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To: MS. TRACI MENARD
Office of Bridge Design South 1, Chief
Bridge Design Branch 15
Division of Engineering Services

Attn: Mr. Jose Higareda

Date: March 25, 2014
File: 12-ORA-91-PM 0.85
EA# 12-0M7201
Valley View Street OC Retrofit
Bridge No. 55-0302

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design South 1
Branch D

Subject: Foundation Report for Valley View Street Overcrossing (OC) Retrofit

INTRODUCTION

In a memo dated July 20, 2013, the Office of Bridge Design South 1 (OBDS1)-Branch 15 requested the Office of Geotechnical Design South 1 (OGDS1) to provide preliminary geologic, geotechnical, seismic, and foundation retrofit recommendations for the proposed Valley View Street Overcrossing (OC, Br. No. 55-0302) bridge retrofit project. OGDS1 has since conducted a site subsurface exploration, performed analyses/evaluations and developed the necessary recommendations. The memorandum documents our findings and these recommendations.

Recommendations presented herein are based on our review of the following records and documents as well as results of the recent OGDS1 geotechnical exploration program implemented for this project**:**

- As-Built Geology/Foundation Report for Valley View Str. OC, dated March 22, 1967.
- As-Built General and Foundation Plan for Valley View OC, dated June 13, 1969.
- As-Built Log of Test Borings (LOTB) for Valley View OC, dated June 13, 1969.
- FPS&E Valley View Street OC Retrofit Plans, plotted March 17, 2014.
- Design Load-Extreme Event (existing and retrofit), provided December 6, 2013.

SCOPE OF WORK

Tasks completed by the OGDS1, Branch D include the following:

1. Review of pertinent information from previous geology/geotechnical reports and As-Built plans for the existing bridge structure.
2. Drilling, logging, and sampling of one rotary wash boring and conducting three electronic Cone Penetrometer Tests (CPTs) at the subject bridge site to supplement existing information used to characterize the subsurface conditions.
3. Laboratory testing of selected soil samples for mechanical analysis, corrosivity, unit weight, Atterberg Limits, and moisture content.
4. Performing geotechnical analyses, and
5. Preparing this report.

PROJECT DESCRIPTION

Existing Bridge Structure

State Route 91 (SR-91) in Orange County was originally constructed in the 1960s as a controlled access freeway. A major effort to improve traffic capacity began in 1992 with the construction of the SR-91 toll lanes. The SR-91 is generally an 8 to 10 general-purpose lane freeway with auxiliary lanes. The SR-91 express/toll lanes provide two additional lanes in each direction. The toll lanes in the median are operated and maintained by OCTA (Orange County Transportation Authority) under a franchise agreement with the State.

The existing Valley View Street OC, Br. No. 55-0302, is a continuous, two-span structure consisting of a cast-in-place/prestressed (CIP/PS) box girder (10 cell), with a 14'-9" minimum clearance, carrying eastbound (EB) and westbound (WB) lanes of Route 91 Freeway traffic in Orange County. The original Valley View Street OC was constructed in 1969, having a total span of 207 feet, 11.25 inches, measured along the center line of Route 91 (PM 0.85). See Appendix I for a Site Vicinity Map of the project area.

Existing ground surface adjacent to Bent 2 is relatively flat at an elevation of about +59.5 feet above mean sea level (MSL). The existing ground surface elevation at the top of the approach embankment/abutments ranges from about +77 to +80 feet.

As-Built drawings and bridge inspection reports indicate that the bridge is supported by open end reinforced concrete (RC) diaphragm type abutments and one bent (Bent 2) , consisting of 3 flared columns.

The elevation of the pile cap footing at Bent 2 is about 52.5 feet, corresponding to a depth of about 6.5 feet from the adjacent ground surface.

Existing Foundations

Based on the as-built drawings, the abutments, as well as Bent 2, are founded on Raymond Step-Tapered driven piles (driven steel shell filled with concrete). The butt and tip diameters of the existing piles are 15 and 8 inches, respectively. Additional information on the existing piles at Bent 2, designed as per the Working Stress Design (WSD) methodology, is summarized in Table 1 below.

Table 1 – As-Built Foundation at Bent 2

Support Location	Pile Type/ Dimension (in)	Design Load (kips)	Bottom of Footing Elevation (ft)	Specified Tip Elevation (ft)	Average Tip Elevation (ft)
Bent 2	Raymond Step-Taper Tip 8", Top 15"	60	52.5	5	3.6

The As-Built elevations are based on NGVD29 datum. The benches on NAVD88 datum are 2.4' higher than the NGVD29 datum (datum shift information provided to OGDS1 by District 12 Survey).

PROPOSED SEISMIC RETROFIT

Based on the above referenced request memo, OBDS1 has identified this subject bridge as one of the existing state bridge structures in need of seismic retrofit. It is also our understanding that the identified seismic capacity deficiency is limited to Bent 2 only.

Based on the proposed retrofit plans provided by OBDS1 (3/17/2014), OGDS1 understands that the scope of the subject retrofit project will consist of installation of steel column casings and an infill wall designed, and if necessary based on the results of the subject geologic, geotechnical and geotechnical seismic hazard evaluation, retrofitting the foundation at Bent 2.

It is our understanding that once the proposed retrofit column casing and the infill wall are installed, the primary concern regarding the foundation at Bent 2 during seismic events, more specifically, in the event of significant soil liquefaction, is the availability of adequate pile axial nominal resistance in compression to support the design dead load transferred from the superstructure. Due to the configuration/type of the bridge and/or supports, no additional axial load will be transferred to the Bent 2 foundation from the superstructure due to inertial forces during seismic events. For similar reasons, lateral foundation capacity is not a seismic retrofit design consideration.

For reference, it should be noted that the elevations provided in the proposed project (Bent 2) retrofit project plans and recent Log of Test Boring (LOTB) are based on NAVD88 datum. As-Built elevations are based on NGVD29 datum. The benches on NAVD88 datum are 2.4' higher than the NGVD29 datum (datum shift information provided to OGDS1 by District 12 Survey on March 14, 2014).

FIELD INVESTIGATION AND TESTING PROGRAM

The site-specific field exploration was performed between October 23, 2013 and November 7, 2013. The filed investigation included drilling one rotary-wash boring (4.5 inch outer diameter) and advancing three cone penetration test (CPT) soundings, near existing bridge Bent 2 location. The boring was drilled by the Caltrans Office of Drilling Services and logged by personnel from our office. Standard Penetration Tests (SPTs) and relatively undisturbed sampling (with a 2 inch inner diameter split-barrel sampler) were performed at the borings. Blow counts (SPT N values) were continuously recorded at 5 foot intervals during drilling. SPTs were performed in accordance with ASTM Test Method D1586-84 using a standard 1.4 inch I.D. sampler with a 140 lb. hammer dropped 30 inches. Undisturbed tube soil samples were also obtained using a 2 inch I.D. modified California Split Spoon Sampler with 4 inch long brass liners. The lined samples were all sealed in the field. A Caltrans-operated drill rig model CS2000 was used at the boring location, utilizing the mud rotary drilling method. The Geotechnical findings obtained from this exploration were utilized to estimate geotechnical capacity of the existing foundation.

At the completion of the boring, the hole was backfilled with grout and Bentonite chips, and patched with AC/Quick set concrete patch at the surface.

The Office of District 12 Survey provided location and elevation of the borings and CPTs. Boring/CPT information, including exploration number, stationing, offset, ground surface elevation, boring depth, and date drilled are summarized in Table 2 below:

Table 2 – Summary of Boring/CPT Information

Boring/CPT Exploration No.	Station Rte 91 CL	Offset (ft)	Surface Elev. (ft)	Drilled Depth (ft)	Bottom Elev. (ft)	Date Drilled
CPT-13-004	263+28.75	9.8Lt	59.37	53.32	6.05	10-23-13
CPT-13-005	263+66.82	9.8Lt	59.48	53.42	6.06	10-23-13
CPT-13-006	263+95.68	9.9Lt	59.51	51.98	7.53	10-24-13
RW-13-002	263+05.83	8.9Lt	59.38	71.5	-12.12	11/07/13

LABORATORY TESTING PROGRAM

Selected soil samples from the two borings were sent to the Department's Transportation Laboratory in Sacramento and District 8 Materials Laboratory (Southern Regional Lab) for testing. All laboratory tests were performed in accordance with ASTM/AASHTO standard procedures and California Test Methods. The summarized laboratory tests data are shown in Table 3 below.

A summary of the geotechnical laboratory results is presented in Appendix II: Laboratory Data.

Table 3 – Laboratory Test Methods

Test	Standard
Particle Size Analysis	ASTM D422
Plasticity Index/Liquid Limit	AASHTO T 90&89
Unit Weight	ASTM D4767
Moisture Content	ASTM D2216
Corrosivity Testing	CTM 643, 422, 417

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Regional Geology

The site is within the Los Angeles Basin, which is between the Peninsular Ranges and Transverse Ranges geomorphic provinces. The Los Angeles Basin is an alluvium-filled basin that is up to several miles thick at its deepest point. The site is southwest of the Coyote Hills and east of the confluence of the Coyote Hills Creek and Fullerton Creek. The topography of the area is relatively level.

Site Geology

The site is located in the central Los Angeles Basin, and is underlain by alluvium derived from the San Gabriel River and its tributaries, such as Coyote Creek**.** The alluvium is generally composed of interlayered, very thickly bedded, medium dense to dense sands with varying amounts of silt.

Subsurface Conditions

Boring RW-13-002 encountered mostly silty sands/poorly graded sands with generally 20-50% fines. In the upper 6 ft the medium dense clayey sand was encountered. Below 6', the soil was loose in the upper 15 feet, and medium dense down to about 50 feet depth. A dense to very dense layer was below 50', and densities returned to medium dense below 60' down to about 71.5', which is the maximum depth drilled. Based on the As-Built LOTB (1993) for the bridge retaining walls a dense layer was encountered below 70' down to about 80' depth from ground surface. There are also scattered thick to very thick, stiff silt beds.

Subsurface conditions encountered during the recent drilling are presented on the Log of Test Borings (LOTB) and submitted with the FPS&E plans for Valley View Street OC Retrofit (dated March 17, 2014). The idealized soil profile developed and used in the geotechnical analysis and design is attached in Appendix III.

Ground Water

Historical Data

Previously conducted investigations for the Valley View Overcrossing and retaining walls encountered ground water between elevations of 45.6' and 47.6' above mean sea level (MSL) in 1957 and elevations of 33' and 35' MSL in 1993. The closest Department of Water Resources ground water well data shows a historic high ground water elevation at 19.7 feet above sea level in October 1979 at well 04S11W04G003S, which is located approximately ½ mile southwest of the site. Monitoring wells at nearby gas stations show a ground water elevation of 48.62 in 2005 according to the GeoTracker website.

Current investigation

Ground water was encountered in boring RW-13-002 at approximately 10' below ground surface, or at an elevation of 49.4 ft. For this project foundation retrofit analysis and recommendations, design ground water elevation at 49.5 ft was used. The water level may vary with the seasonal precipitation.

CORROSION EVALUATION

The soil samples corrosion test results are presented in the Table 4 below. The results show this area can be considered as non-corrosive to concrete and metal (structural elements).

Table 4 - Corrosion Test Summary

Exploration No.	Depth (ft)	PH	Minimum Resistivity (ohm – cm)	Sulfate Content (PPM)	Chloride Content (PPM)
R-13-002	Composite (5.0-71.5)	7.40	3795	N/A	N/A
R-13-002	10.0-16.5	9.35	1150	N/A	N/A
R-13-002	25.0-41.5	7.98	2958	N/A	N/A
R-13-002	42.5-56.5	8.84	3868	N/A	N/A
Corrosive Guidelines		**≤5.5**	**<1000**	**≥2000**	**≥500**

Note: *Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist: Chloride concentration is greater than or equal to 500 ppm, sulphate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less. It is the practice of Caltrans Corrosion Technology Section (with the exception of MSE Walls) if the minimum resistivity of the sample is greater than 1000 ohm-cm and the pH is greater than 5.5, the sample is considered to be noncorrosive.*

SEISMIC DESIGN RECOMMENDATIONS

Design Ground Motion

Seismic ground motion hazard at the site was evaluated using Version 2.3.06 of the Caltrans ARS Online tool. A V_{s30} of 270 m/s was estimated for the subject site based on correlations of soil shear wave velocity with CPT tip resistance as well as SPT blows counts. Site-specific CPT tip resistances from the current investigation and the SPT blow counts from the current and previous investigations were utilized. The computations performed using Caltrans' ARS Online tool indicate that the design Peak Ground Acceleration (PGA) for the project site is 0.58g. The recommended design ARS curve is attached in Appendix IV.

Based on the Caltrans ARS Online tool, the Puente Hills (Coyote Hills), Anaheim, and Compton Faults, all three reverse type faults, are the nearby significant seismic sources for the project site. The Puente Hills Fault dips 26° to the northwest with a M_{max} of 6.8, and contributes most to the seismic hazard corresponding to the design ground motion return period. The rupture distance (R_{rup}) is approximately 4.4 km (2.7 mi) from the site. The Anaheim Fault dips 71° to the northeast with a M_{max} of 6.4. The rupture distance (R_{rup}) is approximately 3.9 km (2.4 mi) from the site. The Compton Fault is Fault ID 367 in the Caltrans ARS On-line database. It dips 20° to the northeast with a M_{max} of 6.9. The rupture distance (R_{rup}) is approximately 10.8 km (6.7 mi) from the site.

Fault Surface Rupture Hazards

The project site is not located within any Alquist-Priolo Earthquake Fault Zones as established by the California Geological Survey (CGS, 1997) and fault surface rupture is not considered a design issue for the subject structure.

Liquefaction Hazards

A detailed liquefaction analysis was performed utilizing the CPT data per Youd et al. (2001) and by considering the recommendations provided in Boulanger and Idriss (2006) and Bray and Sancio (2006). The computer code CLiq (GeoLogismiki, 2014) was utilized as a tool to perform this analysis. Laboratory data, including Atterberg Limits, natural water contents, and fines contents of the site, were also considered in the soil liquefaction hazard evaluation. The analysis is attached to this report as Appendix V.

As stated earlier, elevation of the existing ground surface adjacent to Bent 2 is about 59.5 feet. Based on the current geotechnical investigation and review of the as-built records for the subject site, subsurface soils encountered below the Bent 2 pile-cap footing at elevation +52.5 feet down to elevation +14 ft elevation consist of mostly loose and medium dense, fine, sandy silts and poorly graded sands. Soils encountered below elevation +14 feet consist mainly of dense to very dense sandy silts and poorly graded sand with silts.

Based on our evaluation of the subsurface conditions, as discussed above, and the liquefaction analysis, under saturated conditions, soils from the bottom of the Bent 2 pile-cap footing (Elevation +52.5 feet) to Elevation +14 feet are considered susceptible to liquefaction during seismic ground shaking.

For the design groundwater elevation at 49.5 feet, the potential for liquefaction at the site is considered high for soils from about 10 ft to about 35 ft below the ground surface and medium for soils from about 35 feet to 45 feet depth. This depth of 45 feet corresponds to an elevation of +14 feet above MSL.

The potential for liquefaction of the soils below elevation +14 feet above MSL (depth >45 feet) is considered low to very low due to higher soil densities, as discussed above.

Estimated settlement of the ground surface at Bent 2 due to settlement of the liquefied soils discussed above ranges from about 5 to 8 inches.

Effects of Soil Liquefaction on Existing Foundation at Bent 2

As presented in Table 1 above, the existing piles at Bent 2 are tipped at an average elevation of +3.6 feet above MSL. Based on this tip elevation and the extent of soil liquefaction predicted above at the location of Bent 2, the existing piles extend only 7 feet into the underlying non-liquefiable soil. The upper 42-foot length of the piles is located within liquefiable soils. In the event of soil liquefaction during seismic events, this part of the existing piles is likely to lose most, if not all, of the axial nominal resistances (side resistance).

Geotechnical axial nominal resistances in compression were evaluated for soil strength conditions appropriate for static loading (or no soil liquefaction) as well as seismic loading causing soil liquefaction. Results of this evaluation are presented in Tables 5 and 6 below, respectively.

Table 5 - Static Axial Geotechnical Nominal Resistance in Compression for Existing Piles at Bent

Support Location/ Type & Size	Design Axial Load in Compression	Available Axial Nominal Resistance in Compression (kips)
Bent 2 Raymond Step Taper Tip 8” Top 15”	120	125

Table 6 -1969 Axial Geotechnical Nominal Resistance of Existing Bent 2 Piles after Soil Liquefaction

Support Location/ Type & Size	[1]Design Demand or Load in Axial Compression due to Dead Load only (kips)	Available Total Axial Geotechnical Nominal Resistance in Compression (kips)	Liquefaction-Induced Down Drag (kips)
Bent 2 Raymond Step-Taper Tip 8" Top 15"	82 to 106 kips	50	50

Note: Design axial dead load or demand per pile provided by OBDS1

Based on the information provided in Table 5 above, the predicted available axial total geotechnical nominal resistance of the existing piles once the soils liquefy is significantly less than the minimum amount required to support the dead load. That is, in the event of soil liquefaction the existing piles are likely to experience plunging failure or collapse during the event even if these piles are subjected to the design dead load only.

It should also be noted that the estimated down drag on the pile after the design seismic event and the dissipation of the induced excess pore pressures is about 50 kips which is about equal to the available total geotechnical nominal resistance of the portion of the pile founded below the liquefaction zone.
That is, the existing piles will have no additional capacity necessary to support the dead load even after the event

Based on the above findings, the existing piles are likely to suffer significant loss in the axial nominal resistance due to soil liquefaction and susceptible to failure during as well as after the shaking has ceased. It is our opinion that foundation retrofit at Bent 2 is necessary to provide adequate axial geotechnical nominal resistance during a seismic event, especially those causing foundation soils to liquefy as predicted above. Such events are likely to include many less significant seismic event that the design event since it is the soil liquefaction only, not any additional axial load demand due to inertial load, is sufficient to cause plunging failure of the existing piles.

FOUNDATION DESIGN RECOMMENDATIONS

The foundation at Bent 2 may be retrofitted by installing new piles of suitable size (diameter) extending into the non-liquefiable soil below elevation +14 feet by sufficient length necessary to provide adequate total axial nominal resistance to support the design dead load even if the overlying site soils liquefy during a seismic event.

OBDS1 proposed a foundation retrofit in the advanced planning study consisting of drilled shafts. OBDS1 also provided the load for seismic design (specified tip elevation) of the proposed retrofit piles, attached in Appendix VI.

After several analysis and evaluation iterations with different pile diameters, lengths, and number of piles per footing, also considering down drag load from liquefiable layers, OGDS1 recommends 6 (six) 3-foot diameter, 65-foot long drilled shafts per footing. A total of 12 shafts for two footings supporting the proposed retrofit in-fill wall are thus recommended. The recommended foundation design information in the form of a pile data table is presented in Table 7 below. As discussed, the retrofit pile design recommendations are based on the axial load demand due to dead load only, the magnitude of which is provided by OBDS1.

Table 7 – Retrofit Pile Data for Valley View Str. OC Retrofit

Support Location	Pile Type	Design Load (Extreme Event)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)
		Axial Compression Load Due to Dead Load Only (kips)	Tension (kips)		
Bent 2	36” CIDH	350	N/A	-12.5 (a) -2.5 (b)	-12.5

Notes:

1. Design Tip elevations are controlled by: (a) Compression, (b) Lateral.
2. Extreme Event-liquefaction induced Load from Down-Drag; unsuitable liquefiable soils extend from elevation + 53 ft down to elevation +14 ft
3. Design Tip elevation for Lateral Load is provided by OBDS1
4. The specified tip elevation shall not be raised above the design tip elevation for lateral load.

As per the request from the OBDS1 and based on the review of As-Built soil data and recent geotechnical explorations, OGDS1 (by Dr. Mohammed Islam) performed calculations and provided values for the p-y, t-z, and q-z curves for the existing and the proposed new retrofit piles. These p-y, t-z, and q-z curves and data are attached in Appendix VII.

CONSTRUCTION CONSIDERATIONS

The following recommendations are made for CIDH pile installation and construction and are recommended to be incorporated in the Special Provisions of the project.

1) Significantly difficult pile installation conditions should be anticipated due to the limited work area beneath the existing bridge, immediately adjacent to existing bent support columns and foundations, located in the middle of a freeway to be kept open to traffic (may be required at all times), limited headroom, shallow groundwater, and caving-susceptible loose, saturated, cohesionless subsurface soils with gravel.

2) Groundwater should be anticipated to be present at or near the bottom of the pile-cap footing. Therefore, the wet construction method should be anticipated for the installation of the drilled shafts (i.e., wet specs will be required).

3) Dewatering of excavations and/or slurry displacement construction methods should be anticipated.

4) Installation of temporary casing to the elevation of at least +5 feet above MSL should be required to prevent soil caving and/or disturbance to the foundation soils alongside the drilled holes. Provisions in Section 49-3.02C(3), 'Temporary Steel Casing" of the 2010 Standard specifications shall be followed.

5) Full depth temporary casing may be required depending on the contractor's means and methods of shaft installation and the actual soil and ground water regime encountered during construction.

6) If the slurry displacement method is used, requirements in standard special Provisions 49-310, CIDH shall be followed.

7) The contractor shall be required to clean out or remove any loose soils and all foreign materials that may be present at the bottom of the drilled hole and achieve firm pile tip support conditions prior to placing the reinforcement cage and concrete.

8) A positive hydro-static pressure head shall be maintained inside the temporary casing at all times during construction to achieve a no fluid flow condition between the inside and outside of the casing and to maintain the integrity and stability of the foundation soils below and around the casing.

9) Concrete placement for construction of the CIDH piling should be completed immediately after the completion of the drill holes. Drilling the hole and concrete placement for a given drilled shaft shall be completed within the same work day.

Any questions regarding the above recommendations should be directed to Tatjana Halda at (213) 620-2347, Kristopher Barker at (562) 665-0048, or Shiva Karimi at (213) 620-2146, of the Office of Geotechnical Design-South 1, Branch D.

Report by Date: 3/25/14

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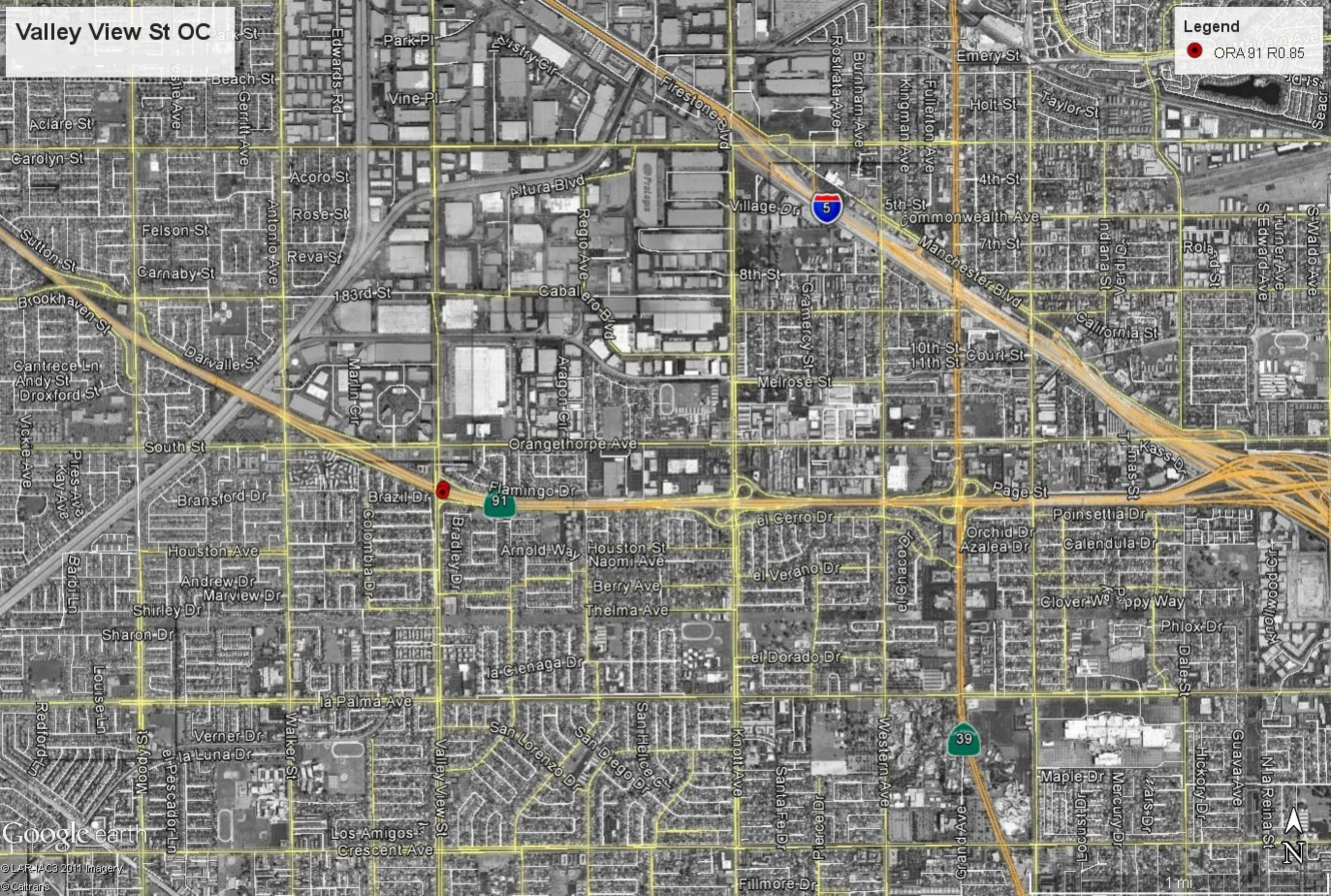
Attachments:
Appendix I – Site Vicinity Map
Appendix II – Laboratory Data
Appendix III – Idealized Soil Profile
Appendix IV – Caltrans ARS (online) Curve
Appendix V – CLiq Analysis (GeoLogismiki, 2014)
Appendix VI – Seismic Design Loads (OBDS1)
Appendix VII – p-y, t-z, q-z Curves

Appendix I

Site Vicinity Map


Valley View St OC
Legend
ORA 91 R0.85
Park St
Beach St
Edwards Rd
Park Pl
Vine Pl
Aclare St
Carolyn St
Gerritt Ave
Acoro St
Rose St
Felson St
Reva St
Carnaby St
Antonio Ave
Sutton St
Brookhaven St
183rd St
Altura Blvd
Regio Ave
Cabalero Blvd
Firestone Blvd
Village Dr
Darvalle St
Cantrece Ln
Andy St
Droxford St
Marlin Cir
Aragon Cir
South St
Orangethorpe Ave
Flamingo Dr
Brazil Dr
Bransford Dr
Houston Ave
Andrew Dr
Marview Dr
Shirley Dr
Sharon Dr
Colombia Dr
Bradley Dr
Arnold Way
Houston St
Naomi Ave
Berry Ave
Thelma Ave
la Cienaga Dr
la Palma Ave
Verner Dr
la Luna Dr
Walker St
Valley View St
San Lorenzo Dr
San Diego Dr
San Helice Cir
Los Amigos
Crescent Ave
Rostrata Ave
Burnham Ave
Kingman Ave
Fullerton Ave
Emery St
Holt St
Taylor St
4th St
5th St
Commonwealth Ave
7th St
Manchester Blvd
8th St
Gramercy St
Melrose St
10th St
11th St
Court St
California St
Indiana St
Verdugo
Roland St
Turner Ave
S Edward Ave
S Waldo Ave
el Cerro Dr
el Verano Dr
el Dorado Dr
el Chaco Dr
Knott Ave
Santa Fe Dr
Pierce Dr
Western Ave
Grand Ave
Fillmore Dr
Page St
Kass Dr
Tomas St
Orchid Dr
Azalea Dr
Poinsettia Dr
Calendula Dr
Glover Way
Poppy Way
Phlox Dr
Dale St
Woodlark Cir
Maple Dr
Mercury Dr
Mars Dr
Lincoln Dr
Hickory Dr
Guava Ave
N la Reina St
Pires Ave
Kay Ave
Barbi Ln
Louise Ln
Redford Ln
S Woody St
el Pescador Ln
Google earth
© LARIAC3 2011 Imagery
© Caltrans
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Appendix II

Laboratory Data

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-1

Material Source: Depth 5'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1	S	-	1				3275B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCVD: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5	0	0		100	
22	4.75	22	2		98	
950		972				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	98
	2.36 mm	1	1	99	97
	1.18 mm	2	3	97	95
80.0 g	600 µm	4	5	95	93
	300 µm	14	18	82	80
	150 µm	36	45	55	54
	75 µm	52	65	35	34

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	19.0	8.0	11.0	14%	14%
24hr.	1M	14.0	8.0	6.0	8%	8%

SAND EQUIVALENT

						MIN.
Sand R2					Avg.	SPEC.
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / (500 - W) =	

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / (A - C) =	
SSD = B / (B - C) =	
OD = A / (B - C) =	

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

SPEC.

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
	A.B.	PCC	
	A.S.	Bk.Fill	
	EMB.	MISC.	
	O.G.	Sub-Grade	
	A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 7 5 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-2

Material Source: Depth 10'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1 2	0 M 7 2 0 1	S - 2	3276B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
585		585				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
		0	100	100	
	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
80.0 g	600 µm	2	3	97	97
	300 µm	11	14	86	86
	150 µm	39	49	51	51
	75 µm	63	79	21	21

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	12.0	8.0	4.0	5%	5%
24hr.	1M	11.0	8.0	3.0	4%	4%

SAND EQUIVALENT

					MIN.
Sand R2				Avg.	SPEC.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

SPEC.

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

	SPEC.
RESULT	

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / (500 - W) =	

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / (A - C) =	
SSD = B / (B - C) =	
OD = A / (B - C) =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
	A.B.	PCC	
	A.S.	Bk.Fill	
	EMB.	MISC.	
	O.G.	Sub-Grade	
	A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 7 6 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-3

Material Source: Depth 15'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By ____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1	S	-	3				3277B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
985		985				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	1	1	99	99
	300 µm	5	6	94	94
	150 µm	18	23	77	77
	75 µm	36	45	55	55

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	23.0	8.0	15.0	19%	19%
24hr.	1M	16.0	8.0	8.0	10%	10%

SAND EQUIVALENT

						MIN.
Sand R2					Avg.	SPEC.
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3277B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-4

Material Source: Depth 20'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1	S	-	4				3278B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
773		773				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
		0	0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	1	1	99	99
	300 µm	11	14	86	86
	150 µm	44	55	45	45
	75 µm	57	71	29	29

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	14.0	8.0	6.0	8%	8%
24hr.	1M	12.0	8.0	4.0	5%	5%

SAND EQUIVALENT

					MIN. SPEC.
Sand R2				Avg.	
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / (500 - W) =	

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / (A - C) =	
SSD = B / (B - C) =	
OD = A / (B - C) =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES	
NM	Satisfactory	
	Unsatisfactory	

TEST(S) REQUESTED			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 7 8 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-5

Material Source: Depth 22.5'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1	S	-	5				3279B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 3 brass

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
283		283				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	0	0	100	100
	300 µm	0	0	100	100
	150 µm	1	1	99	99
	75 µm	13	16	84	84

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	16.0	8.0	8.0	10%	10%
24hr.	1M	12.0	8.0	4.0	5%	5%

SAND EQUIVALENT

					MIN.
Sand R2				Avg.	SPEC.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

			SPEC.
Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk $= \frac{500}{500 - W} =$	

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App $= \frac{A}{A - C} =$	
SSD $= \frac{B}{B - C} =$	
OD $= \frac{A}{B - C} =$	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	NP
P.L.	NP
P.I.	NP

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
■	Unit Wt.		✓
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
	A.B.	PCC	
	A.S.	Bk.Fill	
	EMB.	MISC.	
	O.G.	Sub-Grade	
	A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

115.20 pcf

% MC = 30.0 %

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 7 9 B

SRL SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	-	6				3280B
		CONTRACT NO.						SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

By: FAX MAIL PHONE OTHER

NORMAL ✓ PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-6

Material Source: Depth 25'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

GRADING ANALYSIS

Total Wt | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
1058		1058				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)						
			0	100	100	
	2.36 mm	0	0	100	100	
	1.18 mm	0	0	100	100	
80.0 g	600 µm	0	0	100	100	
	300 µm	3	4	96	96	
	150 µm	20	25	75	75	
	75 µm	41	51	49	49	

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	22.0	8.0	14.0	18%	18%
24hr.	1M	16.0	8.0	8.0	10%	10%

SAND EQUIVALENT

					MIN.
Sand R2				Avg.	SPEC.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

			SPEC.
Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. | SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT | SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / (500 - W) =	

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / (A - C) =	
SSD = B / (B - C) =	
OD = A / (B - C) =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	NP
P.L.	NP
P.I.	NP

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES
NM	Satisfactory
	Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
	A.B.	PCC	
	A.S.	Bk.Fill	
	EMB.	MISC.	
	O.G.	Sub-Grade	
	A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201 LAB. NO. 3280B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-7

Material Source: Depth 30'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1	S	-	7				3281B
CONTRACT NO.														LAB. NO.

SAMPLE NO.

DATE RCV'D: 11/8/13

DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY

DATE NEEDED:

By: FAX / MAIL / PHONE / OTHER

GRADING ANALYSIS

Total Wt | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
963		963				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)						
			0	100	100	
	2.36 mm	0	0	100	100	
	1.18 mm	0	0	100	100	
80.0 g	600 µm	0	0	100	100	
	300 µm	2	3	97	97	
	150 µm	18	23	77	77	
	75 µm	40	51	49	49	

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	16.0	8.0	8.0	10%	10%
24hr.	1M	12.0	8.0	4.0	5%	5%

SAND EQUIVALENT

						MIN.
Sand R2					Avg.	SPEC.
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. | SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT | SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	NP	
P.L.	NP	
P.I.	NP	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3281B

SRL SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	-	8				3282B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-8

Material Source: Depth 35'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
692		692				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)						
			0	100	100	
	2.36 mm	0	0	100	100	
	1.18 mm	0	0	100	100	
80.0 g	600 µm	0	0	100	100	
	300 µm	4	5	95	95	
	150 µm	14	18	82	82	
	75 µm	43	54	46	46	

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	13.0	8.0	5.0	6%	6%
24hr.	1M	10.0	8.0	2.0	3%	3%

SAND EQUIVALENT

					MIN. SPEC.
Sand R2				Avg.	
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / (500 - W) =	

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / (A - C) =	
SSD = B / (B - C) =	
OD = A / (B - C) =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		L.L.
Gr. Dry		
H2O		P.L.
Tare		
Net Dry		P.I.
% H2O		

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES	
NM	Satisfactory	
	Unsatisfactory	

TEST(S) REQUESTED			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 8 2 B

SRL SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	-	9				3283B
		CONTRACT NO.						SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL ✓ PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-9

Material Source: Depth 40'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
724		724				

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)						
			0	100	100	
	2.36 mm	0	0	100	100	
	1.18 mm	0	0	100	100	
80.0 g	600 µm	0	0	100	100	
	300 µm	5	6	94	94	
	150 µm	33	41	59	59	
	75 µm	58	72	28	28	

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	17.0	8.0	9.0	11%	11%
24hr.	1M	12.0	8.0	4.0	5%	5%

SAND EQUIVALENT

						MIN. SPEC.
Sand R2					Avg.	
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

			SPEC.
Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.
P.L.
P.I.

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3283B

07-AGG-SSD (RG/SD 7/93 Rev DH 03/17/03)

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-10

Material Source: Depth 42.5'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1	S	-	1	0			3284B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 2 brass

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total W1 By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
323		323				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)						
			0	100	100	
	2.36 mm	0	0	100	100	
	1.18 mm	0	0	100	100	
80.0 g	600 µm	0	0	100	100	
	300 µm	3	4	96	96	
	150 µm	23	29	71	71	
	75 µm	43	53	47	47	

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	19.0	8.0	11.0	14%	14%
24hr.	1M	13.0	8.0	5.0	6%	6%

SAND EQUIVALENT

						MIN. SPEC.
Sand R2					Avg.	
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / (500 - W) =	

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / (A - C) =	
SSD = B / (B - C) =	
OD = A / (B - C) =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
■	Unit Wt.		✓
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

124.70 pcf

% MC = 22.8 %

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3284B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-11

Material Source: Depth 50'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1	S	-	1	1			3285B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total W1 By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
832		832				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
		0	0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	2	3	97	97
	300 µm	9	11	89	89
	150 µm	36	45	55	55
	75 µm	55	69	31	31

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	13.0	8.0	5.0	6%	6%
24hr.	1M	11.0	8.0	3.0	4%	4%

SAND EQUIVALENT

						MIN. SPEC.
Sand R2					Avg.	
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES
NM	Satisfactory
	Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3285B

SRL SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	-	1	2			3286B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-12

Material Source: Depth 55'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5	0				
3	4.75	3	0		100	
829		832				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	2	3	97	97
80.0 g	600 µm	8	10	90	90
	300 µm	30	38	62	62
	150 µm	64	80	20	20
	75 µm	71	89	11	11

MECH. / HYDRO.	R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	11.0	8.0	3.0	4%	4%
24hr.	1M	10.0	8.0	2.0	3%	3%

SAND EQUIVALENT

		MIN. SPEC.
Sand R2	Avg.	
Clay R1		
S.E. Value		

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / (500 - W) =	

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / (A - C) =	
SSD = B / (B - C) =	
OD = A / (B - C) =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES
NM	Satisfactory
	Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201 LAB. NO. 3286B

07-AGG-SSD (RG/SD 7/93 Rev DH 03/17/01)

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-13

Material Source: Depth 60'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1 2	0 M 7 2 0 1	S - 1 3	3287B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
784		784				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt.			0	100	100	
(g)	2.36 mm	0	0	100	100	
	1.18 mm	0	0	100	100	
80.0 g	600 µm	2	3	97	97	
	300 µm	10	13	87	87	
	150 µm	44	55	45	45	
	75 µm	54	68	32	32	

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	20.0	8.0	12.0	15%	15%
24hr.	1M	14.0	8.0	6.0	8%	8%

SAND EQUIVALENT

						MIN.
Sand R2					Avg.	SPEC.
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / 500 - W =	

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / A - C =	
SSD = B / B - C =	
OD = A / B - C =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
	A.B.	PCC	
	A.S.	Bk.Fill	
	EMB.	MISC.	
	O.G.	Sub-Grade	
	A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3287B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-14

Material Source: Depth 65'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1 2	0 M 7 2 0 1	S - 1 4	3288B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
648		648				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
80.0 g	600 µm	3	4	96	96
	300 µm	22	28	72	72
	150 µm	44	55	45	45
	75 µm	51	64	36	36

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	21.0	8.0	13.0	16%	16%
24hr.	1M	14.0	8.0	6.0	8%	8%

SAND EQUIVALENT

					MIN. SPEC.
Sand R2				Avg.	
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

		SPEC.
Gr. Wet	L.L.	
Gr. Dry		
H2O	P.L.	
Tare		
Net Dry	P.I.	
% H2O		

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3288B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-002 - S-15

Material Source: Depth 70'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By X for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

1 2	0 M 7 2 0 1	S - 1 5	3289B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
643		643				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	0	0	100	100
	300 µm	0	0	100	100
	150 µm	1	1	99	99
	75 µm	16	20	80	80

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	22.0	8.0	14.0	18%	18%
24hr.	1M	15.0	8.0	7.0	9%	9%

SAND EQUIVALENT

					MIN. SPEC.
Sand R2				Avg.	
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk $= \frac{500}{500 - W} =$

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$App = \frac{A}{A - C} =$

$SSD = \frac{B}{B - C} =$

$OD = \frac{A}{B - C} =$

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	NP
P.L.	NP
P.I.	NP

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES
NM	Satisfactory
	Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 8 9 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil	SRL Lab. Stamp
Sampled from: Composite 4 / RC-13-002 (S-10, S-11 & S-12)	By _____ for
Material Source:	**D. OZOWARA**
Owner / Mfr.:	**SRL Materials Engineer**
Date Sampled: 11-5/7-13	**R.E.:** Kristopher Barker
	Address:
	Phone No.:
	Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1							4081B
		CONTRACT NO.												LAB. NO.

SAMPLE NO.

DATE RCV'D: 11/18/14 DATE OUT: 2/25/14

NUMBER OF CONTAINERS: 3 Bags

NORMAL ☐ PRIORITY ✓ DATE NEEDED:

By: FAX ☐ MAIL ☐ PHONE ☐ OTHER ☐

GRADING ANALYSIS

Total Wt. By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
	4.75					

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)			0	100		
	2.36 mm					
.0 g	1.18 mm					
	600 µm					
	300 µm					
	150 µm					
	75 µm					

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M					
24hr.	1M					

SAND EQUIVALENT					MIN.
Sand R2				Avg.	SPEC.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC.
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX			SPEC.
Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

SPEC.

R-VALUE	SPEC.
RESULT	

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk $= \frac{500}{500 - W} =$	

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
$App = \frac{A}{A - C} =$	
$SSD = \frac{B}{B - C} =$	
$OD = \frac{A}{B - C} =$	

MOISTURE CONTENT		SPEC.	PLASTICITY INDEX
Gr. Wet		L.L.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		P.I.	
% H2O			

pH / RESISTIVITY	Field	Lab.
Soil pH		8.84
H2O		8.04
Min. Resistivity		3868

Based on 18 gauge CMP.

Estimated life: 43 yrs.

CLEANNESS VALUE		
NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES	
NM	Satisfactory	
	Unsatisfactory	

TEST(S) REQUESTED			✓
	Fine Grade	202	
	Coarse Grade	202	
	Filler Material	202	
	Mech. Analysis	203	
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Flat & Elongated	ASTM D 4791	
	R-Value	301	
	Fine Agg Angularity	AASHTO T 304	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
■	pH (CMP)	643	✓
■	Resistivity (CMP)	643	✓
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Dry Density

Max. Dry Density (pcf)	
Opt. Moist Content (%)	

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201 LAB. NO. 4081B

SRL SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1							4080B
		CONTRACT NO.						SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: Composite 3 / RC-13-002 (S-6, S-7, S-8 & S-9)

Material Source:

Owner / Mfr.:

Date Sampled: 11-5/7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

DATE RCV'D: 11/18/14

DATE OUT: 2/25/14

NUMBER OF CONTAINERS: 4 Bags

NORMAL ☐ PRIORITY ✓

DATE NEEDED:

By: FAX / MAIL / PHONE / OTHER

R.E.: Kristopher Barker

Address:

Phone No.:

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

GRADING ANALYSIS

Total Wt. | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
	4.75					

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

SPEC.

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)			0	100		
.0 g	2.36 mm					
	1.18 mm					
	600 µm					
	300 µm					
	150 µm					
	75 µm					

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M					
24hr.	1M					

R-VALUE

RESULT		SPEC.
SP. G. FINE (SSD)		
(B) S.S. Dry		
(A) Ov. Dry		
ABS. %		
Wt. S+C+H2O		
Wt. S+C		
W=Wt. H2O		
Bulk $= \frac{500}{500 - W} =$		

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

SAND EQUIVALENT

						MIN. SPEC.
Sand R2					Avg.	
Clay R1						
S.E. Value						

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
$App = \frac{A}{A - C} =$	
$SSD = \frac{B}{B - C} =$	
$OD = \frac{A}{B - C} =$	

pH / RESISTIVITY

	Field	Lab.
Soil pH		7.98
H2O		8.04
Min. Resistivity		2958

Based on 18 gauge CMP.

Estimated life: **39 yrs.**

L.A.R.T.

	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC.
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

CLEANNESS VALUE

NL	SED. HT.	RESULT

DURABILITY INDEX

			SPEC.
Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory	
Unsatisfactory	

TEST(S) REQUESTED

			✓
	Fine Grade	202	
	Coarse Grade	202	
	Filler Material	202	
	Mech. Analysis	203	
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Flat & Elongated	ASTM D 4791	
	R-Value	301	
	Fine Agg Angularity	AASHTO T 304	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
■	pH (CMP)	643	✓
■	Resistivity (CMP)	643	✓
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Dry Density

Max. Dry Density (pcf)	
Opt. Moist Content (%)	

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 4 0 8 0 B

SRL SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1							4079B
		CONTRACT NO.						SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: Composite 2 / RC-13-002 (S-2 & S-3)

Material Source:

Owner / Mfr.:

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

DATE RCV'D: 11/18/13

DATE OUT: 2/25/14

NUMBER OF CONTAINERS: 2 Bags

NORMAL ☐ PRIORITY ✓

DATE NEEDED:

By: FAX ☐ MAIL ☐ PHONE ☐ OTHER ☐

Date Sampled: 11/5/7-13

R.E.: Kristopher Barker

Address:

Phone No.:

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

GRADING ANALYSIS

Total Wt. | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
	4.75					

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)			0	100		
	2.36 mm					
.0 g	1.18 mm					
	600 µm					
	300 µm					
	150 µm					
	75 µm					

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M					
24hr.	1M					

SAND EQUIVALENT

					MIN. SPEC.
Sand R2				Avg.	
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC.
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. | SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT | SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

		SPEC.	PLASTICITY INDEX
Gr. Wet		L.L.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		P.I.	
% H2O			

pH / RESISTIVITY

	Field	Lab.
Soil pH		9.53
H2O		8.04
Min. Resistivity		1150

Based on 18 gauge CMP.

Estimated life: 26 yrs.

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES	
NM	Satisfactory	
	Unsatisfactory	

TEST(S) REQUESTED			✓
	Fine Grade	202	
	Coarse Grade	202	
	Filler Material	202	
	Mech. Analysis	203	
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Flat & Elongated	ASTM D 4791	
	R-Value	301	
	Fine Agg Angularity	AASHTO T 304	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
■	pH (CMP)	643	✓
■	Resistivity (CMP)	643	✓
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Dry Density

Max. Dry Density (pcf)	
Opt. Moist Content (%)	

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M720 1

LAB. NO. 4079B

07-AGG-SSD (RG/SD 7/93, Rev. HC 10/17/11)

SRL SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1								4078B
		CONTRACT NO.						SAMPLE NO.							LAB. NO.

Sample of: Soil

Sampled from: Composite 1 / RC-13-002 (S-1 & S-15)

Material Source:

Owner / Mfr.:

Date Sampled: 11-5 / 7-13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

DATE RCV'D: 11/18/13

DATE OUT: 2/25/14

NUMBER OF CONTAINERS: 2 Bags

NORMAL ☐ PRIORITY ✓

DATE NEEDED:

By: FAX ☐ MAIL ☐ PHONE ☐ OTHER ☐

R.E.: Kristopher Barker

Address:

Phone No.:

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

GRADING ANALYSIS

Total Wt. | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
	4.75					

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

SPEC.

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt.			0	100		
(g)	2.36 mm					
.0 g	1.18 mm					
	600 µm					
	300 µm					
	150 µm					
	75 µm					

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M					
24hr.	1M					

SAND EQUIVALENT

					MIN. SPEC.
Sand R2				Avg.	
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC.
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

			SPEC.
Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE

RESULT		SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry		
(A) Ov. Dry		
ABS. %		
Wt. S+C+H2O		
Wt. S+C		
W=Wt. H2O		
Bulk $= \frac{500}{500 - W} =$		

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry		
(A) Ov. Dry		
ABS. %		
(C) Wt. S. in H2O		
App $= \frac{A}{A - C} =$		
SSD $= \frac{B}{B - C} =$		
OD $= \frac{A}{B - C} =$		

MOISTURE CONTENT

Gr. Wet		L.L.		
Gr. Dry				
H2O		P.L.		
Tare				
Net Dry		P.I.		
% H2O				

pH / RESISTIVITY

	Field	Lab.
Soil pH		7.40
H2O		8.04
Min. Resistivity		3795

Based on 18 gauge CMP.

Estimated life: **43 yrs.**

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES	
NM	Satisfactory	
	Unsatisfactory	

TEST(S) REQUESTED

			✓
	Fine Grade	202	
	Coarse Grade	202	
	Filler Material	202	
	Mech. Analysis	203	
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Flat & Elongated	ASTM D 4791	
	R-Value	301	
	Fine Agg Angularity	AASHTO T 304	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
■	pH (CMP)	643	✓
■	Resistivity (CMP)	643	✓
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Dry Density

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 4 0 7 8 B

Appendix III

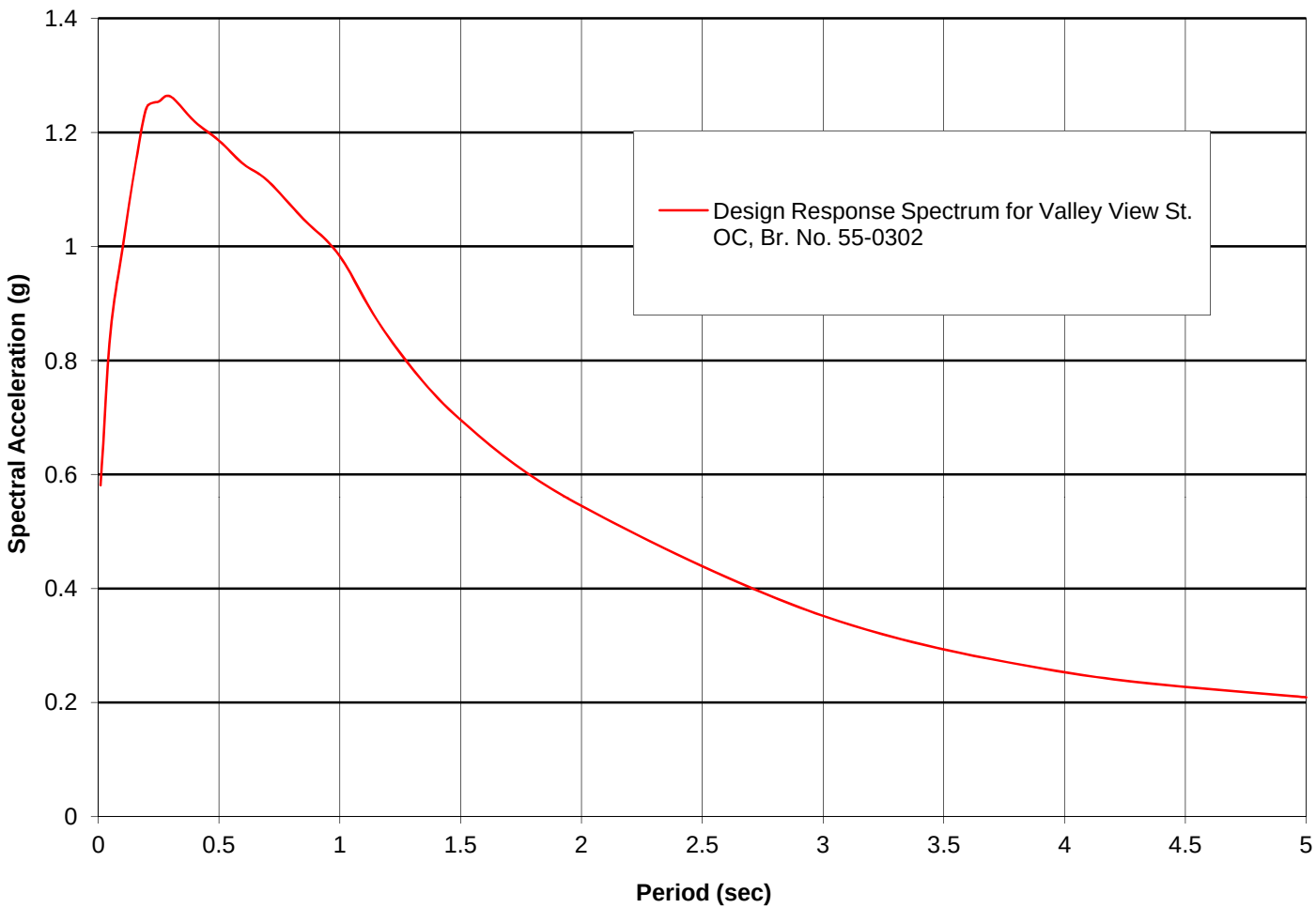
Idealized Soil Profile

IDEALIZED SOIL PROFILE AND STRENGTH PARAMETERS Valley View Street Overcrossing					
Approximate Elevation (ft)	Predominent Soil Type	Average Blowcount, N60	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (Residual – Sr) (psf)
Bent 2					
+59’ to +50’	SC/SP	10	115	32	
+50’ to +41’	SM/ML	6	112	29	260
+41’ to +24’	SM/ML	14	117	33	600
+24’ to +14’	SM	18	120	34	770
+14’ to -1’	SM/SP-SM	40	125	37	
-1’ to -11’	SM/ML	25	125	35	
-11’ to -21’	SM	30	125	36	

Appendix IV

Caltrans ARS Curve

ACCELERATION RESPONSE SPECTRUM (ARS)



SITE DATA (ARS Online Version 2.3.06)

Shear Wave Velocity, V_{S30}:	270 m/s
Latitude:	33.856660
Longitude:	-118.028612
Depth to Vs = 1.0 km/s:	748 m
Depth to Vs = 2.5 km/s:	4.35 km

DETERMINISTIC

Puente Hills (Coyote Hills)	
Fault ID:	361
Maximum Magnitude (MMax):	6.8
Fault Type:	Rev
Fault Dip:	26 Deg
Dip Direction:	NW
Bottom of Rupture Plane:	14.60 km
Top of Rupture Plane(Ztor):	2.80 km
Rrup	4.44 km
Rjb:	3.45 km
Rx:	3.45 km
Fnorm:	0
Frev:	1

Period	SA(Base Spectrum)	Basin Factor	Near Fault Factor(Applied)	SA(Final Spectrum)
0.01	0.481	1.159	1.000	0.558
0.05	0.553	1.151	1.000	0.636
0.1	0.697	1.146	1.000	0.800
0.15	0.809	1.149	1.000	0.930
0.2	0.886	1.153	1.000	1.022
0.25	0.922	1.163	1.000	1.072
0.3	0.937	1.178	1.000	1.103
0.4	0.936	1.208	1.000	1.131
0.5	0.906	1.274	1.000	1.153
0.6	0.836	1.295	1.040	1.126
0.7	0.778	1.310	1.080	1.101
0.85	0.691	1.324	1.140	1.042

1	0.612	1.337	1.200	0.981
1.2	0.514	1.353	1.200	0.834
1.5	0.404	1.368	1.200	0.664
2	0.280	1.384	1.200	0.465
3	0.157	1.399	1.200	0.264
4	0.106	1.406	1.200	0.179
5	0.080	1.411	1.200	0.135

Anaheim	
Fault ID:	363
Maximum Magnitude (MMax):	6.4
Fault Type:	Rev
Fault Dip:	71 Deg
Dip Direction:	ne
Bottom of Rupture Plane:	14.20 km
Top of Rupture Plane(Ztor):	3.80 km
Rrup	3.93 km
Rjb:	0.00 km
Rx:	1.02 km
Fnorm:	0
Frev:	1

Period	**SA(Base Spectrum)**	**Basin Factor**	**Near Fault Factor(Applied)**	**SA(Final Spectrum)**
0.01	0.512	1.154	1.000	0.591
0.05	0.580	1.146	1.000	0.665
0.1	0.719	1.142	1.000	0.821
0.15	0.829	1.144	1.000	0.948
0.2	0.907	1.148	1.000	1.041
0.25	0.944	1.157	1.000	1.092
0.3	0.960	1.170	1.000	1.124
0.4	0.962	1.199	1.000	1.154
0.5	0.925	1.266	1.000	1.170
0.6	0.845	1.287	1.040	1.132
0.7	0.779	1.303	1.080	1.097
0.85	0.680	1.317	1.140	1.022
1	0.593	1.330	1.200	0.946
1.2	0.489	1.346	1.200	0.790

1.5	0.376	1.361	1.200	0.615
2	0.246	1.380	1.200	0.407
3	0.124	1.399	1.200	0.209
4	0.078	1.408	1.200	0.131
5	0.056	1.413	1.200	0.096

Compton	
Fault ID:	367
Maximum Magnitude (MMax):	6.9
Fault Type:	Rev
Fault Dip:	20 Deg
Dip Direction:	NE
Bottom of Rupture Plane:	15.60 km
Top of Rupture Plane(Ztor):	5.20 km
Rrup	10.84 km
Rjb:	0.00 km
Rx:	17.37 km
Fnorm:	0
Frev:	1

Period	SA(Base Spectrum)	Basin Factor	Near Fault Factor(Applied)	SA(Final Spectrum)
0.01	0.462	1.166	1.000	0.539
0.05	0.541	1.160	1.000	0.627
0.1	0.718	1.153	1.000	0.827
0.15	0.846	1.154	1.000	0.977
0.2	0.905	1.160	1.000	1.049
0.25	0.917	1.171	1.000	1.074
0.3	0.916	1.186	1.000	1.086
0.4	0.879	1.219	1.000	1.071
0.5	0.826	1.283	1.000	1.060
0.6	0.750	1.303	1.040	1.017
0.7	0.688	1.317	1.080	0.978
0.85	0.602	1.330	1.140	0.913
1	0.528	1.342	1.200	0.850
1.2	0.437	1.357	1.200	0.712
1.5	0.337	1.370	1.200	0.554
2	0.217	1.385	1.200	0.361

3	0.106	1.398	1.200	0.178
4	0.067	1.405	1.200	0.112
5	0.050	1.410	1.200	0.084

PROBABILISTIC

Probabilistic Model USGS Seismic Hazard Map(2008) 975 Year Return Period				
Period	**SA(Base Spectrum)**	**Basin Factor**	**Near Fault Factor(Applied)**	**SA(Final Spectrum)**
0.01	0.511	1.136	1.000	0.581
0.05	0.753	1.123	1.000	0.845
0.1	0.889	1.117	1.000	0.993
0.15	1.014	1.117	1.000	1.132
0.2	1.112	1.117	1.000	1.243
0.25	1.110	1.130	1.000	1.254
0.3	1.108	1.140	1.000	1.263
0.4	1.025	1.189	1.000	1.219
0.5	0.965	1.229	1.000	1.186
0.6	0.880	1.251	1.040	1.145
0.7	0.813	1.271	1.080	1.116
0.85	0.712	1.291	1.140	1.048
1	0.628	1.305	1.200	0.983
1.2	0.531	1.322	1.200	0.842
1.5	0.432	1.343	1.200	0.696
2	0.332	1.370	1.200	0.545
3	0.211	1.391	1.200	0.352
4	0.150	1.402	1.200	0.253
5	0.124	1.411	1.200	0.209

MINIMUM DETERMINISTIC SPECTRUM

Period	SA
0.01	0.264
0.05	0.319
0.1	0.461

0.15	0.556
0.2	0.588
0.25	0.586
0.3	0.578
0.4	0.544
0.5	0.514
0.6	0.457
0.7	0.412
0.85	0.354
1	0.310
1.2	0.262
1.5	0.209
2	0.149
3	0.089
4	0.061
5	0.045

Envelope Data

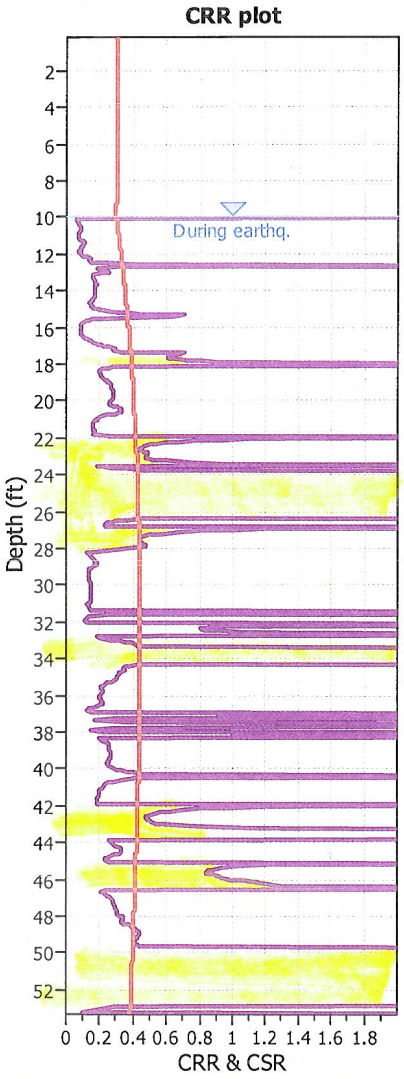
Period	SA
0.01	0.581
0.05	0.845
0.1	0.993
0.15	1.132
0.2	1.243
0.25	1.254
0.3	1.263
0.4	1.219
0.5	1.186
0.6	1.145
0.7	1.116
0.85	1.048
1	0.983
1.2	0.842
1.5	0.696
2	0.545
3	0.352
4	0.253

