

# INFORMATION HANDOUT

## AGREEMENTS

### FISHERIES HYDROACOUSTIC WORKING GROUP

Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving Activities.

## AS BUILT PLANS

### PORT OF LONG BEACH PUMP STATION 8 AS BUILT DRAWINGS

(Pier S Berths S102-S110 Grading, Drainage & Utilities)

## MATERIALS INFORMATION

Schulyer Heim Bridge Reconnaissance Inspection Dive, Investigation of Sunken Object  
Adjacent to the South Tower Pier, Schulyer Heim Bridge Replacement Project, Port of  
Long Beach, CA

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

**ADDED PER ADDENDUM NO. 7 DATED MAY 17, 2011**

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*NOAA's Fisheries Northwest and Southwest Regions*    *U.S. Fish and Wildlife Service Regions 1 & 8*    *California/Washington/Oregon Departments of Transportation*    *California Department of Fish and Game*    *U.S. Federal Highway Administration*

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MEMORANDUM

June 12, 2008

From: Fisheries Hydroacoustic Working Group

Subject: Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving Activities

To: Applicable Agency Staff

The signatory agencies, identified below, have agreed in principle to use the attached Interim Criteria for Injury to Fish from Pile Driving Activities. The agreement was concluded at a meeting in Vancouver, Washington on June 10-11, 2008 with key technical and policy staff from the Federal Highway Administration, NOAA Fisheries, U.S. Fish and Wildlife Service, the Departments of Transportation from California, Oregon, and Washington; and national experts on sound propagation activities that affect fish and wildlife species of concern. The agreed upon criteria identify sound pressure levels of 206 dB peak and 187 dB accumulated sound exposure level(SEL) for all listed fish except those that are less than 2 grams. In that case, the criteria for the accumulated SEL will be 183 dB.

These criteria will apply to all new projects beginning no later than 60 days from the date of this memorandum. During the interim 60 day period, the Transportation Agencies will work with the Services to identify projects currently in the consultation process and reach agreement on which criteria will be used to assess project effects.

The agencies agree to review the science periodically and revise the threshold and cumulative levels as needed to reflect current information. Behavioral impacts to fish and impacts to marine mammals are not addressed in this agreement. Sub-injurious effects will continue to be discussed in future meetings.

The respective agencies also agree to develop appropriate training for staff on these revised criteria, as well as a process to review and possibly refine the criteria, when appropriate.

For questions or concerns about the revised criteria, we recommend staff contact their agency environmental coordinator or agency expert on pile driving issues.

*Carol G. Adkins*



Federal Highway Administration\*

\*FHWA supports the use of these interim criteria in the states signing this agreement in principle. FHWA leaves the schedule for implementation to the discretion of the state DOTs in cooperation with their respective FHWA Division Offices and the Services.

*Michael Jehan*



NOAA Fisheries – NWR

*Russell M. Struck*



NOAA Fisheries – SWR

*Ken S. Berg*



US Fish and Wildlife Service Region 1

*Michael E. Dagensh*



US Fish and Wildlife Service Region 8

*[Signature]*



California Department of Transportation

Caltrans

*[Signature]*



California Department of Fish and Game

*A. G. [Signature]*



Oregon Department of Transportation

*Megawala*  
Washington State Department of Transportation



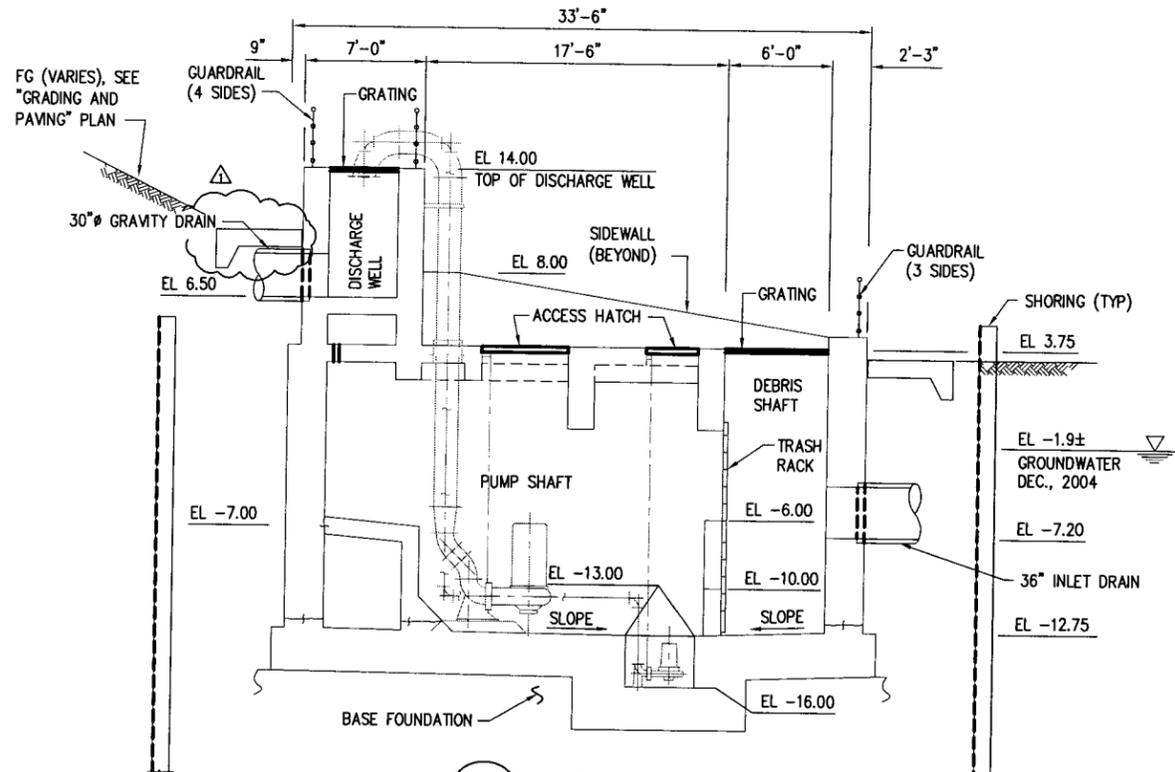
**FHWG Agreement in Principle**  
**Technical/Policy Meeting Vancouver, WA**  
***June, 11 2008***

<b>Interim Criteria for Injury</b>	<b>Agreement in Principle</b>
Peak	206 dB (for all size of fish)
Cumulative SEL	187 dB - for fish size of two grams or greater.  183 dB - for fish size of less than two grams.*

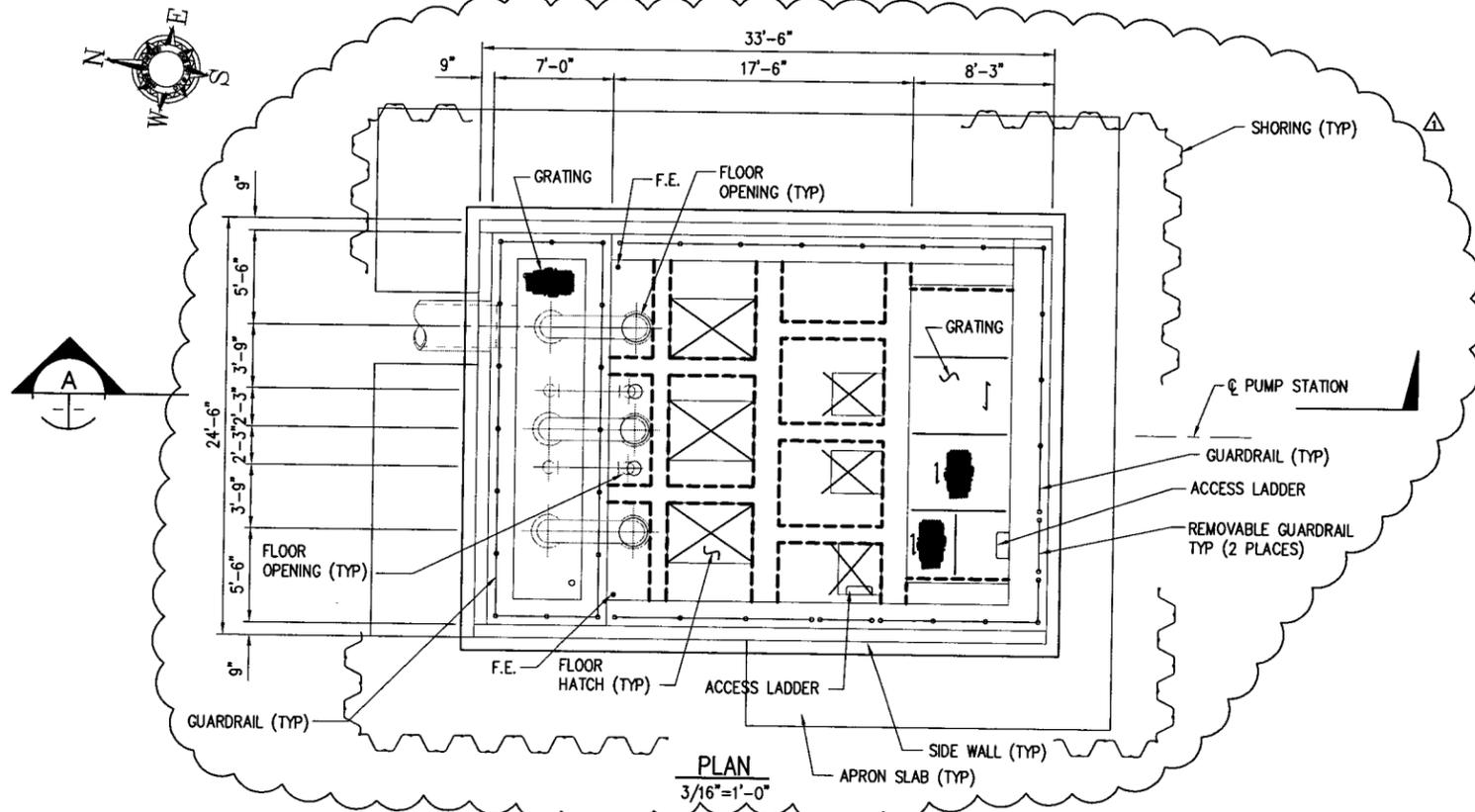
*\*see Table—to be developed*



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SECTION A  
3/16" = 1'-0"



PLAN  
3/16" = 1'-0"

NOTES:  
 FIRE EXTINGUISHERS: 4A:80B:C 10 POUND CAPACITY  
 MULTI-PURPOSE ("A,B,C")  
 DRY CHEMICAL TYPE

MARK	DATE	BY	REVISIONS
7/08	AG	AS-BUILT	

DRAWN EL DATE 10/05  
 DESIGNED FK P.E. NO. S-2649  
 PROJ. MGR. SC P.E. NO.  
 SECT. HEAD DJS P.E. NO. C-46837

ASST. CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE  
 CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE



**THE PORT OF LONG BEACH**  
 925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

PIER S BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 SW PSB STRUCTURAL GENERAL PLAN

**DMJM HARRIS**  
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SCALE AS SHOWN SHEET 188 OF 262  
 SPECIFICATION NUMBER HD-S2275  
 DRAWING NUMBER HD 10-1898-PSB04

FN: D1898PSB04

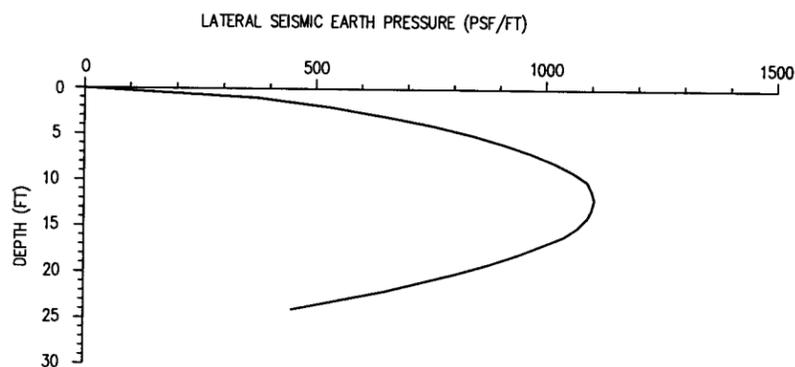
# GENERAL NOTES

## A. GENERAL

1. ALL STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE ARCHITECTURAL, MECHANICAL, ELECTRICAL AND CIVIL DRAWINGS, PROJECT SPECIFICATIONS AND CONTRACTOR SUBMITTALS.
2. SEE ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR SIZE AND LOCATION OF WALL, ROOF AND FLOOR OPENINGS, EMBEDMENTS AND SLEEVES. THE CONTRACTOR SHALL VERIFY EXACT SIZE AND LOCATION OF EQUIPMENT FURNISHED.
3. LATERAL SOIL PRESSURE AGAINST THE WALLS IS RESISTED BY THE FLOOR SLABS. CONTRACTOR SHALL BRACE OR PROTECT ALL WALLS BELOW GRADE FROM LATERAL LOADS UNTIL ATTACHING FLOORS ARE COMPLETELY IN PLACE AND HAVE ATTAINED FULL STRENGTH.
4. ALL EXTERIOR CONCRETE SURFACES BELOW GRADE SHALL BE WATERPROOFED.
5. SHORING AND BASE FOUNDATION SHALL BE CONSTRUCTED TO MINIMIZE GROUND WATER INTRUSION INTO EXCAVATION. CONTRACTOR SHALL PROVIDE SHORING DESIGN AND SUBMIT TO ENGINEER FOR APPROVAL. REFER TO THE GEOTECHNICAL REPORT FOR SHORING RECOMMENDATIONS AND BASE FOUNDATION REQUIREMENTS.

## B. DESIGN

1. CODE  
CONSTRUCTION SHALL ADHERE TO THE PROJECT DOCUMENTS AND THE LATEST VERSIONS OF THE CALIFORNIA BUILDING CODE (CBC), 2001 EDITION
2. REINFORCED CONCRETE (ULTIMATE STRENGTH DESIGN)  
F<sub>c</sub> = 4,000 PSI AT 28 DAYS  
F<sub>y</sub> = 60,000 PSI, ASTM A615 GRADE 60
3. STRUCTURAL STEEL (WORKING STRESS DESIGN)  
WIDE FLANGE ROLLED SHAPES F<sub>y</sub> = 50,000 PSI, ASTM A992  
MISCELLANEOUS SHAPES AND PLATES F<sub>y</sub> = 36,000 PSI, ASTM A36  
HOLLOW STRUCTURAL SECTION (HSS) F<sub>y</sub> = 46,000 PSI, ASTM A500, GRADE B
4. LIVE LOADS  
FLOOR & GRATING = 150 PSF  
WATER = 63 PCF
5. SOIL  
FOUNDATION AND WALL DESIGN ARE BASED ON THE GEOTECHNICAL RECOMMENDATIONS REPORT PREPARED BY GROUP DELTA CONSULTANTS, DATED MARCH 14, 2005  
SOIL UNIT WEIGHT = 125 PCF  
LATERAL EARTH PRESSURE (AT REST EQUIVALENT FLUID PRESSURE)  
= 63 PCF ABOVE WATER TABLE  
= 94 PCF BELOW WATER TABLE  
LATERAL SURCHARGE PRESSURE = 125 PSF  
DESIGN GROUNDWATER ELEVATION = -1.90 FEET  
SEISMIC EARTH PRESSURE (AT REST CONDITION)



## C. FOUNDATION

1. WHEN EXISTING PIPELINE OR CONDUIT NOT SHOWN ON THE PLANS IS DISCOVERED DURING EXCAVATION, THE CONTRACTOR SHALL IMMEDIATELY STOP THE EXCAVATION AND NOTIFY THE ENGINEER. WORK SHALL PROCEED ONLY AFTER THE ENGINEER HAS MADE THE DETERMINATION THAT THE PIPELINE AND THE STRUCTURE WILL NOT BE ADVERSELY AFFECTED.
2. FOR GEOTECHNICAL CONSTRUCTION RECOMMENDATIONS AND GEOTECHNICAL OBSERVATION AND TESTING, THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT PREPARED BY GROUP DELTA, CONSULTANTS.

