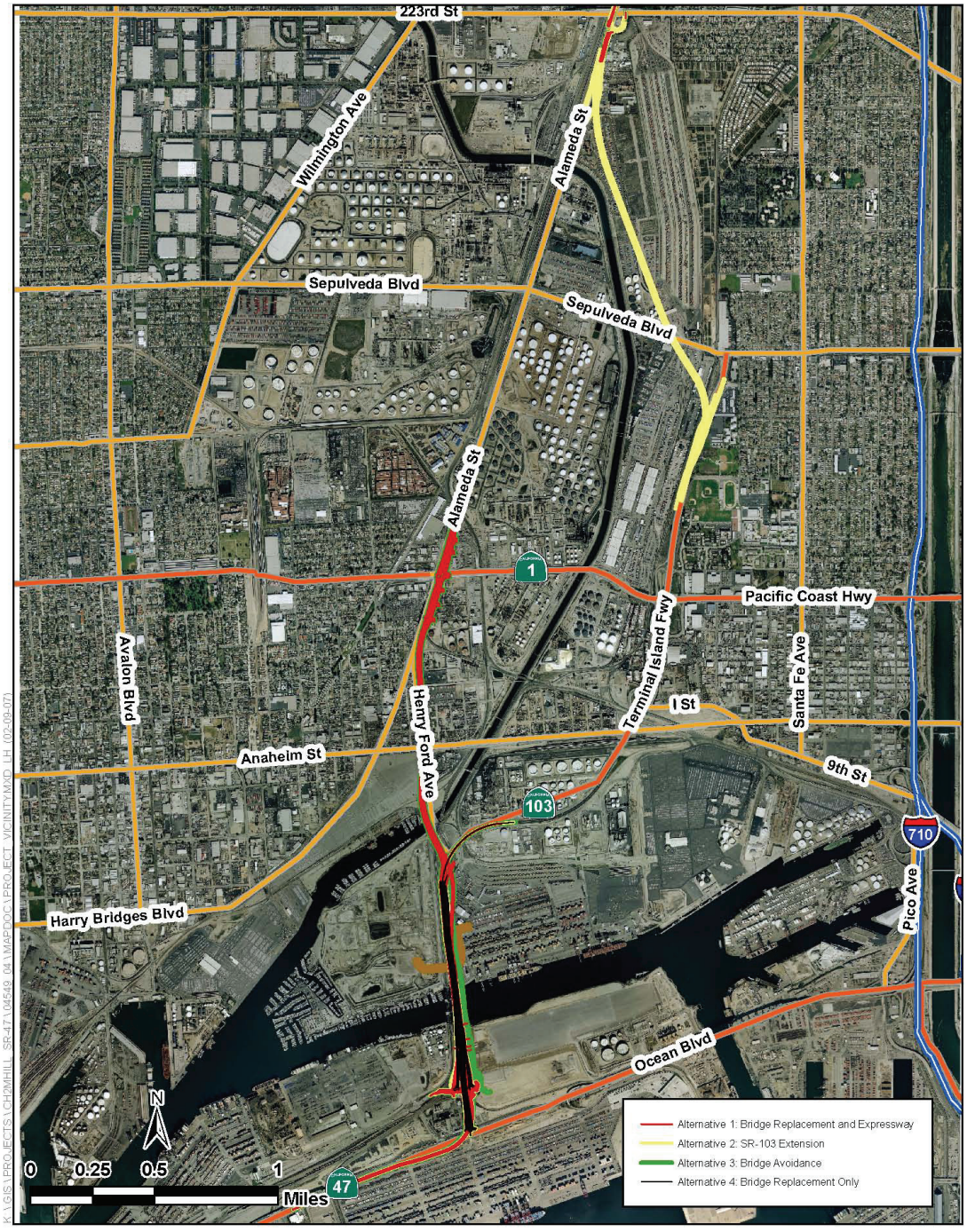
Martin, Harley. CH2M HILL. February 2006—telephone conversation with Rick Adler at POLA Property Management Division and Larry Ditchkus at POLB Property Management Division.

Osterberg, Bret. Real Estate Agent. Lee Associates, Los Angeles, CA. January 2006—telephone conversation.

Attachment 1: Regional Location Map

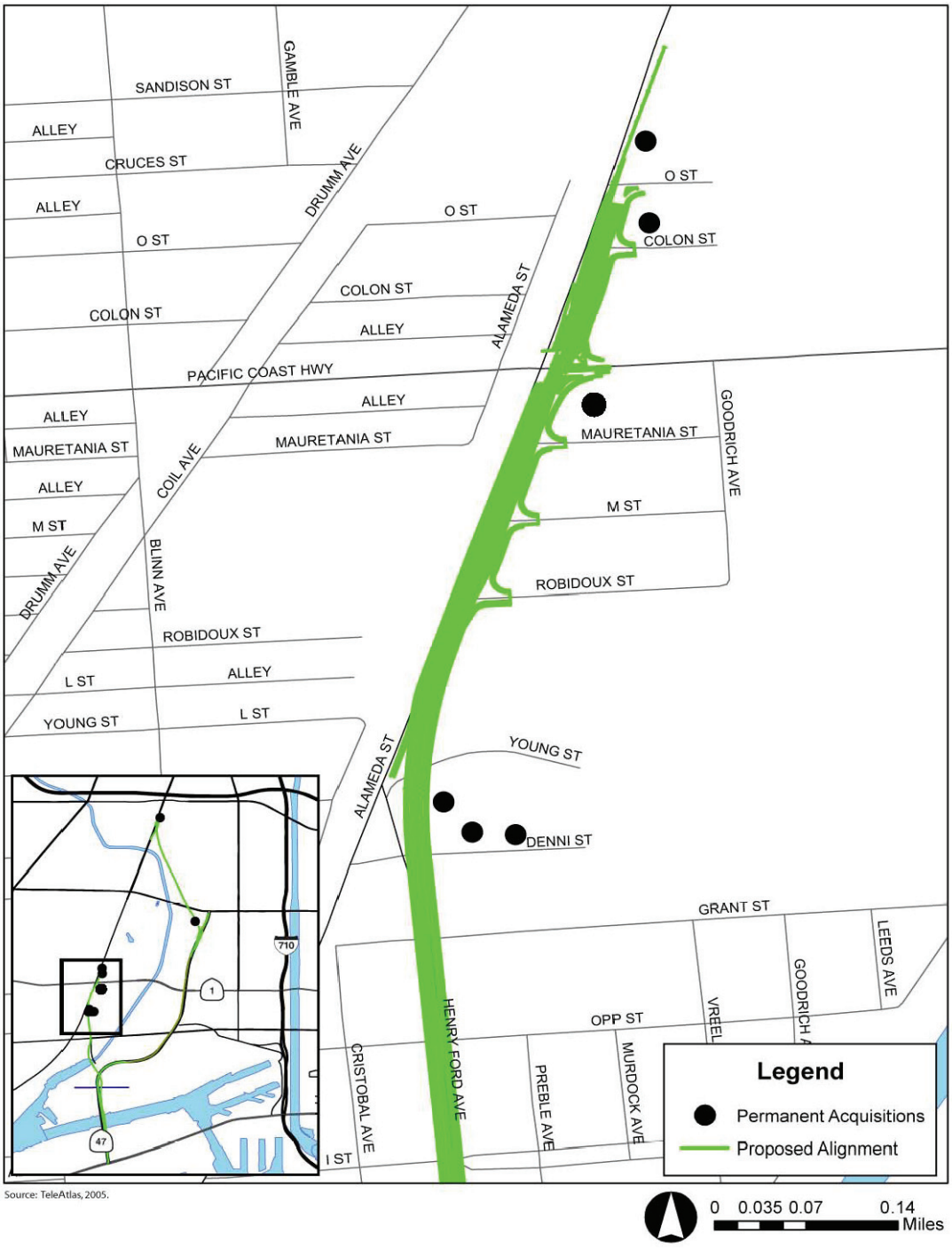


Attachment 2: Project Map

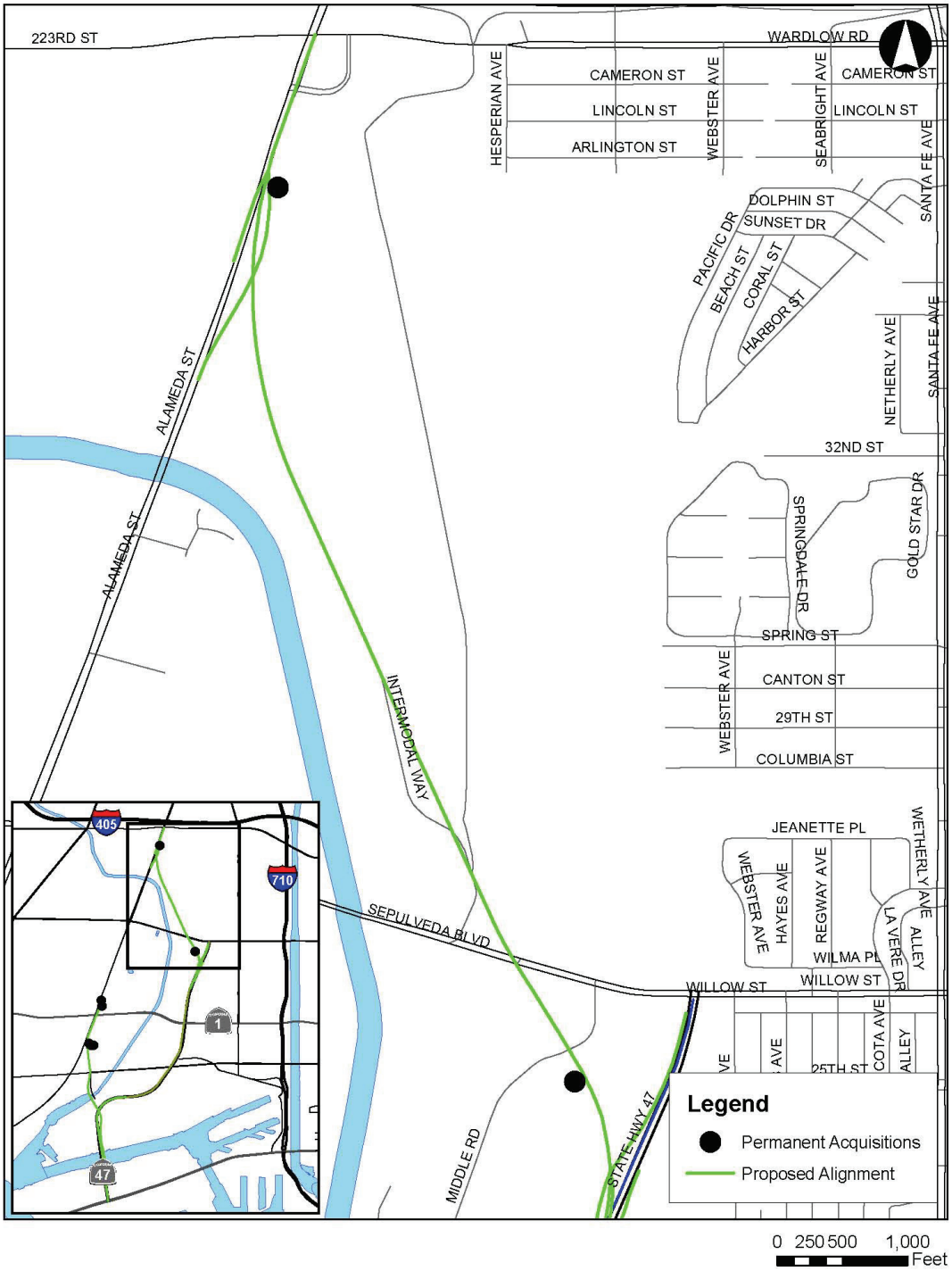


SOURCE: ESRI Streetmap USA (2006)

Attachment 3: Displacement Area Map – Location of Businesses to Be Relocated under Alternatives 1 and 1A.



Attachment 4: Displacement Area Map – Location of Businesses to Be Relocated under Alternative 2



DEPARTMENT OF TRANSPORTATION
DISTRICT 7, 120 SO. SPRING ST.
LOS ANGELES, CA 90012-3606
TDD (213) 897-6610

Flex your power!
Be energy efficient!

August 23, 2004

File: 07-LA-47
KP 4.5/8.5 (PM 2.8/5.3)
Schuyler Heim Br. Replacement and
SR-47 Expressway
EA 199900

Dear Concerned Individuals and Interested Parties:

Notice of Scoping/Initiation of Studies

Caltrans is formally initiating studies for a proposed project in the Los Angeles/Long Beach Harbor area. The project involves replacing the seismically-deficient Schuyler Heim Bridge and improving the SR 47/Henry Ford Avenue/Alameda Street transportation corridor by constructing an elevated expressway from the Heim Bridge to SR 1 (Pacific Coast Highway). It is proposed to replace the existing vertical lift bridge with a fixed structure; various alternative alignments, heights and clear channel widths are being considered. Alternatives are also being considered for the expressway/SR 103 interchange in the expressway portion of the project. The proposed work will require additional Right of Way. The attached map shows the general limits of the proposed study.

During 2002, Caltrans and ACTA began formal public scoping and initiation of environmental studies for the proposed project. Notice letters were sent to federal, state, and local agencies on January 28, 2002. Notices were published in local newspapers advertising the public scoping and open house meetings on February 13, 2002. Public comments were received until February 28, 2002. Budgetary constraints then led Caltrans to temporarily suspend the project.

It is anticipated that the appropriate environmental document will be an Environmental Impact Report/Environmental Impact Statement (EIR/EIS). However, this will be determined by the results of the environmental studies that will be conducted.

It would be appreciated if you would notify us of any existing facilities or planned developments surrounding the project study area. Caltrans anticipates that working cooperatively with the public in an effort to exchange ideas will assure that all pertinent factors are considered and that a mutually acceptable transportation solution will result. Any comments or suggestions you may have concerning alternatives to be studied or potential social, economic, and environmental impacts associated with this project are welcome.

A Public Scoping Meeting will be held on September 9, 2004 at the Wilmington Senior Center located at 1371 Eubank Ave., Wilmington, CA 90744 from 5:30pm to 7:30pm. This will be an informal meeting with displays available for review; questions and comments will also be solicited.

We will be pleased to have your ongoing participation on this project. Please send any written comments by September 30, 2004 to:

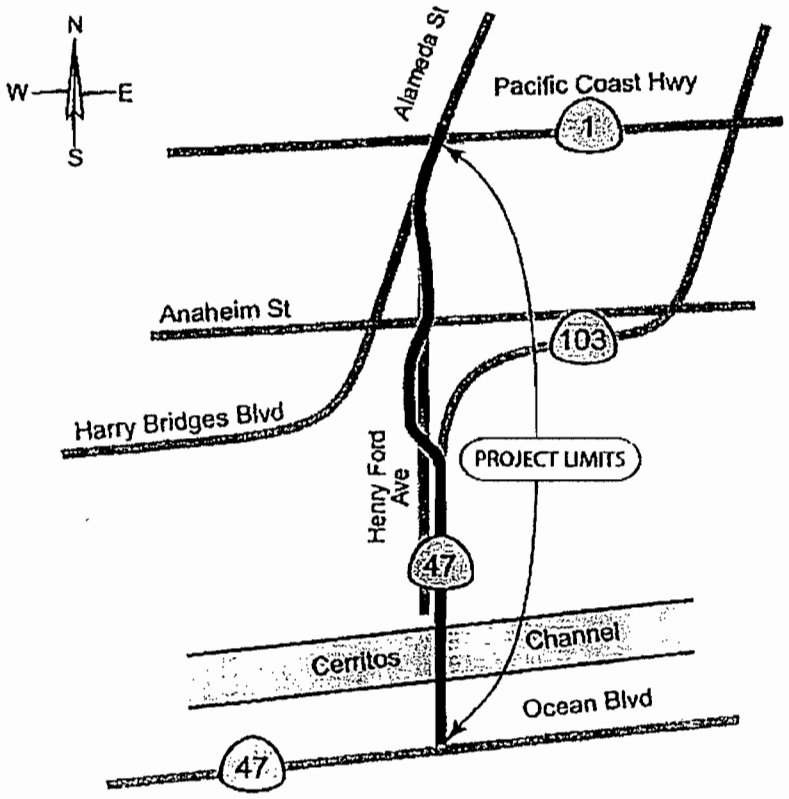
Mr. Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning (LA 47 KP 4.5/8.5 (PM 2.8/5.3))
Caltrans
120 S. Spring Street (MS 16A)
Los Angeles, CA 90012

If you have any questions please contact Karl Price at (213) 897-1839 (e-mail: Karl_Price @dot.ca.gov). Caltrans would like to thank you for your participation and interest in this transportation project study.

Sincerely,

Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning

State Route 47 from Ocean Blvd to Pacific Coast Highway



Project Location Map

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, 120 SO. SPRING ST.
LOS ANGELES, CA 90012-3606
TDD (213) 897-6610

Flex your power!
Be energy efficient!

August 23, 2004

File: 07-LA-47
KP 4.5/8.5 (PM 2.8/5.3)
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An Agency Scoping Meeting will be held on September 9, 2004 at the Wilmington Senior Center located at 1371 Eubank Ave., Wilmington, CA 90744 from 2:30 PM to 4:30 PM. A brief presentation will be made and displays will be available for review; questions and comments will also be solicited.

We will be pleased to have your ongoing participation on this project. Please send any written comments by September 30, 2004 to:

Mr. Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning (LA 47 KP 4.5/8.5 (PM 2.8/5.3))
Caltrans
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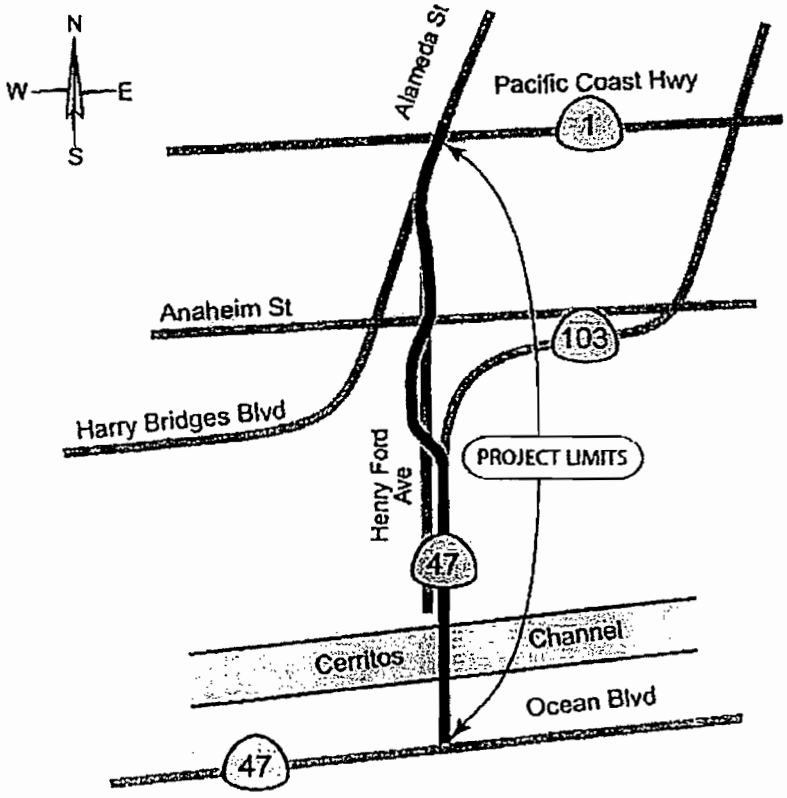
State Route 47 from Ocean Blvd to Pacific Coast Highway



Project Location Map

Fuchs, including the Fuchs Electronics Division of Reunert Limited effective February 27, 1997 (*see* 62 FR 13933, March 24, 1997).

A **Federal Register** notice was published on March 4, 1998 (63 FR 10672) which temporarily suspended the statutory debarment against Fuchs. The Consent Agreement explicitly provided that if the compliance programs or any other parts of the agreement were not fully adhered to, debarment could be re-imposed. The Agreement also stated that the company would establish an internal compliance program and would provide an amount of money equivalent to suspended civil fines to the South African Government to support the effective implementation of its national export control regime.

Section 38(g)(4) of the AECA permits rescission of debarment after consultation with the Secretary of the Treasury and after a thorough review of the circumstances surrounding the conviction and a finding that appropriate steps have been taken to mitigate any law enforcement concerns.

The Department of State has determined that Fuchs (Pty) Ltd has taken appropriate steps to address the causes of the violations and mitigate any law enforcement concerns. Therefore, in accordance with section 38(g)(4) of the AECA and section 127.11 of the ITAR, effective July 14, 2004, the debarment against Fuchs, including the Fuchs Electronics Division of Reunert Limited, is rescinded. The effect of this notice is that Fuchs, and any divisions, subsidiaries, associated companies, affiliated persons, and successor entities may participate without prejudice in the export or transfer of defense articles, related technical data, and defense services subject to section 38 of the AECA and the ITAR.

Dated: July 14, 2004.

Lincoln P. Bloomfield, Jr.,

Assistant Secretary, Bureau of Political-Military Affairs, Department of State.

[FR Doc. 04–16589 Filed 7–23–04; 8:45 am]

BILLING CODE 4710–25–P

DEPARTMENT OF STATE

[Public Notice 4744]

Advisory Committee on International Communications and Information Policy Meeting Notice

The Department of State announces the next meeting of its Advisory Committee on International Communications and Information Policy (ACICIP), to be held on Wednesday, August 18, from 9 a.m. until 11:30 a.m., in Room 1406 of the Harry S Truman Building of the U.S. Department of State. The Truman Building is located at 2201 C Street, NW., Washington, DC 20520.

The committee provides a formal channel for regular consultation and coordination on major economic, social and legal issues and problems in international communications and information policy, especially as these issues and problems involve users of information and communications services, providers of such services, technology research and development, foreign industrial and regulatory policy, the activities of international organizations with regard to communications and information, and developing country issues.

Ambassador David A. Gross, Deputy Assistant Secretary and U.S. Coordinator for International Communications and Information Policy, will attend the meeting together with others from the Office of Communications and Information Policy at the Department of State. Items on the agenda will include Amb. Gross's forthcoming visit to China, issues on the agenda of the October meeting of the World Telecommunications Standards Assembly, reports from the sub-committees of ACICIP, international actions concerning spam, the recent preparatory meeting for Phase II of the World Summit on the Information Society, emerging technologies, and other key multilateral and bilateral issues on the agendas of meetings this fall. Amb. Gross would also like to solicit ideas from ACICIP on current issues facing the telecommunications and information sectors.

Members of the public may attend the meeting up to the seating capacity of the room. While the meeting is open to the public, admittance to the Department of State building is only by means of a pre-arranged clearance list. In order to be placed on the pre-clearance list, those interested in attending must provide name, title, affiliation, social security number, date of birth and citizenship to Avis Alston at *AlstonAC@state.gov* no later than 5:00 p.m. on Monday, August 16. All attendees must enter by the 23rd Street entrance. One of the following valid Identifications will be required for admittance: Any U.S. driver's license with photo, a passport, or a U.S. government agency ID. For security reasons, all those attendees who do not have U.S. government agency IDs must be escorted by Department of State personnel at all times when in the building.

For further information, please contact Elizabeth W. Shelton, Executive Secretary of the Committee at (202) 647–5233, or at *SheltonEW@State.gov.*

Dated: July 20, 2004.

Elizabeth W. Shelton,

Executive Secretary, ACICIP, Department of State.

[FR Doc. 04–16972 Filed 7–23–04; 8:45 am]

BILLING CODE 4710–07–P

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

Environmental Impact Statement: Los Angeles County, CA

AGENCY: Federal Highway Administration (FHWA), DOT.

ACTION: Notice of intent.

SUMMARY: The FHWA is issuing this notice to advise the public that an environmental impact statement will be prepared for a proposed highway project in Los Angeles County, California.

FOR FURTHER INFORMATION CONTACT: César Pérez, Team Leader—South Region, Federal Highway Administration, 650 Capitol Mall, Suite 4–100, Sacramento, California 95814 Telephone (916) 498–5065.

SUPPLEMENTARY INFORMATION: The FHWA, in cooperation with the California Department of Transportation (Caltrans) and the Alameda Corridor Transportation Authority (ACTA), will reinitiate environmental studies and prepare an Environmental Impact Statement (EIS) on a proposal to improve State Route 47 (SR–47) in Los Angeles County, California. The proposed improvement would involve replacing the seismically deficient Schuyler Heim Bridge with a new fixed-span bridge and the construction/extension of SR–47 as a new four-lane elevated expressway from the new Heim Bridge along Alameda Street to Pacific Coast Highway (State Route 1). The new fixed-span bridge would change the current vertical and horizontal clearances through the Cerritos Channel. The elevated expressway would provide a direct route from Terminal Island to Alameda Street, resulting in the elimination of five at-grade railroad crossings and ultimately reduce truck traffic on Interstates 710 and 110.

During 2002, Caltrans and ACTA began formal public scoping and initiation of environmental studies for the proposed project. Notice letters were sent to Federal, State and local agencies on January 28, 2002. Notices were prepared in the **Federal Register** and local newspapers, advertising public scoping and open house meetings, on

February 13, 2002, at 2:30 p.m. and 4:30 p.m. respectively. Public comments were received until February 28, 2002. A review of subsequent environmental studies led to FHWA to conclude that an EIS would be required. Budgetary constraints then led Caltrans to temporarily suspend the project.

Major project elements to be evaluated in the EIS include: Replacement of the vertical-lift Schuyler Heim Bridge with a fixed-span bridge; construction of an elevated four-lane expressway to State Route 1; and, potential realignment of surface roads and ramps. The EIS will consider a variety of possible alignments for these improvements, as well as the "no-build" alternative.

Letters describing the re-initiation of studies and soliciting comments will be sent to appropriate Federal, State and local agencies and to private organizations and citizens who have previously expressed, or are known to have, an interest in this proposal.

Additional public scoping and open house meetings for the Draft EIS/EIR will be held at the Wilmington Senior Center located at 1371 Eubank Ave., Wilmington, California 90745. The public meetings will be held on September 9, 2004, at 2:30 p.m. and 5:30 p.m., respectively. In addition, a public hearing will be held following completion of the Draft EIS/EIR. A public notice will published for the time and place of the hearing. The Draft EIS/EIR will be available for public and agency review and comment prior to the public hearing.

To ensure that the full range of issues related to this proposed action are addressed and all significant issues identified, comments and suggestions are invited from all interested parties. Comments or questions concerning this proposed action and the EIS should be directed to the FHWA at the address provided above.

(Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction. The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal program and activities apply to this program)

Issued on: July 20, 2004.

César E. Pérez,

South Region Team Leader, Federal Highway Administration, California Division.

[FR Doc. 04–16918 Filed 7–23–04; 8:45 am]

BILLING CODE 4910–22–M

DEPARTMENT OF THE TREASURY

Internal Revenue Service

[EE–43–92]

Proposed Collection: Comment Request for Regulation Project

AGENCY: Internal Revenue Service (IRS), Treasury.

ACTION: Notice and request for comments.

SUMMARY: The Department of the Treasury, as part of its continuing effort to reduce paperwork and respondent burden, invites the general public and other Federal agencies to take this opportunity to comment on proposed and/or continuing information collections, as required by the Paperwork Reduction Act of 1995, Public Law 104–13 (44 U.S.C. 3506(c)(2)(A)). Currently, the IRS is soliciting comments concerning an existing final regulation, EE–43–92 (TD 8619), Direct Rollovers and 20-Percent Withholding Upon Eligible Rollover Distributions From Qualified Plans (§§ 1.401(a)(31)–1, 1.402(c)–2, 1.402(f)–1, 1.403(b)–2, and 31.3405(c)–1.

DATES: Written comments should be received on or before September 24, 2004 to be assured of consideration.

ADDRESSES: Direct all written comments to Glenn Kirkland, Internal Revenue Service, room 6411, 1111 Constitution Avenue NW., Washington, DC 20224.

FOR FURTHER INFORMATION CONTACT: Requests for additional information or copies of the regulation should be directed to Allan Hopkins, at (202) 622–6665, or at Internal Revenue Service, room 6407, 1111 Constitution Avenue NW., Washington, DC 20224, or through the Internet, at *Allan.M.Hopkins@irs.gov.*

SUPPLEMENTARY INFORMATION:

Title: Direct Rollovers and 20-Percent Withholding Upon Eligible Rollover Distributions From Qualified Plans.

OMB Number: 1545–1341.

Regulation Project Number: EE–43–92.

Abstract: This regulation implements the provisions of the Unemployment Compensation Amendments of 1992 (Pub. L. 102–318), which impose mandatory 20 percent income tax withholding upon the taxable portion of certain distributions from a qualified pension plan or a tax-sheltered annuity that can be rolled over tax-free to another eligible retirement plan unless such amounts are transferred directly to such other plan in a "direct rollover" transaction. These provisions also require qualified pension plans and tax-sheltered annuities to offer their participants the option to elect to make "direct rollovers" of their distributions and to provide distributees with a written explanation of the tax laws regarding their distributions and their option to elect such a rollover.

Current Actions: There is no change to this existing regulation.

Type of Review: Extension of a currently approved collection.

Affected Public: Individuals, business or other for-profit organizations, not-for-profit institutions, and Federal, State, local or tribal governments.

Estimated Number of Respondents: 10,323,926.

Estimated Time per Respondent: 13 minutes.

Estimated Total Annual Burden Hours: 2,129,669.

The following paragraph applies to all of the collections of information covered by this notice.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the collection of information displays a valid OMB control number. Books or records relating to a collection of information must be retained as long as their contents may become material in the administration of any internal revenue law. Generally, tax returns and tax return information are confidential, as required by 26 U.S.C. 6103.

Request for Comments

Comments submitted in response to this notice will be summarized and/or included in the request for OMB approval. All comments will become a matter of public record. Comments are invited on: (a) Whether the collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; (b) the accuracy of the agency's estimate of the burden of the collection of information; (c) ways to enhance the quality, utility, and clarity of the information to be collected; (d) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology; and (e) estimates of capital or start-up costs and costs of operation, maintenance, and purchase of services to provide information.

Approved: July 15, 2004.

Glenn Kirkland,

IRS Reports Clearance Officer.

[FR Doc. 04–16965 Filed 7–23–04; 8:45 am]

BILLING CODE 4830–01–P

SMALL BUSINESS ADMINISTRATION

Small Business Size Standards: Waiver of the nonmanufacturer rule

AGENCY: Small Business Administration.

ACTION: Notice of waiver of the nonmanufacturer rule for aluminum, sheet, plate, and foil manufacturing.

SUMMARY: The U.S. Small Business Administration (SBA) is granting a waiver of the Nonmanufacturer Rule for Aluminum, Sheet, Plate, and Foil Manufacturing. The basis for waivers is that no small business manufacturers are supplying these classes of products to the Federal government. The effect of a waiver would be to allow otherwise qualified regular dealers to supply the products of any domestic manufacturer on a Federal contract set aside for small businesses or awarded through the SBA 8(a) Program.

DATES: This waiver is effective on June 23, 2004.

FOR FURTHER INFORMATION CONTACT: Edith Butler, Program Analyst, by telephone at (202) 619–0422; by FAX at (202) 205–7280; or by e-mail at *edith.butler@sba.gov.*

SUPPLEMENTARY INFORMATION: Section 8(a)(17) of the Small Business Act, 15 U.S.C. 637(A)(17), requires that recipients of Federal contracts set aside for small businesses or SBA 8(a) Business Development Program provide the product of a small business manufacturer or processor, if the recipient is other than the actual manufacturer or processor. This requirement is commonly referred to as the Nonmanufacturer Rule. The SBA regulations imposing this requirement are found at 13 CFR 121.406 (b). Section 8(a)(17)(b)(iv) of the Act authorizes SBA to waive the Nonmanufacturer Rule for any "class of products" for which there are no small business manufacturers or processors in the Federal market.

As implemented in SBA's regulations at 13 CFR 121.1204, in order to be considered available to participate in the Federal market on these classes of products, a small business manufacturer must have submitted a proposal for a contract solicitation or received a contract from the Federal government within the last 24 months. The SBA defines "class of products" based on six digit coding systems. The first coding system is the Office of Management and Budget *North American Industry Classification System (NAICS).* The second is the Product and Service Code established by the Federal Procurement Data System.

The SBA received a request on April 16, 2004 to waive the Nonmanufacturer Rule for Aluminum, Sheet, Plate, and Foil Manufacturing. In response, on May 4, 2004, SBA published in the Federal Register a notice of intent to grant the waiver of the Nonmanufacturer Rule for Aluminum, Sheet, Plate, and Foil Manufacturing. SBA explained in the notice that it was soliciting comments and sources of small business manufacturers of this class of products. In response to this notice, no comments were received from any interested party. SBA has determined that there are no small business manufacturers of this class of products, and is therefore granting a waiver of the Nonmanufacturer Rule for Aluminum, Sheet, Plate, and Foil Manufacturing, NAICS 331315.

Dated: June 2, 2004.

Barry S. Meltz,

Acting Associate Administrator for Government Contracting.

[FR Doc. 04–12848 Filed 6–7–04; 8:45 am]

BILLING CODE 8025–01–P

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

Environmental Impact Statement: Los Angeles County, CA

AGENCY: Federal Highway Administration (FHWA), DOT.

ACTION: Notice of Intent.

SUMMARY: The FHWA is issuing this notice to advise the public that an environmental impact statement will be prepared for a proposed highway project in Los Angeles County, California.

FOR FURTHER INFORMATION CONTACT: César Pérez, Team Leader—South Region, Federal Highway Administration, 650 Capitol Mall, Suite 4–100, Sacramento, California 95814, Telephone (916) 498–5065.

SUPPLEMENTARY INFORMATION: The FHWA, in cooperation with the California Department of Transportation (Caltrans) and the Alameda Corridor Transportation Authority (ACTA), will reinitiate environmental studies and prepare an Environmental Impact Statement (EIS) on a proposal to improve State Route 47 (SR–47) in Los Angeles County, California. The proposed improvement would involve replacing the seismically deficient Schuyler Heim bridge with a new fixed-span bridge and the construction/extension of SR–47 as a new four-lane elevated expressway from the new Heim bridge along Alameda Street to Pacific Coast Highway (State Route 1). The new fixed-span bridge would change the current vertical and horizontal clearances through the Cerritos Channel. The elevated expressway would provide a direct route from Terminal Island to Alameda Street, resulting in the elimination of five at-grade railroad crossings and ultimately reduce truck traffic on Interstates 710 and 110.

During 2002, Caltrans and ACTA began formal public scoping and initiation of environmental studies for the proposed project. Notice letters were sent to federal, state and local agencies on January 28, 2002. Notices were prepared in the **Federal Register** and local newspapers, advertising public scoping and open house meetings, on February 13, 2002, at 2:30 p.m. and 4:30 p.m., respectively. Public comments were received until February 28, 2002. A review of subsequent environmental studies led the FHWA to conclude that an EIS would be required. Budgetary constraints then led Caltrans to temporarily suspend the project.

Major project elements to be evaluated in the EIS include: Replacement of the vertical-lift Schuyler Heim Bridge with a fixed-span bridge; construction of an elevated four-lane expressway to State Route 1; and, potential realignment of surface roads and ramps. The EIS will consider a variety of possible alignments for these improvements, as well as the "no-build" alternative.

Letters describing the re-initiation of studies and soliciting comments will be sent to appropriate Federal, State and local agencies and to private organizations and citizens who have previously expressed, or are known to have, an interest in this proposal. Additional public scoping meeting(s) for the EIS will be provided, as appropriate. Comments received during the prior scoping period (January 28 through February 28, 2002) will also be considered. In addition, a public hearing will be held following completion of the draft EIS. Public notice will be given of the time and place for the hearing. The draft EIS will be available for public and agency review and comments prior to the public hearing.

To ensure that the full range of issues related to this proposed action are addressed and all significant issues identified, comments and suggestions are invited from all interested parties. Comments or questions concerning this proposed action and the EIS should be directed to the FHWA at the address provided above.

(Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction. The regulations implementing Executive Order 12372

regarding intergovernmental consultation on Federal programs and activities apply to this program.)

Issued on: June 2, 2004.

César E. Pérez,

South Region Team Leader, Federal Highway Administration, California Division.

[FR Doc. 04–12907 Filed 6–7–04; 8:45 am]

BILLING CODE 4910–22–M

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

Environmental Impact Statement: Suffolk County, NY

AGENCY: Federal Highway Administration (FHWA), DOT.

ACTION: Notice of Intent.

SUMMARY: The FHWA is issuing this notice to advise the public that an environmental impact statement will be prepared for a proposed highway project in Suffolk County, New York.

FOR FURTHER INFORMATION CONTACT: Subimal Chakraborti, P.E., Regional Director, NYSDOT Region 10; State Office Building; 250 Veterans Memorial Highway; Hauppauge, NY 11788; Telephone: (631) 952–6632.

or

Robert E. Arnold, Division Administrator, Federal Highway Administration, New York Division, Leo W. O'Brien Federal Building, Room 719, Clinton Avenue and North Pearl Street, Albany, New York 12207, Telephone: (518) 431–4127.

SUPPLEMENTARY INFORMATION: The FHWA, in cooperation with the New York State Department of Transportation (NYSDOT) will prepare an environmental impact statement (EIS) on a proposal to reconstruct NYS Route 347 (Project Identification Number 0054.05) in Suffolk County, New York. The proposed improvements will involve the reconstruction of approximately 15 miles of the existing route from Northern State Parkway to RTE 25A in the Towns of Smithtown, Islip and Brookhaven and through the incorporated Village of Lake Grove. The improvements considered are necessary to provide for the existing and projected traffic demand along Route 347 and to improve safety. Also, included in this proposal are two new ramps on Northern State Parkway and three new grade separation improvements on Route 347 at the intersections of Route 454, Route 25 and Nicolls Road.

Alternatives under consideration include: (1) Taking no action; (2) Eight lane Arterial from Northern State Parkway to Route 454 and six lane arterial east of Route 454 to Route 25A with three grade separations and two new ramps on Northern State Parkway.

Letters describing the proposed action and soliciting comments will be sent to appropriate Federal, State, and local agencies, and to private organizations and citizens who have previously expressed interest in this proposal. Public information meetings will be held in the Towns of Smithtown and Brookhaven between winter of 2004 and summer of 2006. In addition, a public hearing will be held. Public notice will be given of the time and place of the meetings and hearing. The draft EIS, when prepared, will be available for public and agency review and comment. Early public involvement and coordination efforts to identify the range of reasonable alternatives and social, economic and environmental issues to be addressed resulted in a Route 347 Corridor Study Report completed in December 2001. Also, public meetings were held for this project in May of 2002 as part of the scoping process. No additional NEPA scoping meetings are planned at this time.

To ensure that the full range of issues related to this proposed action are addressed and all significant issues identified, comments and suggestions are invited from all interested parties. Comments or questions concerning this proposed action and the EIS should be directed to the NYSDOT or FHWA at the addresses provided above.

(Catalog of Federal Domestic Assistance Program Number 20.205, Highway Research, Planning and Construction. The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program.)

Authority: 23 U.S.C. 315; 23 CFR 771.123

Issued on: May 26, 2004.

Douglas P. Conlan,

District Operations Engineer, Federal Highway Administration, Albany, New York.

[FR Doc. 04–12911 Filed 6–7–04; 8:45 am]

BILLING CODE 4910–22–M

DEPARTMENT OF TRANSPORTATION

Surface Transportation Board

[STB Finance Docket No. 34505]

East Brookfield & Spencer Railroad, LLC—Lease and Operation Exemption—CSX Transportation, Inc.

East Brookfield & Spencer Railroad, LLC (EB&SR), a noncarrier, has filed a verified notice of exemption under 49 CFR 1150.31 to lease, from CSX Transportation, Inc. (CSXT), and operate approximately 4 miles of rail line. The line is a portion of CSXT's passing track located between mileposts 60 and 64 in East Brookfield and Spencer, Worcester County, MA, together with approximately 270 feet of lead track running from the passing track at milepost 63.08 to the property line of the proposed New England Automotive Gateway Facility (Facility) in East Brookfield, MA.[1]

EB&SR certifies that its projected revenues as a result of this transaction will not exceed those that would qualify it as a Class III rail carrier and states that such revenues will not exceed $5 million annually. The transaction was scheduled to be consummated on May 19, 2004.

If the verified notice contains false or misleading information, the exemption is void *ab initio*. Petitions to revoke the exemption under 49 U.S.C. 10502(d) may be filed at any time. The filing of a petition to revoke will not automatically stay the transaction.

An original and 10 copies of all pleadings, referring to STB Finance Docket No. 34505, must be filed with the Surface Transportation Board, 1925 K Street, NW., Washington, DC 20423–0001. In addition, a copy of each pleading must be served on Betty Jo Christian, Steptoe & Johnson, LLP, 1330 Connecticut Ave., NW., Washington, DC 20036.

Board decisions and notices are available on our Web site at *http://www.stb.dot.gov.*

Decided: June 1, 2004.

By the Board, David M. Konschnik, Director, Office of Proceedings.

Vernon A. Williams,

Secretary.

[FR Doc. 04–12766 Filed 6–7–04; 8:45 am]

BILLING CODE 4915–01–P

DEPARTMENT OF THE TREASURY

Office of the Comptroller of the Currency

Proposed Extension of Information Collection; Comment Request

AGENCY: Office of the Comptroller of the Currency (OCC), Treasury.

ACTION: Notice and request for comment.

SUMMARY: The OCC, as part of its continuing effort to reduce paperwork and respondent burden, invites the general public and other Federa-

[1] As part of the lease agreement between CSXT and EB&SR, CSXT will retain certain rights to operate over the line to serve the Facility, and to use the track in the event of an operating emergency.

SCH #_____

NOTICE OF PREPARATION

TO: The State Clearinghouse
1400 Tenth Street
Sacramento, CA 95814

FROM: California Department of
Transportation, District 7
Division of Environmental Planning
120 South Spring Street
Los Angeles, CA 90012

SUBJECT: Notice of Preparation of a Draft Environmental Impact Report for the Schuyler Heim Bridge Replacement and Alameda Corridor Truck Expressway Project
[References: Division 13, Public Resources Code, Section 21080.4]

This is to inform you that the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) will act as Lead Agencies under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA), respectively, for the proposed project described below. These agencies will prepare a joint Environmental Impact Report (EIR) and Environmental Assessment (EA). Your participation as a responsible/trustee/cooperating agency is requested in the preparation and review of this document.

We need to know the applicable permit and environmental review requirements of your agency and the scope and content of the environmental information that is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR/EA when considering your permit or other approval for the project.

Project Title: Schuyler Heim Bridge Replacement and Alameda Corridor Truck Expressway Project (Ocean Boulevard to Pacific Coast Highway)

Project Location: Cities of Long Beach and Los Angeles, Los Angeles County, California.

Project Description: The proposed project consists of replacement of the Schuyler Heim Bridge (Bridge Number 53-2618) over the Cerritos Channel at the Port of Long Beach and construction of an elevated truck expressway between the Schuyler Heim Bridge and Pacific Coast Highway (State Route [SR] 1) in the Wilmington community of Los Angeles. For further information about the project, see the attached "Additional Project Information" and the "Initial Study" checklist.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but no later than 30 days after receipt of this notice.

Please send your response and the name of a contact person in your agency, as well as any comments or questions regarding this project to Ronald Kosinski, Deputy District Director, Division of Environmental Planning, Caltrans, 120 South Spring Street (MS 16 A), Los Angeles, CA 90012.

DATE: 1-28-02

Signature:

Title: Ronald J. Kosinski
Deputy District Director
Division of Environmental Planning

cc: District Engineer/U.S. Army Corps of Engineers
Environmental Clearance Officer/Department of Housing and Urban Development
Thomas Harrison/U.S. Coast Guard
US Coast Guard 12th District
Jim Bartel/U.S. Fish and Wildlife Service
Robert S. Hoffman/National Marine Fisheries Service
Environmental Protection Agency (EPA)/Office of Federal Activities (A-104)
EIS Coordinator, Region 9/Environmental Protection Agency
Federal Transit Administration Region 9
Federal Railroad Administration/Office of Policy and Plans
Director, Office of Environmental Affairs/Department of Health and Human Services
Cesar Perez/U.S. Department of Transportation Federal Highway Administration
Director, Office of Environmental Policy and Compliance
Charles Raysbrook/California Department of Fish and Game South Coast Region
Dennis Dickerson/State Water Quality Control Board Los Angeles Region
Deborah Lee/South Central Coast District California Coastal Commission
Executive Officer/State Lands Commission
Hans Kreutzberg/Office of Historic Preservation Department of Parks and Recreation
Office of Planning and Research
Don Drachane/State of California Air Resources Board-Attn: Bob Cross, Mobil Source Control Division
Commander/California Highway Patrol South Los Angeles Office

Additional Project Information

Purpose and Need of Project

The purpose of the proposed project is to replace the seismically inadequate Schuyler Heim Bridge and improve the SR 47/Henry Ford Avenue/Alameda Street transportation corridor by constructing an elevated truck expressway from the Schuyler Heim Bridge to SR 1.

The Schuyler Heim Bridge is one of only three bridges that connects the mainland with Terminal Island in the Ports of Long Beach and Los Angeles, which are the two largest ports in the United States, based on cargo volume. This bridge currently accommodates three 3.3- to 3.6-meter (m) (11- to 12-foot) lanes in each direction (no shoulders). The Schuyler Heim Bridge is a steel vertical lift bridge that is a popular route for truck traffic because of its relatively short and low sustained longitudinal grades; therefore, it has become a vital truck traffic link between the ports and the mainland. Because it is a vital transportation link, and due to a state mandate, the Schuyler Heim Bridge must sustain a Maximum Credible Earthquake (MCE) without collapsing.

Currently, the Schuyler Heim Bridge is in need of seismic retrofitting and major maintenance work. A previous study[1] evaluating the seismic retrofit and maintenance of the bridge determined that replacement of the bridge would be a more economically feasible alternative.

The Alameda Corridor Truck Expressway (SR 47) would be a four-lane facility constructed above Henry Ford Avenue and Alameda Street that would provide a link between the Terminal Island Freeway (SR 103) and Alameda Street. The purpose of the project is to provide a high capacity alternative route for truck traffic between Terminal Island and SR 91. The new expressway would cross over existing rail crossings and Anaheim Street. It would alleviate existing congestion on Interstate (I)-710, I-110, and local north-south streets by providing a desirable alternative route for truck traffic, and it would eliminate the heavy truck/rail conflicts that presently exist south of SR 1 at existing grade crossings.

Alternatives for the bridge replacement and truck expressway are discussed further in the next section.

Alternatives to be Evaluated

The project to be evaluated in the EIR/EA would be comprised of the replacement of the existing Schuyler Heim Bridge and construction of the Alameda Corridor Truck Expressway. Two build alternatives are being considered for the Schuyler Heim Bridge replacement, and two build alternatives are being considered for the Expressway. The alternative combinations will be evaluated in detail in the EIR/EA. The bridge replacement and truck expressway alternatives are described below.

Bridge Alternatives

Each of the alternatives listed, with the exception of the No Project Alternative, include the replacement of the existing steel vertical lift bridge with a concrete fixed bridge. In addition to the two build horizontal alignments, there are two vertical clearance options, as well as three channel-width options described below.

Bridge Alternative 1 – Existing Alignment Alternative. This alternative would replace the existing bridge with a fixed bridge within the existing alignment. The proposed fixed bridge would be wider than the existing bridge and would consist of three 3.6-m (12-foot) lanes with 3-m

[1] California Department of Transportation. *Schuyler Heim Bridge Update: Summary of CTC Briefing.* January 1999.

(10-foot) shoulders in each direction. The footprint of the fixed bridge would be widened toward the east side to avoid impacts to the railroad located immediately to the west. This fixed bridge replacement alternative would include the following vertical clearance and channel width variations:

- **Vertical Clearance Option A.** The proposed vertical clearance of the bridge would be at 11.6 m (38 feet) over Mean High Water Level (MHWL) of 1.43 m (4.7 feet). This maintains the same clearance as when the existing lift bridge is in the lowered position.
- **Vertical Clearance Option B.** The proposed vertical clearance of the bridge would be increased to 14.3 m (47 feet) over MHWL level. This profile accommodates a 13.7-m (45-foot) fireboat.
- **Channel Width Option A.** The width of the navigable channel would remain at 54.9 m (180 feet).
- **Channel Width Option B.** The width of the navigable channel would be decreased to between 42.7 and 44.2 m (140 to 145 feet).
- **Channel Width Option C.** The width of the navigable channel would be decreased to between 24.4 and 25.9 m (80 to 85 feet).

Bridge Alternative 2 – Realignment Alternative. This alternative would replace the existing Schuyler Heim Bridge with a fixed bridge on an alignment east of the existing footprint. The replacement bridge would consist of three 3.6-m (12-foot) lanes with 3-m (10-foot) shoulders on each side. This fixed bridge replacement alternative would include the following vertical clearance and channel width variations.

- **Vertical Clearance Option A.** The proposed vertical clearance of the bridge would be at 11.6 m (38 feet) over MHWL of 1.43 m (4.7 feet). This maintains the same clearance as when the existing lift bridge is in the lowered position.
- **Vertical Clearance Option B.** The proposed vertical clearance of the bridge would be increased to 14.3 m (47 feet) over MHWL level. This profile accommodates a 13.7-m (45-foot) fireboat.
- **Channel Width Option A.** The width of the navigable channel would remain at 54.9 m (180 feet).
- **Channel Width Option B.** The width of the navigable channel would be decreased to 42.7 to 44.2 m (140 to 145 feet).
- **Channel Width Option C.** The width of the navigable channel would be decreased to 24.4 to 25.9 m (80 to 85 feet).

Truck Expressway Alternatives

A Feasibility Study evaluating the following two alternatives is currently being prepared for the Truck Expressway.

Truck Expressway Alternative 1. The expressway would be constructed along Henry Ford Avenue between the Schuyler Heim Bridge and SR 1. The expressway would be elevated 6 to 22.8 m (20 to 75 feet) above ground for a total of 2.7 kilometers (km) (1.7 miles) and would join Alameda Street just south of SR 1. It would be designed to Caltrans standards and have a design speed of approximately 45 miles per hour (mph). Two lanes in each direction would be provided and right-of-way would be required along the east side of Alameda Street, north and south of SR 1,

affecting approximately 25 parcels. Permanent easements would also be required at certain locations for the elevated portions of the expressway. The project would also include minor street and intersection improvements on Alameda Street between SR 1 and SR 91. This alternative would keep SR 103 as the primary route, but it would construct new on- and off-ramps that link the existing SR 103 to the new truck expressway, just north of the Schuyler Heim Bridge, to allow trucks to travel on the expressway as an alternative. Construction of the expressway is not anticipated to significantly impact existing freeway or truck traffic.

Truck Expressway Alternative 2. This alternative differs from the first in that the Alameda Corridor Truck Expressway would become the primary route and would extend directly from the Schuyler Heim Bridge. On- and off-ramps would be constructed linking the new truck expressway to the existing SR 103, just north of the Schuyler Heim Bridge, to allow trucks to travel on SR 103 as an alternative. All other features listed for Truck Expressway Alternative 1 are the same for this alternative.

Environmental Setting

The proposed project is located in an industrialized area in and near the Ports of Long Beach and Los Angeles. The area is highly developed and includes land uses such as industrial shipyards and oil wells and refineries.

SR 47 crosses the Cerritos Channel at the Schuyler Heim Bridge. The channel is primarily used as a deep water path for the transport of goods between the Los Angeles and Long Beach harbors. It is approximately 99 m (325 feet) wide, with a depth ranging from 0.0 m/feet at the sides to about 15.2 m (50 feet) in the center. The existing vertical clearance of the bridge in its lowered position is 11.6 m (38 feet) over the MHWL, and it is 49.7 m (163 feet) over the MHWL in its raised position. The existing width of the channel beneath the bridge is 54.9 m (180 feet). There is no vegetation on the banks of the channel; therefore, it does not qualify as a federal/state wetland.

Environmental Effects

A preliminary Environmental Checklist has been prepared for this project and potential impacts to the following environmental factors have been identified: aesthetics, biological resources, hazards and hazardous materials, public services, cultural resources, hydrology/water quality, noise, air quality, geology/soils, land use/planning and transportation/traffic. The level of impact will vary depending on the alternatives selected

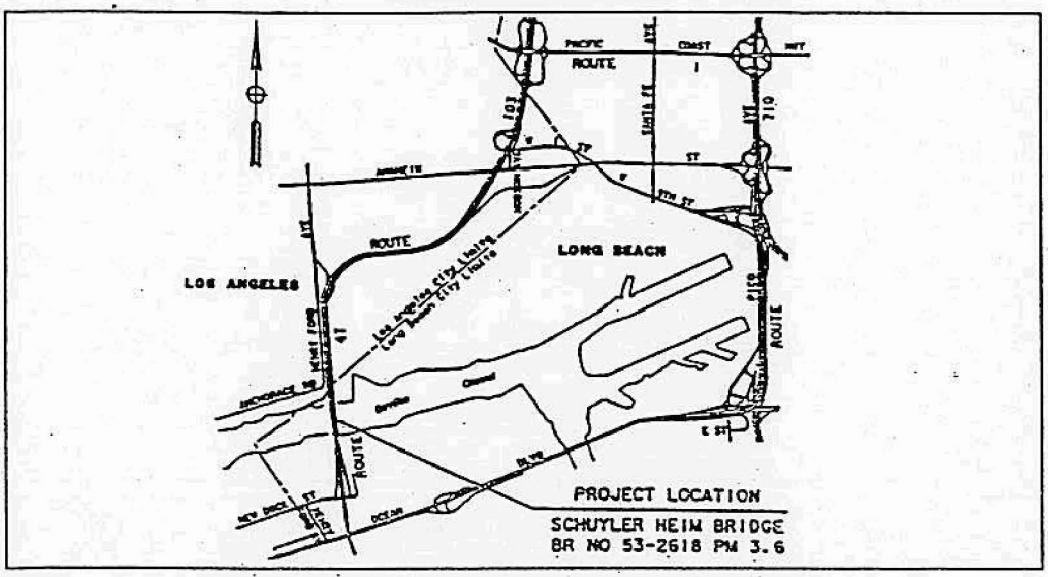
Scoping Meeting

A scoping meeting will be held to discuss environmental and other project-related issues on February 13, 2002, at 3:00 P.M. at the Port of Long Beach Administrative Building located at 925 Harbor Plaza , Long Beach, CA 90802.

LEW

07-LA-PM 3.6/4.3
07224-13820K
RAS-HA4S2

PROJECT SCOPE SUMMARY REPORT
(SEISMIC RETROFIT)
PROJECT NO. 627



ON ROUTE 47
AT SCHUYLER HEIM BRIDGE

I have reviewed the right of way information contained in this Project Scope Summary Report-Seismic Retrofit and the R/W Data Sheet attached hereto, the data to be complete, current, and accurate:

LAWRENCE J. STALEY
Deputy District Director – Right of Way

APPROVAL RECOMMENDED:

ESSAM H. ALAMMEDINE
Project Manager

APPROVAL RECOMMENDED:

DEBORAH MAH
District Seismic Retrofit
Coordinator and Program Manager

APPROVED:

DOUGLAS R. FAILING
District Division Chief / Design

7/23/08
Date

This Project Scope Summary Report-Seismic Retrofit has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

REGISTERED CIVIL ENGINEER

07-15-98
Date

I. INTRODUCTION

The Commodore Schuyler Heim Bridge (Bridge No. 53-2618) on Route 47, is one of the three bridges that connect the mainland and Terminal Island in the Ports of Long Beach/Los Angeles area. The Department of Transportation, District 7 is proposing to retrofit this bridge as a part of a statewide program to improve the seismic safety of those bridges under the responsibility of the Department. The seismic retrofit of this structure will provide a much higher level of security against the loss of this transportation vital link. Because of its original design with a lift span in the center, this bridge presents the advantage over the other two bridges (Vincent Thomas and Gerald Desmond) of having shorter and lower sustained longitudinal grades which makes it more attractive especially for the predominant truck traffic in the area.

The criteria for establishing the scope and extent of the Schuyler Heim Bridge retrofit was the "No Collapse" under the Maximum Credible Earthquake (MCE). This implies that the operation of the lift span is not required following the design seismic event; therefore, all structural evaluations were performed assuming that the lift span was in the down position.

Designed in 1946, the Schuyler Heim Bridge carries three lanes each of northbound and southbound traffic across the Cerritos Channel into and out of Terminal Island. The structure portion design was developed through a service contract by the Engineering Consulting Firm, DeLeuw Cather & Co. under the supervision of Caltrans Office of Structures.

In addition to the seismic retrofit solution proposed, four other alternatives were considered, as follows:

1) a fixed (non-lift) bridge parallel to and offset from the existing bridge alignment,
2) a fixed bridge following the same general alignment as the existing bridge,
3) a vertical lift moveable bridge parallel to and offset from the existing alignment, and
4) a vertical lift moveable bridge following the same general alignment as the existing bridge.

The fixed bridge alternatives were not pursued due to objections from the US Coast Guard and the Ports of Los Angeles and Long Beach due to vertical clearance and right of way constraints.
The offset vertical lift bridge alternative required significant permanent right of way acquisitions and was also abandoned.
The vertical lift moveable bridge alternative was developed by keeping the original bridge alignment as much as possible. This alternative although considered by the Ports, required a temporary detour, fixed bridge, parallel to the existing one, interim retrofit of the approach spans, and additional right of way at a prohibitive cost.

This alternative had a cost estimate of $ 180,000,000 which included interim retrofit of the approach spans.
This Project Scope Summary Report (PSSR) is being prepared to program, fund, and schedule a seismic retrofit project of one structure on Route LA-47. This project is in the legislatively mandated seismic retrofit program.

II. RECOMMENDATION

It is recommended that the seismic retrofit proposals described below be approved.

III. LOCATION AND PROBLEM

This seismic retrofit project proposes work on the following structure which does not meet present standards for seismic resistance:

Location	PM	Bridge No.	Bridge Name
7-LA-47	3.6/4.3	53-2618	Schuyler Heim Bridge

IV. PROPOSALS

This project proposes to provide the following:

A. Truss Bridge

- Tower pier foundation retrofit
- Truss pier foundation retrofit
- Reconstruct timber fenders
- Reconstruct steel sheet pile bulkhead
- Driving of 3' diameter CIDH piles for slope stabilization
- Tower retrofit
- Top laterals retrofit
- Bottom laterals retrofit
- Tower anchorage retrofit
- Truss bearing retrofit
- Lateral restraint retrofit

B. Approach Structures

- Class "F" column retrofit
- Column strengthening
- Longitudinal and transverse footing retrofit
- Bearing retrofit
- Steel cap and deck connection strengthening
- Footing cap strengthening
- Abutment retrofit
- Bearing retrofit
- Lateral bracing

- Hinge retrofit
- End cross bracing retrofit

V. COST ESTIMATES

Bridge No.	Structure	Roadway	Electrical	Supp. Work	Total
53-2618	43,819,000	840,000	1,350,300	623,000	**$46,632,300**

VI. PROJECT SCHEDULES

Strategy Meeting	12/4/96
Project Scope Summary Report Approval	08/98
Structure PS&E to District	08/98
District PS&E to Office Engineer	08/98
Ready to List	08/98
Advertisement	08/98
Construction Complete	10/00

VI. PROJECT FACTORS

A. Environmental

The project Environmental Document to clear this project is ND/FONSI. The soils at the north and south approaches are contaminated at some of the bent locations with lead and petroleum hydrocarbons. Quality of the groundwater was also evaluated for discharge/disposal purposes. Mitigation measures will be implemented in accordance to findings and recommendations of Site Investigation Report and National Pollutant Discharge Elimination System (NPDS) permit requirements.
The superstructure is painted with lead based paint. Containment and monitoring will be necessary.

B. Right of Way

Permanent and temporary easements will be required. There is railroad facilities involvement. The railroad is owned and controlled by the Port of Long Beach.

C. Utilities

The following utilities are in the vicinity of the retrofit work, but have no conflict with this project as cleared by the Utility Engineer:

- 6" So Cal gas line west of the existing piers
- Submarine cables for Southern California Edison
- Submarine cables for W.U. & U.P.R.R.
- 2-35KV Department of Water and Power submarine cables
- Submarine cables for W.U. & U.P.R.R.
- Submarine communication cables between Schuyler Heim and Henry Ford

Bridges. These cables are abandoned.
- 2-6" DU electrical cable

D. Permits

The following permits will be required:

- Port of Long Beach Harbor Development Permit
- Army Corps of Engineers
- U.S. Fish and Wildlife Service
- California Department of Fish and Game
- Regional Water Quality Control Board

E. Traffic Control

The retrofit work will require:

- Partial lane closure and/or lane re-striping
- Temporary lane re-striping of roadways crossing the bridge during work on the underside of the deck
- Coordination with the railroad companies during work at the rail lines
- Full closure of bridge for 8 hour periods to reconstruct the lift span bearings
- 8-48 hour, 48-4 hour and 1-8day periods of lift span closures for shipping traffic in the channel

F. Concurrent Work

There is an ongoing construction project for Bridge Deck Replacement (Contract No. 07-4C51040) and a Minor B Project is currently programmed for the 97/98 FY to modify traffic signals and overhead signs at this bridge (Contract No. 4M2501). Other contracts north and south of the project under the administration of the Port of Long Beach, and the Vincent Thomas Bridge retrofit project.

G. Landscaping

No landscaping will be required for this project.

VIII. PROJECT FUNDING

This project will be funded from the Structure Seismic Retrofit (HA4S) Fund Reservations by SHOPP Amendment following approval of this PSSR. Construction cost will be programmed in the 98/99 fiscal year at a total project cost of $46,700,000.

IX. PROJECT PERSONEL

A. District 7

MARIO A. GUTIERREZ Project Engineer	Calnet 647-4644 (213) 897-4644
ESSAM H. ALAMEDDINE Project Manager	Calnet 647-0141 (213) 897-0141
DEBORAH MAH District Program Manager	Calnet 647-4593 (213) 897-4593
LAWRENCE J. STALEY District 7 R/W Management Branch	Calnet 647-1823 (213) 897-1823
ELATTAR AZIZ Environmental Planning Branch	Calnet 647-0686 (213) 897-0686

B. Office of Structure

RAND HELDE Project Engineer	Calnet 498-8052 (916) 227-8052
RON JESPERSEN Contract Manager	Calnet 498-8047 (916) 227-8047

X. PROJECT REVIEWS

A. FHWA

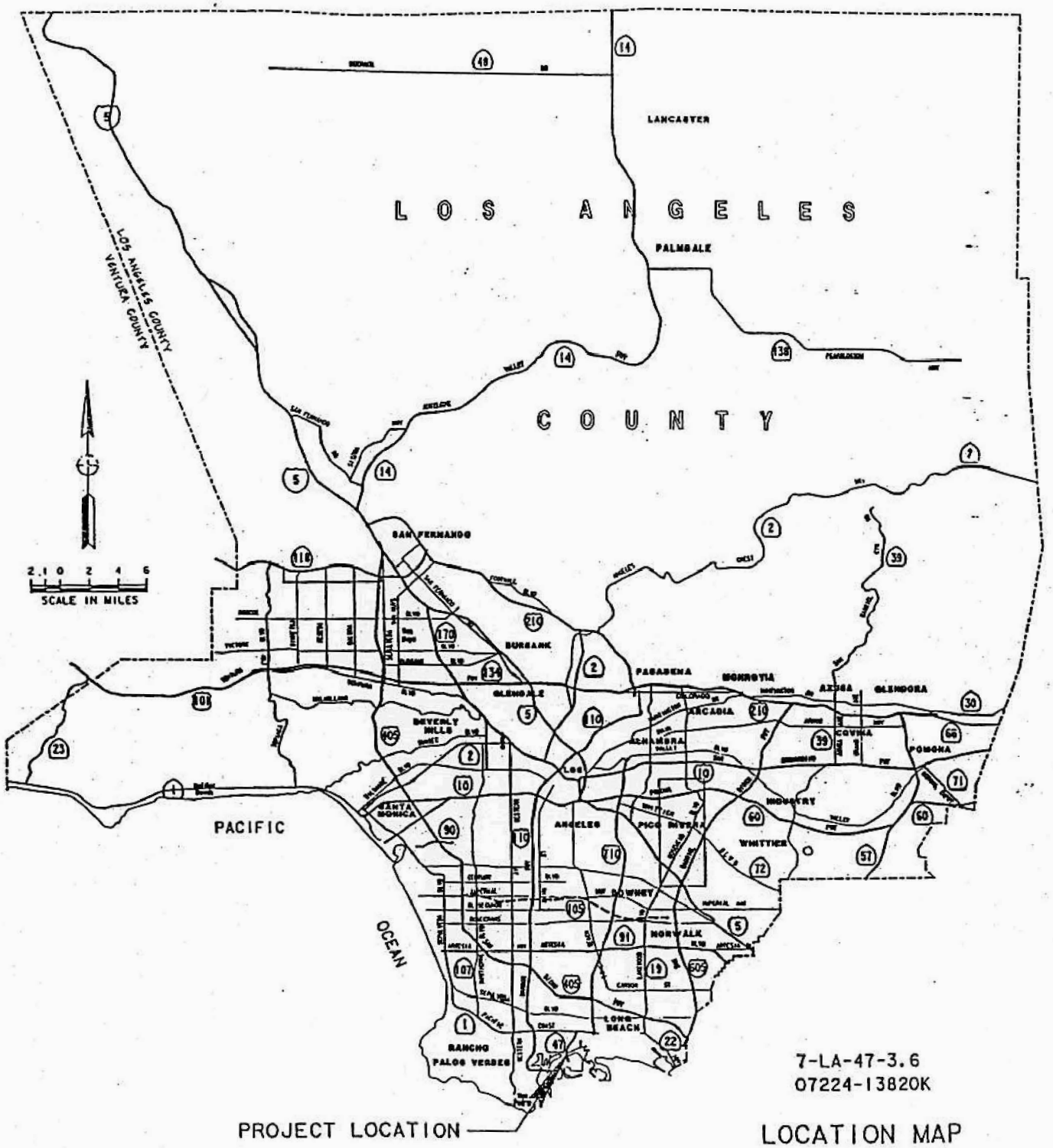
Although this project is exempt from FHWA review, due to its complexity, a review of the PS&E documents has been scheduled. The project is eligible for Federal participation.

B. Headquarters

There are no non-standard features proposed for this project. Review by Project Development Coordinator is not required.

XI. ATTACHMENTS

A. Location Map
B. FONSI/CEQA Documents
C. Right of Way Data Sheet
D. General Plan
E. General Plan Structure for Structure Portion



7-LA-47-3.6
07224-13820K

LOCATION MAP

ATTACHMENT A

Finding of No Significant Impact

for

Route 47 - Schuyler Heim Bridge Seismic Retrofit Project

Los Angeles County, California

The proposed project involves the Seismic retrofit of the Commodore Schuyler Heim Bridge. The structure is one of the three bridges that connect Terminal Island to the mainland in the Los Angeles/Long Beach Harbor complex.

The Federal Highway Administration (FHWA) has determined that this project will not have any significant impact on the human environment. This finding of no significant impact is based on the attached Environmental Assessment(EA) and the information provided by Caltrans, which has been evaluated by the FHWA and determined to adequately discuss the environmental issues and impacts of the proposed project. It provides sufficient evidence and analysis for determining that an environmental impact statement is not required.

The FHWA takes responsibility for the scope and content of the attached environmental assessment.

May 20, 1998

Date

For Jeffrey A. Lindley
Division Administrator, FHWA

SS#P17889

ATTACHMENT B

State of California
Department of Transportation

SCH No. 98031104
7-LA-47 P.M. 3.6

NEGATIVE DECLARATION

(CEQA)

Pursuant: Division 13, Public Resources Code

Description: The proposed project involves the seismic retrofit of the Commodore Schuyler Heim Bridge. This structure is one of three bridges that connect Terminal Island to the mainland in the Los Angeles/Long Beach Harbor complex. The retrofit, which will be carried out as part of the statewide seismic retrofit program, will enhance the ability of this bridge to withstand a major earthquake.

Determination: An Initial Study has been prepared by the California Department of Transportation (Caltrans). On the basis of this study it is determined that the proposed action will not have a significant effect upon the environment for the following reasons:

1. There will be no significant effects on businesses, residences, schools, or public facilities, neighborhoods, employment, or the area economy.
2. Potential significant effects on unique or significant natural features, including but not limited to, threatened or endangered species, their habitat or movement, can be mitigated to a level of insignificance.
3. Potential significant effects on architectural, cultural or historic properties, park lands, recreation or scenic areas can be mitigated to a level of insignificance.
4. There will be no significant effect on noise, air quality or water quality.
5. There will be no effect on growth or require public services beyond those proposed for the near future.
6. There will be no significant effect on prime agricultural land or floodplains.

5-19-98

Raja Mitwasi
Deputy District Director
California Department of Transportation

Date

R/W DATA SHEET FOR PSSR SCOPING REPORT WBS 150.15.05

REVISED
UPDATED
DATE: 7/14/98
ROUTE: LA 047
PM/KM 3.6-4.3
E.A: 138201
ALT:
PROJ. DESC. S.R.

O: M.GUTIERREZ
ATTN: ED SPIRAUSKAS
PHONE 7 7-0136
)SENIOR R/W P&M
(2)CAPITAL COORDINATOR-RM 303
(3)PROJECT FILE ARCHIVE COORD-RM 306
) ESTIMATOR

DATE
7/21/98

IF THIS PROJECT E.A IS SUBSEQUENTLY DIVIDED OR CHANGED INTO ANOTHER E.A AND / OR THE PROJECT COPE CHANGES ,THEN THIS DATA SHEET BECOMES INVALID FOR STIP,BUDGET ,AND PYSCAN URPOSES. NEW DATA SHEET(s) WILL NEED TO BE REQUESTED IMMEDIATELY BY YOUR SECTION.

TRANSMITTED HEREWITH IS A COST ESTIMATE PURSUANT TO THE FOLLOWING CONDITION(S)

X 1- COST ESTIMATE IS VALID FOR THE ABOVE SCOPING REPORT ONLY AND NEED TO BE UPDATED WITHIN TWO YEARS. THIS IS AN ESTIMATE ONLY AND NOT AN APPRAISAL. IT MAY BE BASED ON A WORSE CASE SCENARIOS. THE ESTIMATE IS SUBJECT TO CHANGE AND REVISION

X 2 NOTIFY THE ABOVE COORDINATORS IF THIS IS THE PREFERRED PROJECT

3- RESIDENTIAL DISPLACEMENT IS INVOLVED AND ENVIRONMENTAL DEPT.NEEDS TO BE ADVISED BY YOUR DEPT.

x 4 -MAPS WERE : PROVIDED X NOT PROVIDED
DATE 6/17/98

X 5- THE MAPPING DID NOT PROVIDE SUFFICIENT NOR ADEQUATE DETAIL TO DETERMINE THE LIMITS OF THE RIGHT OF WAY REQUIRED AND EFFECTS ON THE IMPROVEMENTS.

X 6-THE TRANSPORTATION FACILITIES HAVE NOT BEEN SUFFICIENTLY DESIGNED SO OUR ESTIMATOR COULD DETERMINE THE DAMAGES TO ANY OF THE REMAINDER PARCELS AFFECTED BY THE PROJECT.

X 7- ADDITIONAL RIGHT OF WAY REQUIREMENTS ARE ANTICIPATED BUT ARE NOT DEFINED DUE TO THE PRELIMINARY NATURE OF EARLY DESIGN REQUIREMENTS.

X 8- TIME CONSTRAINTS PRECLUDED A DETAILED COST ESTIMATES

9-TIME SCHEDULE PROVIDED BY REQUESTING PARTY DID NOT PERMIT TIME FOR A FIELD INSPECTION.

10- OTHER (EXPLAIN)-

	CURRENT VALUE (FUTURE USE)	ESCALATED VALUE
1-R/W ACQ.(INCL.CONTINGENCY G.W-CONDEM.-ADM.STL)	$678,838	$687,054
2-CLEARENCE /DEMOLITION (CONT.)		
RAP. (CONT.)		
4-ESCROW COSTS (CONT.)	$2,571	$2,602
UTILITY RELOCATION COSTS		
TOTAL ESTIMATED COST CURRENT VALUE-FUTURE USE)	$681,409	TOTAL ESCALATION COST TO CERT. DATE $689,656

ESCALATION RATE R/W 5%
ESCALATION RATE UTILITIES 8%
ERT.DATE 08/01/98 YEARS TO CERT. 0.25

N/A COST DATA IS NOT VALID FOR BUDGET , STIP , PROGRAMMING NOR COST SCREENS #1

ATTACHMENT C

DATE 7/14/98 RTE LA 047 EA. 138201 ALT

PARCEL DATA INFORMATION IS AUTHORIZED FOR THE EVENT SCREENS

IT IS THE PREFERRED OR HIGHEST COST. PARCEL DATA INFORMATION

TYPES	NUM.	DUAL APPR.
A		
B		
C	4	
D		
TOTAL	4	

4

PARCELS	NUM.
FEE	
EASE	1
TCE	3
TOTAL	

4

FULL	
PART	4
TOTAL	4

4

TOTAL PARCELS PER ASSESSORS RECORDS AND /OR MAPS 4 4

UTILITIES	NUMBER	PY HOURS
U4-1-		
U4-2-		
U4-3-		
U4-4-	1	
U5-7		
U5-8		
U5-9-	2	
TOTAL		

GUIDELINES ONLY		
ACTIVITY	%	PERSON YRS
APP.	40%	0.28
ACQ	35%	0.24
RAP		
DEMO		
PM	17%	0.12
UTIL.	8%	0.06
TOTAL	100%	0.69

R.R INVOLVEMENT	NUMBERS	PY HRS
C&M AGRMT:		
SVC CONT.:	X	
LIC/RE/CLAUSES:		
RR PY'S	TOTAL	
.ROE,OP's,PERMITS	1	18
GOVT PERMITS	8	80
CONST.PERMIT:	0.8	8
OUTDOOR ADV.SIGNS		
CONDEM.POTENTIAL		
CLEAR/DEMO:		
DISP. SFR		
DISP. MULTI		
DISP. BUS		

GUIDELINES ONLY	PYS
PROJ.TYPE DESC.	MIN LOW
PROJECT PY's	110
PARCEL SUPPORT HOURS	1000
MISC.PERMITS,ODA PY	106
UTIL. And R.R. PY's	
TOTALS PY HOURS	1216
TOTAL PERSON YEARS	0.69

RAP IMPACT: YES ____ NO NO

ARE RAILROADS FACILITIES OR R/W AFFECTED YES X NO

DESCRIBE: PORT OF L.B RR COSTS

SPUR LINE IMPACTED YES NO CONST.REQUIRE

6-ARE HAZARDOUS WASTE AND /OR MATERIAL FOUND: YES NONE EVIDENT X POTENTIAL HW&ASBESTOS PARCELS

GENERAL DESCRIPTION OF RIGHT OF WAY: temp and perm.EASEMENTS FROM THE gov's entities

8-ARE UTILITY FACILITIES OR RIGHT OF WAYS AFFECT YES NO X

RT NEEDED ADD INFO DESCRIBE relocate poles and anchors ADD. INFO.

9-ARE EXISTING OR POTENTIAL AIR SPACE PARCELS AFFECTED YES NO X

HS IT ANTICIPATED THAT ALL RIGHT OF WAY WORK WILL BE PERFORMED BY C/T STAFF YES X NO

EVALUATION PREPARED BY:

RIGHT OF WAY PREPARED BY: TOM MCVARISH DATE 07/13/98

RAILROAD PREPARED BY: AL HUGHES DATE 07/14/98

UTILITIES PREPARED BY: U.ANAKWENZE DATE 07/15/98

R/W AGENT APPROVES DATA SHEET FOR BUDGETARY PURPOSES J.CABRERA DATE 7/14/98

SR. R/W AGENT DOES NOT APPROVE DATA SHEET COSTS FOR BUDGETARY PURPOSES. DATE

AVE PERSONALLY REVIEWED THIS R/W.DATA SHEET AND ALL SUPPORTING INFORMATION I CERTIFY THAT THE PROBABLE HIGHEST AND BEST USE ,ESTIMATED VALUES,AND ASSUMPTIONS ARE REASONABLE AND PROPER SUBJECT TO THE LIMITING CONDITIONS SET FORTH,AND I FIND THIS DATA SHEET OMPLETE AND CURRENT.

This data sheet is not to be signed unless accompanied by final scoping report PR,PSR,PSSR)for review and/or signature.

CHIEF DATE 7/21/98

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	47			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — G. ORSOLINI — NO. C44461 — EXP. 03/02 — CIVIL — STATE OF CALIFORNIA

DE LEUW, CATHER & COMPANY
120 Howard Street, Suite 850
San Francisco, California 94105

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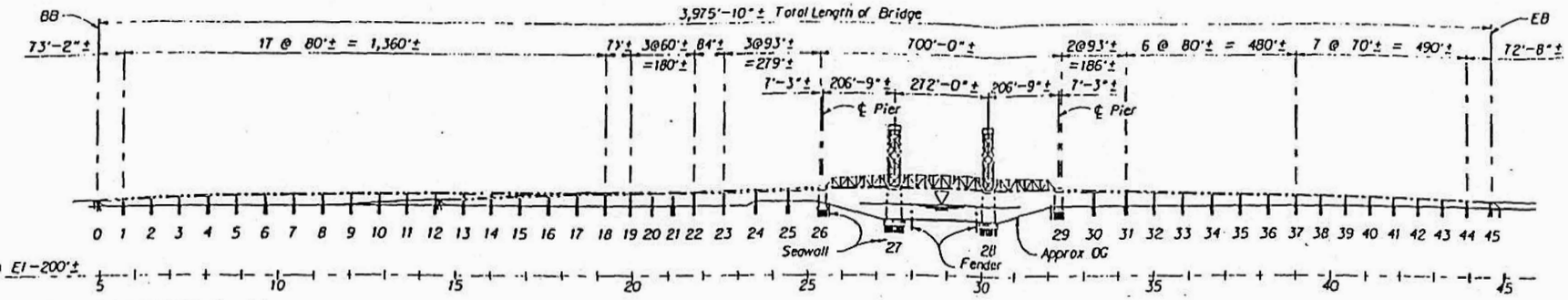
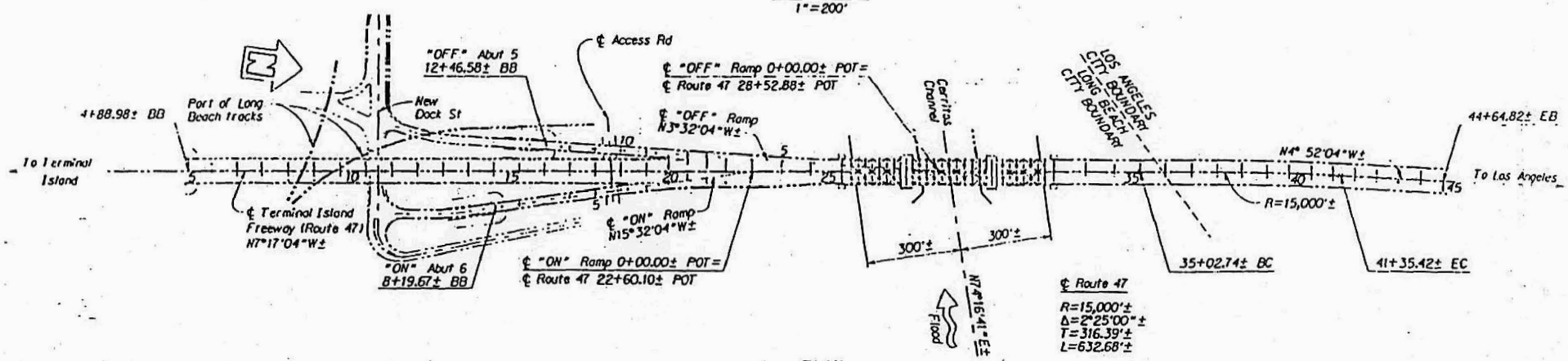


ELEVATION
1"=200'



PLAN
1"=200'

Received
MAY 26 1998
Structures Local Assistance

100% SUBMITTAL

NOTE:
The Contractor shall verify all controlling field dimensions before ordering or fabricating any material.

NOTES:

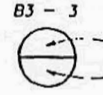
1. Elevations are from 1996 survey and are based on Elev 16.666 ft painted at the Bench Mark located near Pier 29. B.M. elevation is based on Port of Los Angeles Datum which is mean lower low water level based on the observations for the years 1924-1932 by the National Geodetic Survey (N.G.S.), formerly the United States Coast Guard and Geodetic Survey (U.S.C. AND G.S.). A large subsidence ranging from 6' to 11' has occured since the construction of the structure. Due to site conditions, elevation of the monument is subject to change. Contractor shall verify elevations before and during construction.
2. For concrete strength & type limits, see "MISCELLANEOUS DETAILS" sheet.
3. Work on this structure will change the present horizontal clearances to the railroad tracks
4. For Typical Sections, see "TYPICAL SECTIONS" sheet.
5. For Pile Data, see "GENERAL NOTES" sheet.
6. For hydrologic summary see "FOUNDATION PLAN NO. 6" sheet.
7. For identification of retrofit work, see "STRUCTURE PLAN" sheets.

LIST OF ABBREVIATIONS

DP	Drain Pipe
UTP	Utility Pole
FL	Flood Light
BM	Bench Mark
CISS	Cast-In-Steel Shell
UNO	Unless Noted Otherwise
MLLW	Mean Low Low Water
MHW	Mean High Water
NTS	Not To Scale
ES	Each Side
NS	Near Side
FS	Far Side

INDEX TO STANDARD PLANS
(Dated July 1992)

A - 10A	ABBREVIATIONS
A - 10B	SYMBOLS
B3 - 1	RETAINING WALL TYPE 1
B3 - 3	RETAINING WALL TYPE 1A



R. JESPERSEN	DESIGN	BY I. SAVAGE/S. APTE	CHECKED C. HU	LOAD FACTOR DESIGN			
	DETAILS	BY R. WILSON	CHECKED Y. TAN	LAYOUT	BY I. SAVAGE	CHECKED Y. TAN	
	QUANTITIES	BY S. SMITH	CHECKED M. SAN	SPECIFICATIONS	BY C. MATTSIC	PLANS PREPARED BY C. ORSOLINI	

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

S. APTE
PROJECT ENGINEER

CU 07
EA 138701

BRIDGE NO. 53-2618
POST MILE 3.58

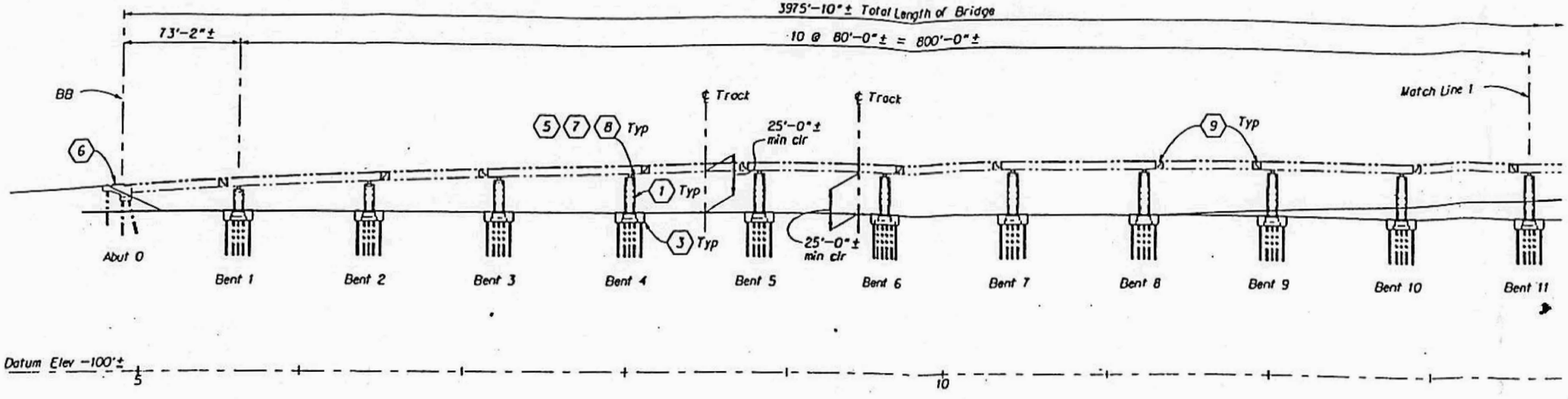
EQ RETROFIT PROJECT NO. 627

SCHUYLER HEIM BRIDGE

GENERAL PLAN

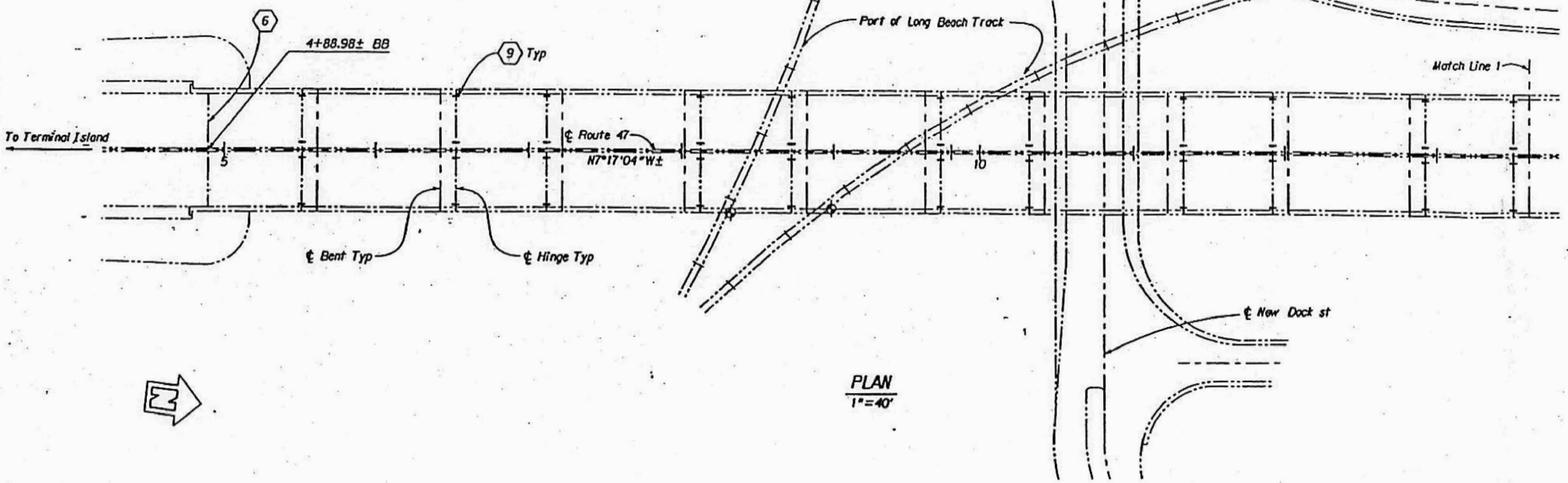
DISREGARD PRINTS BEARING EARLIER REVISION DATES —
REVISION DATES (PRI) [ ] [ ] [ ] [ ]

ATTACHMENT D



Datum Elev 0.0 = Elev 0.0 MLLW (See Note 3)

ELEVATION
1"=40'



PLAN
1"=40'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEET
07	LA	47			

REGISTERED CIVIL ENGINEER

G. ORSOLINI
No. C44461
Exp. 03/02
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

DE LEUW, CATHER & COMPANY
120 Howard Street, Suite 850
San Francisco, California 94105

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet

LEGEND:

- Indicates Existing Structure
- Indicates New Construction
- (1) Column retrofit
- (3) Footing retrofit
- (4) Not used
- (5) Steel Cap & Deck Connection Strengthening
- (6) Abutment retrofit
- (7) Bearing retrofit
- (8) Lateral Bracing
- (9) Hinge retrofit

⊕ Point of minimum vertical clearance

NOTES:

1. For Footing retrofit types, see "FOUNDATION PLAN" sheet.
2. For location of:

   (8) Lateral Bracing

   see "STEEL GIRDER LAYOUT" sheets.
3. Elevations are from 1996 survey and are based on Elev 16.666 ft painted at the Bench Mark located near Pier 29. E.W. elevation is based on Port of Los Angeles Datum which is mean lower low water level based on the observations for the years 1924–1932 by the National Geodetic Survey (N.G.S.), formerly the United States Coast Guard and Geodetic Survey (U.S.C. AND G.S.). A large subsidence ranging from 6' to 11' has occured since the construction of the structure. Due to site conditions, elevation of the monument is subject to change. Contractor shall verify elevations before and during construction.

NOTE:
The Contractor shall verify all controlling field dimensions before ordering or fabricating any material.

R. JESPERSEN		DESIGN	BY S. APTE/I. KHAVINA	CHECKED C. HU	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	S. APTE	BRIDGE NO. 53-7618
		DETAILS	BY R. WILSON/A. HAGY	CHECKED Y. TAN		PROJECT ENGINEER	POST MILE 3.58
		QUANTITIES	BY S. SMITH	CHECKED M. SAII		CU 07 EA 138201	

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY) | | | |

EQ RETROFIT PROJECT NO. 627

SCHUYLER HEIM BRIDGE

STRUCTURE PLAN NO. 1

ATTACHMENT E

- Indicates Existing Structure
- Indicates New Construction
- (1) Column retrofit
- (3) Footing retrofit
- (4) Not used
- (5) Steel Cap & Deck Connection Strengthening
- (6) Abutment retrofit
- (7) Bearing retrofit
- (8) Lateral Bracing
- (9) Hinge retrofit
- (10) End Cross Bracing retrofit

NOTES:

1. For Footing retrofit types, see "FOUNDATION PLAN" sheet.
2. For location of:
   - (8) Lateral Bracing
   - (10) End Cross Bracing retrofit

   see "STEEL GIRDER LAYOUT" sheets.
3. Elevations are from 1996 survey and are based on Elev 16.666 ft painted at the Bench Mark located near Pier 29. B.M. elevation is based on Port of Los Angeles Datum which is mean lower low water level based on the observations for the years 1924–1932 by the National Geodetic Survey (N.G.S.), formerly the United States Coast Guard and Geodetic Survey (U.S.C. AND G.S.). A large subsidence ranging from 6' to 11' has occured since the construction of the structure. Due to site conditions, elevation of the monument is subject to change. Contractor shall verify elevations before and during construction.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEET
07	LA	47			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

G. ORSOLINI, No. C44461, Exp. 03/02, CIVIL, REGISTERED PROFESSIONAL ENGINEER, STATE OF CALIFORNIA

DE LEUW, CATHER & COMPANY
120 Howard Street, Suite 850
San Francisco, California 94105

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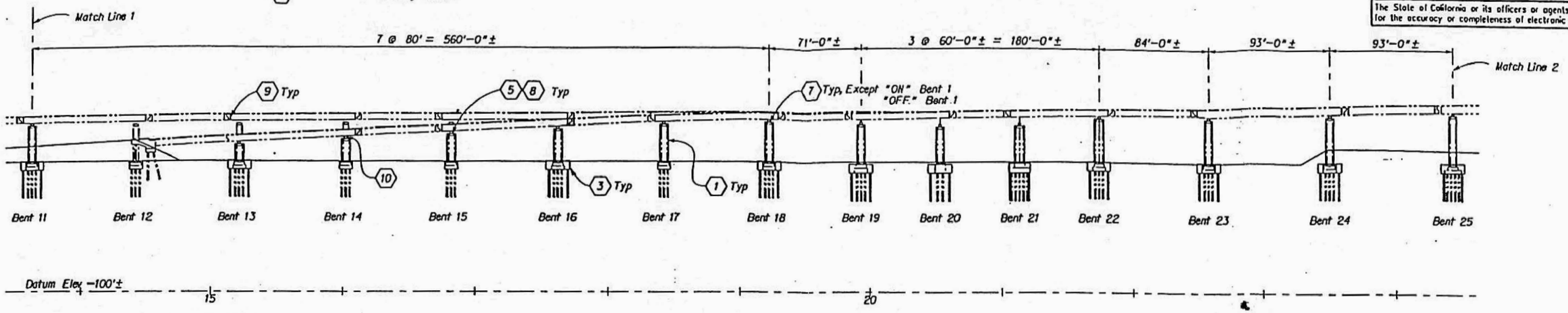
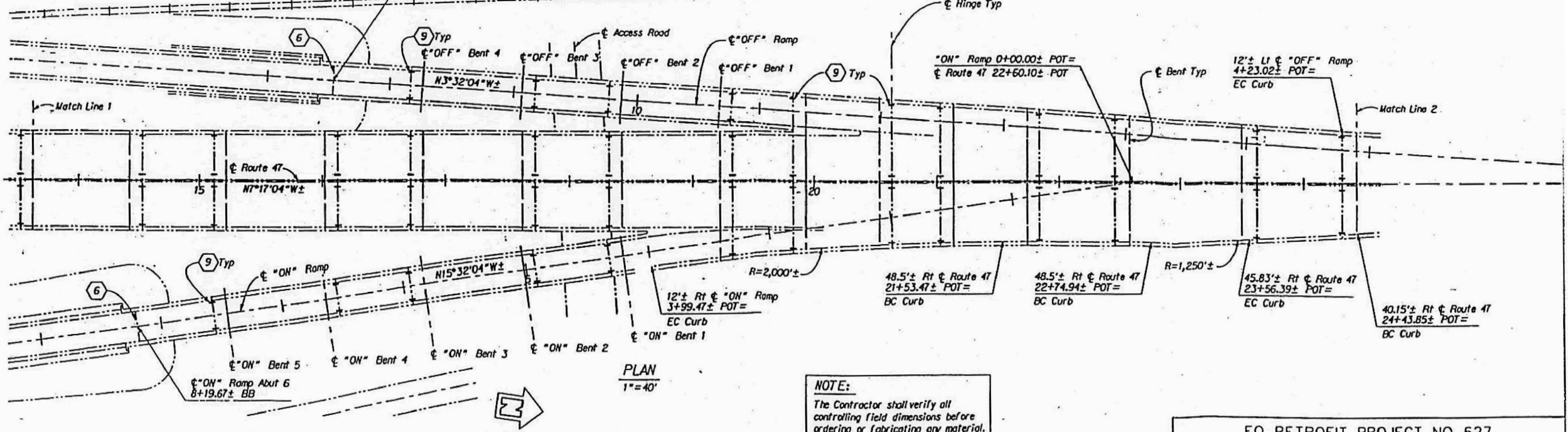


Datum Elev 0.0 = Elev 0.0 MLLW (See Note 3)

ELEVATION
1"=40'



PLAN
1"=40'

NOTE:
The Contractor shall verify all controlling field dimensions before ordering or fabricating any material.

R. JESPERSEN, DESIGN OVERSIGHT		DESIGN	S. APTE/I. KHAVINA	CHECKED	C.D. HU
		DETAILS	R. WILSON/B. HAGY.	CHECKED	Y.S. FAN
		QUANTITIES	S. SMITH	CHECKED	M. SAH

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

S. APTE, PROJECT ENGINEER

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07
EA 138701

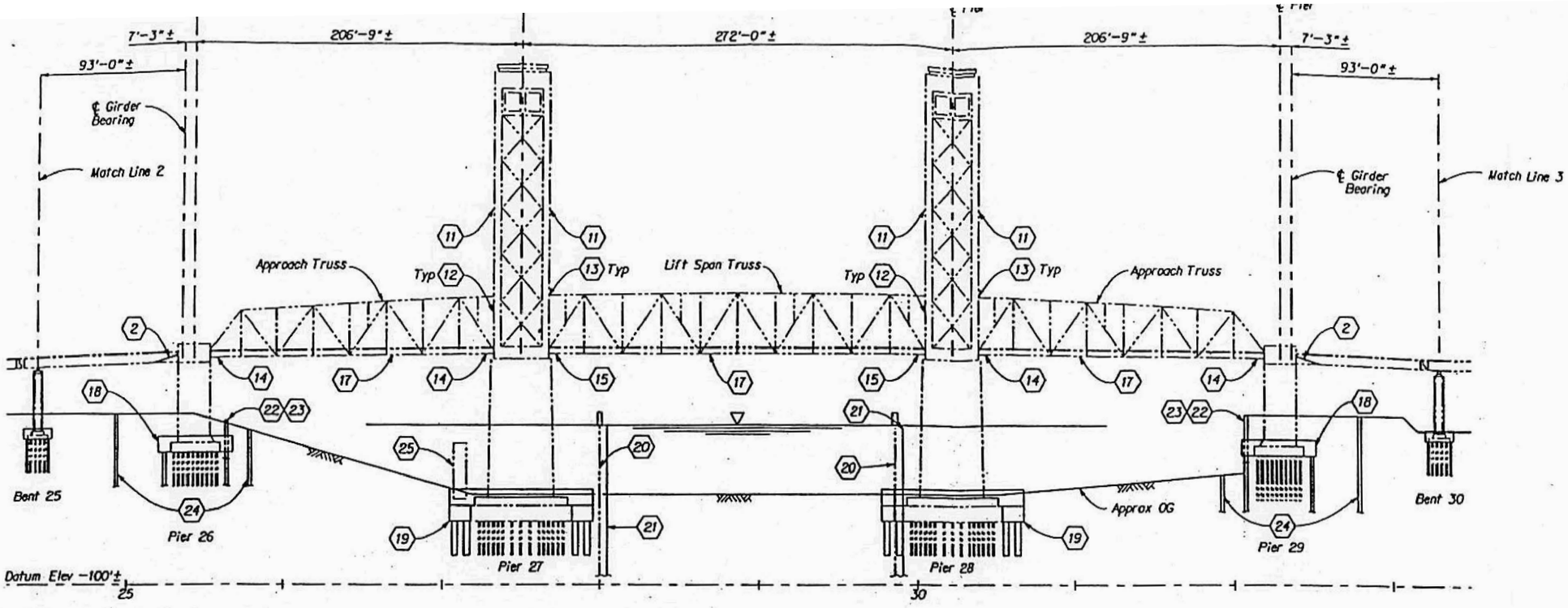
BRIDGE NO. 53-2618
POST MILE 3.58

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

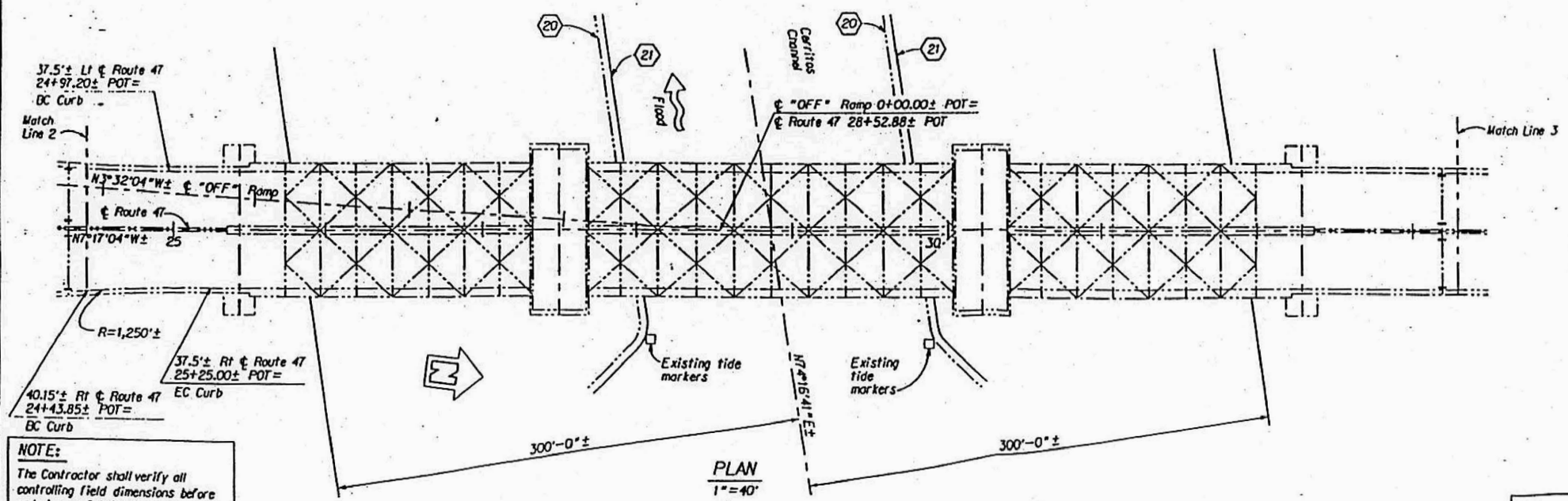
SHEET 5 OF 162

EQ RETROFIT PROJECT NO. 627
SCHUYLER HEIM BRIDGE
STRUCTURE PLAN NO. 2



Datum Elev 0.0 = Elev 0.0 MLLW (See Note 1)

ELEVATION
1"=40'



PLAN
1"=40'

NOTE:
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DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	47			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — G. ORSOLINI — No. C44461 — Exp. 03/02 — CIVIL — STATE OF CALIFORNIA

DE LEUW, CATHER & COMPANY
120 Howard Street, Suite 850
San Francisco, California 94105

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LEGEND:

- Indicates Existing Structure
- Indicates New Construction
- (2) Longitudinal Restrainers
- (11) Tower Bracing Retrofit
- (12) Tower Portal Truss Retrofit
- (13) Tower Transverse Strut Retrofit
- (14) Approach Truss Bearing Retrofit
- (15) Reconstruct Lift Span Truss Bearings
- (16) Not used
- (17) Truss Bottom Lateral Bracing Retrofit
- (18) Pier 26 & 29 Footing Retrofit
- (19) Pier 27 & 28 Footing Retrofit
- (20) Remove Existing Fenders
- (21) New Fenders
- (22) Remove Existing Steel Sheet Pile Bulkhead
- (23) New Pier Retaining Wall
- (24) 48" CISS Pile
- (25) Remove Sunken Barge & boat

NOTES:

1. Elevations are from 1996 survey and are based on Elev 16.666 ft painted at the Bench Mark located near Pier 29. B.M. elevation is based on Port of Los Angeles Datum which is mean lower low water level based on the observations for the years 1924–1932 by the National Geodetic Survey (N.G.S.), formerly the United States Coast Guard and Geodetic Survey (U.S.C. AND G.S.). A large subsidence ranging from 6' to 11" has occured since the construction of the structure. Due to site conditions, elevation of the monument is subject to change. Contractor shall verify elevations before and during construction.

R. JESPERSEN	DESIGN	BY I. SAVAGE/R. MATHUR	CHECKED C.D. HU	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	S. APTE
	DETAILS	BY R. WILSON	CHECKED Y.S. FAN		
	QUANTITIES	BY S. SMITH	CHECKED M. SAI		

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07
EA 138701

BRIDGE NO.	53-2618
POST MILE	3.58

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)

EQ RETROFIT PROJECT NO. 627

SCHUYLER HEIM BRIDGE

STRUCTURE PLAN NO. 3

SHEET 6 OF 152

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOT SHE
07	LA	47			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

G. ORSOLINI
NO. C44461
EXP. 03/02
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

DE LEUW, CATHER & COMPANY
120 Howard Street, Suite 850
San Francisco, California 94105

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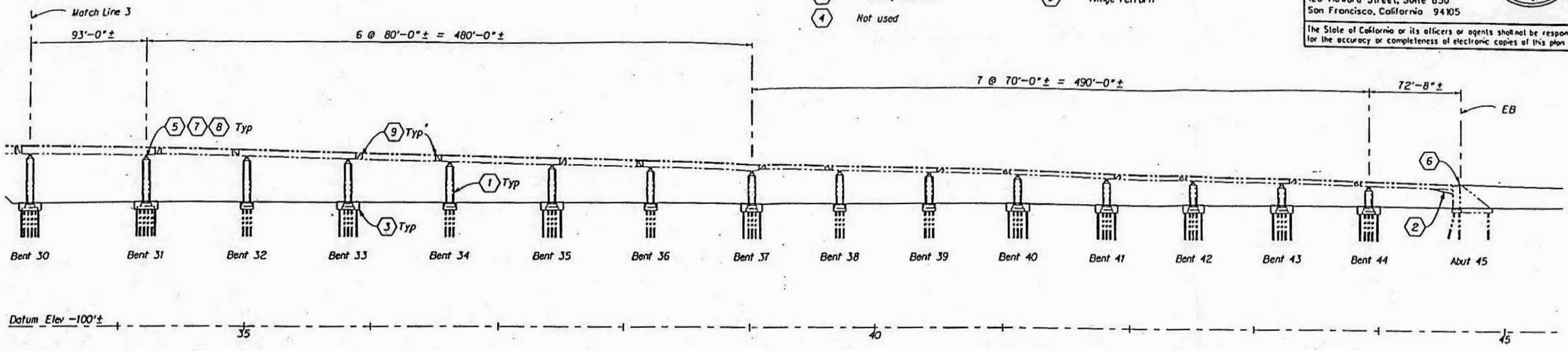
LEGEND:

- Indicates Existing Structure
- Indicates New Construction
- (1) Column retrofit
- (2) Longitudinal Restrainers
- (3) Footing retrofit
- (4) Not used
- (5) Steel Cap & Deck Connection Strengthening
- (6) Abutment retrofit
- (7) Bearing retrofit
- (8) Lateral Bracing
- (9) Hinge retrofit



Datum Elev 0.0 = Elev 0.0 MLLW (See Note 3)

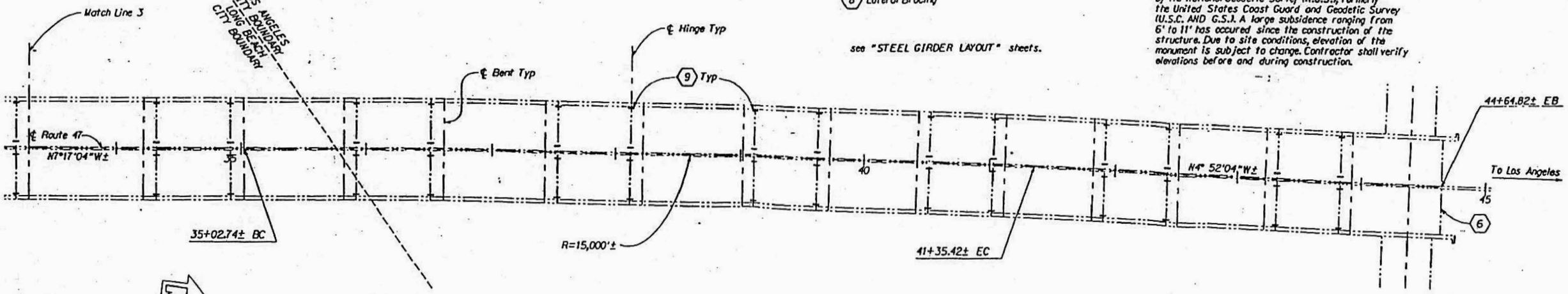
ELEVATION
1"=40'

NOTES:

1. For Footing retrofit types, see "FOUNDATION PLAN" sheet.
2. For location of:

   (8) Lateral Bracing

   see "STEEL GIRDER LAYOUT" sheets.
3. Elevations are from 1996 survey and are based on Elev 16.666 ft painted at the Bench Mark located near Pier 29. B.M. elevation is based on Port of Los Angeles Datum which is mean lower low water level based on the observations for the years 1924–1932 by the National Geodetic Survey (N.G.S.), formerly the United States Coast Guard and Geodetic Survey (U.S.C. AND G.S.). A large subsidence ranging from 6' to 11' has occured since the construction of the structure. Due to site conditions, elevation of the monument is subject to change. Contractor shall verify elevations before and during construction.



℄ Route 47
R=15,000'±
Δ=12°25'00"±
T=316.39'±
L=632.68'±

PLAN
1"=40'

NOTE:

The Contractor shall verify all controlling field dimensions before ordering or fabricating any material.

R. JESPERSEN	DESIGN	BY S. APTE	CHECKED S. SMITH
	DETAILS	BY R. WILSON/B. HAGY	CHECKED C.D. HU
	QUANTITIES	BY S. SMITH	CHECKED M. SAI

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

S. APTE
PROJECT ENGINEER

CU 07
EA 138201

BRIDGE NO. 53-2618
POST MILE 3.58

EQ RETROFIT PROJECT NO. 627
SCHUYLER HEIM BRIDGE
STRUCTURE PLAN NO. 4

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 7 OF 182

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	DESIGN KICK-OFF		ACTA	Beginning of Phase 1					
	ENVIRONMENTAL PS&E REVIEW		Project Developer, Project Management, and Environmental	District PS&E Circ.					
	PRECONSTRUCTION MEETING		ACTA	Contract Award					
	Transfer Resident Engineer Book		ACTA Project Engineer	Preconstruction Meeting					
	PREJOB MEETING		ACTA	Construction					
	ENVIRONMENTAL COMPLIANCE REVIEW		ACTA Construction	Safety Review					
	Avoidance, Minimization, and/or Mitigation Measures		ACTA Construction	Post Construction					
	COMMUNITY IMPACTS	**3.3**							
	Construction								
CI-1	Provide relocation assistance or compensation to eligible persons and businesses in accordance with the federal Uniform Relocation Assistance and Property Acquisition Act of 1970, as amended (42 USC Sections 4601-4655) and the California Relocation Act (California Government Code, Section 7260 et. seq.).		ACTA and Caltrans Right-of-Way Agent	Design					
	UTILITIES AND PUBLIC SERVICES	**3.4**							
	Construction								
U-1	Provide advance notification to utility users of the potential for service disruption and the anticipated time/date of the disruption.		ACTA Resident Engineer, Project Manager	Prior to construction?	x				

Note: There are no avoidance, minimization, or mitigation measures for Sections 3.1 or 3.2.

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
U-2	Prior to bridge construction, notify watch commanders and station chiefs of all fire, police, and other land- and water-based response stations that service the port area or use the Schuyler Heim Bridge or Cerritos Channel as a travel route to respond to service calls in order to minimize delays to emergency response providers during project construction. This action will allow for the identification of alternate routes and the development of contingency response plans, including: • Temporary interim policies that will identify alternative resources within the public service and emergency response organization (i.e., alternative response units located closer to the incident); and • Mutual aid agreements between bordering public service and emergency response organizations (i.e., LAFD and LBFD) that could be dispatched in the event of a response delay of the primary emergency response provider.		ACTA Resident Engineer, Project Manager	Prior to construction?	x				
U-3	Specify in the contract that construction in the Cerritos Channel must occur in a manner that allows emergency marine vessels to pass or be carried out in such a way that barges with construction equipment will be moved quickly to allow passage of emergency vessels.		ACTA Project Manager	Design/PS&E	x				

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
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U-4	Determine where construction-related activities have the potential to disrupt response routes and coordinate with Los Angeles and Long Beach police and fire departments, as well as any local emergency medical service units.		ACTA Resident Engineer, Project Manager	PS&E, Design/Construction	x				
U-5	Utilize a Transportation Management Plan that is agreeable to all emergency service providers and the project design team.		Caltrans/ ACTA Resident Engineer, Project Manager, Traffic	PS&E/Construction	x				
U-6	During final design, a determination will be made regarding which of the identified utilities will be relocated. Plans for the relocations will be developed in consideration of the project schedule and consultation with the utility providers which include, but are not limited to, LADWP, LBWD, SCE, SCG, GTE/Verizon, AT&T, City of Los Angeles. In addition, pipeline relocations will be planned and implemented in consultation with TOPCO, Exxon Mobil, Gulf Oil, and SCG. In further consultation with utility providers, some obsolete utilities may be removed at the request of the provider.		Caltrans/ ACTA Right-of-Way Agent, Project Manager	Design	x				
	TRAFFIC AND TRANSPORTATION	**3.5**							
	Construction								
T-1	Prior to construction, temporary parking spaces will be provided to replace existing parking capacity that will not be available during project construction. Caltrans will		Caltrans/ ACTA/ POLB/ POLA Right-of-Way Agent, Project Manager	Prior to Construction	x				

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	coordinate with the Port of Long Beach and Port of Los Angeles to identify replacement parking for the Pier A East and Pier S Terminals. Exact locations will be determined after consultation with responsible parties, including property owners. Considerations of feasibility will include, but not be limited to, vehicle capacity, time of availability, distance from terminal(s), and the need for employee shuttles.								
T-2	The Transportation Management Plan (TMP) will be implemented to enhance vehicular and pedestrian traffic.		Caltrans/ ACTA Resident Engineer, Project Manager	Construction					
	Operation								
T-3	Compensation for the permanent loss of an estimated 15 employee parking spaces at the Port of Long Beach Pier S Terminal will be provided. Compensation will be based on an agreement between Caltrans and the Port of Long Beach.		Caltrans/ ACTA Right-of-Way Agent, Project Manager	Construction	x				
	VISUAL RESOURCES	**3.7**							
	Construction								
VR-1	The surfaces of columns, roadway barriers, soundwalls, and gore points will receive surface color treatments at specified locations, as determined by a Caltrans Licensed Landscape Architect.		Caltrans/ ACTA Landscape Architect and Construction Contractor, Resident Engineer	Design/Construction	x				

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
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VR-2	Elements of the design of the proposed bridge and expressways, such as color, line, texture, and style, would be aesthetically pleasing and as unobtrusive as possible. During final design, particular attention would be paid to the vertical columns and soundwalls.		Caltrans/ ACTA Landscape Architect and Construction Contractor, Resident Engineer	Design/Construction	x				
VR-3	All visual design elements, including landscaping, would be designed and implemented with the concurrence of a Caltrans Licensed Landscape Architect and in compliance with local policies and guidelines. Additionally, input from interested parties, including the public, will be solicited and considered.		Caltrans/ ACTA Landscape Architect and Construction Contractor, Resident Engineer	Design/Construction	x				
VR-4	Trees and vines will be planted along soundwalls and other walls at specified locations, as determined by a Caltrans Licensed Landscape Architect.		Caltrans/ ACTA Landscape Architect, and Construction Contractor, Resident Engineer	Construction	x				
VR-5	Design of the elevated expressway would be compatible (scale and massing) with the existing Schuyler Heim Bridge or future bridge and the Badger Avenue/Henry Ford Railroad bridge.		Caltrans/ ACTA Landscape Architect	Design	x				
VR-6	Night lighting would be used when required for safety for temporary construction activities. The lights would be directed downward and shielded to reduce light-spill outside of the area required for construction activities.		Caltrans/ ACTA Construction Contractor	Construction					

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	CULTURAL RESOURCES	**3.8**							
	Construction								
CR-1	If any archaeological properties are discovered during construction, Caltrans and SHPO shall be consulted, in accordance with 36 CFR 800.13(b).		Caltrans/ ACTA Resident Engineer, Caltrans Environmental Planning	Construction	x				
CR-2	If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to Public Resources Code Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission (NAHC), who will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact Mr. Gary Iverson, District Heritage Resource Coordinator, Caltrans District 7, so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed, as applicable.		Caltrans/ ACTA Resident Engineer, Caltrans Environmental Planning	Construction	x				
CR-3	The bridge shall be offered for sale for reuse in an alternate location to interested public agencies and non-profits. A marketing plan shall be prepared for the sale of the bridge including: a notification letter, fact		Project Manager, Caltrans Architectural Historian/ SHPO/ ACTA	Design/PS&E/Prior to construction	x				

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	sheet, list of intended recipients, as well as provisions for the salvage of smaller components in the case that there is no interest in re-use of the bridge. Advertisements shall be placed in appropriate newspapers of record. The offer shall run for 6 months. If no acceptable bids are received after 6 months this stipulation shall be deeded to have been met. The above shall be done in accordance with the U.S. Department of Transportation Historic Bridge Program 23USC144(o)(4)(A) and (B).								
CR-4	Informative permanent metal plaques shall be installed at both ends of the new bridge at public locations that provide a brief history of the original bridge, its engineering features and characteristics, the reasons for its demolition, and a statement of the characteristics of the replacement structure.		Project Manager, Caltrans Architectural Historian/ SHPO/ ACTA, RE	Design/construction	x				
CR-5	Pursuant to Section 110(b) of the NHPA, before the Bridge is demolished, the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) shall be contacted to determine what level and kind of recordation is required for the property. All documentation shall be completed and accepted by HABS/HAER before the Bridge is demolished.		Caltrans Architectural Historian/ SHPO/ ACTA	Prior to construction	x				

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
CR-6	Copies of the HABS/HAER report shall be disseminated to the City of Los Angeles Public Library and the City of Long Beach Public Library.		Project Manager, Caltrans Architectural Historian/ SHPO/ ACTA	Prior to construction	x				
CR-7	Information from the HABS/HAER report shall be available to the public for 10 years on an appropriate internet website.		Caltrans Architectural Historian/ SHPO/ ACTA	Design/Construction/ Operation	x				
CR-8	A documentary (motion picture or video) shall be produced and shall address the history of the Bridge, its importance and use within the history of the Port of Long Beach and Port of Los Angeles, and demonstrate its operation and function. The motion picture or video will be of broadcast quality, of sufficient length for a standard 30-minute time period and will be made available for local broadcast stations to public access channels in local cable systems and to schools/libraries.		Caltrans Architectural Historian/ SHPO/ ACTA	Design/Prior to construction	x				
CR-9	Traveling museum exhibits shall be prepared and shall address the history of the Bridge, its importance and use within the history of the Port of Long Beach and the Port of Los Angeles, and demonstrate its operation and function, appropriate for display in small museums, or for use in schools.		Caltrans Architectural Historian/ SHPO/ ACTA	Design/Construction/ Operation	x				

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
CR-10	Artifacts removed from the Bridge during preliminary stages of the demolition process shall be offered to local museums, and provide for their delivery to accepting institutions. Examples of such artifacts may include, but not be limited to, control panels, instruments, structural members, railings, signage, plaques or other identifying ornamentation, street lights, navigation lights, etc.		Caltrans Architectural Historian/ SHPO/ ACTA	Prior to construction	x				
CR-11	Measures CR-3, CR-5, CR-8, and CR-10, above, shall be completed prior to demolition of the Bridge. All stipulations shall be completed within 1 year of demolition, unless an extension of time is agreed upon.		Caltrans Architectural Historian/ SHPO/ ACTA	Design to 1 year of demolition	x				
	HYDROLOGY, FLOODPLAINS, AND OCEANOGRAPHY	**3.9**							
	Construction								
HY-1	The following are BMPs for protection of water quality of the receiving water during construction: • Tires on construction equipment that leaves a contaminated work site will be washed before the equipment leaves the site. • Within a contaminated work area, construction equipment will be cleaned only as necessary (e.g. moved to a non-contaminated area) to minimize the volume of decontamination wash water and		Construction Contractor, Resident Engineer, Project Manager	Construction					

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	prevent transport of contaminants from work site areas. • Designated locations will be provided for servicing, washing, and refueling equipment, away from temporary channels or swales that would quickly convey runoff to the drainage system and into the Cerritos Channel or Consolidated Slip/ Dominguez Channel. • Contaminated material (e.g. oil, lubricants) will be kept at a safe distance, a minimum of 30.5 m (100 ft), from an entry into a receiving water body. Temporary barriers and containers will be used to confine any contaminated materials. Upon completion of construction, all contaminated material on the construction site will be removed and disposed of in accordance with federal, regional, and local regulations. • Use of marine construction equipment will not involve fuel transfers onsite. • A temporary spill containment system will be installed and maintained on either side of a water crossing. The contractor will be responsible for the containment plan and the execution of spill containment during the course of construction. The containment plan will be reviewed and approved by a resident engineer.								

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	• To prevent potential introduction of any lead-based paint into receiving waters, the contractor(s) will take appropriate measures to eliminate lead-based paint from reaching the receiving waters. If paint removal is necessary during the bridge dismantling process, the contractor will comply with all applicable laws and regulations relative to this process to ensure protection of receiving waters. • At project construction sites, as appropriate, the contractor will: - Provide stabilized entrances and exits - Regularly water the non-paved surfaces - Regularly sweep and vacuum paved surfaces - Install silt fences at the toe of excavation and embankment slopes - Install sand or gravel bag berms along the top of slopes - Install slope protection such as geotextiles, plastic covers, soil binders and erosion control blankets/mats - Install slope interruption devices such as fiber rolls and slope drains - Install permanent erosion control seeding, landscape planting or slope/rock paving								

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	- Protect storm drain inlets with inserts or linear interrupters such as gravel bag and/or sand bag berms - Manage stockpiles against wind and water erosion • Monitor and report BMP performance and conditions before and immediately after the completion of work, in accordance with SWPPP specifications.								
HY-2	Construction activities that would produce sediment transport of pollutants through the Cerritos Channel or Consolidated Slip/ Dominguez Channel will be minimized through strict adherence to construction BMPs which include, but are not limited to, the following: • Channel bank work will include bank protection (riprap, concrete walls, and sheet piling) to eliminate the possibility of enhanced bank erosion.		Construction Contractor, Resident Engineer, Project Manager	Construction	x				
HY-3	Groundwater encountered during construction will be temporarily stored onsite, tested, transported, treated, and disposed offsite. A dewatering permit will be obtained from the Los Angeles RWQCB. Based on results of the groundwater assessment and recommendations from the RWQCB, one of the following will be utilized for disposal of groundwater from the proposed dewatering operation: Onsite		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				

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	treatment, Treatment and disposal offsite, or Disposal into local sewer system. **Onsite Treatment** This would entail designing and constructing a temporary water treatment plant for treating water generated from dewatering operations to reduce the concentrations of pollutants of concern below NPDES limits. **Treatment and Disposal Offsite** This would entail temporary storage of water on the project site, waste profiling, and then transporting the water to a regulated facility for treatment and disposal. **Disposal into Local Sewer System** This would entail disposal of the groundwater into the City of Los Angeles sewage treatment system, which is connected to the Terminal Island Treatment Plant. To dispose of groundwater into the City of Los Angeles sewer system, an Industrial Wastewater Discharge Permit is required, which is issued by the City of Los Angeles Department of Public Works, Bureau of Sanitation, Industrial Waste Management Division. To satisfy permit conditions, treatment of discharge water could be required.								