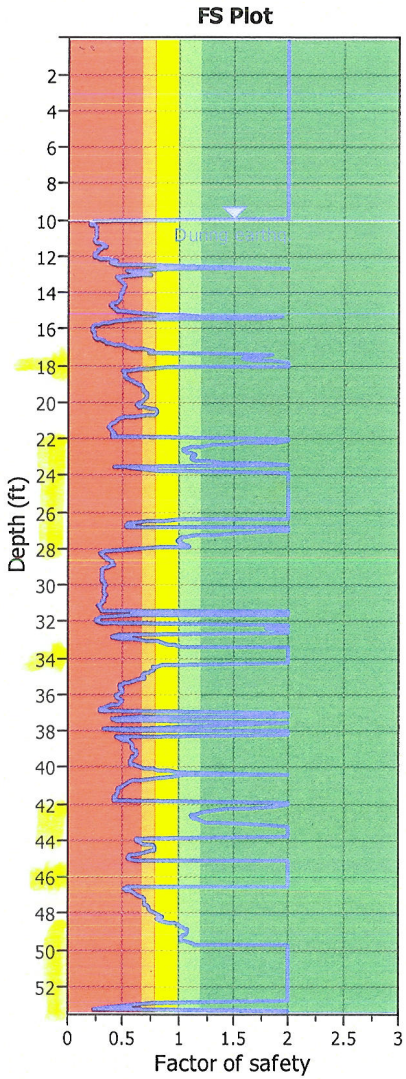
5	0.209

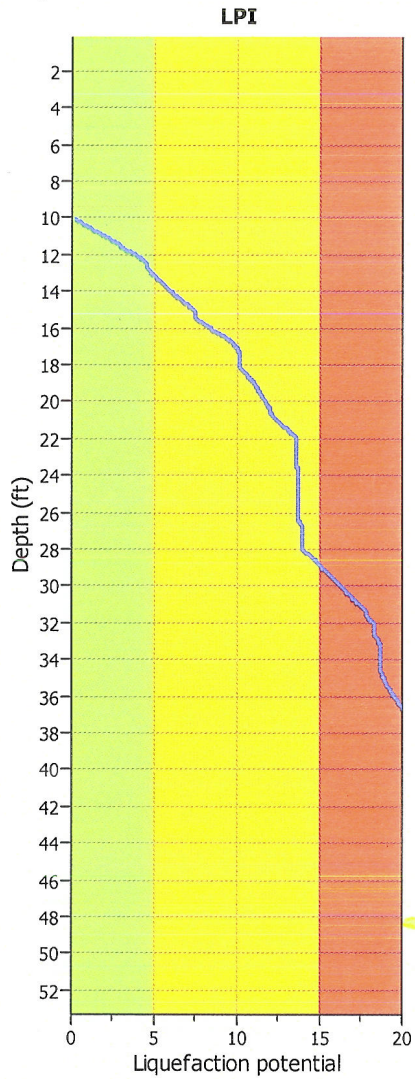
Appendix V

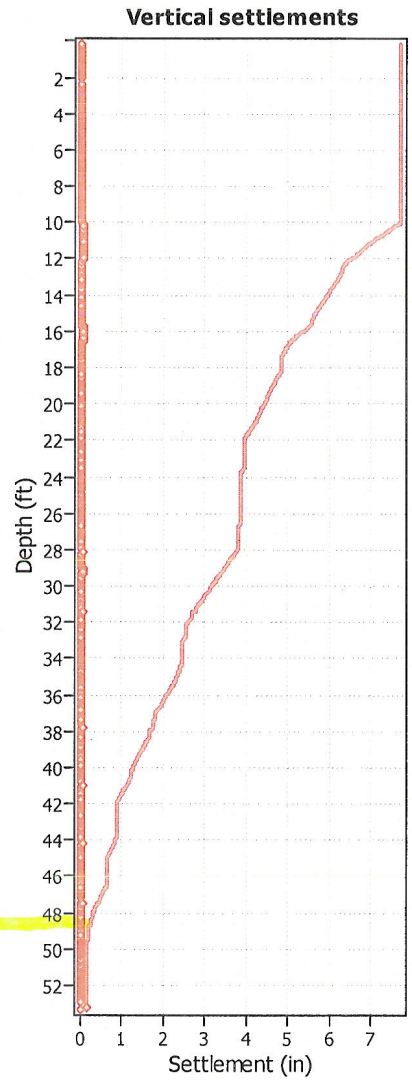
CLiq Analysis

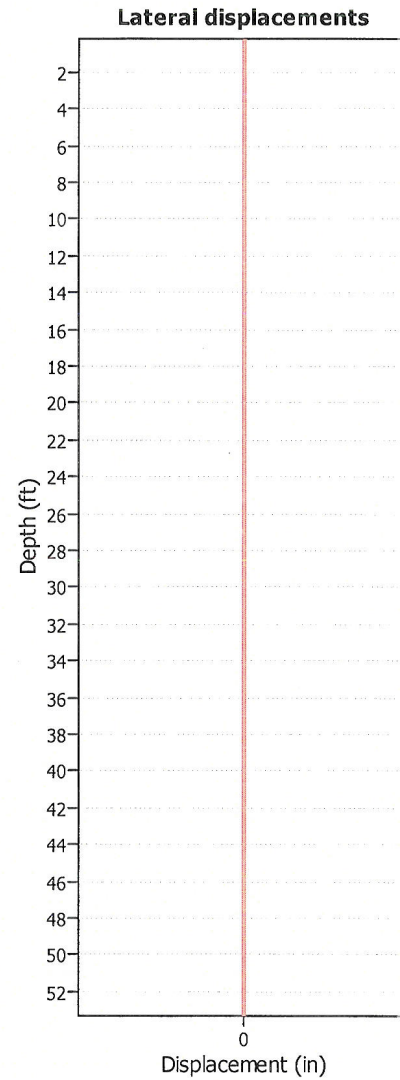
Liquefaction analysis overall plots











Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.58	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	N/A

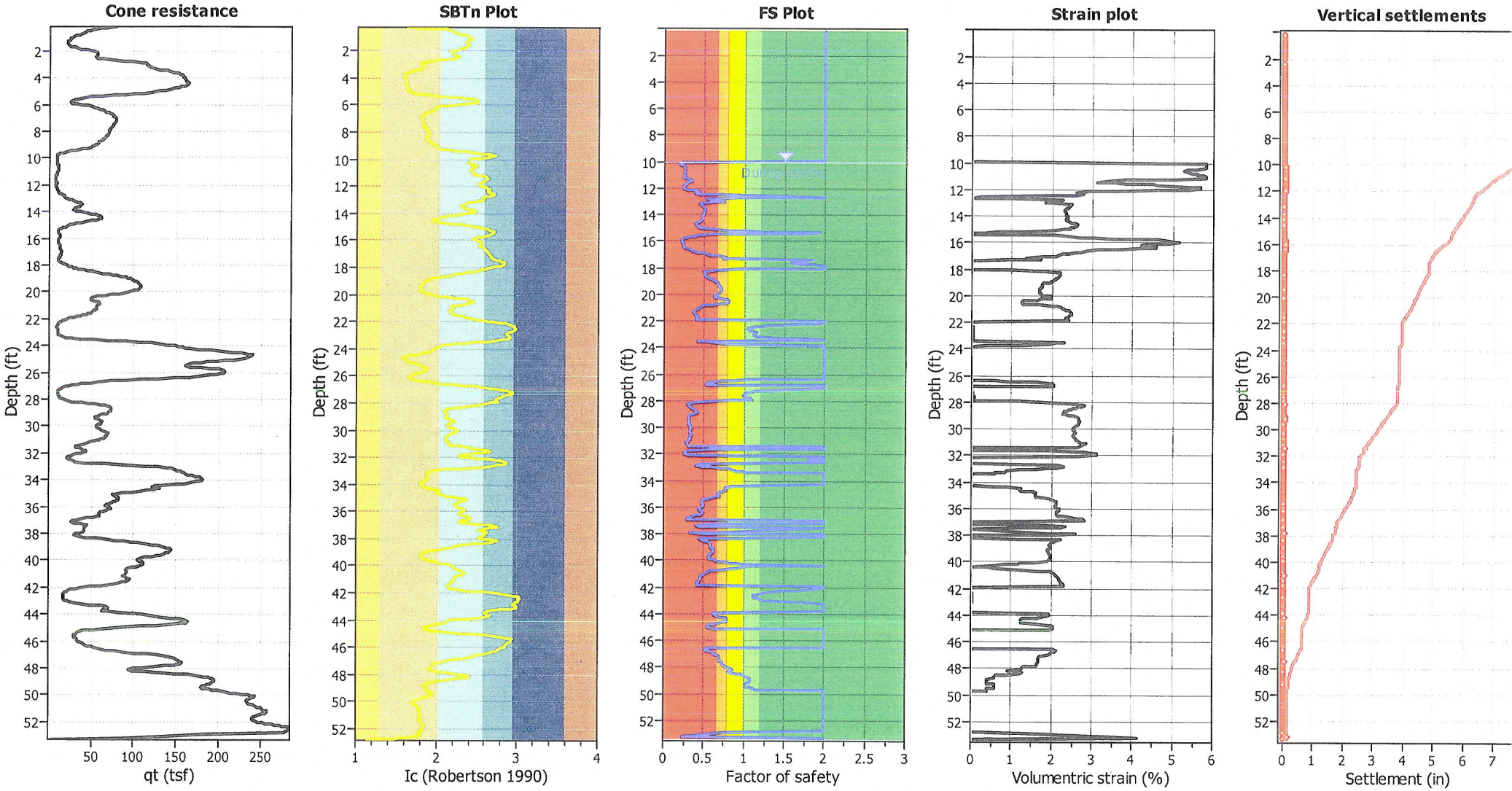
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

Estimation of post-earthquake settlements



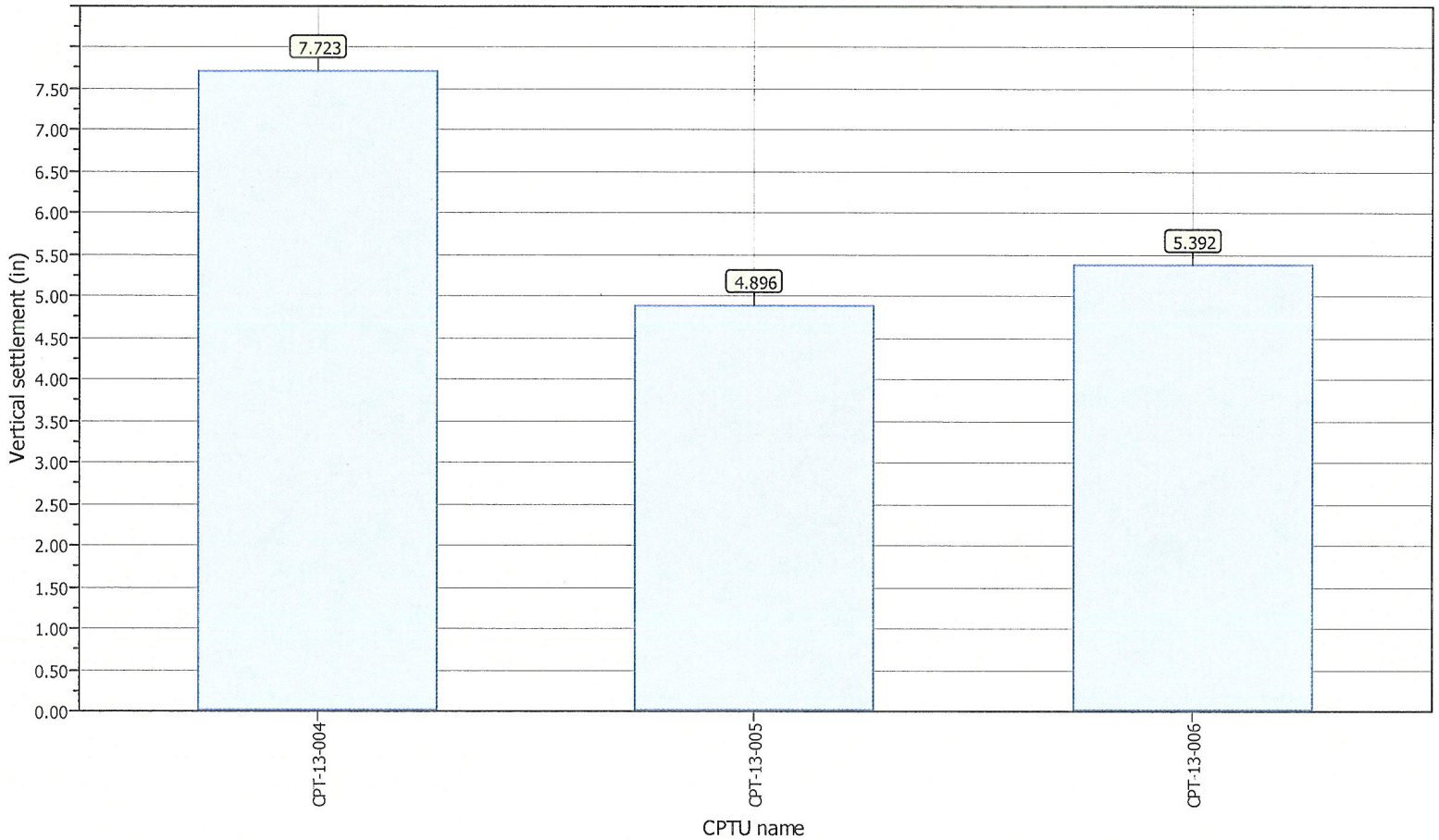
Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Project title : Valley Blvd

Location : 12-ORA-91

Overall vertical settlements report

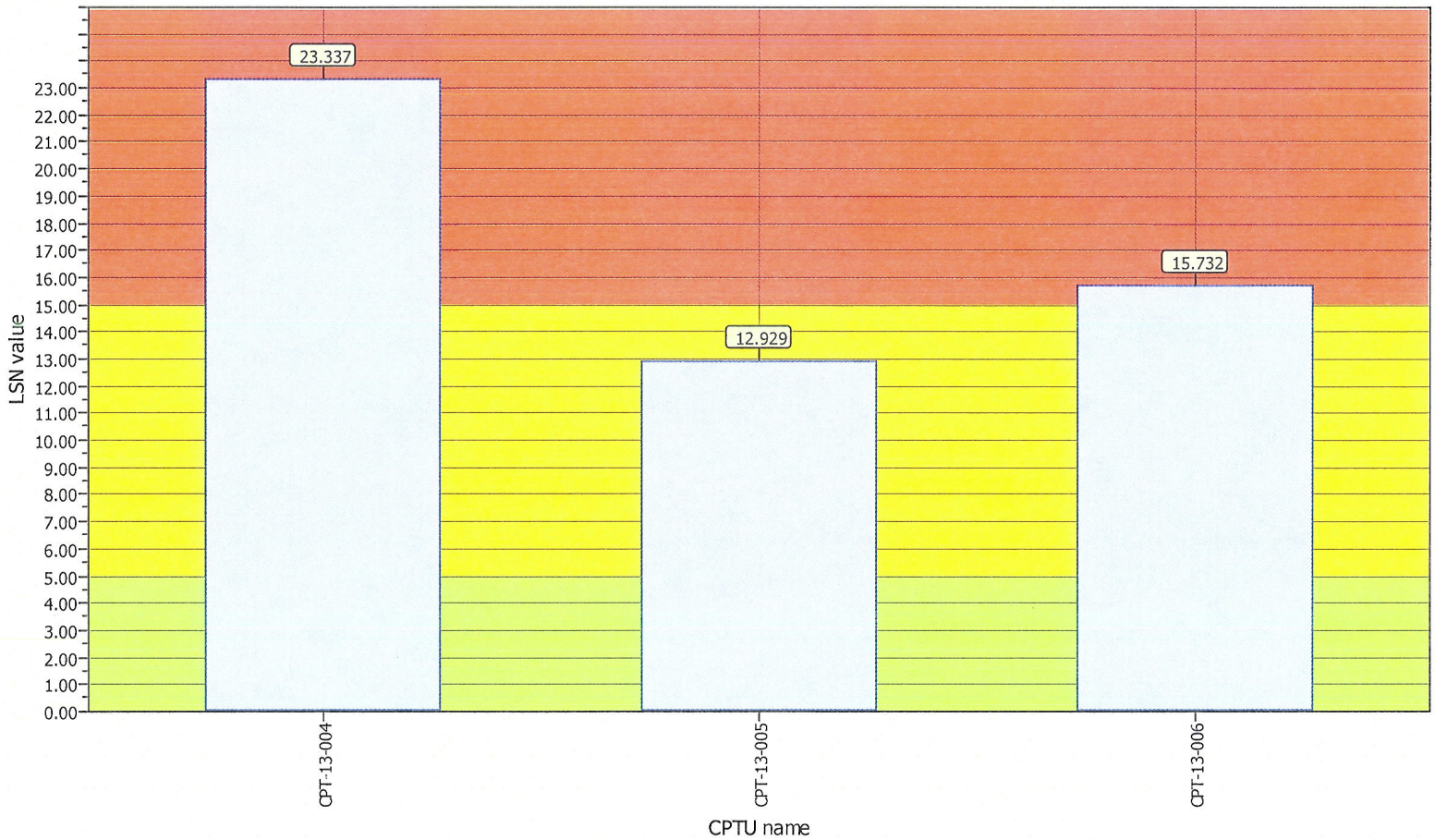


Caltrans
OGDS-1
Branch D

Project title : Valley Blvd

Location : 12-ORA-91

Overall Liquefaction Potential Index report



LPI color scheme

- Very high risk
- High risk
- Low risk

Basic statistics

Total CPT number: 3
0.00% low risk
33.33% high risk
66.67% very high risk

Appendix VI

Seismic Design Loads (OBDS1)

AS-built, if anlysing to see if foundation works without foundation retrofit, otherwise neglect and use values below.

Without overturning effects:

	outside column	inside column
max bottom of pile cap load, kips	1150	1300
max load per existing pile, kips	71.88	81.25

With overturning effects:

	outside column	inside column
max bottom of pile cap load, kips	1700	1300
max load per existing pile, kips	106.25	81.25

Retrofit, new piles carrying all the "as-built" load

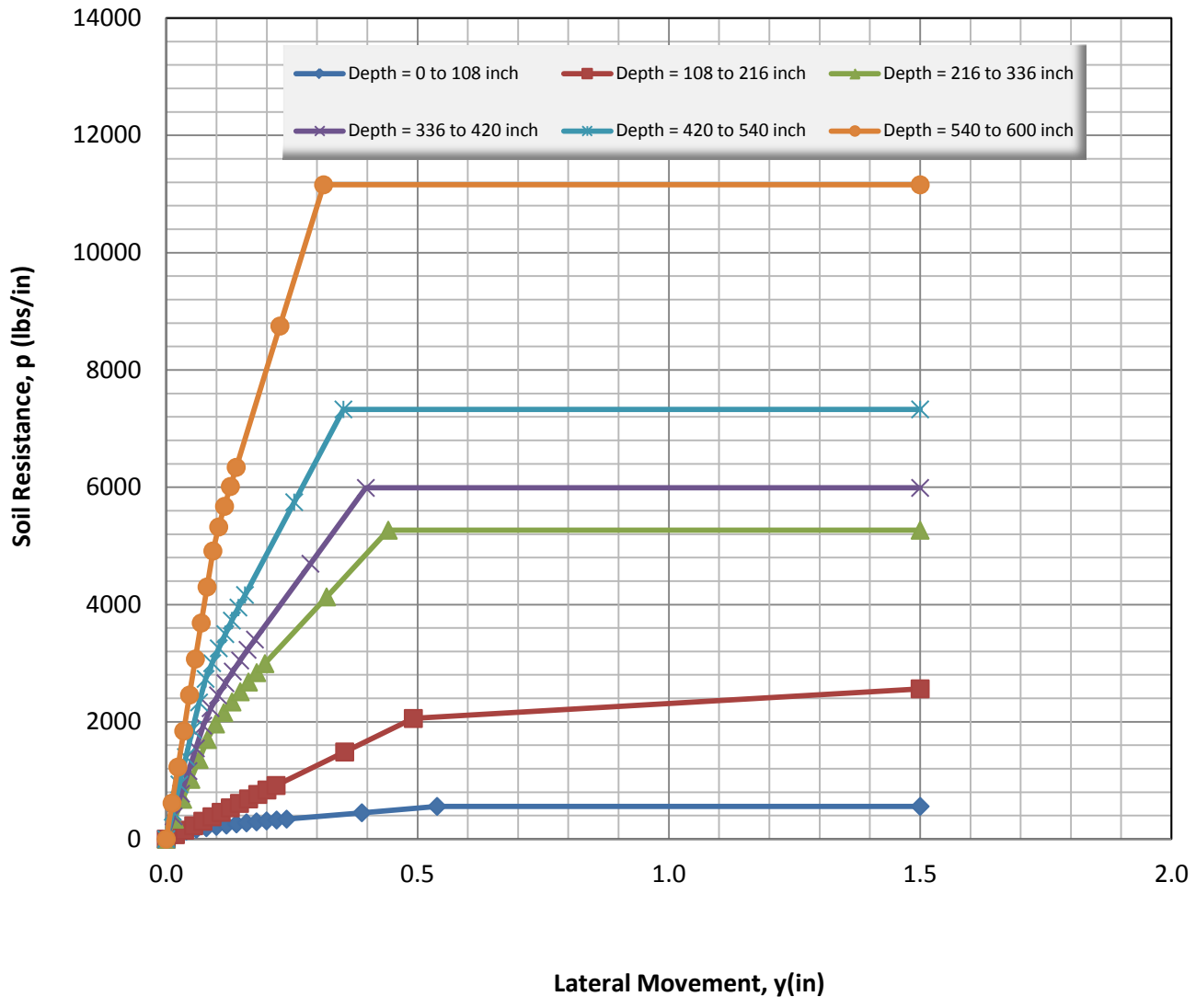
If analysing only new piles:

max bottom of pile cap load, kips	3976	
max load per new pile, kips	663	if adding 6 piles total
max load per new pile, kips	497	if adding 8 piles total
max load per new pile, kips	398	if adding 10 piles total
max load per new pile, kips	331	if adding 12 piles total

Appendix VII

p-y, t-z, Q-z Curves

Project No & Phase : 1213000001
Bridge no: 55-0302, Non-Liquefied Condition
Valley View Street OC, Raymond pile, Bents



Project no Phase: 1213000001, Bridge no: 55-0302, Non-Liquefied condition
Valley View Street OC, Raymond pile, at Bents

Valley View Street OC.-Raymond Pile, Non-Liquefied condition

Layer 1

Depth = 0 to 108 inch	
y (in)	p (lbs/in)
0	0
0.020	75.44
0.040	136.91
0.060	168.31
0.080	194.87
0.100	218.32
0.120	239.56
0.140	259.13
0.160	277.37
0.180	294.51
0.200	310.75
0.220	326.20
0.240	340.98
0.389	449.52
0.539	558.06
1.500	558.06

Layer 2

Depth = 108 to 216 inch	
y (in)	p (lbs/in)
0	0
0.018	76.18
0.036	152.36
0.055	228.54
0.073	304.73
0.091	380.91
0.109	457.09
0.127	533.27
0.146	609.45
0.164	685.63
0.182	761.82
0.200	838.00
0.219	914.18
0.355	1485.54
0.492	2056.90
1.500	2562.13

Layer 3

Depth = 216 to 336 inch	
y (in)	p (lbs/in)
0	0
0.016	339.63
0.033	679.26
0.049	1018.89
0.065	1358.52
0.082	1698.15
0.098	1963.60
0.115	2156.53
0.131	2338.92
0.147	2512.56
0.164	2678.78
0.180	2838.59
0.196	2992.81
0.319	4130.07
0.442	5267.34
1.500	5267.34

Layer 4

Depth = 336 to 420 inch	
y (in)	p (lbs/in)
0	0
0.015	386.88
0.029	773.77
0.044	1160.65
0.059	1547.53
0.074	1934.42
0.088	2232.47
0.103	2451.82
0.118	2659.18
0.132	2856.59
0.147	3045.57
0.162	3227.27
0.177	3402.60
0.287	4695.59
0.397	5988.58
1.500	5988.58

Layer 5

Depth = 420 to 540 inch	
y (in)	p (lbs/in)
0	0
0.013	466.15
0.026	932.31
0.039	1398.46
0.052	1864.62
0.065	2330.77
0.078	2731.44
0.091	2999.82
0.104	3253.53
0.118	3495.06
0.131	3726.28
0.144	3948.59
0.157	4163.11
0.255	5745.09
0.353	7327.07
1.500	7327.07

Project no Phase: 1213000001, Bridge no: 55-0302, Non-Liquefied condition
Valley View Street OC, Raymond pile, at Bents

Layer 6

Depth = 540 to 600 inch	
y (in)	p (lbs/in)
0	0
0.012	614.07
0.023	1228.15
0.035	1842.22
0.046	2456.29
0.058	3070.37
0.070	3684.44
0.081	4298.51
0.093	4912.59
0.104	5321.68
0.116	5673.74
0.128	6012.23
0.139	6338.86
0.226	8747.63
0.313	11156.40
1.500	11156.40

Project no Phase: 1213000001, Bridge no: 55-0302, Liquefied condition
Valley View Street OC, Raymond pile, at Bents

Valley View Street OC.-Raymond, Liquefied condition

Layer 1

Depth = 0 to 108 inch	
y (in)	p (lbs/in)
0	0
0.020	75.44
0.040	136.91
0.060	168.31
0.080	194.87
0.100	218.32
0.120	239.56
0.140	259.13
0.160	277.37
0.180	294.51
0.200	310.75
0.220	326.20
0.240	340.98
0.389	449.52
0.539	558.06
3.000	558.06

Layer 2

Depth = 108 to 216 inch	
y (in)	p (lbs/in)
0	0
0.005	21.31
0.164	67.12
0.328	84.56
0.492	96.80
0.656	106.55
0.819	114.77
0.983	121.96
1.147	128.39
1.311	134.24
1.475	139.61
1.639	144.60
1.803	149.27
1.967	153.66
2.200	160.00
3.000	180.00

Layer 3

Depth = 216 to 336 inch	
y (in)	p (lbs/in)
0	0
0.002	44.21
0.074	139.25
0.147	175.45
0.221	200.84
0.295	221.05
0.368	238.12
0.442	253.04
0.515	266.38
0.589	278.51
0.663	289.66
0.736	300.01
0.810	309.70
0.884	318.81
2.356	442.10
3.000	442.10

Layer 4

Depth = 336 to 420 inch	
y (in)	p (lbs/in)
0	0
0.002	39.74
0.066	125.19
0.132	157.73
0.199	180.55
0.265	198.72
0.331	214.07
0.397	227.48
0.463	239.47
0.530	250.37
0.596	260.40
0.662	269.71
0.728	278.41
0.794	286.61
2.118	397.44
3.000	397.44

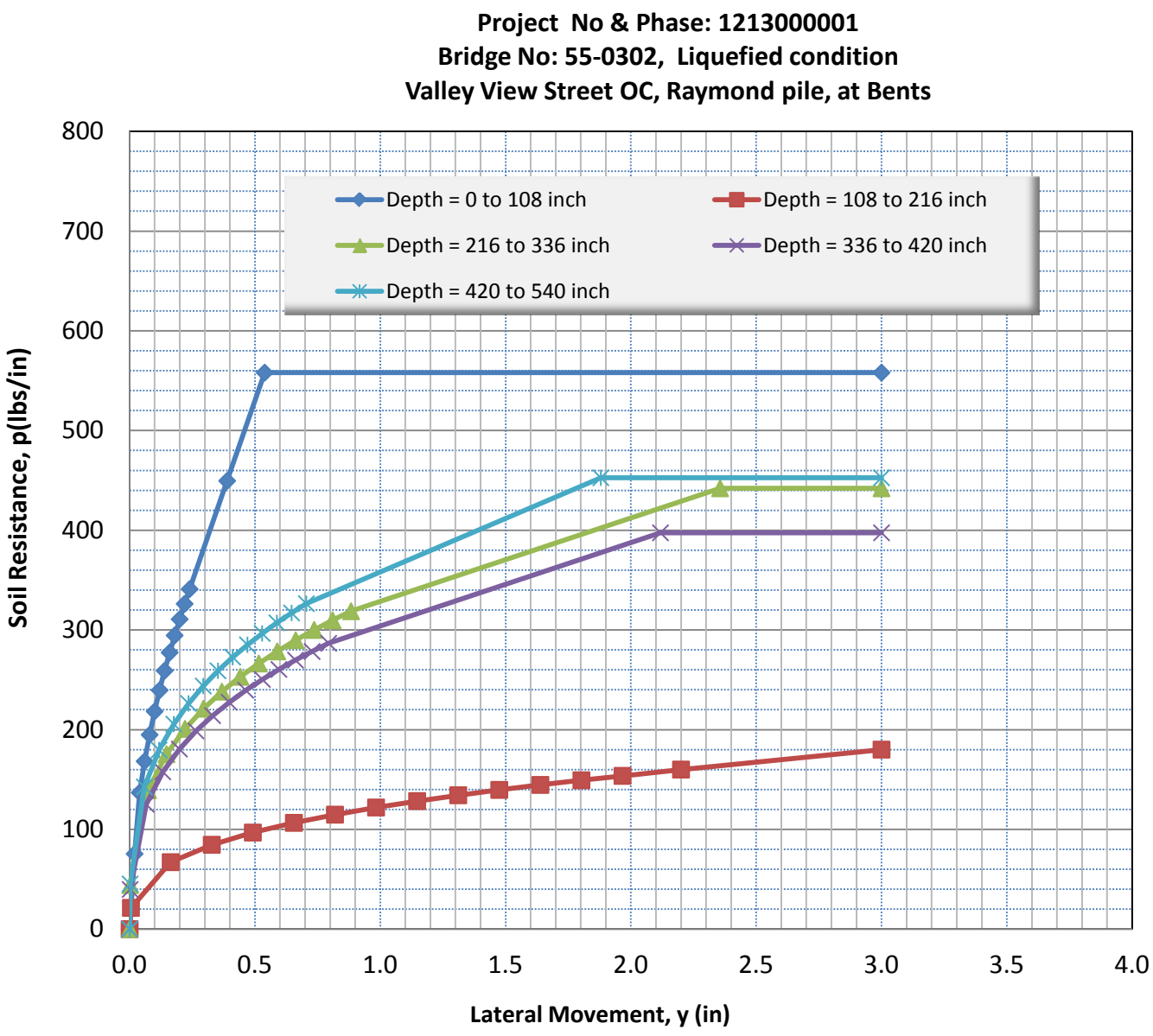
Layer 5

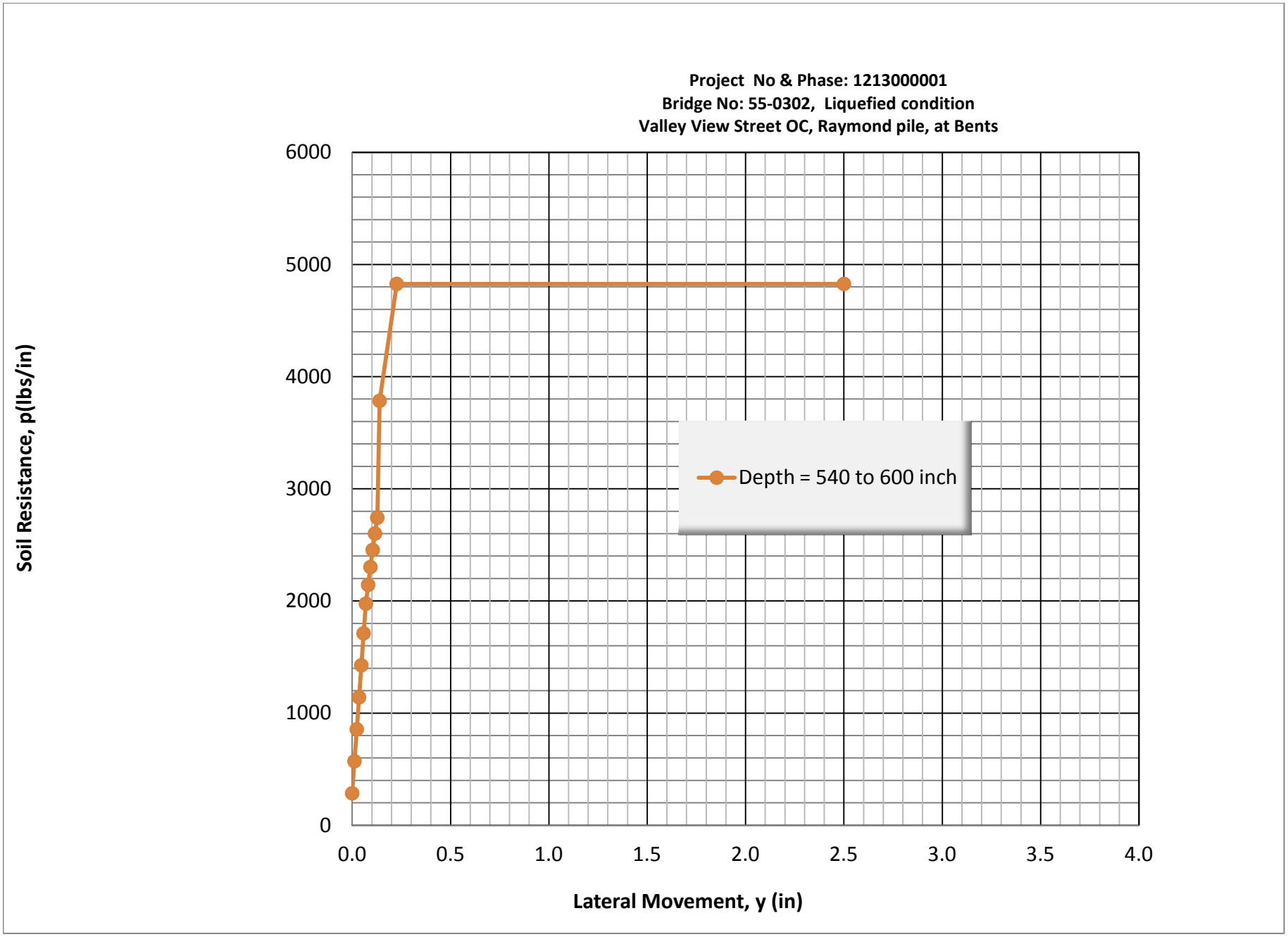
Depth = 420 to 540 inch	
y (in)	p (lbs/in)
0	0
0.002	45.26
0.059	142.56
0.118	179.62
0.176	205.61
0.235	226.31
0.294	243.78
0.353	259.05
0.411	272.71
0.470	285.13
0.529	296.54
0.588	307.14
0.646	317.06
0.705	326.39
1.880	452.61
3.000	452.61

Project no Phase: 1213000001, Bridge no: 55-0302, Liquefied condition
Valley View Street OC, Raymond pile, at Bents

Layer 6

Depth = 540 to 600 inch	
y (in)	
0	0.00
0.012	285.22
0.023	570.44
0.035	855.66
0.046	1140.88
0.058	1426.09
0.070	1711.31
0.081	1976.09
0.093	2143.22
0.104	2302.33
0.116	2454.64
0.128	2601.09
0.139	2742.40
0.226	3784.51
2.500	4826.62
3.000	4826.62


Project No & Phase: 1213000001
Bridge No: 55-0302, Liquefied condition
Valley View Street OC, Raymond pile, at Bents
Depth = 0 to 108 inch
Depth = 108 to 216 inch
Depth = 216 to 336 inch
Depth = 336 to 420 inch
Depth = 420 to 540 inch
Soil Resistance, p(lbs/in)
Lateral Movement, y (in)
0
100
200
300
400
500
600
700
800
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0


Project No & Phase: 1213000001
Bridge No: 55-0302, Liquefied condition
Valley View Street OC, Raymond pile, at Bents
Soil Resistance, p(lbs/in)
6000
5000
4000
3000
2000
1000
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Lateral Movement, y (in)
Depth = 540 to 600 inch

Project: **Valley Street OC Seismic Retrofit**

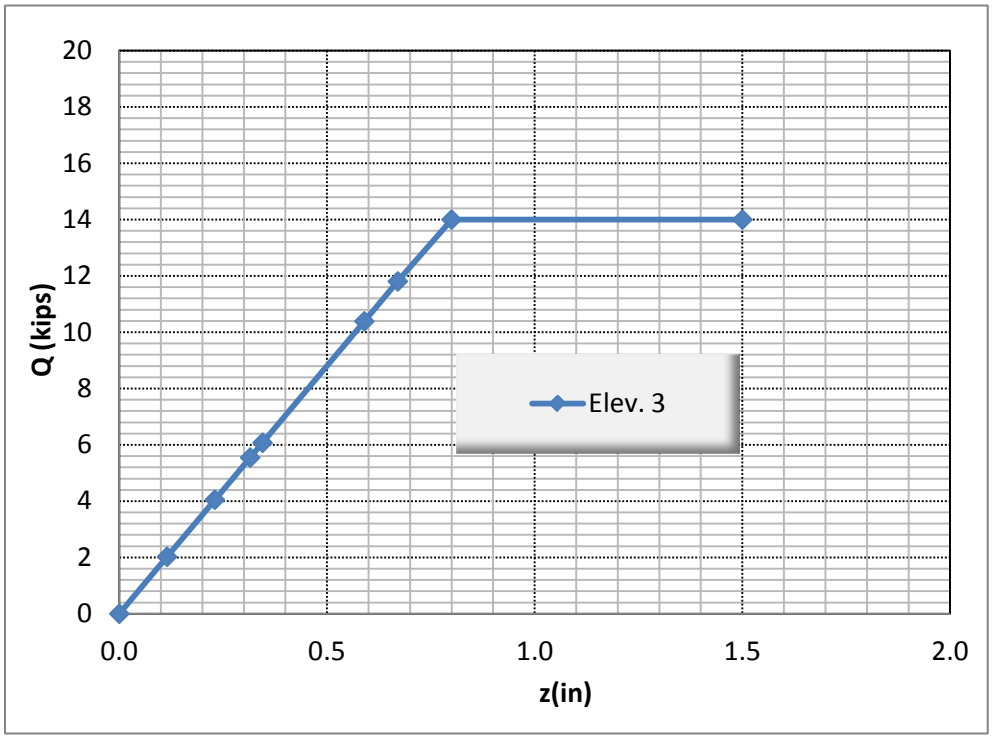
Project Id: 121300001 Date: 3/26/20148:03 AM

Data: Q-z Curves

Br. Name:	Valley View Street OC	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55-0302	OG =	53.0	Tip Dia =	8-inch
Non-Liquefied condition		Pile Cut-Off=	52.5	Tip Elev. =	3 ft
Support(s):	All Bents	GW =	44.0		

Note: All elevations are in feet.

Elev. 3	
z (in)	Q (kips)
0.00	0.00
0.12	2.02
0.23	4.05
0.32	5.55
0.35	6.07
0.59	10.39
0.67	11.80
0.80	14.00
1.50	14.00



Project: **Valley View Street OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:03 AM

Data: t-z Curves

Br. Name: Valley View Street OC	Elevation (ft)	Pile Type: Raymond
Br. No. = 55-0302	OG = 53.0	Avg. Pile Dia = 11.5 in
Non-Liquefied condition	Pile Cut-Off= 52.5	Tip Elev. = 3 ft
Support(s): All Bents	GW = 44.0	

Note: All elevations are in feet.

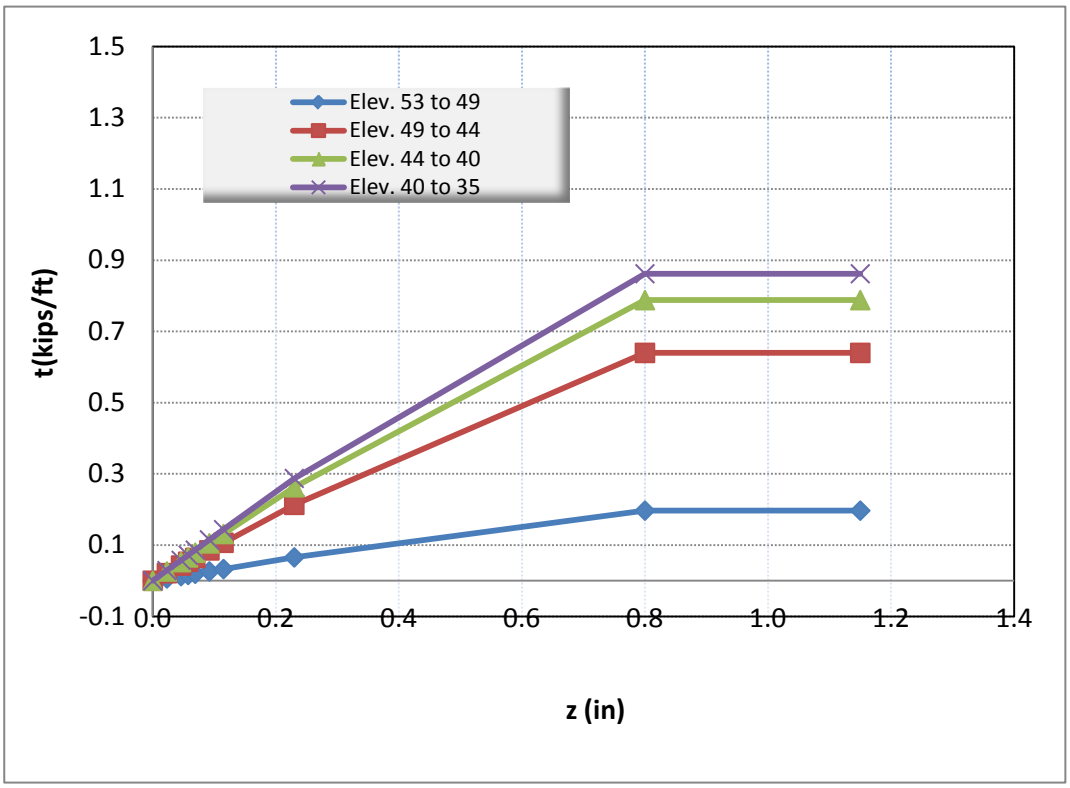
Elev. 53 to 49		Elev. 49 to 44		Elev. 44 to 40	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.00	0.000	0.00	0.000	0.00	0.000
0.02	0.007	0.02	0.021	0.02	0.026
0.05	0.013	0.05	0.043	0.05	0.053
0.06	0.016	0.06	0.053	0.06	0.066
0.07	0.020	0.07	0.064	0.07	0.079
0.09	0.026	0.09	0.085	0.09	0.105
0.12	0.033	0.12	0.107	0.12	0.131
0.23	0.066	0.23	0.213	0.23	0.263
0.80	0.197	0.80	0.640	0.80	0.788
1.15	0.197	1.15	0.640	1.15	0.788

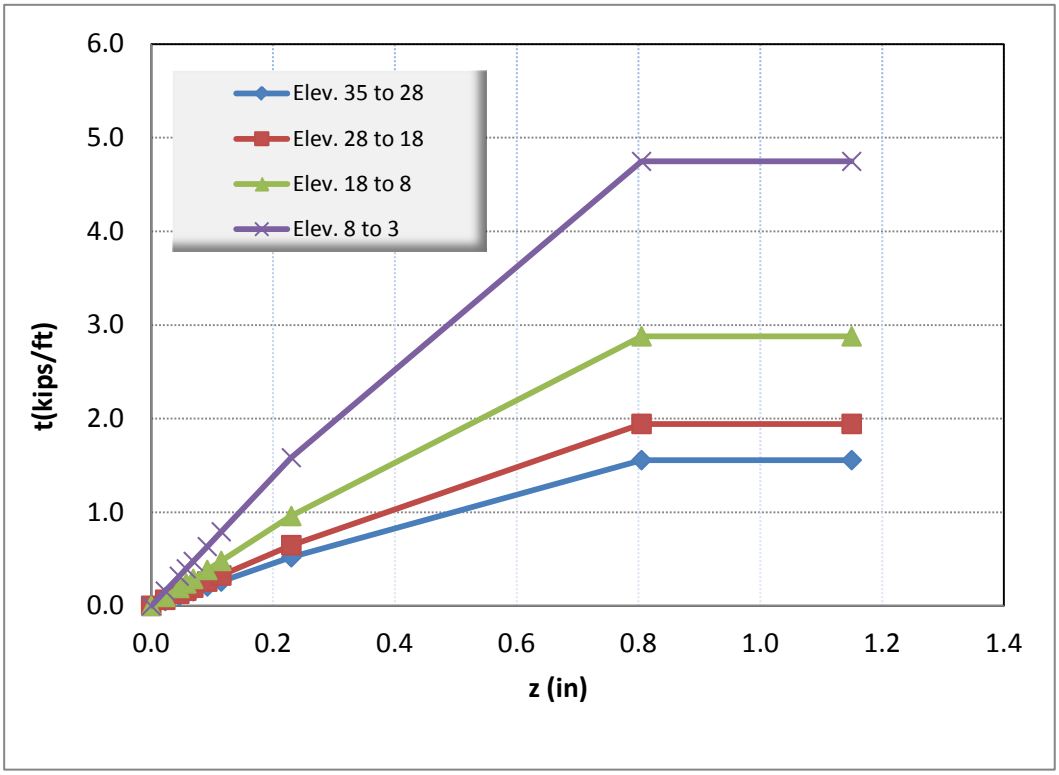
Elev. 40 to 35		Elev. 35 to 28		Elev. 28 to 18	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.00	0.00	0.00	0.00	0.00	0.00
0.02	0.03	0.02	0.05	0.02	0.06
0.05	0.06	0.05	0.10	0.05	0.13
0.06	0.07	0.06	0.13	0.06	0.16
0.07	0.09	0.07	0.16	0.07	0.19
0.09	0.11	0.09	0.21	0.09	0.26
0.12	0.14	0.12	0.26	0.12	0.32
0.23	0.29	0.23	0.52	0.23	0.65
0.80	0.86	0.81	1.56	0.81	1.94
1.15	0.86	1.15	1.56	1.15	1.94

Elev. 18 to 8		Elev. 8 to 3	
z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.00	0.000	0.00	0.00
0.02	0.096	0.02	0.16
0.05	0.192	0.05	0.32
0.06	0.240	0.06	0.40
0.07	0.288	0.07	0.47
0.09	0.384	0.09	0.63
0.12	0.480	0.12	0.79
0.23	0.960	0.23	1.58
0.81	2.879	0.81	4.75
1.15	2.879	1.15	4.75

Project: **Valley View Street OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:03 AM





Project: **Valley View Street OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:23 AM

Data: t-z Curves

Br. Name: Valley View Street OC	Elevation (ft)	Pile Type: Raymond
Br. No. = 55-0302	OG = 53.0	Avg. Pile Dia = 11.5 in
Liquefied condition	Pile Cut-Off= 52.5	Tip Elev. = 3 ft
Support(s): All Bents	GW = 44.0	

Note: All elevations are in feet.

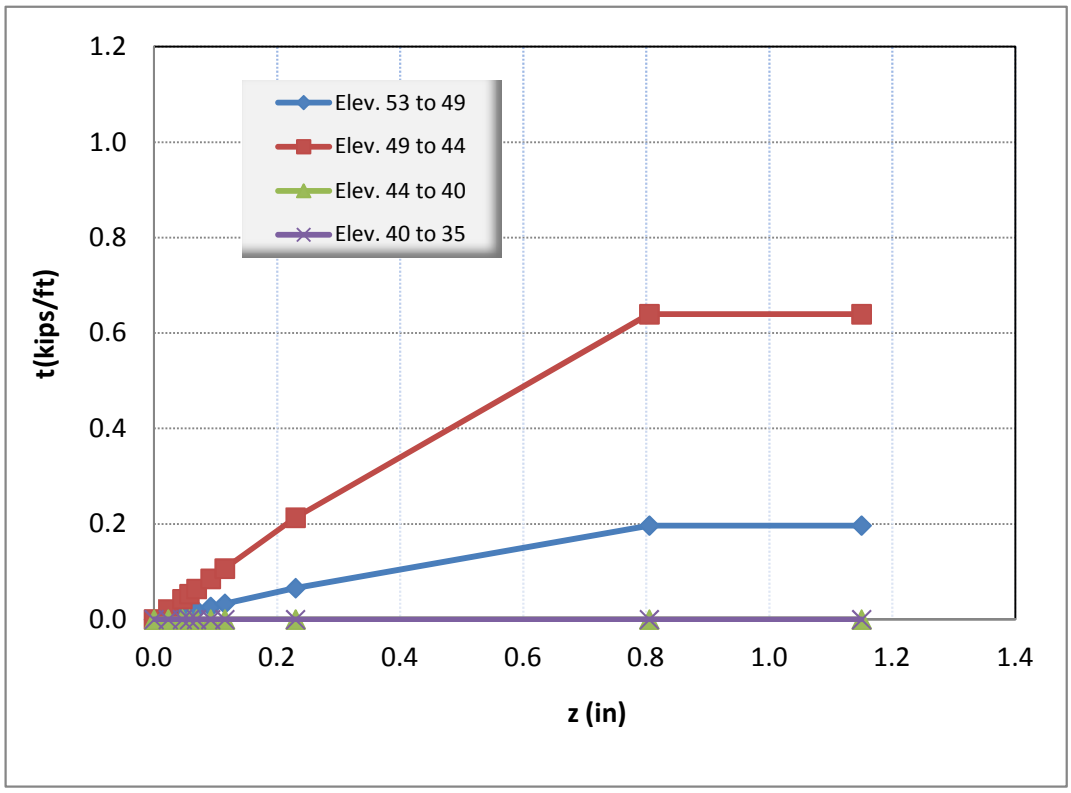
Elev. 53 to 49		Elev. 49 to 44		Elev. 44 to 40	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.00	0.000	0.00	0.000	0.00	0.000
0.02	0.007	0.02	0.021	0.02	0.000
0.05	0.013	0.05	0.043	0.05	0.000
0.06	0.016	0.06	0.053	0.06	0.000
0.07	0.020	0.07	0.064	0.07	0.000
0.09	0.026	0.09	0.085	0.09	0.000
0.12	0.033	0.12	0.107	0.12	0.000
0.23	0.066	0.23	0.213	0.23	0.000
0.81	0.197	0.81	0.640	0.81	0.000
1.15	0.197	1.15	0.640	1.15	0.000

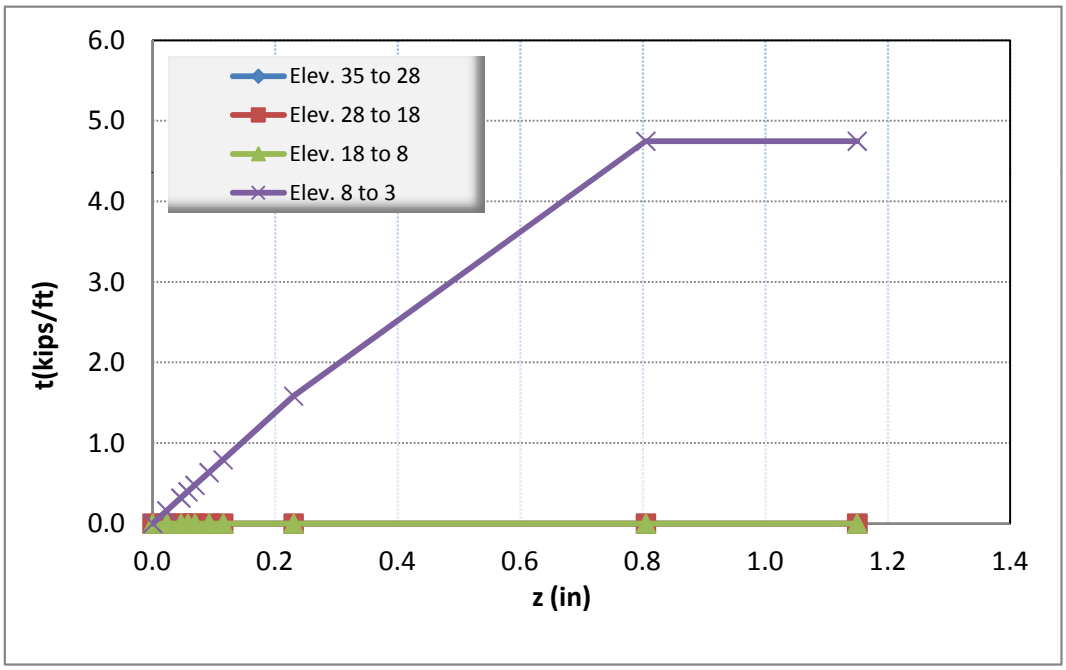
Elev. 40 to 35		Elev. 35 to 28		Elev. 28 to 18	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.00	0.000	0.00	0.000	0.00	0.000
0.02	0.000	0.02	0.000	0.02	0.000
0.05	0.000	0.05	0.000	0.05	0.000
0.06	0.000	0.06	0.000	0.06	0.000
0.07	0.000	0.07	0.000	0.07	0.000
0.09	0.000	0.09	0.000	0.09	0.000
0.12	0.000	0.12	0.000	0.12	0.000
0.23	0.000	0.23	0.000	0.23	0.000
0.81	0.000	0.81	0.000	0.81	0.000
1.15	0.000	1.15	0.000	1.15	0.000

Elev. 18 to 8		Elev. 8 to 3	
z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.00	0.000	0.00	0.000
0.02	0.000	0.02	0.158
0.05	0.000	0.05	0.316
0.06	0.000	0.06	0.396
0.07	0.000	0.07	0.475
0.09	0.000	0.09	0.633
0.12	0.000	0.12	0.791
0.23	0.000	0.23	1.582
0.81	0.000	0.81	4.747
1.15	0.000	1.15	4.747

Project: **Valley View Street OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:23 AM





Project: **Valley Street OC Seismic Retrofit**

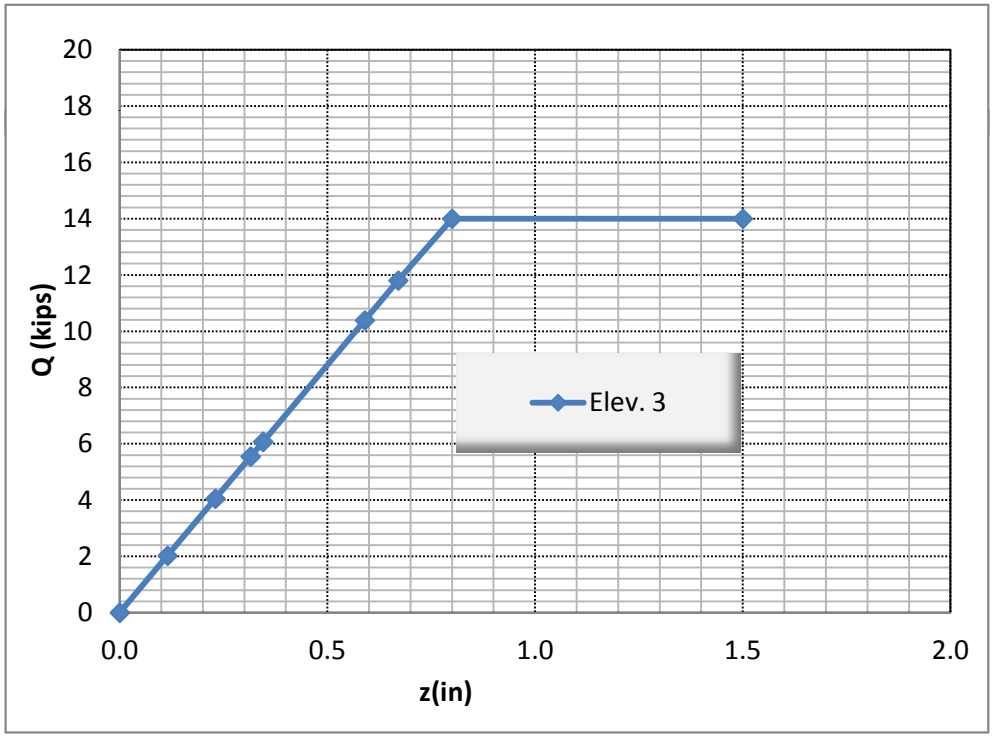
Project Id: 121300001 Date: 3/26/20148:24 AM

Data: Q-z Curves

Br. Name:	Valley View Street OC	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55-0302	OG =	53.0	Tip Dia =	8-inch
Liquefied condition		Pile Cut-Off=	52.5	Tip Elev. =	3 ft
Support(s):	All Bents	GW =	44.0		

Note: All elevations are in feet.