## D. CONCRETE

1. UNLESS NOTED OTHERWISE ON PLANS, CONCRETE CORNERS EXPOSED TO VIEW SHALL BE PROVIDED WITH  $\frac{3}{4}$ " CHAMFER.
2. PROVIDE GALVANIZED STEEL SLEEVES FOR PLUMBING AND ELECTRICAL OPENINGS IN CONCRETE BEFORE PLACING. DO NOT CUT ANY REINFORCING WHICH MAY INTERFERE. CORING IN CONCRETE IS NOT PERMITTED. NOTIFY THE ENGINEER FOR CONDITIONS NOT SHOWN ON THE DRAWING.
3. TYPE IP(MS) OR TYPE II CEMENT WITH A MAXIMUM WATER-CEMENTITIOUS MATERIAL RATIO OF 0.4 SHOULD BE USED FOR STRUCTURAL CONCRETE.  
CONCRETE COVERS OVER THE REINFORCING STEEL ARE AS FOLLOWS:  
POURED AGAINST SOIL : 3-INCH  
POURED AGAINST FORM (BELOW GRADE) : 3-INCH  
POURED AGAINST FORM (ABOVE GRADE) : 2-INCH  
TOP OF FLOOR SLAB : 2-INCH
4. REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN DIRECT CONTACT WITH ANY PIPES, PIPE FLANGES OR METAL PARTS EMBEDDED IN CONCRETE. A MINIMUM OF 2-INCH CLEAR SHALL BE MAINTAINED IN ALL CASES.
5. METAL CLIPS OR SUPPORTS SHALL NOT BE PLACED IN CONTACT WITH THE FORMS OF THE SUBGRADE.
6. NO CONSTRUCTION JOINTS SHALL BE USED UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER PRIOR TO PLACING REINFORCING STEEL. ALL JOINTS SHALL HAVE AN INTENTIONALLY ROUGHENED SURFACE.

## E. REINFORCING STEEL

1. ALL REINFORCING STEEL SHALL BE DETAILED AND PLACED IN CONFORMANCE WITH THE "MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION" BY THE C.R.S.I. AND THE W.C.R.S.I. AS MODIFIED BY THE PROJECT DRAWINGS AND SPECIFICATIONS.
2. ALL REINFORCING STEEL, DOWELS, ANCHOR BOLTS SHALL BE WELL SECURED IN PLACE PRIOR TO PLACING CONCRETE. CONTRACTOR SHALL USE TEMPLATES TO INSURE ACCURATE PLACEMENT.
3. NO LAP SPLICES SHALL BE USED UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER.

## F. STRUCTURAL STEEL

1. ALL CONNECTION BOLTS SHALL CONFORM TO ASTM A325 SLIP CRITICAL WITH  $\frac{3}{4}$ " IN DIAMETER, AND ANCHOR BOLTS SHALL CONFORM TO ASTM A307.
2. WELDING SHALL BE DONE WITH E70XX ELECTRODES AND SHALL CONFORM TO THE CURRENT A.W.S. D1.1.
3. HEADED STUDS SHALL BE STEEL HEADED ANCHORS WITH FLUXED ENDS. HEADED STUD SHALL CONFORM TO ASTM A108.
4. ALL EXPOSED STEEL INCLUDING BOLTS, NUTS AND WASHERS SHALL BE HOT DIPPED GALVANIZED, UNLESS NOTED OTHERWISE.
5. ALL HANDRAILS AND LADDERS SHALL BE IN ACCORDANCE WITH THE PUMP STATION ARCHITECTURAL DETAILS.

## G. ALUMINUM GRATING

1. ALUMINUM GRATING SHALL CONSIST OF  $1\frac{3}{4}$ " x  $\frac{3}{16}$ " BEARING BARS AT  $1\frac{3}{16}$ " ON CENTER AND CROSS BARS AT 4" ON CENTER TYPICAL UNLESS NOTED OTHERWISE.
2. CONTRACTOR SHALL SUBMIT GRATING PANEL SIZE FOR ENGINEER APPROVAL AND ALL GRATING SHALL BE ATTACHED TO STEEL FRAMING.

## H. SPECIAL INSPECTIONS

1. SPECIAL INSPECTION IS REQUIRED IN ACCORDANCE WITH THE 2001 CBC SECTION 1701.
2. STRUCTURAL SPECIAL INSPECTION BY A REGISTERED SPECIAL INSPECTOR APPROVED BY THE ENGINEER OF RECORD AND THE BUILDING DEPARTMENT SHALL BE REQUIRED FOR THE FOLLOWING TYPES OF WORK.
  - A. ALL CONCRETE CONSTRUCTION
  - B. REINFORCING STEEL PLACEMENT
  - C. WELDING
  - D. HIGH STRENGTH BOLTED CONNECTIONS
  - E. PILING
  - F. STRUCTURAL STEEL
  - G. STRUCTURAL OBSERVATION

## I. STRUCTURAL OBSERVATION

1. STRUCTURAL OBSERVATION IS REQUIRED IN ACCORDANCE WITH THE 2001 CBC SECTION 1702.
2. STRUCTURAL OBSERVATION SHALL BE AT THE FOLLOWING STAGES:
  - A. PILES DURING PILE DRIVING
  - B. AFTER FOUNDATION REINFORCING PLACEMENT PRIOR TO POUR
  - C. AFTER WALL REINFORCING PLACEMENT PRIOR TO POUR
  - D. BEFORE COVER ANY STRUCTURAL CONNECTIONS
  - E. AT COMPLETION OF WORK

3. THE CONTRACTOR SHALL ATTEND A "PRE-CONSTRUCTION MEETING" ORGANIZED AND CHAIRED BY THE ENGINEER AND ATTENDED BY THE ENGINEER, THE ENGINEERS PERFORMING STRUCTURAL OBSERVATION, THE CONTRACTOR, AFFECTED SUBCONTRACTORS, AND SPECIAL INSPECTORS REQUIRED BY THE BUILDING CODE. THE PURPOSE OF THE "PRE-CONSTRUCTION MEETING" IS TO IDENTIFY ALL THE MAJOR STRUCTURAL ELEMENTS AND CONNECTIONS THAT AFFECT THE VERTICAL AND LATERAL LOAD RESISTING SYSTEMS, AND TO REVIEW THE SCHEDULING OF THE STRUCTURAL OBSERVATIONS OF THESE SYSTEMS.

## J. ADDRESS

1. BUILDING ADDRESS NUMBERS SHALL BE PROVIDED ON FRONT OF ALL BUILDINGS AND SHALL BE VISIBLE AND LEGIBLE FROM STREET FRONTING PROPERTY. NUMBER SHALL CONTRAST WITH THEIR BACKGROUND.

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DRAWN	EL	DATE	10/05
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SECT. HEAD	DJS	P.E. NO.	C-46837



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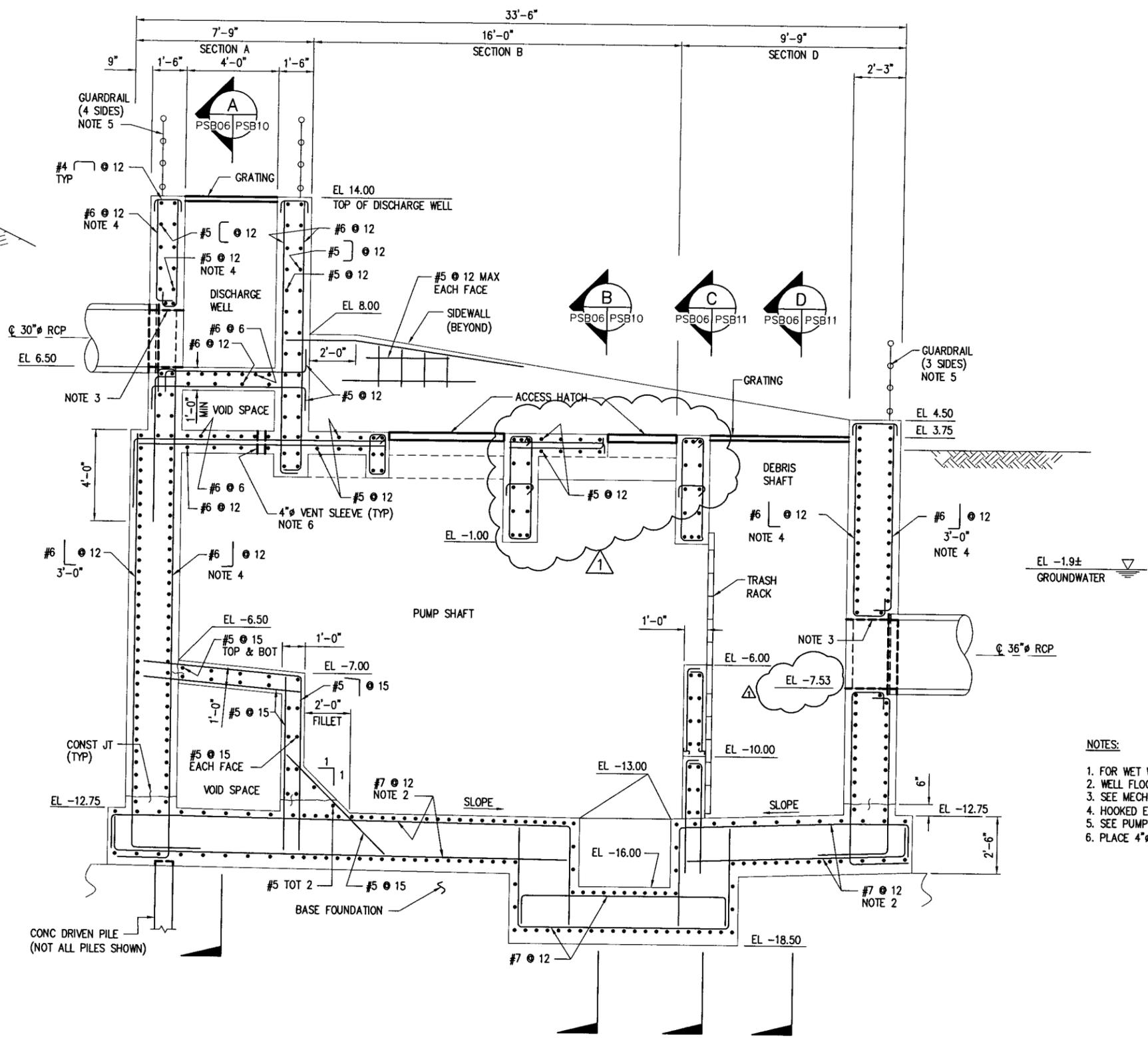
PIER 5 BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 SW PSB STRUCTURAL GENERAL NOTES

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- NOTES:**
1. FOR WET WELL FLOOR ELEVATIONS, SEE "WET WELL PLAN" SHEET.
  2. WELL FLOOR MAT REINF SHALL BE CONTINUOUS OUTSIDE THE PUMP PIT AREA.
  3. SEE MECHANICAL DRAWING FOR STEEL BELL RING DETAILS.
  4. HOOKED END WALL REINF AT PIPE OPENING (HORIZ AND VERT).
  5. SEE PUMP STATION A ARCHITECTURAL DRAWING FOR GUARDRAIL DETAILS.
  6. PLACE 4" x STD STEEL VENT SLEEVE (TOTAL 2 SLEEVES AT OPPOSITE CORNER).

**LONGITUDINAL SECTION**  
3/8"=1'-0"

MARK	DATE	BY	REVISIONS
7/08	AG	AS-BUILT	

DRAWN	EL	DATE	10/05
DESIGNED	FK	P.E. NO.	S-2649
PROJ. MGR.	SC	P.E. NO.	
SECT. HEAD	DJS	P.E. NO.	C-46837



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925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL (562) 437-0041

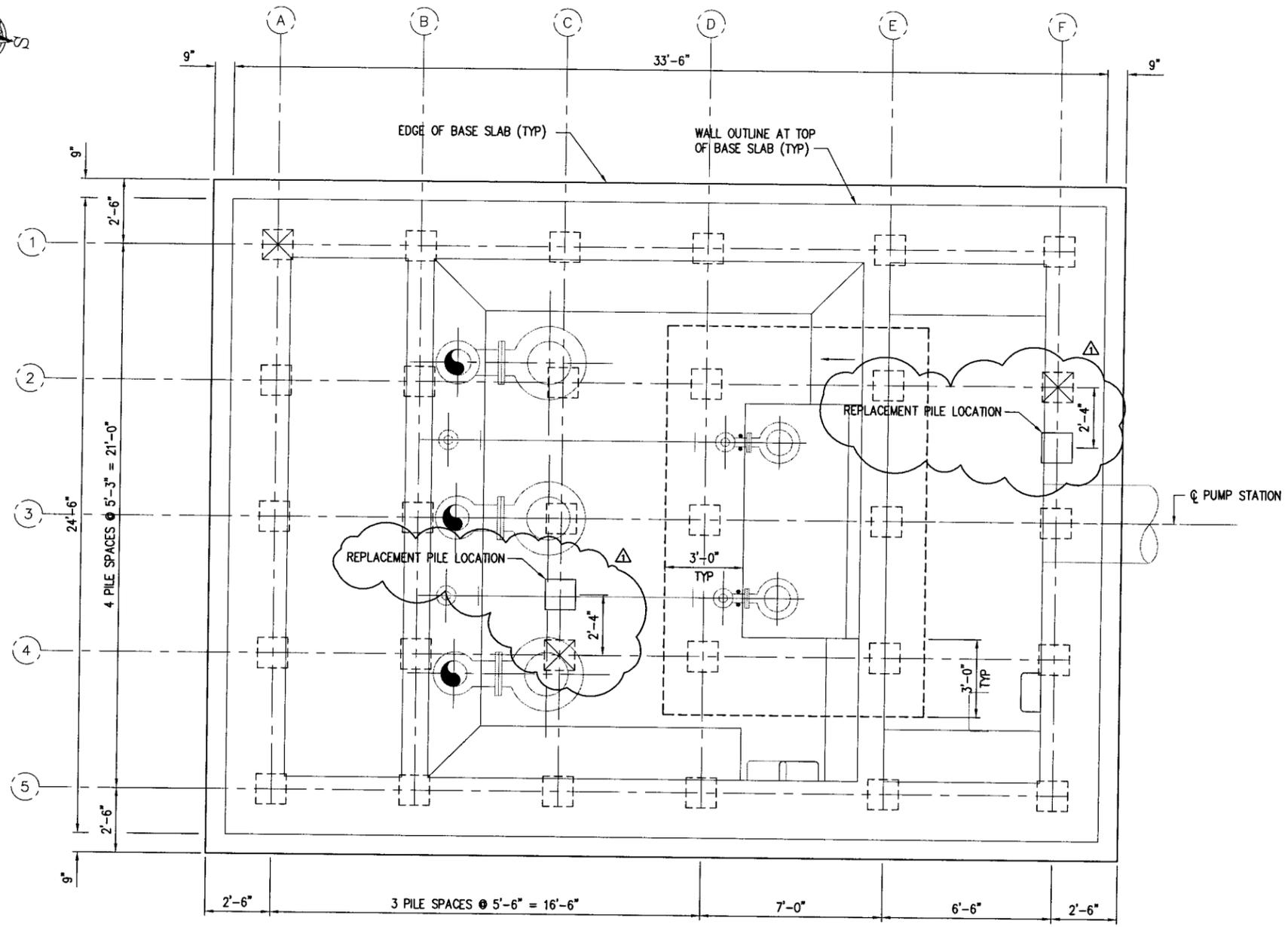
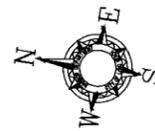
PIER S BERTHS S102-S110  
GRADING, DRAINAGE & UTILITIES  
SW PSB STRUCTURAL LONGITUDINAL SECTION

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SCALE	AS SHOWN	SHEET	190	OF	262
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DRAWING NUMBER	HD 10-1898-PSB06				

FN: D1898PSB06

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**PILE DATA**

LOCATION	PILE TYPE	DESIGN LOAD (SERVICE)	NOMINAL RESISTANCE		SPECIFIED TIP ELEVATION (FEET)
			COMPRESSION	TENSION	
PUMP STATION B	14" SQUARE CONCRETE	200 KIPS	400 KIPS	200 KIPS	-60.0

- 1) DESIGN TIP ELEVATION IS CONTROLLED BY COMPRESSION
- 2) SERVICE LOAD INCLUDES 100 KIP OF DOWNDRAG FORCE

**LEGEND:**

- INDICATES CONCRETE PILES
- INDICATES INDICATOR PILES (TOTAL 3)

**NOTES:**

- 1. INDICATOR PILES SHALL BE MONITORED WITH PILE DRIVING ANALYZER DURING INSTALLATION, SEE "PILE DETAILS" SHEET AND DRAWING NO. GP17 FOR MORE INFORMATION.
- 2. SHORING NOT SHOWN FOR CLARITY.