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	WATER QUALITY AND STORMWATER RUNOFF	**3.10**							
	Construction								
	See HY-1, HY-2 and HY-3								
	Operations								
WQ-1	BMPs for surface runoff include construction of barriers at entry points to receiving waters to prevent large debris from entering the receiving water, and continuous monitoring of the new bridge structures for excessive buildup of debris that could be discharged in a precipitation event.		ACTA Construction Contractor, Resident Engineer, Project Manager	Operation					
	GEOLOGY/SOILS/SEISMICITY/PALEONTOLOGY/TOPOGRAPHY/MINERAL RESOURCES	**3.11**							
	Construction								
GEO-1	Design criteria, standards, and procedures contained in state and local jurisdiction standards and specifications (e.g., Uniform Building Code) would be applied during final design of the project, including earthquake-resistant standards to reduce potential effects from a major earthquake.		Caltrans/ ACTA Design and Structural Engineer	Design					
GEO-2	A geotechnical study would be completed for all areas associated with load-bearing features, and areas with potential for slope failure (e.g., trenches) and soil subsidence, and a geotechnical report would be prepared. The geotechnical report would include		Caltrans/ ACTA Design and Structural Engineer	Design	x				

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	project-specific recommendations consistent with standards established by state and local jurisdictions. Geotechnical report recommendations would be incorporated into final project design.								
GEO-3	Monitoring during construction would be performed by a licensed geologist or engineer to verify construction occurs in compliance with features, standards, and practices included in final design to reduce potential effects from earthquake damage; slope and/or foundation instability; erosion, sedimentation, and flooding; land subsidence; and volcanic hazards.		ACTA Licensed Geologist	Construction	x				
PALEO - 1	Implement Paleontological Resource Impact Mitigation Program, which includes, but is not limited to, the tasks shown below. (Additional detail is provided in the Paleontological Resources EIS/EIR Technical Section [Jones & Stokes, 2005]). • Program will be directed by a paleontologist or paleontological consulting firm approved by Caltrans. • Conduct program in compliance with lead agency and professional society guidelines. • Develop and obtain museum storage agreement.		ACTA Resident Engineer, Caltrans-approved Paleontologist, Project Manager		x				

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	• Coordinate with construction contractor to provide information regarding lead agency requirements for the protection of Paleontological resources. • Conduct paleontological monitoring, as appropriate. • Treat any specimens collected in accordance with museum repository requirements. • Transfer any collected fossils to museum repository. • Maintain daily monitoring logs. • Prepare final report.								
	HAZARDOUS WASTE/HAZARDOUS MATERIALS	**3.12**							
	Construction								
HAZ-1	Conduct a soil investigation prior to any soil excavation. The investigation would assess the potential presence of hazardous contaminants and determine disposal options if necessary for the contaminated soil. The soil investigation could consist of an ADL investigation and investigation for other contaminants of concern due to effects from adjoining properties. Coordination with regulatory agencies will be made for soil investigation, sampling, and/or remediation.		ACTA Hazardous Waste Specialist, Project Manager	Design/Construction	x				

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HAZ-2	Evaluate soil and groundwater information for the adjoining Sunshine Truck Stop, LA Refining Company, Texaco Refining, Texaco (1222 Anaheim Street), TCL (Pier S), Dow Chemical, and former Long Beach Naval Shipyard property to assess potential effects. If the review indicates evidence of contamination or a lack of sufficient data, a soil and groundwater investigation will be conducted, and further measures will be implemented, as necessary.		ACTA Hazardous Waste Specialist, Project Manager	Design/Construction	x				
HAZ-3	Inform demolition contractors of the potential presence of LBP in structures subject to demolition, and applicable Occupational Safety and Health Administration (OSHA) and other regulatory measures shall be adhered to in the demolition of such structures. If contamination is encountered during the construction process, implement appropriate health and safety measures to protect workers and the general public. Such measures may include engineering controls, requiring appropriate personal protective equipment, worker monitoring, and site-specific health and safety plans.		ACTA Resident Engineer, Project Manager	Design	x				
HAZ-4	A licensed professional will conduct a predemolition survey of the Schuyler Heim Bridge ACM and LBP. The purpose of the survey would be to determine the presence of regulated and/or potentially		ACTA Licensed Env. professional, Project Manager	Design	x				

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	hazardous construction materials on the bridge. Any demolition activities that would remove or disturb these materials would implement measures in accordance with applicable regulations. As required by law, the abatement contractor shall be a licensed professional.								
HAZ-5	Conduct asbestos removal in conformance with Rule 1403 of the South Coast Air Quality Management District (AQMD) and EPA's National Emissions Standards for Hazardous Air Pollutants regulation.		ACTA Licensed Env. professional, Project Manager	Construction	x				
HAZ-6	Paint from the dismantled bridge sections would be chemically removed at a suitable offsite location in an upland area. This will be done to avoid the introduction of lead-based paint into the receiving waters. If paint removal is necessary during the dismantling process, the contractor would comply with all applicable laws and regulations relative to this process to ensure protection of receiving waters.		ACTA Construction Contractor, Resident Engineer	Construction	x				
HAZ-9	During construction of the project, the contractor will be required to contact the Division of Oil and Gas for appropriate requirements if any wells are affected by project construction. Further, the contractor will be required to prepare workplans that will provide procedures for construction near		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				

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	idle, plugged, or abandoned wells that meet the requirements of the Division of Oil and Gas specifications. The work plans will be submitted for review and approval prior to implementation.								
HAZ-10	During construction of the project, the contractor will provide the Division of Oil and Gas with applicable building plans for review and approval. These documents will be prepared in accordance with the requirements outlined in the "Construction Project Site Review and Well Abandonment Procedure."		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
	AIR QUALITY	**3.13**							
	Construction								
AQ-1	Apply nontoxic soil stabilizers to all inactive construction areas (previously graded areas inactive for 10 days), and areas anticipated to be inactive for 10 days. Comply with control measures in SCAQMD Rule 403, Table 1.		ACTA Construction Contractor, Resident engineer, Project Manager	Construction	x				
AQ-2	Replace ground cover in disturbed areas as quickly as possible.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
AQ-3	Reduce traffic speed on all unpaved roads to 15 mph or less.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				

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AQ-4	Develop and implement a trip reduction plan to achieve a 1.5 average vehicle ridership for construction employees.		ACTA Construction Contractor, Resident Engineer, Project Manager	Design/Construction	x				
AQ-5	Implement a shuttle service for construction workers to and from retail services and food establishments during lunch hours.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
AQ-6	Prohibit truck idling in excess of 2 minutes. Employ periodic, unscheduled inspections to limit unnecessary idling.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
AQ-7	Suspend use of all construction equipment operations during second stage smog alerts.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
AQ-8	Use electricity, if feasible, from power poles rather than temporary diesel- or gasoline-powered generators.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
AQ-9	**Heavy Duty Truck Buyback Program** The purpose of the buyback program would be to accelerate the modernizing of the heavy duty engine fleet operating in the South Coast Air Basin. By removing the older engines in the fleet and requiring replacement with newer, cleaner vehicles, a net reduction of NO_X emissions (and other combustion pollutants) would occur.		ACTA Project Manager, Environmental-Air Quality professional	Design/Construction	x				

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	This reduction would help offset marine vessel detour emissions. The protocols to be used would be consistent with the Carl Moyer Program, which is already being administered by the SCAQMD. However, this program is not available to projects such as Schuyler Heim Bridge Replacement and could not be used to actually implement this project's buy-back program. The Gateway Cities Diesel Fleet Modernization Program would be an example of a buyback program with similar reduction goals. Also, the POLA/POLB Clean Air Action Plan has a heavy duty truck buy back component. While participating in already existing programs might be preferable (and possible), it would not be necessary in order to accomplish heavy duty truck buy back. The heavy duty truck buy back could be done independently, though it would have to adhere to already accepted protocols (SCAQMD). A heavy duty truck buyback program would consist of three steps: 1) identify target vehicles based on year of make; 2) provide incentives for operators to participate; and 3) establish a means to ensure that replacements meet the net improvement forecasted.								

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	The construction phase of this project is where the greatest impact of increased emission levels occurs. Therefore, the buyback program would be designed to mitigate the NO_X emissions during that time. Based on recent buyback programs, the program for the proposed project would cost from $25,000 to $50,000/ ton of NO_X reduced. This cost can vary significantly and will continue to increase as time passes. The number of tons mitigated would be based on marine vessel detour NO_X emissions during construction. The rerouting of shipping vessels during project construction would amount to 132.8 lbs NO_X per day, which is equivalent to 24.2 tons NO_X per year. The indirect marine vessel emissions would be mitigated to a level that is below the SCAQMD significance threshold for construction emissions. It is estimated that each truck replacement would reduce an average of 0.55 tons per year of NO_X and 0.12 tons per year of PM. This is based on emission factors representative of current buyback programs such as the Gateway Cities Diesel Fleet Modernization Program. These emission reductions would continue for 3 to 5 years, depending on the year of the truck updated. This timeframe would								

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	exceed the duration of the project construction phase.								
AQ-10	To the extent feasible, utilize construction equipment equipped with Tier 2 or newer engines.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
AQ-11	Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to ensure that construction equipment is properly maintained, tuned, and modified to established specifications. Caltrans will adhere to its Standard Specifications 7/1.01F, which require contractors to comply with local air quality regulations.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
AQ-12	Prohibit tampering with engines and require continuing adherence to manufacturer's recommendations.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
	Operations								
AQ-13	Retrofits of heating, ventilating and air conditioning (HVAC) units. New heating, ventilating, and air conditioning (HVAC) units, or retrofit of existing HVAC units, will be installed in schools and residences that have a significant increase in cancer risk as demonstrated by the HRA.		ACTA Construction Contractor, Resident Engineer, Project Manager	Design/Construction/ Operations	?				

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	NOISE	**3.14**							
	Construction								
N-1	Construction noise monitoring and control plans consistent with local noise ordinances will be prepared by a qualified acoustical engineer who is a current member of the Institute of Noise Control Engineering (INCE), and has 5 years of experience performing construction noise analyses. If mitigation is warranted, potential measures, such as screening, noise blankets, etc., would be evaluated for their effectiveness, and appropriate measures would be implemented.		ACTA Acoustical Engineer, Caltrans Noise Unit, Project Manager, Construction Contractor, Resident Engineer	Design/Construction	x				
N-2	During project construction, pile driving will occur during daylight hours only.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
N-3	Residents identified as being impacted by noise from pile driving in Cerritos Channel or Consolidated Slip may obtain hotel vouchers for a local hotel so they can temporarily move. This mitigation measure would apply only during the time that pile driving is being conducted in the Cerritos Channel or Consolidated Slip. Some residents may, however, choose to stay and tolerate the noise. No other mitigation or compensation measure would be provided to residents.		ACTA Right-of-Way Agent ?/ POLA/ POLB	Construction	x				

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	Operations								
N-4	For the Leeward Bay Marina, a barrier along the SR-47 Expressway, with an approximate length of 239 m (785 ft) and an average height of 2.44 m (8 ft) would be constructed to abate future traffic noise levels by 5 to 7 dBA at 65 benefited noise-sensitive receivers. Preliminary reasonableness calculations indicate the estimated barrier cost would be approximately $23,400 per benefited residence, which is within the allowance per residence of $50,000 to $54,000.		ACTA Design Engineer, Resident Engineer, Project Manager	Design/ Construction	x				
N-5	**Wilmington Neighborhood** For the Wilmington neighborhood, a barrier along the SR-47 Expressway and another on ground level along Alameda Street, with an approximate combined length of 1,405 m (4,610 ft) and height of 3.66 m (12 ft) to 5.49 m (18 ft) would be constructed to abate future traffic noise by 5 to 7 dBA at 56 benefited noise sensitive receivers. Preliminary reasonableness calculations indicate that the estimated barrier cost would be approximately $37,500 per benefited residence, which is within the allowance per residence of $48,000.		ACTA Design Engineer, Resident Engineer, Project Manager	Design/ Construction	x				

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	BIOLOGICAL RESOURCES	**3.16**							
	Construction								
B-1	**Wetland Avoidance** To avoid the wetlands present to the east of the Schuyler Heim Bridge along the low tidal terrace on Cerritos Channel construction staging, traffic, and vehicle access would be excluded from these areas to the extent feasible. Caution fencing would be installed to protect the small wetlands, and construction activities would be modified to avoid the areas. This measure also will be implemented, as necessary, to avoid adverse effects to jurisdictional waters.		ACTA Construction Contractor, Resident Engineer, Project Manager	Construction	x				
B-2	**Protecting Aquatic Communities (including Essential Fish Habitat, Coast Pelagic Species, Groundfish)** Sediment resuspension would be minimized by adherence to the CIDH or CISS design of all in-water piles, whereby the outer shell would act as a coffer dam during construction and contain resuspended sediment onsite until it is removed from within the shell prior to concrete pile installation. Measures that would be implemented during construction (including demolition and/or new bridge installation) to minimize sediment resuspension effects include: • Channel bank work would include		ACTA Construction Contractor, Resident Engineer, Project Manager	Design/ Construction	x				

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	bank protection (riprap, concrete walls) to eliminate the possibility of enhanced bank erosion. To reduce effects to channel water quality from lead compounds in paint during removal or during bridge demolition, the following measures in some combination would be implemented: • Erect shrouds around working areas and suspend nets and tarps below bridges to catch debris from abrasive removal of old paint, where wind conditions permit. • Anchor tarps to barges below and enclose the bridge above to confine debris, where the bridge deck is not too far above water level. • Use barges and booms to capture fugitive floating paint chips, and custom-built enclosures to confine and capture the abrasives, old paint chips, and paint. • Use vacuum or suction shrouds on blast heads to capture grit and old paint. • Perform lead-based paint removal offsite following demolition of steel members. To reduce the effects of elevated underwater and terrestrial sound levels on aquatic habitats and EFH during construction from bridge pile driving and related activities, the following measures would be implemented:								

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	• Attenuation of pile driving sound would be developed during the PS&E stage; this is likely to include a contained air bubble curtain on larger pile installations and dewatering casings for smaller piles. Performance criteria for sound attenuation would be developed to achieve maximum practicable reductions in underwater sound levels. • A hydroacoustic monitoring plan would be developed, which would include appropriate sampling point locations, frequency, and methodology to be implemented during pile driving. The results of the hydroacoustic monitoring would be analyzed real time to identify appropriate safety isopleths and monitoring zones for sensitive resources. • Evaluate potential to modify pile driving operational procedures to reduce noise effects, such as ramping up of pile driving energy levels to allow mobile organisms to exit the area; evaluating potential use of vibratory versus impact hammers under certain conditions; using less force of the hydraulic impact hammer; and limiting pile driving to no more than 2 piles a day, with a minimum 12 hours interval between daily driving, to minimize cumulative exposure levels (SEL). • Evaluate potential for seasonal or								

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	daily time constraints, such as pile driving during a time of year when larval and juvenile stages of fish species with designated EFH are not present, driving piles during low tide periods when located in intertidal and shallow subtidal areas, and driving piles when the current is reduced (i.e., centered around slack current) in areas of strong current. To reduce and/or avoid potential impacts of elevated underwater sound levels on marine mammals during construction from pile driving the following additional measures would be implemented: • A detailed marine mammal monitoring/protection plan would be developed in coordination with NMFS; this would include use of biological monitors with authority to suspend pile driving activities should sensitive organisms be present or enter the area. Details of the plan would be developed, and would include methods to identify safety zone limits, numbers and locations of monitors, and conditions when pile driving would be suspended to protect resources.								
B-3	**Protecting Special-Status Plant Species** Preconstruction surveys for southern tarplant would be conducted prior to construction. Surveys would be conducted during the blooming period for this plant,		ACTA	Design	x				

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	between June and October. If identified onsite: • The feasibility of avoiding areas that support the species would be evaluated and, if feasible, the area would be avoided during construction. • If avoidance is infeasible, then mitigation would be required (see Mitigation Measure B-13).								
B-4	**Protecting Special-Status Bat Species** Avoidance and minimization measures apply to the following species: pallid bat; long-legged myotis; long-eared myotis; Yuma myotis; western mastiff bat; pocketed free-tailed bat; big free-tailed bat. To avoid or minimize effects to these species, the following measures would be employed by ACTA (or their designee) relative to bridge or highway deconstruction: • Four quarterly bat surveys would be conducted in the 12 months prior to start of construction to determine the presence or absence of the species, as determined appropriate by a qualified biologist. Surveys may include, but are not limited to the following: - Exit surveys of potential roost sites conducted by survey biologists stationed around the bridge or highway with binoculars and echolocation meters at nightfall		ACTA Environmental/ Biologist, Construction Contractor, Resident Engineer, Project Manager	Design/12 months prior to construction/ Construction	x				

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	- Surveys of all accessible potential roost sites on the bridge conducted by biologists permitted by CDFG for bat survey and handling • In the event any of the above special-status bat species are identified during field surveys, the following would be conducted: - Exclusion of active roost sites by appropriate barriers, installed during the nonbreeding season from September to March - Taking appropriate steps to exclude roosts when vacant during nighttime foraging periods when identified during construction - If the exclusion measures above fail, delay of construction where maternity roosts are encountered, until after the young have weaned and are in flight • Education of construction workers to identify potential roost sites, to avoid activity when identified, and to advise biological monitors when roosts are encountered.								
B-5	**Protecting Bird Nests and Eggs** Preconstruction surveys to identify potential nest sites for birds will be conducted by ACTA (or their designee) within all construction areas on the bridge prior to the nesting season. Potential nest sites will be passively excluded with bird spikes, plywood, or other means, as necessary. An onsite biological		ACTA Environmental, Project Manager	Design/ Preconstruction	x				

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	monitor will be present during construction activities to ensure that nests are not established within the construction zone, and to implement passive exclusion as necessary.								
B-6	**Protecting California Least Tern** Prior to construction, potential breeding habitat for least tern in the vicinity of the project would be surveyed for the presence of least tern during the April 15 to September 15 survey period for nesting birds. If they are found to be present, the avoidance and minimization measures determined through consultation with the USFWS will be adhered to.		ACTA Environmental, Project Manager	Design/ Preconstruction	x				
B-7	**Protecting American Peregrine Falcon** • Historical nesting sites on the Schuyler Heim Bridge would be made unsuitable prior to the nesting season (January 15 to July 30) to avoid direct effects to individuals or an active nest site during construction. This may include positioning exclusion materials, such as plywood, on these nest sites prior to the nesting season to render the sites unsuitable. • Site monitoring during the construction period would be conducted to observe the pair's movements and document its activities. This may assist in identifying nesting attempts by the		ACTA Environmental, Project Manager	Design/ Construction	x				

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	pair on adjacent structures or within the construction zone. If this occurs, and the nest site is at risk or could be at risk during the nesting season, the site can be excluded. This includes risk from egg loss which may occur on a less than optimal nest site. If the nesting attempt site is not anticipated to be at direct risk from construction disturbance during the upcoming nesting season, then the pair will be allowed to nest, and nesting success will be monitored. • Efforts will be made to coordinate the construction schedule of the Schuyler Heim Bridge with the construction schedule of the future Gerald Desmond Bridge replacement project. If these two schedules do not overlap, then the Gerald Desmond Bridge may provide a nesting location for one peregrine pair to breed at the Schuyler Heim/Desmond bridge complex, which has generally been the case in past years. Coordination meetings with the Gerald Desmond Bridge project team are ongoing.								

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B-8	**Protecting Burrowing Owl** To avoid effects on burrowing owls, preconstruction surveys of potential breeding sites would be conducted onsite within 152 m (500 ft) of construction activities. Burrowing owl individuals present within the construction area would be flushed from active burrows during the non-nesting season (August to January) and burrows excluded. These activities would be conducted in a manner consistent with the *Burrowing Owl Survey Protocol and Mitigation Guidelines*, prepared by The California Burrowing Owl Consortium in 1997. Exclusions would require maintenance and monitoring to assure that individuals do not return.		ACTA Environmental, Construction Contractor, Resident Engineer, Project Manager	Design/ PreConstruction/ Construction	x				
B-9	**Protecting Against Invasive Species** Caltrans and/or its contractors will implement the following measures to avoid the introduction or spread of noxious weeds into previously uninfested areas: • Educate construction supervisors and managers on weed identification and the importance of controlling and preventing the spread of noxious weed infestations. • Clean construction equipment at designated wash stations before entering the construction area.		ACTA Environmental, Construction Contractor, Resident Engineer, Project Manager	Design/ Construction	x				

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	• Landscaping and erosion control included in the project would not use species listed as noxious weeds. • Seed all disturbed areas with certified weed-free native mixes. • Use only certified weed-free straw or rice mulch in uplands only. • Conduct a follow-up inventory of the construction area during the first spring following the completion of construction to verify that construction activities have not resulted in the introduction of new noxious weed infestations. • If new noxious weed infestations are located during the follow-up inventory, the appropriate resource agency will be contacted to determine the appropriate species-specific treatment methods.								
	Operations								
B-10	**Protecting Avian Species at Transmission Towers** To protect against operational impacts to birds moving about or utilizing new transmission towers, construction design standards for avian protection will be followed, including use of visual line enhancers and adequate spacing between energized parts. No lighting will be associated with new transmission towers. Design standards for avian protection will be developed from the Edison		ACTA Design, Environmental, Project Manager	Design	x				

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	Electric Institute's Avian Power Line Interaction Committee (APLIC) and USFWS *Avian Protection Plan Guidelines* (APLIC and USFWS, 2005), APLIC's Suggested *Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (APLIC, 1996), or APLIC's *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994* (APLIC, 1994).								
B-12	**Mitigating for Loss of Peregrine Falcon Nest** This measure may include the following, as appropriate, pending coordination with CDFG: • Create a new nest site by placing a nesting box (and potential additional support material) on a tower of the Badger Avenue Bridge or other elevated structure, as determined by a qualified biologist. Because the Badger Avenue Bridge is located adjacent to the Schuyler Heim Bridge, and is approximately the same height, there is the potential that it could provide a suitable vantage point and nesting location to peregrine falcons. The peregrine pair has never nested on this bridge in the past but this may be due to an absence of suitable nesting platforms and substrate. Further evaluation of any design changes or nesting ledge installations by a qualified peregrine expert would be conducted.		Caltrans/ ACTA Environmental, Construction Contractor, Resident Engineer, Project Manager	Construction/ Operation	x				

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	• Offsite mitigation. The goal of the offsite mitigation would be to augment existing peregrine populations. This could be accomplished by purchasing approximately 10 nestling peregrines from a captive breeding facility and have those young released (hacked) in an area of California where, when they disperse, they will possibly create a new nesting pair. • The local peregrine falcon population (approximately five pairs) would be monitored for 2 years. The pair located on the Schuyler Heim Bridge would be monitored to determine if they nest on the Badger Bridge, or if they integrate into other territories by filling a vacancy in another pair, or by usurping existing individuals in a pair. If offsite mitigation is conducted, hacked peregrine falcons would be monitored to determine their fate and if a new nesting pair is established. An experienced peregrine falcon biologist would conduct monitoring of the hacked peregrine falcons.								
B-13	**Mitigating Loss of Special Status Plant Species** Surveys for special-status plant species shall be conducted during flowering season prior to construction, at the PS&E stage. If special-status plant species are found and cannot be avoided		ACTA Environmental, Construction Contractor, Resident Engineer, Project Manager	Design/1 year prior to construction, Construction	x				

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	during project construction, then seed and/or propagules of the species would be collected and replanted at an alternative location. These activities will be conducted in coordination with the resource agencies. - Mitigation measures would be refined in coordination with the resource agencies and standard practices for this species. Measures may include the following: Areas determined to have appropriate hydrology and soil chemistry (salinity) shall be reseeded with seed collected from populations of southern tarplant. Southern tarplant is restricted to saline, vernally mesic areas, often along the margins of estuaries or areas of high salinity. - Prior to construction, southern tarplant and/or other special-status seed shall be collected by personnel experienced in collection of native seeds. Seed collection shall be conducted during successive years from September through December. One-half of the first year's collected seed shall be hand-broadcast at the reintroduction site with the remaining one-half stored in appropriate conditions for introduction the following year. Seed collected during the second season shall be stored for potential later use in the event that success								

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	standards are not met following the seeding during years one and two. - Because southern tarplant is an annual species, population numbers are expected to naturally fluctuate from year to year depending upon environmental conditions. Reseeded areas shall be monitored for three years following the initial seeding. Establishment shall be considered successful if plant densities during any of the three years of monitoring are comparable to densities of the impacted populations based on sampling quadrants. If established populations do not achieve comparable densities of impacted populations, additional reintroduction sites shall be identified and stored seed, obtained during the collection period, shall be introduced into additional sites over a two-year period (as in the initial reintroduction program described above).								
B-14	**Mitigating for Burrowing Owl** If flushing of individual birds and exclusions of burrows fail, construction activities would be delayed within 152 m (500 ft) of nest sites until after the breeding season for these species (February to July).		ACTA Environmental, Construction Contractor, Resident Engineer, Project Manager	Construction	x				

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	Permits and Approvals								
	Federal Highway Administration								
	Project funding		Caltrans/ ACTA Project Manager	Prior to ROD approval?					
	National Marine Fisheries Services								
	Consultation re: Essential Fish Habitat; Incidental Harassment Authorization (IHA)		Caltrans/ ACTA Environmental	PS&E					
	U.S. Army Corps of Engineers								
	Section 404 Permit (Clean Water Act); Section 10 Permit (Rivers and Harbors Appropriations Act)		ACTA Environmental, Project Manager	PS&E					
	U.S. Coast Guard								
	Bridge Permit (Section 9, Rivers and Harbors Appropriations Act)		ACTA Environmental, Project Manager	PS&E					
	U.S. Fish and Wildlife Service								
	Endangered species permitting		Caltrans/ ACTA Environmental	PS&E					
	California Coastal Commission								
	Coastal Development Permit		ACTA Environmental/ POLA/ POLB	PS&E					
	California Department of Fish and Game								
	Streambed Alteration Agreement (Section 1600, Fish and Game Code); Endangered Species Permitting (as applicable)		ACTA Environmental	PS&E					

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	California Transportation Commission								
	Approval authority for funding and route adoption		Caltrans Project Manager	Design					
	State Historic Preservation Officer								
	Consultation; MOA Approval per Section 106 (National Historic Preservation Act)		Caltrans Environmental Planning	PAED		Completed - MOA between Caltrans and SHPO approved			
	Regional Water Quality Control Board								
	Section 401 Water Quality Certification (Clean Water Act); Section 402 National Pollutant Discharge Elimination System [NPDES] Permit (Clean Water Act); Report of Waste Discharge		ACTA Project Manager	PS&E					
	South Coast Air Quality Management District								
	Clean Air Act compliance		Caltrans	Design/ Construction/ Operations					
	Alameda Corridor Transportation Authority								
	Project funding		ACTA Project Manager	PAED					
	California Department of Transportation								
	Encroachment permits		ACTA Project Manager	PS&E					

Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Code	Task and Brief Description	Section	Responsible for Implementation / Oversight	Timing / Phase	NSSP Req.	Action Taken to Comply with Task	Task Complete	Remarks	Environ-mental Compliance
							Initial / Date		Initial / Date
	City of Long Beach								
	Discretionary approvals		ACTA Project Manager	PS&E					
	City of Los Angeles								
	Discretionary approvals; Encroachment permits		ACTA Project Manager	PS&E					
	City of Los Angeles, Bureau of Engineering								
	Coastal Development Permit		ACTA Project Manager	PS&E					
	City of Los Angeles, Fire Department								
	Permits for storage and use of flammable hazardous materials (explosives)		ACTA Project Manager	PS&E					
	County of Los Angeles, Department of Public Works, Flood Control District								
	Encroachment permits		ACTA Project Manager	PS&E					
	Port of Long Beach								
	Harbor Development Permit; Coastal Development Permit		ACTA Project Manager	PS&E					
	Port of Los Angeles								
	Application for Development Project; Coastal Development Permit		ACTA Project Manager	PS&E					

PROJECT PERSONNEL

Initial	Full Name	Title	Phone Number	Assigned to Project Date	Transferred from Project Date	Remarks			

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3, KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

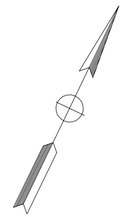
PLANS APPROVAL DATE

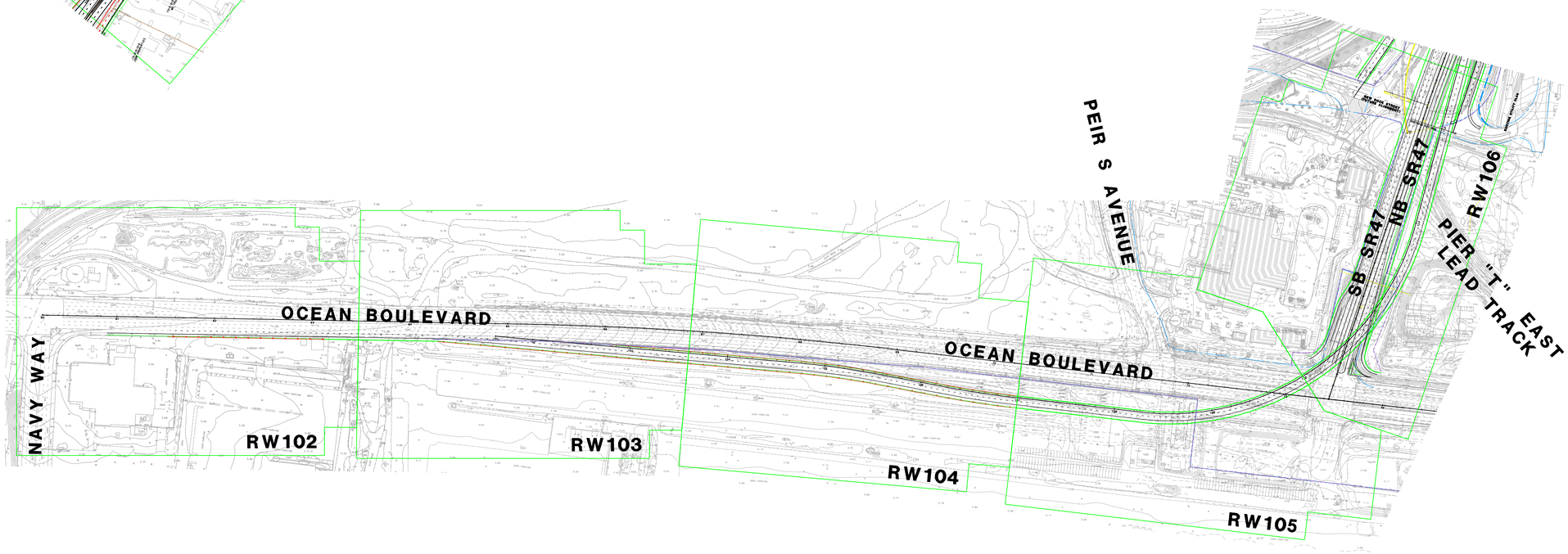
REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

NOTE: THIS AREA OF THE KEY MAP HAS BEEN MOVED FROM IT'S ORIGINAL LOCATION.





SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVES 1 & 2 RIGHT-OF-WAY EXHIBIT KEY MAP

HORIZ SCALE 1:2500

RW100

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

DESIGN OVERSIGHT

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FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

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SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT KEY MAP

HORIZ SCALE 1:3000

RW101

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3, KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

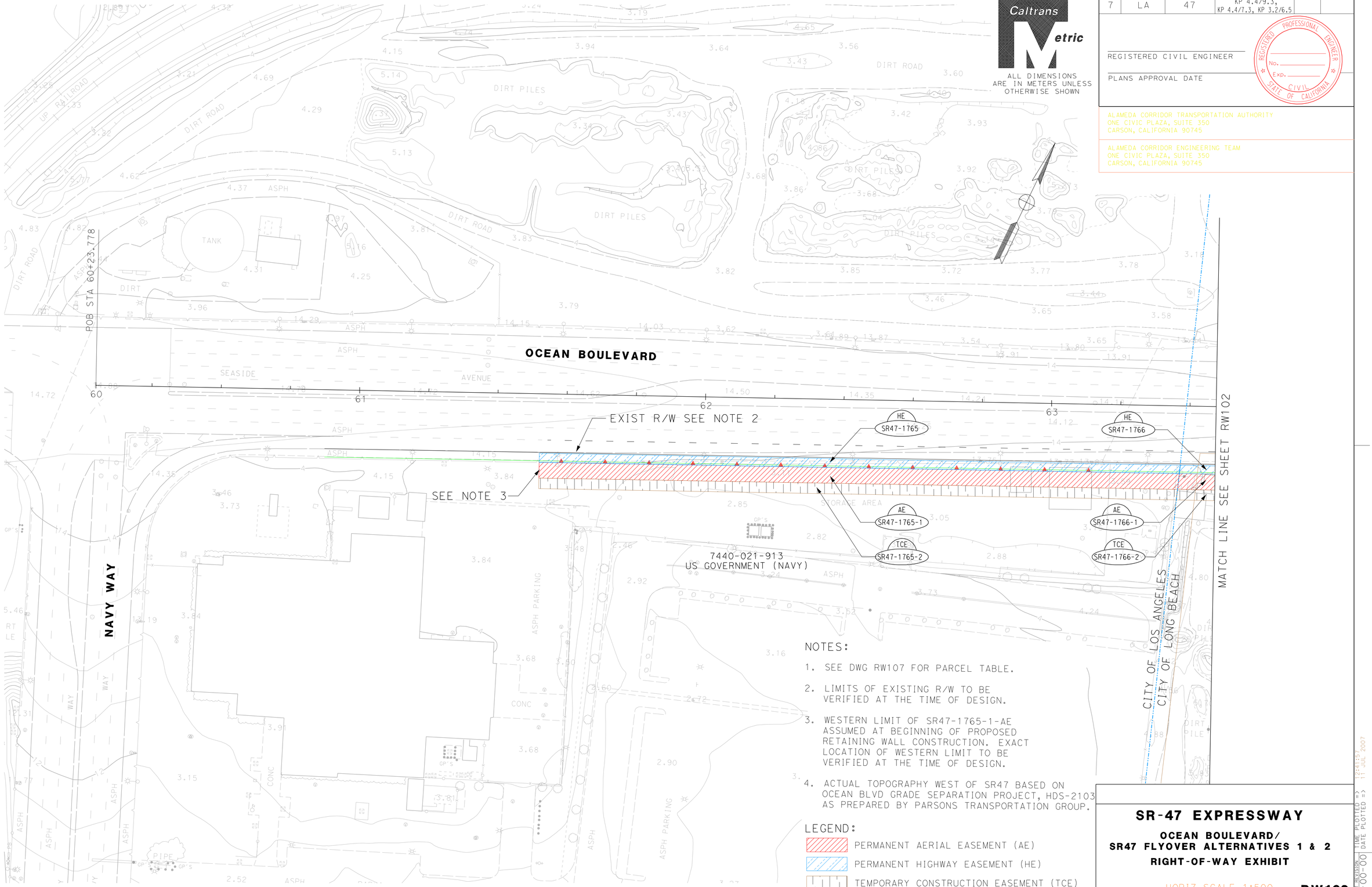
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745



NOTES:

1. SEE DWG RW107 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. WESTERN LIMIT OF SR47-1765-1-AE ASSUMED AT BEGINNING OF PROPOSED RETAINING WALL CONSTRUCTION. EXACT LOCATION OF WESTERN LIMIT TO BE VERIFIED AT THE TIME OF DESIGN.
4. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103 AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVES 1 & 2

RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW102

DATE	REVISED BY	DATE REVISED

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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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DATE PLOTTED => 11-JUL-2007

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3, KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

CITY OF LOS ANGELES
CITY OF LONG BEACH

OCEAN BOULEVARD
BLVD

EXIST R/W SEE NOTE 2

EXIST R/W SEE NOTE 4

EXIST R/W

MATCH LINE SEE SHEET RW101

MATCH LINE SEE SHEET RW103

AE SR47-1766-1

HE SR47-1766

TCE SR47-1766-2

AE SR47-1766-3

"L1" LINE

7436-032-907
CITY OF LONG BEACH

DIRT ROAD

ASPH PARKING

CONC DITCH

NOTES:

1. SEE DWG RW107 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS 2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVES 1 & 2 RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW103

DATE	REVISED BY
	DATE REVISED

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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3, KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

CITY OF LOS ANGELES
CITY OF LONG BEACH

OCEAN BOULEVARD

DIRT ROAD

DIRT PILES

ROCKS

CONC DITCH

ASPH

ASPH PARKING

HV-9
3.74

EXIST R/W
SEE NOTE 4

TCE SR47-1766-4

AE SR47-1766-3

TCE SR47-1767-4

AE SR47-1767-3

HE SR47-1766

AE SR47-1766-1

TCE SR47-1766-2

HE SR47-1767

AE SR47-1767-1

TCE SR47-1767-2

7436-032-907
CITY OF LONG BEACH

7436-032-904
US GOVERNMENT (NAVY)

"L1" LINE

MATCH LINE SEE SHEET RW102

MATCH LINE SEE SHEET RW104

NOTES:

1. SEE DWG RW107 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103 AS PER PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVES 1 & 2 RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW104

DATE	REVISED BY	DATE REVISED

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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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DATE PLOTTED => 11 JUL 2007

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3, KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

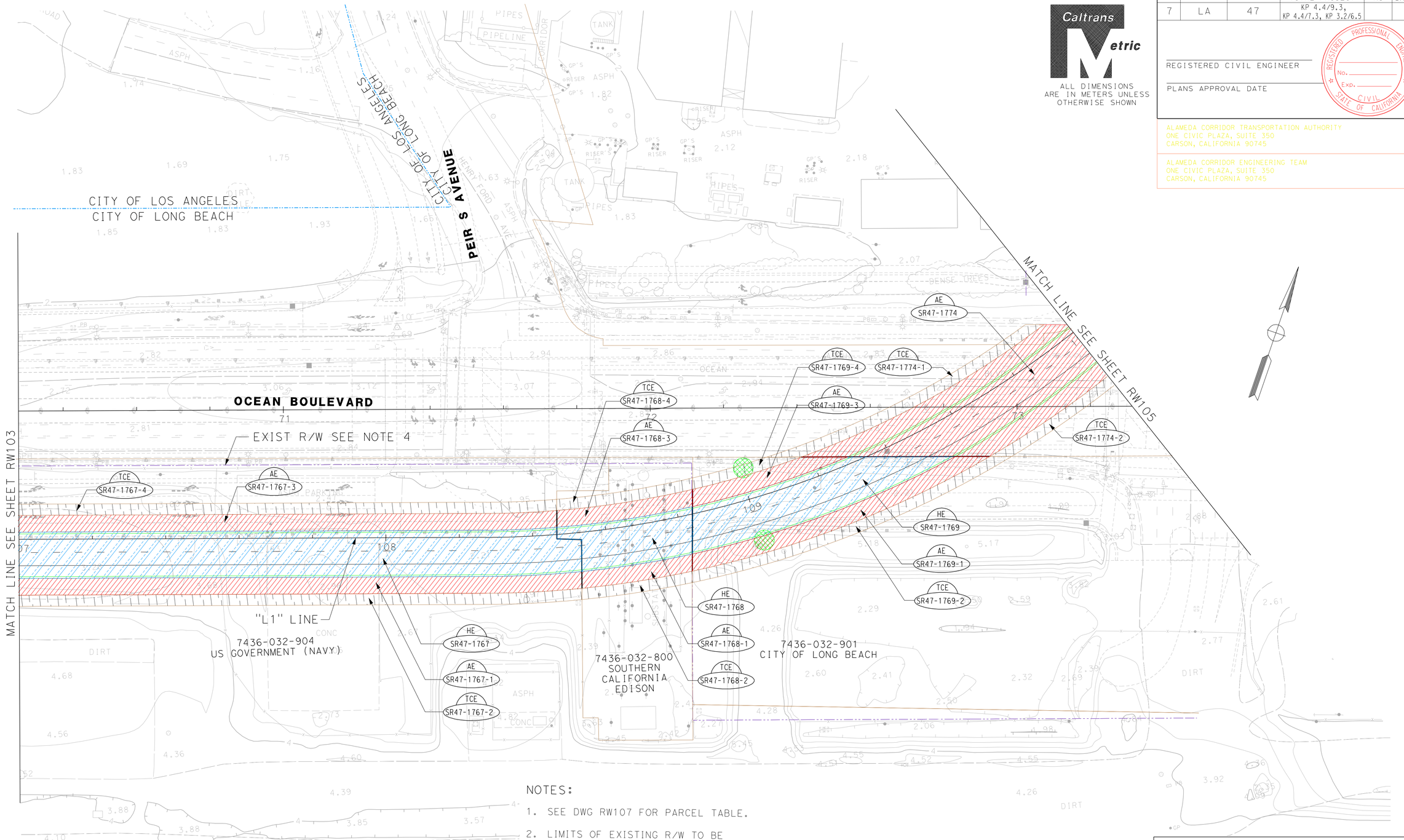
ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

DATE | REVISED BY | DATE REVISED

CALCULATED/ DESIGNED BY | CHECKED BY

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans



NOTES:

1. SEE DWG RW107 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVES 1 & 2

RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW105

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CU 07 | EA 23850K

NOTES:

1. SEE DWG RW107 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3, KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

MATCH LINE SEE SHEET RW104

FOR CONTINUATION SEE ALTERNATIVES 1 & 2 DRAWINGS

PIPELINE CORRIDOR

7436-029-906
CITY OF LONG BEACH

PIER "T" EAST LEAD TRACK

NEW DOCK STREET OFF RAMP

R=100

"B1" LINE

NEW DOCK STREET (FUTURE ALIGNMENT)

WYE TRACK 2+00

JOIN FUTURE OCEAN BLVD

EXIST STATE R/W SEE NOTE 4

LIMIT OF SR47-1701-AE AND SR47-1702-AE FOR ALTERNATIVE 1

"A1" LINE

SB SR47

NB SR47

TCE SR47-1774-2

AE SR47-1774

OCEAN BOULEVARD (FUTURE INTERSECTION)

7436-029-915
CITY OF LONG BEACH

1+00

R=1375

R=5

"C1" LINE

NEW DOCK STREET

NEW DOCK STREET ON RAMP

R=18

PIER "S"

FUTURE FLYOVER CONNECTOR

7436-029-914
CITY OF LONG BEACH

TCE SR47-1702-1

HE SR47-1702-11

AE SR47-1702-9

AE SR47-1703-2

HE SR47-1702-10

TCE SR47-1703-3

HE SR47-1702-14

AE SR47-1702-13

TCE SR47-1702-3

0+00

PIER "T" EAST LEAD TRACK

PIER "S" FUTURE IMPROVEMENTS

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVES 1 & 2

RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW106

CALCULATED/ DESIGNED BY	DATE	REVISED BY	DATE REVISED
CHECKED BY			

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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CU 07

EA 23850K

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE	DWG NO.
				REQUIRED	REMAINDER	TOTAL	EXCESS		
1	7440-021-913	SR47-1765	US GOVERNMENT (NAVY)	468 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW102
2	7440-021-913	SR47-1765-1	US GOVERNMENT (NAVY)	845 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
3	7440-021-913	SR47-1765-2	US GOVERNMENT (NAVY)	562 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
4	7436-032-907	SR47-1766	CITY OF LONG BEACH	6,393 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
5	7436-032-907	SR47-1766-1	CITY OF LONG BEACH	2,951 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
6	7436-032-907	SR47-1766-2	CITY OF LONG BEACH	1,967 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
7	7436-032-907	SR47-1766-3	CITY OF LONG BEACH	1,360 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW103
8	7436-032-907	SR47-1766-4	CITY OF LONG BEACH	406 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	RW104
9	7436-032-904	SR47-1767	US GOVERNMENT (NAVY)	2,450 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
10	7436-032-904	SR47-1767-1	US GOVERNMENT (NAVY)	897 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
11	7436-032-904	SR47-1767-2	US GOVERNMENT (NAVY)	598 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
12	7436-032-904	SR47-1767-3	US GOVERNMENT (NAVY)	868 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
13	7436-032-904	SR47-1767-4	US GOVERNMENT (NAVY)	598 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
14	7436-032-800	SR47-1768	SOUTHERN CALIFORNIA EDISON	409 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW105
15	7436-032-800	SR47-1768-1	SOUTHERN CALIFORNIA EDISON	139 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
16	7436-032-800	SR47-1768-2	SOUTHERN CALIFORNIA EDISON	93 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
17	7436-032-800	SR47-1768-3	SOUTHERN CALIFORNIA EDISON	171 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
18	7436-032-800	SR47-1768-4	SOUTHERN CALIFORNIA EDISON	114 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
19	7436-032-901	SR47-1769	CITY OF LONG BEACH	768 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
20	7436-032-901	SR47-1769-1	CITY OF LONG BEACH	374 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
21	7436-032-901	SR47-1769-2	CITY OF LONG BEACH	276 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
22	7436-032-901	SR47-1769-3	CITY OF LONG BEACH	173 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
23	7436-032-901	SR47-1769-4	CITY OF LONG BEACH	79 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
24	STREET	SR47-1774	CITY OF LONG BEACH	1,459 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
25	STREET	SR47-1774-1	CITY OF LONG BEACH	236 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
26	STREET	SR47-1774-2	CITY OF LONG BEACH	185 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
27	7436-029-914	SR47-1702-1	CITY OF LONG BEACH	385 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	RW106
28	7436-029-906	SR47-1702-3	CITY OF LONG BEACH	291 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
29	7436-029-914	SR47-1702-9	CITY OF LONG BEACH	519 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
30	7436-029-914	SR47-1702-10	CITY OF LONG BEACH	47 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
31	7436-029-914	SR47-1702-11	CITY OF LONG BEACH	1,155 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
32	7436-029-914	SR47-1702-13	CITY OF LONG BEACH	404 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
33	7436-029-914	SR47-1702-14	CITY OF LONG BEACH	72 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
34	7436-029-914	SR47-1703-2	CITY OF LONG BEACH	150 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
35	7436-029-914	SR47-1703-3	CITY OF LONG BEACH	23 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
36	7315-010-002	SR47-1760	MO TRUST	210 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW106A
37	7315-010-009	SR47-1760-1	MO TRUST	222 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
38	7315-010-009	SR47-1761	HERTZ EQUIPMENT RENTAL CORP.	306 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
39	7315-010-009	SR47-1761-1	HERTZ EQUIPMENT RENTAL CORP.	372 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
40	7315-010-009	SR47-1815 **	HERTZ EQUIPMENT RENTAL CORP.	903 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
41	7315-010-009	SR47-1815-1 **	HERTZ EQUIPMENT RENTAL CORP.	376 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
42	7315-010-800	SR47-1829 *	SOUTHERN PACIFIC (UPRR)	78 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	

* ALTERNATIVE 2 FLYOVER ONLY

** INCLUDED AS PART OF ALTERNATIVE 2 COST ESTIMATE

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3, KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CALCULATED/ DESIGNED BY

CHECKED BY

DATE

REVISED BY

DATE REVISED

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVES 1 & 2

RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW107

LAST REVISION => 00-00-00
TIME PLOTTED => 12:44:29
DATE PLOTTED => 11 JUL 2007

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EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

	DATE	REVISED BY
CALCULATED/ DESIGNED BY		DATE REVISED
CHECKED BY		

BOULEVARD

OCEAN

INDUSTRY TRACKS

EXISTING PERMANENT SLOPE EASEMENT (TCE)

POLE 1, H=75', EL=5.92 (MLLW 2002) + 0.38 = 6.30 (NAVD 88)

EXISTING STATE ROW (SEE NOTE 5)

DRIP LINE

EXISTING STRUCTURE

STA 110.6380

SB SR47

NB SR47

EXISTING STRUCTURE

EXISTING STATE ROW (SEE NOTE 5)

DRIP LINE

POLE 2, H=95', EL=8.40 (MLLW 2002) + 0.38 = 8.78 (NAVD 88)

EXISTING PERMANENT SLOPE EASEMENT (PSE)

7436-029-906
CITY OF LONG BEACH

7436-029-914
CITY OF LONG BEACH

7436-029-923

7436-029-918

7436-029-918

7436-032-901

7436-029-914

TCE SR47-1704-1
AE SR47-1704
HE SR47-1704-2
TCE SR47-1701-3
AE SR47-1701-2
TCE SR47-1703-1
HE SR47-1701-7
AE SR47-1703
TCE SR47-1701-1
HE SR47-1701-6
AE SR47-1701
AE SR47-1703-5
AE SR47-1703-4
HE SR47-1702-4
AE SR47-1702
TCE SR47-1702-1
HE SR47-1702-11
AE SR47-1702-9
AE SR47-1703-2
HE SR47-1702-10
AE SR47-1702-12
TCE SR47-1703-3
AE SR47-1702-2
HE SR47-1702-14
AE SR47-1702-13
TCE SR47-1702-3

NOTES:

1. HIGHWAY EASEMENT LIMITS FROM DRIP LINE
2. AERIAL EASEMENT LIMITS EXTEND FROM DRIP LINE PLUS 4.57M (15 FEET) TO DRIP LINE.
3. FOR HIGHWAY EASEMENT (HE), SR47-1703-4 (AE) AND SR47-1703-5 (AE) AREAS SEE DWG RW-122.
4. OCEAN BLVD FLYOVER DENOTED WITH * AND SCREENED SHOWN FOR INFORMATION ONLY. RW ACQUISITION TO BE MADE AT LATER DATE.
5. PRECISE LIMITS OF EXISTING CALTRANS ROW TO BE DETERMINED AT THE TIME OF FINAL DESIGN.
6. BASE ELEVATIONS FOR POLES 1 AND 2 PER POLB ARE EXPRESSED IN ENGLISH UNITS AND BASED ON MEAN LOWER LOW WATER ELEVATION.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

MATCH LINE SEE DWG RW-109

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7436-029-906	SR47-1701	CITY OF LONG BEACH	512 SQ. M				PERMANENT AERIAL EASEMENT (AE)
2	7436-029-906	SR47-1701-1	CITY OF LONG BEACH	346 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7436-029-906	SR47-1701-2	CITY OF LONG BEACH	26 SQ. M				PERMANENT AERIAL EASEMENT (AE)
4	7436-029-906	SR47-1701-3	CITY OF LONG BEACH	18 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
5	7436-029-906	SR47-1701-6	CITY OF LONG BEACH	207 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
6	7436-029-906	SR47-1701-7	CITY OF LONG BEACH	26 SQ. M				PERMANENT AERIAL EASEMENT (AE)
7	7436-029-914	SR47-1702	CITY OF LONG BEACH	689 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
8	7436-029-914	SR47-1702-1 *	CITY OF LONG BEACH	385 SQ. M				PERMANENT AERIAL EASEMENT (AE)
9	7436-029-906	SR47-1702-2	CITY OF LONG BEACH	280 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
10	7436-029-906	SR47-1702-3 *	CITY OF LONG BEACH	291 SQ. M				PERMANENT AERIAL EASEMENT (AE)
11	7436-029-906	SR47-1702-4	CITY OF LONG BEACH	89 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
12	7436-029-906	SR47-1703	CITY OF LONG BEACH (RAIL)	23 SQ. M				PERMANENT AERIAL EASEMENT (AE)
13	7436-029-906	SR47-1703-1	CITY OF LONG BEACH (RAIL)	10 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
14	7436-029-914	SR47-1703-2 *	CITY OF LONG BEACH (RAIL)	150 SQ. M				PERMANENT AERIAL EASEMENT (AE)
15	7436-029-914	SR47-1703-3 *	CITY OF LONG BEACH (RAIL)	23 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
16	7436-029-906	SR47-1704	CITY OF LONG BEACH	31 SQ. M				PERMANENT AERIAL EASEMENT (AE)
17	7436-029-906	SR47-1704-1	CITY OF LONG BEACH	21 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
18	7436-029-906	SR47-1704-2	CITY OF LONG BEACH	17 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-108

LAST REVISION => TIME PLOTTED =>
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EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CALCULATED/ DESIGNED BY

CHECKED BY

DATE

REVISED BY

DATE REVISED

PERMANENT DRAINAGE EASEMENT (PDE) AREA = 3376 SQ M (36,339 SQ FT) ACQUISITION AREA = 823 SQ M

PDE SR47-1760

HE SR47-1705 · AE SR47-1705-1 · TCE SR47-1705-3 · HE SR47-1706 · AE SR47-1706-4 · TCE SR47-1706-2 · AE SR47-1707 · TCE SR47-1707-1 · HE SR47-1706-5 · AE SR47-1708 · TCE SR47-1708-1 · AE SR47-1714 · AE SR47-1714-1 · AE SR47-1714-2 · TCE SR47-1714-3 · TCE SR47-1706-7 · AE SR47-1706-6 · AE SR47-1706-1 · TCE SR47-1706-3 · AE SR47-1709 · TCE SR47-1709-1 · TCE SR47-1701-5 · AE SR47-1701-4 · HE SR47-1701-8 · AE SR47-1705-4 · AE SR47-1705-5 · AE SR47-1705-2

7436-029-923 CITY OF LONG BEACH

7436-029-906 CITY OF LONG BEACH

7436-029-917 CITY OF LONG BEACH

7436-029-914 CITY OF LONG BEACH

7436-029-019 VOPAK TERMINAL LONG BEACH INC.

DOCK STREET

NEW DOCK STREET OFF RAMP

SB SR47

NB SR47

NEW DOCK STREET ON RAMP

MATCH LINE SEE DWG RW-108

MATCH LINE SEE DWG RW-110

EXISTING STRUCTURE

DRIP LINE

PIER "S" BOUNDARY LINE

EXISTING STATE ROW (SEE NOTE 3)

HE SR47-1702-13 · HE SR47-1702-11 · AE SR47-1702-2 · TCE SR47-1702-3 · HE SR47-1702-15 · TCE SR47-1702-5 · HE SR47-1702-6 · AE SR47-1702-7 · TCE SR47-1702-8

NOTES:

1. FOR PARCEL TABLE SEE DWG RW-015 EXCEPT SR47-1701-4, SR47-1701-5, SR47-1701-8, SR47-1714, SR47-1714-1, SR47-1714-2, SR47-1714-3 AND SR47-1760.
2. OCEAN BLVD FLYOVER DENOTED WITH * AND SCREEN SHOWN FOR INFORMATION ONLY. RW ACQUISITION TO BE MADE AT LATER DATE.
3. PRECISE LIMITS OF EXISTING CALTRANS ROW TO BE DETERMINED AT THE TIME OF FINAL DESIGN.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT
- PERMANENT DRAINAGE EASEMENT (PDE)

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7436-029-906	SR47-1701-4	CITY OF LONG BEACH	188 SQ. M				PERMANENT AERIAL EASEMENT (AE)
2	7436-029-906	SR47-1701-5	CITY OF LONG BEACH	147 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7436-029-906	SR47-1701-8	CITY OF LONG BEACH	81 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
4	7436-029-917	SR47-1714	CITY OF LONG BEACH	101 SQ. M				PERMANENT AERIAL EASEMENT (AE)
5	7436-029-917	SR47-1714-1	CITY OF LONG BEACH	57 SQ. M				PERMANENT AERIAL EASEMENT (AE)
6	7436-029-917	SR47-1714-2	CITY OF LONG BEACH	9 SQ. M				PERMANENT AERIAL EASEMENT (AE)
7	7436-029-917	SR47-1714-3	CITY OF LONG BEACH	36 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
8	7436-029-923	SR47-1760	CITY OF LONG BEACH	823 SQ. M				PERMANENT DRAINAGE EASEMENT (PDE)
9								
10								
11								
12								
13								

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-109

LAST REVISION => 00-00-00 TIME PLOTTED => 11:29:44 DATE PLOTTED => 11 JUL 2007

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

7436-029-019
VOPAK TERMINAL LONG BEACH INC.

7436-029-923
CITY OF LONG BEACH

7436-029-914
CITY OF LONG BEACH

CHANNEL

BADGER BRIDGE (RAIL)

STATE EXISTING ROW (SEE NOTE 1)

REL SR47-1710-3

4.572M

SB SR47

NB SR47

MATCH LINE SEE DWG RW-109

MATCH LINE SEE DWG RW-111

DRIP LINE

PIER "S" BOUNDARY LINE

AE SR47-1702-7

TCE SR47-1702-8

HE SR47-1702-6

AE SR47-1710

TCE SR47-1710-1

HE SR47-1710-2

COMMODORE HEIM BRIDGE

STATE OF CALIFORNIA

CERRITOS

NOTE:

1. PRECISE LIMITS OF EXISTING CALTRANS ROW TO BE DETERMINED AT THE TIME OF FINAL DESIGN.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

LACFCD LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	EXCESS
1	7436-011-900	SR47-1710	LACFCD	843 SQ. M			
2	7436-011-900	SR47-1710-1	LACFCD	562 SQ. M			
3	7436-011-900	SR47-1710-2	LACFCD	3,395 SQ. M			
4	7436-011-900	SR47-1710-3	LACFCD	919 SQ. M			
5							
6							

ACQUISITION TYPE
- PERMANENT AERIAL EASEMENT (AE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- PERMANENT HIGHWAY EASEMENT (HE)
- RELINQUISHMENT BY CALTRANS (REL)

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-110

LAST REVISION 00-00-00
TIME PLOTTED =>
DATE PLOTTED => 11 JUL 2007

CU 07 | EA 23850K

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DESIGN OVERSIGHT

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DATE

REVISED BY

DATE REVISED

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

CHANNEL

7440-003-904
CITY OF LOS ANGELES

7436-011-904
CITY OF LONG BEACH

7440-003-273
CITY OF LONG BEACH

BADGER BRIDGE
(RAIL)

REL
SR47-1710-3

4.572M

7436-011-910
7436-011-210
CITY OF LOS ANGELES
CITY OF LONG BEACH

ACTA 1 & 2 TRACKS

MATCH LINE SEE DWG RW-110

SB SR47

NB SR47

200+12.318

201

400+12.352

401

MATCH LINE SEE DWG RW-112

AE SR47-1710
TCE SR47-1710-1
HE SR47-1710-2
COMMODORE HEIM BRIDGE

AE SR47-1711
TCE SR47-1711-1
HE SR47-1711-2

AE SR47-1712
TCE SR47-1712-1
HE SR47-1712-2

CERRITOS

STATE OF CALIFORNIA

7436-003-261
CITY OF LONG BEACH

CITY OF LOS ANGELES
CITY OF LONG BEACH

TARGET

RIP RAP

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT
- LACFCD LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	ACQUISITION TYPE	EXCESS
1	7436-003-261	SR47-1711	CITY OF LONG BEACH	626 SQ. M			PERMANENT AERIAL EASEMENT (AE)	
2	7436-003-261	SR47-1711-1	CITY OF LONG BEACH	423 SQ. M			TEMPORARY CONSTRUCTION EASEMENT (TCE)	
3	7436-003-261	SR47-1711-2	CITY OF LONG BEACH	2,370 SQ. M			PERMANENT HIGHWAY EASEMENT (HE)	
4	7440-003-261 7440-003-906	SR47-1712	CITY OF LONG BEACH	1,255 SQ. M			PERMANENT AERIAL EASEMENT (AE)	
5	7440-003-261 7440-003-906	SR47-1712-1	CITY OF LONG BEACH	1,177 SQ. M			TEMPORARY CONSTRUCTION EASEMENT (TCE)	
6	7440-003-261 7440-003-906	SR47-1712-2	CITY OF LONG BEACH	7,283 SQ. M			PERMANENT HIGHWAY EASEMENT (HE)	

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DATE PLOTTED => 11 JUL 2007
TIME PLOTTED => 00-00-00

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-111

DATE	REVISED BY	DATE REVISED

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

7440-003-273
CITY OF LONG BEACH

ACTA 1 & 2 TRACKS

7440-003-906
CITY OF LONG BEACH

OBLONG PILE (TYP)

MATCH LINE SEE DWG RW-111

MATCH LINE SEE DWG RW-113

202 203 204

302+02.612

303 304

402 403 404

SB SR47

NB SR47

502 503

AE SR47-1712

HE SR47-1712-2

TCE SR47-1712-1

AE SR47-1712-3

7440-003-261
CITY OF LONG BEACH

ASPH.

STORAGE AREA

PIER A

LEGEND:
- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7440-003-261 7440-003-906	SR47-1712	SEE DWG RW-004					PERMANENT AERIAL EASEMENT (AE)
2	7440-003-261 7440-003-906	SR47-1712-1	SEE DWG RW-004					TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7440-003-261 7440-003-906	SR47-1712-2	SEE DWG RW-004					PERMANENT HIGWAY EASEMENT (HE)
4	7440-003-261	SR47-1712-3	CITY OF LONG BEACH	522 SQ. M				PERMANENT AERIAL EASEMENT (AE)

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-112

LAST REVISION TIME PLOTTED => 12:52:49
00-00-00 DATE PLOTTED => 11 JUL 2007

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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DATE REVISED

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EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

Caltrans Metric

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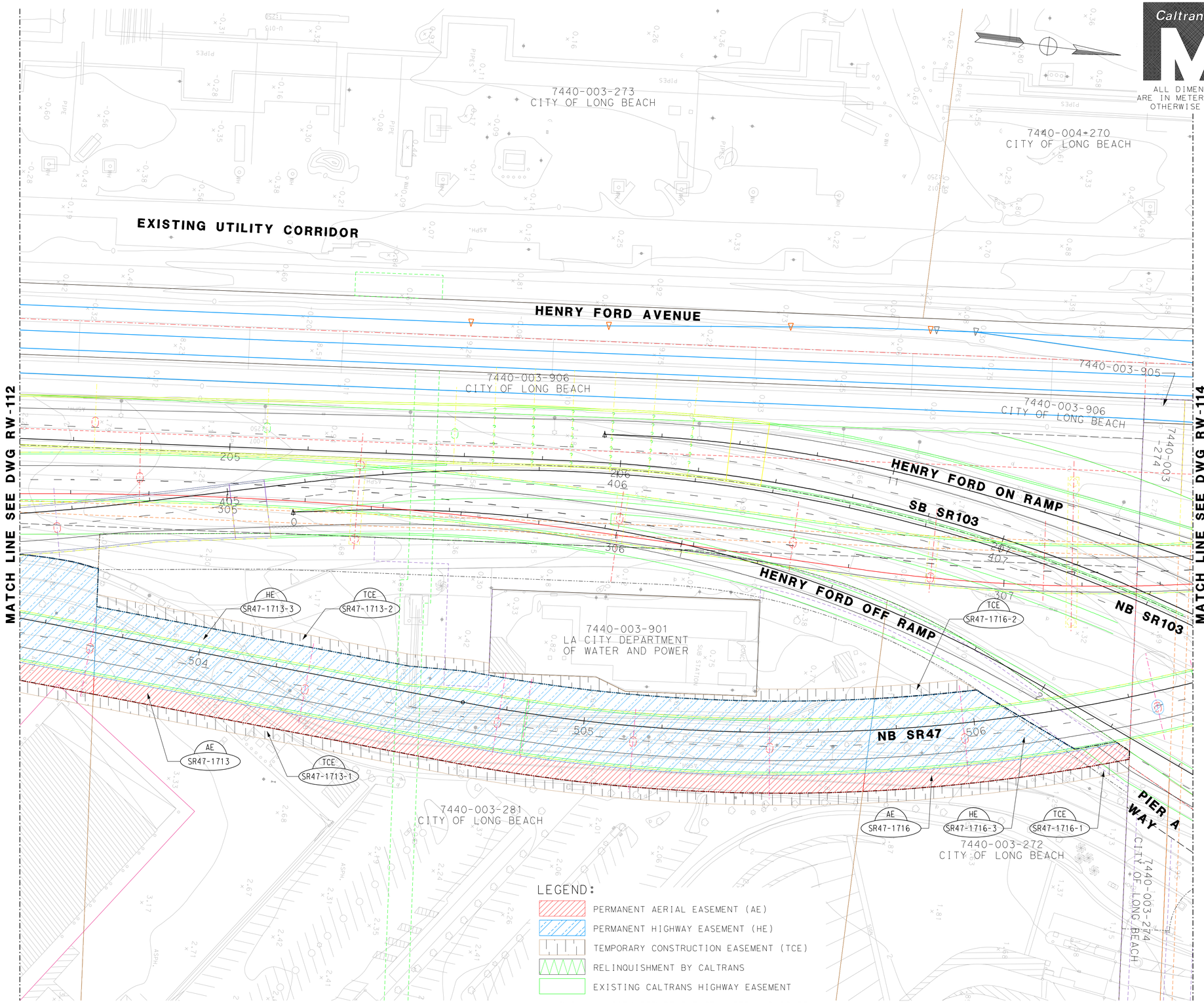
ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7440-003-281	SR47-1713	CITY OF LONG BEACH	909 SQ. M				PERMANENT AERIAL EASEMENT (AE)
2	7440-003-281	SR47-1713-1	CITY OF LONG BEACH	606 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7440-003-281	SR47-1713-2	CITY OF LONG BEACH	515 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7440-003-281	SR47-1713-3	CITY OF LONG BEACH	3,686 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
5	7440-003-272	SR47-1716	CITY OF LONG BEACH	309 SQ. M				PERMANENT AERIAL EASEMENT (AE)
6	7440-003-272	SR47-1716-1	CITY OF LONG BEACH	210 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
7	7440-003-272	SR47-1716-2	CITY OF LONG BEACH	72 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
8	7440-003-272	SR47-1716-3	CITY OF LONG BEACH	771 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
9								
10								
11								



SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-113

LAST REVISION 00-00-00 TIME PLOTTED => DATE PLOTTED => 12:34:1 11 JUL 2007

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

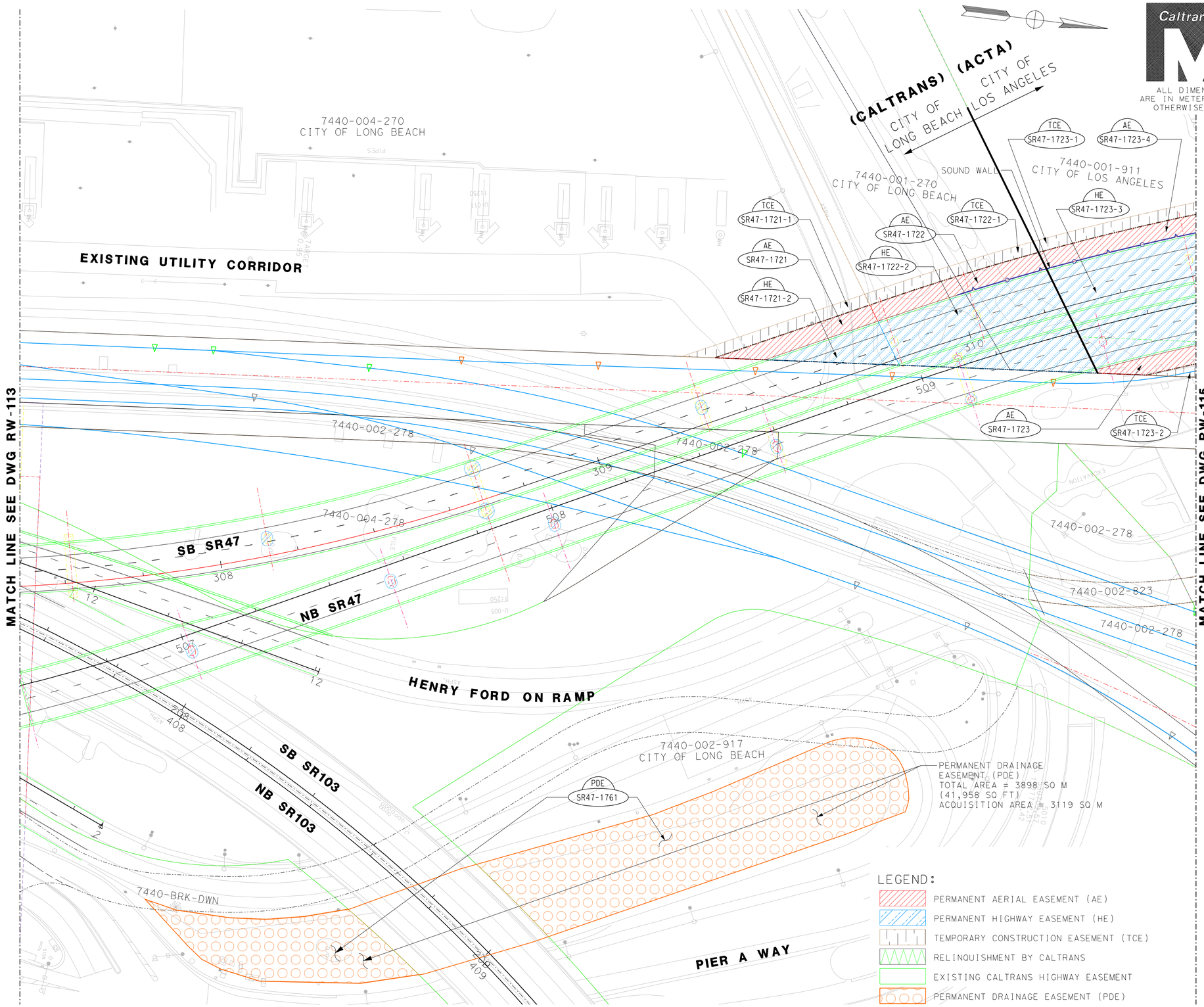
PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT
- PERMANENT DRAINAGE EASEMENT (PDE)

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7440-004-270	SR47-1721	CITY OF LONG BEACH	171 SQ. M				PERMANENT AERIAL EASEMENT (AE)
2	7440-004-270	SR47-1721-1	CITY OF LONG BEACH	142 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7440-004-270	SR47-1721-2	CITY OF LONG BEACH	203 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
4	7440-001-270	SR47-1722	CITY OF LONG BEACH	246 SQ. M				PERMANENT AERIAL EASEMENT (AE)
5	7440-001-270	SR47-1722-1	CITY OF LONG BEACH	137 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
6	7440-001-270	SR47-1722-2	CITY OF LONG BEACH	969 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
7	7440-001-911	SR47-1723	CITY OF LOS ANGELES	231 SQ. M				PERMANENT AERIAL EASEMENT (AE)
8	7440-001-911	SR47-1723-1	CITY OF LOS ANGELES	171 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
9	7440-001-911	SR47-1723-2	CITY OF LOS ANGELES	116 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
10	7440-001-911	SR47-1723-3	CITY OF LOS ANGELES	1,628 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
11	7440-001-911	SR47-1723-4	CITY OF LOS ANGELES	256 SQ. M				PERMANENT AERIAL EASEMENT (AE)
12	7440-002-917	SR47-1761	CITY OF LONG BEACH	3,119 SQ. M				PERMANENT DRAINAGE EASEMENT (PDE)

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-114

LAST REVISION => 00-00-00
TIME PLOTTED => 12:34:29
DATE PLOTTED => 11 JUL 2007

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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	DATE REVISED

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

Caltrans Metric

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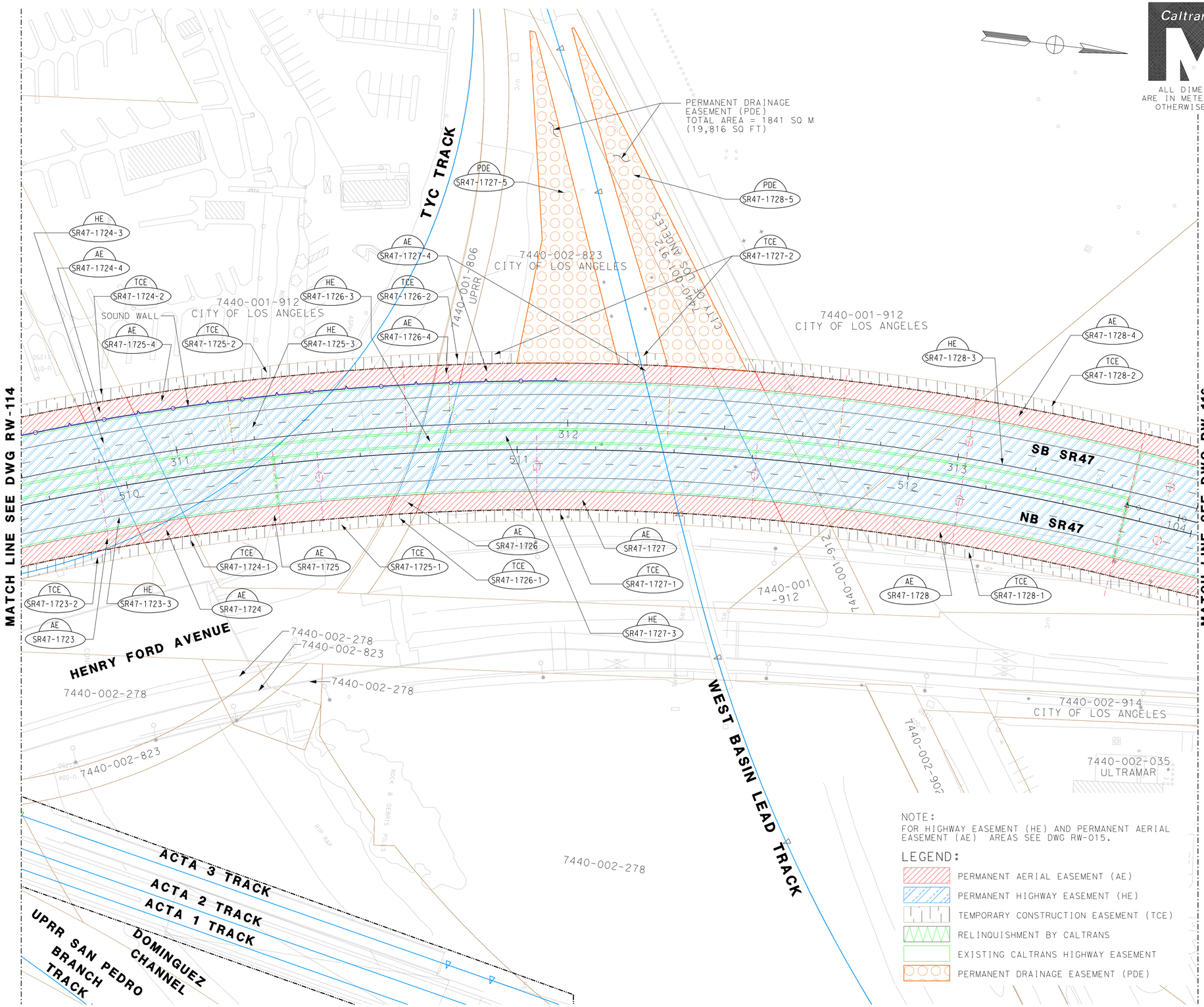
ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745



NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7440-001-XXX	SR47-1724	CITY OF LOS ANGELES	58 SQ. M				PERMANENT AERIAL EASEMENT (AE)
2	7440-001-XXX	SR47-1724-1	CITY OF LOS ANGELES	39 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7440-001-XXX	SR47-1724-2	CITY OF LOS ANGELES	39 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7440-001-912	SR47-1725	CITY OF LOS ANGELES	233 SQ. M				PERMANENT AERIAL EASEMENT (AE)
5	7440-001-912	SR47-1725-1	CITY OF LOS ANGELES	145 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
6	7440-001-912	SR47-1725-2	CITY OF LOS ANGELES	247 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
7	7440-001-806	SR47-1726	CITY OF LOS ANGELES	33 SQ. M				PERMANENT AERIAL EASEMENT (AE)
8	7440-001-806	SR47-1726-1	CITY OF LOS ANGELES	22 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
9	7440-001-806	SR47-1726-2	CITY OF LOS ANGELES	20 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
10	7440-002-823	SR47-1727	CITY OF LOS ANGELES	420 SQ. M				PERMANENT AERIAL EASEMENT (AE)
11	7440-002-823	SR47-1727-1	CITY OF LOS ANGELES	292 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
12	7440-002-823	SR47-1727-2	CITY OF LOS ANGELES	79 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
13	7440-001-912	SR47-1728	CITY OF LOS ANGELES	628 SQ. M				PERMANENT AERIAL EASEMENT (AE)
14	7440-001-912	SR47-1728-1	CITY OF LOS ANGELES	359 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
15	7440-001-912	SR47-1728-2	CITY OF LOS ANGELES	819 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
16	7440-001-823	SR47-1727-5	CITY OF LOS ANGELES	1,841 SQ. M				PERMANENT DRAINAGE EASEMENT (PDE)
17	7440-001-912	SR47-1728-5	CITY OF LOS ANGELES					PERMANENT DRAINAGE EASEMENT (PDE)

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-115

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EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

Caltrans Metric

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ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

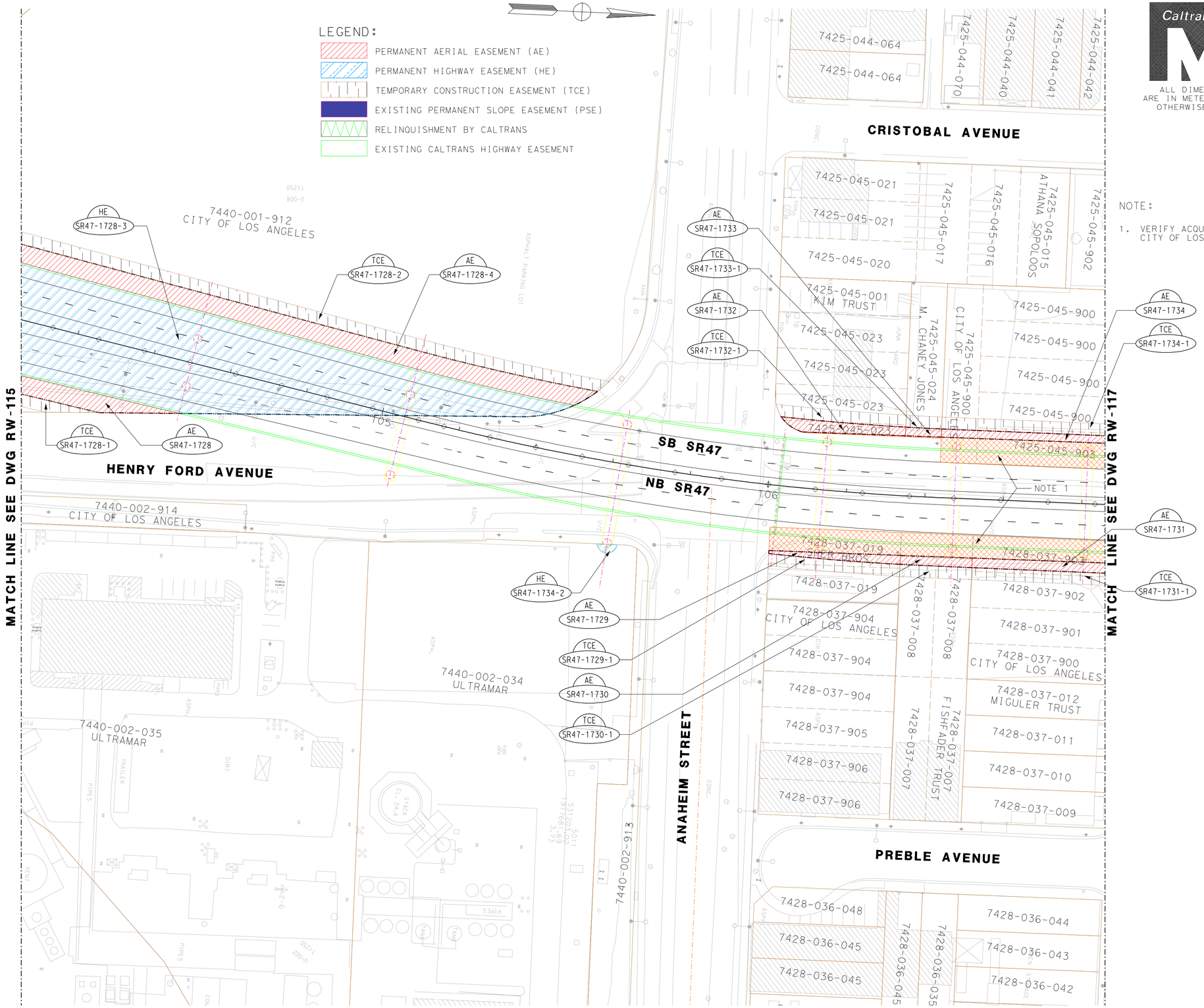
ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- EXISTING PERMANENT SLOPE EASEMENT (PSE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

NOTE:

1. VERIFY ACQUISITION BY CITY OF LOS ANGELES.



NO.	APN	PARCEL NO.	GRANTOR	AREAS TOTAL	AREAS REMAINDER	ACQUISITION TYPE	EXCESS
1	7428-037-019	SR47-1729	SHER BROTHERS	56 SQ. M		PERMANENT AERIAL EASEMENT (AE)	
2	7428-037-019	SR47-1729-1	SHER BROTHERS	102 SQ. M		TEMPORARY CONSTRUCTION EASEMENT (TCE)	
3	7428-037-008	SR47-1730	FISHFADER TRUST	44 SQ. M		PERMANENT AERIAL EASEMENT (AE)	
4	7428-037-008	SR47-1730-1	FISHFADER TRUST	56 SQ. M		TEMPORARY CONSTRUCTION EASEMENT (TCE)	
5	7428-037-903	SR47-1731	CITY OF LOS ANGELES	93 SQ. M		PERMANENT AERIAL EASEMENT (AE)	
6	7428-037-903	SR47-1731-1	CITY OF LOS ANGELES	112 SQ. M		TEMPORARY CONSTRUCTION EASEMENT (TCE)	
7	7428-045-023	SR47-1732	KIM TRUST	82 SQ. M		PERMANENT AERIAL EASEMENT (AE)	
8	7428-045-023	SR47-1732-1	KIM TRUST	99 SQ. M		TEMPORARY CONSTRUCTION EASEMENT (TCE)	
9	7425-045-024	SR47-1733	M. CHANEY JONES	20 SQ. M		PERMANENT AERIAL EASEMENT (AE)	
10	7425-045-024	SR47-1733-1	M. CHANEY JONES	28 SQ. M		TEMPORARY CONSTRUCTION EASEMENT (TCE)	
11	7425-045-903	SR47-1734	CITY OF LOS ANGELES	91 SQ. M		PERMANENT AERIAL EASEMENT (AE)	
12	7425-045-903	SR47-1734-1	CITY OF LOS ANGELES	140 SQ. M		TEMPORARY CONSTRUCTION EASEMENT (TCE)	
13	7490-002-908	SR47-1734-2	CITY OF LOS ANGELES	9 SQ. M		PERMANENT AERIAL EASEMENT (AE)	
14							

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-116

LAST REVISION => 12:34:08
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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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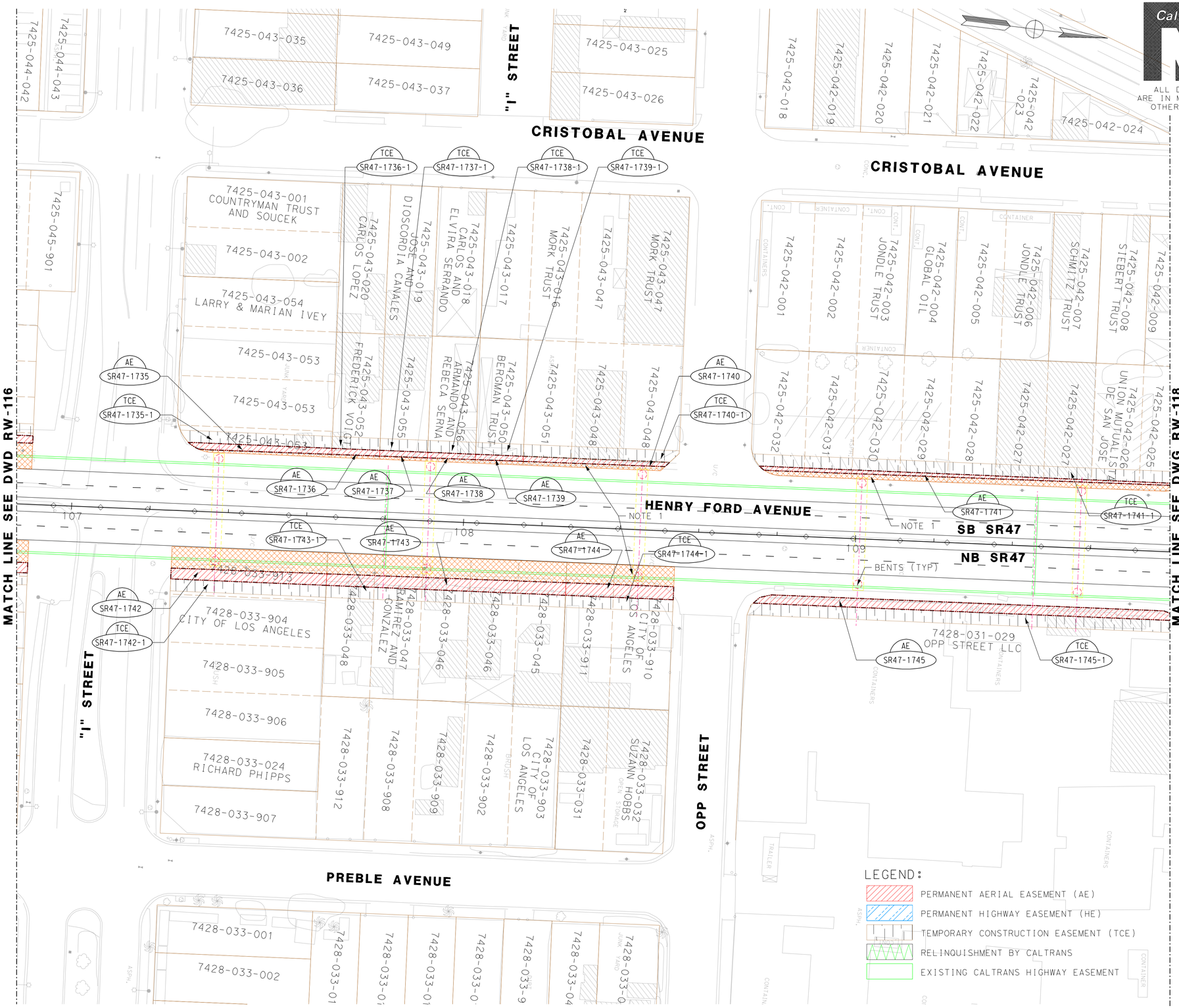
ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

NOTES:

1. VERIFY ACQUISITION BY CITY OF LOS ANGELES.
2. FOR PARCEL TABLE SEE DWG RW-015.



SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-117

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CU 07 EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

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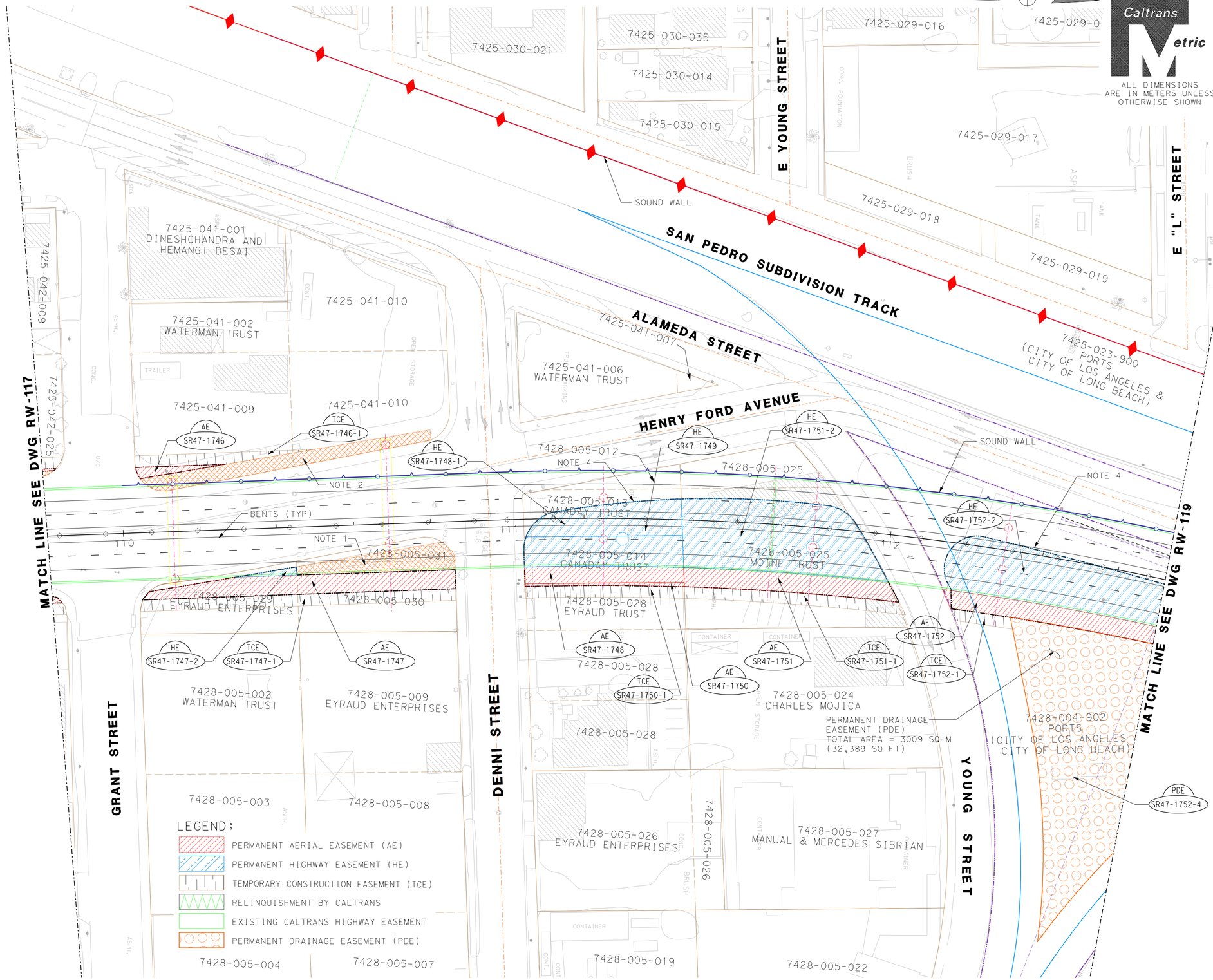
ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

NOTES:

1. PROPERTY ACQUIRED BY CITY OF LOS ANGELES, ALAMEDA STREET PHASE 3.
2. VERIFY ACQUISITION BY CITY OF LOS ANGELES.
3. FOR PARCEL TABLE SEE DWG RW-122.
4. EXISTING RIGHT-OF-WAY LIMITS PER PADP PROJECT UNIT 2 PHASE 2 DRAWINGS C-2 THROUGH C-4.



SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-118

LAST REVISION => 00-00-00
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DATE PLOTTED => 11 JUL 2007

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EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

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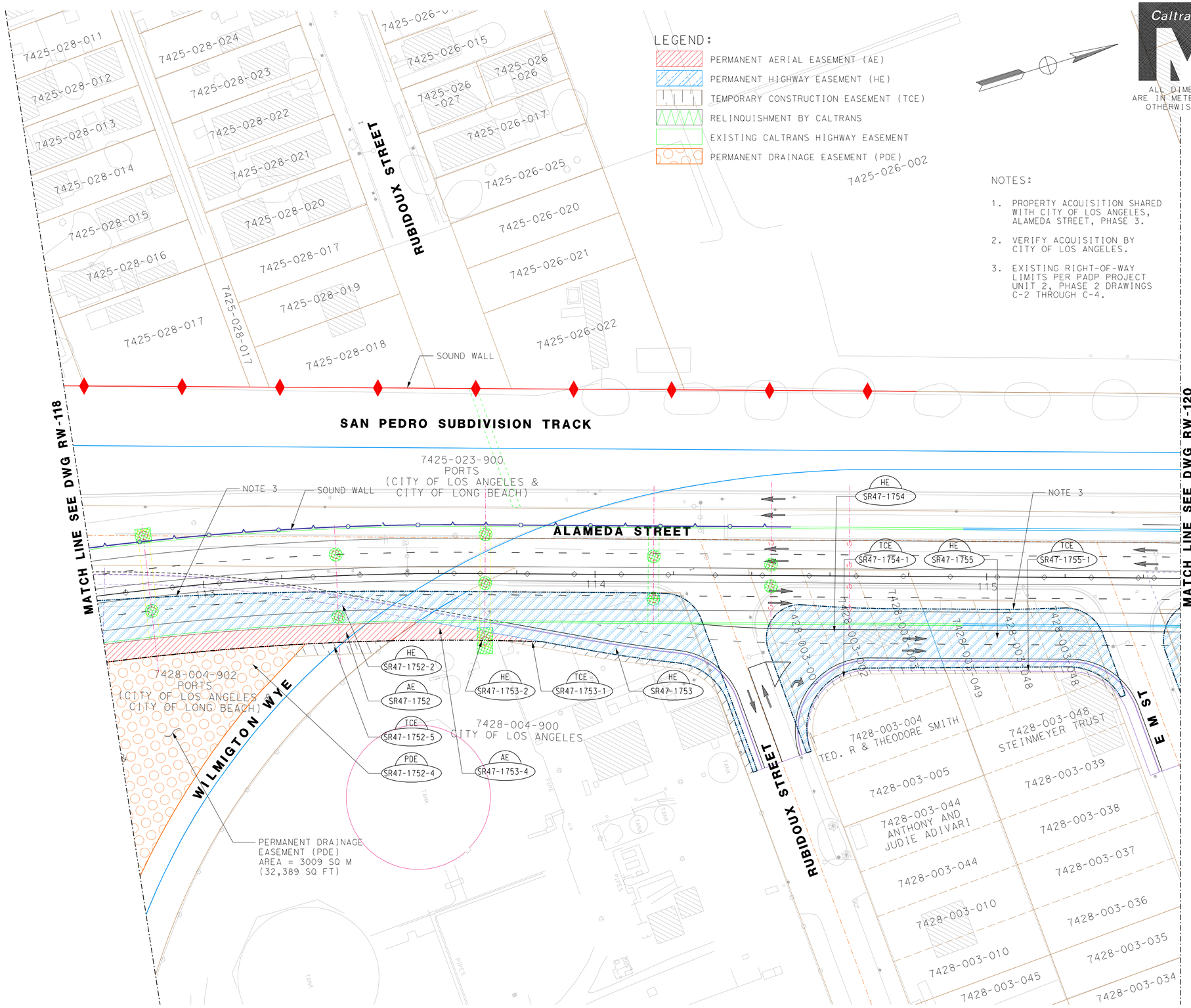
LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT
- PERMANENT DRAINAGE EASEMENT (PDE)

NOTES:

1. PROPERTY ACQUISITION SHARED WITH CITY OF LOS ANGELES, ALAMEDA STREET, PHASE 3.
2. VERIFY ACQUISITION BY CITY OF LOS ANGELES.
3. EXISTING RIGHT-OF-WAY LIMITS PER PADP PROJECT UNIT 2, PHASE 2 DRAWINGS C-2 THROUGH C-4.



NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7428-004-900	SR47-1752-3	NOT USED					TEMPORARY CONSTRUCTION EASEMENT (TCE)
2	7428-004-902	SR47-1752-5	CITY OF LOS ANGELES & CITY OF LONG BEACH	65 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
3	7428-004-900	SR47-1753	CITY OF LOS ANGELES	953 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7428-004-900	SR47-1753-1	CITY OF LOS ANGELES	114 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
5	7428-004-900	SR47-1753-2	CITY OF LOS ANGELES	27 SQ. M				
6	7428-004-900	SR47-1753-3	DELETED					
7	7428-004-900	SR47-1753-4	CITY OF LOS ANGELES			96 SQ. M		PERMANENT AERIAL EASEMENT (AE)
8	7428-003-001/003	SR47-1754	TED. R AND THEODRE SMITH			782 SQ. M		PERMANENT HIGHWAY EASEMENT (HE)
9	7428-003/001/003	SR47-1754-1	TED. R AND THEODRE SMITH			74 SQ. M		TEMPORARY CONSTRUCTION EASEMENT (TCE)
10	7428-003/001/003	SR47-1754-2	DELETED					
11	7428-003-048/049	SR47-1755	STEINMEYER TRUST			669 SQ. M		PERMANENT HIGHWAY EASEMENT (HE)
12	7428-003-048/049	SR47-1755-1	STEINMEYER TRUST			71 SQ. M		TEMPORARY CONSTRUCTION EASEMENT (TCE)
13	7428-003-048/049	SR47-1755-2	DELETED					

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

HORIZ SCALE 1:500

RW-119

LAST REVISION => 00-00-00 TIME PLOTTED => 17:00:26
DATE PLOTTED => 29 FEB 2008

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

NOTE:

1. EXISTING RIGHT-OF-WAY LIMITS PER PADP PROJECT UNIT 2, PHASE 2 DRAWINGS C-2 THROUGH C-4.

MATCH LINE SEE DWG RW-119

MATCH LINE SEE DWG RW-121

MAURETANIA ST

PACIFIC COAST HWY

COLON STREET

E "M" ST

ALAMEDA STREET

SAN PEDRO SUBDIVISION TRACK

WILMINGTON

NOTE 1

Bent 1

Bent 2

Structure approach slab Type N(9S)

MSE

AE SR47-1756

TCE SR47-1756-1

HE SR47-1757

TCE SR47-1757-1

HE SR47-1758

TCE SR47-1758-1

7315-019-004 FUEL ENGINEERING

7425-025-059
7425-025-061
7425-025-056
7425-026-001
7425-025-054
7425-025-058
7425-025-021
7425-025-020
7425-025-057
7425-025-055
7425-025-007
7425-025-008
7425-025-043
7425-025-046
7425-025-047
7425-025-048
7425-025-049
7425-025-050
7425-025-051
7426-033-011
7426-033-010
7426-033-028
7426-033-006
7426-033-005
7426-033-004
7426-033-002
7426-033-001
7426-033-003
7426-032-047
7426-032-048
7426-032-049
7426-032-050
7426-032-051
7426-032-052
7426-032-042
7426-031-024
7426-031-023
7426-031-022
7426-031-021
7426-031-041
7426-031-04
7425-023-900
7428-002-035
7428-002-036
7428-002-038
7428-002-037
7428-001-036
7428-002-004 FRANK DUPUY
7428-002-032
7428-002-005
7428-002-031 JOSE RIVERA
7428-002-006 EDDY MONTES
7428-002-030 WILMINGTON MANAGEMENT
7428-002-007 CLARK TRUST
7428-002-029
7428-002-008
7428-002-028
7428-002-009
7428-002-027
7428-002-010
7428-002-026
7428-001-036 WATERMAN TRUST
7428-001-037 RAY STOBER
7428-001-020
7428-001-019 ACTA (THIRKILL)
7428-001-034
7428-001-008
7428-001-009
7428-001-010
7428-001-016
7428-001-015

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS TOTAL	AREAS REMAINDER	AREAS EXCESS	ACQUISITION TYPE
1	7428-002-035/037	SR47-1756	FRANK DUPUY	1,494 SQ. M				PERMANENT AERIAL EASEMENT (AE)
2	7428-002-035/037	SR47-1756-1	FRANK DUPUY	135 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7428-002-035/037	SR47-1756-2	DELETED					
4	7428-001-036	SR47-1757	WATERMAN TRUST	1,231 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
5	7428-001-036	SR47-1757-1	WATERMAN TRUST	139 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
6	7315-019-004	SR47-1758	FUEL ENGINEERING	2,003 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
7	7315-019-004	SR47-1758-1	FUEL ENGINEERING	233 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-120

DATE	REVISED BY	DATE REVISED

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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LAST REVISION 00-00-00 TIME PLOTTED => 11:10:08
DATE PLOTTED => 29 FEB 2008

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

LEGEND:
- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

LITTLE ALAMEDA STREET

"O" STREET

SAN PEDRO SUBDIVISION TRACK

ALAMEDA STREET

COLON STREET

"O" STREET

EXISTING PERMANENT HIGHWAY EASEMENT

ACTA 1 & 2 TRACKS

MATCH LINE SEE DWG RW-120

7426-031-044
7426-031-012
7426-031-013
7426-031-037
7426-031-037
7426-031-016
7426-031-017
7426-030-007
7426-030-006
7426-030-005
7426-030-004
7426-030-003
7426-030-002
7426-030-001
7426-029-001
7426-028-901
7426-028-900
7315-019-002
7315-019-001
7315-019-001
7315-018-016
7315-018-015
7315-018-014
7315-018-013
7315-018-012
7315-018-011
7315-018-010
7315-018-009
7315-018-031
7315-018-031
7315-018-031
7315-017-004
7315-019-005
FUEL ENGINERING
7315-018-017
WATERMAN TRUST
7315-018-030
DEAN TARICO
7315-018-030
7315-018-030
7315-018-030
7315-018-030
7315-018-031
HARBOR INVESTMENT
7315-018-031
7315-018-031
7315-018-031
7315-018-031
7315-018-031
7315-018-031

HE SR47-1758
TCE SR47-1758-1
HE SR47-1759
TCE SR47-1759-1

POT 33H 51.650

S86°38'21"E 69.912

69.912

32.81

33

EC

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE: PERMANENT HIGHWAY EASEMENT (HE)	ACQUISITION TYPE: TEMPORARY CONSTRUCTION EASEMENT (TCE)
1	7315-018-011/016	SR47-1759	WATERMAN TRUST	776 SQ. M				
2	7315-018-011/016	SR47-1759-1	WATERMAN TRUST	127 SQ. M				

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-121

LAST REVISION => 00-00-00 TIME PLOTTED => 12:35:40
DATE PLOTTED => 17 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CU 07

EA 23850K

NOTES:

1. SEE DWG RW107 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3, KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

SAN PEDRO SUBDIVISION TRACKS

223RD STREET

S. ALAMEDA STREET

HE SR47-1760

TCE SR47-1760-1

TCE SR47-1761-1

HE SR47-1761

LA COUNTY FLUORDATION SUBSTATION (LESEE)

EXISTING FENCE

7315-010-002
MO TRUST

7315-010-009
HERTZ EQUIPMENT RENTAL CORP.

7315-010-800
SOUTHERN PACIFIC (UPRR)

)10-010
PROPERTIES

DOCK LOADING

ASPH CONC GNV SIGN GATE

DATE	REVISED BY	DATE REVISED

CALCULATED/ DESIGNED BY

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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVES 1 & 2 RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500 **RW106A**

LAST REVISION => 00-00-00 | TIME PLOTTED => 12:44:03 | DATE PLOTTED => 17 JUL 2007

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CU 07 | EA 23850K

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE
				REQUIRED	REMAINDER	TOTAL	EXCESS	
1	7315-010-002	SR47-1762*	MO TRUST	210 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
2	7315-010-009	SR47-1762-1*	MO TRUST	222 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7315-010-009	SR47-1763*	HERTZ EQUIPMENT RENTAL CORP.	306 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
4	7315-010-009	SR47-1763-1*	HERTZ EQUIPMENT RENTAL CORP.	372 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)

NOTES:

1. OCEAN BLVD FLYOVER DENOTED WITH * AND SCREENED SHOWN FOR INFORMATION ONLY. RW ACQUISITION TO BE MADE AT LATER DATE.

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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DATE | REVISED BY | DATE REVISED

SR-47 EXPRESSWAY

ALTERNATIVE 1 PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-121A

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CU 07 | EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE	DWG NO.
				REQUIRED	REMAINDER	TOTAL	EXCESS		
1	7436-029-914	SR47-1702-9 *	CITY OF LONG BEACH	519 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-108
2	7436-029-914	SR47-1702-10 *	CITY OF LONG BEACH	47 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
3	7436-029-914	SR47-1702-11 *	CITY OF LONG BEACH	1,155 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
4	7436-029-914	SR47-1702-12	CITY OF LONG BEACH	65 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
5	7436-029-914	SR47-1702-13 *	CITY OF LONG BEACH	404 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
6	7436-029-914	SR47-1702-14 *	CITY OF LONG BEACH	72 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
7	7436-029-914	SR47-1703-4	CITY OF LONG BEACH (RAIL)	26 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
8	7436-029-914	SR47-1703-5	CITY OF LONG BEACH (RAIL)	33 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
9	7436-029-914	SR47-1702-5	CITY OF LONG BEACH	44 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	RW-109
10	7436-029-914	SR47-1702-6	CITY OF LONG BEACH	5,015 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
11	7436-029-914	SR47-1702-7	CITY OF LONG BEACH	1,501 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
12	7436-029-914	SR47-1702-8	CITY OF LONG BEACH	1,001 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
13	7436-029-914	SR47-1702-15	CITY OF LONG BEACH	72 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
14	7436-029-917	SR47-1705	CITY OF LONG BEACH	1,271 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
15	7436-029-917	SR47-1705-1	CITY OF LONG BEACH	103 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
16	7436-029-917	SR47-1705-2	CITY OF LONG BEACH	160 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
17	7436-029-917	SR47-1705-3	CITY OF LONG BEACH	6 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
18	7436-029-917	SR47-1705-4	CITY OF LONG BEACH	153 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
19	7436-029-917	SR47-1705-5	CITY OF LONG BEACH	49 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
20	7436-029-923	SR47-1706	CITY OF LONG BEACH	90 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
21	7436-029-923	SR47-1706-1	CITY OF LONG BEACH	17 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
22	7436-029-923	SR47-1706-2	CITY OF LONG BEACH	34 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
23	7436-029-923	SR47-1706-3	CITY OF LONG BEACH	97 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
24	7436-029-923	SR47-1706-4	CITY OF LONG BEACH	83 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
25	7436-029-923	SR47-1706-5	CITY OF LONG BEACH	202 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
26	7436-029-923	SR47-1706-6	CITY OF LONG BEACH	44 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
27	7436-029-923	SR47-1706-7	CITY OF LONG BEACH	90 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
28	7436-029-019	SR47-1707	VOPAK TERMINAL LONG BEACH INC.	20 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
29	7436-029-019	SR47-1707-1	VOPAK TERMINAL LONG BEACH INC.	139 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
30	7436-029-917	SR47-1708	CITY OF LONG BEACH	2 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
31	7436-029-917	SR47-1708-1	CITY OF LONG BEACH	36 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
32	STREET	SR47-1709	CITY OF LONG BEACH	54 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
33	STREET	SR47-1709-1	CITY OF LONG BEACH	46 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
34	7440-001-XXX	SR47-1724-3	CITY OF LOS ANGELES	369 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW-115
35	7440-001-XXX	SR47-1724-4	CITY OF LOS ANGELES	58 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
36	7440-001-912	SR47-1725-3	CITY OF LOS ANGELES	1,902 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
37	7440-001-912	SR47-1725-4	CITY OF LOS ANGELES	354 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
38	7440-001-806	SR47-1726-3	CITY OF LOS ANGELES	196 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
39	7440-001-806	SR47-1726-4	CITY OF LOS ANGELES	30 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
40	7440-002-823	SR47-1727-3	CITY OF LOS ANGELES	2,211 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
41	7440-002-823	SR47-1727-4	CITY OF LOS ANGELES	76 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
42	7440-001-912	SR47-1728-3	CITY OF LOS ANGELES	6,080 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
43	7440-001-912	SR47-1728-4	CITY OF LOS ANGELES	1,196 SQ. M				PERMANENT AERIAL EASEMENT (AE)	

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE	DWG NO.
				REQUIRED	REMAINDER	TOTAL	EXCESS		
44	7425-043-053	SR47-1735	LARRY AND MARIAN IVEY	57 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-117
45	7425-043-053	SR47-1735-1	LARRY AND MARIAN IVEY	115 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
46	7425-043-052	SR47-1736	FREDERICK VOIGT	18 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
47	7425-043-052	SR47-1736-1	FREDERICK VOIGT	37 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
48	7425-043-055	SR47-1737	DIOSCORDIA CANALES	18 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
49	7425-043-055	SR47-1737-1	DIOSCORDIA CANALES	37 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
50	7425-043-056	SR47-1738	ARMAND AND REBECA SERNA	17 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
51	7425-043-056	SR47-1738-1	ARMAND AND REBECA SERNA	37 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
52	7425-043-050	SR47-1739	BERGMAN TRUST	17 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
53	7425-043-050	SR47-1739-1	BERGMAN TRUST	37 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
54	7425-043-048	SR47-1740	MORK TRUST	45 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
55	7425-043-048	SR47-1740-1	MORK TRUST	119 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
56	7425-042-025/032	SR47-1741	UNION MUTUTALISTA DE SAN JOSE	85 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
57	7425-042-025/032	SR47-1741-1	UNION MUTUTALISTA DE SAN JOSE	335 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
58	7428-033-913	SR47-1742	CITY OF LOS ANGELES	113 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
59	7428-033-913	SR47-1742-1	CITY OF LOS ANGELES	121 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
60	7428-033-045/048	SR47-1743	RAMIREZ AND GONZALEZ	187 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
61	7428-033-045/048	SR47-1743-1	RAMAREZ AND GONZALEZ	186 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
62	7428-033-910/911	SR47-1744	CITY OF LOS ANGELES	90 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
63	7428-033-910/911	SR47-1744-1	CITY OF LOS ANGELES	84 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
64	7428-031-029	SR47-1745	SWM NO ONE LLC (SOLD 10/04)	245 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
65	7428-031-029	SR47-1745-1	SWM NO ONE LLC (SOLD 10/04)	339 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
66	7425-041-009	SR47-1746	WATERMAN TRUST	35 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-118
67	7425-041-009	SR47-1746-1	WATERMAN TRUST	107 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
68	7428-005-029	SR47-1747	EYRAUD ENTERPRISES	370 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
69	7428-005-029	SR47-1747-1	EYRAUD ENTERPRISES	249 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
70	7428-005-029	SR47-1747-2	EYRAUD ENTERPRISES	18 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
71	7428-005-014	SR47-1748	CANADAY TRUST	310 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
72	7428-005-014	SR47-1748-1	CANADAY TRUST	324 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
73	7428-005-013	SR47-1749	CANADAY TRUST	176 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
74	7428-005-028	SR47-1750	EYRAUD TRUST	28 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
75	7428-005-028	SR47-1750-1	EYRAUD TRUST	126 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
76	7428-005-025	SR47-1751	MOINE TRUST	276 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
77	7428-005-025	SR47-1751-1	MOINE TRUST	173 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
78	7428-005-025	SR47-1751-2	MOINE TRUST	881 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
79	7428-004-902	SR47-1752	CITY OF LOS ANGELES & CITY OF LONG BEACH	601 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
80	7428-004-902	SR47-1752-1	CITY OF LOS ANGELES & CITY OF LONG BEACH	47 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
81	7428-004-902	SR47-1752-2	CITY OF LOS ANGELES & CITY OF LONG BEACH	1,544 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
82	7428-004-902	SR47-1752-4	CITY OF LOS ANGELES & CITY OF LONG BEACH	3,009 SQ. M				PERMANENT DRAINAGE EASEMENT (PDE)	

SR-47 EXPRESSWAY

ALTERNATIVE 1
PRELIMINARY LAYOUT

SHEET OF 18

HORIZ SCALE 1:500

RW-122

LAST REVISION => 00-00-00
TIME PLOTTED =>
DATE PLOTTED => 17-JUL-2007

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DATE
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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

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CU 07 | EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

NOTE: THIS AREA OF THE KEY MAP IS MOVE FROM THE ORIGINAL LOCATION

SR-47 EXPRESSWAY

OCEAN BOULVEARD/ SR47 FLYOVER ALTERNATIVE 2

RIGHT-OF-WAY EXHIBIT KEY MAP

HORIZ SCALE 1:2500

RW200

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

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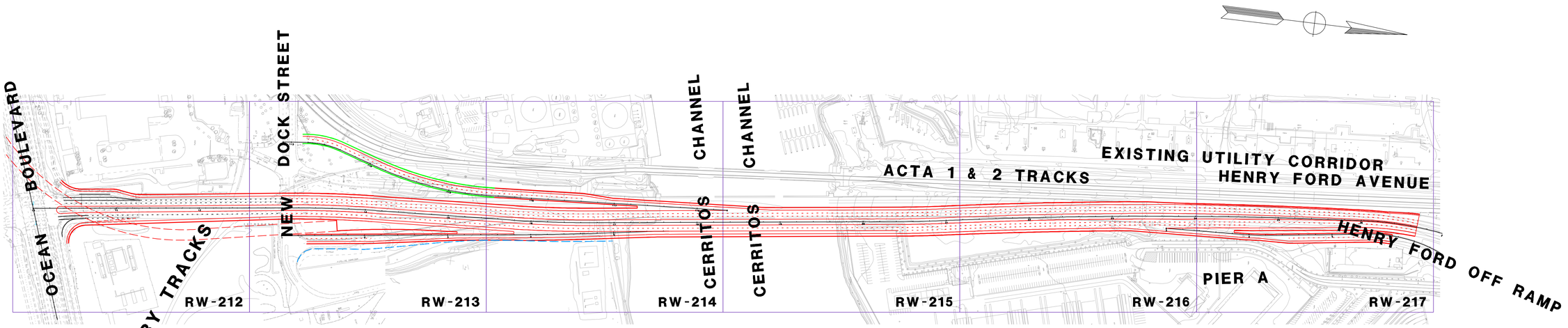
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745



ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
RIGHT-OF-WAY KEY MAP
SHEET 2 OF 2

SCALE 1:3000

RW201

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00-00-00 DATE PLOTTED => 11 JUL 2007

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

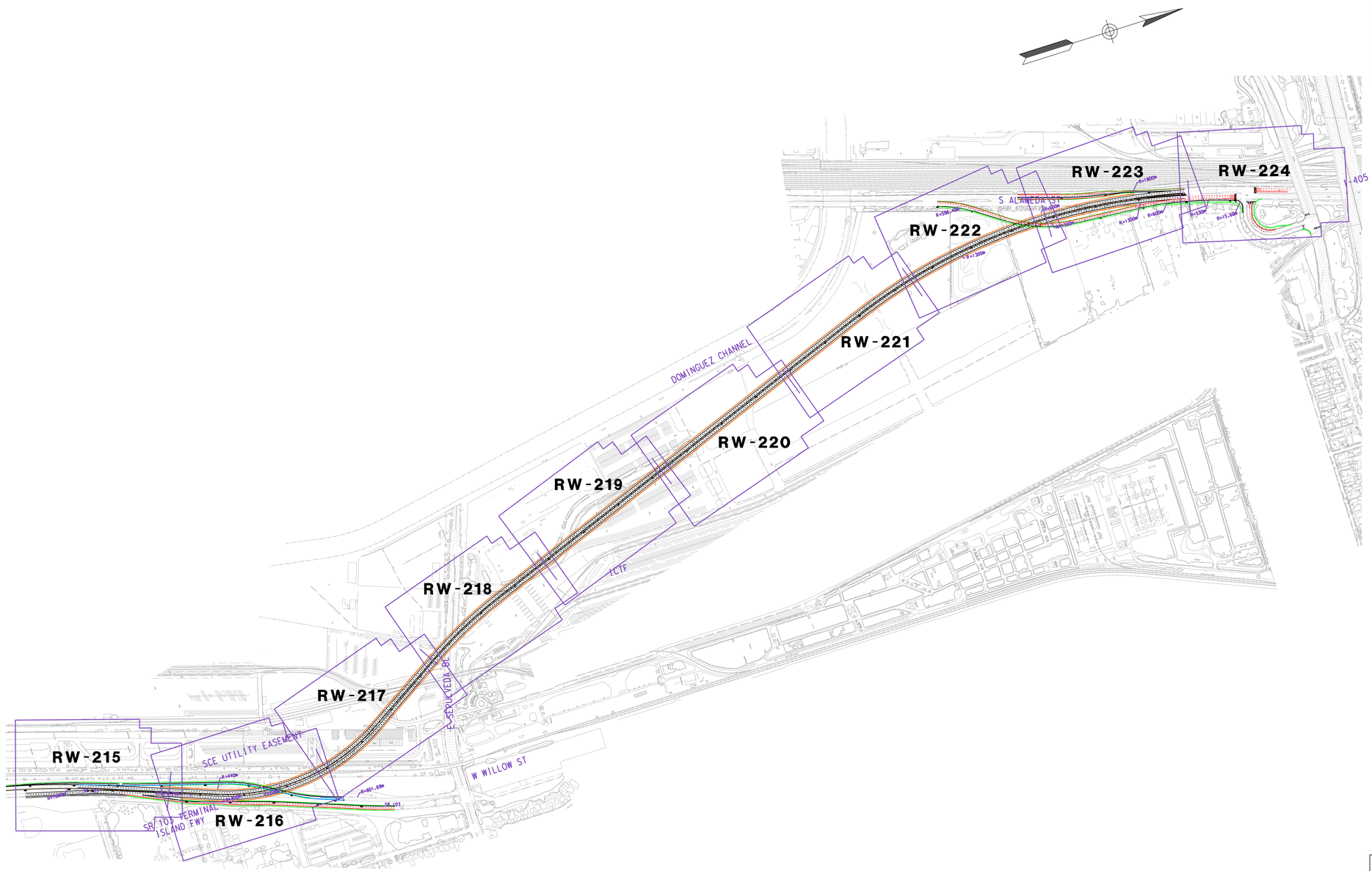
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745



DATE	REVISED BY
	DATE REVISED

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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
RIGHT-OF-WAY KEY MAP
SHEET 1 OF 2

SCALE 1:5000

RW202

LAST REVISION => 00-00-00
TIME PLOTTED => 12:58:21
DATE PLOTTED => 17 JUL 2007

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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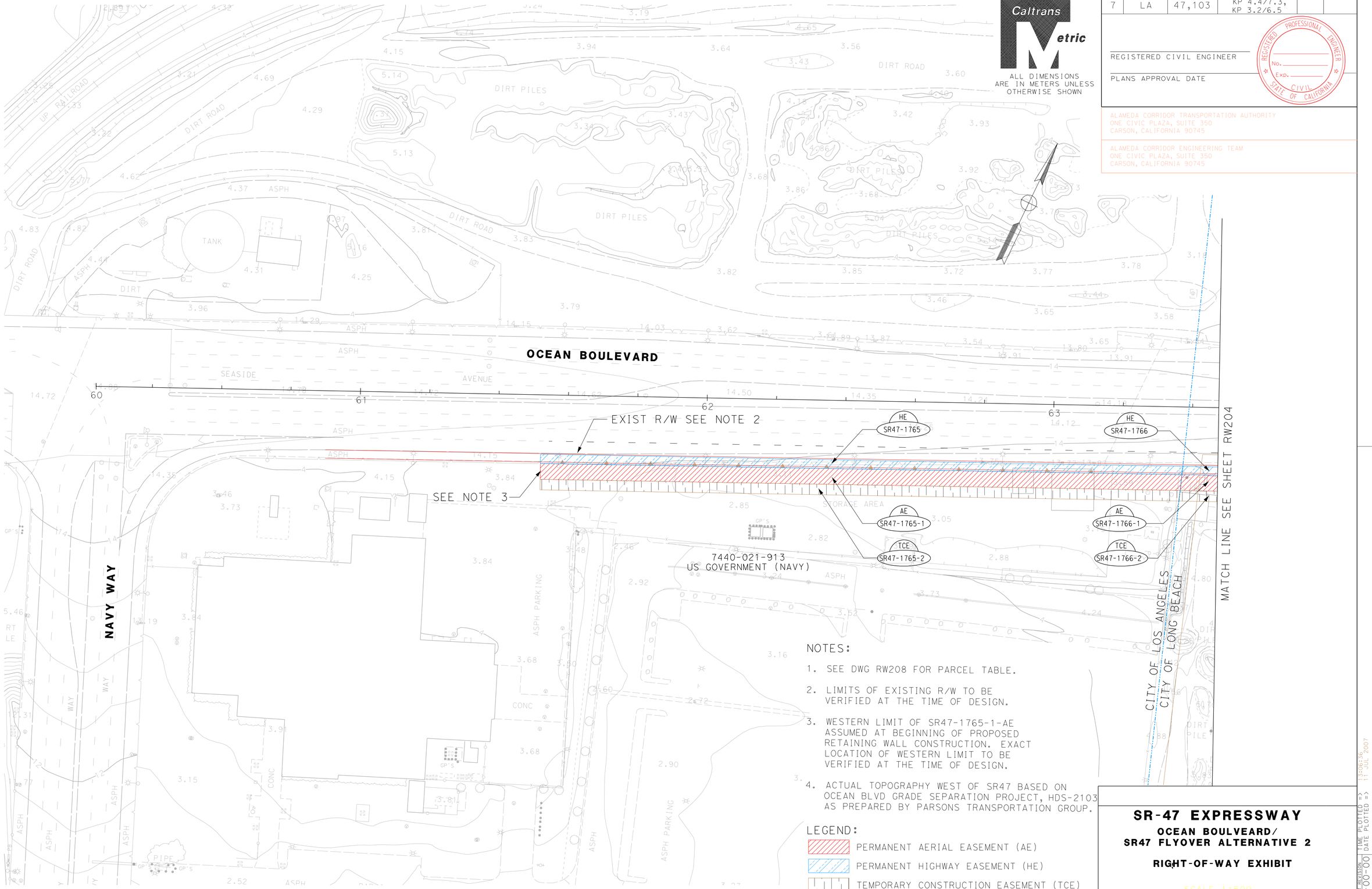

NOTES:

1. SEE DWG RW208 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. WESTERN LIMIT OF SR47-1765-1-AE ASSUMED AT BEGINNING OF PROPOSED RETAINING WALL CONSTRUCTION. EXACT LOCATION OF WESTERN LIMIT TO BE VERIFIED AT THE TIME OF DESIGN.
4. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103 AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULVEARD/ SR47 FLYOVER ALTERNATIVE 2

RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW203

LAST REVISION => 00-00-00
TIME PLOTTED => 15:06:36
DATE PLOTTED => 11-JUL-2007

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DATE	REVISED BY	DATE REVISED
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CITY OF LOS ANGELES
CITY OF LONG BEACH

OCEAN BOULEVARD
BLVD

EXIST R/W SEE NOTE 2

EXIST R/W SEE NOTE 4

EXIST R/W

64 65 66

101 102 103

MATCH LINE SEE SHEET RW203

MATCH LINE SEE SHEET RW205

AE SR47-1766-1

HE SR47-1766

TCE SR47-1766-2

AE SR47-1766-3

"L1" LINE

7436-032-907
CITY OF LONG BEACH

DIRT ROAD

DIRT PILE

CONC DITCH

ASPH

ASPH PARKING

CONC

OCEAN

GP's

NOTES:

1. SEE DWG RW208 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS 2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULVEARD/ SR47 FLYOVER ALTERNATIVE 2

RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW204

LAST REVISION => 00-00-00
TIME PLOTTED =>
DATE PLOTTED => 11-JUL-2007

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CITY OF LOS ANGELES
CITY OF LONG BEACH

OCEAN BOULEVARD

MATCH LINE SEE SHEET RW204

MATCH LINE SEE SHEET RW206

EXIST R/W
SEE NOTE 4

DIRT ROAD "L1" LINE

7436-032-907
CITY OF LONG BEACH

7436-032-904
US GOVERNMENT (NAVY)

TCE SR47-1766-4

AE SR47-1766-3

HE SR47-1766

AE SR47-1766-1

TCE SR47-1766-2

TCE SR47-1767-4

AE SR47-1767-3

HE SR47-1767

AE SR47-1767-1

TCE SR47-1767-2

ASPH

ASPH PARKING

DIRT ROAD

DIRT PILES

ROCKS

CONC DITCH

GP'S

PB

OCEAN

HV-9

NOTES:

1. SEE DWG RW208 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103 AS PER PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULVEARD/ SR47 FLYOVER ALTERNATIVE 2

RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW205

LAST REVISION => 00-00-00 TIME PLOTTED => 13:07:16 DATE PLOTTED => 11 JUL 2007

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

Caltrans Metric

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ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

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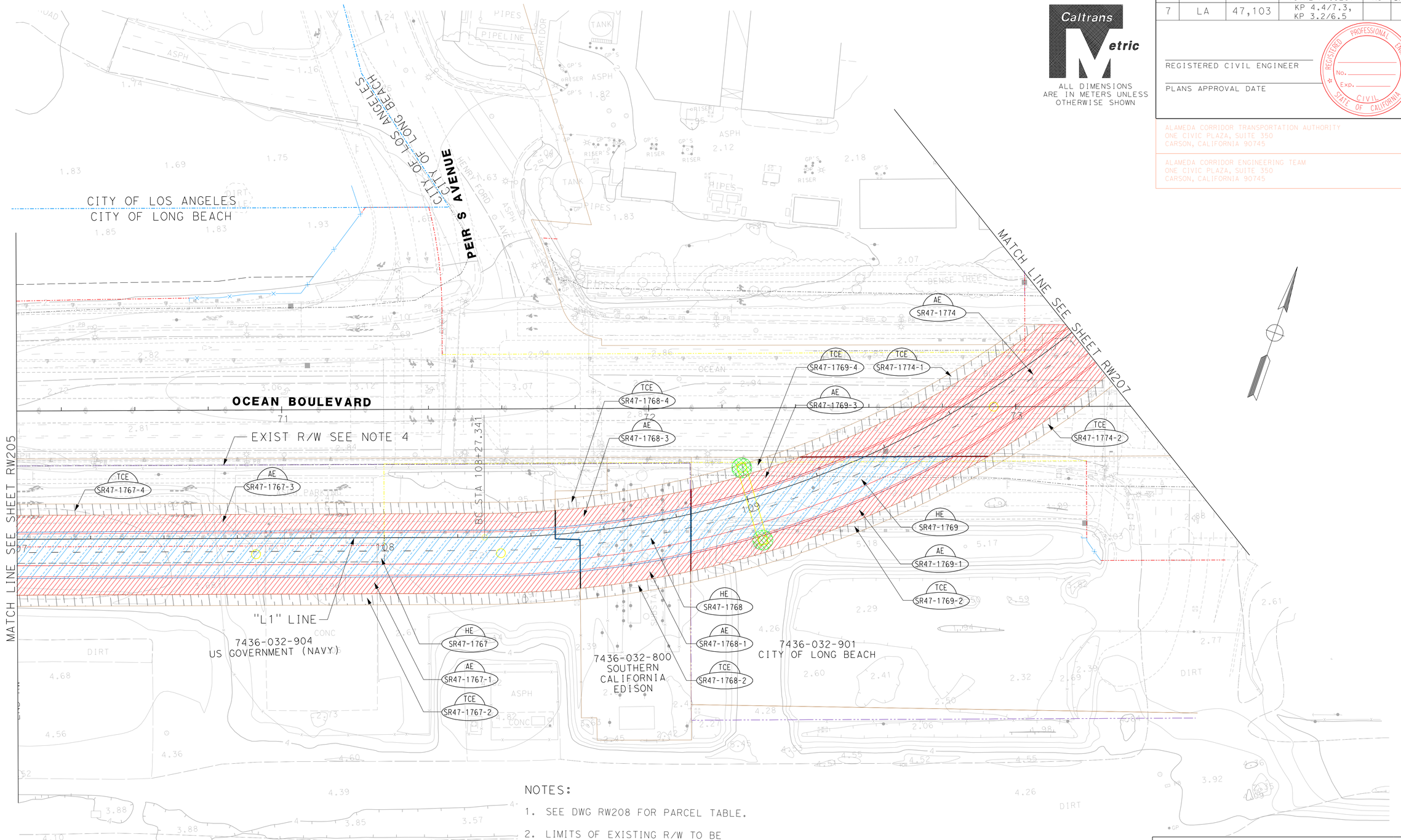
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans



NOTES:

1. SEE DWG RW208 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULVEARD/ SR47 FLYOVER ALTERNATIVE 2

RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW206

LAST REVISION => TIME PLOTTED =>
00-00-00 DATE PLOTTED => 11-JUL-2007

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

NOTES:

1. SEE DWG RW208 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

MATCH LINE SEE SHEET RW206

JOIN FUTURE OCEAN BLVD

EXIST STATE R/W SEE NOTE 4

"A1" LINE

TCE SR47-1774-2

AE SR47-1774

OCEAN BOULEVARD (FUTURE INTERSECTION)

SB SR47

NB SR47

EXIST STATE R/W SEE NOTE 4

FUTURE FLYOVER CONNECTOR

JOIN FUTURE OCEAN BLVD

7436-029-914
CITY OF LONG BEACH

TCE SR47-1702-1

HE SR47-1702-11

AE SR47-1702-9

LIMIT OF SR47-1701-AE AND SR47-1702-AE FOR ALTERNATIVE 1

7436-029-906
CITY OF LONG BEACH

7436-029-915
CITY OF LONG BEACH

7436-029-923

PIER "T" EAST LEAD TRACK

0+00

1+00

AE SR47-1703-2

HE SR47-1702-10

TCE SR47-1703-3

HE SR47-1702-14

AE SR47-1702-13

TCE SR47-1702-3

PIER "S" FUTURE IMPROVEMENTS

NEW DOCK STREET (FUTURE ALIGNMENT)

NEW DOCK STREET OFF RAMP

R=100

"B1" LINE

WYE TRACK 2+00

R=1375

R=5

"C1" LINE

NEW DOCK STREET

NEW DOCK STREET ON RAMP

R=18

PIER "S"

FOR CONTINUATION SEE ALTERNATIVES 1 & 2 DRAWINGS

SR-47 EXPRESSWAY

OCEAN BOULVEARD/ SR47 FLYOVER ALTERNATIVE 2

RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW207

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USERNAME => sheth

CU 07

EA 23850K

LAST REVISION => 00-00-00 TIME PLOTTED => DATE PLOTTED => 11-JUL-2007 15:08:39

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE	DWG NO.
				REQUIRED	REMAINDER	TOTAL	EXCESS		
1	7440-021-913	SR47-1765	US GOVERNMENT (NAVY)	468 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW203
2	7440-021-913	SR47-1765-1	US GOVERNMENT (NAVY)	845 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
3	7440-021-913	SR47-1765-2	US GOVERNMENT (NAVY)	562 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
4	7436-032-907	SR47-1766	CITY OF LONG BEACH	6,393 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
5	7436-032-907	SR47-1766-1	CITY OF LONG BEACH	2,951 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
6	7436-032-907	SR47-1766-2	CITY OF LONG BEACH	1,967 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
7	7436-032-907	SR47-1766-3	CITY OF LONG BEACH	1,360 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW204
8	7436-032-907	SR47-1766-4	CITY OF LONG BEACH	406 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	RW205
9	7436-032-904	SR47-1767	US GOVERNMENT (NAVY)	2,450 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
10	7436-032-904	SR47-1767-1	US GOVERNMENT (NAVY)	897 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
11	7436-032-904	SR47-1767-2	US GOVERNMENT (NAVY)	598 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
12	7436-032-904	SR47-1767-3	US GOVERNMENT (NAVY)	868 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
13	7436-032-904	SR47-1767-4	US GOVERNMENT (NAVY)	598 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
14	7436-032-800	SR47-1768	SOUTHERN CALIFORNIA EDISON	409 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW206
15	7436-032-800	SR47-1768-1	SOUTHERN CALIFORNIA EDISON	139 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
16	7436-032-800	SR47-1768-2	SOUTHERN CALIFORNIA EDISON	93 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
17	7436-032-800	SR47-1768-3	SOUTHERN CALIFORNIA EDISON	171 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
18	7436-032-800	SR47-1768-4	SOUTHERN CALIFORNIA EDISON	114 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
19	7436-032-901	SR47-1769	CITY OF LONG BEACH	768 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
20	7436-032-901	SR47-1769-1	CITY OF LONG BEACH	374 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
21	7436-032-901	SR47-1769-2	CITY OF LONG BEACH	276 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
22	7436-032-901	SR47-1769-3	CITY OF LONG BEACH	173 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
23	7436-032-901	SR47-1769-4	CITY OF LONG BEACH	79 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
24	STREET	SR47-1774	CITY OF LONG BEACH	1,459 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
25	STREET	SR47-1774-1	CITY OF LONG BEACH	236 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
26	STREET	SR47-1774-2	CITY OF LONG BEACH	185 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
27	7436-029-914	SR47-1702-1	CITY OF LONG BEACH	385 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	RW207
28	7436-029-906	SR47-1702-3	CITY OF LONG BEACH	291 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
29	7436-029-914	SR47-1702-9	CITY OF LONG BEACH	519 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
30	7436-029-914	SR47-1702-10	CITY OF LONG BEACH	47 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
31	7436-029-914	SR47-1702-11	CITY OF LONG BEACH	1,155 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
32	7436-029-914	SR47-1702-13	CITY OF LONG BEACH	404 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
33	7436-029-914	SR47-1702-14	CITY OF LONG BEACH	72 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
34	7436-029-914	SR47-1703-2	CITY OF LONG BEACH	150 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
35	7436-029-914	SR47-1703-3	CITY OF LONG BEACH	23 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
36	7315-010-002	SR47-1760	MO TRUST	210 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
37	7315-010-009	SR47-1760-1	MO TRUST	222 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
38	7315-010-009	SR47-1761	HERTZ EQUIPMENT RENTAL CORP.	306 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
39	7315-010-009	SR47-1761-1	HERTZ EQUIPMENT RENTAL CORP.	372 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
40	7315-010-009	SR47-1815 **	HERTZ EQUIPMENT RENTAL CORP.	903 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW207A
41	7315-010-009	SR47-1815-1 **	HERTZ EQUIPMENT RENTAL CORP.	376 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
42	7315-010-800	SR47-1829 *	SOUTHERN PACIFIC (UPRR)	78 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	

* ALTERNATIVE 2 FLYOVER ONLY

** INCLUDED AS PART OF ALTERNATIVE 2 COST ESTIMATE

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CALCULATED/ DESIGNED BY

CHECKED BY

DATE

REVISED BY

DATE REVISED

SR-47 EXPRESSWAY

OCEAN BOULVEARD/ SR47 FLYOVER ALTERNATIVE 2

RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW208

LAST REVISION => TIME PLOTTED => 13:09:31
00-00-00 DATE PLOTTED => 11 JUL 2007

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

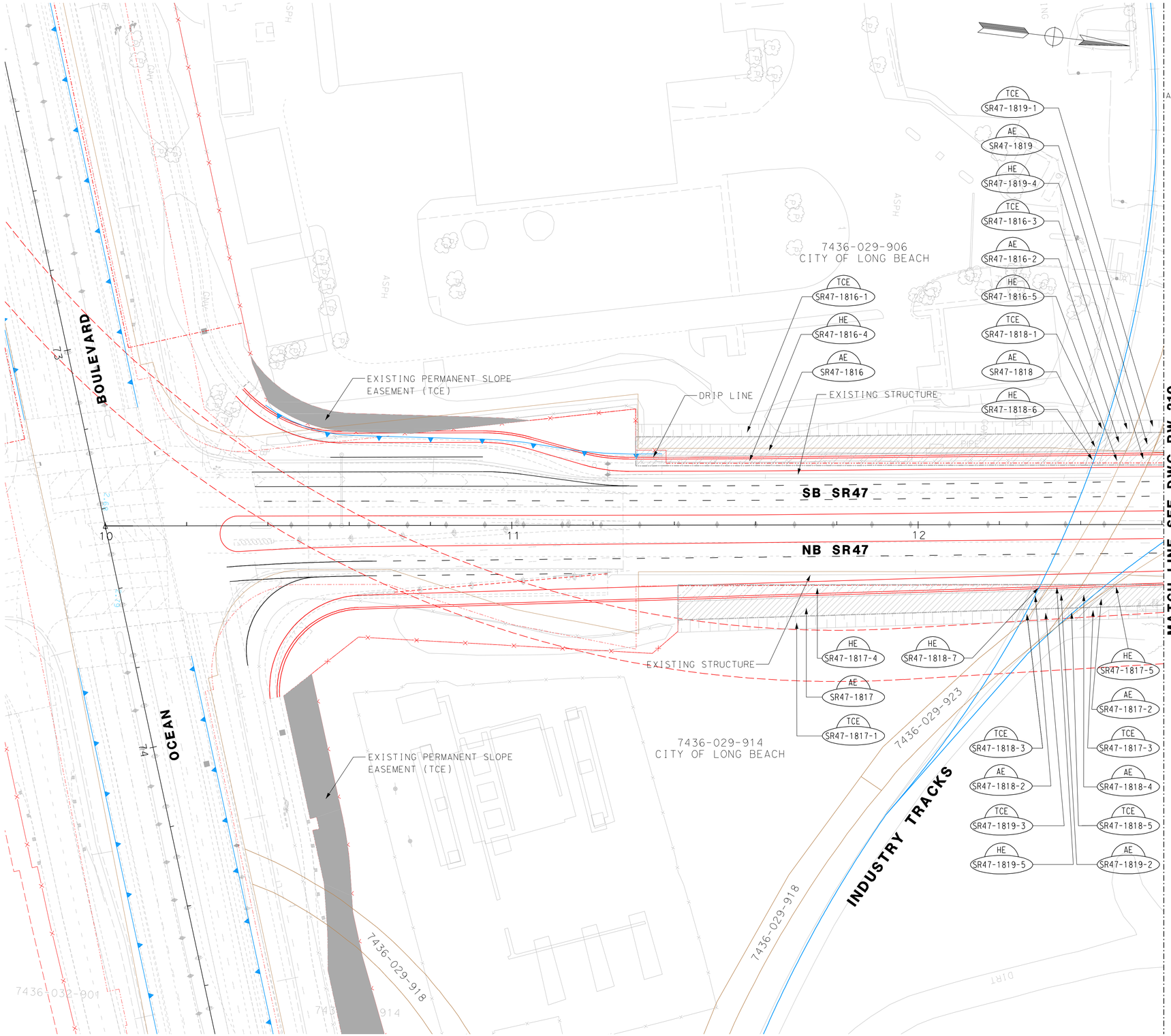
REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS

NOTES:

1. HIGHWAY EASEMENT LIMITS FROM DRIP LINE TO DRIP LINE.
2. AERIAL EASEMENT LIMITS EXTEND FROM DRIP LINE PLUS 4.57M (15 FEET) TO DRIP LINE.
3. FOR PARCEL TABLE SEE DWG RW-225.