Elev. 3	
z (in)	Q (kips)
0.00	0.00
0.12	2.02
0.23	4.05
0.32	5.55
0.35	6.07
0.59	10.39
0.67	11.80
0.80	14.00
1.50	14.00



Project no Phase: 1213000001, Bridge no: 55-0302, Non-Liquefied condition
Valley View Street OC, 36"CIDH, at Bents

Valley View Street OC.-36"CIDH, Non-Liquefied condition

Layer 1

Depth = 0 to 108 inch	
y (in)	p (lbs/in)
0	0
0.050	189.00
0.100	378.00
0.150	567.00
0.200	744.98
0.250	798.10
0.300	844.31
0.350	885.45
0.400	922.71
0.450	956.87
0.500	988.50
0.550	1018.01
0.600	1045.72
0.975	1247.46
1.350	1449.19
12.000	1449.19

Layer 2

Depth = 108 to 216 inch	
y (in)	p (lbs/in)
0	0
0.050	177.06
0.100	354.12
0.150	531.19
0.200	708.25
0.250	885.31
0.300	1062.37
0.350	1239.43
0.400	1416.49
0.450	1593.56
0.500	1722.25
0.550	1824.26
0.600	1922.65
0.975	2648.14
1.350	3373.63
12.000	3373.63

Layer 3

Depth = 216 to 336 inch	
y (in)	p (lbs/in)
0	0
0.050	1031.40
0.100	1626.34
0.150	2081.01
0.200	2478.77
0.250	2838.95
0.300	3171.76
0.350	3483.41
0.400	3778.01
0.450	4058.49
0.500	4326.98
0.550	4585.13
0.600	4834.22
0.975	6671.23
1.350	8508.23
12.000	8508.23

Layer 4

Depth = 336 to 420 inch	
y (in)	p (lbs/in)
0	0
0.050	1437.35
0.100	2801.32
0.150	3584.48
0.200	4269.62
0.250	4890.01
0.300	5463.26
0.350	6000.06
0.400	6507.51
0.450	6990.62
0.500	7453.09
0.550	7897.74
0.600	8326.81
0.975	11490.99
1.350	14655.18
12.000	14655.18

Layer 5

Depth = 420 to 540 inch	
y (in)	p (lbs/in)
0	0
0.050	2033.95
0.100	4067.89
0.150	5697.12
0.200	6786.06
0.250	7772.12
0.300	8683.23
0.350	9536.42
0.400	10342.95
0.450	11110.79
0.500	11845.83
0.550	12552.56
0.600	13234.51
0.975	18263.62
1.350	23292.73
12.000	23292.73

Layer 6

Depth = 540 to 660 inch	
y (in)	p (lbs/in)
0	0
0.050	3479.27
0.100	6958.54
0.150	9623.62
0.200	11463.08
0.250	13128.73
0.300	14667.80

Layer 7

Depth = 660 to 720 inch	
y (in)	p (lbs/in)
0	0
0.050	4020.17
0.100	8040.34
0.150	12060.51
0.200	15072.93
0.250	17263.10
0.300	19286.84

Layer 8

Depth = 720 to 840 inch	
y (in)	p (lbs/in)
0	0
0.050	3748.72
0.100	7497.45
0.150	11246.17
0.200	14584.95
0.250	16704.22
0.300	18662.44

Layer 9

Depth = 840 to 960 inch	
y (in)	p (lbs/in)
0	0
0.050	4713.92
0.100	9427.83
0.150	14141.75
0.200	18855.66
0.250	21814.62
0.300	24371.93

Project no Phase: 1213000001, Bridge no: 55-0302, Non-Liquefied condition

Valley View Street OC, 36"CIDH, at Bents

0.350	16109.00
0.400	17471.40
0.450	18768.45
0.500	20010.08
0.550	21203.90
0.600	22355.85
0.975	30851.07
1.350	39346.29
12.000	39346.29

0.350	21181.89
0.400	22973.32
0.450	24678.83
0.500	26311.47
0.550	27881.23
0.600	29395.94
0.975	40566.40
1.350	51736.85
12.000	51736.85

0.350	20496.14
0.400	22229.57
0.450	23879.86
0.500	25459.65
0.550	26978.58
0.600	28444.26
0.975	39253.07
1.350	50061.89
12.000	50061.89

0.350	26766.62
0.400	29030.38
0.450	31185.55
0.500	33248.65
0.550	35232.28
0.600	37146.35
0.975	51261.96
1.350	65377.58
12.000	65377.58

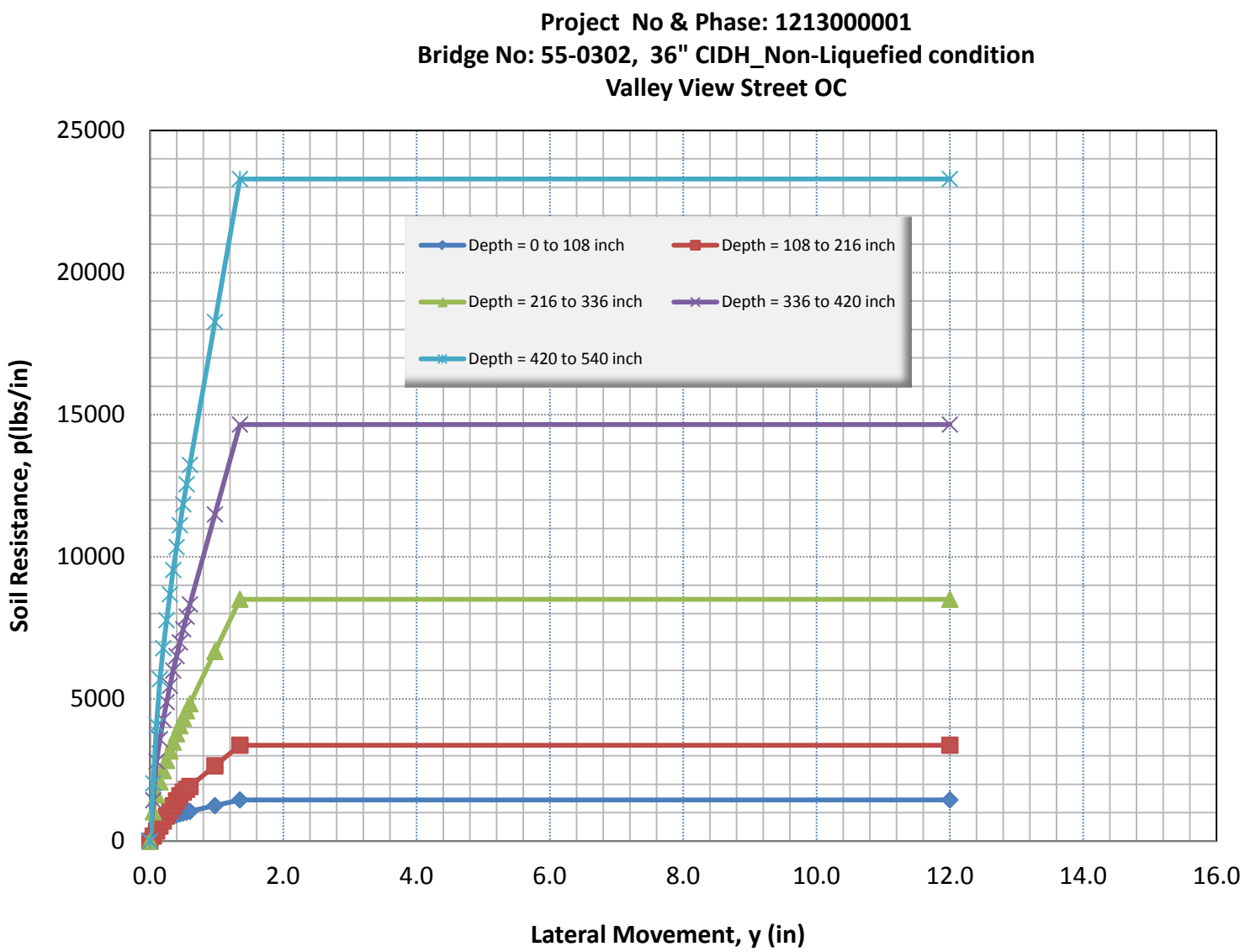

Project No & Phase: 1213000001
Bridge No: 55-0302, 36" CIDH_Non-Liquefied condition
Valley View Street OC
Depth = 0 to 108 inch
Depth = 108 to 216 inch
Depth = 216 to 336 inch
Depth = 336 to 420 inch
Depth = 420 to 540 inch
Soil Resistance, p(lbs/in)
25000
20000
15000
10000
5000
0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
Lateral Movement, y (in)

Figure 1

Project No & Phase: 1213000001 ,
Bridge No: 55-0302, 36-in ICDH, Non-LiquefiedCondition
Valley View Street OC

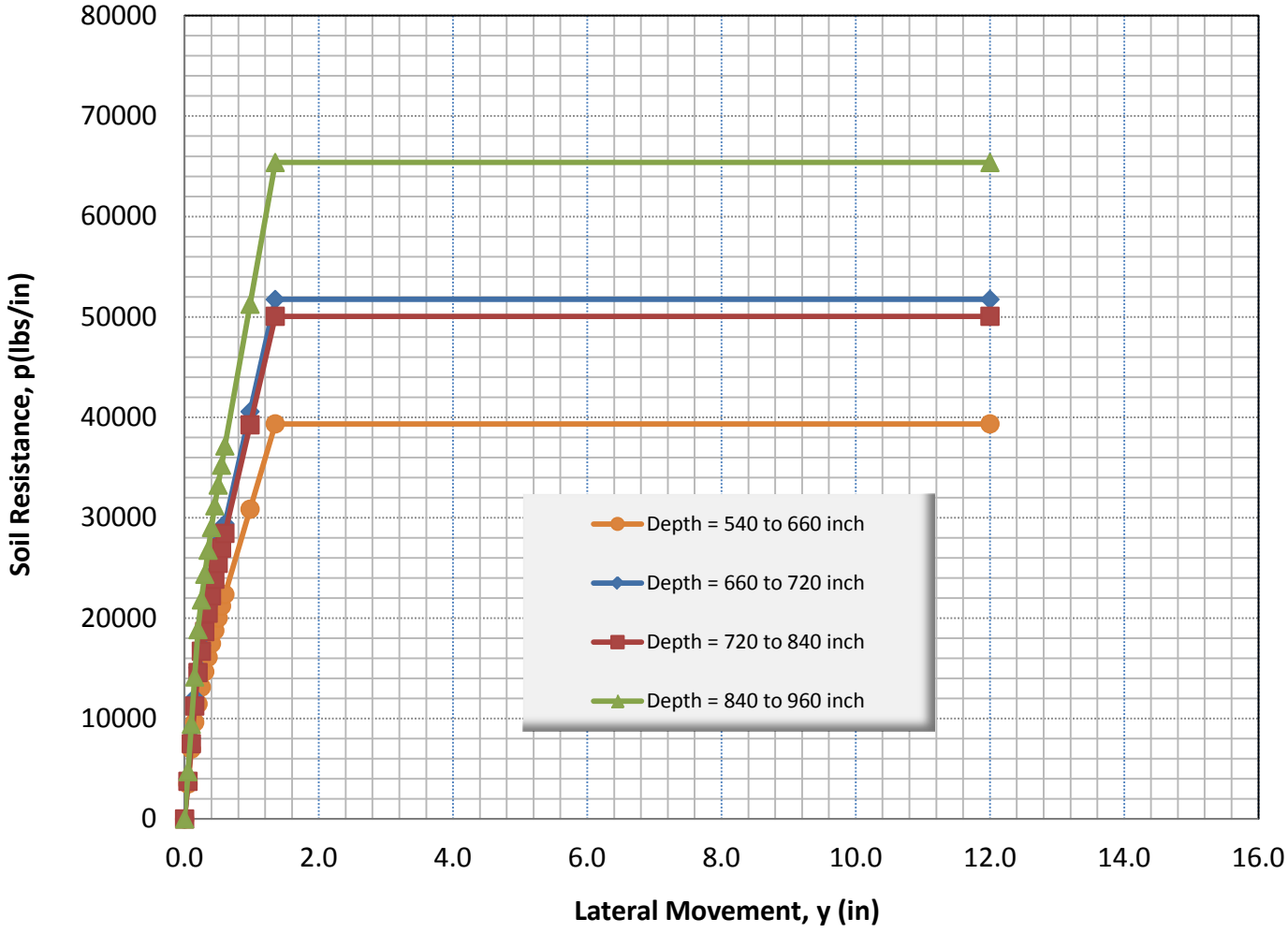


Figure 2

Project no Phase: 1213000001, Bridge no: 55-0302, Liquefied condition
Valley View Street OC, 36"CIDH, at Bents

Valley View Street OC.-36"CIDH, Liquefied condition

Layer 1

Depth = 0" to 108"	
y (in)	p (lbs/in)
0	0
0.050	189.00
0.100	378.00
0.150	567.00
0.200	744.98
0.250	798.10
0.300	844.31
0.350	885.45
0.400	922.71
0.450	956.87
0.500	988.50
0.550	1018.01
0.600	1045.72
0.975	1247.46
1.350	1449.19
12.000	1449.19

Layer 2

Depth = 108" to 216"	
y (in)	p (lbs/in)
0	0
0.014	58.51
0.450	184.31
0.900	232.21
1.350	265.82
1.800	292.57
2.250	315.16
2.700	334.91
3.150	352.57
3.600	368.62
4.050	383.38
4.500	397.08
4.950	409.90
5.400	421.96
7.200	440.00
12.000	440.00

Layer 3

Depth = 216" to 336"	
y (in)	p (lbs/in)
0	0
0.007	135.11
0.225	425.56
0.450	536.18
0.675	613.77
0.900	675.54
1.125	727.70
1.350	773.30
1.575	814.07
1.800	851.13
2.025	885.21
2.250	916.85
2.475	946.44
2.700	974.30
7.200	1351.08
12.000	1351.08

Layer 4

Depth = 336" to 420"	
y (in)	p (lbs/in)
0	0
0.007	135.11
0.225	425.56
0.450	536.18
0.675	613.77
0.900	675.54
1.125	727.70
1.350	773.30
1.575	814.07
1.800	851.13
2.025	885.21
2.250	916.85
2.475	946.44
2.700	974.30
7.200	1351.08
12.000	1351.08

Layer 5

Depth = 420" to 540"	
y (in)	p (lbs/in)
0	0
0.007	173.34
0.225	545.99
0.450	687.90
0.675	787.45
0.900	866.70
1.125	933.62
1.350	992.12
1.575	1044.44
1.800	1091.97
2.025	1135.70
2.250	1176.29
2.475	1214.26
2.700	1250.00
7.200	1733.40
12.000	1733.40

Layer 6

Depth = 540 to 660"	
y (in)	p (lbs/in)
0	0
0.050	1461.83
0.100	2228.04
0.150	2850.93
0.200	3395.85
0.250	3889.29

Layer 7

Depth = 660 to 720"	
y (in)	p (lbs/in)
0	0
0.050	2375.01
0.100	3619.85
0.150	4631.85
0.200	5517.18
0.250	6318.86

Layer 8

Depth = 720 to 840"	
y (in)	p (lbs/in)
0	0
0.050	2411.75
0.100	4760.17
0.150	6090.96
0.200	7255.19
0.250	8309.41

Layer 9

Depth = 840 to 960"	
y (in)	p (lbs/in)
0	0
0.050	3334.52
0.100	6669.05
0.150	9906.31
0.200	11799.80
0.250	13514.37

Project no Phase: 1213000001, Bridge no: 55-0302, Liquefied condition

Valley View Street OC, 36"CIDH, at Bents

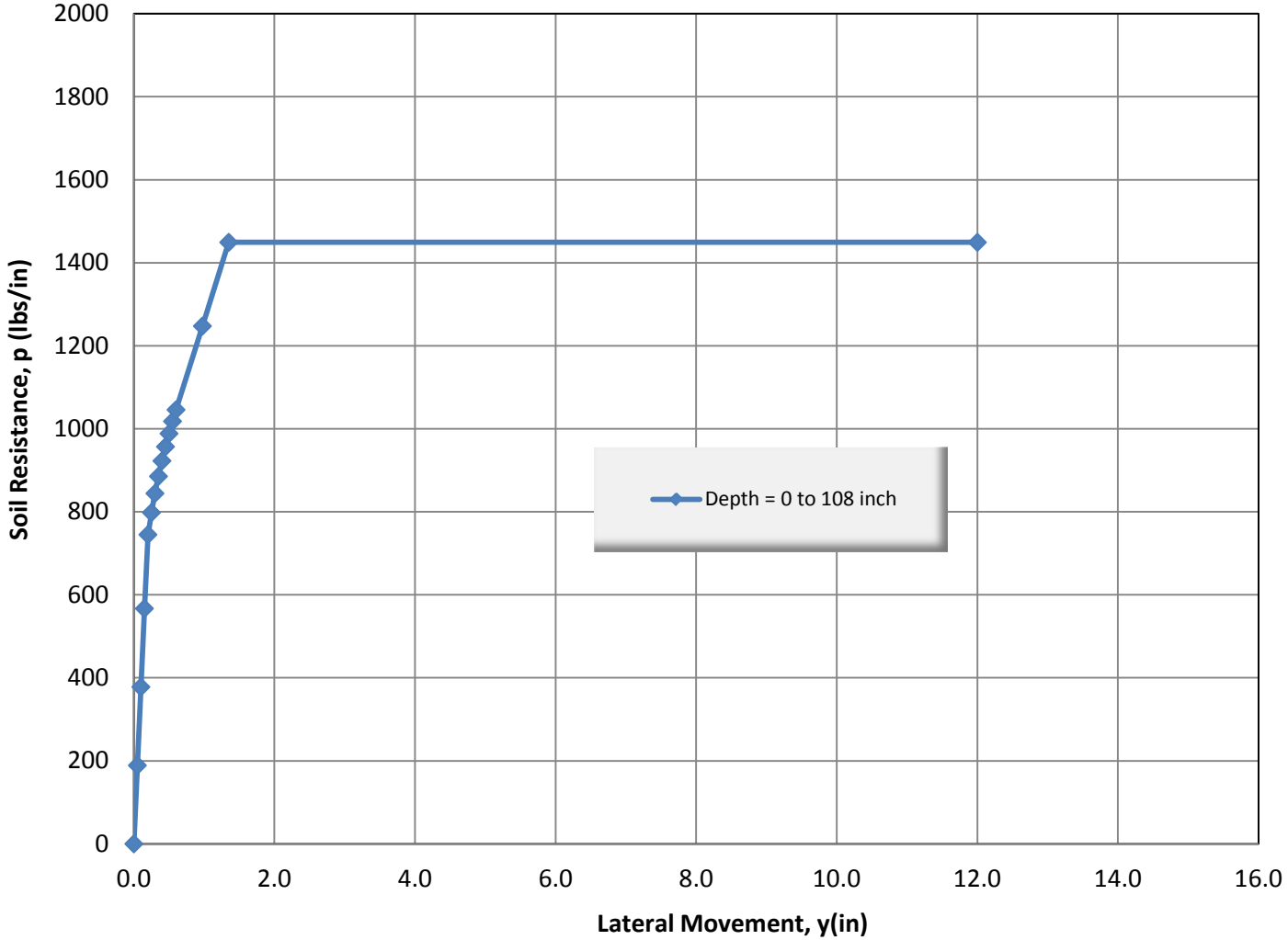
0.300	4345.23
0.350	4772.17
0.400	5175.77
0.450	5560.01
0.500	5927.84
0.550	6281.50
0.600	6622.75
0.975	9139.40
1.350	11656.05
12.000	11656.05

0.300	7059.61
0.350	7753.26
0.400	8408.99
0.450	9033.26
0.500	9630.86
0.550	10205.44
0.600	10759.87
0.975	14848.62
1.350	18937.37
12.000	18937.37

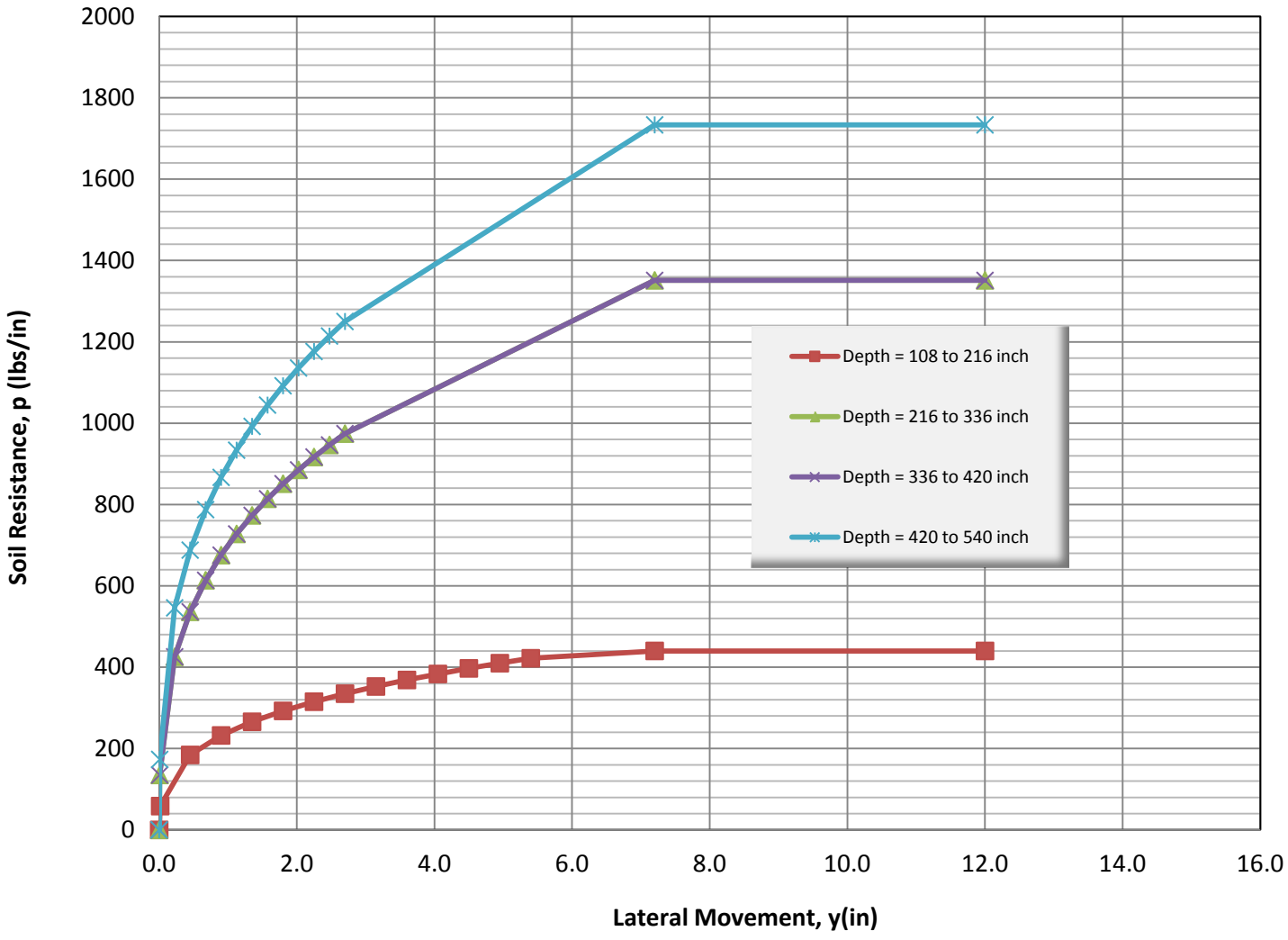
0.300	9283.51
0.350	10195.67
0.400	11057.96
0.450	11878.89
0.500	12664.74
0.550	13420.33
0.600	14149.42
0.975	19526.19
1.350	24902.97
12.000	24902.97

0.300	15098.65
0.350	16582.19
0.400	17984.60
0.450	19319.76
0.500	20597.86
0.550	21826.74
0.600	23012.53
0.975	31757.29
1.350	40502.05
12.000	40502.05

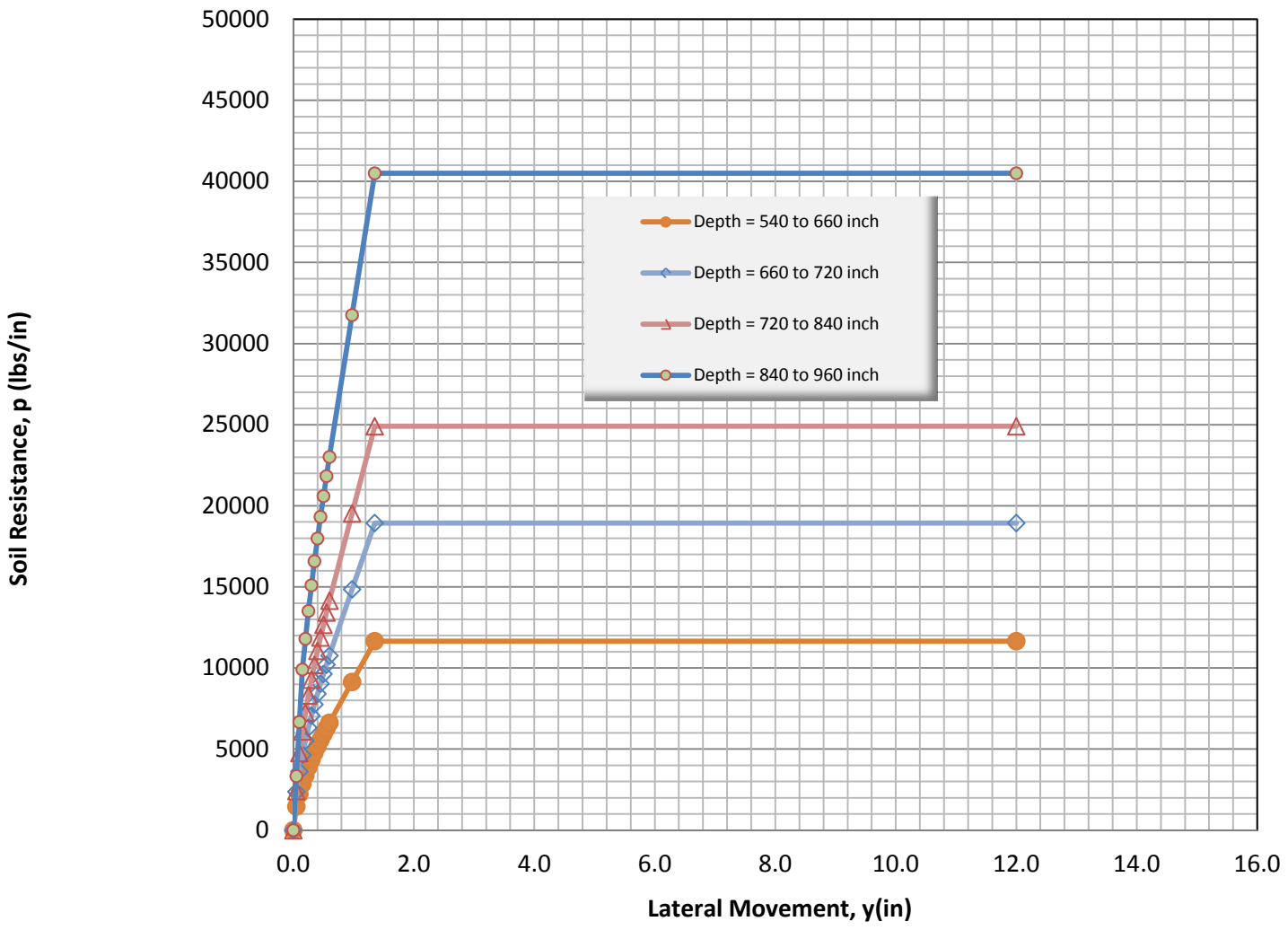
Project no & Phase : 1213000001
Bridge no: 55-0302, 36" CIDH-Liquefied
Valley View Street OC, Bents



Project no & Phase : 1213000001
Bridge no: 55-0302, 36" CIDH -Liquefied
Valley View Street OC, Bents



Project no & Phase : 1213000001
Bridge no: 55-0302, 26" CIDH-Liquefied
Valley View Street OC, Bents



Project: **Valley View Street OC Seismic Retrofit**

Project Id: 121300001 Date: 3/25/20142:26 PM

Data: t-z Curves

Br. Name:	Valley View Street OC	Elevation (ft)		Pile Type:	36 CIDH
Br. No. =	55-0302	OG =	53.0	Pile Dia =	36 in
Non-Liquefied condition		Pile Cut-Off=	52.5		
Support(s):	All Bents	GW =	44.0		

Note: All elevations are in feet.

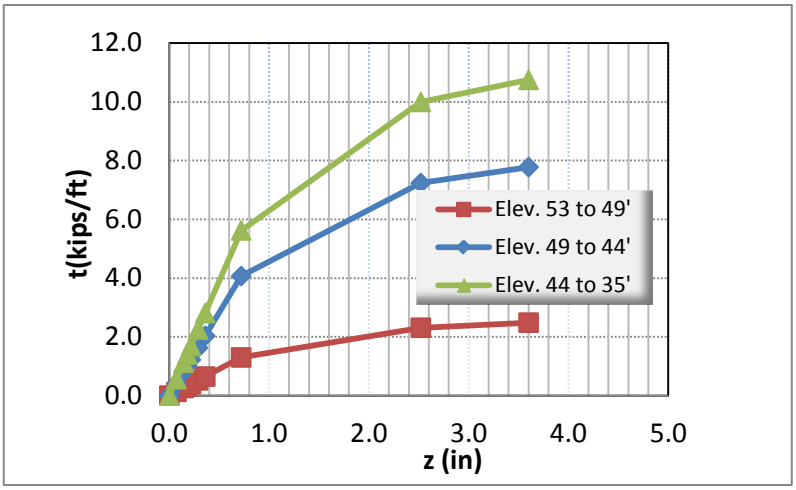
Elev. 53 to 49'		Elev. 49 to 44'		Elev. 44 to 35'	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.00	0.000	0.00	0.000	0.00	0.000
0.07	0.130	0.07	0.407	0.07	0.562
0.14	0.260	0.14	0.814	0.14	1.125
0.18	0.325	0.18	1.018	0.18	1.406
0.22	0.390	0.22	1.221	0.22	1.687
0.29	0.520	0.29	1.629	0.29	2.250
0.36	0.650	0.36	2.036	0.36	2.812
0.72	1.301	0.72	4.071	0.72	5.624
2.52	2.312	2.52	7.238	2.52	9.998
3.60	2.486	3.60	7.781	3.60	10.748

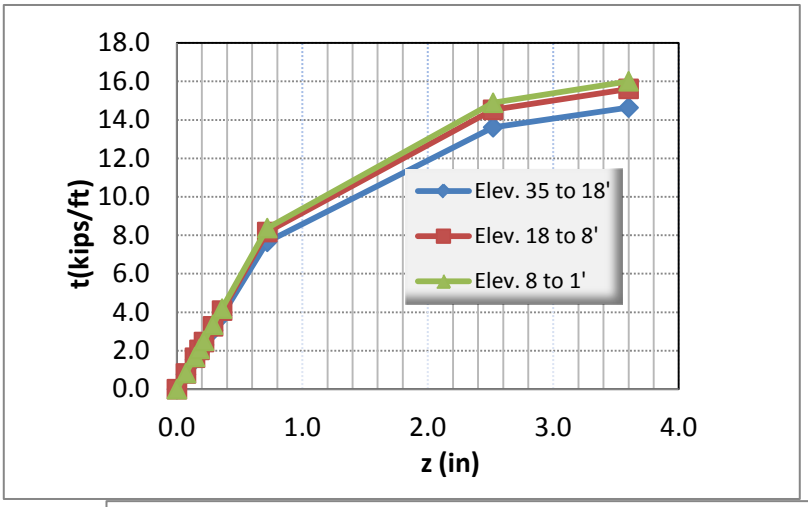
Elev. 35 to 18'		Elev. 18 to 8'		Elev. 8 to 1'	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.00	0.000	0.00	0.000	0.00	0.000
0.07	0.766	0.07	0.817	0.07	0.838
0.14	1.532	0.14	1.634	0.14	1.675
0.18	1.914	0.18	2.042	0.18	2.094
0.22	2.297	0.22	2.451	0.22	2.513
0.29	3.063	0.29	3.267	0.29	3.350
0.36	3.829	0.36	4.084	0.36	4.188
0.72	7.658	0.72	8.169	0.72	8.375
2.52	13.614	2.52	14.522	2.52	14.890
3.60	14.635	3.60	15.611	3.60	16.006

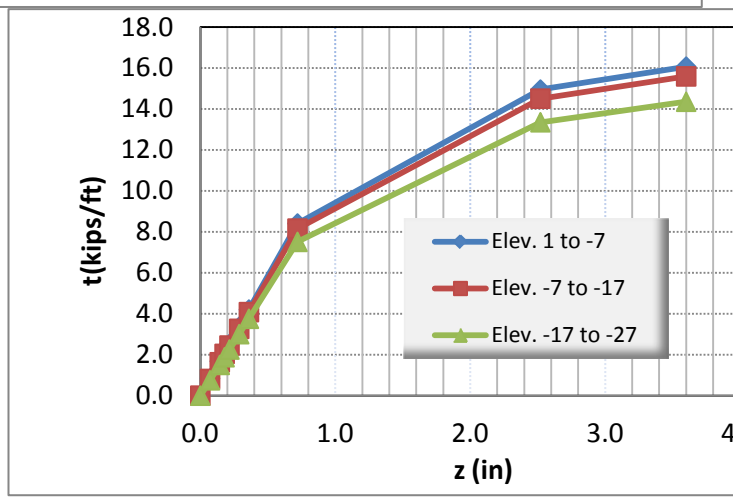
Elev. 1 to -7'		Elev. -7 to -17'		Elev. -17 to -27'	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.00	0.000	0.00	0.000	0.00	0.000
0.07	0.841	0.07	0.816	0.07	0.751
0.14	1.682	0.14	1.632	0.14	1.503
0.18	2.103	0.18	2.040	0.18	1.878
0.22	2.523	0.22	2.448	0.22	2.254
0.29	3.364	0.29	3.264	0.29	3.005
0.36	4.205	0.36	4.081	0.36	3.757
0.72	8.410	0.72	8.161	0.72	7.513
2.52	14.952	2.52	14.509	2.52	13.356
3.60	16.073	3.60	15.597	3.60	14.358

Project: **Valley View Street OC Seismic Retrofit**
Project Id: 121300001 Date: 3/25/20142:26 PM

Date: 01/24/2014 By: M Islam







Project: **Valley View Street OC Seismic Retrofit**

Project Id: 121300001 Date: 3/25/20142:26 PM

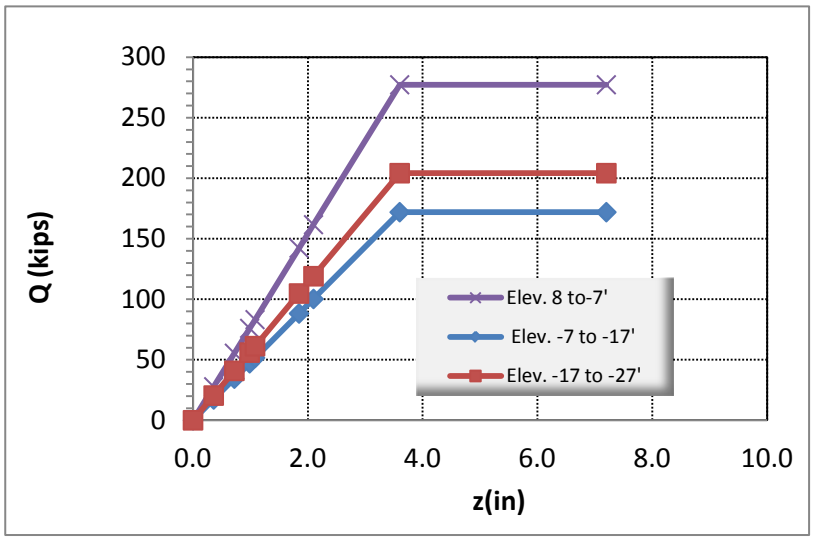
Data: Q-z Curves

Date: 01/24/2014

By: M Islam

Br. Name: Valley View Street OC	Elevatiion (ft)	Pile Type:	36in CIDH
Br. No. = 55-0302	OG = 53.0	Pile Tip Dia =	36 inches
Non-Liquefied condition	Pile Cut-Off= 52.5		
Support(s): All Bents	GW = 44.0		

Elev. 8 to-7'		Elev. -7 to -17'		Elev. -17 to -27'	
z (in)	Q (kips)	z (in)	Q (kips)	z (in)	Q (kips)
0.00	0.000	0.00	0.000	0.00	0.000
0.36	27.721	0.36	17.194	0.36	20.416
0.72	55.442	0.72	34.388	0.72	40.831
0.99	75.956	0.99	47.111	0.99	55.939
1.08	83.163	1.08	51.582	1.08	61.247
1.85	142.209	1.85	88.205	1.85	104.732
2.10	161.614	2.10	100.241	2.10	119.023
3.60	277.211	3.60	171.940	3.60	204.156
7.20	277.211	7.20	171.940	7.20	204.156



Project: **Valley View Street OC Seismic Retrofit**

Project Id: 121300001 Date: 3/25/20142:21 PM

Data: t-z Curves

Br. Name:	Valley View Street OC	Elevation (ft)		Pile Type:	36 CIDH
Br. No. =	55-0302	OG =	53.0	Pile Dia =	36 in
Liquefied condition		Pile Cut-Off=	52.5		
Support(s):	All Bents	GW =	44.0		

Note: All elevations are in feet.

Elev. 53 to 49'		Elev. 49 to 44'		Elev. 44 to 35'	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
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0.14	0.260	0.14	0.814	0.14	0.000
0.18	0.325	0.18	1.018	0.18	0.000
0.22	0.390	0.22	1.221	0.22	0.000
0.29	0.520	0.29	1.629	0.29	0.000
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2.52	2.312	2.52	7.238	2.52	0.000
3.60	2.486	3.60	7.781	3.60	0.000

Elev. 35 to 18'		Elev. 18 to 8'		Elev. 8 to 1'	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.00	0.000	0.00	0.000	0.00	0.000
0.07	0.000	0.07	0.000	0.07	0.838
0.14	0.000	0.14	0.000	0.14	1.675
0.18	0.000	0.18	0.000	0.18	2.094
0.22	0.000	0.22	0.000	0.22	2.513
0.29	0.000	0.29	0.000	0.29	3.350
0.36	0.000	0.36	0.000	0.36	4.188
0.72	0.000	0.72	0.000	0.72	8.375
2.52	0.000	2.52	0.000	2.52	14.890
3.60	0.000	3.60	0.000	3.60	16.006
3.60	0.000	3.60	0.000	3.60	16.006

Elev. 1 to -7'		Elev. -7 to -17'		Elev. -17 to -27'	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
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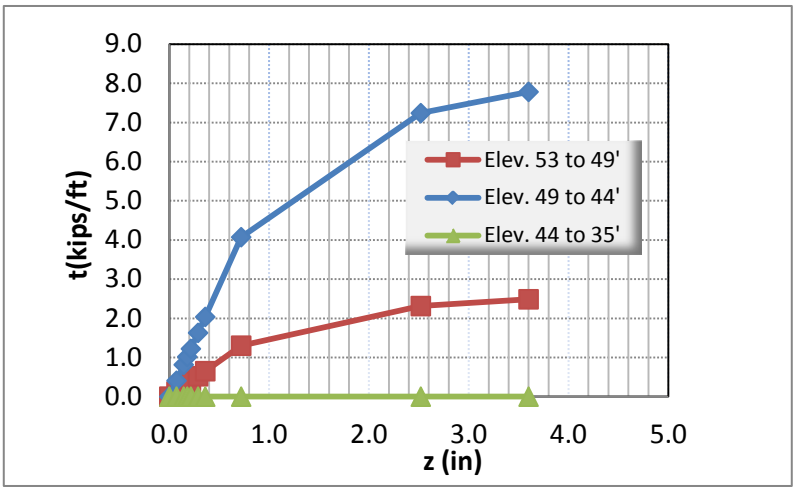

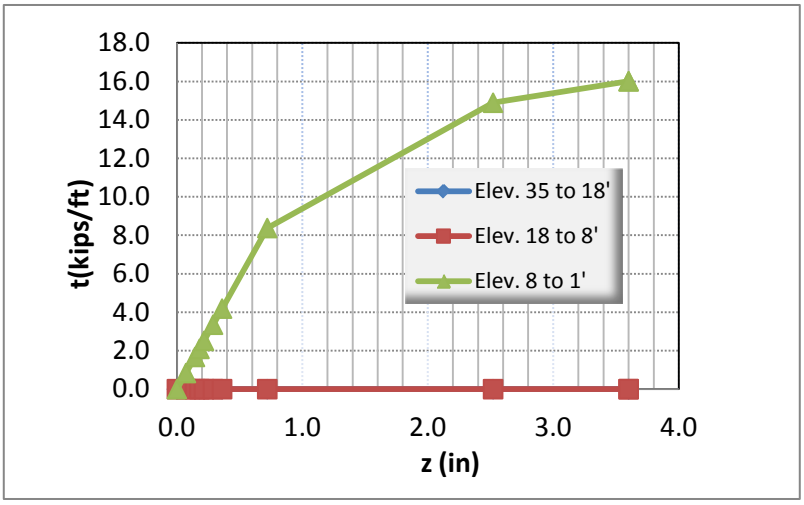

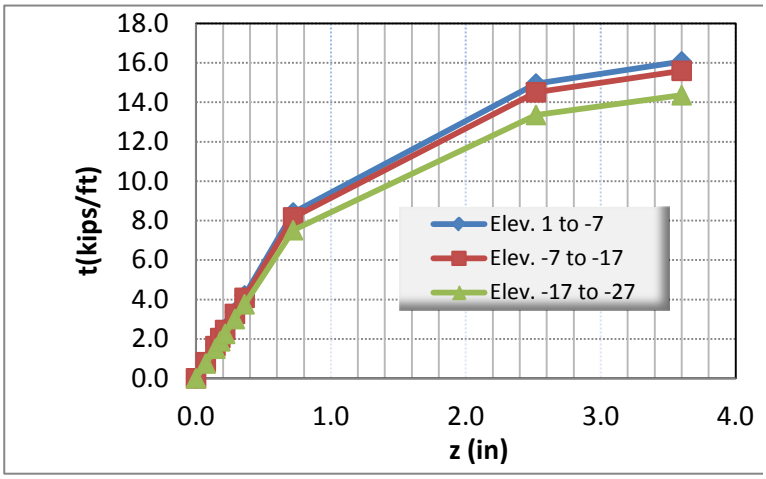

Project: **Valley View Street OC Seismic Retrofit**

Project Id: 121300001 Date: 3/25/20142:21 PM

Data: Q-z Curves

Date: 01/24/2014 By: M Islam

Br. Name:	Valley View Street OC	Elevatiion (ft)		Pile Type:	36in CIDH
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Support(s):	All Bents	GW =	44.0		

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0.72	55.442	0.72	34.388	0.72	40.831
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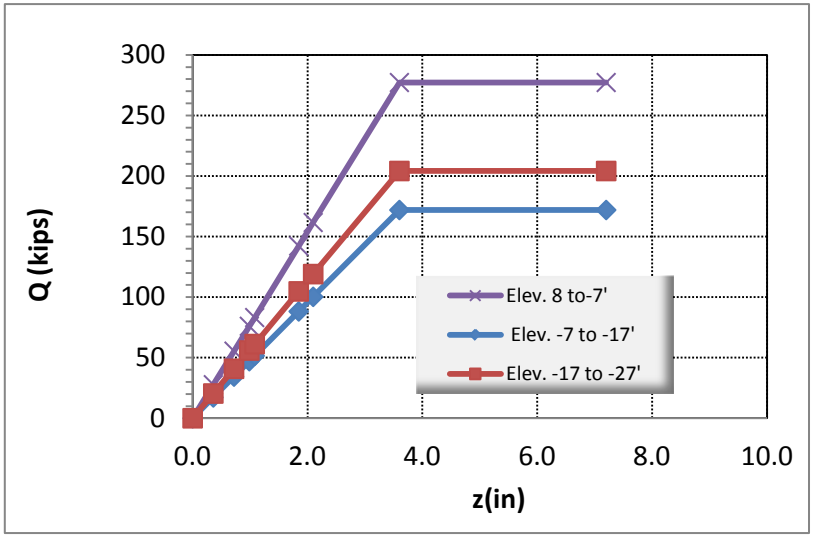
1.08	83.163	1.08	51.582	1.08	61.247
1.85	142.209	1.85	88.205	1.85	104.732
2.10	161.614	2.10	100.241	2.10	119.023
3.60	277.211	3.60	171.940	3.60	204.156
7.20	277.211	7.20	171.940	7.20	204.156

Note: Soils from Elev. 8' to -27' are not liquefiable and this the Q-z curves are the same as the non-liquefied case



State of California
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Business, Transportation and Housing

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To: MS. TRACI MENARD
Office of Bridge Design South 1, Chief
Bridge Design Branch 15
Division of Engineering Services

Attn: Mr. Jose Higareda

Date: March 25, 2014
File: 12-ORA-405-PM 9.89
EA# 12-0M721
(1213000001)
Bear Street OC Retrofit
Bridge No. 55-0433

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design South 1
Branch D

Subject: Foundation Report for Bear Street Overcrossing (OC) Retrofit

INTRODUCTION

In a memo dated July 20, 2013, the Office of Bridge Design South 1 (BDS1)-Branch 15 has requested from Office of Geotechnical Design South 1 (OGDS1) preliminary geologic, geotechnical, seismic and foundation recommendations for a proposed retrofit of the Bear Street Overcrossing (OC), Bridge No. 55-0433.

OGDS1 geologic/foundation recommendations are based on the review of the following records and documents as well as results of the recent OGDS1 geotechnical exploration program implemented for this project**:**

- As-Built Geology Report for Bear Street Overcrossing (OC), dated November 12, 1964.
- As-Built General and Foundation Plan for Bear Street OC, dated October 24, 1967.
- As-Built Log of Test Borings (LOTB) for Bear Street OC, dated October 24 1967.
- FPS&E Bear Street OC Retrofit Plans, plotted March 17, 2014.

SCOPE OF WORK

Tasks completed by the OGDS1, Branch D include the following:

1. Review of pertinent information from previous geology/geotechnical reports and As-Built plans in the project area.
2. Drilling, logging, and sampling of one rotary wash boring and soundings from four electronic cone penetrometer tests (CPT's) at the subject bridge site to characterize the subsurface conditions.
3. Laboratory testing of selected soil samples for mechanical analysis, corrosivity, direct shear, unit weight, Atterberg Limits, and moisture content.

4. Performing geotechnical analysis.
5. Preparing this report.

PROJECT DESCRIPTION

The existing Bear Steet OC, Br. No. 55-0433, is a continuous four-span structure consisting of reinforced concrete box girder (7 cell), with 16 foot 9 inch minimum vertical clearance, crossing over northbound (NB) and southbound (SB) lanes of Rte 405 Freeway traffic in Orange County (PM 9.89). The original Bear Street OC was constructed in 1968, having a total span length of 255 foot 2 inch, measured along Center Line Bear Street. The site map is attached as Appendix I.

As built drawings and bridge inspection reports indicate that the bridge contains open end reinforced concrete (RC) diaphragm type abutments and three bents, each consisting of 2 flared columns. The drawings indicate that the abutments and the bents are supported on Raymond Step-Tapered CIP driven piles (driven steel shell filled with concrete), designed for loads of 45 Tons.

Based on recommendations by the Caltrans Seismic Advisory Board, the Office of Earthquake Engineering (OEE) performed reviews of state-owned bridges for potential seismic vulnerabilities and provided the summary of results in a Memorandum dated July 16, 2010. Based on the OEE review, bridges built before 1971 with flared columns were evaluated for vulnerability to shear damage during earthquakes. The primary concern was for the portion of the columns below the flare that had not been designed for the larger plastic shear force caused by the reduced effective column length. Bear Str. OC was among bridges in this study found vulnerable to the flared column shear damage during earthquakes. The typical retrofit to address this vulnerability includes installation of column casing below the flare at bents/piers, possibly an infill wall, and/or the footing retrofit/strengthening.

OGDS1 Branch D received a request from OBDS1 to provide the bridge site geology/ geotechnical information, seismic recommendations including liquefaction potential due to seismic event and site settlements, ARS curve and PGA for the bridge site, p-y, t-z, and q-z curves, and foundation retrofit recommendations.

Based on the FPS&E project plant for Bear Str. OC Retrofit, provided by OBDS1 (3/17/2014), OGDS1 understands that the proposed retrofit project will consist of steel column casing installation (retrofit).

The elevations provided in the proposed FPS&E (retrofit) project plans and recent Log of Test Boring (LOTB) are based on NAVD88 datum. The As-Built elevations are based on NGVD29 datum. The benches on NAVD88 datum are 2.4' higher than the NGVD29 datum (datum shift information provided to OGDS1 by District 12 Survey on March 14, 2014).

FIELD INVESTIGATION AND TESTING PROGRAM

The site-specific field exploration was performed between October 29, 2013 and December 5, 2013. The filed investigation included drilling one rotary-wash boring (4.5 inch outer diameter) and advancing four cone penetration test (CPT) soundings. Standard Penetration Tests (SPT's) and relatively undisturbed sampling (with a 2 inch inner diameter split-barrel sampler) were performed at the borings. Blow counts (SPT N values) were continuously recorded at 5 foot intervals during drilling. SPT's were performed in accordance with ASTM Test Method D1586-84 using a standard 1.4 inch I.D. sampler with a 140 lb. hammer dropped 30 inches. Undisturbed tube soil samples were also obtained using a 2 inch I.D. modified California Split Spoon Sampler with 4 inch long brass liners. The lined samples were all sealed in the field. This modified sampler was used to collect fine-grained soils such as silts and clays that were identified during the CPT investigation. Caltrans operated drill rigs model CME 75 was used at boring locations. The boring was drilled by the Caltrans Office of Drilling Services and logged by personnel from our office. The Geotechnical findings obtained from this exploration were utilized to estimate geotechnical capacity of the existing foundation.

At the completion of the boring, the hole was backfilled with grout and Bentonite chips, and patched with AC/Quick set concrete patch at the surface.

The Office of District 12 Survey provided location and elevation of the borings and CPT's. Boring/CPT information, including exploration number, stationing, offset, ground surface elevation, boring depth, and date drilled are summarized in Table 1 below:

Table 1 – Summary of Boring/CPT Information

Boring/CPT Exploration No.	Station Rte 405 CL	Offset (ft)	Surface Elev. (ft)	Drilled Depth (ft)	Bottom Elev. (ft)	Date Drilled
CPT-13-007	561+98.81	79.4Rt	35.53	30.6	4.9	10-31-13
CPT-13-008	561+99.46	10.8Lt	36.29	33.7	2.6	10-30-13
CPT-13-008B	561+56.23	9.5Lt	36.36	32.6	3.8	10-30-13
CPT-13-009	561+94.26	79.2Lt	35.59	32.8	2.7	10-31-13
RC-13-003	561+54.00	9.5Lt	36.33	91.5	-54.9	12-04-13

LABORATORY TESTING PROGRAM

Selected soil samples from the two borings were sent to the Department's Transportation Laboratory in Sacramento and District 8 Materials Laboratory (Southern Regional Lab) for testing. All laboratory tests were performed in accordance with ASTM/AASHTO standard procedures and California Test Methods. The summarized laboratory tests data are shown in Table 2 below.

A summary of the geotechnical laboratory results is presented in Appendix II: Laboratory Data.

Table 2 – Laboratory Test Methods

Test	Standard
Particle Size Analysis	ASTM D422
Plasticity Index/Liquid Limit	AASHTO T 90&89
Unit Weight	ASTM D4767
Moisture Content	ASTM D2216
Corrosivity Testing	CTM 643, 422, 417
Direct Shear	ASTM D 3080

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Regional Geology

The site is within the Los Angeles Basin, which is between the Peninsular Ranges and Transverse Ranges geomorphic provinces. The Los Angeles Basin is an alluvium-filled basin that is up to several miles thick at its deepest point. The site is north of Newport Harbor, between the Santa Ana River and Sand Diego Creek watersheds. The topography of the area is relatively level.

Site Geology

The site is located in the central Los Angeles Basin, which is underlain by alluvium derived from the San Gabriel and Santa Ana Rivers and their tributaries, such as Coyote Creek**.** The alluvium is generally composed of interlayered, very thickly bedded, medium dense to dense sands with varying amounts of silt.

Subsurface Conditions

Soil encountered at Boring A-13-003 consist of mostly stiff to very stiff sandy lean clay/lean clay with sand and silt interbeds down to about 27 ft depth. From about 27 ft down to 50 ft depth dense to very dense poorly graded sand with silt and silty sand was encountered. From about 50 ft down to the maximum depth drilled (elevation -54.9 ft) layers of stiff lean clay with sand, dense sandy silt, and medium dense to dense silty sands/poorly graded sands were encountered.

Subsurface conditions encountered during the recent drilling are presented on the Log of Test Borings (LOTB), attached to this report as Appendix III.

Groundwater

Historical Data

Groundwater was encountered at elevations +14.2 feet in borings B-2, and at elevation +15.7 feet in boring B-3 during the initial field investigation in 1964 at this bridge site. The closest Department of Water Resources ground water well with reliable data shows a historic high ground water elevation at -8.1 feet MSL in April 1994 at well 05S10W35E001S, which is located approximately ¾ mile northwest of the site. Monitoring wells at a nearby gas station at the intersection of Baker St. and Bristol St. show a maximum ground water elevation of +15.87 MSL in April, 2013 according to the GeoTracker website. This site is approximately 0.6 miles to the southeast of the bridge.

Current Investigation

During the recent field exploration ground water was initially encountered at about 23.7 ft depth (elevation +12.6 ft), measured on November 6, 2013, in auger boring A-13-003. Ground water was measured again in auger boring on December 4, 2013, at depth of 20 ft (elevation +16.3 feet). Drilling was continued with mud rotary method in Boring RC-13-003, from depth of about 25 feet (elevation +11.3 feet). For this project foundation retrofit analysis and recommendations, ground water elevation at +16.3 ft was used. The water level may vary with the seasonal precipitation.

SEISMIC RECOMMENDATIONS

The seismicity at the site was evaluated using Version 2.3.06 of the Caltrans ARS Online tool. The seismicity for the project was measured from the center of the Bear St Overcrossing. A V_{s30} of 310 m/s was used based on correlations with CPT data from the current investigation, as well as SPT blow counts from the current and previous investigations. The computations performed using Caltrans ARS Online tool indicated that the site PGA for the project limits is 0.66g. The ARS curve is attached as Appendix IV.

The controlling faults are the USGS 5% in 50 years probabilistic data, the San Joaquin Hills Fault, Newport Inglewood Fault Zone (S. Los Angeles Basin section-southern), and Newport Inglewood (offshore) Fault. The San Joaquin Hills Fault is Fault ID 376 in the Caltrans ARS On-line database. It is a reverse fault dipping 23° to the west with a M_{max} of 7.0. The rupture distance (R_{rup}) is approximately 2.1 km (1.3 mi) from the site. The Newport Inglewood Fault Zone is Fault ID 366 in the Caltrans ARS On-line database. It is a strike-slip fault dipping 90° with a M_{max} of 7.2. The rupture distance (R_{rup}) is approximately 5.4 km (3.4 mi) from the site. The Newport Inglewood (offshore) Fault is Fault ID 381 in the Caltrans ARS On-line database. It is a strike-slip fault dipping 90° with a M_{max} of 6.9. The rupture distance (R_{rup}) is approximately 10.9 km (6.8 mi) from the site.

The project site is not located within any Alquist-Priolo Earthquake Fault Zones as established by the California Geological Survey (CGS, 1997) and surface rupture potential is considered to be low.

Liquefaction

The potential for liquefaction is considered low based on the recent geotechnical investigation and review of As-Built records at the subject site. Soils encountered below ground water table (elevation +16.3 ft) were mostly stiff to very stiff lean clay with sand/sandy silty clay/sandy lean clay, about 5 to 7 ft thick layers, underlined with dense to very dense silty sand/clayey sand/poorly graded sand with silt, about 20 ft thick. As-Built driven concrete pile tips have bearing in dense to very dense sandy layer. Soil settlements estimate at bent locations due to seismic event for this site are up to 1 inch. The site soil liquefaction potential and settlement estimates were based on CPT records analysis using GeoLogismiki software CLiq v.1.7, Cone Penetration Test based soil liquefaction assessment software, prepared in collaboration with Gregg Drilling Inc. and Prof. Peter Robertson.

AS-BUILT INFORMATION

The existing structure is a continuous 4-span reinforced concrete bridge constructed in 1968. The existing foundation is comprised of driven concrete piles at Abutments and Bents locations. Piles used were Raymond Step-Taper C.I.P. piles (steel shall filled with concrete), driven to specified bearing of 45 tons at all support locations.

The summary of As-Built pile data, pile type, design load, bottom of footing elevation, specified tip elevations, and average tip elevations are presented in Table 3 below.

Table 3 – As-Built Foundation Data for Bear Street OC, Br. No. 55-0433

Design Location	Pile Type/ Dimension (in)	Service Load (kips)	Bottom of Footing Elev. (ft)	Specified Tip Elevation (ft)	Average Tip Elevation (ft)
Abutment 1	Raymond Step-Taper CIP Class I	90	Varies +45.4,+46.0	-3	+3.3
Bent 2	Raymond Step-Taper Tip 8”, Top 12”	90	+26	-3	-4.6
Bent 3	Raymond Step-Taper Tip 8”, Top 12”	90	+27	-3	-3.5
Bent 4	Raymond Step-Taper Tip 8”, Top 12”	90	+26	-3	-4.9
Abutment 5	Raymond Step-Taper CIP Class I	90	Varies +45.6, 46.2	-3	-0.9

As-Built elevations are based on NGVD29 datum. The benches on NAVD88 datum are 2.4’ higher than the NGVD29 datum (datum shift information provided to OGDS1 by District 12 Survey on March 14, 2014).

FOUNDATION RECOMMENDATIONS

Axial Pile Geotechnical Capacity

Geotechnical capacities of the existing piles were evaluated by OGDS1 based on the 1967 As-Built Plans/LOTB and soil data obtained from the recent geotechnical exploration (October to December, 2013). Pile original design loading, pile cut-off elevation, and average pile tip elevations are obtained from the 1967 As-Built Plans/LOTB.

Raymond Step-Taper driven concrete pile geotechnical axial capacities were calculated using the APILE plus Version 4.0 (Ensoft Inc.) computer program for analysis of the axial capacity of driven piles. Pile Data Table No. 4 for Bens 2, 3, and 4 is shown below.

Table 4- As-Built (1967) Pile Soil Resistance (Bents) for Bear Street OC, Br. No. 55-0433

Support Location/ Type & Size	Design Loading	Ultimate Soil Resistance		Elevations Based On NGVD 29 Datum (1967 As-Built Contract Plans)		
	Compression (kips)	Compression Average (kips)	Tension (kips)	Approx. Exist. Grade Elevation (ft)	Pile Cut-Off Elevation (ft)	Average Pile Tip Elevation (ft)
Bent 2 Raymond Step Taper Tip 8" Top 12"	90	110	N/A	35.6+-	26.25	-4.6
Bent 3 Raymond Step Taper Tip 8" Top 12"	90	110	N/A	36.3+-	27.25	-3.5
Bent 4 Raymond Step Taper Tip 8" Top 12"	90	110	N/A	35.5+-	26.25	-4.9

Axial resistance to compression noted in the table above is based on combined skin friction and end bearing at the supports within foundation soils.

Based on the review of As-Built soil data and recent geotechnical explorations, OGDS1 performed calculations and provided values for the p-y, t-z, and q-z curves/data for the bridge site to OBDS1 (by Dr. Mohammed Islam). P-y, t-z, and q-z curves and data are attached as Appendix V.

OGDS1 provided geotechnical (retrofit) recommendations for Bents 2, 3, and 4 include descriptions of geotechnical exploration, preparation of LOTB, analysis of site soil liquefaction potential, seismic data (ARS design curve), and analysis/calculation for existing piles geotechnical axial capacity. Based on the results of analysis there is low liquefaction potential at the project site (bents). OGDS1 in discussion with OBDS1 agreed that deep foundation retrofit won't be necessary at the bents.

For the Bent 2, 3, and 4 retrofit, column casing retrofit was proposed by OBDS1, as shown in FPS&E project plans, dated 03/17/14. The design engineer should determine the anticipated performance and requirement expected of the existing foundation type.

Any questions regarding the above recommendations should be directed to Tatjana Halda at (213) 620-2347, Kristopher Barker at (562) 665-0048, or Shiva Karimi at (213) 620-2146, of the Office of Geotechnical Design-South 1, Branch D.