**INDICATOR PILE DATA**

LOCATION	PILE LENGTH (FT)
A1	50.00
C4	50.00
F2	50.00

**PLAN**  
3/8"=1'-0"



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**PIER S BERTHS S102-S110**  
**GRADING, DRAINAGE & UTILITIES**  
**SW PSB STRUCTURAL FOUNDATION PLAN**

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MARK	DATE	BY	REVISIONS
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DRAWN	EL	DATE	10/05
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PROJ. MGR.	SG	P.E. NO.	
SECT. HEAD	DJS	P.E. NO.	C-46837

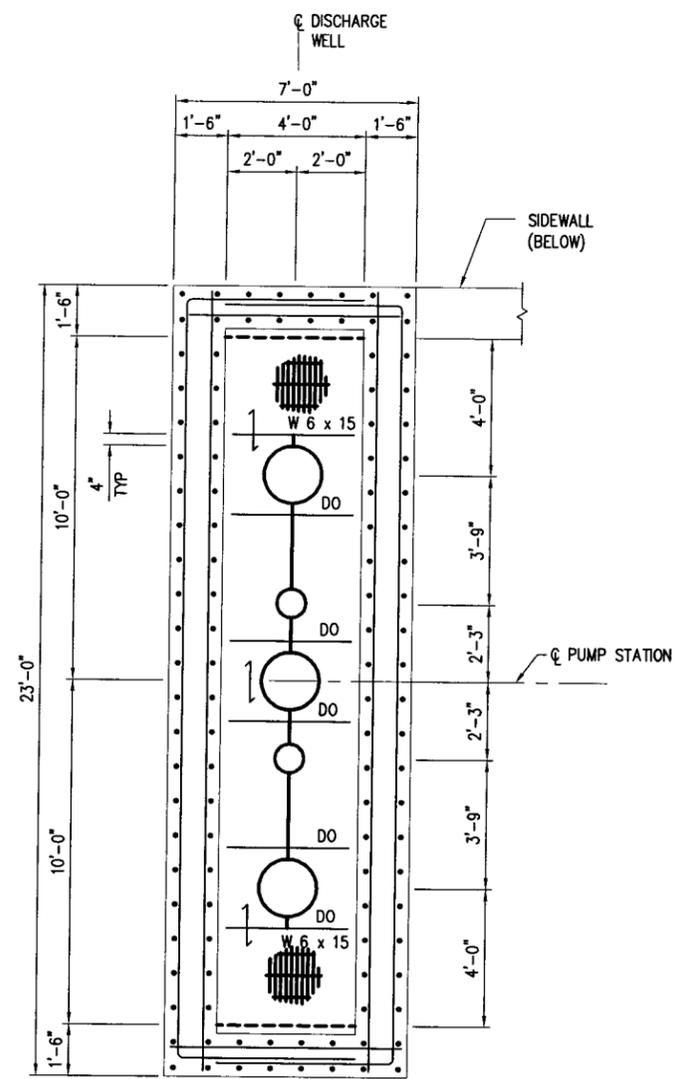
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CHIEF HARBOR ENGINEER	P.E. NO.	C-43065	DATE

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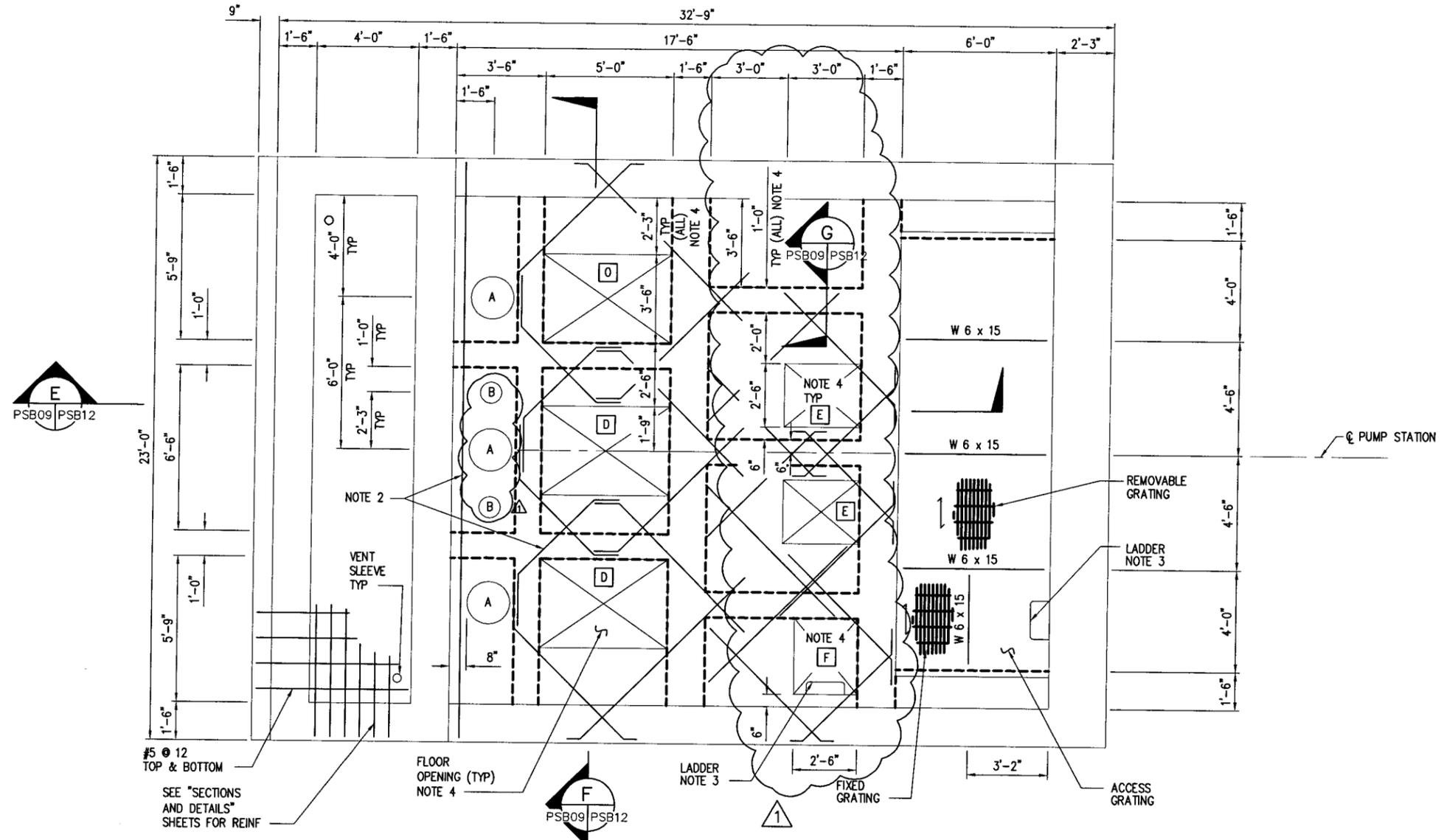
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**TOP OF DISCHARGE WELL PLAN**  
3/8"=1'-0"



- LEGEND:**
- (A) FLOOR SLEEVES FOR 16" PIPE (TOTAL 3)
  - (B) FLOOR SLEEVES FOR 4" (TOTAL 2)
  - (D) 60" x 42" FLOOR HATCH
  - (E) 30" x 36" FLOOR HATCH
  - (F) 30" x 36" FLOOR HATCH

- NOTES:**
- FOR GRATING SUPPORTS AND DETAILS SEE, "GRATING DETAILS" SHEET.
  - SEE "REINFORCEMENT AT CONCRETE OPENING" ON "SECTIONS & DETAILS" 3" SHEET.
  - FOR LADDER DETAILS, SEE PUMP STATION A ARCHITECTURAL DRAWING.
  - COORDINATE WITH MECHANICAL DRAWINGS AND MANUFACTURER'S DATA (HALLIDAY PRODUCTS OR EQUAL) FOR FLOOR SLEEVES AND FLOOR HATCH INSTALLATION.

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7/08	AC	AS-BUILT	

DRAWN	EL	DATE	10/05
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SECT. HEAD	DJS	P.E. NO.	C-46837



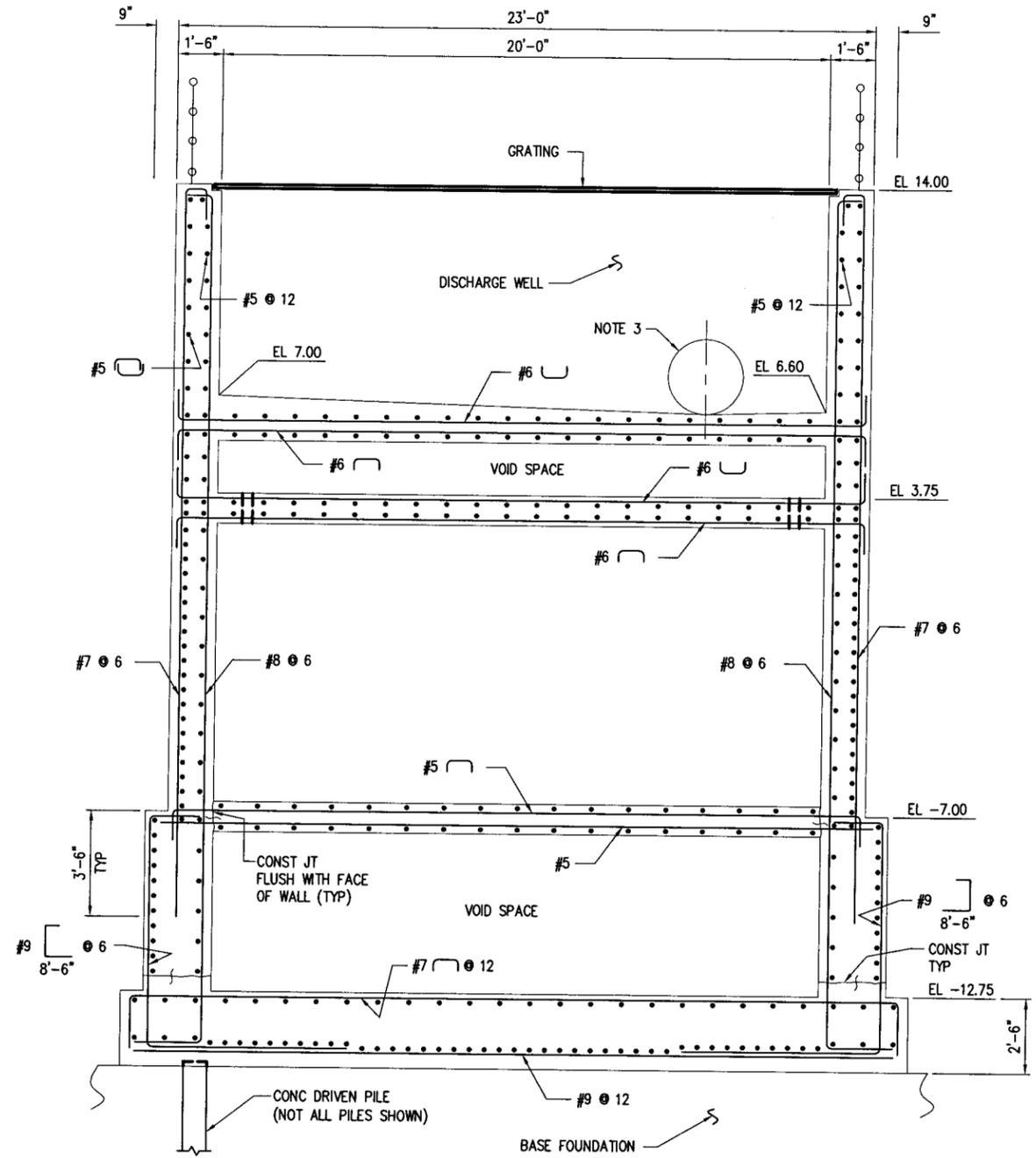
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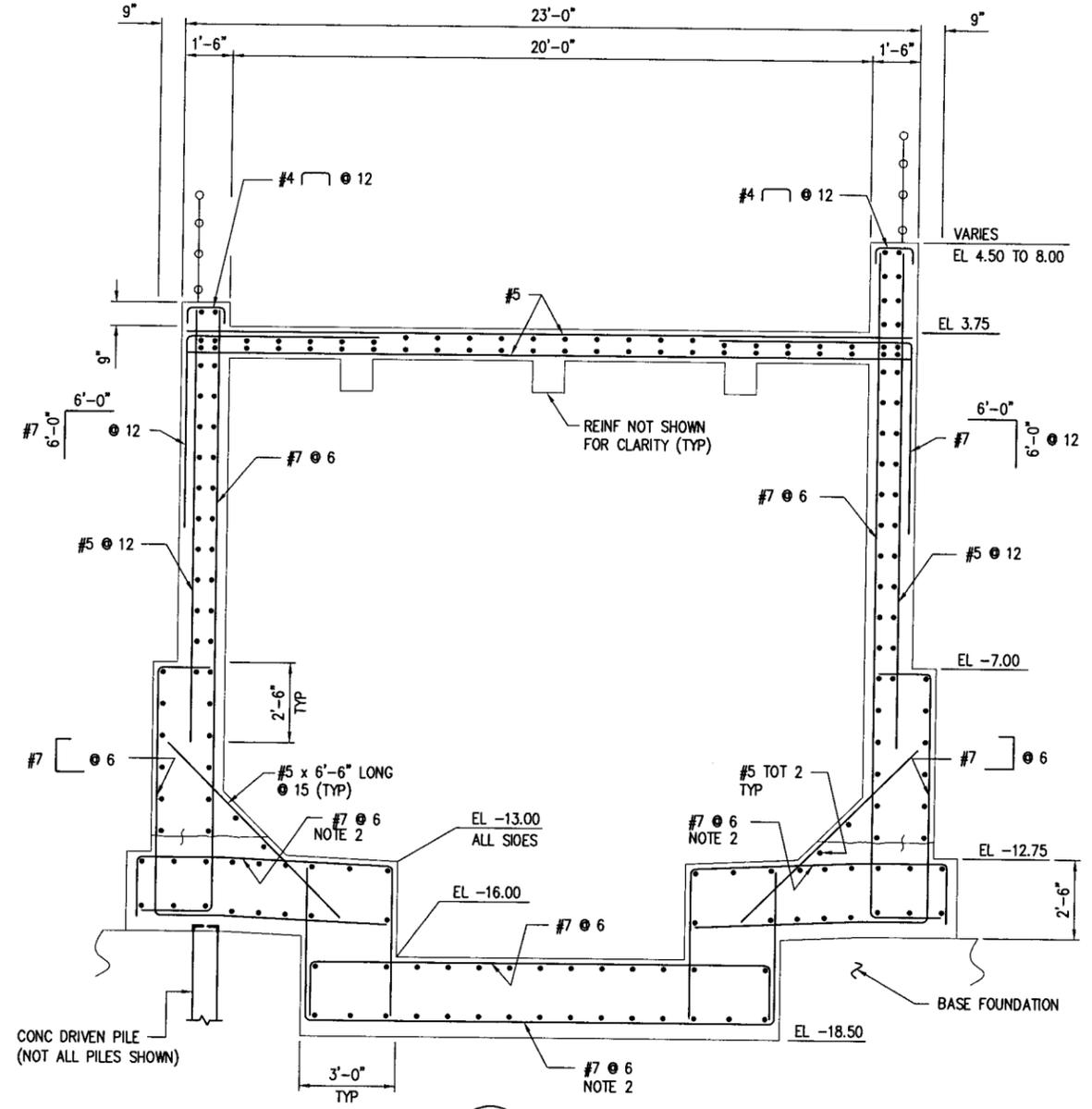
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**A SECTION**  
 PSB06 | PSB10 | 3/8"=1'-0"



**B SECTION**  
 PSB06 | PSB10 | 3/8"=1'-0"

- NOTES:**
1. SHORING IS REQUIRED FOR STRUCTURE CONSTRUCTION AND NOT SHOWN FOR CLARITY.
  2. WELL FLOOR MAT REINF SHALL BE CONTINUOUS OUTSIDE THE SUMP NOTCHED DOWN AREA (#7 TOP, #7 BOTTOM).
  3. FOR ADDITIONAL REINF AT SIDES OF OPENING, SEE "SECTIONS & DETAILS 3" AND "LONGITUDINAL SECTION" SHEETS.