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-209

DATE	REVISED BY	DATE REVISED

CALCULATED/DESIGNED BY

CHECKED BY

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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DATE PLOTTED => 11-JUL-2007

CU 07 | EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

PERMANENT DRAINAGE EASEMENT (PDE)
AREA = 2421 SQ M
(26,059 SQ FT)
ADDITIONAL ACQUISITION
AREA = 2289 SQ M
(24,639 SQ FT)

NEW DOCK STREET OFF RAMP

NEW DOCK STREET ON RAMP

SB SR47

NB SR47

EXISTING STRUCTURE

DRIP LINE

EXISTING STATE ROW

7436-029-019
VOPAK TERMINAL LONG BEACH INC.

7436-029-917
CITY OF LONG BEACH

7436-029-923
CITY OF LONG BEACH

7436-029-906
CITY OF LONG BEACH

7436-029-914
CITY OF LONG BEACH

PIPELINE CORRIDOR

RIPRAP

ASPH

HE SR47-1820 · TCE SR47-1821-4 · AE SR47-1821-1 · HE SR47-1821 · AE SR47-1822 · HE SR47-1822-1 · TCE SR47-1822-2 · AE SR47-1823 · HE SR47-1823-1 · TCE SR47-1823-2 · TCE SR47-1820-3 · AE SR47-1818-16 · TCE SR47-1818-9 · AE SR47-1821-3 · HE SR47-1818-15 · HE SR47-1820-2 · HE SR47-1821-2 · TCE SR47-1821-5 · AE SR47-1706-1 · TCE SR47-1706-3 · AE SR47-1709 · TCE SR47-1709-1 · HE SR47-1818-11 · TCE SR47-1818-8 · AE SR47-1818-14 · TCE SR47-1816-8 · PDE SR47-1824-4 · AE SR47-1816-7 · AE SR47-1824 · HE SR47-1816-6 · TCE SR47-1703-14 · TCE SR47-1824-2 · REL SR47-1824-3 · AE SR47-1820-1 · HE SR47-1824-1 · REL SR47-1817-15 · AE SR47-1825-2 · HE SR47-1825 · AE SR47-1825-1 · AE SR47-1817-2 · TCE SR47-1817-3 · AE SR47-1703-13 · HE SR47-1703-11 · TCE SR47-1817-14 · REL SR47-1817-16 · HE SR47-1817-11 · TCE SR47-1817-12 · HE SR47-1817-6 · TCE SR47-1817-8 · AE SR47-1817-7 · HE SR47-1817-9 · AE SR47-1817-13 · HE SR47-1817-10

MATCH LINE SEE DWG RW-209

MATCH LINE SEE DWG RW-211

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- PERMANENT DRAINAGE EASEMENT (PDE)

NOTES:

1. HIGHWAY EASEMENT LIMITS FROM DRIP LINE TO DRIP LINE.
2. AERIAL EASEMENT LIMITS EXTEND FROM DRIP LINE PLUS 4.57M (15 FEET) TO DRIP LINE.
3. FOR PARCEL TABLE SEE DWG RW-225.

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-210

LAST REVISION — TIME PLOTTED => 12:50:12
00-00-00 — DATE PLOTTED => 11 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DATE | REVISED BY | DATE REVISED

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CHECKED BY

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

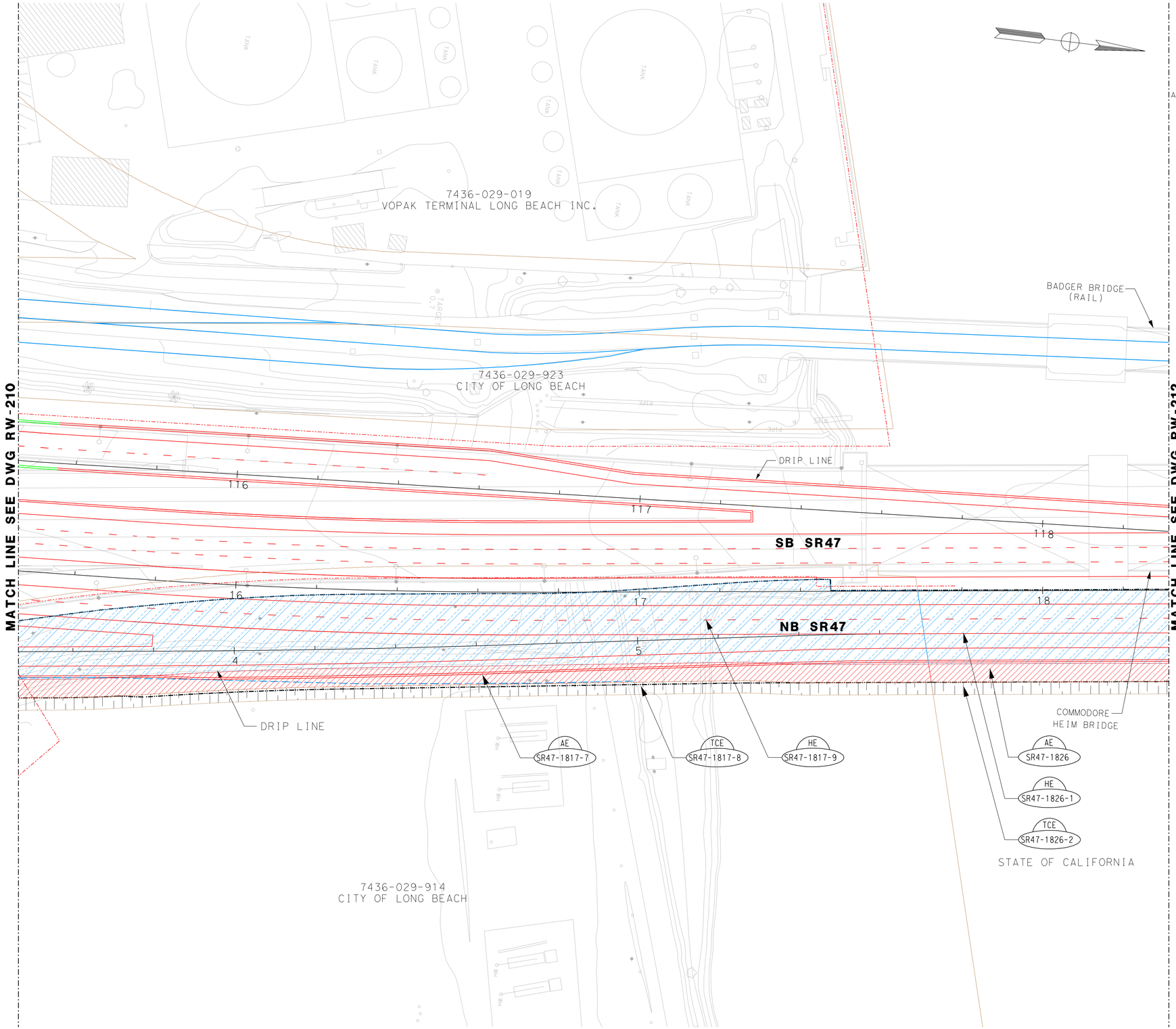
PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS

NOTES:

1. HIGHWAY EASEMENT LIMITS FROM DRIP LINE TO DRIP LINE.
2. AERIAL EASEMENT LIMITS EXTEND FROM DRIP LINE PLUS 4.57M (15 FEET) TO DRIP LINE.
3. FOR PARCEL TABLE SEE DWG RW-225.

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-211

LAST REVISION 00-00-00 | TIME PLOTTED => 12:59:30
DATE PLOTTED => 11 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

DATE	REVISED BY	DATE REVISED
	CALCULATED/ DESIGNED BY	
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CU 07 | EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

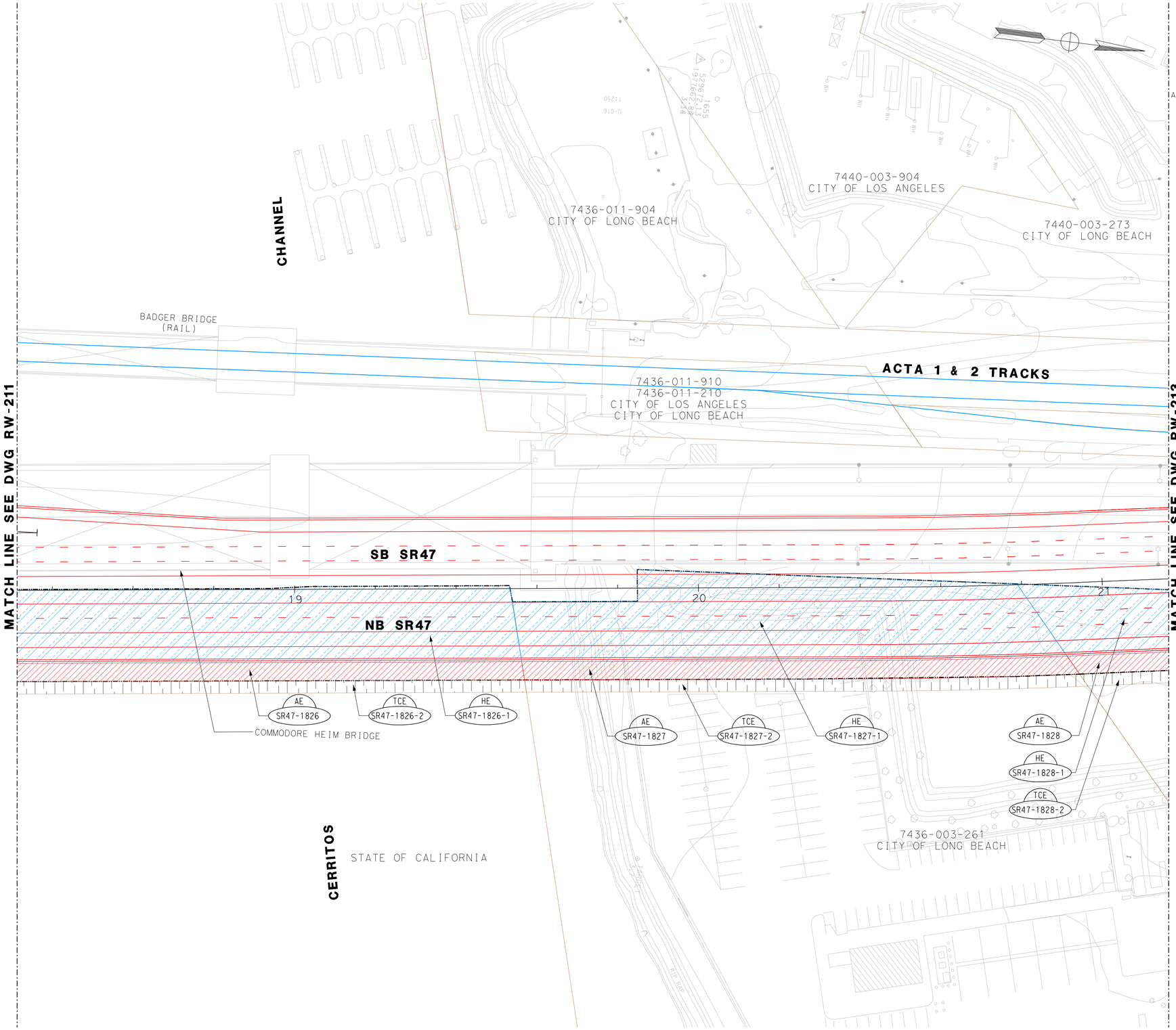
REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS

NOTES:

1. HIGHWAY EASEMENT LIMITS FROM DRIP LINE TO DRIP LINE.
2. AERIAL EASEMENT LIMITS EXTEND FROM DRIP LINE PLUS 4.57M (15 FEET) TO DRIP LINE.
3. FOR PARCEL TABLE SEE DWG RW-225.

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-212

LAST REVISION TIME PLOTTED => 12:59:56
00-00-00 DATE PLOTTED => 11-JUL-2007

DATE	REVISED BY
	DATE REVISED

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CHECKED BY

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

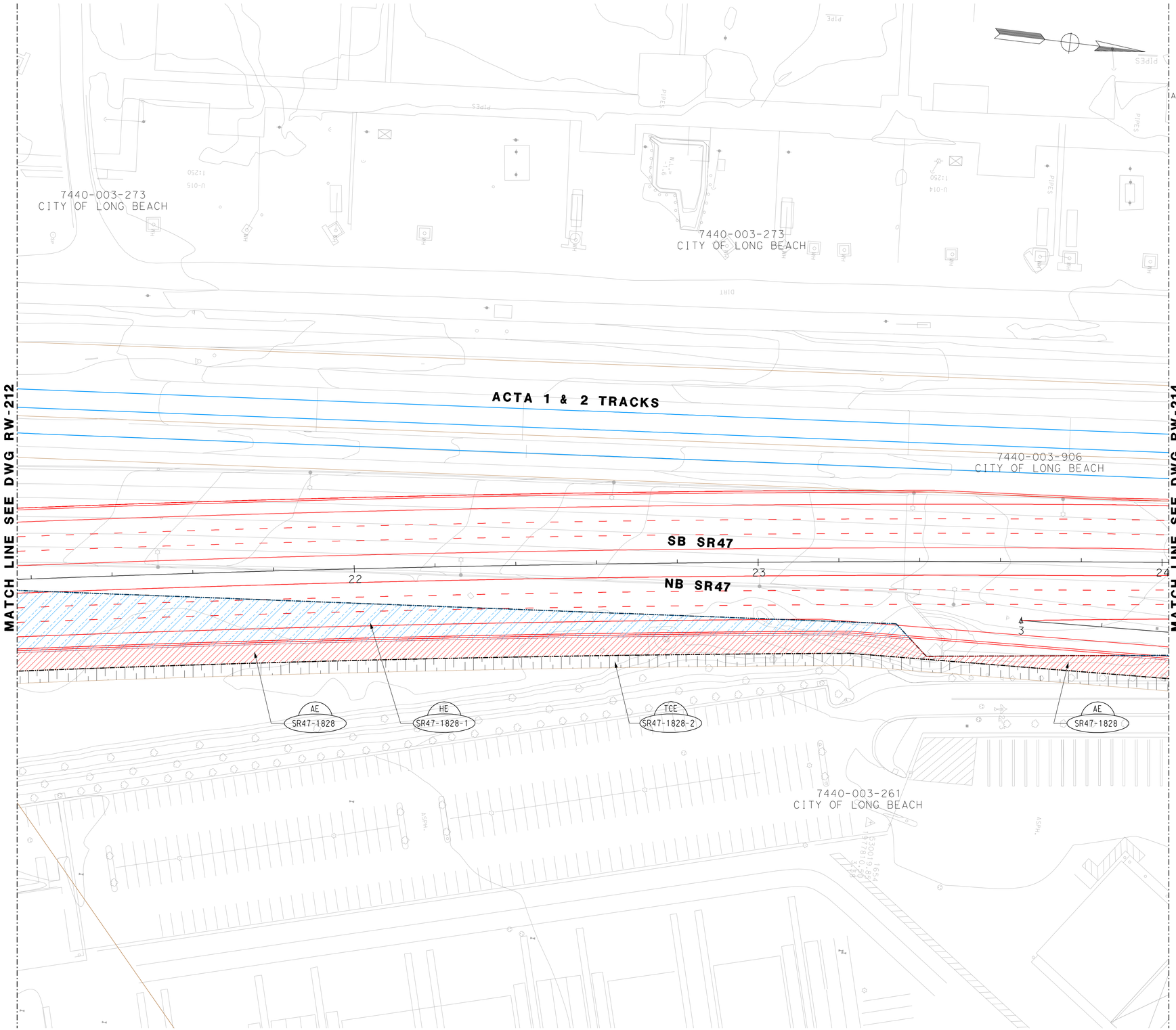
PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS

NOTES:

1. HIGHWAY EASEMENT LIMITS FROM DRIP LINE TO DRIP LINE.
2. AERIAL EASEMENT LIMITS EXTEND FROM DRIP LINE PLUS 4.57M (15 FEET) TO DRIP LINE.
3. FOR PARCEL TABLE SEE DWG RW-225.

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-213

LAST REVISION => 00-00-00 TIME PLOTTED => 13:40:13 DATE PLOTTED => 11 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

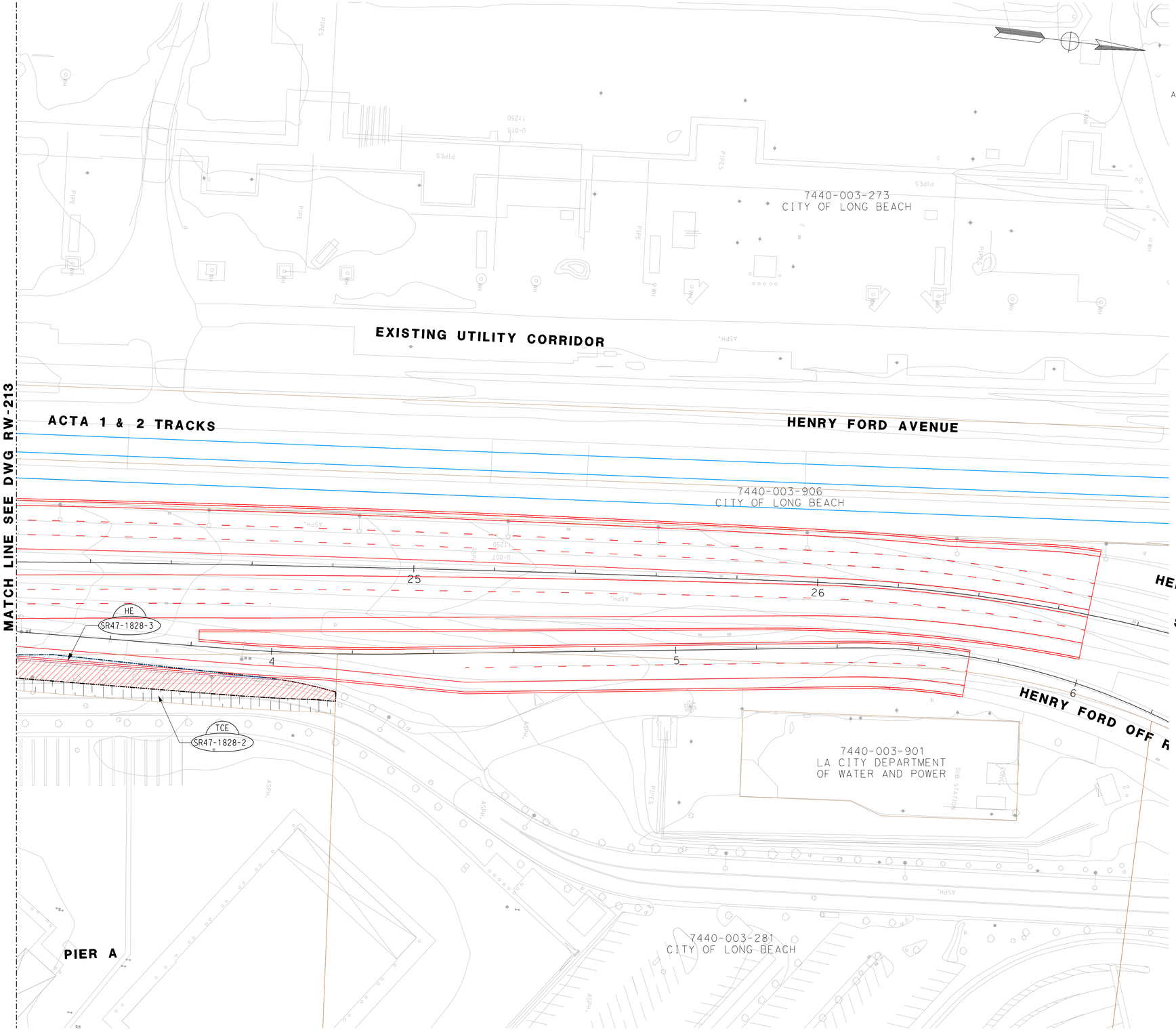
REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS

NOTES:

1. HIGHWAY EASEMENT LIMITS FROM DRIP LINE TO DRIP LINE.
2. AERIAL EASEMENT LIMITS EXTEND FROM DRIP LINE PLUS 4.57M (15 FEET) TO DRIP LINE.
3. FOR PARCEL TABLE SEE DWG RW-225.

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-214

LAST REVISION => TIME PLOTTED => 13:00:30
00-00-00 DATE PLOTTED => 11 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

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FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07 | EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

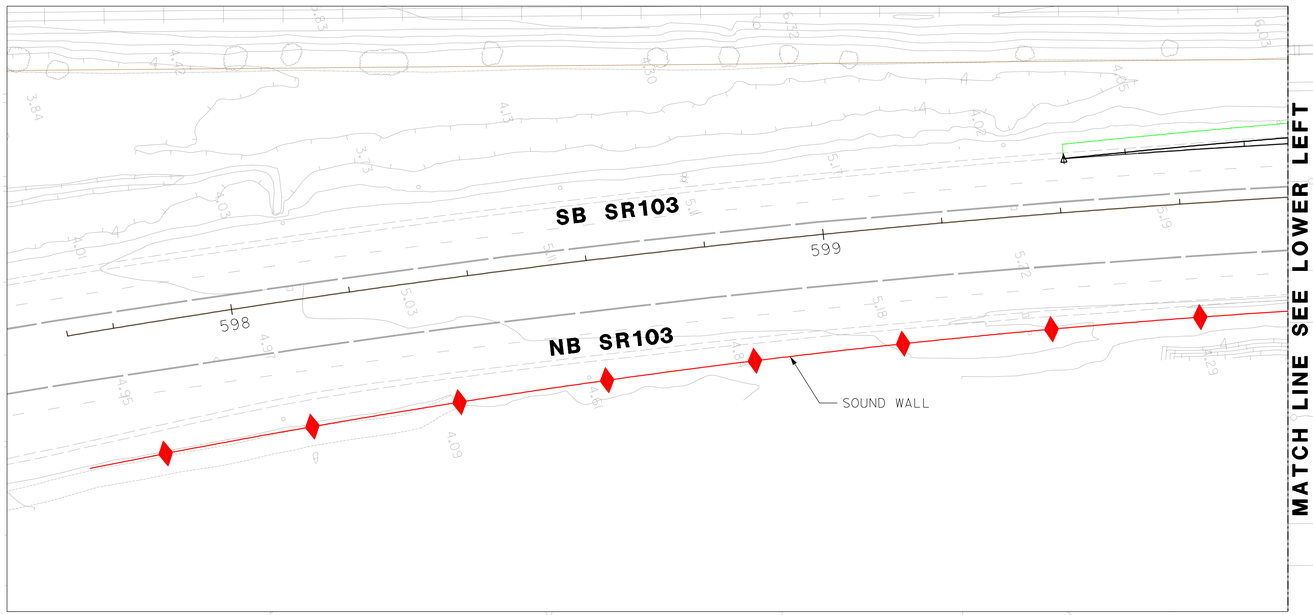
ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

LEGEND:

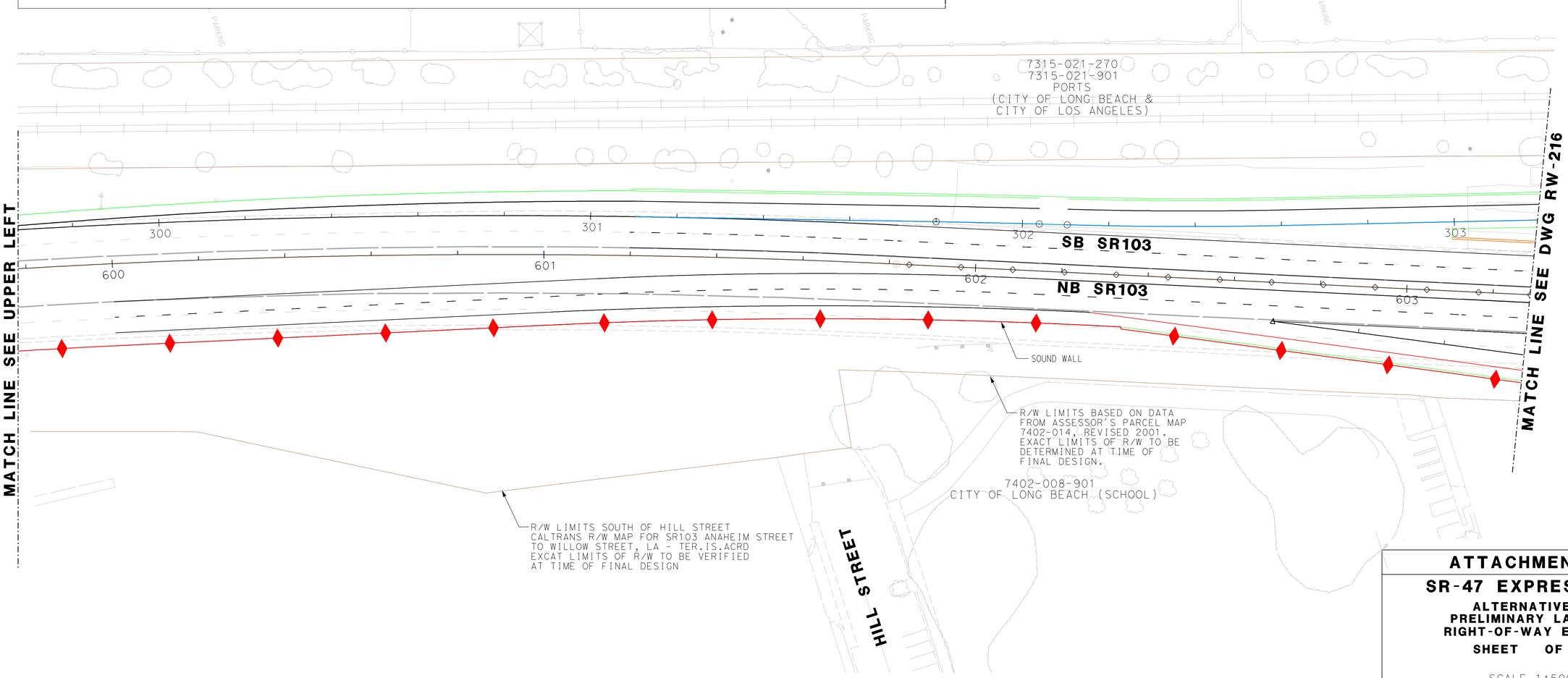
- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)



MATCH LINE SEE LOWER LEFT

MATCH LINE SEE UPPER LEFT

MATCH LINE SEE DWG RW-216



ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT
SHEET OF 10

SCALE 1:500

RW-215

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DATE	REVISED BY	DATE REVISED

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00-00-00 DATE PLOTTED => 11 JUL 2007

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

Caltrans Metric

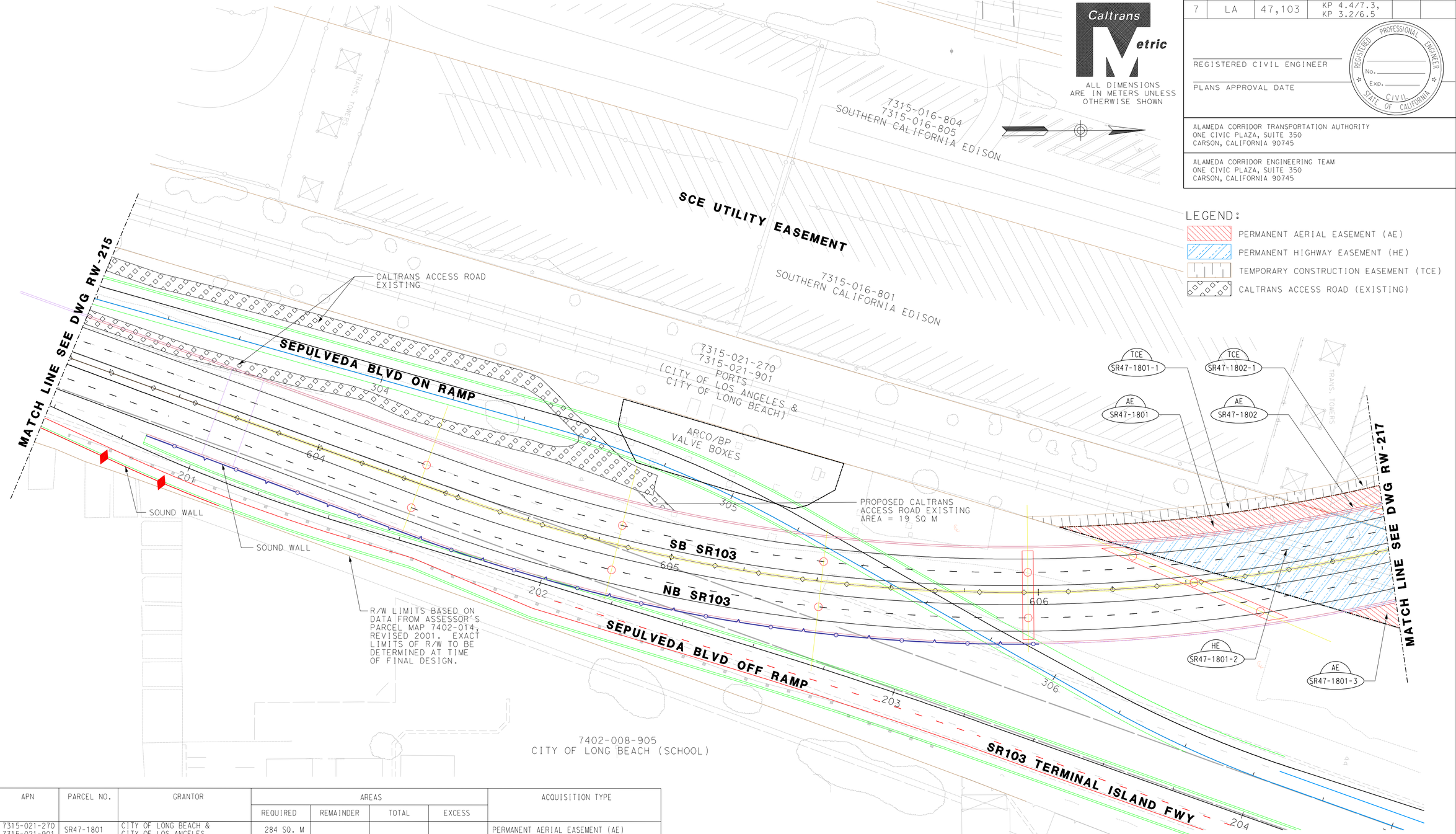
ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- CALTRANS ACCESS ROAD (EXISTING)



NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE
				REQUIRED	REMAINDER	TOTAL	EXCESS	
1	7315-021-270 7315-021-901	SR47-1801	CITY OF LONG BEACH & CITY OF LOS ANGELES	284 SQ. M				PERMANENT AERIAL EASEMENT (AE)
2	7315-021-270 7315-021-901	SR47-1801-1	CITY OF LONG BEACH & CITY OF LOS ANGELES	200 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7315-021-270 7315-021-901	SR47-1801-2	CITY OF LONG BEACH & CITY OF LOS ANGELES	1,452 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
4	7315-021-270 7315-021-901	SR47-1801-3	CITY OF LONG BEACH & CITY OF LOS ANGELES	352 SQ. M				PERMANENT AERIAL EASEMENT (AE)
5	7315-016-801 7315-016-804 7315-016-805	SR47-1802	SOUTHERN CALIFORNIA EDISON	743 SQ. M				PERMANENT AERIAL EASEMENT (AE)
6	7315-016-801 7315-016-804 7315-016-805	SR47-1802-1	SOUTHERN CALIFORNIA EDISON	504 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
CALTRANS ACCESS ROAD
RIGHT-OF-WAY EXHIBIT

SHEET OF 10

SCALE 1:500

RW-216

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DATE	REVISED BY	DATE REVISED

CALCULATED/ DESIGNED BY

CHECKED BY

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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DATE PLOTTED => 11 JUL 2007

CU 07

EA 23850K

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE
				REQUIRED	REMAINDER	TOTAL	EXCESS	
1	7315-021-270 7315-021-901	SR47-1801-4	CITY OF LONG BEACH & CITY OF LOS ANGELES	138 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
2	7315-021-801	SR47-1802-2	SOUTHERN CALIFORNIA EDISON	439 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7315-021-801	SR47-1802-3	SOUTHERN CALIFORNIA EDISON	4,178 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
4	7315-021-801	SR47-1802-4	SOUTHERN CALIFORNIA EDISON	1,084 SQ. M				PERMANENT AERIAL EASEMENT (AE)
5	7315-015-905	SR47-1803	CITY OF LOS ANGELES (POLA)	1,114 SQ. M				PERMANENT AERIAL EASEMENT (AE)
6	7315-015-905	SR47-1803-1	CITY OF LOS ANGELES (POLA)	744 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
7	7315-015-905	SR47-1803-2	CITY OF LOS ANGELES (POLA)	553 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
8	7315-015-905	SR47-1803-3	CITY OF LOS ANGELES (POLA)	5,948 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
9	7315-015-905	SR47-1803-4	CITY OF LOS ANGELES (POLA)	1,677 SQ. M				PERMANENT AERIAL EASEMENT (AE)

Caltrans Metric

ALL DIMENSIONS
ARE IN METERS UNLESS
OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

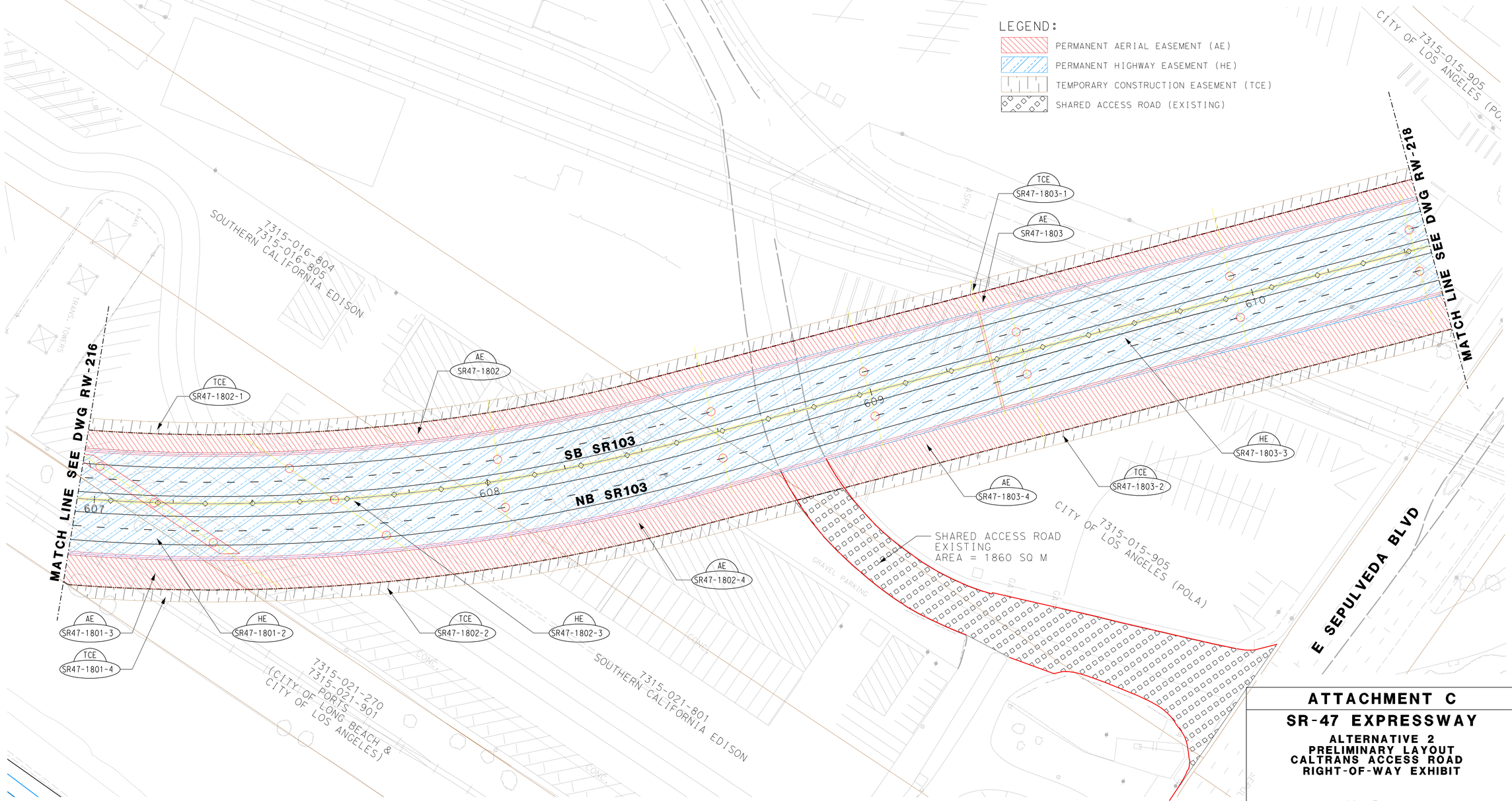
PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- SHARED ACCESS ROAD (EXISTING)



ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
CALTRANS ACCESS ROAD
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-217

DATE	REVISED BY	DATE REVISED

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CU 07

EA 23850K

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NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE
				REQUIRED	REMAINDER	TOTAL	EXCESS	
1	7315-015-012	SR47-1804	WATSON LAND COMPANY	85 SQ. M				PERMANENT AERIAL EASEMENT (AE)
2	7315-015-012	SR47-1804-1	WATSON LAND COMPANY	80 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7315-015-012	SR47-1804-2	WATSON LAND COMPANY	49 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
4	STREET	SR47-1805	E SEPULVEDA BLVD (CARSON)	207 SQ. M				PERMANENT AERIAL EASEMENT (AE)
5	STREET	SR47-1805-1	E SEPULVEDA BLVD (CARSON)	138 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
6	STREET	SR47-1805-2	E SEPULVEDA BLVD (CARSON)	142 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
7	STREET	SR47-1805-3	E SEPULVEDA BLVD (CARSON)	1,186 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
8	STREET	SR47-1805-4	E SEPULVEDA BLVD (CARSON)	414 SQ. M				PERMANENT AERIAL EASEMENT (AE)
9	7315-011-805	SR47-1806	SOUTHERN PACIFIC (UPRR)	2,042 SQ. M				PERMANENT AERIAL EASEMENT (AE)
10	7315-011-805	SR47-1806-1	SOUTHERN PACIFIC (UPRR)	303 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
11	7315-011-805	SR47-1806-2	SOUTHERN PACIFIC (UPRR)	791 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
12	7315-011-805	SR47-1806-3	SOUTHERN PACIFIC (UPRR)	3,972 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
13	7315-011-805	SR47-1806-4	SOUTHERN PACIFIC (UPRR)	493 SQ. M				PERMANENT AERIAL EASEMENT (AE)
14	STREET	SR47-1807	INTERMODAL WAY (CARSON)	193 SQ. M				PERMANENT AERIAL EASEMENT (AE)
15	STREET	SR47-1807-1	INTERMODAL WAY (CARSON)	110 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
16	STREET	SR47-1807-5	INTERMODAL WAY (CARSON)	3,415 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
17	7315-011-013	SR47-1808	WATSON LAND COMPANY	637 SQ. M				PERMANENT AERIAL EASEMENT (AE)
18	7315-011-013	SR47-1808-1	WATSON LAND COMPANY	478 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
19	7315-011-013	SR47-1808-2	WATSON LAND COMPANY	640 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
20	7315-011-807	SR47-1809-7	SOUTHERN PACIFIC (UPRR)	93 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

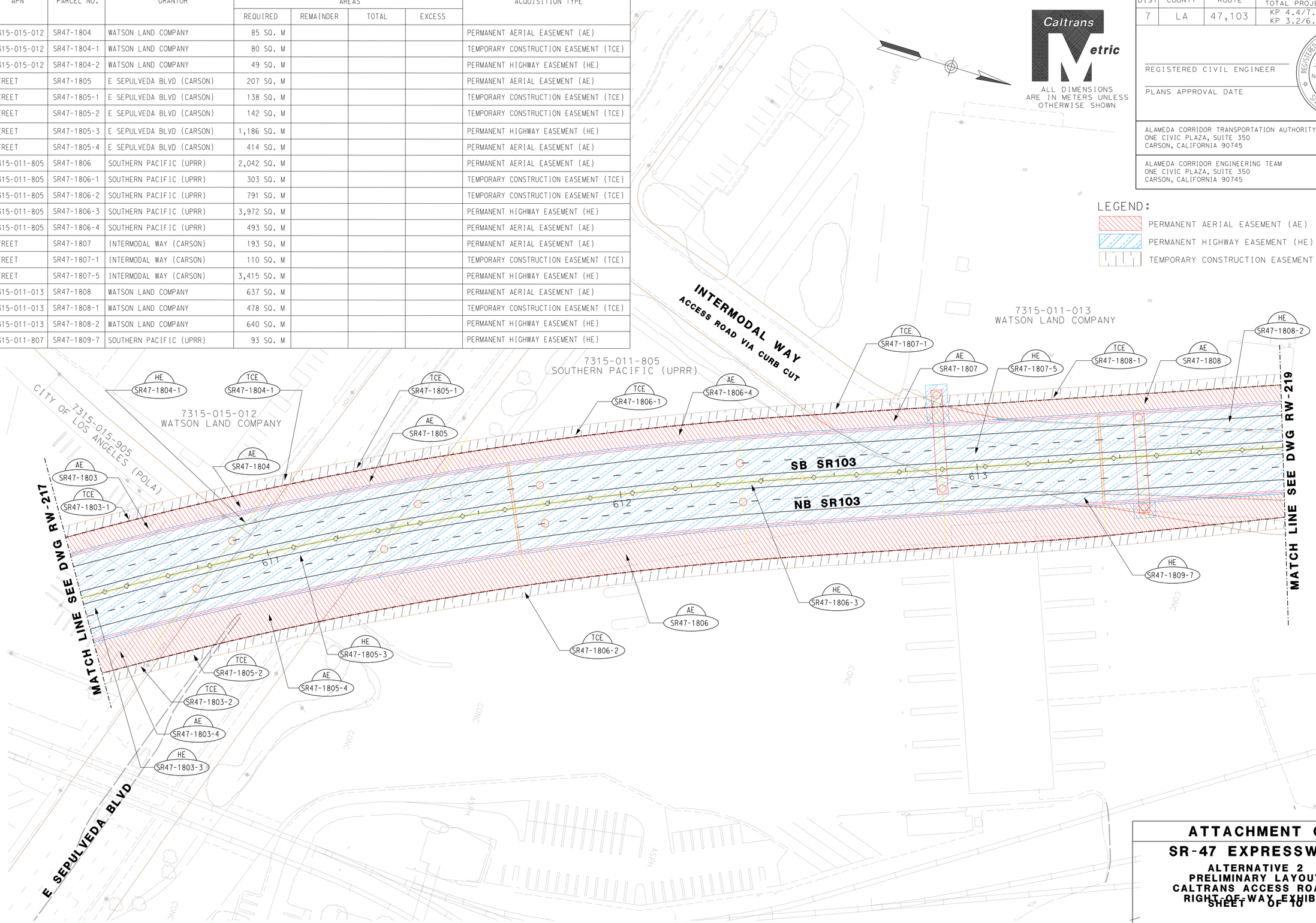
PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

LEGEND:
- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)



ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
CALTRANS ACCESS ROAD
RIGHT-OF-WAY EXHIBIT
SHEET OF 10

SCALE 1:500

RW-218

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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

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CU 07 | EA 23850K

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE
				REQUIRED	REMAINDER	TOTAL	EXCESS	
1	STREET	SR47-1807-2	INTERMODAY WAY (CARSON)	95 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
2	STREET	SR47-1807-3	INTERMODAL WAY (CARSON)	339 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	STREET	SR47-1807-4	INTERMODAL WAY (CARSON)	153 SQ. M				PERMANENT AERIAL EASEMENT (AE)
4	STREET	SR47-1807-6	INTERMODAL WAY (CARSON)	516 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
5	STREET	SR47-1807-7	INTERMODAL WAY (CARSON)	75 SQ. M				PERMANENT AERIAL EASEMENT (AE)
6	7315-011-807	SR47-1809	SOUTHERN PACIFIC (UPRR)	5,506 SQ. M				PERMANENT AERIAL EASEMENT (AE)
7	7315-011-808 7315-011-811	SR47-1809-1	SOUTHERN PACIFIC (UPRR)	588 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
8	7315-011-812	SR47-1809-2	SOUTHERN PACIFIC (UPRR)	3,546 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
9	7315-011-814 7315-011-815	SR47-1809-3	SOUTHERN PACIFIC (UPRR)	26,953 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
10		SR47-1809-4	SOUTHERN PACIFIC (UPRR)	1,001 SQ. M				PERMANENT AERIAL EASEMENT (AE)

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

7315-011-013
WATSON LAND COMPANY

7315-011-809
SOUTHERN PACIFIC (UPRR)

7315-011-81
SOUTHERN PACIFIC

INTERMODAL WAY

HE SR47-1808-2
AE SR47-1808
HE SR47-1807-5
TCE SR47-1808-1
AE SR47-1807-4
TCE SR47-1807-2
TCE SR47-1809-1
AE SR47-1809-4
AE SR47-1807-6
TCE SR47-1807-3

MATCH LINE SEE DWG RW-218

SB SR103
NB SR103

614
615
616
617

AE SR47-1809
HE SR47-1809-3
TCE SR47-1809-2
AE SR47-1807-7

MATCH LINE SEE DWG RW-220

7315-011-807
SOUTHERN PACIFIC (UPRR)

7315-011-808
SOUTHERN PACIFIC (UPRR)

ASPH
CONC

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
CALTRANS ACCESS ROAD
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-219

DATE	REVISED BY	DATE REVISED

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

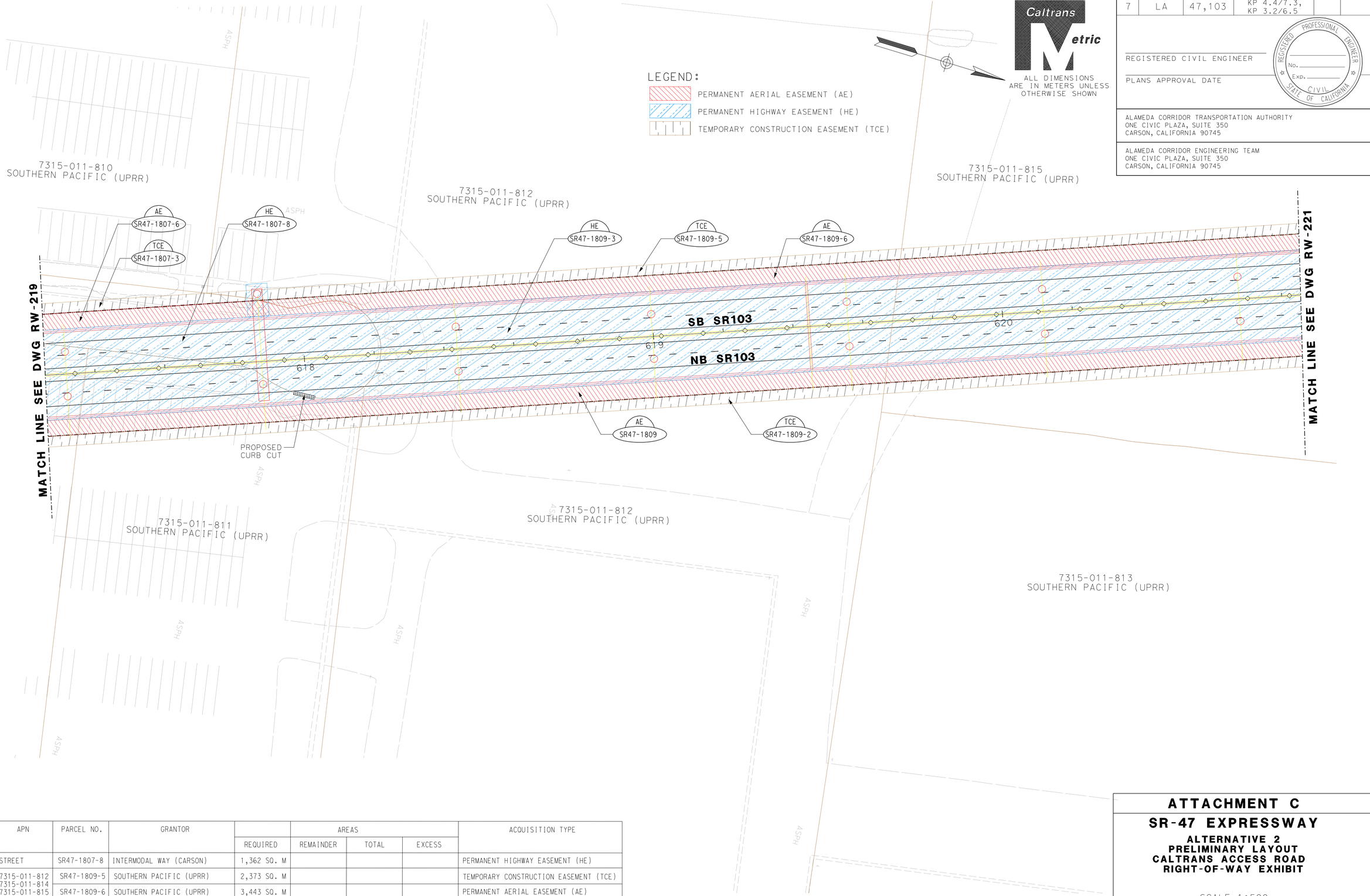
ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

LEGEND:
- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)



NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE
				REQUIRED	REMAINDER	TOTAL	EXCESS	
1	STREET	SR47-1807-8	INTERMODAL WAY (CARSON)	1,362 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
2	7315-011-812	SR47-1809-5	SOUTHERN PACIFIC (UPRR)	2,373 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7315-011-814 7315-011-815	SR47-1809-6	SOUTHERN PACIFIC (UPRR)	3,443 SQ. M				PERMANENT AERIAL EASEMENT (AE)

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
CALTRANS ACCESS ROAD
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-220

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

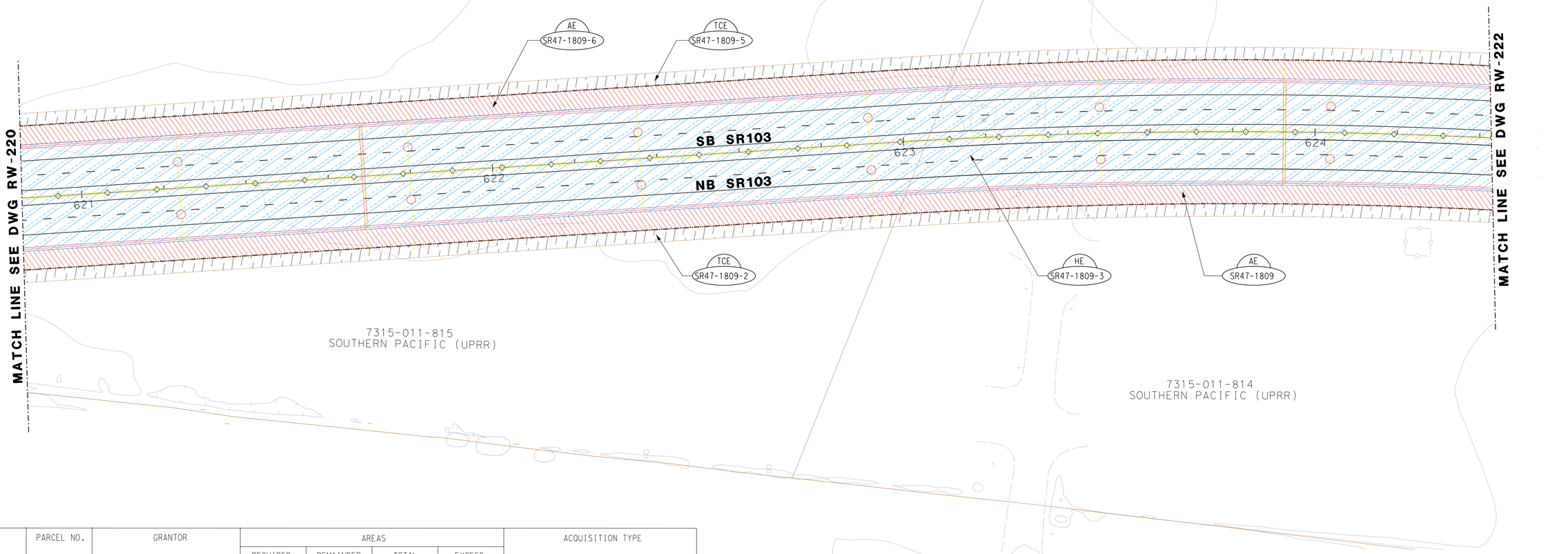
Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DOMINGUEZ CHANNEL

7315-011-804
LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT

LEGEND:
- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)



NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE
				REQUIRED	REMAINDER	TOTAL	EXCESS	
1	7315-011-807 7315-011-808 7315-011-811	SR47-1809	SEE DWG RW-206					
2		SR47-1809-2	SEE DWG RW-206					
3	7315-011-812 7315-011-814 7315-011-815	SR47-1809-3	SEE DWG RW-206					
4	7315-011-812 7315-011-814 7315-011-815	SR47-1809-5	SEE DWG RW-207					
5		SR47-1809-6	SEE DWG RW-207					
6	7315-011-814	SR47-1809-7	SOUTHERN PACIFIC (UPRR) RW-209	125 SQ M				PERMANENT HIGHWAY EASEMENT (HE)
7	7315-011-814	SR47-1809-8	SOUTHERN PACIFIC (UPRR) RW-209	120 SQ M				TEMPORARY CONSTRUCTION EASEMENT (TCE)

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
CALTRANS ACCESS ROAD
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-221

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

SAN PEDRO SUBDIVISION TRACKS

S ALAMEDA STREET

ALAMEDA STREET ON RAMP

7315-011-814
SOUTHERN PACIFIC (UPRR)

FOR PARCEL SR47-1809-7 AND SR47-1809-8 SEE DWG RW-208

7315-011-021
WATSON LAND COMPANY

ACCESS ROAD PROPOSED

SB SR103

NB SR103

7315-010-005
MYRON CHLAVIN AND RAE DESSER ESTATE

MATCH LINE SEE DWG RW-221

MATCH LINE SEE DWG RW-223

207.4155
73°07'48.9589"

HE SR47-1809-7
TCE SR47-1809-8
HE SR47-1810-7
TCE SR47-1810-8
TCE SR47-1810-6
TCE SR47-1812-5
HE SR47-1812-3
AE SR47-1812-9
TCE SR47-1812-1
TCE SR47-1809-5
HE SR47-1809-3
AE SR47-1809-6
TCE SR47-1810-1
HE SR47-1810-3
AE SR47-1810
AE SR47-1809
TCE SR47-1809-2
AE SR47-1810-4
TCE SR47-1810-2
HE SR47-1812-8
TCE SR47-1812-2
AE SR47-1812
HE SR47-1812-6
TCE SR47-1812-7

NOTE: FOR PARCEL TABLE SEE DWG RW-225.

LEGEND:
- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
CALTRANS ACCESS ROAD
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-222

DATE	REVISED BY	DATE REVISED

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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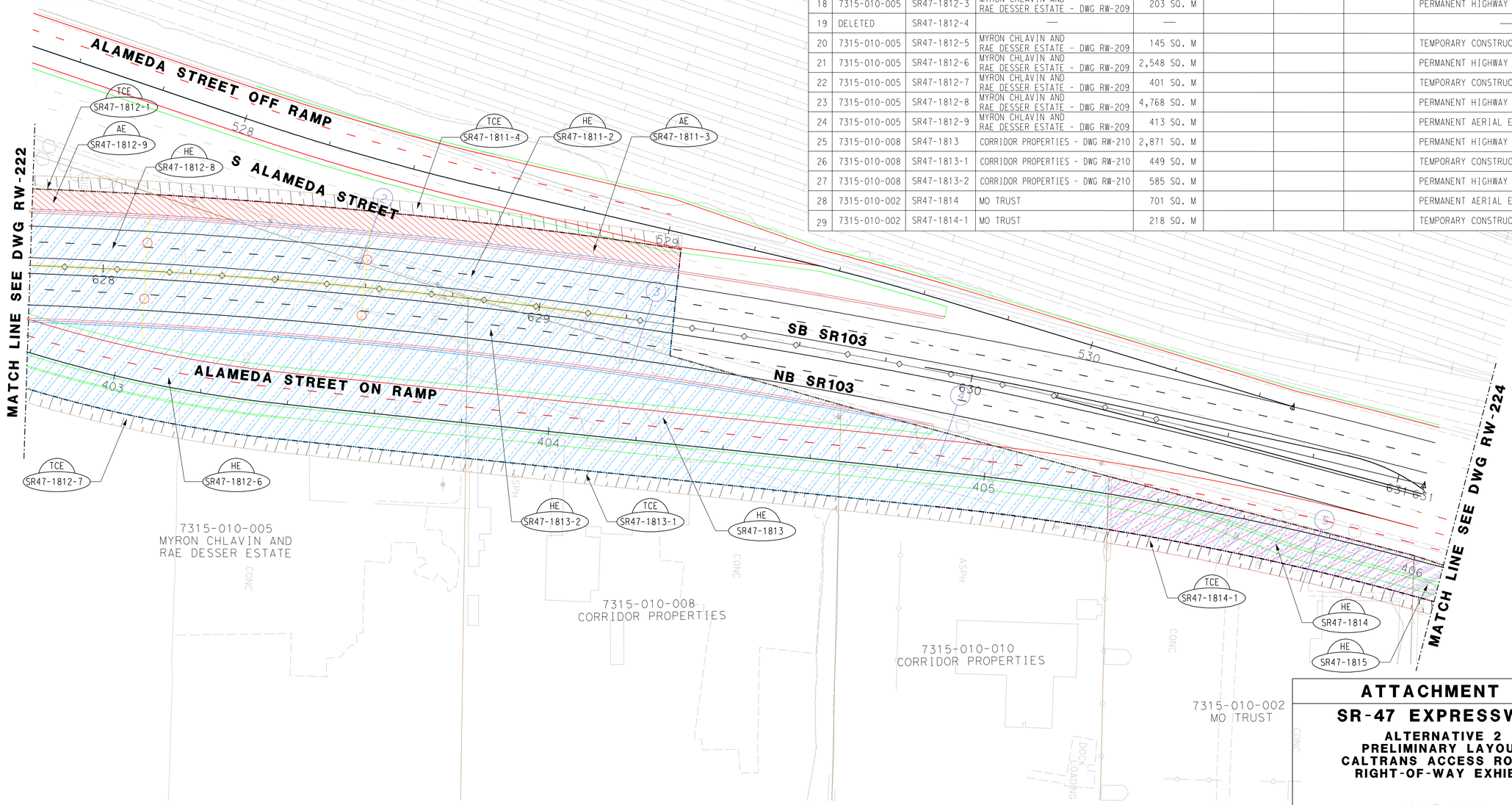
CU 07

EA 23850K

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE
				REQUIRED	REMAINDER	TOTAL	EXCESS	
1	7315-011-021	SR47-1810	WATSON LAND CO - DWG RW-209	612 SQ. M				PERMANENT AERIAL EASEMENT (AE)
2	7315-011-021	SR47-1810-1	WATSON LAND CO - DWG RW-209	383 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7315-011-021	SR47-1810-2	WATSON LAND CO - DWG RW-209	441 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7315-011-021	SR47-1810-3	WATSON LAND CO - DWG RW-209	3,562 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
5	7315-011-021	SR47-1810-4	WATSON LAND CO - DWG RW-209	655 SQ. M				PERMANENT AERIAL EASEMENT (AE)
6	DELETED	SR47-1810-5	—	—				—
7	7315-011-021	SR47-1810-6	WATSON LAND CO - DWG RW-209	81 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
8	7315-011-021	SR47-1810-7	WATSON LAND CO - DWG RW-209	1,849 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
9	7315-011-021	SR47-1810-8	WATSON LAND CO - DWG RW-209	357 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
10	DELETED	SR47-1811	—	—				—
11	DELETED	SR47-1811-1	—	—				—
12	STREET	SR47-1811-2	S ALAMEDA STREET (COLA)	1,140 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
13	STREET	SR47-1811-3	S ALAMEDA STREET (COLA)	514 SQ. M				PERMANENT AERIAL EASEMENT (AE)
14	STREET	SR47-1811-4	S ALAMEDA STREET (COLA)	385 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
15	DELETED	SR47-1812	—	—				—



LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE
				REQUIRED	REMAINDER	TOTAL	EXCESS	
16	7315-010-005	SR47-1812-1	MYRON CHLAVIN AND RAE DESSER ESTATE - DWG RW-209	250 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
17	7315-010-005	SR47-1812-2	MYRON CHLAVIN AND RAE DESSER ESTATE - DWG RW-209	215 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
18	7315-010-005	SR47-1812-3	MYRON CHLAVIN AND RAE DESSER ESTATE - DWG RW-209	203 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
19	DELETED	SR47-1812-4	—	—				—
20	7315-010-005	SR47-1812-5	MYRON CHLAVIN AND RAE DESSER ESTATE - DWG RW-209	145 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
21	7315-010-005	SR47-1812-6	MYRON CHLAVIN AND RAE DESSER ESTATE - DWG RW-209	2,548 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
22	7315-010-005	SR47-1812-7	MYRON CHLAVIN AND RAE DESSER ESTATE - DWG RW-209	401 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
23	7315-010-005	SR47-1812-8	MYRON CHLAVIN AND RAE DESSER ESTATE - DWG RW-209	4,768 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
24	7315-010-005	SR47-1812-9	MYRON CHLAVIN AND RAE DESSER ESTATE - DWG RW-209	413 SQ. M				PERMANENT AERIAL EASEMENT (AE)
25	7315-010-008	SR47-1813	CORRIDOR PROPERTIES - DWG RW-210	2,871 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
26	7315-010-008	SR47-1813-1	CORRIDOR PROPERTIES - DWG RW-210	449 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
27	7315-010-008	SR47-1813-2	CORRIDOR PROPERTIES - DWG RW-210	585 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
28	7315-010-002	SR47-1814	MO TRUST	701 SQ. M				PERMANENT AERIAL EASEMENT (AE)
29	7315-010-002	SR47-1814-1	MO TRUST	218 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
CALTRANS ACCESS ROAD
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-223

REVISED BY | DATE REVISED | DATE | CALCULATED/ DESIGNED BY | CHECKED BY | DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

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CU 07 | EA 23850K

NOTES:

1. SEE DWG RW208 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

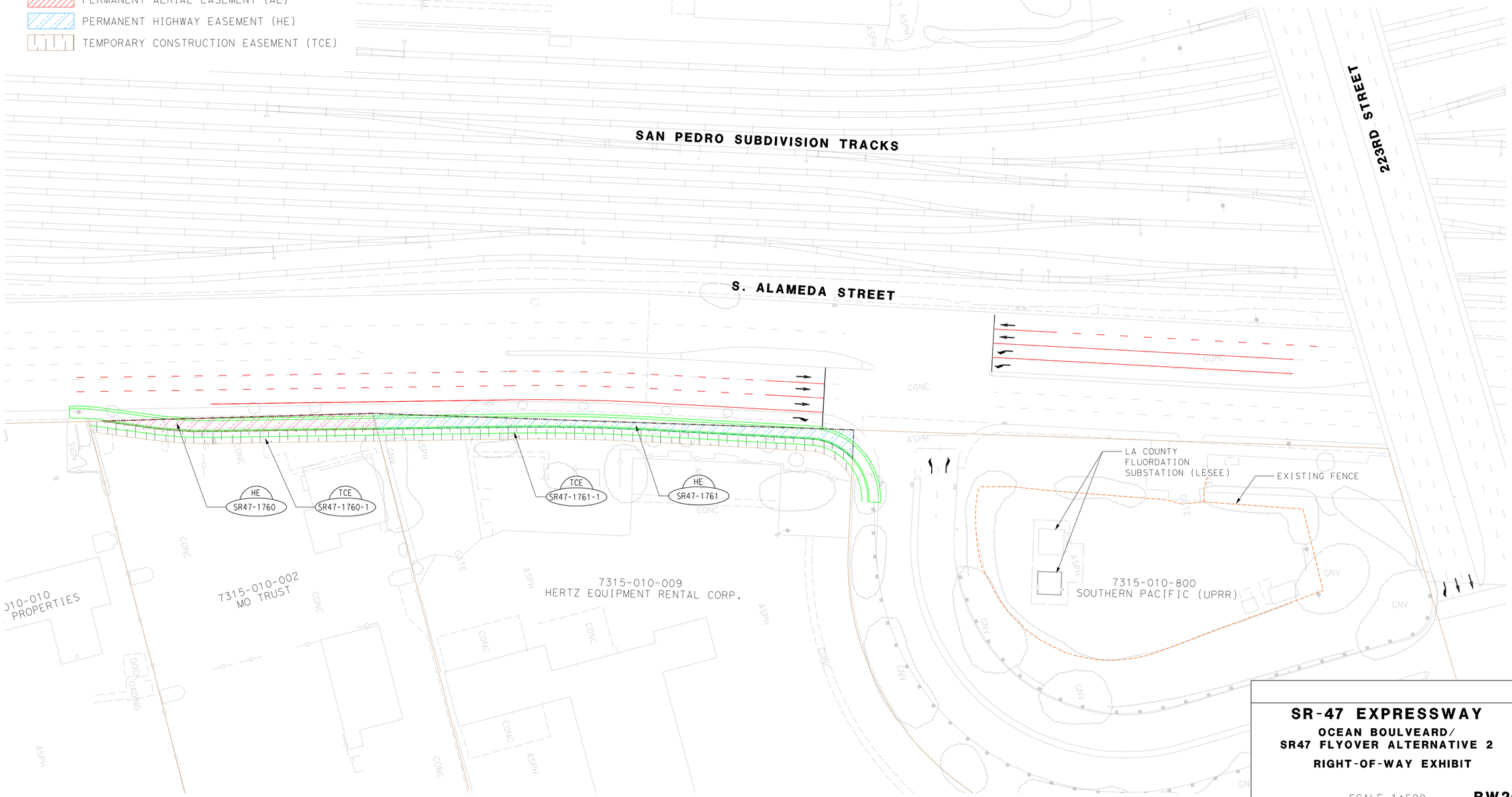
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745



SR-47 EXPRESSWAY

OCEAN BOULVEARD/ SR47 FLYOVER ALTERNATIVE 2

RIGHT-OF-WAY EXHIBIT

SCALE 1:500 **RW207A**

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DATE | REVISED BY | DATE REVISED

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CU 07 | EA 23850K

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE
				REQUIRED	REMAINDER	TOTAL	EXCESS	
1	7315-010-009	SR47-1815*	HERTZ EQUIPMENT RENTAL CORP.	903 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
2	7315-010-009	SR47-1815-1*	HERTZ EQUIPMENT RENTAL CORP.	376 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
3	7315-010-800	SR47-1829	SOUTHERN PACIFIC (UPRR)	79 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)

NOTE:

1. OCEAN BLVD FLYOVER DENOTED WITH * AND SCREENED SHOWN FOR INFORMATION ONLY. RW ACQUISITION TO BE MADE AT LATER DATE.

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

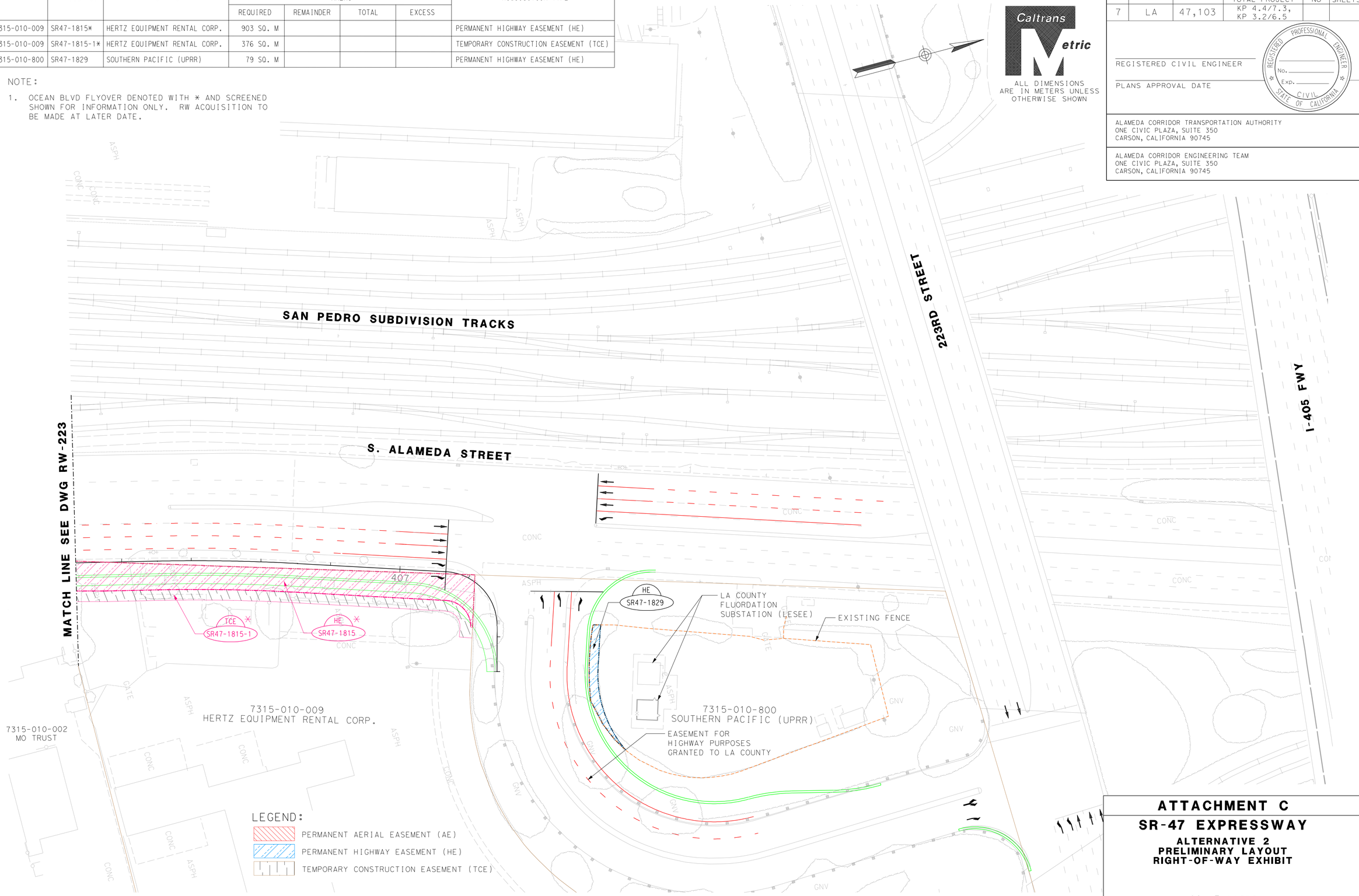
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745



ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-224

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DATE	REVISED BY	DATE REVISED

CALCULATED/ DESIGNED BY

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CU 07

EA 23850K

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE	DWG NO.
				REQUIRED	REMAINDER	TOTAL	EXCESS		
1	7436-029-906	SR47-1816	CITY OF LONG BEACH	515 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-209
2	7436-029-906	SR47-1816-1	CITY OF LONG BEACH	347 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
3	7436-029-906	SR47-1816-2	CITY OF LONG BEACH	26 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
4	7436-029-906	SR47-1816-3	CITY OF LONG BEACH	18 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
5	7436-029-906	SR47-1816-4	CITY OF LONG BEACH	320 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
6	7436-029-906	SR47-1816-5	CITY OF LONG BEACH	19 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
7	7436-029-906	SR47-1816-6	CITY OF LONG BEACH	129 SQ M				PERMANENT HIGHWAY EASEMNT (HE)	RW-209 RW-210
8	7436-029-906	SR47-1816-7	CITY OF LONG BEACH	188 SQ M				PERMANENT AERIAL EASEMENT (AE)	RW-210
9	7436-029-906	SR47-1816-8	CITY OF LONG BEACH	144 SQ M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	RW-210
10	7436-029-914	SR47-1817	CITY OF LONG BEACH	391 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-209
11	7436-029-914	SR47-1817-1	CITY OF LONG BEACH	255 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
12	7436-029-906	SR47-1817-2	CITY OF LONG BEACH	984 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
13	7436-029-906	SR47-1817-3	CITY OF LONG BEACH	214 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
14	7436-029-906	SR47-1817-4	CITY OF LONG BEACH	242 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW-210
15	7436-029-906	SR47-1817-5	CITY OF LONG BEACH	14 SQ M				PERMANENT HIGHWAY EASEMENT (HE)	RW-209
16	7436-029-906	SR47-1817-6	CITY OF LONG BEACH	76 SQ M				PERMANENT HIGHWAY EASEMENT (HE)	RW-210
17	7436-029-906	SR47-1817-7	CITY OF LONG BEACH	1543 SQ M				PERMANENT AERIAL EASEMENT (AE)	RW-210 RW-211
18	7436-029-906	SR47-1817-8	CITY OF LONG BEACH	1050 SQ M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
19	7436-029-906	SR47-1817-9	CITY OF LONG BEACH	4982 SQ M				PERMANENT HIGHWAY EASEMENT (HE)	
20	7436-029-906	SR47-1817-10	CITY OF LONG BEACH	651 SQ M				PERMANENT HIGHWAY EASEMENT (HE)	RW-210
21	7436-029-906	SR47-1817-11	CITY OF LONG BEACH	575 SQ M				PERMANENT HIGHWAY EASEMENT (HE)	
22	7436-029-906	SR47-1817-12	CITY OF LONG BEACH	319 SQ M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
23	7436-029-906	SR47-1817-13	CITY OF LONG BEACH	984 SQ M				PERMANENT AERIAL EASEMENT (AE)	
24	7436-029-906	SR47-1817-14	CITY OF LONG BEACH	423 SQ M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
25	7436-029-906	SR47-1817-15	CITY OF LONG BEACH	514 SQ M				RELINQUISHMENT BY CALTRANS (REL)	
26	7436-029-906	SR47-1817-16	CITY OF LONG BEACH	427 SQ M				RELINQUISHMENT BY CALTRANS (REL)	
27	7436-029-906	SR47-1818	CITY OF LONG BEACH (RAIL)	15 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-209
28	7436-029-906	SR47-1818-1	CITY OF LONG BEACH (RAIL)	10 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
29	7436-029-914	SR47-1818-2	CITY OF LONG BEACH (RAIL)	16 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
30	7436-029-914	SR47-1818-3	CITY OF LONG BEACH (RAIL)	11 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
31	7436-029-914	SR47-1818-4	CITY OF LONG BEACH (RAIL)	23 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
32	7436-029-914	SR47-1818-5	CITY OF LONG BEACH (RAIL)	15 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
33	7436-029-914	SR47-1818-6	CITY OF LONG BEACH (RAIL)	11 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
34	7436-029-914	SR47-1818-7	CITY OF LONG BEACH (RAIL)	5 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
35	7436-029-914	SR47-1818-8	CITY OF LONG BEACH (RAIL)	14 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	RW-210
36	7436-029-914	SR47-1818-9	CITY OF LONG BEACH (RAIL)	28 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
37	7436-029-914	SR47-1818-10	CITY OF LONG BEACH (RAIL)	26 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
38	7436-029-914	SR47-1818-11	CITY OF LONG BEACH (RAIL)	17 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
39	7436-029-914	SR47-1818-12	CITY OF LONG BEACH (RAIL)	33 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
40	7436-029-914	SR47-1818-13	CITY OF LONG BEACH (RAIL)	23 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
41	7436-029-914	SR47-1818-14	CITY OF LONG BEACH (RAIL)	19 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
42	7436-029-914	SR47-1818-15	CITY OF LONG BEACH (RAIL)	57 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
43	7436-029-914	SR47-1818-16	CITY OF LONG BEACH (RAIL)	33 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
44	7436-029-923	SR47-1819	CITY OF LONG BEACH	31 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-209
45	7436-029-923	SR47-1819-1	CITY OF LONG BEACH	21 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
46	7436-029-923	SR47-1819-2	CITY OF LONG BEACH	45 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
47	7436-029-923	SR47-1819-3	CITY OF LONG BEACH	23 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
48	7436-029-923	SR47-1819-4	CITY OF LONG BEACH	24 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
49	7436-029-923	SR47-1819-5	CITY OF LONG BEACH	14 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
50	7436-029-917	SR47-1820	CITY OF LONG BEACH	549 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW-210
51	7436-029-917	SR47-1820-1	CITY OF LONG BEACH	77 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
52	7436-029-917	SR47-1820-2	CITY OF LONG BEACH	158 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
53	7436-029-917	SR47-1820-3	CITY OF LONG BEACH	53 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
54	7436-029-923	SR47-1821	CITY OF LONG BEACH	548 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
55	7436-029-923	SR47-1821-1	CITY OF LONG BEACH	45 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
56	7436-029-923	SR47-1821-2	CITY OF LONG BEACH	139 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
57	7436-029-923	SR47-1821-3	CITY OF LONG BEACH	97 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
58	7436-029-923	SR47-1821-4	CITY OF LONG BEACH	44 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
59	7436-029-923	SR47-1821-5	CITY OF LONG BEACH	30 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
60	7436-029-019	SR47-1822	VOPAK TERMINAL LONG BEACH INC.	216 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
61	7436-029-019	SR47-1822-1	VOPAK TERMINAL LONG BEACH INC.	132 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
62	7436-029-019	SR47-1822-2	VOPAK TERMINAL LONG BEACH INC.	93 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE	DWG NO.
				REQUIRED	REMAINDER	TOTAL	EXCESS		
63	7436-029-917	SR47-1823	CITY OF LONG BEACH	174 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-210
64	7436-029-917	SR47-1823-1	CITY OF LONG BEACH	209 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
65	7436-029-917	SR47-1823-2	CITY OF LONG BEACH	64 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
66	7436-029-923	SR47-1824	CITY OF LONG BEACH	644 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
67	7436-029-923	SR47-1824-1	CITY OF LONG BEACH	307 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
68	7436-029-923	SR47-1824-2	CITY OF LONG BEACH	506 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
69	7436-029-923	SR47-1824-3	CITY OF LONG BEACH	2404 SQ. M				RELINQUISHMENT BY CALTRANS (REL)	
70	7436-029-923	SR47-1824-4	CITY OF LONG BEACH	2289 SQ. M				PERMANENT DRAINAGE EASEMENT (PDE)	
71	STREET	SR47-1825	CITY OF LONG BEACH	216 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
72	STREET	SR47-1825-1	CITY OF LONG BEACH	12 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
73	STREET	SR47-1825-2	CITY OF LONG BEACH	56 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
74	7436-029-923	SR47-1706-1	CITY OF LONG BEACH	140 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
75	7436-029-923	SR47-1706-3	CITY OF LONG BEACH	97 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
76	7436-029-923	SR47-1706-8	CITY OF LONG BEACH	103 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
77	7436-029-923	SR47-1706-9	CITY OF LONG BEACH	66 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
78	7436-011-900	SR47-1826	LACFCD	843 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-211 RW-212
79	7436-011-900	SR47-1826-1	LACFCD	3398 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
80	7436-011-900	SR47-1826-2	LACFCD	563 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
81	7436-003-261	SR47-1827	CITY OF LONG BEACH	623 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-212
82	7436-003-261	SR47-1827-1	CITY OF LONG BEACH	2501 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
83	7436-003-261	SR47-1827-2	CITY OF LONG BEACH	421 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
84	7440-003-261 7440-003-906	SR47-1828	CITY OF LONG BEACH	1666 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW-212 RW-213
85	7440-003-261 7440-003-906	SR47-1828-1	CITY OF LONG BEACH	2365 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
86	7440-003-261 7440-003-906	SR47-1828-2	CITY OF LONG BEACH	1175 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
87	7440-003-261 7440-003-906	SR47-1828-3	CITY OF LONG BEACH	83 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW-213
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Caltrans Metric

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DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47,103	KP 4.4/7.3, KP 3.2/6.5		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ATTACHMENT C

SR-47 EXPRESSWAY

ALTERNATIVE 2
PRELIMINARY LAYOUT

RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-225

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

Caltrans Metric

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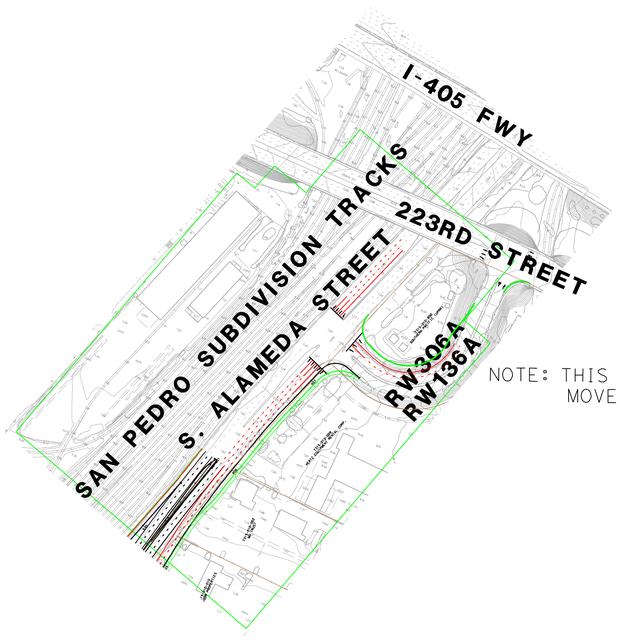
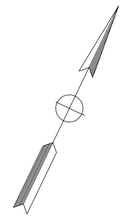


NOTE: THIS AREA OF THE KEY MAP IS MOVE FROM THE ORIGINAL LOCATION



SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVE 3 RIGHT-OF-WAY EXHIBIT KEY MAP

HORIZ SCALE 1:2500

RW300

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

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ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY

ALTERNATIVE 3
RIGHT-OF-WAY KEY MAP

SCALE 1:3000

RW301

LAST REVISION => 00-00-00
TIME PLOTTED => 13:56:15
DATE PLOTTED => 11 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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USERNAME => sheth

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

DATE | REVISED BY | DATE REVISED

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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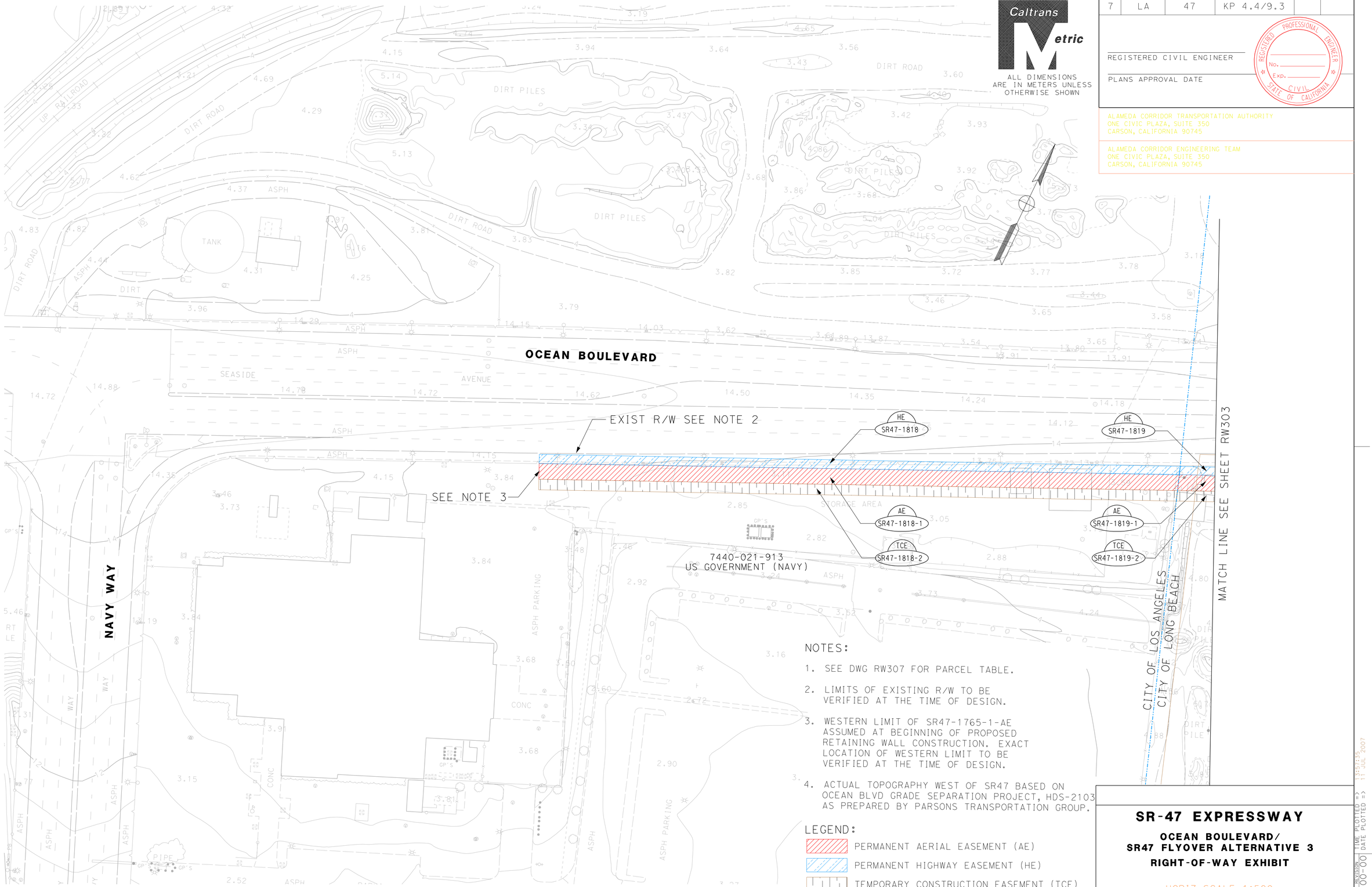

NOTES:

1. SEE DWG RW307 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. WESTERN LIMIT OF SR47-1765-1-AE ASSUMED AT BEGINNING OF PROPOSED RETAINING WALL CONSTRUCTION. EXACT LOCATION OF WESTERN LIMIT TO BE VERIFIED AT THE TIME OF DESIGN.
4. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103 AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVE 3

RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW302

LAST REVISION => 00-00-00 | TIME PLOTTED => 11:37:35 | DATE PLOTTED => 17 JUL 2007

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

CITY OF LOS ANGELES
CITY OF LONG BEACH

EXIST R/W SEE NOTE 2 | EXIST R/W SEE NOTE 4

EXIST R/W

OCEAN BOULEVARD
BLVD

DIRT ROAD

MATCH LINE SEE SHEET RW302

MATCH LINE SEE SHEET RW304

TCE SR47-1819-2

AE SR47-1819-1

HE SR47-1819

AE SR47-1819-3

"L1" LINE

7436-032-907
CITY OF LONG BEACH

NOTES:

1. SEE DWG RW307 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS 2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVE 3 RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW303

DATE	REVISED BY
	DATE REVISED

CALCULATED/ DESIGNED BY

CHECKED BY

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

CITY OF LOS ANGELES
CITY OF LONG BEACH

OCEAN BOULEVARD

MATCH LINE SEE SHEET RW303

MATCH LINE SEE SHEET RW305

DIRT ROAD

"L1" LINE

HV-9

DIRT PILES

ROCKS

CONC DITCH

ASPH

ASPH PARKING

OCEAN

7436-032-907
CITY OF LONG BEACH

7436-032-904
US GOVERNMENT (NAVY)

EXIST R/W
SEE NOTE 4

TCE SR47-1819-4

AE SR47-1819-3

HE SR47-1819

AE SR47-1819-1

TCE SR47-1819-2

TCE SR47-1820-4

AE SR47-1820-3

HE SR47-1820

AE SR47-1820-1

TCE SR47-1820-2

NOTES:

1. SEE DWG RW307 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103 AS PER PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVE 3 RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW304

DATE	REVISED BY
	DATE REVISED

CALCULATED/ DESIGNED BY

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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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TIME PLOTTED =>
DATE PLOTTED => 00-00-00

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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DATE	REVISED BY	DATE REVISED

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CITY OF LOS ANGELES
CITY OF LONG BEACH

CITY OF LOS ANGELES
CITY OF LONG BEACH

PEIR S AVENUE

HENRY FORD AVE

OCEAN BOULEVARD

EXIST R/W SEE NOTE 4

MATCH LINE SEE SHEET RW304

MATCH LINE SEE SHEET RW306

"L1" LINE

7436-032-904
US GOVERNMENT (NAVY)

7436-032-800
SOUTHERN CALIFORNIA EDISON

7436-032-901
CITY OF LONG BEACH

TCE SR47-1820-4
AE SR47-1820-3
HE SR47-1820
AE SR47-1820-1
TCE SR47-1820-2
TCE SR47-1821-5
TCE SR47-1821-4
AE SR47-1821-3
HE SR47-1821
AE SR47-1821-1
TCE SR47-1821-2
TCE SR47-1822-4
AE SR47-1822-3
HE SR47-1822
AE SR47-1822-1
TCE SR47-1822-2
TCE SR47-1823-1
HE SR47-1823
TCE SR47-1823-2

NOTES:

1. SEE DWG RW307 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVE 3

RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW305

LAST REVISION => TIME PLOTTED => 14:59:12
00-00-00 DATE PLOTTED => 11 JUL 2007

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

NOTES:

1. SEE DWG RW307 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

MATCH LINE SEE SHEET RW305

JOIN FUTURE OCEAN BLVD

EXIST STATE R/W SEE NOTE 4

"A1" LINE

AE SR47-1823

TCE SR47-1823-2

OCEAN BOULEVARD (FUTURE INTERSECTION)

SB SR47

NB SR47

LIMIT OF SR47-1801-1-AE AND SR47-1803-1-AE FOR ALTERNATIVE 3

7436-029-906 CITY OF LONG BEACH

PIER "T" EAST LEAD TRACK

7436-029-923

7436-029-915

7436-029-914 CITY OF LONG BEACH

FUTURE FLYOVER CONNECTOR

TCE SR47-1802-2

HE SR47-1802

AE SR47-1802-1

AE SR47-1802-4

AE SR47-1802-3

TCE SR47-1802-5

HE SR47-1802-6

AE SR47-1802-7

TCE SR47-1802-8

PIER "S" FUTURE IMPROVEMENTS

NEW DOCK STREET (FUTURE ALIGNMENT)

NEW DOCK STREET OFF RAMP

R=100

"B1" LINE

WYE TRACK

R=1375

R=5

"C1" LINE

NEW DOCK STREET

NEW DOCK STREET ON RAMP

PIER "S"

FOR CONTINUATION SEE ALTERNATIVE 3 DRAWING

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVE 3

RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW306

DATE	REVISED BY	DATE REVISED
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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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LAST REVISION => 00-00-00 TIME PLOTTED => 15:59:10
DATE PLOTTED => 11-JUL-2007

CU 07

EA 23850K

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE	DWG NO.
				REQUIRED	REMAINDER	TOTAL	EXCESS		
1	7440-021-913	SR47-1818	US GOVERNMENT (NAVY)	468 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW302
2	7440-021-913	SR47-1818-1	US GOVERNMENT (NAVY)	845 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
3	7440-021-913	SR47-1818-2	US GOVERNMENT (NAVY)	562 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
4	7436-032-907	SR47-1819	CITY OF LONG BEACH	6,393 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
5	7436-032-907	SR47-1819-1	CITY OF LONG BEACH	2,951 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
6	7436-032-907	SR47-1819-2	CITY OF LONG BEACH	1,967 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
7	7436-032-907	SR47-1819-3	CITY OF LONG BEACH	1,360 SQ. M				PERMANENT AERIAL EASEMENT (AE)	RW303
8	7436-032-907	SR47-1819-4	CITY OF LONG BEACH	406 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	RW304
9	7436-032-904	SR47-1820	US GOVERNMENT (NAVY)	2,431 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
10	7436-032-904	SR47-1820-1	US GOVERNMENT (NAVY)	898 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
11	7436-032-904	SR47-1820-2	US GOVERNMENT (NAVY)	598 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
12	7436-032-904	SR47-1820-3	US GOVERNMENT (NAVY)	869 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
13	7436-032-904	SR47-1820-4	US GOVERNMENT (NAVY)	607 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
14	7436-032-800	SR47-1821	SOUTHERN CALIFORNIA EDISON	437 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW305
15	7436-032-800	SR47-1821-1	SOUTHERN CALIFORNIA EDISON	141 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
16	7436-032-800	SR47-1821-2	SOUTHERN CALIFORNIA EDISON	94 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
17	7436-032-800	SR47-1821-3	SOUTHERN CALIFORNIA EDISON	174 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
18	7436-032-800	SR47-1821-4	SOUTHERN CALIFORNIA EDISON	16 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
19	7436-032-800	SR47-1821-5	SOUTHERN CALIFORNIA EDISON	66 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
20	7436-032-901	SR47-1822	CITY OF LONG BEACH	523 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
21	7436-032-901	SR47-1822-1	CITY OF LONG BEACH	291 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
22	7436-032-901	SR47-1822-2	CITY OF LONG BEACH	222 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
23	7436-032-901	SR47-1822-3	CITY OF LONG BEACH	77 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
24	7436-032-901	SR47-1822-4	CITY OF LONG BEACH	13 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
25	STREET	SR47-1823	CITY OF LONG BEACH	1,554 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
26	STREET	SR47-1823-1	CITY OF LONG BEACH	254 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
27	STREET	SR47-1823-2	CITY OF LONG BEACH	195 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
28	7436-029-914	SR47-1802	CITY OF LONG BEACH	1,058 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW306
29	7436-029-914	SR47-1802-1	CITY OF LONG BEACH	435 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
30	7436-029-906	SR47-1802-2	CITY OF LONG BEACH	327 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
31	7436-029-906	SR47-1802-3	CITY OF LONG BEACH	107 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
32	7436-029-906	SR47-1802-4	CITY OF LONG BEACH	28 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
33	7436-029-914	SR47-1802-5	CITY OF LONG BEACH	17 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
34	7436-029-914	SR47-1802-6	CITY OF LONG BEACH	1,366 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
35	7436-029-914	SR47-1802-7	CITY OF LONG BEACH	595 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
36	7436-029-914	SR47-1802-8	CITY OF LONG BEACH	494 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
37	7315-010-002	SR47-1760	MO TRUST	210 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW306A
38	7315-010-009	SR47-1760-1	MO TRUST	222 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
39	7315-010-009	SR47-1761	HERTZ EQUIPMENT RENTAL CORP.	306 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
40	7315-010-009	SR47-1761-1	HERTZ EQUIPMENT RENTAL CORP.	372 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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DATE

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DATE REVISED

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVE 3

RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500

RW307

LAST REVISION 00-00-00 | TIME PLOTTED => 14:00:21
DATE PLOTTED => 11 JUL 2007

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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USERNAME => sheth

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

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Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

BOULEVARD

7436-029-906
CITY OF LONG BEACH

EXISTING STATE ROW (SEE NOTE 1)

DRIP LINE

EXISTING STRUCTURE

SB SR47

NB SR47

REL SR47-1814

TCE SR47-1801-4

TCE SR47-1801-2

TCE SR47-1801-3

HE SR47-1801

AE SR47-1801-1

HE SR47-1803

AE SR47-1803-1

AE SR47-1803-3

AE SR47-1803-2

HE SR47-1803-5

AE SR47-1803-4

AE SR47-1803-9

AE SR47-1803-8

AE SR47-1803-7

AE SR47-1803-6

MATCH LINE / SEE DWG RW-309

OCEAN

7436-029-914
CITY OF LONG BEACH

TCE SR47-1802-2

HE SR47-1802

AE SR47-1802-1

7436-029-923

7436-029-918

INDUSTRY TRACKS

AE SR47-1802-4

AE SR47-1802-3

TCE SR47-1802-5

HE SR47-1802-6

AE SR47-1802-7

TCE SR47-1802-8

7436-032-901

7436-029-914

NOTES:

1. PRECISE LIMITS OF EXISTING CALTRANS ROW TO BE DETERMINED AT THE TIME OF FINAL DESIGN.
2. FOR PARCEL TABLE SEE DWG RW-317.
3. OCEAN BLVD FLYOVER SHOWN FOR INFORMATION ONLY. RW ACQUISITION TO BE MADE AT LATER DATE.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- EXISTING PERMANENT SLOPE EASEMENT (PSE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-308

LAST REVISION => TIME PLOTTED => 13:59:24
00-00-00 DATE PLOTTED => 11 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

DATE	REVISED BY	DATE REVISED

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FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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USERNAME => sheth

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

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ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

DATE | REVISED BY | DATE REVISED

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

MATCH LINE SEE DWG RW-308

MATCH LINE SEE DWG RW-310

DOCK STREET

NEW DOCK STREET OFF RAMP

NEW DOCK STREET ON RAMP

NEW

SB SR47

NB SR47

7436-029-923
CITY OF LONG BEACH

7436-029-906
CITY OF LONG BEACH

7436-029-915
CITY OF LONG BEACH

7436-029-917
CITY OF LONG BEACH

7436-029-019
VOPAK TERMINAL LONG BEACH INC.

7436-029-914
CITY OF LONG BEACH

EXISTING STATE ROW (SEE NOTE 1)

EXISTING STRUCTURE

DRIP LINE

TCE SR47-1804-7
HE SR47-1804
TCE SR47-1805-3
AE SR47-1805-1
HE SR47-1805
TCE SR47-1806-2
HE SR47-1806
AE SR47-1806-1
HE SR47-1807
AE SR47-1807-1
AE SR47-1805-2
AE SR47-1807-2
TCE SR47-1807-3
AE SR47-1805-5
AE SR47-1804-1
TCE SR47-1804-2
TCE SR47-1805-6
HE SR47-1805-4
REL SR47-1817
REL SR47-1814
TCE SR47-1804-4
AE SR47-1804-5
HE SR47-1803-9
AE SR47-1803-8
TCE SR47-1804-6
AE SR47-1804-3
HE SR47-1804-8
HE SR47-1802-6
AE SR47-1802-7
TCE SR47-1802-8
AE SR47-1808-2
TCE SR47-1808-5
HE SR47-1808
AE SR47-1808-1
AE SR47-1808-3
AE SR47-1808-4

NOTES:

1. PRECISE LIMITS OF EXISTING CALTRANS ROW TO BE DETERMINED AT THE TIME OF FINAL DESIGN.
2. FOR PARCEL TABLE SEE DWG RW-317.
3. OCEAN BLVD FLYOVER SHOWN FOR INFORMATION ONLY. RW ACQUISITION TO BE MADE AT LATER DATE.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- EXISTING PERMANENT SLOPE EASEMENT (PSE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-309

LAST REVISION => 00-00-00 | TIME PLOTTED => 13:52:56 | DATE PLOTTED => 11 JUL 2007

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

7436-029-019
VOPAK TERMINAL LONG BEACH INC.

CHANNEL

BADGER BRIDGE (RAIL)

7436-029-923
CITY OF LONG BEACH
EXISTING STATE ROW (SEE NOTE 1)

TCE SR47-1808-7

REL SR47-1817

TCE SR47-1809-2

REL SR47-1809

AE SR47-1808-4

COMMODORE HEIM BRIDGE

MATCH LINE SEE DWG RW-309

MATCH LINE SEE DWG RW-311

SB SR47

NB SR47

DRIP LINE

7436-029-914
CITY OF LONG BEACH

AE SR47-1808-1

HE SR47-1808

AE SR47-1808-2

AE SR47-1808-6

TCE SR47-1808-5

TCE SR47-1809-3

STATE OF CALIFORNIA

AE SR47-1809-1

CERRITOS

NOTE:

1. PRECISE LIMITS OF EXISTING CALTRANS ROW TO BE DETERMINED AT THE TIME OF FINAL DESIGN.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- EXISTING PERMANENT SLOPE EASEMENT (PSE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

LACFCD LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7736-029-914	SR47-1809	CITY OF LONG BEACH	9,263 SQ. M				RELINQUISHMENT BY CALTRANS (REL)
2	7736-029-914	SR47-1809-1	CITY OF LONG BEACH	5,726 SQ. M				PERMANENT AERIAL EASEMENT (AE)
3	7736-029-914	SR47-1809-2	CITY OF LONG BEACH	562 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7736-029-914	SR47-1809-3	CITY OF LONG BEACH	564 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
5	7436-029-923	SR47-1817	CITY OF LONG BEACH	6,274 SQ. M				RELINQUISHMENT BY CALTRANS (REL)
6								
7								
8								
9								
10								
11								
12								
13								

SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-310

LAST REVISION 00-00-00 | TIME PLOTTED => 13:53:18 | DATE PLOTTED => 11 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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DATE REVISED

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

CHANNEL

7436-011-904
CITY OF LONG BEACH

7440-003-904
CITY OF LOS ANGELES

7440-003-273
CITY OF LONG BEACH

BADGER BRIDGE
(RAIL)

ACTA 1 & 2 TRACKS

7436-011-910
7436-011-210
CITY OF LOS ANGELES
CITY OF LONG BEACH

REL SR47-1809-1

TCE SR47-1809-2

REL SR47-1811

MATCH LINE SEE DWG RW-310

COMMODORE HEIM BRIDGE

SB SR47

NB SR47

MATCH LINE SEE DWG RW-312

CERRITOS

STATE OF CALIFORNIA

7436-003-261
CITY OF LONG BEACH

CITY OF LOS ANGELES
CITY OF LONG BEACH

AE SR47-1809

TCE SR47-1809-3

TCE SR47-1810-4

TCE SR47-1810-3

AE SR47-1810-1

HE SR47-1810

AE SR47-1810-2

TCE SR47-1812-2

AE SR47-1812-1

HE SR47-1812

RIP RAP

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- EXISTING PERMANENT SLOPE EASEMENT (PSE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT
- LACFCD LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	ACQUISITION TYPE	EXCESS
1	7436-003-261	SR47-1810	CITY OF LONG BEACH	6,020 SQ. M			PERMANENT HIGWAY EASEMENT (HE)	
2	7436-003-261	SR47-1810-1	CITY OF LONG BEACH	685 SQ. M			PERMANENT AERIAL EASEMENT (AE)	
3	7436-003-261	SR47-1810-2	CITY OF LONG BEACH	545 SQ. M			PERMANENT AERIAL EASEMENT (AE)	
4	7436-003-261	SR47-1810-3	CITY OF LONG BEACH	462 SQ. M			TEMPORARY CONSTRUCTION EASEMENT (TCE)	
5	7436-003-261	SR47-1810-4	CITY OF LONG BEACH	322 SQ. M			TEMPORARY CONSTRUCTION EASEMENT (TCE)	
6	7436-011-210 7436-011-910	SR47-1811	CITY OF LOS ANGELES CITY OF LONG BEACH	4,673 SQ. M			RELINQUISHMENT BY CALTRANS (REL)	
7	7436-003-261	SR47-1812	CITY OF LONG BEACH	11,317 SQ. M			PERMANENT HIGHWAY EASEMENT (HE)	
8	7436-003-261	SR47-1812-1	CITY OF LONG BEACH	1,690 SQ. M			PERMANENT AERIAL EASEMENT (AE)	
9	7436-003-261	SR47-1812-2	CITY OF LONG BEACH	1,119 SQ. M			TEMPORARY CONSTRUCTION EASEMENT (TCE)	
10								

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DATE PLOTTED => 11 JUL 2007

SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-311

DATE	REVISED BY	DATE REVISED

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

DATE	REVISED BY
	DATE REVISED

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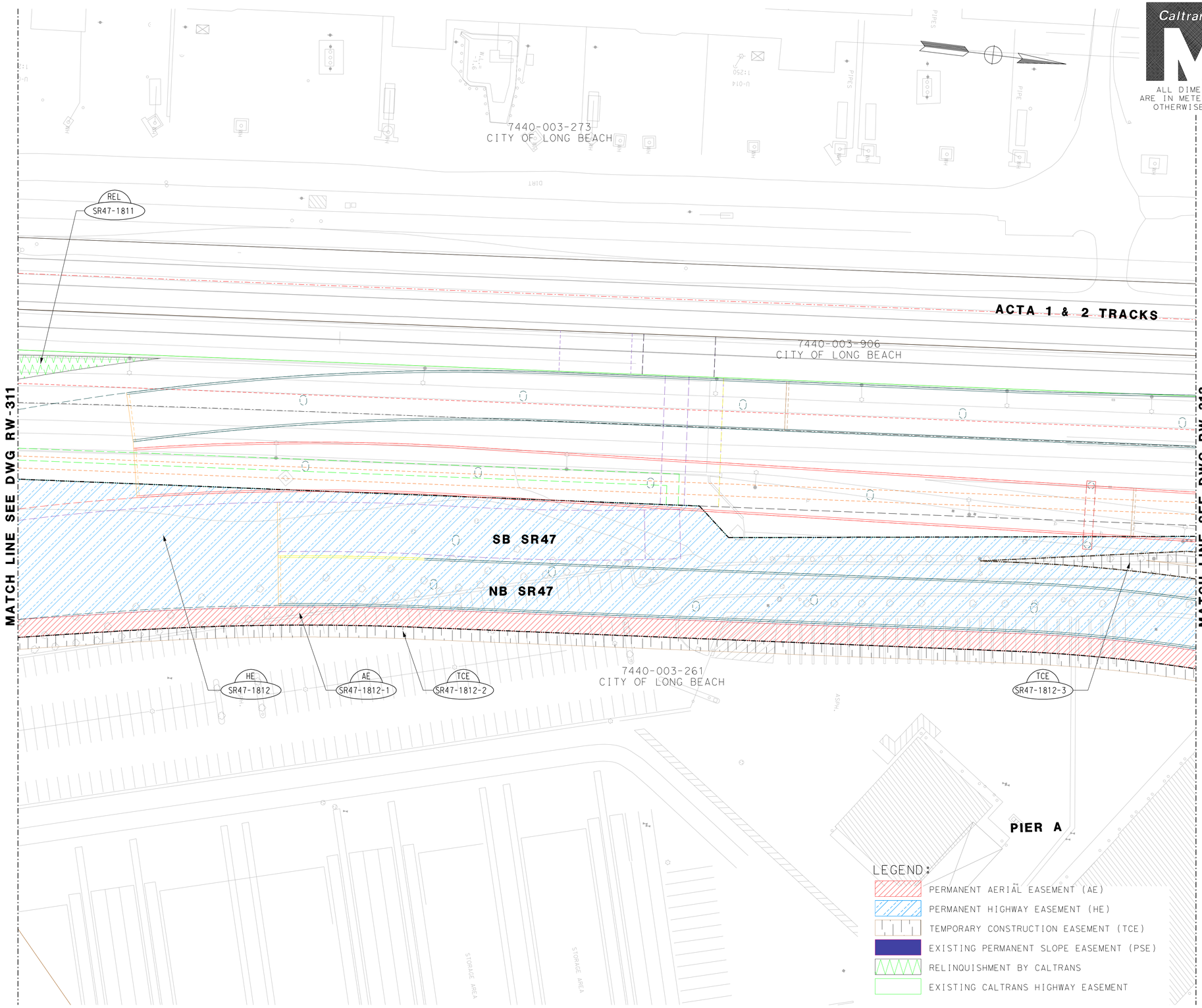
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans



NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE: TEMPORARY CONSTRUCTION EASEMENT (TCE)
1	7440-003-261	SR47-1812-3	CITY OF LONG BEACH	287 SQ. M				
2								
3								
4								
5								
6								

SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-312

LAST REVISION => 00-00-00 TIME PLOTTED => 13:53:57
DATE PLOTTED => 11 JUL 2007

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

NOTE:

1. PRECISE LIMITS OF CALTRANS RIGHT-OF-WAY PENDING PROPERTY TRANSFER TO CALTRANS FROM PORT OF LONG BEACH FOR HENRY FORD/TI FREEWAY INTERCHANGE PROJECT.

EXISTING UTILITY CORRIDOR

HENRY FORD AVENUE

7440-003-273
CITY OF LONG BEACH

7440-004-270
CITY OF LONG BEACH

7440-003-906
CITY OF LONG BEACH

7440-003-905

7440-003-906
CITY OF LONG BEACH

7440-003-274

NB SR103

HENRY FORD OFF RAMP

7440-003-901
LA CITY DEPARTMENT
OF WATER AND POWER

NB SR47

7440-003-281
CITY OF LONG BEACH

7440-003-272
CITY OF LONG BEACH

7440-003-274
CITY OF LONG BEACH

PIER A WAY

MATCH LINE SEE DWG RW-312

MATCH LINE SEE DWG RW-314

TCE SR47-1813-4

TCE SR47-1813-3

TCE SR47-1813-5

AE SR47-1812-1

HE SR47-1812

HE SR47-1813

TCE SR47-1812-2

AE SR47-1813-1

TCE SR47-1813-2

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- EXISTING PERMANENT SLOPE EASEMENT (PSE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT
- LADWP LA CITY DEPARTMENT OF WATER AND POWER

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7440-003-281	SR47-1813	CITY OF LONG BEACH	7,289 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
2	7440-003-281	SR47-1813-1	CITY OF LONG BEACH	1,220 SQ. M				PERMANENT AERIAL EASEMENT (AE)
3	7440-003-281	SR47-1813-2	CITY OF LONG BEACH	827 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7440-003-281	SR47-1813-3	CITY OF LONG BEACH	375 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
5	7440-003-281	SR47-1813-4	CITY OF LONG BEACH	417 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
6	7440-003-281	SR47-1813-5	CITY OF LONG BEACH	266 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
7								

SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-313

LAST REVISION 00-00-00 | TIME PLOTTED => 13:54:14 | DATE PLOTTED => 11 JUL 2007

DESIGN OVERSIGHT

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CU 07

EA 23850K

NOTE:

1. PRECISE LIMITS OF CALTRANS RIGHT-OF-WAY PENDING PROPERTY TRANSFER TO CALTRANS FROM PORT OF LONG BEACH FOR HENRY FORD/TI FREEWAY INTERCHANGE PROJECT.