Report by Date: 3/25/14

Tatjana Halda

REGISTERED PROFESSIONAL ENGINEER
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Tatjana Halda, P.E. (Civil)
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Supervised by Date: 3/25/14

P Shiva Karimi

REGISTERED PROFESSIONAL ENGINEER
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GEOTECHNICAL
STATE OF CALIFORNIA

Shiva Karimi, Ph.D., P.E., G.E
Chief, Branch D
Office of Geotechnical Design – South 1

Report by Date: 3/25/14

Kristopher Barker

PROFESSIONAL GEOLOGIST
KRISTOPHER BARKER
No. 2383
CERTIFIED
ENGINEERING
GEOLOGIST
8-31-15
STATE OF CALIFORNIA

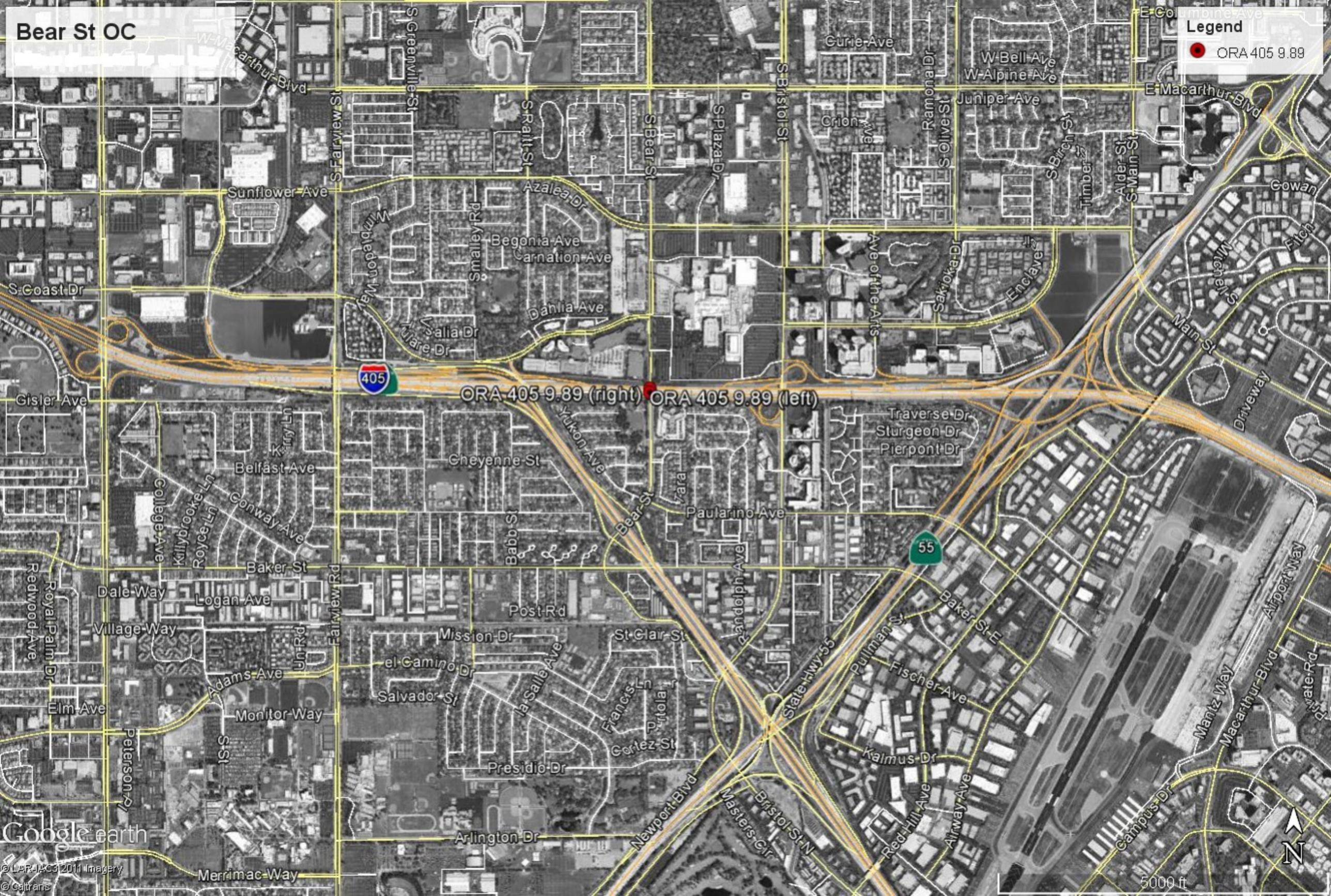
Kristopher Barker, C.E.G.
Engineering Geologist, Branch D
Office of Geotechnical Design – South 1

cc: Structure Construction R.E. pending File (RE_Pending@dot.ca.gov)
District 12 Design – Andrew_P_Oshrin@dot.ca.gov,
Project Manager – Leo_Chen@dor.ca.gov
Structure Design – Jose_Higareda@dot.ca.gov, Anthony Logus@dot.ca.gov
GS Corporate – Douglas_Brittsan@dot.ca.gov

Attachments:
Appendix I – Site Vicinity Map
Appendix II – Laboratory Data
Appendix III – LOTB
Appendix IV – Caltrans ARS (online) Curve
Appendix V – p-y, t-z, q-z curves

Appendix I

Site Vicinity Map


Bear St OC
Legend
ORA 405 9.89
ORA 405 9.89 (right)
ORA 405 9.89 (left)
W Macarthur Blvd
E Macarthur Blvd
S Greenville St
S Fairview St
S Raitt St
S Bear St
S Plaza Dr
S Bristol St
Gurie Ave
W Bell Ave
W Alpine Ave
Juniper Ave
Ramona Dr
S Olive St
S Birch St
Timber
Alder St
S Main St
Cowan
Fitch
Sunflower Ave
Azalea Dr
Begonia Ave
Carnation Ave
Smalley Rd
W Hopkins Ave
Dahlia Ave
Visalia Dr
Tulare Dr
S Coast Dr
Ave of the Arts
Sakioka Dr
Enclave
Main St
Driveway
Gisler Ave
Traverse Dr
Sturgeon Dr
Pierpont Dr
Yukon Ave
Cheyenne St
Belfast Ave
Conway Ave
College Ave
Killybrooke Ln
Royce Ln
Paularino Ave
Bear St
Babb St
Baker St
Redwood Ave
Royal Palm Dr
Dale Way
Logan Ave
Village Way
Farmview Rd
Post Rd
Randolph Ave
Mission Dr
St Clair St
el Camino Dr
Adams Ave
Salvador St
la Salle Ave
Frances Ln
Portola Dr
Cortez St
Elm Ave
Monitor Way
Presidio Dr
Petersson Dr
State Hwy 55
Pullman St
Baker St E
Fischer Ave
Kalmus Dr
Red Hill Ave
Airway Ave
Mantz Way
Macarthur Blvd
Airport Way
Newport Blvd
Masters Cir
Bristol St N
Arlington Dr
Merrimac Way
Campus Dr
405
55
5000 ft
N
Google earth
© LAR-IAC3 2011 Imagery
© Caltrans

Appendix II

Laboratory Data

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 0 1	3327B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 5.0'-6.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 527 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
527		527			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	3	3	97	97
87.1 g	600 µm	6	7	93	93
	300 µm	11	13	87	87
	150 µm	18	21	79	79
	75 µm	25	29	71	71

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	41.0	8.0	33.0	38%	38%
24hr.	1M	31.0	8.0	23.0	26%	26%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	P.I.	13
Gr. Dry		
H2O	P.L.	21
Tare		
Net Dry	L.L.	34
% H2O		

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3327B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	0	2	-	3		3328B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 7.5'-7.8'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

DATE RCV'D: 12/12/13

DATE OUT:

NUMBER OF CONTAINERS: 1 brass tube

By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

GRADING ANALYSIS

Total Wt 358 g By: Date:

Wt. Ret	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
358		358			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	4	4	96	96
90.5 g	600 µm	8	9	91	91
	300 µm	16	18	82	82
	150 µm	27	30	70	70
	75 µm	37	41	59	59

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M	27.0	8.0	19.0	21%	21%
24hr.	1M	21.0	8.0	13.0	14%	14%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry

(A) Ov. Dry

ABS. %

Wt. S+C+H2O

Wt. S+C

W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry

(A) Ov. Dry

ABS. %

(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	402.5	P.I.	5
Gr. Dry	358.2		
H2O	44.3	P.L.	18
Tare	0.0		
Net Dry	358.2	L.L.	23
% H2O	12.4		

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
■	Unit Wt.	212	✓
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Wet Unit Weight

126.20 pcf

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 2 8 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	0	3				3329B
		CONTRACT NO.						SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 10.0'-11.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

DATE RCV'D: 12/12/13

DATE OUT:

NUMBER OF CONTAINERS: 1 bag

By: FAX / MAIL / PHONE / OTHER

NORMAL / PRIORITY

DATE NEEDED:

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 639 g | By: | Date:

Wt. Ret	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
639		639			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	2	2	98	98
89.7 g	600 µm	3	3	97	97
	300 µm	7	8	92	92
	150 µm	11	12	88	88
	75 µm	21	23	77	77

MECH. / HYDRO.		R	Corr.	C.R.	Mat'l In Sus.	Comb % In Sus
1hr.	5M	40.0	8.0	32.0	36%	36%
24hr.	1M	33.0		25.0	28%	28%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	15
Gr. Dry			
H2O		P.L.	23
Tare			
Net Dry		L.L.	38
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 2 9 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2 0 M 7 2 0 1 S 0 4	3330B
CONTRACT NO. / SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 15.0'-16.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 588 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
588		588			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	4	5	95	95
	1.18 mm	7	9	91	91
81.2 g	600 µm	9	11	89	89
	300 µm	13	16	84	84
	150 µm	17	21	79	79
	75 µm	27	33	67	67

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	35.0	8.0	27.0	33%	33%
24hr.	1M	23.0		15.0	18%	18%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=
Dura-Fine	R2/R1 =

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk $= \frac{500}{500 - W} =$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$App = \frac{A}{A - C} =$

$SSD = \frac{B}{B - C} =$

$OD = \frac{A}{B - C} =$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	15
P.L.	23
L.L.	38

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life: 26 yrs.

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 3 0 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 0 6 - 2	3332B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 brass tube

NORMAL PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 22.4'-22.7'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 299 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
299		299			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	3	3	97	97
	1.18 mm	4	5	95	95
85.9 g	600 µm	5	6	94	94
	300 µm	6	7	93	93
	150 µm	7	8	92	92
	75 µm	14	16	84	84

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	25.0	8.0	17.0	20%	20%
24hr.	1M	17.0		9.0	10%	10%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	382.5	P.I.	12
Gr. Dry	298.9		
H2O	83.6	P.L.	22
Tare	0.0		
Net Dry	298.9	L.L.	34
% H2O	28.0		

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
■	Unit Wt.	212	✓
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Wet Unit Weight

120.60 pcf

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 3 3 2 B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	0	7				3333B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 25.0'-25.8'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

DATE RCV'D: 12/12/13
DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ☐ PRIORITY ☐
DATE NEEDED:

By: FAX ☐ MAIL ☐ PHONE ☐ OTHER ☐

GRADING ANALYSIS

Total Wt 641 g By: Date

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
641		641			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	1	1	99	99
84.9 g	600 µm	2	2	98	98
	300 µm	6	7	93	93
	150 µm	13	15	85	85
	75 µm	21	25	75	75

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M	33.0	8.0	25.0	29%	29%
24hr.	1M	22.0		14.0	16%	16%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
■	SpG. of Soils	209	✓
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo	25.0 g	Spec.	2.70 g
Wa	165.2 g	Grav.	
Wb	180.95 g		

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 3 3 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 30.0'-31.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1 2	0 M 7 2 0 1	S 0 8	3334B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

By: FAX / MAIL / PHONE / OTHER

NORMAL PRIORITY DATE NEEDED:

GRADING ANALYSIS

Total Wt 627 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
627		627			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	4	3	97	97
116.5 g	600 µm	18	15	85	85
	300 µm	56	48	52	52
	150 µm	88	76	24	24
	75 µm	100	86	14	14

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	14.0	8.0	6.0	5%	5%
24hr.	1M	11.0		3.0	3%	3%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3334B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 0 9 a	3335B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 35.0'-36.0'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 766 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
766		766			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	7	6	94	94
115.4 g	600 µm	33	29	71	71
	300 µm	83	72	28	28
	150 µm	104	90	10	10
	75 µm	108	94	6	6

MECH. / HYDRO.		R	Corr.	C.R.	Mat'l In Sus.	Comb % In Sus
1hr.	5M	11.0	8.0	3.0	3%	3%
24hr.	1M	10.0		2.0	2%	2%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse Sed.Ht.=

Dura-Fine R2/R1 =

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry

(A) Ov. Dry

ABS. %

Wt. S+C+H2O

Wt. S+C

W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry

(A) Ov. Dry

ABS. %

(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3335B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	0	9	b			3336B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 36.0'-36.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

DATE RCV'D: 12/12/13

DATE OUT:

NUMBER OF CONTAINERS: 1 bag

By: FAX / MAIL / PHONE / OTHER

NORMAL ☐ PRIORITY ☐

DATE NEEDED:

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 557 g | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
557		557			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	3	3	97	97
	1.18 mm	12	13	87	87
95.1 g	600 µm	28	29	71	71
	300 µm	54	57	43	43
	150 µm	73	77	23	23
	75 µm	81	85	15	15

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	12.0	8.0	4.0	4%	4%
24hr.	1M	10.0		2.0	2%	2%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		

Min. Resistivity

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 3 6 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 1 0		3337B
	CONTRACT NO.	SAMPLE NO.		LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 36.5'-40.0'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 921 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
921		921			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	2	2	98	98
114.7 g	600 µm	14	12	88	88
	300 µm	47	41	59	59
	150 µm	78	68	32	32
	75 µm	94	82	18	18

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	11.0	8.0	3.0	3%	3%
24hr.	1M	9.0		1.0	1%	1%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No 4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		L.L.	
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3337B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	1	1				3338B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 41.0'-41.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

DATE RCV'D: 12/12/13

DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL | PRIORITY | DATE NEEDED:

By: FAX, MAIL, PHONE, OTHER

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 427 g | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
427		427			

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	3	3	97	97
106.3 g	600 µm	12	11	89	89
	300 µm	44	41	59	59
	150 µm	75	71	29	29
	75 µm	89	84	16	16

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	11.0	8.0	3.0	3%	3%
24hr.	1M	9.0		1.0	1%	1%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		L.L.	
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 3 8 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 1 2	3339B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 45.0'-46.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 658 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
658		658			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	8	7	93	93
	1.18 mm	23	20	80	80
112.2 g	600 µm	45	40	60	60
	300 µm	70	62	38	38
	150 µm	87	78	22	22
	75 µm	95	85	15	15

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	10.0	8.0	2.0	2%	2%
24hr.	1M	9.0		1.0	1%	1%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse Sed.Ht.=

Dura-Fine R2/R1 =

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry

(A) Ov. Dry

ABS. %

Wt. S+C+H2O

Wt. S+C

W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry

(A) Ov. Dry

ABS. %

(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		L.L.	
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3339B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 1 4 a	3340B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 55.0'-55.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

GRADING ANALYSIS

Total W1 197 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
197		197			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	2	2	98	98
96.5 g	600 µm	5	5	95	95
	300 µm	17	18	82	82
	150 µm	58	60	40	40
	75 µm	78	81	19	19

MECH. / HYDRO.		R	Corr.	C.R.	Mat'l in Sus.	Comb % In Sus.
1hr.	5M	13.0	8.0	5.0	5%	5%
24hr.	1M	11.0		3.0	3%	3%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk $= \frac{500}{500 - W} =$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$App = \frac{A}{A - C} =$

$SSD = \frac{B}{B - C} =$

$OD = \frac{A}{B - C} =$

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.L.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 4 0 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 1 4 b	3341B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 55.5'-56.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 543 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
0	9.5	0	0		100
10	4.75	10	2		98
533		543			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	98
	2.36 mm	1	1	99	97
	1.18 mm	1	1	99	97
98.9 g	600 µm	2	2	98	96
	300 µm	4	4	96	94
	150 µm	15	15	85	83
	75 µm	39	39	61	60

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	17.0	8.0	9.0	9%	9%
24hr.	1M	13.0		5.0	5%	5%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk $= \frac{500}{500 - W} =$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$App = \frac{A}{A - C} =$

$SSD = \frac{B}{B - C} =$

$OD = \frac{A}{B - C} =$

MOISTURE CONTENT

Gr. Wet		P.I.	0
Gr. Dry			
H2O		P.L.	23
Tare			
Net Dry		L.L.	23
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3341B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 1 5 b	3342B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 60.5'-61.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 483 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
483		483			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	1	1	99	99
92.1 g	600 µm	2	2	98	98
	300 µm	3	3	97	97
	150 µm	25	27	73	73
	75 µm	56	61	39	39

MECH. / HYDRO.		R	Corr.	C.R.	Mat'l In Sus.	Comb % In Sus.
1hr.	5M	19.0	8.0	11.0	12%	12%
24hr.	1M	13.0		5.0	5%	5%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 4 2 B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 1 6 a	3343B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 65.0'-66.0'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 353 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
353		353			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
89.0 g	600 µm	14	16	84	84
	300 µm	39	44	56	56
	150 µm	56	63	37	37
	75 µm	66	74	26	26

MECH. / HYDRO.		R	Corr.	C.R.	Mat'l In Sus.	Comb % In Sus.
1hr.	5M	14.0	8.0	6.0	7%	7%
24hr.	1M	12.0		4.0	4%	4%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=
Dura-Fine	R2/R1 =

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		L.L.	
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3343B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 1 7	3344B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 66.5'-68.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 697 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5	0			
1	4.75	1	0		100
696		697			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	2	2	98	98
86.9 g	600 µm	12	14	86	86
	300 µm	39	45	55	55
	150 µm	67	77	23	23
	75 µm	78	90	10	10

MECH. / HYDRO.		R	Corr.	C.R.	Mat'l in Sus.	Comb % in Sus.
1hr.	5M	10.0	8.0	2.0	2%	2%
24hr.	1M	9.0		1.0	1%	1%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		

Min. Resistivity

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3344B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	1	8				3245B
			CONTRACT NO.							SAMPLE NO.				LAB. NO.

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 71.0'-71.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

DATE RCV'D: 12/12/13

DATE OUT:

NUMBER OF CONTAINERS: 1 bag

By: FAX / MAIL / PHONE / OTHER

NORMAL / PRIORITY / DATE NEEDED:

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 435 g | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
0	9.5	0			
1	4.75	1	0		100
434		435			

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	17	16	84	84
109.2 g	600 µm	54	49	51	51
	300 µm	83	76	24	24
	150 µm	98	90	10	10
	75 µm	103	94	6	6

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	10.0	8.0	2.0	2%	2%
24hr.	1M	10.0		2.0	2%	2%

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

CLEANNESS VALUE

SED. HT.	RESULT

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

CONTRACT NO. 12-0M7201

LAB. NO. 3245B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 73.5'-74.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1	2	0	M	7	2	0	1	S	1	9	b			3346B
		CONTRACT NO.						SAMPLE NO.						LAB. NO.

DATE RCVD: 12/12/13
DATE OUT:

NUMBER OF CONTAINERS: 1 bag
NORMAL | PRIORITY | DATE NEEDED:

By: FAX / MAIL / PHONE / OTHER

GRADING ANALYSIS

Total Wt 372 g | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
372		372			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	1	1	99	99
81.7 g	600 µm	1	1	99	99
	300 µm	1	1	99	99
	150 µm	5	6	94	94
	75 µm	11	13	87	87

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	63.0	8.0	55.0	67%	67%
24hr.	1M	51.0		43.0	53%	53%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / 500 - W =	

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / A - C =	
SSD = B / B - C =	
OD = A / B - C =	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	35
P.L.	25
L.L.	60

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3346B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 75.0'-76.5'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1 2	0 M 7 2 0 1	S 2 0	3347B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13
DATE OUT:

NUMBER OF CONTAINERS: 1 bag
NORMAL PRIORITY
DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 526 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
526		526			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
80.7 g	600 µm	1	1	99	99
	300 µm	2	2	98	98
	150 µm	7	9	91	91
	75 µm	12	15	85	85

MECH. / HYDRO.		R	Corr.	C.R.	Mat'l In Sus.	Comb % In Sus.
1hr.	5M	62.0	8.0	54.0	67%	67%
24hr.	1M	48.0		40.0	50%	50%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	28
Gr. Dry			
H2O		P.L.	24
Tare			
Net Dry		L.L.	52
% H2O			

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.
Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES
NM	Satisfactory
	Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3347B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 80.0'-81.2'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1	2	0	M	7	2	0	1	S	2	1				3348B
		CONTRACT NO.						SAMPLE NO.						LAB. NO.

DATE RCV'D: 12/12/13
DATE OUT:

NUMBER OF CONTAINERS: 1 bag
NORMAL | PRIORITY | DATE NEEDED:

By: FAX / MAIL / PHONE / OTHER

GRADING ANALYSIS

Total Wt 513 g | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
513		513			

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	4	4	96	96
95.5 g	600 µm	7	7	93	93
	300 µm	9	9	91	91
	150 µm	11	12	88	88
	75 µm	16	17	83	83

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

MOISTURE CONTENT

Gr. Wet
Gr. Dry
H2O
Tare
Net Dry
% H2O

PLASTICITY INDEX

P.I. 24
P.L. 21
L.L. 45

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	57.0	8.0	49.0	51%	51%
24hr.	1M	44.0		36.0	38%	38%

SAND EQUIVALENT

Sand R2 | Avg.
Clay R1
S.E. Value

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$App = \frac{A}{A - C} =$$

$$SSD = \frac{B}{B - C} =$$

$$OD = \frac{A}{B - C} =$$

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.
Estimated life:

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

CLEANNESS VALUE

SED. HT.	RESULT

DURABILITY INDEX

Dura-Coarse | Sed.Ht.=
Dura-Fine | R2/R1 =

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo | Spec.
Wa | Grav.
Wb

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

CONTRACT NO. 12-0M7201

LAB. NO. 3348B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 90.0'-90.9'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1	2	0	M	7	2	0	1	S	2	3	a				3350B
CONTRACT NO.								SAMPLE NO.							LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

By: FAX / MAIL / PHONE / OTHER

NORMAL PRIORITY DATE NEEDED

GRADING ANALYSIS

Total Wt 952 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5	0			
2	4.75	2	0		100
950		952			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	6	5	95	95
	1.18 mm	42	36	64	64
115.2 g	600 µm	89	77	23	23
	300 µm	98	85	15	15
	150 µm	103	89	11	11
	75 µm	106	92	8	8

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	12.0	8.0	4.0	3%	3%
24hr.	1M	11.0		3.0	3%	3%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3350B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	2	3	b			3351B
		CONTRACT NO.						SAMPLE NO.						LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED

Sample of: Soil

Sampled from: Bear Street Over Crossing(55-0433), Boring#A-13-003

Material Source: Bent 3, SB 405 median, east side bridge - Depth 90.0'-91.2'

Owner / Mfr.:

Date Sampled: 11-19/27-13 & 12-04/05-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 358 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
358		358			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	2	2	98	98
	1.18 mm	5	6	94	94
89.1 g	600 µm	6	7	93	93
	300 µm	7	8	92	92
	150 µm	41	46	54	54
	75 µm	72	81	19	19

MECH. / HYDRO.		R	Corr.	C.R.	Mat'l In Sus.	Comb % In Sus.
1hr.	5M	13.0	8.0	5.0	6%	6%
24hr.	1M	10.0		2.0	2%	2%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG Coarse	206	
	SpG Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

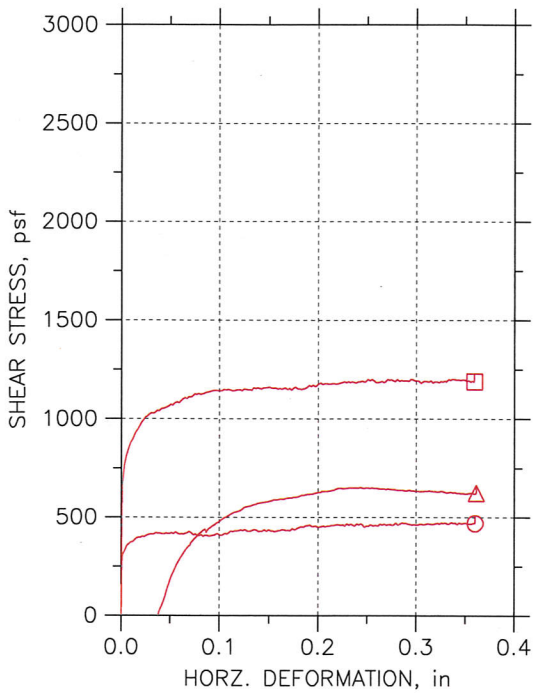
Wo / (Wo + Wa - Wb)

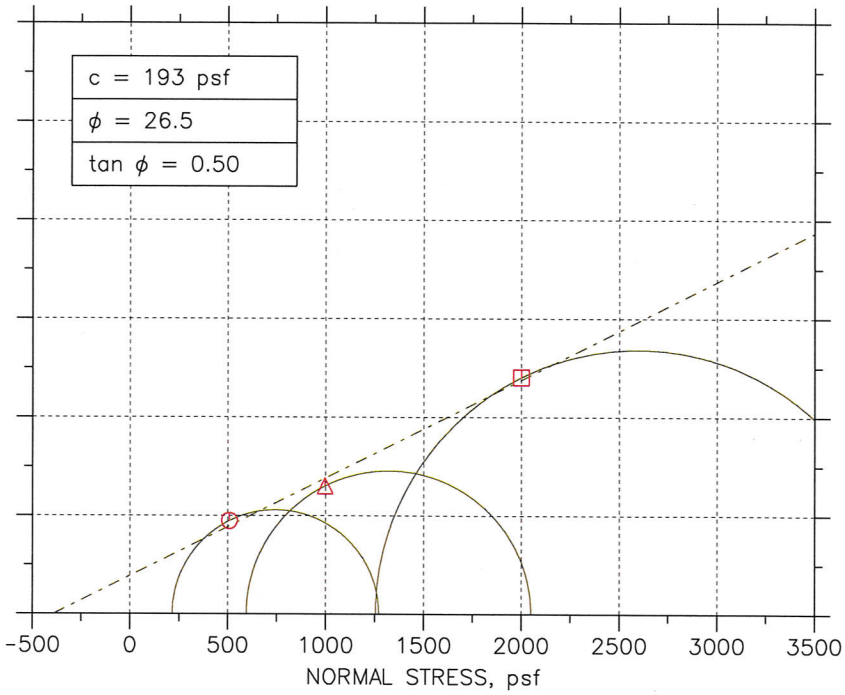
Wo		Spec.	
Wa		Grav.	
Wb			

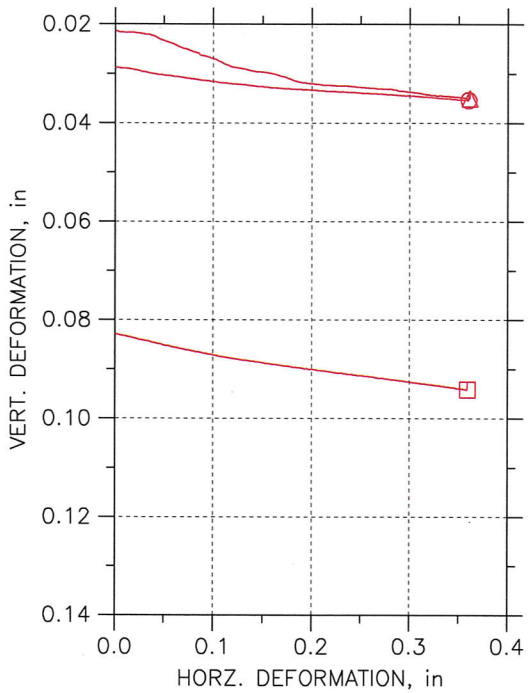
CONTRACT NO. 12-0M7201

LAB. NO. 3351B

DIRECT SHEAR TEST REPORT







Symbol		○	△	□	
Test No.		DS1324A	DS1324B1	DS1324C	
Sample No.		S02-2	S02-1	S02-2	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	1.944	1.944	1.944	
	Area, in^2	2.9681	2.9681	2.9681	
	Height, in	1	1	1	
	Water Content, %	46.47	40.64	45.41	
	Dry Density, pcf	74.571	80.219	75.47	
	Saturation, %	99.56	99.64	99.40	
	Void Ratio	1.2603	1.1012	1.2334	
Consol. Height, in		0.9731	0.98011	0.9358	
Consol. Void Ratio		1.1995	1.0594	1.09	
Final	Water Content, %	43.55	37.92	37.76	
	Dry Density, pcf	77.311	83.136	83.313	
	Saturation, %	99.62	99.65	99.63	
	Void Ratio	1.1802	1.0275	1.0232	
Normal Stress, psf		507.71	998.1	1999.1	
Max. Shear Stress, psf		472.78	650.74	1201.8	
Ult. Shear Stress, psf		469.26	621.99	1188.5	
Time to Failure, min		84.003	62.001	74.003	
Disp. Rate, in/min		0.004	0.004	0.004	
Implied Specific Gravity		2.70	2.70	2.70	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	
Plasticity Index		---	---	---	

Project: Bear St. OC-Retrofit

Location: 12-ORA-405-7.8

Project No.: 12-0M7201

Boring No.: A-13-004

Sample Type: TUBE

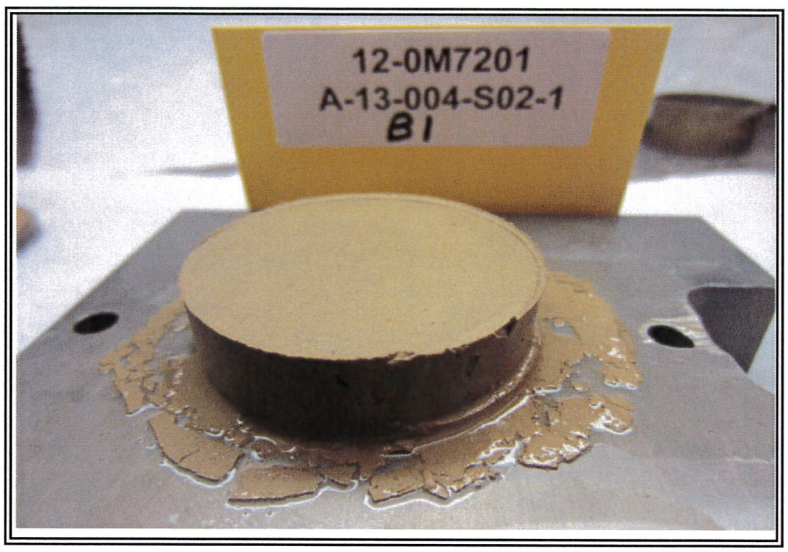
Description: Moist, brown, clay

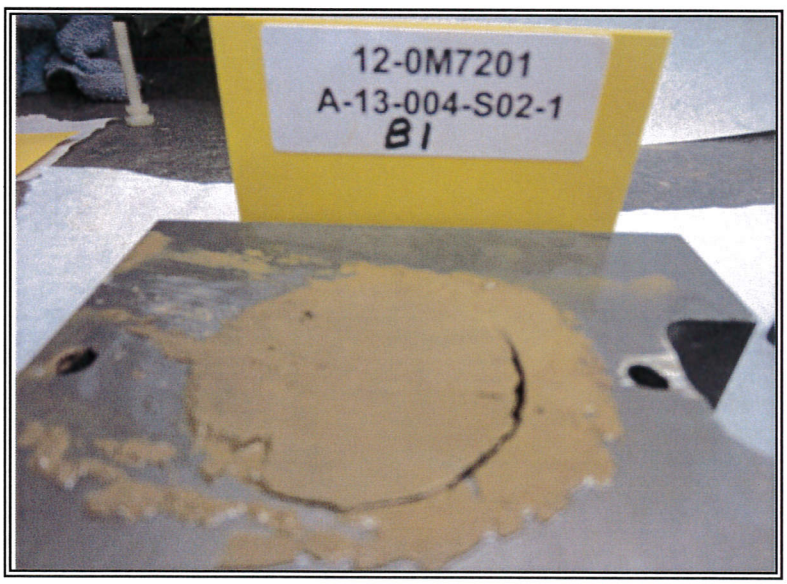
Remarks: ASTM D 3080. Sample description is not a soil classification.

Fri, 21-FEB-2014 17:18:27

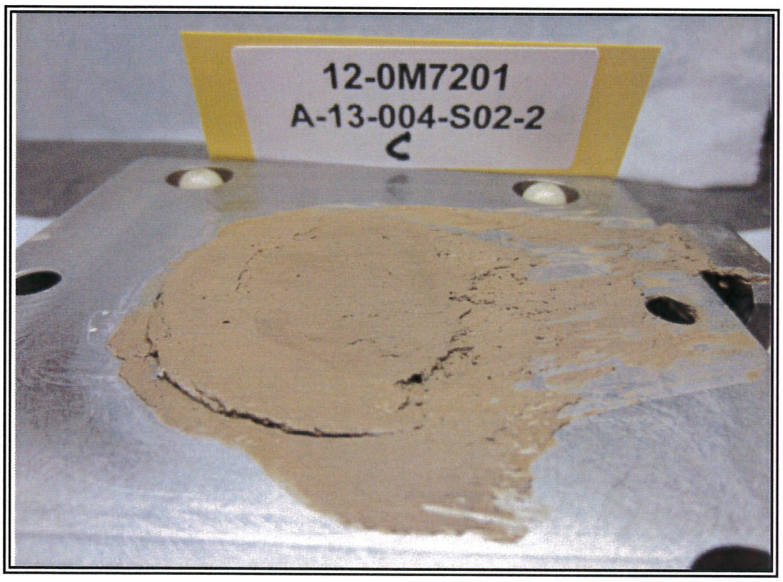
DIRECT SHEAR
JOB : 12-0M7201
SAMPLE : A-13-004-S02-2
Test Specimen A

DIRECT SHEAR
JOB : 12-0M7201
SAMPLE : A-13-004-S02-2
Test Specimen B





DIRECT SHEAR
JOB : 12-0M7201
SAMPLE : A-13-004-S02-2
Test Specimen C



Appendix III

Log of Test Boring

(LOTB)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
12	Ora	405			

REGISTERED CIVIL ENGINEER 3-26-14

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.

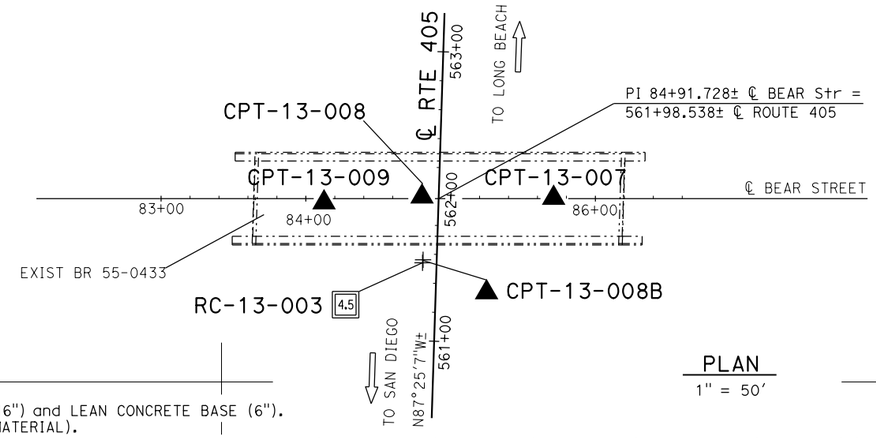
REGISTERED PROFESSIONAL ENGINEER Tatjana Halda No. C68293 Exp. 9-30-15 CIVIL STATE OF CALIFORNIA

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

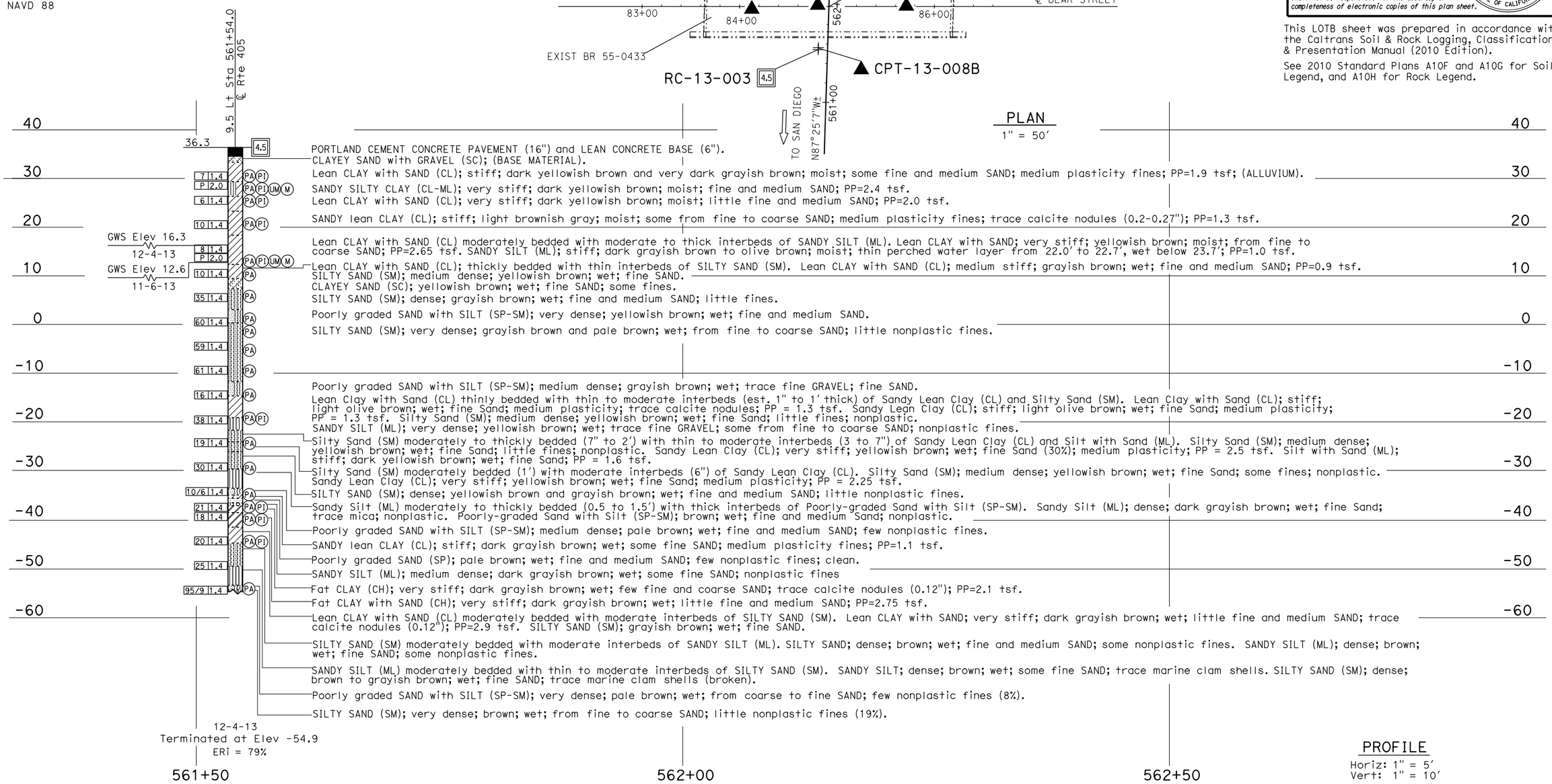
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

BENCH MARK

OCS BM CM-42-81 (2010): Elev 35.182
DESCRIBED BY OCS 2001 - FOUND 3¾" OCS ALUMINUM BENCHMARK DISK STAMPED "CM-42-81", SET IN THE SOUTH-EAST CORNER OF A 4 FT. BY 11 FT. CONCRETE CATCH BASIN. MONUMENT IS LOCATED ALONG THE WEST SIDEOF BEAR STREET, 794 FT. SOUTHERLY OF THE 405 SAND DIEGO FREEWAY, AND 42 FT. WESTERLY OF THE CENTERLINE OF BEAR STREET. MONUMENT IS SET LEVEL WITH THE SIDEWALK.
NAVD 88



PLAN
1" = 50'



PROFILE
Horiz: 1" = 5'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN DESIGN BRANCH X	BRIDGE NO. 55-0433 POST MILE 9.89	BEAR STREET OC RETROFIT LOG OF TEST BORINGS 1 OF 2
FUNCTIONAL SUPERVISOR NAME: S. Karimi	DRAWN BY: W. Tang 3/14 CHECKED BY: K. Barker	FIELD INVESTIGATION BY: T. Halda; J. Pratt			

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 12130000011 CONTRACT NO.: 12-0M7201

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 03-31-14 03-25-14 SHEET X OF X

FILE => bear-st-oc1of2.dgn

USERNAME => s128444 DATE PLOTTED => 26-MAR-2014 TIME PLOTTED => 11:18

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
12	Ora	405			

Tatjana Halda 3-26-14
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Tatjana Halda
No. C68293
Exp. 9-30-15
CIVIL
STATE OF CALIFORNIA

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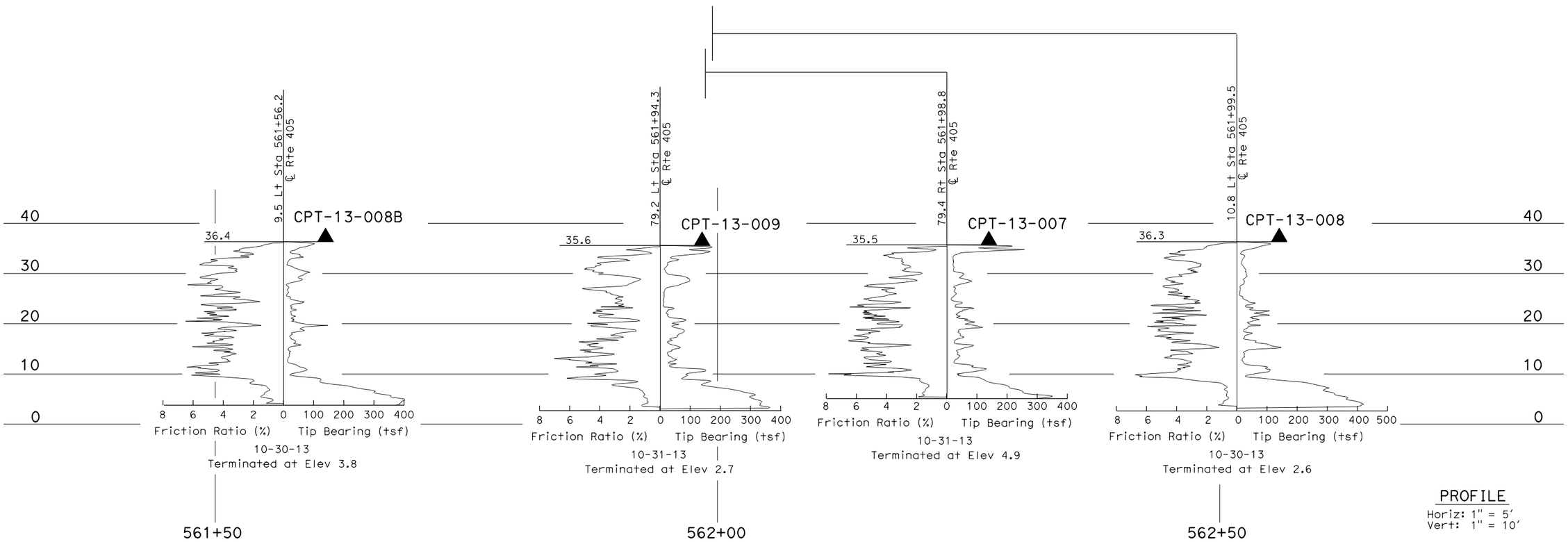
This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 2"



PROFILE
Horiz: 1" = 5'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN DESIGN BRANCH X	BRIDGE NO. 55-0433 POST MILE 9.89	BEAR STREET OC RETROFIT LOG OF TEST BORINGS 2 OF 2
FUNCTIONAL SUPERVISOR NAME: S. Karimi	DRAWN BY: W. Tang 3/14 CHECKED BY: K. Barker	FIELD INVESTIGATION BY: T. Halda; J. Pratt			

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 12130000011 CONTRACT NO.: 12-0M7201

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES			SHEET	OF
03-24-14	03-25-14		X	X

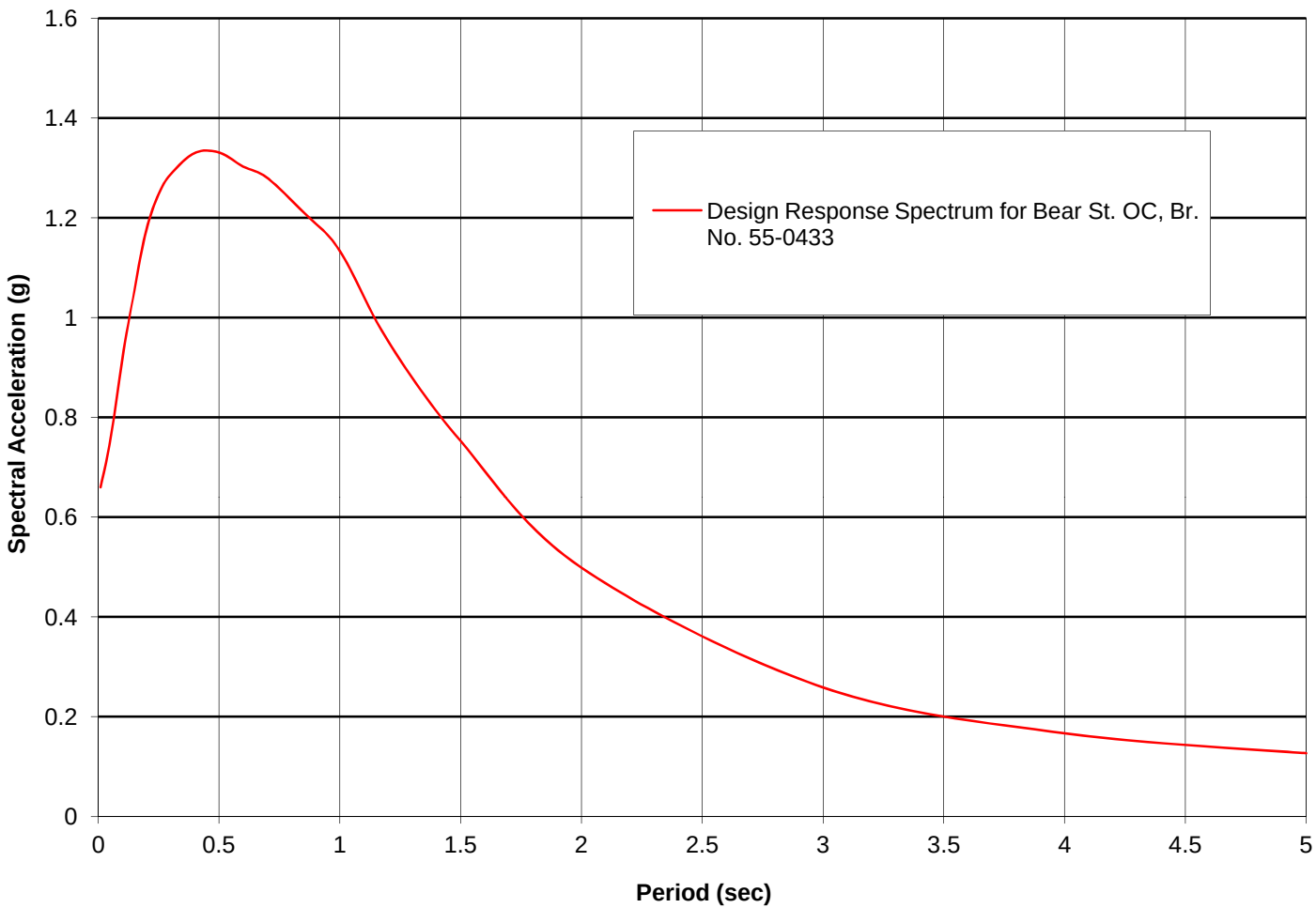
FILE => bear-st-oc2of2.dgn

USERNAME => s128444 DATE PLOTTED => 26-MAR-2014 TIME PLOTTED => 11:18

Appendix IV

Caltrans ARS Curve

ACCELERATION RESPONSE SPECTRUM (ARS)



SITE DATA (ARS Online Version 2.3.06)

Shear Wave Velocity, V_{S30}:	310 m/s
Latitude:	33.687425
Longitude:	-117.892184
Depth to Vs = 1.0 km/s:	N/A
Depth to Vs = 2.5 km/s:	N/A

DETERMINISTIC

San Joaquin Hills	
Fault ID:	376
Maximum Magnitude (MMax):	7
Fault Type:	Rev
Fault Dip:	23 Deg
Dip Direction:	W
Bottom of Rupture Plane:	12.50 km
Top of Rupture Plane(Ztor):	2.00 km
Rrup	2.08 km
Rjb:	0.00 km
Rx:	0.56 km
Fnorm:	0
Frev:	1

Period	SA(Base Spectrum)	Basin Factor	Near Fault Factor(Applied)	SA(Final Spectrum)
0.01	0.660	1.000	1.000	0.660
0.05	0.753	1.000	1.000	0.753
0.1	0.915	1.000	1.000	0.915
0.15	1.056	1.000	1.000	1.056
0.2	1.177	1.000	1.000	1.177
0.25	1.247	1.000	1.000	1.247
0.3	1.287	1.000	1.000	1.287
0.4	1.330	1.000	1.000	1.330
0.5	1.331	1.000	1.000	1.331
0.6	1.253	1.000	1.040	1.303
0.7	1.185	1.000	1.080	1.280
0.85	1.062	1.000	1.140	1.211

1	0.945	1.000	1.200	1.134
1.2	0.794	1.000	1.200	0.953
1.5	0.628	1.000	1.200	0.753
2	0.416	1.000	1.200	0.499
3	0.216	1.000	1.200	0.259
4	0.139	1.000	1.200	0.167
5	0.106	1.000	1.200	0.127

Newport Inglewood fault zone (S. Los Angeles Basin section-southern)	
Fault ID:	366
Maximum Magnitude (MMax):	7.2
Fault Type:	SS
Fault Dip:	90 Deg
Dip Direction:	V
Bottom of Rupture Plane:	15.00 km
Top of Rupture Plane(Ztor):	0.00 km
Rrup	5.43 km
Rjb:	5.43 km
Rx:	5.43 km
Fnorm:	0
Frev:	0

Period	**SA(Base Spectrum)**	**Basin Factor**	**Near Fault Factor(Applied)**	**SA(Final Spectrum)**
0.01	0.395	1.000	1.000	0.395
0.05	0.477	1.000	1.000	0.477
0.1	0.640	1.000	1.000	0.640
0.15	0.754	1.000	1.000	0.754
0.2	0.816	1.000	1.000	0.816
0.25	0.831	1.000	1.000	0.831
0.3	0.827	1.000	1.000	0.827
0.4	0.795	1.000	1.000	0.795
0.5	0.754	1.000	1.000	0.754
0.6	0.689	1.000	1.040	0.717
0.7	0.637	1.000	1.080	0.688
0.85	0.567	1.000	1.140	0.646
1	0.508	1.000	1.200	0.610

1.2	0.440	1.000	1.200	0.529
1.5	0.363	1.000	1.200	0.436
2	0.271	1.000	1.200	0.325
3	0.170	1.000	1.200	0.204
4	0.120	1.000	1.200	0.144
5	0.092	1.000	1.200	0.110

Newport-Inglewood (Offshore)	
Fault ID:	381
Maximum Magnitude (MMax):	6.9
Fault Type:	SS
Fault Dip:	90 Deg
Dip Direction:	V
Bottom of Rupture Plane:	10.00 km
Top of Rupture Plane(Ztor):	0.00 km
Rrup	10.90 km
Rjb:	10.90 km
Rx:	9.52 km
Fnorm:	0
Frev:	0

Period	**SA(Base Spectrum)**	**Basin Factor**	**Near Fault Factor(Applied)**	**SA(Final Spectrum)**
0.01	0.268	1.000	1.000	0.268
0.05	0.329	1.000	1.000	0.329
0.1	0.473	1.000	1.000	0.473
0.15	0.566	1.000	1.000	0.566
0.2	0.597	1.000	1.000	0.597
0.25	0.591	1.000	1.000	0.591
0.3	0.575	1.000	1.000	0.575
0.4	0.530	1.000	1.000	0.530
0.5	0.482	1.000	1.000	0.482
0.6	0.427	1.000	1.040	0.444
0.7	0.385	1.000	1.080	0.416
0.85	0.333	1.000	1.140	0.380
1	0.292	1.000	1.200	0.351
1.2	0.248	1.000	1.200	0.297
1.5	0.199	1.000	1.200	0.239

2	0.144	1.000	1.200	0.172
3	0.087	1.000	1.200	0.105
4	0.061	1.000	1.200	0.073
5	0.046	1.000	1.200	0.055

PROBABILISTIC

Probabilistic Model USGS Seismic Hazard Map(2008) 975 Year Return Period				
Period	**SA(Base Spectrum)**	**Basin Factor**	**Near Fault Factor(Applied)**	**SA(Final Spectrum)**
0.01	0.502	1.000	1.000	0.502
0.05	0.751	1.000	1.000	0.751
0.1	0.894	1.000	1.000	0.894
0.15	1.006	1.000	1.000	1.006
0.2	1.095	1.000	1.000	1.095
0.25	1.082	1.000	1.000	1.082
0.3	1.072	1.000	1.000	1.072
0.4	0.979	1.000	1.000	0.979
0.5	0.912	1.000	1.000	0.912
0.6	0.824	1.000	1.040	0.857
0.7	0.757	1.000	1.080	0.817
0.85	0.659	1.000	1.140	0.751
1	0.578	1.000	1.200	0.694
1.2	0.486	1.000	1.200	0.584
1.5	0.394	1.000	1.200	0.472
2	0.300	1.000	1.200	0.360
3	0.189	1.000	1.200	0.227
4	0.135	1.000	1.200	0.161
5	0.110	1.000	1.200	0.132

MINIMUM DETERMINISTIC SPECTRUM

Period	SA
0.01	0.227
0.05	0.280

0.1	0.412
0.15	0.494
0.2	0.516
0.25	0.505
0.3	0.487
0.4	0.441
0.5	0.389
0.6	0.337
0.7	0.297
0.85	0.250
1	0.215
1.2	0.178
1.5	0.139
2	0.096
3	0.056
4	0.038
5	0.029

Envelope Data

Period	SA
0.01	0.660
0.05	0.753
0.1	0.915
0.15	1.056
0.2	1.177
0.25	1.247
0.3	1.287
0.4	1.330
0.5	1.331
0.6	1.303
0.7	1.280
0.85	1.211
1	1.134
1.2	0.953
1.5	0.753
2	0.499
3	0.259

4	0.167
5	0.132

Appendix V

p-y, t-z, Q-z Curves

Project no Phase: 1213000001, Bridge no: 55-0433
Bear Street OC, at Bents

Bear Street OC.

p-y Curves for the 12 to 8 inch dia Raymond Piles

Layer 1

Depth = 0 to 36 inch	
y (in)	p (lbs/in)
0	0
0.000	47.498
0.000	71.026
0.000	84.464
0.001	126.304
0.002	150.201
0.012	224.603
0.024	267.099
0.059	335.860
0.118	399.407
0.177	442.016
0.236	474.978
0.589	597.253
1.178	710.257
2.356	844.643
3.000	844.643

Layer 2

Depth = 36 to 72 inch	
y (in)	p (lbs/in)
0	0
0.016	288.567
0.032	439.818
0.047	562.777
0.063	670.346
0.079	767.750
0.095	857.753
0.111	942.032
0.126	1021.704
0.142	1097.553
0.158	1170.163
0.174	1239.975
0.190	1307.340
0.308	1804.129
0.427	2300.918
3.000	2300.918

Layer 3

Depth = 72 to 156 inch	
y (in)	p (lbs/in)
0	0
0.000	75.038
0.000	112.208
0.000	133.439
0.001	199.538
0.002	237.292
0.011	354.834
0.021	421.971
0.053	530.601
0.107	630.994
0.160	698.310
0.214	750.382
0.534	943.556
1.069	1122.084
2.138	1334.390
3.000	1334.390

Layer 4

Depth = 156 to 180 inch	
y (in)	p (lbs/in)
0	0
0.014	420.853
0.028	841.707
0.042	1262.560
0.056	1666.052
0.070	1908.138
0.084	2131.827
0.098	2341.292
0.112	2539.304
0.126	2727.818
0.140	2908.278
0.154	3081.788
0.168	3249.213
0.273	4483.914
0.378	5718.615
3.000	5718.615

Note: Soil liquefaction potential/hazard is low at this site and thus not necessary to consider in the design.