MARK	DATE	BY	REVISIONS
7/08	AG	AS-BUILT	

DRAWN	EL	DATE	10/05
DESIGNED	FK	P.E. NO.	S-2649
PROJ. MGR.	SC	P.E. NO.	
SECT. HEAD	DJS	P.E. NO.	C-46837



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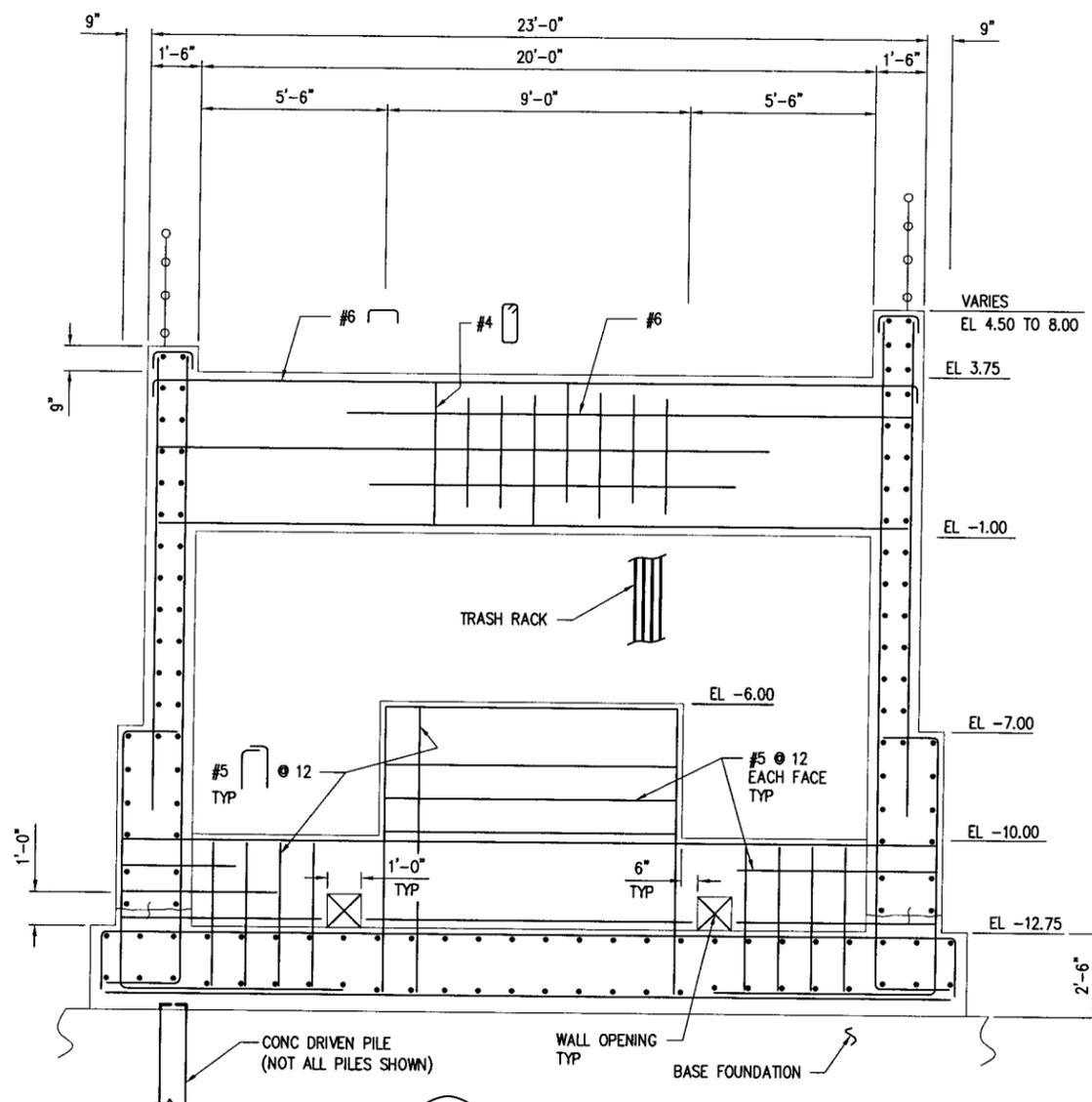
PIER S BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 SW PSB STRUCTURAL SECTIONS & DETAILS 1

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SCALE	AS SHOWN	SHEET	194	OF	262
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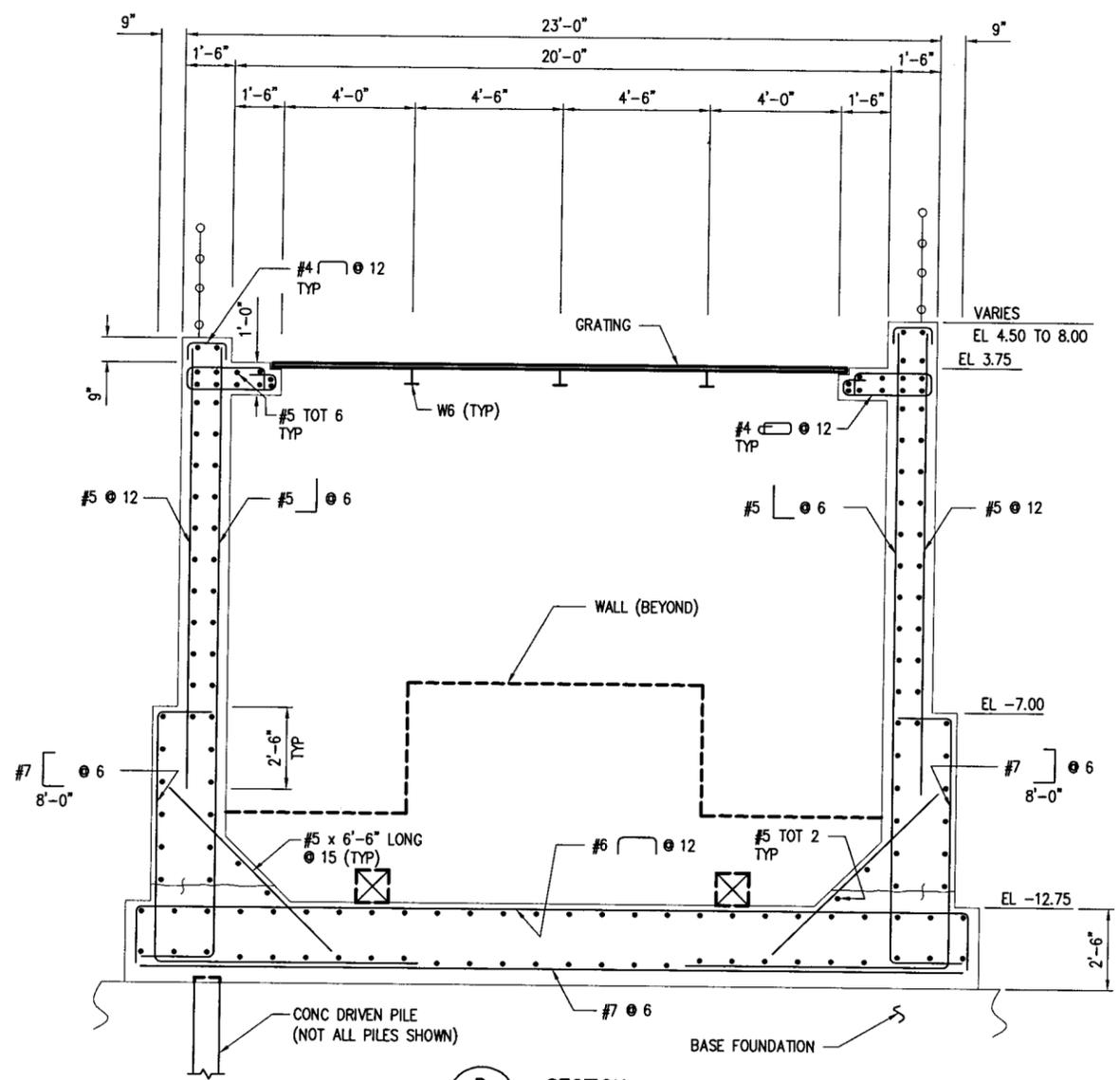
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 DATE: Jan 26, 2010 9:54:58 am  
 Xrefs: X:\PHOUSET\PH-LABEL\\*phbl-2275



**C SECTION**  
PSB06 | PSB11 3/8"=1'-0"

NOTE: SEE SECTION (D) FOR REINF NOT SHOWN.



**D SECTION**  
PSB06 | PSB11 3/8"=1'-0"

MARK	DATE	BY	REVISIONS
7/08	AG	AS-BUILT	

DRAWN	EL	DATE	10/05
DESIGNED	FK	P.E. NO.	S-2649
PROJ. MGR.	SC	P.E. NO.	
SECT. HEAD	DJS	P.E. NO.	C-46837



**THE PORT OF LONG BEACH**  
 925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

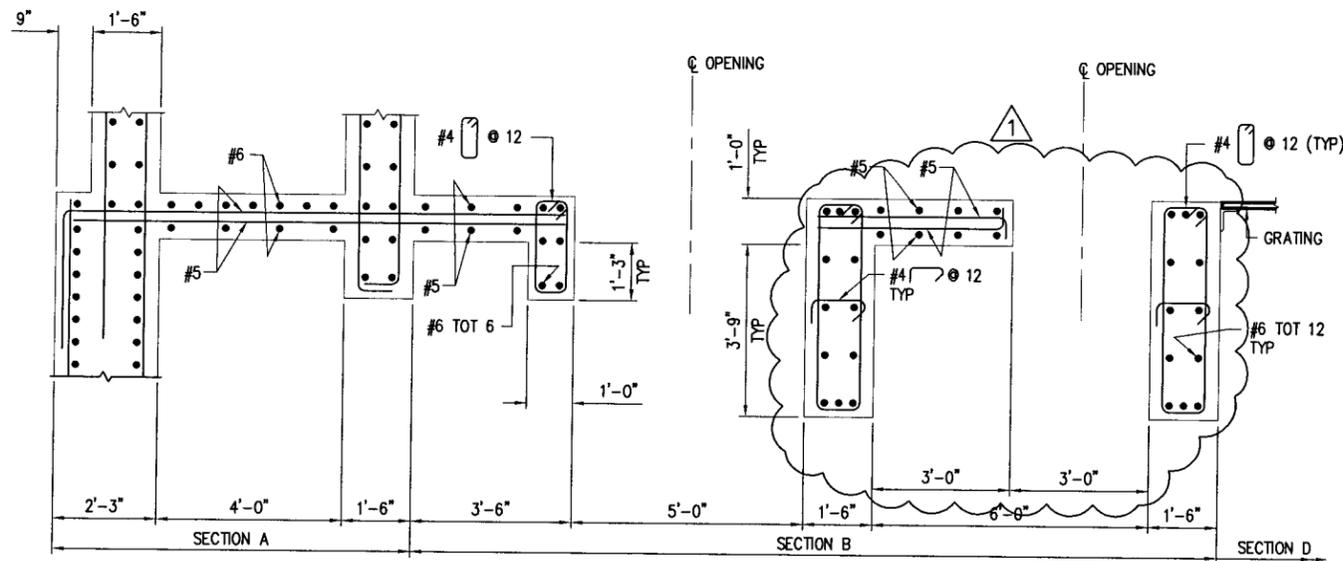
PIER S BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 SW PSB STRUCTURAL SECTIONS & DETAILS 2

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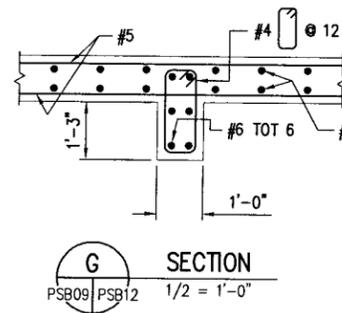
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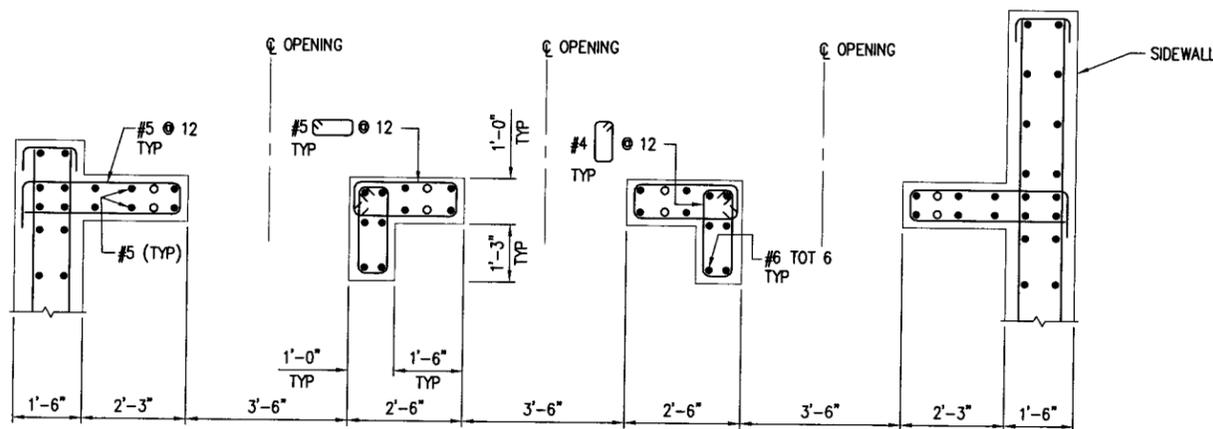
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**E SECTION**  
PSB09 | PSB12 1/2 = 1'-0"

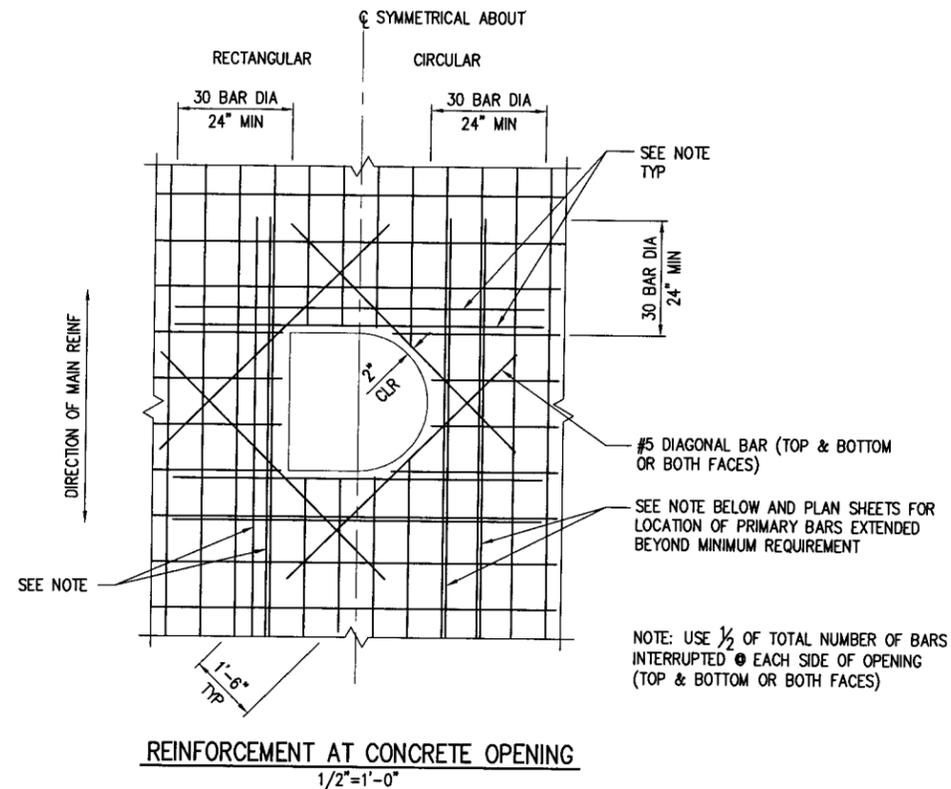


**G SECTION**  
PSB09 | PSB12 1/2 = 1'-0"



**F SECTION**  
PSB09 | PSB12 1/2 = 1'-0"

NOTE: ○ DENOTES ADDITIONAL #5 FLOOR SLAB REINF AT OPENING



**REINFORCEMENT AT CONCRETE OPENING**  
1/2" = 1'-0"

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7/08	AG	AS-BUILT	

DRAWN	EL	DATE	10/05
DESIGNED	FK	P.E. NO.	S-2649
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SECT. HEAD	DJS	P.E. NO.	C-46837