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

7440-004-270
CITY OF LONG BEACH

EXISTING UTILITY CORRIDOR

7440-001-270
CITY OF LONG BEACH

7440-001-911
CITY OF LOS ANGELES

SOUND WALL

MATCH LINE SEE DWG RW-313

7440-002-278

7440-004-278

SB SR47

NB SR47

7440-002-823

HENRY FORD ON RAMP

SB SR103

NB SR103

7440-002-917
CITY OF LONG BEACH

7440-BRK-DWN

AE
SR47-1815

TCE
SR47-1815-2

AE
SR47-1815-1

TCE
SR47-1815-3

PIER A WAY

MATCH LINE SEE DWG RW-315

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- EXISTING PERMANENT SLOPE EASEMENT (PSE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7440-002-917	SR47-1815	CITY OF LONG BEACH	92 SQ. M				PERMANENT AERIAL EASEMENT (AE)
2	7440-002-917	SR47-1815-1	CITY OF LONG BEACH	253 SQ. M				PERMANENT AERIAL EASEMENT (AE)
3	7440-002-917	SR47-1815-2	CITY OF LONG BEACH	336 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7440-002-917	SR47-1815-3	CITY OF LONG BEACH	351 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
5								
6								

SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-314

LAST REVISION => 00-00-00
TIME PLOTTED => 11:54:31
DATE PLOTTED => 11 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

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DATE REVISED	

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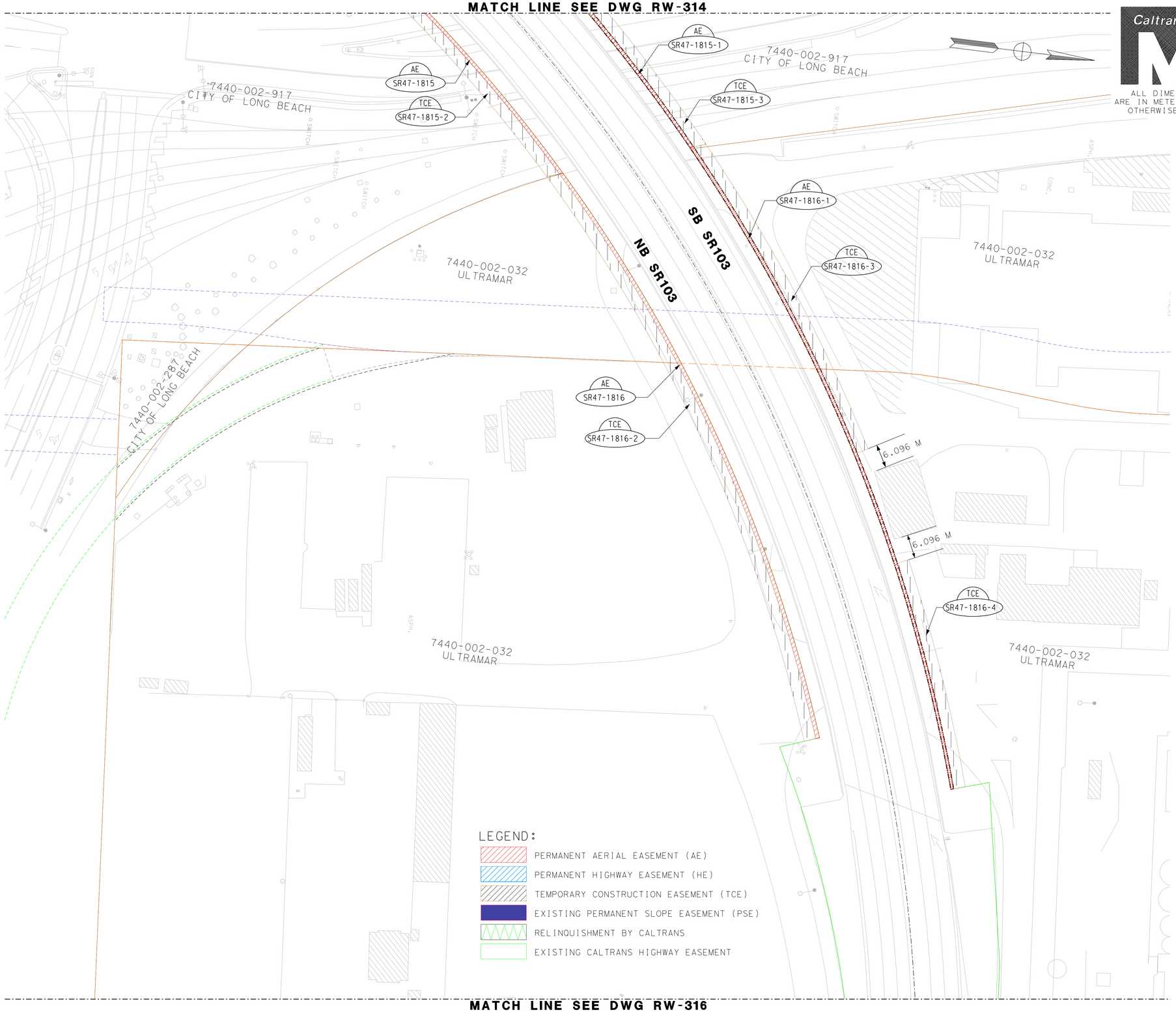
CU 07

EA 23850K

MATCH LINE SEE DWG RW-314



LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- EXISTING PERMANENT SLOPE EASEMENT (PSE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

MATCH LINE SEE DWG RW-316

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS TOTAL EXCESS	AREAS REMAINDER	ACQUISITION TYPE
1	7440-002-032	SR47-1816	ULTRAMAR	151 SQ. M			PERMANENT AERIAL EASEMENT (AE)
2	7440-002-032	SR47-1816-1	ULTRAMAR	253 SQ. M			PERMANENT AERIAL EASEMENT (AE)
3	7440-002-032	SR47-1816-2	ULTRAMAR	490 SQ. M			TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7440-002-032	SR47-1816-3	ULTRAMAR	272 SQ. M			TEMPORARY CONSTRUCTION EASEMENT (TCE)
5	7440-002-032	SR47-1816-4	ULTRAMAR	184 SQ. M			TEMPORARY CONSTRUCTION EASEMENT (TCE)
6							
7							

SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-315

LAST REVISION => 00-00-00
TIME PLOTTED => 13:54:49
DATE PLOTTED => 11-JUL-2007

DATE	REVISED BY	DATE REVISED

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

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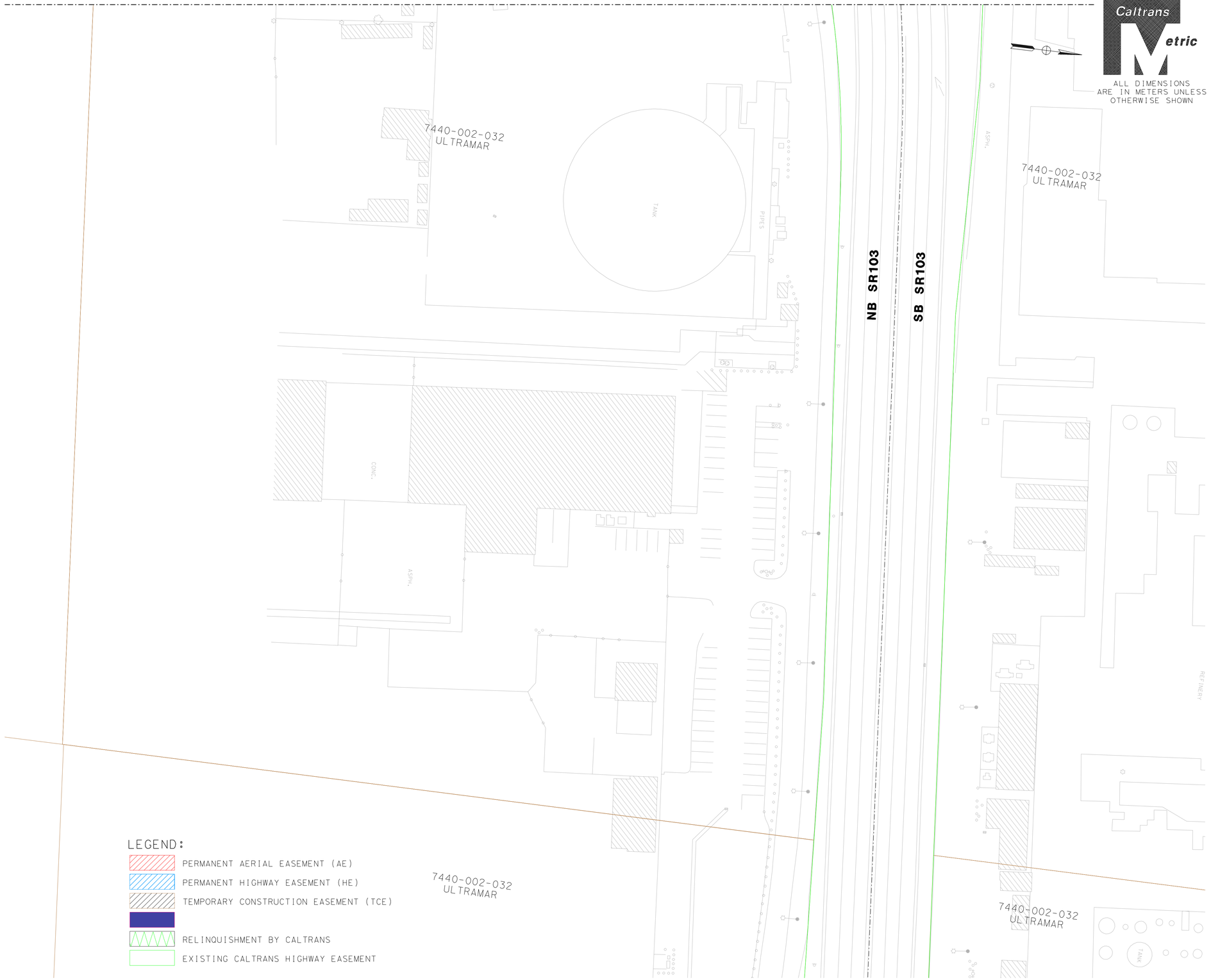
CU 07

EA 23850K

MATCH LINE SEE DWG RW-315



LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-316

LAST REVISION => TIME PLOTTED => 13:55:18
00-00-00 DATE PLOTTED => 11 JUL 2007

DATE	REVISED BY
DATE REVISED	

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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CU 07

EA 23850K

NOTES:

1. SEE DWG RW307 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

SAN PEDRO SUBDIVISION TRACKS

223RD STREET

S. ALAMEDA STREET

HE SR47-1760

TCE SR47-1760-1

TCE SR47-1761-1

HE SR47-1761

LA COUNTY FLUORDATION SUBSTATION (LESEE)

EXISTING FENCE

7315-010-002
MO TRUST

7315-010-009
HERTZ EQUIPMENT RENTAL CORP.

7315-010-800
SOUTHERN PACIFIC (UPRR)

010-010
PROPERTIES

DOCK LOADING

ASPH CONC GNV SIGN GATE

DATE	REVISED BY	DATE REVISED

CALCULATED/ DESIGNED BY

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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

SR-47 EXPRESSWAY

OCEAN BOULEVARD/ SR47 FLYOVER ALTERNATIVE 3 RIGHT-OF-WAY EXHIBIT

HORIZ SCALE 1:500 **RW306A**

LAST REVISION | TIME PLOTTED => 14:00:06
00-00-00 | DATE PLOTTED => 11-JUL-2007

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CU 07 | EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

NOTES:

1. SEE DWG RW317 FOR PARCEL TABLE.
2. LIMITS OF EXISTING R/W TO BE VERIFIED AT THE TIME OF DESIGN.
3. ACTUAL TOPOGRAPHY WEST OF SR47 BASED ON OCEAN BLVD GRADE SEPARATION PROJECT, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.
4. EXISTING R/W PER OCEAN BLVD GRADE SEPARATION PROJECT, POLB, HDS-2103, AS PREPARED BY PARSONS TRANSPORTATION GROUP.

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

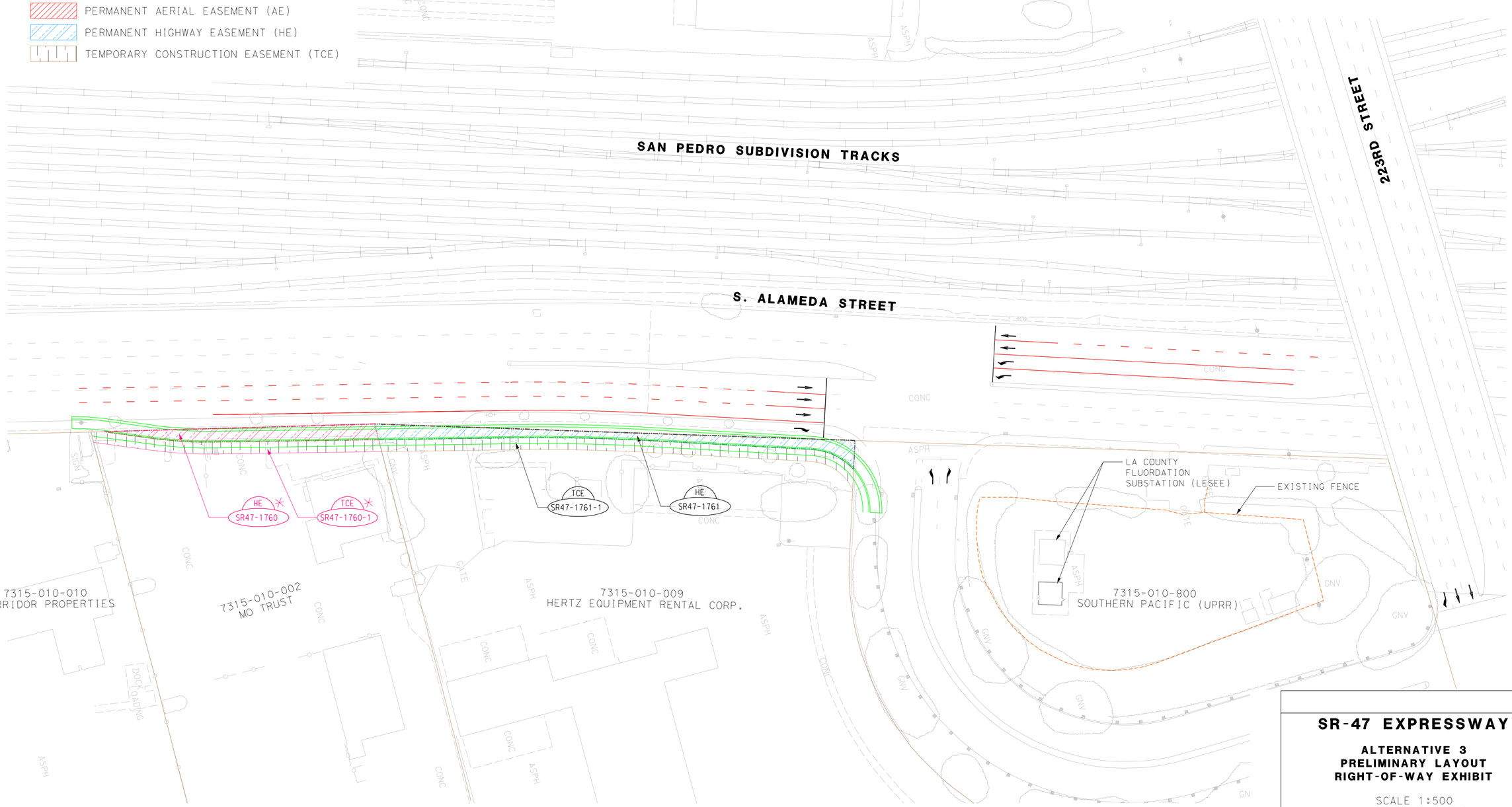
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745



SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-316A

LAST REVISION: TIME PLOTTED => 13:55:36
00-00-00 DATE PLOTTED => 11 JUL 2007

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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CU 07

EA 23850K

NO.	APN	PARCEL NO.	GRANTOR	AREAS				ACQUISITION TYPE	DWG NO.
				REQUIRED	REMAINDER	TOTAL	EXCESS		
1	7436-029-906	SR47-1801	CITY OF LONG BEACH	78 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW-308
2	7436-029-906	SR47-1801-1	CITY OF LONG BEACH	401 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
3	7436-029-914	SR47-1801-2	CITY OF LONG BEACH (RAIL)	339 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
4	7436-029-914	SR47-1801-3	CITY OF LONG BEACH	9 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
5	7436-029-914	SR47-1801-4	CITY OF LONG BEACH	4 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
6	7436-029-914	SR47-1802 *	CITY OF LONG BEACH	1,058 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
7	7436-029-914	SR47-1802-1 *	CITY OF LONG BEACH	435 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
8	7436-029-914	SR47-1802-2 *	CITY OF LONG BEACH	327 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
9	7436-029-914	SR47-1802-3 *	CITY OF LONG BEACH (RAIL)	107 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
10	7436-029-914	SR47-1802-4 *	CITY OF LONG BEACH (RAIL)	28 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
11	7436-029-914	SR47-1802-5 *	CITY OF LONG BEACH (RAIL)	17 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
12	7436-029-914	SR47-1802-6 *	CITY OF LONG BEACH	1,366 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
13	7436-029-914	SR47-1802-7 *	CITY OF LONG BEACH	595 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
14	7436-029-914	SR47-1802-8 *	CITY OF LONG BEACH	494 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
15	7436-029-914	SR47-1803	CITY OF LONG BEACH	251 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
16	7436-029-914	SR47-1803-1	CITY OF LONG BEACH	784 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
17	7436-029-914	SR47-1803-2	CITY OF LONG BEACH (RAIL)	37 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
18	7436-029-914	SR47-1803-3	CITY OF LONG BEACH (RAIL)	19 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
19	7436-029-914	SR47-1803-4	CITY OF LONG BEACH	48 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
20	7436-029-914	SR47-1803-5	CITY OF LONG BEACH	59 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
21	7436-029-914	SR47-1803-6	CITY OF LONG BEACH (RAIL)	44 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
22	7436-029-914	SR47-1803-7	CITY OF LONG BEACH (RAIL)	32 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
23	7436-029-914	SR47-1803-8	CITY OF LONG BEACH	667 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
24	7436-029-914	SR47-1803-9	CITY OF LONG BEACH	656 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	▼
25	7436-029-917	SR47-1804	CITY OF LONG BEACH	607 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	RW-309
26	7436-029-917	SR47-1804-1	CITY OF LONG BEACH	285 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
27	7436-029-917	SR47-1804-2	CITY OF LONG BEACH	250 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
28	7436-029-917	SR47-1804-3	CITY OF LONG BEACH	24 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
29	7436-029-917	SR47-1804-4	CITY OF LONG BEACH (RAIL)	16 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
30	7436-029-917	SR47-1804-5	CITY OF LONG BEACH (RAIL)	46 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
31	7436-029-917	SR47-1804-6	CITY OF LONG BEACH	29 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
32	7436-029-917	SR47-1804-7	CITY OF LONG BEACH	27 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
33	7436-029-917	SR47-1804-8	CITY OF LONG BEACH	64 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
34	7436-029-923	SR47-1805	CITY OF LONG BEACH	510 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
35	7436-029-923	SR47-1805-1	CITY OF LONG BEACH	50 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
36	7436-029-923	SR47-1805-2	CITY OF LONG BEACH	25 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
37	7436-029-923	SR47-1805-3	CITY OF LONG BEACH	49 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
38	7436-029-923	SR47-1805-4	CITY OF LONG BEACH	71 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
39	7436-029-923	SR47-1805-5	CITY OF LONG BEACH	48 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
40	7436-029-923	SR47-1805-6	CITY OF LONG BEACH	19 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
41	7436-029-019	SR47-1806	VOPAK TERMINAL LONG BEACH INC.	156 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
42	7436-029-019	SR47-1806-1	VOPAK TERMINAL LONG BEACH INC.	255 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
43	7436-029-019	SR47-1806-2	VOPAK TERMINAL LONG BEACH INC.	225 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
44	7436-029-917	SR47-1807	CITY OF LONG BEACH	258 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
45	7436-029-917	SR47-1807-1	CITY OF LONG BEACH	157 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
46	7436-029-917	SR47-1807-2	CITY OF LONG BEACH (RAIL)	25 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
47	7436-029-917	SR47-1807-3	CITY OF LONG BEACH	125 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
48	7436-029-914	SR47-1808	CITY OF LONG BEACH	17,305 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)	
49	7436-029-914	SR47-1808-1	CITY OF LONG BEACH	1,392 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
50	7436-029-914	SR47-1808-2	CITY OF LONG BEACH	2,030 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
51	7436-029-914	SR47-1808-3	CITY OF LONG BEACH	260 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
52	7436-029-914	SR47-1808-4	CITY OF LONG BEACH	101 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
53	7436-029-914	SR47-1808-5	CITY OF LONG BEACH	1,372 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	
54	7436-029-914	SR47-1808-6	CITY OF LONG BEACH	534 SQ. M				PERMANENT AERIAL EASEMENT (AE)	
55	7736-029-917	SR47-1814	CITY OF LONG BEACH	3,870 SQ. M				RELINQUISHMENT BY CALTRANS (REL)	▼
56	7436-029-914	SR47-1808-7	CITY OF LONG BEACH	228 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)	RW-310

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 4.4/9.3		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

DESIGN OVERSIGHT

CALCULATED/ DESIGNED BY

CHECKED BY

DATE

REVISED BY

DATE REVISED

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

SR-47 EXPRESSWAY

ALTERNATIVE 3
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-317

LAST REVISION 00-00-00 TIME PLOTTED => 13:56:50
DATE PLOTTED => 11 JUL 2007

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 5.6/7.3		

Caltrans Metric

ALL DIMENSIONS
ARE IN METERS UNLESS
OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
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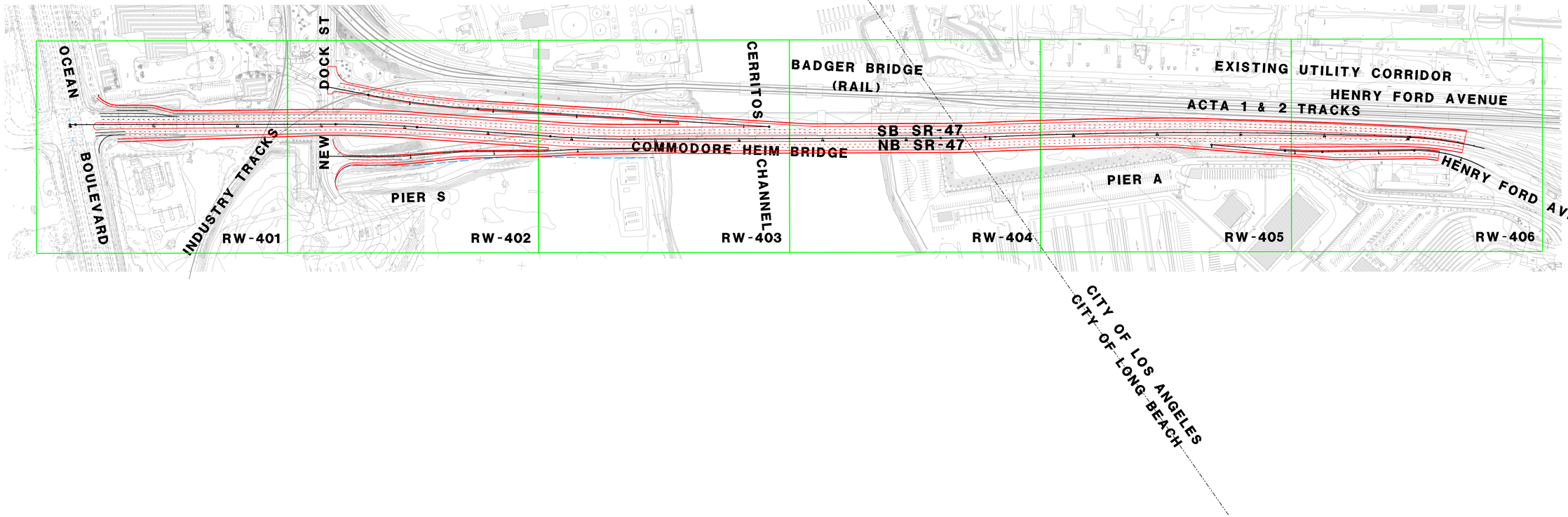
CARSON, CALIFORNIA 90745



SR-47 EXPRESSWAY

ALTERNATIVE 4
RIGHT-OF-WAY KEY MAP

SCALE 1:2500

RW-400

CALCULATED/ DESIGNED BY	DATE	REVISED BY	DATE REVISED
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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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CU 07 | EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 5.6/7.3		

REGISTERED CIVIL ENGINEER

PLANS

PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

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BOULEVARD

7436-029-906
CITY OF LONG BEACH

EXISTING PERMANENT SLOPE EASEMENT (TCE)

DRIP LINE

EXISTING STRUCTURE

TCE SR47-1901-2

AE SR47-1901-1

HE SR47-1901

SB SR47

NB SR47

10 11 12

DRIP LINE

EXISTING STRUCTURE

HE SR47-1902

AE SR47-1902-1

TCE SR47-1902-2

MATCH LINE SEE DWG RW-402

OCEAN

EXISTING PERMANENT SLOPE EASEMENT (TCE)

7436-029-914
CITY OF LONG BEACH

7436-029-923

7436-029-918

INDUSTRY TRACKS

7436-032-901

7436-029-914

LEGEND:
- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS EASEMENT (TCE)
- EXISTING CALTRANS HIGHWAY EASEMENT
- EXISTING CALTRANS HIGHWAY EASEMENT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7436-029-906	SR47-1901	CITY OF LONG BEACH	803 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
2	7436-029-906	SR47-1901-1	CITY OF LONG BEACH	1,909 SQ. M				PERMANENT AERIAL EASEMENT (AE)
3	7436-029-906	SR47-1901-2	CITY OF LONG BEACH	1,013 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7436-029-914	SR47-1902	CITY OF LONG BEACH	595 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
5	7436-029-914	SR47-1902-1	CITY OF LONG BEACH	4,183 SQ. M				PERMANENT AERIAL EASEMENT (AE)
6	7436-029-914	SR47-1902-2	CITY OF LONG BEACH	2,081 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
7								
8								

SR-47 EXPRESSWAY

ALTERNATIVE 4
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-401

LAST REVISION => TIME PLOTTED => 10:10:46
00-00-00 DATE PLOTTED => 12 JUL 2007

DATE	REVISED BY
DATE REVISED	

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 5.6/7.3		

REGISTERED CIVIL ENGINEER

PLANS

PROFESSIONAL ENGINEER — REGISTERED — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

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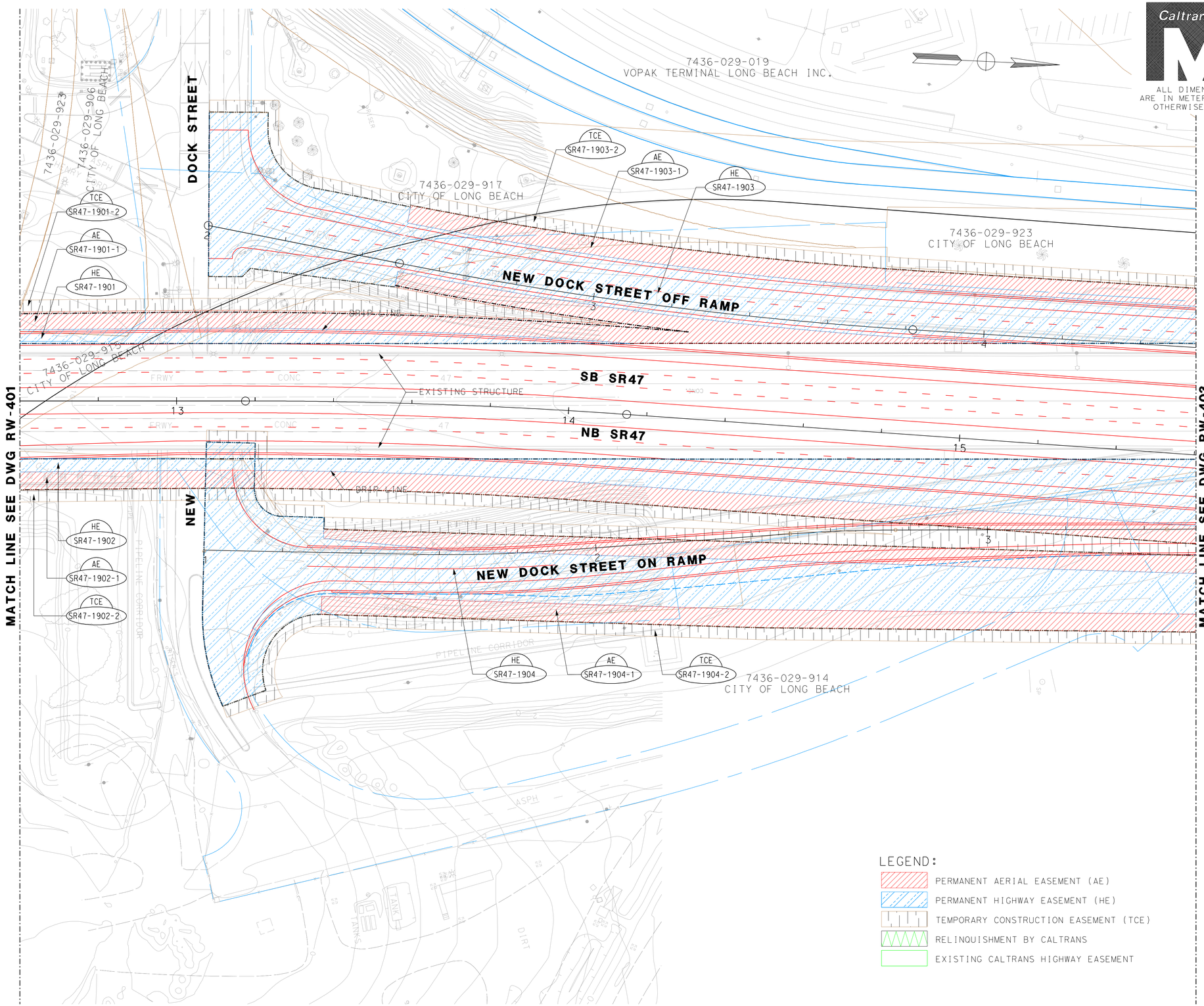

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7436-029-906	SR47-1903	CITY OF LONG BEACH	4,568 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
2	7436-029-906	SR47-1903-1	CITY OF LONG BEACH	1,536 SQ. M				PERMANENT AERIAL EASEMENT (AE)
3	7436-029-906	SR47-1903-2	CITY OF LONG BEACH	1,289 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7436-029-914	SR47-1904	CITY OF LONG BEACH	12,437 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
5	7436-029-914	SR47-1904-1	CITY OF LONG BEACH	1,994 SQ. M				PERMANENT AERIAL EASEMENT (AE)
6	7436-029-914	SR47-1904-2	CITY OF LONG BEACH	1,454 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
7								
8								

NO.	DATE	REVISED BY	DATE REVISED

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DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

SR-47 EXPRESSWAY

ALTERNATIVE 4
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-402

LAST REVISION => TIME PLOTTED => 00:00:00
DATE PLOTTED => 12 JUL 2007

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 5.6/7.3		

REGISTERED CIVIL ENGINEER

PLANS

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

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CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

7436-029-019
VOPAK TERMINAL LONG BEACH INC.

CHANNEL

BADGER BRIDGE (RAIL)

7436-029-923
CITY OF LONG BEACH

HE SR47-1903 | AE SR47-1903-1 | TCE SR47-1903-2

DRIP LINE

SB SR47

NB SR47

MATCH LINE SEE DWG RW-402

MATCH LINE SEE DWG RW-404

COMMODORE HEIM BRIDGE

AE SR47-1905 | TCE SR47-1905-1

TCE SR47-1902-2 | DRIP LINE | HE SR47-1904 | AE SR47-1904-1 | AE SR47-1902-1 | TCE SR47-1904-2

7436-029-914
CITY OF LONG BEACH

STATE OF CALIFORNIA

CERRITOS

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT
- LACFCD LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE: PERMANENT AERIAL EASEMENT (AE)	ACQUISITION TYPE: TEMPORARY CONSTRUCTION EASEMENT (TCE)
1	XXXX	SR47-1905	STATE OF CALIFORNIA	5,659 SQ. M					
2	XXXX	SR47-1905-1	STATE OF CALIFORNIA	560 SQ. M					
3									
4									
5									
6									

DATE	REVISED BY	DATE REVISED

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

SR-47 EXPRESSWAY

ALTERNATIVE 4
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-403

LAST REVISION 00-00-00
TIME PLOTTED => 07:11:33
DATE PLOTTED => 12 JUL 2007

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CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 5.6/7.3		

REGISTERED CIVIL ENGINEER

PLANS

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ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

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CHANNEL

7440-003-904
CITY OF LOS ANGELES

7436-011-904
CITY OF LONG BEACH

7440-003-273
CITY OF LONG BEACH

BADGER BRIDGE (RAIL)

7436-011-910
7436-011-210
CITY OF LOS ANGELES
CITY OF LONG BEACH

ACTA 1 & 2 TRACKS

MATCH LINE SEE DWG RW-403

MATCH LINE SEE DWG RW-405

SB SR47

NB SR47

19

20

21

COMMODORE HEIM BRIDGE

AE SR47-1905

TCE SR47-1905-1

HE SR47-1906

HE SR47-1906-1

TCE SR47-1906-2

HE SR47-1907

HE SR47-1907-1

TCE SR47-1907-2

CERRITOS

STATE OF CALIFORNIA

7436-003-261
CITY OF LONG BEACH

CITY OF LOS ANGELES
CITY OF LONG BEACH

RIP RAP

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT
- LACFCD LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7436-003-261	SR47-1906	CITY OF LONG BEACH	2,690 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
2	7436-003-261	SR47-1906-1	CITY OF LONG BEACH	622 SQ. M				PERMANENT AERIAL EASEMENT (AE)
3	7436-003-261	SR47-1906-2	CITY OF LONG BEACH	421 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4	7436-003-261	SR47-1907	CITY OF LONG BEACH	2,366 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
5	7436-003-261	SR47-1907-1	CITY OF LONG BEACH	1,680 SQ. M				PERMANENT AERIAL EASEMENT (AE)
6	7436-003-261	SR47-1907-2	CITY OF LONG BEACH	1,175 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)

SR-47 EXPRESSWAY

ALTERNATIVE 4
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-404

LAST REVISION => 00-00-00
TIME PLOTTED =>
DATE PLOTTED => 12 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

DATE	REVISED BY	DATE REVISED
	CALCULATED/ DESIGNED BY	
	CHECKED BY	

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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USERNAME => sheth

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 5.6/7.3		

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED CIVIL ENGINEER

PLANS

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

7440-003-273
CITY OF LONG BEACH

ACTA 1 & 2 TRACKS

7440-003-906
CITY OF LONG BEACH

SB SR47

NB SR47

22 23 24

3

MATCH LINE SEE DWG RW-404

MATCH LINE SEE DWG RW-406

HE SR47-1907

AE SR47-1907-1

TCE SR47-1907-2

AE SR47-1907-4

HE SR47-1907-3

7440-003-261
CITY OF LONG BEACH

PIER A

LEGEND:
- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE: PERMANENT HIGHWAY EASEMENT (HE)	ACQUISITION TYPE: PERMANENT AERIAL EASEMENT (AE)
1	7436-003-261	SR47-1907-3	CITY OF LONG BEACH	357 SQ. M					
2	7436-003-261	SR47-1907-4	CITY OF LONG BEACH	1,680 SQ. M					
3									
4									
5									
6									

SR-47 EXPRESSWAY

ALTERNATIVE 4
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-405

LAST REVISION => 00-00-00 TIME PLOTTED => 07:12:09
DATE PLOTTED => 12 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

DATE	REVISED BY	DATE REVISED

CALCULATED/DESIGNED BY

CHECKED BY

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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USERNAME => sheth

CU 07

EA 23850K

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
7	LA	47	KP 5.6/7.3		

REGISTERED CIVIL ENGINEER

PLANS

PROFESSIONAL ENGINEER — REGISTERED — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

ALAMEDA CORRIDOR ENGINEERING TEAM
ONE CIVIC PLAZA, SUITE 350
CARSON, CALIFORNIA 90745

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

7440-003-273
CITY OF LONG BEACH

7440-004-270
CITY OF LONG BEACH

EXISTING UTILITY CORRIDOR

HENRY FORD AVENUE

7440-003-906
CITY OF LONG BEACH

7440-003-905

7440-003-906
CITY OF LONG BEACH

7440-003-274

HENRY FORD ON RAMP

SB SR103

HENRY FORD OFF RAMP

MATCH LINE SEE DWG RW-405

25 26 27 4 5 6 1

HE SR47-1908
AE SR47-1908-1
TCE SR47-1908-2
HE SR47-1907-3
AE SR47-1907-4
TCE SR47-1907-2

7440-003-901
LA CITY DEPARTMENT
OF WATER AND POWER

7440-003-281
CITY OF LONG BEACH

7440-003-272
CITY OF LONG BEACH

PIER A WAY

7440-003-274
CITY OF LONG BEACH

LEGEND:

- PERMANENT AERIAL EASEMENT (AE)
- PERMANENT HIGHWAY EASEMENT (HE)
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- RELINQUISHMENT BY CALTRANS
- EXISTING CALTRANS HIGHWAY EASEMENT

LADWP LA CITY DEPARTMENT OF WATER AND POWER

NO.	APN	PARCEL NO.	GRANTOR	AREAS REQUIRED	AREAS REMAINDER	AREAS TOTAL	AREAS EXCESS	ACQUISITION TYPE
1	7440-003-281	SR47-1908	CITY OF LONG BEACH	1,308 SQ. M				PERMANENT HIGHWAY EASEMENT (HE)
2	7440-003-281	SR47-1908-1	CITY OF LONG BEACH	729 SQ. M				PERMANENT AERIAL EASEMENT (AE)
3	7440-003-281	SR47-1908-2	CITY OF LONG BEACH	399 SQ. M				TEMPORARY CONSTRUCTION EASEMENT (TCE)
4								
5								
6								

SR-47 EXPRESSWAY

ALTERNATIVE 4
PRELIMINARY LAYOUT
RIGHT-OF-WAY EXHIBIT

SCALE 1:500

RW-406

LAST REVISION => 00-00-00 TIME PLOTTED => 07:12:26
DATE PLOTTED => 12 JUL 2007

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

CALCULATED/ DESIGNED BY
CHECKED BY

DATE
REVISED BY
DATE REVISED

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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CU 07

EA 23850K

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, District Director
100 S. Main Street
LOS ANGELES, CA 90012-3606
PHONE (213) 897-4937
FAX (213) 897-0685

Flex your power!
Be Energy efficient!

August 17, 2007

Responsible agencies, Review Agencies, Trustee Agencies and individuals interested in the Schuyler Heim Bridge Replacement and SR-47 Expressway Project

File: 07-LA-47 PM 2.7/5.8
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
EA 238500

Notice of Public Hearing and Availability of Environmental Impact Report/Statement

The California Department of Transportation (Caltrans) has completed the Draft Environmental Impact Report/Statement (EIR/EIS) for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project in the Ports of Long Beach and Los Angeles, California. The proposed alternatives include the replacement of the Schuyler Heim lifted bridge with a fix span bridge and either construction of an elevated SR-47 expressway from Terminal Island to Alameda Street (the new bridge will be a portion of the new expressway) or construction of an elevated SR-103 extension. There are six alternatives for the project that are discussed in the document.

A Public Hearing will be held to discuss the project on **September 25, 2007** from 6:00 p.m. to 8:00 p.m. at the Banning's Landing Community Center, located at 100 East Water Street, Wilmington, CA 90744. Project staff will be available to discuss the project and to answer any questions about the proposed project.

If an effort to save paper, the enclosed Draft EIR/EIS is being sent on CD along with a hard copy of the Document Summary. A hard copy of the document may also be viewed at the following locations:

- Caltrans, District 7, 100 S. Main Street, Los Angeles, CA 90012
- Wilmington Library, 1300 N. Avalon Blvd., Wilmington, CA 90744
- Carson Regional Library, 151 E. Carson St. Carson, CA 90745-2797
- Victoria Park Library. 17906 S. Avalon Blvd, Carson, CA 90746-1598
- San Pedro Regional Library, 931 S. Gaffey St. San Pedro, CA 90731
- Harbor City – Harbor Gateway Branch Library, 24000 S. Western, Harbor City, CA 90710
- Long Beach City Library – Harte Library: 1595 W. Willow Street, Long Beach, CA 90810
- Long Beach Main Library, 101 Pacific Avenue, Long Beach, CA 90802
- Mark Twain Neighborhood Library, 1325 E. Anaheim Street, Long Beach, CA 90813
- East Rancho Dominguez Library, 4205 E. Compton Blvd., East Rancho Dominguez, CA 90221-3664

The Draft EIR/EIS may also be accessed from our website: http://www.dot.ca.gov/dist07/resources/envdocs/ and through the Alameda Corridor Transportation Authority website at www.acta.org

We will be pleased to answer any questions you may have with regard to this project. It may be to your advantage to view the project plans at the Public Hearing to clarify any questions you may have about the proposals. Written comments on the Draft EIR/EIS must be submitted by **October 16, 2007**.

Please send your comments to:

Ronald J. Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 S. Main Street MS-16A
Los Angeles, CA 90012

If you have any questions, please contact Karl Price, (213) 897-1839. Thank you for your interest in this important transportation study.

Sincerely,

RON KOSINSKI
Deputy District Director, Caltrans District 7

Enclosures

stated. This document corrects the notice.

DATES: This action is effective August 24, 2007.

ADDRESSES: Copies of the documentation used in the notice being corrected are available for inspection during normal business hours at the following location: U.S. Environmental Protection Agency, Region 4, 61 Forsyth Street, SW., Atlanta, Georgia 30303–8960. The Regional Office's official hours of business are Monday through Friday, 8:30 to 4:30, excluding Federal holidays.

FOR FURTHER INFORMATION CONTACT: Lynorae Benjamin, Air Quality Modeling and Transportation Section, Air Planning Branch, Air, Pesticides and Toxics Management Division, U.S. Environmental Protection Agency, Region 4, 61 Forsyth Street, SW., Atlanta, Georgia 30303–8960. The telephone number is (404) 562–9040. Ms. Benjamin can also be reached via electronic mail at *Benjamin.Lynorae@epa.gov.* The finding is available at EPA's conformity Web site: *http://www.epa.gov/otaq/stateresources/transconf/currsips.htm.*

SUPPLEMENTARY INFORMATION:

Correction

EPA is correcting the error in the **Federal Register** notice, published on April 9, 2007 (72 FR 17550), which announced the adequacy finding for the 2006 MVEBs. In that notice on page 17550, in the third column, the table labeled ''Atlanta 8-Hour Ozone MVEBs,'' EPA inadvertently identified the NO_X MVEB as 172.27 tpd and the VOC MVEB as 306.75 tpd. This action corrects that error. As announced in EPA's January 24, 2007, letter from Beverly Banister, Director of the Air, Pesticides and Toxics Management Division, to Heather Abrams, Chief of EPD's Air Protection Branch, the correct 2006 MVEBs for the Atlanta 8-Hour Ozone Area, as established by the Early Progress Plan, are provided in the following table.

ATLANTA 8-HOUR OZONE MVEBS

[Tons per day]

	2006
NO_X	306.75
VOC	172.27

Authority: 42 U.S.C. 7401 *et seq.*

Dated: August 16, 2007.

J.I. Palmer, Jr.,

Regional Administrator, Region 4.

[FR Doc. E7–16802 Filed 8–23–07; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–6690–3]

Environmental Impact Statements and Regulations; Availability of EPA Comments

Availability of EPA comments prepared pursuant to the Environmental Review Process (ERP), under section 309 of the Clean Air Act and section 102(2)(c) of the National Environmental Policy Act as amended. Requests for copies of EPA comments can be directed to the Office of Federal Activities at 202–564–7167.

An explanation of the ratings assigned to draft environmental impact statements (EISs) was published in the **Federal Register** dated April 6, 2007 (72 FR 17156).

Draft EISs

EIS No. 20070205, ERP No. D–AFS–L65537–WA. Tripod Fire Salvage Project, Proposal to Salvage Harvest Dead Trees and Fire-Injured Trees Expected to Die Within One Year, Methow Valley and Tonasket Ranger Districts, Okanogan and Wenatchee National Forests, Okanogan County, WA.

Summary: EPA does not object to the proposed project, but recommended expanding the purpose and need to include active restoration and monitoring survival of fire-damaged trees across the Tripod burn area to validate the proposed methodology for determining post fire tree mortality. Rating LO.

EIS No. 20070227, ERP No. D–NPS–K61166–CA. Golden Gate National Recreation Area, Proposed Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan, Implementation, Marin County, CA.

Summary: EPA does not object with the proposed action. Rating LO.

EIS No. 20070239, ERP No. D–AFS–K65329–CA. Sugarberry Project, Proposes to Protect Rural Communities from Fire Hazards by Constructing Fuel Breaks Known as Defensible Fuel Profile Zones (DFPZs), Feather River Ranger District, Plumas National Forest, Plumas, Sierra, Yuba Counties, CA.

Summary: EPA expressed environmental concern about natural resource impacts, impacts to habitat fragmentation and cumulative effects. Rating EC2.

EIS No. 20070248, ERP No. D–SFW–F65068–WI. Trempealeau National Wildlife Refuge Comprehensive Conservation Plan, Implementation, located within the Mississippi River Valley, Buffalo and Trempealeau Counties, WI.

Summary: EPA does not object to the action as proposed. Rating LO.

EIS No. 20070257, ERP No. D–FHW–F40195–MN. Tier 1 DEIS—Trunk Highway (TH) 41 Minnesota River Crossing, Construction of a New Minnesota River Crossing Connecting U.S. Highway 169 to New US Highway 212, U.S. Army COE section 10 and 404 Permits, Scott and Carver Counties, MN.

Summary: EPA expressed environmental objections about impacts on calcareous fens and the low potential for successful mitigation. EPA also requested that a conceptual wetland mitigation plan be developed and included in the final EIS. Rating EO2.

Final EISs

EIS No. 20070249, ERP No. F–AFS–L65527–WA, Natapoc Ridge Restoration Project, To Improve Forest Health and Sustainability, and Reduce Wildfire and Hazardous Fuels, Wenatchee River Ranger District, Okanogan-Wenatchee National Forest, Chelan County, WA.

Summary: The Final EIS has addressed EPA's concerns about meeting the Aquatic Concervation Strategy objectives and sedimentation rates by including additional road improvements and aquatic resource mitigation measures.

EIS No. 20070259, ERP No. F–FHW–E40805–KY, Newtown Pike Extension Project, Road Connection from West Main Street to South Limestone Street in Lexington, Fayette County, KY

Summary: EPA expressed environmental concerns about impacts to floodplains. EPA is also concerned with hazardous waste remediation for contaminated soil as well as potentially significant cumulative impacts.

EIS No. 20070290, ERP No. F–RUS–H05025–MO, Norborne Baseload Power Plant, Proposed Construction and Operation of a 660-megawatt Net Coal-Fired Power Plant, Carroll County, MO

Summary: EPA continues to have environmental concerns about wetland/floodplain impacts and impacts from

ozone. EPA requested additional analysis of these issues be included in the Record of Decision.

EIS No. 20070165, ERP No. FS–NRS–D36121–WV. Lost River Subwatershed of the Potomac River Watershed Project, Construction of Site 16 on Lower Cove Run and Deletion of Site 23 on Upper Cove Run, US Army COE Section 404 Permit, Hardy County, WV.

Summary: EPA continues to have environmental concerns about potential thermal impacts to area streams, as well as the lack of information regarding secondary and cumulative effects.

Dated: August 21, 2007.

Ken Mittelholtz,

Environmental Protection Specialist, Office of Federal Activities.

[FR Doc. E7–16824 Filed 8–23–07; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–6690–2]

Environmental Impacts Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7167 or *http://www.epa.gov/compliance/nepa/.*

Weekly receipt of Environmental Impact Statements.

Filed 08/13/2007, through 08/17/2007. Pursuant to 40 CFR 1506.9.

EIS No. 20070357, Draft EIS, BLM, UT. Moab Field Office Planning Area, Resource Management Plan, Implementation, Grand and San Juan Counties, UT, Comment Period Ends: 11/21/2007. Contact: Brent Northrup 435–259–2151.

EIS No. 20070358, Final EIS, AFS, CA. Turntable Bay Marina Master Development Project, Implementation, Shasta-Trinity National Forest, Special Use Permit, Shasta and Trinity Counties, CA.Wait Period Ends: 09/24/2007. Contact: J. Sharon Heywood 530–226–2500.

EIS No. 20070359, Draft Supplement, BLM, AK, Northeast National Petroleum Reserve—Alaska Integrated Activity Plan, Updated Information, addressing the need for more Oil and Gas Production through Leasing Lands, Consideration of 4 Alternatives, North Slope Borough, AK. Comment Period Ends: 10/09/2007. Contact: Jim Ducker 907–271–3130.

EIS No. 20070360, Final EIS, BLM, 00. Overland Pass Natural Gas Liquids Pipeline Project (OPP), Construction and Operation of 760 mile Natural Gas Liquids Pipeline, Right-of-Way Grant, KS, WY, and CO. Wait Period Ends: 09/24/2007. Contact: Tom Hurshman 970–240–5345.

EIS No. 20070361, Draft EIS, FHW, CA. Schuyler Heim Bridge Replacement and SR–47 Expressway Improvement Project, from Alameda Street to Pacific Coast Highway, Funding, U.S. Coast Guard Bridge Permit, U.S. Army COE Section 10 and 404 Permits, Ports of Long Beach and Los Angeles, Los Angeles County, CA. Comment Period Ends: 10/16/2007. Contact: Karl Price 213–897–1839.

EIS No. 20070362, Draft EIS, FRC, OR, WA. Bradwood Landing Project, Liquified Natural Gas Import Terminal and Natural Gas Pipeline Facilities, Construction and Operation, U.S. Army COE Section 10 and 404 Permits, Clatsop County, OR and Cowlitz County, WA. Comment Period Ends: 12/24/2007. Contact: Andy Black 1–866–208–3372.

EIS No. 20070363, Draft EIS, COE, CA. Carryover Storage and San Vicente Dam Raise Project, Providing Additional Storage Capacity for 100,000 area feet of Water by the Year 2011, Issuance of Permits, Section 10 and 404 Permits, San Diego County, CA. Comment Period Ends: 10/09/2007. Contact: Robert R. Smith 858–674–6784.

EIS No. 20070364, Draft Supplement, COE, FL. Rock Mining in the Lake Belt Region Plan, Continuance of Limestone Mining Construction, Section 404 Permit, Miami-Dade County, FL. Comment Period Ends: 10/22/2007. Contact: Leah Oberlin 561–472–3506.

EIS No. 20070365, Draft EIS, USA, 00. PROGRAMMATIC—Army Growth and Force Structure Realignment, Implementation, Nationwide. Comment Period Ends: 10/09/2007. Contact: Mike Ackerman 410–436–2522.

EIS No. 20070366, Draft EIS, OSM, 00. Excess Spoil Minimization Stream Buffer Zones. Proposed Revisions to the Permanent Program Regulations Implementing the Surface Mining Control and Reclamation Act of 1977 Concerning the Creation and Disposal of Excess Spoil and Coal Mine Waste and Stream Buffer Zones. Permit Application, Comment Period Ends: 10/15/2007. Contact: David Hartos 412–937–2909.

Dated: August 21, 2007.

Ken Mittelholtz,

Environmental Protection Specialist, Office of Federal Activities.

[FR Doc. E7–16816 Filed 8–23–07; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[EPA–HQ–OPP–2007–0501; FRL–8145–6]

Chloropicrin, Dazomet, 1,3-Dichloropropene, Metam potassium, Metam sodium, and Methyl bromide; Extension of Comment Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice; extension of comment period.

SUMMARY: EPA issued five notices in the **Federal Register** of May 2, 2007, announcing the availability and seeking comments on EPA's revised human health risk assessments and risk mitigation proposal for the fumigants chloropicrin, dazomet, 1,3-dichloropropene, metam potassium, metam sodium, and methyl bromide. On June 20, 2007, EPA issued a notice in the **Federal Register** extending the comment period for 60 days, until September 3, 2007. This document is extending the comment period for another 60 days, from September 3, 2007 to November 3, 2007, for the five actions.

DATES: Comments, identified by docket identification (ID) number (see the May 2, 2007 notices) must be received on or before November 3, 2007.

ADDRESSES: Follow the detailed instructions as provided under **ADDRESSES** in the **Federal Register** documents of May 2, 2007.

FOR FURTHER INFORMATION CONTACT: The applicable contact persons listed in the **Federal Register** documents of May 2, 2007.

SUPPLEMENTARY INFORMATION:

I. General Information

A. Does this Action Apply to Me?

The Agency included in the notice a list of those who may be potentially affected by this action. If you have questions regarding the applicability of this action to a particular entity, consult the person listed under**FOR FURTHER INFORMATION CONTACT** in the **Federal Register** documents of May 2, 2007.

B. How Can I Access Electronic Copies of this Document?

In addition to accessing an electronic copy of this **Federal Register** document

Form A

Notice of Completion & Environmental Document Transmittal

SCH # 2002021009

Mail to: State Clearinghouse, P. O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

Project Title: Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Lead Agency: California Department of Transportation (Caltrans) District 7 — Contact Person: Karl Price

Mailing Address: Division of Environmental Planning, 100 S. Main Street, MS 16A — Phone: 213-897-1839

City: Los Angeles, CA — Zip: 90012 — County: Los Angeles

Project Location:

County: Los Angeles — City/Nearest Community: Long Beach and Los Angeles — Total Acres: approx. 31

Cross Streets: Ocean Blvd. and SR-47 to Alameda Street and SR-1 — Zip Code:

Assessor's Parcel No. — Section: — Twp. 5S/4S — Range: R13W — Base:

Within 2 Miles: State Hwy #: SR-47 and SR-1 — Waterways: Cerritos Channel; Dominguez Channel

Airports: — Railways: UPRR, PHL, ACTA — Schools: Wilmington Elm., Hudson Elm., Cabrillo HS.

Document Type:

CEQA: ☐ NOP ☒ Draft EIR ☐ Supplement to EIR (Note prior SCH # below) ☐ Subsequent EIR (Note prior SCH # below) ☐ Other
☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec

NEPA: ☐ NOI ☐ EA ☒ Draft EIS ☐ FONSI

Other: ☒ Joint Document ☐ Final Document ☐ Other

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☒ Coastal Permit ☐ Other

Development Type:

☐ Residential: Units Acres
☐ Office: Sq.ft. Acres Employees
☐ Commercial: Sq.ft. Acres Employees
☐ Industrial: Sq.ft. Acres Employees
☐ Educational
☐ Recreational

☐ Water Facilities: Type MGD
☒ Transportation: Type Hwy. bridge replacement and elevated expwy.
☐ Mining: Mineral
☐ Power: Type MW
☐ Waste Treatment: Type MGD
☐ Hazardous Waste: Type
☐ Other:

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☐ Agricultural Land ☒ Air Quality ☒ Archeological/Historical ☒ Biological Resources ☒ Coastal Zone ☒ Drainage/Absorption ☒ Economic/Jobs
☐ Fiscal ☒ Flood Plain/Flooding ☐ Forest Land/Fire Hazard ☒ Geologic/Seismic ☒ Minerals ☒ Noise ☒ Population/Housing Balance ☒ Public Services/Facilities
☒ Recreation/Parks ☒ Schools/Universities ☐ Septic Systems ☒ Sewer Capacity ☒ Soil Erosion/Compaction/Grading ☒ Solid Waste ☒ Toxic/Hazardous ☒ Traffic/Circulation
☒ Vegetation ☒ Water Quality ☒ Water Supply/Groundwater ☒ Wetland/Riparian ☒ Growth Inducement ☒ Land Use ☒ Cumulative Effects ☐ Other

Present Land Use/Zoning/General Plan Designation:

Transportation and Utilities, Heavy and Light Industrial

Project Description: *(please use a separate page if necessary)*

The proposed Schuyler Heim Bridge Replacement and SR-47 Expressway project would replace the seismically-deficient vertical lift bridge with a fixed-span bridge across the Cerritos Channel, and either construct an elevated four lane expressway from Terminal Island to Alameda Street, or construct an elevated four lane extension of SR-103 to Alameda Street. Six alternatives are evaluated in the joint EIR/EIS.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

continued

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "X". If you have already sent your document to the agency please denote that with an "S".

- S Air Resources Board
- X Boating & Waterways, Department of
- S California Highway Patrol
- S Caltrans District # 7
- ___ Caltrans Division of Aeronautics
- S Caltrans Planning
- ___ Coachella Valley Mountains Conservancy
- S Coastal Commission
- ___ Colorado River Board Commission
- S Conservation, Department of
- ___ Corrections, Department of
- ___ Delta Protection Commission
- ___ Education, Department of
- ___ Office of Public School Construction
- ___ Energy Commission
- S Fish & Game Region # 5
- ___ Food & Agriculture, Department of
- ___ Forestry & Fire Protection
- ___ General Services, Department of
- ___ Health Services, Department of
- S Housing & Community Development
- S Integrated Waste Management Board
- S Native American Heritage Commission
- X Office of Emergency Services
- S Office of Historic Preservation
- X Parks & Recreation
- ___ Pesticide Regulation, Department of
- S Public Utilities Commission
- ___ Reclamation Board
- S Regional WQCB # 4
- X Resources Agency
- ___ S.F. Bay Conservation & Development Commission
- ___ San Gabriel & Lower Los Angeles Rivers & Mountains Conservancy
- ___ San Joaquin River Conservancy
- ___ Santa Monica Mountains Conservancy
- S State Lands Commission
- ___ SWRCB: Clean Water Grants
- S SWRCB: Water Quality
- ___ SWRCB: Water Rights
- ___ Tahoe Regional Planning Agency
- S Toxic Substances Control, Department of
- ___ Water Resources, Department of
- S Other South Coast Air Quality Management District
- ___ Other ___

Local Public Review Period (to be filled in by lead agency)

Starting Date August 17, 2007 Ending Date October 16, 2007

Lead Agency (Complete if applicable):

Consulting Firm: ___

Address: ___

City/State/Zip: ___

Contact: ___

Phone: (___) ___

Applicant: Caltrans/Alameda Corridor Transportation Authority

Address: 100 S. Main St.

City/State/Zip: Los Angeles

Phone: (213) 897-1839

Signature of Lead Agency Representative Karl Price Date 8-15-07

Authority cited: Section 21083 and 21087, Public Resources Code. Reference: Section 21161, Public Resources Code.

DEPARTMENT OF TRANSPORTATION
DISTRICT 7 – DIVISION OF ENVIRONMENTAL PLANNING
100 MAIN STREET, SUITE 100
LOS ANGELES, CA 90012-3606
PHONE (213) 897-1839

Flex your power!
Be energy efficient!

October 15, 2007

To: Parties requesting an extension of the comment period for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Dear Sir/Madam:

The legally mandated 60-day period for public comment on this Draft EIR/EIS ends on October 16. However, you and representatives from other local agencies and interest groups have requested additional time to provide written comments on the project. Per your request, Caltrans is providing an informal extension of the deadline and will accept your written comments until early November 2007. Please rest assured that if we receive your comments within a reasonable timeframe, they will be included and addressed in the final environmental document.

Please forward all comments to Karl Price, Senior Environmental Planner, at the address above, or they can be faxed to him at 213-897-0685. If questions remain, he can also be reached by phone at 213-897-1839. Your timely comments are important to the decision making process.

Sincerely,

Ron Kosinski
Deputy District Director
Division of Environmental Planning
Caltrans-District 7

PROOF OF PUBLICATION
(2015.5C.C.P.)

La Opinión
The Leading Spanish Language Daily Newspaper
700 S. Flower St. • Los Angeles, CA 90017
Tel:(213) 896-2260 • Fax:(213) 896-2238
www.laopinion.com

STATE OF CALIFORNIA

I am a citizen of the United States and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the above-entitle matter. I am the principal clerk of the printer of La Opinión a newspaper of general circulation, printed and published daily in the city of Los Angeles, County of Los Angeles, and which newpaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Los Angeles, State of California, under the date of July 28, 1969, Case Number: 950176; that the notice, of which the annexed is a printed copy, has been published in each regular and not in any supplement thereof on the following dates, to-wit:

August 17

all in the year 20 07

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated at Los Angeles, California, this

17 day of August, 20 07

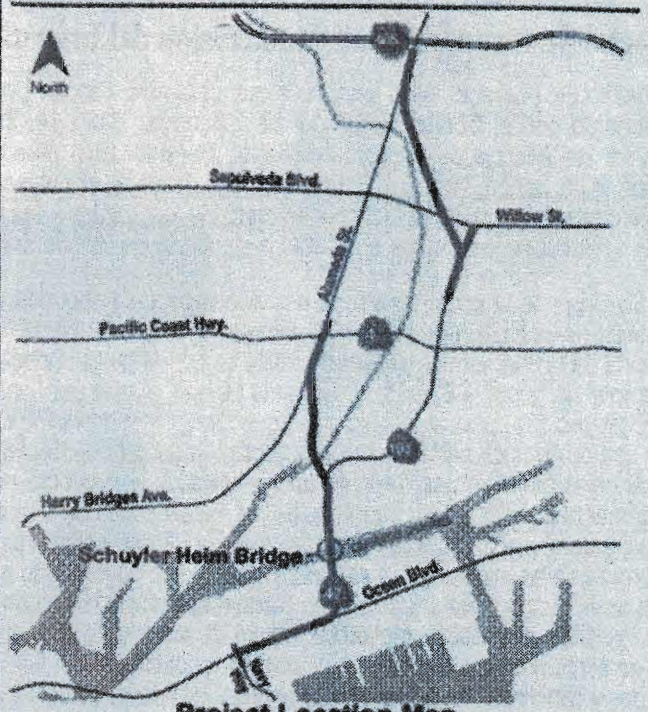
Signature

ADV #017 Controlled
Rev. 06/05

* A 0 0 0 0 0 0 1 9 2 9 9 4 *

Aviso de Disponibilidad
Aviso de Audiencia Pública

Reemplazo de Puente Schuyler Heim y Proyecto de Autopista SR-47



Project Location Map

Qué está siendo planeado?
El Departamento de Transporte de California (Caltrans), Distrito 7, propone el reemplazo del Puente Schuyler Heim el cual tiene una deficiencia sísmica con una abertura fija y construir una nueva autopista elevada dentro y anexa a los Puertos de Long Beach y Los Ángeles. Se han abarcado seis alternativas en el Borrador de la Declaración de Impacto Ambiental/Informe de Impacto Ambiental (Borrador EIS/EIR): Reemplazo de Puente y Autopista SR-47; Reemplazo de Puente y Extensión SR-103; Evitar la Demolición del Puente; Sólo Reemplazo del Puente; Administración de Sistemas de Transporte; y Zero Acción.

¿Cuál es el objetivo de este aviso?
Caltrans ha estudiado los efectos potenciales que este proyecto pueda tener en el ambiente. El estudio que explica estos resultados se llama Borrador de la Declaración de Impacto Ambiental/Informe de Impacto Ambiental (Borrador EIS/EIR), el cual recientemente fue aprobado para distribución pública.

¿Qué está disponible?
La audiencia pública se llevará a cabo el:
martes 25 de septiembre, 2007, de 6 a 8 PM.
Banning's Landing Community Center
100 East Water Street, Wilmington, CA 90744

Las copias del Borrador EIR/EIS están disponibles para revisión en nuestra oficina del Distrito 7 y en las siguientes bibliotecas públicas alrededor del área del proyecto: Biblioteca Regional de Carson; Biblioteca de Victoria Park, Carson; Biblioteca de East Rancho Dominguez; Biblioteca de Harbor City – Harbor Gateway Branch; Biblioteca Regional de San Pedro; Biblioteca de Wilmington; Biblioteca Principal de Long Beach; Biblioteca Vecinal Mark Twain, Long Beach y en Biblioteca de la ciudad de Long Beach, Harte. El Borrador EIR/EIS y otra información del proyecto también pueden ser accedidas a través del sitio Web http://www.dot.ca.gov/dist07/resources/envdocs y a través del sitio Web de la Autoridad de Transporte Alameda Corridor www.acta.org.

¿Cuál es su participación?
¿Han sido evaluados los impactos potenciales? ¿Tiene usted información que debe ser incluida? Si usted desea hacer algún comentario al Borrador EIR/EIS, puede asistir a la audiencia pública y/o enviar sus comentarios por escrito hasta el **16 de octubre, 2007 a:**

Mr. Ronald Kosinski, Deputy District Director
Division of Environmental Planning
CALTRANS, District 7
100 South Main Street
Los Angeles, CA 90012

111-9110351

Si usted tiene cualquier pregunta sobre este proyecto, por favor comuníquese con Karl Price al (213) 897-1839

¡Gracias por su interés!

IIR7GA1

while the government decided to seek a grand jury indictment.

The defense also complained that Padilla was never given a fair shake by the government from the moment in spring 2002 that then-Atty. Gen. John Ashcroft went on national television and identified him as a major terrorism suspect intent on causing great harm with a dirty bomb.

"Throughout our history there have been times of crisis, times when fears run high, when political convenience causes parts of our government to overreach," defense lawyer Anthony J. Natale told the jurors. He was referring to how Padilla was caught up in much of the anger and hysteria that followed the Sept. 11 terrorist strikes on New York and the Pentagon.

"Now is one of those times of crisis, and this is one of those cases," Natale said.

Padilla was arrested at Chicago's O'Hare International Airport. Ashcroft and other top administration officials said that upon returning to the United States, Padilla had planned to scope out sites for detonating a radioactive device.

The Padilla case immediately became the government's signature front in the war on terrorism at home.

But those charges were dropped after lawyers fought for years over his legal rights, and the courts ultimately ruled that Padilla must be either granted a trial or set free.

In November 2006, Padilla was added to an indictment originally drawn up in South Florida in 2004. It was on those charges that he was convicted Thursday.

richard.serrano@latimes.com

LA. TIMES
FULL-RUN
8/17/2007

1182962

reelection

Pickering's seat could be safer for the GOP: No Democrat challenged him in 2006.

"I have a window of opportunity to maximize my time, influence and participation in the lives of my five sons now ages 8 to 17," Pickering said in a statement. "Time is the one element I can never recover or regain."

Pickering, 44, did not say whether he has a new job lined up.

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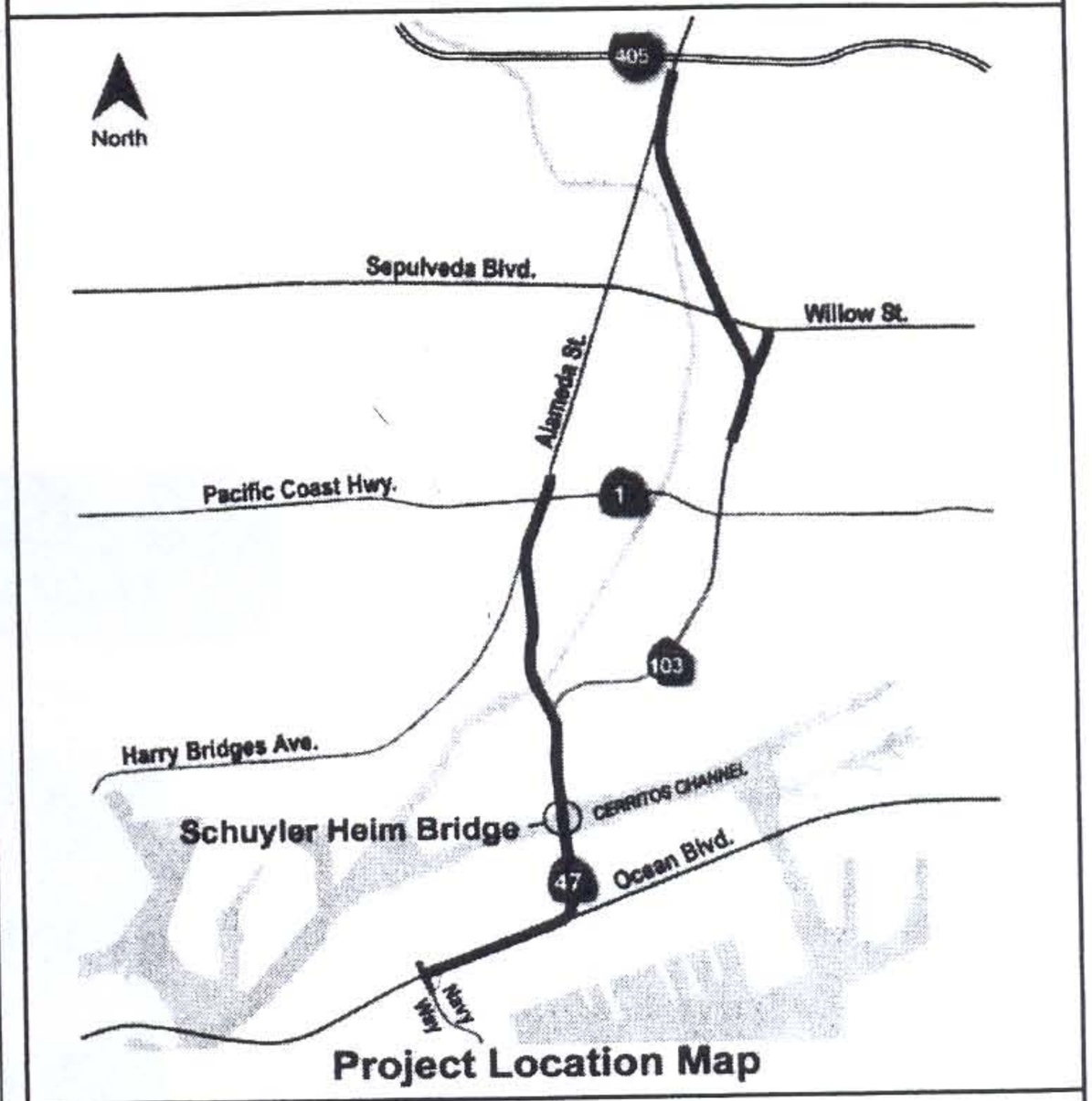
Caltrans

Notice of Availability
Notice of Public Hearing

Schuyler Heim Bridge Replacement
and SR-47 Expressway Project



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A public hearing will be held on:
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Banning's Landing Community Center
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Thank you for your interest!

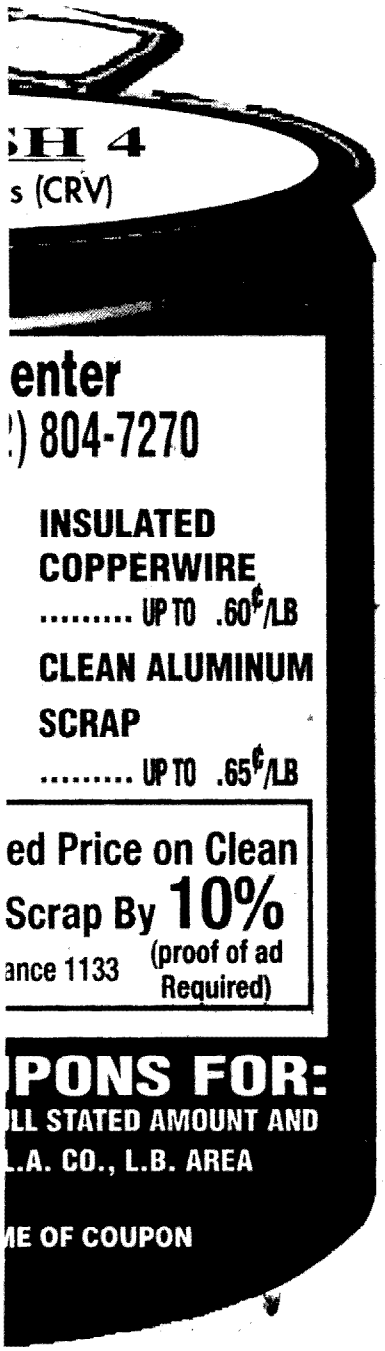
* A 0 0 0 0 0 0 0 2 0 2 3 6 4 *

and for all, a one-line article reading: 'Hugo Chavez will be president however long he wants.'"

The president's political allies firmly control the National Assembly and are expected to approve the reform plan within months. It would then have to be approved by voters in a national referendum.

Government foes said they would mount a nationwide campaign lobbying Venezuelans to oppose the reform — a daunting task in a country that re-elected Chavez to the presidency by a wide margin last December.

Chavez was first elected in 1998 and took office the following year. Current presidential term limits prevent him from seeking re-election to a third term in 2012.



PRESS-TELEGRAM
Aug. 17, 2007

1182969

Caltrans

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Notice of Public Hearing

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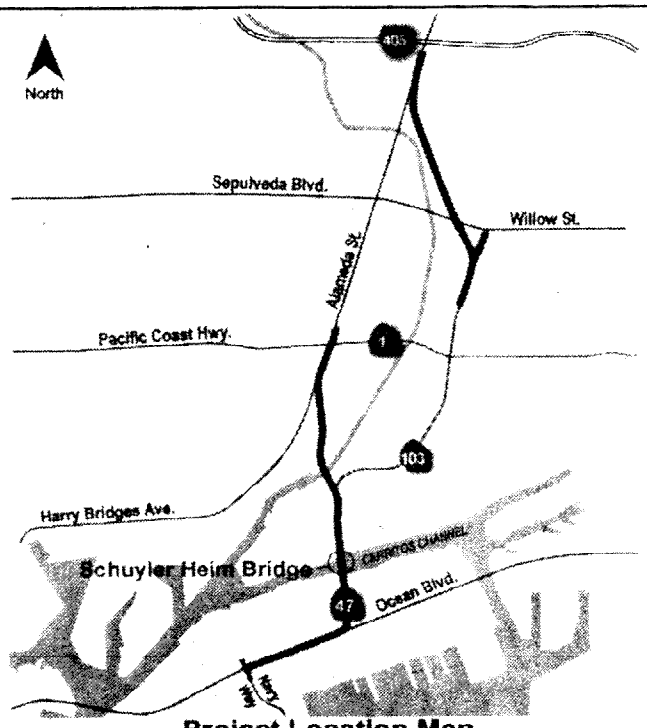
and SR-47 Expressway Project



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Caltrans

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CALTRANS, District 7
100 South Main Street
Los Angeles, CA 90012

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tial primary.
-known Obama

fan. She called him "my favorite guy" and "my choice" on CNN's "Larry King Live" last year before he announced he would run for president.

In a statement, Johnson said Clinton "has the experience and knowledge to help lead our country."

Co-hosts at Johnson's fundraiser include music industry heavyweights Quincy Jones and Berry Gordy, who announced their support for Clinton's campaign in April.

See BRIEFS, page 12

sept. 6 - 9

boundaries:

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LA sept. 29

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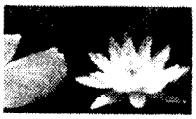

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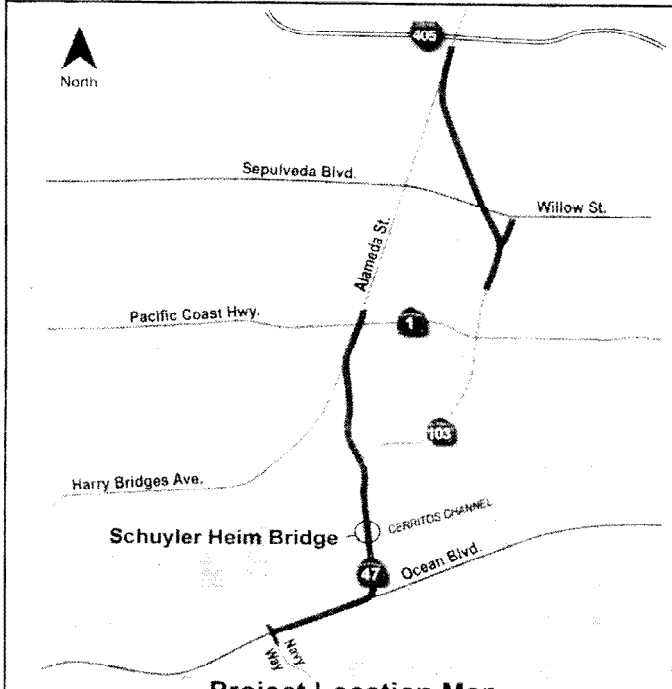
Notice of Availability
Notice of Public Hearing

Schuyler Heim Bridge Replacement
and SR-47 Expressway Project



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Thank you for your interest!

Watts Times
8/23/07

04-LA-105-11.8/29.3

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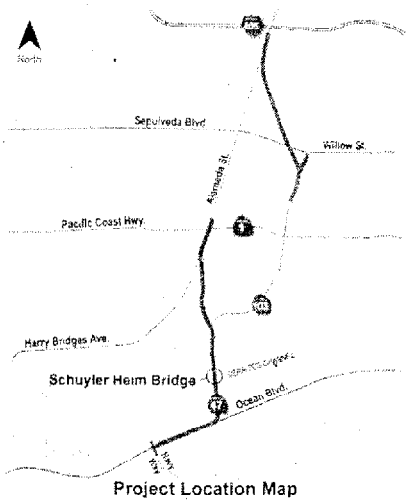
Notice of Public Hearing

Schuyler Heim Bridge Replacement and SR-47 Expressway Project



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When and Where?

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Thank you for your interest!

never seemed to want anything, the operative said. What's more, Hsu would return calls.

The checks he would bundle generally were for about $1,000. People responsible for vetting donations spend little or no time verifying that checks that small came from legitimate sources.

Unlike some donors, Hsu does not seem enthralled by policy. He has views like many other Democrats, but sees politics more like a game and will "root for his team," the operative said. "He seemed to get a thrill out of the victories."

Hsu, who is not registered to vote, emerged on the political scene in 2003 with a contribution to Massachusetts Sen. John F. Kerry's presidential campaign.

Michelle Kraus, a political strategist, fundraiser and technology executive in Silicon Valley, came to know Hsu when she was helping Kerry — and says she was immediately skeptical. She had worked extensively with the Asian American community during the campaign and said Hsu did not seem to fit in with those she knew.

She said he tried to ingratiate himself, offering to get her reservations at exclusive restaurants. "I was not impressed with Norman's machinations," Kraus said. "We are dealing with someone who wanted to be part of the cool kids."

But though Kraus was wary of Hsu, she does not fault the Clinton campaign: "They just got suckered by a guy who suckered a lot of people."

tom.hamburger@latimes.com
dan.morain@latimes.com
robin.fields@latimes.com
Hamburger and Fields reported from Washington, Morain from Sacramento. Times staff writer Chuck Neubauer in Washington contributed to this report.

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1196844 9/14/07

LONG BEACH
PRESS-TELEGRAM

300 Oceangate
Long Beach, CA 90844

1196839

PROOF OF PUBLICATION
(2015.5 C.C.P.)

STATE OF CALIFORNIA

County of Los Angeles

I am a citizen of the United States, and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of the Long Beach Press-Telegram, a newspaper of general circulation printed and published daily in the City of Long Beach, County of Los Angeles, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Los Angeles, State of California, on the date of March 21, 1934, Case Number 370512. The notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit.

Sept 14 2007

The Long Beach Press-Telegram, a newspaper of general circulation, is delivered to and available in, but not limited to the following cities: Long Beach, Lakewood, Bellflower, Cerritos, Downey, Norwalk, Artesia, Paramount, Wilmington, Compton, South Gate, Los Alamitos, Seal Beach, Cypress, La Palma, Lynwood, San Pedro, Hawaiian Gardens, Huntington Park, La Mirada, Santa Fe Springs, Carson.

I declare under penalty of perjury that the foregoing is true and correct.

Executed at Long Beach, LA Co., California
this 14 day of Sept 2007,

Kathleen Hafer
signature

Proof of Publication of

Paste Clipping of Notice
SECURELY in this space.

PUBLIC NOTICE

CITY OF LOS ANGELES
PUBLIC AUCTION

The City of Los Angeles, Department of General Services, Asset Management Division, will hold a public auction by bid, to sell three (3) surplus City-owned properties. The properties consist of (2) Single-family homes, and (1) Former Library.

Minimum Bids set on all parcels. **CASH SALE ONLY.** The City will not offer any financing on any of the properties.

The **Auction** will be held on
OCTOBER 1, 2007
Monday at 2:00 p.m.
Room 350 City Hall, 200 N. Spring Street, Los Angeles

Open House Schedule:
Saturday - September 8, 2007
Saturday - September 15, 2007

10:00 a.m. - 3:00 p.m.

736 S. Cloverdale Ave., Los Angeles, CA 90036
2090 Stradella Road, Bel Air, CA 90077
14555 Sylvan Street, Los Angeles, CA 91411

For a copy of the brochure, please visit our website at www.lacity.org/GSD/asset/surplus.htm. For general information, please call (213) 922-8500 or (213) 922-8552 and (213) 922-8542.
L.A. Watts Times
CN783602 AUCTION Sep 13, 2007

REQUESTING SUB BIDS FOR ALL TRADES NCLUDING QUALIFIED SBE & DVBE SUBCONTRACTORS & SUPPLIERS ON THE FOLLOWING PROJECT
LAUSD: Phase 2 CENTRAL LA LEARNING CENTER #1/Heritage K-12
Los Angeles, California
BIDS DUE: Friday, Sept. 28, 2007
2:00 PM PST
Contact our office below to request an invitation to bid with specific project information.

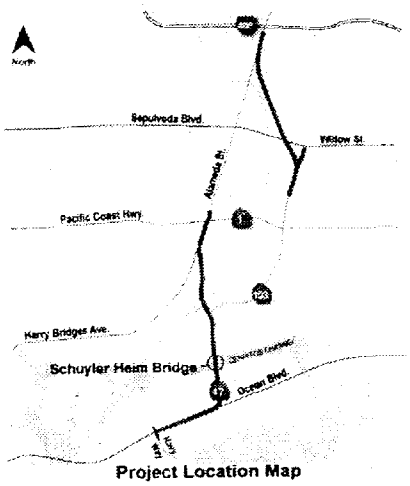
Hensel Phelps Construction Co.
(An Equal Opportunity Employer)
18850 Von Karman Avenue, Suite 100, Irvine, CA
(949) 852-0111 · (949) 852-0218 (FAX)
Subcontracts awarded on this project will be on the Hensel Phelps Construction Co. standard loan subcontract and may include a requirement to provide payment & performance bonds from a T-listed surety at the subcontractor's expense. HPCC will assist in obtaining bonds, lines of credit or insurance required.

REQUEST FOR PROPOSALS
(RFP# 7472)

RENOVATION PROJECT MANAGEMENT SERVICES

The Housing Authority of the City of Los Angeles invites proposals from qualified firms interested in providing renovation project management services for an office building. Copies of the RFP may be obtained beginning **September 2, 2007** via www.hacla.org website or call (213) 252-1832/5405 for a RFP. Proposals will be accepted until **2:00 P.M., by September 28, 2007.**
9/13, 9/20/07
CNS-1193128#

Notice of Public Hearing
Schuyler Heim Bridge Replacement and SR-47 Expressway Project



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A public hearing will be held to allow you an opportunity to discuss proposed design features with the Project staff prior to the selection of the final design.

What's Available?
Copies of the Draft EIR/EIS are available for review at our District 7 office (100 S. Main Street, Los Angeles) and the following public libraries around the project area: Carson Regional Library; Victoria Park Library, Carson; East Rancho Dominguez Library; Harbor City - Harbor Gateway Branch Library; San Pedro Regional Library; Wilmington Library; Long Beach Main Library; Mark Twain Neighborhood Library, Long Beach; Los Angeles Central Library. The Draft EIR/EIS and other project information can also be accessed through our website at http://www.dot.ca.gov/dist07/resources/envdocs and through the Alameda Corridor Transportation Authority website at www.acta.org.

When and Where?
The public hearing will be held on:

Tuesday, September 25, 2007, 6 - 8 PM.
Banning's Landing Community Center
100 East Water Street, Wilmington, CA 90744

You can send your written comments until **October 16, 2007** to:

Mr. Ronald Kosinski, Deputy District Director
Division of Environmental Planning
CALTRANS, District 7
100 South Main Street
Los Angeles, CA 90012

If you have any questions regarding this project, please contact Karl Price at (213) 897-1839.

Thank you for your interest!

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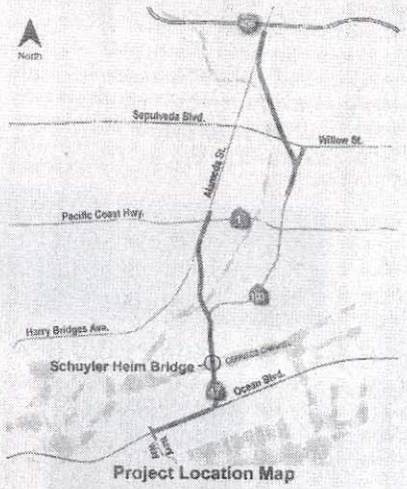
Notice of Public Hearing
Schuyler Heim Bridge Replacement and SR-47 Expressway Project



Project Location Map

What's Being Planned?
The California Department of Transportation (Caltrans), District 7, proposes to replace the seismically deficient Schuyler Heim Bridge with a fixed-span bridge and construct a new elevated expressway in and adjacent to the Ports of Long Beach and Los Angeles. Six alternatives have been addressed in the Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR): Bridge Replacement and SR-47 Expressway; Bridge Replacement and SR-103 Extension; Bridge Demolition Avoidance; Bridge Replacement Only; Transportation Systems Management; and No Action. Some build alternatives will require additional right-of-way.

Why This Notice?
A public hearing will be held to allow you an opportunity to discuss proposed design features with the Project staff prior to the selection of the final design.

What's Available?
Copies of the Draft EIR/EIS are available for review at our District 7 office (100 S. Main Street, Los Angeles) and the following public libraries around the project area: Carson Regional Library; Victoria Park Library, Carson; East Rancho Dominguez Library; Harbor City - Harbor Gateway Branch Library; San Pedro Regional Library; Wilmington Library; Long Beach Main Library; Mark Twain Neighborhood Library, Long Beach; Los Angeles Central Library. The Draft EIR/EIS and other project information can also be accessed through our website at http://www.dot.ca.gov/dist07/resources/envdocs and through the Alameda Corridor Transportation Authority website at www.acta.org.

When and Where?
The public hearing will be held on:

Tuesday, September 25, 2007, 6 - 8 PM.
Banning's Landing Community Center
100 East Water Street, Wilmington, CA 90744

You can send your written comments until **October 16, 2007** to:

Mr. Ronald Kosinski, Deputy District Director
Division of Environmental Planning
CALTRANS, District 7
100 South Main Street
Los Angeles, CA 90012

If you have any questions regarding this project, please contact Karl Price at (213) 897-1839.

Thank you for your interest!

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LIFORNIA/NATION

Schuyler Heim Bridge Replacement & SR-47 Expressway Project

Draft Environmental Impact Statement/Report (EIS/EIR)

Public Hearing:	September 25, 2007, 6:00 p.m. Banning's Landing, 100 E. Water Street, Wilmington
Public Comment Period:	Ends October 16, 2007
Draft EIS/EIR:	Available at local public libraries and at http://www/acta.org or www.dot.ca.gov/dist07/resources/envdoc

Project Description

The Schuyler Heim Bridge Replacement and SR-47 Expressway Project is being advanced through a joint partnership between Caltrans and the Alameda Corridor Transportation Authority (ACTA) The project proposes to replace the seismically deficient Schuyler Heim Bridge over Cerritos Channel and add a four-lane elevated roadway connection to Alameda Street that will bypass three signalized intersections and five at-grade railroad crossings. The Heim Bridge is an essential service link between Terminal Island and the mainland in Wilmington.

This project will provide an alternative route from Terminal Island, a major generator of port-related truck traffic, and provide direct access to local distribution centers and warehousing facilities in the South Bay area, as well as I-405 and SR-91, thereby relieving congestion on the Harbor and Long Beach freeways.

The Schuyler Heim Bridge Replacement and SR-47 project will enhance the efficient, secure movement of goods at the nation's largest port complex, as well as reduce congestion and improve mobility.

Project Benefits

- Replaces the seismically-deficient Schuyler Heim moveable bridge with a new safer fixed bridge
- Creates an expressway between Ocean Blvd. on Terminal Island and Alameda St. at Pacific Coast Highway
- Enhances mobility on local freeways by diverting 5-8% of the port-related trucks
- Diverts trucks from certain local arterials and commercial and residential areas
- Facilitates future improvements to the Long Beach I-710 Freeway
- Provides alternative route to the existing near-dock rail yard
- Eliminates traffic conflicts at 5 at-grade rail crossings and 3 traffic signals

Alternative 1 - Flyer Distribution

Alternative 2 - Flyer Distribution

STAMP

MR. RONALD J. KOSINSKI
DEPUTY DISTRICT DIRECTOR
DIVISION OF ENVIRONMENTAL PLANNING
CALTRANS - DISTRICT 7
100 SOUTH MAIN STREET (MS 16A)
LOS ANGELES, CA 90012

STAMP

MR. RONALD J. KOSINSKI
DEPUTY DISTRICT DIRECTOR
DIVISION OF ENVIRONMENTAL PLANNING
CALTRANS - DISTRICT 7
100 SOUTH MAIN STREET (MS 16A)
LOS ANGELES, CA 90012

WRITTEN COMMENT CARD

Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Name _____
Address _____
Affiliation _____
Phone _____
Date _____

We welcome your participation. Please submit comments at the Public Hearing or by mail.

___ I would like to be added to the mailing list

___ I would like to have the comment below filed in the record

COMMENTS: _____

For more information call Karl Price, Environmental Planner, at (213) 897-1839

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WRITTEN COMMENT CARD

Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street

Los Angeles, CA 90012-3106

Name _____
Address _____
Affiliation _____
Phone _____
Date _____

We welcome your participation. Please submit comments at the Public Hearing or by mail.

___ I would like to be added to the mailing list

___ I would like to have the comment below filed in the record

COMMENTS: _____

For more information call Karl Price, Environmental Planner, at (213) 897-1839

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Fact Sheet

Schuyler Heim Bridge Replacement / SR-47 Expressway Project

Project Location:

The project area is located within the cities and ports of Los Angeles and Long Beach, between Ocean Boulevard on Terminal Island and I-405.

Project Description:

The proposed project consists of replacing the seismically deficient vertical lift Schuyler Heim Bridge with a fixed-span bridge, construction of a 4-lane elevated expressway connecting to Alameda Street, and construction of an elevated onramp (flyover) from eastbound Ocean Boulevard to northbound SR-47. Six alternatives are evaluated in the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR): Bridge Replacement and SR-47 Expressway; SR-103 Extension to Alameda Street; Bridge Demolition Avoidance; Bridge Replacement Only; and Transportation System Management (TSM); and No-Build.

Project Need and Benefits:

The Schuyler Heim Bridge was constructed in 1948 and provides an essential service link to Terminal Island. The bridge and needs to remain in service to ensure ground and marine vessel transportation during a major earthquake, even though it does not meet current seismic standards. In addition, existing and increasing traffic and congestion occur along local arterials, on I-710 and I-110, and at the intersection of Ocean Boulevard and SR-47.

A new fixed-span bridge would provide additional vehicle capacity and could remain in service in the event of a major earthquake. An elevated north-south expressway extension would reduce traffic congestion by grade-separating at-grade railroad crossings and signalized intersections. With the flyover, traffic on eastbound Ocean Boulevard could divert directly onto northbound SR-47 and across the new bridge, thereby avoiding the existing signalized intersection.

Environmental Process:

The National Environmental Policy Act (NEPA) of 1969 requires federal agencies to analyze potential environmental impacts of major federal actions. The California Environmental Quality Act (CEQA) of 1970 requires state agencies to analyze potential environmental impacts of major state actions. Since there are both federal and state aspects of the proposed project, the six alternatives are evaluated in the Draft EIS/EIR in accordance with requirements of both NEPA and CEQA.

Environmental Impacts:

The project alternatives have the potential for impacts related to: cultural resources (Schuyler Heim Bridge), biological resources, hazardous waste, air and water quality, hydrology, noise, aesthetics, surface and marine traffic, utilities/public services, community resources, land use, growth, energy, and geology/paleontology. The Draft EIS/EIR evaluates potential impacts and proposes mitigation measures where necessary. As evaluated, impacts to noise and biological resources would be mitigated. Impacts to air quality and cultural resources could not be completely mitigated. For other resources, either no impacts are anticipated, or avoidance and minimization measures are proposed.

Project Milestones:

Public Outreach	Ongoing
Complete Draft EIS/EIR	August 2007
Public Comment Period Begins	August 17, 2007
Public Meeting	September 25, 2007
Public Comment Period Ends	October 16, 2007
Certify EIS/EIR; Record of Decision	Spring 2008
Project Construction Begins	January 2009

Agenda

Schuyler Heim Bridge Replacement / SR-47 Expressway Project

07-LA-47-KP 4.4/9.3 (PM 2.7/5.8)
Schuyler Heim Bridge/SR-47 Expressway

Schuyler Heim Bridge Replacement and SR-47 Expressway Public Hearing
September 25, 2007
6:00 p.m. to 8:00 p.m.
Banning's Landing Community Center
Wilmington, CA

1. Sign-in and Exhibit Viewing
2. Introductions
3. Purpose of Hearing
4. Engineering
5. Project Alternatives
   - Bridge Replacement and SR-47 Expressway
   - SR-103 Extension to Alameda Street
   - Bridge Demolition Avoidance
   - Bridge Replacement Only
   - Transportation System Management (TSM)
   - No-Build
6. Environmental Studies
7. Public Comment and Questions

If you prefer, you may send your written comments to:

Mr. Ronald J. Kosinski
Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 South Main Street MS-16A
Los Angeles, CA 90012

PUBLIC HEARING
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR

Please sign in

September 25, 2007

Name GENE BOUGDANOS
Address 801 S. GRAND AVE. # 500
City/State/Zip LOS ANGELES CA 90017
Phone 213/239-5811
Organization CELSOC / HDR
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email gene.bougdanos@hdrinc.com

Name GEORGE A. MARTINEZ
Address 2717 E. MONROE ST
City/State/Zip CARSON 90810
Phone (310) 834 3358
Organization SELT
Would you like to be added to our mailing list? ☐ Yes ☒ No
Email —

Name BILL BURGEL
Address 1001 SW 5TH SUITE 1800
City/State/Zip PORTLAND, OR 97204
Phone 503 7894147
Organization HDR
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email BILL.BURGEL@HDRINC.COM

Name SEYMOUR WATERMAN
Address 910 MAHAR AVE
City/State/Zip WILMINGTON, CAL. 90748
Phone 310-522 9698
Organization WATERMAN Supply Co
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email

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Please sign in

September 25, 2007

Name John R. Garcia
Address 803 W. L street
City/State/Zip Wilmington
Phone 3107 518-0992
Organization Heim Bridge operator
Would you like to be added to our mailing list? [X] Yes [ ] No
Email

Name DAVE BOGER
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City/State/Zip LA QUINTA CA 92253
Phone
Organization LAN CONSULT.
Would you like to be added to our mailing list? [X] Yes [ ] No
Email

Name Richard Garland
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City/State/Zip 701 E Carson St Carson 90745
Phone 310- 830- 7600
Organization City of Carson
Would you like to be added to our mailing list? [ ] Yes [X] No
Email

Name Farrokh Abolfathi
Address 701 E Carson ST.
City/State/Zip Carson CA 90745
Phone 310-952-1700
Organization City of Carson
Would you like to be added to our mailing list? [ ] Yes [X] No
Email fabolfathi@Carson.Ca.US

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Caltrans

Please sign in

September 25, 2007

Name Doug Montgomery
Address 300 E. Water St.
City/State/Zip Wilmington Ca, 90744
Phone 310 6293339
Organization Harley Marine Services
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email dmontgomery@harleymarine.com

Name Russell Cox
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City/State/Zip Huntington Bch Ca. 92648
Phone 714-960-8262
Organization Property Owner
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email —

Name Larry Keller
Address 227 Savona Walk
City/State/Zip Long Beach 90803
Phone 310-418-5024
Organization L.B. Intl Business Assn
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email LA.KLLR@AOL.Com

Name Zak Gonzalez II
Address 701 E Carson St
City/State/Zip Carson Ca 90749
Phone 310-952-1700 EXT 1301
Organization City of Carson
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email zgonzalez@carson.ca.us

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September 25, 2007

Name Mike Bogner
Address 234 Prospect
City/State/Zip Long Beach 90803
Phone
Organization Port of LB
Would you like to be added to our mailing list? ☐ Yes ☑ No
Email

Name Gilbert Dodson
Address 22500 So Alameda St
City/State/Zip Carson CA 90810
Phone 310 835-9109
Organization Corridor Recycling
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email GDODSON@CORRIDORRECYCLING.COM

Name Colleen Callahan
Address 3325 Wilshire Blvd. Suite 900
City/State/Zip LA, CA 90010
Phone 323. 839. 8114
Organization American Lung Assn. of CA
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email ccallahan@alac.org

Name Nick Sramek
Address
City/State/Zip
Phone
Organization LB Harbor Comm
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

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September 25, 2007

Name Neal Denno
Organization Parsons
Address
Would you like to be added to our mailing list? ☒ Yes ☐ No
City/State/Zip
Email neal.denno@parsons.com
Phone (949) 263-9322

Name Donna Ethington
Organization WNC & PCAC
Address Berth 203 #9
Would you like to be added to our mailing list? ☒ Yes ☐ No
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Email Bayprosvs@earthlink.net
Phone (310) 549-8111

Name Juan Carmona
Organization Coalition For A Safe Environment
Address
Would you like to be added to our mailing list? ☑ Yes ☐ No
City/State/Zip
Email JCarmona831@yahoo.com
Phone 310-984-9600

Name Susan M. Prichard
Organization Property Owner
Address 1314 W. "I" St.
Would you like to be added to our mailing list? ☐ Yes ☐ No
City/State/Zip Wilmington CA 90744
Email SPRICH1314@AOL.COM
Phone (310) 834-6568

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September 25, 2007

Name Guillermo Martinez Jr
Address 425 S Palos Verdes 3rd Fl
City/State/Zip CA, CA 90731
Phone (310) 732-3090
Organization POLA
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email gmartinez@portla.org

Name Mark Nero
Address 220 Quincy Ave
City/State/Zip LB, CA 90803
Phone (562) 598-7866
Organization Cunningham Rpt
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email mark@cunninghamreport.com

Name Niki Tennant
Address 333 W Ocean Blvd #202
City/State/Zip Long Beach CA 90802
Phone 562 570-6919
Organization Ofc of Vice Mayor Bonnie Lowenthal
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email Niki_Tennant@longbeach.gov

Name Jim Dear
Address 701 E. Carson St.
City/State/Zip Carson CA 90745
Phone 310-952-1706
Organization Mayor, City of Carson
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email

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Please sign in

September 25, 2007

Name Anthony Ng
Address 100 S main ST
City/State/Zip Los Angeles / CA / 90012
Phone (213) 897-8700
Organization CALTRANS
Would you like to be added to our mailing list? ☐ Yes ☒ No
Email Anthony.ng@dot.ca.gov

Name NATE WILLIAMS
Address 11423 So ST. STE #99
City/State/Zip CERRITOS CA 90703
Phone 562-804-4549
Organization SAFETY ENVIRONMENTAL CONSULTING
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email SECONSULTING@MAIL.COM

Name Belinda Pineda
Address 2456 Oregon Ave.
City/State/Zip Long Beach, CA 90806
Phone
Organization Member of Apostolic Faith Center
Would you like to be added to our mailing list? ☐ Yes ☐ No
I'm on it. Thank you.
Email

Name NANCY PINEDA
Address 2456 OREGON AVE
City/State/Zip LONG BEACH CA 90806
Phone
Organization Member of APOSTOLIC ~~FAITH~~ CENTER
Would you like to be added to our mailing list? ☐ Yes ☒ No
Email

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Please sign in

September 25, 2007

Name ELIZABETH WARREN
Address 1328 N. AVALON BLVD. SUITE A
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Phone 310-922-6227
Organization FUTUREPORTS
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email ewarren@futureports.org

Name Ana Rugh
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Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

Name Pilar Hoyos
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Phone (310) 952-6417
Organization
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Email

Name Alfred Carrillo
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Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

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Please sign in

September 25, 2007

Name Marie Castle
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City/State/Zip Wilmington Ca 90744
Phone 310 7195440

Organization Cal-Trans Heim Draw Bridge Operator
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email

Name
Address
City/State/Zip
Phone

Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

Name
Address
City/State/Zip
Phone

Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

Name
Address
City/State/Zip
Phone

Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

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Schuyler Heim Bridge Replacement and SR-47 Expressway Project
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September 25, 2007

Name Evelyn French
Address 1039 W. 9th Street
City/State/Zip Upland, CA 91784
Phone 909 973-2771
Organization Caltrop Corporation
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email efrench@caltrop.com

Name Otis Jackson
Address
City/State/Zip
Phone
Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email OTIS-JACKSON@DOT.CA.GOV

Name MARIA RAPTIS
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City/State/Zip CA 90012
Phone 213-897-9372.
Organization Caltrans
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email maria.raptis@dot.ca.gov

Name HUDSON WARREN
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Phone 310-984-6496
Organization FOREIGN TRADE ASSN - 1ST. V.P. PROPELLER CLUB of LA/LB PRES
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email HWARREN@CHINAWEST LLC.COM

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September 25, 2007

Name DAN HOFFMAN
Organization Wilmington CHAMBER
Address 544 N AVALON Suite 104
Would you like to be added to our mailing list? ☑ Yes ☐ No
City/State/Zip Wilmington CA 90744
Email info @ wilmington-chamber.com
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Name TOM SARDO
Organization PARSONS
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Would you like to be added to our mailing list? ☒ Yes ☐ No
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Email THOMAS.SARDO @ PARSONS.COM.
Phone (949) 263-9322

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Name Andrea Hricko
Organization USC
Address USC 1540 Alcazar St CHP 236
Would you like to be added to our mailing list? ☑ Yes ☐ No
City/State/Zip LA 90033
Email ahricko@usc.edu
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PUBLIC HEARING
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Please sign in

September 25, 2007

Name Melissa Lin Perrella
Address 1314 2nd St.
City/State/Zip Santa Monica, CA 90401
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Email mlinperrella@nrdc.org.

Name Kara Bouton
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City/State/Zip Baldwin Park, CA 91706
Phone
Organization Corridor Properties
Would you like to be added to our mailing list? ☐ Yes ☐ No
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Name DWAYNE MEARS
Address THE PLANNING CENTER
City/State/Zip 1580 METRO, COSTA MESA 92626
Phone 714 966 9220
Organization →
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email dmears@planningcenter.com

Name RAY PARK
Address 2858 E DOMINGUEZ ST
City/State/Zip CARSON CA 90810
Phone 3108306742
Organization DOMINGUEZ HILLS PROPERTY
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email DISHMASTER1@ATT.NET

PUBLIC HEARING
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Please sign in

September 25, 2007

Name Peter Ho. Organization LAN Eng.
Address 361 W Grove Ave Would you like to be added to our mailing list? ☑ Yes ☐ No
City/State/Zip Orang, CA Email Peter.ho@Lanengineering.com
Phone (323) 855-1670.

Name PAUL MAK Organization HDR
Address 3819 Bluff St Would you like to be added to our mailing list? ☑ Yes ☐ No
City/State/Zip Torrance CA 90505 Email paul.mak@hdrinc.com
Phone (213) 239-5813

Name Vernica Zendejas Organization Senator Jenny Oropeza
Address Would you like to be added to our mailing list? ☐ Yes ☐ No
City/State/Zip Email
Phone 310 318 6954

Name STACEY CROWEN Organization Port of Long Beach
Address 925 HARBOR PLAZA Would you like to be added to our mailing list? ☐ Yes ☐ No
City/State/Zip LONG BEACH, CA 90802 Email
Phone

PUBLIC HEARING
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR

Please sign in

September 25, 2007

Name: Cine Ivery
Organization: Senator Alan Lowenthal
Address: 115 Pine Ave, #430
Would you like to be added to our mailing list? ☐ Yes ☑ ~~No~~
City/State/Zip: Long Beach 90802
Email: cine.ivery@sen.ca.gov
Phone: (562) 495-4766

Name: Steve Smith
Organization: SCAQMD
Address: 21865 Copley Dr
Would you like to be added to our mailing list? ☑ ~~Yes~~ ☐ No
City/State/Zip: Diamond Bar CA 91765
Email: ssmith@aqmd.gov
Phone: 909 396 3054

Name: JESSE N. MARQUEZ
Organization: COALITION FOR A SAFE ENVIRONMENT
Address: P.O. Box 1918
Would you like to be added to our mailing list? ☒ Yes ☐ No
City/State/Zip: WILMINGTON, CA 90748
Email: JNMARQUEZ@PRODIGY.NET
Phone: 310-834-1128

Name: Prashant Konareddy
Organization: Port of Los Angeles
Address: 425 S Palos Verdes St
Would you like to be added to our mailing list? ☒ Yes ☐ No
City/State/Zip: San Pedro CA 90731
Email: pkonareddy@portla.org
Phone: 310-732-3362

PUBLIC HEARING
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR

Caltrans

Please sign in

September 25, 2007

Name Jacob Haik
Address 638 S. Beacon St.
City/State/Zip San Pedro CA. 90731
Phone (310) 732-4515
Organization Office of Councilwoman Hahn
Would you like to be added to our mailing list? ☑ Yes ☐ No
Email Jacob.Haik@lacity.org

Name JESSICA DUBOFF
Address
City/State/Zip
Phone (310) 643-3638
Organization REP. JANE HARMAN
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email JESSICA.DUBOFF@MAIL.HOUSE.GOV

Name Vanessa Aramayo
Address
City/State/Zip
Phone (310) 549-8282
Organization Rep. Jane Harman
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email vanessa.aramayo@mail.house.gov

Name GEORGE FETTY
Address
City/State/Zip LONG BEACH CA
Phone 562-434-6428
Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

PUBLIC HEARING
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR

Please sign in

September 25, 2007

Name Louis Rubenstein
Address 925 Harbor Plaza
City/State/Zip Long Beach CA
Phone 562 590 4151
Organization Port of Long Beach
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email Rubenstein@POLB.com

Name Lupe Valdez
Address 13181 Crossroads Pkwy
City/State/Zip Industry CA
Phone (626) 935-7617
Organization Union Pacific RR
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email lcvaldez@up.com

Name John Peterson
Address 707 Wilshire Blvd., Suite 5270
City/State/Zip Los Angeles, CA 90017
Phone 213-236-9720
Organization
Would you like to be added to our mailing list? ☒ Yes ☐ No
Email JSP@petersonlawgroup.com

Name Harold Williams
Address 701 E. Carson St
City/State/Zip Carson 90745
Phone
Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

PUBLIC HEARING
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR

Caltrans

Please sign in

September 25, 2007

Name JOHN CROSS
Address 2627 HAYES AVE
City/State/Zip LONG BEACH CA 90810
Phone 562 889.3933
Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

Name
Address
City/State/Zip
Phone
Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

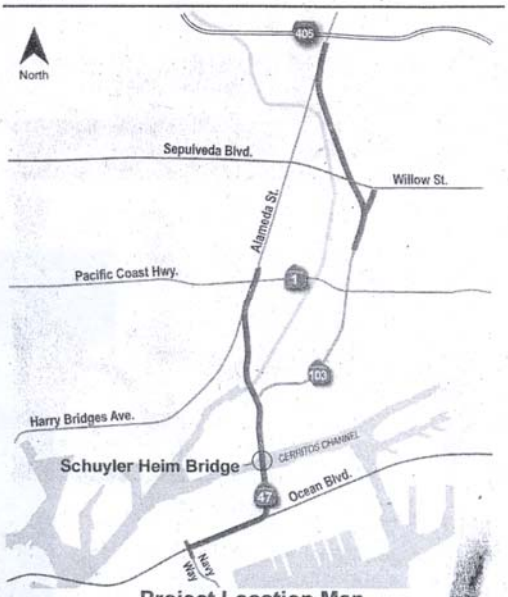
Name
Address
City/State/Zip
Phone
Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

Name
Address
City/State/Zip
Phone
Organization
Would you like to be added to our mailing list? ☐ Yes ☐ No
Email

ES082007012SCO320265.P2.05.05.03 signin.ai 8/07

Notice of Availability

Schuyler Heim Bridge Replacement and SR-47 Expressway Project



Project Location Map

What Is Being Planned?

The California Department of Transportation (Caltrans), District 7, is proposing to replace the seismically deficient Schuyler Heim Bridge with a fixed-span bridge and construct a new elevated expressway in and adjacent to the Ports of Long Beach and Los Angeles. Six alternatives have been addressed in the Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR): Bridge Replacement and SR-47 Expressway; Bridge Replacement and SR-103 Extension; Bridge Demolition Avoidance; Bridge Replacement Only; Transportation Systems Management; and No Action.

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What is available?

Copies of the SDEIS/RDEIR are available for review at our District 7 office and the following public libraries around the project area: Carson Regional Library; Dr. Martin Luther King, Jr. Library, Carson; Compton Library; East Rancho Dominguez Library; Harbor City – Harbor Gateway Branch Library; San Pedro Regional Library; Wilmington Library; Long Beach Main Library; Mark Twain Neighborhood Library, Long Beach, Long Beach City Library – Harte Library, and the Los Angeles Library Department. The SDEIS/RDEIR and other project information can also be accessed through our website at http://www.dot.ca.gov/dist07/resources/envdocs or through the Alameda Corridor Transportation Authority website at http://www.acta.org

What is Your Involvement?

Have the potential impacts been addressed? Do you have information that should be included? If you wish to make a comment on the SDEIS/RDEIR, you may submit your written comments until **January 5, 2009** to:

Mr. Ronald Kosinski, Deputy District Director
Division of Environmental Planning
CALTRANS, District 7
100 South Main Street
Los Angeles, CA 90012

If you have any questions regarding this project, please contact Karl Price at (213) 897-1839

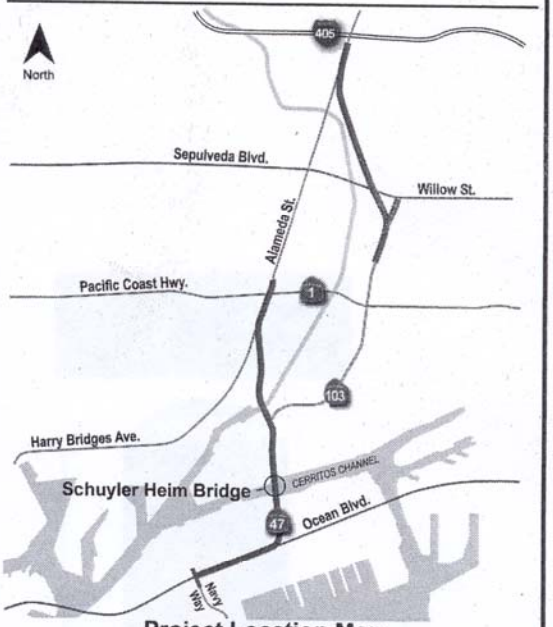
Thank you for your interest!

* A 0 0 0 0 0 0 9 1 9 7 9 6 *

LA Times
11/20/08

Notice of Availability

Schuyler Heim Bridge Replacement
and SR-47 Expressway Project



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CALTRANS, District 7
100 South Main Street
Los Angeles, CA 90012

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Thank you for your interest!

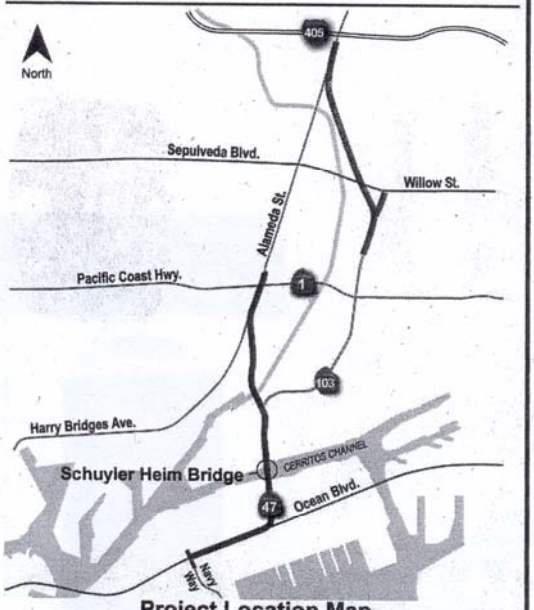
L.B. Press-Telegram
11/20/08

Call Aesthetic Accents 310-539-5888

Caltrans

Notice of Availability

Schuyler Heim Bridge Replacement
and SR-47 Expressway Project



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Caltrans

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100 South Main Street
Los Angeles, CA 90012

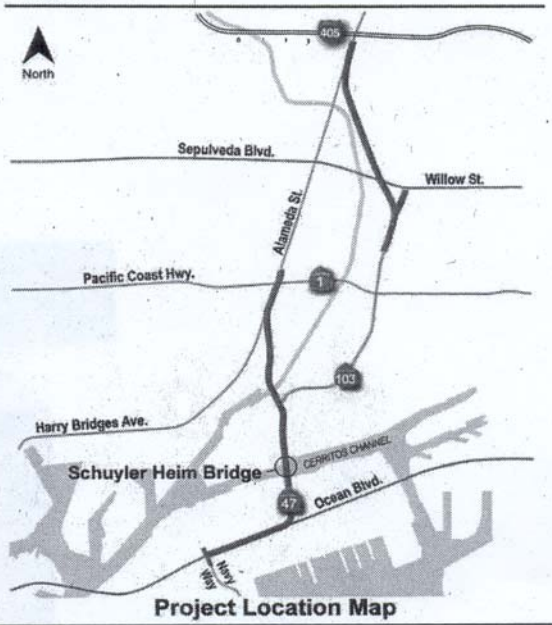
If you have any questions regarding this project, please contact Karl Price at (213) 897-1839

Thank you for your interest!

Daily Breeze
11/20/08

Aviso de Disponibilidad

Reemplazo de Puente Schuyler Heim y Proyecto Expressway SR-47



Project Location Map

¿Qué está siendo planeado?

El Departamento de Transporte de California (Caltrans), Distrito 7, propone el reemplazo del Puente Schuyler Heim el cual tiene una deficiencia sísmica con una abertura fija y construir una nueva autopista elevada dentro y adyacente a los Puertos de Long Beach y de Los Ángeles. En el Borrador de la Declaración de Impacto Ambiental/Informe de Impacto Ambiental (Borrador EIS/EIR) se han tratado seis alternativas: Reemplazo de Puente y Autopista SR-47; Reemplazo de Puente y Extensión SR-103; Evitar la Demolición del Puente; Sólo Reemplazo del Puente; Administración de Sistemas de Transporte; y Zero Acción.

¿Cuál es el objetivo de este aviso?

Caltrans ha estudiado los efectos potenciales que este proyecto podría tener en el ambiente. **La nueva información relevante para el proyecto propuesto está disponible ahora, dicha información no estuvo disponible cuando el Borrador del EIS/EIR estuvo circulando para revisión y comentario del público en agosto de 2007.** El documento que explica estos resultados se llama Borrador de la Declaración de Impacto Ambiental/Informe de Impacto Ambiental (Borrador EIS/EIR), el cual recientemente fue aprobado para distribución pública

¿Qué está disponible?

Las copias del SDEIS/RDEIR están disponibles para revisión en nuestra oficina del Distrito 7 y en las siguientes bibliotecas públicas en los alrededores del área del proyecto: Biblioteca Regional Carson; Biblioteca Dr. Martin Luther King, Jr., Carson; Biblioteca Compton; Biblioteca East Rancho Dominguez; Biblioteca Harbor City – Harbor Gateway Branch; Biblioteca Regional San Pedro; Biblioteca Wilmington; Biblioteca Principal Long Beach; Biblioteca Mark Twain Neighborhood Library, Long Beach, Biblioteca Long Beach City Library, Biblioteca Harte, y el Departamento de Biblioteca de Los Ángeles. El SDEIS/RDEIR e información adicional del proyecto también puede ser accesada a través de internet en la dirección http://www.dot.ca.gov/dist07/resources/envdocs o a través de la página del Alameda Corridor Transportation Authority http://www.acta.org

¿Cuál es su participación?

¿Se han evaluado los impactos potenciales? ¿Tiene usted información que debe ser incluida? Si usted desea hacer un comentario sobre el SDEIS/RDEIR, puede enviar sus comentarios por escrito hasta el **5 de enero de 2009** a la siguiente dirección:

Mr. Ronald Kosinski, Deputy District Director
Division of Environmental Planning
CALTRANS, District 7
100 South Main Street
Los Angeles, CA 90012

Si usted tiene cualquier pregunta sobre este proyecto, por favor comuníquese con Karl Price al (213) 897-1839

¡Muchas gracias por su interés!

111-9137659

LA Opinion

11/20/08

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* A 0 0 0 0 0 0 9 1 4 7 6 7 *

performances.
ervisor Yvonne
Ephraim.

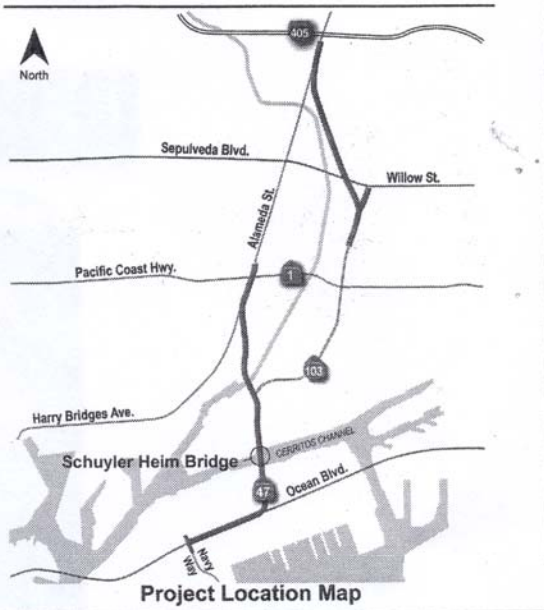
All batteries
Oil-based paints
We can do it!

You can get more information about recycling or make service requests by calling the city's 3-1-1 line.

Caltrans

Notice of Availability

Schuyler Heim Bridge Replacement
and SR-47 Expressway Project



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Caltrans

Mr. Ronald Kosinski, Deputy District Director
Division of Environmental Planning
CALTRANS, District 7
100 South Main Street
Los Angeles, CA 90012

If you have any questions regarding this project, please contact Karl Price at (213) 897-1839

Thank you for your interest!

L.A. Watts Times
11/20/08

TR2 Page 4

information that were submitted for review on November 20th, 2008, which included the health risk assessment that was performed at the request of the ACTA Board, the ACTA Board in response to comments made of the September public meeting.

Please fill out the speaker cards in advance and give them to Maria or Liz. They're over there. Please raise your hands.

If you do not wish to speak but want to submit comments tonight, please fill in your comments on the cards. Both the speakers' oral comments and those comments on the cards will be made part of the record with responses included in the final EIR/EIS.

You will also have the opportunity to file written comments with Caltrans by Friday of this week, January 30th, 2009, by e-mail, fax or letter. Those who require more time may request Caltrans in writing before Friday to grant them additional time.

These requests will be considered by Caltrans on a case-by-case basis. We encourage all of you to get your comments in by the deadline so they can be addressed. These instructions will be repeated at the end of this meeting.

We will begin with a seven-minute long video describing the project followed by three speakers.

Please hold all your comments until after the speakers finish. Those who have submitted speaker cards will be called in the order they were received. Three names will be called at a time to help speed the process.

And with that, I would like to introduce the SR-47 video to provide you with an overview of the entire project.

(A seven-minute video was played.)

MR. HERNANDEZ: I would now like to introduce Art Goodwin, the director of planning for the Alameda Corridor who will provide an overview of the project.

Mr. Goodwin.

MR. GOODWIN: Thank you very much.

I'm just going to provide a very brief overview of the project and some of the milestones and dates that we've been working on.

The first thing I'll provide is the project alternatives. Something that you may remember we had in the drafting of the EIR/EIS here in this room September 27, 2007. So that's a year-and-a-half ago now.

There were six alternatives. The two alternatives that received the most attention and provide the most -- address most of the goals of the project are really two.

DEPARTMENT OF TRANSPORTATION
DISTRICT 7
100 S. MAIN STREET, SUITE 100
LOS ANGELES, CA 90012-3606
PHONE (213) 897-0362
FAX (213) 897-0360
TTY (213) 897-9797

Flex your power!
Be energy efficient!

January 20, 2009

The Honorable Warren T. Furutani
Assembly Member, 55th District
4201 Long Beach Boulevard, Suite 327
Long Beach, CA 90807

Dear Assembly Member Furutani:

We appreciate your interest in this critical bridge replacement and expressway improvement project. The California Department of Transportation (Department) and Alameda Corridor Transportation Authority (ACTA) are attempting to develop a project that replaces the Schuyler Heim Bridge, which is seismically deficient, structurally deficient and has substandard safety features. The proposed project alternatives, which have not changed, originally commenced public review on August 17, 2007. So the public's knowledge and understanding of the project alternatives and their potential impacts are well known.

The new information currently being recirculated has a limited focus. The Department and ACTA agreed to circulate the ACTA Health Risk Assessment (HRA) and the UC Davis analysis. The Department believes that this limited new information has clear limitations and uncertainties. The ACTA HRA follows the South Coast Air Quality Management District methodology, which is well known to those who are interested in potential health related implications of projects proposed in the vicinity of the Port of Los Angeles and Port of Long Beach.

Public circulation of this HRA commenced on November 20, 2008. Since then, we have received several comments and believe the legally required 45-day California Environmental Quality Act review timeframe is adequate. However, we have offered community interest groups additional time to provide responses as an informal extension. In response to your request, the Department will extend our informal comment period and will accept comments until the ACTA community meeting on January 27, 2009, this timeframe allows for consideration of any insights that may come from that meeting. Those individuals who contact us requesting more time will be informed of this extension. We look forward to reviewing any meaningful comments and moving forward with a decision. I trust that this extension and the factors we are considering provide a balanced understanding of the factors surrounding this critical transportation project.

If you have any additional comments or questions, please contact Ron Kosinski, Deputy District Director, Environmental Planning, at (213) 897-0362.

Sincerely,

DOUGLAS R. FAILING
District Director

Print Form

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P. O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # 2002021009

Project Title: Schuyler Heim Bridge Replacement and SR-47 Expressway Project

Lead Agency: Caltrans District 7 | Contact Person: Karl Price

Mailing Address: Division of Environmental Planning, 100 S. Main Street | Phone: 213-897-1839

City: Los Angeles, CA | Zip: 90012 | County: Los Angeles

Project Location: County: Los Angeles | City/Nearest Community: Long Beach and Los Angeles

Cross Streets: | Zip Code:

Lat. / Long.: ____° ____' ____" N/ ____° ____' ____" W | Total Acres: approximately 31

Assessor's Parcel No.: | Section: | Twp.: 5S/4S | Range: R13W | Base:

Within 2 Miles: State Hwy #: SR-47 and SR-1 | Waterways: Cerritos Channel; Dominguez Channel

Airports: | Railways: UPRR, PHL, ACTA | Schools: Hudson,Cabrillo,Wlmtn

Document Type:

CEQA: ☐ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) 2002021009 Other Recirculated Draft EIR

NEPA: ☐ NOI ☐ EA ☑ Draft EIS ☐ FONSI

Other: ☑ Joint Document ☐ Final Document ☑ Other Supp EIS

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☑ Coastal Permit ☐ Other

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational
☐ Recreational

☐ Water Facilities: Type ____ MGD ____
☑ Transportation: Type Hwy, bridge replacement, expway
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☐ Other: ____

Project Issues Discussed in Document:

☐ Aesthetic/Visual
☐ Agricultural Land
☑ Air Quality
☐ Archeological/Historical
☐ Biological Resources
☐ Coastal Zone
☐ Drainage/Absorption
☐ Economic/Jobs
☐ Fiscal
☐ Flood Plain/Flooding
☐ Forest Land/Fire Hazard
☐ Geologic/Seismic
☐ Minerals
☐ Noise
☐ Population/Housing Balance
☐ Public Services/Facilities
☐ Recreation/Parks
☐ Schools/Universities
☐ Septic Systems
☐ Sewer Capacity
☐ Soil Erosion/Compaction/Grading
☐ Solid Waste
☐ Toxic/Hazardous
☐ Traffic/Circulation
☐ Vegetation
☐ Water Quality
☐ Water Supply/Groundwater
☐ Wetland/Riparian
☐ Wildlife
☐ Growth Inducing
☐ Land Use
☑ Cumulative Effects
☑ Other Community Resources

Present Land Use/Zoning/General Plan Designation:

Project Description: *(please use a separate page if necessary)*

The proposed Schuyler Heim Bridge Replacement and SR-47 Expressway project would replace the seismically deficient vertical lift bridge with a fixed-span bridge across Cerritos Channel, and either construct an elevated four-lane expressway from Terminal island to Alameda Street, or construct an elevated four-lane extension of SR-103 to Alameda Street. Six alternatives are evaluated in the Draft Recirculated EIR/Draft Supplemental EIR.

Note: The state Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

January 2008

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

S Air Resources Board
X Boating & Waterways, Department of
S California Highway Patrol
S Caltrans District # 7
____ Caltrans Division of Aeronautics
S Caltrans Planning (Headquarters)
____ Coachella Valley Mountains Conservancy
S Coastal Commission
____ Colorado River Board
S Conservation, Department of
____ Corrections, Department of
____ Delta Protection Commission
____ Education, Department of
____ Energy Commission
S Fish & Game Region # 5
____ Food & Agriculture, Department of
____ Forestry & Fire Protection
____ General Services, Department of
____ Health Services, Department of
S Housing & Community Development
S Integrated Waste Management Board
S Native American Heritage Commission
X Office of Emergency Services

S Office of Historic Preservation
____ Office of Public School Construction
X Parks & Recreation
____ Pesticide Regulation, Department of
S Public Utilities Commission
____ Reclamation Board
S Regional WQCB # 4
X Resources Agency
____ S.F. Bay Conservation & Development Commission
____ San Gabriel & Lower L.A. Rivers and Mtns Conservancy
____ San Joaquin River Conservancy
____ Santa Monica Mountains Conservancy
S State Lands Commission
____ SWRCB: Clean Water Grants
S SWRCB: Water Quality
____ SWRCB: Water Rights
____ Tahoe Regional Planning Agency
S Toxic Substances Control, Department of
____ Water Resources, Department of

S Other South Coast Air Quality Management District
____ Other _____

Local Public Review Period (to be filled in by lead agency)

Starting Date November 21, 2008 Ending Date January 5, 2009

Lead Agency (Complete if applicable):

Consulting Firm: _____
Address: _____
City/State/Zip: _____
Contact: _____
Phone: _____

Applicant: Caltrans/Alameda Corridor Transportation Authorit
Address: 100 South Main Street
City/State/Zip: Los Angeles/CA/90012
Phone: 213-897-1839

Signature of Lead Agency Representative: Karl Price **Date:** 11/13/08

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, 100 SO. MAIN ST., STE. 100
LOS ANGELES, CA 90012-3606
TDD (213) 897-6610

Flex your power!
Be energy efficient!