Project no Phase: 1213000001, Bridge no: 55-0433
Bear Street OC, at Bents

1/17/2014 By: M Islam

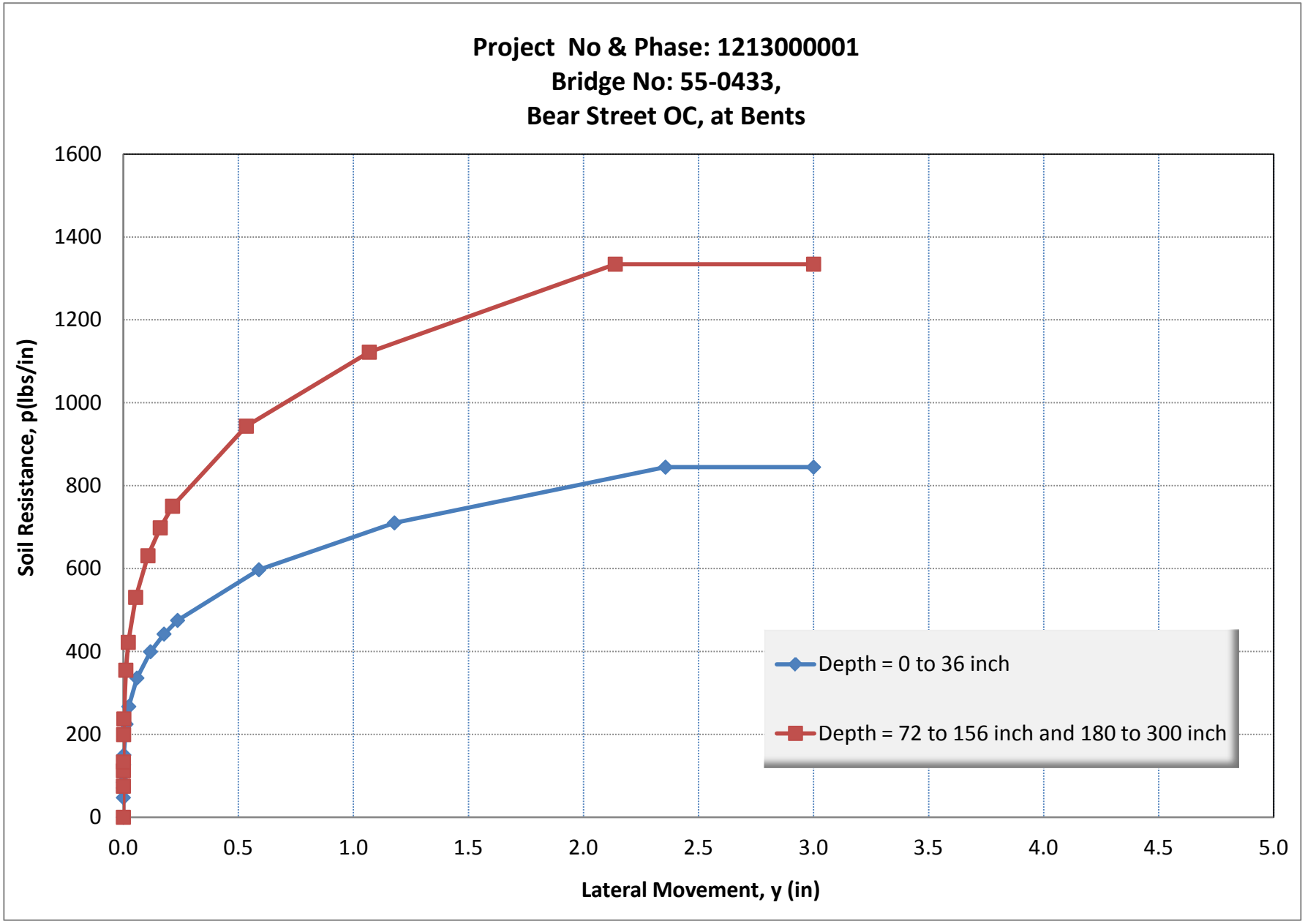
Layer 5

Depth = 180 to 300 inch	
y (in)	p (lbs/in)
0	0
0.000	64.872
0.000	97.006
0.000	115.360
0.001	172.504
0.002	205.143
0.009	306.760
0.018	364.801
0.046	458.713
0.092	545.504
0.139	603.700
0.185	648.718
0.462	815.719
0.924	970.059
1.848	1153.601
3.000	1153.601

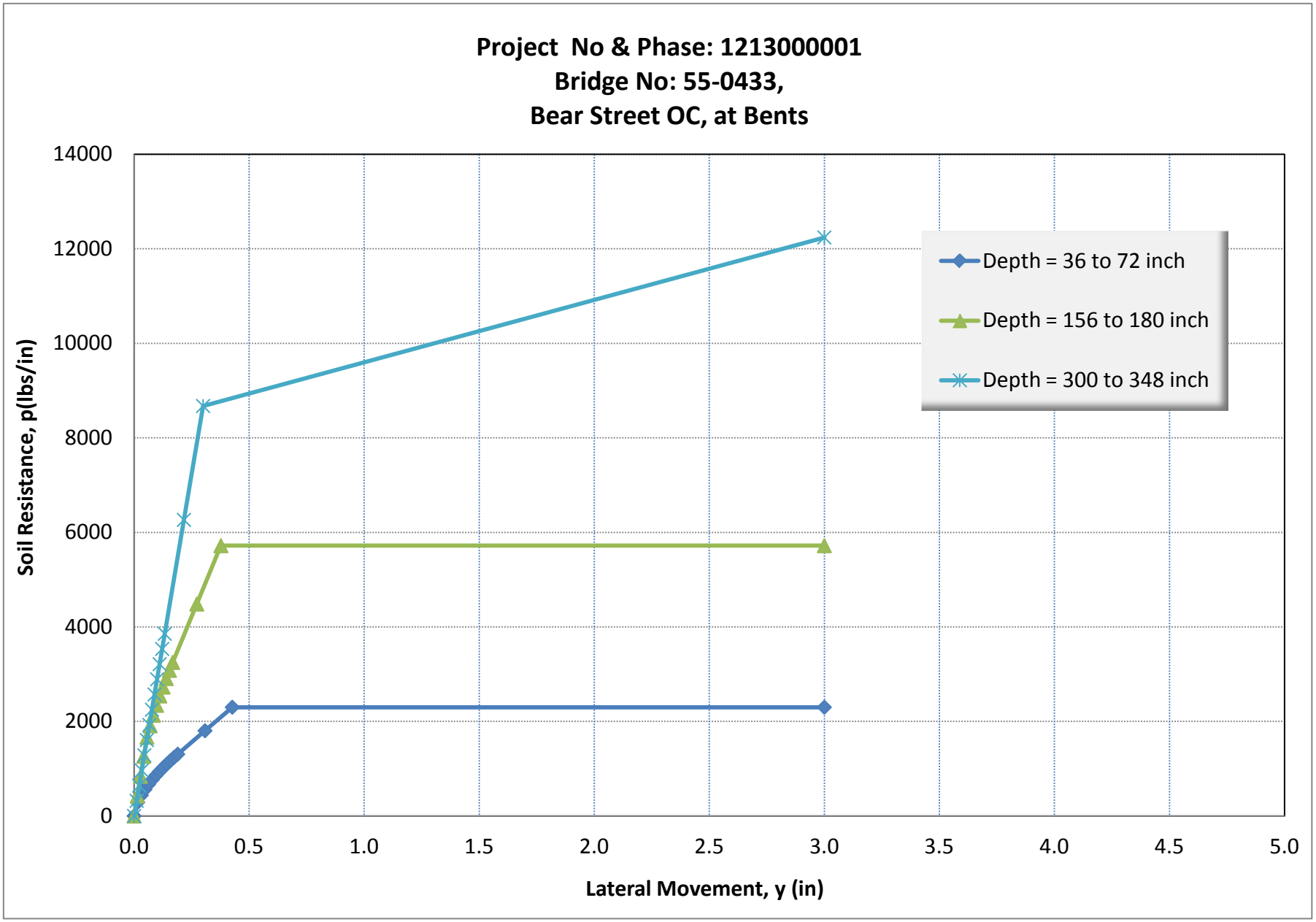
Layer 6

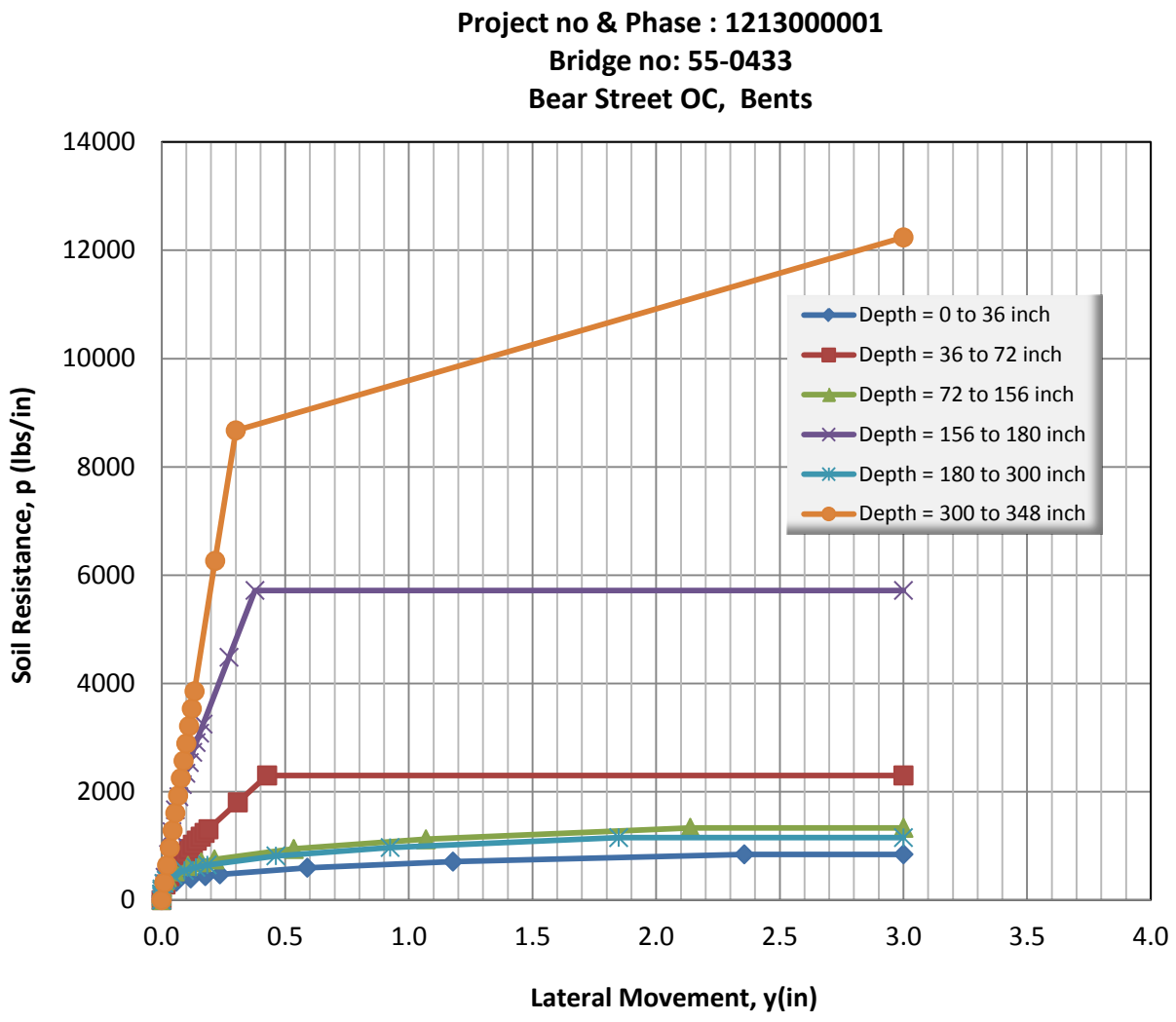
Depth = 300 to 348 inch	
y (in)	p (lbs/in)
0	0
0.011	321.240
0.022	642.480
0.033	963.721
0.044	1284.961
0.056	1606.201
0.067	1927.441
0.078	2248.682
0.089	2569.922
0.100	2891.162
0.111	3212.402
0.122	3533.643
0.133	3854.883
0.217	6264.184
0.300	8673.486
3.000	12238.152

Project no Phase: 1213000001, Bridge no: 55-0433
Bear Street OC, at Bents



Project no Phase: 1213000001, Bridge no: 55-0433
Bear Street OC, at Bents




Project no & Phase : 1213000001
Bridge no: 55-0433
Bear Street OC, Bents
Soil Resistance, p (lbs/in)
14000
12000
10000
8000
6000
4000
2000
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Lateral Movement, y(in)
Depth = 0 to 36 inch
Depth = 36 to 72 inch
Depth = 72 to 156 inch
Depth = 156 to 180 inch
Depth = 180 to 300 inch
Depth = 300 to 348 inch

Project: **Bear Street OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:41 AM

Data: t-z Curves

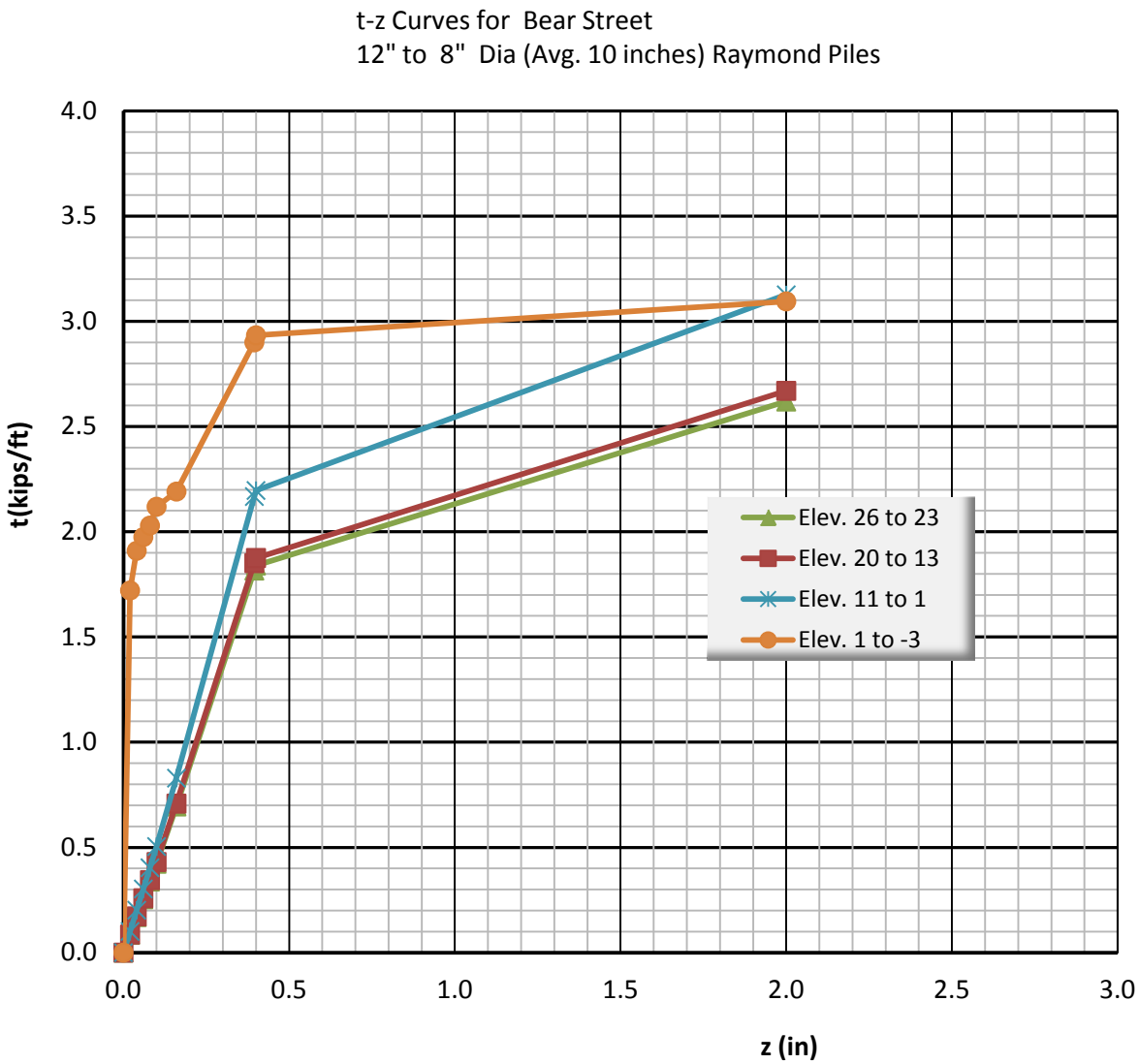
Br. Name:	Bear Street OC Seismic Retrofit	Elevatiion (ft)		Pile Type:	12 to 8 in Raymond Piles
Br. No. =	55-0433	OG =	30.0	Avg. Pile Dia =	10 inches
		Pile Cut-Off=	26.0		
Support(s):	All Bents	GW =	11.0		

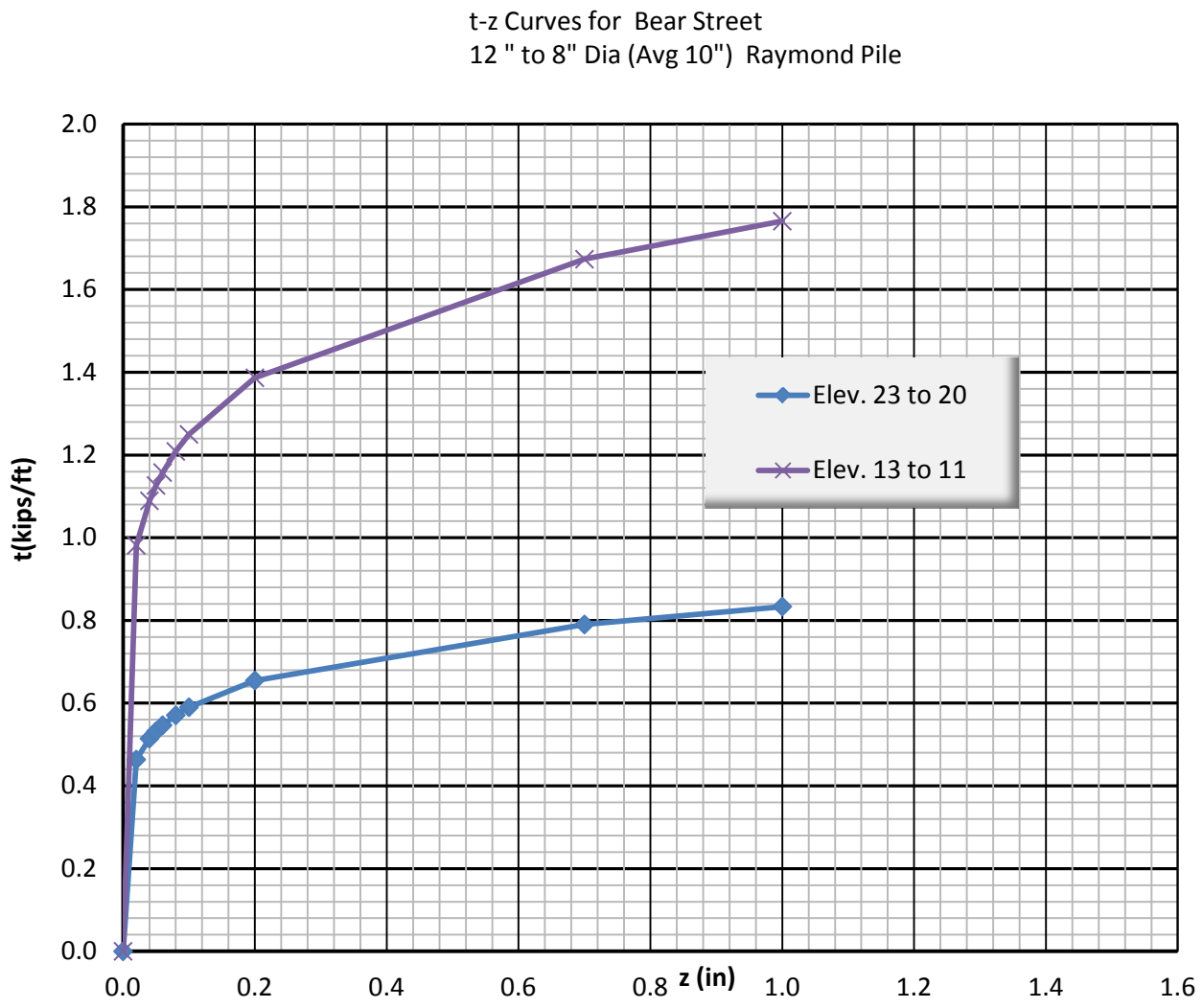
Note: All elevations are in feet.

Elev. 26 to 23		Elev. 23 to 20		Elev. 20 to 13	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.020	0.084	0.020	0.464	0.020	0.086
0.040	0.169	0.040	0.514	0.040	0.172
0.060	0.253	0.050	0.532	0.060	0.258
0.080	0.338	0.060	0.547	0.080	0.344
0.100	0.422	0.080	0.571	0.100	0.431
0.160	0.695	0.100	0.590	0.160	0.708
0.395	1.816	0.200	0.655	0.395	1.851
0.400	1.840	0.700	0.790	0.400	1.875
2.000	2.619	1.000	0.834	2.000	2.669

Elev. 13 to 11		Elev. 11 to 1		Elev. 1 to -3	
z (in)	t(kips/ft)	z (in)	t(kips/ft)	z (in)	t(kips/ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.020	0.982	0.020	0.101	0.020	1.721
0.040	1.089	0.040	0.202	0.040	1.910
0.050	1.126	0.060	0.303	0.060	1.975
0.060	1.158	0.080	0.403	0.080	2.029
0.080	1.209	0.100	0.504	0.100	2.119
0.100	1.250	0.160	0.829	0.160	2.191
0.200	1.387	0.395	2.167	0.395	2.900
0.700	1.673	0.400	2.196	0.400	2.934
1.000	1.765	2.000	3.126	2.000	3.095

Note: Soil liquefaction potential/hazard is low at this site and thus not necessary to consider in the design.


t-z Curves for Bear Street
12" to 8" Dia (Avg. 10 inches) Raymond Piles
t(kips/ft)
z (in)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Elev. 26 to 23
Elev. 20 to 13
Elev. 11 to 1
Elev. 1 to -3


t-z Curves for Bear Street
12 " to 8" Dia (Avg 10") Raymond Pile
t(kips/ft)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
z (in)
1.0
1.2
1.4
1.6
Elev. 23 to 20
Elev. 13 to 11

Project: **Bear Street OC Seismic Retrofit**

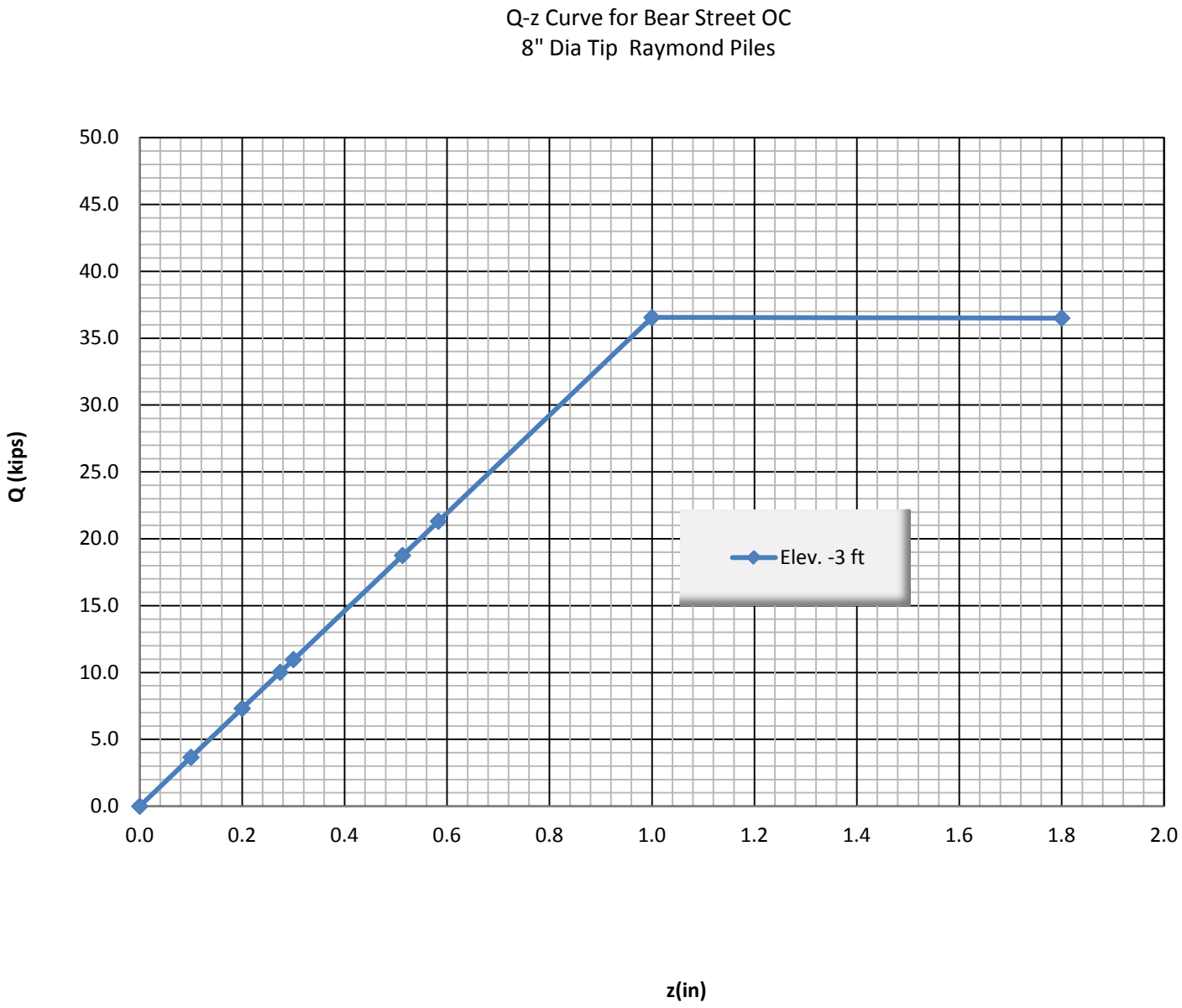
Project Id: 121300001 Date: 3/26/20148:41 AM

Data: Q-z Curves

Br. Name: Bear Street OC Seismic Retrofit	Elevatiion (ft)	Pile Type:	12" to 8 in dia Raymond Piles
Br. No. = 55-0433	OG = 30.0	Pile Tip Dia =	8 inches
	Pile Cut-Off= 26.0		
Support(s): All Bents	GW = 11.0		

Note: All elevations are in feet.

Elev. -3	
z (in)	Q (kips)
0.00	0.000
0.10	3.655
0.20	7.310
0.27	10.015
0.30	10.966
0.51	18.751
0.58	21.310
1.00	36.552
1.80	36.500


Q-z Curve for Bear Street OC
8" Dia Tip Raymond Piles
Q (kips)
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Elev. -3 ft
z(in)

State of California **Business, Transportation and Housing Agency**

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: MS. TRACI MENARD
Office of Bridge Design South 1, Chief
Bridge Design Branch 15
Division of Engineering Services

Attn: Mr. Jose Higareda

Date: March 25, 2014
File: 12-ORA-405-PM 7.8
EA# 12-0M721
MacArthur Boulevard OC Retrofit
Bridge No. 55-0440L

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1
Branch D

Subject: Foundation Report for MacArthur Boulevard Overcrossing (OC) Retrofit

INTRODUCTION

In a memo dated July 20, 2013, the Office of Bridge Design South 1 (OBDS1)-Branch 15 requested from the Office of Geotechnical Design South 1 (OGDS1) geologic, geotechnical, seismic, and foundation retrofit recommendations for the proposed structural retrofit of MacArthur Boulevard Overcrossing (OC), Bridge No. 55-0440L.

OGDS1 geologic/foundation recommendations are based on the review of the following records and documents as well as results of the recent OGDS1 geotechnical exploration program implemented for this project**:**

- As-Built Geology/Foundation Report for MacArthur Blvd OC, dated January 19, 1965.
- As-Built General and Foundation Plan for MacArthur Blvd OC, dated October 2, 1967.
- As-Built Log of Test Borings (LOTB) for MacArthur Blvd OC, dated October 2, 1967.
- As-Built Log of Test Borings (LOTB) for MacArthur Blvd Right, dated March 19, 1998.
- FPS&E MacArthur Blvd. OC Retrofit Plans, plotted March 17, 2014.

SCOPE OF WORK

Tasks completed by the OGDS1, Brach D include the following:

1. Review of pertinent information from previous geology/geotechnical reports and As-Built plans in the project area.
2. Drilling, logging, and sampling of one rotary wash borings, one hollow stem auger boring, and soundings from four electronic cone penetrometer tests (CPT's) at the subject bridge site to characterize the subsurface conditions.

3. Laboratory testing of selected soil samples for mechanical analysis, corrosivity, direct shear, unit weight, Atterberg Limits, and moisture content.
4. Performing geotechnical analysis.
5. Preparing this report.

PROJECT DESCRIPTION

The existing MacArthur Blvd OC, Br. No. 55-0440L, is a continuous four-span structure consisting of reinforced concrete box girder (8 cell), crossing over northbound (NB) and southbound (SB) lanes of Rte 405 Freeway traffic in Orange County (PM 7.8). The original MacArthur Blvd. OC (Left Structure) was constructed in 1968, having a total span length of 333 foot, measured along Center Line MacArthur Blvd. Left Structure. The site map is attached as Appendix I.

As built drawings and bridge inspection reports indicate that the bridge contains open end reinforced concrete (RC) diaphragm type abutments and three bents, each consisting of 3 flared columns. The drawings indicate that the abutments and the bents are supported on Raymond Step-Tapered CIP driven piles (driven steel shell filled with concrete), designed for loads of 45 Tons.

Based on recommendations by the Caltrans Seismic Advisory Board, the Office of Earthquake Engineering (OEE) performed reviews of state-owned bridges for potential seismic vulnerabilities and provided the summary of results in a Memorandum dated July 16, 2010. Based on the OEE review, bridges built before 1971 with flared columns were evaluated for vulnerability to shear damage during earthquakes. The primary concern was for the portion of the columns below the flare that had not been designed for the larger plastic shear force caused by the reduced effective column length. MacArthur Blvd OC (Left Structure) was among bridges in this study found vulnerable to the flared column shear damage during earthquakes. The typical retrofit to address this vulnerability includes installation of column casing below the flare at bents/piers, possibly an infill wall, and/or the footing retrofit/strengthening.

OGDS1 Branch D received a request from OBDS1 to provide the bridge site geology/ geotechnical information, seismic recommendations including liquefaction potential due to seismic event and site settlements, ARS curve and PGA for the bridge site, p-y, t-z, and q-z curves, and foundation retrofit recommendations.

Based on the FPS&E project plans for MacArthur Blvd. OC Retrofit provided by OBDS1 (3/17/2014), OGDS1 understands that the proposed project will consist of column casing retrofit and footing strengthening at Bents 2, 3 and 4.

The elevations provided in proposed bridge bents retrofit project plans and recent Log of Test Boring (LOTB) are based on NAVD88 datum. As-Built elevations are based on NGVD29 datum. The benches on NAVD88 datum are 2.4' higher than the NGVD29 datum (datum shift information provided to OGDS1 by District 12 Survey on March 14, 2014).

FIELD INVESTIGATION AND TESTING PROGRAM

The site-specific field exploration was performed between October 29, 2013 and December 5, 2013. The filed investigation included drilling one rotary-wash boring (4.5 inch outer diameter), one hollow-stem auger boring (6 inch outer diameter), and advancing four cone penetration test (CPT) soundings. Standard Penetration Tests (SPT's) and relatively undisturbed sampling (with a 2 inch inner diameter split-barrel sampler) were performed at the borings. Blow counts (SPT N values) were continuously recorded at 5 foot intervals during drilling. SPT's were performed in accordance with ASTM Test Method D1586-84 using a standard 1.4 inch I.D. sampler with a 140 lb. hammer dropped 30 inches. Undisturbed tube soil samples were also obtained using a 2 inch I.D. modified California Split Spoon Sampler with 4 inch long brass liners. The lined samples were all sealed in the field. This modified sampler was used to collect fine-grained soils such as silts and clays that were identified during the CPT investigation. Caltrans operated drill rigs model CME 75 was used at boring locations. The boring was drilled by the Caltrans Office of Drilling Services and logged by personnel from our office. The Geotechnical findings obtained from this exploration were utilized to estimate geotechnical capacity of the existing foundation.

At the completion of the boring, the hole was backfilled with grout and Bentonite chips, and patched with AC/Quick set concrete patch at the surface.

The Office of District 12 Survey provided location and elevation of the borings and CPT's. Boring/CPT information, including exploration number, stationing, offset, ground surface elevation, boring depth, and date drilled are summarized in Table 1 below:

Table 1 – Summary of Boring/CPT Information

Boring/CPT Exploration No.	Station Rte 405 CL	Offset (ft)	Surface Elev. (ft)	Drilled Depth (ft)	Bottom Elev. (ft)	Date Drilled
CPT-13-010	451+93.75	115.4Lt	37.7	40.75	-3.05	10-30-13
CPT-13-011	451+95.27	10.9Rt	38.6	36.22	2.38	10-29-13
CPT-13-011B	452+35.36	12.5Rt	38.7	54.03	-15.33	10-30-13
CPT-13-012	451+78.75	122.7Rt	37.48	57.71	-20.23	10-29-13
R-13-004	452+37.86	8.1Rt	38.65	101.5	-62.85	11-14-13
A-13-005	452+67.11	122.7Rt	36.95	26.5	10.45	12-03-13

LABORATORY TESTING PROGRAM

Selected soil samples from the two borings were sent to the Department's Transportation Laboratory in Sacramento and District 8 Materials Laboratory (Southern Regional Lab) for testing. All laboratory tests were performed in accordance with ASTM/AASHTO standard procedures and California Test Methods. The summarized laboratory tests data are shown in Table 2 below.

A summary of the geotechnical laboratory results is presented in Appendix II: Laboratory Data.

Table 2 – Laboratory Test Methods

Test	Standard
Particle Size Analysis	ASTM D422
Plasticity Index/Liquid Limit	AASHTO T 90&89
Unit Weight	ASTM D4767
Moisture Content	ASTM D2216
Corrosivity Testing	CTM 643, 422, 417
Direct Shear	ASTM D 3080
Triaxial CU	ASTM D 4767

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Regional Geology

The site is within the Los Angeles Basin, which is between the Peninsular Ranges and Transverse Ranges geomorphic provinces. The Los Angeles Basin is an alluvium-filled basin that is up to several miles thick at its deepest point. The site is north of Newport Harbor, between the Santa Ana River and Sand Diego Creek watersheds. The topography of the area is relatively level.

Site Geology

The site is located in the central Los Angeles Basin, which is underlain by alluvium derived from the San Gabriel and Santa Ana Rivers and their tributaries, such as Coyote Creek**.** The alluvium is generally composed of interlayered, very thickly bedded, medium dense to dense sands with varying amounts of silt.

Subsurface Conditions

Soil encountered at Borings R-13-004 and A-13-005 consist of mostly medium stiff to stiff lean clay/sandy lean clay and silty clay inter-layered with medium dense to dense clayey sand/silty sand/and poorly graded sand down to the maximum depth drilled, 101.5 ft. Only in the upper 5 ft loose clayey sand was found.

Subsurface conditions encountered during the recent drilling are presented on the Log of Test Borings (LOTB), attached to this report as Appendix III.

Groundwater

Historical Data

Groundwater was encountered at elevations 29.1 feet in borings B-2, and at elevation 28.6 feet in boring B-1 during the initial field investigation in 1964 at this bridge site. Previously conducted investigations for the MacArthur Blvd. Overcrossing (OC) Left Structure, encountered ground water between elevations of 29.1' and 28.6' above mean sea level (MSL) during the initial field investigation in 1964, and elevations of 13', 16.5', and 15' MSL in 1992 during field investigation for MacArthur Blvd. OC Right Structure. The closest Department of Water Resources ground water well data shows a historic ground water elevation at 27.0 ft above sea level in February of 1981 at well 336870N1178340W001, located approximately 1.3 miles east of the site. Monitoring wells at nearby gas station show a maximum ground water elevation of 26.49 ft in August of 2011 according to the GeoTracker website.

Current Investigation

During the recent field exploration ground water was encountered at about 17.5 ft depth (elevation 19.4 ft) in auger boring A-13-005. Ground water was estimated from the moisture of soil samples in mud rotary Boring R-13-004, and was encountered at about 22 to 23 ft depth (elevation 15.7 ft). For this project foundation retrofit analysis and recommendations, ground water elevation at 19.4 ft was used. The water level may vary with the seasonal precipitation.

CORROSION EVALUATION

The soil samples corrosion test results are presented in the Table 3 below. Soil sample at depths 11.5' to 15' tested with minimum resistivity less than 1000 ohm-cm. The practice is to retest such sample in Sacramento Laboratory for sulfate and chloride content. The retest of the soil sample from the same depths showed ***"the site is not corrosive to foundation elements".***

Table 3 - Corrosion Test Summary

Exploration No.	Depth (ft)	PH	Minimum Resistivity (ohm – cm)	Sulfate Content (PPM)	Chloride Content (PPM)
R-13-004	11.5-15.0	7.80	**398**	***Retest Sac Lab***	***Retest Sac Lab***
R-13-004	11.5-15.0	9.35	**1150**	**94**	**39**
R-13-004	67.0-68.5	7.93	1126	N/A	N/A
R-13-004	92.0-94.0	7.72	1138	N/A	N/A
Corrosive Guidelines		**≤5.5**	<1000	**≥2000**	**≥500**

Note: *Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist. Chloride concentration is greater than or equal to 500 ppm, sulphate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less. It is the practice of Caltrans Corrosion Technology Section (with the exception of MSE Walls) if the minimum resistivity of the sample is greater than 1000 ohm-cm and the pH is greater than 5.5, the sample is considered to be noncorrosive.*

SEISMIC RECOMMENDATIONS

The seismicity at the site was evaluated using Version 2.3.06 of the Caltrans ARS Online tool. The seismicity for the project was measured from the center of the MacArthur Blvd. Overcrossing. A V_{s30} of 250 m/s was used based on correlations with CPT data from the current investigation, as well as SPT blow counts from the current and previous investigations. The computations performed using Caltrans ARS Online tool indicated that the site PGA for the project limits is 0.60g. The ARS curve is attached as Appendix IV.

The controlling faults are the USGS 5% in 50 years probabilistic data, the San Joaquin Hills, Newport-Inglewood (S. Los Angeles Basin section-southern), and Newport-Inglewood (Offshore) faults. The San Joaquin Hills Fault is Fault ID 376 in the Caltrans ARS On-line database. It is a reverse fault dipping 23° to the west with a M_{max} of 7.0. The rupture distance (R_{rup}) is approximately 2.2 km (1.4 mi) from the site. The Newport-Inglewood (S. Los Angeles Basin section-southern) Fault is Fault ID 366 in the Caltrans ARS On-line database. It is a vertical strike-slip fault with a M_{max} of 7.2. The rupture distance (R_{rup}) is approximately 7.0 km (4.4 mi) from the site. The Newport-Inglewood (Offshore) Fault is Fault ID 381 in the Caltrans ARS On-line database. It is a vertical strike-slip fault with a M_{max} of 6.9. The rupture distance (R_{rup}) is approximately 11.5 km (7.2 mi) from the site.

The project site is not located within any Alquist-Priolo Earthquake Fault Zones as established by the California Geological Survey (CGS, 1997) and surface rupture potential is considered to be low.

Liquefaction

The potential for liquefaction is considered low based on recent geotechnical investigation and review of As-Built records at the subject site. Soils encountered below ground water table (elevation 19.5 ft) were mostly stiff sandy lean clay/silty clay, inter-layered with dense silty sand/poorly graded sands and silts. As-Built driven concrete pile tips have bearing in dense sandy layer. Soil settlements estimate at bent locations due to seismic event for this site are up to 2 inch. The site soil liquefaction potential and settlement estimates were based on CPT records analysis using GeoLogismiki software CLiq v.1.7, Cone Penetration Test based soil liquefaction assessment software, prepared in collaboration with Gregg Drilling Inc. and Prof. Peter Robertson.

AS-BUILT INFORMATION

The existing structure is a continuous 4-span bridge constructed in 1968. The existing foundation is comprised Raymond Step-Taper (CIP) driven piles (steel shall field with concrete) to specified bearing of 45 tons at all support locations. Based on the As-Built plans, the Average Pile Tip Elevation is lower than Specified Pile Tip Elevation for all supports. OGDS1 is at opinion that existing Raymond Step Tapered piles were driven with tip elevations lower than specified tip elevations to provide required ultimate geotechnical resistance (axial bearing) and support 45 ton design load.

The summary of As-Built pile data, pile type, design load, bottom of footing elevation, specified tip elevations, and average tip elevations are presented in Table 3 below.

Table 3 – As-Built Foundation Data for MacArthur Blvd. OC, Br. No. 55-0440L

Support Location	Pile Type/ Dimension (in)	Design Load (kips)	Bottom of Footing Elevation (ft)	Specified Tip Elevation (ft)	Average Tip Elevation (ft)
Abutment 1	Raymond Step-Taper CIP Class I Tip 8”, Top 15”	90	Varies (+48.5)	-5	-16.0
Bent 2	Raymond Step-Taper CIP Class II Tip 8”, Top 12”	90	+30	-5	-5.8
Bent 3	Raymond Step-Taper CIP Class II Tip 8”, Top 12”	90	+30	-5	-24.3
Bent 4	Raymond Step-Taper CIP Class II Tip 8”, Top 12”	90	+30	-5	-24.7
Abutment 5	Raymond Step-Taper CIP Class I Tip 8”, Top 15”	90	Varies (47.4)	-5	-22.9

The As-Built elevations are based on NGVD29 datum. The benches on NAVD88 datum are 2.4’ higher than the NGVD29 datum (datum shift information provided to OGDS1 by District 12 Survey).

FOUNDATION RECOMMENDATIONS

As-Built Pile Axial Geotechnical Capacity

Geotechnical capacities of the existing piles were evaluated by OGDS1 based on the 1967 As-Built Plans/LOTB and soil data obtained from the recent geotechnical exploration (October to December, 2013). Pile original design loading, pile cut-off elevation, and average pile tip elevations are obtained from the 1967 As-Built Plans/LOTB.

Raymond Step-Taper (CIP) piles (driven steel shall filled with concrete) geotechnical axial capacities were calculated using the APILE plus Version 4.0 (Ensoft Inc.) computer program for analysis of the axial capacity of driven piles. Pile Data Table 4 for Bens 2, 3, and 4 is shown below.

Table 4- As-Built (1967) Pile Soil Resistance (Bents) for MacArthur Blvd OC, Br. No. 55-0440L

Support Location/ Type & Size	Design Loading	Ultimate Soil Resistance		Elevations Based On NGVD 29 Datum (1967 As-Built Contract Plans)		
	Compression (kips)	Compression Average (kips)	Tension (kips)	Approx. Exist. Grade Elevation (ft)	Pile Cut-Off Elevation (ft)	Average Pile Tip Elevation (ft)
Bent 2 Raymond Step Taper Tip 8" Top 12"	90	95	N/A	37.7+-	+30.25	-5.8
Bent 3 Raymond Step Taper Tip 8" Top 12"	90	180	N/A	38.6+-	+30.25	-24.3
Bent 4 Raymond Step Taper Tip 8" Top 12"	90	180	N/A	375+-	+30.25	-24.7

Axial resistance to compression noted in the table above is based on combined skin friction and end bearing at the supports within foundation soils.

Based on the review of As-Built soil data and recent geotechnical explorations, OGDS1 performed calculations and provided values for the p-y, t-z, and q-z curves/data for the bridge site to OBDS1 (by Dr. Mohammed Islam). P-y, t-z, and q-z curves and data are attached as Appendix V.

OGDS1 provided geotechnical (retrofit) recommendations for Bents 2, 3, and 4 include descriptions of geotechnical exploration, preparation of LOTB, analysis of site soil liquefaction potential, seismic data (ARS design curve), and analysis/calculation for existing piles geotechnical axial capacity. Based on the results of analysis there is low liquefaction potential at the project site (bents). OGDS1 in discussion with OBDS1 agreed that deep foundation retrofit won't be necessary at the bents.

For the Bent 2, 3, and 4 retrofit, column casing retrofit and footing retrofit were proposed by OBDS1, as shown in FPS&E project plans, dated 03/17/14.

Any questions regarding the above recommendations should be directed to Tatjana Halda at (213) 620-2347, Kristopher Barker at (562) 665-0048, or Shiva Karimi at (213) 620-2146, of the Office of Geotechnical Design-South 1, Branch D.

Report by Date: 3/25/14

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Report by Date: 3/25/14

Kristopher Barker

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8-31-15
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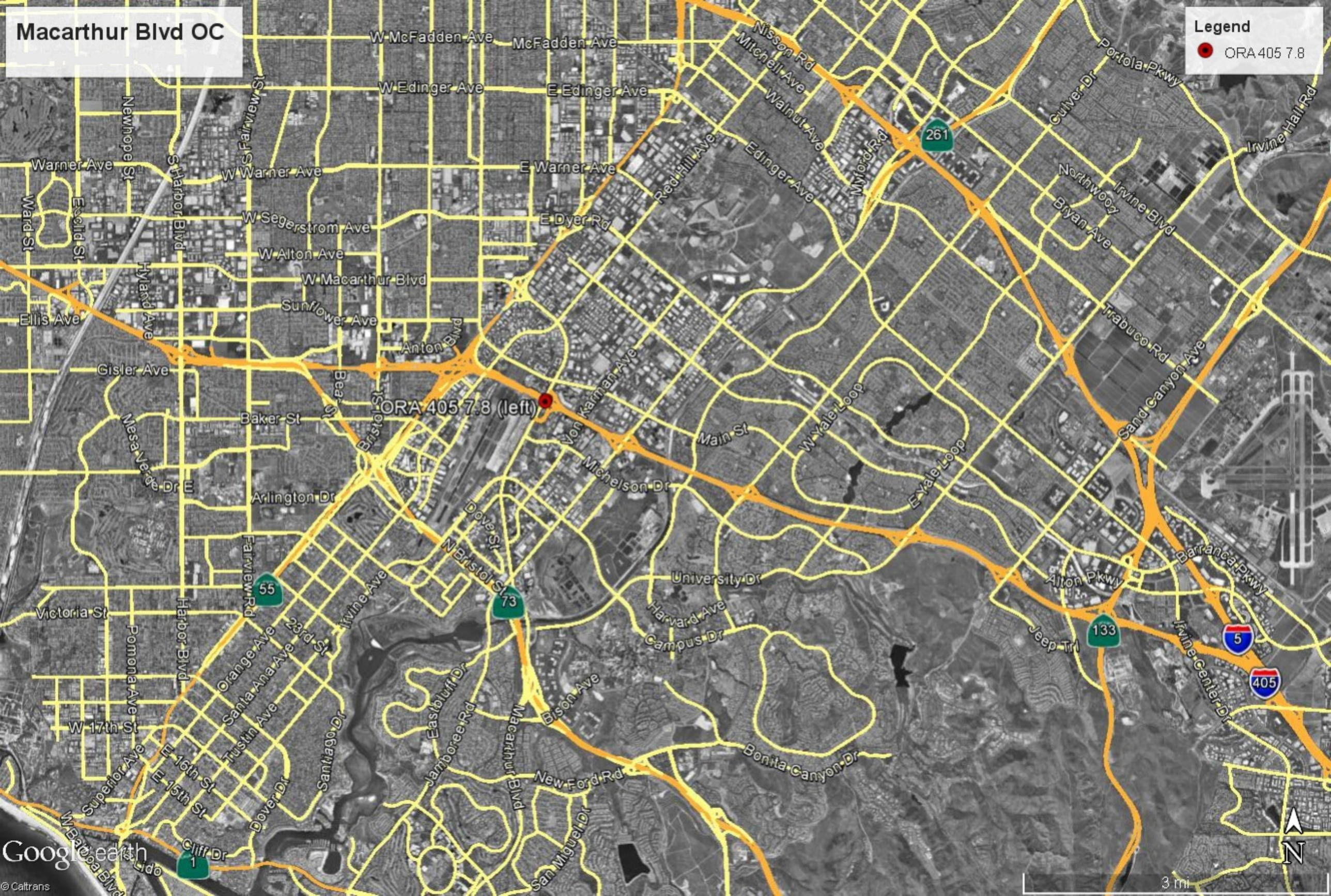
Kristopher Barker, C.E.G.
Engineering Geologist, Branch D
Office of Geotechnical Design – South 1

cc: Structure Construction R.E. pending File (RE_Pending@dot.ca.gov)
District 12 Design – Andrew_P_Oshrin@dot.ca.gov,
Project Manager – Leo_Chen@dor.ca.gov
Structure Design – Jose_Higareda@dot.ca.gov, Anthony Logus@dot.ca.gov
GS Corporate – Douglas_Brittsan@dot.ca.gov

Attachments:
Appendix I – Site Vicinity Map
Appendix II – Laboratory Data
Appendix III – LOTB
Appendix IV – Caltrans ARS Curve
Appendix V – p-y, t-z, q-z Curves

Appendix I

Site Vicinity Map


Macarthur Blvd OC
Legend
ORA 405 7.8
ORA 405 7.8 (left)
W McFadden Ave
McFadden Ave
W Edinger Ave
E Edinger Ave
Warner Ave
W Warner Ave
E Warner Ave
W Segerstrom Ave
E Dyer Rd
W Alton Ave
W Macarthur Blvd
Sunflower Ave
Ellis Ave
Anton Blvd
Gisler Ave
Baker St
Arlington Dr
Victoria St
W 17th St
E 16th St
E 15th St
Cliff Dr
Nisson Rd
Mitchell Ave
Walnut Ave
Edinger Ave
Red Hill Ave
Myford Rd
Portola Pkwy
Culver Dr
Irvine Hall Rd
Northwoody
Irvine Blvd
Bryan Ave
Trabuco Rd
Sand Canyon Ave
Von Karman Ave
Main St
W Yale Loop
E Yale Loop
Michelson Dr
Dove St
N Bristol St
University Dr
Harvard Ave
Campus Dr
Alton Pkwy
Barranca Pkwy
Jeep Trl
Irvine Center Dr
Irvine Ave
Bison Ave
Bonita Canyon Dr
New Ford Rd
San Miguel Dr
Jamboree Rd
Eastbluff Dr
Macarthur Blvd
Santiago Dr
Dover Dr
Tustin Ave
Santa Ana Ave
Orange Ave
23rd St
Pomona Ave
Superior Ave
Harbor Blvd
Fairview Rd
S Fairview St
S Harbor Blvd
Newhope St
Ward St
Euclid St
Hyland Ave
Mesa Verde Dr E
Bristol St
Bear St
Lido
W Balboa Blvd
55
73
261
133
5
405
1
3 mi
N
© Caltrans

Appendix II

Laboratory Data

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 5-0-6.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1 2	0 M 7 2 0 1	S 0 1	3200B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCVD: 11/21/13 DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag

NORMAL PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 798 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
798		798			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	0	0	100	100
	300 µm	1	1	99	99
	150 µm	2	3	97	97
	75 µm	3	4	96	96

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	65.0	8.0	57.0	71%	71%
24hr.	1M	flocculated				

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse Sed.Ht.=

Dura-Fine R2/R1 =

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

R-VALUE

RESULT

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk $= \frac{500}{500 - W} =$

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

App $= \frac{A}{A - C} =$

SSD $= \frac{B}{B - C} =$

OD $= \frac{A}{B - C} =$

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

MOISTURE CONTENT

Gr. Wet	1067.4	P.I.	40
Gr. Dry	797.7		
H2O	269.7	P.L.	25
Tare	0.0		
Net Dry	797.7	L.L.	65
% H2O	33.8		

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 0 0 B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	0	2	-	3		3201B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 brass tube

NORMAL PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 7.4-7.7"

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

GRADING ANALYSIS

Total Wt 213 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
213		213			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	0	0	100	100
	300 µm	0	0	100	100
	150 µm	1	1	99	99
	75 µm	2	3	97	97

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	63.0	8.0	55.0	69%	69%
24hr.	1M	FLOCCULATED				

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	307.5	P.I.	40
Gr. Dry	212.5		
H2O	95.0	P.L.	30
Tare	0.0		
Net Dry	212.5	L.L.	70
% H2O	44.7		

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
■	Unit Wt.	212	✓
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Wet Unit Weight

98.60 pcf

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3201B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 10.0-11.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DF for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
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Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

1 2	0 M 7 2 0 1	S 0 3	3202B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag

NORMAL PRIORITY DATE NEEDED

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 903 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
903		903			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	0	0	100	100
	300 µm	0	0	100	100
	150 µm	1	1	99	99
	75 µm	2	2	98	98

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	63.0	8.0	55.0	69%	69%
24hr.	1M	FLOCCULATED				

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	34
Gr. Dry			
H2O		P.L.	27
Tare			
Net Dry		L.L.	61
% H2O			

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		

Min. Resistivity

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3202B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 0 4	3203B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12-11

NUMBER OF CONTAINERS: 1 bag

NORMAL PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 11.5-15.0'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DF for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
	4.75				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)			0	100	
	2.36 mm				
	1.18 mm				
	600 µm				
	300 µm				
	150 µm				
	75 µm				

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M					
24hr.	1M					

SAND EQUIVALENT

					Avg.
Sand	R2				
Clay	R1				
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse Sed.Ht.=

Dura-Fine R2/R1 =

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk $= \frac{500}{500 - W} =$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$App = \frac{A}{A - C} =$

$SSD = \frac{B}{B - C} =$

$OD = \frac{A}{B - C} =$

MOISTURE CONTENT

Gr. Wet		P.I.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		L.L.	
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		**7.80**
H2O		**45 ml**
Min. Resistivity		**398**

Based on 18 gauge CMP.

Estimated life: **17 yrs.**

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
	Fine Grade	202	
	Coarse Grade	202	
	Filler Material	202	
	Mech. Analysis	203	
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
■	pH (RC)	532	✓
■	Resistivity (RC)	532	✓
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3203B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	0	5				3204B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 15.0-16.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DF for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

DATE RCV'D: 11/21/13

DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag

NORMAL | PRIORITY | DATE NEEDED:

By: FAX | MAIL | PHONE | OTHER

GRADING ANALYSIS

Total Wt 908 g | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
908		908			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
80.0 g	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
	600 µm	3	4	96	96
	300 µm	7	9	91	91
	150 µm	14	18	82	82
	75 µm	20	25	75	75

MECH. / HYDRO.		R	Corr.	C.R.	Mat'l in Sus.	Comb % in Sus.
1hr.	5M	FLOCCULATED				
24hr.	1M	FLOCCULATED				

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = | Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk = 500 / (500 - W) =

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

App = A / (A - C) =

SSD = B / (B - C) =

OD = A / (B - C) =

MOISTURE CONTENT

Gr. Wet		P.I.	18
Gr. Dry			
H2O		P.L.	22
Tare			
Net Dry		L.L.	40
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3204B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 0 6	3205B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag

NORMAL PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 20.0-21.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By BT for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 646 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
646		646			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt.					
(g)	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	1	1	99	99
	300 µm	2	3	97	97
	150 µm	7	9	91	91
	75 µm	20	25	75	75

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	27.0	8.0	19.0	24%	24%
24hr.	1M	21.0	8.0	13.0	16%	16%

SAND EQUIVALENT

				Avg.
Sand R2				
Clay R1				
S.E. Value				

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=
Dura-Fine	R2/R1 =

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	5
P.L.	25
L.L.	30

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3205B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 23.0-24.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

1	2	0	M	7	2	0	1	S	0	7				3206B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag

NORMAL PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 708 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
708		708			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
80.0 g	600 µm	3	4	96	96
	300 µm	11	14	86	86
	150 µm	33	41	59	59
	75 µm	54	67	33	33

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M	18.0	8.0	10.0	13%	13%
24hr.	1M	14.0	8.0	6.0	8%	8%

SAND EQUIVALENT

Sand R2				Avg.	
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk $= \frac{500}{500 - W} =$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$App = \frac{A}{A - C} =$

$SSD = \frac{B}{B - C} =$

$OD = \frac{A}{B - C} =$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3206B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	0	9				3207B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 30.0-31.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By ____ for

DENIS OZOWARA

SRL Materials Engineer

DATE RCV'D: 11/21/13

DATE OUT: 12/n

NUMBER OF CONTAINERS: 1 bag

NORMAL ☐ PRIORITY ☐

DATE NEEDED:

By: FAX ☐ MAIL ☐ PHONE ☐ OTHER ☐

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 252 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
252		252			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	2	3	97	97
80.0 g	600 µm	8	10	90	90
	300 µm	25	31	69	69
	150 µm	46	58	42	42
	75 µm	59	73	27	27

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	14.0	8.0	6.0	8%	8%
24hr.	1M	11.0	8.0	3.0	4%	4%

SAND EQUIVALENT

Sand	R2				Avg.
Clay	R1				
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		L.L.	
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3207B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	1	0				3208B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/9

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 35.0-36.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DF for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

GRADING ANALYSIS

Total Wt 759 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
759		759			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
80.0 g	600 µm	2	3	97	97
	300 µm	8	10	90	90
	150 µm	55	69	31	31
	75 µm	70	87	13	13

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	11.0	8.0	3.0	4%	4%
24hr.	1M	9.0	8.0	1.0	1%	1%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.
P.L.
L.L.

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3208B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	1	1				3209B
CONTRACT NO.										SAMPLE NO.				LAB. NO.

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 38.5-39.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DR for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

DATE RCV'D: 11/21/13

DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag

NORMAL | PRIORITY | DATE NEEDED

By: FAX | MAIL | PHONE | OTHER

GRADING ANALYSIS

Total Wt 1181 g | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
1181		1181			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
115.0 g	600 µm	2	2	98	98
	300 µm	33	29	71	71
	150 µm	93	81	19	19
	75 µm	103	90	10	10

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M	12.0	8.0	4.0	3%	3%
24hr.	1M	10.0	8.0	2.0	2%	2%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3209B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 1 2	3210B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag

NORMAL ☐ PRIORITY ☐ DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 40.0-41.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DE for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

GRADING ANALYSIS

Total Wt 822 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
822		822			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	6	5	95	95
115.0 g	600 µm	30	26	74	74
	300 µm	74	64	36	36
	150 µm	98	85	15	15
	75 µm	105	91	9	9

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	11.0	8.0	3.0	3%	3%
24hr.	1M	9.0	8.0	1.0	1%	1%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=
Dura-Fine	R2/R1 =

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3210B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	1	3	a				3211B
CONTRACT NO.								SAMPLE NO.							LAB. NO.

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 45.0-46.0'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DF for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

DATE RCV'D: 11/21/13
DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag
NORMAL | PRIORITY | DATE NEEDED:

By: FAX, MAIL, PHONE, OTHER

GRADING ANALYSIS

Total Wt 637 g | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
637		637			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
80.0 g	600 µm	1	1	99	99
	300 µm	2	3	97	97
	150 µm	3	4	96	96
	75 µm	4	5	95	95

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	61.0	8.0	53.0	66%	66%
24hr.	1M	36.0	8.0	28.0	35%	35%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	20
Gr. Dry			
H2O		P.L.	25
Tare			
Net Dry		L.L.	45
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.
Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3211B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 47.4-47.7'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By ___ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1 2	0 M 7 2 0 1	S 1 4 - 4	3212B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/4

NUMBER OF CONTAINERS: 1 brass tube

NORMAL ☐ PRIORITY ☐ DATE NEEDED:

By: FAX ☐ MAIL ☐ PHONE ☐ OTHER ☐

GRADING ANALYSIS

Total Wt 311 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
311		311			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	0	0	100	100
	300 µm	1	1	99	99
	150 µm	3	4	96	96
	75 µm	5	6	94	94

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	60.0	8.0	52.0	65%	65%
24hr.	1M	43.0	8.0	35.0	44%	44%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	393.6	P.I.	24
Gr. Dry	311.0		
H2O	82.6	P.L.	23
Tare	0.0		
Net Dry	311.0	L.L.	47
% H2O	26.6		

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		

Min. Resistivity

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
■	Unit Wt.	212	✓
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Wet Unit Weight

124.00 pcf

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3212B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	1	5				3213B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/4

NUMBER OF CONTAINERS: 1 bag

NORMAL PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 55.0-56.2'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 573 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
573		573			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	2	3	97	97
	300 µm	4	5	95	95
	150 µm	7	9	91	91
	75 µm	20	25	75	75

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	27.0	8.0	19.0	24%	24%
24hr.	1M	20.0	8.0	12.0	15%	15%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	4
P.L.	23
L.L.	27

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3213B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	1	6				3214B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 60.0-61.2'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DF for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

DATE RCV'D: 11/21/13

DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag

NORMAL | PRIORITY | DATE NEEDED:

By: FAX | MAIL | PHONE | OTHER

GRADING ANALYSIS

Total Wt 814 g | By: | Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
814		814			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	7	6	94	94
115.0 g	600 µm	43	37	63	63
	300 µm	88	77	23	23
	150 µm	104	90	10	10
	75 µm	108	94	6	6

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	13.0	8.0	5.0	4%	4%
24hr.	1M	12.0	8.0	4.0	3%	3%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = | Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.
P.L.
L.L.

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.
Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3214B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	1	7				3215B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag

NORMAL PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 65.2-66.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DT for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

GRADING ANALYSIS

Total Wt 624 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
624		624			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
80.0 g	600 µm	2	3	97	97
	300 µm	2	3	97	97
	150 µm	4	5	95	95
	75 µm	6	7	93	93

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	49.0	8.0	41.0	51%	51%
24hr.	1M	27.0	8.0	19.0	24%	24%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	14
P.L.	23
L.L.	37

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3215B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 67.0-68.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1 2	0 M 7 2 0 1	S 1 8	3216B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt By: Date:

Wt. Ret	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
	4.75				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)			0	100	
	2.36 mm				
	1.18 mm				
	600 µm				
	300 µm				
	150 µm				
	75 µm				

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M					
24hr.	1M					

SAND EQUIVALENT

				Avg.
Sand R2				
Clay R1				
S.E. Value				

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		7.93
H2O		40ml
Min. Resistivity		1126

Based on 18 gauge CMP.

Estimated life: 26 yrs.

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
	Fine Grade	202	
	Coarse Grade	202	
	Filler Material	202	
	Mech. Analysis	203	
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
■	pH (RC)	532	✓
■	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3216B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 80.0-81.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By ___ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

1	2	0	M	7	2	0	1	S	1	9				3217B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCVD: 11/21/13 DATE OUT: MY

NUMBER OF CONTAINERS: 1 bag

NORMAL ☐ PRIORITY ☐ DATE NEEDED:

By: FAX ☐ MAIL ☐ PHONE ☐ OTHER ☐

GRADING ANALYSIS

Total Wt 708 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
708		708			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	0	0	100	100
	300 µm	0	0	100	100
	150 µm	0	0	100	100
	75 µm	1	1	99	99

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M	64.0	8.0	56.0	70%	70%
24hr.	1M	59.0	8.0	51.0	64%	64%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk $= \frac{500}{500 - W} =$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$App = \frac{A}{A - C} =$

$SSD = \frac{B}{B - C} =$

$OD = \frac{A}{B - C} =$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	61
P.L.	32
L.L.	93

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 1 7 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 88.0-89.0'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DK for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

1	2	0	M	7	2	0	1	S	2	0				3218B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/11

NUMBER OF CONTAINERS: 1 bag

NORMAL ☐ PRIORITY ☐ DATE NEEDED:

By: FAX ☐ MAIL ☐ PHONE ☐ OTHER ☐

GRADING ANALYSIS

Total Wt 999 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
999		999			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	0	0	100	100
	300 µm	0	0	100	100
	150 µm	1	1	99	99
	75 µm	36	45	55	55

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	19.0	8.0	11.0	14%	14%
24hr.	1M	15.0	8.0	7.0	9%	9%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk $= \frac{500}{500 - W} =$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$App = \frac{A}{A - C} =$

$SSD = \frac{B}{B - C} =$

$OD = \frac{A}{B - C} =$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3218B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	2	1				3219B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/4

NUMBER OF CONTAINERS: 1 bag

NORMAL PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 90.0-91.5'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By DF for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

GRADING ANALYSIS

Total Wt 560 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
560		560			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	0	0	100	100
	300 µm	0	0	100	100
	150 µm	5	6	94	94
	75 µm	47	59	41	41

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	15.0	8.0	7.0	9%	9%
24hr.	1M	13.0	8.0	5.0	6%	6%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry

(A) Ov. Dry

ABS. %

Wt. S+C+H2O

Wt. S+C

W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry

(A) Ov. Dry

ABS. %

(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 1 9 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: McArthur Blvd. OC(Bridge#55-0440L - Boring - R-13-004

Material Source: Bent 3, NB 405 median, north side bridge - Depth 92.0-94.0'

Owner / Mfr.:

Date Sampled: 11/12-14/13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1	2	0	M	7	2	0	1	S	2	2				3220B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/21/13 DATE OUT: 12/4

NUMBER OF CONTAINERS: 1 bag

NORMAL ☐ PRIORITY ☐ DATE NEEDED:

By: FAX ☐ MAIL ☐ PHONE ☐ OTHER ☐

GRADING ANALYSIS

Total Wt ____ By: ____ Date: ____

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
	4.75				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)			0	100	
	2.36 mm				
	1.18 mm				
	600 µm				
	300 µm				
	150 µm				
	75 µm				

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M					
24hr.	1M					

SAND EQUIVALENT

				Avg.
Sand R2				
Clay R1				
S.E. Value				

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=		
Dura-Fine	R2/R1 =		

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		L.L.	
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		7.72
H2O		40ml
Min. Resistivity		1138

Based on 18 gauge CMP.

Estimated life: 26 yrs.