**THE PORT OF LONG BEACH**  
925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

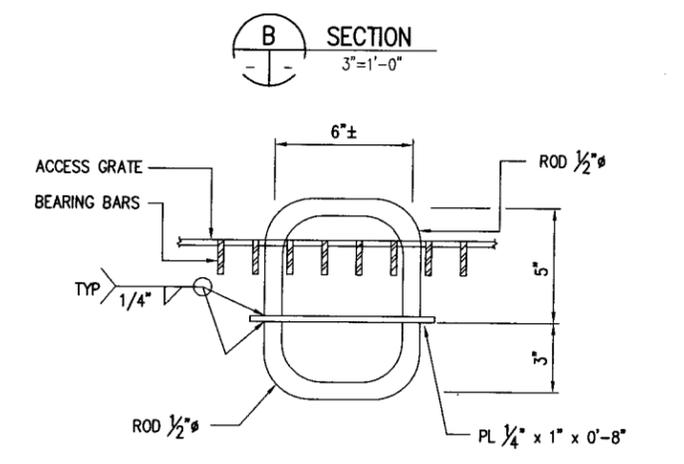
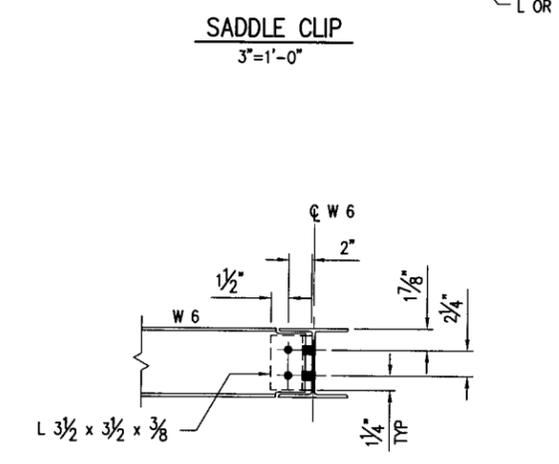
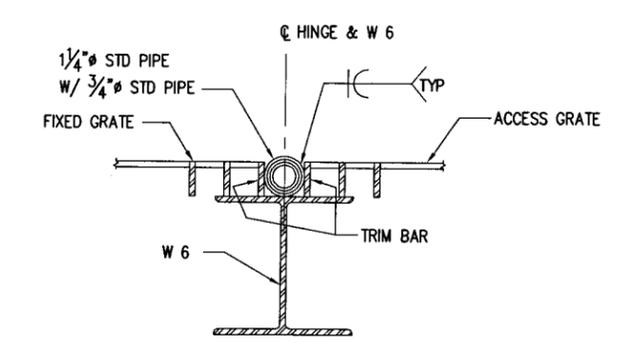
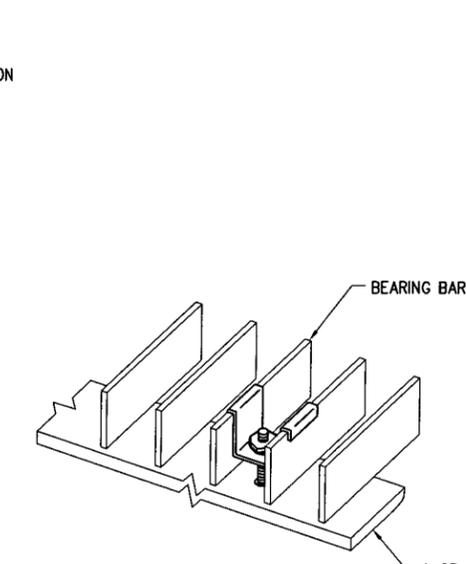
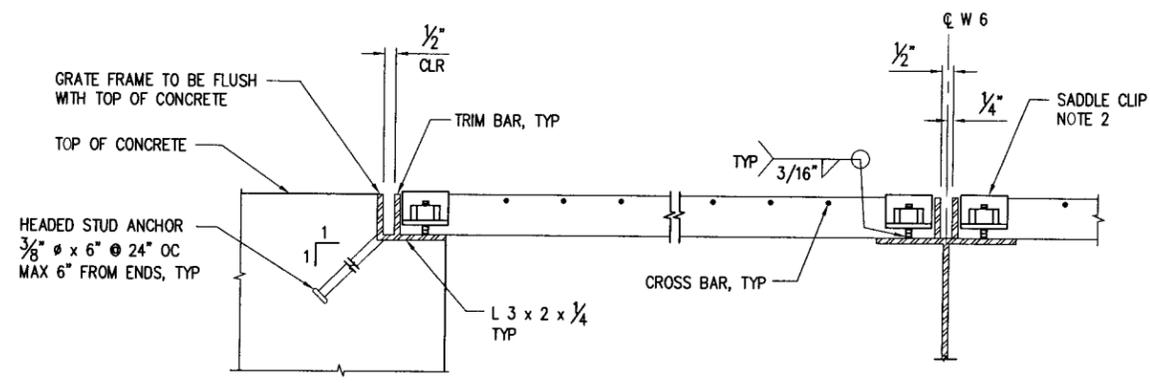
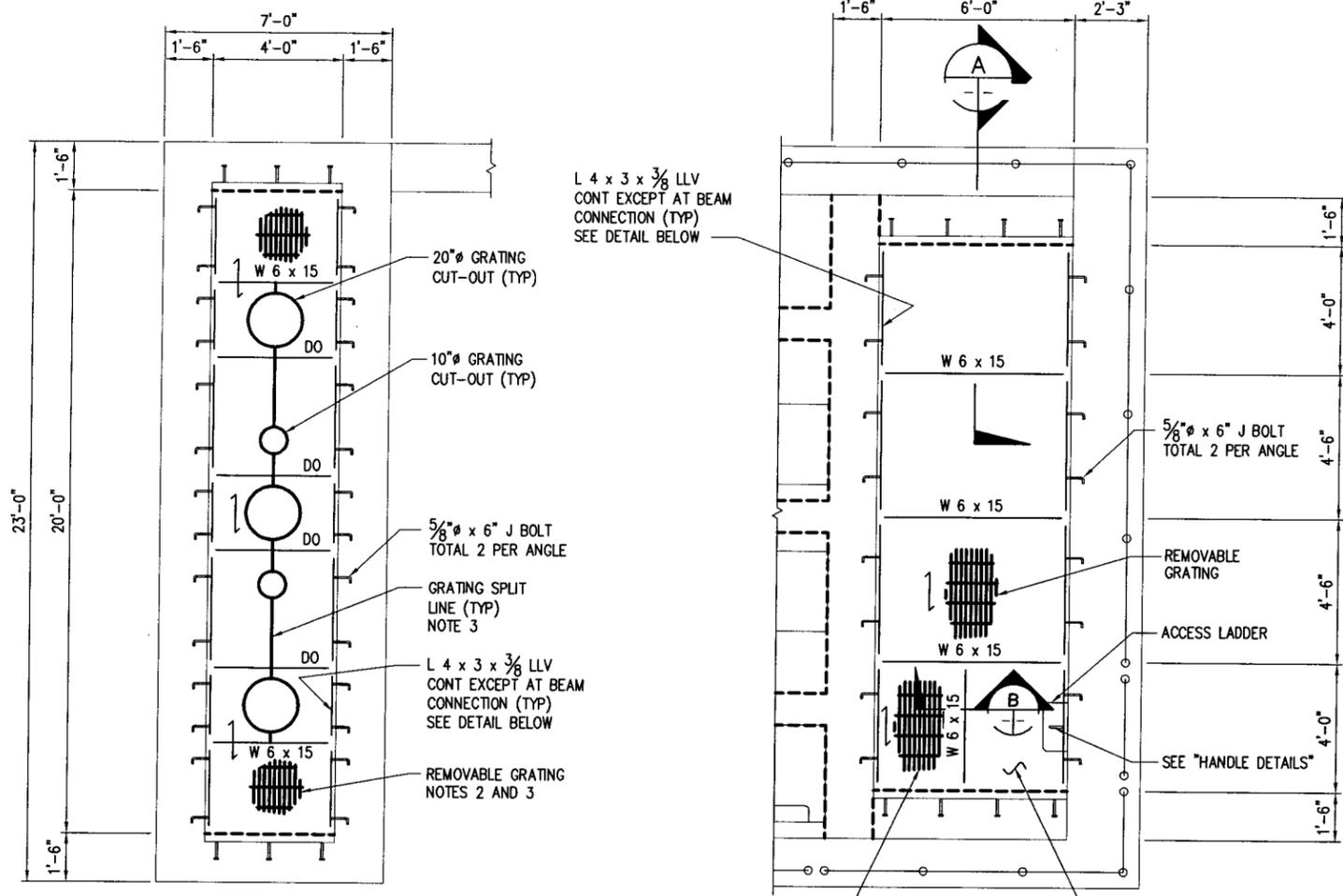
PIER S BERTHS S102-S110  
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SW PSB STRUCTURAL SECTIONS & DETAILS 3

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DRAWING NUMBER	HD 10-1898-PSB12				

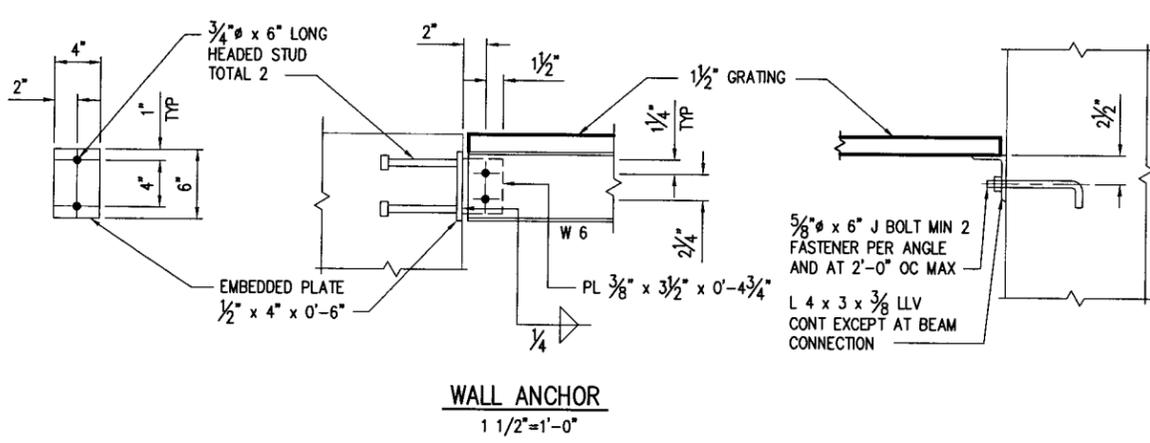
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 Date: Jan 26, 2010 9:55:57 am Images: X=PHOUSET, X=PH-LABEL, X=PHBT-2275



TOP OF GRATING EL 14.00  
 NOTE: SEE "FLOOR PLAN" SHEET FOR LOCATION OF PIPES  
**GRATING AT TOP OF DISCHARGE WELL**  
 3/8"=1'-0"

TOP OF GRATING EL 3.75  
**GRATING AT FLOOR**  
 3/8"=1'-0"



- NOTES:**
- CONTRACTOR SHALL SUBMIT GRATING PANEL SIZE FOR ENGINEER APPROVAL.
  - GRATING SHALL BE ANCHORED TO SUPPORTS WITH 1/2" DIAMETER THREADED STUD AND SADDLE CLIPS PER MANUFACTURER'S RECOMMENDATION. THE FASTENERS SHALL BE INSTALLED AT 3'-0" ON CENTER MAX AND 6" FROM ENDS.
  - PROVIDE GRATING BEND TRIM BAR AND WELD AROUND ALL CUT BEARING BARS AT PIPE PENETRATIONS.

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SECT. HEAD	DJS	P.E. NO.	C-46837

ASS'T CHIEF HARBOR ENGR.	P.E. NO.	C-25677	DATE
CHIEF HARBOR ENGINEER	P.E. NO.	C-43065	DATE



**THE PORT OF LONG BEACH**  
 925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

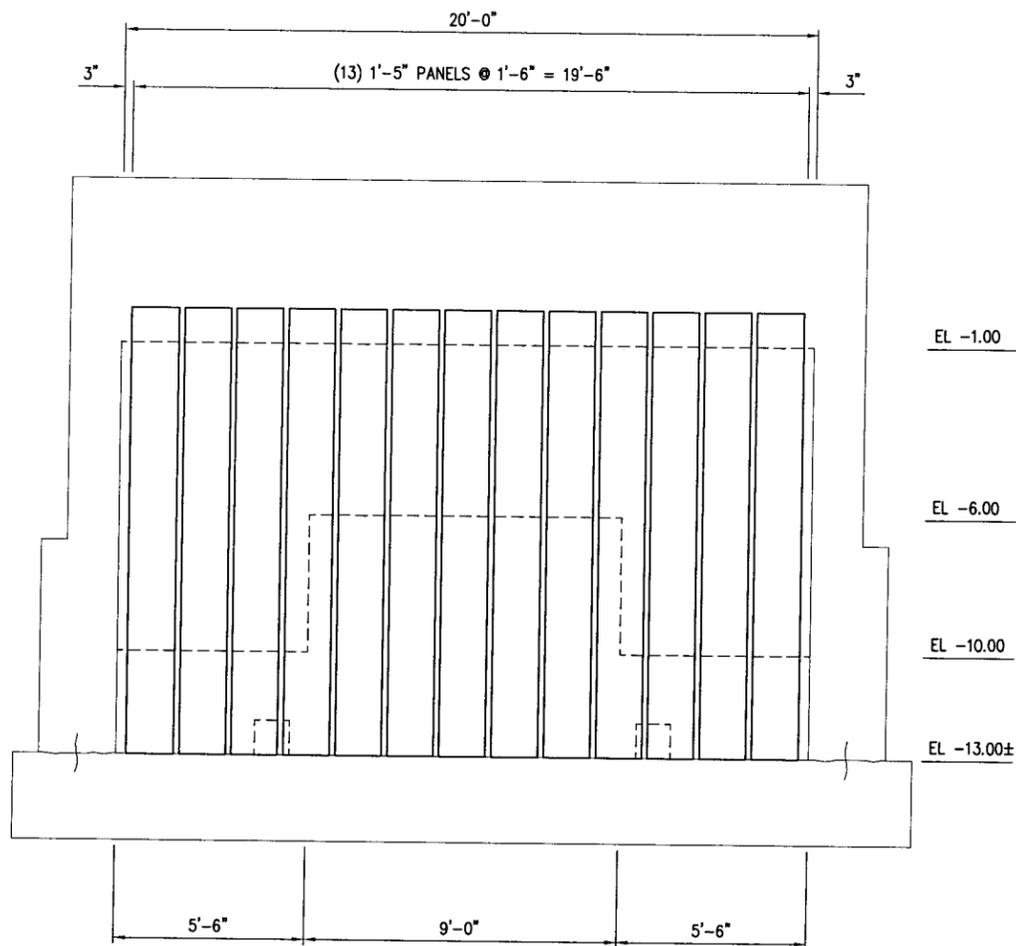
PIER S BERTHS S102-S110  
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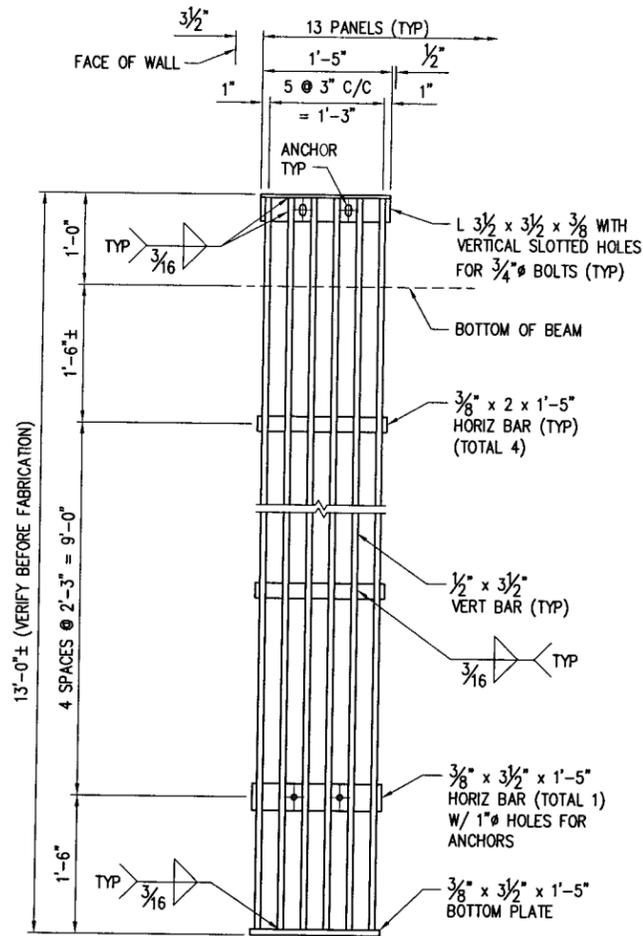
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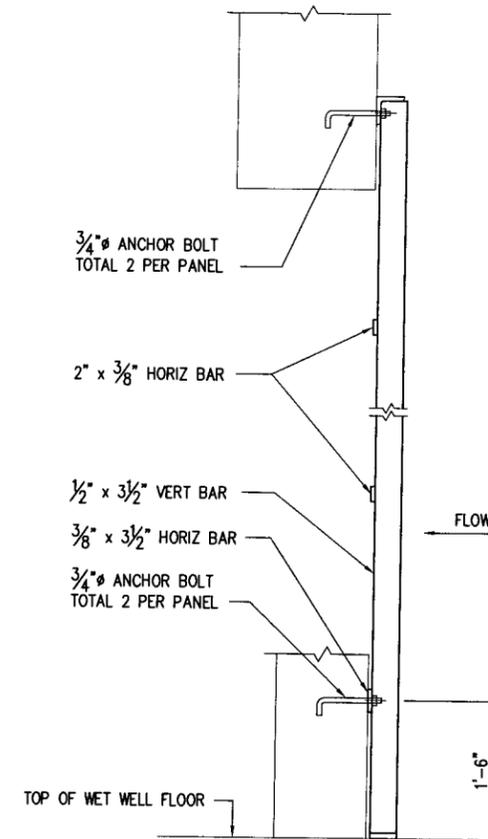
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 Date: Jan 26, 2010 - 9:57:02 am Image:  
 Xrefs: 'xobdr-2275'



**ELEVATION**  
3/8" = 1'-0"



**TRASH RACK PANEL**  
1" = 1'-0"



**ATTACHMENT DETAIL**  
1" = 1'-0"

**NOTES:**

1. THE CONTRACTOR SHALL VERIFY ALL FIELD CONTROLLING DIMENSIONS BEFORE FABRICATING THE TRASH RACK.
2. TRASH RACK PANEL SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
3. CONCRETE ANCHOR BOLTS SHALL BE 6" EMBEDMENT (MIN).