November 14, 2008

Responsible Agencies, Reviewing Agencies, Trustee Agencies and Individuals Interested in the Schuyler Heim Bridge Replacement and SR-47 Expressway Project

File: 07-LA-47 PM 2.7/5.8
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
EA 238500

Notice of Availability

Supplemental Draft Environmental Impact Statement/Recirculated Draft Environmental Report

The California Department of Transportation (Caltrans) has completed the Supplemental Draft Environmental Impact Statement/Recirculated Draft Environmental Impact Report (SDEIS/RDEIR) for the Schuyler Heim Bridge Replacement and SR-47 Expressway Project in the Ports of Long Beach and Los Angeles, California. The proposed alternatives include replacement of the Schuyler Heim lift bridge with a fixed-span bridge and either construction of an elevated SR-47 expressway from Terminal Island to Pacific Coast Highway (the new bridge will be a portion the new expressway) or construction of an elevated SR-103 extension. Six alternatives for the project have been evaluated.

This SDEIS/RDEIR for the proposed Schuyler Heim Bridge Replacement and SR-47 Expressway project provides new information relevant to the proposed project, information that was not available when the Draft EIS/EIR was circulated for public review and comment in August 2007. The document is considered a partial SDEIS/RDEIR because it only includes information and analysis updated since the Draft EIS/EIR was circulated. The new information is based on a Health Risk Assessment prepared by the Alameda Corridor Transportation Authority (ACTA), as a Responsible Agency, and an analysis of the ACTA HRA performed by Caltrans and the University of California Davis.

IS THIS BEING SENT AS A HARD COPY? WHAT ABOUT CDs?

In an effort to save paper, the enclosed SDEIS/RDEIR is being sent on CD. A hard copy of the SDEIS/RDEIR may be viewed at the following locations:

- Caltrans, District 7: 100 South Main Street, Los Angeles, CA 90012
- Los Angeles Library Department: 630 W. 5th Street, Los Angeles, CA 90071
- Wilmington Library: 1300 North Avalon Boulevard, Wilmington, CA 90744
- Carson Regional Library: 151 East Carson Street, Carson, CA 90745-2797
- Victoria Park Library: 17906 South Avalon Boulevard, Carson, CA 90746-1598
- Compton Library: 240 W. Compton Blvd., Compton, CA 90220
- San Pedro Regional Library: 931 South Gaffey Street, San Pedro, CA 90731
- Harbor City-Harbor Gateway Branch Library: 24000 South Western, Harbor City, CA 90710

- Long Beach City Library-Harte Library: 1595 West Willow Street, Long Beach, CA 90810
- Long Beach Main Library: 101 Pacific Avenue, Long Beach, CA 90802
- Mark Twain Neighborhood Library: 1325 East Anaheim Street, Long Beach, CA 90813
- Each Rancho Dominguez Library: 4205 East Compton Boulevard, East Rancho Dominguez, CA 90221-3664

The SDEIS/RDEIR may also be accessed from our website: http://www.dot.ca.gov/dist07/resources/envdocs/ and through the Alameda Corridor Transportation Authority website at: www.acta.org

We will be pleased to answer any questions you may have with regard to this project.

Written comments on the SDEIS/RDEIR must be submitted by January 5, 2009.

Please send your comments to:

Ronald Kosinski, Deputy District Director
Division of Environmental Planning
Department of Transportation, District 7
100 South Main Street MS-16A
Los Angeles, CA 90012

If you have any questions, please contact Karl Price (213) 897-1839. Thank you for your interest in this important transportation project.

Sincerely,

Ronald Kosinski
Deputy District Director, Caltrans District 7

Enclosure

Web site that enables subscribers to receive e-mail notification when a document is added to a subscribed docket(s). For assistance with any FERC Online service, please e-mail *FERCOnlineSupport@ferc.gov*, or call (866) 208–3676 (toll free). For TTY, call (202) 502–8659.

Comment Date: 5 p.m. Eastern Time Monday, December 1, 2008.

Kimberly D. Bose,

Secretary.

[FR Doc. E8–28280 Filed 11–26–08; 8:45 am]

BILLING CODE 6717–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. PR09–5–000]

Lee 8 Storage Partnership; Notice of Petition for Rate Approval

November 21, 2008.

Take notice that on November 14, 2008, Lee 8 Storage Partnership (Lee 8) filed pursuant to section 284.123(b)(2) of the Commission's regulations, filed a petition requesting that the Commission approve its rates pursuant to section 31(a)(2) of the Natural Gas Policy Act of 1978. Lee 8 proposes system-wide maximum rates of $3.2988 per Dt of deliverability and $0.0330 per Dt of capacity. In addition, Lee 8 states that it will charge 0.57% of the injected volumes and 0.57% of the withdrawal volumes as an allowance for compressor fuel and lost-and-unaccounted-for gas on Lee 8's system.

Any person desiring to participate in this rate proceeding must file a motion to intervene or to protest this filing must file in accordance with Rules 211 and 214 of the Commission's Rules of Practice and Procedure (18 CFR 385.211 and 385.214). Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a notice of intervention or motion to intervene, as appropriate. Such notices, motions, or protests must be filed on or before the date as indicated below. Anyone filing an intervention or protest must serve a copy of that document on the Applicant. Anyone filing an intervention or protest on or before the intervention or protest date need not serve motions to intervene or protests on persons other than the Applicant.

The Commission encourages electronic submission of protests and interventions in lieu of paper using the ''eFiling'' link at *http://www.ferc.gov.* Persons unable to file electronically should submit an original and 14 copies of the protest or intervention to the Federal Energy Regulatory Commission, 888 First Street, NE., Washington, DC 20426.

This filing is accessible on-line at *http://www.ferc.gov,* using the ''eLibrary'' link and is available for review in the Commission's Public Reference Room in Washington, DC. There is an ''eSubscription'' link on the Web site that enables subscribers to receive e-mail notification when a document is added to a subscribed docket(s). For assistance with any FERC Online service, please e-mail *FERCOnlineSupport@ferc.gov,* or call (866) 208–3676 (toll free). For TTY, call (202) 502–8659.

Comment Date: 5 p.m. Eastern Time December 1, 2008.

Kimberly D. Bose,

Secretary.

[FR Doc. E8–28291 Filed 11–26–08; 8:45 am]

BILLING CODE 6717–01–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–8588–1]

Environmental Impact Statements and Regulations; Availability of EPA Comments

Availability of EPA comments prepared pursuant to the Environmental Review Process (ERP), under section 309 of the Clean Air Act and Section 102(2)(c) of the National Environmental Policy Act as amended. Requests for copies of EPA comments can be directed to the Office of Federal Activities at 202–564–7146.

An explanation of the ratings assigned to draft environmental impact statements (EISs) was published in FR dated April 6, 2008 (73 FR 19833).

Draft EISs

EIS No. 20080340, ERP No. D–FHW–J40184–UT, SR–262; Montezuma Creek to Aneth Project, Improvements to the Intersection of SR–162, SR–262, and County Road (CR) 450 in Montezuma Creek, Funding, Navajo Nation, San Juan County, UT.

Summary: EPA expressed environmental concerns about increased sedimentation and erosion impacts, additional impacts to drainage channels and habitat connectivity, and cumulative impacts to water quality and wildlife. Rating EC2.

EIS No. 20080370, ERP No. D–AFS–K65347–CA, Gemmill Thin Project, Proposal to Reduce the Intensity and Size of Future Wildfires, and to Maintain/Improve Ecosystem Function and Wildlife Habitat, Chanchellula Late-Success ional Reserve, Shasta-Trinity National Forest, Trinity County, CA.

Summary: EPA expressed environmental concerns about impacts to air quality, and requested additional mitigation measures. EPA also expressed environmental concerns about impacts to communities. Rating EC2.

EIS No. 20080397, ERP No. D–AFS–J65525–00, Hermosa Landscape Grazing Analysis Project, Proposes to Continue to Authorize Livestock Grazing Cascade Reservoir, Dutch Creek, Elbert Creek, Hope Creek South Fork, and Upper Hermosa Allotments, Columbine Ranger District, San Juan National Forest, LaPlata and San Juan Counties, CO.

Summary: EPA expressed environmental concerns about impacts to water quality, and requested a commitment to monitoring and protection of at-risk riparian areas. Rating EC2.

EIS No. 20080302, ERP No. DB–UAF–E11056–FL, Eglin Air Force Base (AFB) and Hurlburt Field, Proposes to Implement the Military Housing Privatization Initiative (MHPI), FL.

Summary: EPA expressed environmental concerns about impacts to air quality from construction activities. Rating EC2.

EIS No. 20080352, ERP No. DS–COE–G39047–00, White River Minimum Flood Study, To Provide an Improved Minimum Flow for the Benefit of the Tail Water Fishery, White River Basin Lakes: Beaver, Table Rock, and Bull Shoal Lakes on the White River; Norfork Lake on the North Fork White River; and Greens Ferry Lake on the Little Red River, AR and MO.

Summary: No formal comment letter was sent to the preparing agency. Rating LO.

Final EISs

EIS No. 20080321, ERP No. F–FHW–K40267–CA, Phase I–CA 11 Corridor Location and Route Adoption and Location Identification of the Otay Mesa East Port of Entry (POE) on Otay Mesa, Presidential Permit for the POE and Acquisition of Right-Of-Way Permit, San Diego County, CA.

Summary: EPA continues to have environmental concerns about impacts from induced growth and the lack of information on mobile source air toxics.

EIS No. 20080338, ERP No. F–FHW–J40180–UT, UT–108 Transportation Improvement Project, To Improve Local and Regional Mobility from UT–108 between UT–127 (Antelope Drive) to UT–126 (1900 West) Located in Syracuse, West Point and Clinton in Dave County, and Roy and West Haven in Weber County, UT.

Summary: EPA continues to have environmental concerns about mobile source air toxics. However, EPA is pleased that FHWA has addressed previous concerns raised about other construction emission BMPs and mitigation measures for impacts to sensitive receptors.

EIS No. 20080367, ERP No. F–FHW–J40178–UT, Mountain View Corridor (MVC) Project, Proposed Transportation Improvement 2030 Travel Demand in Western Salt Lake County south of I–80 and west of Bangerter Highway and in northwestern Utah County of I–15, south of the Salt Lake County Line, and north of Utah Lake, Salt Lake and Utah County, UT.

Summary: EPA continues to have environmental concerns about the analysis of mobile source air toxics.

EIS No. 20080412, ERP No. F–FRA–C50016–UT, Portal Bridge Capacity Enhancement Project, To Replace the nearly 100-Year-Old Portal Bridge and Eliminate Capacity Constraints on the Northeast Corridor between Swift Interlocking and Secaucus Transfer Station, Funding, U.S. Army Corp Section 10 and 404 Permits, Hackensack River, Hudson County, NJ.

Summary: EPA has environmental concerns about the general air conformity and mitigation for wetlands impacts.

EIS No. 20080417, ERP No. F–UAF–E15001–FL, Eglin Air Force Base Program, Base Realignment and Closure (BRAC) 2005 Decisions and Related Action, Implementation, FL.

Summary: EPA has environmental concerns about impacts to air quality from the BRAC relocation activities and noise exposure from the introduction of the F–35 aircraft.

EIS No. 20080425, ERP No. F–NOA–C91006–00, Amendment 4 to the Spiny Lobster Fishery Management Plan of Puerto Rico and the U.S. Virgin Islands and Amendment 8 to the Spiny Lobster Fishery Management Plan of the Gulf of Mexico and South Atlantic, To Address the Harvest and Exportation of Undersized Lobster Tails to the United States.

Summary: EPA does not object to the proposed project.

EIS No. 20080427, ERP No. F–AFS–F65071–WI, Medford Aspen Project, Preferred Alternative is Alternative 3, To Implement a Number of Vegetation and Transportation Management Activities, Medford-Park Falls Ranger District, Chequamegon-Nicolet National Forest, Taylor County, WI.

Summary: EPA does not object to the proposed action.

Dated: November 24, 2008.

Robert W. Hargrove,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. E8–28320 Filed 11–26–08; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–8587–9]

Environmental Impacts Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–1399 or *http://www.epa.gov/compliance/nepa/*.

Weekly Receipt of Environmental Impact Statements

Filed 11/17/2008 Through 11/21/2008 Pursuant to 40 CFR 1506.9.

EIS No. 20080474, Draft EIS, NPS, VA, Cedar Creek and Bella Grove National Historical Park, General Management Plan, Implementation, Frederick, Shenandoah, Warren Counties, VA, *Comment Period Ends:* 02/26/2009, *Contact:* Christopher J. Stubbs 540–868–9176.

EIS No. 20080475, Draft Supplement, FHW, CA, Schuyler Heim Bridge Replacement and SR–47 Expressway Improvement Project, New Information related to Health Risk Associated with Air Toxics, Funding, U.S. Coast Guard Bridge Permit, U.S. Army COE Section 10 and 404 Permits, Ports of Long Beach and Los Angeles, Los Angeles County, CA, *Comment Period Ends:* 01/12/2009, *Contact:* Karl Price 213–897–1839.

EIS No. 20080476, Final EIS, COE, 00, White River Minimum Flood Study, To Provide an Improved Minimum Flow for the Benefit of the Tail Water Fishery, White River Basin Lakes: Beaver, Table Rock, and Bull Shoal Lakes on the White River; Norfork Lake on the North Fork White River; and Greens Ferry Lake on the Little Red River, AR and MO, *Wait Period Ends:* 12/29/2008, *Contact:* Mike Biggs 501–324–7342.

EIS No. 20080477, Draft EIS, FTA, MA, Urban Ring Corridor—Phase 2 Project, Circumferential Transportation Improvements, Proposed Major New Bus Rapid Transit, Funding and Right-of-Way Permit, Located in the Municipalities of Boston, Brookline, Cambridge, Chelsea, Everett, Medford and Somerville, MA, *Comment Period Ends:* 02/09/2009, *Contact:* Mary Beth Mello 617–494–2055.

EIS No. 20080478, Final Supplement, COE, CA, Pacific Los Angeles Marine Terminal, Pier 400 Berth 408 Project, Construction and Operation of a new Marine Terminal, U.S. Army COE Section 10 and 404 Permits, Port of Los Angeles, Los Angeles County, CA, *Wait Period Ends:* 12/29/2008, *Contact:* Dr. Spencer D. MacNeil 805–585–2152.

EIS No. 20080479, Draft EIS, FHW, UT, Geneva Road, Center Street/1600 West (Provo) to Geneva Road/SR–89 (Pleasant Grove), Improvements, U.S. Army COE 404 Permit, Utah County, UT, *Comment Period Ends:* 01/22/2009, *Contact:* Bryan Dillon 801–963–0182.

EIS No. 20080480, Draft EIS, USN, NJ, Laurelwood Housing Area, Access at Naval Weapons Station Earle, Lease Agreement, Monmouth County, NJ, *Comment Period Ends:* 01/12/2009, *Contact:* Kim Joyner-Barty 757–322–8473.

EIS No. 20080481, Draft EIS, NOA, CA, Southwest Fisheries Science Center Replacement, Construction and Operation, located on University of California, San Diego Scripps Institute of Oceanography Campus, LaJolla, CA, *Comment Period Ends:* 01/12/2009, *Contact:* Mark Eberling 206–526–6477.

EIS No. 20080482, Final EIS, DOE, 00, PROGRAMMATIC—Designation of Energy Corridors in 11 Western States, Preferred Location of Future Oil, Gas, and Hydrogen Pipelines and Electricity Transmission and Distribution Facilities on Federal Land, AZ, CA, CO, ID, MT, NV, NM, UT, WA and WY, *Wait Period Ends:* 12/29/2008, *Contact:* LaVerne Kyriss 202–586–1056. Department of Energy and the Department of the Interior/Bureau of Land Management are Joint Lead Agencies on this project.

EIS No. 20080483, Final EIS, FHW, MO, MO–34 Improvement, from U.S. Routes 60/21 Intersection in Carter County to Routes 34/72 Intersection in Cape Girardeau County, Funding, U.S. Army COE Section 404 Permit, Carter, Bollinger, Reynolds, Wayne, and Cape Girardeau Counties, MO, *Wait Period Ends:* 12/30/2008, *Contact:* Peggy Casey 573–636–7104.

Comment Card 1

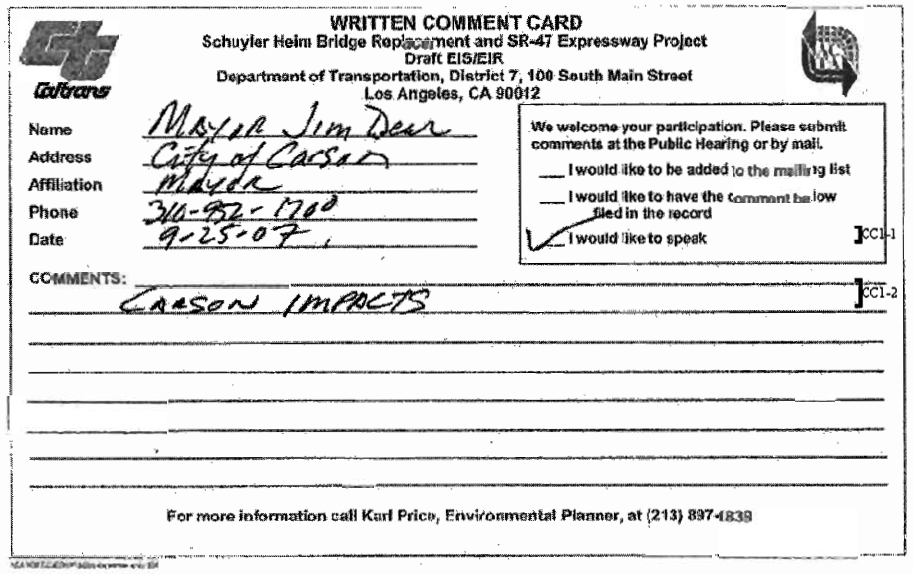
Response to Comment CC1-1

Your concerns regarding project-related impacts to the City of Carson are recorded in the Public Hearing transcript. Please see responses to your comments (TR-1, TR-2, TR-3, TR-4, TR-5).

Response to Comment CC1-2

Your concerns regarding project-related impacts to the City of Carson are acknowledged. Please see responses AJ8-2 and AJ8-15.

Also, please note that residences of concern in Carson, namely those located east of Alameda Street between Dominguez Street and I-405, and the church and homes between Dominguez and Carson Streets, are considered to be outside the project study area. The study area encompasses locations where the proposed SR-47 project would cause actual physical changes to the roadway system.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

Name: Mayor Jim Dear
Address: City of Carson
Affiliation: Mayor
Phone: 310-952-1700
Date: 9-25-07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
__ I would like to be added to the mailing list
__ I would like to have the comment below filed in the record
✓ I would like to speak CC1-1

COMMENTS: CARSON IMPACTS CC1-2

For more information call Karl Price, Environmental Planner, at (213) 897-1839

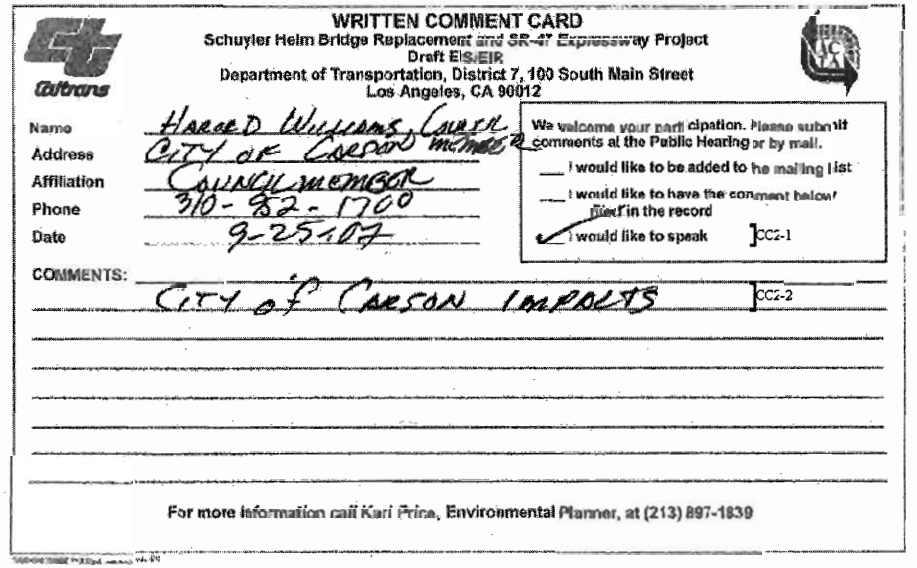
Comment Card 2

Response to Comment CC2-1

Your comments are addressed in responses TR1-6, TR1-7, TR1-8, and TR1-9.

Response to Comment CC2-2

Your concerns regarding project-related impacts to the City of Carson are acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

Name: Harold Williams, Council member
Address: City of Carson
Affiliation: Council member
Phone: 310-952-1700
Date: 9-25-07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
__ I would like to be added to the mailing list
__ I would like to have the comment below filed in the record
✓ I would like to speak CC2-1

COMMENTS: CITY of CARSON IMPACTS CC2-2

For more information call Karl Price, Environmental Planner, at (213) 897-1839

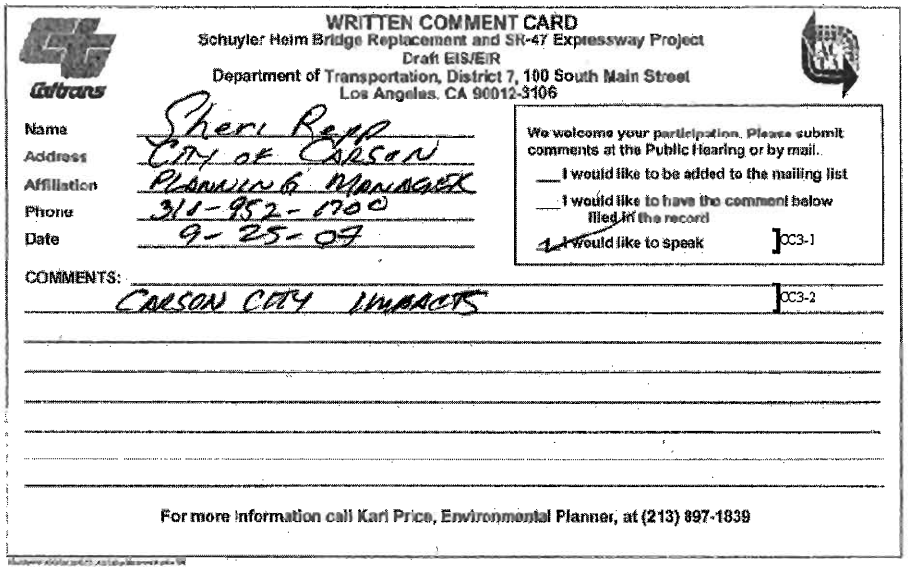
Comment Card 3

Response to Comment CC3-1

Your comments are addressed in responses TR1-10 and TR1-11.

Response to Comment CC3-2

Your concerns regarding project-related impacts to the City of Carson are acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3106

Caltrans

Name: Sheri Repp
Address: City of Carson
Affiliation: Planning Manager
Phone: 310-952-1700
Date: 9-25-07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
X I would like to speak

CC3-1

COMMENTS: CARSON CITY IMPACTS

CC3-2

For more information call Karl Price, Environmental Planner, at (213) 897-1839

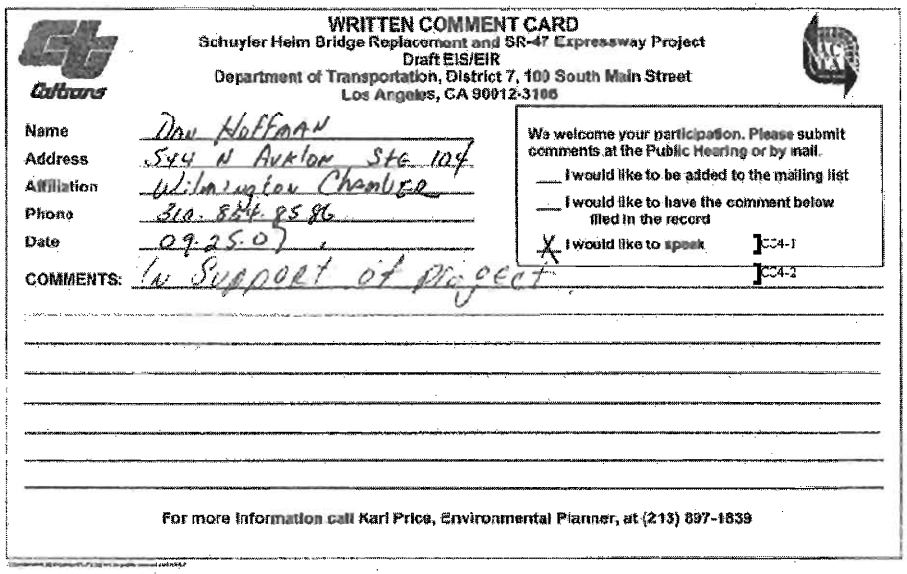
Comment Card 4

Response to Comment CC4-1

Your comments are addressed in responses TR1-12 and TR1-13.

Response to Comment CC4-2

Your support for the proposed project is acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3106

Caltrans

Name: Don Hoffman
Address: 544 N Avalon Ste 104
Affiliation: Wilmington Chamber
Phone: 310. 834. 8586
Date: 09.25.07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
X I would like to speak

CC4-1

COMMENTS: In Support of Project.

CC4-2

For more information call Karl Price, Environmental Planner, at (213) 897-1839

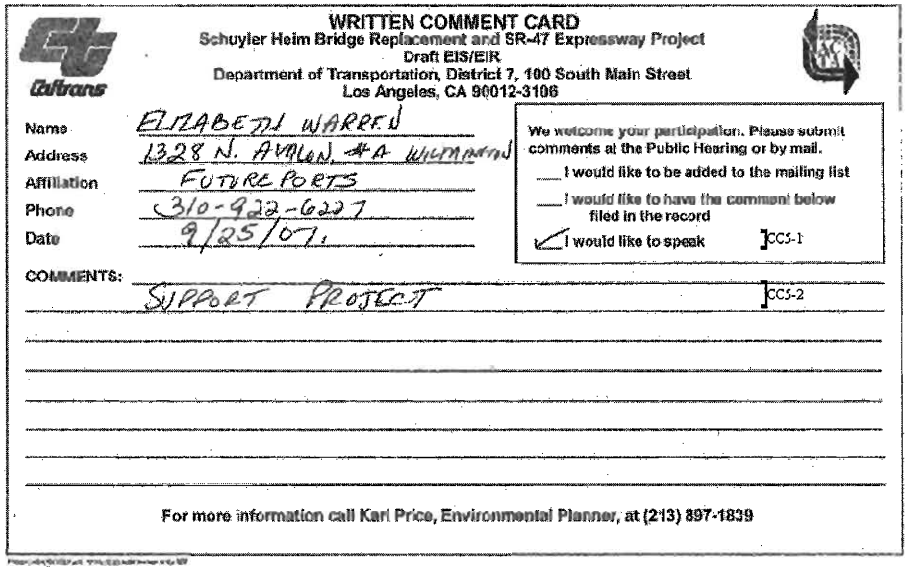
Comment Card 5

Response to Comment CC5-1

Your comment is addressed in response TR1-14.

Response to Comment CC5-2

Your support for the proposed project is acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3106

Caltrans

Name: ELIZABETH WARREN
Address: 1328 N. AVALON #A WILMINGTON
Affiliation: FUTUREPORTS
Phone: 310-922-6227
Date: 9/25/07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
✓ I would like to speak CC5-1

COMMENTS: SUPPORT PROJECT CC5-2

For more information call Karl Price, Environmental Planner, at (213) 897-1839

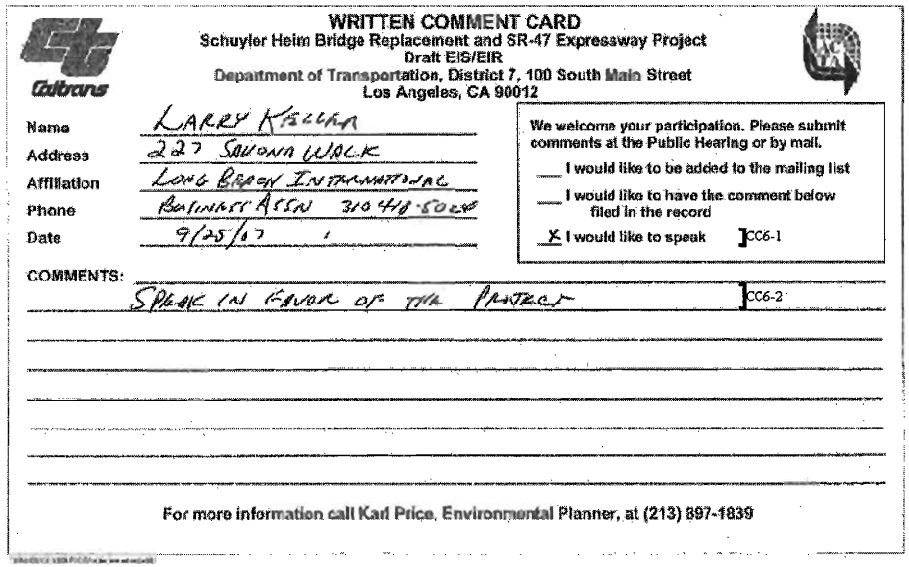
Comment Card 6

Response to Comment CC6-1

Your comments are addressed in responses TR1-15 and TR1-16.

Response to Comment CC6-2

Your support for the proposed project is acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

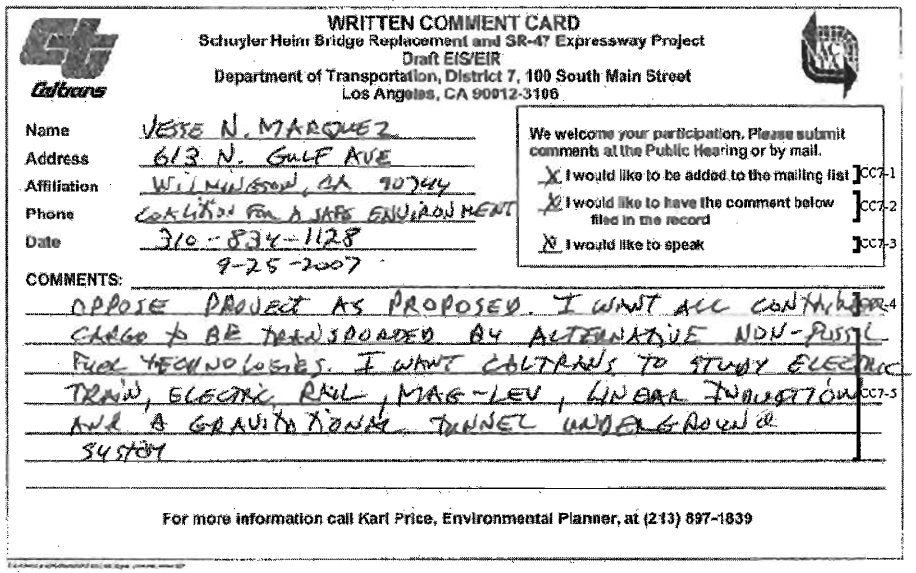
Name: LARRY KELLER
Address: 227 SAVONA WALK
Affiliation: LONG BEACH INTERNATIONAL BUSINESS ASSN
Phone: 310 410-5020
Date: 9/25/07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
X I would like to speak CC6-1

COMMENTS: SPEAK IN FAVOR OF THE PROJECT CC6-2

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Comment Card 7



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3186

Name: JESSE N. MARQUEZ
Address: 613 N. GULF AVE
Affiliation: WILMINGTON, CA 90744
Phone: COALITION FOR A SAFE ENVIRONMENT
Date: 310-834-1128
9-25-2007

We welcome your participation. Please submit comments at the Public Hearing or by mail.
X I would like to be added to the mailing list CC7-1
X I would like to have the comment below filed in the record CC7-2
X I would like to speak CC7-3

COMMENTS:
OPPOSE PROJECT AS PROPOSED. I WANT ALL CONTAINER CARGO TO BE TRANSPORTED BY ALTERNATIVE NON-FOSSIL FUEL TECHNOLOGIES. I WANT CALTRANS TO STUDY ELECTRIC TRAIN, ELECTRIC RAIL, MAG-LEV, LINEAR INDUCTION AND A GRAVITATIONAL TUNNEL UNDERGROUND SYSTEM CC7-4 CC7-5

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC7-1

Your name has been added to the mailing list, as requested.

Response to Comment CC7-2

By virtue of being included in this Final EIS/EIR, your comments and responses are filed in the public record.

Response to Comment CC7-3

Your comments are addressed in responses TR1-17 and TR1-18.

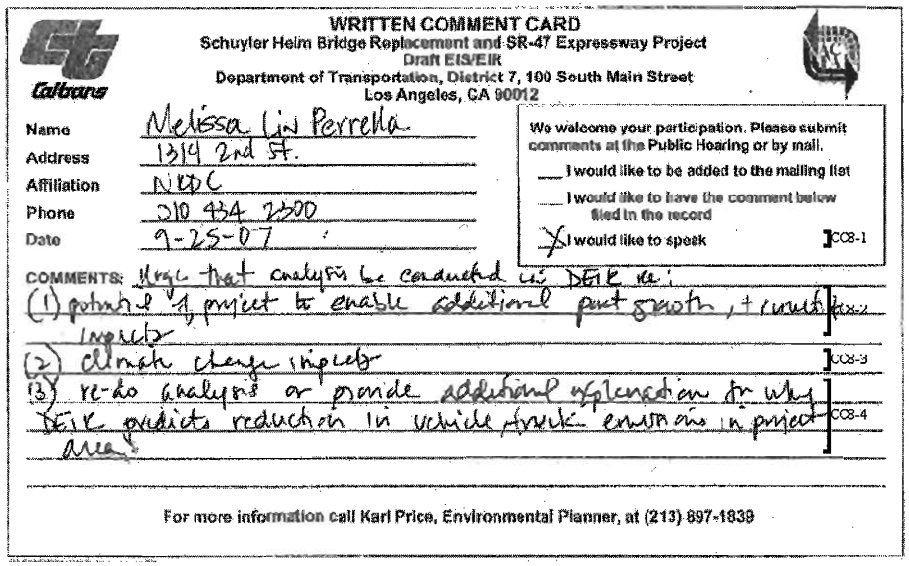
Response to Comment CC7-4

Your opposition to the proposed project is acknowledged.

Response to Comment CC7-5

The commenter is referred to responses OB4-5, OB4-11, and OB5-8 discussions regarding cargo transport by alternative technologies.

Comment Card 8



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Name: Melissa Lin Perrella
Address: 1314 2nd St.
Affiliation: NRDC
Phone: 310 434 2300
Date: 9-25-07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
__ I would like to be added to the mailing list
__ I would like to have the comment below filed in the record
X I would like to speak CC8-1

COMMENTS: Urge that analysis be conducted in DEIR re:
(1) potential of project to enable additional port growth, + cumulative impacts CC8-2
(2) climate change impacts CC8-3
(3) re-do analysis or provide additional explanation for why DEIR predicts reduction in vehicle truck emissions in project area. CC8-4

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC8-1

Your comments are addressed in responses TR1-19, TR1-20, TR1-21, TR1-22 and TR1-23.

Response to Comment CC8-2

The commenter is referred to responses TR1-19 and TR1-20, which address the relationship between the project and port growth.

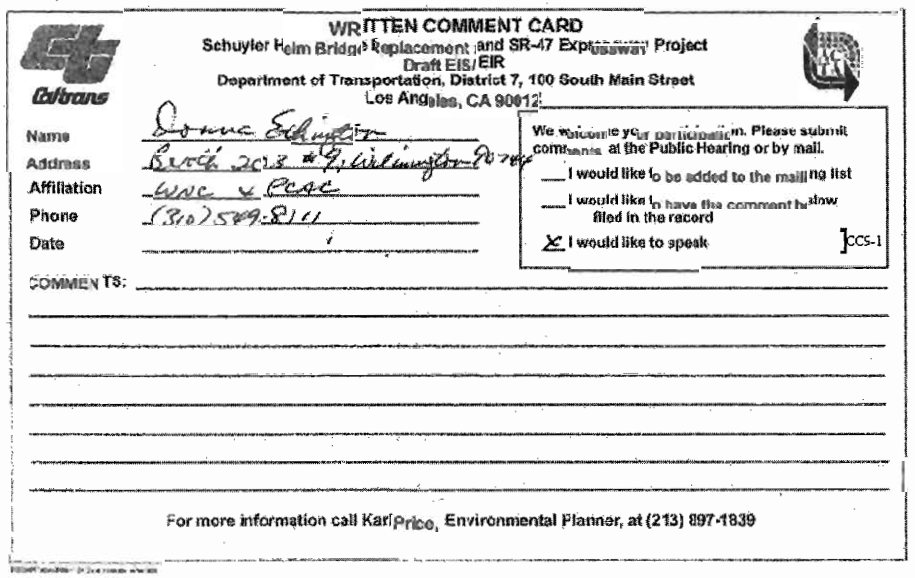
Response to Comment CC8-3

The commenter is referred to Response AJ11-32 for discussion of global climate change as it may relate to the proposed project.

Response to Comment CC8-4

The commenter is referred to responses TR1-21 and OB6-6, which address the expected decrease in vehicular emissions.

Comment Card 9



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

Name: Donna Schuyler
Address: Box 2013 #9, Wilmington 90748
Affiliation: WNC & PCAC
Phone: (310) 549-8111
Date:

We welcome your participation. Please submit comments at the Public Hearing or by mail.
__ I would like to be added to the mailing list
__ I would like to have the comment below filed in the record
X I would like to speak CCS-1

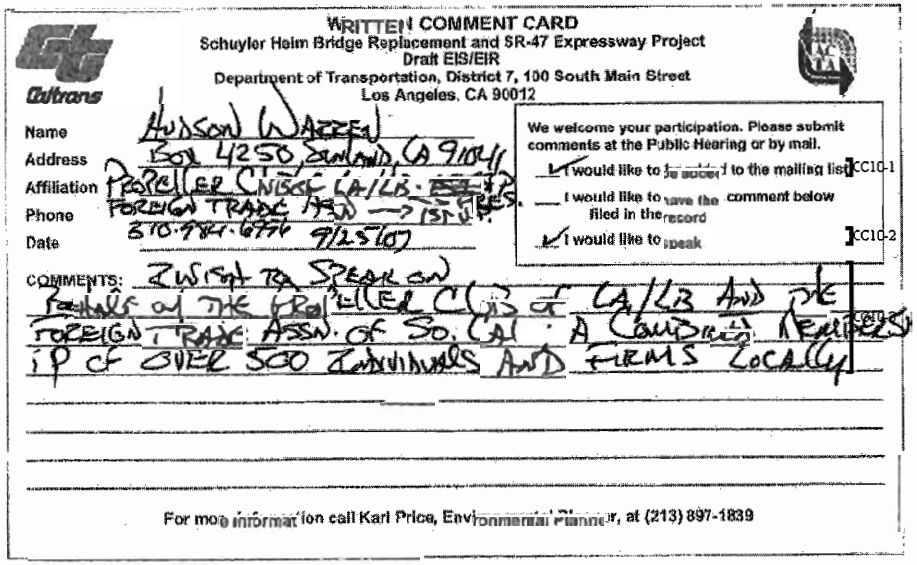
COMMENTS:

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC9-1

Your comments are addressed in responses TR1-24, TR1-25, and TR1-26.

Comment Card 10



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

Name: HUDSON (WARREN)
Address: BOX 4250, SANTA MD, CA 91064
Affiliation: PROPELLER CLUB LA/LB · FOREIGN TRADE ASSN → 1ST VP'S
Phone: 310-984-6776
Date: 9/25/07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
✓ I would like to be added to the mailing list CC10-1
__ I would like to have the comment below filed in the record
✓ I would like to speak CC10-2

COMMENTS: I WISH TO SPEAK ON BEHALF OF THE PROPELLER CLUBS OF LA/LB AND THE FOREIGN TRADE ASSN. OF SO. CAL. A COMBINED MEMBERSHIP OF OVER 500 INDIVIDUALS AND FIRMS LOCALLY CC10-3

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC10-1

Your name has been added to the mailing list, as requested.

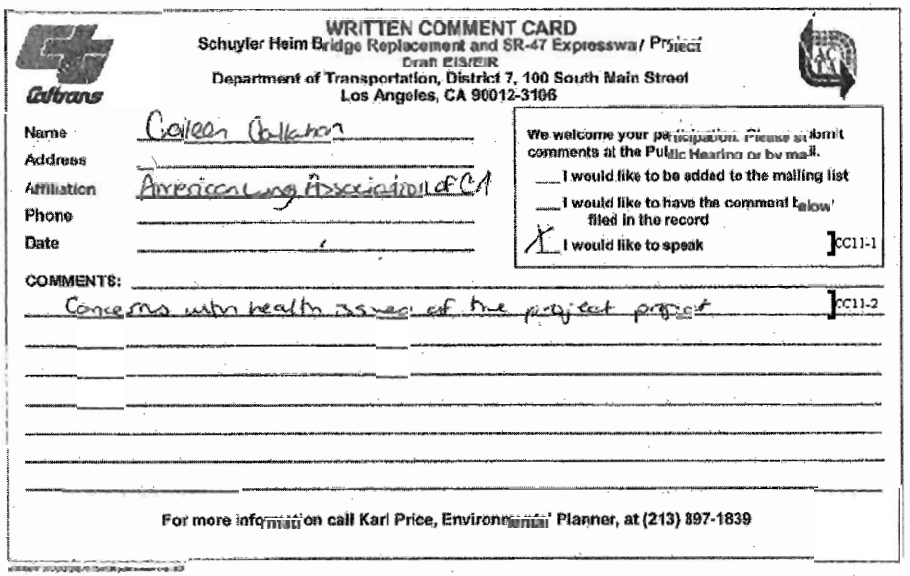
Response to Comment CC10-2

Your comment is addressed in response TR1-27.

Response to Comment CC10-3

Your representation on behalf of the Propeller Club of Los Angeles and Long Beach and the Foreign Trade Association of Southern California is acknowledged.

Comment Card 11



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3166

Name: Coleen Callahan
Address:
Affiliation: American Lung Association of CA
Phone:
Date:

We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
X I would like to speak CC11-1

COMMENTS:
Concerns with health issues of the project project CC11-2

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC11-1

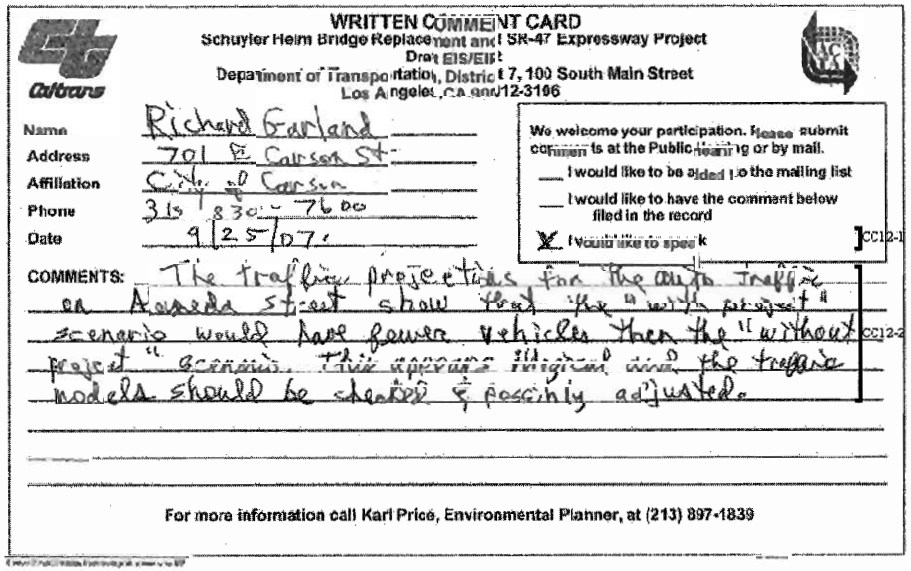
Your comments are addressed in responses TR1-28 and TR1-29.

Response to Comment CC11-2

The commenter's concern regarding potential health issues of the project is acknowledged.

The commenter is referred to responses EO1-5, AJ7-1, and AJ11-2.

Comment Card 12



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3166

Name: Richard Garland
Address: 701 E Carson St
Affiliation: City of Carson
Phone: 310 830-7600
Date: 9/25/07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
X I would like to speak CC12-1

COMMENTS: The traffic projections for the Auto traffic on Alameda Street show that the "with project" scenario would have fewer vehicles than the "without project" scenario. This appears illogical and the traffic models should be checked & possibly adjusted. CC12-2

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC12-1

Your comments are addressed in responses TR1-30 and TR1-31.

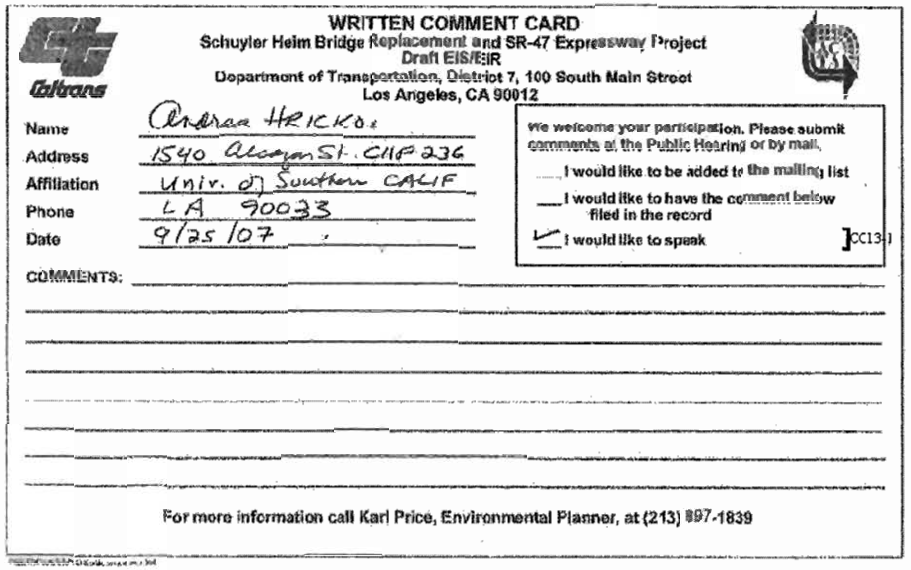
Response to Comment CC12-2

The commenter's concerns regarding the accuracy of traffic projections are acknowledged.

The traffic models are correct. With the project, as the truck traffic is expected to increase along Alameda Street, auto traffic will tend to divert to I-110 and I-710. As a result, auto traffic will decrease along Alameda Street.

Also see response TR1-30.

Comment Card 13



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

Name: Andrea HRICKO
Address: 1540 Alcazar St. CHP 236
Affiliation: Univ. of Southern CALIF
Phone: LA 90033
Date: 9/25/07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
✓ I would like to speak]CC13-1

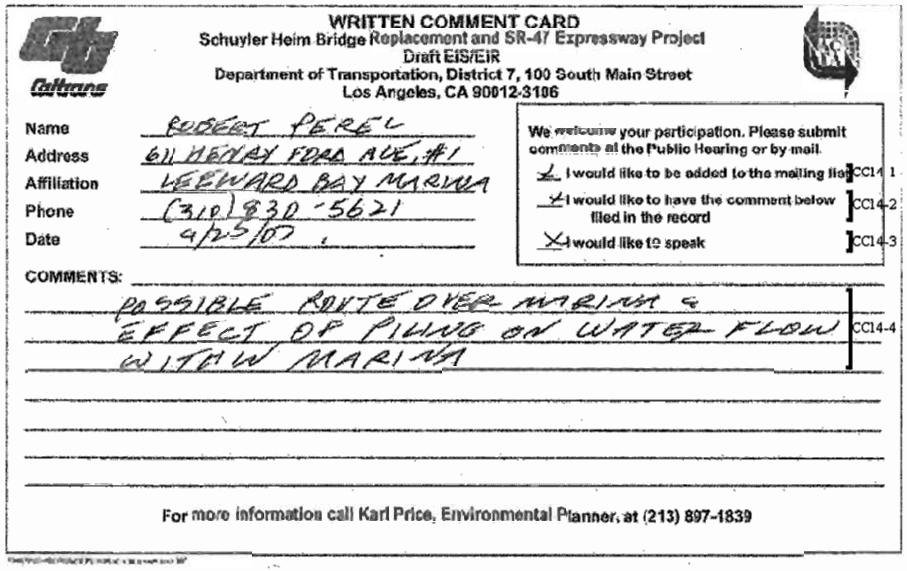
COMMENTS:

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC13-1

Your comments are addressed in responses TR1-32, TR1-33, TR1-34, TR1-35, TR1-36, TR1-37, and TR1-38.

Comment Card 14



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3106

Caltrans

Name: ROBERT PEREZ
Address: 611 HENRY FORD AVE, #1
Affiliation: LEEWARD BAY MARINA
Phone: (310) 830-5621
Date: 9/25/07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
✓ I would like to be added to the mailing list]CC14-1
✓ I would like to have the comment below filed in the record]CC14-2
✓ I would like to speak]CC14-3

COMMENTS:
POSSIBLE ROUTE OVER MARINA & EFFECT OF PILING ON WATER FLOW WITHIN MARINA]CC14-4

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC14-1

Your name has been added to the mailing list, as requested.

Response to Comment CC14-2

By virtue of being included in this Final EIS/EIR, your comments and responses are filed in the public record.

Response to Comment CC14-3

Your comments are addressed in responses TR1-39, TR1-40, and TR1-41.

Response to Comment CC14-4

The commenter is referred to responses TR1-40 and TR1-41 for discussions of potential effects to water flow at the marina.

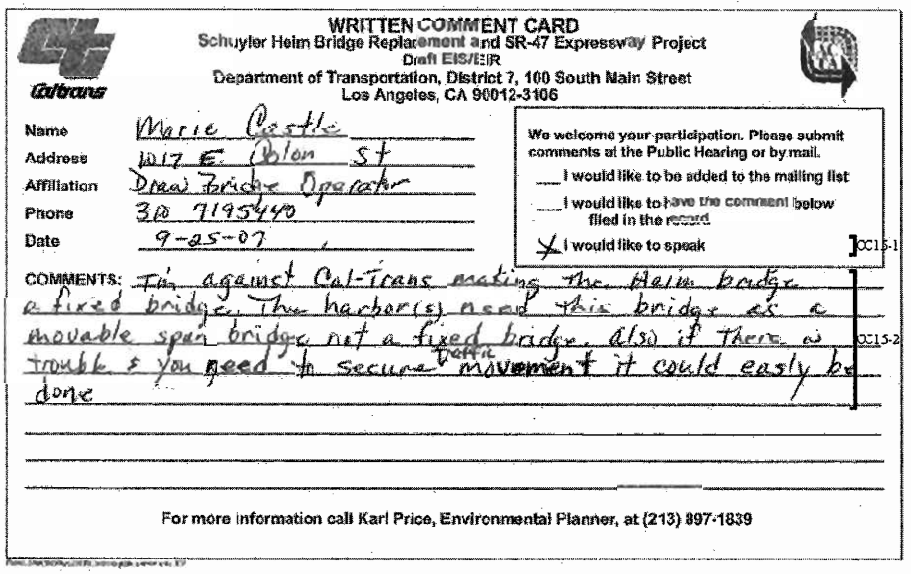
Comment Card 15

Response to Comment CC15-1

Your comments are addressed in responses TR1-42, TR1-43, and TR1-44.

Response to Comment CC15-2

Your opposition to replacement of the vertical lift Schuyler Heim Bridge with a fixed-span bridge is acknowledged. The existing Schuyler Heim Bridge has a number of well-documented deficiencies that must be rectified. The bridge is functionally obsolete and does not meet current seismic standards and, as a consequence, would not be capable of remaining in service following a major earthquake and ensuring the continued flow of highway and marine traffic. The current bridge is incapable of maintaining emergency relief access to and from Terminal Island and the critical movement of people, freight, and goods following a major earthquake. The proposed fixed span bridge would remedy the shortcomings of the Schuyler Heim Bridge at less cost than retrofitting and maintaining the existing bridge.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3106

Caltrans

Name: Marie Castle
Address: 1017 E. Obton St
Affiliation: Draw Bridge Operator
Phone: 310 7195440
Date: 9-25-07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
X I would like to speak

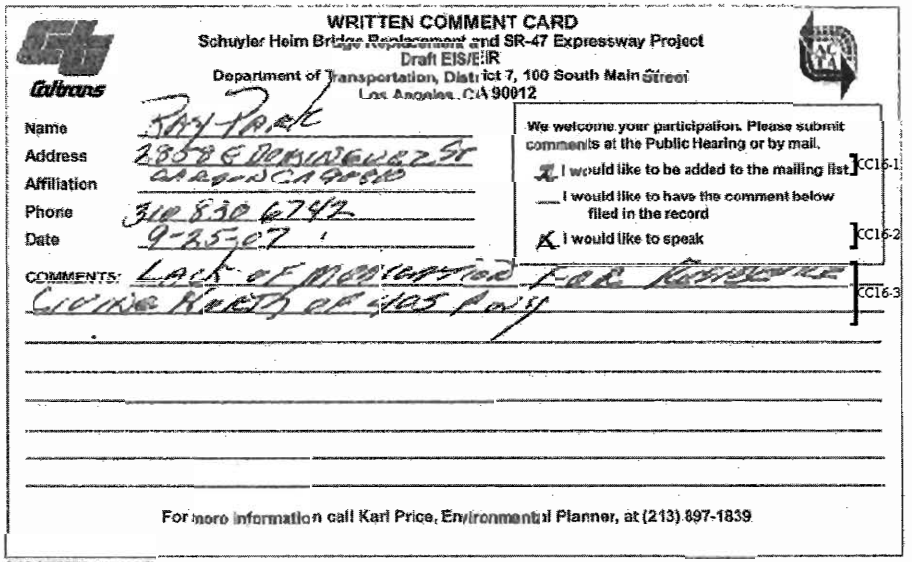
CC15-1

COMMENTS: I'm against Cal-Trans making the Heim bridge a fixed bridge. The harbor(s) need this bridge as a movable span bridge not a fixed bridge. Also if there is trouble & you need to secure traffic movement it could easly be done

CC15-2

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Comment Card 16



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

Name: Ray Tark
Address: 2858 E Dominguez St Carson CA 90810
Affiliation:
Phone: 310 830 6742
Date: 9-25-07
COMMENTS: Lack of Mitigation for Noise Levels Coming North of 405 Fwy

We welcome your participation. Please submit comments at the Public Hearing or by mail.
[X] I would like to be added to the mailing list CC16-1
[ ] I would like to have the comment below filed in the record
[X] I would like to speak CC16-2
CC16-3

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC16-1

Your name has been added to the mailing list, as requested.

Response to Comment CC16-2

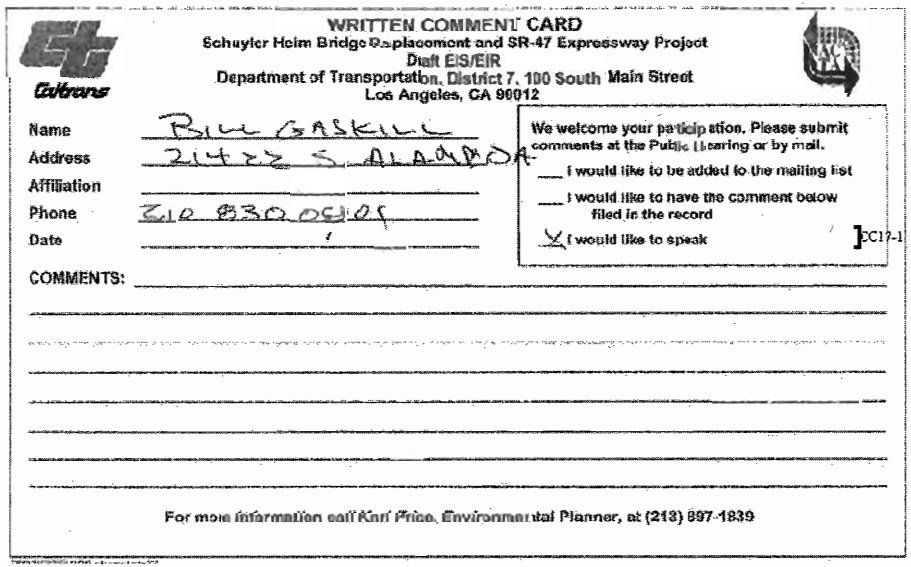
Your comments are addressed in responses TR1-45 and TR1-46.

Response to Comment CC16-3

The commenter's concerns for persons who live north of I-405 are noted. Minimization and mitigation measures have been addressed and incorporated, as appropriate to the project.

Please see the following responses: For a discussion of traffic - TR1-30; for air quality discussions related to Carson - AJ8-14, OB3-7, and TR1-46; for noise discussions related to Carson - AJ8-18, AJ8-15, OB4-25, TR1-9, and TR1-31; and for traffic related to Carson - AJ8-3, AJ8-5, and AJ8-9.

Comment Card 17



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

Name: Bill Gaskill
Address: 21422 S. Alameda
Affiliation:
Phone: 310 830 0505
Date:
COMMENTS:

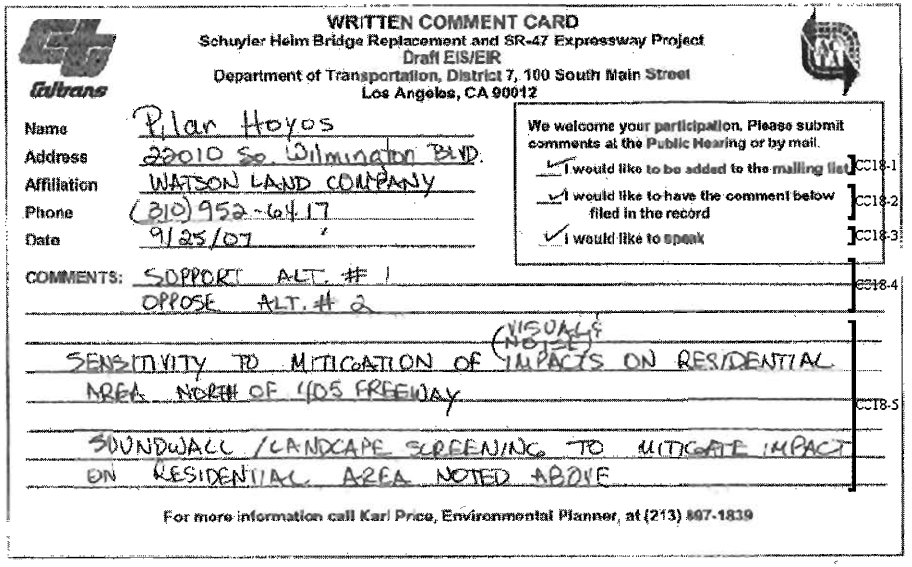
We welcome your participation. Please submit comments at the Public Hearing or by mail.
[ ] I would like to be added to the mailing list
[ ] I would like to have the comment below filed in the record
[X] I would like to speak CC17-1

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC17-1

Your comments are addressed in responses TR1-47 and TR1-48.

Comment Card 18



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

Name: Pilar Hoyos
Address: 22010 So. Wilmington Blvd.
Affiliation: WATSON LAND COMPANY
Phone: (310) 952-6417
Date: 9/25/07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
- ✓ I would like to be added to the mailing list — CC18-1
- ✓ I would like to have the comment below filed in the record — CC18-2
- ✓ I would like to speak — CC18-3

COMMENTS: SUPPORT ALT. # 1 — CC18-4
OPPOSE ALT. # 2
SENSITIVITY TO MITIGATION OF (VISUAL & NOISE) IMPACTS ON RESIDENTIAL AREA NORTH OF 405 FREEWAY — CC18-5
SOUNDWALL / LANDCAPE SCREENING TO MITIGATE IMPACT ON RESIDENTIAL AREA NOTED ABOVE

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Response to Comment CC18-1

Your name has been added to the mailing list, as requested.

Response to Comment CC18-2

Your comments and responses are filed in the public record.

Response to Comment CC18-3

Your comments are addressed in responses TR1-49 and TR1-50.

Response to Comment CC18-4

Your support for project Alternative 1 and your objection to project Alternative 2 are acknowledged.

Response to Comment CC18-5

Your concerns regarding noise and visual impacts to the residential area north of the I-405 are acknowledged. However, the project study area encompasses locations where the proposed SR-47 project would cause actual physical changes to the roadway system.

Residences of concern in Carson, namely those located east of Alameda Street between Dominguez Street and I-405, and the church and homes between Dominguez and Carson Streets, are considered to be outside the project study area in regard to noise analysis, visual assessment, and other concerns.

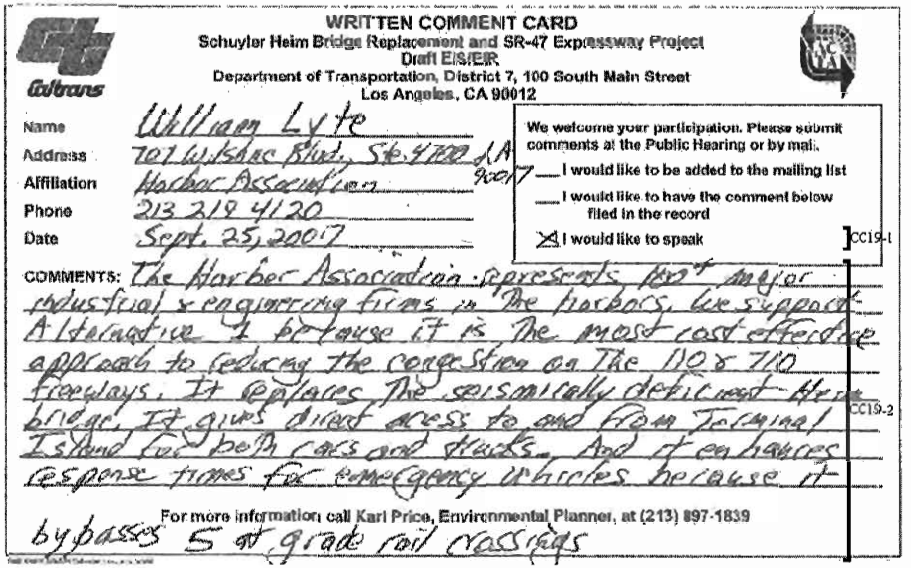
Comment Card 19

Response to Comment CC19-1

Your comment is addressed in response TR1-51.

Response to Comment CC19-2

Your support for project Alternative 1 is acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

Name: William Lyte
Address: 707 Wilshire Blvd, Ste. 4700 LA 90017
Affiliation: Harbor Association
Phone: 213 219 4120
Date: Sept. 25, 2007

We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
X I would like to speak CC19-1

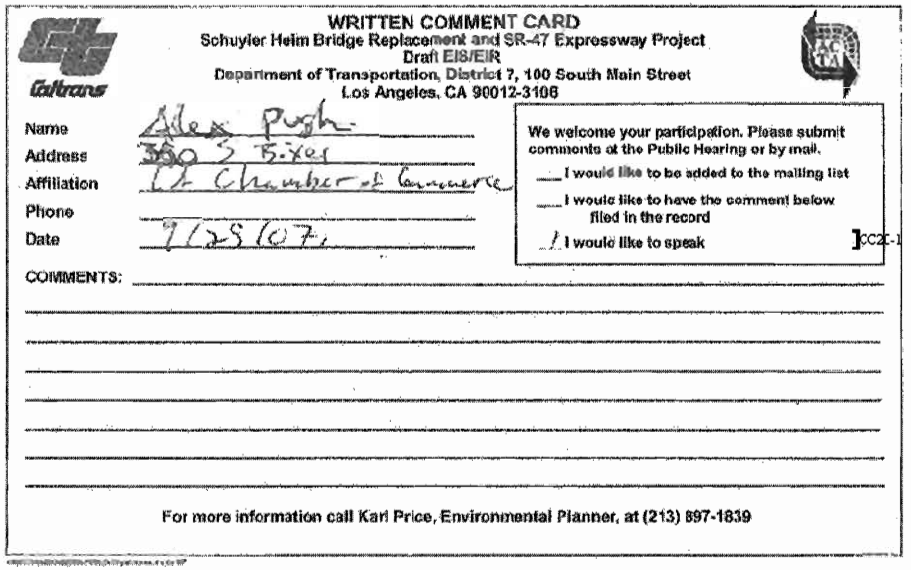
COMMENTS: The Harbor Association represents most major industrial engineering firms in the harbors. We support Alternative 4 because it is the most cost effective approach to reducing the congestion on the 110 & 710 freeways. It replaces the seismically deficient Heim bridge. It gives direct access to and from Terminal Island for both cars and trucks. And it enhances response times for emergency vehicles because it bypasses 5 at grade rail crossings CC19-2

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Comment Card 20

Response to Comment CC20-1

Your comment is addressed in response TR-52.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3106

Caltrans

Name: Alex Pugh
Address: 390 S. Vinces
Affiliation: LA Chamber of Commerce
Phone:
Date: 9/25/07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
/ I would like to speak CC20-1

COMMENTS:

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Comment Card 21

Response to Comment CC21-1

Your name has been added to the mailing list, as requested.

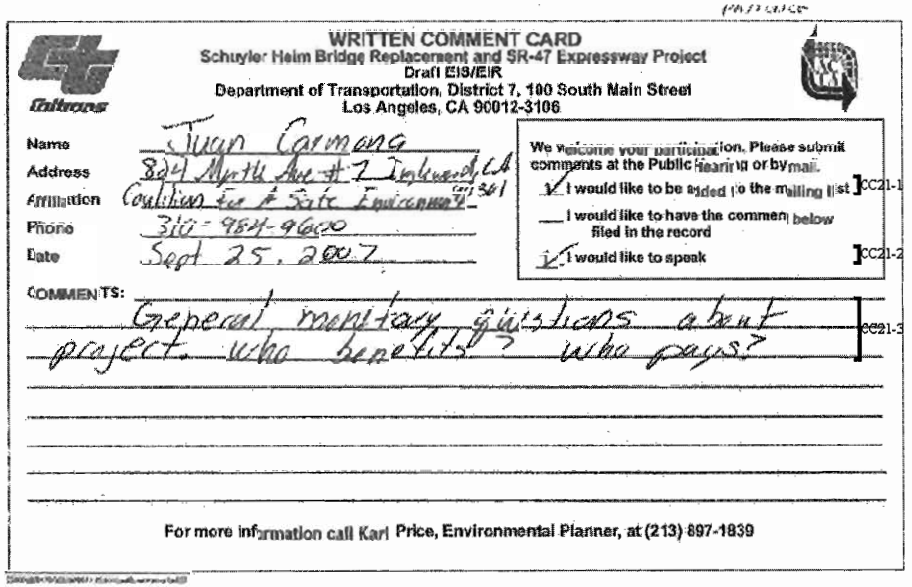
Response to Comment CC21-2

Your comments are addressed in responses TR1-53, TR1-54, TR1-55, and TR1-56.

Response to Comment CC21-3

Your concerns regarding the monetary aspects of the proposed project are acknowledged. Regarding funding for the proposed project: the State Route 47 and Schuyler Heim Bridge replacement project is one of the candidate short-term (0-3 years) actions listed in the final Goods Movement Action Plan published in January, 2007. With the passage of the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, $3.1 billion will be available to help address the wide range of infrastructure, air quality, and homeland security aspects of California's goods movement system. Appendix C of the Plan indicates the amounts of committed public funding to candidate projects. The SR-47 (including Schuyler Heim Bridge replacement) has a commitment of $246 million from the State Highway Operations and Protection Program of the state and $10 million from the federal Safe, Accountable, Flexible, Efficient, Transportation Equity Act-A Legacy for Users program. It is currently expected that funding for the bridge portion of the project will be replaced with Grant Anticipation Revenue Vehicle (GARVEE) bonds and will be included in the 2008 SHOPP.

Implementation of the proposed project would bring a number of benefits including, but not limited to, the following: a safe and secure bridge connection to Terminal Island and the Ports of Long Beach and Los Angeles; uninterrupted traffic flow (for both highway vehicles and marine vessels); reduced congestion on approach streets and highways; reduced travel time; and reduced emissions of air contaminants.



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Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3106

Name: Juan Carmona
Address: 824 Myrtle Ave #2 Inglewood, CA 90301
Affiliation: Coalition for a Safe Environment
Phone: 310-954-9600
Date: Sept 25, 2007

We welcome your participation. Please submit comments at the Public Hearing or by mail.
☑ I would like to be added to the mailing list CC21-1
☐ I would like to have the comment below filed in the record
☑ I would like to speak CC21-2

COMMENTS: General monetary questions about project. who benefits? who pays? CC21-3

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Comment Card 22

Response to Comment CC22-1

Your concern regarding notice to residents near Henry Ford Avenue and Alameda Street is acknowledged. Please see the response to this comment at TR1-57.

Response to Comment CC22-2

Your request for an extension of the public comment period is acknowledged. Please see the response to this comment at TR1-59.

Response to Comment CC22-3

Your concern about the readability of one of the tables in the Air Quality Technical Report is acknowledged. Please see the response to this comment at TR1-58.

WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3106

Caltrans

Name: Andrea Hricko
Address: USC
Affiliation:
Phone: ahricko@usc.edu
Date: [illegible]

We welcome your participation. Please submit comments at the Public Hearing or by mail.
__ I would like to be added to the mailing list
__ I would like to have the comment below filed in the record
__ I would like to speak

COMMENTS:

1) Were residents near Henry Ford Ave & Alameda flyered for this meeting CC22-1

2) Will you grant an extension of public comments CC22-2

3) Table 1 in AQ Tech Report - makes no sense CC22-3

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Comment Card 23

Response to Comment CC23-1

Your name has been added to the mailing list, as requested.

Response to Comment CC23-2

Your comments and responses are filed in the public record.

Response to Comment CC23-3

Your request for an extension of the public comment period is acknowledged. Please see response TR1-59.

WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3106

Caltrans

Name: JESSE N. MARQUEZ
Address: 613 N. Gulf Ave Wilmington
Affiliation:
Phone: 310-834-1128
Date: 9-25-2007

We welcome your participation. Please submit comments at the Public Hearing or by mail.
X I would like to be added to the mailing list CC23-1
X I would like to have the comment below filed in the record CC23-2
__ I would like to speak

COMMENTS:

REQUEST 90 DAY EXTENSION OF PUBLIC COMMENT PERIOD CC23-3

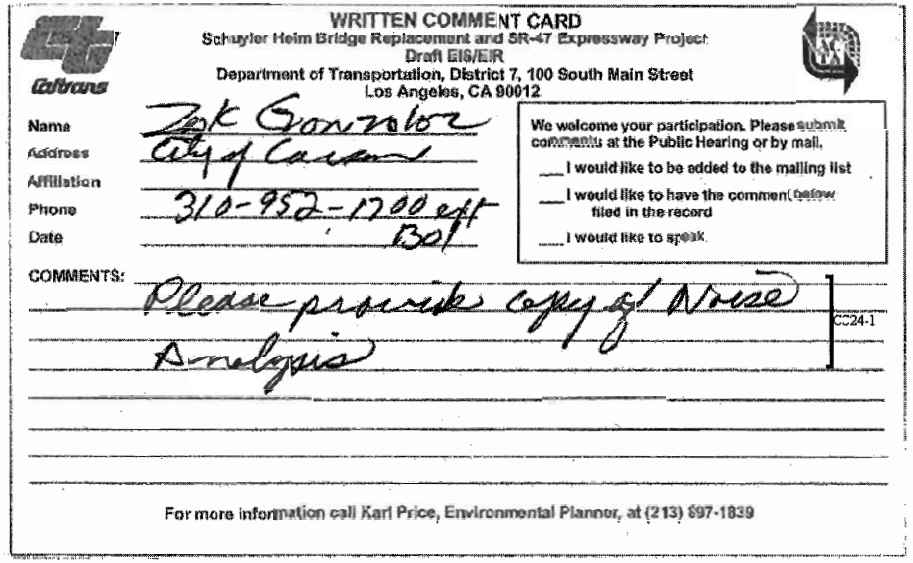
For more information call Karl Price, Environmental Planner, at (213) 897-1839

Comment Card 24

Response to Comment CC24-1

The commenter's request for a copy of the Noise report is acknowledged. A hard copy of the Noise Technical Study was delivered to the commenter a few days following the public hearing.

The Noise report is available at the same locations as the Draft EIS/EIR: libraries, Caltrans District 7, the Alameda Corridor Transportation Authority, and electronically.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012

Caltrans

Name: Zak Gonzalez
Address: City of Carson
Affiliation:
Phone: 310-952-1700 ext 1301
Date:

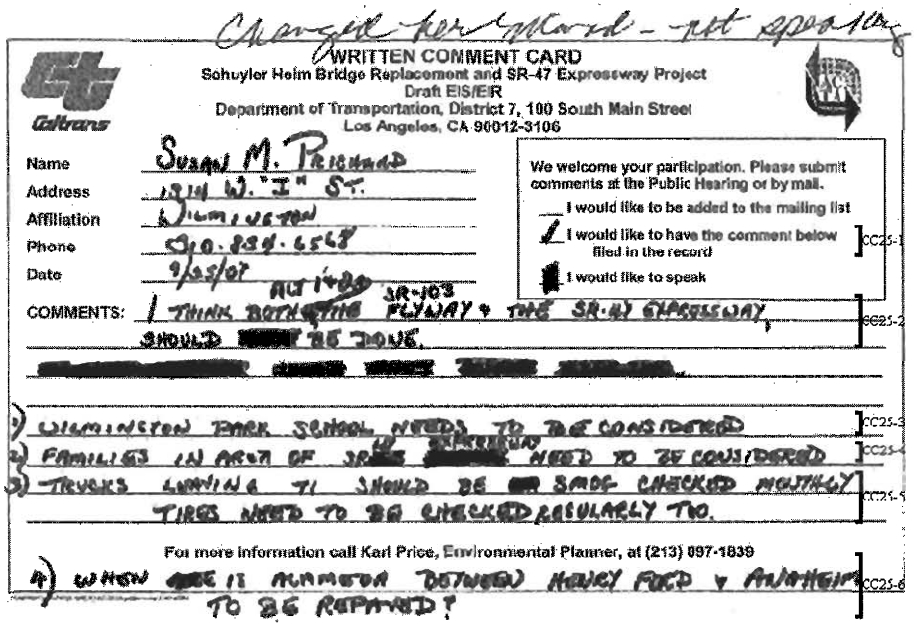
We welcome your participation. Please submit comments at the Public Hearing or by mail.
___ I would like to be added to the mailing list
___ I would like to have the comment below filed in the record
___ I would like to speak.

COMMENTS: Please provide copy of Noise Analysis

CC24-1

For more information call Karl Price, Environmental Planner, at (213) 897-1839

Comment Card 25



Changed from Standard - not speaking

WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement and SR-47 Expressway Project
Draft EIS/EIR
Department of Transportation, District 7, 100 South Main Street
Los Angeles, CA 90012-3106

Caltrans

Name: SUSAN M. PRICHARD
Address: 1314 W. "I" ST.
Affiliation: WILMINGTON
Phone: 310.834.4548
Date: 9/25/07

We welcome your participation. Please submit comments at the Public Hearing or by mail.
__ I would like to be added to the mailing list
✓ I would like to have the comment below filed in the record
__ I would like to speak

COMMENTS: I THINK BOTH THE ALT 1 AND ALT 2 FLYAWAY & THE SR-47 EXPRESSWAY SR-103 SHOULD [redacted] BE MOVE.

[redacted]

1) WILMINGTON PARK SCHOOL NEEDS TO BE CONSIDERED
2) FAMILIES IN AREA OF SR [redacted] NEED TO BE CONSIDERED
3) TRUCKS LOOKING 71 SHOULD BE [redacted] SMOG CHECKED MONTHLY TIRES NEED TO BE CHECKED REGULARLY TOO.

For more information call Karl Price, Environmental Planner, at (213) 897-1839

4) WHEN ARE IT ALAMEDA BETWEEN HEAVY FWD & ANAHEIM TO BE REPAVED?

Response to Comment CC25-1

Your comments and responses are filed in the public record.

Response to Comment CC25-2

Your support for project Alternatives 1 and 2 is acknowledged.

Response to Comment CC25-3

Please see responses TR1-21, EO1-5, AJ7-2, AJ7-21, and AJ11-2, which address vehicular emissions.

Response to Comment CC25-4

In the air quality analysis, sensitive receptors such as residences, schools, and medical facilities were evaluated which and address your concern that families be considered. Please see responses TR1-23, EO1-5, AJ7-2, and AJ11-2.

Response to Comment CC25-5

Your comments regarding trucks are noted. However, smog checks are a regulatory requirement outside the jurisdiction of the Lead Agency. In addition, truck owner/operators would be expected to maintain their vehicles to the manufacturer's specifications. The condition of the truck tires is beyond the control of the Lead Agency.

Response to Comment CC25-6

The schedule for repaving Alameda Street at the location specified in the comment is not within the scope of the proposed project and, therefore, is not known.

TR1

SCHUYLER HEIM BRIDGE REPLACEMENT DRAFT ENVIRONMENTAL

AND SR-47 EXPRESSWAY PROJECT

DRAFT EIS/EIR

PUBLIC HEARING

TUESDAY, SEPTEMBER 25, 2007

6:00 P.M.

REPORTER'S TRANSCRIPT OF PROCEEDINGS

REPORTED BY: NICOLE R. HARNISH, CSR No. 13101

SEPTEMBER 25, 2007, WILMINGTON, CALIFORNIA

MS. LOWENTHAL: Hi. Good Evening. I am standing. I am Bonny Lowenthal. I am the vice chair of the City of Long Beach; and I am the current chair of the Alameda Corridor Transportation Authority, which is why you are all here. We are known as ACTA. And I want to welcome you to the public hearing this evening. I want to thank you for taking the time to be here and learn all about this project, hopefully ask a lot of questions, give ACTA a lot of feedback; and for those who don't have the time to get all the information that they're interested in, please, be assured that we are very happy to set up additional meetings. It's very important for everyone to know.

I see many of you that I know in the audience, but I do want to give a special welcome to my friend Mick Sramek who is the new harbor commissioner for the Port of Long Beach. Wave your hand, Nick. And I don't know if there are any other commissioners here. But, Nick, thank you for being here.

The SR-47 Expressway project is a joint partnership with Caltrans and ACTA to replace the seismically deficient Commodore Heim Bridge over the

Cerritos Channel. We all know how important bridge safety is, having just witnessed the catastrophe in Minneapolis.

The project will also add a four-lane elevated roadway that will allow both cars and truck to by pass three signalized intersections and five at-grade rail crossings in Wilmington, reducing congestion on the I-710 and Harbor Freeways. The Heim Bridge provides an essential service link to the ports of Los Angeles and Long Beach and is required to remain in service to ensure ground and marine vessel transportation during an earthquake.

There are several project alternatives which were analyzed within the environmental documents, and they will be summarized for you tonight.

I want very much to thank our partners at Caltrans and ACTA's consultants for all of their efforts today to bring forward the environmental impact documents about which we would like to hear from you. ACTA and Caltrans have a successful history of collaboration, most recently on the critical grade separation project that was developed several years go on PCH, which is also in Wilmington.

So, again, I want to thank all of you for

taking the time. We look forward to hearing your comments and feedback. Thank you very much.

I also would like to let you know I have a 7:00 o'clock obligation in Long Beach, so I won't be able to stay. But for sure, I will hear the comments and look forward to any individual meetings that may come up following this session. Thank you.

MR. KOSINSKI: Okay. Thank you, Bonnie. And what we are going to do now is go back to the format that we had when we talked. So if there are people here who want to look at the maps and talk to the staff on an informal basis, we are going to that for a few more minutes. And then we will start the formal presentation when it appears that nobody else has any issue with the map. So go back to what you were doing before, and we will be having our presentation in a few minutes.

Thank you.

(Recess.)

MR. KOSINISKI: If I could have your attention, we are going to start the public hearing right now. So if you would please take your seats. Can we have your attention, please.

TRANSLATOR: Good evening. This message is for translation equipment. If anybody needs

equipment for translation services from English to Spanish, the equipment is in the back. We will be happy to interpret for you.

(Foreign languages announcement.)

MS. KOSINSKI: I would like to open this public hearing and formally welcome you to this evening. We are here to discuss the Schuyler Heim -- or Schuyler Heim Bridge replacement project and the various improvements that are proposed for the SR-47 Expressway. We have a draft environmental impact report, environmental statement that is out in circulation currently. The end-of-comment period will mentioned several times. It's October 16th.

There is some individual housekeeping events I would like to take care of before we start. First of all, there's a court reporter here today. So I would encourage you to, when you do come to the microphone to speak, speak slowly. First give your name and speak slowly and distinctly, like I am trying to do. And that way we will have an accurate transcript from this proceeding. There are comment cards, which each one of you should have received when you got here today.

We are going to take these comment cards, and staff will be available to take them. If you

wish to speak or you wish to have comments or a statement read into the record, please fill out one of these comment cards. We are going to try to keep this informal, but somewhat structured, by following the comment card process at this meeting today.

As we mentioned, we have Spanish and Tagalog translators here to help with the translation. And the -- when we get to the comment section, we are first going to be taking comments and statements from individuals who have filled out these comment cards and then go into questions after that.

I would like to introduce our panel. We have two individuals here who are very knowledgeable in this process. The basic situation -- in terms of how we operate here at Caltrans and when working with the agencies -- excuse me -- that the engineering staff works very closely with the environmental staff; and it's kind of an iterative process where there are engineering details that are developed, that goes to the environmental staff for review to see what the impacts are. And then if there are impacts that can be mitigated, that information comes back to the engineering staff. And it's an iterative process to get to the project alternatives that we have today. We are going to have Shahram Vahdat

giving the engineering presentation. And then that will be followed by Harley Martin, who will identify the information on the environmental studies.

The process here today is to provide an overview of these projects, which these two individuals will be doing. And then most importantly, of course, to hear you, the community. It's always nice that we are working with the community to find out the issues that are important. We have had scoping meetings. We've had interactions with the community, and today is just another one of that interactive process.

The testimony that we get today would be, of course, received from the public, as well as from the agencies that are involved. There's a long list of -- testing -- sorry -- there's a long list of agencies that are involved in this process. Caltrans is the lead agency on this environmental document; but of course, we are working very closely with the Alameda Corridor Transportation Agency and their consultant team. The Coast Guard is the Federal cooperating agency. They have a role to submit -- to play in terms of making a decision on this project. And there's other agencies who are identified as responsible agencies.

The questions are when, who, what, and how. The question in terms of when is for this process that we are going through, when to get involved. The process, of course, is to be involved on a regular basis, but now is a very important step in that process. The who, of course, is you and the agencies that are listed. The community, again, has a very important role to play in this decision-making process. No decision is going to be made until after we hear from the community and listen to everybody's comments and get all those comments by, again, October 16th.

The what is what we are trying to accomplish today, is some clarification of process, if that is needed. That is why this informal process is set up, so you can look at the maps and talk to staff. After the presentations are completed and the hearing is completed, we can go back to that format for those people who need to have some additional interaction with staff on this project. We will be doing some refinements to the process as we go through it. And, again, as I mentioned, we are here to get guidance from you as a part of the community.

The how, of course, is through these written comments that we are asking you to provide by

the 16th, by the verbal comments that we get today. And the important other thing, of course, is, beyond the meeting today, to stay involved in this process.

With that, I am going to introduce our first panel member, which is Shahram, who is going to talk about the engineering aspects of this project. Oh, there's one more thing I have got to do. I'm sorry. There are certain -- Bonnie has already been introduced and made a few statements about this project. But I do have cards from other important dignitaries here today, who are here also today to hear what the community has to say. First we have John Dear who is the Mayor of Carson. John -- Jim. Did I say John when it says -- John Dear. That is the -- John Dear is very, very important because you cannot have a tractor in this country without him. That is Jim Dear. I'm sorry, Jim. We have -- let's see how many more of these names I can mess up. Nick Sramek, who is the commissioner with the Harbor Commission. Nick, how are you doing? Did I get that relatively close?

MR. SRAMEK: Good job.

MR. KOSINSKI: We have Jessica Duboff, field representative for Jane Harmon. Hi, Jessica. Then we have Veronica Zendejas representing

Jenny Oropeza. Veronica, hi. Then we have Cine Avery representing Senator Alan Lowenthal. Cine?

MS. AVERY: Cine.

MR. KOSINSKI: I'm sorry. Then last we have -- oh, we have two more. We have Niki Tennant representing the office of the Vice Mayor; Bonnie Lowenthal, who spoke earlier. Niki. She stepped out top. Then we have -- last is Jacob Haik representing Honorable Janice Hahn, the City Councilwoman from this district. Jacob? There's Jacob. Is there anybody else that I missed before we proceed with the presentations?

Again with a name like Kosinski, I should do a better job on these, but I -- people mispronounce my name all the time. So I guess that is my subliminal revenge. With that, we will go to our presentations.

MR. VAHDAT: Thank you, Ron. Again, my name is Shahram Vahdat. I am going to present the engineering aspects of the SR-47 project.

First, I just want to show you the project location. To give you some orientation on this one, north is up. But the rest of the drawings that is going to come up, north is going be where I show it to you. Basically this project, the limits of the

projects on the south is the Ocean Boulevard and Terminal Island. The entire project goes within the cities and the ports of Los Angeles and Long Beach, and goes through the north up to the 405.

Now, let's look at the next slide, please. On the projects, purpose, and need. See what was the need for the project, and why did we need this project. The first one is we want to have the structurally and seismically sound bridge over the Cerritos channel to connect Terminal Island to the other side. One of the other needs for this project is we want to have a viable route that connects Terminal Island directly to 405. And this is going to help us to reduce the congestion on both I-710 and I-110. On top of that, we want to make sure that in case of emergency we have a good connection between Terminal Island and the rest of -- the other side of the Cerritos Channel. So these were the needs that caused this project to begin with at the beginning.

Now, let me see -- let's see. How did we respond to these needs? The overall alternatives that we have, they come up with those proposed engineering alternatives. Number one, which is common in all those alternatives, is we want to replace this seismically deficient Heim Bridge with a

fixed span bridge that is stable and is seismically efficient now.

The other one is we want to provide a flyover. Flyover means a direct connector that connects the eastbound Ocean Boulevard to the northbound SR-47, because by the time this project goes on, even very recently, we have some congestion in that intersection; and that is going to reduce the congestion.

And then we want to have a four-lane elevated structure that connects the Terminal Island freeway all the way to -- somehow to 405, basically touches down on Alameda. And, again, all of these improvements we are talking about occur between the Ocean Boulevard to the south and I-405 to the north.

Now, let's look at the different alternatives that we came up with. Here we are proposing five alternatives, but these five alternatives are being prepared by elimination of lots of other alternatives that we went through -- or have been through within the past five or six years. So basically we started with any kind of alternative we can think of and eliminated the ones that are not feasible.

Okay. Let me start with the first

alternative, which is bridge replacement and extension of the SR-47 expressway. This area that you see here, north is to the right. So basically starts from Ocean Boulevard in this area. We have the flyover, which is a direct connector, starts eastbound off Ocean Boulevard, comes directly to the northbound SR-47. We are going to replace the Schuyler Heim Bridge. And the replacement of the bridge happens by basically constructing a path of the bridge on the eastern side of it and then demo the bridge and deconstruct the other half. So the bridge is going to be slightly moved to the east because of construction requirements. And then this four-lane expressway starts from here, all elevated, goes through the Henry Ford, comes down, and goes over north, and comes and touches down on Alameda just south of the PCH. This is PCH. This is north. North is going this way. That is the first alternative.

NEW SPEAKER: Touches down south or north?

MR. VAHDAT: Touches down just south of -- south of PCH. So basically the expressway is elevated all the way up to here. The whole project is elevated and we are going to replace the Schuyler Heim Bridge.

Okay. Let's look at the second alternative, which is called SR-103 extension to Alameda. In this alternative the southerly part of it is exactly the same thing. So basically the other flyover comes over there, replaces the bridge, almost the same thing, but when it comes down, touches down to existing 103. So basically SR-47, after replacement of the Schuyler Heim Bridge, comes down, touches down at the SR-103. So SR-103 is going to be the extension of a route that comes through -- as you know, 103 comes down here at Sepulveda and ends. What we did here, we proposed that starting from here, we go up on elevated structure, raise and go up, go over Sepulveda, go basically kind of west to ICTF, go through this landfill area, all elevated -- everything is elevated, stopping from here when you see a drain -- come down and touch down just south of 405 on Alameda. We have to do some minor realignment of Alameda coming down here to make room for this elevated structure to come down on Alameda. All the elements of Schuyler Heim Bridge, exactly the same as the previous alternative that I mentioned.

Let's look at the third alternative that we came up with. This one is bridge demolition that would preserve the historic part of the structure.

This basically, what we came up with, we have to look at an alternative according to the Federal Section 106 to look, see what happens if we don't touch the bridge, leave the bridge as is, and come up with an alternative.

So the alignment is almost the same as alternative number one, except the alignment has been shifted to the east. So the existing Schuyler Heim Bridge stays where it is, but the whole island shifts to the east. And, again, we have the flyover and coming down, the rest of the project is the same. This is going to cause tremendous impact on the pier that is in that area.

Next alternative is we don't do any SR-47 program, just replace the bridge. And these are the alternatives that we came up with. As you see here, we don't even have the flyover. We just start from here and go up, replace the bridge, and come back and touch down. So this alternative only takes care of the bridge replacement, does not do any other improvement anywhere else.

The one to the last alternative is the transportation system management system. And what we do is we don't replace the bridge. We don't do any improvement to the SR-47. Rather than that we come

and do some traffic improvement like restriping, basically doing synchronization of the signals, eliminating some parking spots to make the street wider, come up with some signage system that provides more information to drivers. For example, let them know that this road is congested, go the other route, or there's some traffic jam here. And basically this alternative does not provide any change on the existing bridge that is seismically deficient.

And last, but not least, basically do nothing. Leave as is and don't spend a penny on that.

With this, I am going to ask Harley Martin to talk about the environmental aspect of the project.

MR. KOSINSKI: While Harry is making his way up here, let me just remind you, if you want to speak at the meeting, please fill out one of these comment cards; and staff will be roaming around to pick them up. So keep that in mind.

MR. MARTIN: Thank you, Shahram. Before I get started on the environmental summary, I want to kind of reiterate some of the project benefits Shahram addressed earlier. But there are also some other project benefits that were incorporated with

working closely with the engineering group, and I will talk about those when I talk about the adverse impacts.

In preparation of the EIS/EIR, we prepared 13 technical studies, air quality, water, noise. We did special multi-modal economic study looking at marine vessel transportation through the Pacific Coast Channel. We prepared the other typical technical studies in support of the EIS/EIR with respect to community impacts, property acquisitions. And I won't go into detail. They are back -- on display back there. You are welcome to take a look at those.

Basically the EIS/EIR concluded that the majority of the impacts were minor. The reason -- we basically worked with the engineering group. We first looked to avoid project impacts. We then looked where we couldn't avoid some issues. We looked to try to minimize those impacts by moving things around and incorporating them into the design to reduce those impacts.

And last, if there were more impacts, we basically incorporated what are called best management practices or other design features to reduce those impacts to less than significance.

The EIS/EIR did conclude that there were some adverse impacts. The most adverse impact were a result of traffic at Ocean Boulevard. That intersection was forecasted to fail in the future. And that is basically the reason why the project incorporated the flyover structure at Ocean Boulevard. That is basically a 10-million dollar mitigation.

There is some other traffic in terms of the southbound Alameda Street connecting to Pacific Coast Highway, the ramp connector as provided as part of project mitigation as well.

And then thirdly, there are also some other traffic improvements at Wardlow Avenue to facilitate truck movements or vehicle movements to the 405 Freeway.

We also had adverse impacts to the Peregrine Falcon, which is known to nest on the Schuyler Heim Bridge. We have mitigation measures incorporated to protect the Peregrine Falcon. We also have some minor impacts with respect to wetlands along the channels, Cerritos Channel

The EIS/EIR and the noise technical study identified some noise impacts. Those impacts were based within the project limits. They are basically

sound barriers proposed for three locations, Leeward Bay Marina on the structure, the Wilmington area, along Alameda Street. There is a wall at grade at Alameda Street west of the railroad right-of-way. And there's also a barrier on the structure as the structure comes back down to grade before PCH.

For alternative two, there is a noise barrier proposed adjacent to SR-103 along Hudson School and the park area along there. Again, similar -- there's a grade structure along the school, plus as the structure takes off up into the air. There is another noise barrier on the structure as well.

The air quality technical study, basically we have construction -- significant adverse construction impacts during the construction period. They are temporary in nature, but one of the other impacts were associated with detouring of the marine vessels. We determined that there was an adverse impact with respect to those air emissions and so proposed, basically, some mitigation measures to compensate those marine vessels' detour air emissions.

We have some unavoidable adverse impacts with this project. They are air quality during

construction and also with cultural resources. The Schuyler Heim Bridge is a national registered eligible historic bridge, and basically demolishing that bridge is an adverse impact. We have worked with Section 106 and the Federal agencies to come up with a mitigation plan, and that's incorporated as part of this project.

Next slide. In terms of providing comments on the draft EIR/EIS -- whoops -- sorry. Where we are in the process, we've started the public review period, August 17th. We are conducting the public hearing tonight. And the public comment period closes on October 16th. We plan to circulate the final EIS/EIR in the winter -- late winter this year. And we hope Caltrans certifies the final EIS/EIR and issues a record in the spring of 2009. And shortly thereafter we would begin final design of the selected alternative and then also issue construction contracts.

In terms of comments that need to be sent in, your personal comments on the project, or the agency that you represent, please contact Ron Kosinski, Deputy District Director, Division of Environmental Planning at Caltrans, District 7, and the address is above. And that is all.

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Response to Comment TR1-1

Your support for the proposed project is acknowledged.

MR. KOSINSKI: All right. We have quite a few comment cards, so we are going to charge right into this. And keep in mind that the protocol we are following is we are taking speakers first who have comments or statements that they want. And once those are done we will go into the questions for the various panel members. And we are going to give Jim Dear a priority on this. And we will have Jim and then Harold Williams, Sheri Repp and then Dan Hoffman. So we will start with Jim. Charge ahead.

MR. DEAR: And Jesse Marquez wants a priority here.

MR. KOSINSKI: And Jesse is high on our list also.

MR. DEAR: That's what he told me. Greetings. I'm Jim Dear. I'm the mayor of the City of Carson, and the City of Carson welcomes this opportunity to testify before you at this public hearing regarding the proposed draft for the EIR/EIS for the Schuyler Heim Bridge replacement and the SR-47 Expressway project.

TR1-1 The project is something that is going to impact the City of Carson greatly. We realize that the goods movement is -- from the ports to the rest

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Response to Comment TR1-2

The commenter is referred to response AJ8-1 for a discussion of noise that occurs east of Alameda Street and north of I-405.

Response to Comment TR1-3

The commenter is referred to response AJ8-15 for a discussion of noise mitigation for residents east of Alameda Street and north of I-405.

of the country is something that needs to be not just brought forward in a efficient way, but also a way that is very sensitive to the residents living in the harbor area.

So as the mayor I represent Carson as a member of the I-710 Major Corridor Study Steering Committee. And I am aware of the need for trucks to safely and efficiently access the ports of Los Angeles and Long Beach. Carson recognizes the need to seismically retrofit the subject bridge to protect the public safety and welfare, to continue to maintain a safe port -- transport route that will sustain a major earthquake. The SR-47 Expressway would likely be supported as well if adequate mitigation measures are taken into consideration to protect the Carson community. TR1-1

The draft EIR/EIS must adequately address potential significant adverse effects of the increased noise levels to Carson residents east of Alameda Street and north of the 405 Freeway. They may result upon the projects -- that may result upon the project implementation due to the expected increase in diesel traffic along Alameda Street. TR1-2

The draft EIR/EIS must also identify appropriate noise mitigation measures, such as the TR1-3

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Response to Comment TR1-4

Funding for the Bridge replacement portion comes from the Grant Anticipation Revenue Vehicle (GARVEE) bond and is included in the 2008 SHOPP, which was approved by the California Transportation Commission (CTC) on March 13, 2008. Funding for the Expressway portion is included in the Trade Corridor Improvement fund (TCIF) program adopted by CTC on April 10, 2008. A part of the funding for the Expressway portion also comes from ACTA's Demonstration fund, Port fee, and ACTA bond. Contract bidding for the project would be consistent with federal requirements for the application of federal funding. Details on the bidding process is provided on the Caltrans website.

Based on a recent ruling establishing new standards to constitutionally support the use of race-conscious disadvantaged business (DBE) goals, agencies receiving federal aid contracts are required to implement the DBE program.

Response to Comment TR1-5

Your support for project Alternative 1 and your objection to project Alternative 2 are acknowledged.

installation of sound wall noise barriers as was proposed for the Wilmington neighborhood and the

TR1-3 Leeward Bay Marina as well.

The project, also, is a project that I am interested in having local people working on the project. So I know that often contractors bring people from out of state to work on projects locally.

TR1-4 I am a person who's very interested in employing people who live in this area, in Long Beach, Los Angeles, and Carson particularly, because that is where the project will be taking place.

The alternatives that you have forward -- have on the wall in the back, I would -- after looking at it and studying the data that has been sent to my office, I don't support Alternative 2. I

TR1-5 don't think it's a very good alternative. But at the same time I think the best choice for the City of Carson and for the entire harbor area would be Alternative 1. Of the staff -- city staff from Carson are here. So they've reviewed the draft EIR/EIS on the Schuyler Heim Bridge replacement and the SR-47 Expressway project. And they are present to provide additional public testimony for the record.

City of Carson thanks Caltrans for this

opportunity to comment and is prepared to work with Caltrans and the Alameda Corridor Transportation Authority to make this project a success and to protect the public's health and safety and welfare in compliance with the CEQA and EPA.

The City of Carson is currently evaluating the opportunity for installing sound walls along East Alameda Street between I-405 and Dominguez Street. Implementation of the sound walls are difficult since there are residential uses, a church, and other businesses located on Alameda Street.

So the City intends to complete the study by the end of this year. We anticipate that many of the properties along the corridor may need to be acquired to allow for the installation of the sound wall.

We look forward to working with Caltrans and ACTA in identifying adequate resources to provide the necessary sound walls to protect the Carson community. Thank you very much for having me speak today.

MR. KOSINSKI: Next we have Harold Williams, followed by Sheri Repp and Dan Hoffman.

MR. WILLIAMS: Mr. Chair, members of the

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Response to Comment TR1-6

The commenter is referred to response AJ8-1 for a discussion of noise that occurs east of Alameda Street and north of I-405.

Response to Comment TR1-7

The commenter is referred to response AJ8-15 for a discussion of noise mitigation for residents east of Alameda Street and north of I-405.

Response to Comment TR1-8

In accordance with Caltrans Noise Protocol, residences of concern in Carson, namely those located east of Alameda Street between Dominguez Street and I-405, and the church and homes between Dominguez and Carson Streets, are considered to be outside the study area for the SR-47 project regarding noise analysis. The study area for noise analysis encompasses locations where the proposed SR-47 project would cause actual physical changes to the roadway system. Nonetheless, ACTA is currently conducting a separate noise study to address the concerns of Carson residents in the above areas.

panel, thank you for the opportunity to comment on the proposed draft EIR/EIS for the Schuyler Heim Bridge replacement and State Route 47 Expressway.

My comments express the need for the draft EIR to adequately address potential significant adverse effects of increased noise level on a TR1-6 residential community in Carson east of Alameda Street that will result from increased truck traffic along Alameda Street north of the 405 Freeway.

I am familiar with the Alameda corridor because of my prior position as a public works director for the City of Carson. And I remain interested in the success of the Alameda corridor. However, the success of the ports of Los Angeles and Long Beach cannot sacrifice the health and safety of our local businesses and residences. Mitigation TR1-7 measures must be proposed and addressed, expected increase in noise levels to existing residences churches, and schools east of Alameda Street as a result of project implementation.

TR1-8 The residents of Alameda Street experience continued degradation of their quality of life to increased noise volume generated by increased rail and truck traffic traveling on Alameda Street from the ports. Residents there have told me that they

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Response to Comment TR1-9

The commenter is referred to response AJ8-1 for discussion of noise that occurs east of Alameda Street and north of I-405.

are not able to enjoy their outdoor life, their patios, having barbecues in the backyard because of the noise from the truck traffic along Alameda corridor as well as the rail.

Yet the draft EIR states that there is no environmental justice issues. But based on what I am hearing from my constituents, I believe additional investigations of their environmental justice issues are required to mitigate the significant adverse effects of increased noise levels resulting from the project to the identified residents. TR1-8

To bring what I have said together in just a few words, let me say this. We do not expect the project to mitigate all of the existing and future impacts within Carson. We do, however, expect the draft EIR/EIS to adequately address potential significant adverse effects of increased noise levels to Carson residents east of Alameda Street that will result from increases in truck traffic along Alameda Street north of the 405 Freeway. TR1-9

This concludes my testimony. And I appreciate the opportunity to stand before you.

MR. KOSINSKI: Okay. Thank you. Okay. Sheri.

MS. REPP-LOADSMAN: Good evening. My name

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Response to Comment TR1-10

Please see response TR1-8, above, for a discussion regarding noise impacts in Carson north of I-405.

is Sherry Repp-Loadsman. I am responsible for the planning activities for the City of Carson. And I appreciate the opportunity to speak this evening.

TR1-10 The City of Carson has been, I guess, the host for the Alameda corridor, at least that section that comes through our community. And over the years we certainly have recognized the increase in rail and truck traffic. And as a result, we have had the opportunity to have discussions with ACTA in the past, as well as other organizations, trying to understand how we can provide for appropriate mitigations for the Carson community. We have some unusual circumstances in that we have residential and businesses directly on the corridor. They're serviced by an alley. And their livelihood really is associated with access directly from the Alameda corridor.

The problem is that ultimately we need a sound wall in order to protect the 2400 homes that are located to the east. The only way to do that sound wall is really to significantly impact those business. We have recently hired the firm of Tetra Tech to help us evaluate the opportunities for replacing the sound wall and look at the implications as it may relate to those businesses and homes that

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Response to Comment TR1-11

The amount of traffic on the roadway is constrained by its capacity. As more trucks use Alameda Street under Alternative 1 and take more if its capacity, less capacity is available for autos. Hence, the amount of automobile traffic on Alameda Street would be reduced under Alternative 1.

are on the Alameda corridor.

Frankly, the problem is way beyond Carson. It's more than we can handle by ourselves. So we are looking to partner with both Caltrans and ACTA to make sure that appropriate mitigation measures are identified for all projects, both past as well as future so that collectively we can have a mechanism that can be implemented in the form of protective measures for our community. TR1-10

Now, we do plan on having follow-up meetings with all of the involved agencies. But we do find that this particular project -- that it has not evaluated impacts that we believe will be associated with areas north of the 405.

Following me later this evening will be the traffic engineer for the City of Carson. His comments will -- I think will illustrate how there will be more traffic than is currently identified. With that additional traffic, we do believe that noise impacts will increase and, as a result, that there is a need for mitigation. TR1-11

We look forward to working with you in the future. Thank you very much.

MR. KOSINSKI: Thank you. We have Dan Hoffman, then Elizabeth Warren.

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Response to Comment TR1-12

Your support for the proposed project is acknowledged.

Response to Comment TR1-13

Truck traffic cannot be restricted from using Pacific Coast Highway or from traveling through Wilmington to access I-110 or SR-103. However, trucks are required to use truck routes and are restricted from using some roadways in Wilmington:

- C Street between Alameda and I-110
- Anaheim Street between Alameda and I-110
- Avalon Boulevard between C Street and Lomita Boulevard
- Wilmington Boulevard between C Street and Lomita Boulevard

Further, trucks usually do not enter areas outside of accepted truck routes, or points of destination or origin unless they are making local deliveries. Also, during periods of congestion, no time would be saved by veering off Pacific Coast Highway into surrounding residential communities.

However, based on traffic data, the majority of existing truck traffic northbound on Alameda Street toward Pacific Coast Highway is seeking access to I-405 or SR-91. Therefore, the project is not expected to result in unnecessary truck traffic through Wilmington.

MR. HOFFMAN: Good evening. My name is Dan Hoffman. I'm executive director for the Wilmington Chamber of Commerce. We do support the replacement of the Schuyler Heim Bridge because it is seismically deficient. And also we support the elevated expressway. We believe it will relieve congestion and pollution. TR1-12

Moving traffic efficiently, and especially trucks, will benefit business and the community. The project will also allow uninterrupted access to and from Terminal Island, which will benefit the port community and provide a dependable emergency escape route in the event of a natural disaster.

We do have one concern. And that is that the northbound traffic, based on Alternative 1, may enter Wilmington by accessing PCH north of the expressway connection to Alameda, and seek some assurance that a method will be implemented to prevent trucks from entering the community unnecessarily. TR1-13

Wilmington, being kind of in the middle of the Port of Los Angeles, you know, adjacent to Long Beach, does get its share of -- or unfair share of truck traffic.

We appreciate the thought that has gone

into the mitigation of noise and light with the proposed sound walls for the area of marine proximate to the neighboring residents.

And we thank you for giving us an opportunity for this comment. Thank you.

MR. KOSINSKI: Thank you, sir. Elizabeth Warren and then Larry Keller and then Jesse Marquez. If people have statements, if you can provide a copy to our transcriber, she certainly would appreciate it.

MS. WARREN: Good evening. My name is Elizabeth Warren. I'm the executive director of FuturePorts. And FuturePorts is an advocacy group. We are membership based and we support clean growth and balance in the port area. A balance between economic prosperity and also the environmental stewardship of our region.

So with that, I would like to thank you for the opportunity to speak this evening. And on behalf of FuturePorts, we would like to congratulate Caltrans and the Alameda corridor Transportation Authority for producing this draft EIR for the Schuyler Heim Bridge replacement project and of the ports of L.A. and Long Bach.

We think this is a great step in ensuring

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Response to Comment TR1-14

Your support for project Alternative 1 is acknowledged.

that our ports are efficiently manage the expected growth while mitigating environmental impacts. And we think that this represents a very important project.

As you are well aware, the ports of Los Angeles and Long Beach are a major economic driver to our region, providing approximately 500,000 jobs in the greater five-county region and more than 3 million jobs nationally.

At the same time, the ports are potentially facing a major capacity crisis and trying to accommodate the growth of the TEUs, 17.2 million this year and 6.4, increased to 16.81. We firmly believe that port growth and the appropriate accommodation of that corridor -- that growth with the Alameda corridor and these projects are critical, not not only to Southern California and national economy, but also to our air quality.

So with that said FuturePorts supports the proposed project of the Schuyler Heim Bridge replacement and the SR-47 Expressway. This alternative represents an important green growth initiative to provide more efficient goods movement to reduce emissions. TR1-14

It's very important that the traffic

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Response to Comment TR1-15

Your support for project Alternative 1 is acknowledged.

conflict at the five at-grade crossing be eliminated and the signalization of the three intersections to ensure less congestion. We also believe that additional project benefits, such as replacing the seismically deficient Schuyler Heim Bridge with a more safer fixed bridge, is without question of utmost importance. And the other additional benefits are also critical to safety and efficiency.

So with that, we think that we have a common goal of growing our ports and the other infrastructure to reduce congestion and improve efficiency, thereby reducing emissions. We look forward to supporting your efforts to move this project forward and look forward to working with you as well.

So thank you, again, for the opportunity to address you this evening.

MR. KOSINSKI: Thank you, Elizabeth Warren, Keller and Jesse Marquez, and then Melissa Lin Perrella.

MR. KELLER: Good evening, Mr. Kosinski. Thank you. And I thank the members of the panel for allowing me to speak tonight. I am Larry Keller. I am the president of the International Business Association of the Long Beach Chamber of Commerce. I

TR1-15

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am here to speak in support of Alternative 1 of the SR-47 project because of the great need for improved infrastructure to efficiently move port traffic in a safe, efficient, and environmentally responsible manner. TR1-15

I believe that No. 1 is the best alternative because it connects the existing SR-47 from Terminal Island to the four- to six-lane Alameda truck route created by ACTA and allows this route to be effectively utilized to move traffic between the ports and the 405 Freeway and beyond.

Also, it provides a much needed third highway for truck and commuter traffic, not only to serve busy Terminal Island, but to relieve the large amounts of traffic on the 710 and 110 freeways.

An improved SR-47 will allow much needed improvements to be made on the 710 freeway and the Desmond and Thomas Bridges, eventually, by providing a parallel artery for traffic while those works are being done. And connecting the SR-47 to Alameda Street will allow trucks and containers destined for the railroad ICTF facilities to be routed away from west side of Long Beach neighborhoods and schools by routing traffic bound to the rail yards eastbound from Alameda Street instead.

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Response to Comment TR1-16

The commenter's support for mitigation in the City of Carson is acknowledged.

The SR-47 project will improve air quality by consolidating several truck arteries and, in the process, eliminating many stop signs and traffic lights that cause greater diesel emissions through stopping, starting, and idling as trucks leave the port area.

We certainly support any of the mitigations that have been requested by the City of Carson on the east side to protect and improve the quality of life for the citizens living there and the businesses that attend them. And that support would be unmitigated. TR1-16

But in conclusion, I am again speaking in favor of the SR-47 project and specifically Alternative 1. Thank you for allowing me to speak this evening.

MR. KOSINSKI: Thank you.

MR. VAHDAT: Jesse Marquez, Melissa Lin Perrella, and then Donna Ellington.

MR. MARQUEZ: My name is Jesse Marquez. I live at 613 Gulf Avenue here in Wilmington. I am also the executive director for the Coalition for a Safe Environment. We are an environmental justice organization headquartered in Wilmington with representatives in 24 different cities throughout south L.A. County.

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Response to Comment TR1-17

Your opposition to the proposed project is acknowledged.

Response to Comment TR1-18

The commenter is referred to responses OB4-5, OB4-11, and OB5-8 for discussions regarding transport of goods by alternative methods.

I'm here to speak against the project as proposed. Unfortunately it appears that Caltrans is still living back in the 18th Century, 19th century. It's obvious Caltrans has not attended any of the ports and goods movement committee meetings, task TR1-17 forces, governor appointed committees, Southern California Associated Government Task Force community meetings because the public has already told every one of these agencies how we would like goods movement to be moved.

TR1-18 In every plan that is being prepared right now, and even the one that has already been completed, such as the Governor's goods and movements plan of the State of California, we, the public, stated that we supported the movement of goods.

However, we want it to be done in an efficient, clean, green, nonpolluting and causing no public harm or public safety. Yet, here you are presenting a bridge, which is basically no different than all prior past bridges, which is only going to encourage the same transportation method. Our environmental justice organization and numerous other environmental justice organizations, environmental groups, public health groups, academic institutions have all proposed to use alternative transportation

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TR1-18

systems. We do not support the movement of containers and cargo via trucks.

Just like ACTA was asked and came forward to work with the Alameda corridor, there were two things that the public demanded and asked that the Alameda corridor incorporate, that the public wanted; and they did not do it.

We had asked that the Alameda corridor have truck lanes in there so they would not be impacting our bridges, they would not be impacting our streets, roads, highways, and freeways; but they did not do that. The public asked that the trains in Alameda corridor be electric so there would be no air pollution that would impact the public health and, they did not do it.

What you are proposing does the exact same thing. It continues polluting trucks. It continues polluting trains. What we ask is that you scrap the whole project and go back to the basics, look into that 21st, 22nd century, whereby there are new emerging technologies. Instead of moving the containers by trucks, we want them done by rail. They can be done by electric rail systems, electric monorail systems, magnetic levitation transportation systems, linear induction systems, and even an

underground gravitational system.

We will not support your project as proposed until you investigate these other technologies. Right now the Port of L.A. and the Port of Long Beach is doing that as we speak. Right now the Southern California Association of Governments is getting ready to issue an RFP for consultants to consider these alternative technologies; and you are moving forward, business as usual. You cannot do that.

Basically, there are no public benefits to what you are doing. Who's going to pay for this bridge? Bottom line, it's Wal-Mart. It's Kmart, Home Depot, Costco, Sam's Club. You are providing a free transportation road to them.

A week and a half ago at the joint task force of that the Port of L.A. and Port of Long Beach, Professor John Husing did a study on the Clean Air Action Plan Truck Proposal in which they calculated what would be the cost to mitigate the purchasing of the new trucks as well as the public health impacts, and there was a cost per container. That fee was $540 per container.

We, the public, will not finance and support the payment of this bridge from public funds

when basically it is private companies that are being the primary benefactor of this. If you are going to build anything, then it should be paid by those importers, those retailers, those shipping companies that need the product here.

Yes, the cost will be passed onto the public, but let those publics who do not care about the impacts pay the burden of that. If you are going to build something that we would support, something like a tunnel that would be with electric rail system or magnetic system or linear induction systems, such as the ones I have mentioned to be built into that tunnel -- why should residents of Wilmington or Carson have to worry about sound walls? You build a tunnel, there is no sound. There is no noise. Who wants to stare at continuous truck streams all day? We do not want that. So a tunnel, we would not have to see that. We don't want to smell the exhaust. We don't want air pollution in our air. Wilmington right now -- UCLA Medical Center just completed a child asthma study. 23.9 percent of all children have asthma. The highest percentage is in Wilmington Park Elementary School, of which your new freeway is going to be about 100 feet from it. And since you are going to have it built high, that means that the

particulate matter and other pollutants will float over a higher dispersion, even further choking the children and causing them to suffer.

In your mitigation you didn't recommend things that we need. We need to have air purification systems built into the people's home. We need to have air conditioning/heating systems built into the people's homes, and we need homes to be soundproofed.

We will submit a written public comment which will include my remarks. We will also submit to you the names of the companies of these alternative technologies. But we are asking you now not to move forward until you have studied these technologies. Now, yes, some of them are not out of the box right now today, but we, the public, are willing to wait a few years to have Caltrans and other government agencies invest in these new technologies and get the prototype up and running. Electric trains exist today. Electric monorail systems exist today. General Atomics at California State University, Long Beach, the Cnet program. There is a prototype of Maglav technology which has already built a track and levitated up a container. It's now a matter of expanding that experiment and

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Response to Comment TR1-19

The commenter is referred to responses OB6-2, OB6-11, and OB6-25, which address growth, the project, and air pollution.

prototype so it can now move it.

There is no crisis to build this bridge right now. It may be seismically deficient that you say due to an earthquake -- I have not seen one meeting by Caltrans or any government agency right now in Wilmington or West Long Beach saying let's prepare for earthquakes. Yet it seems it's perfectly okay to invest to move containers, but not protect the public and our safety.

So I ask you to consider things that I have said. Let's put this on hold because there's more homework that needs to be done. Thank you.

MR. KOSINSKI: Thank you, Jesse. Melissa and then followed by Donna Ellington and Hudson Warren.

MS. PERRELLA: Good evening. My name is Melissa Lin Perrella. I'm with the Natural Resources Defense Council. Thank you for the opportunity to provide comments on the proposed project. NRDC will be submitting written comments, but tonight I would like to focus on several major concerns that we have with the draft EIR.

TR1-19

First, the draft EIR does not appear to consider the project as enabling port growth, even though the project will enhance port capacity. As a

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Response to Comment TR1-20

As stated in the Draft and the Final EIS/EIR Section 1.2.2.2, the existing transportation system within and adjacent to the ports is becoming increasingly constrained with cargo traffic and other vehicular traffic. A Port of Long Beach/Port of Los Angeles study forecasting that the amount of cargo entering the two ports would nearly double between 2010 and 2020. During the same time period, the amount of port-related truck traffic also is expected to double. This large, and rapid, increase in truck volume has the potential to seriously compromise the essential north-south connectivity between the ports and the regional freeway system, thereby slowing and/or otherwise limiting the movement of people, freight, and goods.

The growth scenario used for the analysis in the Draft and the Final EIS/EIR is based on the Port of Long Beach/Port of Los Angeles Transportation Study model developed in 2001, which was based on the Southern California Association of Governments regional model and approved by the Ports for transportation planning and environmental studies. The model was updated in 2004 for the proposed project and other port area transportation planning. The 2004 update incorporates the most current regional and port data, which include the forecast twenty-foot equivalent units (TEU) throughput for 2030 of approximately 44.7 million TEU, with a peak-month estimate of 4.1 million TEU. This compares to the TEU throughput for 2003 of 11.8 million.

Additional growth would not occur due to this project, since Port growth is constrained by other factors, such as terminal and rail yard capacities.

Based on the above, it can be seen that the project is proposed in response to considerable and expected growth at the ports.

Response to Comment TR1-21

See response AJ11-4.

result, the draft EIR does not report any increase in air pollution that will result from the increased ports' ship, truck, train, harbor craft, and harbor handling equipment emissions that will result from
TR1-19 the project.

Notably, Caltrans is also a lead agency with the Port of Long Beach for the Gerald Desmond Bridge project, which like the proposed project, is a major connector to Terminal Island. After receiving comments at the Gerald Desmond Bridge EIR failed to analyze impacts from the project's potential cause of port growth, the agencies reissued a notice of
TR1-20 preparation back in December of 2005 indicating that they would perform such an analysis in a revised EIR. There's no reason why such an analysis should not be performed for this project as well. Indeed, the California Court of Appeals has noted that where a road project will serve as a catalyst for further development, construction should not be permitted to commence until such growth impacts are evaluated under CEQA.

TR1-21 Second, the draft EIR reports that truck and vehicle emissions that occur in the project area will decrease significantly between the year 2003 and 2030 due to State and Federal regulations. In some

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Response to Comment TR1-22

A discussion of greenhouse gases has been added to Section 3.13.1.2 and 3.13.2.2 of the Final EIS/EIR. Climate change is addressed in Chapter 4.0 of the Draft and Final EIS/EIR.

Response to Comment TR1-23

See responses AJ7-2, AJ7-11, and EO1-5.

instances the draft EIR assumes an 86 percent reduction in noxious emissions from such regulations. This data seems to contradict other sources that predict an increase in emissions in the project area due to port growth. We urge Caltrans to reconsider these assumptions.

TR1-21

Third, we were surprised the draft EIR did not include a comprehensive discussion of the climate changes in impacts that will result from the project. In fact, the draft EIR seemed to suggest that, since there are no regulations specifically addressing green house gas emissions, the agencies need not conduct a CEQA analysis of the project's climate changes impacts.

TR1-22

However, the California Court of Appeals had made clear that, even in the absence of a precise or universally accepted methodology for quantifying impacts, an agency must still undertake a good faith reasonable analysis.

Based on these errors and others mentioned tonight, I urge Caltrans to withdraw the EIR and circulate a revised draft for public review. The draft EIR reports the proposed project is located in the communities of Wilmington and Long Beach near hospitals, residences as close as 100 feet away, and

TR1-23

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Response to Comment TR1-24

The commenter's concern is acknowledged. The Draft Relocation Impact Report (DRIR) identifies the loss of businesses as a consequence of the project. However, considering the small number of relocated businesses, in relation to the total number of businesses in the city, no significant adverse effect is anticipated in terms of loss of tax revenues to the city.

As stated in the DRIR and in Section 3.3.2.4 of the Draft and the Final EIS/EIR, for individuals, relocation assistance or compensation is available and will be provided to eligible persons and businesses in accordance with the federal Uniform Relocation Assistance and Property Acquisition Act of 1970 and with the California Relocation Act.

Response to Comment TR1-25

The projects mentioned by the commenter - TRAPAC, Channel Deepening, Pier A expansion - are included in the cumulative analysis for the proposed project, and their traffic issues are included in the traffic model developed for both ports and utilized for the traffic analysis in the Draft and the Final EIS/EIR. The traffic projections for all the projects are the same, based on the SCAG 2030 set of socioeconomic data, the official projection for Southern California. Therefore, the commenter's concerns regarding traffic associated with these and other projects have already been incorporated into the traffic model for both ports and in the project-specific and cumulative traffic analysis provided in the Draft and the Final EIS/EIR (see Section 3.5 and Chapter 5.0).

The commenter's concern regarding loss of property in Wilmington is acknowledged. Please see response TR1-24.

11 schools, the closest only 700 feet away.

As a result, it is critical that the draft EIR properly analyze the environmental and public

TR1-23 health impacts from the project.

Thank you.

MR. KOSINSKI: Donna, Bill and then Hudson Warren and Colleen.

MS. ELLINGTON: I wasn't sure if it was me that you were calling.

MR. KOSINSKI: Yeah. Sorry.

MS. ELLINGTON: I was really concerned on your Alternative 1, that it removes so many properties from Wilmington. You know, the port and the State and everybody has taken so much of our

TR1-24 property. And when they do, they remove it from our tax base. And so when we lose those property taxes, we lose City services. So that is just a huge concern. Isn't it? Mr. Water, is going to lose an awful lot of property here. There's something else.

TR1-25 When I was looking at the cumulative impacts, I don't see -- some of these projects you mentioned, but you don't really go into the full extent of these projects. Like, for instance, as part of the TRAPAC terminal they are proposing relocating the Pacific Harbor line rail yard, which

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will -- it would occupy that huge parking lot right next to Leeward Bay Marina, 70-acre rail yard. And the construction date is 2009 to 2010.

The channel deepening project. You mentioned the channel deepening project. The Pier A -- it's right next to the Pier A west property. It's like a 40-acre soil storage site that's in one of the Wilmington marinas. And I know that the EIR has not been released yet, but the 2002 EIR did authorize 597,000 cubic yards of material to be dredged from the Port of L.A. and disposed of at that site. The construction date is, like, between 2008, 2009. So, you know, there's a lot of trucks there in these marinas that will be hauling dirt back and forth.

The Pier A west remediation project is scheduled to begin -- I don't know -- I think the middle of the 2008 until possibly 2009. And the Port of Long Beach has estimated 500 to 1,000 trucks a day for at least five months.

So what I see is, you know, your project would be between 2009 and 2011. So the whole east basin area would be undersea between 2008 and 2011. So I want to make sure that all this progress will be going on at the same time. Trucks will be on all the

TR1-25

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Response to Comment TR1-26

See response TR1-25.

same roads that your construction equipment will be on.

I will probably submit a report or comments. That was just something that you really need to address in here. You know, that and the fact that I believe the TRAPAC terminal also is talking about adding a northbound and a southbound lane on Alameda Street at the Anaheim intersection and probably all the way up. So that street will be widened anyway. So I am concerned, again, that -- I don't know if this project overlaps, but there, again, we are losing a lot of Wilmington businesses, you know, potential employment. You know, far east Wilmington is now mostly owned by the Port of L.A. and the Port of Long Beach. We have probably lost 400 jobs over there just between the Dominguez Channel and Alameda.

So it's really a concern. You know, maybe this construction project is creating jobs, but you know, the project itself is eliminating property taxes, businesses, and employment in Wilmington.

Thank you.

MR. KOSINSKI: Thank you. We have Hudson Warren. Then Colleen Callahan.

MR. WARREN: Good evening. My name is

TR1-25

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Response to Comment TR1-27

Your support for project Alternative 1 is acknowledged.

Hudson Warren. I am here on behalf of the Foreign Trade Association, which I am vice president, and the Propeller Club of Long Beach, where I am president. We boast members of close to 500 individual companies within the area and those companies employ thousands of people.

We are here to support the EIR process as well as the particular project here, in particular Assumption No. 1. We believe the benefits are significant and will improve the flow of traffic and at the same time believe it is a mitigated approach in terms of the environmental impact. TR1-27

Thank you.

MR. KOSINSKI: Thank you. Okay. Colleen. Then we have Richard Garland from the City of Carson. And then Andrea Hricko.