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
	Fine Grade	202	
	Coarse Grade	202	
	Filler Material	202	
	Mech. Analysis	203	
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
■	pH (RC)	532	✓
■	Resistivity (RC)	532	✓
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3220B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	0	1				3352B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

Sample of: Soil

Sampled from: McArthur Blvd Over Crossing(55-0440L), Boring#A-13-005

Material Source: Dirt Shoulder, NW of Bent 4 & Abut 5 NW Bridge, Depth 5.0'-6.5'

Owner / Mfr.:

Date Sampled: 12-03/04-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

DATE RCV'D: 12/12/13
DATE OUT:
NUMBER OF CONTAINERS: 1 bag
NORMAL PRIORITY
DATE NEEDED:
By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 570 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
570		570			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
85.4 g	600 µm	1	1	99	99
	300 µm	2	2	98	98
	150 µm	4	5	95	95
	75 µm	9	11	89	89

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	65.0	8.0	57.0	67%	67%
24hr.	1M	Flocculated				

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse Sed.Ht.=
Dura-Fine R2/R1 =

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. **% CP** Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk = 500 / (500 - W) =

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

App = A / (A - C) =

SSD = B / (B - C) =

OD = A / (B - C) =

MOISTURE CONTENT

Gr. Wet		P.I.	32
Gr. Dry			
H2O		P.L.	31
Tare			
Net Dry		L.L.	63
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.
Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 5 2 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 0 2	3353B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED

Sample of: Soil

Sampled from: McArthur Blvd Over Crossing(55-0440L), Boring#A-13-005

Material Source: Dirt Shoulder, NW of Bent 4 & Abut 5 NW Bridge, Depth 10.0'-11.5'

Owner / Mfr.:

Date Sampled: 12-03/04-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax. (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

GRADING ANALYSIS

Total Wt 865 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5	0	0		100
28	4.75	28	3		97
837		865			

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	97
	2.36 mm	0	0	100	97
	1.18 mm	0	0	100	97
91.2 g	600 µm	1	1	99	96
	300 µm	2	2	98	95
	150 µm	3	3	97	94
	75 µm	5	5	95	92

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	65.0	8.0	57.0	63%	61%
24hr.	1M	Flocculated				

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	23
P.L.	25
L.L.	48

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 5 3 B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	0	3				3354B
		CONTRACT NO.						SAMPLE NO.						LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: McArthur Blvd Over Crossing(55-0440L), Boring#A-13-005

Material Source: Dirt Shoulder, NW of Bent 4 & Abut 5 NW Bridge, Depth 15.0'-16.5'

Owner / Mfr.:

Date Sampled: 12-03/04-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 970 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5	0			
2	4.75	2	0		100
968		970			

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	2	2	98	98
86.3 g	600 µm	5	6	94	94
	300 µm	9	10	90	90
	150 µm	16	19	81	81
	75 µm	24	28	72	72

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M	44.0	8.0	36.0	42%	42%
24hr.	1M	34.0		26.0	30%	30%

R-VALUE

RESULT

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	12
P.L.	22
L.L.	34

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=
Dura-Fine	R2/R1 =

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3354B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 0 4	3355B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: McArthur Blvd Over Crossing(55-0440L), Boring#A-13-005

Material Source: Dirt Shoulder, NW of Bent 4 & Abut 5 NW Bridge, Depth 20.8'-21.5'

Owner / Mfr.:

Date Sampled: 12-03/04-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 358 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
358		358			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	2	2	98	98
90.0 g	600 µm	3	3	97	97
	300 µm	7	8	92	92
	150 µm	22	24	76	76
	75 µm	45	50	50	50

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	22.0	8.0	14.0	16%	16%
24hr.	1M	17.0		9.0	10%	10%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk = 500 / (500 - W) =

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

App = A / (A - C) =

SSD = B / (B - C) =

OD = A / (B - C) =

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	
P.L.	
L.L.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 5 5 B

07-AGG-SSD (RG/SD 7/93, Rev. DH 03/17/01)

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 0 5 a	3356B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED:

Sample of: Soil

Sampled from: McArthur Blvd Over Crossing(55-0440L), Boring#A-13-005

Material Source: Dirt Shoulder, NW of Bent 4 & Abut 5 NW Bridge, Depth 25.0'-25.5'

Owner / Mfr.:

Date Sampled: 12-03/04-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

GRADING ANALYSIS

Total Wt 204 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
204		204			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
102.3 g	600 µm	3	3	97	97
	300 µm	14	14	86	86
	150 µm	49	48	52	52
	75 µm	72	70	30	30

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus
1hr.	5M	16.0	8.0	8.0	8%	8%
24hr.	1M	12.0		4.0	4%	4%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE

CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet		P.I.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		L.L.	
% H2O			

PLASTICITY INDEX

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3356B

SOUTHERN REGIONAL LABORATORY - SOIL & AGGREGATE TESTS

1 2	0 M 7 2 0 1	S 0 5 b	3357B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 12/12/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag By: FAX MAIL PHONE OTHER

NORMAL PRIORITY DATE NEEDED

Sample of: Soil

Sampled from: McArthur Blvd Over Crossing(55-0440L), Boring#A-13-005

Material Source: Dirt Shoulder, NW of Bent 4 & Abut 5 NW Bridge, Depth 25.5'-25.8'

Owner / Mfr.:

Date Sampled: 12-03/04-13

Materials Lab. Stamp

By _____ for

DENIS OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

Southern Regional Laboratory
13970 Victoria St.
Fontana, CA 92336

Phone: (909)829-6292

Fax: (909)829-6294

GRADING ANALYSIS

Total Wt 278 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass
	87.5				
	75				
	62.5				
	50				
	37.5				
	25				
	19				
	12.5				
	9.5				
0	4.75	0	0		100
278		278			

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	1	1	99	99
90.2 g	600 µm	3	3	97	97
	300 µm	10	11	89	89
	150 µm	26	29	71	71
	75 µm	40	44	56	56

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	30.0	8.0	22.0	24%	24%
24hr.	1M	21.0		13.0	14%	14%

SAND EQUIVALENT

Sand R2					Avg.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss
A B	100	5000g			
C D	500	5000g			

No. of spheres = Wt. of spheres =

DURABILITY INDEX

Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	7
P.L.	20
L.L.	27

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 3 5 7 B

Results sent to: KRISTOPHER BARKER

Division of Engineering Services
Materials Engineering and Testing Services
Corrosion and Structural Concrete Field Investigation Branch

Report Date: 3/12/2014
Reported by Michael Mifkovic

CORROSION TEST SUMMARY REPORT - SOIL

EFIS: **1213000001** Bridge # **55-0440**

Dist/Co/Rte/PM **12 / ORA /405/ / 7.8 PM** Bridge Name **MACARTHUR BLVD OC**

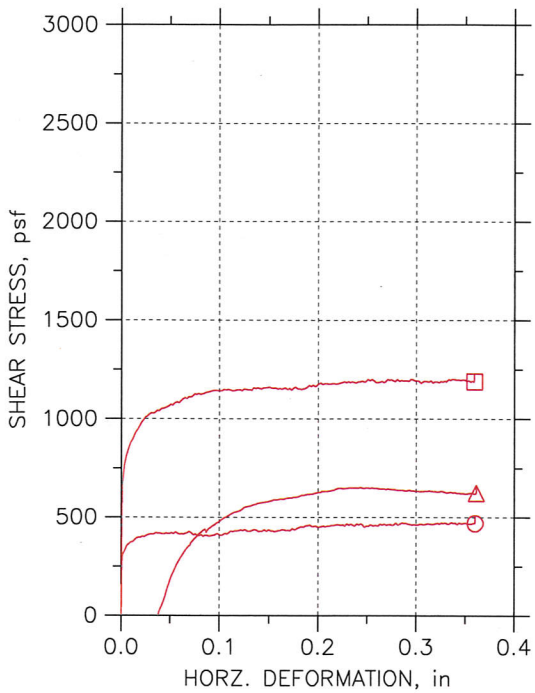
CORROSION LAB #	TL101 #	BORE #	DEPTH (FT) START	DEPTH (FT) END	MINIMUM RESISTIVITY[1] (ohm-cm)	pH[1]	CHLORIDE CONTENT[2] (ppm)	SULFATE CONTENT[3] (ppm)	IS SAMPLE CORROSIVE?
SOIL SAMPLE FROM: MACARTHUR BLVD OC									
CR20140064†	C080045	R-13-004	11.5	11.5	1150	9.35	39	94	NO
†Comment: REC'D FROM DISTRICT LAB									

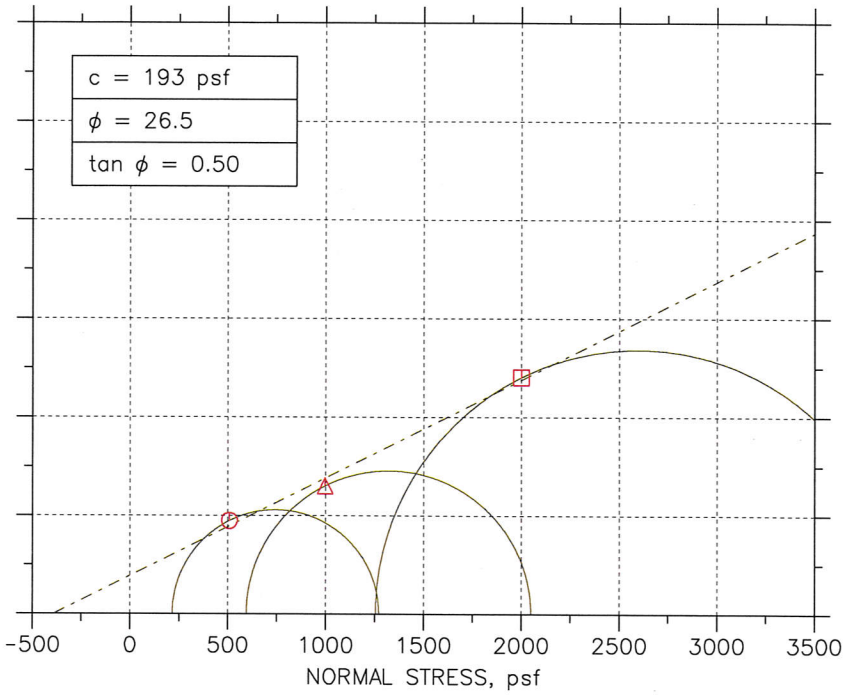
This site is not corrosive to foundation elements (see note below).

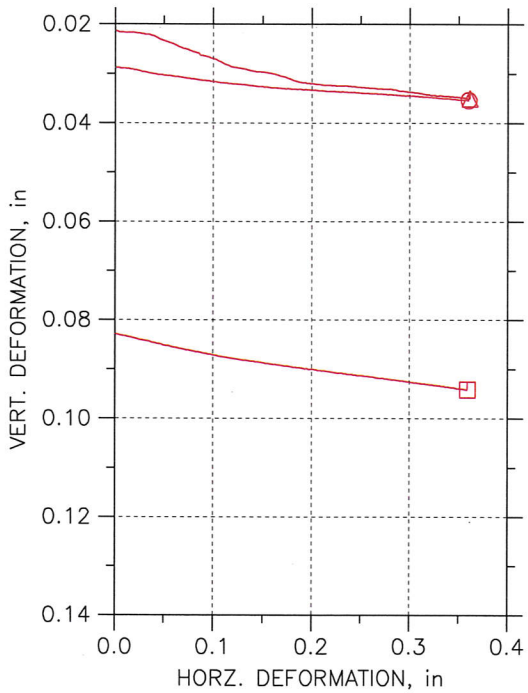
Note: For Structural Elements, the Department considers a site corrosive if one or more of the following conditions exist: pH is 5.5 or less, chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater. Resistivity is not considered for Structural Elements. MSE backfill shall conform to the requirements of section 47-2.02C Structure Backfill in the 2010 Standard Specifications.

[1]CT 643, [2]CT 422, [3]CT 417

DIRECT SHEAR TEST REPORT







Symbol		○	△	□	
Test No.		DS1324A	DS1324B1	DS1324C	
Sample No.		S02-2	S02-1	S02-2	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	1.944	1.944	1.944	
	Area, in^2	2.9681	2.9681	2.9681	
	Height, in	1	1	1	
	Water Content, %	46.47	40.64	45.41	
	Dry Density, pcf	74.571	80.219	75.47	
	Saturation, %	99.56	99.64	99.40	
	Void Ratio	1.2603	1.1012	1.2334	
Consol. Height, in		0.9731	0.98011	0.9358	
Consol. Void Ratio		1.1995	1.0594	1.09	
Final	Water Content, %	43.55	37.92	37.76	
	Dry Density, pcf	77.311	83.136	83.313	
	Saturation, %	99.62	99.65	99.63	
	Void Ratio	1.1802	1.0275	1.0232	
Normal Stress, psf		507.71	998.1	1999.1	
Max. Shear Stress, psf		472.78	650.74	1201.8	
Ult. Shear Stress, psf		469.26	621.99	1188.5	
Time to Failure, min		84.003	62.001	74.003	
Disp. Rate, in/min		0.004	0.004	0.004	
Implied Specific Gravity		2.70	2.70	2.70	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	
Plasticity Index		---	---	---	

Project: Bear St. OC-Retrofit

Location: 12-ORA-405-7.8

Project No.: 12-0M7201

Boring No.: A-13-004

Sample Type: TUBE

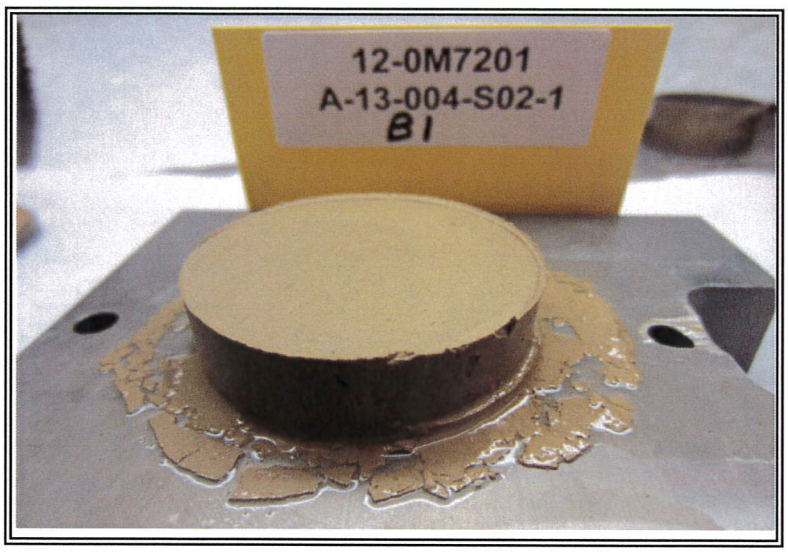
Description: Moist, brown, clay

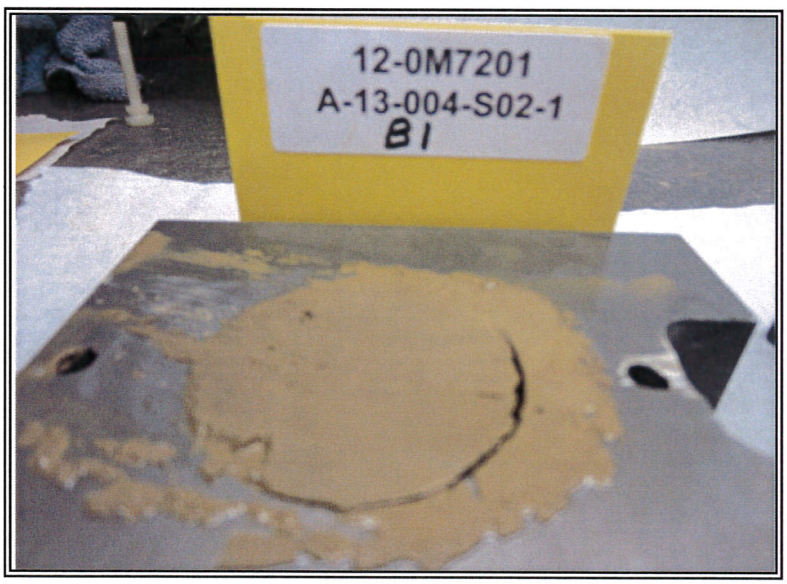
Remarks: ASTM D 3080. Sample description is not a soil classification.

Fri, 21-FEB-2014 17:18:27

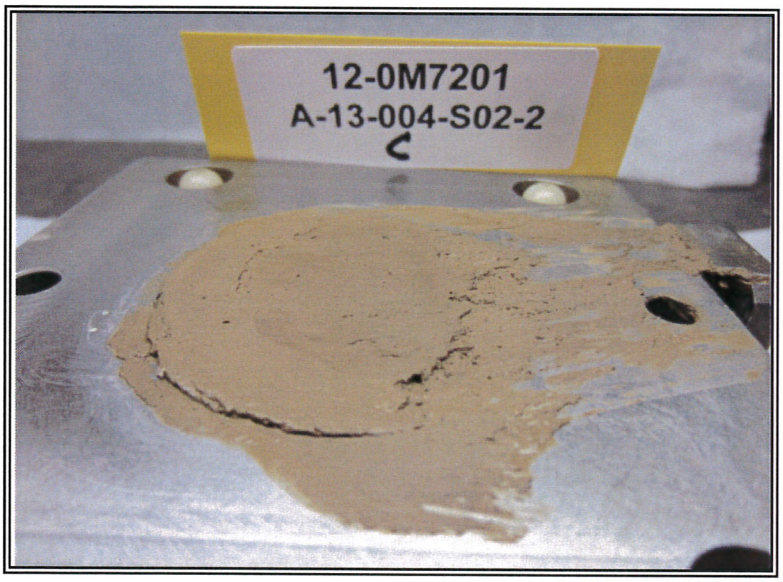
DIRECT SHEAR
JOB : 12-0M7201
SAMPLE : A-13-004-S02-2
Test Specimen A

DIRECT SHEAR
JOB : 12-0M7201
SAMPLE : A-13-004-S02-2
Test Specimen B





DIRECT SHEAR
JOB : 12-0M7201
SAMPLE : A-13-004-S02-2
Test Specimen C



Appendix III

Log of Test Boring

(LOTB)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	405			

Tatjana Halda 3-7-14
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Tatjana Halda No. C68293 Exp. 9-30-15 CIVIL STATE OF CALIFORNIA

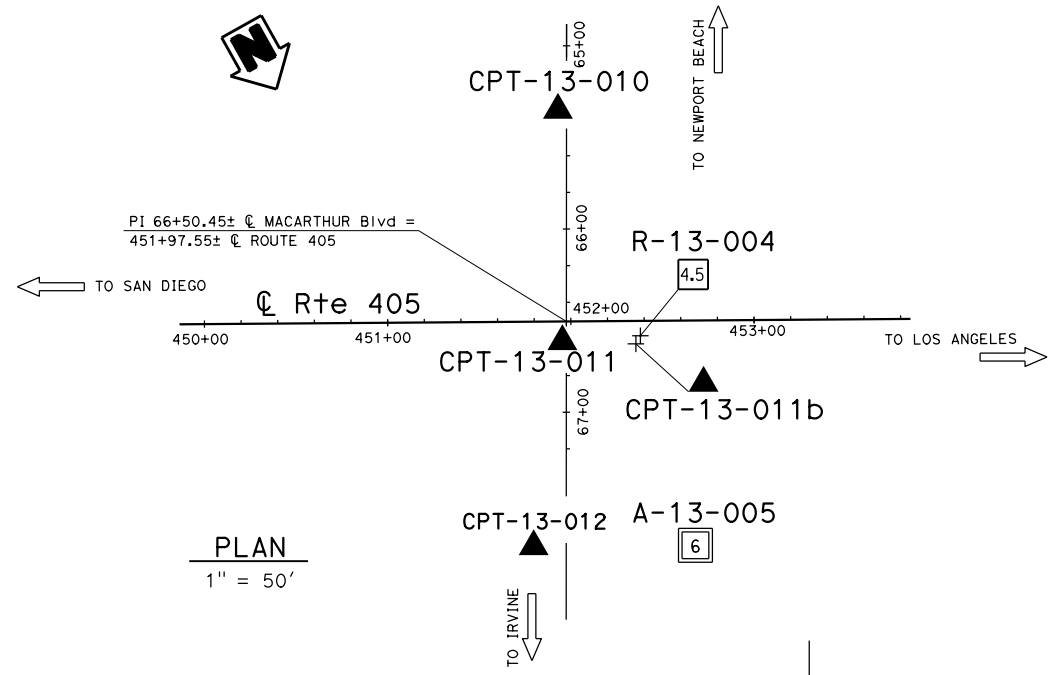
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

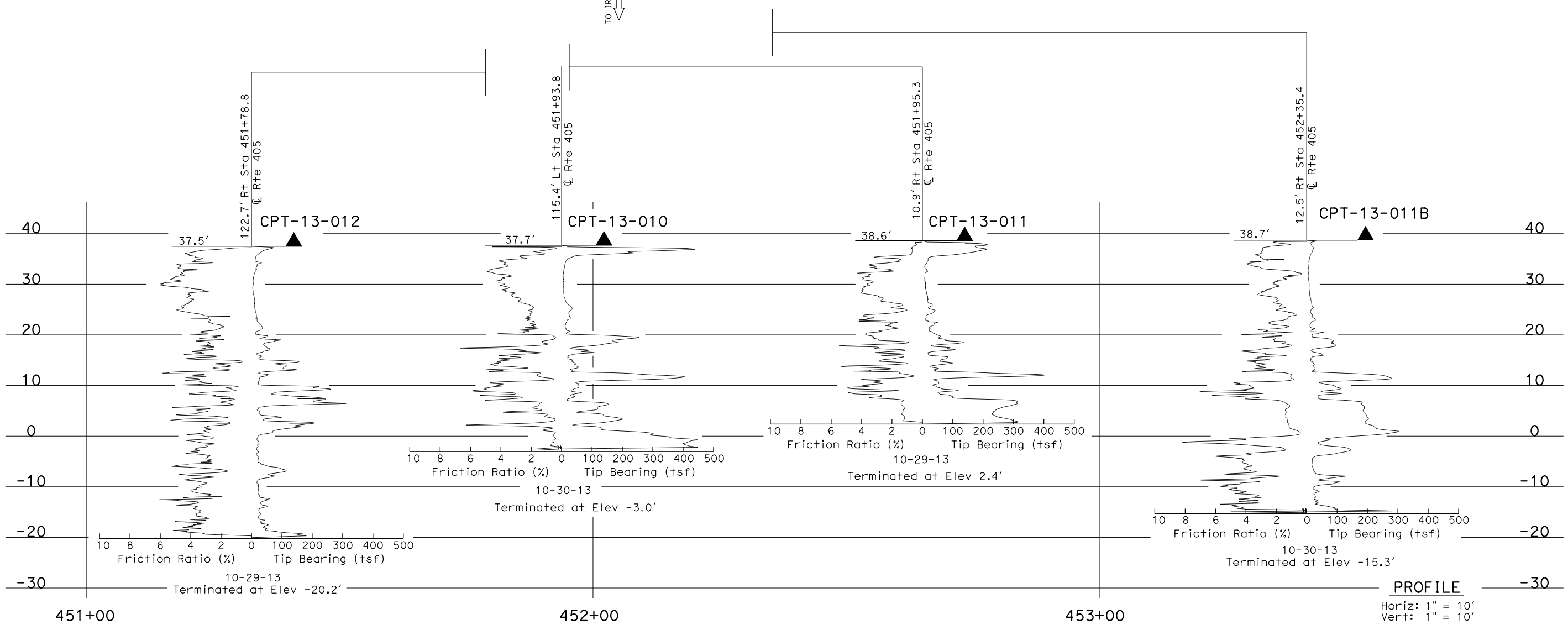
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

BENCH MARK

OCS BM 3f-126-03 (2003) Elev 37.178
Described by OCS 2003 -
Found 3¾" OCS aluminum benchmark disk stamped "3f-126-03", set in the Easterly corner of a 5.0 ft By 15.0 ft concrete catch basin. Monument is located in the Westerly corner of the intersection of Main street and Macarthur boulevard, 107.0 ft Southwesterly of the centerline of Main street and 75 ft Northwesterly of the centerline of Macarthur. Monument is set level with the sidewalk.
NAVD 88



PLAN
1" = 50'



PROFILE
Horiz: 1" = 10'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN DESIGN BRANCH X	BRIDGE NO. 55-0440L POST MILE 7.8	MACARTHUR BLVD OC RETROFIT LOG OF TEST BORINGS 1 OF 3
FUNCTIONAL SUPERVISOR NAME: S. Karimi	DRAWN BY: F. Nguyen CHECKED BY: K. Barker	FIELD INVESTIGATION BY: T. Halda			

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 12130000011 CONTRACT NO.: 12-0M7201

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 02-27-14 03-04-14 03-06-14 SHEET X OF X

FILE => mcarthur1of3.dgn

USERNAME => s128198 DATE PLOTTED => 10-MAR-2014 TIME PLOTTED => 10:27

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	405			

Tatjana Halda 3-7-14
REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER Tatjana Halda No. C68293 Exp. 9-30-15 CIVIL STATE OF CALIFORNIA

PLANS APPROVAL DATE

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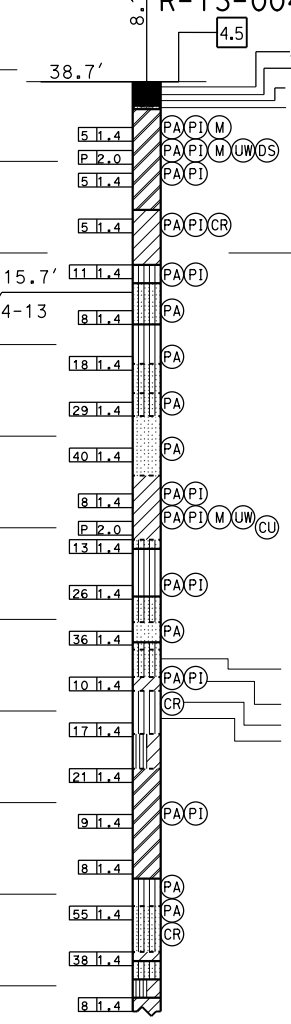
FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 3"

8.1' Rt Sta 452+37.9
℄ Rte 405

R-13-004



GWS Elev 15.7'
11-14-13

11-14-13
Terminated at Elev -62.8'
ERi = 79%

40 — ASPHALT CONCRETE (14); PCC.
ASPHALT CONCRETE (6); LC.
AGGREGATE BASE (12).
CLAYEY SAND (SC); very dark grayish brown.
Fat CLAY (CH); stiff; dark yellowish brown; moist; trace fine SAND (4%); calcite or gypsum filaments; PP= 1.25-1.85 tsf.

30 — -medium stiff; trace fine SAND; PP= 0.5-0.75 tsf.
-medium stiff; yellowish brown; moist; trace fine SAND (2%); PP= 0.5 tsf.

20 — Lean CLAY with SAND (CL); light olive brown; moist; little fine SAND (25%).
SILT with SAND (ML); medium dense; grayish brown; moist; little fine SAND (25%).

10 — SILTY SAND (SM) thickly bedded with thin interbeds of Lean CLAY with SAND (CL). SILTY SAND; medium dense; fine SAND (67%); some fines (33%); 2" CLAY interbed. Lean CLAY with SAND (CL); brown; wet; some fines; calcite nodules.
SANDY SILT (ML) thickly bedded with thin interbeds of SANDY lean CLAY (CL). SANDY SILT; medium dense; brown; wet; some fine SAND. SANDY lean CLAY (CL); yellowish brown; 30% fine to medium SAND.
SILTY SAND (SM) thickly bedded with thin interbeds of SANDY lean CLAY (CL). SILTY SAND; wet; fine and medium SAND (73%); little fines (27%). SANDY lean CLAY (CL); yellowish brown; 30% fine to medium SAND; little fines.

0 — -dense; brown; wet; fine SAND (87%); few fines (13%).
Poorly graded SAND with SILT (SP-SM); brown; wet; fine and medium SAND (90%); few fines (10%).
-dense; grayish brown; trace GRAVEL; fine and medium SAND; few fines.

-10 — Lean CLAY (CL) thickly bedded with moderate interbeds of SANDY SILT (ML). Lean CLAY; stiff; light olive brown; wet; few fine SAND (5%); PP=1.5 tsf. SANDY SILT (ML); medium stiff; brown; wet; 40% fine SAND; PP= 0.5.
-few fine SAND; PP=1.25-1.75 tsf.
SILTY SAND (SM); medium dense; dark grayish brown; wet; fine and medium SAND ; 30% fines.
SILT with SAND (ML) thickly bedded with thick interbeds of SANDY lean CLAY (CL). SILT with SAND (ML); light olive brown; little fine SAND (25%). SANDY lean CLAY (CL); very stiff; light olive brown; wet; fine to medium SAND; PP=2.5 tsf.

-20 — SILTY SAND (SM/ML); dense; light olive brown to brown; wet; fine and medium SAND; 25% fines.
-40% fines.
Poorly graded SAND with SILT (SP-SM); dense; yellowish brown; wet; medium and fine SAND (94%); few fines (6%).
SILTY SAND (SM); dense; dark grayish brown; fine and medium SAND ; 15% fines.

-30 — SILTY SAND (SM); thickly bedded with moderate interbeds of CLAYEY SAND (SC); SILTY SAND (SM); fine SAND; some fines. CLAYEY SAND (SC); some fines.
Lean CLAY (CL); light olive brown; wet; few fine and medium SAND (7%); PP= 1.75 tsf.
SANDY SILT (ML); wet; fine SAND.
-calcite filament.

-40 — SILTY CLAY (CL-ML); beige brown to olive brown; wet.
Fat CLAY (CH); very stiff; olive brown to grayish brown; wet; trace fine SAND (1%); PP= 2.25-2.5 tsf.
-dark grayish brown.
-stiff; PP=1.5 tsf.
-PP= 1.5 tsf.

-50 — SANDY SILT (ML); greenish gray; wet; some fine SAND (45%).
SILTY SAND (SM); very dense; greenish gray; wet; fine SAND (59%); some fines (41%).
-with marine shells.

-60 — Lean CLAY (CL); medium stiff; olive gray; wet; PP= 0.8-1.0 tsf.
SILTY SAND (SM); dark gray; wet; some fines ; little shell debris.
SILTY CLAY (CL-ML); 15% fine SAND.

-70 — Lean CLAY (CL); medium stiff; dark greenish gray; few sea shells; PP= 0.5-0.75 tsf.

452+00 453+00 454+00

PROFILE
Horiz: 1" = 10'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN DESIGN BRANCH X	BRIDGE NO. 55-0440L POST MILE 7.8	MACARTHUR BLVD OC RETROFIT LOG OF TEST BORINGS 2 OF 3
FUNCTIONAL SUPERVISOR NAME: S. Karimi	DRAWN BY: F. Nguyen CHECKED BY: K. Barker	FIELD INVESTIGATION BY: T. Halda			

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 12130000011 CONTRACT NO.: 12-0M7201

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 02-21-14 03-04-14 03-06-14 03-07-14 SHEET X OF X

FILE => mcarthur2of3.dgn

USERNAME => s128198 DATE PLOTTED => 10-MAR-2014 TIME PLOTTED => 10:27

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	405			

Tatjana Halda 3-7-14
REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
Tatjana Halda
No. C68293
Exp. 9-30-15
CIVIL
STATE OF CALIFORNIA

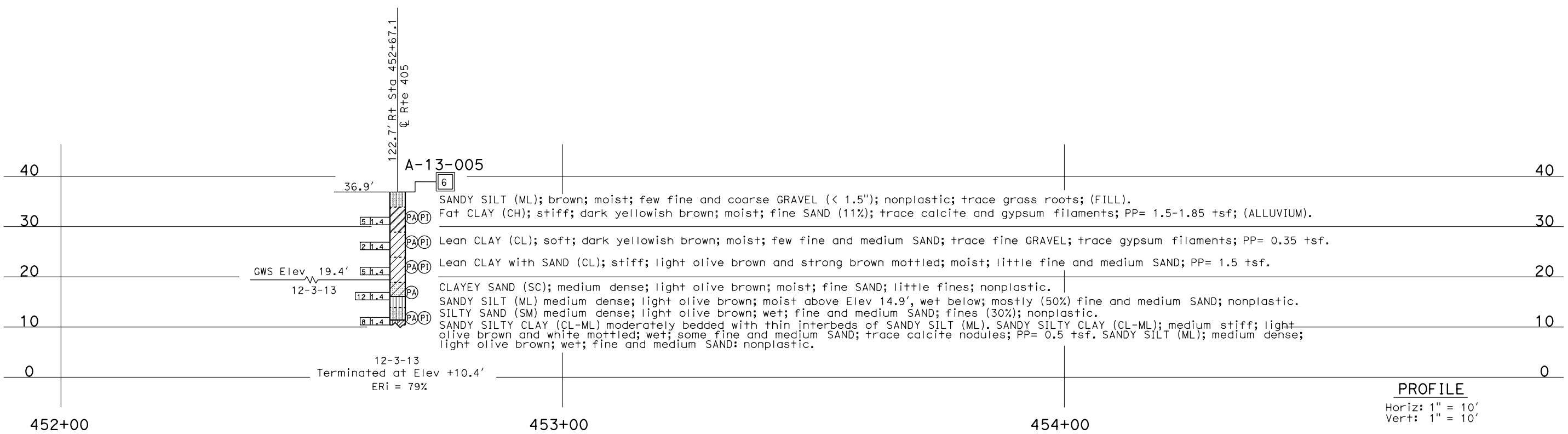
PLANS APPROVAL DATE

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.

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 3"



PROFILE
Horiz: 1" = 10'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN DESIGN BRANCH X	BRIDGE NO. 55-0440L POST MILE 7.8	MACARTHUR BLVD OC RETROFIT LOG OF TEST BORINGS 3 OF 3
FUNCTIONAL SUPERVISOR NAME: S. Karimi	DRAWN BY: F. Nguyen CHECKED BY: K. Barker	FIELD INVESTIGATION BY: J. Pratt			

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 12130000011 CONTRACT NO.: 12-0M7201

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 02-21-14 03-06-14 03-06-14 | SHEET X | OF X

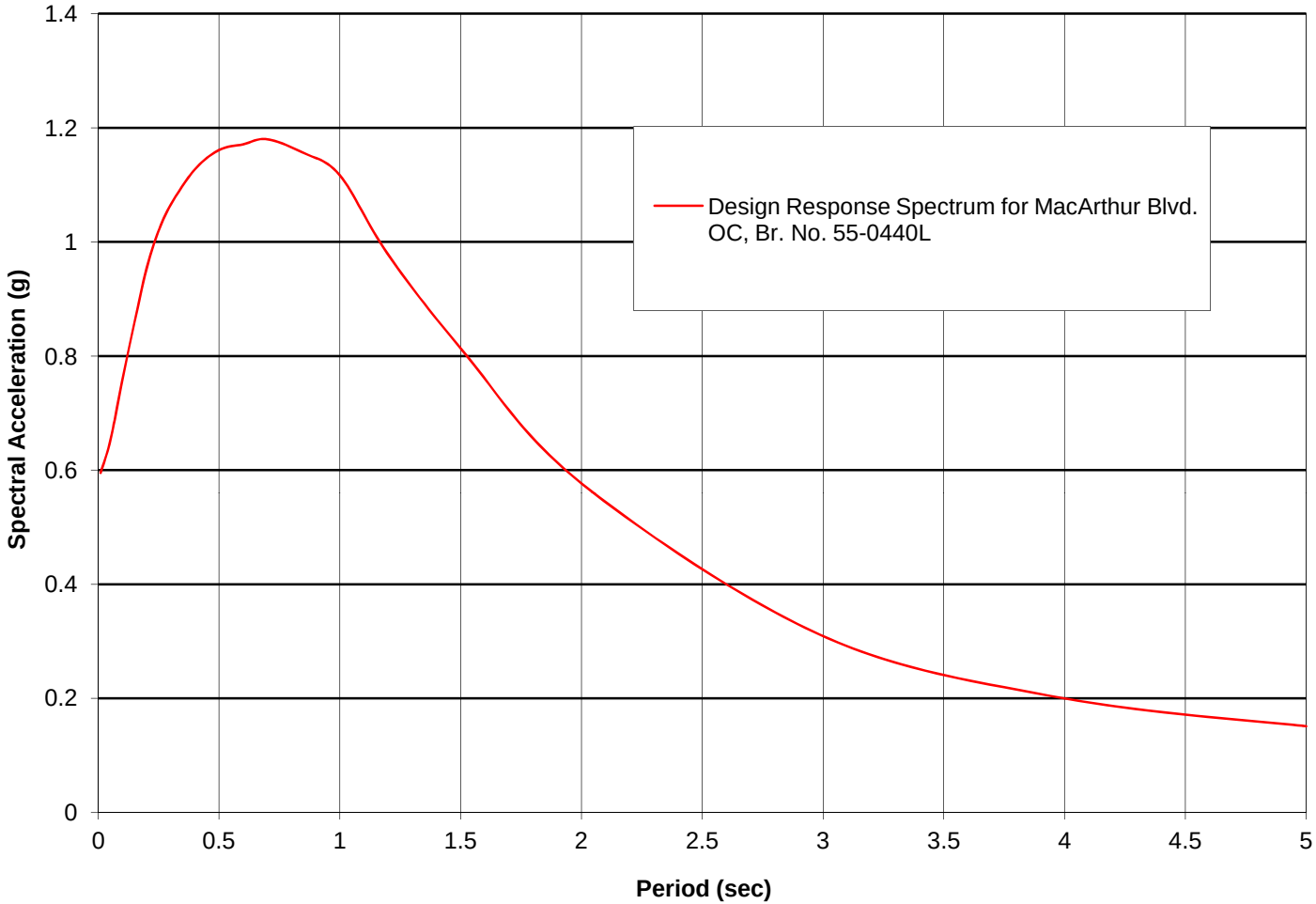
FILE => mcarthur3of3.dgn

USERNAME => s128198 DATE PLOTTED => 10-MAR-2014 TIME PLOTTED => 10:27

Appendix IV

Caltrans ARS Curve

ACCELERATION RESPONSE SPECTRUM (ARS)



SITE DATA (ARS Online Version 2.3.06)

Shear Wave Velocity, Vs_{30}:	250 m/s
Latitude:	33.682675
Longitude:	-117.857122
Depth to Vs = 1.0 km/s:	N/A
Depth to Vs = 2.5 km/s:	N/A

DETERMINISTIC

San Joaquin Hills	
Fault ID:	376
Maximum Magnitude (MMax):	7
Fault Type:	Rev
Fault Dip:	23 Deg
Dip Direction:	W
Bottom of Rupture Plane:	12.50 km
Top of Rupture Plane(Ztor):	2.00 km
Rrup	2.17 km
Rjb:	0.00 km
Rx:	0.84 km
Fnorm:	0
Frev:	1

Period	SA(Base Spectrum)	Basin Factor	Near Fault Factor(Applied)	SA(Final Spectrum)
0.01	0.595	1.000	1.000	0.595
0.05	0.651	1.000	1.000	0.651
0.1	0.757	1.000	1.000	0.757
0.15	0.858	1.000	1.000	0.858
0.2	0.953	1.000	1.000	0.953
0.25	1.019	1.000	1.000	1.019
0.3	1.065	1.000	1.000	1.065
0.4	1.127	1.000	1.000	1.127
0.5	1.161	1.000	1.000	1.161
0.6	1.126	1.000	1.040	1.171
0.7	1.092	1.000	1.080	1.180
0.85	1.014	1.000	1.140	1.156

1	0.931	1.000	1.200	1.117
1.2	0.815	1.000	1.200	0.978
1.5	0.678	1.000	1.200	0.814
2	0.480	1.000	1.200	0.577
3	0.257	1.000	1.200	0.309
4	0.166	1.000	1.200	0.200
5	0.126	1.000	1.200	0.151

Newport Inglewood fault zone (S. Los Angeles Basin section-southern)	
Fault ID:	366
Maximum Magnitude (MMax):	7.2
Fault Type:	SS
Fault Dip:	90 Deg
Dip Direction:	V
Bottom of Rupture Plane:	15.00 km
Top of Rupture Plane(Ztor):	0.00 km
Rrup	6.95 km
Rjb:	6.95 km
Rx:	6.95 km
Fnorm:	0
Frev:	0

Period	**SA(Base Spectrum)**	**Basin Factor**	**Near Fault Factor(Applied)**	**SA(Final Spectrum)**
0.01	0.344	1.000	1.000	0.344
0.05	0.404	1.000	1.000	0.404
0.1	0.538	1.000	1.000	0.538
0.15	0.634	1.000	1.000	0.634
0.2	0.686	1.000	1.000	0.686
0.25	0.703	1.000	1.000	0.703
0.3	0.706	1.000	1.000	0.706
0.4	0.688	1.000	1.000	0.688
0.5	0.664	1.000	1.000	0.664
0.6	0.618	1.000	1.040	0.643
0.7	0.579	1.000	1.080	0.626
0.85	0.526	1.000	1.140	0.600
1	0.480	1.000	1.200	0.576

1.2	0.426	1.000	1.200	0.511
1.5	0.362	1.000	1.200	0.434
2	0.280	1.000	1.200	0.336
3	0.179	1.000	1.200	0.215
4	0.127	1.000	1.200	0.152
5	0.097	1.000	1.200	0.116

Newport-Inglewood (Offshore)	
Fault ID:	381
Maximum Magnitude (MMax):	6.9
Fault Type:	SS
Fault Dip:	90 Deg
Dip Direction:	V
Bottom of Rupture Plane:	10.00 km
Top of Rupture Plane(Ztor):	0.00 km
Rrup	11.51 km
Rjb:	11.51 km
Rx:	11.23 km
Fnorm:	0
Frev:	0

Period	SA(Base Spectrum)	Basin Factor	Near Fault Factor(Applied)	SA(Final Spectrum)
0.01	0.256	1.000	1.000	0.256
0.05	0.305	1.000	1.000	0.305
0.1	0.430	1.000	1.000	0.430
0.15	0.516	1.000	1.000	0.516
0.2	0.549	1.000	1.000	0.549
0.25	0.550	1.000	1.000	0.550
0.3	0.544	1.000	1.000	0.544
0.4	0.511	1.000	1.000	0.511
0.5	0.474	1.000	1.000	0.474
0.6	0.429	1.000	1.040	0.446
0.7	0.392	1.000	1.080	0.423
0.85	0.346	1.000	1.140	0.394
1	0.308	1.000	1.200	0.370
1.2	0.266	1.000	1.200	0.319
1.5	0.219	1.000	1.200	0.263

2	0.163	1.000	1.200	0.195
3	0.101	1.000	1.200	0.121
4	0.070	1.000	1.200	0.084
5	0.053	1.000	1.200	0.064

PROBABILISTIC

Probabilistic Model USGS Seismic Hazard Map(2008) 975 Year Return Period				
Period	**SA(Base Spectrum)**	**Basin Factor**	**Near Fault Factor(Applied)**	**SA(Final Spectrum)**
0.01	0.475	1.000	1.000	0.475
0.05	0.691	1.000	1.000	0.691
0.1	0.812	1.000	1.000	0.812
0.15	0.930	1.000	1.000	0.930
0.2	1.024	1.000	1.000	1.024
0.25	1.025	1.000	1.000	1.025
0.3	1.026	1.000	1.000	1.026
0.4	0.953	1.000	1.000	0.953
0.5	0.900	1.000	1.000	0.900
0.6	0.824	1.000	1.040	0.857
0.7	0.765	1.000	1.080	0.827
0.85	0.677	1.000	1.140	0.772
1	0.604	1.000	1.200	0.724
1.2	0.517	1.000	1.200	0.620
1.5	0.427	1.000	1.200	0.513
2	0.334	1.000	1.200	0.401
3	0.214	1.000	1.200	0.257
4	0.153	1.000	1.200	0.184
5	0.125	1.000	1.200	0.150

MINIMUM DETERMINISTIC SPECTRUM

Period	SA
0.01	0.225
0.05	0.271

0.1	0.392
0.15	0.471
0.2	0.497
0.25	0.494
0.3	0.483
0.4	0.447
0.5	0.404
0.6	0.356
0.7	0.318
0.85	0.273
1	0.238
1.2	0.200
1.5	0.160
2	0.114
3	0.068
4	0.046
5	0.034

Envelope Data

Period	SA
0.01	0.595
0.05	0.691
0.1	0.812
0.15	0.930
0.2	1.024
0.25	1.025
0.3	1.065
0.4	1.127
0.5	1.161
0.6	1.171
0.7	1.180
0.85	1.156
1	1.117
1.2	0.978
1.5	0.814
2	0.577
3	0.309

4	0.200
5	0.151

Appendix V

p-y, t-z, Q-z Curves

Project no Phase: 1213000001, Bridge no: 55-0440L

I-405 MacArthur Blvd OC, at Bent 2

MacArthur Blvd OC

Layer 1

Depth = 60 to 120 inch	
y (in)	p (lbs/in)
0	0
0.002	51.51
0.074	162.25
0.148	204.42
0.222	234.01
0.296	257.56
0.370	277.45
0.443	294.83
0.517	310.38
0.591	324.50
0.665	337.50
0.739	349.56
0.813	360.84
0.887	371.46
2.365	515.12
4.434	515.12
5.912	515.12

Layer 2

Depth = 120 to 216 inch	
y (in)	p (lbs/in)
0	0
0.016	67.44
0.032	134.88
0.047	202.32
0.063	269.76
0.079	337.20
0.095	404.63
0.111	472.07
0.126	539.51
0.142	606.95
0.158	674.39
0.174	741.83
0.189	809.27
0.308	1315.06
0.426	1820.85
11.795	2929.44
23.163	2929.44

Layer 3

Depth = 216 to 252 inch	
y (in)	p (lbs/in)
0	0
0.015	319.57
0.031	639.15
0.046	958.72
0.061	1278.30
0.076	1597.87
0.092	1917.45
0.107	2237.02
0.122	2556.60
0.137	2876.17
0.153	3195.74
0.168	3515.32
0.183	3834.89
0.297	6078.80
0.412	7752.68
11.394	7752.68
22.377	7752.68

Layer 4

Depth = 252 to 300 inch	
y (in)	p (lbs/in)
0	0
0.015	116.04
0.030	232.09
0.045	348.13
0.060	464.18
0.075	580.22
0.089	696.27
0.104	812.31
0.119	928.36
0.134	1044.40
0.149	1160.45
0.164	1276.49
0.179	1392.54
0.291	2262.88
0.403	3133.21
11.140	5652.44
21.876	5652.44

Layer 5

Depth = 300 to 336 inch	
y (in)	p (lbs/in)
0	0
0.015	429.73
0.029	859.46
0.044	1289.19
0.058	1718.92
0.073	2148.65
0.087	2578.38
0.102	3008.10
0.117	3437.83
0.131	3867.56
0.146	4297.29
0.160	4727.02
0.175	5156.75
0.284	8379.72
0.393	11602.69
10.885	13033.48
21.376	13033.48

Project no Phase: 1213000001, Bridge no: 55-0440L
I-405 MacArthur Blvd OC, at Bent 2

Layer 6

Depth = 336 to 360 inch	
y (in)	p (lbs/in)
0	0
0.000	72.41
0.000	108.28
0.000	128.77
0.001	192.56
0.002	228.99
0.010	342.42
0.021	407.21
0.052	512.04
0.103	608.93
0.155	673.89
0.206	724.14
0.516	910.56
1.032	1082.84
2.063	1287.72
2.321	1287.72
2.579	1287.72

Layer 7

Depth = 360 to 444 inch	
y (in)	p (lbs/in)
0	0
0.014	359.14
0.028	718.28
0.042	1077.42
0.056	1436.56
0.069	1795.70
0.083	2154.84
0.097	2513.98
0.111	2873.12
0.125	3232.26
0.139	3591.40
0.153	3950.54
0.167	4309.68
0.271	7003.22
0.375	9696.77
10.375	17656.24
20.375	17656.24

Layer 8

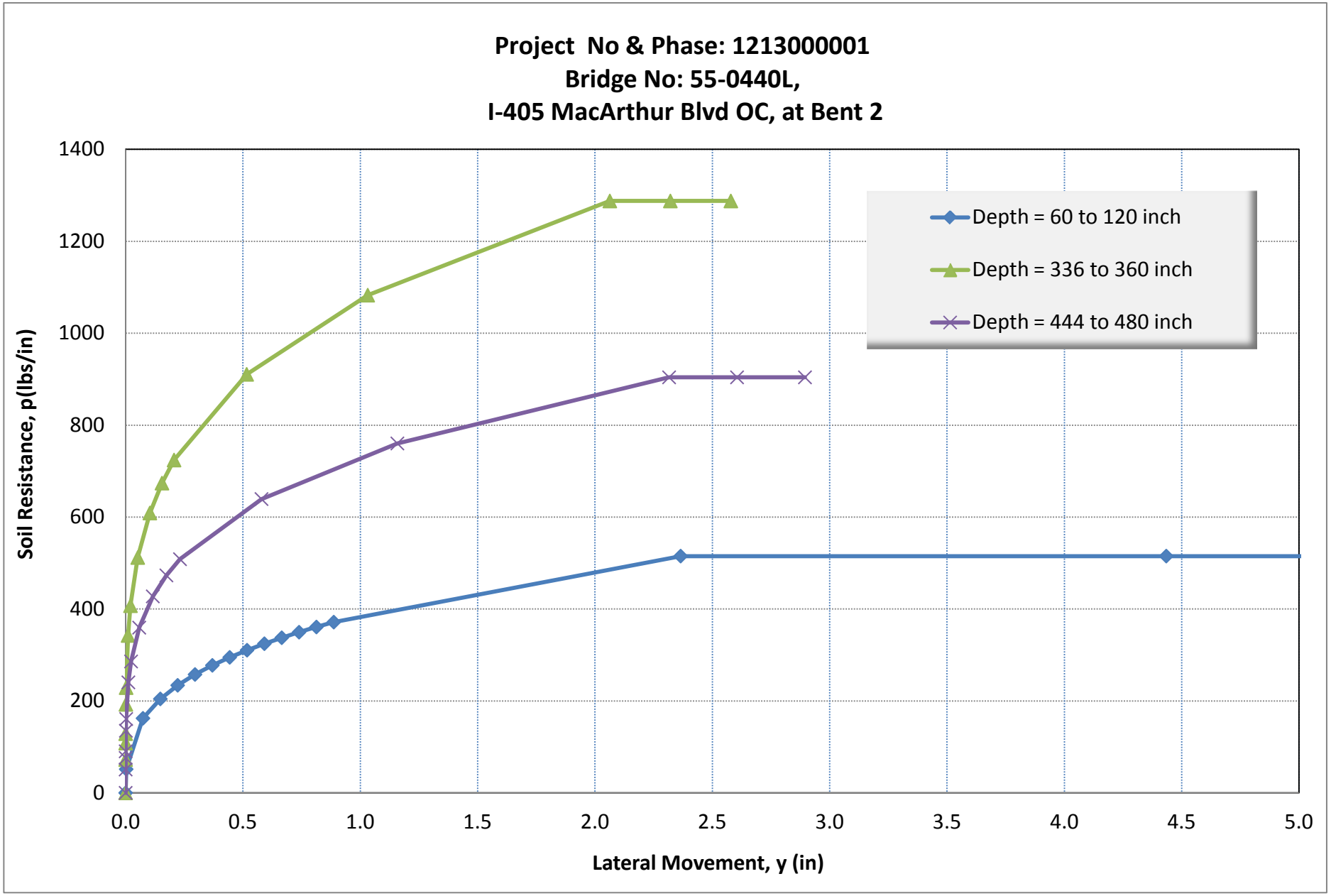
Depth = 444 to 480 inch	
y (in)	p (lbs/in)
0	0
0.000	50.84
0.000	76.02
0.000	90.40
0.001	135.18
0.002	160.76
0.012	240.39
0.023	285.88
0.058	359.47
0.116	427.49
0.174	473.09
0.232	508.37
0.579	639.24
1.158	760.19
2.316	904.03
2.605	904.03
2.895	904.03

Layer 9

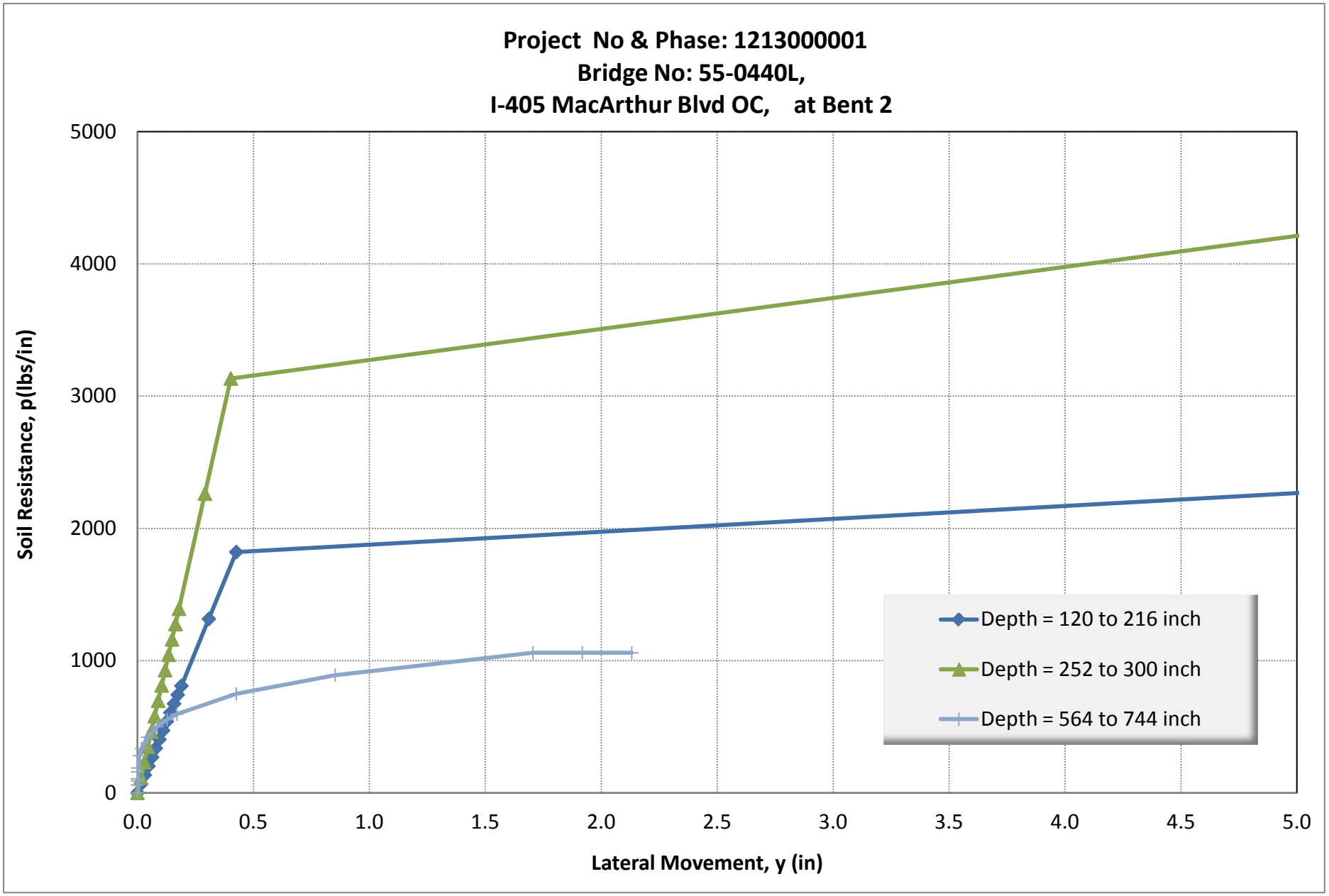
Depth = 480 to 564 inch	
y (in)	p (lbs/in)
0	0
0.013	541.08
0.026	1082.16
0.039	1623.25
0.052	2164.33
0.065	2705.41
0.077	3246.49
0.090	3787.58
0.103	4328.66
0.116	4869.74
0.129	5410.82
0.142	5951.90
0.155	6492.99
0.252	10551.10
0.349	14609.22
9.647	26481.55
18.945	26481.55

Layer 10

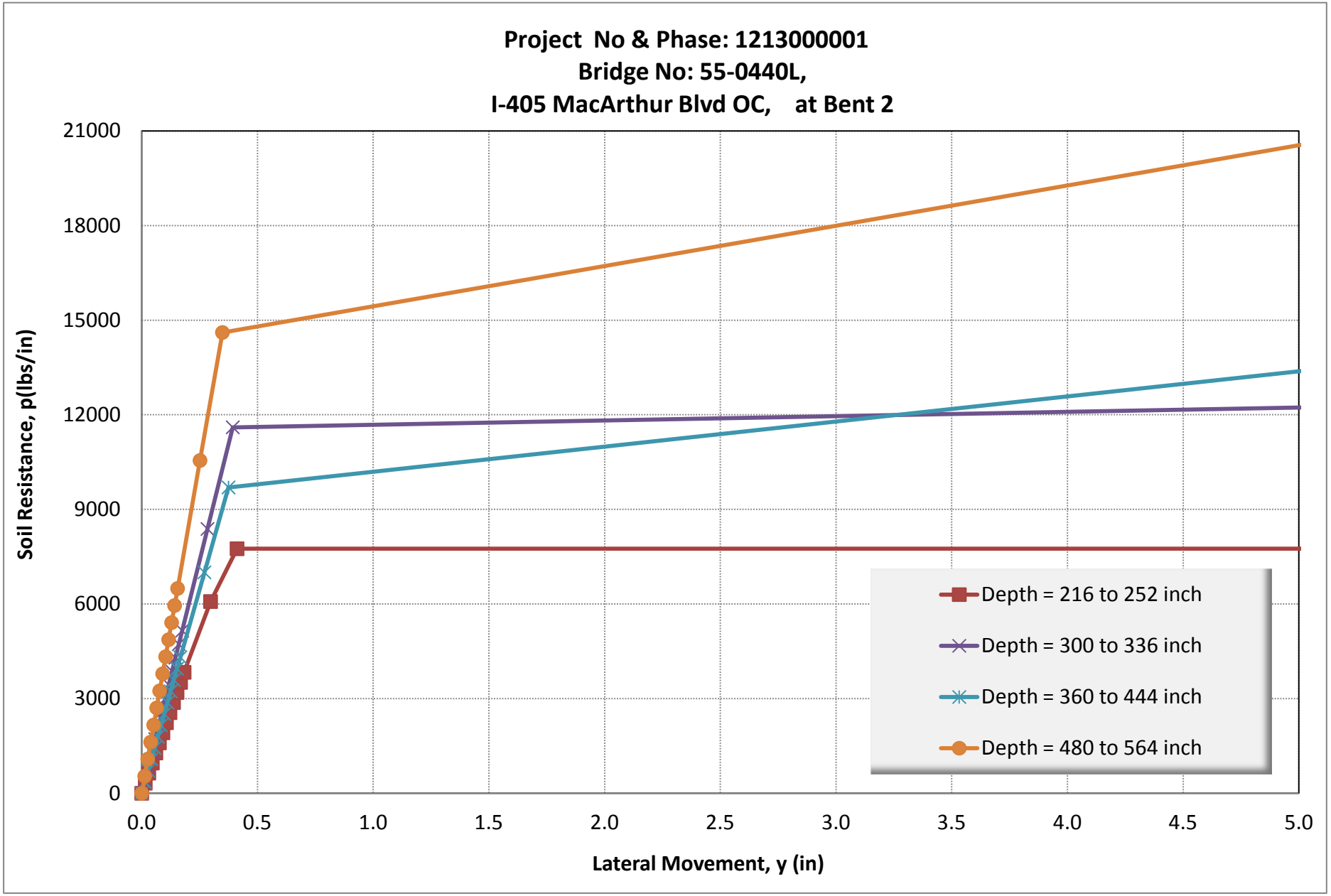
Depth = 564 to 744 inch	
y (in)	p (lbs/in)
0	0
0.000	59.55
0.000	89.05
0.000	105.90
0.001	158.35
0.002	188.31
0.009	281.60
0.017	334.88
0.043	421.08
0.085	500.76
0.128	554.18
0.171	595.50
0.426	748.80
0.853	890.48
1.705	1058.97
1.918	1058.97
2.132	1058.97


Project No & Phase: 1213000001
Bridge No: 55-0440L,
I-405 MacArthur Blvd OC, at Bent 2
Soil Resistance, p(lbs/in)
Lateral Movement, y (in)
0
200
400
600
800
1000
1200
1400
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Depth = 60 to 120 inch
Depth = 336 to 360 inch
Depth = 444 to 480 inch

Project no Phase: 1213000001, Bridge no: 55-0440L
I-405 MacArthur Blvd OC, at Bent 2



Project no Phase: 1213000001, Bridge no: 55-0440L
I-405 MacArthur Blvd OC, at Bent 2



Note: t is in kip/ft and Q is in kips

		Layer 1		Layer 2		Layer 3
	USCS	CL		SM		SM
		p(kips/ft)		p(kips/ft)		p(kips/ft)
Point	z (ft)	Elev. 35 to 25	z (ft)	Elev. 25 to 17	z (ft)	Elev. 17 to 14
1	0.000	0.000	0.000	0.000	0.000	0.000
2	0.002	0.051	0.002	0.470	0.002	1.193
3	0.003	0.102	0.003	0.522	0.003	1.324
4	0.005	0.153	0.004	0.540	0.004	1.369
5	0.007	0.204	0.005	0.555	0.005	1.407
6	0.008	0.255	0.007	0.579	0.007	1.469
7	0.013	0.420	0.008	0.599	0.008	1.519
8	0.033	1.098	0.017	0.664	0.017	1.686
9	0.033	1.113	0.058	0.802	0.058	2.034
10	0.167	1.584	0.083	0.846	0.083	2.146