**THE PORT OF LONG BEACH**  
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PIER S BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 SW PSB STRUCTURAL TRASH RACK

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SCALE AS SHOWN SHEET 198 OF 262  
 SPECIFICATION NUMBER HD-S2275  
 DRAWING NUMBER HD 10-1898-PSB14

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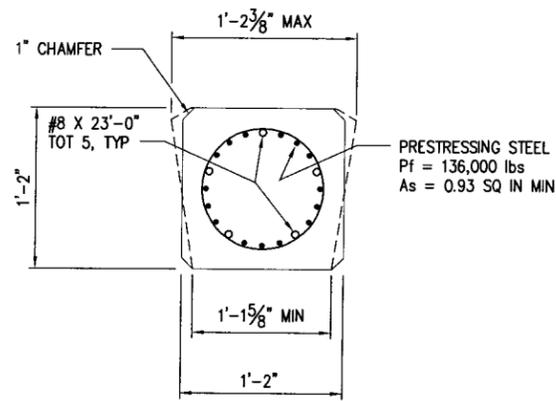
  

DRAWN	EL	DATE	10/05
DESIGNED	FK	P.E. NO.	S-2649
PROJ. MGR.	SC	P.E. NO.	
SECT. HEAD	DJS	P.E. NO.	C-46837

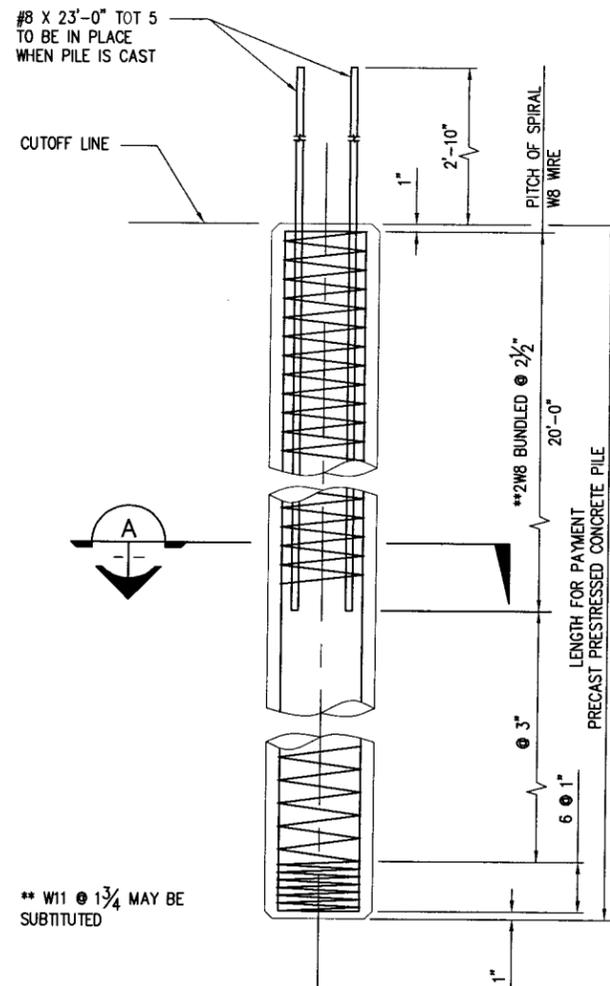
  

ASS'T CHIEF HARBOR ENGR.	P.E. NO.	C-25677	DATE
CHIEF HARBOR ENGINEER	P.E. NO.	C-43065	DATE

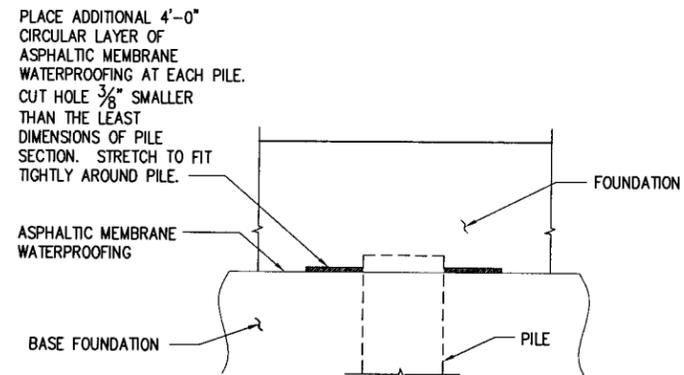
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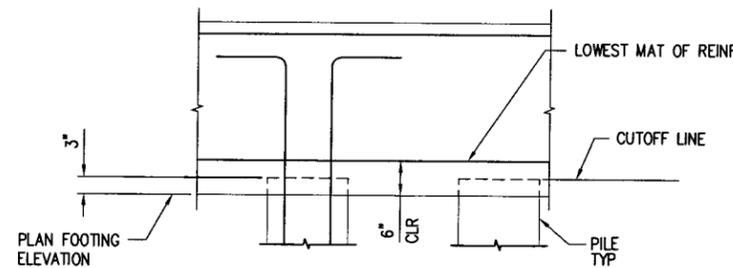
SECTION  
1 1/2" = 1'-0"



ELEVATION  
1" = 1'-0"



PILE WATERPROOFING  
3/4" = 1'-0"



PILE EMBEDMENT  
3/4" = 1'-0"

DESIGN NOTES

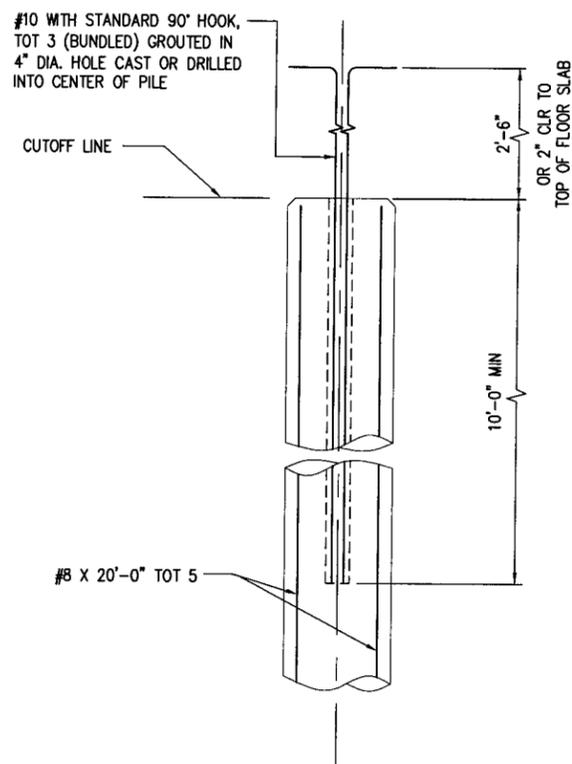
REINFORCING STEEL:  $F_y = 60,000$  PSI

PRECAST PRESTRESSED PILES:

$P_f =$  PRESTRESS FORCE (AFTER LOSSES)

CONCRETE STRENGTH  $f'_c @ 28$  DAYS = 7,000 psi

$f'_{ci} @$  TRANSFER = 4,000 psi



ALTERNATIVE PILE ANCHOR  
FOR PRESTRESSED PILE  
1" = 1'-0"

NOTES:

1. CONCRETE SHALL CONTAIN NOT LESS THAN 752 POUNDS OF CEMENT PER CUBIC YARD.
2. PILE REINFORCEMENT EXTENDING INTO FOOTING SHALL BE HOOKED AS REQUIRED TO PROVIDE CLEARANCE TO TOP OF FOOTING.
3. LAPPED SPLICES IN SPIRAL PILE REINFORCEMENT SHALL BE LAPPED 80 WIRE DIAMETER MINIMUM. SPIRAL PILE REINFORCEMENT AT SPLICES AND AT ENDS SHALL BE TERMINATED BY A 135° HOOK WITH 6" TAIL HOOKED AROUND A LONGITUDINAL BAR OR STRAND.
4. MAXIMUM CUTOFF LENGTH AT THE TOP OF PILES IS 10'-0".

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DRAWN	EL	DATE	10/05
DESIGNED	FK	P.E. NO.	S-2649
PROJ. MGR.	SC	P.E. NO.	
SECT. HEAD	DJS	P.E. NO.	C-46837

ASST' CHIEF HARBOR ENGR.	P.E. NO.	C-25677	DATE
CHIEF HARBOR ENGINEER	P.E. NO.	C-43085	DATE



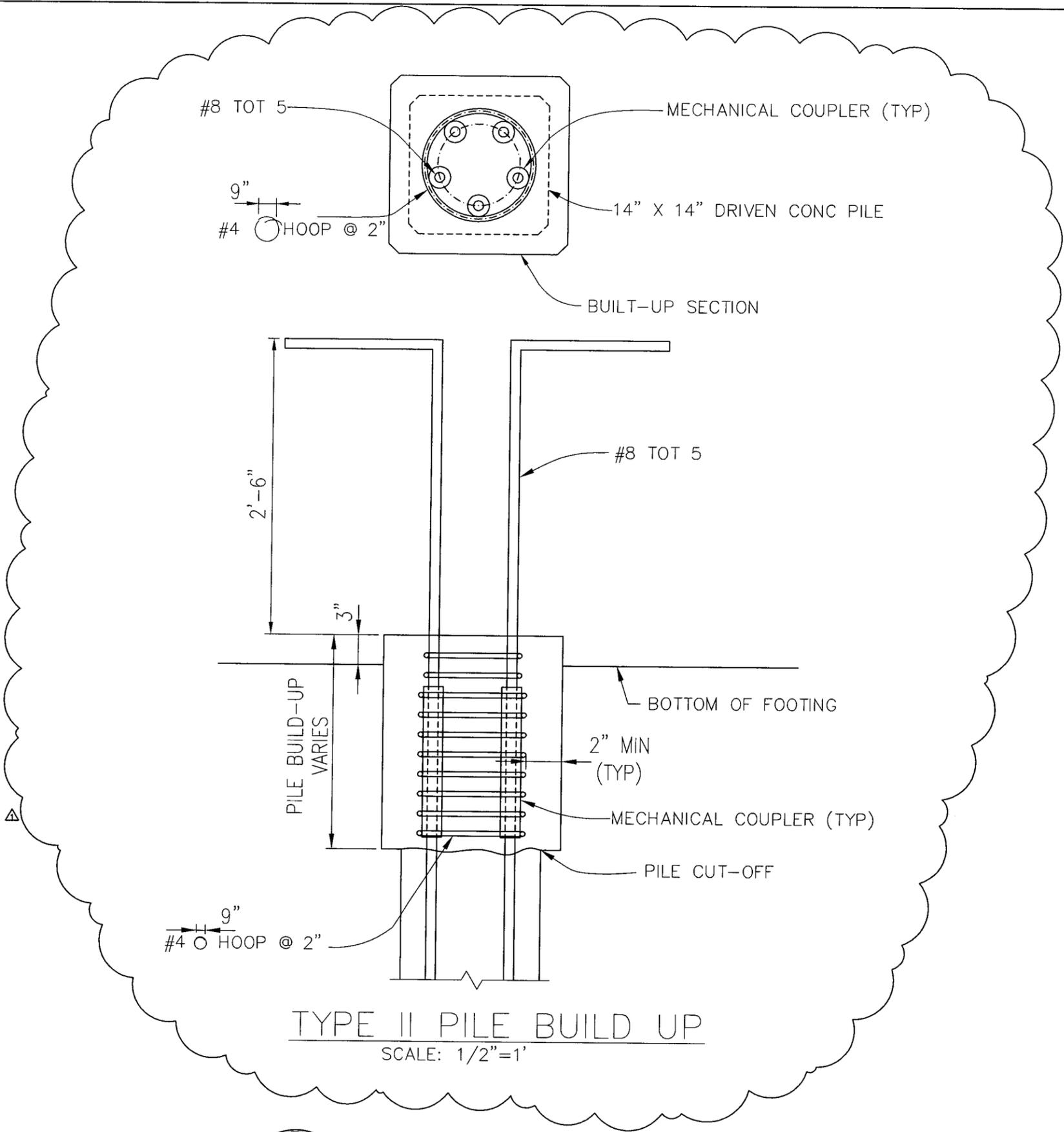
**THE PORT OF LONG BEACH**  
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PIER 3 BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 SW PSB STRUCTURAL PILE DETAILS

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SCALE	AS SHOWN	SHEET	199	OF	262
SPECIFICATION NUMBER	HD-S2275				
DRAWING NUMBER	HD 10-1898-PSB15				

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 Date: Jan 26, 2010 9:58:47 am Images: xrefs: \*pdr-2275



**TYPE II PILE BUILD UP**  
 SCALE: 1/2" = 1'

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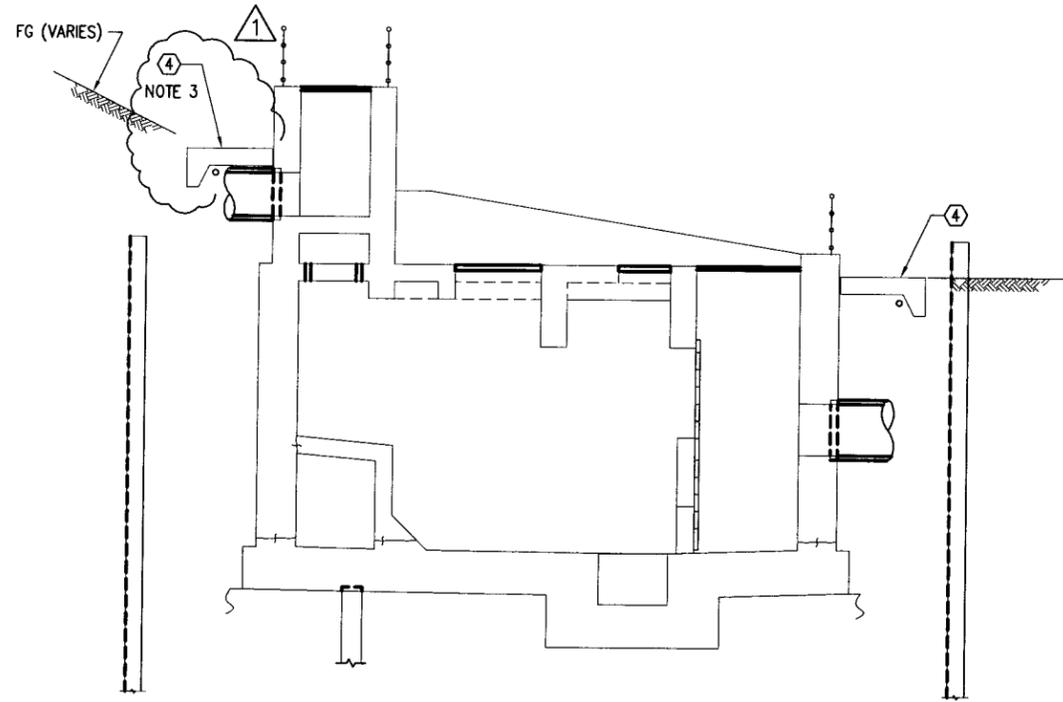
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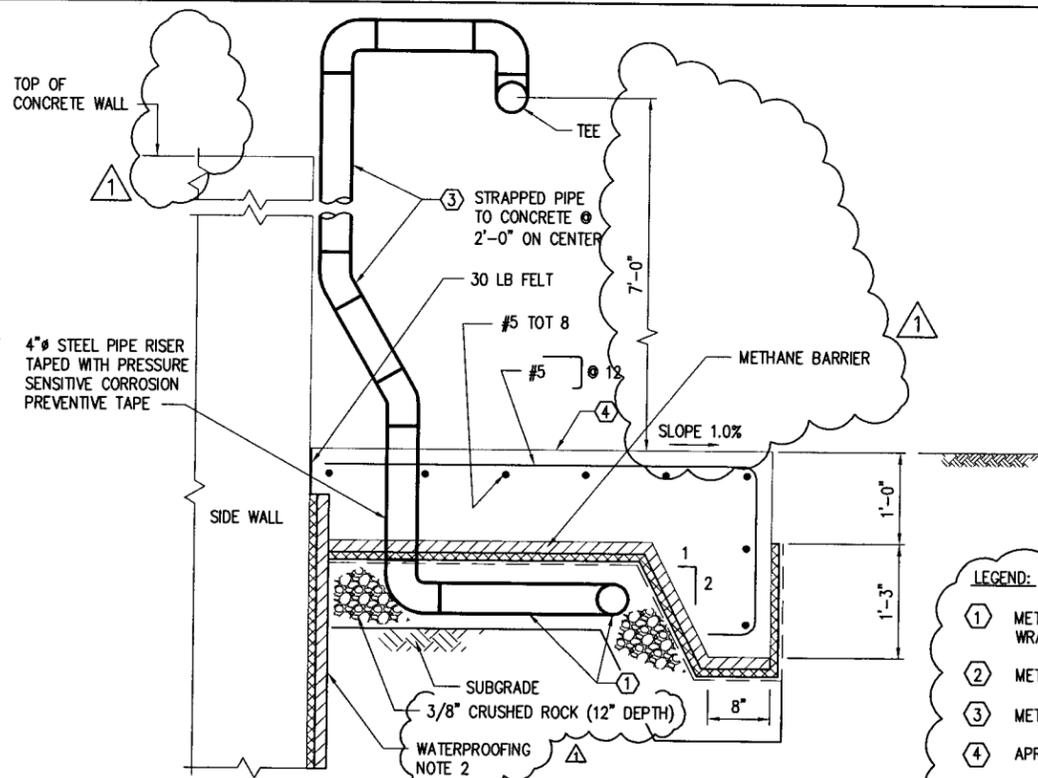
PIER S BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 TYPE II PILE BUILD UP DETAIL