MS. CALLAHAN: Good evening. Colleen Callahan with the American Lung Association of California. I thank you for the opportunity to speak today. The American Lung Association of California is concerned about the potential health impacts of the proposed project and what this will do to many of our communities and the region as a whole. Scientific studies prove that air pollution makes people sick. It's killing people. The draft EIR are

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Response to Comment TR1-28

See responses AJ7-1, AJ11-2, and EO1-5.

Response to Comment TR1-29

As stated in the Draft and the Final EIS/EIR Section 1.2.2.2, the existing transportation system within and adjacent to the ports is becoming increasingly constrained with cargo traffic and other vehicular traffic. A Port of Long Beach/Port of Los Angeles study forecasting that the amount of cargo entering the two ports would nearly double between 2010 and 2020. During the same time period, the amount of port-related truck traffic also is expected to double. This large, and rapid, increase in truck volume has the potential to seriously compromise the essential north-south connectivity between the ports and the regional freeway system, thereby slowing and/or otherwise limiting the movement of people, freight, and goods.

The growth scenario used for the analysis in the Draft and the Final EIS/EIR is based on the Port of Long Beach/Port of Los Angeles Transportation Study model developed in 2001, which was based on the Southern California Association of Governments regional model and approved by the Ports for transportation planning and environmental studies. The model was updated in 2004 for the proposed project and other port area transportation planning. The 2004 update incorporates the most current regional and port data, which include the forecast twenty-foot equivalent units (TEU) throughput for 2030 of approximately 44.7 million TEU, with a peak-month estimate of 4.1 million TEU. This compares to the TEU throughput for 2003 of 11.8 million.

Based on the above, it can be seen that the project is proposed in response to considerable and expected growth at the ports.

reports that the proposed project be located in communities along West Long Beach and Wilmington, just a few feet away from a hospital, numerous residences, and 11 schools. This area is already referred to as the diesel death zone because community members inhale high levels of diesel pollution.

We know that diesel pollution is toxic, causes cancer and premature death, but research also now finds that risk is elevated for people living near high traffic freeways. It's critical that the TR1-28
draft EIR properly analyze the environmental and public health impacts from the project. The American Lung Association has concerns with the findings of the air toxins analysis, even if the proposed project could potentially reduce the stop and go, and even if the trucks of the future will be cleaner than the trucks of today, the diesel truck -- even though the 2007 standard will not get us completely clean healthy air, this project will inevitably make the TR1-29
situation worse because it will increase traffic by increasing port capacity. This increased capacity needs to be taken into account. Instead, the draft fails to provide straightforward information about current and future traffic volumes.

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Response to Comment TR1-30

The amount of traffic on the roadway is constrained by its capacity. As more trucks use Alameda Street under Alternative 1 and take more if its capacity, less capacity is available for autos. Hence, the amount of automobile traffic on Alameda Street would be reduced under Alternative 1.

It is time for better data, but it is also time for a better vision that moves us away from the overreliance on dirty diesel trucks and moves us forward into an era of clean, innovated technologies. Our health and the health of our children depend on smart transportation decisions.

Thank you.

MR. KOSINSKI: Thank you. Again, if you happen to have an extra copy of your presentation or something that you can help our court reporter out on, that will be very appreciated. Richard.

TR1-30

MR. GARLAND: Richard Garland, City of Carson. As you heard earlier one of the primary concerns that the City of Carson has with regard to the project is the potential for noise impacts for the residential neighborhood, Alameda Street. As the noise impacts are directly related to volumes of traffic along Alameda, we took a close look at the traffic volume projections to ensure that they appeared reasonable.

What I found was that the before and after traffic projections indicated the project would result in a decrease in automobile traffic volume on Alameda Street. This would imply after the new bridge is constructed and after a new and improved

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Response to Comment TR1-31

Please refer to responses TR1-10 and TR1-30.

roadway link is provided between Terminal Island and Alameda Street that the number of cars on Alameda would actually decrease. This seems unlikely to me.

So I would request that the traffic modeling forecast be reevaluated and adjusted to more logical projection from the without-project to with-project scenario. Then the noise impacts could be recessed, using what I would consider more reasonable traffic projections; and maybe some effective mitigation measures could be identified to mitigate the problem impacts of these affected residential areas.

TR1-30

TR1-31

Thank you.

MR. KOSINSKI: Thank you, Richard. Andrea and then Robert Perel and Marie Castle.

MS. HRICKO: Thank you for this opportunity. My name is Andrea Hricko and I am on the faculty at the Keck School of Medicine of the University of Southern California, where I work with a team of scientists conducting the children's health study, a longitudinal study of the respiratory health of thousands of Southern California children in relationship to the air pollution that they breathe.

I have read major sections of the Heim Bridge Expressway/SR-47 draft EIR, and find that it

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Response to Comment TR1-32

The traffic analysis is performed for the AM, MD, and PM peak hours. The existing peak and future peak hour traffic volumes on the Schuyler Heim Bridge are presented in Figures 3.5-3, 3.5-10, and 3.5-17 of the Draft and the Final EIS/EIR. This was clarified to the commenter in a meeting after the public hearing.

Response to Comment TR1-33

Estimates of the numbers of trucks being taken off the 710 Freeway by other rail and road projects are outside the scope of this environmental analysis. Further, estimates as to the numbers of trucks that may go to specific rail yards also are outside the scope of this environmental analysis.

The growth scenario used for the analysis in the Draft and the Final EIS/EIR is based on the Port of Long Beach/Port of Los Angeles Transportation Study model developed in 2001 and approved by the Ports for transportation planning and environmental studies. The model was updated in 2004 for the proposed project and other port area transportation planning and includes the BNSF SCIG and UP ICTF in the background projections for port growth. Therefore, cumulative impacts associated with development of these projects as part of overall port growth were assessed in the Draft and the Final EIS/EIR. Also see response OB6-14.

The ICTF has not been proposed by formal public notices (Notice of Intent, Notice of Preparation), does not have pending environmental documentation, and is not awaiting regulatory reviews or approvals. Therefore, in accordance with federal (NEPA) and state (CEQA) requirements, at this time it is not considered a reasonably foreseeable project that would merit specific analysis, and is not identified as a specific location where trips would begin or end.

Although the SCIG is listed in Table 5-1 of the Draft and the Final EIS/EIR, it is noted on the table that the project was not reasonably foreseeable at the time of issuance of the NOP for the proposed

is -- that it makes dozens of undocumented and unreferenced claims and repeatedly refers to documents that Caltrans staff told me I could review at the public library, all the supplemental documents that are on the back table.

Several specific items that I question.

TR1-32 One, traffic volumes need to be presented in an understandable way that people who are not traffic engineers can understand. We were surprised that we could not find the answer in this 1500-page document to the most basic question: How many trucks go over the Heim Bridge today, and how many will be going across it in subsequent years? I actually went to the Caltrans truck count data myself and found 8,000,259 truck AADT, but I couldn't find that anywhere in the document. In fact, the phrase "AADT" shows up only one time.

TR1-33 Number two, I would ask exactly how many road and rail projects are going to claim, without careful documentation, that they are taking trucks off the 710 Freeway. Between the claims of the Alameda corridor being a proposed skid project, the UPICTF, and now if we add together these projects, perhaps we are not going to even need that 710 expansion.

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project which, as described in Chapter 6.0 of the Draft and the Final EIS/EIR, occurred on January 28, 2002. As shown in Table 5-1, the SCIG NOP was issued in September 2005.

An assessment of environmental impacts associated with construction and operation of the SCIG and ICTF projects would occur separately, as part of the NEPA and CEQA approval process for each one.

Please see Chapter 5.0, Cumulative Impacts, for further explanation of requirements for including a project in the EIS/EIR.

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Response to Comment TR1-34

See responses AJ7-1, AJ11-2, and EO1-5.

The draft environmental impact report needs to explain these estimates in greater detail. We need an analysis not just a statement as though it is fact. You need to add in the one and a half million trucks that would be going to the proposed skid and the 750,000 trucks to the enlarged ICTF. In fact, those two rail yards are not even mentioned in the EIR even though ACTA has been considering them and discussing them as a major -- projects that they want for years. TR1-33

Number three, the health impacts are almost completely dismissed by Caltrans. Caltrans and the Federal Highway Administration, I believe, are disingenuous in saying that they cannot validate the existing studies about proximity to the highways and health impacts. At USC alone we have published three papers showing health impacts with proximity to traffic, with one that lands in one of the world's most prestigious journals. Yet Caltrans and Federal Highway Administration, who have no research scientists, say that they have no ability to validate these studies. We are happy to provide a scientific briefing to Caltrans and ACTA on the studies that many people in the world are referring to with regard to proximity to freeways. TR1-34

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Response to Comment TR1-35

See responses AJ7-2, AJ7-11, and EO1-5 regarding the Health Risk Assessment.

When the commenter inquired as to the availability of the technical studies, she was informed that they were available at the listed public libraries and Caltrans District office and that she could choose to go to these libraries or the Caltrans office to review the technical studies.

Research findings and adverse health comes from air pollution in general. And freeway proximity is now well-documented, and it should be incorporated into the DEIR. Our studies show that children who live near freeways and busy roads are more likely to have asthma, reduced lung function, and school absences. Studies in other communities are showing similar results. The SR-47 Expressway will be 700 feet away from a school and 100 feet away from homes. And yet the DEIR says there will be no adverse impacts. The word "ultrafine" does not even appear in the document, even though there are dozens of articles on ultrafine and ultrafines and health, including two articles from our fellow scientists at UCLA on ultrafine particles being very high in close proximity busy roads and freeways. TR1-34

I'm almost finished here. The M-7 analysis shows slightly higher mobile source air toxic emissions in Alternatives 1 and 2, but it doesn't say how high. And it says the health effects cannot be estimated. Again, you want to read that air quality analysis, I was told to go to the public library to read it. TR1-35

When one of the mobile source air toxics is diesel PM and others, Benzene and petadien (phonetic)

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Response to Comment TR1-36

By building the SR-47 expressway and providing better access to Alameda Street, the traffic operation of the entire study area improves. Trucks would travel shorter distances to their destinations, and in less travel time.

Further, the growth scenario used for the analysis in the Draft and the Final EIS/EIR is based on the Port of Long Beach/Port of Los Angeles Transportation Study model developed in 2001, which was based on the Southern California Association of Governments regional model and approved by the Ports for transportation planning and environmental studies. The model was updated in 2004 for the proposed project and other port area transportation planning. The 2004 update incorporates the most current regional and port data, which include the forecast twenty-foot equivalent units (TEU) throughput for 2030 of approximately 44.7 million TEU, with a peak-month estimate of 4.1 million TEU. This compares to the TEU throughput for 2003 of 11.8 million.

Based on the above, it can be seen that the project is proposed in response to considerable and expected growth at the ports.

Response to Comment TR1-37

The conclusion used for the $PM_{2.5}$ hotspot analysis was based on the traffic data contained in Section 3.5 of the Draft and the Final EIS/EIR. Depending on the alternative evaluated, the project would improve level of service on segments of the mainline and many intersections when compared to the No Build alternative, as shown in Section 3.5.3.3.1.2 of the Final EIS/EIR. Improving level of service means congestion would be reduced. Table 3.5-10 presents the traffic volumes across the Schuyler Heim Bridge for the project and the No Build alternative in the year 2030.

I think it's not acceptable to say that they are slightly higher, but cannot -- but the health effects
TR1-35 cannot be estimated.

I would like to mention something about VMT. I read from the document the emissions decrease for Alternatives 11A3 are due to a predicted decrease in VMT in the study area and an increase in vehicle
TR1-36 speed. How is it responsible that building the Heim Bridge and SR-47 Expressway resulted in lower VMT than the current situation of no-build. Clearly Caltrans and ACTA are not accounting for the port growth the bridge and this expressway will induce.

The DEIR states that it is unlikely that PM2.5 hot spots will be associated with the proposed project because local accumulation and delay of vehicles will be reduced by the project. This assumption does not document it. What evidence is there that congestion will be reduced in the
TR1-37 long-term? To know that, we need to know how many trucks are expected to go across the Heim Bridge in each of the successive coming decades. When will there be a cut point for congestion? So where are all these analyses also of what Pier S and other growth from the ports is going to be doing in terms of this pollution on this bridge and expressway.

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Response to Comment TR1-38

The commenter's dissatisfaction with the Draft EIS/EIR, including requests to "redo" the document, as well as extend the public comment period, are noted.

Please refer to response OB9-27 for a brief discussion of the adequacy of the Draft EIS/EIR, in accordance with CEQA and NEPA guidelines.

In regard to the review period, the legal period for public comment on the Draft EIS/EIR is 45 days. However, Caltrans provided 60 days, and this extended review period ended on October 16, 2007. In response to public and agency requests, Caltrans provided the requesters with an additional extension of the deadline, agreeing to accept written comments until early November 2007, even though such extensions are not required by CEQA or NEPA. Where applicable, some portions of the Draft EIS/EIR have been revised in good faith response to comments.

Response to Comment TR1-39

The commenter's support for project Alternative 2 is acknowledged.

Finally, I would urge you to take this document back to the drawing to board, to redo it, and provide additional comments, when it is completed I think that a number of people tonight have expressed and found many flaws in the document. I find that the topics that I discussed are serious flaws that do not allow us to review the document in an acceptable fashion.

TR1-38

If it's not redone and recirculated, then I suggest that there be an extension of at least an additional month for the public to submit comments, since people may want to do modeling. And since the -- and I would also suggest if there is an extension, all the supplement documents be put on a Web site and be available electronically to the public.

Thank you. Thank you for giving me so much time. I appreciate it.

MR. KOSINSKI: No problem. Your presentation cries out for helping our court reporter if you have an extra copy.

Thank you. Okay. We've got Robert Perel, Marie Castle and then Ray Park.

TR1-39

MR. PEREL: My name is Robert Peral and I am the operator of the Leeward Bay Marina. Therefore

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Response to Comment TR1-40

Since water flows southward from the Consolidated Slip into the Leeward Bay Marina, the greatest project-related impact to the free flowing water will be experienced at the narrow section of the Consolidated Slip, which is approximately 120 feet wide, before it widens to approximately 375 feet at the section of the channel housing the Leeward Bay Marina. Currently, the bridge over the Consolidated Slip that connects to Henry Ford Avenue includes two sets of multiple large piers in the channel. In addition, the TYC track includes a curved railroad bridge with nine sets of piers (2 each) at the wider section of the Consolidated Slip.

The project proposes to install four 12-foot diameter piers in the wider section of the Consolidated Slip. One of the piers is proposed at the shoreline, two other piers are proposed at the edges of the wider section of the channel, just south of where it widens, and the fourth is located in the middle of the channel. As result, only one of the proposed piers will directly affect water flows.

Since so many piers exist in this segment of the channel where the water velocities slow down as the channel width increases, and because it is so close to San Pedro Bay affects on water flow are expected to be minimal as a result of installing four new piers in the Cerritos Channel.

Response to Comment TR1-41

The traffic report studied the needs for the area and recommended the proposed design. With implementation of the proposed project, in year 2030, at intersections along the new fixed-span bridge and the proposed SR-47 Expressway, the level of service (LOS) is projected to be C or better (see March 2007 Traffic Report, Table 6, Page 33 prepared by Meyer Mohaddes Associates). This is better than the LOS at the same intersections in the event no project is built (see Section 3.5.3 of the Draft and the Final EIS/EIR).

TR1-39 I think Alternative 2 seems to be a wonderful alternative.

Somehow I have the feeling that I am going to be renewing acquaintances with my friends at ACTA. And I never thought I would survive the last time. What concerns me is the bridge itself, because I somehow think this is the alternative that you are going to end up with. I always presumed that they were going to have berm on each side and that the bridge would go over the -- and wouldn't basically be in the middle.

They need to pay particular attention, because I have some experience over 30 years. I

TR1-40 think my family has been here about 55 years. And every time they move boulders on the side it deflects the water the flow and direction of water. You are going to be putting in a big piling somewhere. They are talking about they may displace one of our docks, but I have not heard anything -- what should happen -- should the flow be diverted, it could go right into the marina. So I think they have to pay particular attention to this and what the results will be.

TR1-41 I think they should also consider the fact, even though it's not mentioned at all right now, it's

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not in the drawing board, some days -- sometime they are going to have to build another bridge right next to this. The reason is, if they don't, everyone that has the other marinas -- which I have one of them -- are going to be trapped. The fire department is not going to be able to get in. The police department is not going to get in there, because right now it's difficult. And they talking about an increase of, I don't know, 20 percent, 30 percent, 40 percent. So it's almost an impossible situation. Therefore, they are going to need to build another bridge almost adjacent to where your bridge is going to go. And if you can't expand it, they are not going to expand it. And then there's going to be another problem. So what is starting off as a bridge is going to end up as a dam.

So someone is going to have to do something. So maybe you could even figure if they are going to do something, you could -- it -- it's going to be inevitable that somehow when yours takes into consideration what may follow, maybe it can be in conjunction with it, but really should be considered because we don't know how the water is going to be deflected. So it's more of a technical comment that I have at this point. That is basically

TR1-41

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Response to Comment TR1-42

The commenter's support for project Alternative 2 is acknowledged.

Response to Comment TR1-43

It is acknowledged that improvements to the existing bridge have been made over the past years. However, the need to continue these high-cost improvements, plus overall considerations of bridge stability, have led to the conclusion that the Schuyler Heim Bridge needs to be replaced.

The seismic deficiencies of the existing bridge are described in the Draft and the Final EIS/EIR Section 1.2.2 (Need for the Project). The evaluation that determined a new fixed-span bridge would be preferable to a new moveable bridge is described in Section 2.1.1 (Bridge Alternatives). As stated, the vertical lift bridge alternatives were dropped from consideration, as they would require significant right-of-way acquisitions, a temporary fixed-span bridge for detour during construction, and interim retrofit of approach spans.

The effects that a new fixed-span bridge would have on marine vessel traffic are described in the Draft and the Final EIS/EIR Section 3.6.3.3. It is estimated that about 13 percent of the vessels that currently use the Cerritos Channel will be able to pass under the new bridge and that, over a period of 20 years, detours by the remaining vessels will cost the marine industry approximately $23.6 million (approximately $1.2 million per year). This cost, however, would be offset by the positive economic benefits of the new bridge and improved safety and emergency response, as vehicles would not be required to wait to cross the channel because of a raised bridge, and overall congestion at the bridge would be reduced. In addition, there would be ongoing savings in bridge maintenance costs, as maintenance of the new bridge would cost less than maintenance of the existing bridge.

TR1-41 it.

MR. KOSINSKI. Okay. Thank you. We have Marie Castle, Ray Park, and the last card I have is from Bill Gaskill. Do we have anymore cards? Then we will go into questions.

MS. CASTLE: My name is Marie Castle. I'm one of the drawbridge operators at the drawbridge. I have been a drawbridge operator for 25 years.

MR. KOSINSKI: Could you stand a little closer to the microphone.

TR1-42 MS. CASTLE: I have been a bridge operator for over 25 years. I do think that the extension at the Alameda to 405, that is a good idea. The 103, I think that is what it was. It will take a lot of

TR1-43 congestion off the other streets. But a few years ago we had a new controller, new computer system in the bridge, new decking on the bridge, new brakes. The bridge does need to be painted. I believe Caltrans took it over in 1975. And as far as I can remember, because I have been at the harbor since '71 on and off boats, it has never been painted, and it does need to be seismically retrofitted. They have retrofitted all the bridges up north, or they are in the process of doing that, or they have replaced them with movable span bridges. This is the only one that

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they are going to make into a fixed-span bridge. That's going to eliminate the tug traffic that goes through the bridge. And also there's tour boats that come through, because they want to look at the harbor, tourism. There's a lot of harbor cruise vessels. We also have larger tugs than what is in the draft. Some of the tugs that are in your draft -- they are either -- they are up north or down south. They went someplace. But a lot of them aren't there. We have got a lot of them that are a lot taller. I don't know how tall the SEA RELIANCE is but they are -- it's huge, huge tug. To go around it takes over an hour plus fuel. I know one captain was complaining at the port bridge the other day that it would take over an hour and two hundred plus gallons of fuel. I also know Pack Tow, they are changing their engines over to electric and diesel. So when they are not towing they will be running on, I guess, electricity. I don't know how they are going to do that. I do want to say, yea, for the two harbor train line engines that they have -- you can breathe when they go by. The Union Pacific Railroad, you can't breathe when they go by. I do know they can make vehicles more efficient. Back in the '60s they had a carburetor that was by the name of Fisher,

TR1-43

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Response to Comment TR1-44

As described in the Draft and the Final EIS/EIR, various types of bridges were considered early-on when determining how to address Caltrans' finding that the Schuyler Heim Bridge was in need of seismic retrofit improvements. As described, two different vertical-lift bridges were evaluated, but were dropped from consideration because either would require: significant right-of-way acquisitions; a temporary fixed-span bridge for detours; interim retrofit of approach spans; and acquisition of additional rights-of-way at prohibitive cost.

Please see the complete discussion in the Draft and the Final EIS/EIR, Section 2.1.1, Bridge Alternatives.

and it got 100 to 150 miles to the gallon. It could run on three different kinds of fuels, and it was less than, I think, ten working parts. So that can be done. I agree with the other gentleman with the different kind of rail systems. That could work. That is about it.

MR. KOSINSKI: Okay. Very good.

MS. CASTLE: The harbor needs the bridge as a lift span, not as expanded. TR1-44

MR. KOSINSKI: Okay. Thank you very much. Then we have Ray Park and then Pilar and William will be the next two. And then I am out of cards.

MR. PARK: Good evening. My name is Ray Park. I come before you tonight as president of the Dominguez area property owners association. It's the community north of the 405 Freeway that runs right along Alameda Street. We are the ones that have the residences within 100 feet of Alameda Street. I am not going to bore you with some of the same statements that our fine representative from Carson gave about air quality, noise traffic, but I am going to take a different tack.

Your EIR does not meet any standards or levels of any other EIRs that are written in this whole South Bay. The traffic mock-up is completely

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Response to Comment TR1-45

The commenter is referred to the following responses relative to the evaluation of traffic and air quality impacts north of Pacific Coast Highway/Alameda Street: For a discussion of traffic and noise - TR1-30; for air quality discussions related to Carson - AJ8-14, OB3-7, and TR-46 (below); for noise discussions related to Carson - I2-4, I2-9, I2-10, OB3-4, and TR1-31; for traffic related to Carson - AJ8-3, AJ8-5, AJ8-9, and TR1-11.

Response to Comment TR1-46

Residences of concern in Carson, namely those located east of Alameda Street between Dominguez Street and I-405, and the church and homes between Dominguez and Carson Streets, are considered to be outside the project study area in regard to noise analysis. According to the Caltrans Traffic Noise Protocol, the study area encompasses locations where the proposed SR-47 project would cause actual physical changes to the roadway system. Nonetheless, ACTA is currently conducting a separate noise study, independent of this project, to address the concerns of Carson residents in the above areas.

different by number. The area quality, the environmental effect are different quality. I really think that this was a put-together thing. And one of the biggest problems that we see in it is it says it

TR1-45 stops at PCH, no more environmental impacts at PCH and Alameda. But in the next sentence it says "Oh, by the way, the trucks are going to go clear to the 91 Freeway."

There's no remediation measures, no mitigation measures, nothing for the residents of the Dominguez Lincoln Village area. Many, many years ago we were promised sound walls to reduce the noise effect from, then, the new Alameda corridor. We still don't have anything. Folks out there need

TR1-46 help. We need air quality controls like Mr. Marquez said with filters and air cleaners. We need sound walls to knock the sound down. We -- there's 2400 homes in this area. That is quite a few folks, and I think that this EIR had better look at some of the impacts in the environmental impact that they are causing on these residents.

Last thing I will say, it's a funny thing to me that you can put some remediation measures to protect the birds, but you cannot protect 2400 homes.

Thank you.

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Response to Comment TR1-47

In accordance with the California State Code, Highway and Streets Article 888, the current Schuyler Heim Bridge does not allow or accommodate non-motorized traffic. As a result, the proposed fixed-span bridge also does not provide for non-motorized traffic. In the event another bridge is built over the Cerritos Channel and could accommodate non-motorized traffic, the concern regarding non-motorized traffic routes could be considered by that project, which would be independent from this project.

Response to Comment TR1-48

The project includes improvements to northbound and southbound Alameda Street at the 223rd Street/Wardlow Road connector ramps, and to the connector ramp. These improvements will involve restriping the ramp and Alameda Street and resignalizing the intersection. These improvements are described in Section 2.2.1.1.2 and shown on Figure 2-4e of the Draft and the Final EIS/EIR.

The multi-traffic-signal issue noted by the commenter at the 223rd Street access ramp to the I-405 is outside the scope of the proposed project. However, the City of Carson, in conjunction with Caltrans, has a future project that plans to provide improvements to this area.

MR. KOSINSKI: Thank you, Ray. Okay. We've got a few more cards here that have come up. Bill Gaskill, Pilar Hoyos, and William Lyte.

MR. GASKILL: Hi. Hi, folks. My name is Bill Gaskill. I live on Alameda, just north of the freeway. There's a couple of items I would like to address that haven't been addressed yet. I am a bicycler and I remember the times when Terminal Island was accessible by the pontoon bridge, by the ferry, and by the Henry Ford drawbridge. The ferry got displaced by the Thomas bridge, Schuyler Heim Bridge went in, and nonmotorized traffic was not allowed to go on that bridge. The adjacent bridge, the Henry Ford bridge, does not allow motorized traffic. The pontoon bridge was displaced by the Odessa Bridge. It does allow motorized traffic on it.

In the State Code, Highway and Streets -- Street and Highways, Article 888, it prohibits the State from discontinuing nonmotorized traffic routes when they replace it with freeways. This has been done in violation of their -- of the State law. I would like to see this addressed when another bridge is built over the Cerritos Channel. TR1-47

Another issue which I was a little TR1-48

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Response to Comment TR1-49

The commenter's support for project Alternative 1 and objection to project Alternative 2 are acknowledged.

irritated at when I talked to the engineer is the transition between the Alameda Street and the southbound 405 Freeway. As it exists now, trucks have to line up at the intersection, turn right to go up to the Portal Road or 223rd Street, turn right again, and then go down to the on-ramp which they turn left, and then onto the freeway. That is one, two, three -- three signals. I suggested to the engineer that they make another on-ramp which would entail one signal. And he suggested that that is not feasible. I think it is. I think it is. Just didn't want to address the issue. I have several other items here. I hope you address them. I would like to hand them to you.

TR1-48

MR. KOSINSKI: Okay. Great. Thank you so much.

MS. HOYOS: Good evening. Pilar Hoyos representing Watson Land Company.

MR. KOSINSKI: Go ahead.

MS. HOYOS: I am here in support of Alternative 1 and to oppose Alternative 2. We are owners of the property adjacent to Alameda in Sepulveda through which Alternative 2 is proposed or noted on the project route. We would bring to your attention that that is not really a feasible

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Response to Comment TR1-50

See responses AJ7-1, AJ11-2, and EO1-5.

alternative in terms of the impacts because of that property being a landfill -- former landfill property. So you've got some real limitations and restrictions on the ability to build on that property.

TR1-49

TR1-50

I would also like to echo the concerns and issues that have been raised by a number of the Carson representatives here this evening. The City of Carson has taken great care in good land use planning and having issues of incompatibility of uses by having projects such as Watson Industrial Center and Dominguez Technology Center where you have master plan centers that can accommodate the logistics and corporate uses, serve as an economic engine for the City, provide thousands of jobs and revenue, and being a good neighbor.

So I want to call to your attention the need to mitigate -- to address the issues of mitigation for the residents to have this kind of incompatible use. Impasse on the residential areas creates more issues. I think that there's recognition on the part of the company and many others out there tonight for a need for this project in terms of the safety and efficiency and we commend you for taking the lead to do this project and

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Response to Comment TR1-51

The commenter's support for project Alternative 1 is acknowledged.

finding the resources to do this project, but it does need to consider both the feasibility and terms of the routing and mitigation for those areas that are potentially impacted, that are sensitive in the residential area. TR1-50

Thank you, and I would be happy to answer any questions.

MR. KOSINSKI: Okay. Thank you. Then we have William?

MR. LYTE: Yes. Good evening. My name is William Lyte. I'm president-elect of the Harbor Association of Industry and Commerce. We have more than 100 members of major industrial engineering, maritime, and increasingly, technology firms involved with our organization.

Our governmental affairs committee and our board of directors have reviewed the EIR documents, and we would like to endorse Alternative 1. We feel that it is the best alternative due to the benefits of highway congestion relief, seismic safety, emergency access, and cost effectiveness. TR1-51

We appreciate the opportunity to make our comments tonight and look forward to helping in the process in the future.

MR. KOSINSKI: Great. Thank you, William,

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Response to Comment TR1-52

The commenter's support for project Alternative 1 is acknowledged.

especially for your brevity. We have Alex Pugh. I have got Alex Pugh, and then that is it. I have got Juan Carmona, who wants to speak also, but has a question, so let's hold that to last.

MR. PUGH: Thank you for allowing me the opportunity to speak. I will also keep my comments brief, since most of my colleagues have made most of the comments that I would like to as well.

Once again, my name is Alex Pugh. I represent the Los Angeles Chamber of Commerce. As an organization we represent 1,600 members in the Los Angeles County.

The goods movement industry is a major economic driver in the Los Angeles region. And expected container volume growth is expected to double in the next two decades. Efficiently moving goods through the region is the key to seeking green growth at the ports. So the replacement of the Schuyler Heim Bridge and rebuilding the SR-47 Expressway are vital components of this system.

TR1-52 Therefore, we would like to register our support of Alternative 1 as the best way to effectively manage growth in the coming decades.

Thank you for the opportunity to speak, and we look forward to working with you in the future.

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Response to Comment TR1-53

The proposed project is one of the candidate short-term (0-3 years) actions listed in the final Goods Movement Action Plan published in January, 2007. With passage of the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, $3.1 billion will be available to help address the wide range of infrastructure, air quality, and homeland security aspects of California's goods movement system. Those funds include $2 billion for infrastructure, $1 billion for emission reduction projects, and $100 million to enhance homeland security.

Funding for the Bridge replacement portion comes from the Grant Anticipation Revenue Vehicle (GARVEE) bond and is included in the 2008 State Highway Operation and Protection Program (SHOPP), which was approved by CTC on March 13, 2008. Funding for the Expressway portion is included in the Trade Corridor Improvement fund (TCIF) program adopted by CTC on April 10, 2008. A part of the funding for the Expressway portion also comes from ACTA's Demonstration fund, Port container fees, and ACTA bond. For further discussion, please see Response to Comment TR2-35.

MR. KOSINSKI: Okay. Thank you. Then Juan Carmona. And this is the last card I have. We have no comment -- no additional cards anywhere? I'm sorry. I really appreciate your patience on this.

MR. CARMONA: Thank you. Good evening, Mr. Chairmen, members of the board. My name is Juan Carmona. I am from Coalition for a Safe Environment, and I have several questions for you. I'm not sure if you can respond to these questions, but here we go.

TR1-52 How will Caltrans enact and fund this project?

MR. KOSINSKI: Who's the banker that would be able to answer this question? It's a common -- where is our project manager? Here we go. We are going to ask the project manager, who is the one dealing with funding, I believe, unless there's somebody else here who understand -- I've got to tell you frankly, I am totally confused about the entire funding process for all transportation projects.

MR. SU: I'm James Su, Caltrans project manager. We have programmed the funding to replace the bridge. The rest of the expressway will be funded by ACTA.

MR. CARMONA: Okay. Do you guys have the

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Response to Comment TR1-54

The benefits of the proposed project will be borne by the local community and those who utilize the roads in the project area. These benefits include reduced congestion and better traffic flow in the Port area, as well as greater reliance on the bridge across the Cerritos Channel, both on a daily basis and in the event of a major earthquake.

Although an economic analysis is not a requirement of the CEQA or NEPA process, a discussion of cost considerations is provided in the Summary of the Draft and Final EIS/EIR. A discussion of alternatives considered and withdrawn is provided in Section S.5.2, and anticipated costs for the alternatives evaluated are provided in Section S.7. In addition, a detailed discussion of the alternatives development process is provided in Section 2.1 and Section 2.3 of the Draft and Final EIS/EIR.

Response to Comment TR1-55

Maximum subsidence occurred in 1951-1952 with groundwater withdrawal and oil production from the Wilmington oil field. Since then, water injection has been implemented to reverse and/or minimize subsidence, and imported fill has been used to re-grade the area. Also, oil production has lessened since then. The proposed bridge replacement will disrupt small amounts of soil that will quickly be filled with CIDH piles that sit on bedrock. No subsidence is expected. During construction, a licensed geologist will monitor the area for unexpected subsidence.

Soil erosion is limited to areas with exposed soil. During construction, temporary construction site best management practices (BMPs) will be employed to eliminate potential soil erosion. After construction, exposed soil areas will be paved or possibly landscaped. Additional soil erosion is not expected in the future.

funds now?

MR. SU: Excuse me?

MR. CARMONA: Do you have the funds now?

MR. SU: For the bridge replacement only.

MR. CARMONA: Who benefits most from the proposal? The public? Business?

MR. KOSINSKI: Okay. First of all, the EIR/EIS is really supposed to deal with the definition of the project and what the impacts are, the adverse impact primarily.

So who benefits -- you know, the legislature attempted several years ago to pass a bill requiring that economic analysis on projects, but it failed.

So who benefits the most would be a difficult question to answer, I suspect. We cannot -- we can put it in the record and see if we can come up with a successful answer for you.

TR1-54

MR. CARMONA: Okay. And also, in the EIR/EIS report they mention something at subsidence which created a lot of problems in the past with this Schuyler Heim Bridge, soil erosion. And I was wondering, is that going to be a continuing problem in the future for this project for this bridge?

TR1-55

MR. KOSINSKI: I'm trusting that one of our

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Response to Comment TR1-56

The commenter's concerns regarding the visual effects and noise, odor, and air quality impacts associated with the proposed project are acknowledged. As detailed in the relevant sections of the Draft and the Final EIS/EIS, all actions will be taken to mitigate, to the maximum extent feasible, adverse impacts of the proposed project.

engineers will be able to answer that question. I assume that the answer is affirmative.

NEW SPEAKER: The whole island is subsiding.

MR. KOSINSKI: Okay. I guess that is not a question we will be able to answer.

MR. CARMONA: Okay. Also, I notice that there was translators in English and Spanish and other languages, and I was wondering why there weren't any flyers prepared in these languages.

MR. KOSINSKI: Good question. Do we have them?

NEW SPEAKER: If they want one, I'm sure Connie --

MR. KOSINSKI: Yeah.

MR. CARMONA: Okay. You guys have them?

MR. KOSINSKI: Yes.

TR1-56 MR. CARMONA: And lastly, the community does not want a bridge for the following reasons: The public does not want to see it. The public does not want to hear it. The public does not want to smell the exhaust from the trucks. And the public does not want air pollution to affect their health.

So in consideration of the bridge or another alternative, maybe a tunnel can be conceived

somehow. I am not sure how. This is something you guys could take up and prepare some type of statement for it. And that is it.

TR1-56

MR. KOSINSKI: Okay. Again, thank you for your patience. Okay. That is the last card I have. Are there any other individuals that would like to speak? Seeing none, I am going to remind you, again, that you have until October 16th to respond. If you leave the meeting today and you would like to --

MS. HRICKO: I thought you said you were taking questions.

MR. KOSINSKI: You would like to come up and ask a question. Yes.

MS. HRICKO: I'm sorry. Wasn't there going to be time for questions from anybody in the audience?

MR. KOSINSKI: The format we follow for questions is the same format we follow here. And that is why Juan got held up. If you have a question -- what we are trying to do is make sure that the reporter is able to accurately collect this information. So the questions are on these cards. So if you want to ask a question, please fill out another card. We will be happy to give you another one. You can come up and ask the question.

So we will stall for a little bit, and I will give you some wrap-up information. And, again, if other people have additional questions that they would like to ask, please fill out a card; and we will take them in the order that we receive them. In closing the meeting, other than for the questions that will be coming up next, we have copies of the document in the back for those who need them. Certainly, if there are technical studies that people want, our staff should have those available. Hopefully, they brought them today. If they haven't brought them, then we should be able to take the card of the person who wants that study and supply it to them very quickly. With that, we will take about a one-minute break.

(Recess.)

MR. KOSINSKI: Are you ready?

MS. HRICKO: Whenever you get your audience back, if there is anybody staying.

MR. KOSINSKI: Okay. If everybody will please quiet down, we have one more card with a question on it. It's from Andrea Hricko from USC who spoke earlier. You want this card back?

MS. HRICKO: I know the question.

MR. KOSINSKI: Okay.

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Response to Comment TR1-57

The commenter is referred to response OB4-20 for a discussion regarding public hearing notification, distribution of flyers, and copies of the flyers.

MS. HRICKO: My question is I want to know -- this is Andrea Hricko from the University of Southern California, Keck School of Medicine.

And I would like to know whether the residents who are closest to the elevated expressway, who live near Henry Ford Avenue and Alameda Street 100 feet from the expressway and along with the students and parents at Wilmington Park Elementary School, were they flyered by either ACTA or Caltrans so that they knew to come to this meeting? Were there any notices given to residents in the most impacted area? TR1-57

MR. KOSINSKI: Do we have somebody that is familiar with our noticing process? Maria. I can -- while we are tracking down Maria --

MR. MARTIN: There were hand flyers passed out.

MS. KOSINSKI: Maria is going to answer that question. While she's coming up here, let me just assure you that we had large ads in the newspaper, ran them twice in local papers. And they were not carried in some sections. For example, in the national section of the L.A. Times on Friday the 17th. So the notification process that we follow, in our opinion, goes beyond what the normal requirements

TR1
Page 72

Response to Comment TR1-58

The commenter is referred to response OB9-6.

are for the CEQA. With that, Maria will give me a little summary of the notification process.

NEW SPEAKER: Yes. We gave flyers to students in the area surrounding all of the alternatives. So they were distributed about two weeks prior to this meeting. We have the actual boundaries for you, if you would like that. And the number that were actually distributed, I can provide that to you as well.

MS. HRICKO: The next question I have for you is, finally having got my hands on -- and I will put it back if I need to -- but, my hands on the air quality technical study, is there anyone who can answer a question? There's a table in here that is showing the total daily traffic volume, but it's in millions of vehicles. And fortunately, we don't have millions of vehicles going across the roadway. So I am wondering if anyone can explain this. And it also shows no increase -- no increase from 2003 to 2011 in the number of vehicles going across the Heim Bridge, which is completely implausible. So I am wondering who can we talk to to make any sense out of this Caltrans data?

TR1-58

MR. MARTIN: What table are you referring to?

TR1
Page 73

Response to Comment TR1-59

In regard to the review period, the legal period for public comment on the Draft EIS/EIR is 45 days. However, Caltrans provided 60 days, and this extended review period ended on October 16, 2007. In response to public and agency requests, Caltrans provided the requesters with an additional extension of the deadline, agreeing to accept written comments until early November 2007, even though such extensions are not required by CEQA or NEPA.

MR. KOSINSKI: You know, this may be an item that you might handle after the public hearing. We should be able to give her a copy of this report.

MS. HRICKO: Can I take this one, please?

MR. KOSINSKI: These are public documents, so you should we able to have a copy of this. If that is the only one we brought, then other people should be able to --

MS. HRICKO: Thank you I have one last question.

MR. KOSINSKI: Sure.

MS. HRICKO: Can someone tell us tonight whether or not you will grant an extension for public comments? I assume that you probably can't tell us whether you plan to redo the entire EIR, but can you tell us whether we can assume that there will be an extension of the comment period based on all of the problems that were raised this evening. TR1-59

MR. KOSINSKI: We will have to sit down and evaluate what we learned today and -- before we make that decision. Have we -- the October 16th would be the 60th day of the comment period, I assume, or longer. So we've gone to the legal limits.

MS. HRICKO: Minimum. The Port of Los Angeles recently extended the TRAPAC deadline by

TR1
Page 74

Response to Comment TR1-60

The commenter is referred to response OB4-19 for a discussion of the complexities of the environmental analyses.

a month or two months.

MR. KOSINSKI: Right. We just extended the 405 to 130 days. So that is a long period. See, we will evaluate that. I can tell you that, informally, you know, if you get us comments within a week after the 16th, we certainly will still accept your comments. We don't have a situation where, if we receive a comment on the 17th or the 18th, that we drop them in the trash. We, as a matter of courtesy, respond to them and make sure that all comments that we get in a reasonable time after the comment period are included in the public record.

TR1-60

MS. HRICKO: And I wasn't quite clear. Is there someone that we can talk to if we, you know, question the traffic analysis or the data, we just don't even understand the tables. Is there someone from Caltrans we could call after this meeting?

MR. KOSINSKI: We have two people here who are the traffic and the air quality consultants that are involved in the preparation of this document. They are sitting over there. So you can probably talk to them right now.

MS. HRICKO: Okay. And get their cards.

MR. KOSINSKI: And those are two areas where, unfortunately, over the years, I think because

of the technical nature of those studies, as well as the litigation that has ensued, they have become more and more complex because of these technical and legal requirements. So I certainly sympathize and empathize with this issue.

MS. HRICKO: Well, I have read a lot of these documents. And this one, with regard to the traffic, is quite incomprehensible compared to other EIRs that I have read, so --

MR. KOSINSKI: Right. But our technical staff and traffic -- it might be sort of a technical specialist that deals with the entire freeway system in California. And as a consequence they take the analysis very seriously and they are very technical oriented. So they are not as simple as some of the other studies that you normally see.

MS. HRICKO: I would just suggest that you should not have to be a traffic engineer to be able to read one of these. TR1-60

MR. KOSINSKI: I agree with you.

MS. HRICKO: Thank you.

MR. KOSINSKI: Okay. Any other questions? Comments? Comment cards? Okay. With that, I am going to hereby close the public hearing and remind you about the 16th as the end of the comment period

TR1
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and that all comments will be addressed in the final EIR/EIS.

With that, drive carefully.

(Proceedings concluded at 8:20 p.m.)

* * *

TR1
Page 77

I, NICOLE R. HARNISH, Certified Shorthand Reporter for the State of California, do hereby certify:

That the public hearing was taken by me in machine shorthand and later transcribed into typewriting under my direction; and that the foregoing contains a true record of the testimony of the witness.

Dated: This _____ day of _____

at San Diego, California.

_____

NICOLE R. HARNISH

C.S.R. NO. 13101

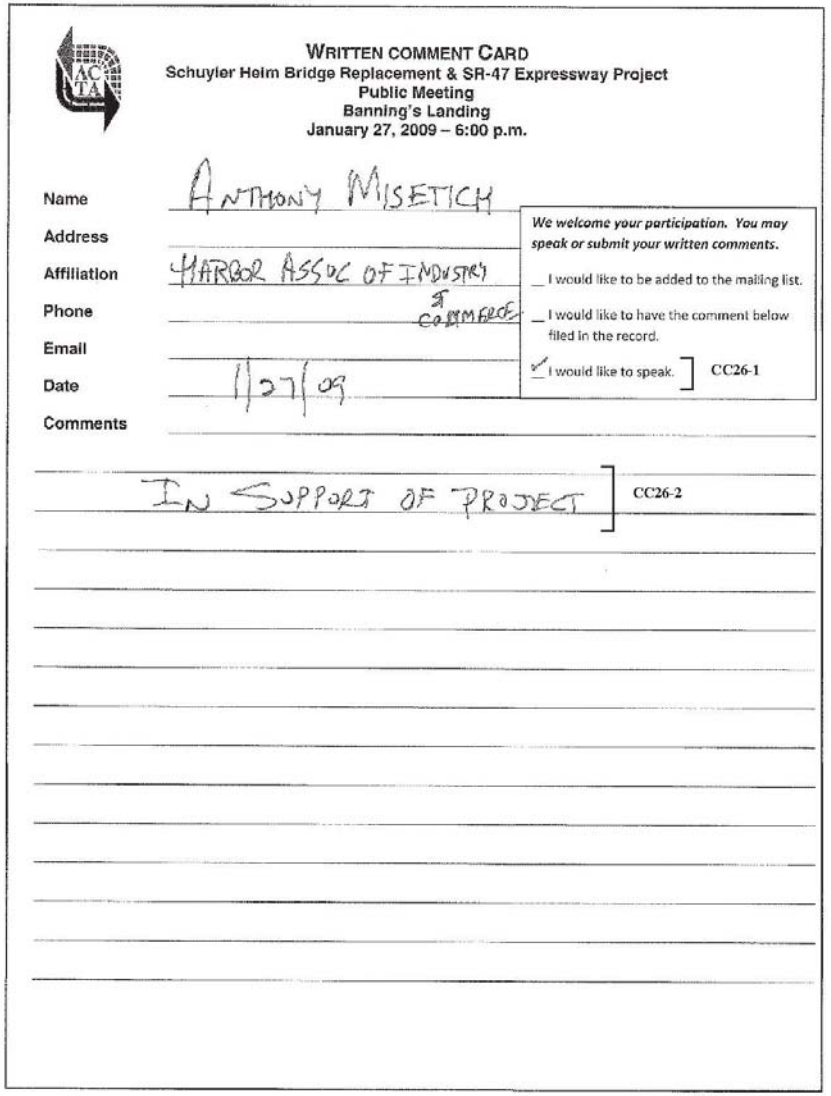
Comment Card 26

Response to Comment CC26-1

Your comment is addressed in the Response to Comment TR2-1.

Response to Comment CC26-2

Your support for the proposed project is acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: ANTHONY MISETICH
Address:
Affiliation: HARBOR ASSOC OF INDUSTRY & COMMERCE
Phone:
Email:
Date: 1/27/09
Comments:

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.
__ I would like to have the comment below filed in the record.
✓ I would like to speak.] CC26-1

IN SUPPORT OF PROJECT] CC26-2

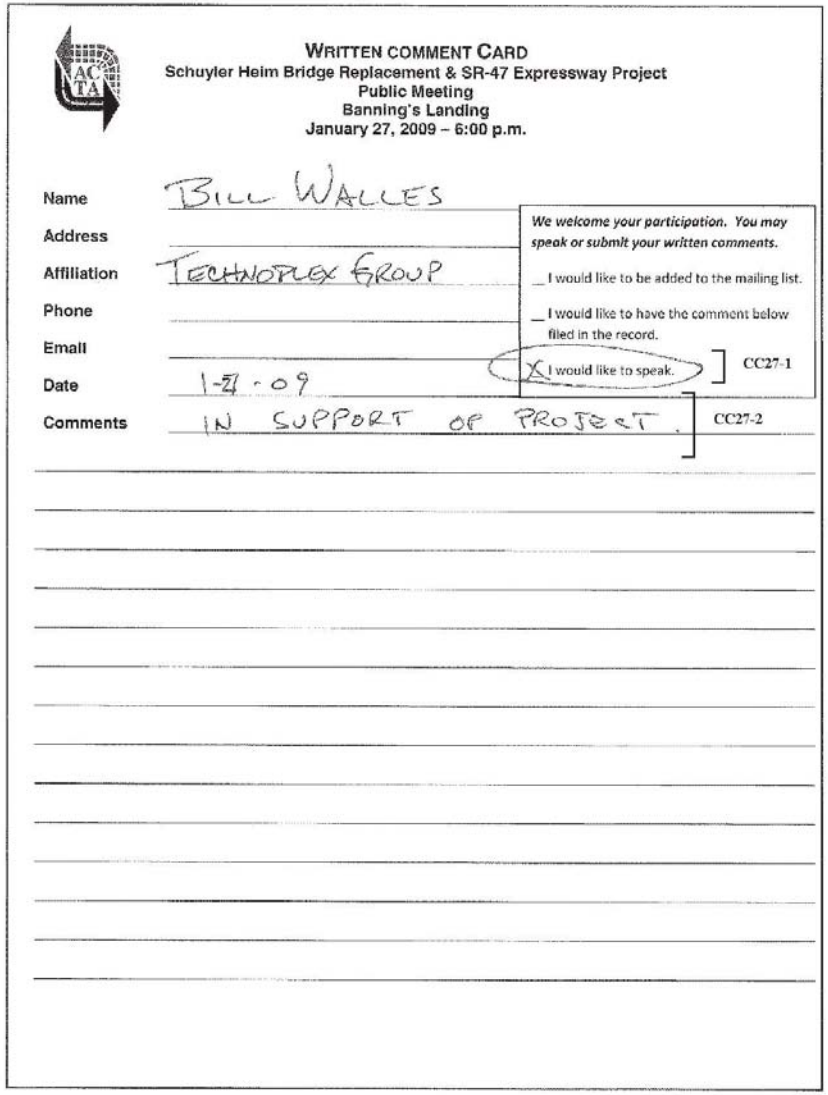
Comment Card 27

Response to Comment CC27-1

Your comment is addressed in Response to Comment TR2-1.

Response to Comment CC27-2

Your support of the proposed project is acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: BILL WALLES
Address:
Affiliation: TECHNOFLEX GROUP
Phone:
Email:
Date: 1-27-09
Comments: IN SUPPORT OF PROJECT.

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

__ I would like to have the comment below filed in the record.

X I would like to speak.] CC27-1

CC27-2

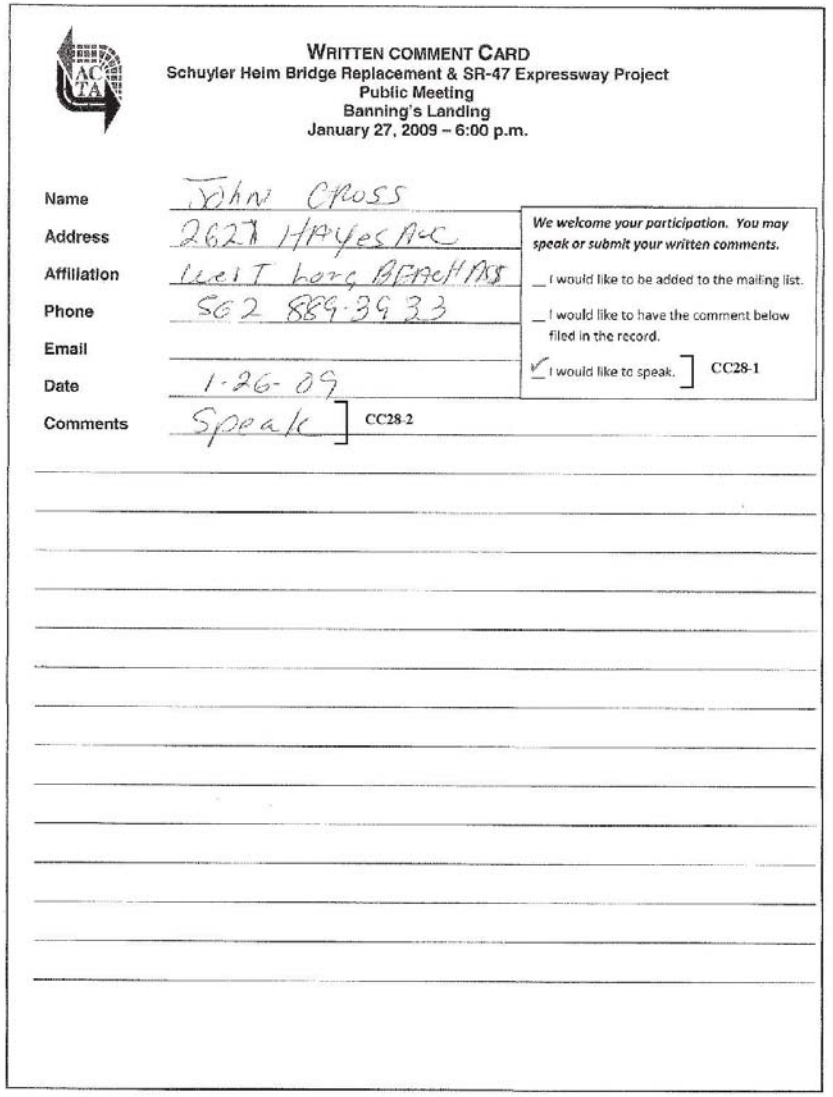
Comment Card 28

Response to Comment CC28-1

Your comments are addressed in Response to Comments TR2-3 through TR2-5.

Response to Comment CC28-2

Your comments are addressed in Response to Comments TR2-3 through TR2-5.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: John Cross
Address: 2627 Hayes Ave
Affiliation: Int'l Long Beach Mfg
Phone: 562 889-3933
Email:
Date: 1-26-09
Comments: Speak CC28-2

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

__ I would like to have the comment below filed in the record.

✓ I would like to speak. CC28-1

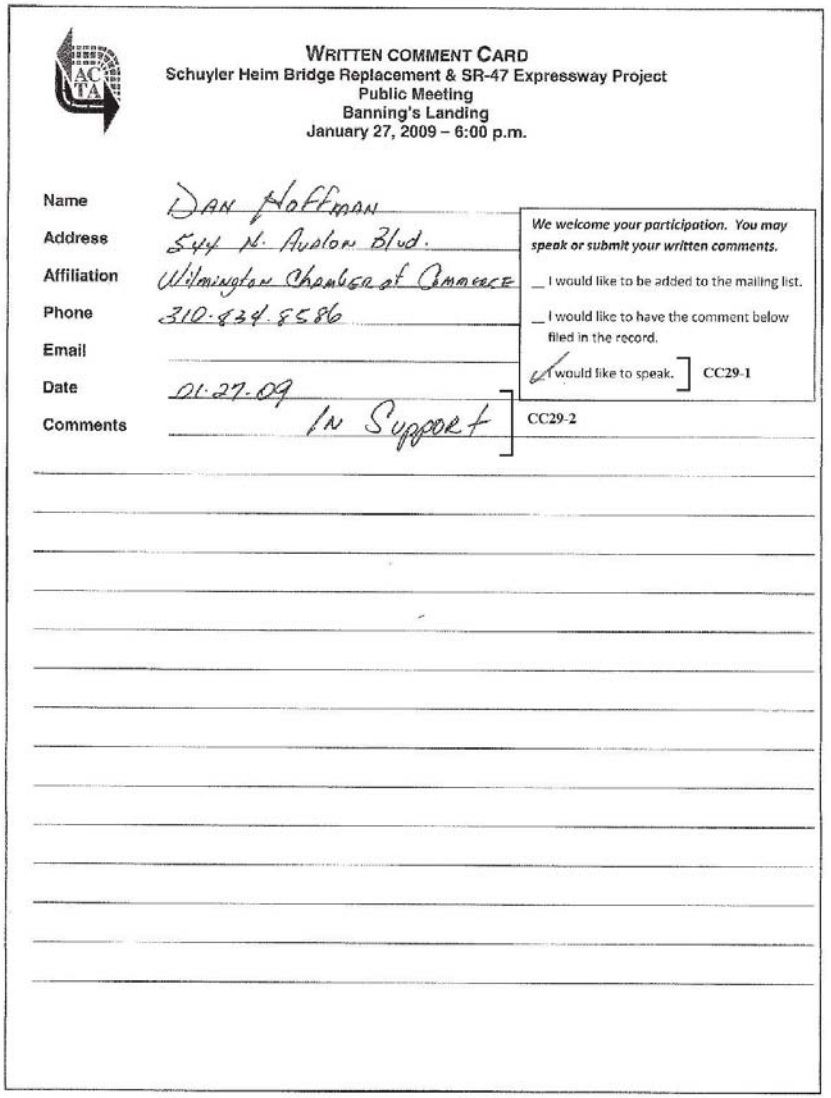
Comment Card 29

Response to Comment CC29-1

Your comments are addressed in Response to Comments TR2-6 and TR2-7.

Response to Comment CC29-2

Your comments are addressed in Response to Comments TR2-6 and TR2-7.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: DAN Hoffman
Address: 544 N. Avalon Blvd.
Affiliation: Wilmington Chamber of Commerce
Phone: 310-834-8586
Email:
Date: 01-27-09
Comments: IN Support

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

__ I would like to have the comment below filed in the record.

✓ I would like to speak. CC29-1

CC29-2

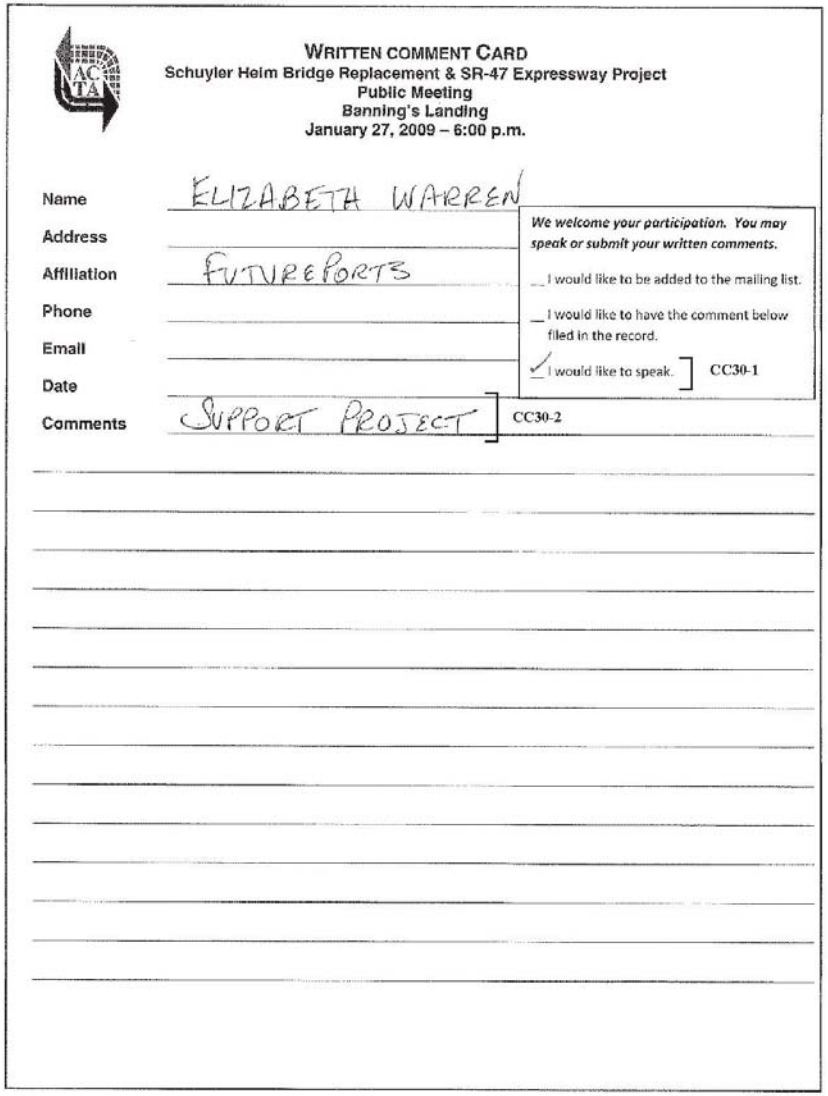
Comment Card 30

Response to Comment CC30-1

Your comment is addressed in Response to Comment TR2-8.

Response to Comment CC30-2

Your support of the proposed project is acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: ELIZABETH WARREN
Address:
Affiliation: FUTUREPORTS
Phone:
Email:
Date:
Comments: SUPPORT PROJECT CC30-2

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

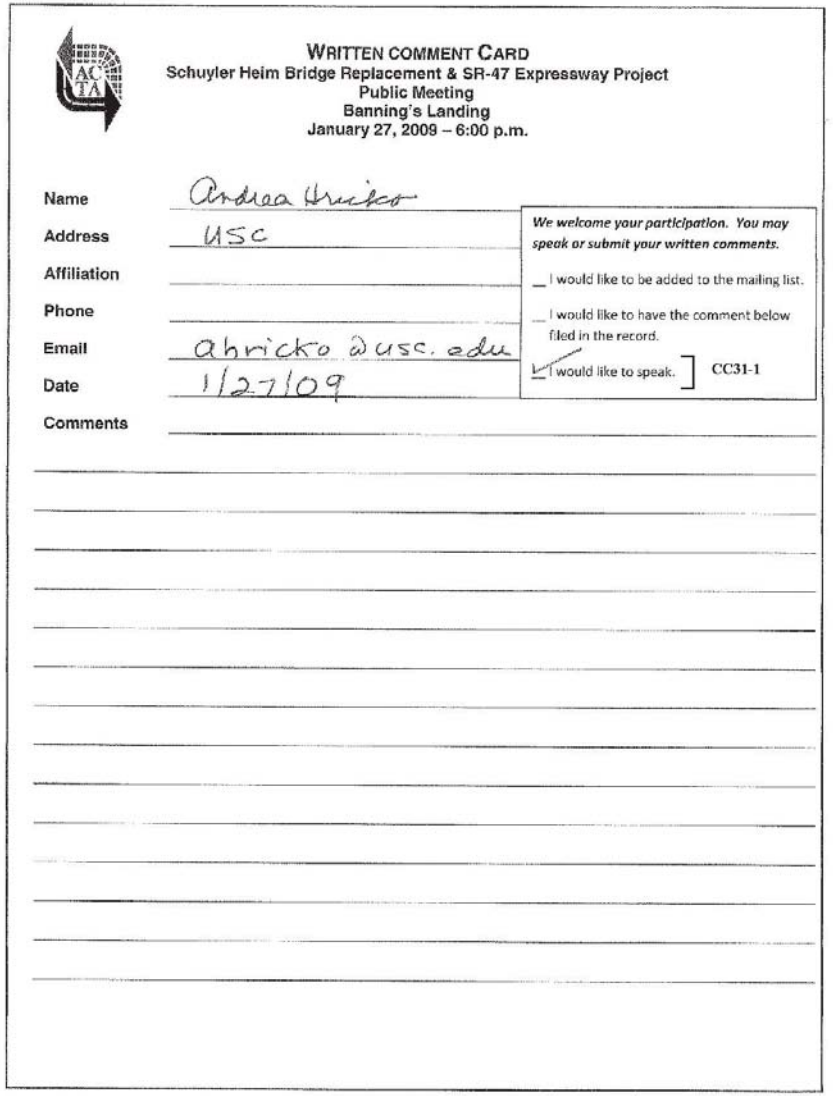
__ I would like to have the comment below filed in the record.

✓ I would like to speak. CC30-1

Comment Card 31

Response to Comment CC31-1

Your comments are addressed in Response to Comments TR2-9 through TR2-14.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Andrea Hricko
Address: USC
Affiliation:
Phone:
Email: ahricko@usc.edu
Date: 1/27/09
Comments:

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

__ I would like to have the comment below filed in the record.

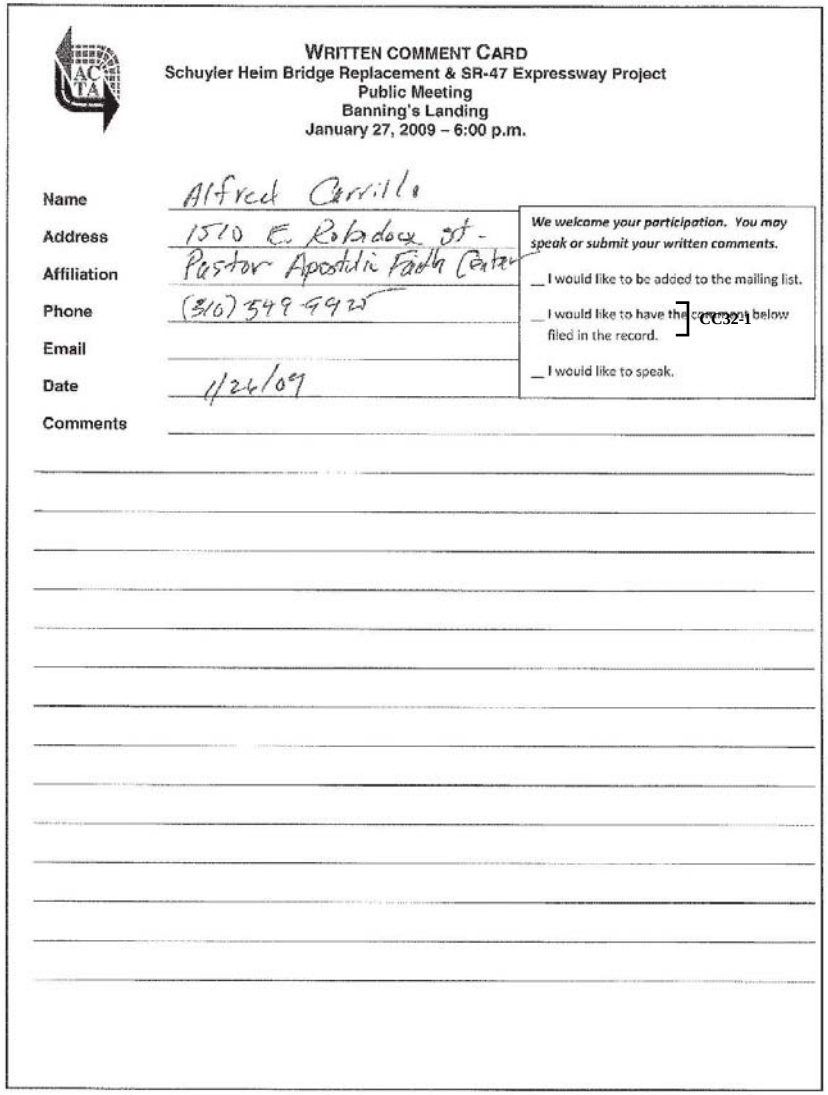
✓ I would like to speak.

CC31-1

Comment Card 32

Response to Comment CC32-1

Your comments are addressed in Response to Comment TR2-15.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Alfred Carrillo
Address: 1510 E. Robidoux St.
Affiliation: Pastor Apostolic Faith Center
Phone: (310) 549-9925
Email:
Date: 1/26/09
Comments:

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

__ I would like to have the comments below filed in the record.] CC32-1

__ I would like to speak.

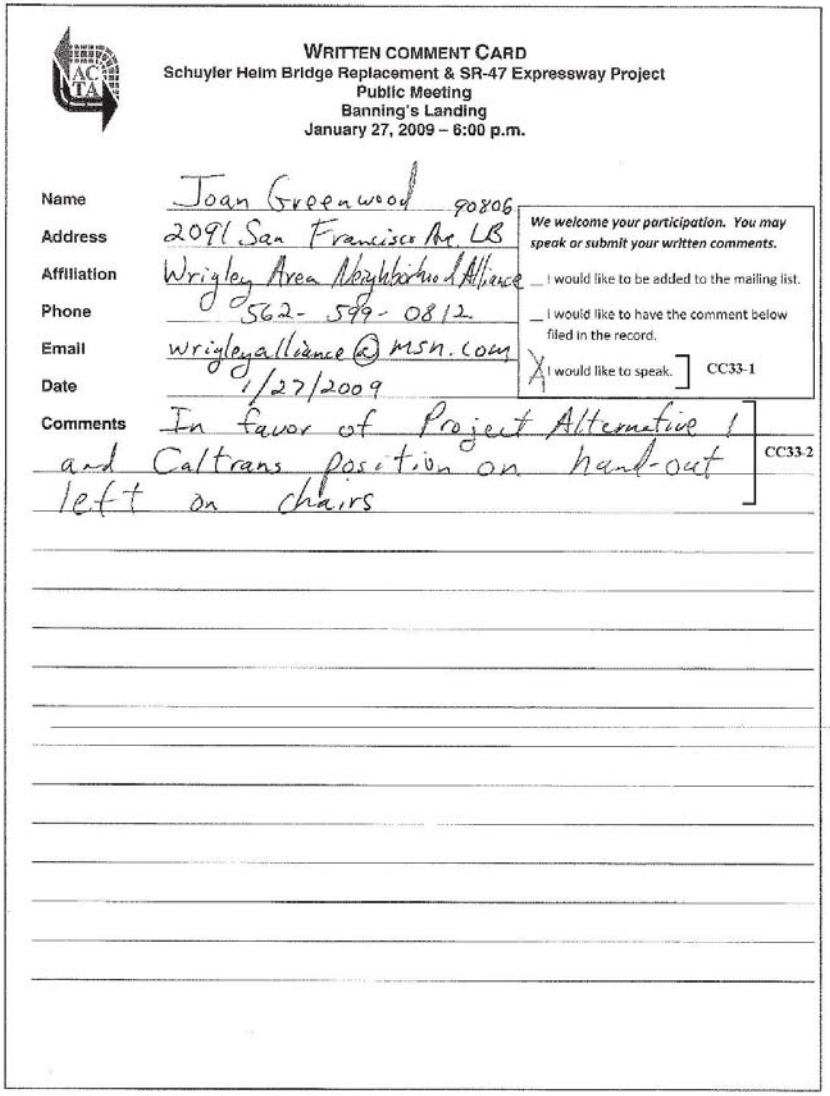
Comment Card 33

Response to Comment CC33-1

Your comments are addressed in Response to Comments TR2-16 through TR2-18.

Response to Comment CC33-2

Your support for Alternative 1 is acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Joan Greenwood 90806
Address: 2091 San Francisco Av. LB
Affiliation: Wrigley Area Neighborhood Alliance
Phone: 562-599-0812
Email: wrigleyalliance@msn.com
Date: 1/27/2009
Comments: In favor of Project Alternative 1 and Caltrans position on hand-out left on chairs

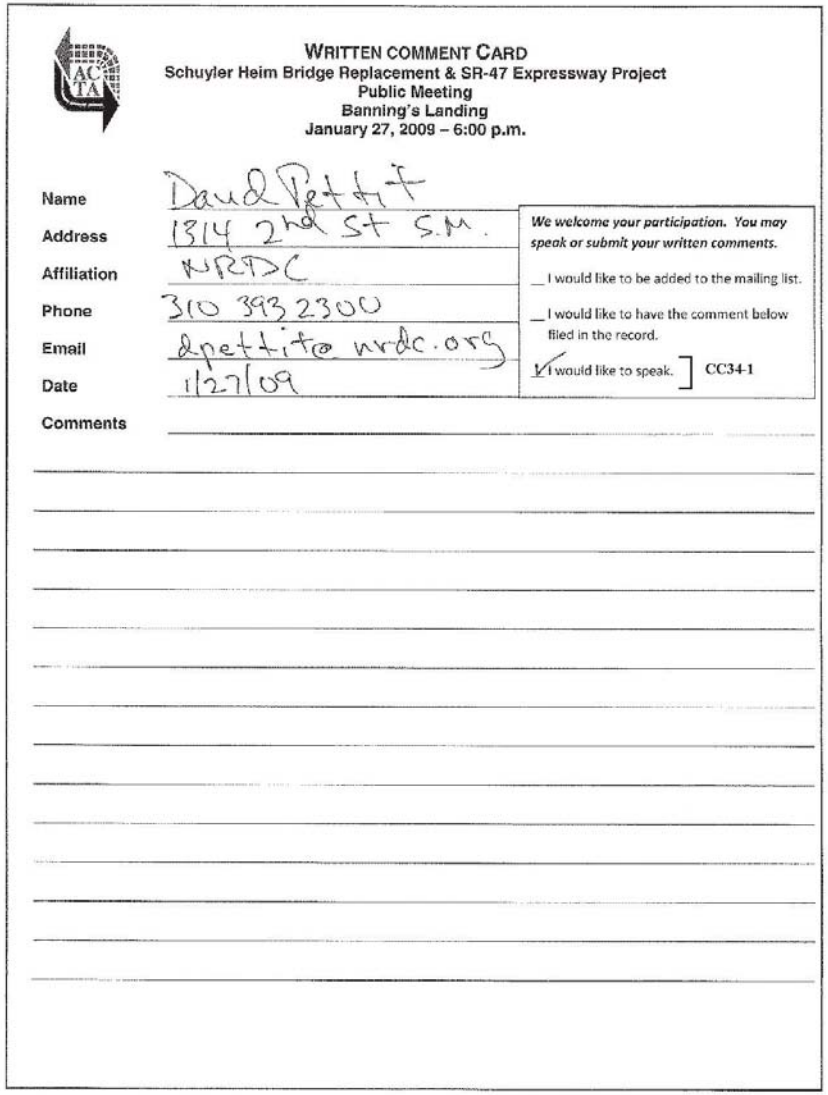
We welcome your participation. You may speak or submit your written comments.
__ I would like to be added to the mailing list.
__ I would like to have the comment below filed in the record.
X I would like to speak. CC33-1

CC33-2

Comment Card 34

Response to Comment CC34-1

Your comments are addressed in Response to Comments TR2-19 through TR2-26.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: David Pettit
Address: 1314 2nd St S.M.
Affiliation: NRDC
Phone: 310 393 2300
Email: dpettit@nrdc.org
Date: 1/27/09
Comments:

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

__ I would like to have the comment below filed in the record.

✓ I would like to speak.] CC34-1

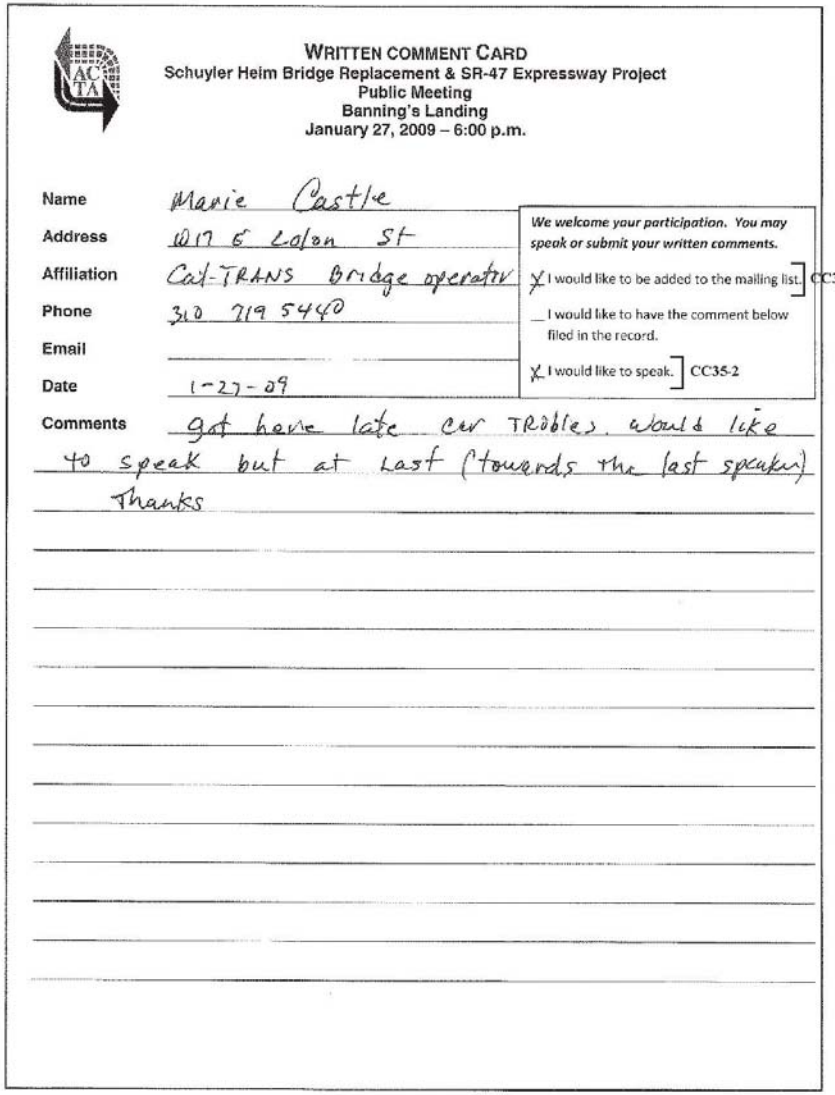
Comment Card 35

Response to Comment CC35-1

Your name has been added to the mailing list.

Response to Comment CC35-2

Your comments are addressed in Response to Comments TR2-27 and TR2-28.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Marie Castle
Address: 917 E Colon St
Affiliation: Cal-TRANS Bridge operator
Phone: 310 719 5440
Email:
Date: 1-27-09
Comments: got here late cuz TRAffic, would like to speak but at last (towards the last speaker) Thanks

We welcome your participation. You may speak or submit your written comments.

X I would like to be added to the mailing list. CC35-1

__ I would like to have the comment below filed in the record.

X I would like to speak. CC35-2

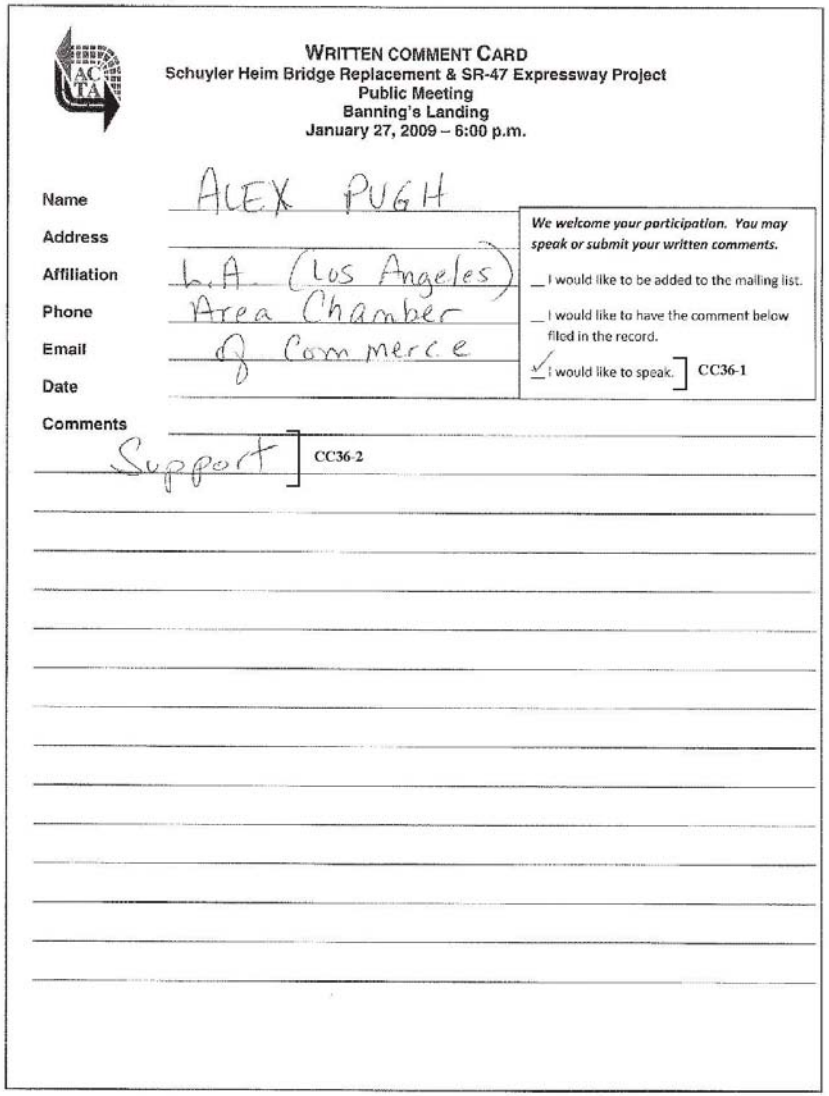
Comment Card 36

Response to Comment CC36-1

Your comment has been addressed in Response to Comment TR2-29.

Response to Comment CC36-2

Your support of the proposed project is acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: ALEX PUGH
Address:
Affiliation: L.A. (Los Angeles) Area Chamber of Commerce
Phone:
Email:
Date:
Comments: Support CC36-2

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

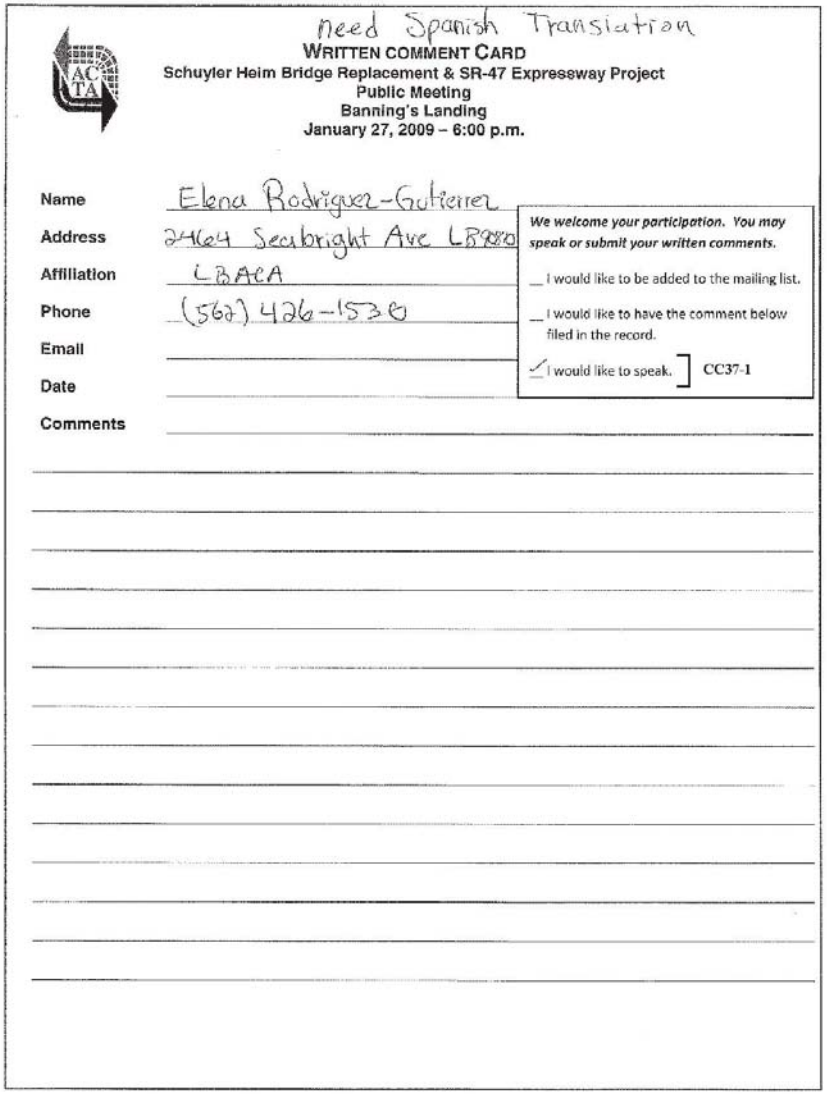
__ I would like to have the comment below filed in the record.

✓ I would like to speak. CC36-1

Comment Card 37

Response to Comment CC37-1

Your comments have been addressed in Response to Comments TR2-30 and TR2-31.



need Spanish Translation

WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Elena Rodriguez-Gutierrez
Address: 24164 Seabright Ave LB 90810
Affiliation: LBACA
Phone: (562) 426-1530
Email:
Date:
Comments:

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

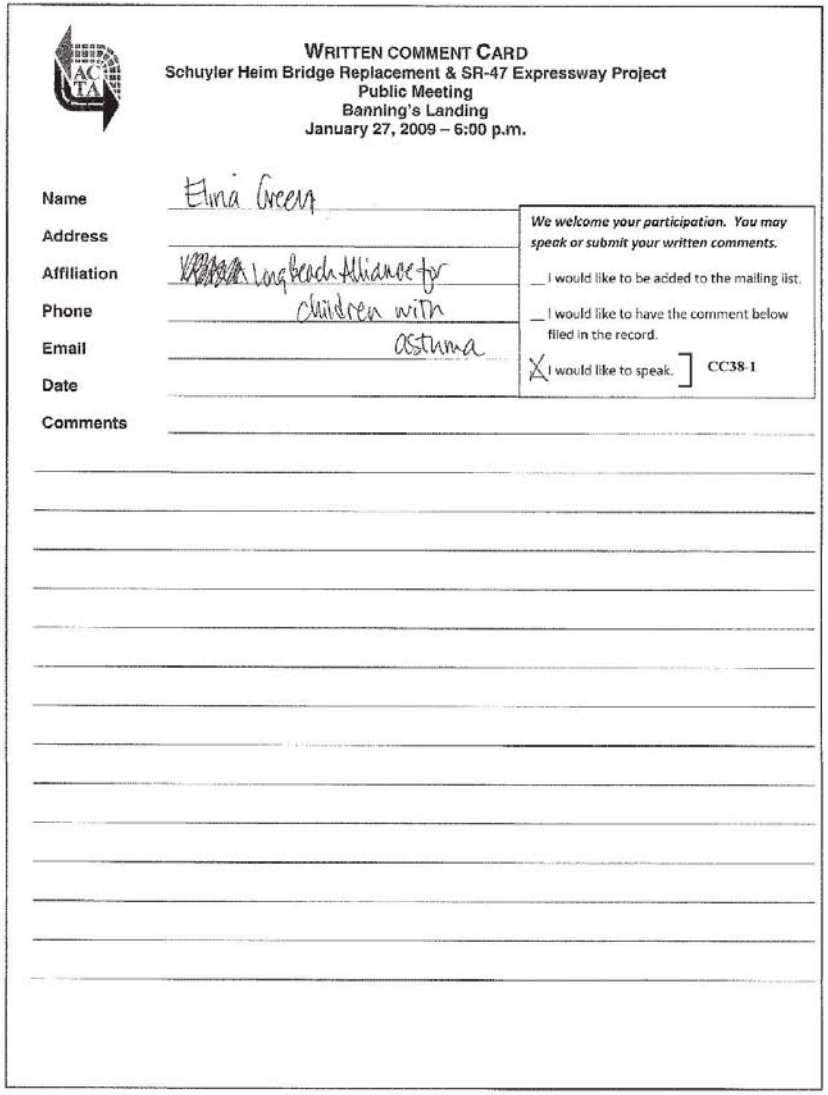
__ I would like to have the comment below filed in the record.

✓ I would like to speak.] CC37-1

Comment Card 38

Response to Comment CC38-1

Your comments have been addressed in Response to Comments TR2-32 through TR2-36.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Elma Green
Address:
Affiliation: Long Beach Alliance for children with asthma
Phone:
Email:
Date:
Comments:

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

__ I would like to have the comment below filed in the record.

X I would like to speak.] CC38-1

Comment Card 39

Response to Comment CC39-1

Please note this record of your comments.

Response to Comment CC39-2

Your comments have been addressed in Response to Comments TR2-37 through TR2-42.

Response to Comment CC39-3

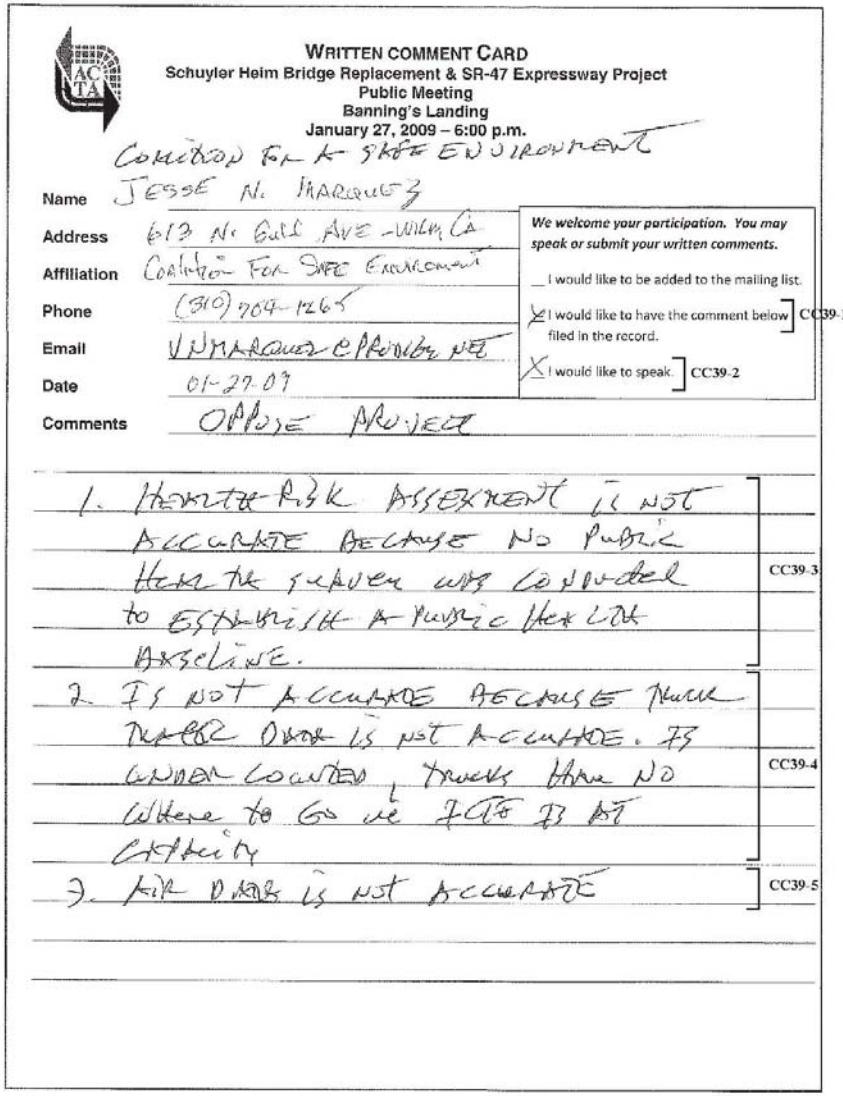
The Health Risk Assessment was performed in accordance with the latest guidance outlined in the "Air Toxics Hot Spots Program Risk Assessment Guidelines" (California Office of Environmental Health Hazard Assessment [OEHHA, 2003]). OEHHA methodology is recognized by CARB and SCAQMD and does not recommend that a public health survey be completed as part of a health risk assessment. Also, please see Response to Comment TR2-40.

Response to Comment CC39-4

The commenter is referred to Response to Comment TR2-39.

Response to Comment CC39-5

Your comments have been addressed in the transcripts. Please see Response to Comments TR2-37 through TR2-42.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

COALITION FOR A SAFE ENVIRONMENT

Name: JESSE N. MARQUEZ
Address: 613 N. Gulf Ave - Wilm, CA
Affiliation: Coalition For Safe Environment
Phone: (310) 704-1265
Email: JNMARQUEZ@PRODIGY.NET
Date: 01-27-09
Comments: OPPOSE PROJECT

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.
X I would like to have the comment below filed in the record. CC39-1
X I would like to speak. CC39-2

1. HEALTH RISK ASSESSMENT IS NOT ACCURATE BECAUSE NO PUBLIC HEALTH SURVEY WAS CONDUCTED TO ESTABLISH A PUBLIC HEALTH BASELINE. CC39-3
2. IT IS NOT ACCURATE BECAUSE TRUCK NUMBER COUNT IS NOT ACCURATE. IT IS UNDER COUNTED, TRUCKS HAVE NO WHERE TO GO WE ARE AT CAPACITY CC39-4
3. AIR DATA IS NOT ACCURATE CC39-5

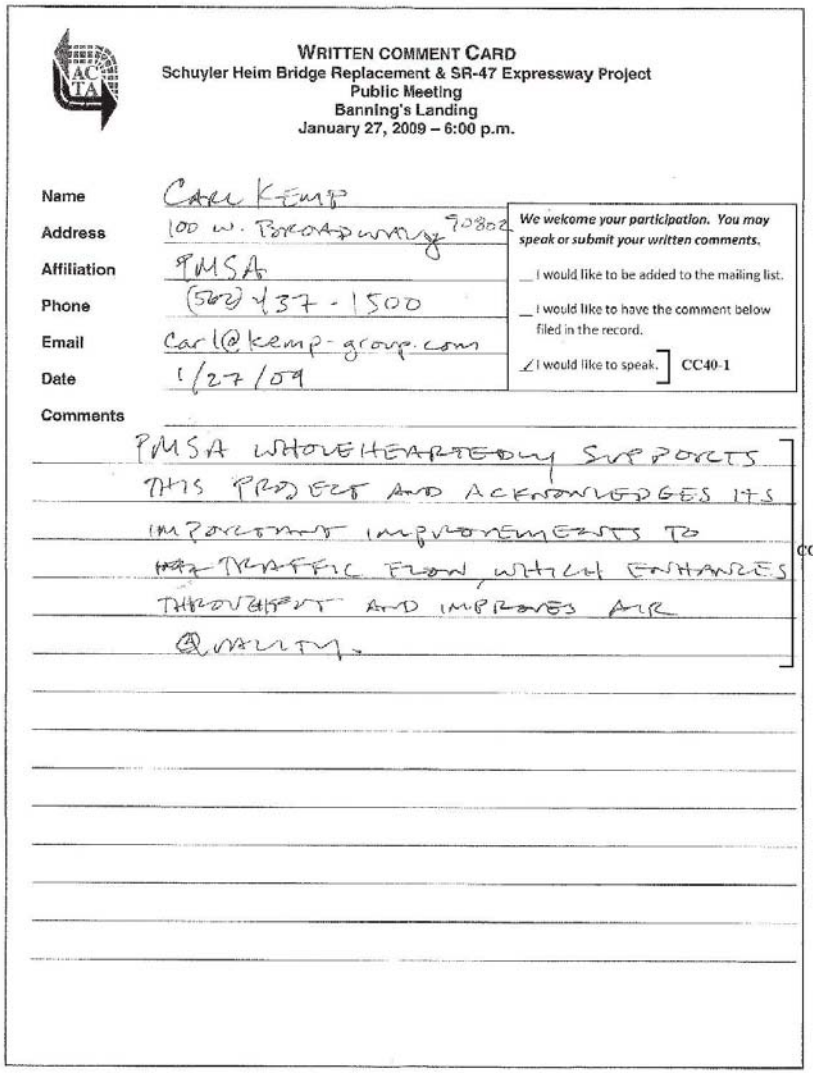
Comment Card 40

Response to Comment CC40-1

Your comment is addressed in Response to Comment TR2-41.

Response to Comment CC40-2

Your support of the proposed project is acknowledged.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Carl Kemp
Address: 100 W. Broadway 90802
Affiliation: PMSA
Phone: (562) 437-1500
Email: carl@kemp-group.com
Date: 1/27/09

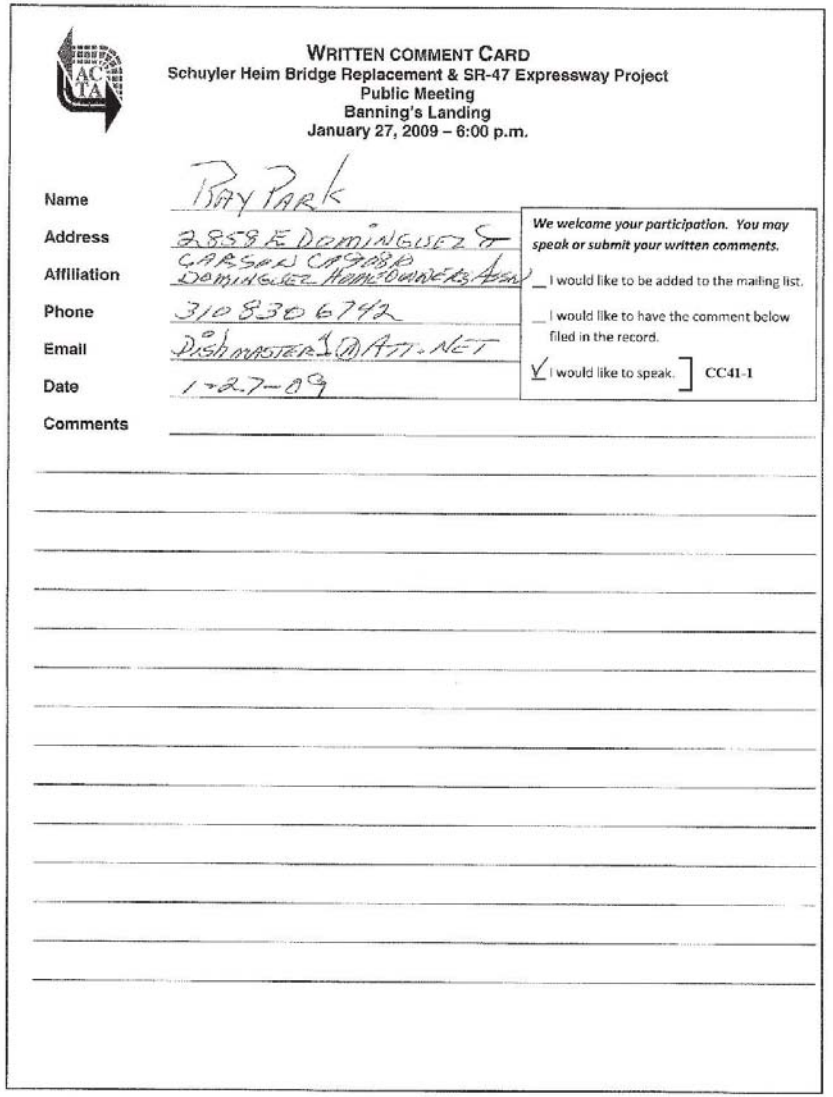
We welcome your participation. You may speak or submit your written comments.
__ I would like to be added to the mailing list.
__ I would like to have the comment below filed in the record.
✓ I would like to speak. CC40-1

Comments:
PMSA WHOLEHEARTEDLY SUPPORTS THIS PROJECT AND ACKNOWLEDGES ITS IMPORTANT IMPROVEMENTS TO TRAFFIC FLOW WHICH ENHANCES THROUGHPUT AND IMPROVES AIR QUALITY. CC40-2

Comment Card 41

Response to Comment CC41-1

Your comments are addressed in Response to Comments TR2-42 through TR2-45.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: RAY PARK
Address: 2858 E DOMINGUEZ ST
Affiliation: CARSON CALIFORNIA DOMINGUEZ HOMEOWNERS ASSN
Phone: 3108306742
Email: DISHMASTER1@ATT.NET
Date: 1-27-09
Comments:

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.

__ I would like to have the comment below filed in the record.

√ I would like to speak.] CC41-1

Comment Card 42

Response to Comment CC42-1

Please note this record of your comments.

Response to Comment CC42-2

Your comments are addressed in Response to Comments TR2-46 and TR2-47.

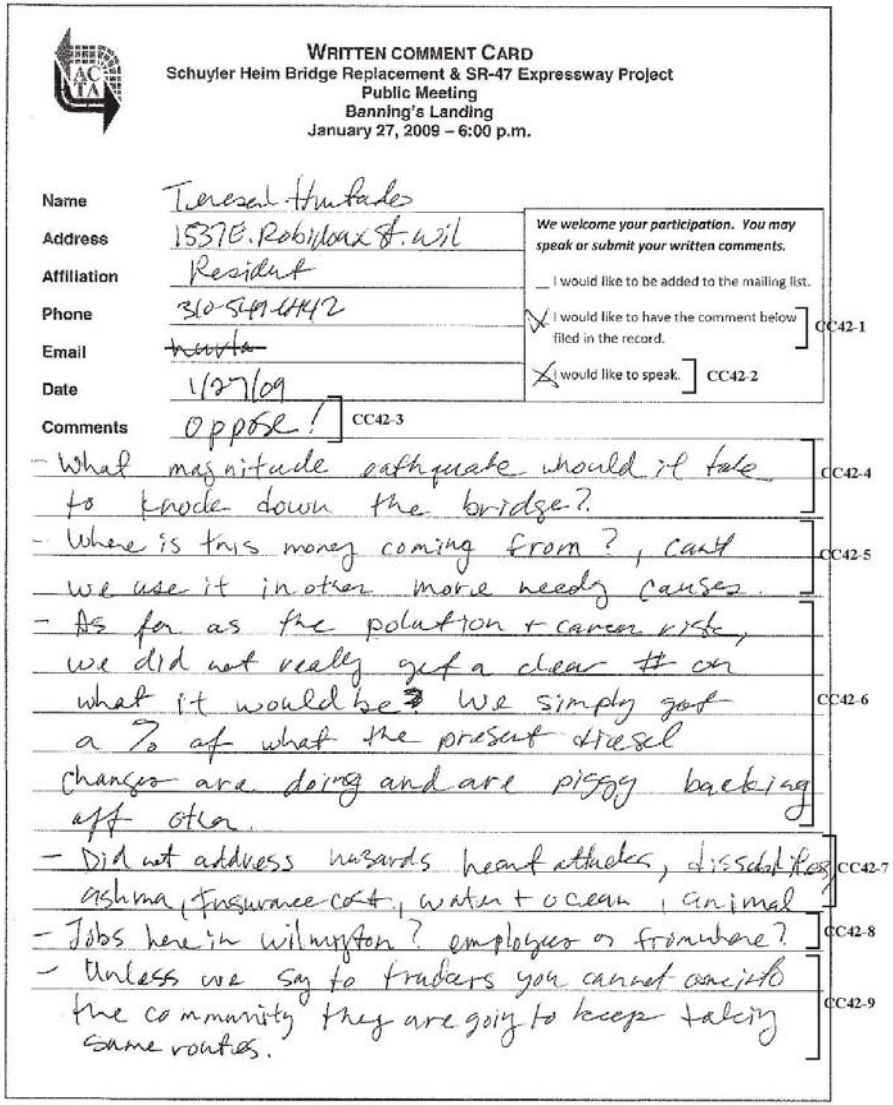
Response to Comment CC42-3

Your opposition to the proposed project is noted.

Response to Comment CC42-4

Section 1.2.2.1.1.1 of the Draft EIS/EIR states: "FHWA and Caltrans have documented that the existing Schuyler Heim Bridge does not conform to current seismic criteria (Caltrans, 2002). Using the Caltrans 1996 Seismic Hazard Map, peak bedrock acceleration at the site is estimated to be 0.6 g[1]. However, it has been determined that, due to the ongoing deterioration of the bridge, it would only require a seismic event with a bedrock acceleration of 0.3 g to cause collapse of the main bridge spans; an event with 0.1 g acceleration would result in collapse of the approach spans."

Following the 1994 Northridge Earthquake, every bridge structure in the state underwent a thorough seismic safety evaluation. Of the bridges identified as seismically deficient, the Schuyler Heim Bridge is one of only two bridges that have not been replaced or retrofitted. The project is proposed to address this need.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Teresa Hurtado
Address: 1537 E. Robidoux St. Wil
Affiliation: Resident
Phone: 310-549-4442
Email: ~~n/a~~
Date: 1/27/09
Comments: Oppose! CC42-3

We welcome your participation. You may speak or submit your written comments.
__ I would like to be added to the mailing list.
X I would like to have the comment below filed in the record. CC42-1
X I would like to speak. CC42-2

- What magnitude earthquake would it take to knock down the bridge? CC42-4
- Where is this money coming from?, can't we use it in other more needy causes. CC42-5
- As far as the pollution + cancer risks, we did not really get a clear # on what it would be? We simply got a % of what the present diesel changes are doing and are piggy backing off other. CC42-6
- Did not address hazards heart attacks, dissolution, asthma, insurance cost, water + ocean, animal CC42-7
- Jobs here in Wilmington? employees or from here? CC42-8
- Unless we say to truckers you cannot come into the community they are going to keep taking same routes. CC42-9

[1] Bedrock acceleration is the horizontal movement of the earth (the solid rock below the soil surface) caused by an earthquake. Its magnitude is measured in terms of (g), the acceleration due to gravity, which represents the force with which the earth moves (e.g., 0.1 g is the acceleration equal to 10 percent of the force of gravity).

Comment Card 42
Page 2

Response to Comment CC42-5

Funding for the Bridge replacement portion comes from the Grant Anticipation Revenue Vehicle (GARVEE) bond and is included in the 2008 State Highway Operation and Protection Program (SHOPP), which was approved by CTC on March 13, 2008. Funding for the Expressway portion is included in the Trade Corridor Improvement fund (TCIF) program adopted by CTC on April 10, 2008. A part of the funding for the Expressway portion also comes from ACTA's Demonstration fund, Port container fees, and ACTA bond. For further discussion, please see Response to Comment TR2-35.

Response to Comment CC42-6

Specific risk levels are listed in Tables 3.13-17 through 3.13-20 of the SDEIS/RDEIR. For a discussion of asthma and other sub-chronic effects, please see Response to Comment AJ15-5. In addition, the commenter is referred to Response to Comment TR2-20.

Response to Comment CC42-7

The Draft EIS/EIR provided environmental analyses for hazards, water, biological resources, and other natural resources. The environmental consequences and impacts for these areas can be found in the Physical Environment Sections 3.12 (Hazardous Waste/ Hazardous Materials), 3.9 (Hydrology, Floodplains and Oceanography), 3.10 Water Quality and Stormwater Runoff), and 3.16 (Biological Resources). It is unclear what impact, if any, the proposed project would have on insurance costs. Please see Response to Comment CC42-6.

Response to Comment CC42-8

The proposed project is estimated to produce approximately 11,000 construction jobs, and generate about $47 million in taxes. It is anticipated that most of these jobs would come from local employers within the greater Los Angeles area, including Wilmington and Long Beach. Construction job growth is also discussed in Section 3.2 (Growth) of the Draft EIS/EIR.

Response to Comment CC42-9

Your comment is noted.

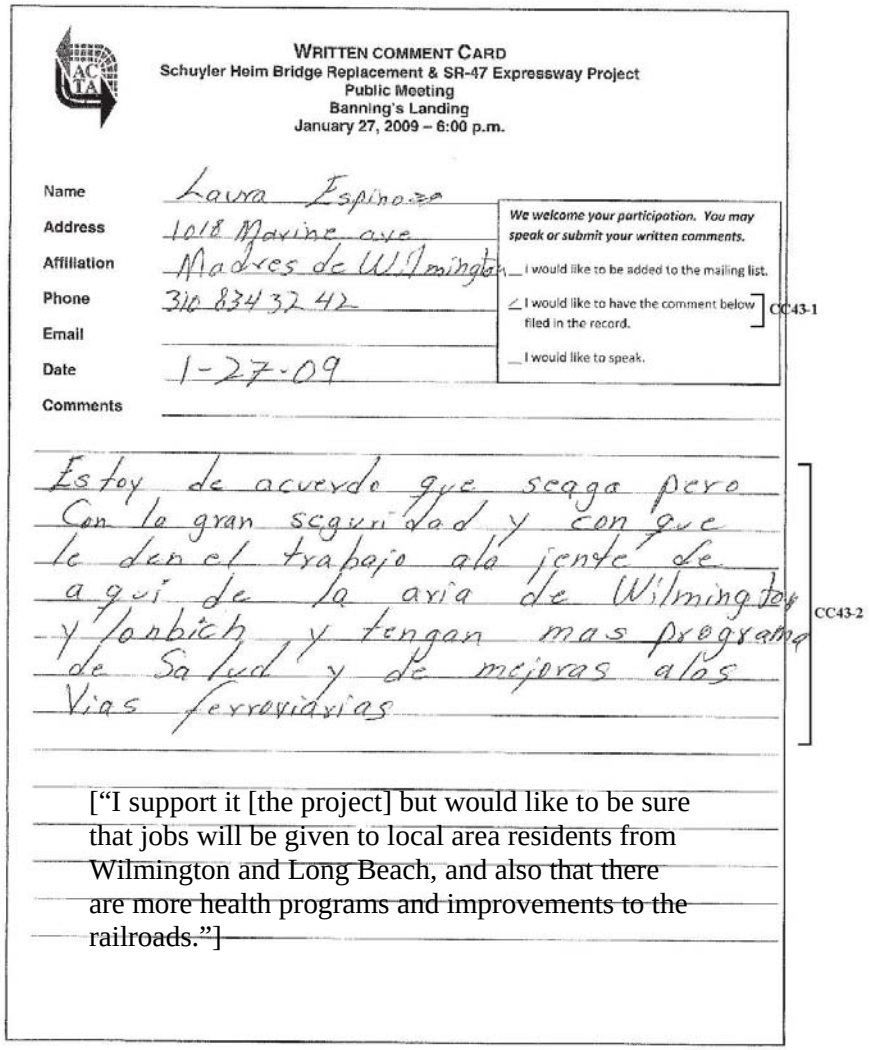
Comment Card 43

Response to Comment CC43-1

Please note this record of your comments.

Response to Comment CC43-2

Your support of the proposed project is acknowledged. No changes are proposed as part of this project to railroads. With mitigation, no significant health impacts are anticipated associated with the proposed project. Please see Response to Comment CC42-8 regarding potential constructions jobs in Wilmington and Long Beach.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Laura Espinoza
Address: 1018 Marine ave
Affiliation: Madres de Wilmington
Phone: 310 834 32 42
Email:
Date: 1-27-09
Comments:

We welcome your participation. You may speak or submit your written comments.
__ I would like to be added to the mailing list.
✓ I would like to have the comment below filed in the record. CC43-1
__ I would like to speak.

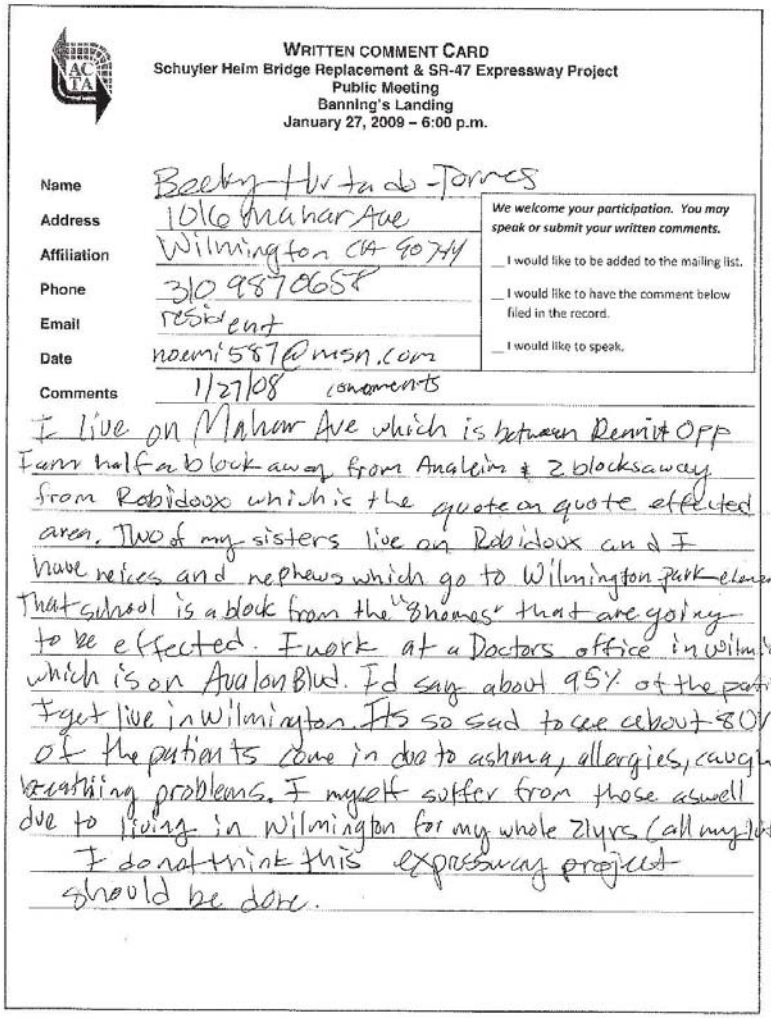
Estoy de acuerdo que seaga pero Con la gran seguridad y con que le den el trabajo ala jente de aqui de la aria de Wilmington y Lorbich y tengan mas programa de Salud y de mejoras alos Vias ferroviarias CC43-2

["I support it [the project] but would like to be sure that jobs will be given to local area residents from Wilmington and Long Beach, and also that there are more health programs and improvements to the railroads."]

Comment Card 44

Response to Comment CC44-1

Your comment is noted. Please see the discussion regarding proximity in the response to TR2-15, TR2-19, and OB14-7.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Beeby-Hurtado-Torres
Address: 1016 Mahar Ave
Affiliation: Wilmington CA 90744
Phone: 310 9870658
Email: resident
Date: noemi587@msn.com
Comments: 1/27/08 comments

We welcome your participation. You may speak or submit your written comments.
__ I would like to be added to the mailing list.
__ I would like to have the comment below filed in the record.
__ I would like to speak.

I live on Mahar Ave which is between Remint Opp I am half a block away from Anaheim & 2 blocks away from Robidoux which is the quote on quote effected area. Two of my sisters live on Robidoux and I have neices and nephews which go to Wilmington park elementary That school is a block from the "8 homes" that are going to be effected. I work at a Doctors office in Wilm which is on Avalon Blvd. I'd say about 95% of the patients I get live in Wilmington. Its so sad to see about 80% of the patients come in due to ashma, allergies, cough & breathing problems. I myself suffer from those aswell due to living in Wilmington for my whole 21yrs (all my life) I do not think this expressway project should be done.

CC44-1

Comment Card 45

Response to Comment CC45-1

Your name has been added to the mailing list.

Response to Comment CC45-2

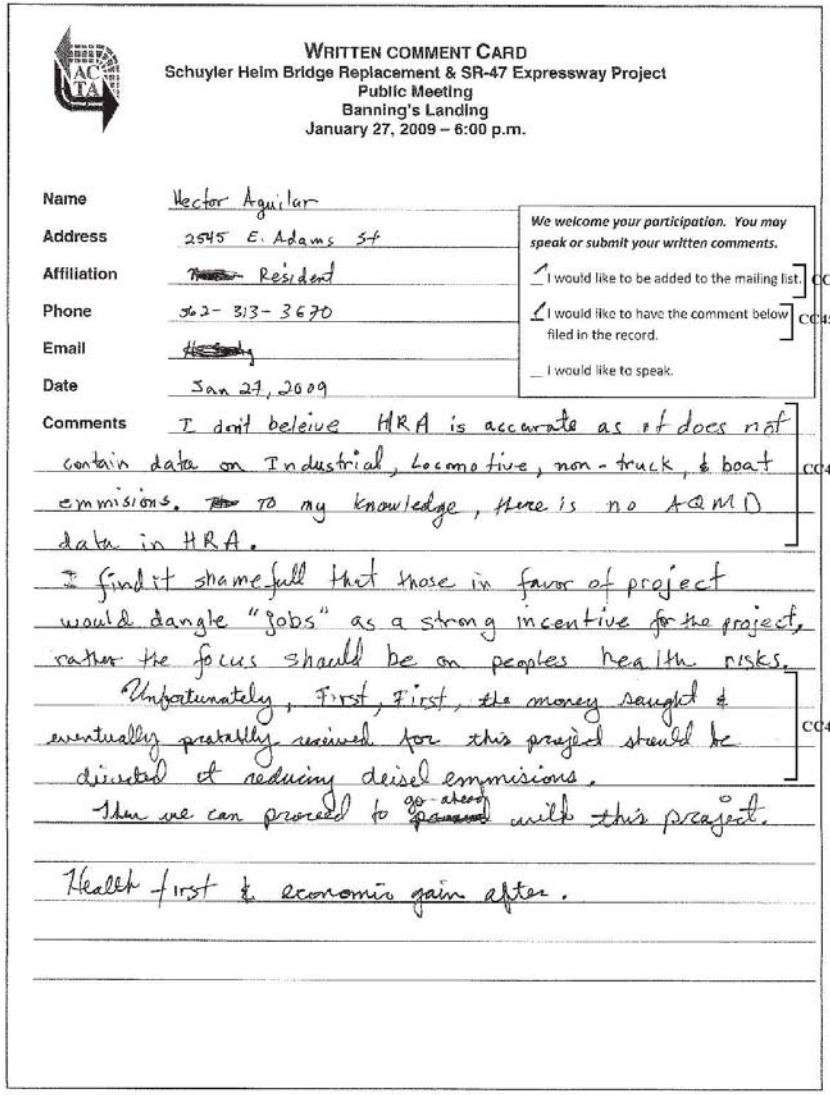
Please note this record of your comments.

Response to Comment CC45-3

The purpose of the HRA is to evaluate the incremental health risk changes due to the project operation. The HRA was conducted following OEHHA Guidance, which is recognized by CARB and SCAQMD, and has taken into account different vehicle types and different fuel types within the project area. Any increase from marine vessel emissions would mostly occur at the outer harbor area where the ships would be rerouted, which would be further away from the harbor and any sensitive and residential receptors. The emissions would also be offset at some level by eliminating the vehicle idling emissions at the bridge by building the fixed-span bridge. Implementation of the project would not cause any changes in rail operation. Therefore, locomotive and marine vessel emissions were not included in the HRA analysis.

Response to Comment CC45-4

For a discussion on efforts to reduce diesel emissions in the Port area, please see Response to Comments TR2-18 and TR2-31.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Hector Aguilar
Address: 2545 E. Adams St
Affiliation: [redacted] Resident
Phone: 562- 313- 3670
Email: [redacted]
Date: Jan 27, 2009

We welcome your participation. You may speak or submit your written comments.

- ✓ I would like to be added to the mailing list. CC45-1
- ✓ I would like to have the comment below filed in the record. CC45-2
- __ I would like to speak.

Comments: I dont beleive HRA is accurate as it does not contain data on Industrial, Locomotive, non-truck, & boat emmisions. To my knowledge, there is no AQMD data in HRA. CC45-3

I find it shamefull that those in favor of project would dangle "jobs" as a strong incentive for the project, rather the focus should be on peoples health risks. Unfortunately, First, First, the money sought & eventually probably received for this project should be directed at reducing deisel emmisions. CC45-4

Then we can proceed to go-ahead with this project.

Health first & economic gain after.

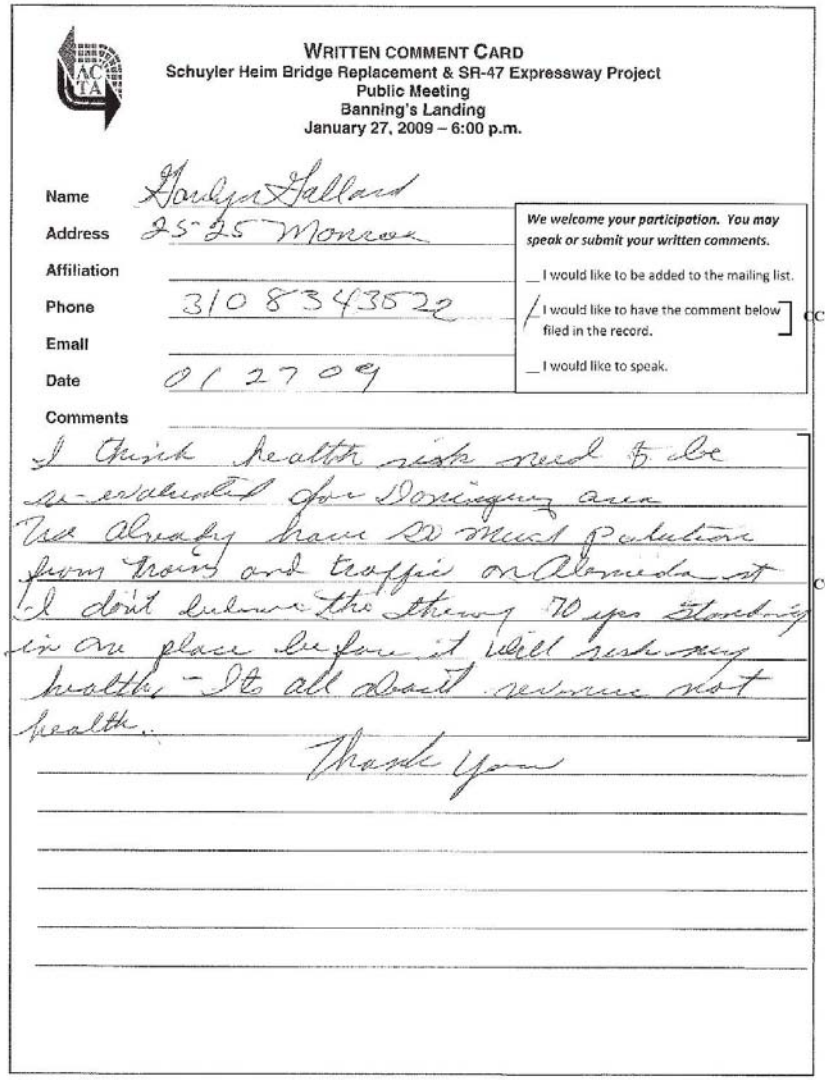
Comment Card 46

Response to Comment CC46-1

Please note this record of your comments.

Response to Comment CC46-2

Please see Response to Comment TR2-20.



WRITTEN COMMENT CARD
Schuyler Heim Bridge Replacement & SR-47 Expressway Project
Public Meeting
Banning's Landing
January 27, 2009 – 6:00 p.m.

Name: Jaclyn Holland
Address: 25-25 Monroe
Affiliation:
Phone: 3108343522
Email:
Date: 01 27 09

We welcome your participation. You may speak or submit your written comments.

__ I would like to be added to the mailing list.
/ I would like to have the comment below filed in the record. CC46-1
__ I would like to speak.

Comments:

I think health risk need to be re-evaluated for Norwalk area. We already have so much pollution from trains and traffic on Alameda st. I don't believe the strong 70 ft Sound wall in one place before it will help my health - Its all about revenue not health.

Thank You CC46-2

PP1

The following slides were included as a part of a commenter's presentation during the public meeting on January 27, 2009. Please see TR2-9 to TR2-14 for comments and responses relating to the slides.

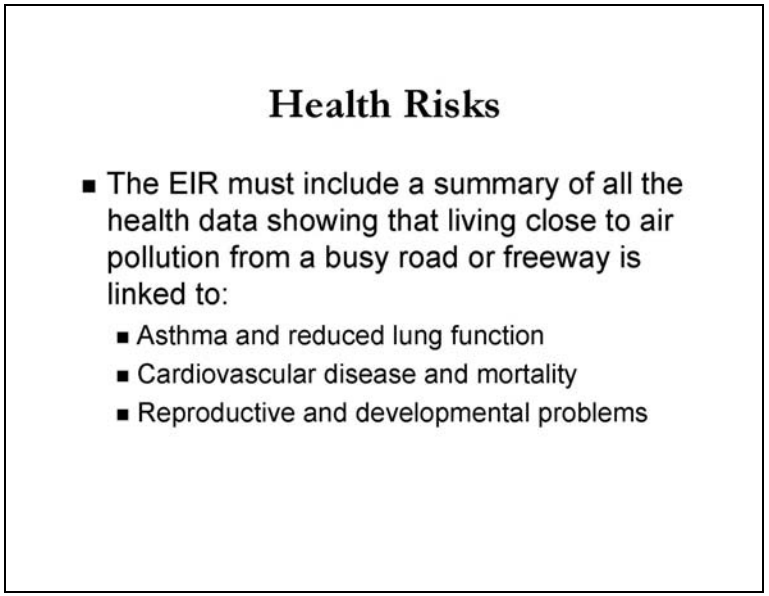
SR-47 Expressway
Recirculated DEIR & HRA:

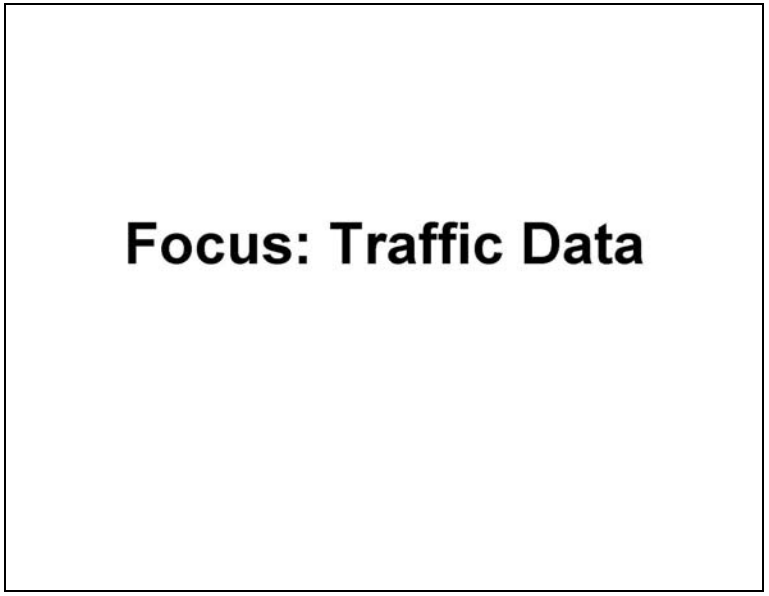
Concerns about Faulty Assumptions,
Faulty Traffic Estimates,
the Health Risk Assessment Relying on
those Faulty Estimates,
& Failure to Consider the Latest
Scientific Research Findings

Presentation by

Andrea Hricko, Director
Community Outreach and Education Program
Southern CA Environmental Health Sciences Center
Keck School of Medicine
USC
January 27, 2009

PP1
Page 2


Health Risks
The EIR must include a summary of all the health data showing that living close to air pollution from a busy road or freeway is linked to:
Asthma and reduced lung function
Cardiovascular disease and mortality
Reproductive and developmental problems


Focus: Traffic Data

PP1
Page 3

Why do the traffic data matter so much?