		Layer 1		Layer 2		Layer 3
	USCS	CL		SM		SM
Point	z (ft)	Elev. 35 to 25	z (ft)	Elev. 25 to 17	z (ft)	Elev. 17 to 14
1	0.000	0.000	0.000	0.000	0.000	0.000
2	0.002	0.401	0.008	1.178	0.008	3.699
3	0.005	0.567	0.017	2.357	0.017	7.397
4	0.007	0.694	0.023	3.229	0.023	10.134
5	0.009	0.802	0.025	3.535	0.025	11.096
6	0.011	0.896	0.043	6.045	0.043	18.974
7	0.014	0.982	0.049	6.870	0.049	21.563
8	0.016	1.060	0.083	11.784	0.083	36.986
9	0.018	1.134	0.167	23.569	0.167	73.971
10	0.333	3.927	0.333	47.138	0.333	147.943

t-z Data

Layer 4		Layer 5			Layer 6	
ML		SM		USCS	CL	
p(kips/ft)		p(kips/ft)			p(kips/ft)	
z (ft)	Elev. 14 to 10	z (ft)	Elev. 10 to 7	z (ft)	Elev. 7 to 5	z (ft)
0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.002	0.563	0.002	1.403	0.002	0.093	0.002
0.003	0.625	0.003	1.557	0.003	0.186	0.003
0.004	0.646	0.004	1.610	0.005	0.279	0.004
0.005	0.664	0.005	1.654	0.007	0.372	0.005
0.007	0.694	0.007	1.727	0.008	0.465	0.007
0.008	0.717	0.008	1.786	0.013	0.765	0.008
0.017	0.796	0.017	1.982	0.033	2.001	0.017
0.058	0.960	0.058	2.391	0.033	2.027	0.058
0.083	1.013	0.083	2.523	0.167	2.886	0.083

Q-z Data

Layer 4		Layer 5			Layer 6	
ML		SM		USCS	CL	
z (ft)	Elev. 14 to 10	z (ft)	Elev. 10 to 7	z (ft)	Elev. 7 to 5	z (ft)
0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.008	0.426	0.008	4.272	0.002	0.751	0.008
0.017	0.852	0.017	8.545	0.003	1.063	0.017
0.023	1.168	0.023	11.706	0.005	1.302	0.023
0.025	1.278	0.025	12.817	0.006	1.503	0.025
0.043	2.186	0.043	21.917	0.008	1.680	0.043
0.049	2.484	0.049	24.908	0.009	1.841	0.049
0.083	4.261	0.083	42.723	0.011	1.988	0.083
0.167	8.522	0.167	85.447	0.012	2.126	0.167
0.333	17.044	0.333	170.893	0.333	7.363	0.333

Layer 7		Layer 8		Layer 9	USCS	Layer 10
SM		SM		CL		SP
p(kips/ft)		p(kips/ft)		p(kips/ft)		p(kips/ft)
Elev. 5 to -2	z (ft)	Elev. -2 to -5	z (ft)	Elev. -5 to -17	z (ft)	Elev. -17 to -27
0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.092	0.002	1.813	0.002	0.100	0.002	2.455
1.212	0.003	2.012	0.003	0.200	0.003	2.724
1.253	0.004	2.081	0.005	0.300	0.004	2.817
1.288	0.005	2.138	0.007	0.401	0.005	2.895
1.345	0.007	2.233	0.008	0.501	0.007	3.023
1.390	0.008	2.309	0.013	0.823	0.008	3.125
1.543	0.017	2.562	0.033	2.152	0.017	3.468
1.862	0.058	3.091	0.033	2.181	0.058	4.185
1.964	0.083	3.261	0.167	3.104	0.083	4.415

Layer 7		Layer 8		Layer 9	USCS	Layer 10
SM		SM		CL		SP
Elev. 5 to -2	z (ft)	Elev. -2 to -5	z (ft)	Elev. -5 to -17	z (ft)	Elev. -17 to -27
0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.553	0.008	4.942	0.002	0.751	0.008	5.626
5.107	0.017	9.885	0.003	1.063	0.017	11.251
6.996	0.023	13.542	0.005	1.302	0.023	15.414
7.660	0.025	14.827	0.006	1.503	0.025	16.877
13.098	0.043	25.354	0.008	1.680	0.043	28.860
14.885	0.049	28.813	0.009	1.841	0.049	32.798
25.533	0.083	49.423	0.011	1.988	0.083	56.257
51.065	0.167	98.845	0.012	2.126	0.167	112.514
102.130	0.333	197.691	0.333	7.363	0.333	225.028

Project: **MacArther Blvd OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:39 AM

Data: t-z Curves

Br. Name:	MacArther OC Seismic Retrofit	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55-0440L	OG =	35.0	Avg. Pile Dia =	10 inches
		Pile Cut-Off=	30.0		
Support(s):	All Bents	GW =	17.0		

Note: All elevations are in feet.

	t(kips/ft)		t(kips/ft)		t(kips/ft)
z (in)	Elev. 35 to 25	z (in)	Elev. 25 to 17	z (in)	Elev. 17 to 14
0.000	0.000	0.000	0.000	0.000	0.000
0.020	0.051	0.020	0.470	0.020	1.193
0.040	0.102	0.040	0.522	0.040	1.324
0.060	0.153	0.050	0.540	0.050	1.369
0.080	0.204	0.060	0.555	0.060	1.407
0.100	0.255	0.080	0.579	0.080	1.469
0.160	0.420	0.100	0.599	0.100	1.519
0.395	1.098	0.200	0.664	0.200	1.686
0.400	1.113	0.700	0.802	0.700	2.034
2.000	1.584	1.000	0.846	1.000	2.146

	t(kips/ft)		t(kips/ft)		t(kips/ft)
z (in)	Elev. 14 to 10	z (in)	Elev. 10 to 7	z (in)	Elev. 7 to 5
0.000	0.000	0.000	0.000	0.000	0.000
0.020	0.563	0.020	1.403	0.020	0.093
0.040	0.625	0.040	1.557	0.040	0.186
0.050	0.646	0.050	1.610	0.060	0.279
0.060	0.664	0.060	1.654	0.080	0.372
0.080	0.694	0.080	1.727	0.100	0.465
0.100	0.717	0.100	1.786	0.160	0.765
0.200	0.796	0.200	1.982	0.395	2.001
0.700	0.960	0.700	2.391	0.400	2.027
1.000	1.013	1.000	2.523	2.000	2.886

	t(kips/ft)		t(kips/ft)		t(kips/ft)
z (in)	Elev. 5 to -2	z (in)	Elev. -2 to -5	z (in)	Elev. -5 to -17
0.000	0.000	0.000	0.000	0.000	0.000
0.020	1.092	0.020	1.813	0.020	0.100
0.040	1.212	0.040	2.012	0.040	0.200
0.050	1.253	0.050	2.081	0.060	0.300
0.060	1.288	0.060	2.138	0.080	0.401
0.080	1.345	0.080	2.233	0.100	0.501
0.100	1.390	0.100	2.309	0.160	0.823
0.200	1.543	0.200	2.562	0.395	2.152
0.700	1.862	0.700	3.091	0.400	2.181
1.000	1.964	1.000	3.261	2.000	3.104

Project: **MacArther Blvd OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:39 AM

Data: t-z Curves

Br. Name:	MacArther OC Seismic Retrofit	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55=0440L	OG =	35.0	Avg. Pile Dia =	10 inches
		Pile Cut-Off=	30.0		
Support(s):	All Bents	GW =	17.0		

Note: All elevations are in feet.

	t(kips/ft)
z (in)	Elev. -17 to -
0.000	0.000
0.020	2.455
0.040	2.724
0.050	2.817
0.060	2.895
0.080	3.023
0.100	3.125
0.200	3.468
0.700	4.185
1.000	4.415

Project: **MacArther Blvd OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:39 AM

Data: Q-z Curves

Br. Name:	MacArther OC Seismic Retrofit	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55-0440L	OG =	35.0	Pile Tip Dia =	8 inches
		Pile Cut-Off=	30.0		
Support(s):	All Bents	GW =	17.0		

Note: All elevations are in feet.

	t(kips/ft)		t(kips/ft)		t(kips/ft)
z (in)	Elev. 35 to 25	z (in)	Elev. 25 to 17	z (in)	Elev. 17 to 14
0.000	0.000	0.000	0.000	0.000	0.000
0.022	0.257	0.080	0.754	0.080	2.367
0.044	0.363	0.160	1.508	0.160	4.734
0.066	0.444	0.219	2.067	0.219	6.486
0.088	0.513	0.240	2.263	0.240	7.101
0.110	0.574	0.410	3.869	0.410	12.143
0.132	0.628	0.466	4.397	0.466	13.800
0.154	0.679	0.800	7.542	0.800	23.671
0.176	0.726	1.600	15.084	1.600	47.342
3.200	2.513	3.200	30.168	3.200	94.683

	t(kips/ft)		t(kips/ft)		t(kips/ft)
z (in)	Elev. 14 to 10	z (in)	Elev. 10 to 7	z (in)	Elev. 7 to 5
0.000	0.000	0.000	0.000	0.000	0.000
0.080	0.000	0.080	2.734	0.015	0.481
0.160	0.000	0.160	5.469	0.029	0.680
0.219	0.000	0.219	7.492	0.044	0.833
0.240	0.000	0.240	8.203	0.058	0.962
0.410	0.000	0.410	14.027	0.073	1.075
0.466	0.000	0.466	15.941	0.088	1.178
0.800	0.000	0.800	27.343	0.102	1.272
1.600	0.000	1.600	54.686	0.117	1.360
3.200	0.000	3.200	109.372	3.200	4.712

	t(kips/ft)		t(kips/ft)		t(kips/ft)
z (in)	Elev. 5 to -2	z (in)	Elev. -2 to -5	z (in)	Elev. -5 to -17
0.000	0.000	0.000	0.000	0.000	0.000
0.080	1.634	0.080	3.163	0.015	0.481
0.160	3.268	0.160	6.326	0.029	0.680
0.219	4.477	0.219	8.667	0.044	0.833
0.240	4.902	0.240	9.489	0.058	0.962
0.410	8.383	0.410	16.226	0.073	1.075
0.466	9.527	0.466	18.441	0.088	1.178
0.800	16.341	0.800	31.630	0.102	1.272
1.600	32.682	1.600	63.261	0.117	1.360
3.200	65.363	3.200	126.522	3.200	4.712

Project: **MacArther Blvd OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:39 AM

Data: Q-z Curves

Br. Name:	MacArther OC Seismic Retrofit	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55=0440L	OG =	35.0	Pile Dia =	10 inches
		Pile Cut-Off=	30.0		
Support(s):	All Bents	GW =	17.0		

Note: All elevations are in feet.

	t(kips/ft)
z (in)	Elev. -17 to -
0.000	0.000
0.100	3.600
0.200	7.201
0.274	9.865
0.300	10.801
0.513	18.470
0.583	20.991
1.000	36.005
2.000	72.009
4.000	144.018

Br. Name:	MacArther OC Seismic Retrofit	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55-0440L	OG =	35.0	Pile Dia =	10 inches
		Pile Cut-Off=	30.0		
Support(s):	All Bents	GW =	17.0		

Note: All elevations are in feet.

	t(kips/ft)		t(kips/ft)		t(kips/ft)
z (in)	Elev. 35 to 25	z (in)	lev. 25 to 1	z (in)	Elev. 17 to 14
0.000	0.000	0.000	0.000	0.000	0.000
0.020	0.051	0.020	0.470	0.020	1.193
0.040	0.102	0.040	0.522	0.040	1.324
0.060	0.153	0.050	0.540	0.050	1.369
0.080	0.204	0.060	0.555	0.060	1.407
0.100	0.255	0.080	0.579	0.080	1.469
0.160	0.420	0.100	0.599	0.100	1.519
0.395	1.098	0.200	0.664	0.200	1.686
0.400	1.113	0.700	0.802	0.700	2.034
2.000	1.584	1.000	0.846	1.000	2.146

	t(kips/ft)		t(kips/ft)		t(kips/ft)
z (in)	Elev. 14 to 10	z (in)	Elev. 10 to 7	z (in)	Elev. 7 to 5
0.000	0.000	0.000	0.000	0.000	0.000
0.020	0.563	0.020	1.403	0.020	0.093
0.040	0.625	0.040	1.557	0.040	0.186
0.050	0.646	0.050	1.610	0.060	0.279
0.060	0.664	0.060	1.654	0.080	0.372
0.080	0.694	0.080	1.727	0.100	0.465
0.100	0.717	0.100	1.786	0.160	0.765
0.200	0.796	0.200	1.982	0.395	2.001
0.700	0.960	0.700	2.391	0.400	2.027
1.000	1.013	1.000	2.523	2.000	2.886

	t(kips/ft)		t(kips/ft)		t(kips/ft)
z (in)	Elev. 5 to -2	z (in)	Elev. -2 to -5	z (in)	Elev. -5 to -17
0.000	0.000	0.000	0.000	0.000	0.000
0.020	1.092	0.020	1.813	0.020	0.100
0.040	1.212	0.040	2.012	0.040	0.200
0.050	1.253	0.050	2.081	0.060	0.300
0.060	1.288	0.060	2.138	0.080	0.401
0.080	1.345	0.080	2.233	0.100	0.501
0.100	1.390	0.100	2.309	0.160	0.823
0.200	1.543	0.200	2.562	0.395	2.152
0.700	1.862	0.700	3.091	0.400	2.181
1.000	1.964	1.000	3.261	2.000	3.104

Br. Name:	MacArther OC Seismic Retrofit	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55=0440L	OG =	35.0	Pile Dia =	10 inches
		Pile Cut-Off=	30.0		
Support(s):	All Bents	GW =	17.0		

Note: All elevations are in feet.

	t(kips/ft)
z (in)	Elev. -17 to -27
0.000	0.000
0.020	2.455
0.040	2.724
0.050	2.817
0.060	2.895
0.080	3.023
0.100	3.125
0.200	3.468
0.700	4.185
1.000	4.415

State of California **Business, Transportation and Housing Agency**

M e m o r a n d u m

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To: MS. TRACI MENARD
Office of Bridge Design South 1, Chief
Bridge Design Branch 15
Division of Engineering Services

Attn: Mr. Jose Higareda

Date: March 25, 2014
File: 12-ORA-91-R0.0/R2.9
EA# 12-0M7201
Route 91/39 Separation Retrofit
Bridge No. 55-0303

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design South 1
Branch D

Subject: Foundation Report for Route 91/39 Separation Retrofit

INTRODUCTION

In a memo dated July 20, 2013, the Office of Bridge Design South 1 (OBDS1)-Branch 15 requested from the Office of Geotechnical Design South 1 (OGDS1) preliminary geologic, geotechnical, seismic, and foundation recommendations for a proposed retrofit of the Route 91/39 Separation, Bridge No. 55-0302.

OGDS1 geologic/foundation recommendations are based on the review of the following records and documents as well as results of the recent OGDS1 geotechnical exploration program implemented for this project**:**

- As-Built Geology/Foundation Report for Beach Blvd UC, dated March 22, 1967.
- As-Built General and Foundation Plan for Beach Blvd UC, dated June 13, 1969.
- As-Built Log of Test Borings (LOTB) for Beach Blvd UC, dated June 13, 1969.
- As-Built General/Foundation Plan for Beach Blvd UC (Widen), dated June 15, 1999.
- As-Built Log of Test Borings (LOTB) for Beach Blvd UC (Widen) dated June 15, 1999.
- FPS&E Beach Blvd. UC Retrofit Plans, plotted March 17, 2014.

SCOPE OF WORK

Tasks completed by the OGDS1, Brach D include the following:

1. Review of pertinent information from previous geology/geotechnical reports and As-Built plans in the project area.
2. Drilling, logging, and sampling of one rotary wash boring and soundings from three electronic cone penetrometer tests (CPT's) at the subject bridge site to characterize the subsurface conditions.

3. Laboratory testing of selected soil samples for mechanical analysis, corrosivity, direct shear, unit weight, Atterberg Limits, and moisture content.
4. Performing geotechnical analysis.
5. Preparing this report.

PROJECT DESCRIPTION

State Route 91 (SR-91) in Orange County was originally constructed in the 1960s as a controlled access freeway. A major effort to improve traffic capacity began in 1992 with the construction of the SR-91 toll lanes. The SR-91 is generally an 8 to 10 general-purpose lane freeway with auxiliary lanes. The SR-91 express/toll lanes provide two additional lanes in each direction. The toll lanes in the median are operated and maintained by OCTA (Orange County Transportation Authority) under a franchise agreement with the State.

The existing Route 91/39 Separation, Br. No. 55-0433, is a continuous two-span structure consisting of precast prestressed concrete girders, with 15 foot minimum vertical clearance, carrying westbound (WB) and eastbound (EB) lanes of Rte 91 Freeway traffic in Orange County (PM 2.61). The original Route 91/39 Separation was constructed in 1969, having a total span length of 187 foot 10 inch, measured along Center Route 91. The site map is attached as Appendix I.

As built drawings and bridge inspection reports indicate that the bridge contains one bent, consisting of 8 flared columns. The original bridge was widened from 6 columns to 8 columns bent. The drawings indicate that abutments and bents are supported on Raymond Step Taper CIP driven piles (driven steel shell filled with concrete), designed for loads (bearing) of 45 Tons.

Based on recommendations by the Caltrans Seismic Advisory Board, the Office of Earthquake Engineering (OEE) performed reviews of state-owned bridges for potential seismic vulnerabilities and provided the summary of results in a Memorandum dated July 16, 2010. Based on the OEE review, bridges built before 1971 with flared columns were evaluated for vulnerability to shear damage during earthquakes. The primary concern was for the portion of the columns below the flare that had not been designed for the larger plastic shear force caused by the reduced effective column length. Route 91/39 Separation was among bridges in this study found vulnerable to the flared column shear damage during earthquakes. The typical retrofit to address this vulnerability includes installation of column casing below the flare at bents/piers, possibly an infill wall, and/or the footing retrofit/strengthening.

OGDS1 Branch D received a request from OBDS1 to provide the bridge site geology/ geotechnical information, seismic recommendations including liquefaction potential due to seismic event and site settlements, ARS curve and PGA for the bridge site, p-y, t-z, and q-z curves/data, and foundation retrofit recommendations.

Based on the FPS&E project plant for Route 91/39 Separation Retrofit, provided by OBDS1 (3/17/2014), OGDS1 understands that the proposed retrofit project will consist of steel column casing installation (retrofit).

The elevations provided in the proposed FPS&E (retrofit) project plans and recent Log of Test Boring (LOTB) are based on NAVD88 datum. The As-Built elevations are based on NGVD29 datum. The benches on NAVD88 datum are 2.4' higher than the NGVD29 datum (datum shift information provided to OGDS1 by District 12 Survey on March 14, 2014).

FIELD INVESTIGATION AND TESTING PROGRAM

The site-specific field exploration was performed between October 22, 2013 and November 6, 2013. The filed investigation included drilling one rotary-wash boring (4.5 inch outer diameter) and advancing three cone penetration test (CPT) soundings. Standard Penetration Tests (SPT's) and relatively undisturbed sampling (with a 2 inch inner diameter split-barrel sampler) were performed at the borings. Blow counts (SPT N values) were continuously recorded at 5 foot intervals during drilling. SPT's were performed in accordance with ASTM Test Method D1586-84 using a standard 1.4 inch I.D. sampler with a 140 lb. hammer dropped 30 inches. Undisturbed tube soil samples were also obtained using a 2 inch I.D. modified California Split Spoon Sampler with 4 inch long brass liners. The lined samples were all sealed in the field. This modified sampler was used to collect fine-grained soils such as silts and clays that were identified during the CPT investigation. Caltrans operated drill rig model CS2000, utilizing mud rotary drilling methods, was used at boring locations. The boring was drilled by the Caltrans Office of Drilling Services and logged by personnel from our office. The Geotechnical findings obtained from this exploration were utilized to estimate geotechnical capacity of the existing foundation.

At the completion of the boring, the hole was backfilled with grout and Bentonite chips, and patched with AC/Quick set concrete patch at the surface.

The Office of District 12 Survey provided location and elevation of the borings and CPT's. Boring/CPT information, including exploration number, stationing, offset, ground surface elevation, boring depth, and date drilled are summarized in Table 1 below:

Table 1 – Summary of Boring/CPT Information

Boring/CPT Exploration No.	Station Rte 405 CL	Offset (ft)	Surface Elev. (ft)	Drilled Depth (ft)	Bottom Elev. (ft)	Date Drilled
CPT-13-001	357+09.74	114.4Rt	79.2	85.0	-5.8	10-22-13
CPT-13-002	357+09.45	12.5Lt	79.0	60.9	18.1	10-22-13
CPT-13-003	357+09.32	86.5Lt	79.0	59.9	19.0	10-23-13
RW-13-001	357+09.55	103.5Lt	79.0	71.5	7.5	11-06-13

4.0 LABORATORY TESTING PROGRAM

Selected soil samples from the two borings were sent to the Department's Transportation Laboratory in Sacramento and District 8 Materials Laboratory (Southern Regional Lab) for testing. All laboratory tests were performed in accordance with ASTM/AASHTO standard procedures and California Test Methods. The summarized laboratory tests data are shown in Table 2 below.

A summary of the geotechnical laboratory results is presented in Appendix II: Laboratory Data.

Table 2 – Laboratory Test Methods

Test	Standard
Particle Size Analysis	ASTM D422
Plasticity Index/Liquid Limit	AASHTO T 90&89
Unit Weight	ASTM D4767
Moisture Content	ASTM D2216

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Regional Geology

The site is within the Los Angeles Basin, which is between the Peninsular Ranges and Transverse Ranges geomorphic provinces. The Los Angeles Basin is an alluvium-filled basin that is up to several miles thick at its deepest point. The site is southwest of the Coyote Hills and east of the confluence of the Coyote Hills Creek and Fullerton Creek. The topography of the area is relatively level.

Site Geology

The site is located in the central Los Angeles Basin, and is underlain by alluvium derived from the San Gabriel River and its tributaries, such as Coyote Creek**.** The alluvium is generally composed of interlayered, very thickly bedded, medium dense to dense sands with varying amounts of silt.

Subsurface Conditions

Boring RW-13-001 encountered poorly graded sand/ silty sand/clayey sand with generally 5-45% fines, and sandy silt, silt, and clay (70-99% fines). The mostly sandy/silty soil was medium dense to dense in the upper 35 feet, and dense to very dense from 35 feet down to maximum dept drilled, 71.5 feet (elevation +7.5 feet). Fine grained soils (silts) encountered from 15 feet to 50 feet depth were mostly stiff to very stiff. Very stiff clay layer was encountered from about 52 feet to 60 feet depth.

Subsurface conditions encountered during the recent drilling are presented on the Log of Test Borings (LOTB), attached to this report as Appendix III.

Groundwater

Historical Data

Previously conducted investigations for the Route 91/39 Separation encountered ground water at elevations of +58.3 ft and +60 ft, above mean sea level (MSL) and in 1957 elevations of +52 ft and +56 ft MSL in 1993. The closest Department of Water Resources ground water well data shows a historic high ground water elevation at +32.6 feet above sea level in January 1982 at well 04S11W02R002S, which is located approximately ½ mile south of the site on Beach Blvd (Route 91/39 Separation). Monitoring wells at nearby gas stations show a depth to ground water of roughly 13 to 15 feet below grade between 1989 and 1999 according to the GeoTracker website.

Current investigation

Ground water was encountered in boring RW-13-001 at approximately 14.5 feet below ground surface, or at an elevation of +64.5 feet. For this project foundation retrofit analysis and recommendations, ground water elevation at +64.5 feet was used. The water level may vary with the seasonal precipitation.

SEISMIC RECOMMENDATIONS

The seismicity at the site was evaluated using Version 2.3.06 of the Caltrans ARS Online tool. The seismicity for the project was measured from at the center of the Beach Blvd. Separation. A V_{s30} of 280 m/s was used based on correlations with CPT data from the current investigation, as well as SPT blow counts from the current and previous investigations. The PGA for the project limits is 0.57g. The ARS curve is attached as Appendix IV.

The controlling faults are the USGS 5% in 50 years probabilistic data, the Puente Hills (Coyote Hills), Anaheim, and Compton Faults. The Puente Hills Fault is Fault ID 361 in the Caltrans ARS On-line database. It is a reverse fault dipping 26° to the northwest with a M_{max} of 6.8. The rupture distance (R_{rup}) is approximately 3.9 km from the site. The Anaheim Fault is Fault ID 363 in the Caltrans ARS On-line database. It is a reverse fault dipping 71° to the northeast with a M_{max} of 6.4. The rupture distance (R_{rup}) is approximately 4.8 km from the site. The Compton Fault is Fault ID 367 in the Caltrans ARS On-line database. It is a reverse fault dipping 20° to the northeast with a M_{max} of 6.9. The rupture distance (R_{rup}) is approximately 11.4 km from the site.

The project site is not located within any Alquist-Priolo Earthquake Fault Zones as established by the California Geological Survey (CGS, 1997) and surface rupture potential is considered to be low.

Liquefaction

The potential for liquefaction is considered medium from about 22 to 25 ft below the ground surface (elevation +54 to +57 feet) and low at other elevations due to a higher density or cohesive soil, based on recent geotechnical investigation and review of As-Built records at the subject site. Soils encountered below ground water table (elevation +64.5 ft) were mostly medium dense to very dense sands and stiff to very stiff silts and fat clays As-Built driven concrete pile tips (Raymond Step Taper) have bearing in dens sandy layer. Soil settlements estimate at bent locations due to seismic event for this site are up to 4 inch. The site soil liquefaction potential and settlement estimates were based on CPT records analysis using GeoLogismiki software CLiq v.1.7, Cone Penetration Test based soil liquefaction assessment software, prepared in collaboration with Gregg Drilling Inc. and Prof. Peter Robertson.

AS-BUILT INFORMATION

The existing structure is a continuous 2-span reinforced concrete bridge constructed in 1969. The existing foundation is comprised of Raymond Step Taper C.I.P. piles (driven steel shall filled with concrete), driven to specified bearing of 45 tons at all support locations. The specified tip elevation at all support locations is 40 feet and estimated tip is 35 feet elevation.

The widen structure (1999) is supported by Class 45C (45) at Abutments and Class 70C (70) at Bent location. Specified tip elevations for concrete piles, at Bent 2 support, are 22 and 31 feet for EB and WB widen, respectively.

The summary of As-Built (1969) pile data, pile type, design load, bottom of footing elevation, specified tip elevations, and average tip elevations are presented in Table 3 below.

Table 3 – As-Built (1969) Foundation Data for Route 91/39 Separation, Br. No. 55-0303

Design Location	Pile Type/ Dimension (in)	Service Load (kips)	Bottom of Footing Elev. (ft)	Specified Tip Elevation (ft)	Average Tip Elevation (ft)
Abutment 1	Raymond Step-Taper Tip 8”, Top 15”	90	+86.91	40	+38
Bent 2	Raymond Step-Taper Tip 8”, Top 12”	90	+71.5	40	+37.5
Abutment 3	Raymond Step-Taper Tip 8”, Top 15”	90	+88.17	40	+39

As-Built elevations are based on NGVD29 datum. The benches on NAVD88 datum are 2.4’ higher than the NGVD29 datum (datum shift information provided to OGDS1 by District 12 Survey on March 14, 2014).

FOUNDATION RECOMMENDATIONS

Pile Axial Geotechnical Capacity

Geotechnical capacities of the existing piles were evaluated by OGDS1 based on the 1969 As-Built Plans/LOTB and soil data obtained from the recent geotechnical exploration (October to November, 2013). Pile original design loading, pile cut-off elevation, and average pile tip elevations are obtained from the 1969 As-Built Plans/LOTB.

Raymond Step Taper CIP pile (driven steel shall filled with concrete) geotechnical axial capacities were calculated using the APILE plus Version 4.0 (Ensoft Inc.) computer program for analysis of the axial capacity of existing driven piles. Pile Data Table No. 4 for Ben 2 is shown below.

Table 4- As-Built (1969) Pile Soil Resistance for Route 91/39 Separation, Br. No. 55-0303

Support Location/ Type & Size	Design Loading	Ultimate Soil Resistance		Elevations Based On NGVD 29 Datum (1969 As-Built Contract Plans)		
	Compression (kips)	Compression Average (kips)	Tension (kips)	Approx. Exist. Grade Elevation (ft)	Pile Cut-Off Elevation (ft)	Average Pile Tip Elevation (ft)
Bent 2 Raymond Step Taper Tip 8" Top 12"	90	100	N/A	79.0+-	+71.75	+38

Axial resistance to compression noted in the table above is based on combined skin friction and end bearing at the supports within foundation soils.

Based on the review of As-Built soil data and recent geotechnical explorations, OGDS1 performed calculations and provided values for the p-y, t-z, and q-z curves/data for the bridge site to OBDS1 (by Dr. Mohammed Islam). P-y, t-z, and q-z curves and data are attached as Appendix V.

OGDS1 provided geotechnical (retrofit) recommendations for Bent 2 include descriptions of geotechnical exploration, preparation of LOTB, analysis of site soil liquefaction potential, seismic data (ARS design curve), and analysis/calculation for existing piles geotechnical axial capacity. Based on the results of analysis for liquefaction potential at the project site (Bent 2), OGDS1 in discussion with OBDS1 agreed that deep foundation retrofit won't be necessary at the bents.

For the proposed Bent 2 retrofit, composite column casing retrofit was proposed by OBDS1, as shown in FPS&E project plans, dated 03/17/14. The design engineer should determine the anticipated performance and requirement expected of the existing foundation type.

Any questions regarding the above recommendations should be directed to Tatjana Halda at (213) 620-2347, Kristopher Barker at (562) 665-0048, or Shiva Karimi at (213) 620-2146, of the Office of Geotechnical Design-South 1, Branch D.

Report by Date: 3/25/14

Tatjana Halda

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Tatjana Halda, P.E. (Civil)
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Supervised by Date: 3/25/14

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STATE OF CALIFORNIA

Shiva Karimi, Ph.D., P.E., G.E
Chief, Branch D
Office of Geotechnical Design – South 1

Report by Date: 3/25/14

Kristopher Barker

PROFESSIONAL GEOLOGIST
KRISTOPHER BARKER
No. 2383
CERTIFIED
ENGINEERING
GEOLOGIST
8-31-15
STATE OF CALIFORNIA

Kristopher Barker, C.E.G.
Engineering Geologist, Branch D
Office of Geotechnical Design – South 1

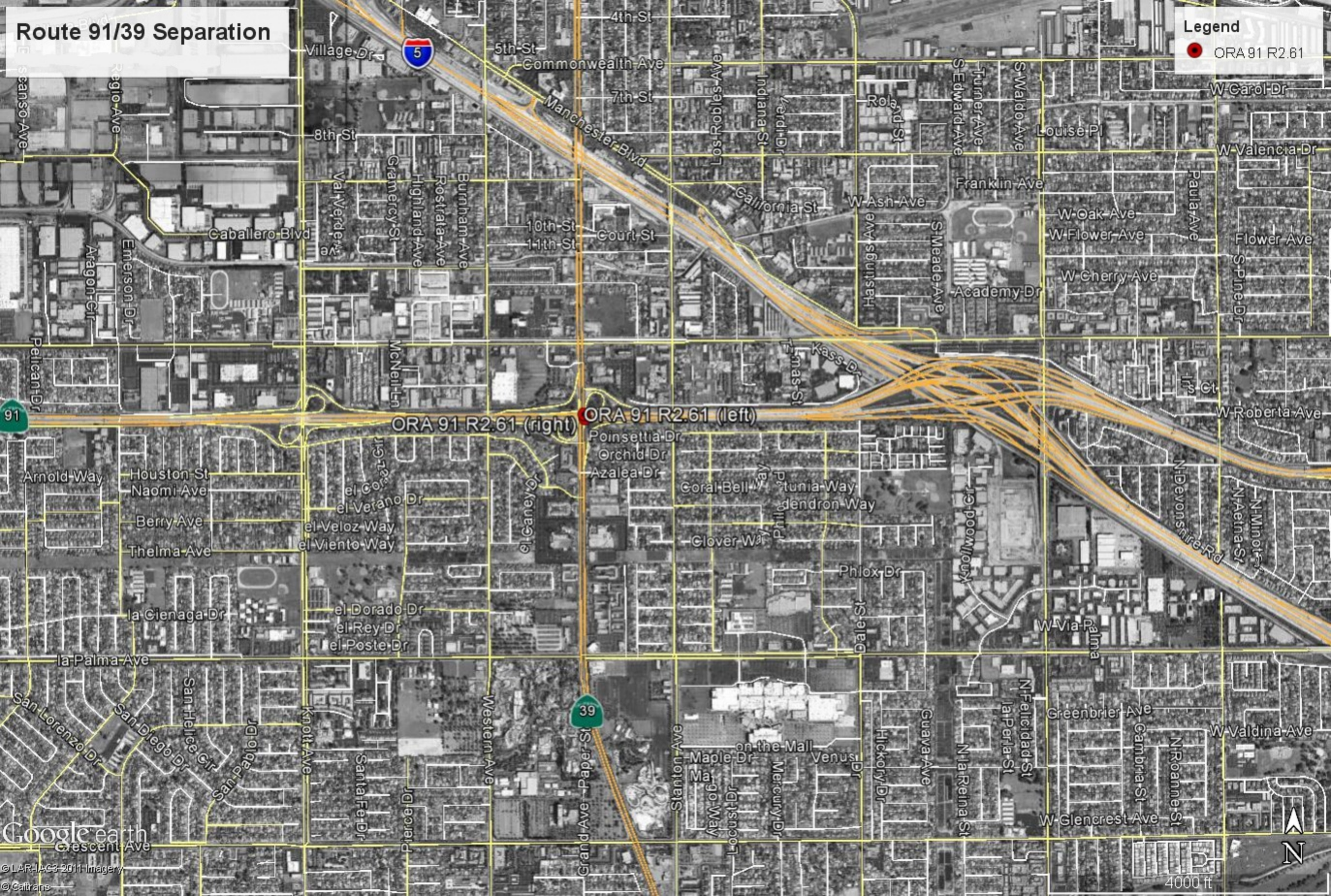
cc: Structure Construction R.E. pending File (RE_Pending@dot.ca.gov)
District 12 Design – Andrew_P_Oshrin@dot.ca.gov,
Project Manager – Leo_Chen@dor.ca.gov
Structure Design – Jose_Higareda@dot.ca.gov, Anthony Logus@dot.ca.gov
GS Corporate – Douglas_Brittsan@dot.ca.gov

Attachments:
Appendix I – Site Vicinity Map
Appendix II – Laboratory Data
Appendix III – LOTB
Appendix IV – Caltrans ARS (online) Curve
Appendix V – p-y, t-z, q-z Curves

Appendix I

Site Vicinity Map

Route 91/39 Separation



Appendix II

Laboratory Data

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-1

Material Source: Depth 5'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1	S	-	1				3263B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 1111 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5	0	0		100	
6	4.75	6	1		99	
1105		1111				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	99
	2.36 mm	0	0	100	99
	1.18 mm	2	3	97	96
80.0 g	600 µm	8	10	90	89
	300 µm	21	26	74	73
	150 µm	36	45	55	54
	75 µm	45	57	43	43

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	22.0	7.0	15.0	19%	19%
24hr.	1M	16.0	7.0	9.0	11%	11%

SAND EQUIVALENT

						MIN. SPEC.
Sand R2					Avg.	
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / 500 - W =	

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / A - C =	
SSD = B / B - C =	
OD = A / B - C =	

MOISTURE CONTENT

		SPEC.	PLASTICITY INDEX
Gr. Wet		L.L.	
Gr. Dry			
H2O		P.L.	
Tare			
Net Dry		P.I.	
% H2O			

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES	
NM	Satisfactory	
	Unsatisfactory	

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
	A.B.	PCC	
	A.S.	Bk.Fill	
	EMB.	MISC.	
	O.G.	Sub-Grade	
	A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 6 3 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-2

Material Source: Depth 10'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1 2	0 M 7 2 0 1	S - 2	3264B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 733 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
733		733				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)						
	2.36 mm	0	0	100	100	
	1.18 mm	1	1	99	99	
80.0 g	600 µm	3	4	96	96	
	300 µm	9	11	89	89	
	150 µm	29	36	64	64	
	75 µm	48	60	40	40	

MECH. / HYDRO.		R	Corr.	C.R.	Mat. In Sus.	Comb % Pass
1hr.	5M	16.0	7.0	9.0	11%	11%
24hr.	1M	13.0	7.0	6.0	8%	8%

SAND EQUIVALENT

					MIN.
Sand R2				Avg.	SPEC.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.	SPEC.
	Wtd.
	Avg.
	% CP
	Ret.
	No.4 =

% CP = P/R

R-VALUE

RESULT	SPEC.

SP. G. FINE (APP)

	Dummy	Sample
Final		
Initial		
Δ =		
Correction:		

V = Volume

$\frac{55.0\ g}{V} =$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$App = \frac{A}{A - C} =$

$SSD = \frac{B}{B - C} =$

$OD = \frac{A}{B - C} =$

MOISTURE CONTENT

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

P.I.	9
P.L.	19
L.L.	28

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O pH		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NL	

ORGANIC IMPURITIES

Satisfactory	
Unsatisfactory	

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (APP)	208	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		CRM-Rubber	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 6 4 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-3

Material Source: Depth 15'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
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Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1	S	-	3				3265B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 991 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
991		991				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)						
			0	100	100	
	2.36 mm	1	1	99	99	
	1.18 mm	3	4	96	96	
80.0 g	600 µm	12	15	85	85	
	300 µm	39	49	51	51	
	150 µm	65	81	19	19	
	75 µm	73	91	9	9	

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	10.0	7.0	3.0	4%	4%
24hr.	1M	9.0	7.0	2.0	3%	3%

SAND EQUIVALENT

					MIN.
Sand R2				Avg.	SPEC.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

SPEC.

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.	212	
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 6 5 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-4

Material Source: Depth 20'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
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Fontana, CA 92336

Phone: (909) 350 9039

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R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1	2	0	M	7	2	0	1	S	-	4				3266B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 3 brass tube

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 100 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
100		100				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
		0	0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	1	1	99	99
	300 µm	2	3	97	97
	150 µm	9	11	89	89
	75 µm	18	22	78	78

MECH. / HYDRO.	R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	27.0	7.0	20.0	25%	25%
24hr.	1M	18.0	7.0	11.0	14%	14%

SAND EQUIVALENT

						MIN.
Sand R2					Avg.	SPEC.
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

Bulk $= \frac{500}{500 - W} =$

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$App = \frac{A}{A - C} =$

$SSD = \frac{B}{B - C} =$

$OD = \frac{A}{B - C} =$

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	28
P.L.	26
P.I.	2

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
■	Unit Wt.		✓
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Wet Unit Weight

117.10 pcf

% MC = 31.5%

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201 LAB. NO. 3266B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-5

Material Source: Depth 25'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1 2	0 M 7 2 0 1	S - 5	3267B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 3 brass tube

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 288 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
288		288				

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)						
			0	100	100	
	2.36 mm	0	0	100	100	
	1.18 mm	0	0	100	100	
80.0 g	600 µm	1	1	99	99	
	300 µm	1	1	99	99	
	150 µm	4	5	95	95	
	75 µm	24	30	70	70	

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	23.0	7.0	16.0	20%	20%
24hr.	1M	14.0	7.0	7.0	9%	9%

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / 500 - W =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

SAND EQUIVALENT

						MIN. SPEC.
Sand R2					Avg.	
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / A - C =	
SSD = B / B - C =	
OD = A / B - C =	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
■	Unit Wt.		✓
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Wet Unit Weight

118.10 pcf

% MC = 28.6 %

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 6 7 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-6

Material Source: Depth 30'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1 2	0 M 7 2 0 1	S - 6	3268B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 979 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
979		979				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	1	1	99	99
	300 µm	4	5	95	95
	150 µm	19	24	76	76
	75 µm	44	56	44	44

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	20.0	7.0	13.0	16%	16%
24hr.	1M	15.0	7.0	8.0	10%	10%

SAND EQUIVALENT

						MIN. SPEC.
Sand R2					Avg.	
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 6 8 B

07-AGG-SSD (RG/SD 7/93, Rev. DH 07/17/01)

SRL SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	-	7				3269B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-7

Material Source: Depth 35'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

GRADING ANALYSIS

Total Wt 698 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
698		698				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	100
	2.36 mm	1	1	99	99
	1.18 mm	1	1	99	99
80.0 g	600 µm	5	6	94	94
	300 µm	25	31	69	69
	150 µm	54	68	32	32
	75 µm	70	87	13	13

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	10.0	7.0	3.0	4%	4%
24hr.	1M	8.0	7.0	1.0	1%	1%

SAND EQUIVALENT

					MIN.
Sand R2				Avg.	SPEC.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

SPEC.

Gr. Wet	
Gr. Dry	
H2O	
Tare	
Net Dry	
% H2O	

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 6 9 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-9

Material Source: Depth 45'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

1	2	0	M	7	2	0	1	S	-	9				3270B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 3 brass tube

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 293 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
293		293				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
		0	0	100	100
	2.36 mm	0	0	100	100
	1.18 mm	0	0	100	100
80.0 g	600 µm	0	0	100	100
	300 µm	0	0	100	100
	150 µm	0	0	100	100
	75 µm	10	13	87	87

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	22.0	7.0	15.0	19%	19%
24hr.	1M	14.0	7.0	7.0	9%	9%

SAND EQUIVALENT

						MIN. SPEC.
Sand R2					Avg.	
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	29
P.L.	27
P.I.	2

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3270B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-10

Material Source: Depth 50'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1	2	0	M	7	2	0	1	S	-	1	0			3271B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 3 brass tube

By: FAX / MAIL / PHONE / OTHER

NORMAL ✓ PRIORITY DATE NEEDED:

GRADING ANALYSIS

Total Wt 309 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
309		309				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)						
			0	100	100	
	2.36 mm	0	0	100	100	
	1.18 mm	0	0	100	100	
80.0 g	600 µm	0	0	100	100	
	300 µm	0	0	100	100	
	150 µm	20	25	75	75	
	75 µm	61	76	24	24	

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	10.0	7.0	3.0	4%	4%
24hr.	1M	9.0	7.0	2.0	3%	3%

SAND EQUIVALENT

						MIN. SPEC.
Sand R2					Avg.	
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry
(A) Ov. Dry
ABS. %
Wt. S+C+H2O
Wt. S+C
W=Wt. H2O

$$\text{Bulk} = \frac{500}{500 - W} =$$

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry
(A) Ov. Dry
ABS. %
(C) Wt. S. in H2O

$$\text{App} = \frac{A}{A - C} =$$

$$\text{SSD} = \frac{B}{B - C} =$$

$$\text{OD} = \frac{A}{B - C} =$$

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.
P.L.
P.I.

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.
Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory
Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
■	Unit Wt.		✓
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Wet Unit Weight

122.70 pcf

% MC = 24.5 %

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 7 1 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-11

Material Source: Depth 55'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1	2	0	M	7	2	0	1	S	-	1	1			3272B
CONTRACT NO.								SAMPLE NO.						LAB. NO.

DATE RCV'D: 11/8/13
DATE OUT:

NUMBER OF CONTAINERS: 3 brass tube

NORMAL ✓ PRIORITY
DATE NEEDED:

By: FAX / MAIL / PHONE / OTHER

GRADING ANALYSIS

Total Wt 244 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5					
0	4.75	0	0		100	
244		244				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)						
			0	100	100	
	2.36 mm	0	0	100	100	
	1.18 mm	0	0	100	100	
80.0 g	600 µm	0	0	100	100	
	300 µm	0	0	100	100	
	150 µm	0	0	100	100	
	75 µm	1	1	99	99	

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus.	Comb % In Sus.
1hr.	5M	62.0	7.0	55.0	69%	69%
24hr.	1M	43.0	7.0	36.0	45%	45%

SAND EQUIVALENT

						MIN.
Sand R2					Avg.	SPEC.
Clay R1						
S.E. Value						

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.			SPEC.
			Wtd.
			Avg.
			% CP
			Ret.
			No.4 =
	% CP = P/R		

R-VALUE

RESULT	SPEC.

SP. G. FINE (SSD)	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / (500 - W) =	

SP. GR. COARSE CT206/CT209, +4	
(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / (A - C) =	
SSD = B / (B - C) =	
OD = A / (B - C) =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	72
P.L.	30
P.I.	42

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.
Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory	
Unsatisfactory	

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
■	Plasticity Index	204	✓
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
■	Unit Wt.		✓
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
■	Moisture Content	226	✓
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
A.B.		PCC	
A.S.		Bk.Fill	
EMB.		MISC.	
O.G.		Sub-Grade	
A.C. Agg.		SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Wet Unit Weight

109.10 pcf

% MC = 41.6 %

Max. Dry Density (pcf)
Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)
Wt Pycnometer + H_2O (Wa)
Wt Pycnometer + H2O + Soil (Wb)
Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 7 2 B

SRL SOIL & AGGREGATE TESTS

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-12

Material Source: Depth 60'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker
Address:

Phone No.: 909-388-7185
Fax. No.:

1 2	0 M 7 2 0 1	S - 1 2	3273B
	CONTRACT NO.	SAMPLE NO.	LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

GRADING ANALYSIS

Total Wt 678 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5	0	0		100	
13	4.75	13	2		98	
665		678				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	98
	2.36 mm	1	1	99	97
	1.18 mm	4	5	95	93
80.0 g	600 µm	12	15	85	83
	300 µm	26	33	67	66
	150 µm	43	54	46	45
	75 µm	55	68	32	31

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	12.0	7.0	5.0	6%	6%
24hr.	1M	9.0	7.0	2.0	3%	3%

SAND EQUIVALENT

					MIN.
Sand R2				Avg.	SPEC.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod.	SPEC.
	Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT	SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / (500 - W) =	

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / (A - C) =	
SSD = B / (B - C) =	
OD = A / (B - C) =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING

NM

ORGANIC IMPURITIES

Satisfactory

Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

			✓
	A.B.	PCC	
	A.S.	Bk.Fill	
	EMB.	MISC.	
	O.G.	Sub-Grade	
	A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 1 2 - 0 M 7 2 0 1

LAB. NO. 3 2 7 3 B

SRL SOIL & AGGREGATE TESTS

1	2	0	M	7	2	0	1	S	-	1	3				3274B
CONTRACT NO.								SAMPLE NO.							LAB. NO.

DATE RCV'D: 11/8/13 DATE OUT:

NUMBER OF CONTAINERS: 1 bag

NORMAL ✓ PRIORITY DATE NEEDED:

By: FAX MAIL PHONE OTHER

Sample of: Soil

Sampled from: Bridge Retrofit Route 91 - RC-13-001 - S-13

Material Source: Depth 65'

Owner / Mfr.:

Date Sampled: 11/5-7/13

SRL Lab. Stamp

By _____ for

D. OZOWARA

SRL Materials Engineer

SOUTHERN REGIONAL LABORATORY
13970 Victoria Street
Fontana, CA 92336

Phone: (909) 350 9039

Fax: (909) 829 6294

R.E.: Kristopher Barker

Address:

Phone No.: 909-388-7185

Fax. No.:

GRADING ANALYSIS

Total Wt 1167 g By: Date:

Wt. Ret.	Size (mm)	Acc. Wt. Ret.	% Ret.	% Pass	Comb. % Pass	SPEC.
	87.5					
	75					
	62.5					
	50					
	37.5					
	25					
	19					
	12.5					
	9.5	0	0		100	
10	4.75	10	1		99	
1157		1167				

FINE GRADE / MECHANICAL ANALYSIS

Dry Wt. (g)					
			0	100	99
	2.36 mm	2	3	97	96
	1.18 mm	13	16	84	83
80.0 g	600 µm	50	63	37	37
	300 µm	70	88	12	12
	150 µm	75	94	6	6
	75 µm	76	95	5	5

MECH. / HYDRO.		R	Corr.	C.R.	Mat In Sus	Comb % In Sus
1hr.	5M	9.0	7.0	1.0	1%	1%
24hr.	1M	9.0	7.0	1.0	1%	1%

SAND EQUIVALENT

					MIN.
Sand R2				Avg.	SPEC.
Clay R1					
S.E. Value					

L.A.R.T.	Rev.	Wt.	Wt. Ret.	% Ret.	% Loss	% SPEC
A B	100	5000g				
C D	500	5000g				

No. of spheres = Wt. of spheres =

DURABILITY INDEX

		SPEC.
Dura-Coarse	Sed.Ht.=	
Dura-Fine	R2/R1 =	

R-VALUE BATCH

% Run	Size	Wt.
	25 mm	
	19 mm	
	12.5 mm	
	9.5 mm	
	4.75 mm	

% CRUSHED PARTICLES

%Ret.x(Wt.Cr./Tot.Wt.) = Prod. SPEC.

Wtd. Avg. % CP Ret. No.4 =

% CP = P/R

R-VALUE

RESULT SPEC.

SP. G. FINE (SSD)

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
Wt. S+C+H2O	
Wt. S+C	
W=Wt. H2O	
Bulk = 500 / 500 - W =	

SP. GR. COARSE CT206/CT209, +4

(B) S.S. Dry	
(A) Ov. Dry	
ABS. %	
(C) Wt. S. in H2O	
App = A / A - C =	
SSD = B / B - C =	
OD = A / B - C =	

MOISTURE CONTENT

		SPEC.
Gr. Wet		
Gr. Dry		
H2O		
Tare		
Net Dry		
% H2O		

PLASTICITY INDEX

L.L.	
P.L.	
P.I.	

pH / RESISTIVITY

	Field	Lab.
Soil pH		
H2O		
Min. Resistivity		

Based on 18 gauge CMP.

Estimated life:

CLEANNESS VALUE

NL	SED. HT.	RESULT

FILM STRIPPING	ORGANIC IMPURITIES
NM	Satisfactory
	Unsatisfactory

TEST(S) REQUESTED

			✓
■	Fine Grade	202	✓
	Coarse Grade	202	
	Filler Material	202	
■	Mech. Analysis	203	✓
	Plasticity Index	204	
	% Crushed Particles	205	
	SpG. Coarse	206	
	SpG. Fine (SSD)	207	
	SpG. of Soils	209	
	L.A.R.T.	211	
	Unit Wt.		
	Organic Impurities	213	
	Soundness	214	
	Relative Compaction	216	
	Sand Equivalent	217	
	Moisture Content	226	
	Cleaness Value	227	
	Durability Fine	229	
	Durability Coarse	229	
	Reactivity	ASTM C-289	
	R-Value	301	
	Film Strip	302	
	Mortar Strength	515	
	pH (RC)	532	
	Resistivity (RC)	532	
	pH (CMP)	643	
	Resistivity (CMP)	643	
	Expansion Index	UBC-29-2	
	Max. Dry Density/ Opt. Moist Content	ASTM-D1557	

SAMPLE TYPE

		✓
A.B.	PCC	
A.S.	Bk.Fill	
EMB.	MISC.	
O.G.	Sub-Grade	
A.C. Agg.	SOIL	✓

TL-101 S.I.C. NO.

Expansion Index

Unit Weight

Max. Dry Density (pcf)

Opt. Moist Content (%)

Laboratory Remarks:

SPECIFIC GRAVITY OF SOILS

Wt Oven Dry Soil (Wo)

Wt Pycnometer + H_2O (Wa)

Wt Pycnometer + H2O + Soil (Wb)

Wo / (Wo + Wa - Wb)

Wo		Spec.	
Wa		Grav.	
Wb			

CONTRACT NO. 12-0M7201

LAB. NO. 3274B

Appendix III

Log of Test Boring

(LOTB)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
12	Ora	91			

Kristopher Barker 3-26-14
CERTIFIED ENGINEERING GEOLOGIST

PROFESSIONAL GEOLOGIST Kristopher Barker No. 2383 Exp. 8-31-15 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

PLANS APPROVAL DATE

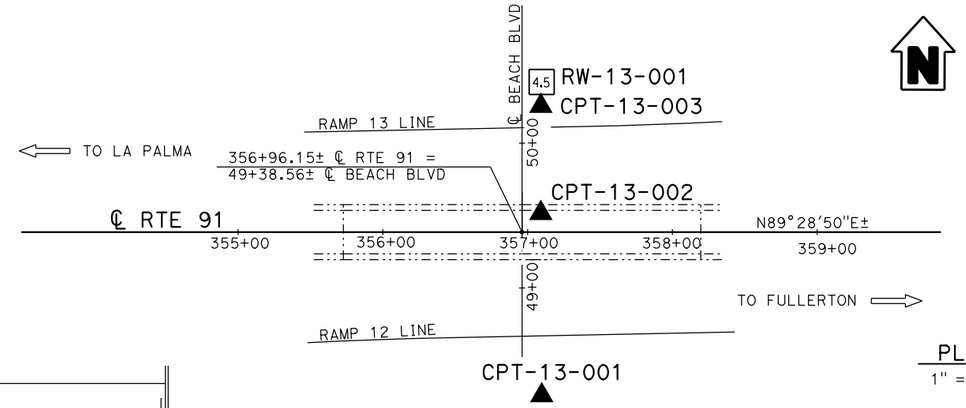
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

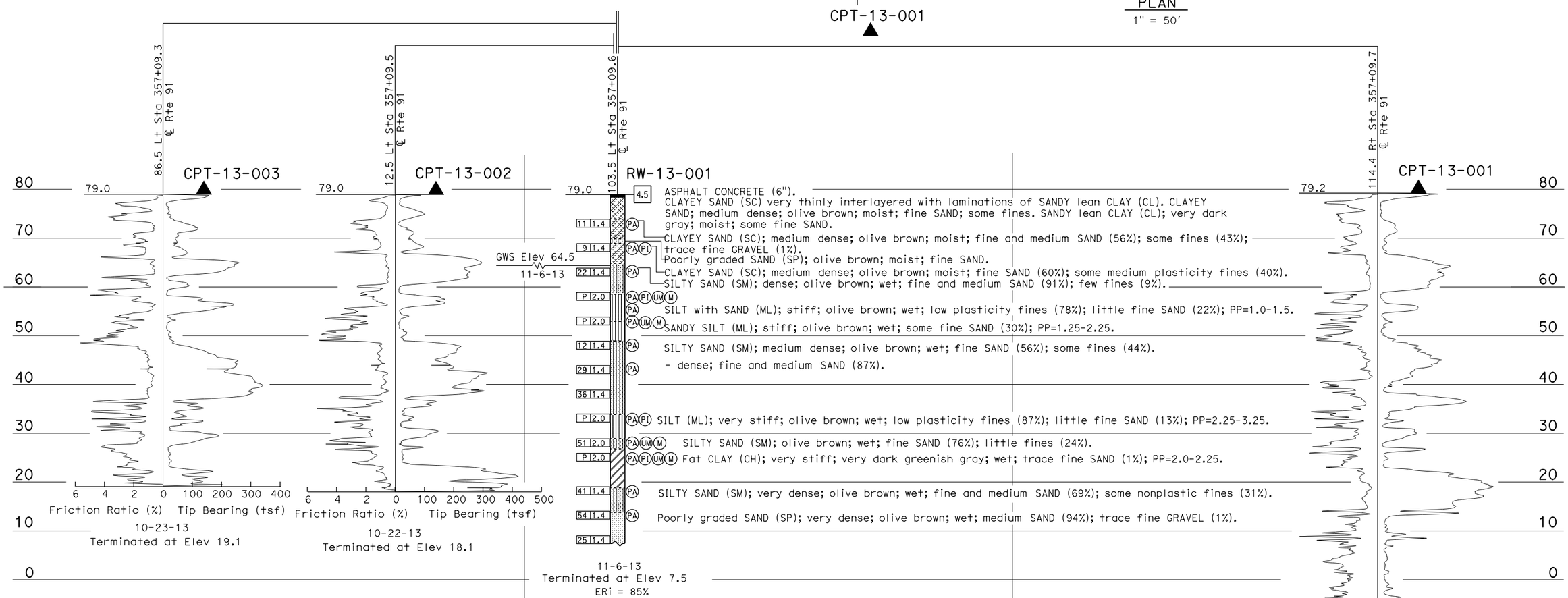
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

BENCH MARK

CalTrans PRHV 110 ELEV. 79.132
SET CHIS "+" ON TOP OF CURB NOSE ON SOUTHBOUND BEACH BLVD. TO THE RTE. 91 EASTBOUND ON RAMP. MONUMENT IS LOCATED ON THE SOUTHWESTERLY SIDE OF RTE 91, 500 FT. SOUTHERLY OF THE CENTERLINE OF RTE. 91 AND 65 FT. WESTERLY OF THE CENTERLINE OF BEACH BOULEVARD.
NAVD 88



PLAN
1" = 50'



PROFILE
Horiz: 1" = 5'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN DESIGN BRANCH X	BRIDGE NO. 55-0303 POST MILE 2.61	ROUTE 91/39 SEPARATION RETROFIT LOG OF TEST BORINGS
FUNCTIONAL SUPERVISOR NAME: S. Karimi	DRAWN BY: W. Tang 2/14 CHECKED BY: T. Halda	FIELD INVESTIGATION BY: K. Barker			

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 12130000011 CONTRACT NO.: 12-0M7201

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 03-06-14 03-25-14 SHEET X OF X

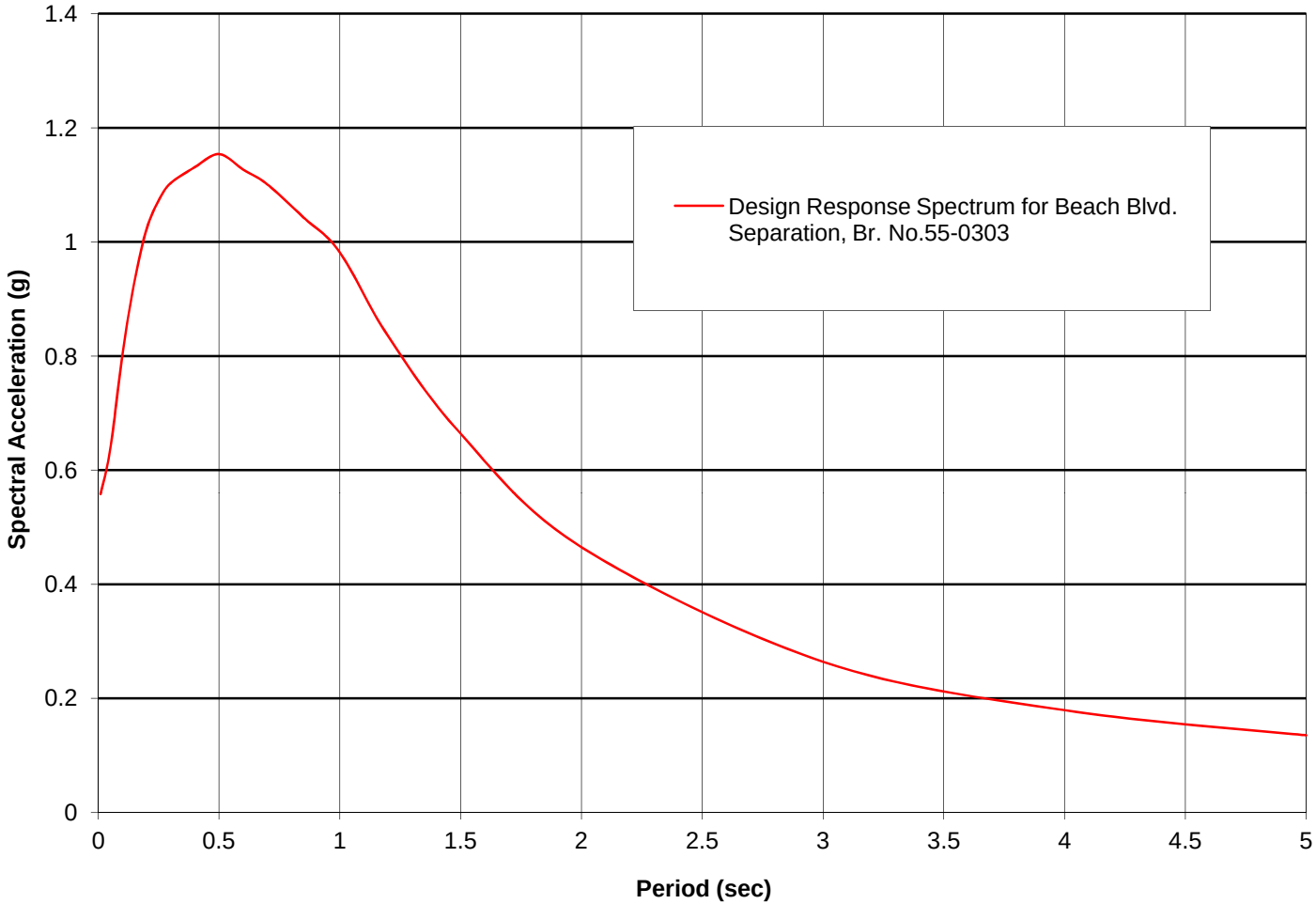
FILE => Rte91-39Sep.dgn

USERNAME => s128444 DATE PLOTTED => 26-MAR-2014 TIME PLOTTED => 11:23

Appendix IV

Caltrans ARS Curve

ACCELERATION RESPONSE SPECTRUM (ARS)



SITE DATA (ARS Online Version 2.3.06)

Shear Wave Velocity, V_{S30}:	280 m/s
Latitude:	33.855947
Longitude:	-117.997971
Depth to Vs = 1.0 km/s:	702 m
Depth to Vs = 2.5 km/s:	3.58 km