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SCALE	AS SHOWN	SHEET	199A	OF	262
SPECIFICATION NUMBER	HD-S2275				
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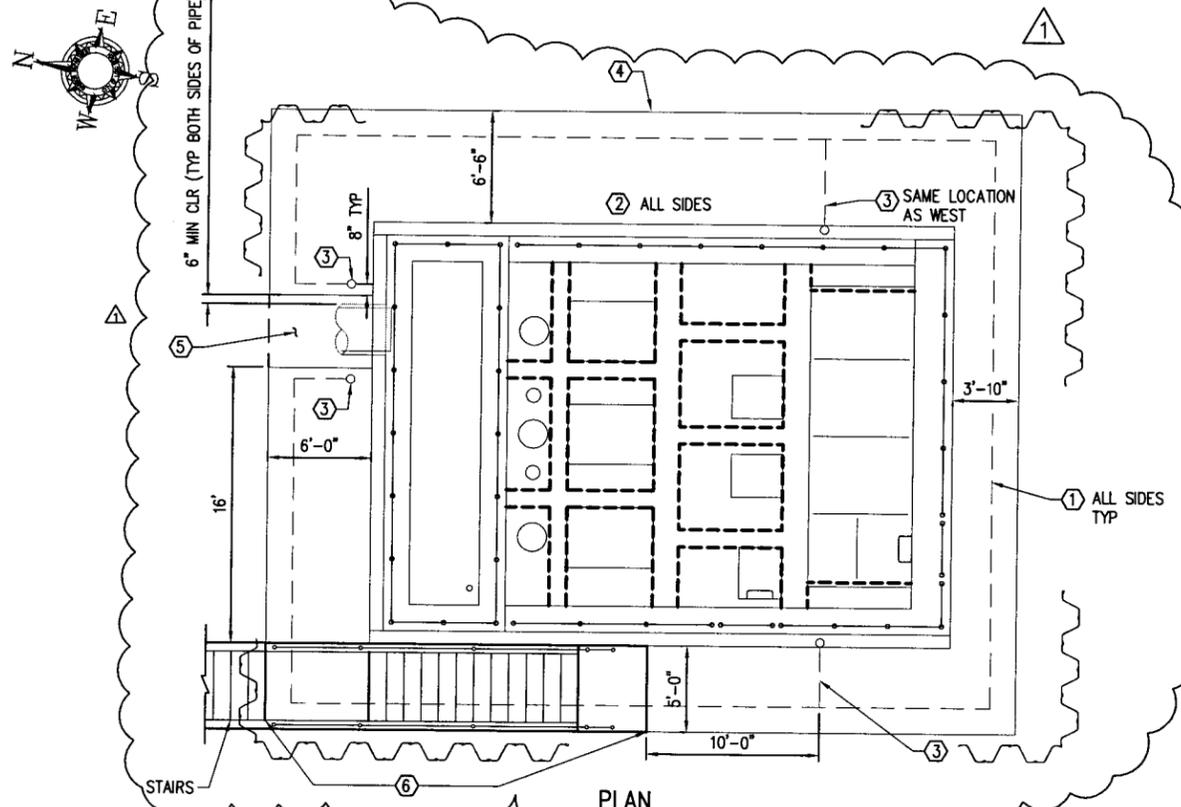


ELEVATION  
3/16"=1'-0"

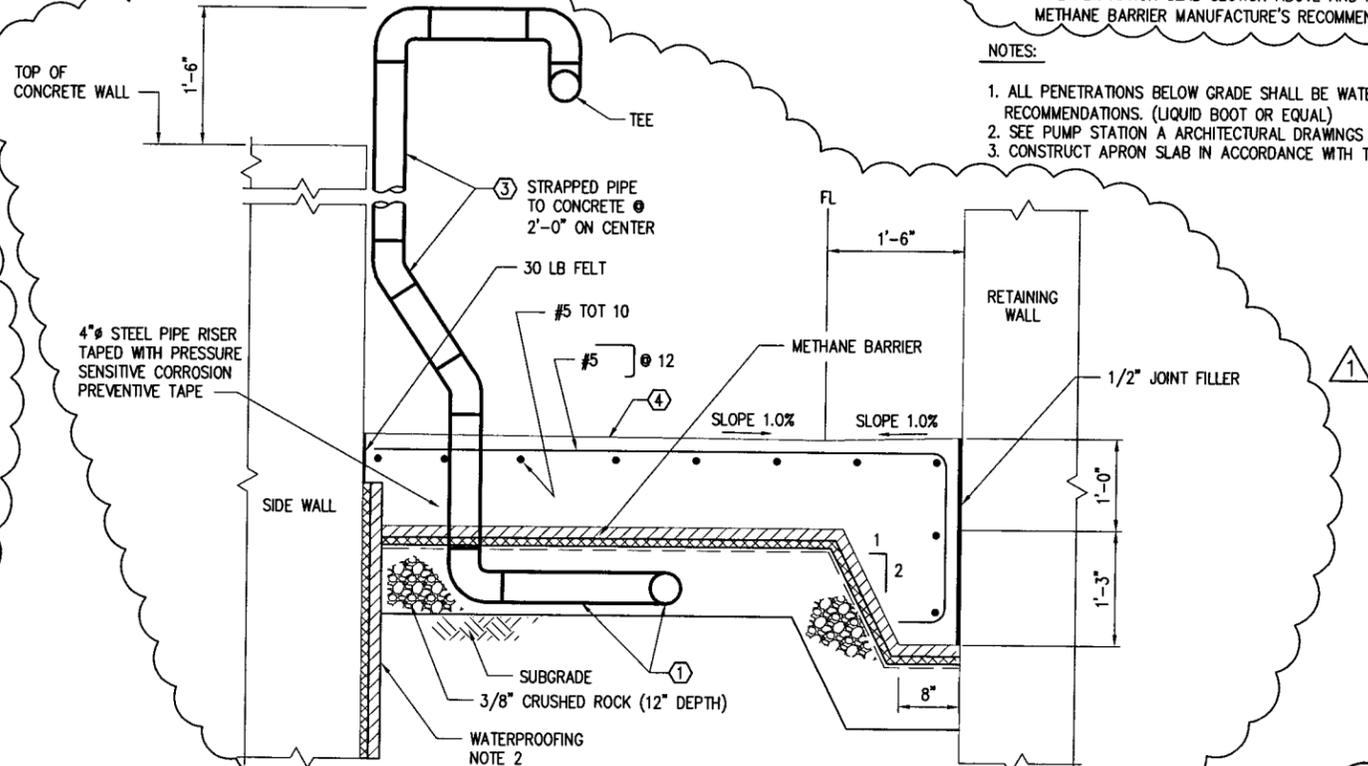


APRON SLAB ALONG NORTH, SOUTH AND WESTSIDE  
1"=1'-0"

- LEGEND:
- ① METHANE VENTING COLLECTOR PIPE 4" SCH 40 PERFORATED PVC PIPE. WRAP PIPE WITH FILTER FABRIC.
  - ② METHANE BARRIER SYSTEM
  - ③ METHANE VENT RISER 4" STEEL PIPE
  - ④ APRON SLAB
  - ⑤ OMIT CONCRETE APRON SLAB WITHIN LIMITS SHOWN AND FILL WITH 4" CMB TO FS ELEVATION. INSTALL METHANE BARRIER UNDER CMB PER MANUFACTURE'S RECOMMENDATIONS.
  - ⑥ INSTALL METHANE BARRIER AND COLLECTION PIPE UNDER STAIRS. CONSTRUCT PIPE PER APRON SLAB SECTION ABOVE AND METHANE BARRIER PER METHANE BARRIER MANUFACTURE'S RECOMMENDATIONS.
- NOTES:
1. ALL PENETRATIONS BELOW GRADE SHALL BE WATERPROOFING PER MANUFACTURER'S RECOMMENDATIONS. (LIQUID BOOT OR EQUAL)
  2. SEE PUMP STATION ARCHITECTURAL DRAWINGS FOR BELOW GRADE WATERPROOFING DETAIL
  3. CONSTRUCT APRON SLAB IN ACCORDANCE WITH THE ELEVATION OF FINISH GRADE.



PLAN  
3/16"=1'-0"



APRON SLAB ALONG EASTSIDE  
1"=1'-0"

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SECT. HEAD	DJS	P.E. NO.	C-46837

ASST CHIEF HARBOR ENGR.	P.E. NO.	C-25677	DATE
CHIEF HARBOR ENGINEER	P.E. NO.	C-43065	DATE



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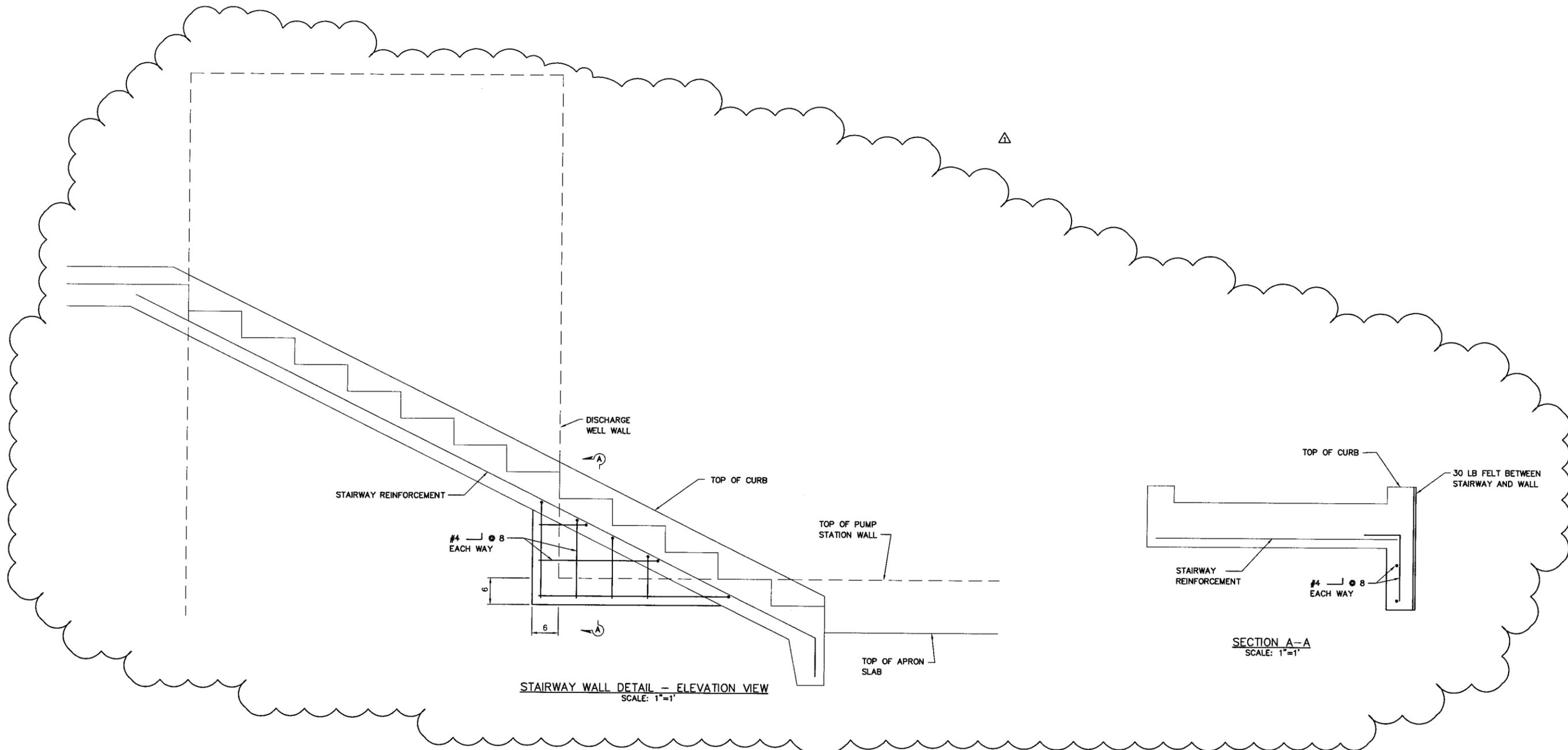
PIER 5 BERTHS S102-S110  
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 SW PSB STRUCTURAL METHANE VENTING SYSTEM

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SCALE	AS SHOWN	SHEET	200	OF	262
SPECIFICATION NUMBER	HD-S2275				
DRAWING NUMBER	HD 10-1898-PSB16				

FN: D1898XXX

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STAIRWAY WALL DETAIL -- ELEVATION VIEW  
SCALE: 1"=1'

SECTION A-A  
SCALE: 1"=1'

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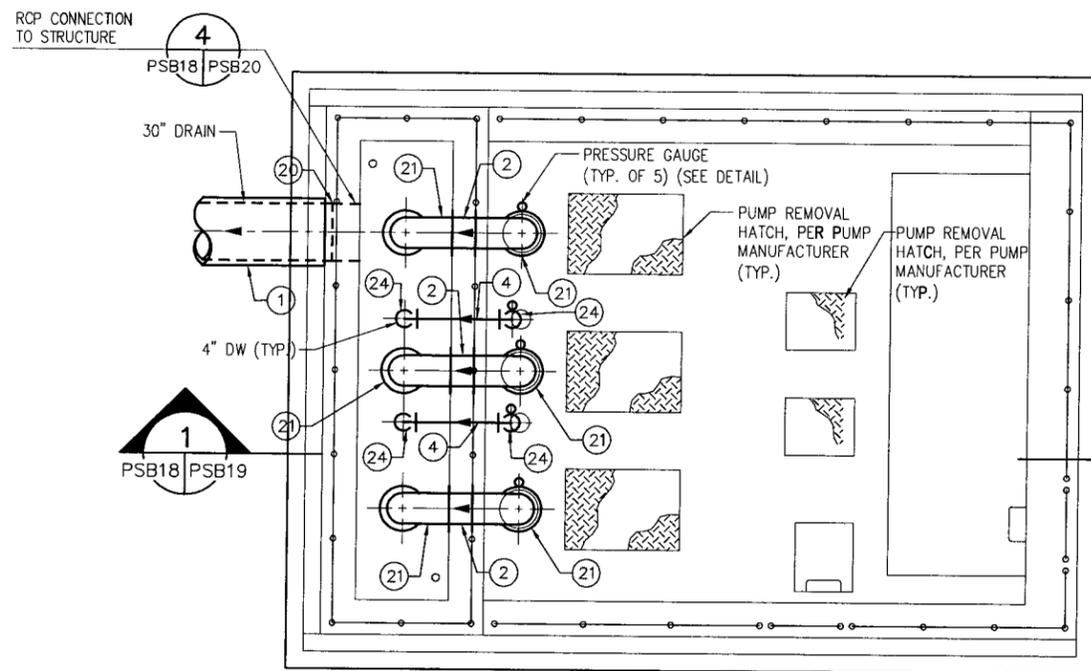
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 SW PSB STAIRWAY WALL DETAIL