- The public needs to have confidence that a new freeway infrastructure project uses accurate traffic data because all of the Health Risk and Mobile Source Air Toxics Assessments rely on them.
- When the traffic data are wrong, then all of the analyses are wrong, and the public has no way to know whether or not the project will cause an increased risk to public health.

HRA Accuracy

- "The level of travel activity is typically the most important variable in completing air quality related project assessments."*

- Quotation from UC Davis analysis of HRA for Caltrans, commenting on the need for better traffic data, in the Recirculated DEIR

PP1
Page 4

What ACTA and Caltrans Have Repeatedly Stated

- The SR-47 Expressway will "divert truck traffic from local arterial streets…."
- It will "reduce truck traffic on surface streets."

Widely-held public assumptions based on what ACTA and Caltrans say in their press releases and statements

#1: There will be fewer trucks on local surface streets

#2: There will be fewer trucks going past Hudson School than today

- *" Wouldn't it be a good thing for health to have fewer trucks going past Hudson School?"*

PP1
Page 5

The reality

- There will MORE traffic after the Expressway is built – everywhere.
  - In 2030, after the Expressway is built, there will be twice as much truck traffic going past Hudson School as today
    - 2003: 5500 trucks/day
    - 2030: AFTER the SR-47 Expressway is built, 9800 trucks/day

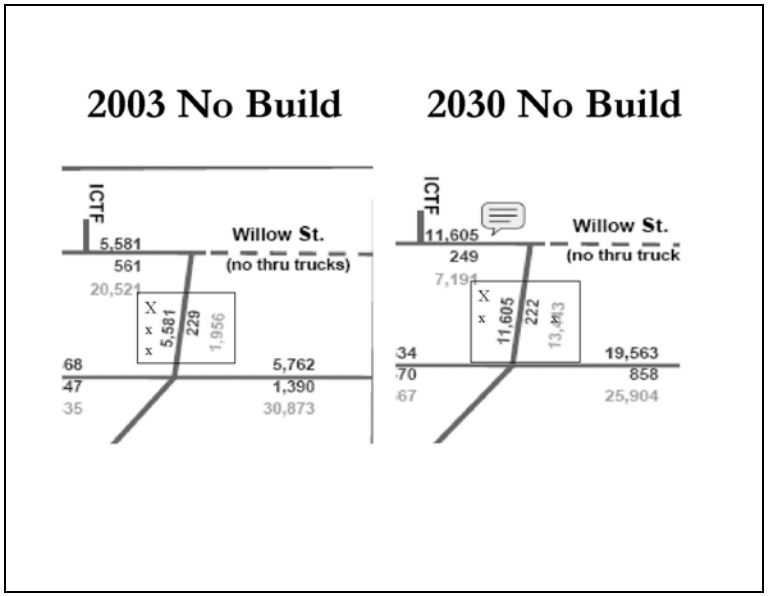
Explanation?

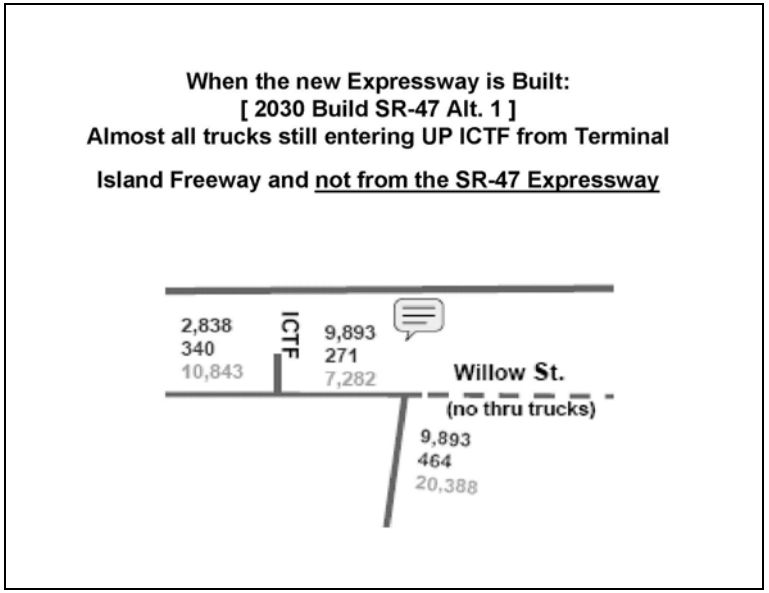
"We never said that there would be fewer trucks than today…"

The Union Pacific Railyard (ICTF)

- Right now the UP ICTF is FULL
  - It cannot handle any more trucks unless it expands.
- Yet the HRA traffic maps show that in 2030 there would 2x as many trucks on the 103 Freeway as now
  - on their way to a FULL rail yard that can't handle them!

PP1
Page 6


2003 No Build
2030 No Build
ICTF
5,581
561
20,521
Willow St.
(no thru trucks)
X
x
x
5,581
229
1,956
68
47
35
5,762
1,390
30,873
ICTF
11,605
249
7,194
Willow St.
(no thru truck
X
x
x
11,605
222
13,443
34
70
67
19,563
858
25,904


When the new Expressway is Built:
[2030 Build SR-47 Alt. 1]
Almost all trucks still entering UP ICTF from Terminal
Island Freeway and not from the SR-47 Expressway
2,838
340
10,843
ICTF
9,893
271
7,282
Willow St.
(no thru trucks)
9,893
464
20,388

PP1
Page 7

Traffic engineers' explanation?

- "… the expected increased traffic from the Ports will follow current traffic patterns through the port area."
  - Port trucks will take their old routes after the new Expressway is built
    - a completely erroneous assumption

In reality….

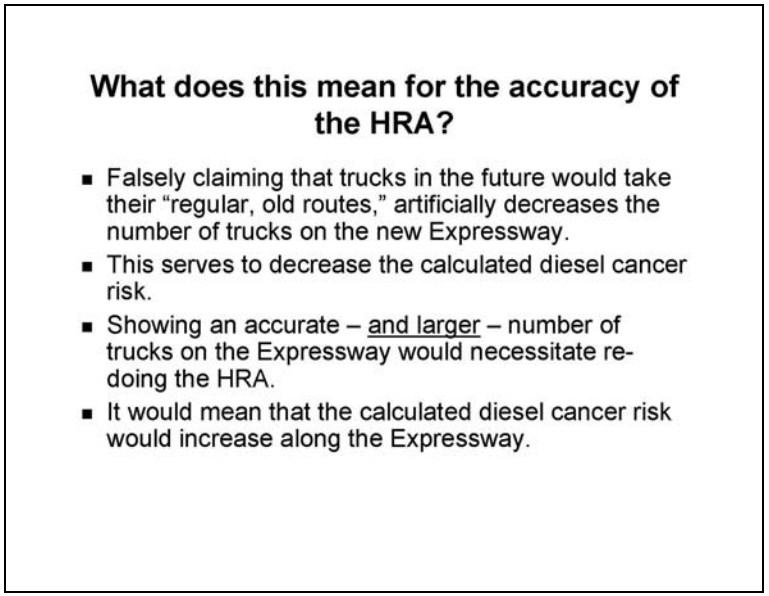
- If UP is expanded, the railyard claims it will use the SR-47 and Alameda Street
- That would 11,000 more trucks on Alameda Street

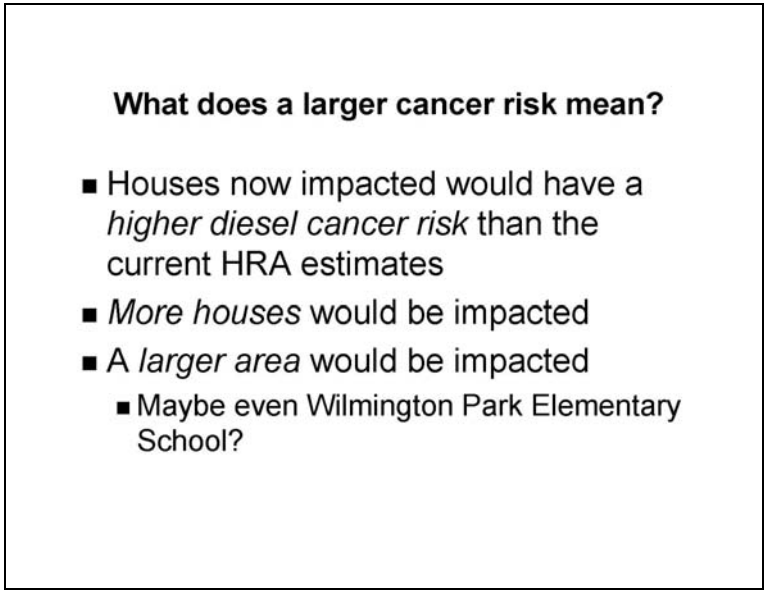
These trucks are on the maps in the HRA

BUT traffic engineers chose to put them all onto the SR-103, past Hudson Schools ….

So they are not counted as being on the new Truck Expressway!

PP1
Page 8


What does this mean for the accuracy of the HRA?
Falsely claiming that trucks in the future would take their "regular, old routes," artificially decreases the number of trucks on the new Expressway.
This serves to decrease the calculated diesel cancer risk.
Showing an accurate – and larger – number of trucks on the Expressway would necessitate re-doing the HRA.
It would mean that the calculated diesel cancer risk would increase along the Expressway.


What does a larger cancer risk mean?
Houses now impacted would have a higher diesel cancer risk than the current HRA estimates
More houses would be impacted
A larger area would be impacted
Maybe even Wilmington Park Elementary School?

PP1
Page 9

How would trucks get to the SCIG?

SR-103 SAY ACTA AND CALTRANS ENGINEERS in letter to Andrea Hricko

- "Regarding SCIG, the most direct route will be SR 103, even if the SR- 47 project is built."
- "The traffic analysis does not account for SCIG, but if it did, the trips on the SR-103 would increase by 6,000 and the increase on the Expressway would be nominal."

SR-47 SAY ACTA AND THE L.A. CITY COUNCIL

City Council Resolution 07-1005:

ACTA adopted an Expanded Mission … WHEREAS, one of the projects that ACTA has identified is improving State Route 47 (SR-47), which includes a 2.2 mile expressway…that will connect the port complex on Terminal Island to Alameda Street **in order to access near-dock rail facilities**, local warehouses and other transportation corridors; …

In other words….

- The City Council: a major purpose of the Expressway is to carry trucks to the near-dock railyard**s.**
- If these trucks also traveled on the SR-47 to the SCIG, there would be 11,000 MORE trucks on SR-47 than shown on maps
  - plus a total of 11,000 more if UP ICTF were expanded! = 22,000 more trucks than shown

PP1
Page 10

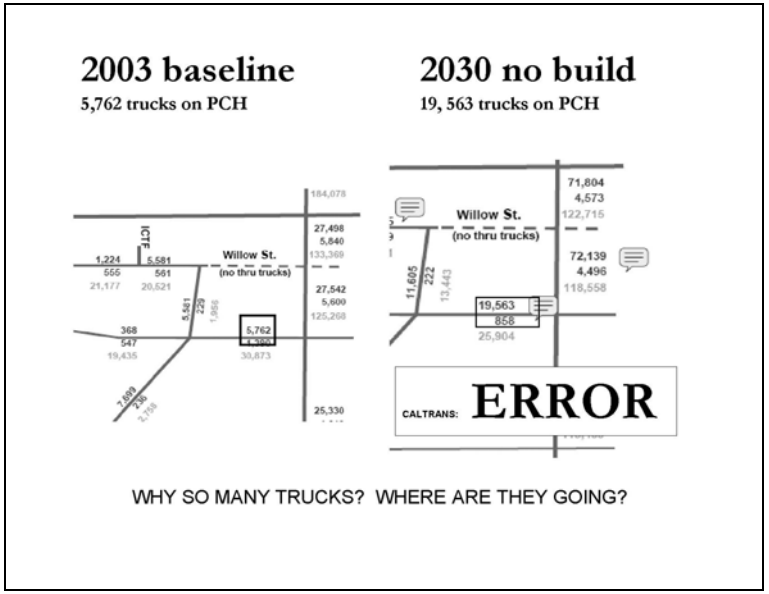
Trucks not counted as traveling on SR-47 Expressway

- 11,000 – UP ICTF
- 11,000 -- proposed BNSF SCIG
- = 22,000 more trucks a year than calculated

- The 10/million risk is based on 28,000 trucks a day on the SR-47 near PCH in Wilmington
- What would it be if there were actually **51,382 trucks a day?**

Major Errors?

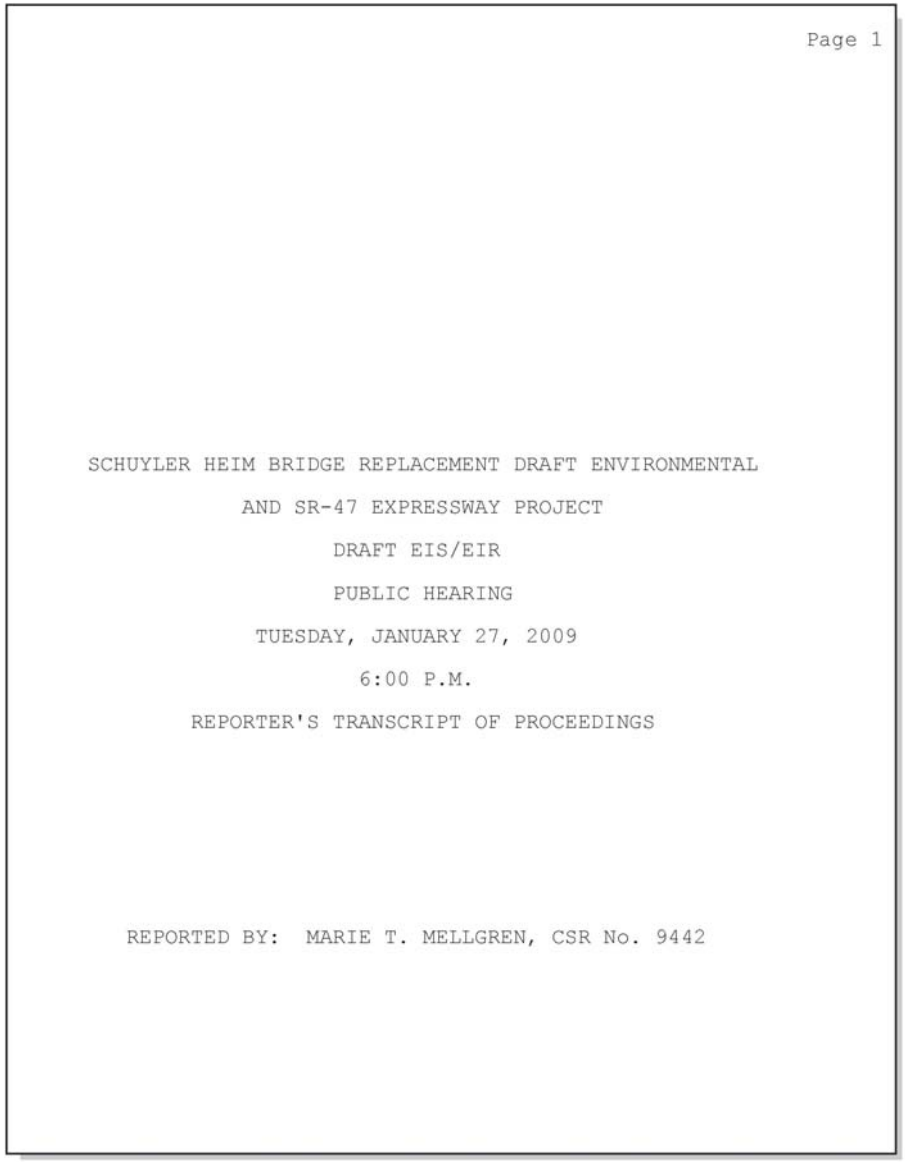
PP1
Page 11



Conclusion about Traffic Data and a Request

- There can be no confidence in the current HRA or MSAT analyses because the traffic data upon which they are based contains incorrect assumptions and multiple errors.
- The traffic data must be redone and peer-reviewed by another independent firm, with the public able to see the errors and final results shown to the public.
- After the traffic data are redone, the HRA and MSAT analyses must be redone using the peer-reviewed/corrected data.

Transcripts of Schuyler Heim Bridge Replacement and SR-47 Replacement Project Public Hearing Proceedings January 27, 2009 TR2



Page 1

SCHUYLER HEIM BRIDGE REPLACEMENT DRAFT ENVIRONMENTAL

AND SR-47 EXPRESSWAY PROJECT

DRAFT EIS/EIR

PUBLIC HEARING

TUESDAY, JANUARY 27, 2009

6:00 P.M.

REPORTER'S TRANSCRIPT OF PROCEEDINGS

REPORTED BY: MARIE T. MELLGREN, CSR No. 9442

TR2 Page 2

JANUARY 27, 2009, WILMINGTON, CALIFORNIA

6:49 P.M.

MS. HAHN: I'm Councilwoman Janice Hahn. And aside from being a councilwoman representing Wilmington, I also serve as chair of the Alameda Corridor Transportation Authority or vice-chair, depending on the year.

And it was the Board of the Alameda Corridor Transportation Authority that heard the public loud and clear about this project. And we heard that you didn't feel that you had enough information about this project.

We also asked for a health risk assessment of this project. We wanted to know what impact this project would have on people's health, their homes, their lives. So that is going to be part of this assessment. But we hope tonight that many of your questions, your concerns, your fears, everything -- we want you to ask and we hope that your questions will be answered.

But before we go any further, the City of Wilmington suffered a great tragedy early this morning. And I just came from another community meeting. And I was informed that early this morning a man killed his

wife, killed his five children, ranging in ages from two to eight, and then he killed himself. And it was such a tragedy for a small community in Wilmington. I thought it would be appropriate right now if we just all took a moment of silence to remember this family and the tragedy that unfolded early this morning.

(A brief moment of silence.)

MS. HAHN: Thank you.

I know we're talking about the SR-47 project tonight, but I want you to know, anybody in this room, if you have issues, if you have problems, if you have issues at your job, if you have -- are you worried about your home going into foreclosure, whatever it is, please know that there is help available for you, there are resources where we can help you through rough times. And I think this whole country is going to have rough times. And Wilmington is not going to be spared from rough times.

So please call my office. We're able to give you numbers that can help you with a number of issues. Please don't ever think that you are alone or that anything is too big or too insurmountable that you would ever consider taking your own lives or a member of your family. We want to all be a community. We want to take care of each other. We want to pay

TR2 Page 3

attention to each other. We want to make sure that this tragedy never happens again. It's so sad. I can barely comprehend what happened today.

So back to this tonight. There's many of us that believe this is a positive project. It has positive benefits for the community. But there certainly are impacts that we want you to be aware of. And we want this tonight to be a workshop format, that everyone here that can answer your question, please this is -- the reason we held this meeting tonight was because we did not feel like you had enough information. We've tried to get the public comment period of time extended so that you have opportunity to weigh in on this project.

So, please, this meeting is for you to understand what this project is and understand the alternatives that can or cannot happen. And more importantly, have all your questions answered. So I hope this is informational. It's valuable. And I hope that the concerns that are brought up, we will find a way to answer those, to mitigate those so that this project really is a benefit to this community and not a burden to this community.

So with that -- what's happening?

MR. HERNANDEZ: Good evening.

On behalf of ACTA, I want to welcome you to the public meeting on the project's health risk assessment.

My name is Manny Hernandez and I'm one of ACTA's community coordinators. I hope that you found the workshop portion of this meeting helpful. We will have three presenters who will speak to you about the project in general, the health risk assessment, and the traffic analysis.

Following the presentations, we will open the floor for comments. Those who wish to speak will have three minutes to make their comments. Please respect the time limit so all who wish to speak can do so. The comments will be recorded and made part of the written record of this meeting and responses to those comments will be included in the final EIR/EIS documents for the project.

Caltrans, the lead agency for the project, will consider these comments before reaching its decision regarding certification of the environmental documents.

Note that any comments that were previously submitted following the September 2007 public meeting will also be responded to in the final EIR/EIS documents. Tonight's meeting focuses on the additional

TR2 Page 4

information that were submitted for review on November 20th, 2008, which included the health risk assessment that was performed at the request of the ACTA Board, the ACTA Board in response to comments made of the September public meeting.

Please fill out the speaker cards in advance and give them to Maria or Liz. They're over there. Please raise your hands.

If you do not wish to speak but want to submit comments tonight, please fill in your comments on the cards. Both the speakers' oral comments and those comments on the cards will be made part of the record with responses included in the final EIR/EIS.

You will also have the opportunity to file written comments with Caltrans by Friday of this week, January 30th, 2009, by e-mail, fax or letter. Those who require more time may request Caltrans in writing before Friday to grant them additional time.

These requests will be considered by Caltrans on a case-by-case basis. We encourage all of you to get your comments in by the deadline so they can be addressed. These instructions will be repeated at the end of this meeting.

We will begin with a seven-minute long video describing the project followed by three speakers.

Please hold all your comments until after the speakers finish. Those who have submitted speaker cards will be called in the order they were received. Three names will be called at a time to help speed the process.

And with that, I would like to introduce the SR-47 video to provide you with an overview of the entire project.

(A seven-minute video was played.)

MR. HERNANDEZ: I would now like to introduce Art Goodwin, the director of planning for the Alameda Corridor who will provide an overview of the project.

Mr. Goodwin.

MR. GOODWIN: Thank you very much.

I'm just going to provide a very brief overview of the project and some of the milestones and dates that we've been working on.

The first thing I'll provide is the project alternatives. Something that you may remember we had in the drafting of the EIR/EIS here in this room September 27, 2007. So that's a year-and-a-half ago now.

There were six alternatives. The two alternatives that received the most attention and provide the most -- address most of the goals of the project are really two.

TR2 Page 5

Before we talk about those two, the area in blue that you can see here down on the Cerritos Channel, in this area, this is Cerritos Channel and, of course, Terminal Island. The area involves replacement of the Commodore Heim Bridge. You may know it's a fixed bridge. Two lift bridge will replace or reinforce the top of the fixed bridge as part of the seismic retrofit plan that the State of California has had in operation for a number of years.

Alternative one is in red and that is the line that comes from just south of where Cerritos -- excuse me -- Dominguez Channel comes into the Port of Los Angeles area, which proceeds along Henry Ford Avenue, curves and comes up at a downward grade from an elevated structure at Pacific Coast Highway. That was the only preferred alternative as a result of the environmental impact studies, EIS, a year-and-a-half ago.

The second alternative, instead of going out this way, this will remain as it is. You will come and make a new connection on the existing 103 Freeway. You would go up under -- or over, excuse me, Anaheim Street up to Pacific Coast Highway, which is right here. And about halfway between Pacific Coast Highway and Willow Street, Sepulveda Boulevard, you would rise up on an

elevated structure over the new Union Pacific Railroad tracks, crossing northeasterly -- going in a westerly direction, excuse me, and you'd come back on Alameda Street just south of the 405 Freeway.

Those are the two alternatives that have the most analysis performed on.

Project benefits: Replace the Heim moveable bridge with an earthquake-safe fixed bridge; provide an elevated expressway to Alameda Street at Pacific Coast Highway. Two traffic studies reduced freeway truck congestion by nearly ten percent, both on the 710 and on the 110 Freeways.

Reduce future truck congestion on certain local streets. Studies have been shown that truckers, if you can get them on a more direct route to where they want to go versus using some local streets and secondary highways, particularly in the west Long Beach areas, they tend to go to where the capacity is. And that would be on the new SR-47 Expressway.

Provide alternative route to local warehouse and existing rail yards. If you're familiar with the area north of Wilmington on Alameda Street into the City of Carson, there's something like 25 to 30 million square feet of warehouse distribution centers in and around the City of Carson.

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The number of trucks that currently use the 710 Freeway will go up and cross over on Willow Street and the 405 and they'll go then north on Alameda Street to get into that region. So if they're coming from Terminal Island, particularly this would be a much more direct route than trying to go over the bridge, up the 710 and so forth.

Reduce delays and emissions at five railroad crossings and three signalized traffic intersections along Henry Ford Avenue. Based on the objective car watchings and the traffic subsequent to that, those five signalized intersections would be right underneath by where Henry Ford Avenue merges onto the ramps at SR-47. It would be Anaheim Street and it would be up by where Henry Ford goes in Alameda Street.

So there's three signalized intersections here. If you're on the top of the structure, you would go through all of those without stop signs. And it still would be all local access on the local streets below.

It's been estimated that we will generate about 11,000 construction jobs and create about $47 million in taxes.

A brief history of the project: The project really started back in 1981. When I say "the project,"

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it was SCIG that recommended the studies that created the basis of the Alameda Corridor to improve highway and railway to the Ports of Los Angeles and Long Beach. Those studies came out in 1981.

From 1982 to 1995, various agencies went out to seek the funds to build this lower portion of the Alameda Corridor, if you will. Two various federal and local funds, they were secured to construct the passageway and improvements along the route south of the 91 Freeway.

And by the way, Alameda, Henry Ford is actually designated State Route 47 based on this early SCIG work in 1981/1982 time frame.

From 1985 to 2004, agencies including the City of Carson, Los Angeles County, City of Los Angeles and ACTA completed projects to widen Alameda Street essentially to six lanes. And they also built six highway rail grade separations essentially from Anaheim Street north all the way to the 91 Freeway along Alameda Street.

In 2001, ACTA and Caltrans began a partnership to study the feasibility and prepared environmental documents for the SR-47 to complete the highway portion of the overall project and concept that SCIG put forth over 30 years ago now.

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What is the schedule for the EIR/EIS? This will show you what can be placed for this evening. The first is the notice of preparation of EIR/EIS, which was published in July 26, 2004 in the federal register. There was a public meeting held on September 9th, 2004. One in the morning and one in the evening. The draft EIR/EIS was circulated August 17th, 2007. I mentioned we had a public hearing right here in this room on September 25th, 2007. Again, in the afternoon and one in the evening.

Right after that meeting, as Chairman Hahn mentioned, the ACTA governing board requested that an HRA be prepared for the project based on the concerns that the other governing board had from the comments that everyone here put forth.

So with that started in earnest in the middle of November 2007, we recirculated the supplemental information. We generated in that subsequent period of time, including the HRA. That was started officially on November 20th, 2008.

And here we are today, on January 27th, 2009 to provide you additional information and discuss the findings of the supplemental information and the HRA.

What's the next step after tonight? As we mentioned, Caltrans is the lead agency on the EIR/EIS.

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They will receive the comments that have already been taken in this supplemental period. They will incorporate those responses and comments, including everything that's said today either by transcription, by written or fax or e-mails to Caltrans, that information is provided to you in the back table if you don't know who to contact or how to contact them.

So once they get this information, they'll start working and incorporating the responses and comments. And by February -- I think we should point out these are tentative dates -- February 20, 2009, they'll incorporate this EIR/EIS. Caltrans will make a decision then regarding the certification. The EIR would be anticipated in late February/March time frame of 2009.

After that, Caltrans forwards the EIS to FHWA. And it's the Federal Highway Administration. And it's the federal determination on the ROD, record on decision, that would start in the March 2009 time frame.

There's a public comment period again on the final EIS. And that would be in the March/April 2009 time frame. And then the FHWA decision regarding the ROD we anticipate that would happen in the April/May 2009 time frame. I want to point out these are just

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our tentative dates. Caltrans is the responsible agency for doing those things.

With that, I'd like to introduce Dr. Peggy Lobnitz who will be discussing the HRA itself.

MR. HERNANDEZ: Before Dr. Lobnitz comes up, I'd like to apologize for the lighting. There's been problems today in the building about the electrical power. And unfortunately, we can't turn the lights down because if we do, we may not have any more lights tonight. So I apologize sincerely about the lighting, but that was beyond our ability to control right now.

Thank you.

DR. LOBNITZ: So as Art said, I'm Peggy Lobnitz and I'm here to discuss the health risk assessment that we performed for the project.

And basically, I'd like to go over why we did the health risk assessment with respect to what kind of methods we used to analyze the risks, what we found out, what it means in terms of, you know, your propensity to get cancer, and then what we're going to do about it. That's what I'm going to cover.

Basically, the sources of the project risks are cars and trucks that would be traveling over the bridge and along the expressway. And if you look at

all the pollutants that are generated from both cars and trucks, it's the exhaust is basically the thing that causes cancer. But, remember, this is a bridge and expressway. There will be cars and trucks in this project whether or not this is built. The only thing that will really change when this project is built is where that traffic goes.

And the other thing you should recognize is between now and 2015, overall emissions in the project study area will decrease. Let me show you what I mean.

Thanks to the good work of the EPA, California Resources Board, there's been several regulations that have been passed over the last few years that will significantly reduce pollution.

If you look at the year 2003, the daily amount of diesel exhaust that went into the community was about 900 pounds per day. By 2015, when the project has started, it will be reduced to 577 pounds. And by 2030, down to 455 pounds.

So that's one good thing we can say is that pollution levels are going to go down. And if you want to look at it on a percentage basis, the diesel exhaust is recommended in that last column at PM 2.5. So in three years, we're expecting 26 percent reduction. By 2015, 36 percent. By 2030, 50 percent.

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UNKNOWN SPEAKER: Can you define the study area?

DR. LOBNITZ: The study area is between Terminal Island, the 91 Freeway, the 110, and the 710. But there still will be truck exhaust in the study area. And that's why we're here tonight.

Just to let you know, Caltrans and Federal Highway Administration really --

UNKNOWN SPEAKER: They're wrong.

DR. LOBNITZ: -- but Alameda Corridor instructed their staff to conduct one. And there were a couple of reasons for that.

Number one, they really wanted to understand the risk of the community. And, number two, if there really were problems, they wanted to make sure they took care of them. So that's why they brought me in to do the study.

So this is kind of new ground for health risk assessment. Normally when we do health risk assessments, it's on a big refinery or a chemical plant and the source of pollution is in one place. But with a transportation project, cars are moving around all the time. So it's a little bit harder to quantify.

But what we did is we consulted with the South Coast Air Quality Management District, California

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Resources Board and made sure that we adopted all the major protocols for truck emissions and estimated health risk and incorporated that into our analysis.

So we basically looked at four exposure assumptions, so four different populations that we're really worried about.

Number one is residential exposure. I know a lot of you are probably residents. So what we assumed for this group is that you stay in your house for 70 full years and actually you didn't leave, you were there 24 hours a day, and you may have taken a two-week vacation, but you basically stayed on that piece of property for 70 years. So we tried to make it as conservative as possible.

The second group we went to was people that go to the parks. We assumed that a person went to a park every single day for two hours, except when they went on vacation.

And then for school workers and people who worked in parks, we assumed they spent their entire career in one place for 40 years, they worked eight hours a day and they were there 245 days a year.

For students, we assumed they went to one school from K through 12. They never moved schools. They were there for six hours and they were there

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during the entire school year.

So every assumption we used, we tried to keep conservative so it really would be the worse case or what people would think the worse situation.

So what we did is according to a really good data on port trucks, that's the latest information about the ages of the trucks, what kinds of trucks they were, a lot of regional planning study that are prepared by local government agencies, we used those to estimate for non-port trucks and cars, then we laid the whole project area on a grid.

We wanted to be able to show up at a hearing like this and tell you, based on your neighborhood, what would happen. So then we calculated all the emissions. Then we used a very sophisticated model that calculated what the concentrations of the diesel we thought would be all over the entire area. And then we plotted it on maps, then we overlaid it with land use to figure out what kinds of land use matched up to what kind of risks.

So hopefully you'll find that much more meaningful than just looking at a table with numbers.

We looked at two scenarios. Both of them, like we talked about, for residential exposure living with the 70 years of exposure. But one of them assumed

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that we have no new regulation after 2020 and that the port growth will continue to grow to 44 million TEUs by 2030.

The other assumption in the scenario used was everything is stationary by 2030. No other regulation after 2030, even though we know we're going to have them. No growth because we're assuming that as regulations get more stringent, it will balance off the growth. We really believe that the 2015 scenario is really the one that's most representative of conditions over the entire project life.

So the results -- I'm going to show you in a minute -- but basically we're showing quite a bit of regional benefit in the entire project area. There are some localized impacts, but we think they can be mitigated.

And there's a real difference -- I'm going to show in a second -- between alternative one, bridge replacement and SR-47; alternative two, which goes through the SR-103.

Alt one, there's no problems with students going to the park or workers. But we do show some residences, about eight, that are over the significant threshold, which is ten in a million.

In alt two, where it goes out to the 103,

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there's still no problems with students and recreational workers, but there are problems with park recreation, student workers and about a hundred fifty residences.

So let's look at the picture. The green area of this map show project improvements. So you can see that for the majority of the project area, we moved the trucks off of all of the surface streets. This is the green area. When you move them off the 110 and put them on the dedicated expressway, there's over 40,000 residents that all of sudden have better air quality directly as a result of redistributing the trucks, getting them off the major side streets.

And you know what that's like. There's a safety issue associated with that as well.

Now, the great thing about Alameda is that it's mostly commercial/industrial. And what we're showing you here is residential 70-year exposure. So there's really not a lot of houses -- well, there's no houses here, frankly.

There's a group of houses here that are uncertain what the exposure would be. But let's look at the other alternative. You go up the 103 and you'll see that the risk here is a lot fatter, a much bigger area. And land use is worse. You've got a lot of

pools. You've got residences.

So in this scenario, you know, you have about a hundred and fifty residences. So we prefer alternative one for many reasons, but for health risk purposes, this is also superior.

So what does ten in a million mean? I mean, how do figure out what that is.

Right now in this community, the cancer risk is 250,000 in a million. That means one in four people will get cancer. That's really really high. From air toxins only. So if you take out all the other kinds of cancer, it's 1300 to 1800 per million. And because cancer risks are so severe, not only here but in the entire south coast area, the agencies have adopted a threshold of significance that basically says if you do anything greater than ten, you've got to mitigate it.

So that's the criteria we used. If it's less than ten, it's okay. If it's greater than ten, we just got to do something about it. So we looked at the houses in question. And we think we've come up with a very feasible method.

There's some really good high-efficiency filters that can be used to filter the air in your house. And not only would it take care of the ten in a million, but it will probably bring you way down in

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terms of your 1800 to 1300 overall cancer risk. And that makes it very favorable. And we have done this on other projects and it has been successful. And we plan to have it all installed and ready to go before we ever start to operate the expressway.

MR. HAMRICK: Good evening.

I'd like to briefly discuss the traffic study that was done with the same agency with the health risk assessment. They actually provided the traffic numbers that resulted in the air quality analysis.

The traffic study contains and was based on what we call the high growth estimated growth up to 44 million TEUs per year. This is an estimate that's generated by the port in its own internal plant. And it's also been used for -- if you looked at other documents, other projects that have occurred over the past few years by the ports, the same numbers were used by this project.

Traffic volumes conservatively ranked ICTF based on port projected near-dock trips as opposed to a facility to capacity constraint. Those are a lot of words. What it really means is some of the growth of the ports will result in more near-dock truck ships, truck movements to and from the ports. We did assume that in the analysis. And again, that's an assumption

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directly from the port's own documents and their own forecasts.

What this did by assuming the high-growth forecast and some increase in trucks to and from ICTF, we made sure that we did not underestimate localized traffic and back and localized health risks. We wanted to be very conservative.

The other alternative would be to assume that those trucks go up to, for example, the Inland Empire and they don't return here. So we wanted to make sure that we didn't assume them away.

The model that we used, the traffic model, used both local and regional, we call to-scale traffic forecast. What that means is we assumed and included all growth that's going to occur up to the year 2030 based on the regional agencies' projection of growth in San Pedro and Wilmington and throughout all of Southern California, and we included that as the background condition.

We also accounted for all truck-restricted routes. We made sure that the traffic analysis didn't allow trucks to go on routes that are currently, by ordinance, not allowed. For example, Wilmington, portions of Santa Fe, Avalon, et cetera.

The model includes all freeways and major and

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secondary streets in the area. And the traffic model chooses routes based on roadway capacities and local and regional origins and destinations. In other words, it's a realistic model of how truckers move.

Next slide.

MS. HRICKO: Can you go back and explain number two in a little more detail because it isn't what worked then? And someone asked what that meant, asked whether it meant trucks are going to the ICTF if they can't go in there.

MR. HAMRICK: It does assume that there would be an expansion in what we call near-dock or off-dock interval movements. That's taking the container from the port that is going to get onto your train. For example, be destined to some area outside of California, whether it be Dallas or the mid west or whatever.

So this assumes that there will be a number of containers going from the port terminals to an off-dock rail yard. ICTF is the one that's here. We know about that. It also assumes that there will be an expansion of some type of off-dock facility, whether an ICTF or a different one. That wasn't specific, but the port's own forecast do assume that with the 44 million TEUs, there will also be an increase in the near-dock,

off-dock being built and the containers that are stacked.

MS. HRICKO: I'm sorry. I --

MR. HERNANDEZ: Can we just hold the comments until the end, please, so we can get through the presentation? We're almost done.

MS. HRICKO: What we don't understand is why you would show those trucks going to the ICTF when they can't get in there as opposed to them going past Hudson School as opposed to taking your brand new expressway that Mr. Goodwin said would be the preferred route.

Why would they go up the Terminal Island Freeway rather than take your beautiful new expressway? Why would you not show that on --

MR. HAMRICK: If I understand your question correctly, the model actually has some of these increase in truck trips within the ICTF area on all facilities. So we didn't tell the traffic model to put them up to the 103 or the 47 or the 710 or the 110 or Alameda.

We let the model determine that, looked at that to see if it was reasonable. So when you actually look at the results, all of those routes are being used. Obviously, the new 47 would be a brand new four-lane facility so the truckers -- many truckers

TR2 Page 14

would like that facility from, you know, particularly from Terminal Island to get to, for example, the ICTF area or Carson distribution centers.

Some will still prefer to take the 710, depending on where they're coming from, but some will still prefer to use Alameda Street. So there is a balance of all of the routes being used.

MS. HRICKO: Thank you.

MR. HAMRICK: Thank you.

Next slide.

What this slide shows is basically you see some negatives there. These are changes on a daily basis, on a percentage basis if the project would be built. And then at the bottom you see a couple of changes. What this basically says is that by building this facility, there's going to be an enhancement of capacity in the area where the new facility is.

Some truckers -- again, some, not all -- will choose to shift their routes to use this. Some will remain in the 710. But these numbers show that, for example, about ten percent of the trucks that would have occurred by 2030 on Harbor Freeway and about ten percent of the trucks that would have used the 710 Freeway would have shifted over to the new truck route.

Henry Ford would get the biggest change

because this route is directly parallel. Why would they go through Henry Ford and have to go through railroad crossings and intersections when they can take an expressway facility?

Also, the 103 would be reduced. Again, there would still be trucks in the 103. And then there would be increases along the new route at the Heim Bridge and Alameda Street as a result of this new increase in capacity.

So that concludes my traffic presentation. And I'll turn it back over to Manny for the rest of the program.

MR. HERNANDEZ: Before I call the individuals who would like to comment in the order that it was received, let me once again reiterate, as I mentioned earlier, if you'd like to speak, please fill out the speaker card in advance and give them to Maria or Liz.

If you do not wish to speak but want to submit comments tonight, please fill in your comments on the cards. Both the speaker's oral comments and those comments listed on the cards will be made part of the record in the final EIR/EIS.

With that, I'd like to remind you that for -- so that everyone will have ample time to make their comments, there's a three-minute rule and the light is

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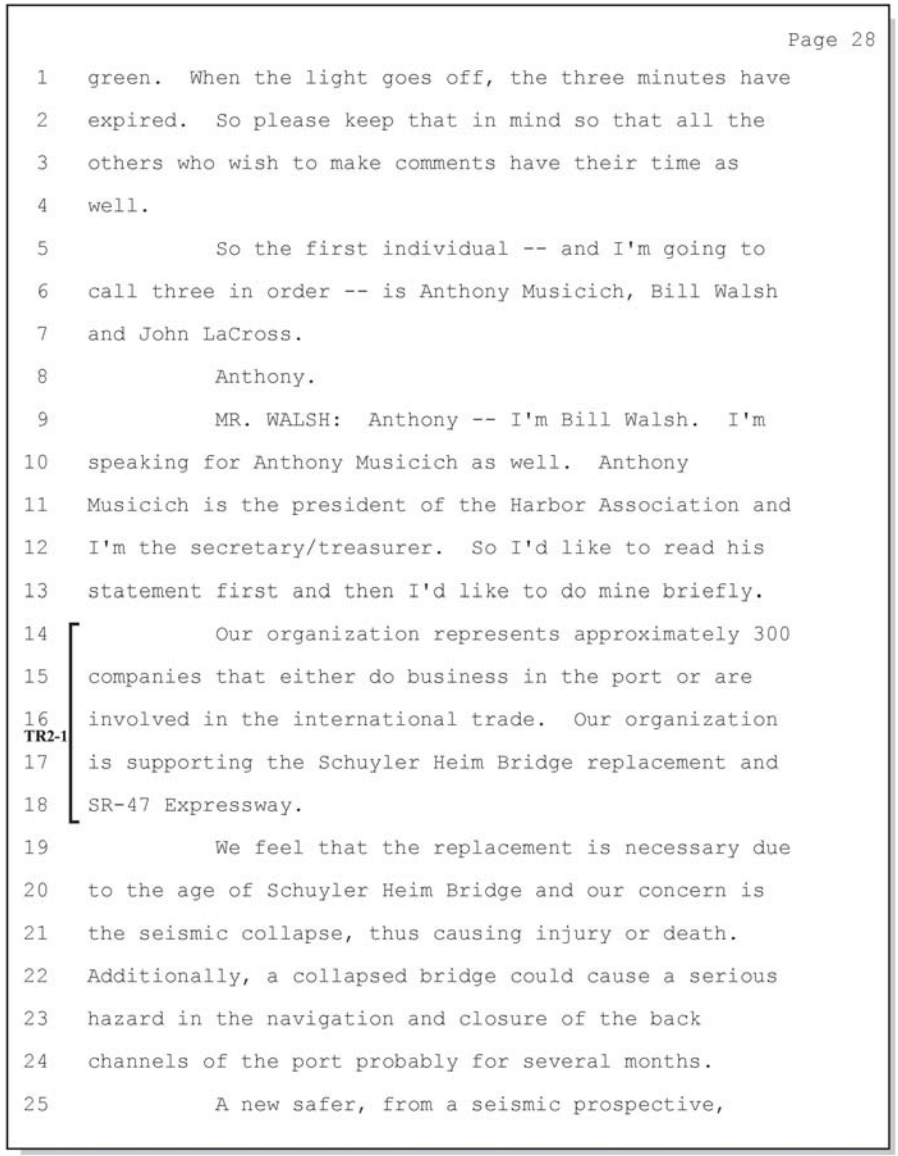
Response to Comment TR2-1

Your support of the proposed project is acknowledged.



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green. When the light goes off, the three minutes have expired. So please keep that in mind so that all the others who wish to make comments have their time as well.

So the first individual -- and I'm going to call three in order -- is Anthony Musicich, Bill Walsh and John LaCross.

Anthony.

MR. WALSH: Anthony -- I'm Bill Walsh. I'm speaking for Anthony Musicich as well. Anthony Musicich is the president of the Harbor Association and I'm the secretary/treasurer. So I'd like to read his statement first and then I'd like to do mine briefly.

TR2-1 Our organization represents approximately 300 companies that either do business in the port or are involved in the international trade. Our organization is supporting the Schuyler Heim Bridge replacement and SR-47 Expressway.

We feel that the replacement is necessary due to the age of Schuyler Heim Bridge and our concern is the seismic collapse, thus causing injury or death. Additionally, a collapsed bridge could cause a serious hazard in the navigation and closure of the back channels of the port probably for several months.

A new safer, from a seismic prospective,

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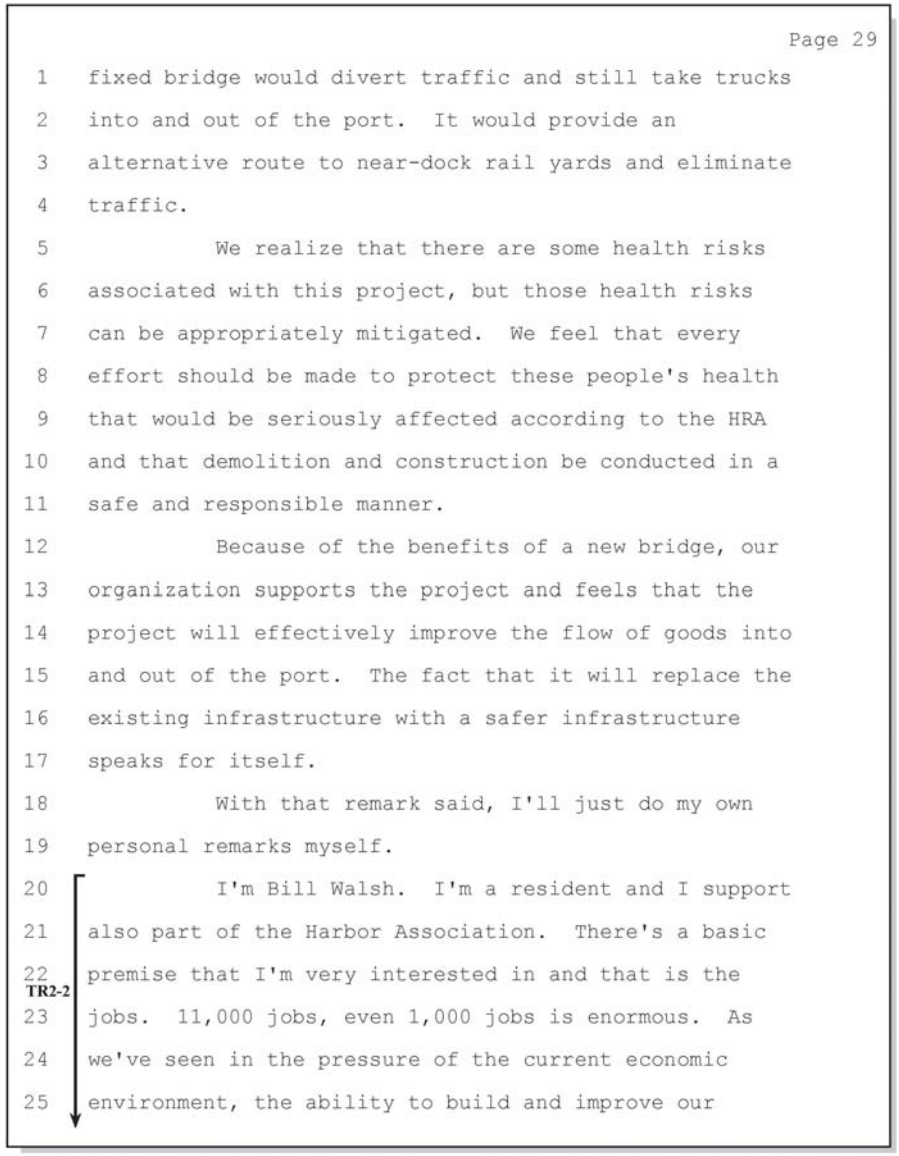
Response to Comment TR2-2

Your support of the proposed project is acknowledged.



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fixed bridge would divert traffic and still take trucks into and out of the port. It would provide an alternative route to near-dock rail yards and eliminate traffic.

We realize that there are some health risks associated with this project, but those health risks can be appropriately mitigated. We feel that every effort should be made to protect these people's health that would be seriously affected according to the HRA and that demolition and construction be conducted in a safe and responsible manner.

Because of the benefits of a new bridge, our organization supports the project and feels that the project will effectively improve the flow of goods into and out of the port. The fact that it will replace the existing infrastructure with a safer infrastructure speaks for itself.

With that remark said, I'll just do my own personal remarks myself.

I'm Bill Walsh. I'm a resident and I support also part of the Harbor Association. There's a basic premise that I'm very interested in and that is the jobs. 11,000 jobs, even 1,000 jobs is enormous. As we've seen in the pressure of the current economic environment, the ability to build and improve our

TR2-2

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infrastructure is critical from everybody's perspective.

Certainly there are effects and those effects need to be mitigated. Those effects need to be handled by new technology, and cleaner technology, improved fuels and all kinds of other things that are in the process of development.

TR2-2

I firmly believe that we need to support the growth of this bridge and this project should be approved.

Thank you.

MR. HERNANDEZ: John LaCross, Dan Hoffman and Elizabeth Warren.

MR. LA CROSS: My name is John LaCross. I support alternative two. I'm glad to see this is good because that's all inaudible) it's good for the Port of Long Beach and Port of L.A., but I think you guys are way off base with your estimates of the traffic reduction.

And one gentleman said there hasn't been any truck traffic on Willow so you're not going to reduce any smog over there.

Also, somebody wants to get to the ICTF, they're not going to take your expressway to come out of the Port of Long Beach. They're going to come up

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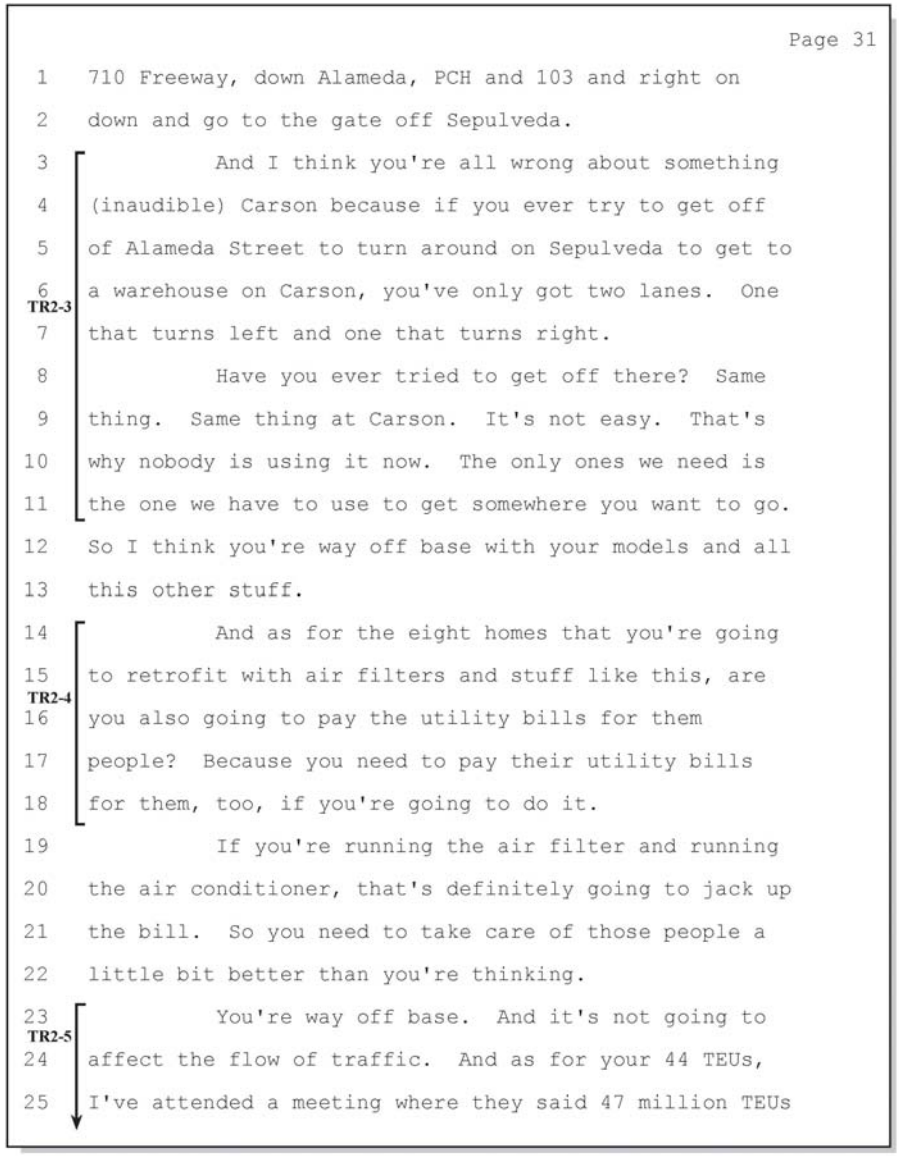
Response to Comment TR2-3

The Traffic Study includes forecasts for the traffic flow for both the baseline (No Build) and each of the build alternatives for the year 2030. These traffic forecasts include each of the five new grade separated intersections on Alameda Street. These five grade separated intersections are Pacific Coast Highway (PCH), Sepulveda, 223rd St, Carson and Del Amo (see the Traffic Study, Exhibits 8a, 8b, 9a, 9b, 10a, and 10b on pages 24 through 29 for the No Build condition and Exhibits 15a, 15b, 16a, 16b, 17a, and 17b on pages 38 through 43 for Alternative 1). These forecasts include both projected through-flow and turning movement counts. In the Traffic Study, Tables 7, 8, and 9 (pages 45, 46, and 47) provide the resulting levels of service for the various portions of the intersections under both the No Build and Alternative 1 cases for the AM, Mid Day and PM peak traffic flow periods. These tables show an improvement in level of service (LOS) for most of the intersections under Alternative 1. In the year 2030, the Carson Street and Del Amo intersections are forecast to move smoothly with little or no interruption (LOS A and B). However, Alameda/223rd, Alameda/Sepulveda and Alameda/PCH are forecast to have the lowest levels of service. As a result of the evaluation process, configuration enhancements were proposed for two of these intersections. The intersection configuration changes are now a part of the scope of Alternative 1 and the level of service reported in the traffic study include these configuration changes. Turn lane pockets and lane stripping improvements are planned to improve the traffic movement at the Alameda/223rd intersection. A southbound connector ramp is planned for the Alameda/PCH intersection to eliminate the left-turn movement and improve traffic flow through the intersection. No improvements are proposed for this Alameda/Sepulveda intersection.



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710 Freeway, down Alameda, PCH and 103 and right on down and go to the gate off Sepulveda.

And I think you're all wrong about something (inaudible) Carson because if you ever try to get off of Alameda Street to turn around on Sepulveda to get to a warehouse on Carson, you've only got two lanes. One

TR2-3

that turns left and one that turns right.

Have you ever tried to get off there? Same thing. Same thing at Carson. It's not easy. That's why nobody is using it now. The only ones we need is the one we have to use to get somewhere you want to go. So I think you're way off base with your models and all this other stuff.

And as for the eight homes that you're going to retrofit with air filters and stuff like this, are

TR2-4

you also going to pay the utility bills for them people? Because you need to pay their utility bills for them, too, if you're going to do it.

If you're running the air filter and running the air conditioner, that's definitely going to jack up the bill. So you need to take care of those people a little bit better than you're thinking.

You're way off base. And it's not going to

TR2-5

affect the flow of traffic. And as for your 44 TEUs, I've attended a meeting where they said 47 million TEUs

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Response to Comment TR2-4

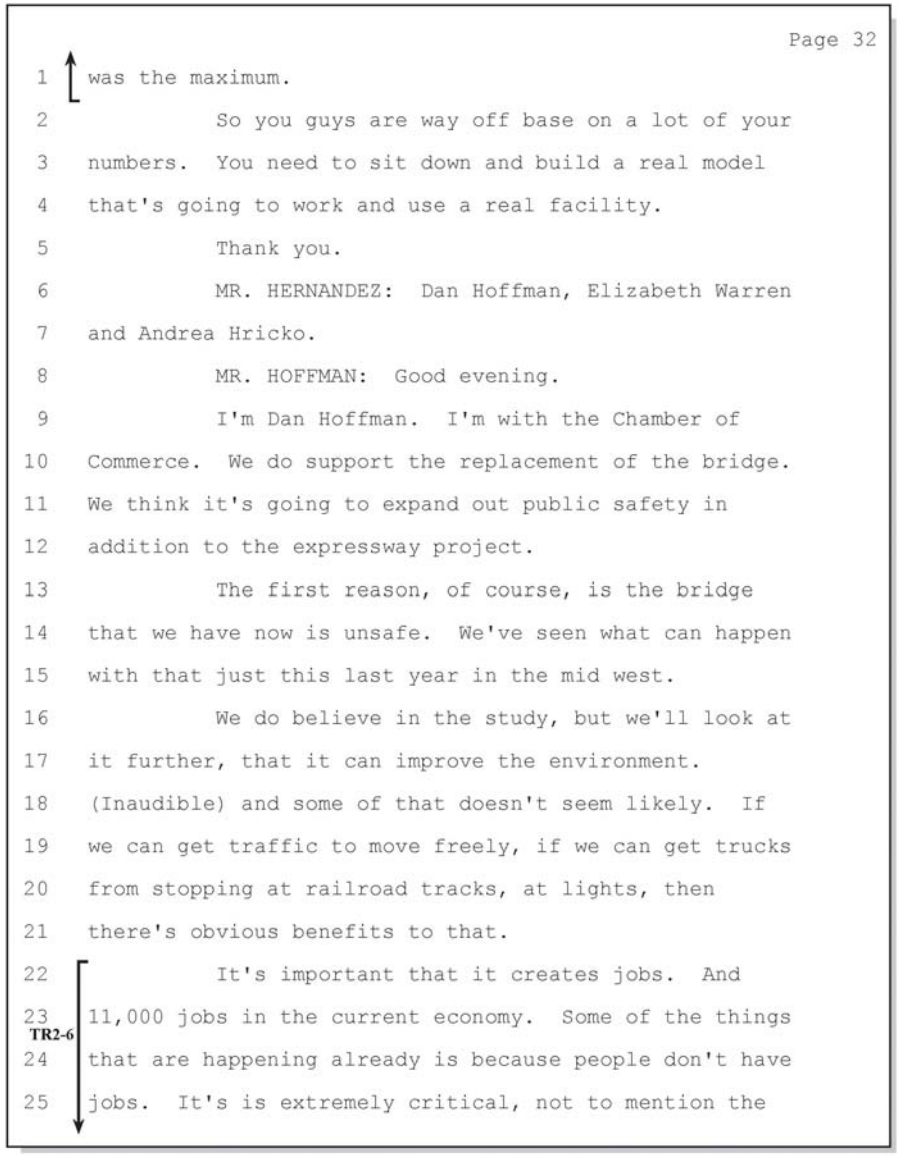
ACTA's decision to provide mitigation by retrofitting affected homes with HVAC would not include paying utility bills, operation, maintenance, or future replacements.

Response to Comment TR2-5

Please see Response to Comment OB14-6. Growth projections contained in the Final EIS/EIR are consistent with TRANSPLAN data.

Response to Comment TR2-6

Your support of the proposed project is acknowledged.



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was the maximum.

So you guys are way off base on a lot of your numbers. You need to sit down and build a real model that's going to work and use a real facility.

Thank you.

MR. HERNANDEZ: Dan Hoffman, Elizabeth Warren and Andrea Hricko.

MR. HOFFMAN: Good evening.

I'm Dan Hoffman. I'm with the Chamber of Commerce. We do support the replacement of the bridge. We think it's going to expand out public safety in addition to the expressway project.

The first reason, of course, is the bridge that we have now is unsafe. We've seen what can happen with that just this last year in the mid west.

We do believe in the study, but we'll look at it further, that it can improve the environment. (Inaudible) and some of that doesn't seem likely. If we can get traffic to move freely, if we can get trucks from stopping at railroad tracks, at lights, then there's obvious benefits to that.

It's important that it creates jobs. And 11,000 jobs in the current economy. Some of the things that are happening already is because people don't have jobs. It's is extremely critical, not to mention the

TR2-6

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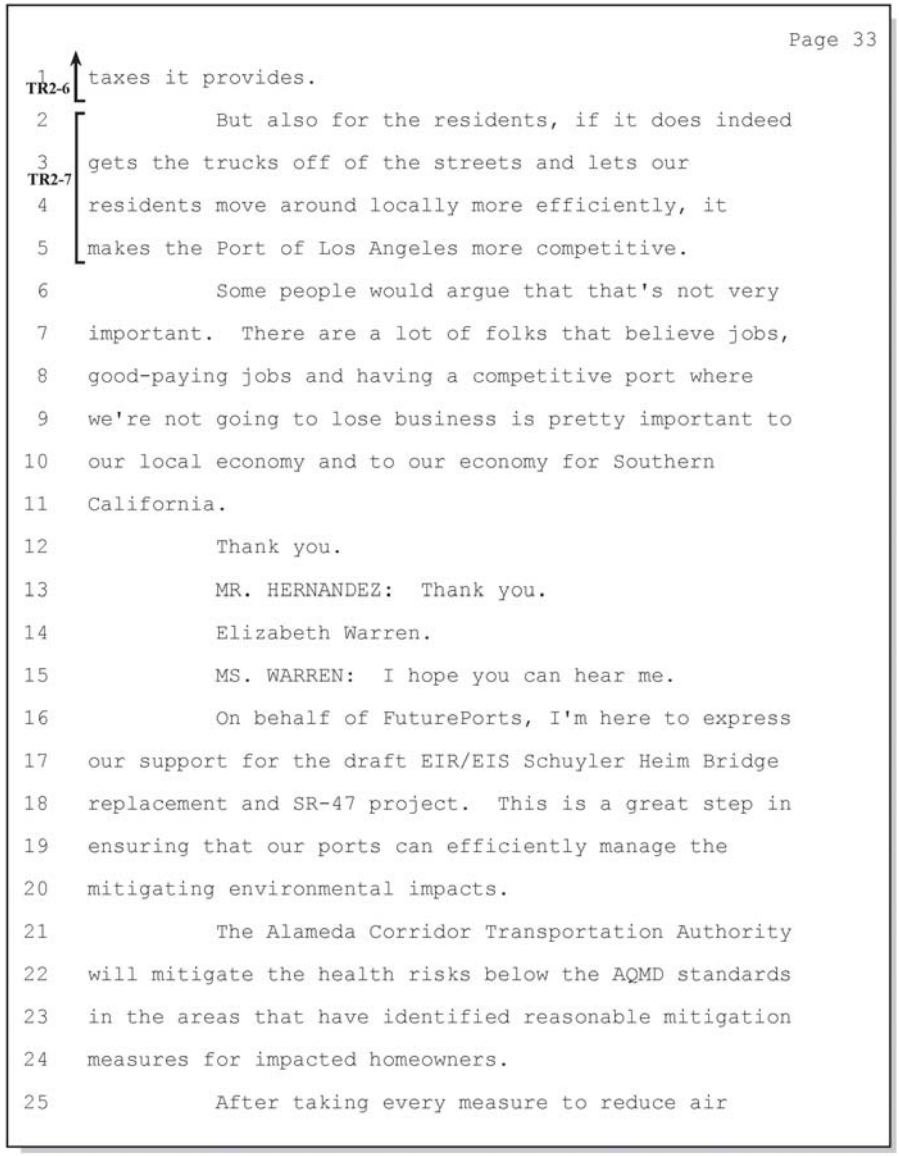
Response to Comment TR2-7

Your support of the proposed project is acknowledged.



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TR2-6 taxes it provides.

But also for the residents, if it does indeed gets the trucks off of the streets and lets our residents move around locally more efficiently, it makes the Port of Los Angeles more competitive. TR2-7

Some people would argue that that's not very important. There are a lot of folks that believe jobs, good-paying jobs and having a competitive port where we're not going to lose business is pretty important to our local economy and to our economy for Southern California.

Thank you.

MR. HERNANDEZ: Thank you.

Elizabeth Warren.

MS. WARREN: I hope you can hear me.

On behalf of FuturePorts, I'm here to express our support for the draft EIR/EIS Schuyler Heim Bridge replacement and SR-47 project. This is a great step in ensuring that our ports can efficiently manage the mitigating environmental impacts.

The Alameda Corridor Transportation Authority will mitigate the health risks below the AQMD standards in the areas that have identified reasonable mitigation measures for impacted homeowners.

After taking every measure to reduce air

TR2
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emissions, this project represents an important step to ensure green growth in the ports. And although, we may be in a recession right now, there will be a recovery. And there's no greater time than now to prepare for the future.

Ports of L.A. and Long Beach are and always will be major economic (inaudible) providing approximately half a million jobs in the greater five town region and more three million jobs annually. In this project alone, we will incur 11,000 construction jobs and $47 million in state and local taxes.

So this is a very important issue right now. We firmly believe that port growth is appropriate. The accomodation in that growth is critical not only in Southern California and the national economy but also our air quality. This alternative presents an important green growth issue to provide movement of goods in the port resulting in emissions.

We also believe that replacing the Heim Bridge with the newer safer fixed bridge is without question the utmost importance.

The other additional benefits are also critical to safety and efficiency. We believe that we have some common goals that are important to reduce efficiency thereby reducing emissions.

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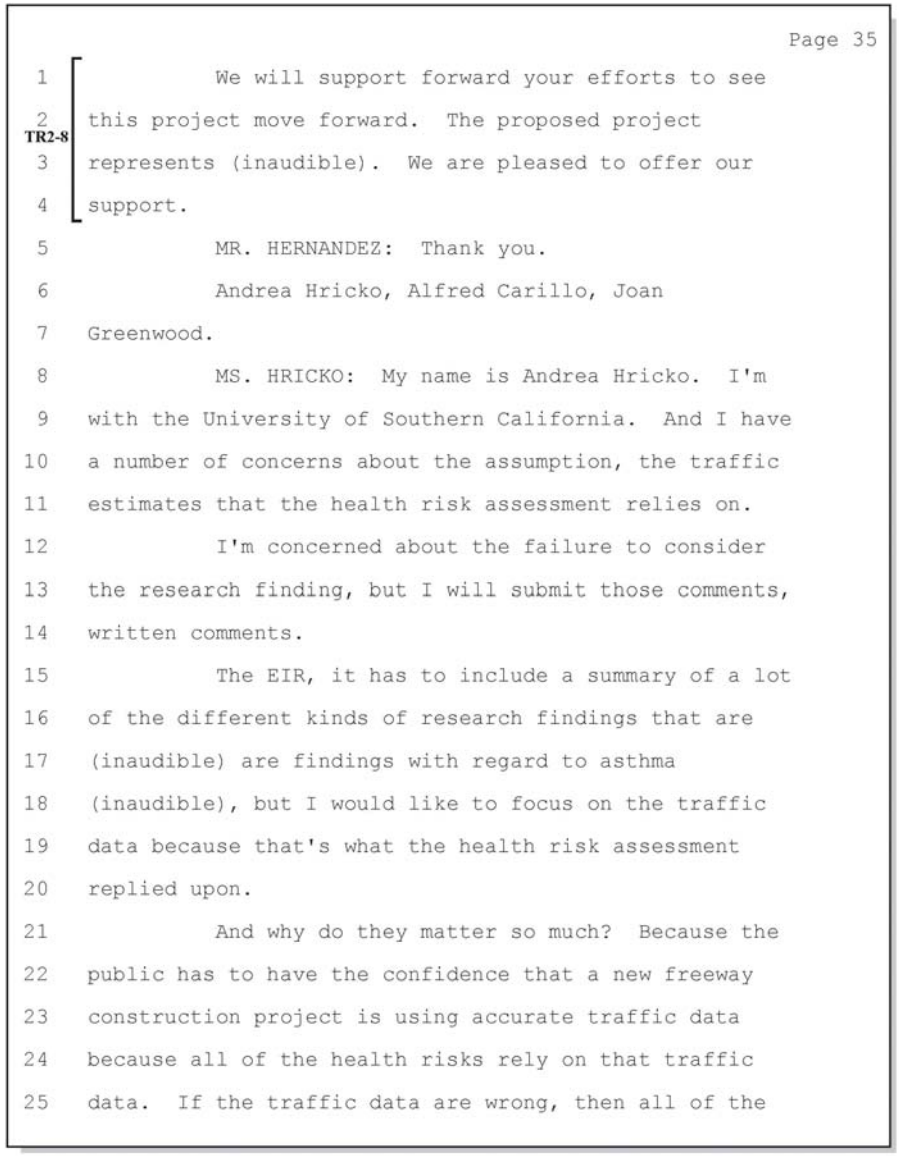
Response to Comment TR2-8

Your support of the proposed project is acknowledged.



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We will support forward your efforts to see this project move forward. The proposed project represents (inaudible). We are pleased to offer our support.

TR2-8

MR. HERNANDEZ: Thank you.

Andrea Hricko, Alfred Carillo, Joan Greenwood.

MS. HRICKO: My name is Andrea Hricko. I'm with the University of Southern California. And I have a number of concerns about the assumption, the traffic estimates that the health risk assessment relies on.

I'm concerned about the failure to consider the research finding, but I will submit those comments, written comments.

The EIR, it has to include a summary of a lot of the different kinds of research findings that are (inaudible) are findings with regard to asthma (inaudible), but I would like to focus on the traffic data because that's what the health risk assessment replied upon.

And why do they matter so much? Because the public has to have the confidence that a new freeway construction project is using accurate traffic data because all of the health risks rely on that traffic data. If the traffic data are wrong, then all of the

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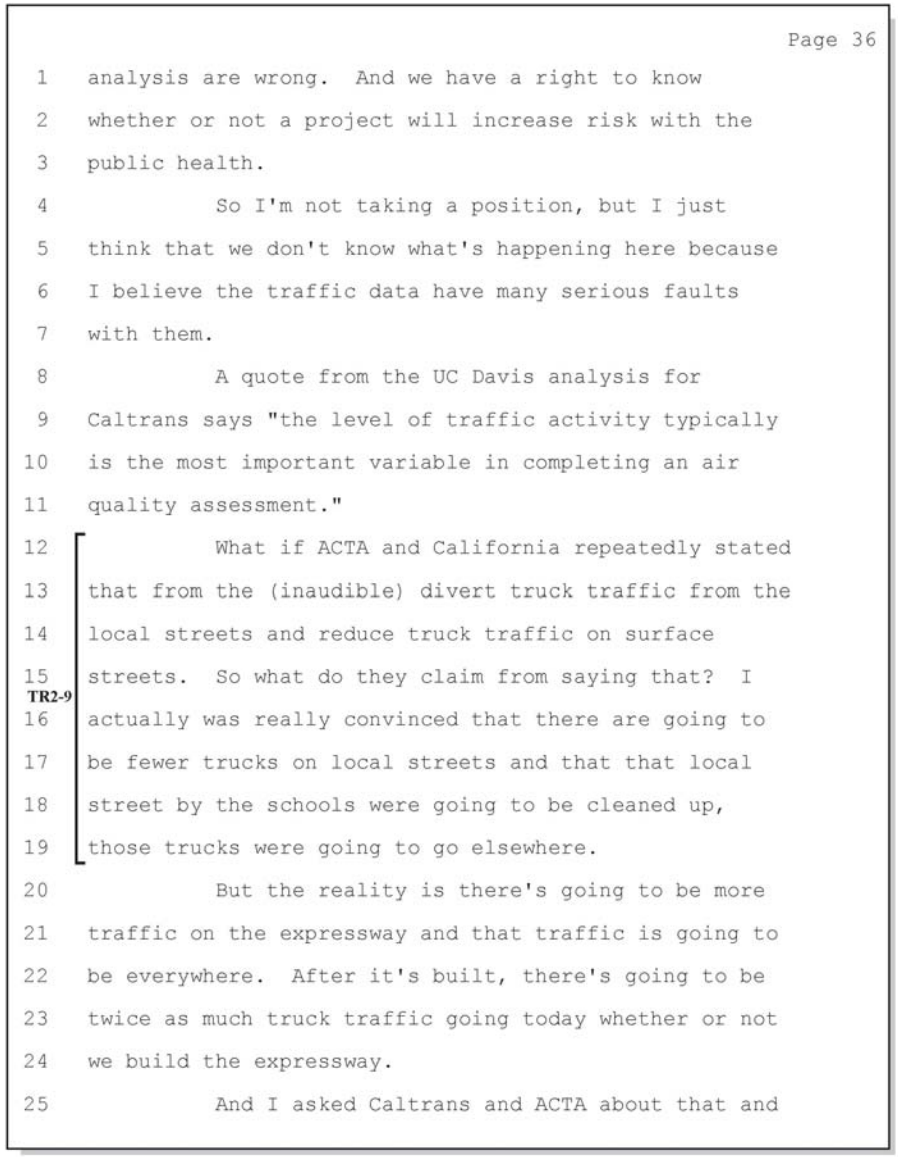
Response to Comment TR2-9

Please see Response to Comment OB15-1.



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analysis are wrong. And we have a right to know whether or not a project will increase risk with the public health.

So I'm not taking a position, but I just think that we don't know what's happening here because I believe the traffic data have many serious faults with them.

A quote from the UC Davis analysis for Caltrans says "the level of traffic activity typically is the most important variable in completing an air quality assessment."

What if ACTA and California repeatedly stated that from the (inaudible) divert truck traffic from the local streets and reduce truck traffic on surface streets. So what do they claim from saying that? I actually was really convinced that there are going to be fewer trucks on local streets and that that local street by the schools were going to be cleaned up, those trucks were going to go elsewhere.

TR2-9

But the reality is there's going to be more traffic on the expressway and that traffic is going to be everywhere. After it's built, there's going to be twice as much truck traffic going today whether or not we build the expressway.

And I asked Caltrans and ACTA about that and

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Response to Comment TR2-10

Please see Response to Comment OB14-6 and OB15-3. It was reasonable to assume expansion of the existing ICTF facility when the Traffic Study was completed.

the answer was, "We never said that there would be fewer trucks than there is today, just that there wouldn't be as many in the local community and in the future because some of those trucks are going to go on the expressway."

So looking at one of the route that the traffic is taking. Right now the ICTF really is just full. It can't take anymore trucks. And yet there are 11,000 trucks shown going into ICTF in 2030, where it can only handle a little over 5,000 trucks. Those trucks should be placed on the expressway. And if they are placed on the expressway -- I just can't do this in three minutes. TR2-10

Right now the ICTF is full, can't handle anymore trucks unless it expands, but the traffic map show that in 2030, there's going to be twice as many trucks on the 103 Freeway as now. They're going to be going on their way to a full rail yard that can't handle them.

If you notice, there are currently 5,581 trucks right now coming off the Terminal Island up to Willow going into ICTF. In 2030, whether you build this project or not, there's going to be 11,000 trucks if you don't build it, and 9,800 trucks if you do build it, going to an ICTF that can only handle 5,581 trucks.

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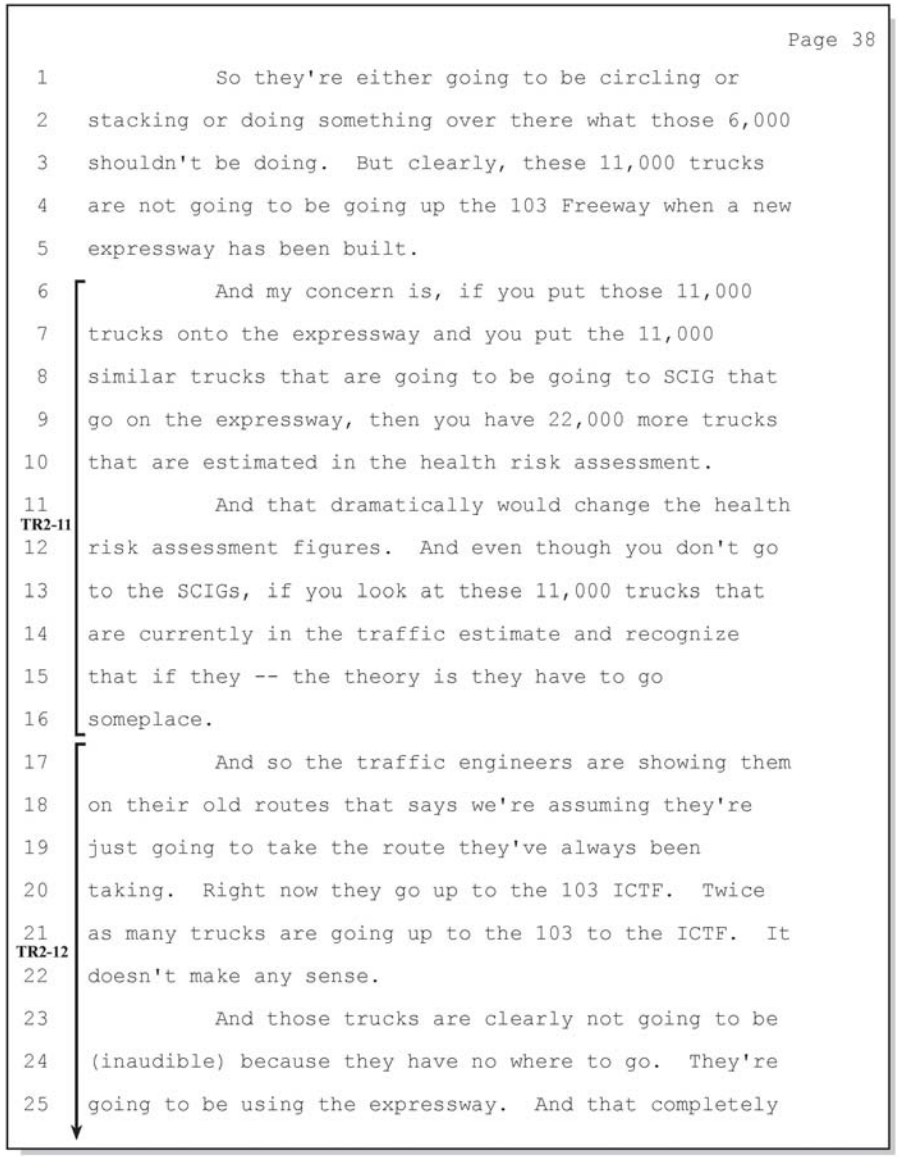
Response to Comment TR2-11

The Health Risk Assessment (HRA) does account for container movement that will be handled by the proposed SCIG and ICTF expansion projects.

Please see Response to Comment OB14-6.

Response to Comment TR2-12

Please see Response to Comments OB14-6 and OB15-3. The Traffic Study made reasonable assumptions about growth and trip distribution that were consistent with the data available at the time it was commissioned.



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So they're either going to be circling or stacking or doing something over there what those 6,000 shouldn't be doing. But clearly, these 11,000 trucks are not going to be going up the 103 Freeway when a new expressway has been built.

And my concern is, if you put those 11,000 trucks onto the expressway and you put the 11,000 similar trucks that are going to be going to SCIG that go on the expressway, then you have 22,000 more trucks that are estimated in the health risk assessment.

And that dramatically would change the health risk assessment figures. And even though you don't go to the SCIGs, if you look at these 11,000 trucks that are currently in the traffic estimate and recognize that if they -- the theory is they have to go someplace.

TR2-11

And so the traffic engineers are showing them on their old routes that says we're assuming they're just going to take the route they've always been taking. Right now they go up to the 103 ICTF. Twice as many trucks are going up to the 103 to the ICTF. It doesn't make any sense.

TR2-12

And those trucks are clearly not going to be (inaudible) because they have no where to go. They're going to be using the expressway. And that completely

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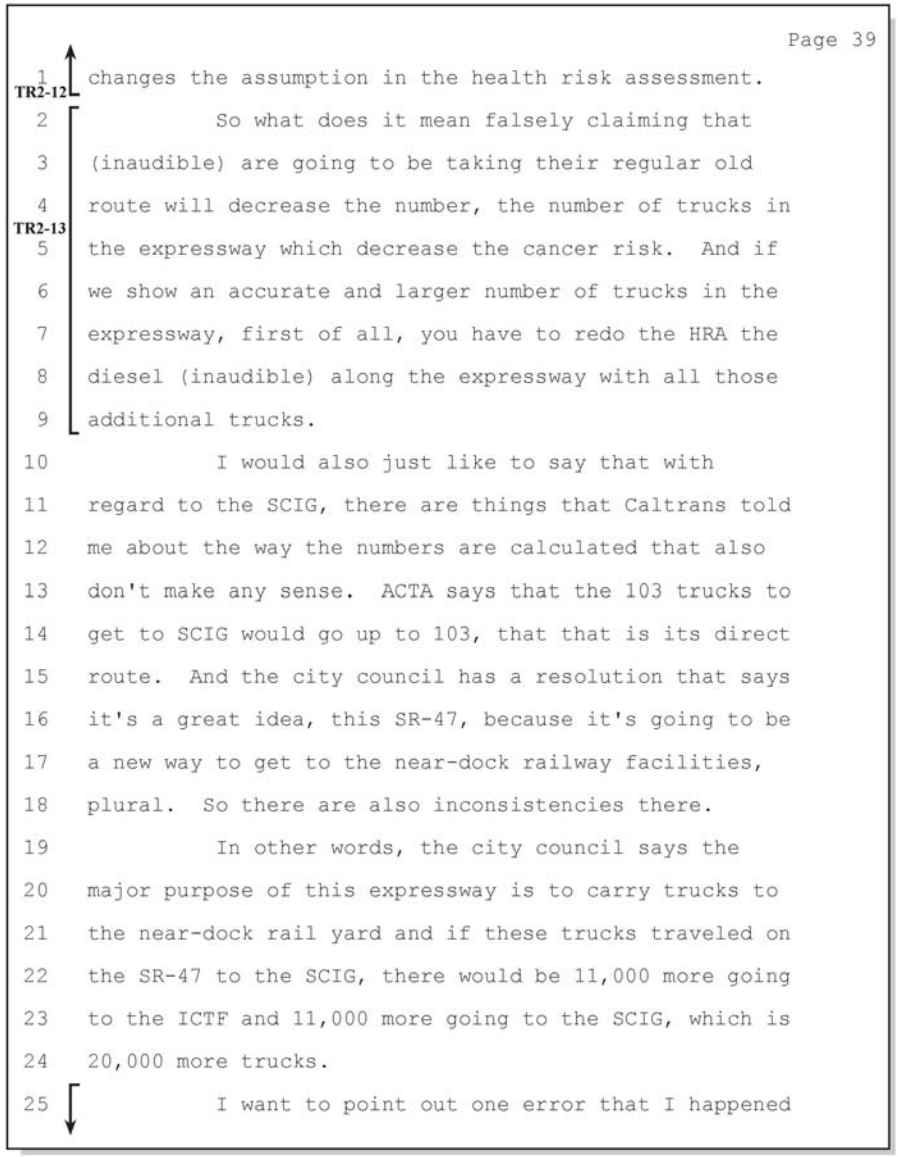
Response to Comment TR2-13

See Response to Comment OB14-6. The traffic study projects increases in traffic on Alameda Street as well as SR-103. The routes that would be taken to the ICTF are based on current traffic patterns. If those patterns are changed as a result of conditions imposed during review and approval of the proposed ICTF project, the impacts of those changes would be considered as part of that project. Neither Caltrans nor ACTA have the authority to dictate the route used by trucks traveling to the ICTF.

Please also see Response to Comments OB15-3, and OB15-12.



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TR2-12
changes the assumption in the health risk assessment.
So what does it mean falsely claiming that (inaudible) are going to be taking their regular old route will decrease the number, the number of trucks in
TR2-13
the expressway which decrease the cancer risk. And if we show an accurate and larger number of trucks in the expressway, first of all, you have to redo the HRA the diesel (inaudible) along the expressway with all those additional trucks.
I would also just like to say that with regard to the SCIG, there are things that Caltrans told me about the way the numbers are calculated that also don't make any sense. ACTA says that the 103 trucks to get to SCIG would go up to 103, that that is its direct route. And the city council has a resolution that says it's a great idea, this SR-47, because it's going to be a new way to get to the near-dock railway facilities, plural. So there are also inconsistencies there.
In other words, the city council says the major purpose of this expressway is to carry trucks to the near-dock rail yard and if these trucks traveled on the SR-47 to the SCIG, there would be 11,000 more going to the ICTF and 11,000 more going to the SCIG, which is 20,000 more trucks.
I want to point out one error that I happened

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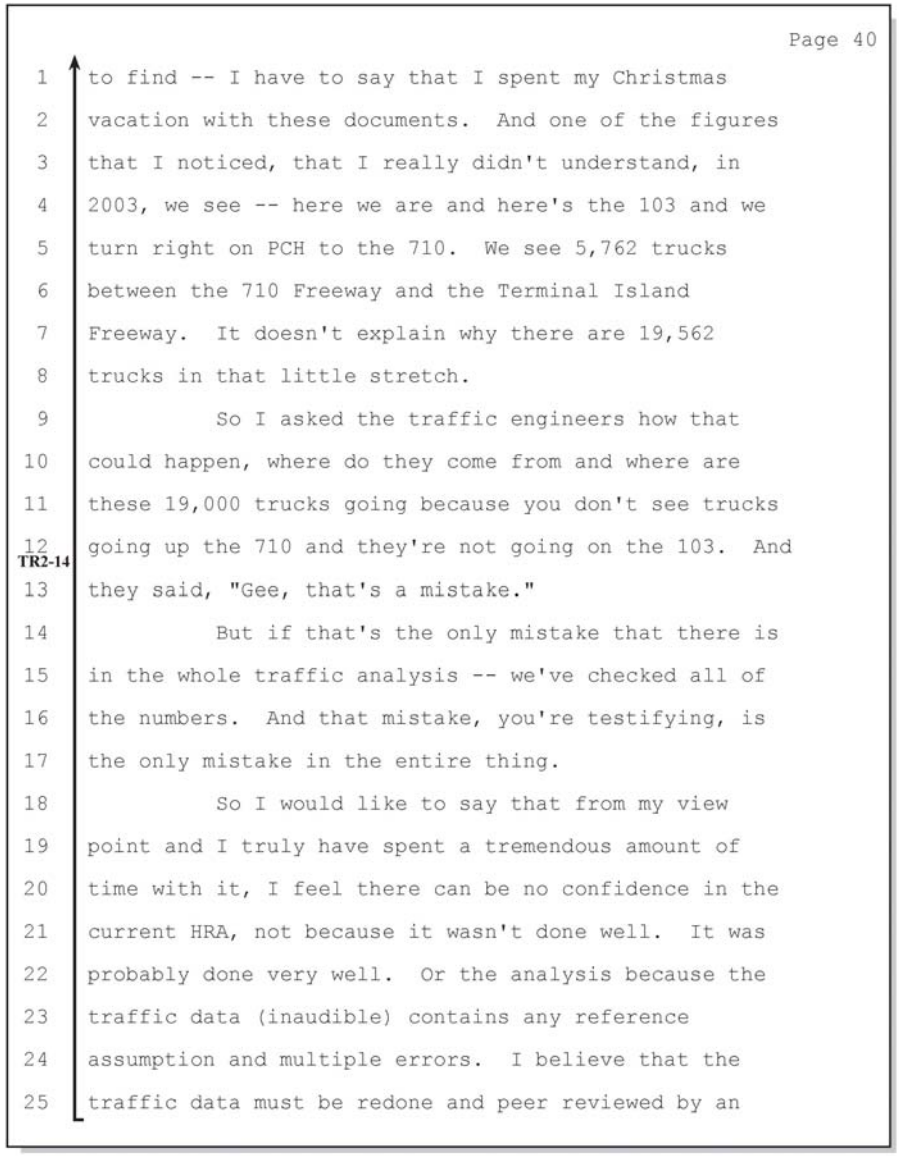
Response to Comment TR2-14

Please see Response to Comment OB14-6 and OB15-12.



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to find -- I have to say that I spent my Christmas vacation with these documents. And one of the figures that I noticed, that I really didn't understand, in 2003, we see -- here we are and here's the 103 and we turn right on PCH to the 710. We see 5,762 trucks between the 710 Freeway and the Terminal Island Freeway. It doesn't explain why there are 19,562 trucks in that little stretch.

So I asked the traffic engineers how that could happen, where do they come from and where are these 19,000 trucks going because you don't see trucks going up the 710 and they're not going on the 103. And

TR2-14

they said, "Gee, that's a mistake."

But if that's the only mistake that there is in the whole traffic analysis -- we've checked all of the numbers. And that mistake, you're testifying, is the only mistake in the entire thing.

So I would like to say that from my view point and I truly have spent a tremendous amount of time with it, I feel there can be no confidence in the current HRA, not because it wasn't done well. It was probably done very well. Or the analysis because the traffic data (inaudible) contains any reference assumption and multiple errors. I believe that the traffic data must be redone and peer reviewed by an

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TR2-14

independent firm with the public able to see the errors, and final results need to be shown to the public.

And after the traffic data are redone, the HRA and the analysis should be redone using the corrected data.

I thank you very much for the extra time and holding this public meeting.

Thank you.

MR. HERNANDEZ: Alfred Carrillo, Joan Greenwood, David Petit.

MR. CARRILLO: My name is Alfred Carrillo. I live at 1508 East Rubidoux Street. Beautiful presentation. Congratulations.

My concern is the area between Rubidoux Street all the way to Opt Street, the cross street of Blend. I've lived in that area for about 60 years. I have a congregation of a hundred ten, a hundred fifteen members located in that block. I see that on Arm Street, on Rubidoux Street, there are only eight houses that are being affected. To me, that's a joke.

Like I said, I've been in Wilmington for 60 years, approximately. My concern is all those houses in that area. I know by the time 70 years pass, all that area is going to be such a dump.

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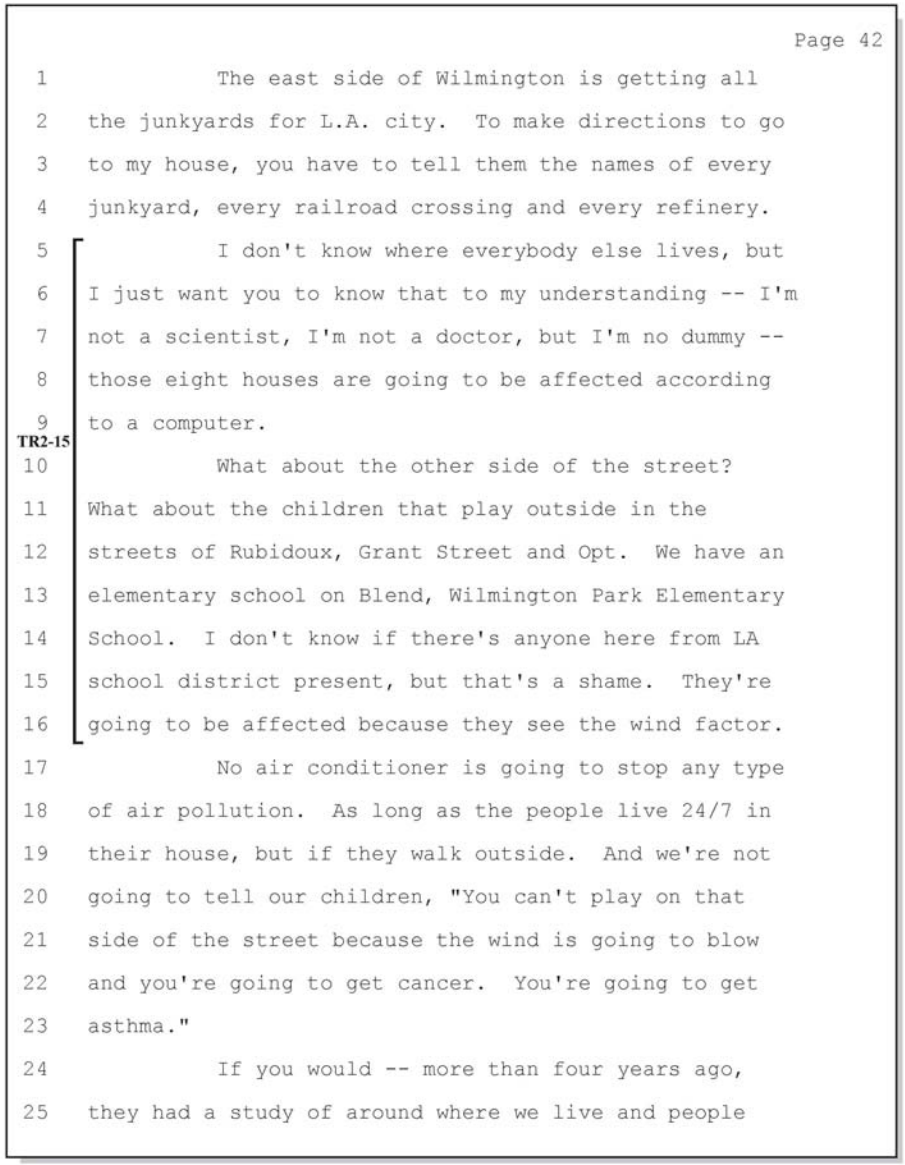
Response to Comment TR2-15

The HRA evaluated the project-associated health impacts in terms of increased cancer risk and acute and chronic health impacts (non-cancer health risks). All non-cancer health risk impacts were found to be less than significant (with hazard indexes less than the SCAQMD significance level of 1.0). The cancer risk is considered significant if the incremental cancer risk increase between the No Build scenario and the proposed project is greater than 10 in a million. The increased cancer risk was calculated for residences, commercial workers, recreational users and workers, and students and school workers. For Alternative 1, all impacts were found to be less than significant, except at a limited number of residential receptors. The incremental cancer risk increases at schools in the study area were all less than 10 in a million. Therefore, none of the schools mentioned by the commenter were found to have a significant health risk.

It is highly unlikely that more homes in the study area would have a risk higher than 10 in a million because of the conservative methodology employed. For further discussion on this issue please see Response to Comment AJ11-7 and OB14-7.



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The east side of Wilmington is getting all the junkyards for L.A. city. To make directions to go to my house, you have to tell them the names of every junkyard, every railroad crossing and every refinery.

I don't know where everybody else lives, but I just want you to know that to my understanding -- I'm not a scientist, I'm not a doctor, but I'm no dummy -- those eight houses are going to be affected according to a computer.

TR2-15

What about the other side of the street? What about the children that play outside in the streets of Rubidoux, Grant Street and Opt. We have an elementary school on Blend, Wilmington Park Elementary School. I don't know if there's anyone here from LA school district present, but that's a shame. They're going to be affected because they see the wind factor.

No air conditioner is going to stop any type of air pollution. As long as the people live 24/7 in their house, but if they walk outside. And we're not going to tell our children, "You can't play on that side of the street because the wind is going to blow and you're going to get cancer. You're going to get asthma."

If you would -- more than four years ago, they had a study of around where we live and people

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have died of heart attacks, people died of diseases. And I know that once they build that expressway, people are going to be affected with that air pollution.

I know. I've lived there. I've seen things happening and I know that even in our school, we have a private school on that same block. It's a small school, but I want you to know that what came out of that school, we have produced people in the medical field, young soldiers that have been in Somalia, they have three tours of Iraq, another one went to Afghanistan. There have been doctors that came out of that school, people going to college from that school. It's a small school, but I want you to know that they go out and play, they go out and exercise, they use Green Belt Park.

And when we go out there, there's other people there. And if you would walk out in the evening, you see children, young kids playing outside, basketball. They can't go to another park because if they go to another park, there's about three gangs on L Street.

So we have a community. We don't need more pollution. We don't need it.

And that's all I have to say. Either buy us out or don't do nothing.

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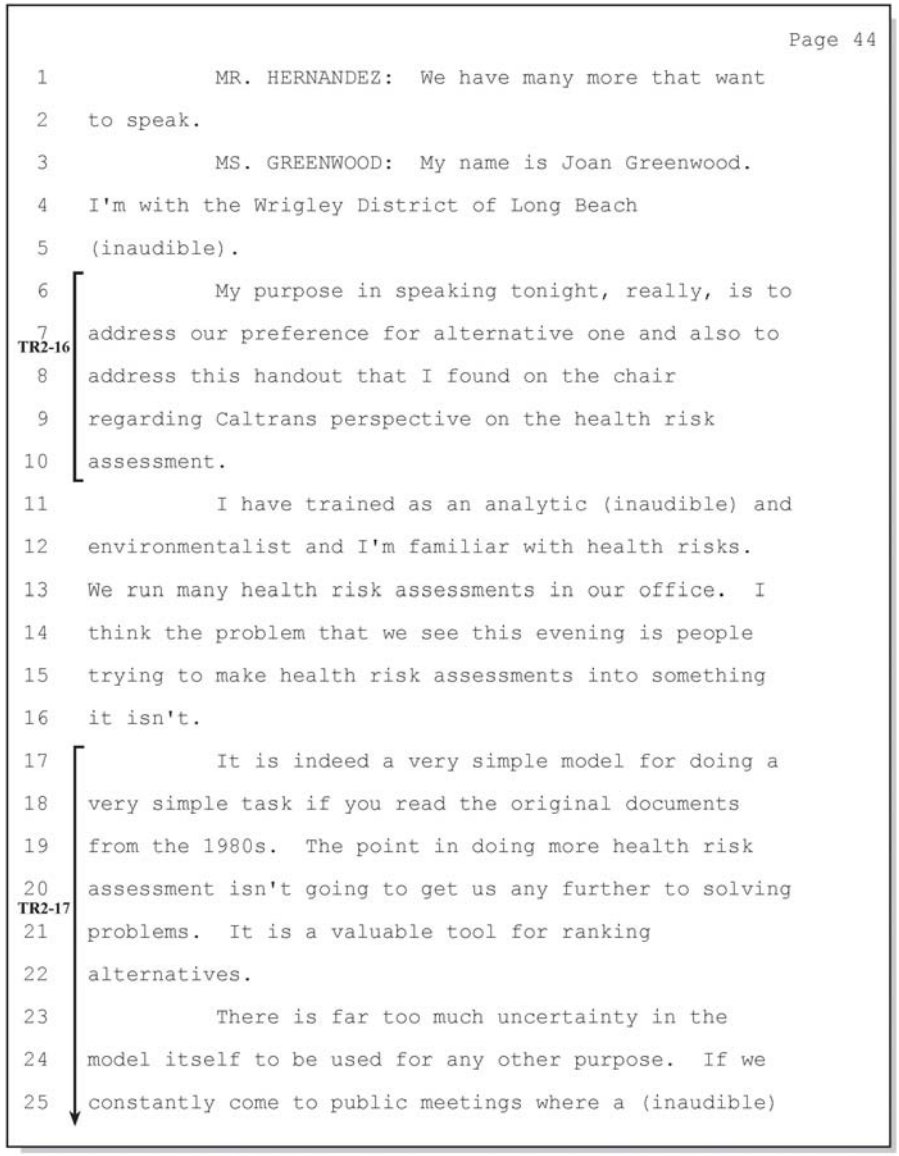
Response to Comment TR2-16

Your support for Alternative 1 is acknowledged.

Response to Comment TR2-17

See Response to Comment TR2-15. The commenter is correct that the original purpose of risk assessments was to compare relative risk of one alternative from another and for comparing the potential risks to target levels to determine the level of mitigation needed. ACTA's Board has proposed to mitigate the impacts identified by the HRA as potentially significant even though the results of the HRA are considered to be extremely conservative.

For further discussion of the conservative methodology employed please see Response to Comment AJ11-7 and OB14-7.



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MR. HERNANDEZ: We have many more that want to speak.

MS. GREENWOOD: My name is Joan Greenwood. I'm with the Wrigley District of Long Beach (inaudible).

TR2-16 My purpose in speaking tonight, really, is to address our preference for alternative one and also to address this handout that I found on the chair regarding Caltrans perspective on the health risk assessment.

I have trained as an analytic (inaudible) and environmentalist and I'm familiar with health risks. We run many health risk assessments in our office. I think the problem that we see this evening is people trying to make health risk assessments into something it isn't.

TR2-17 It is indeed a very simple model for doing a very simple task if you read the original documents from the 1980s. The point in doing more health risk assessment isn't going to get us any further to solving problems. It is a valuable tool for ranking alternatives.

There is far too much uncertainty in the model itself to be used for any other purpose. If we constantly come to public meetings where a (inaudible)

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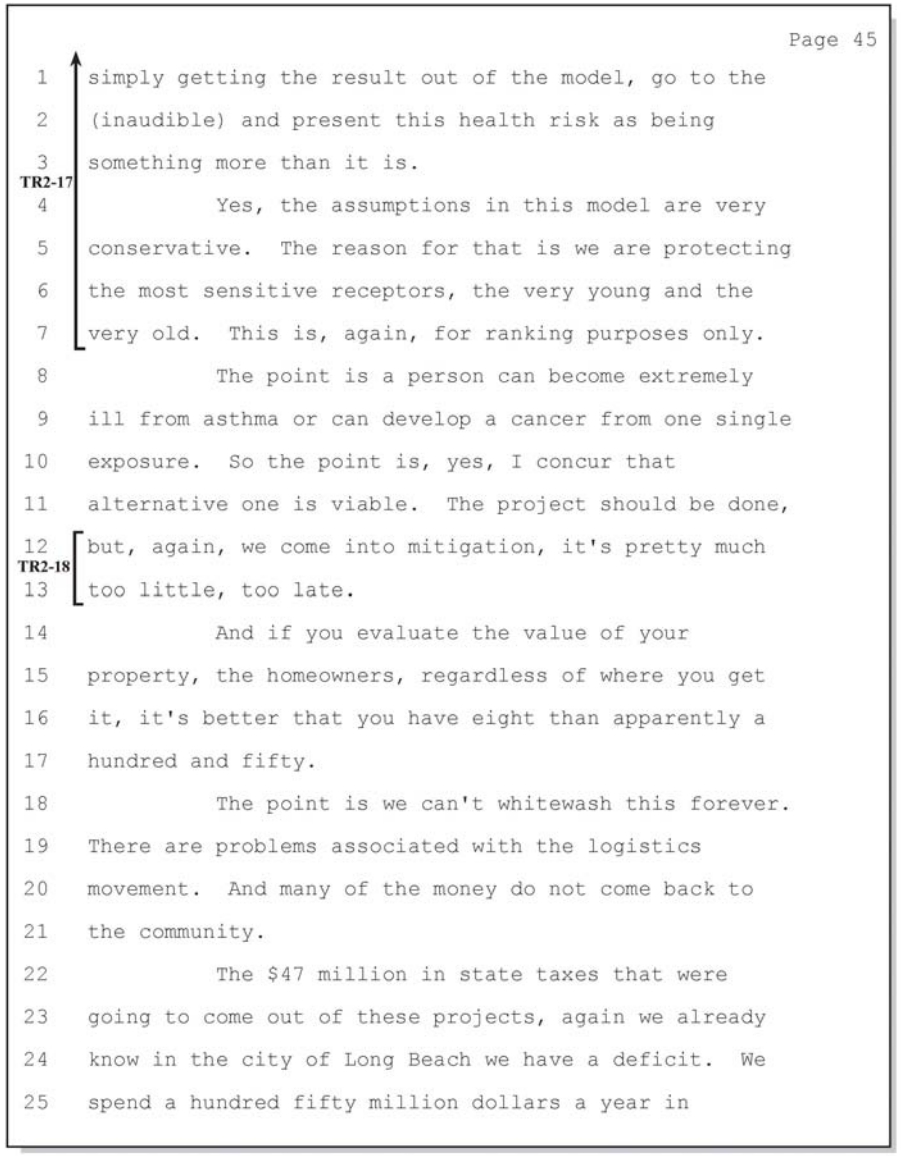
Response to Comment TR2-18

Caltrans has no authority to regulate the emissions of the mobile sources that will utilize the proposed projects. The emissions attributed to the proposed project would come from cars and trucks that would use the expressway and the direct control of vehicular emissions is within the jurisdiction of other agencies.

Motor vehicle emissions are a significant source of pollution in the South Coast Air Basin and their continued control is required to meet the state and federal ambient air quality standards. As discussed in Response to Comment AJ17-2 there are several federal state and local measures that will contribute to improved air quality in future years, thereby reducing the possibility that persons will be exposed to pollutant concentrations that would result in negative health impacts.



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simply getting the result out of the model, go to the (inaudible) and present this health risk as being something more than it is.

TR2-17

Yes, the assumptions in this model are very conservative. The reason for that is we are protecting the most sensitive receptors, the very young and the very old. This is, again, for ranking purposes only.

The point is a person can become extremely ill from asthma or can develop a cancer from one single exposure. So the point is, yes, I concur that alternative one is viable. The project should be done, but, again, we come into mitigation, it's pretty much too little, too late.

TR2-18

And if you evaluate the value of your property, the homeowners, regardless of where you get it, it's better that you have eight than apparently a hundred and fifty.

The point is we can't whitewash this forever. There are problems associated with the logistics movement. And many of the money do not come back to the community.

The $47 million in state taxes that were going to come out of these projects, again we already know in the city of Long Beach we have a deficit. We spend a hundred fifty million dollars a year in

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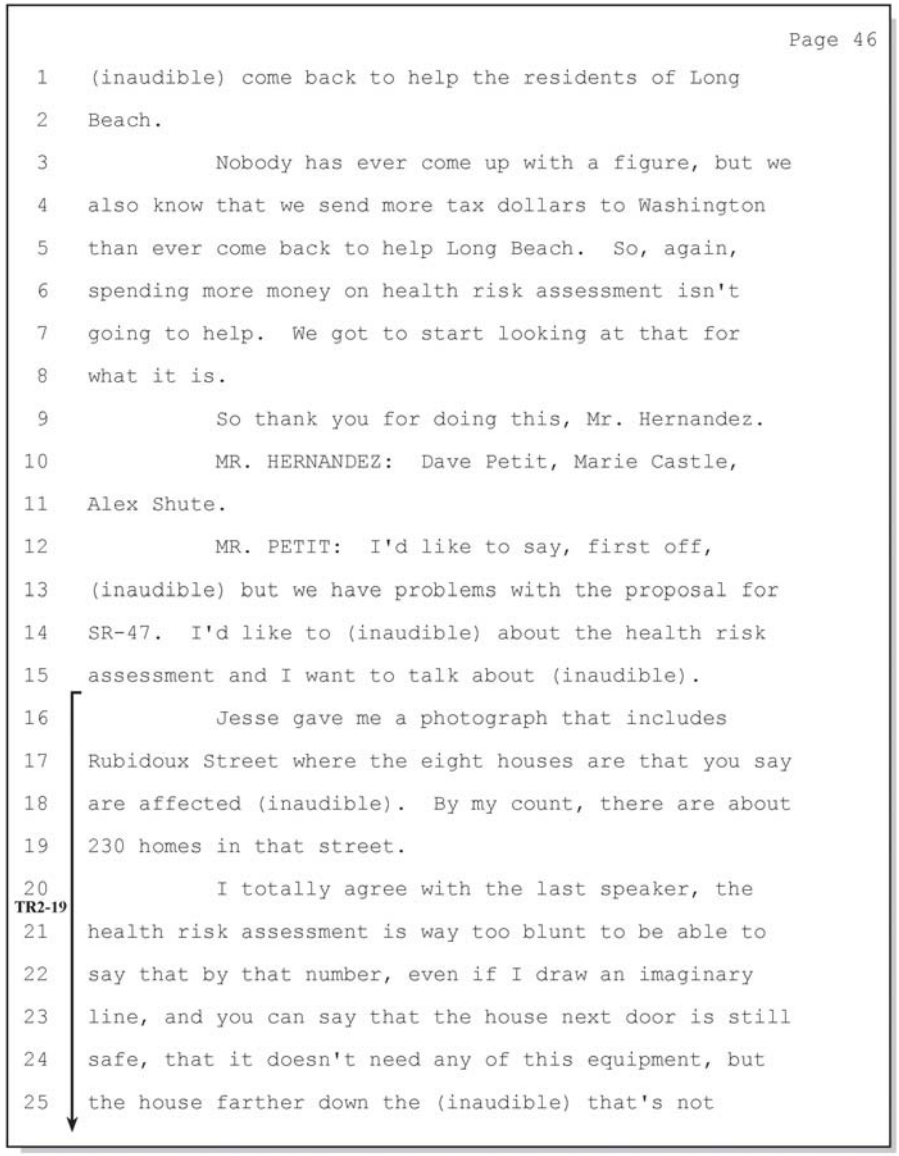
Response to Comment TR2-19

The commenter is correct that there are more than eight homes on Rubidoux Street. The other homes are located farther away from the proposed project and their risk was determined to be less than significant. For further discussion on the conservative methodology and results contained in the HRA, please see Response to Comment AJ11-7 and OB14-7.



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(inaudible) come back to help the residents of Long Beach.

Nobody has ever come up with a figure, but we also know that we send more tax dollars to Washington than ever come back to help Long Beach. So, again, spending more money on health risk assessment isn't going to help. We got to start looking at that for what it is.

So thank you for doing this, Mr. Hernandez.

MR. HERNANDEZ: Dave Petit, Marie Castle, Alex Shute.

MR. PETIT: I'd like to say, first off, (inaudible) but we have problems with the proposal for SR-47. I'd like to (inaudible) about the health risk assessment and I want to talk about (inaudible).

Jesse gave me a photograph that includes Rubidoux Street where the eight houses are that you say are affected (inaudible). By my count, there are about 230 homes in that street.

TR2-19

I totally agree with the last speaker, the health risk assessment is way too blunt to be able to say that by that number, even if I draw an imaginary line, and you can say that the house next door is still safe, that it doesn't need any of this equipment, but the house farther down the (inaudible) that's not

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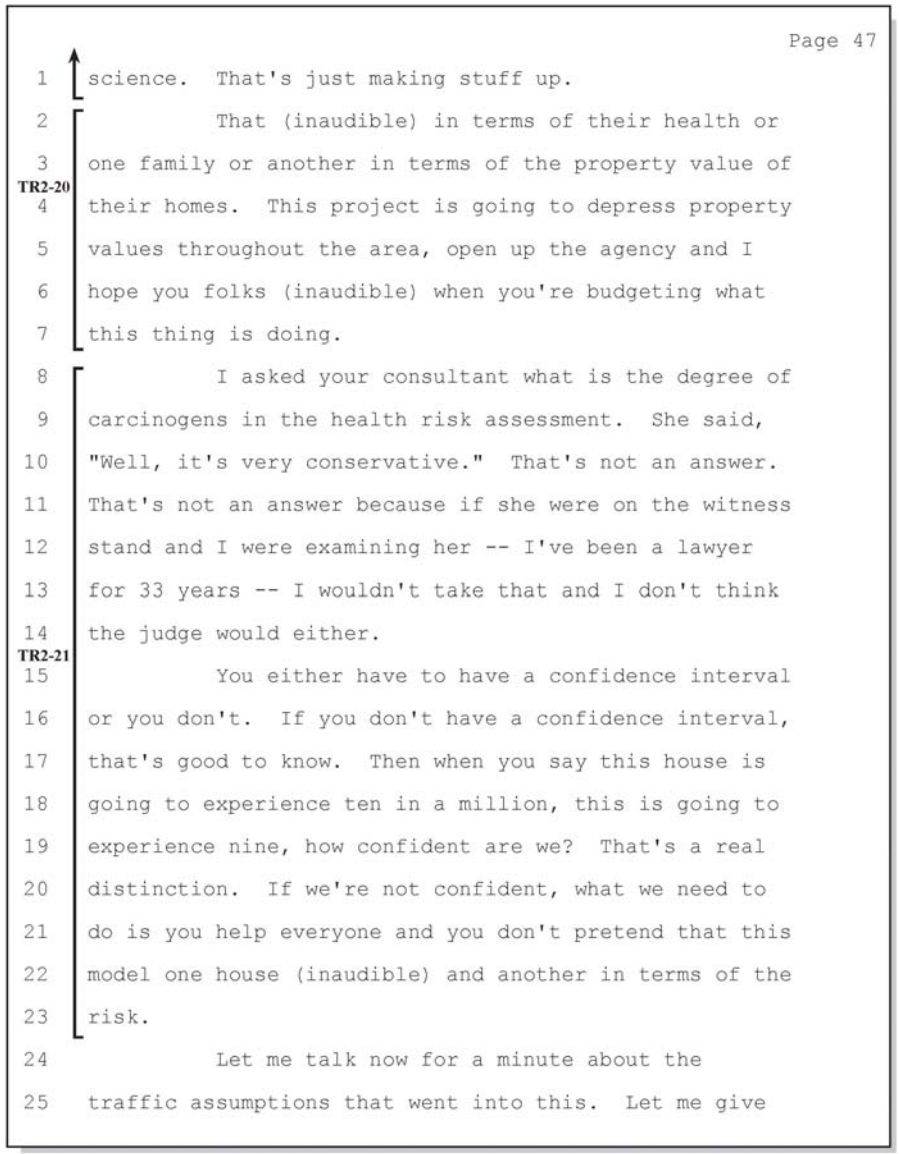
Response to Comment TR2-20

Property values are unlikely to decline due to the proposed project. The project would be located in a heavily industrialized area where residences are impacted by local commercial and industrial operations and traffic. The proposed project would improve air quality in the study area by reducing emissions due to traffic idling by-passing five at-grade rail crossings and three intersections. The project would also reduce traffic on the I-110 and I-710 over levels that would otherwise occur if the project is not built. Referring to the SCAQMD's MATES III study, existing air-quality related residential risk in the South Coast Air Basin is approximately 1200 excess cancer risks per million people exposed, and existing risk near the ports ranges from about 1100 to 3700 in million. In 2003, using the methodology in the HRA, the health risk attributed to vehicles using the SR-47 is estimated at approximately 356 to 630 in a million in Dominguez, Lincoln Village, Long Beach, and Wilmington communities. By the time the project is scheduled to begin operation in approximately 2015, the baseline risk in these communities (assuming no project) is predicted to be 39.7 to 87.8 in a million. The risks of 2015 Emissions Scenario is presented below in Table TR2-1. This table is a variation on Table 3.13-17 of the SDEIS/RDEIR, p. 3.13-53. The 2003 baseline has been added for comparative purposes. Thus, in 2015 risk from port-related traffic would be reduced by over 90 percent from the existing condition due to the benefits of already adopted regulatory programs to reduce vehicular emissions, such as the CARB fleet rule and the Clean Truck Program. With the project, the excess risk (difference between the proposed project and the No Build scenario) at the maximally impacted homes would be slightly over the 10 in a million threshold but it would still be approximately 90 percent lower than the risk level in 2003. ACTA proposes to install HVAC systems on the impacted homes. HVAC systems are conservatively estimated to reduce particulate emissions by 90 percent, which would reduce excess risk at all impacted residences to less than the 10 in a million threshold (SDEIS/RDEIR, Appendix A, *Human Health Risk Assessment for the Schuyler-Heim Bridge Replacement and SR-47 Expressway Project*, p. 53).



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science. That's just making stuff up.

That (inaudible) in terms of their health or one family or another in terms of the property value of their homes. This project is going to depress property values throughout the area, open up the agency and I hope you folks (inaudible) when you're budgeting what this thing is doing.

TR2-20

I asked your consultant what is the degree of carcinogens in the health risk assessment. She said, "Well, it's very conservative." That's not an answer. That's not an answer because if she were on the witness stand and I were examining her -- I've been a lawyer for 33 years -- I wouldn't take that and I don't think the judge would either.

TR2-21

You either have to have a confidence interval or you don't. If you don't have a confidence interval, that's good to know. Then when you say this house is going to experience ten in a million, this is going to experience nine, how confident are we? That's a real distinction. If we're not confident, what we need to do is you help everyone and you don't pretend that this model one house (inaudible) and another in terms of the risk.

Let me talk now for a minute about the traffic assumptions that went into this. Let me give

Table TR2-1 Summary of Cancer Risks

Alternative 1

All risks are expressed in number per million population

Residential Regions	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario Residential Risk Baseline	Alt 1	Increase[4]
Dominguez	2535	386,675	3,744,275	630	87.8	97.6	9.8
Lincoln Village	2389	386,525	3,743,825	612	84.9	95.0	10.1
Long Beach	2274	386,675	3,743,375	411	52.5	57.9	5.4
Wilmington	1548	384,975	3,740,025	356	39.7	50.3	10.6

Recreational Areas	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario Worker Risk Baseline	Alt 1	Increase[4]	2003 Baseline[3]	2015 Emission Scenario Adjusted Recreational Risk Baseline	Alt 1	Increase[4]
Hudson Park	1677	386,825	3,740,375	151	10.9	11.3	0.4	227	16.4	17.0	0.6

School Areas	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario 40-year Staff Risk Baseline	Alt 1	Increase[4]	2003 Baseline[3]	2015 Emission Scenario Adjusted 13-year Student Risk Baseline	Alt 1	Increase[4]
Cabrillo High School	1623	386,775	3,740,225	152	10.8	11.2	0.4	35	2.5	2.6	0.1
Hudson Elementary School	1766	386,925	3,740,625	153	11.3	11.7	0.4	36	2.6	2.7	0.1

Alternative 2

All risks are expressed in number per million population

Residential Regions	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario Residential Risk Baseline	Alt 2	Increase[4]
Dominguez	2535	386,675	3,744,275	630	87.8	94.1	6.3
Lincoln Village	2389	386,525	3,743,825	612	84.9	91.8	6.9
Long Beach	1736	387,125	3,740,525	532	50.1	66.2	16.1
Wilmington	1189	384,325	3,738,725	281	26.7	26.4	None

Recreational Areas	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario Worker Risk Baseline	Alt 2	Increase[4]	2003 Baseline[3]	2015 Emission Scenario Adjusted Recreational Risk Baseline	Alt 2	Increase[4]
Hudson Park	1677	386,825	3,740,375	151	10.9	20.3	9.4	227	16.4	30.5	14.1

School Areas	Receptor[1]	UTM Coordinates[2] East (m)	UTM Coordinates[2] North (m)	2003 Baseline[3]	2015 Emission Scenario Worker Risk Baseline	Alt 2	Increase[4]	2003 Baseline[3]	2015 Emission Scenario Adjusted Recreational Risk Baseline	Alt 2	Increase[4]
Cabrillo High School	1623	386,775	3,740,225	152	10.8	22.7	11.9	35.3	2.5	5.3	2.8
Hudson Elementary School	1749	386,925	3,740,575	143	10.857	15.4	4.5	33.2	2.5	3.6	1.0

NOTES

[1] - Multiple receptors may share maximum risk increase; receptor listed is lowest-numbered.

[2] - Universal Transverse Mercator projection, Zone 11, NAD 83

[3] - For informational purposes only. Cancer risks of 2003 were estimated based on 2003 emisssions.

[4] - 2015 Baseline values used to calculate incremental risk.

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Response to Comment TR2-21

State law required the Office of Environmental Health Hazard Assessment (OEHHA) to develop risk assessment guidelines to be used by state and local agencies in implementing the Air Toxic Hot Spots program (Health and Safety Code, Section 44300 et seq.). In association with that task, OEHHA has developed methodology for assessing cancer health risks. CARB both utilizes and recommends OEHHA guidance for the evaluation of cancer health risk (see Health Risk Assessment for the UP Intermodal Container Transfer Facility (ICTF) and Dolores Railyards [CARB, 2008]). Because OEHHA acknowledges that there is a great deal of uncertainty associated with the health risk assessment process, assumptions are designed to be conservative, in order to avoid underestimation of risk to the public (The Air Toxics Hot Sots Program Guidance Manual for Preparation of Health Risk Assessments, pp. 1-4 and 1-5 [OEHHA, 2003]). For these reasons, health risk assessment conclusions about the potential for significant health risk impacts at residences in the vicinity of the project err on the side of caution. They overstate the additional cancer risk and over-extend the impact zone boundaries.

Please also see Response to Comment AJ11-7 and OB14-7, which further explain the HRA's conservative methodology.

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Response to Comment TR2-22

In November 2007, a question was asked by the commenter as to how to convert the peak hour volumes shown in the Traffic Study of the DEIR/DEIS to AADT. The traffic consultant responded that a "rule of thumb" (approximate) conversion factor was to multiply the peak hour traffic by 10. This factor varies widely depending on the nature and composition of the traffic. For example, where there is no real peaking the multiplier can theoretically be as high as 24 – in other words the traffic every hour is the same. In the case of traffic near the Ports, truck trips are spread more uniformly over periods of time resulting in a factor of greater than 10.

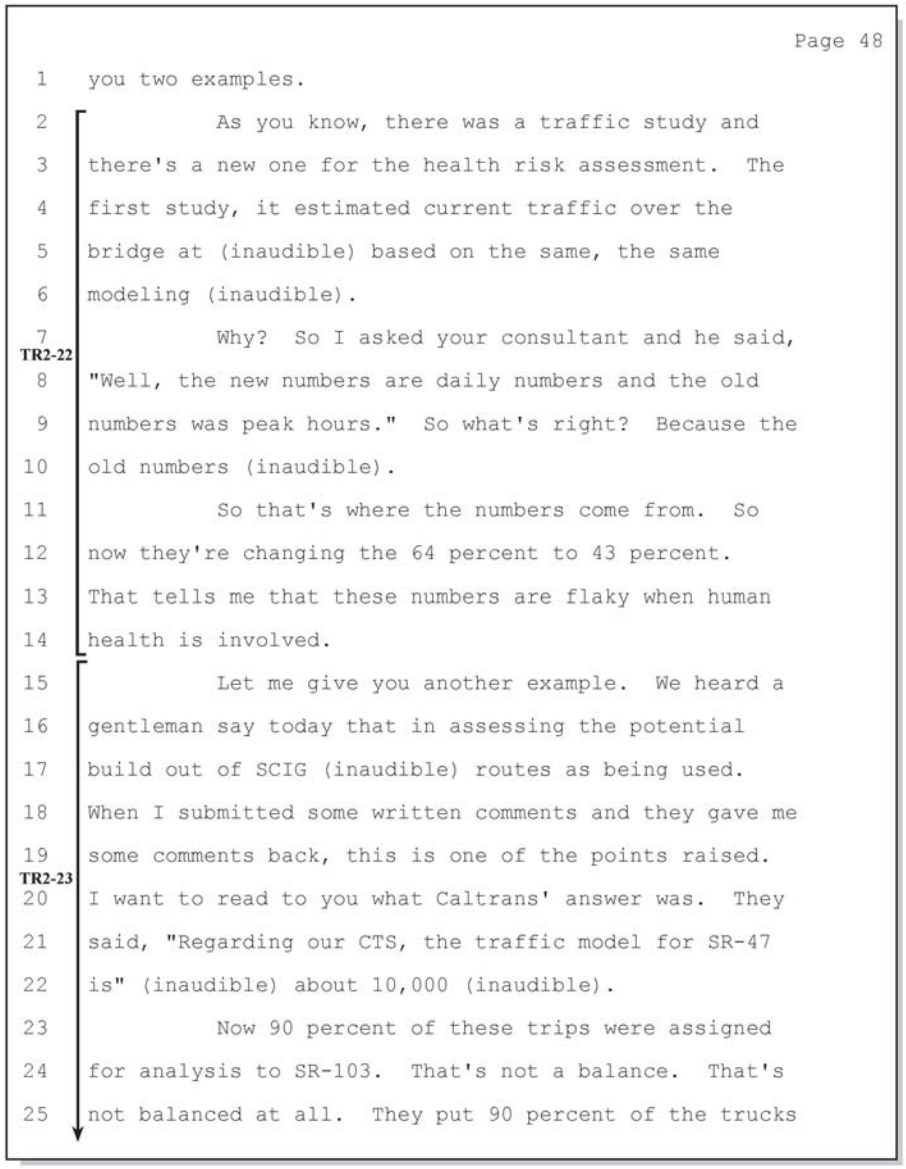
The actual computation of AADT by the model does not involve a "rule of thumb" multiplier, but a dispersion of daily traffic across four periods totaling 24 hours. It then derives peak our traffic by interpolation methods. The AADT numbers in the diagrams are more accurate than the multiplier approximation results cited in the comment.

Response to Comment TR2-23

The SR-103 truck trips are determined by the model, which assigns routes to trucks based on the shortest trip time.

Trucks originating in the POLB to the ICTF (about 35 percent) use the I-710 to PCH to SR-103, or port surface roads to Anaheim Street to SR-103. These trucks do not use the Schuyler Heim Bridge now and would not use the Expressway.

Trucks originating in the POLA West Basin to the ICTF (about 10 percent) use Harry Bridges Road to Alameda Street to Sepulveda Boulevard. These trucks also do not use the Heim Bridge now and would not use the Expressway.



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you two examples.

As you know, there was a traffic study and there's a new one for the health risk assessment. The first study, it estimated current traffic over the bridge at (inaudible) based on the same, the same modeling (inaudible).