DETERMINISTIC

Puente Hills (Coyote Hills)	
Fault ID:	361
Maximum Magnitude (MMax):	6.8
Fault Type:	Rev
Fault Dip:	26 Deg
Dip Direction:	NW
Bottom of Rupture Plane:	14.60 km
Top of Rupture Plane(Ztor):	2.80 km
Rrup	3.91 km
Rjb:	2.73 km
Rx:	2.73 km
Fnorm:	0
Frev:	1

Period	SA(Base Spectrum)	Basin Factor	Near Fault Factor(Applied)	SA(Final Spectrum)
0.01	0.510	1.111	1.000	0.566
0.05	0.587	1.108	1.000	0.650
0.1	0.736	1.108	1.000	0.815
0.15	0.853	1.112	1.000	0.948
0.2	0.937	1.115	1.000	1.045
0.25	0.977	1.123	1.000	1.097
0.3	0.994	1.136	1.000	1.129
0.4	0.996	1.161	1.000	1.157
0.5	0.966	1.197	1.000	1.156
0.6	0.892	1.208	1.040	1.120
0.7	0.830	1.215	1.080	1.089
0.85	0.735	1.225	1.140	1.026

1	0.649	1.237	1.200	0.963
1.2	0.543	1.252	1.200	0.816
1.5	0.426	1.262	1.200	0.645
2	0.292	1.272	1.200	0.446
3	0.162	1.282	1.200	0.249
4	0.109	1.282	1.200	0.168
5	0.082	1.274	1.200	0.125

Anaheim	
Fault ID:	363
Maximum Magnitude (MMax):	6.4
Fault Type:	Rev
Fault Dip:	71 Deg
Dip Direction:	ne
Bottom of Rupture Plane:	14.20 km
Top of Rupture Plane(Ztor):	3.80 km
Rrup	4.85 km
Rjb:	0.00 km
Rx:	3.01 km
Fnorm:	0
Frev:	1

Period	**SA(Base Spectrum)**	**Basin Factor**	**Near Fault Factor(Applied)**	**SA(Final Spectrum)**
0.01	0.494	1.107	1.000	0.546
0.05	0.566	1.104	1.000	0.626
0.1	0.720	1.104	1.000	0.795
0.15	0.835	1.107	1.000	0.924
0.2	0.908	1.110	1.000	1.007
0.25	0.935	1.118	1.000	1.045
0.3	0.942	1.130	1.000	1.064
0.4	0.928	1.153	1.000	1.070
0.5	0.878	1.190	1.000	1.044
0.6	0.793	1.201	1.040	0.990
0.7	0.724	1.209	1.080	0.945
0.85	0.625	1.219	1.140	0.868
1	0.541	1.230	1.200	0.798
1.2	0.442	1.244	1.200	0.660

1.5	0.336	1.254	1.200	0.506
2	0.216	1.267	1.200	0.329
3	0.108	1.283	1.200	0.167
4	0.068	1.286	1.200	0.104
5	0.049	1.279	1.200	0.075

Compton	
Fault ID:	367
Maximum Magnitude (MMax):	6.9
Fault Type:	Rev
Fault Dip:	20 Deg
Dip Direction:	NE
Bottom of Rupture Plane:	15.60 km
Top of Rupture Plane(Ztor):	5.20 km
Rrup	11.39 km
Rjb:	0.00 km
Rx:	19.01 km
Fnorm:	0
Frev:	1

Period	SA(Base Spectrum)	Basin Factor	Near Fault Factor(Applied)	SA(Final Spectrum)
0.01	0.459	1.119	1.000	0.514
0.05	0.542	1.118	1.000	0.606
0.1	0.727	1.114	1.000	0.810
0.15	0.860	1.116	1.000	0.959
0.2	0.917	1.121	1.000	1.027
0.25	0.925	1.131	1.000	1.046
0.3	0.920	1.144	1.000	1.052
0.4	0.875	1.172	1.000	1.026
0.5	0.816	1.209	1.000	0.986
0.6	0.737	1.219	1.040	0.934
0.7	0.672	1.226	1.080	0.889
0.85	0.584	1.235	1.140	0.822
1	0.509	1.246	1.200	0.761
1.2	0.419	1.260	1.200	0.634
1.5	0.320	1.268	1.200	0.487
2	0.204	1.276	1.200	0.313

3	0.099	1.282	1.200	0.153
4	0.062	1.280	1.200	0.095
5	0.047	1.272	1.200	0.071

PROBABILISTIC

Probabilistic Model USGS Seismic Hazard Map(2008) 975 Year Return Period				
Period	**SA(Base Spectrum)**	**Basin Factor**	**Near Fault Factor(Applied)**	**SA(Final Spectrum)**
0.01	0.520	1.092	1.000	0.567
0.05	0.769	1.084	1.000	0.833
0.1	0.910	1.080	1.000	0.983
0.15	1.034	1.081	1.000	1.118
0.2	1.131	1.082	1.000	1.224
0.25	1.127	1.093	1.000	1.232
0.3	1.124	1.102	1.000	1.238
0.4	1.037	1.138	1.000	1.180
0.5	0.975	1.166	1.000	1.137
0.6	0.886	1.181	1.040	1.088
0.7	0.818	1.193	1.080	1.053
0.85	0.714	1.207	1.140	0.983
1	0.628	1.219	1.200	0.919
1.2	0.529	1.233	1.200	0.783
1.5	0.429	1.249	1.200	0.644
2	0.328	1.271	1.200	0.500
3	0.208	1.284	1.200	0.320
4	0.148	1.290	1.200	0.229
5	0.122	1.294	1.200	0.189

MINIMUM DETERMINISTIC SPECTRUM

Period	SA
0.01	0.252
0.05	0.307
0.1	0.446

0.15	0.538
0.2	0.567
0.25	0.564
0.3	0.554
0.4	0.518
0.5	0.478
0.6	0.421
0.7	0.376
0.85	0.323
1	0.281
1.2	0.237
1.5	0.189
2	0.134
3	0.079
4	0.054
5	0.040

Envelope Data

Period	SA
0.01	0.567
0.05	0.833
0.1	0.983
0.15	1.118
0.2	1.224
0.25	1.232
0.3	1.238
0.4	1.180
0.5	1.156
0.6	1.120
0.7	1.089
0.85	1.026
1	0.963
1.2	0.816
1.5	0.645
2	0.500
3	0.320
4	0.229

5	0.189

Appendix V

p-y, t-z, Q-z Curves

Project no Phase: 1213000001, Bridge no: 55-0303
Route 91/39 Separation, at Bents

Layer 1

Depth = 0 to 114 inch	
y (in)	p (lbs/in)
0	0
0.016	45.29
0.032	89.85
0.048	114.92
0.064	136.85
0.079	156.70
0.095	175.04
0.111	192.22
0.127	208.45
0.143	223.90
0.159	238.68
0.175	252.90
0.191	266.62
0.310	367.78
0.429	468.93
11.870	468.93
23.311	468.93

Layer 2

Depth = 114 to 198 inch	
y (in)	p (lbs/in)
0	0
0.015	221.07
0.029	442.13
0.044	663.20
0.058	884.26
0.073	1105.33
0.087	1326.40
0.102	1547.46
0.116	1768.53
0.131	1989.59
0.145	2210.66
0.160	2431.73
0.175	2581.68
0.284	3562.72
0.393	4543.76
10.863	4543.76
21.334	4543.76

Layer 3

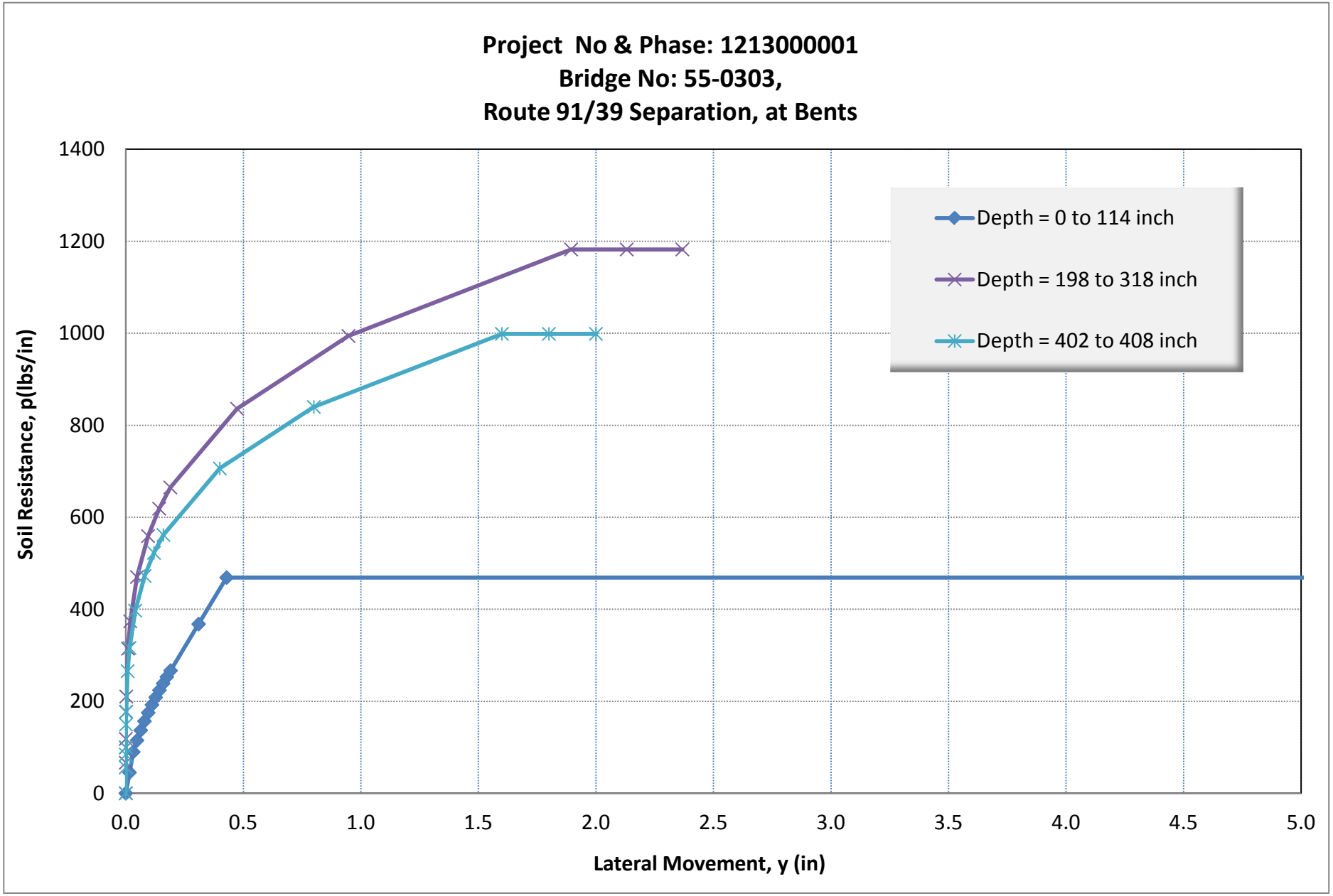
Depth = 198 to 318 inch	
y (in)	p (lbs/in)
0	0
0.000	66.48
0.000	99.41
0.000	118.22
0.001	176.78
0.002	210.23
0.009	314.37
0.019	373.85
0.047	470.09
0.095	559.03
0.142	618.67
0.189	664.81
0.474	835.95
0.947	994.12
1.894	1182.21
2.131	1182.21
2.368	1182.21

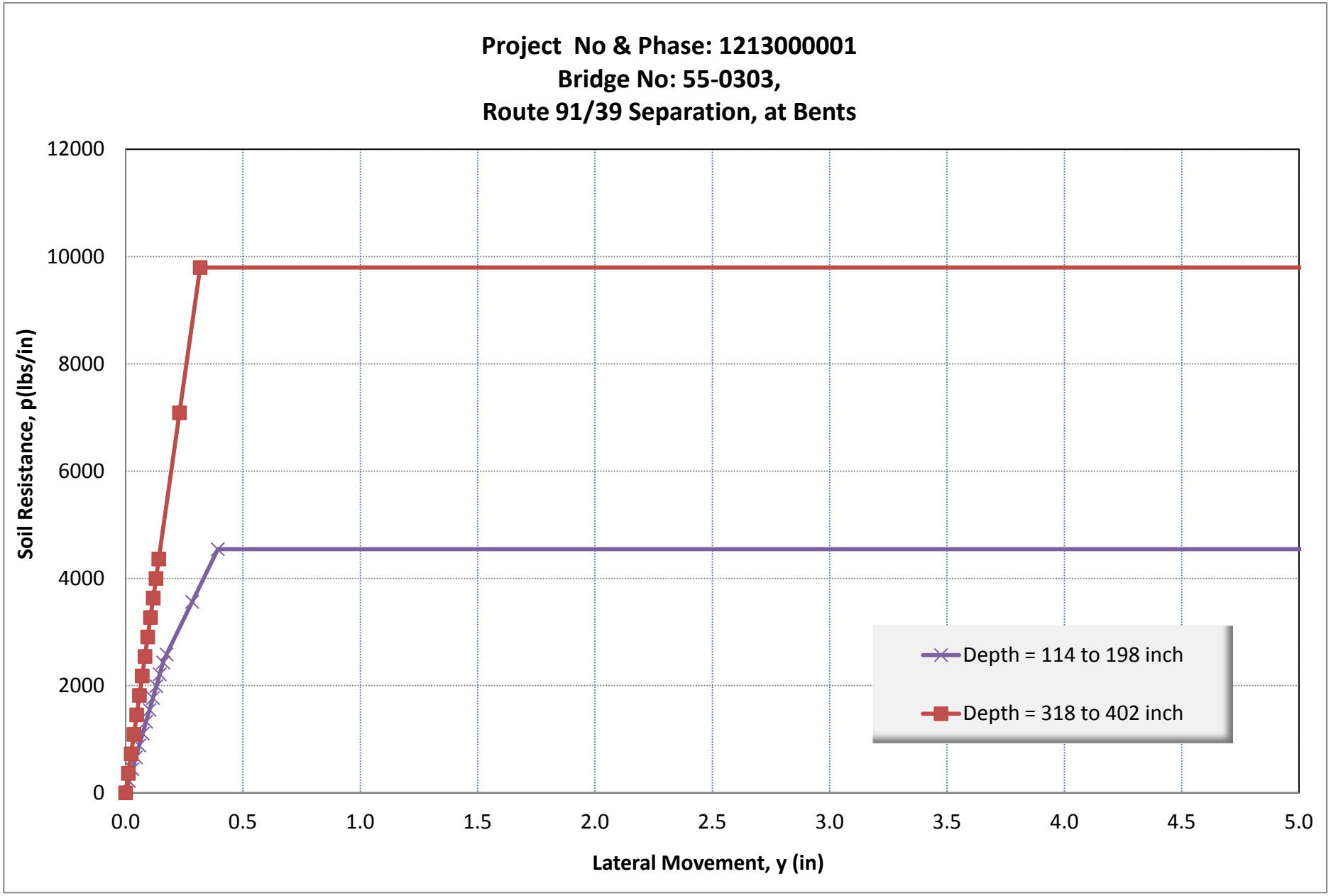
Layer 4

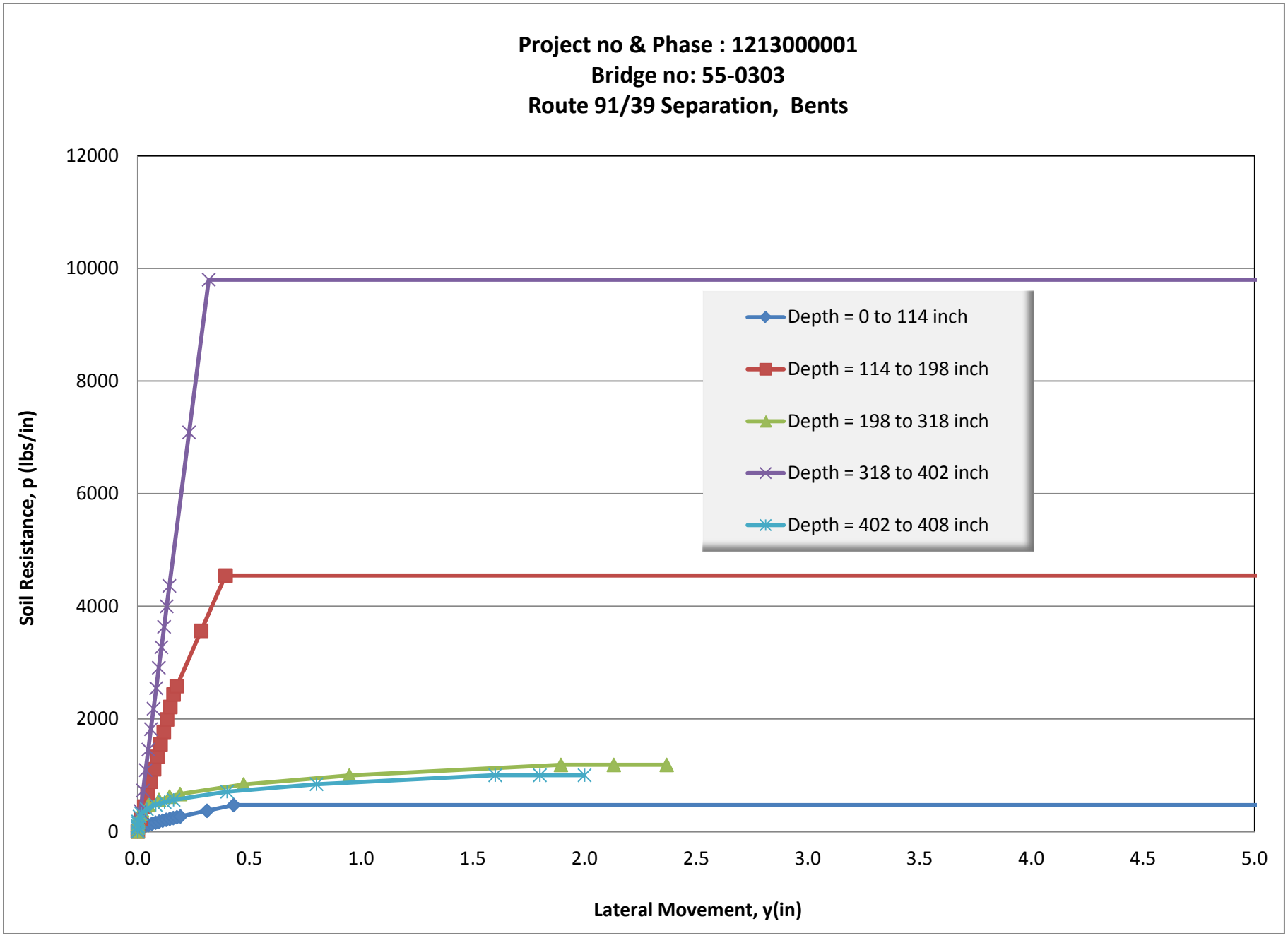
Depth = 318 to 402 inch	
y (in)	p (lbs/in)
0	0
0.012	363.42
0.024	726.83
0.035	1090.25
0.047	1453.66
0.059	1817.08
0.071	2180.50
0.082	2543.91
0.094	2907.33
0.106	3270.74
0.118	3634.16
0.129	3997.58
0.141	4360.99
0.229	7086.61
0.318	9797.36
8.788	9797.36
17.259	9797.36

Layer 5

Depth = 402 to 408 inch	
y (in)	p (lbs/in)
0	0
0.000	56.16
0.000	83.98
0.000	99.86
0.001	149.33
0.002	177.59
0.008	265.55
0.016	315.80
0.040	397.09
0.080	472.23
0.120	522.61
0.160	561.58
0.400	706.15
0.800	839.75
1.600	998.64
1.800	998.64
2.000	998.64


Project No & Phase: 1213000001
Bridge No: 55-0303,
Route 91/39 Separation, at Bents
Soil Resistance, p(lbs/in)
1400
1200
1000
800
600
400
200
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Lateral Movement, y (in)
Depth = 0 to 114 inch
Depth = 198 to 318 inch
Depth = 402 to 408 inch


Project No & Phase: 1213000001
Bridge No: 55-0303,
Route 91/39 Separation, at Bents
Soil Resistance, p(lbs/in)
12000
10000
8000
6000
4000
2000
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Lateral Movement, y (in)
Depth = 114 to 198 inch
Depth = 318 to 402 inch


Project no & Phase : 1213000001
Bridge no: 55-0303
Route 91/39 Separation, Bents
Soil Resistance, p (lbs/in)
12000
10000
8000
6000
4000
2000
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Lateral Movement, y(in)
Depth = 0 to 114 inch
Depth = 114 to 198 inch
Depth = 198 to 318 inch
Depth = 318 to 402 inch
Depth = 402 to 408 inch

12	324	113.094
8	64	50.264

Elev.		Length (ft)		Length (in)		
Top(ft)	Bot (ft)	Top(ft)	Bot (ft)	Top(in)	Bot (in)	Mid (in)
71.5	62	0	9.5	0	114	57
62	55	9.5	16.5	114	198	156
55	45	16.5	26.5	198	318	258
45	38	26.5	33.5	318	402	360
38	35	33.5	36.5	402	438	420
35	25	36.5	46.5	438	558	498
25	19	46.5	52.5	558	630	594
19	9	52.5	62.5	630	750	690

Project: **MacArther Blvd OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:35 AM

Data: t-z Curves

Br. Name:	Beach Blvd UC	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55-0303	OG =	75.0	Avg. Pile Dia =	10 inches
		Pile Cut-Off=	71.5		(Average)
Support(s):	Bent	GW =	62.0		

Note: All elevations are in feet.

	t(kips/ft)	t(kips/ft)		t(kips/ft)	
z (in)	Elev. 71.5 to 67	z (in)	Elev. 67 to 62	z (in)	Elev. 62 to 55
0.000	0.000	0.000	0.000	0.000	0.000
0.020	0.080	0.020	0.147	0.020	0.860
0.040	0.089	0.040	0.163	0.040	0.954
0.050	0.092	0.050	0.168	0.050	0.987
0.060	0.095	0.060	0.173	0.060	1.014
0.080	0.099	0.080	0.180	0.080	1.059
0.100	0.102	0.100	0.187	0.100	1.095
0.200	0.113	0.200	0.207	0.200	1.215
0.700	0.137	0.700	0.250	0.700	1.466
1.000	0.144	1.000	0.264	1.000	1.546

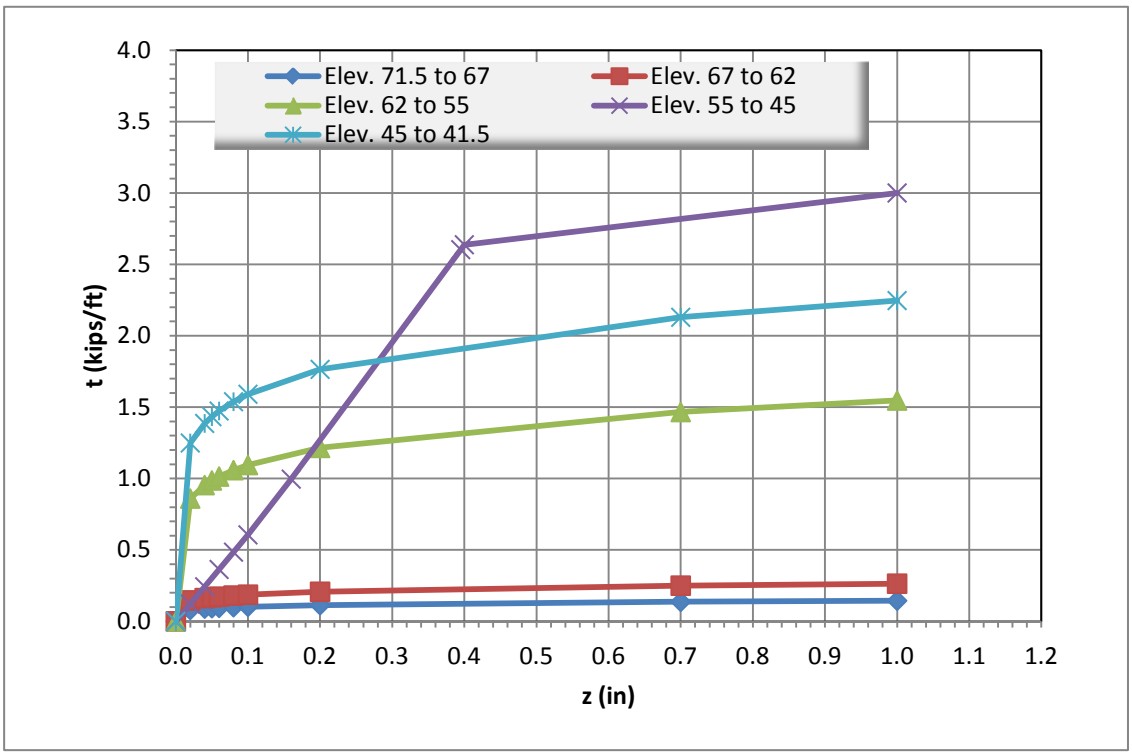
	t(kips/ft)	t(kips/ft)			
z (in)	Elev. 55 to 45	z (in)	Elev. 45 to 41.5		
0.000	0.000	0.000	0.000		
0.020	0.121	0.020	1.249		
0.040	0.242	0.040	1.386		
0.060	0.363	0.050	1.433		
0.080	0.484	0.060	1.473		
0.100	0.606	0.080	1.538		
0.160	0.996	0.100	1.590		
0.395	2.603	0.200	1.765		
0.400	2.637	0.700	2.129		
1.000	3.000	1.000	2.246		

Project: **MacArther Blvd OC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:35 AM

Data: t-z Curves

Br. Name:	Beach Blvd UC	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55-0303	OG =	75.0	Avg. Pile Dia =	10 inches
		Pile Cut-Off=	71.5		(Average)
Support(s):	Bent	GW =	62.0		



Project: **Beach Blvd UC Seismic Retrofit**

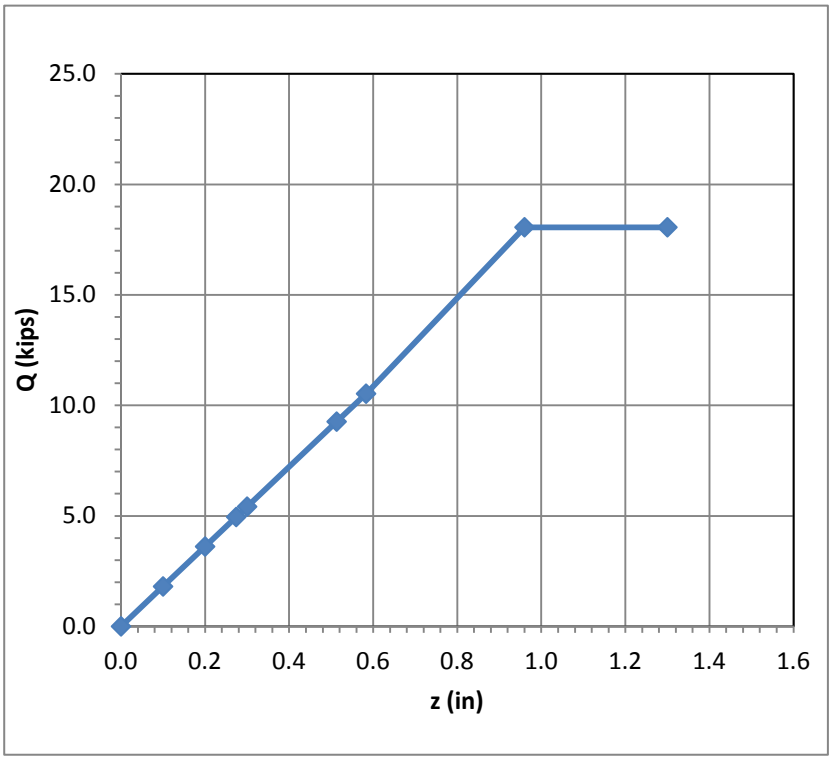
Project ID: 121300001 Date: 3/26/20148:35 AM

Data: Q-z Curves

Br. Name:	Beach Blvd UC	Elevatiion (ft)		Pile Type:	Raymond
Br. No. =	55-0303	OG =	75.0	Avg. Pile Dia =	10 inches
		Pile Cut-Off=	71.5		(Average)
Support(s):	Bent	GW =	62.0		

Note: All elevations are in feet.

	q (kips)				
z (in)	Elev. 45 to 41.5				
0.000	0.000				
0.100	1.806				
0.200	3.612				
0.274	4.948				
0.300	5.418				
0.513	9.264				
0.583	10.529				
0.960	18.059				
1.300	18.059				



Beach Blvd UC
Bent 2
Raymond Pile
Tip Diameter = 8 inch
Tip Elevation 41.5 feet

Project no Phase: 1213000001, Bridge no: 55-0303
Route 91/39 Separation, at Bents

Layer 1

Depth = 0 to 114 inch	
y (in)	p (lbs/in)
0	0
0.017	47.50
0.033	94.07
0.050	119.74
0.067	142.10
0.083	162.27
0.100	180.87
0.117	198.25
0.133	214.64
0.150	230.23
0.167	245.12
0.183	259.43
0.200	273.21
0.325	374.83
0.450	476.44
12.450	476.44
24.450	476.44

Layer 2

Depth = 114 to 198 inch	
y (in)	p (lbs/in)
0	0
0.017	253.32
0.033	506.64
0.050	759.96
0.067	1013.29
0.083	1266.61
0.100	1519.93
0.117	1773.25
0.133	2026.57
0.150	2189.02
0.167	2333.84
0.183	2473.07
0.200	2607.43
0.325	3598.25
0.450	4589.07
12.450	4589.07
24.450	4589.07

Layer 3

Depth = 198 to 318 inch	
y (in)	p (lbs/in)
0	0
0.000	84.24
0.000	125.96
0.000	149.80
0.001	224.00
0.002	266.38
0.012	398.33
0.024	473.70
0.060	595.64
0.120	708.34
0.180	783.91
0.240	842.36
0.600	1059.22
1.200	1259.63
2.400	1497.96
2.700	1497.96
3.000	1497.96

Layer 4

Depth = 318 to 402 inch	
y (in)	p (lbs/in)
0	0
0.017	547.47
0.033	1094.94
0.050	1642.41
0.067	2189.88
0.083	2737.35
0.100	3284.82
0.117	3832.29
0.133	4379.76
0.150	4927.23
0.167	5474.70
0.183	6022.17
0.200	6418.56
0.325	8857.61
0.450	11296.66
12.450	11296.66
24.450	11296.66

Layer 5

Depth = 402 to 438 inch	
y (in)	p (lbs/in)
0	0
0.000	84.24
0.000	125.96
0.000	149.80
0.001	224.00
0.002	266.38
0.012	398.33
0.024	473.70
0.060	595.64
0.120	708.34
0.180	783.91
0.240	842.36
0.600	1059.22
1.200	1259.63
2.400	1497.96
2.700	1497.96
3.000	1497.96

Project no Phase: 1213000001, Bridge no: 55-0303
Route 91/39 Separation, at Bents

Layer 6

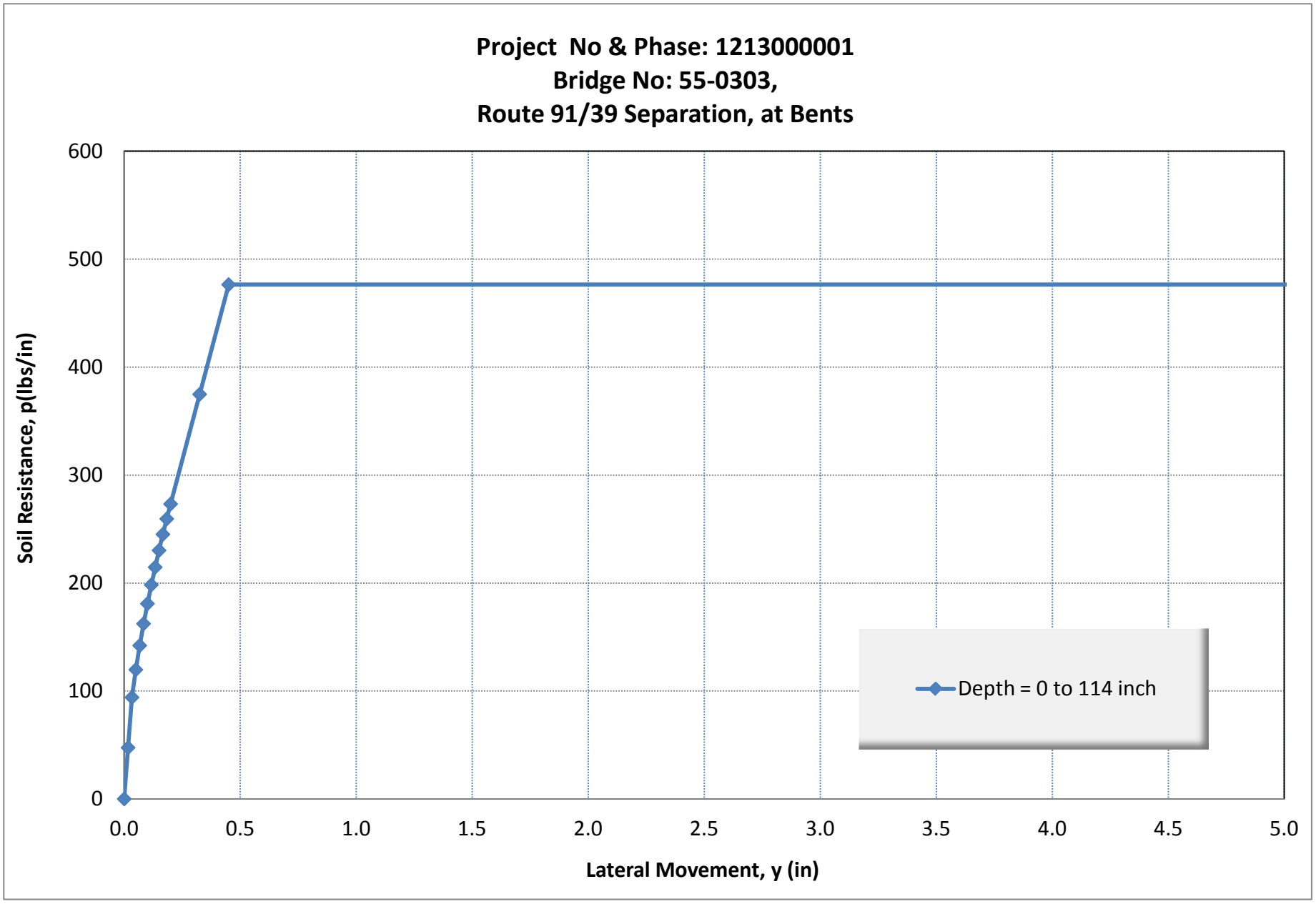
Depth = 438 to 510 inch	
y (in)	p (lbs/in)
0	0
0.017	651.58
0.033	1303.15
0.050	1954.73
0.067	2606.31
0.083	3257.88
0.100	3909.46
0.117	4561.03
0.133	5212.61
0.150	5864.19
0.167	6515.76
0.183	7167.34
0.200	7818.92
0.325	12705.74
0.450	17592.56
12.450	21440.10
24.450	21440.10

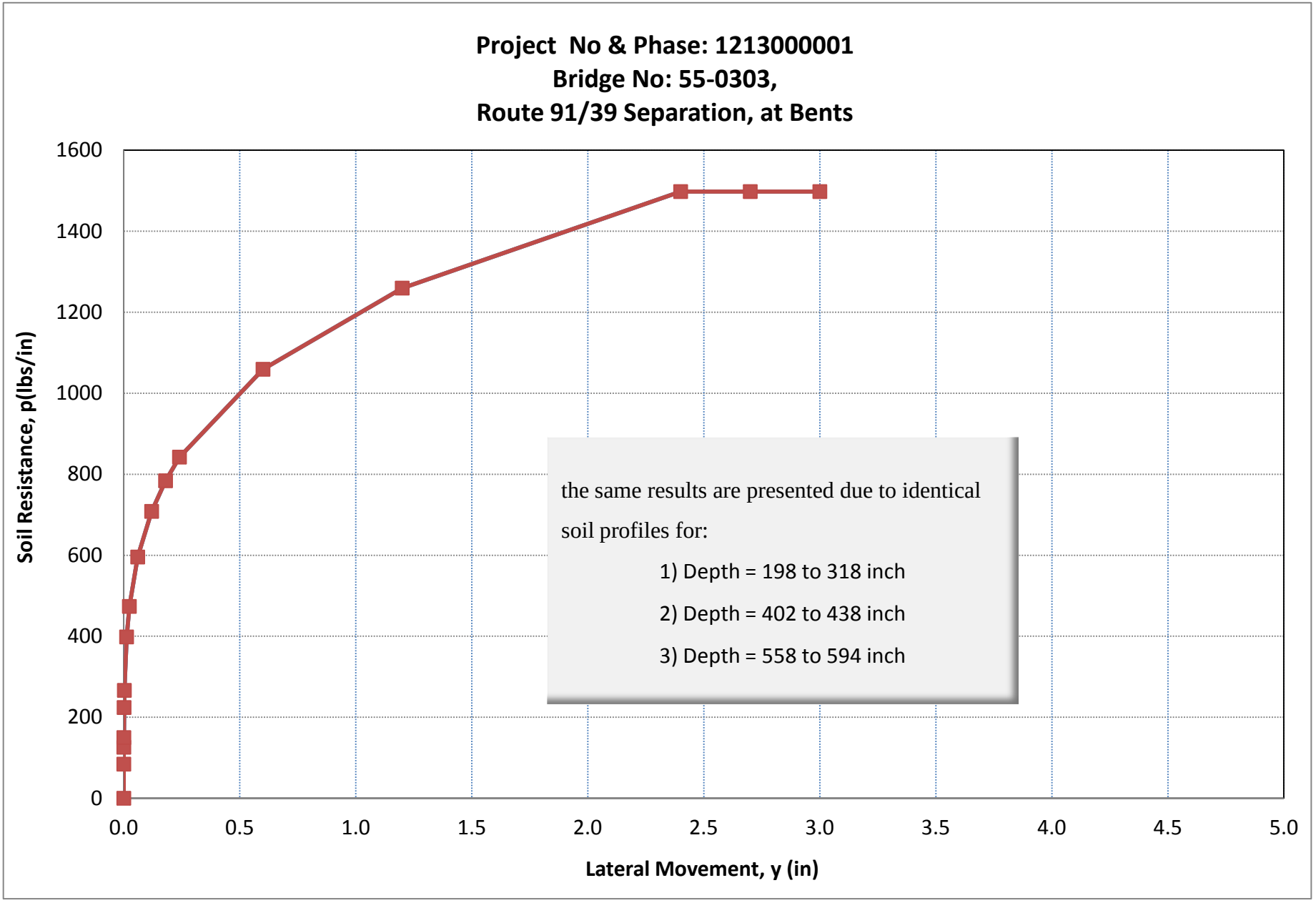
Layer 7

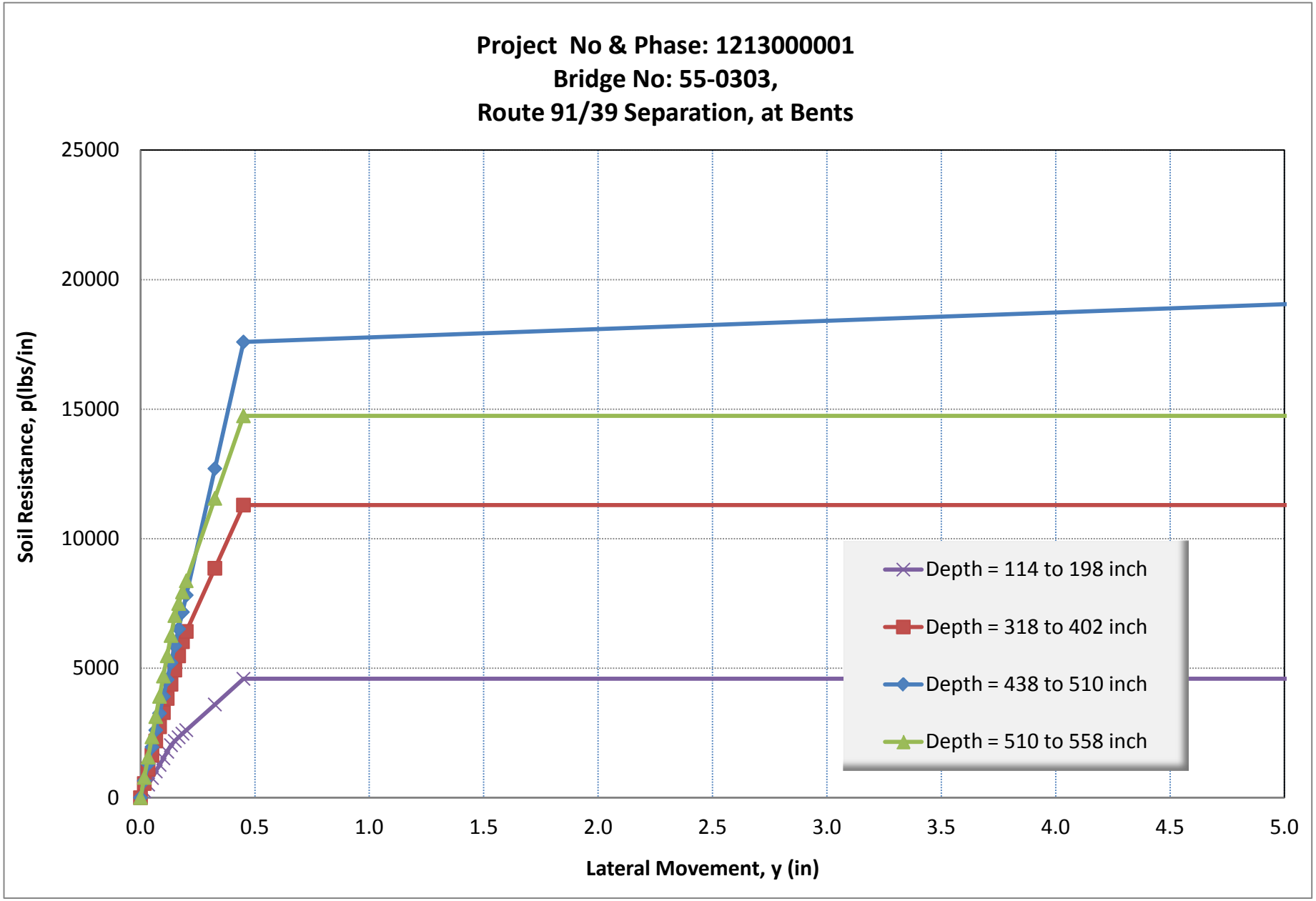
Depth = 510 to 558 inch	
y (in)	p (lbs/in)
0	0
0.017	782.59
0.033	1565.18
0.050	2347.77
0.067	3130.36
0.083	3912.95
0.100	4695.54
0.117	5478.13
0.133	6260.72
0.150	7031.36
0.167	7496.52
0.183	7943.77
0.200	8375.33
0.325	11557.96
0.450	14740.59
12.450	14740.59
24.450	14740.59

Layer 8

Depth = 558 to 594 inch	
y (in)	p (lbs/in)
0	0
0.000	84.24
0.000	125.96
0.000	149.80
0.001	224.00
0.002	266.38
0.012	398.33
0.024	473.70
0.060	595.64
0.120	708.34
0.180	783.91
0.240	842.36
0.600	1059.22
1.200	1259.63
2.400	1497.96
2.700	1497.96
3.000	1497.96


Project No & Phase: 1213000001
Bridge No: 55-0303,
Route 91/39 Separation, at Bents
Soil Resistance, p(lbs/in)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Lateral Movement, y (in)
Depth = 0 to 114 inch


Project No & Phase: 1213000001
Bridge No: 55-0303,
Route 91/39 Separation, at Bents
Soil Resistance, p(lbs/in)
1600
1400
1200
1000
800
600
400
200
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Lateral Movement, y (in)
the same results are presented due to identical soil profiles for:
1) Depth = 198 to 318 inch
2) Depth = 402 to 438 inch
3) Depth = 558 to 594 inch


Project No & Phase: 1213000001
Bridge No: 55-0303,
Route 91/39 Separation, at Bents
Soil Resistance, p(lbs/in)
25000
20000
15000
10000
5000
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Lateral Movement, y (in)
Depth = 114 to 198 inch
Depth = 318 to 402 inch
Depth = 438 to 510 inch
Depth = 510 to 558 inch

12	324	113.094
8	64	50.264

	Elev.		Length (ft)		Length (in)		
Layer no	Top(ft)	Bot (ft)	Top(ft)	Bot (ft)	Top(in)	Bot (in)	Mid (in)
1	71.5	62	0	9.5	0	114	57
2	62	55	9.5	16.5	114	198	156
3	55	45	16.5	26.5	198	318	258
4	45	38	26.5	33.5	318	402	360
5	38	35	33.5	36.5	402	438	420
6	35	29	36.5	42.5	438	510	474
7	29	25	42.5	46.5	510	558	534
8	25	0	46.5	71.5	558	858	708

Soil Layers

Layer	Soil Type (p-y curve model)	Top of Layer, (in)	Bottom of Layer, (in)	Properties of Layer
1	Sand (Reese)	0	114	1: Sand (Reese)
2	Sand (Reese)	114	198	2: Sand (Reese)
3	Stiff Clay w/o Free Water (Reese)	198	318	3: Stiff Clay w/o Free Water
4	Sand (Reese)	318	402	4: Sand (Reese)
5	Stiff Clay w/o Free Water (Reese)	402	438	5: Stiff Clay w/o Free Water
6	Sand (Reese)	438	510	6: Sand (Reese)
7	Sand (Reese)	510	558	7: Sand (Reese)
8	Stiff Clay w/o Free Water (Reese)	558	630	8: Stiff Clay w/o Free Water

Add Row | Insert Row | Delete Row

All positive depth coordinates are defined as distances below the pile-head.
If the pile-head is embedded below the ground surface, the uppermost layer must extend from the ground surface (defined by a negative depth) to some point below the pile head.

Project: **Beach Blvd UC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:34 AM

Data: t-z Curves

Br. Name:	Beach Blvd UC	Elevatiion (ft)		Pile Type:	12 in PC/PS
Br. No. =	55-0303	OG =	75.0	Pile Dia =	12 inches
		Pile Cut-Off=	71.5		
Support(s):	Bent	GW =	62.0		

Note: All elevations are in feet.

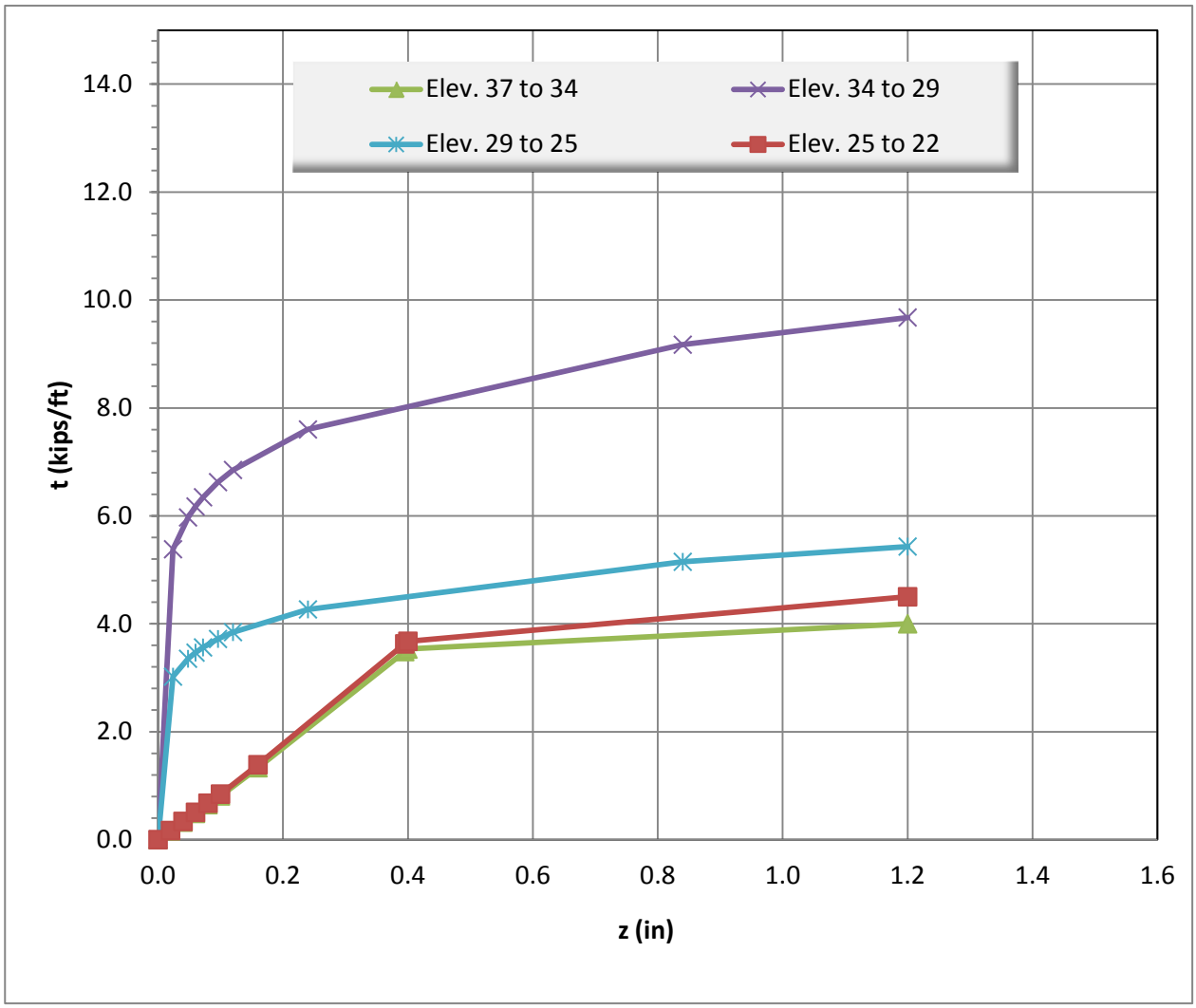
z (in)	t(kips/ft) Elev. 71.5 to 67	z (in)	t(kips/ft) Elev. 67 to 62	z (in)	t(kips/ft) Elev. 62 to 55
0.000	0.000	0.000	0.000	0.000	0.000
0.024	0.271	0.024	0.495	0.024	2.709
0.048	0.300	0.048	0.549	0.048	3.006
0.060	0.311	0.060	0.567	0.060	3.109
0.072	0.319	0.072	0.583	0.072	3.195
0.096	0.333	0.096	0.609	0.096	3.336
0.120	0.345	0.120	0.630	0.120	3.449
0.240	0.383	0.240	0.699	0.240	3.827
0.840	0.462	0.840	0.843	0.840	4.618
1.200	0.487	1.200	0.889	1.200	4.872

z (in)	t(kips/ft) Elev. 55 to 45	z (in)	t(kips/ft) Elev. 45 to 37	z (in)	t(kips/ft) Elev. 37 to 34
0.000	0.000	0.000	0.000	0.000	0.000
0.020	0.138	0.024	2.898	0.020	0.162
0.040	0.276	0.048	3.216	0.040	0.324
0.060	0.415	0.060	3.325	0.060	0.486
0.080	0.553	0.072	3.417	0.080	0.649
0.100	0.691	0.096	3.568	0.100	0.811
0.160	1.137	0.120	3.689	0.160	1.333
0.395	2.971	0.240	4.094	0.395	3.485
0.400	3.010	0.840	4.940	0.400	3.531
1.200	3.500	1.200	5.211	1.200	4.000

z (in)	t(kips/ft) Elev. 34 to 29	z (in)	t(kips/ft) Elev. 29 to 25	z (in)	t(kips/ft) Elev. 25 to 22
0.000	0.000	0.000	0.000	0.000	0.000
0.024	5.381	0.024	3.020	0.020	0.169
0.048	5.970	0.048	3.351	0.040	0.338
0.060	6.174	0.060	3.465	0.060	0.506
0.072	6.345	0.072	3.561	0.080	0.675
0.096	6.625	0.096	3.719	0.100	0.844
0.120	6.850	0.120	3.845	0.160	1.388
0.240	7.601	0.240	4.266	0.395	3.627
0.840	9.172	0.840	5.148	0.400	3.675
1.200	9.676	1.200	5.431	1.200	4.500

Project: **Beach Blvd UC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:34 AM



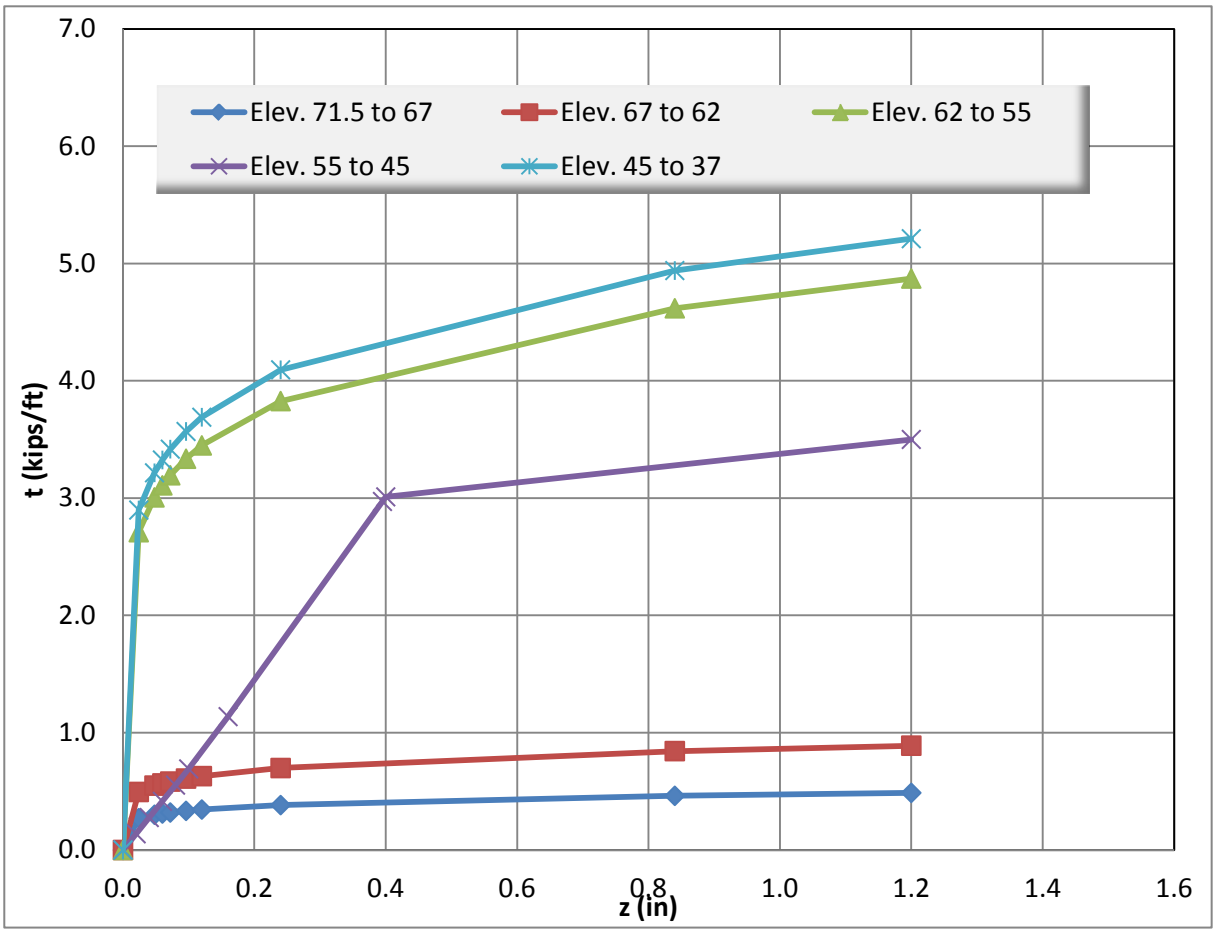
Project: **Beach Blvd UC Seismic Retrofit**

Project Id: 121300001 Date: 3/26/20148:34 AM

Data: t-z Curves

Br. Name:	Beach Blvd UC	Elevatiion (ft)		Pile Type:	12 in PC/PS
Br. No. =	55-0303	OG =	75.0	Pile Dia =	12 inches
		Pile Cut-Off=	71.5		
Support(s):	Bent	GW =	62.0		

Note: All elevations are in feet.



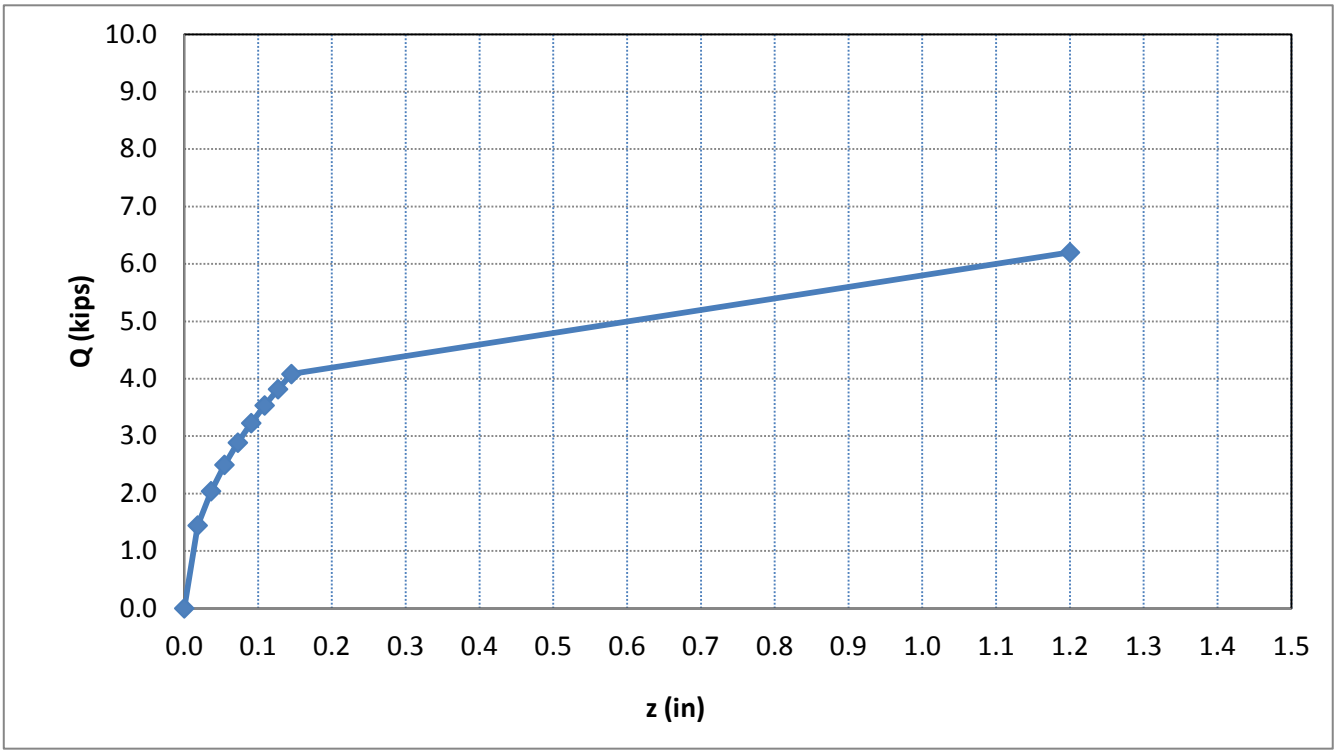
Project: **Beach Blvd UC Seismic Retrofit**

Project ID: 121300001 Date: 3/26/20148:34 AM

Data: Q-z Curves

Br. Name:	Beach Blvd UC	Elevatiion (ft)		Pile Type:	12 in PC/PS
Br. No. =	55-0303	OG =	75.0	Pile Dia =	12 in
		Pile Cut-Off=	71.5		
Support(s):	Bent	GW =	62.0		

Note: All elevations are in feet.

	Q (kips)
z (in)	Elev. 22
0.000	0.000
0.018	1.443
0.036	2.041
0.054	2.499
0.073	2.886
0.091	3.226
0.109	3.534
0.127	3.817
0.145	4.081
1.200	6.200

Beach Blvd UC
45 Ton
12" PC/PS pile
Tip Diameter = 12 inch Tip Elevation 22.0 feet