TR2-22

Why? So I asked your consultant and he said, "Well, the new numbers are daily numbers and the old numbers was peak hours." So what's right? Because the old numbers (inaudible).

So that's where the numbers come from. So now they're changing the 64 percent to 43 percent. That tells me that these numbers are flaky when human health is involved.

Let me give you another example. We heard a gentleman say today that in assessing the potential build out of SCIG (inaudible) routes as being used. When I submitted some written comments and they gave me some comments back, this is one of the points raised.

TR2-23

I want to read to you what Caltrans' answer was. They said, "Regarding our CTS, the traffic model for SR-47 is" (inaudible) about 10,000 (inaudible).

Now 90 percent of these trips were assigned for analysis to SR-103. That's not a balance. That's not balanced at all. They put 90 percent of the trucks

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Trucks originating on Terminal Island to the ICTF (about 55 percent) use the Schuyler Heim Bridge to SR-103. These trucks would likely not use the Expressway rather than the SR-103 unless the ICTF Modernization Project moves forward. That project includes a new gate on Alameda Street and no left turns from the exit gate on Sepulveda Boulevard. That modernization may attract many of the SR-103 truck trips to the Expressway. As discussed in Response to Comment OB14-6, potential impacts resulting from newly proposed elements of the ICTF expansion project will be analyzed as part of the environmental review process for that project.

Response to Comment TR2-24

Please see Response to Comment OB14-6 and OB15-3.

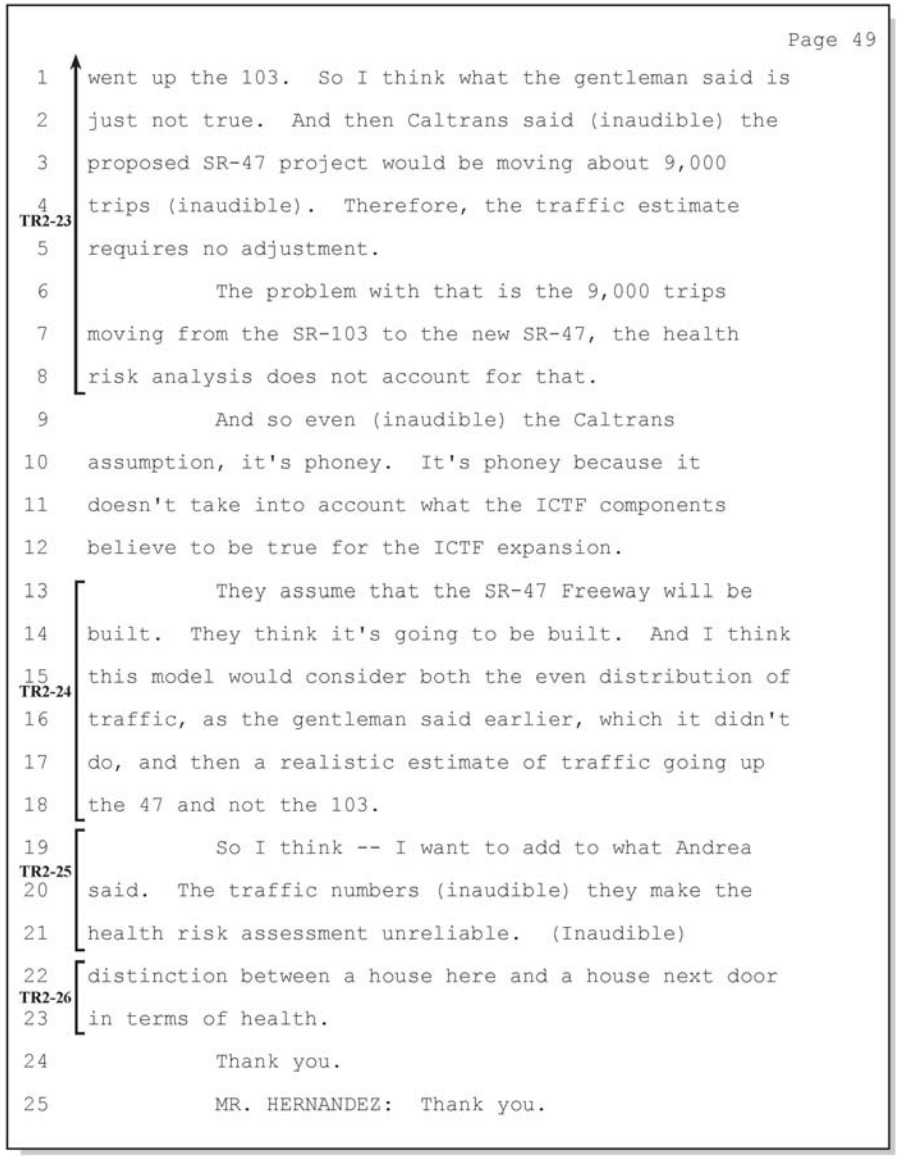
The Final EIS/EIR made reasonable assumptions about future trip distribution. To the extent the ICTF Modernization and/or SCIG projects will result in alternative trip distribution patterns, those patterns will be analyzed as part of the environmental review process for those projects.

Response to Comment TR2-25

Please see Response to Comment TR2-24.

Response to Comment TR2-26

As discussed in TR2-21, the HRA conclusions about the potential for significant impacts at residences in the vicinity of the proposed project err on the side of caution. They overstate the additional cancer risk and over-extend the impact zone boundaries. For this reason, the list of homes with the potential to be impacted by the proposed project is likely over- rather than under-inclusive. Moreover, if the 2003 baseline were utilized to assess potential health risks, the analysis would have concluded that no significant health risk impacts would result from the project. Please see Response to Comment AJ11-7 and OB14-7 for further discussion of the HRA's conservative methodology.



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went up the 103. So I think what the gentleman said is just not true. And then Caltrans said (inaudible) the proposed SR-47 project would be moving about 9,000 trips (inaudible). Therefore, the traffic estimate
TR2-23
requires no adjustment.

The problem with that is the 9,000 trips moving from the SR-103 to the new SR-47, the health risk analysis does not account for that.

And so even (inaudible) the Caltrans assumption, it's phoney. It's phoney because it doesn't take into account what the ICTF components believe to be true for the ICTF expansion.

They assume that the SR-47 Freeway will be built. They think it's going to be built. And I think this model would consider both the even distribution of
TR2-24
traffic, as the gentleman said earlier, which it didn't do, and then a realistic estimate of traffic going up the 47 and not the 103.

So I think -- I want to add to what Andrea
TR2-25
said. The traffic numbers (inaudible) they make the health risk assessment unreliable. (Inaudible) distinction between a house here and a house next door
TR2-26
in terms of health.

Thank you.

MR. HERNANDEZ: Thank you.

TR2
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Response to Comment TR2-27

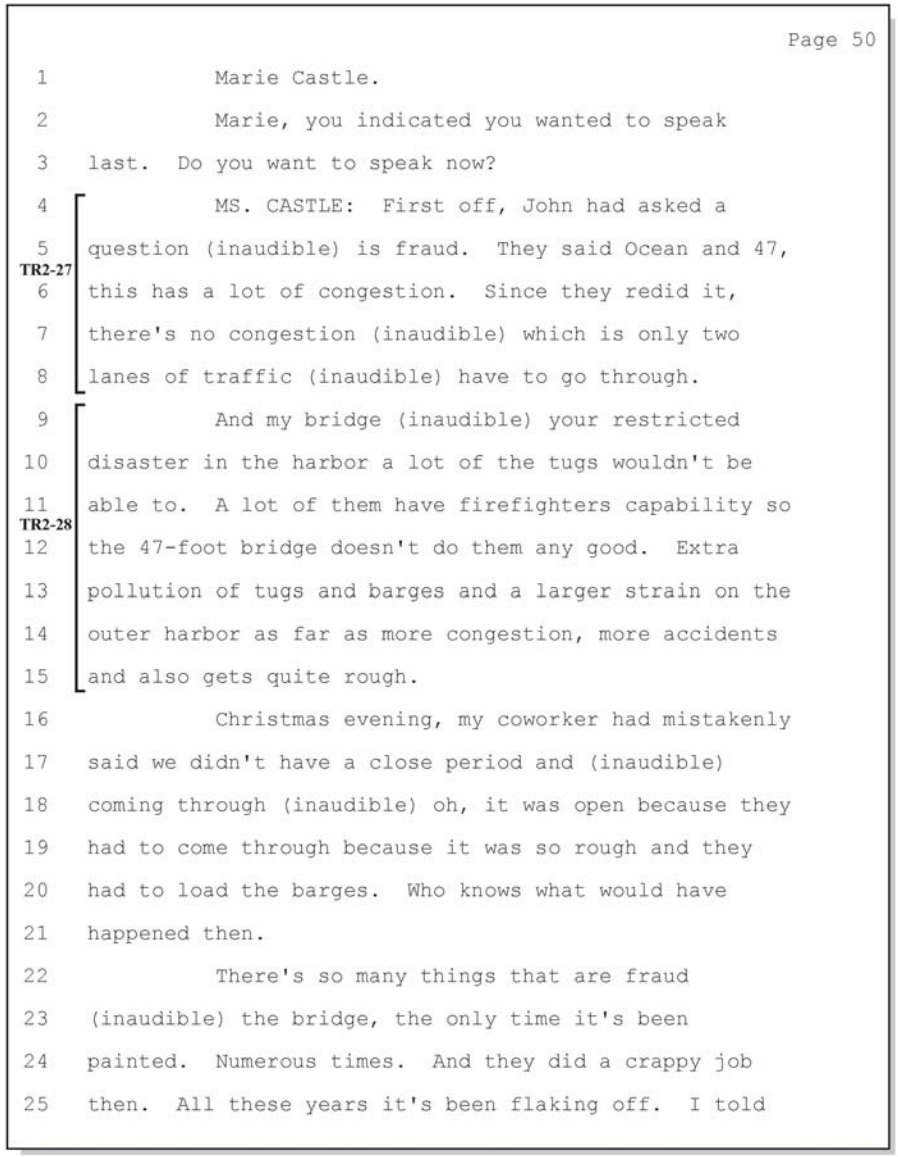
Since the Port of Long Beach reconstructed this intersection, the level of service has improved. However, the traffic study analysis determined that it will still operate at a poor level of service in the future based on Port growth.

Response to Comment TR2-28

Federal regulations concerning marine navigation are implemented by the U.S. Coast Guard (USCG) and the U.S. Army Corp of Engineers (ACOE). During preparation of the EIS/EIR, both the USCG and ACOE were consulted, and as a condition of the bridge permit, the USCG required consultation with both Ports, and the local mariners who use the Cerritos Channel. The agreed upon 47-foot vertical clearance permits the largest Port fireboats to pass through Cerritos Channel.

Section 3.4, Utilities and Public Services, of the Final EIS/EIR provides an analysis of potential impacts from both construction and operations. The conclusion is that average emergency response time for both land and water based operations would not be affected by the proposed project. Please see Public Services page 3.4-27 of the Final EIS/EIR for further discussion.

Air emissions associated with the detours of marine vessels were considered and appropriate mitigation measures were applied to help offset the emissions. Please see AQ-9, the Heavy Duty Truck Buy Back Program, in Section 3.13.4.2 of the Final EIS/EIR.



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Marie Castle.

Marie, you indicated you wanted to speak last. Do you want to speak now?

TR2-27 MS. CASTLE: First off, John had asked a question (inaudible) is fraud. They said Ocean and 47, this has a lot of congestion. Since they redid it, there's no congestion (inaudible) which is only two lanes of traffic (inaudible) have to go through.

TR2-28 And my bridge (inaudible) your restricted disaster in the harbor a lot of the tugs wouldn't be able to. A lot of them have firefighters capability so the 47-foot bridge doesn't do them any good. Extra pollution of tugs and barges and a larger strain on the outer harbor as far as more congestion, more accidents and also gets quite rough.

Christmas evening, my coworker had mistakenly said we didn't have a close period and (inaudible) coming through (inaudible) oh, it was open because they had to come through because it was so rough and they had to load the barges. Who knows what would have happened then.

There's so many things that are fraud (inaudible) the bridge, the only time it's been painted. Numerous times. And they did a crappy job then. All these years it's been flaking off. I told

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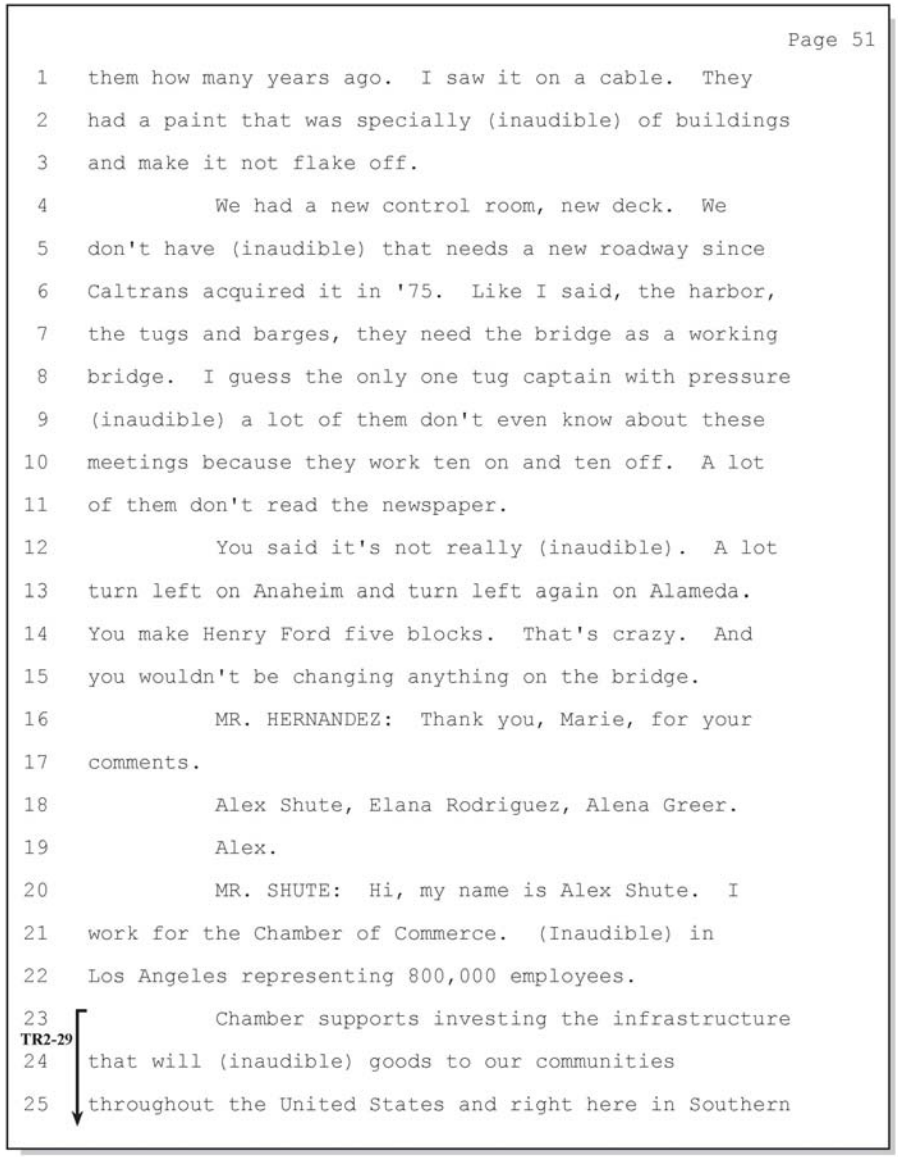
Response to Comment TR2-29

Your support of Alternative 1 is acknowledged.



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them how many years ago. I saw it on a cable. They had a paint that was specially (inaudible) of buildings and make it not flake off.

We had a new control room, new deck. We don't have (inaudible) that needs a new roadway since Caltrans acquired it in '75. Like I said, the harbor, the tugs and barges, they need the bridge as a working bridge. I guess the only one tug captain with pressure (inaudible) a lot of them don't even know about these meetings because they work ten on and ten off. A lot of them don't read the newspaper.

You said it's not really (inaudible). A lot turn left on Anaheim and turn left again on Alameda. You make Henry Ford five blocks. That's crazy. And you wouldn't be changing anything on the bridge.

MR. HERNANDEZ: Thank you, Marie, for your comments.

Alex Shute, Elana Rodriguez, Alena Greer.

Alex.

MR. SHUTE: Hi, my name is Alex Shute. I work for the Chamber of Commerce. (Inaudible) in Los Angeles representing 800,000 employees.

TR2-29 Chamber supports investing the infrastructure that will (inaudible) goods to our communities throughout the United States and right here in Southern

TR2
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California.

We support alternative one for this bridge because of the safety and reliability. Reduction of trucks on the street and safety (inaudible). The Chamber does strongly support (inaudible) ACTA and Caltrans mitigate local community impacts as discussed in the HRA. TR2-29

Additionally, (inaudible) expects the Los Angeles County to (inaudible) jobs and it's vital that the project continues.

Thank you.

MR. HERNANDEZ: Elana Rodriguez will be speaking in Spanish and will be interpreted in English by our interpreter for all the rest.

MS. RODRIGUEZ: Good evening.

My name is Elana Rodriguez. And I'm coming from the Alliance for Children with Asthma. And I'm also a resident of Long Beach, an area that's going to be affected.

A group of mothers in my area, we do several activities protecting the environment. We have been doing some counting on traffic. And we realized we counted 500 trucks with heavy loads per hour. They go by Cabrillo School that presently has over 4500 students. Hudson School that has over 1500 students.

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Response to Comment TR2-30

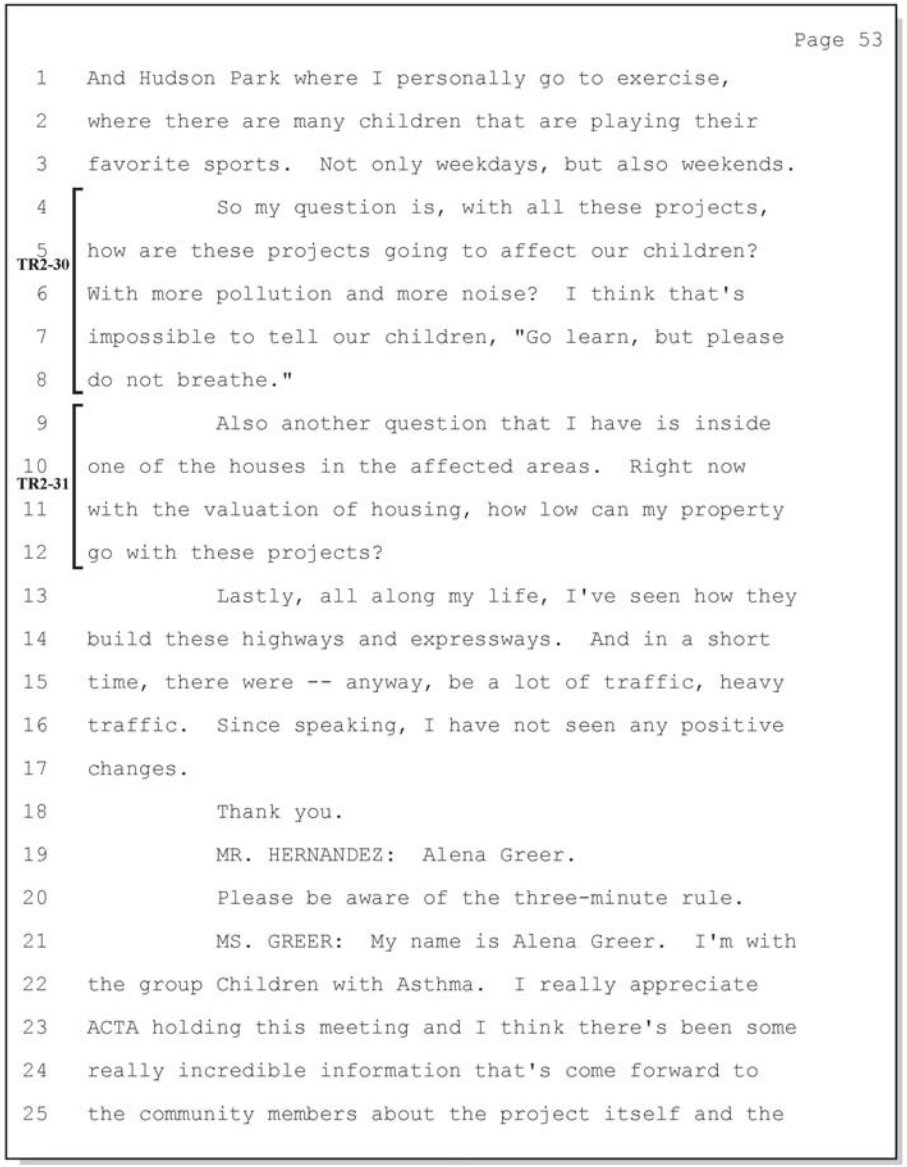
The HRA evaluated the risk to children in the project area. It considered exposure to project-associated motor vehicle emissions for several exposure scenarios and used assumptions to estimate the risk to children based on CARB's Interim Policy for Inhalation-Based Residential Cancer Risk (CARB, 2003) (HRA p. 31). Residential exposure duration was assumed to be 24 hours per day, 350 days per year over 70 years. Risks were also estimated for students attending schools in the study area and for recreational users. For Alternative 1, the preferred alternative, cancer risk increases for students in the study area were less than the SCAQMD significance level of 10 in a million (See Table TR2-1). Results are shown for Cabrillo High School. All other schools have less than significant risk. All residential impacts were less than the significance level with the exception of limited number of homes. If the proposed project is approved, ACTA has offered to install HVAC systems on the homes with significant impacts. HVAC systems are estimated to be 90 percent effective in removing particulate matter, which would reduce risk to less than the significance level as well as reducing baseline risk substantially at these locations (HRA, p. 53). Noise impacts were addressed in the Draft EIS/EIR, Section 3.14, and found to be less than significant with mitigation.

Response to Comment TR2-31

Please see Response to Comment TR2-20 and OB14-11.

In addition, other efforts would be made to minimize impacts and engage the community.

Referring to the SCAQMD's MATES III study, existing air-quality related residential risk in the project area ranges from 1300 to 1800 excess cancer risks per million people exposed. In 2003, the baseline health risk (assuming no project) for the SR-47 without improvements is 356 in a million. By the time the project is scheduled to begin



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And Hudson Park where I personally go to exercise, where there are many children that are playing their favorite sports. Not only weekdays, but also weekends.

So my question is, with all these projects, how are these projects going to affect our children? With more pollution and more noise? I think that's impossible to tell our children, "Go learn, but please do not breathe." TR2-30

Also another question that I have is inside one of the houses in the affected areas. Right now with the valuation of housing, how low can my property go with these projects? TR2-31

Lastly, all along my life, I've seen how they build these highways and expressways. And in a short time, there were -- anyway, be a lot of traffic, heavy traffic. Since speaking, I have not seen any positive changes.

Thank you.

MR. HERNANDEZ: Alena Greer.

Please be aware of the three-minute rule.

MS. GREER: My name is Alena Greer. I'm with the group Children with Asthma. I really appreciate ACTA holding this meeting and I think there's been some really incredible information that's come forward to the community members about the project itself and the

TR2
Page 43

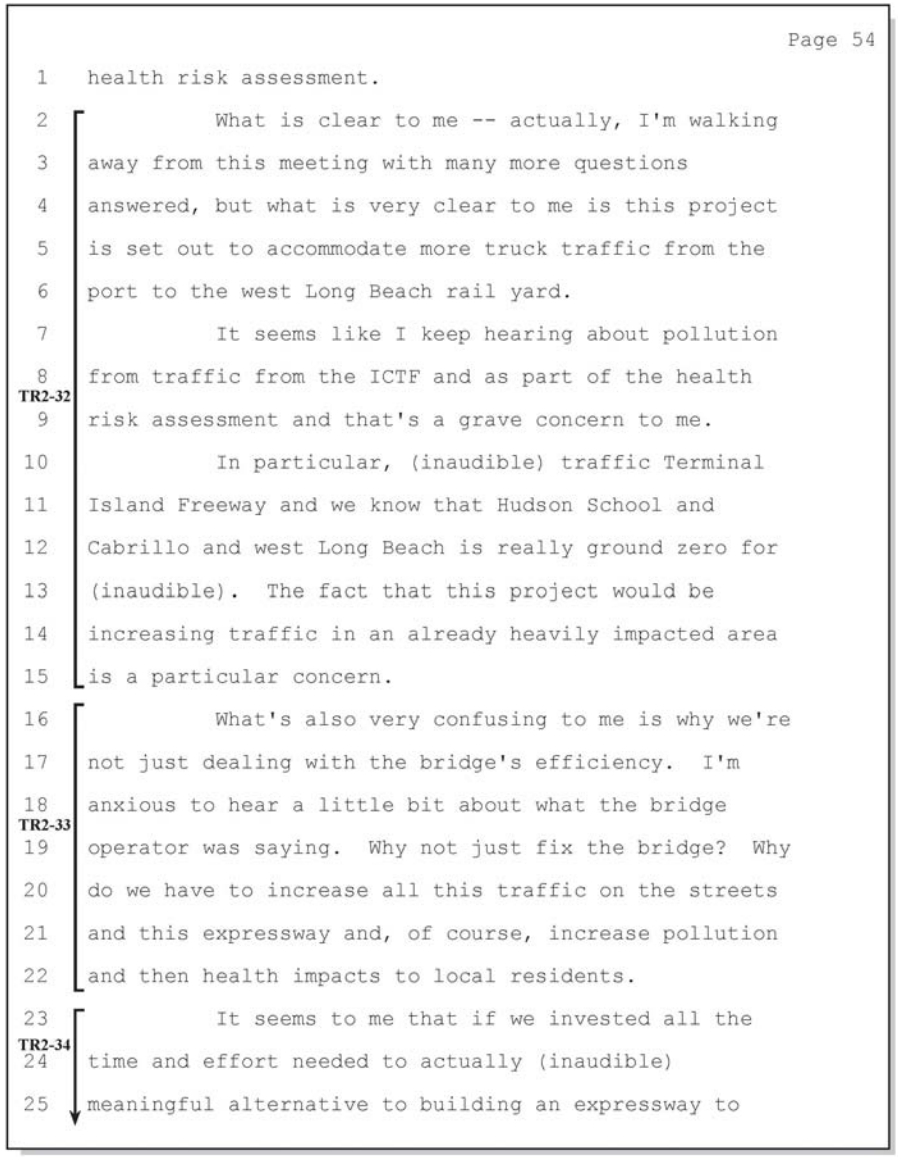
operation in approximately 2015, the baseline risk in the project area (assuming no project) is predicted to be 39.7 in a million (see Table TR2-1). Thus, risk from port-related traffic would be substantially less than current levels due to the benefits of the various regulatory efforts to reduce vehicular emissions such as the CARB fleet rule and the Clean Truck Program. With the project, the excess risk (difference between the proposed project and the No-Build scenario) at the most impacted homes would add slightly over 10 in a million to the risk at that time. ACTA has proposed to install HVAC systems on the impacted homes. HVAC systems are conservatively estimated to reduce particulate emissions by 90 percent, which would reduce excess risk at the impacted homes to less than 10 in a million (see HRA, pg 53). In homes with existing HVAC systems, the weatherization process and replacement with increased efficiency HVAC units would lower energy costs for these residents.

Response to Comment TR2-32

Please see Response to Comments OB14-6, OB15-1, OB15-2, and OB15-3.

Response to Comment TR2-33

Your comment is noted. The purpose of the project is to ensure safe vehicular connection between Terminal Island and the mainland, reduce congestion, and provide a high-capacity limited-access route for traffic between Terminal Island and I-405. All reasonable and feasible alternatives were considered during project scoping and are addressed in Chapter 2 of the Draft and the Final EIS/EIR. Alternative 4 considered the option of replacing the bridge only. Section 2.2.1 of the Final EIS/EIR states "Alternative 4 involves only replacement of the Schuyler Heim Bridge. Because it would not help address traffic congestion north of the bridge, it would not meet the project purpose and need. Therefore, Alternative 4 was not identified as a preferred alternative over Alternative 1."



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health risk assessment.

What is clear to me -- actually, I'm walking away from this meeting with many more questions answered, but what is very clear to me is this project is set out to accommodate more truck traffic from the port to the west Long Beach rail yard.

It seems like I keep hearing about pollution from traffic from the ICTF and as part of the health

TR2-32

risk assessment and that's a grave concern to me.

In particular, (inaudible) traffic Terminal Island Freeway and we know that Hudson School and Cabrillo and west Long Beach is really ground zero for (inaudible). The fact that this project would be increasing traffic in an already heavily impacted area is a particular concern.

What's also very confusing to me is why we're not just dealing with the bridge's efficiency. I'm anxious to hear a little bit about what the bridge

TR2-33

operator was saying. Why not just fix the bridge? Why do we have to increase all this traffic on the streets and this expressway and, of course, increase pollution and then health impacts to local residents.

It seems to me that if we invested all the

TR2-34

time and effort needed to actually (inaudible) meaningful alternative to building an expressway to

TR2
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Response to Comment TR2-34

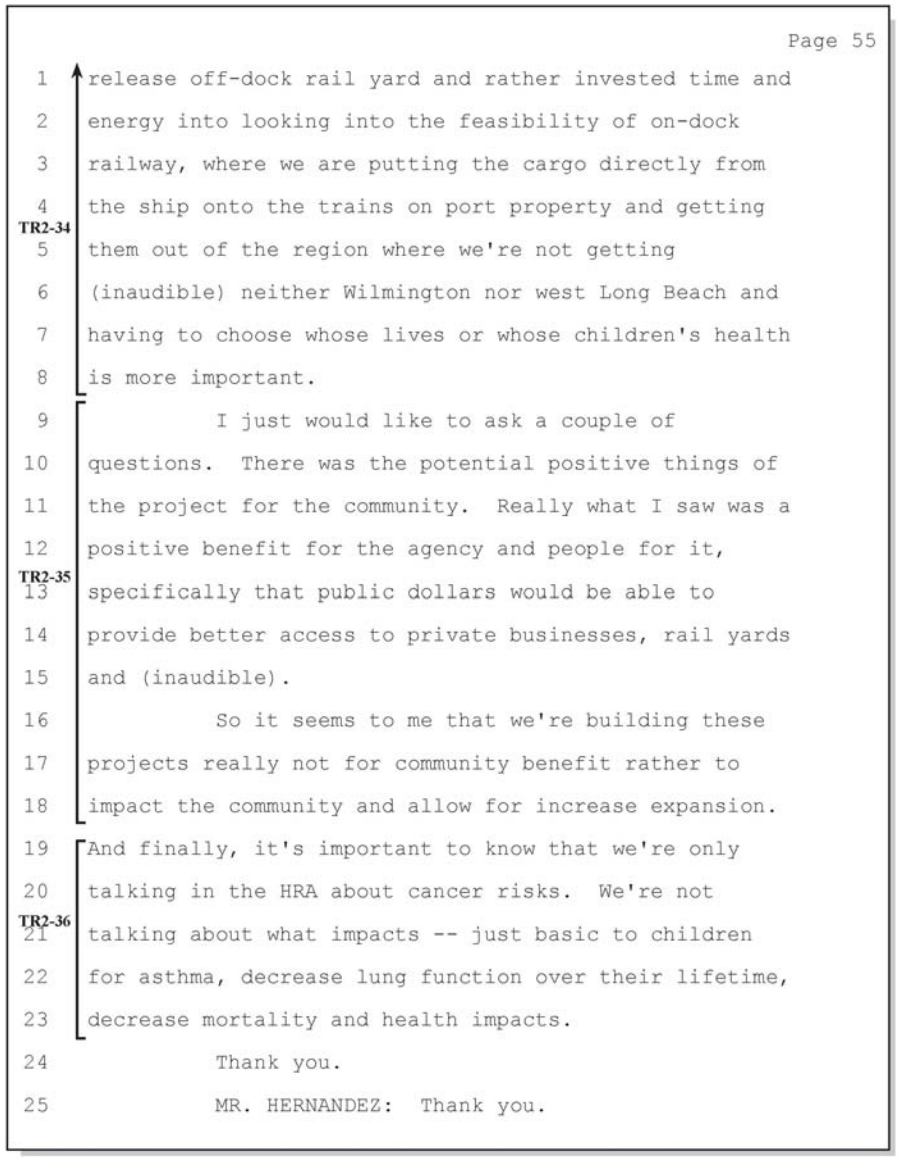
Several projects have been approved or proposed that would increase the percentage of cargo loaded on trains using on-dock rail. However, due to space and logistic constraints it is not considered possible for all cargo to be loaded using on-dock rail and for that reason near-dock rail yards such as the SCIG, if adopted, and the ICTF would continue to be used. Near-dock rail is considered preferable to shipping containers lengthy distances by truck (*San Pedro Bay Ports Clean Air Action Plan Technical Report*, p. 137). Rail shipment reduces traffic congestion and reduces emission per container (*Id*. at p. 136).

Response to Comment TR2-35

The community would benefit from the proposed project because it would reduce traffic congestion and emissions as opposed to the No-Build scenario (Please see Response to Comment TR1-54). Historically public dollars have been used for transportation improvements that benefit both the traveling public and industry. Much of these public dollars come from state and federal fuel taxes that are paid by the public and industry. In the case of the Expressway, over half its funding would come specifically from industry assessed container fees, which is a new model for funding port-related infrastructure.

Response to Comment TR2-36

Non-cancer acute and chronic health risks were evaluated in the HRA. OEHHA has developed Reference Exposure Levels (RELs) to assess non-cancer health risks. RELs are developed from the best available data in the scientific literature and are concentrations at or below which no adverse health effects are anticipated in the most susceptible people. In other words, RELs are set at levels of exposure meant to ensure that the most sensitive individuals (e.g., children and the elderly) are protected from non-cancer health effects (*A Guide to Health Risk Assessment*, p. 10, OEHHA, 2001). To assess chronic



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release off-dock rail yard and rather invested time and energy into looking into the feasibility of on-dock railway, where we are putting the cargo directly from the ship onto the trains on port property and getting them out of the region where we're not getting (inaudible) neither Wilmington nor west Long Beach and having to choose whose lives or whose children's health is more important.

TR2-34

I just would like to ask a couple of questions. There was the potential positive things of the project for the community. Really what I saw was a positive benefit for the agency and people for it, specifically that public dollars would be able to provide better access to private businesses, rail yards and (inaudible).

TR2-35

So it seems to me that we're building these projects really not for community benefit rather to impact the community and allow for increase expansion.

And finally, it's important to know that we're only talking in the HRA about cancer risks. We're not talking about what impacts -- just basic to children for asthma, decrease lung function over their lifetime, decrease mortality and health impacts.

TR2-36

Thank you.

MR. HERNANDEZ: Thank you.

and acute non-cancer exposures, annual and 1-hour TAC ground-level concentrations were compared to the RELs developed by OEHHA to obtain a chronic or acute hazard index. According to the most recent guidance published by OEHHA (OEHHA, 2003) a hazard index less than 1.0 indicates that the potential for non-cancer public health risks is less than significant.

The HRA concluded that there would be net decreases in the acute and chronic hazard indices for the project years 2015 and 2030 (as well as intermediate project years) compared to the baseline scenario for all receptors due to improvements in vehicle emissions controls. It also found that the potential for non-cancer health effects between the build and no-build alternatives was less than significant for all scenarios analyzed because the highest hazard index in the vicinity of the proposed project were estimated to be less than the 1.0 threshold (HRA, p. 36). This methodology is consistent with applicable guidance and analyses of non-cancer health impacts performed by agencies such as, OEHHA, CARB, and SCAQMD, which are responsible for the protection of human health.

The HRA relied on the currently adopted regulatory guidelines. The health values of diesel PM and other air toxics used in the HRA were those in the latest version of the HARP model, which embodies the latest approved health values for air toxics and the regulatory guidance from OEHHA.

Adverse impacts of diesel PM, such as cardiovascular and respiratory disease, are not specifically addressed by the OEHHA guideline or HARP model. However, it is generally accepted that PM concentrations lower than the REL can affect cardiovascular and respiratory systems. The Final EIS/EIR has been revised to indicate that the HI calculations for air toxics were based on acute and chronic non-cancer effects but do not explicitly include other effects such as cardiovascular and respiratory disease and deaths, exacerbation of asthma, or enhancement of allergic response.

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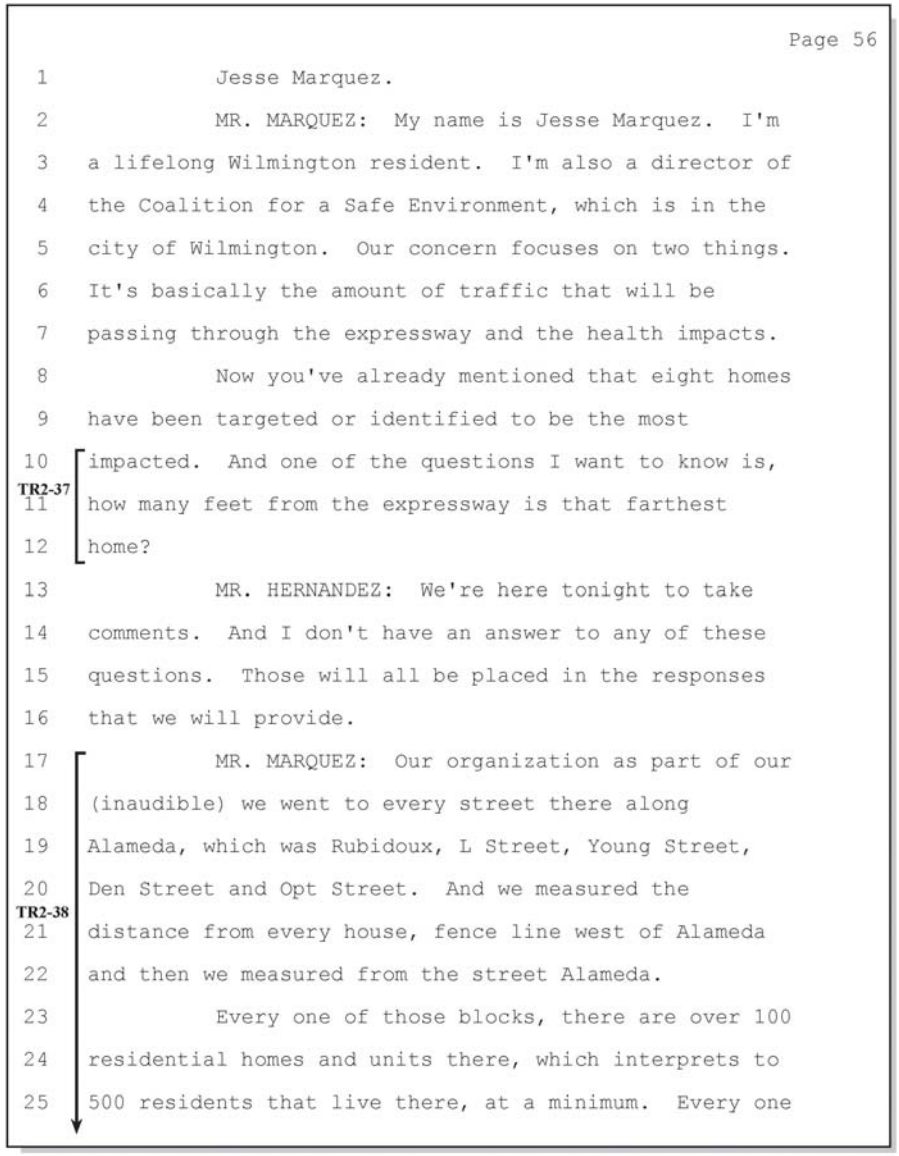
Response to Comment TR2-37

The furthest affected home is 557 ft from the elevated expressway. The isopleths for determining the boundary is calculated by comparing the difference between emission levels determined for the no build case and the specific alternative at the various grid locations (HRA; Figures 3-5, 3-6). Due to geometries, prevailing winds and physical topography, this line is not a fixed distance from the roadway alignment but instead varies in distance from one side of the alignment to the other or even along the alignment. Therefore universally applying this number to all locations is not valid. One of the conditions that affects the results in the Rubidoux area is that the Expressway is transitioning from an elevated structure to an at-grade facility in this vicinity.

Response to Comment TR2-38

As noted in the comment, studies have shown elevated risk within 500 feet of existing transportation corridors, particularly freeways. That is one of the reasons why ACTA decided to conduct an HRA and mitigate the risks to the levels below SCAQMD's significance level. The HRA used very conservative assumptions and the impact zones calculated are similarly very conservative, meaning that they overstate the additional cancer risk and over-extend the impact zone boundaries.

The cited California Air Resources Board (CARB) and South Coast Air Quality Management District (SCAQMD) guidelines come out of advisory documents that provide suggested policies. The documents do not establish regulatory standards (see *Air Quality and Land Use Handbook: A Community Health Perspective*, p. 3 [CARB, 2005]; see also *Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning*, p. 1 [SCAQMD, 2005]). While both documents recommend that residences and other sensitive land uses be cited more than 500 feet from a freeway, they also recognize that land use



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Jesse Marquez.

MR. MARQUEZ: My name is Jesse Marquez. I'm a lifelong Wilmington resident. I'm also a director of the Coalition for a Safe Environment, which is in the city of Wilmington. Our concern focuses on two things. It's basically the amount of traffic that will be passing through the expressway and the health impacts.

Now you've already mentioned that eight homes have been targeted or identified to be the most impacted. And one of the questions I want to know is, how many feet from the expressway is that farthest home?

TR2-37

MR. HERNANDEZ: We're here tonight to take comments. And I don't have an answer to any of these questions. Those will all be placed in the responses that we will provide.

MR. MARQUEZ: Our organization as part of our (inaudible) we went to every street there along Alameda, which was Rubidoux, L Street, Young Street, Den Street and Opt Street. And we measured the distance from every house, fence line west of Alameda and then we measured from the street Alameda.

TR2-38

Every one of those blocks, there are over 100 residential homes and units there, which interprets to 500 residents that live there, at a minimum. Every one

TR2
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decisions are not within the jurisdiction of either agency and; therefore, that recommendations in each respective document are not binding on agencies exercising land use authority (*Air Quality and Land Use Handbook: A Community Health Perspective*, supra, pp. 2 and 4.; see also *Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning*, supra, p. 1.) Accordingly, while a 500-foot guideline is suggested in both documents, Caltrans and FHWA have the authority to deviate from the suggested guideline.

Please see Response to Comment TR2-15.

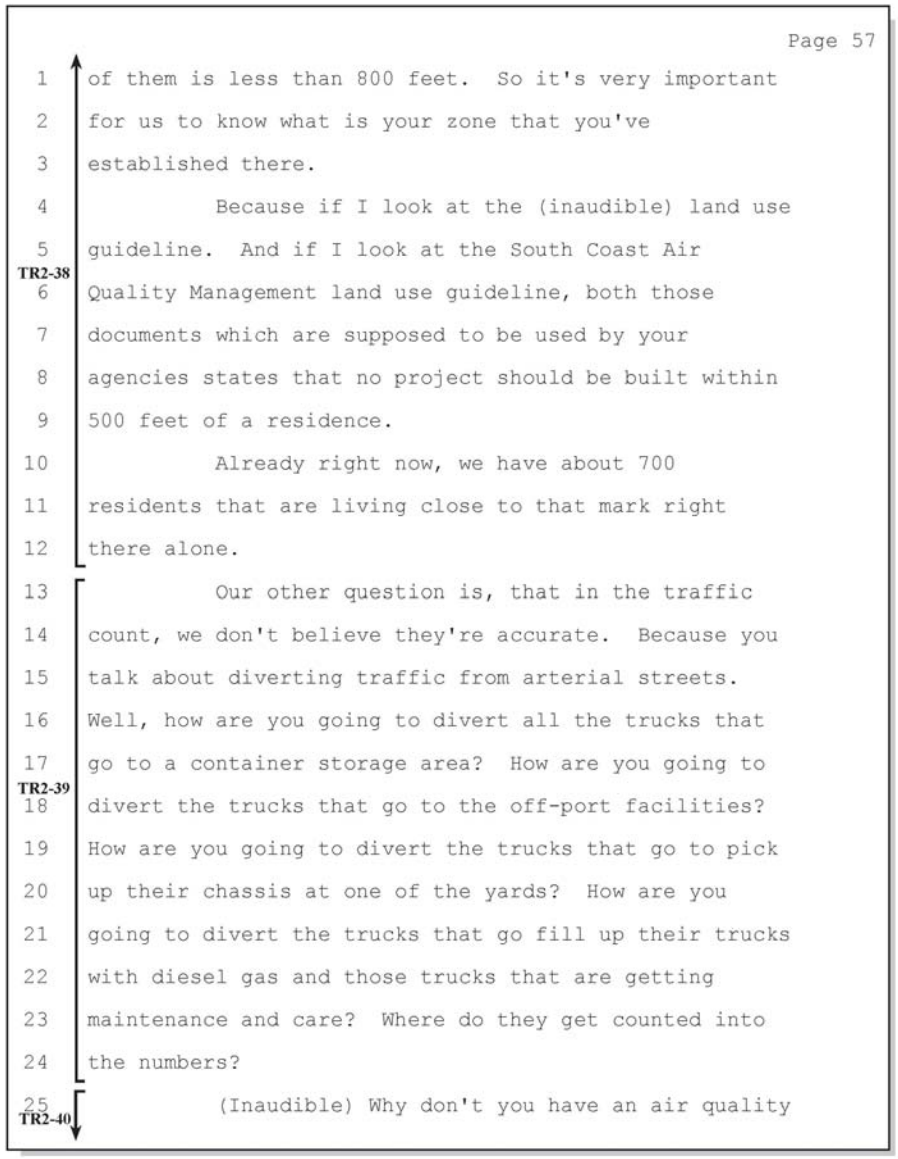
Response to Comment TR2-39

The primary purpose of the project is freeway congestion relief by diverting certain traffic to the previously improved Alameda Street where tens of millions have been spent by local agencies to increase its capacity. The localized diversion, as stated in the Executive Summary of the Draft EIS/EIR, involves the existing surface street Henry Ford/Alameda Street connection from the fully improved and widened Alameda Street north of PCH to the SR-103 ramps to Terminal Island. The new elevated structure would result in a 50 percent reduction in the trucks on Henry Ford Avenue that would otherwise use it if the proposed project is not built. It was never the intent nor is it reasonably possible to divert all the types of localized trips mentioned in the comment away from the area.

Response to Comment TR2-40

In terms of "fence-line" monitoring, it should be noted that the air dispersion modeling in the HRA used meteorological data collected at the Sts. Peter and Paul School, which is within the overall modeling domain, and approximately 0.3 mile outside the refined receptor region in Wilmington area.

A public health survey in the project area would not yield meaningful baseline information or information about potential project impacts because it would be impossible to separate project impacts from illnesses caused by natural processes or even general port-related impacts. Please see Response to Comment TR2-36.



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of them is less than 800 feet. So it's very important for us to know what is your zone that you've established there.

Because if I look at the (inaudible) land use guideline. And if I look at the South Coast Air Quality Management land use guideline, both those documents which are supposed to be used by your agencies states that no project should be built within 500 feet of a residence.

TR2-38

Already right now, we have about 700 residents that are living close to that mark right there alone.

Our other question is, that in the traffic count, we don't believe they're accurate. Because you talk about diverting traffic from arterial streets. Well, how are you going to divert all the trucks that go to a container storage area? How are you going to divert the trucks that go to the off-port facilities? How are you going to divert the trucks that go to pick up their chassis at one of the yards? How are you going to divert the trucks that go fill up their trucks with diesel gas and those trucks that are getting maintenance and care? Where do they get counted into the numbers?

TR2-39

(Inaudible) Why don't you have an air quality

TR2-40

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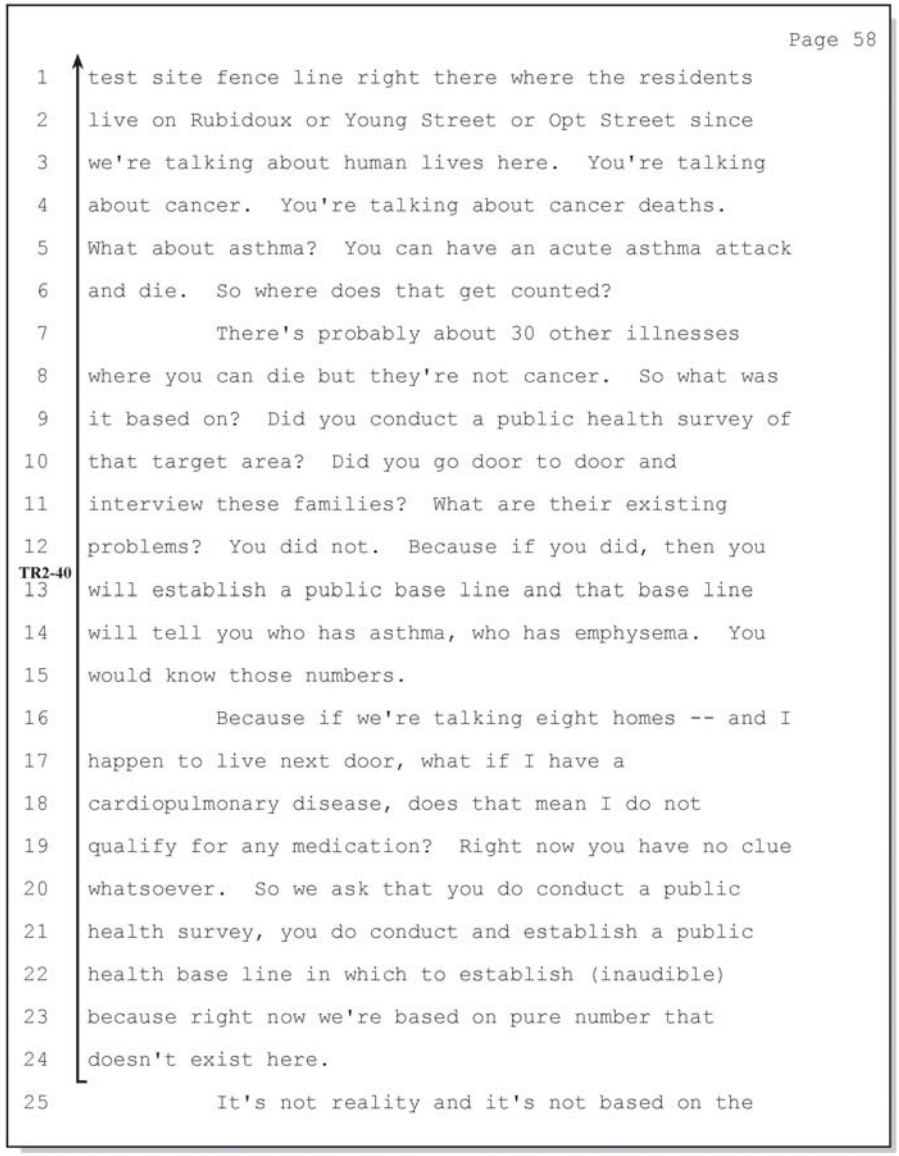

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test site fence line right there where the residents live on Rubidoux or Young Street or Opt Street since we're talking about human lives here. You're talking about cancer. You're talking about cancer deaths. What about asthma? You can have an acute asthma attack and die. So where does that get counted?

There's probably about 30 other illnesses where you can die but they're not cancer. So what was it based on? Did you conduct a public health survey of that target area? Did you go door to door and interview these families? What are their existing problems? You did not. Because if you did, then you

TR2-40

will establish a public base line and that base line will tell you who has asthma, who has emphysema. You would know those numbers.

Because if we're talking eight homes -- and I happen to live next door, what if I have a cardiopulmonary disease, does that mean I do not qualify for any medication? Right now you have no clue whatsoever. So we ask that you do conduct a public health survey, you do conduct and establish a public health base line in which to establish (inaudible) because right now we're based on pure number that doesn't exist here.

It's not reality and it's not based on the

TR2
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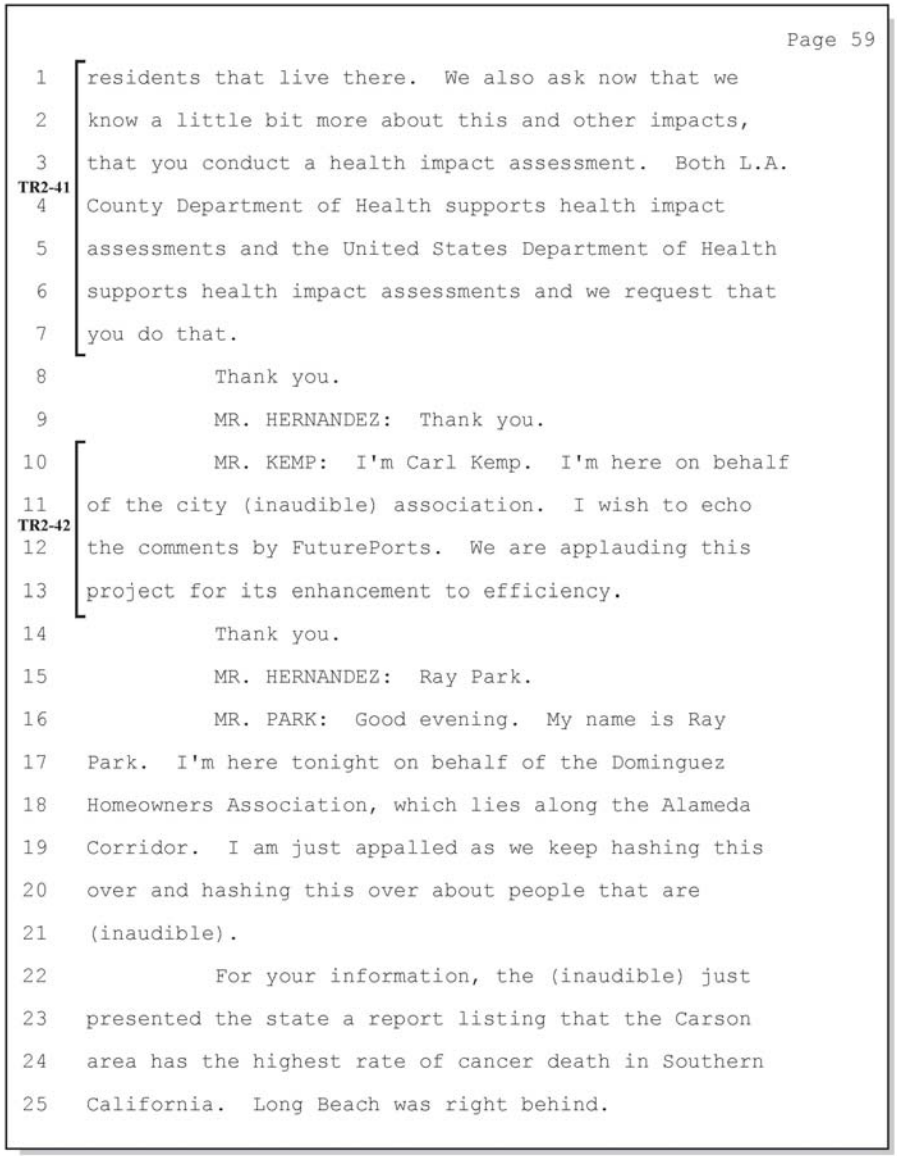
Response to Comment TR2-41

According to the World Health Organization (WHO), a Health Impact Assessment ("HIA") is "A combination of procedure, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population." HIA recommendations are produced for decision makers and stakeholders, with the aim of maximizing a proposed project's positive health effects and minimizing the negative health effects. In a letter dated January 28, 2009, the EPA stated that a port-wide health impact assessment may be "beyond the scope of any one Port project NEPA document" (Goforth, Kathleen; EPA; 2009; letter to U.S. Army Corps of Engineers; January 28.)

Because the Final EIS/EIR discloses environmental impacts, including health risk impacts, of the proposed project, an additional HIA is not required. Nonetheless, the Final EIS/EIR includes a number of health assessment tools including the HRA, criteria pollutant modeling, and Environmental Justice analysis that will assist the lead agency in comparing the benefits and costs among project alternatives.

Response to Comment TR2-42

Your support of the proposed project is acknowledged.



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residents that live there. We also ask now that we know a little bit more about this and other impacts, that you conduct a health impact assessment. Both L.A. County Department of Health supports health impact assessments and the United States Department of Health supports health impact assessments and we request that you do that.

TR2-41

Thank you.

MR. HERNANDEZ: Thank you.

MR. KEMP: I'm Carl Kemp. I'm here on behalf of the city (inaudible) association. I wish to echo the comments by FuturePorts. We are applauding this project for its enhancement to efficiency.

TR2-42

Thank you.

MR. HERNANDEZ: Ray Park.

MR. PARK: Good evening. My name is Ray Park. I'm here tonight on behalf of the Dominguez Homeowners Association, which lies along the Alameda Corridor. I am just appalled as we keep hashing this over and hashing this over about people that are (inaudible).

For your information, the (inaudible) just presented the state a report listing that the Carson area has the highest rate of cancer death in Southern California. Long Beach was right behind.

TR2
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Response to Comment TR2-43

The traffic study and the HRA consider the impacts through the Dominguez area to SR-91. The results show virtually no additional significant cancer risk between the build and no-build conditions.

Response to Comment TR2-44

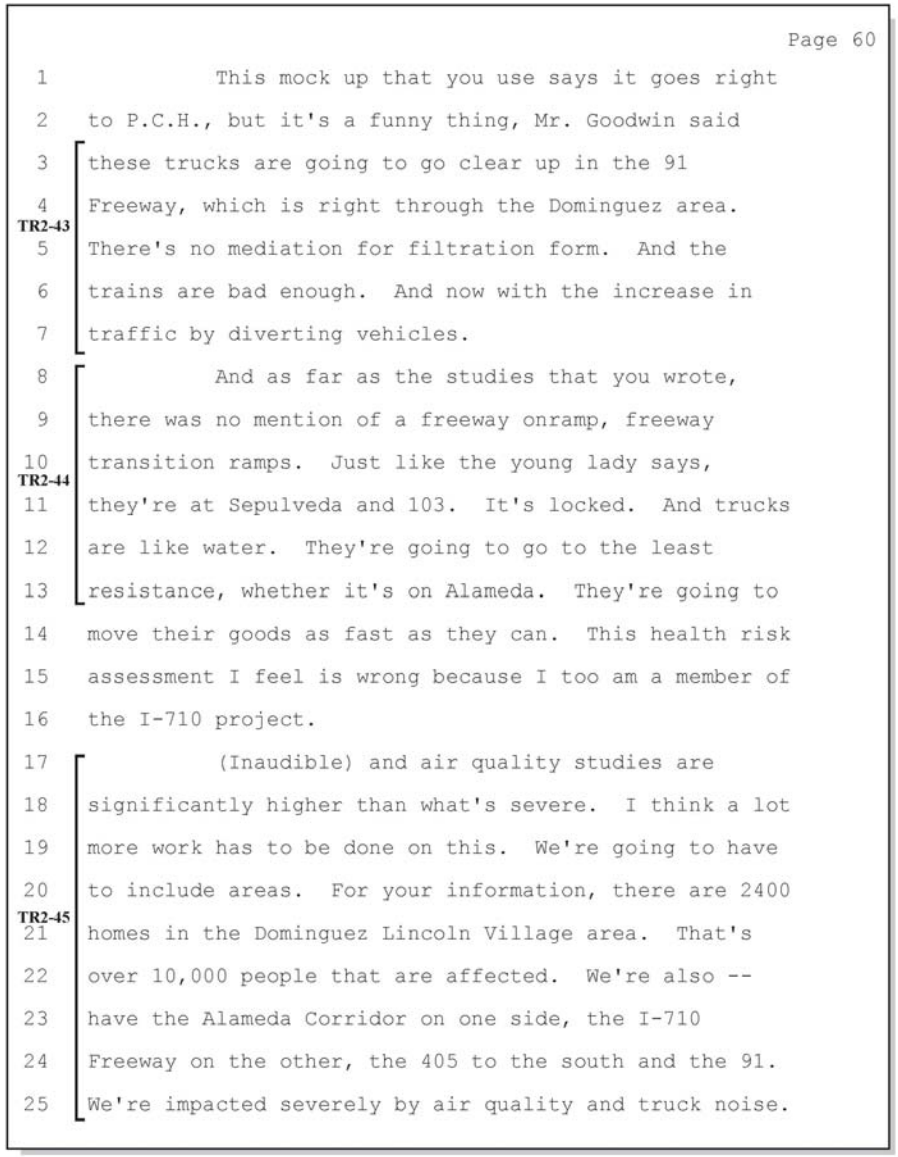
Table 3.5-14 of the Final EIS/EIR shows 14 ramp conditions with and without the project from PCH north to SR91. Three improve, nine stay the same and two are worse with the project. Improvements at impacted intersections are incorporated as an element of the proposed project for Alternatives 1 and 2.

Response to Comment TR2-45

The HRA estimated the potential health impacts for the Dominguez and Lincoln Village areas associated with the proposed project. The results are shown in Tables 3.13-17 and 3.13-19 of the SDEIS/RDEIR, pp. 3.13-53 and 56. The maximum cancer risk increases at residential areas are below the significance threshold for Alternatives 1 using the preferred emissions scenario, except for a small area in Lincoln Village. For any residence in the impacted area, ACTA has offered to install HVAC systems to reduce the risk to a level that is less than significant.

The potential for noise impacts as a result of the project was studied in the EIS/EIR (Final EIS/EIR, Section 3.14; Section 4.5.4). The EIS/EIR determined that with implementation of mitigation including noise barriers along the SR-47 Expressway and Alameda Street, potential operational noise impacts (including those resulting from truck noise) would be reduced to a less than significant level at all locations in the project study area except Anchorage Way Marinas where no mitigation is feasible (*Id.* at pp. 3.14-20 and 4-15).

Please see Response to Comment TR2-43.



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This mock up that you use says it goes right to P.C.H., but it's a funny thing, Mr. Goodwin said these trucks are going to go clear up in the 91 Freeway, which is right through the Dominguez area.

TR2-43

There's no mediation for filtration form. And the trains are bad enough. And now with the increase in traffic by diverting vehicles.

And as far as the studies that you wrote, there was no mention of a freeway onramp, freeway transition ramps. Just like the young lady says,

TR2-44

they're at Sepulveda and 103. It's locked. And trucks are like water. They're going to go to the least resistance, whether it's on Alameda. They're going to move their goods as fast as they can. This health risk assessment I feel is wrong because I too am a member of the I-710 project.

(Inaudible) and air quality studies are significantly higher than what's severe. I think a lot more work has to be done on this. We're going to have to include areas. For your information, there are 2400

TR2-45

homes in the Dominguez Lincoln Village area. That's over 10,000 people that are affected. We're also -- have the Alameda Corridor on one side, the I-710 Freeway on the other, the 405 to the south and the 91. We're impacted severely by air quality and truck noise.

TR2
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I think that we've got to do some more studying and we have to include people that are affected, whether it's at the elementary schools in Long Beach, the residents along the Alameda Corridor, but something has to be done to ensure the safety of the residents, not just four or five folks that you can draw a line and no more fumes and air quality at this point. It doesn't work.

Thank you very much.

MR. HERNANDEZ: Thank you very much.

Teresa Hurtado.

MS. HURTADO: Hello, I'm Teresa Hurtado. I'm a registered dental (inaudible) and I'm getting my Bachelor's in occupational science. I work full-time and I go to school full-time at night. The only reason that I looked at this flier was because I remember that bridge, going through that bridge when we would go visit my dad because he worked in Terminal Island.

Me, as a community member, we usually don't have time to come to these meetings and listen to everything (inaudible) and one thing and another, but I'm really happy that I did look at this.

I am on 1500 block Rubidoux. This is crazy to me how we have all this pollution that can be happening, like premature deaths, asthma.

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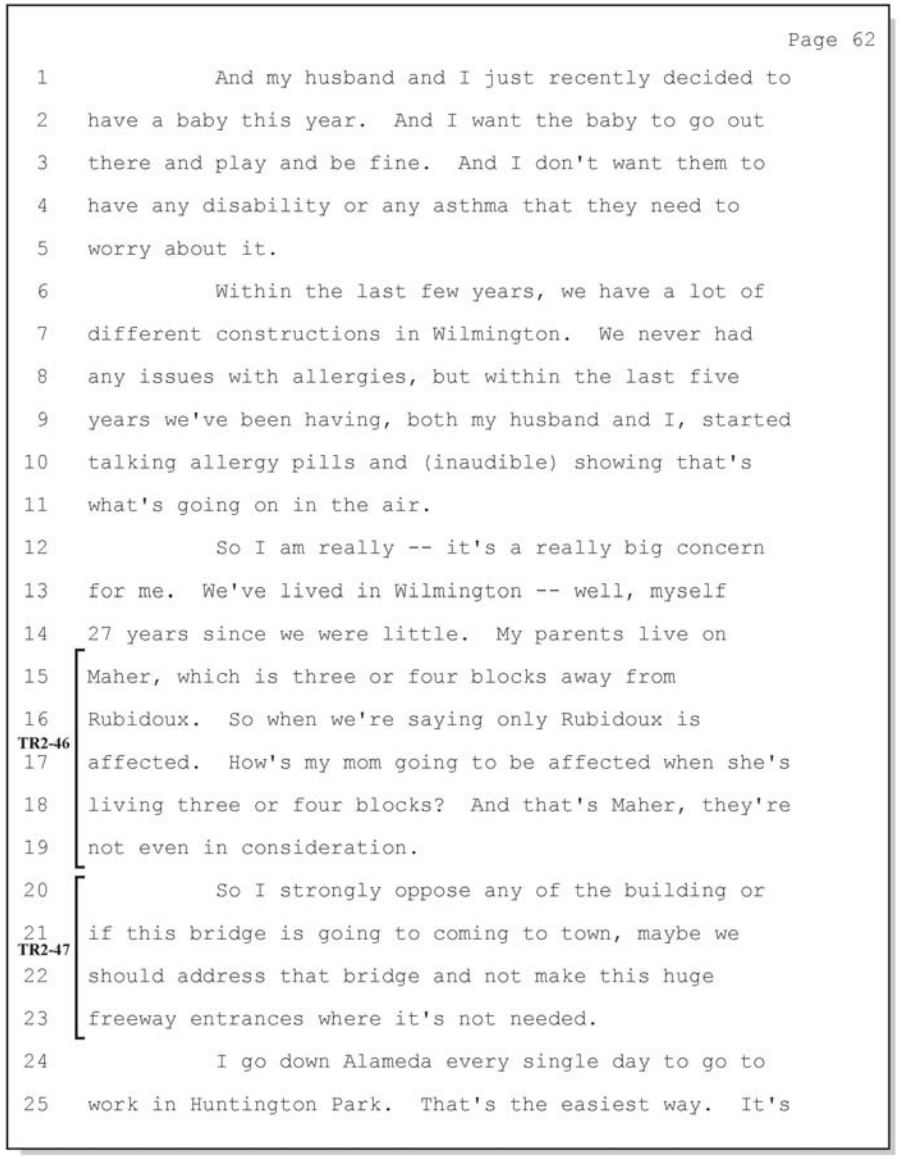
Response to Comment TR2-46

It is highly unlikely that more homes in the study area would have a risk higher than 10 in a million. Please see Response to Comment AJ11-7 and OB14-7 for further discussion.

Response to Comment TR2-47

Your comment is noted. The option of only replacing the bridge was considered as Alternative 4.



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And my husband and I just recently decided to have a baby this year. And I want the baby to go out there and play and be fine. And I don't want them to have any disability or any asthma that they need to worry about it.

Within the last few years, we have a lot of different constructions in Wilmington. We never had any issues with allergies, but within the last five years we've been having, both my husband and I, started talking allergy pills and (inaudible) showing that's what's going on in the air.

So I am really -- it's a really big concern for me. We've lived in Wilmington -- well, myself 27 years since we were little. My parents live on Maher, which is three or four blocks away from Rubidoux. So when we're saying only Rubidoux is affected. How's my mom going to be affected when she's living three or four blocks? And that's Maher, they're not even in consideration.

TR2-46

So I strongly oppose any of the building or if this bridge is going to coming to town, maybe we should address that bridge and not make this huge freeway entrances where it's not needed.

TR2-47

I go down Alameda every single day to go to work in Huntington Park. That's the easiest way. It's

TR2
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usually packed, but Alameda and Anaheim, they don't have a huge congestion. So I don't think truckers will take these new routes on the 47 or whatever this new route is going to be. It wouldn't be beneficial.

MR. HERNANDEZ: Thank you very much.

Thank you very much. That concludes our portion of the public comments. There are still a few cookies left. And I'd like to thank all of you for attending this evening. Good night.

(Proceedings concluded at 8:36 p.m.)

MEMORANDUM OF AGREEMENT
BETWEEN THE CALIFORNIA DEPARTMENT OF TRANSPORTATION AND THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER REGARDING THE STATE ROUTE 47 (SR-47) EXPRESSWAY AND THE SCHUYLER HEIM BRIDGE REPLACEMENT PROJECT, CITIES OF LONG BEACH AND LOS ANGELES, LOS ANGELES COUNTY, CALIFORNIA

WHEREAS, the Federal Highways Administration (FHWA) has assigned, and the California Department of Transportation (Caltrans) has assumed, FHWA responsibility for environmental review, consultation, and coordination under the provisions of the *Memorandum of Understanding (MOU) between the Federal Highway Administration and the California Department of Transportation Concerning the State of California's Participation in the Surface Transportation Project Delivery Pilot Program*, which became effective on July 1, 2007 and applies to this project; and

WHEREAS, Caltrans has determined that the State Route 47 (SR-47) Expressway and the Schuyler Heim Bridge Replacement Project (Undertaking), will have an adverse effect on the Schuyler Heim Bridge (#53-2618), a property determined to be eligible for inclusion in the National Register of Historic Places (National Register); and

WHEREAS, Caltrans has consulted with the California State Historic Preservation Officer (SHPO) pursuant to Stipulations X.C., and X.I. of the January 2004, *Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act, as it pertains to the Administration of the Federal-Aid Highway Program in California* (PA), and where the PA so directs, in accordance with 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act (16 USC Section 470f), as amended (NHPA), regarding the Undertaking's effects on historic properties and has notified the Advisory Council on Historic Preservation (ACHP) of the adverse effect finding pursuant to pursuant to 36 CFR § 800.6(a)(1); and

WHEREAS, Caltrans has thoroughly considered alternatives to the Undertaking, has determined that the statutory and regulatory constraints on the design of the Undertaking preclude the possibility of avoiding adverse effects to the historic property during the Undertaking's implementation , and has further determined that it will resolve adverse effects of the Undertaking on the subject historic property through the execution and implementation of this Memorandum of Agreement (MOA); and

WHEREAS, Caltrans District 7 (District 7) and the Alameda Corridor Transportation Authority (ACTA), have participated in the consultation process and have been invited to concur in this MOA; and

WHEREAS, For Alternatives 1, 1A, 2, 4, and 3, Caltrans shall ensure that the following stipulations are implemented; and

NOW, THEREFORE, Caltrans and the SHPO agree that, upon Caltrans' decision to proceed with the Undertaking, Caltrans shall ensure that the Undertaking is implemented in accordance with the following stipulations in order to take into account the effect of the Undertaking on historic properties, and further agrees that these stipulations shall govern the Undertaking and all of its parts until this MOA expires or is terminated.

STIPULATIONS

I. AREA OF POTENTIAL EFFECT

A. The Undertaking's area of potential effects (APE) is depicted in Figures 4A and 4B of the September 2006 *Finding of Adverse Effect for the Commodore Schuyler Heim Bridge and SR-47 Project.* The APE includes the maximum existing or proposed right-of-way for all alternatives under consideration, easements (temporary and permanent), all improved properties subject to temporary or permanent changes in access (ingress and egress), and areas where visual or audible changes could occur outside the required right-of-way.

B. If modifications to the Undertaking, subsequent to the execution of this MOA, necessitate the revision of the APE, Caltrans will consult with District 7 and the SHPO to facilitate mutual agreement on the subject revisions. If Caltrans, District 7, and the SHPO cannot reach such agreement, then the parties to this MOA shall resolve the dispute in accordance with Stipulation III. D. below. If Caltrans, District 7, and the SHPO reach mutual agreement on the proposed revisions, then Caltrans will submit a final map of the revisions, consistent with the requirements of stipulation VIII.A. and attachment 3 of the PA, no later than 30 days following such agreement.

II. TREATMENT OF HISTORIC PROPERTIES

A. Caltrans shall offer the Schuyler Heim Bridge (Bridge) for sale for reuse in an alternate location to interested public agencies and non-profits. A marketing plan shall be prepared for the sale of the bridge, including: a notification letter, fact sheet, list of intended recipients, as well as provisions for the salvage of smaller components in the case that there is no interest in re-use of the bridge. Advertisements shall be placed in appropriate newspapers of record. The offer shall run for 6 months. If no acceptable bids are received after 6 months, this stipulation shall be deeded to have been met. The above shall be done in accordance with the U.S. Department of Transportation Historic Bridge Program 23 USC 144(o)(4)(A) and (B).

B. Caltrans shall install informative permanent metal plaques at both ends of the new bridge at public locations that provide a brief history of the original Bridge, its engineering features and characteristics, the reasons for its demolition, and a statement of the characteristics of the replacement structure. SHPO shall have 30 days to review proposed plaque information before they are produced and installed.

C. Caltrans shall, pursuant to Section 110(b) of the NHPA, before the Bridge is demolished, contact the National Park Service (NPS) Historic American Building Survey/Historic American Engineering Record (HABS/HAER) program to determine what level and kind of recordation is required for the property.

D. Caltrans shall disseminate copies of the HABS/HAER report to local libraries. One acid-free xerographic copy of the report or reports shall be prepared on standard 8 ½ X 11 paper and provided to each repository to include the Los Angeles Public Library, the Long Beach Public Library, the Los Angeles Conservancy, the Caltrans Transportation Library in Sacramento, and the California Office of Historic Preservation.

E. Caltrans shall prepare a website, or adapt its current website, or help the Port of Long Beach or Port of Los Angeles adapt its website to make the information from the HABS/HAER report available to the public for 10 years. The information will also be made available to the Caltrans Transportation Library in Sacramento for inclusion on their website.

F. Caltrans shall produce a documentary (motion picture or video) that addresses the history of the Bridge, its importance and use within the history of the Port of Long Beach and Port of Los Angeles, and demonstrates its operation and function. The motion picture or video will be of broadcast quality, of sufficient length for a standard 30-minute time period and will be made available to local broadcast stations for public access channels in local cable systems and to schools/libraries; and one copy shall be submitted to the Caltrans Transportation Library in Sacramento.

G. Caltrans shall prepare traveling exhibits that address the history of the Bridge, its importance and use within the history of the Port of Long Beach and the Port of Los Angeles, and demonstrate its operation and function, appropriate for display in small museums, or for use in schools.

H. Caltrans shall offer artifacts removed from the Bridge during preliminary stages of the demolition process to local museums, and provide for their delivery to accepting institutions. Examples of such artifacts may include, but not be limited to, control panels, instruments, structural members, railings, signage, plaques or other identifying ornamentation, street lights, navigation lights, etc., unless such artifacts are subject to sale of the bridge under stipulation II. A.

III. ADMINISTRATIVE PROVISIONS

A. Definitions. The definitions provided at 36 CFR § 800.16 are applicable throughout this MOA.

B. Professional Qualifications and Standards. Caltrans will ensure that only individuals meeting the Secretary of the Interior's Professional Qualification Standards (48 FR 44738-39) in the relevant field of study carry out or review appropriateness and quality of the actions and products required by Stipulations II.A-H in this MOA.

C. Discoveries and Unanticipated Effects. If Caltrans determines after the construction of the Undertaking has commenced, that the undertaking will affect a previously unidentified property that may be eligible for listing in the National Register, or affect a known historic property in an unanticipated

manner, Caltrans will address the discovery or unanticipated effect in accordance with 36 CFR § 800.13(b)(3). Caltrans at its discretion may hereunder assume any discovered property to be eligible for inclusion in the National Register in accordance with 36 CFR § 800.13 (c).

D. Resolving Objections

1. Should any party to this MOA object at any time in writing to the manner in which the terms of this MOA are implemented, to any action carried out or proposed with respect to implementation of the MOA, or to any document prepared in accordance with and subject to the terms of the MOA, Caltrans shall immediately notify the other parties of the objection, request their comments on the objection within 15 days following receipt of Caltrans' notification, and proceed to consult with the objecting party for no more than 30 days to resolve the objection. Caltrans will honor the request of the other parties to participate in the consultation and will take any comments provided by those parties into account.
2. If the objection is resolved during the 30-day consultation period, Caltrans may proceed with the disputed action in accordance with the terms of such resolution.
3. If at the end of the 30 day consultation period, Caltrans determines that the objection cannot be resolved through such consultation, then Caltrans shall forward all documentation relevant to the objection to the ACHP, including Caltrans' proposed response to the objection, with the expectation that the ACHP will, within thirty (30) days after receipt of such documentation:
    a. Advise Caltrans that the ACHP concurs in Caltrans' proposed response to the objection, whereupon Caltrans will respond to the objection accordingly. The objection shall thereby be resolved; or
    b. Provide Caltrans with recommendations, which Caltrans will take into account in reaching a final decision regarding its response to the objection. The objection shall thereby be resolved; or
    c. Notify Caltrans that the objection will be referred for comment pursuant to 36 CFR § 800.7(c) and proceed to refer the objection and comment. Caltrans shall take the resulting comments into account in accordance with 36 CFR § 800.7(c)(4) and Section 110(1) of the NHPA. The objection shall thereby be resolved.
4. Should the ACHP not exercise one of the above options within 30 days after receipt of all pertinent documentation, Caltrans may assume the ACHP's concurrence in its proposed response to the

objection and proceed to implement that response. The objection shall thereby be resolved.

5. Caltrans shall take into account any of the ACHP's recommendations or comments provided in accordance with this stipulation with reference only to the subject of the objection. Caltrans' responsibility to carry out all other actions under this MOA that are not the subject of the objection shall remain unchanged.

6. At any time during implementation of the measures stipulated in this MOA, should a member of the public raise an objection in writing pertaining to such implementation to any signatory party to this MOA, that signatory party shall immediately notify Caltrans. Caltrans shall immediately notify the other signatory parties in writing of the objection. Any signatory party may choose to comment in writing on the objection to Caltrans. Caltrans shall establish a reasonable time frame for this comment period. Caltrans shall consider the objection, and in reaching its decision, Caltrans will take all comments from the other signatory parties into account. Within 15 days following closure of the comment period, Caltrans will render a decision regarding the objection and respond to the objecting party. Caltrans will promptly notify the other signatory parties of its decision in writing, including a copy of the response to the objecting party. Caltrans' decision regarding resolution of the objection will be final. Following issuance of its final decision, Caltrans may authorize the action subject to dispute hereunder to proceed in accordance with the terms of that decision.

7. Caltrans shall provide all parties to this MOA, and the ACHP, if the ACHP has commented, and any parties that have objected pursuant to section D.6 of the stipulation, with a copy of its final written decision regarding any objection addressed pursuant to this stipulation.

8. Caltrans may authorize any action subject to objection under this stipulation to proceed after the objection has been resolved in accordance with the terms of this stipulation.

E. Amendments. Any signatory party to this MOA may propose that this MOA be amended, whereupon all signatory parties shall consult to consider such amendment. The amendment will be effective on the date a copy signed by all of the original signatories is filed with the ACHP. If the signatories cannot agree to appropriate terms to amend the PA, any signatory may terminate the agreement in accordance with Stipulation III.F, below.

F. Termination

1. If this MOA is not amended as provided for in section E of this stipulation, or if either signatory proposes termination of this MOA for other reasons, the signatory party proposing termination shall, in

writing, notify the other MOA parties, explain the reasons for proposing termination, and consult with the other parties for at least 30 days to seek alternatives to termination. Such consultation shall not be required if Caltrans proposes termination because the Undertaking no longer meets the definition set forth in 36 CFR § 800.16(y).

2. Should such consultation result in an agreement on an alternative to termination, the signatory parties shall proceed in accordance with that agreement.

3. Should such consultation fail, the signatory party proposing termination may terminate this MOA by promptly notifying the other parties in writing. Termination hereunder shall render this MOA without further force or effect.

4. If this MOA is terminated hereunder, and if Caltrans determines that the Undertaking will nonetheless proceed, then Caltrans shall comply with the requirements of 36 CFR 800.3-800.6.

G. Duration of MOA

1. Unless terminated pursuant to section F. of this stipulation, or unless it is superseded by an amended MOA, this MOA will be in effect following execution by the signatory parties until Caltrans, in consultation with the other signatory parties, determines that all of its stipulations have been satisfactorily fulfilled.

2. The terms of this MOA shall be satisfactorily fulfilled within ten (10) years following the date of execution by the signatory parties. If Caltrans determines that this requirement cannot be met, the MOA parties will consult to reconsider its terms. Reconsideration may include continuation of the MOA as originally executed, amendment of the MOA or termination. In the event of termination, Caltrans will comply with section F.4 of this stipulation, if it determines that the Undertaking will proceed notwithstanding termination of this MOA.

3. If the Undertaking has not been implemented within ten (10) years following execution of this MOA, this MOA shall automatically terminate and have no further force or effect. In such event, Caltrans shall notify the other signatory parties in writing and, if it chooses to continue with the Undertaking, shall reinitiate review of the Undertaking in accordance with 36 CFR Part 800.

H. Effective Date

This MOA will take effect on the date that it is executed by Caltrans and the SHPO.

EXECUTION of this MOA by Caltrans and the SHPO, its filing with the ACHP in accordance with 36 CFR §800.6(b)(1)(iv), and subsequent implementation of its terms, shall evidence, pursuant to 36CFR§800.6(c), that Caltrans has afforded the ACHP an opportunity to comment on the Undertaking and its effects on historic properties, and that Caltrans has taken into account the effects of the Undertaking on historic properties.

SIGNATORY PARTIES

California Department of Transportation

By:_____ Date: 2/4/08
Jay Norvell, Chief
Division of Environmental Analysis

California State Historic Preservation Officer

By:_____ Date: 5 FEB 2008
Milford Wayne Donaldson
State Historic Preservation Officer

CONCURRING PARTIES

California Department of Transportation

By:_____ Date: 2/29/08
Douglas R. Failing, District Director
District 7, Los Angeles

Alameda Corridor Transportation Authority

By:_____ Date: 4/11/08
John T. Doherty, P.E.
Chief Executive Officer

Acronyms and Abbreviations

°F	Fahrenheit
µ/L	micrograms per liter
µg	micrograms
µg/kg	micrograms per kilogram
µg/m^3	micrograms per cubic meter
µm	micron
AB 1493	Assembly Bill 1493
ACET	Alameda Corridor Engineering Team
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
ACTA	Alameda Corridor Transportation Authority
ACTM	Airborne Toxic Control Measure
ADA	Americans with Disabilities Act
ADL	aerially deposited lead
ADT	average daily traffic
AHERA	Asbestos Hazard Emergency Response Act
AMSL	above mean sea level
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	Air Resources Board
ARP	Accidental Release Prevention
ASR	Archaeological Survey Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
ATCM	Asbestos Airborne Toxic Control Measure

ATIS	Advanced Traveler Information System
ATMIS	Advanced Transportation Management and Information Systems
ATSAC	Automated Traffic Surveillance and Control
BAT	Best Available Technology
BCPCT	Best Conventional Pollutant Control Technology
BEP	Business Emergency Plan
bgs	below ground surface
BHC	benzene hexachloride
BMP	best management practices
BPTCP	Bay Protection and Toxic Cleanup Program
BTEX	benzene, toluene, ethylene, and xylenes
Btu	British thermal unit(s)
CAA	Clean Air Act
CAAP	Clean Air Action Plan
CAAQS	California ambient air quality standards
CalARP	California Accidental Release Prevention
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCA	California Coastal Act
CCTV	closed circuit television
CDFG	California Department of Fish and Game
CDMG	California Department of Mining and Geology
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERFA	Community Environmental Response Facilitation Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations

CGS	California Geological Survey
CH_4	methane
CHMIRS	California Hazardous Material Incident Report System
CIDH	cast-in-drilled-hole
CIP	cast-in-place
CISS	cast-in-steel-shell
CIWMB	California Integrated Waste Management Board
cm	centimeter(s)
cm/s	centimeters per second
CMA	Critical Movement Analysis
CMP	Congestion Management Program
CMS	changeable message sign
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
Coast Guard	United States Coast Guard
COC	contaminants of concern
CORRACTS	Corrective Action Sites
CPS	Coastal Pelagic Species
CRHR	California Register of Historic Resources
CTC	California Transportation Commission
cu	cubic meter
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DCA	dichloroethane
DDD	dichlorodiphenyl dichloroethane
DDE	dichlorodiphenyl dichloroethylene
DDT	dichlorodiphenyl trichloroethane
DOC	California Department of Conservation
DOT	Department of Transportation
DPM	diesel particulate matter

DTSC	Department of Toxic Substances Control
ECOUS	Environmental Consequences of Underwater Sound
EDR	Environmental Database Report
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS/EIR	Environmental Impact Statement/Environmental Impact Report
EO	Executive Order
EPA	United States Environmental Protection Agency
ERL	effects range-low
ERM	effects range-median
ERMQ	effect range median quotient
ERNS	Emergency Response Notification System
FACU	facultative upland plants
FACW	facultative wetland plants
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
FMP	Fishery Management Plan
FOE	Findings of Effect
FONSI	Finding of No Significant Impact
ft	foot/feet
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Plan
g	average acceleration produced by terrestrial gravity
GHG	greenhouse gas
HABS/HAER	Historic American Buildings Survey/Historic American Engineering Record
HAS	hydrologic subarea

HAZWOPER	Hazardous Waste Operations and Emergency Response
HBRR	Highway Bridge Replacement and Rehabilitation
HCM	Highway Capacity Manual
HFC	Hydrofluorocarbon
HHD	Heavy Duty
HHW	higher high water
HLW	higher low water
HMS	Hazardous Materials System
HPSR	Historic Properties Survey Report
HRA	Health Risk Assessment
HSA	hydrologic subarea
I-	Interstate
I-110	Harbor Freeway
I-405	San Diego Freeway
ICTF	intermodal container transfer facility
IHA	Incidental Harassment Authorization
in	inch(es)
INCE	Institute of Noise Control Engineering
IPCC	Intergovernmental Panel on Climate Change
IRIS	Integrated Risk Information System
IS/EA	initial study/environmental assessment
ISA	Initial Site Assessment
ISTEA	Intermodal Surface Transportation Efficiency Act
ITS	Intelligent Transportation System
IWMD	Industrial Waste Management Division
JWPCP	Joint Water Pollution Control Plant
kg	kilogram
kJ	kilojoule(s)
km	kilometer(s)
KP	kilometer post
kV	kilovolt(s)

LA	Los Angeles
LACM	Natural History Museum of Los Angeles County
LACOFD	Los Angeles County Fire Department
LADWP	Los Angeles Department of Water and Power
LAFC	City of Los Angeles Fire Code
LAFD	Los Angeles City Fire Department
LAHD	Los Angeles Harbor Department
LAPD	Los Angeles Police Department
LARWQCB	California Regional Water Quality Control Board, Los Angeles Region
LAUSD	Los Angeles Unified School District
LBFD	Long Beach Fire Department
LBP	lead-based paint
LBPD	Long Beach Police Department
LBPL	Long Beach Public Library
LBSWMP	Long Beach Storm Water Management Program
LBUSD	Long Beach Unified School District
LBWD	Long Beach Water Department
LCP	Local Coastal Program
LHW	lower high water
LLW	lower low water
LNM	*Local Notice to Mariners* (USCG District weekly publication)
LOMR	Letter of Map Revision
LOS	level of service
LQG	large-quantity generator
LUST	leaking underground storage tank
M	magnitude
m	meter
m^3	cubic meter
MBAS	methylene blue activated substances
MCE	maximum credible earthquake
MD	mid-day

MEB	maximum extent practicable
mg	milligram
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MHHW	mean higher high water
MHLW	mean higher low water
MHWL	mean high water level
mi	mile(s)
MLD	Most Likely Descendent
MLHW	mean lower high water
MLLW	mean lower low water
mm	millimeter(s)
MMBtu	million Btu
MMPA	Marine Mammal Protection Act
MOA	memorandum of agreement
mph	miles per hour
MPO	Metropolitan Planning Organization
MRZ	mineral resource zone
MS4	Municipal Separate Storm Sewer Systems
MSAT	Mobile Source Air Toxics
MSE	mechanically stabilized earth
MT	metric ton
MTA	Metropolitan Transportation Authority
MUN	Municipal water use
MWD	Metropolitan Water District of Southern California
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NES	Natural Environment Study

NESHAP	National Emission Standard for Hazardous Air Pollutants
NGA	Natural Gas Act of 1938
NHPA	National Historic Preservation Act of 1966
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOP	Notice of Preparation
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRHP	National Register of Historic Places
NTU	nephelometric turbidity unit
NWTC	National Wind Technology Center
O_3	ozone
OBL	obligate wetland plants
OCORM	Office of the Coast and Ocean Resource Management
OSHA	Occupational Safety & Health Act
PA	Programmatic Agreement
PAH	polycyclic aromatic hydrocarbons
Pb	lead
PBA	peak bedrock acceleration
PCB	polychlorinated biphenyls
PCE	passenger car equivalent
PCG	Pacific Coast groundfish
pcphpl	passenger cars per hour per lane
PDT	Project Development Team
PEA	Preliminary Endangerment Assessment
PEL	permissible exposure limits
PFC	perfluorocarbon

PHL	Pacific Harbor Line
PM	post mile(s)
PM	particulate matter
PM_{10}	particulate matter equal to or less than 10 microns in equivalent diameter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in equivalent diameter
PMP	Port Master Plan
POLA	Port of Los Angeles
POLB	Port of Long Beach
Port Police	Los Angeles Harbor Department Port Police
ppm	parts per million
PQS	Professionally Qualified Staff
PRC	California Public Resources Code
PR-PSR	Project Report-Project Study Report
PS&E	plans, specifications, and estimates
PSI	preliminary site investigation
PSSR	Project Scope Summary Report
PST	Pacific Standard Time
PTS	Permanent Threshold Shift
PUC	Public Utilities Commission
PY	person years
RAP	Remedial Action Plan
RCPG	Regional Comprehensive Plan and Guide
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RDIFF	River Diffusion Farfield
REC	recognized environmental condition
Regional Board	Regional Water Quality Control Board
RI/FS	Focused Remedial Investigation/Feasibility Study
RL	reporting limit
RMP	Risk Management Plan
RMS	root mean square

ROD	Record of Decision
ROG	reactive organic gases
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCEC	Southern California Earthquake Center
SEL	Sound Exposure Level
SF_6	sulfur hexafluoride
SCIG	Southern California International Gateway
SHOPP	State Highway Operation and Protection Program
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLIC	spills, leaks, investigations, and cleanups
SMARA	Surface Mining and Reclamation Act
SO_2	sulfur dioxide
SQG	small-quantity generator
SQG	sediment quality guideline
SR-	State Route
SR-1	Pacific Coast Highway
SR-91	Artesia Freeway
SUSMP	Standard Urban Stormwater Mitigation Plan
SVOC	semivolatile organic compounds
SVP	Society of Vertebrate Paleontology
SWF/LF	Solid Waste Facility/Landfill
SWMP	Stormwater Management Program
SWPPP	Stormwater Pollution Prevention Plan

SWQCB	State Water Quality Control Board
SWRCB	California State Water Resources Control Board
TASAS	Traffic Accident Surveillance and Analysis System
TCIF	Trade Corridor Improvement Funds
TCM	Transportation Control Measure
TCWG	Transportation Conformity Working Group
tDDT	total DDT
TDF	traffic demand forecast
TDM	travel demand management
TDS	total dissolved solid
TE	Guidance for Transportation
TEA-21	Transportation Equity Act for the 21st Century
TEU	twenty-foot equivalent unit
TMC	Traffic Management Center
TMDL	total maximum daily load
TMP	traffic management plan
TOC	Traffic Operation Center
TPH	total petroleum hydrocarbon
TPH-d	total petroleum hydrocarbon-diesel
TRPH	total recoverable petroleum hydrocarbons
TSAR	TASAS Selective Accident Retrieval
TSCA	Toxic Substance Control Act
TSM	transportation systems management
TSS	total suspended solids
TTLC	total threshold limit concentration
TTS	Temporary Threshold Shift
TCWG	Transportation Conformity Working Group
UBC	Uniform Building Code
UCD	University of California, Davis
UP	Union Pacific
UPL	obligate upland species

UPRC	Union Pacific Resource Company
UPRR	Union Pacific Railroad
USA	Underground Service Alert
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
V/C	volume to capacity
VCP	Voluntary Cleanup Property
VHF-FM	very high frequency-frequency modulation
VMT	vehicle miles traveled
VOC	volatile organic compound
VTIS	Vessel Traffic Information Service
WDR	waste discharge requirement
WMUDS/SWAT	Waste Management Unit Database System
WQC	water quality criteria
WQO	water quality objectives
WWECP	Wet Weather Erosion Control Plan
yd	yard(s)

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FINAL MEMORANDUM

September 8, 2008

TO: Mike Brady (Caltrans)

FROM: Doug Eisinger, Deb Niemeier (UC Davis-Caltrans Air Quality Project)
Deborah Bennett (UC Davis Department of Public Health Sciences)

SUBJECT: Brief Screening-Level Review of the Draft Health Risk Assessment (HRA) for the Schulyer-Heim Bridge Replacement and SR-47 Expressway Project (Heim Bridge)

This memo updates our June 24, 2008 memorandum that responded to your request that we provide a high level review of the June 2008 Draft HRA[1] for the Heim Bridge project. There are no substantive changes between the June 24, 2008 document and this document; this memo streamlines some of the text from the June memo and clarifies that this communication is a final work product.

We have scanned the draft report and identified any obvious questions or issues regarding: travel activity, emissions, concentrations, exposure, and risk. We also had some comments regarding mitigation, using "reasonable" vs. "worst-case" modeling assumptions, and differentiating this project from other projects. The expediency with which this review was requested prohibits detailed analysis, but we have identified some issues that we believe relate to future HRAs. We strongly encourage Caltrans/U.S. Federal Highway Administration to consider a formalized effort aimed at developing a systematic framework for conducting HRAs for transportation project-level analysis. As a matter of note, all page number references cited below are to the 44-page June 2008 Draft HRA.

[1] Draft Health Risk Assessment for the Schulyer-Heim Bridge Replacement and SR-47 Expressway Project. Prepared for Alameda Corridor Transportation Authority, Carson, CA. Prepared by Weston Solutions, Inc. June 2008.

Travel Activity

- The project description text should note the beginning and ending of the construction phase and the built year. We were unable to determine when the project became operational, but assumed it was in year 2015.

- The analysis segregated traffic activity into the four time periods currently used by SCAG to model the regional transportation plan (RTP): AM peak, midday activity, PM peak, and night activity (p. 11). This approach is reasonable. It is generally considered more optimal in terms of traffic level predictions to have a greater number of modeling time periods. The UCD-Caltrans mobile source air toxics (MSAT) methodology prepared in 2006 with multi-agency input recommended, at the minimum, travel estimation for at least the peak vs. off-peak periods.

- The level of travel activity is typically the most important variable in completing air quality related project assessments. In the main body of the report, details should be expanded to include activity assumptions for the no-build and build alternatives, including fleet mix (truck percentage), volumes, and speeds. This information would be especially valuable for the main routes directly affected by the project: for Alternative 1, illustrating how truck traffic would be diverted from SR-103 to SR-47 (as described on p. 25), and how, for Alternative 2, truck traffic would be diverted from the Alameda St. corridor to SR-103 (as described on p. 25). The report employs traffic projections "from the traffic study" (p. 11); however, the genesis of this traffic study is not clear. Did this traffic study document expected traffic shifts to/from adjacent facilities and any other affected facilities such as the 110 and 710 freeways? The report also notes that traffic volumes and average daily traffic were developed using information from the Ports and from SCAG (pp. 11-12). It appears that the project analysts used travel assumptions consistent with regional analysis, which would be appropriate; however, as noted above, further documentation is needed to understand where and how the various assumptions are employed in the analysis. The traffic study should be included in the material as an appendix.

- Page 20 of the report describes how "conservative traffic assumptions" were used to create the scenarios to be analyzed. Using a conservative approach would appear to be correct in concept; however, it is critical to document assumptions, and to clearly identify how each was conservative.

- Standard milestone years for project-level air quality analysis typically include a base year, the year of project completion, and the design year (usually defined as the project completion year plus 20 years). It is not a serious problem that this analysis used different years, however the analysis years neither match the standard air quality approach, nor do they align the 70-year exposure assessment period with the years the project is operational (some of the 70 years are before the project is built, some are after the project is built). It would seem more logical to have the 70-year window begin with the year of project completion, so that the entire risk analysis would reflect no-build vs. build conditions.

Emissions

- The emissions assessment includes assumed implementation of various control programs which are part of the Ports Clean Air Action Plan (CAAP) (p. 9). For example, one of the assumptions is that 100% of trucks entering the Port by January 1, 2012 will meet 2007 federal clean truck standards (p. 9). As a general practice, the U.S. EPA typically discounts the effectiveness of control programs for planning purposes, to account for unexpected implementation delays and problems, as well as enforcement issues and other factors that can lessen effectiveness. So, for example, EPA has sometimes assumed that control programs achieve only 80% of the emission reductions that would occur if the program was fully implemented as planned. Unless the CAAP's emission reductions are federally enforceable, it would be more in keeping with standard practice to discount the anticipated effectiveness of these controls, rather than assume 100% successful program implementation. The HRA should clearly identify which control strategies are included in the analysis, which strategies are enforceable compared to those that are merely planned, and what year they are expected to be implemented.

- Alternative 1 provides for grade separations, which would generally be expected improve traffic flow and reduce emissions (p. 7).

- Use of EMFAC2007 was appropriate. It appears that the study took vehicle deterioration into account when estimating LNG vehicle emissions (p. 10), and that conservative assumptions were made about the lack of LNG truck introduction after 2011 (p. 11). Further details would be helpful to document the methodology for LNG trucks consistent with EMFAC2007 (p. 10).

- It appears that the analysis used the 2006 UCD-Caltrans MSAT methodology, which is reasonable since that methodology was the only readily-available tool during 2007 when the analysis was likely completed. Future analyses (for other projects), should use the UCD-Caltrans CT-EMFAC model, the most recent version of which is dated May 2008, since it incorporates a more robust methodology to account for MSAT emissions.

- As mentioned later under both the Risk and Mitigation sections, there is confusion about what is meant by the "mitigation scenarios" explored for 2015. Further documentation on these is necessary to understand whether the emission factors chosen to represent the mitigation scenarios were different than the other scenarios (see pp. 13, 20).

- The main report text should clarify which gasoline and diesel-related compounds are covered by the health risk assessment. The MSATs listed in the main report are recognized as priority MSATs by the U.S. Environmental Protection Agency and are appropriate compounds for analysis. Material in an appendix seemed to indicate that, beyond diesel PM, several additional diesel-related compounds were evaluated; if this is the case, this should be made clear in the main body of the report.

Concentrations

- The spacing of the receptors seemed to be appropriate to capture near-road impacts since they were spaced at 50 m intervals close to the affected facilities (p. 16).

- Overall, the dispersion modeling approach appears reasonable based on the tools used and the information provided in the main body of the report.

Exposure

- The text states that maximum 1-hour concentrations were used for acute effects. For some compounds, the acute time frame uses a slightly longer time period. In general, HRAs should match the time period of exposure and health concern (e.g., for some pollutants, the reference dose should be compared to a maximum six or seven hour concentration). We did not check the time frames for the pollutants under consideration. The Hazard Index (HI) will only go down if longer time periods are used. The text should state the time-frames of interest for all the pollutants evaluated.

- The breathing rate needs to be confirmed. Using the parameters listed for the Gamma distribution in OEHHA's 2003 "Air Toxics Program Risk Assessment Guidelines"[2], along with Crystal Ball software, we derived an 80th percentile value of 393.9 L/kg-day. The guidelines list a high-end value of 393 L/kg-day, which matches the 80th percentile value we calculated. However, the analysis done in the report we are evaluating states that the 80th percentile value is 302 L/kg-day. This value should be revised upwards. The discrepancy may be that the 302 L/kg-d comes from an estimate of the adult breathing rate. The value presented for use by OEHHA (2003) assumes a 70-year exposure beginning in childhood, such that the higher breathing rates for children's early years are incorporated into the estimate for the entire lifetime. The OEHHA guidance value should be used.

- The OEHHA guidance also states, "The risk assessment guidelines require the use of the 95th percentile (i.e., high-end) breathing rate for all assessments of cancer risk by the inhalation route in Tier-1 risk assessments in order to avoid underestimating risk to the public, including children." The potential discrepancy between the listed "high-end" value in the report, which appears to be the 80th percentile, and the OEHHA guidance, should be resolved by following OEHHA guidance.

- The breathing rates for the workers should also be confirmed once the residential breathing rate has been established.

- The concentrations do not consider potentially lower indoor air concentrations for some of the particle bound species. By not including this factor, the concentrations are more conservative than they need to be. However, given the temperate climate in the Long Beach area, doors and windows may be open a considerable fraction of time, in which case the conservative approach is appropriate.

[2] See: http://www.oehha.org/air/hot_spots/pdf/HRAfinalnoapp.pdf.

Risk

- (*see also first bullet comment below under Mitigation*) The text on pages 20 and 23 is confusing – it seems to imply that, in addition to the build vs. no-build scenarios, there were other sensitivity analyses done for year 2015. However, the text on p. 24 notes that these sensitivity analyses were simply build vs. no-build comparisons. The final document should clarify the analyses discussed.

- The modeling time period was 2003 to 2072, which is said to be "for purposes of CEQA comparison." The baseline assumes no project construction, and the project scenarios assume project emissions from the year 2015 onward (page 13). The linear extrapolation is from 2003 to 2015, and from 2015 to 2030. It is not made clear if the HRA assumed a "baseline" version of 2015 for the first averaging period, and a "project" version of 2015 for the second averaging period. As we state elsewhere, it was also not clear which control programs (mitigation) were assumed to be operative in the no-build and build scenarios. Also, as stated above, a broader concern is that, ideally, we would want to make risk comparisons beginning at the time period the project was completed, and extending for 70 years from that time point.

- There are two issues with the presentation of the HI results. First: South Coast Air Quality Management District (SCAQMD) guidance[3] does indicate that the standards for a project are increases in the HI of less than 1.0. Also necessary to determine, however, is if the project pushes the exposed population from below 1.0 to above 1.0. Second: from the report, we cannot determine the value of the ultimate HI. A look through the appendices does not clear up the issue either as it is not clear if the values presented are the HI considering all sources of exposure, or just the difference between the baseline and the project scenarios.

- The report notes that the results show "substantial regional benefits that reduce risk in the majority of the study area" (p. 34). The figures shown, however, only highlight the geographic areas where risk decreases and increases, thus it is hard to see (quantitatively) what the population-weighted risk impacts are. This information needs to be documented better.

- The actual risk values should be stated in a clear and visible manner in the main body of the report, preferably in the executive summary. Without reading Table 3.1, it is possible to have the impression that the exposed population meets all regulatory guidelines in the no-build situation. In fact, their no-build risk is already above 1×10^{-4}, the level at which action should be taken in most regulatory guidelines. While it is true that this proposed project comes very close to meeting the guidelines for the allowed increase of less than 10 in a million, this increase should be placed in context of the existing, no-build risk conditions.

[3] See: http://www.aqmd.gov/CEQA/handbook/signthres.pdf.

- The discussion (beginning p. 34) identifies factors that could contribute to over-estimating the risk impacts. Some points merit further discussion. The first bullet statement notes that actual goods movement activity may be less than what is forecasted, thus reducing activity and risk. Presumably, the premise for the entire project is the need to satisfy future goods movement demand – if that demand has been over-predicted, then the basis for the entire project is in question. We recommend removing the bullet. The second bullet statement on page 34 includes helpful comments about the fact that future controls may be implemented that are not yet credited; however, as discussed under the "Emissions" section, it would be more appropriate to discount the assumed effectiveness of the Ports CAAP.

- The risk discussion would benefit by including information describing the conservative nature of the risk assessment process, including, for example, the approach used to establish unit risk factors and the analytical process of assuming 70-year exposures regardless of the low probability of individuals remaining in one location for 70 years. That would help provide the general public with some context to understand how to interpret the risk results.

- The individual pollutants and the exposure pathways used to complete the analysis should be stated in the main body of the report. Currently, some of this is documented in an appendix, and some is mentioned in the text, but it is difficult to identify. Our assumption is that the modeled risk is largely a function of diesel PM exposure via inhalation. It would be helpful, especially to inform how to structure future HRAs, to break down the attribution of risk by pollutant, and by exposure route. If, as expected, virtually all of the health risk is due to diesel PM, and by inhalation, documenting these results would help encourage streamlining future HRAs to eliminate analytical work with little informational value.

Mitigation

- (*See also the first bullet point above under Risk*) There is a discussion under Section 2.3 (Risk Assessment Approach, p. 20) which refers to a year 2015 "mitigation scenario." It is not clear what this means. It appears that year 2015 risks were estimated for the purpose of identifying homes impacted, and to help identify homes that would be candidates for mitigation (as described later on p. 35). Is this correct? How does this information compare to the risk information presented in Table 3-1? Also, the page 20 text creates some confusion about the assumptions for all of the no-build vs. build analyses. Page 20 states that year 2015 analyses were based on known emission reduction strategies as the basis for mitigation. It was not clear whether all the build scenarios were modeled with the known emission reduction strategies, or just the ones for the 2015 analysis. The text on p. 20 implies that the mitigation was used only for 2015, but on page 9, it said the Ports CAAP was assumed for both 2015 and 2030. Was there some mitigation other than the Ports CAAP also assumed for 2015? Also, the text on page 35 refers to the sensitivity analysis results in Figure 4-1; that figure is not included.

- The mitigation discussion (p. 35) describes approximately 12 homes as meriting mitigation, and expanding that pool of homes to 100 to 200 to provide a safety buffer and ensure anonymity of the impacted receptors. The justification seems understandable, but the

impact – raising the number of sites to be mitigated by a factor of about 10 to 15 – seems overly high. Given the conservative nature of risk assessments (see comment under Risk above), margins of safety are already built into the analysis. The need for mitigation, and the geographic coverage for such mitigation, should be further examined.

- The choice of mitigation (p. 36) requires further discussion and documentation. HVAC system effectiveness can be easily defeated simply by opening windows or doors. The socio-economic status of these residents also needs to be considered as they are likely to minimize HVAC use if operational cost is prohibitive. For HVAC improvements to be an effective mitigation, some consideration needs to be given to ensuring that adequate resources are available to pay for ongoing HVAC system maintenance as well as the monthly bills that would be incurred due to HVAC operation. If, however, HVAC system improvements need only be effective for a small fraction of the year to reduce risk below the target level, that information should be described. Alternatively, other mitigation could be examined if the HVAC systems prove impractical. For example, there is some literature that shows that tree screens (particular species of trees) have successfully reduced ambient PM levels. If tree-planting is a practical solution for the affected sites, that option could be explored as well.

Minor / Miscellaneous Issues

- Page 5 of the report describes Alternative 1 as replacing the existing bridge with a "slightly wider" new bridge – we assumed that the new structure did not increase capacity by adding travel lanes, since the text focused on the addition of standard shoulders. If that is not the case, the text should be clarified.

Broader HRA Discussion Points

1. Differentiating Project Types: Which Projects Merit Assessment?

Separate from the Heim Bridge project assessment, you have asked us for thoughts concerning which types of projects might be more appropriate for HRAs. Since there is no regulatory requirement to prepare an HRA for transportation projects, there are no uniform procedures for completing such assessments, for interpreting the results obtained, or for communicating the findings to the public in a meaningful way. In the Heim Bridge analysis, this has resulted in, for example, confusing analysis years, lack of understandable travel activity and modeling assumptions, and other issues as discussed above. We highly recommend that Caltrans consider implementing a study in which a small number of project-level HRAs are completed by a qualified team, using different analytical approaches for each of the analyses. The various approaches and results can then be compared and assessed as to their explanatory value, as well as the time and cost involved with their preparation. We believe that this process will also help to establish the outlines of a broader HRA analysis framework for transportation projects that can be used to gather multi-agency input, and to gain consensus from other regional, state and federal partner agencies on the need for these studies and the usefulness of different HRA options.

Diesel PM is the risk driver in the Heim Bridge case (p. 36) as well as in other California communities (e.g., see findings from the MATES-II and III studies). Accordingly, one option for selecting candidate projects for HRA pilot studies is to examine project situations involving an unusually high percentage of diesel traffic. Also, given the literature on near-road pollutant concentrations, study candidates could include cases where there are residential areas and schools in close proximity (e.g., within 100 m) to a project. For example, projects facilitating increased goods movement through ports, where environmental justice and community concerns are high, would be good candidates to explore how to implement HRAs and to pilot test what risk information is of most value to assist public involvement in the project selection process.

2. Worst-Case vs. Real-World Analyses

Independent of the Heim Bridge project, you also asked for thoughts concerning how to estimate risk when completing HRAs; in particular, you asked whether such assessments should focus on using worst-case or real-world assumptions. OEHHA guidance[4] for hot-spot analyses recommends using a tiered approach to risk assessment, and such an approach might be applicable for transportation projects as well. In concept, tiered analyses begin by using conservative assumptions to facilitate screening assessments; if a project passes a simplified conservative screening test, the analysis is complete. Projects that fail an initial screening test can move to the next tier of analysis, which can involve replacing default screening assumptions with site-specific conservative information. Projects failing second tier review then move to more detailed assessment involving distributions for input data. A tiered approach would be consistent with other project-level analysis protocols, such as the carbon monoxide protocol developed for Caltrans by UC Davis.

In addition, HRAs could also consider presenting population-weighted risk impacts as well as site-specific impacts. OEHHA guidance, for example, recommends that hot-spot analyses assess population risk. A population risk analysis often includes two approaches. One approach involves estimating total cancer burden across the population – in other words, the increased number of excess cancers that are forecasted to occur across the population as a whole. A second approach involves estimating cancer risk by specifying the size of population at a given level of risk. From a more practical standpoint, this can be done as the number of people exposed to concentrations that result in excess cancer risks of less than 1 per million, 1-10 per million, 11-20 per million, and so on. The first approach details total risk. The second approach allows for greater resolution – enabling analysts to understand whether the absolute number of excess cancers is derived from a small pool of highly exposed individuals, or a large pool of people exposed to relatively lower concentrations and risk. In addition, OEHHA recommends presenting two sets of risk values: one set using conservative, high-end exposure assumptions (e.g., 80th or 95th percentile values for exposure), and a second set using average exposure factors.

In summary, a general approach for completing HRAs might include steps such as the following:

- As a first-tier screening approach, calculate increased risk using high-end, conservative values (higher concentrations and longer exposure periods). Present the actual risk

[4] (See OEHHA guidance available at footnote 2 Internet address.)

numbers in addition to the change in risk. Determine whether there are homes/receptors exceeding incremental additional risk criteria. If there are, then:

- As a second-tier approach, reassess increased risk for the affected receptors using site specific conservative values, rather than general conservative values.
- For context, reassess the increased risk for the affected receptors using typical values, rather than conservative values.
- Once this suite of information is available, project sponsors can then evaluate whether mitigation is warranted, or whether further analytical work is needed. If they do not feel they can move forward on the project with the results obtained, they might conduct additional analysis; for example:
    - Present the overall population-based impact of the project by summing the change in risks over the population, especially if risk is reduced for a significant portion of the population.
    - Conduct an uncertainty analysis to provide the likely range of expected impacts, rather than just point estimates. The HARP[5] tool, for example, has an option for Monte Carlo simulation that could assist with such analyses.

In closing, in our judgment, we believe it is premature to define a specific HRA analytical approach for transportation projects. Since relatively little work has been done to establish uniform transportation project-level HRA procedures, we do not believe the Heim Bridge approach should be used as a template for future analyses. Instead, we believe a better technical approach would be to complete several HRAs, compare them, and then assess their relative merits. Comparisons of pilot results will provide insight on whether HRA analyses should be completed, what project types they should apply to, and how to structure them assuming they are valuable.

Reference

California Office of Environmental Health Hazard Assessment (OEHHA) (2003) *Air Toxics Hot Spots Program Risk Assessment Guidelines. The Air Toxic Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments.* August. Available via: http://www.oehha.org/air/hot_spots/pdf/HRAfinalnoapp.pdf.

[5] See: http://www.arb.ca.gov/toxics/harp/harp.htm.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
650 Capitol Mall, Suite 4-100
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May 6, 2009

IN REPLY REFER TO
HDA-CA
EA # 07-23850
Document # P59095

Doug Failing, District Director
California Department of Transportation
District 7
100 South Main Street, Suite 100
Los Angeles, CA 90012-3606

Attention: Andrew Yoon, Senior Transportation Engineer

Dear Mr. Yoon:

SUBJECT: Project-Level Conformity Redetermination for the SR-47 Expressway: Schuyler Heim Bridge Replacement Project

On April 29, 2009, the California Department of Transportation (Caltrans) submitted to the Federal Highway Administration (FHWA) a request for the project-level conformity redetermination for the State Route 47 Expressway: Schuyler Heim Bridge Replacement Project pursuant to 23 U.S.C. 327(a)(2)(B)(ii)(1). The project is in an area that is designated nonattainment or maintenance for ozone, course particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), carbon monoxide (CO), and nitrogen dioxide (NO_2).

FHWA originally issued a project-level conformity determination for this project on January 21, 2009. Since then, the PM_{10} hot-spot analysis has been updated in accordance with the FHWA and Environmental Protection Agency (EPA) guidance, *The Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (March 29, 2006).

The project-level conformity analysis submitted by Caltrans indicates that the project-level transportation conformity requirements of 40 C.F.R. Part 93 have been met. The project is included in the Southern California Association of Government's (SCAG) currently conforming *2008 Regional Transportation Plan (RTP),* and the *2008 Regional Transportation Improvement Program (RTIP).* The current conformity determinations for the RTP and RTIP were approved by FHWA and the Federal Transit Administration (FTA) on January 14, 2009. The design concept and scope of the preferred alternative have not changed significantly from those assumed in the regional emissions analysis.

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Based on the information provided, FHWA finds that the Conformity Determination for the State Route 47 Expressway: Schuyler Heim Bridge Replacement Project conforms to the State Implementation Plan (SIP) in accordance with 40 C.F.R. Part 93.

If you have any questions pertaining to this conformity finding, please contact Aimee Kratovil, FHWA Air Quality Specialist, at (916) 498-5866.

Sincerely,

/s/ Aimee Kratovil

For
Walter C. Waidelich, Jr.
Division Administrator

cc: (email)
Brett Gainer, FHWA
Steve Luxenberg, FHWA
Karl Price, Caltrans
Ron Kosinski, Caltrans
Mike Brady, Caltrans

AKratovil/ac

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M e m o r a n d u m

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To: Hamid R. Toossi, STE
Office of Design D
Division of Project Development

Attn: Hector Bedolla
Project Engineer

Date: December 13, 2010

File: 07-LA-47,103-KP (PM)
0.1/1.1(3.5/4.6)
Schuyler Heim Bridge
Replacement Project
SR-47 & SR-103

EA: 07-333-138201
PN: 1856-0700000142-1

From: **DEPARTMENT OF TRANSPORTATION**
OEECS- HAZARDOUS WASTE BRANCH, SOUTH REGION, MS-16

Subject: *Hazardous Waste Re-Assessment for Proposed Changes to Scope of Work, SR-47 Schuyler Heim Bridge Replacement Project, Long Beach, California, Los Angeles County*

The Office of Environmental Engineering and Corridor Studies (OEECS) reviewed the Proposed Changes to the Scope of Work for State Route 47/103 (SR 47/103) Schuyler Heim Bridge Replacement Project. The change in scope for this project proposes to include:

1. Importation of approximately 500,000 cubic yards (CY) of fill material to be placed under the new Schuyler Heim Bridge without removal of lead contaminated soil at a depth from surface to 1 ft below ground surface (bgs);
2. Construction of a bioswale at New Dock Street requiring acquisition of temporary construction easement (TCE);
3. Construction of a culvert for diverting surface water runoff to the existing pump station;
4. Strengthening of soil adjacent to the piles by deep soil mixing;
5. Utility relocation.

OEECS' comments on the proposed changes for the project are provided below.

1. <u>Import Fill Material</u>

The primary concern is introducing contaminated fill material that is a potential risk to human health, the environment, and ecological receptors. To minimize the risk of this occurring, select non-industrial areas as the source areas for the fill material and avoid sites undergoing an environmental cleanup. Non-industrial areas include previously undeveloped land, or land used solely for residential or agricultural purposes. Note that agricultural areas may contain former agricultural waste process byproducts such as manure or other decomposed organic material that need to be avoided. Undesirable sources of fill material

include industrial and commercial sites where hazardous materials were used, handled, stored, or treated as part of operations, unpaved parking areas where petroleum hydrocarbons could have been spilled or leaked into the soil, former gasoline service stations, retail strip malls that contained dry cleaners or photographic processing facilities, paint stores, auto repair and/or painting facilities, metal processing shops, manufacturing facilities, aerospace facilities, oil refineries, waste treatment plants, etc.

Verification of an appropriate fill source through documentation needs to be obtained from a commercial supplier of fill material or from soil pits in rural or suburban areas. Fill documentation should include detailed information on the previous use of the land from where the fill is taken, whether an environmental site assessment was performed and its findings, and the results of any testing performed. Documentation should be signed by an appropriately licensed (CA-registered) individual. If documentation is not available or is inadequate, samples of the fill material should be chemically analyzed. Analysis of the fill material should be based on the source of the fill and knowledge of the prior land use. Compare detectable concentrations of constituents of concern from the fill material to the Port of Long Beach Import Fill Quality Guidelines, California Human Health Screening Levels (CHHSLs) prepared by the Office of Environment Health Hazard Assessment, and the Regional Water Quality Control Board's (RWQCB) guidelines for reuse of non-hazardous petroleum hydrocarbon contaminated soil (as applied to Total Petroleum Hydrocarbons (TPH) only). If any concentration is in excess of the POLB, CHHSLs or RWQCB screening levels then the soil is not suitable for use as fill material on this project. Any import materials provided by POLB should be accompanied by documentation or analytical test results to verify that it meets all the aforementioned requirements.

In addition, a standard laboratory data package, including a summary of the QA/QC (Quality Assurance/Quality Control) sample results should also accompany all analytical reports. Representative samples should be collected and analyzed prior to removal from the borrow area. In addition to performing the appropriate analyses of the fill material, an appropriate number of samples should also be determined based on the approximate volume or area of soil to be used as fill material. The tables below can be used as a guide to determine the potential contaminants and the number of samples needed to adequately characterize the fill material when sampled at the borrow site. One (1) sample per truckload be collected and analyzed for all compounds of concern to ensure that the imported soil is uncontaminated and acceptable. Should contaminants exceeding acceptance criteria be identified in the stockpiled fill material, that material will be deemed unacceptable and new fill material will need to be obtained, sampled and analyzed.

Potential Contaminants Based on the Fill Source Area	
Fill Source	**Target Compounds**
Land near to an existing freeway	Lead (EPA methods 6010B or 7471A), PAHs (EPA method 8310)
Land near a mining area or rock quarry	Heavy Metals (EPA methods 6010B and 7471A), asbestos (polarized light microscopy), pH
Agricultural land	Pesticides (Organochlorine Pesticides: EPA method 8081A or 8080A; Organophosphorus Pesticides: EPA method 8141A; heavy metals: EPA methods 6010B and 7471A
Residential/acceptable commercial land	VOCs (EPA method 8021 or 8260B, as appropriate and combined with collection by EPA Method 5035), semi-VOCs (EPA method 8270C), TPH (modified EPA method 8015), PCBs (EPA method 8082 or 8080A), heavy metals including lead (EPA methods 6010B and 7471A), asbestos (OSHA Method ID-191)
**The recommended analyses should be performed in accordance with USEPA SW-846 methods (1996). Other possible analyses include Hexavalent Chromium: EPA method 7199*	

Recommended Fill Material Sampling Schedule	
Area of Individual Borrow Area	**Sampling Requirements**
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every 1/2 acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location
Volume of Borrow Area Stockpile	**Samples per Volume**
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for first 1000 cubic yards +1 sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

Placement of Fill Materials over Existing Contaminated Soil

A. Engineering Controls

To address the question of placement of fill materials over existing contaminated soil, the following Engineering Controls for Soil has been used by USEPA. Examples of engineering controls include the placement of two feet (or more) of clean soil/fill material (meeting POLB Import Fill Quality Guidelines) covered by an impervious cover or engineered cap to prevent water from infiltrating to the potentially leachable

contamination below. Engineered surface parking lots and building slabs represent other acceptable engineering controls for eliminating direct contact exposure to soils and infiltration of water.

The most common practice to isolate the underlying soil is to use geotextile membrane and visual barrier materials (such as polyethylene orange construction/snow fencing material). Two feet of clean fill and soil is placed over the geotextile and visual barrier. The visual barrier serves as a "marker layer" to warn anyone who might dig into the soil that soil below this marker contains pollutants in soil that should not be disturbed. However, in areas such as the POLB where the ground surface is below sea level, additional engineering controls to encapsulate the contaminated layer of soil/fill. For example, a layer of crushed stone underneath the clean fill layer will provide a "capillary break" that limits the upward and downward movement of water or leachate. This layer will also prevent burrowing animals and worms from transporting contaminated soil into the clean fill and potentially to the surface.

Fill materials must be placed to eliminate the potential for erosion into the creek.

Underground utilities are best installed within clean soil zones to mitigate exposure from direct contact exposure to pre-existing contaminated soils should future repairs, alterations, improvements, or disturbances be necessary.

B. Long-Term Maintenance of Engineering and Institutional Controls

An institutional control, in the form of a notice to the property deed is needed to restrict land use to non-residential, specify certain actions to be completed by the property owner and will identify the various reporting requirements to document that the engineering control remains intact. This "deed notice" informs the owner and future owners of the property to: maintain the engineering controls; ensuring water is not allowed to pond on surface of engineered cap, notify the regulatory agency prior to any alterations, improvements or disturbances in the restricted area; sets forth the schedule to conduct periodic inspections of the area; and any specific certification requirements that the engineering control remains intact.

2. *Construction of a bioswale at New Dock Street requiring acquisition of additional TCE*

ACTA will determine if the Site Investigation covers this area. From the data it appears that the previous Hazardous Waste Assessment that identifies the top one foot of soil as hazardous waste across the project area includes this area.

3. *Construction of a culvert parallel to bridge for diverting surface water runoff to the existing pump station*

The culvert will be constructed on the surface of the ground within the existing easement area previously included in the project description. At this time, no additional impacts are foreseen. However, if in the future, the existing pump plant is relocated or water is diverted to another location with construction of additional piping, a re-assessment for impacts from hazardous waste will be required.

4. Strengthening of soil adjacent to the piles by deep soil mixing

The deep soil mixing with concrete will encapsulate and stabilize any contaminants and is not expected to create additional impacts to the project. However, the soil and water that is removed from the boreholes prior to the deep soil mixing process needs to be managed as identified in the soil profile for the project at the depths shown and the NSSP for Contaminated Materials.

5. *Utility relocation*

The waste soil and water generated from the relocation of utilities within the project area should be managed as identified in the NSSP for Contaminated Materials if Caltrans is the generator and signs the manifests and bill of lading. Contaminated material that does not meet the POLB import fill material quality guidelines cannot be reused within the project area and must be recycled or disposed at an appropriate licensed facility. If the Utility Agreements identify the utility company as the generator then it is the responsibility of the utility company to be sign the manifests and bill of lading and dispose of the waste in accordance with state and federal laws and regulation.

OEECS is available to review the draft Utility Agreements for consistency with special provisions and State and federal laws and regulations pertaining to hazardous waste.

If you have any questions, I can be reached at steve.chan@dot.ca.gov (213) 897-3646, or contact Penny Nakashima of my staff at penny.nakashima@dot.ca.gov (213) 897-7695.

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