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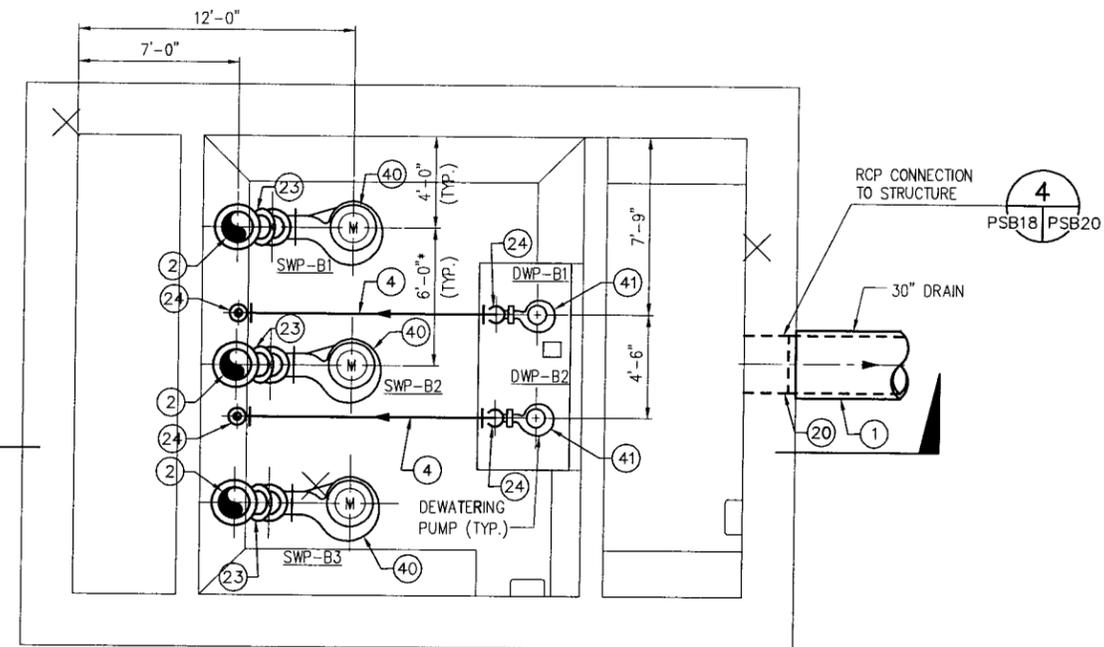
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SPECIFICATION NUMBER			HD-S2275
DRAWING NUMBER			HD 10-1898-PSB16A

FN: D1898PSB16B





FLOOR PLAN



WET WELL PLAN

SCALE: 1/4"=1'-0"

DWG: C:\Projects\Bim\10-10-10-PQB-Per-S\565426 GD\Drawings\AS-BUILT-07-08\DMJM As-builts\SHEET-2275\PSB18.dwg Version: 17.0a (LMS Tech) User: john\_j\_kim  
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SECT. HEAD	DJS	P.E. NO.	C-46837

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CHIEF HARBOR ENGINEER	P.E. NO. C-43065	DATE	



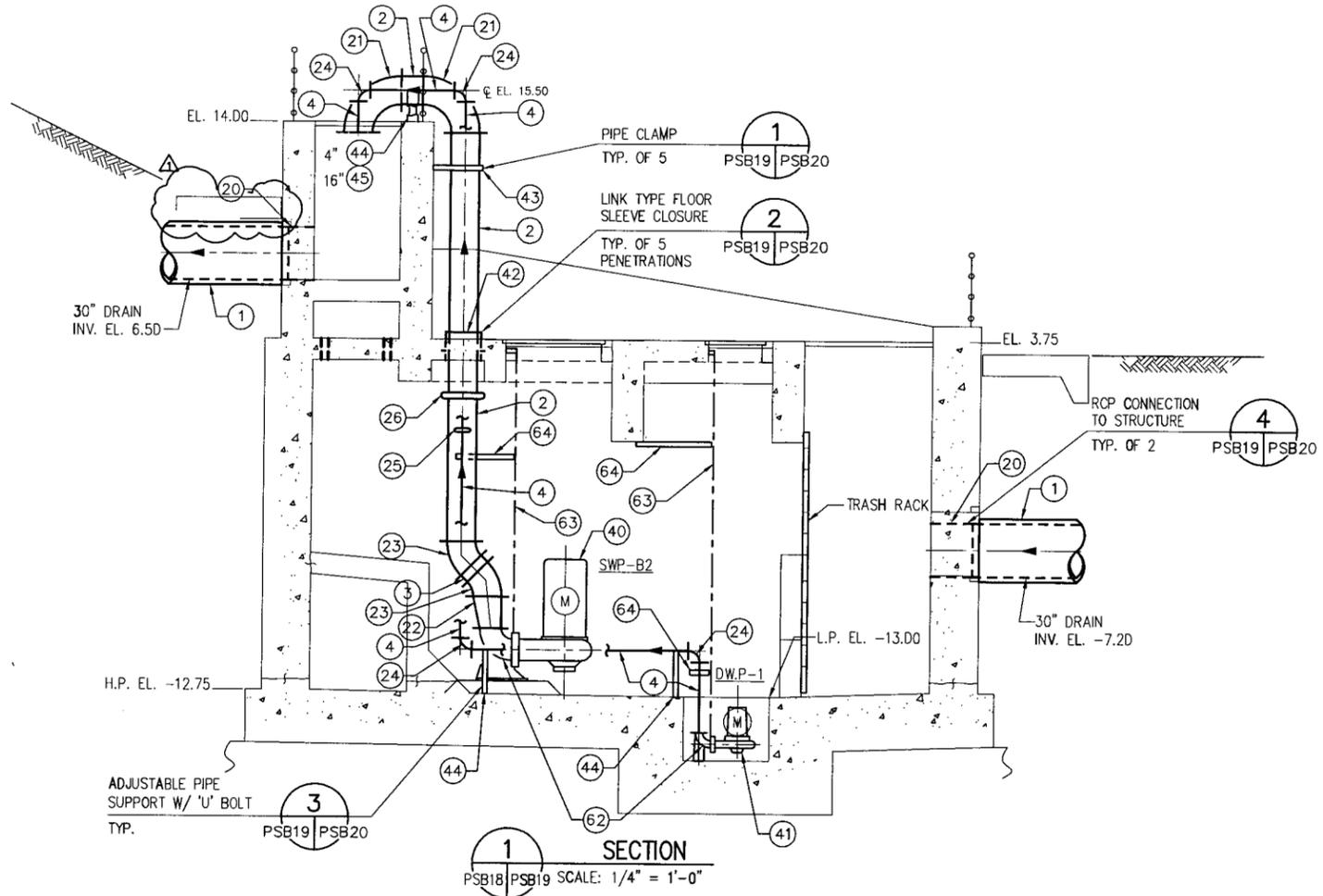
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PIER S BERTHS S102-S110  
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 SW PSB MECHANICAL FLOOR PLANS

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SCALE	1/4"=1'-0"	SHEET	202	OF	262
SPECIFICATION NUMBER	HD-S2275				
DRAWING NUMBER	HD 10-1898-PSB18				

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**WET WELL LEVEL CONTROL ELEVATIONS**

LEVEL POINT	ACTION	ELEVATION
L12 (LS-G)	HIGH HIGH ALARM	-3.25
L11 (LS-F)	ALARM + START TWO (2) SW PUMPS W/TIME DELAY	-3.75
L10	ULTRASONIC LEVEL - START STAND BY SW PUMP (IF TWO PUMPS NOT ALREADY RUNNING)	-4.25
L9	ULTRASONIC LEVEL - START LAG SW PUMP	-4.75
L8	ULTRASONIC LEVEL - START LEAD SW PUMP	-5.75
L7	ULTRASONIC LEVEL - STOP LAG SW PUMP	-6.75
L6	ULTRASONIC LEVEL - STOP LEAD SW PUMP	-7.75
L5 (LS-E)	STORMWATER (SW) PUMP LOW LEVEL ALARM + STOP ALL SW PUMPS IF RUNNING	-8.25
L4 (LS-D)	START LAG/STANDBY DEWATERING PUMP	-12.00
L3 (LS-C)	START LEAD DEWATERING PUMP	-12.50
L2 (LS-B)	STOP DEWATERING PUMPS	-13.50
L1 (LS-A)	SUMP LOW LEVEL ALARM	-14.00

\* INHIBIT OPERATION OF DEWATERING PUMPS WHEN STORMWATER PUMP(S) IS ON.

MARK	DATE	BY	REVISIONS
7/08	AG	AS-BUILT	

DRAWN	SAC	DATE	10/05
DESIGNED	DV	P.E. NO.	C-39182
PROJ. MGR.	SG	P.E. NO.	
SECT. HEAD	DJS	P.E. NO.	C-46837



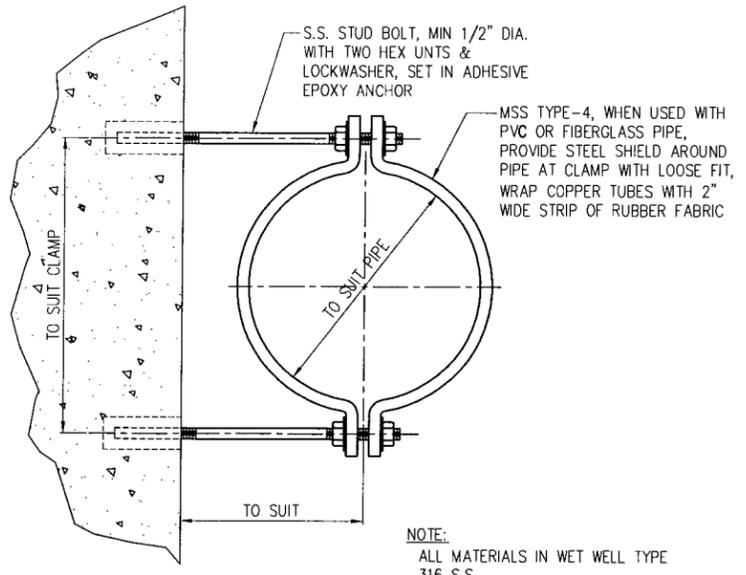
PIER S BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 SW PSB MECHANICAL SECTIONS

DMJM HARRIS  
 999 TOWN & COUNTRY ROAD  
 ORANGE, CALIFORNIA 92868-4786  
 Phone: (714) 567-2400  
 Fax: (714) 567-2441

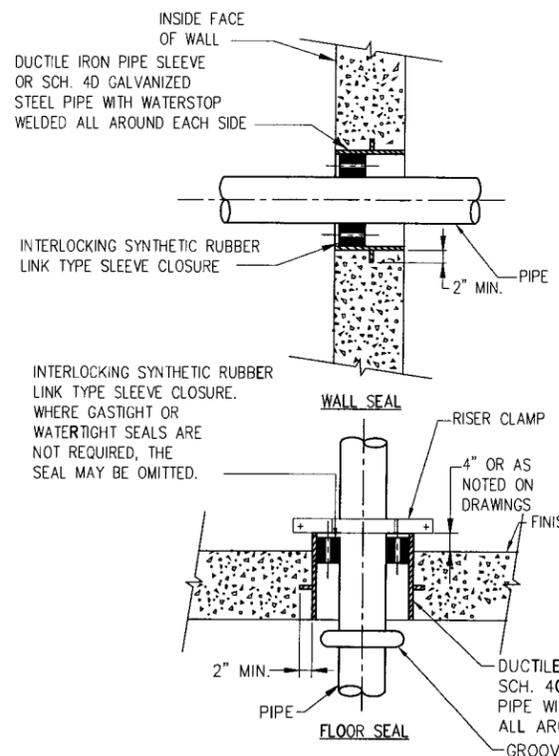
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DRAWING NUMBER	HD 10-1898-PSB19				

FN: D1898XXX

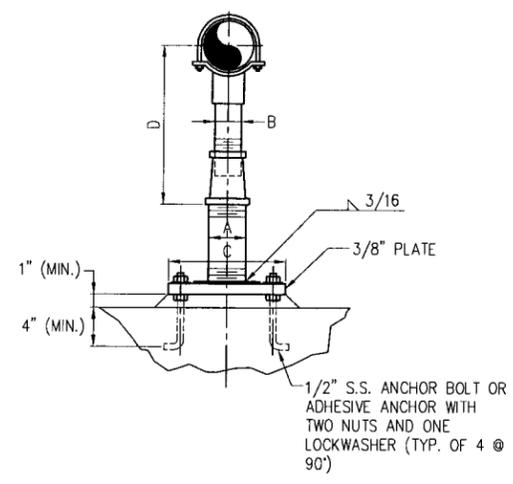
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 DATE: Jan 26, 2010 10:03:11 am  
 Xrefs: Xpsbdr-2275



**PIPE CLAMP**  
NTS PSB18, PSB19 PSB20

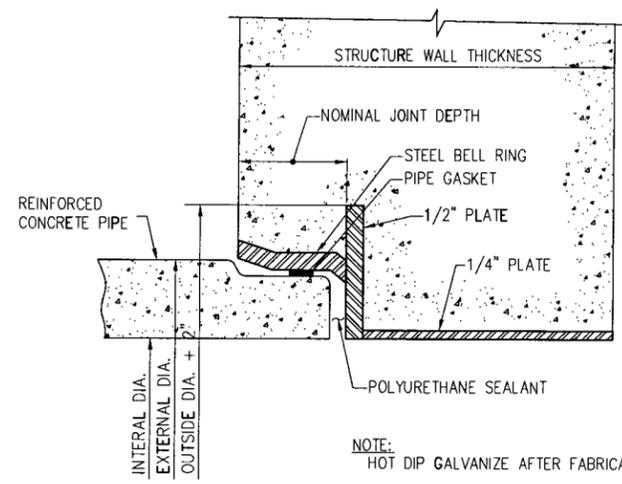


**LINK TYPE WALL AND FLOOR SLEEVE CLOSURE**  
NTS PSB18, PSB19 PSB20

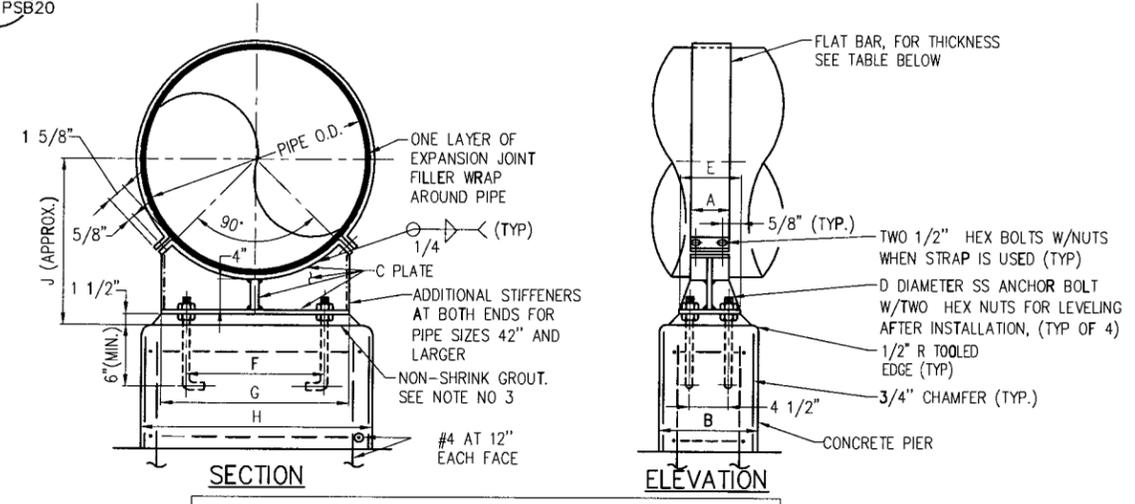


**ADJUSTABLE PIPE SUPPORT WITH 'U' BOLT**  
NTS PSB18, PSB19 PSB20

ADJUSTABLE PIPE SUPPORT DIMENSIONS IN INCHES					
PIPE SIZE	A	B	C	D (MIN.)	D (MAX.)
2 1/2	2 1/2	1 1/2	9	8	11 1/2
3	2 1/2	1 1/2	9	8 1/4	11 3/4
3 1/2	2 1/2	1 1/2	9	8 1/2	12
4	3	2 1/2	9	10 1/4	14
6	3	2 1/2	9	11 5/8	15 1/4
8	3	2 1/2	9	13 5/8	16 1/2



**RCP CONNECTION TO STRUCTURE**  
NTS PSB18, PSB19 PSB20



NOMINAL PIPE SIZE	DIMENSIONS IN INCHES													
	SUPPORTING						PIPE							
	A	B	C	D	E	FLAT BAR	F	G	H	J	F	G	H	J
16	4	12	3/8	5/8	6	1/4	9	15	21	15	12	20	26	18

- NOTES:  
 1. PIER PIPE SUPPORTS TO BE LOCATED WHERE INDICATED.  
 2. GALVANIZE AFTER FABRICATION

**PIER PIPE CONNECTION**  
NTS PSB18, PSB19 PSB20



**THE PORT OF LONG BEACH**  
 925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

PIER S BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 SW PSB MECHANICAL DETAILS

**DMJM HARRIS**  
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 ORANGE, CALIFORNIA 92868-4786  
 Phone: (714) 567-2400  
 Fax: (714) 567-2441

SCALE	NONE	SHEET	204	OF	262
SPECIFICATION NUMBER	HD-S2275				
DRAWING NUMBER	HD 10-1898-PSB20				

MARK	DATE	BY	REVISIONS
	7/08	AG	AS-BUILT

DRAWN	SAC	DATE	10/05
DESIGNED	DV	P.E. NO.	C-39182
PROJ. MGR.	SG	P.E. NO.	
SECT. HEAD	DJS	P.E. NO.	C-46837

ASST CHIEF HARBOR ENGR.	P.E. NO. C-25677	DATE	
CHIEF HARBOR ENGINEER	P.E. NO. C-43065	DATE	

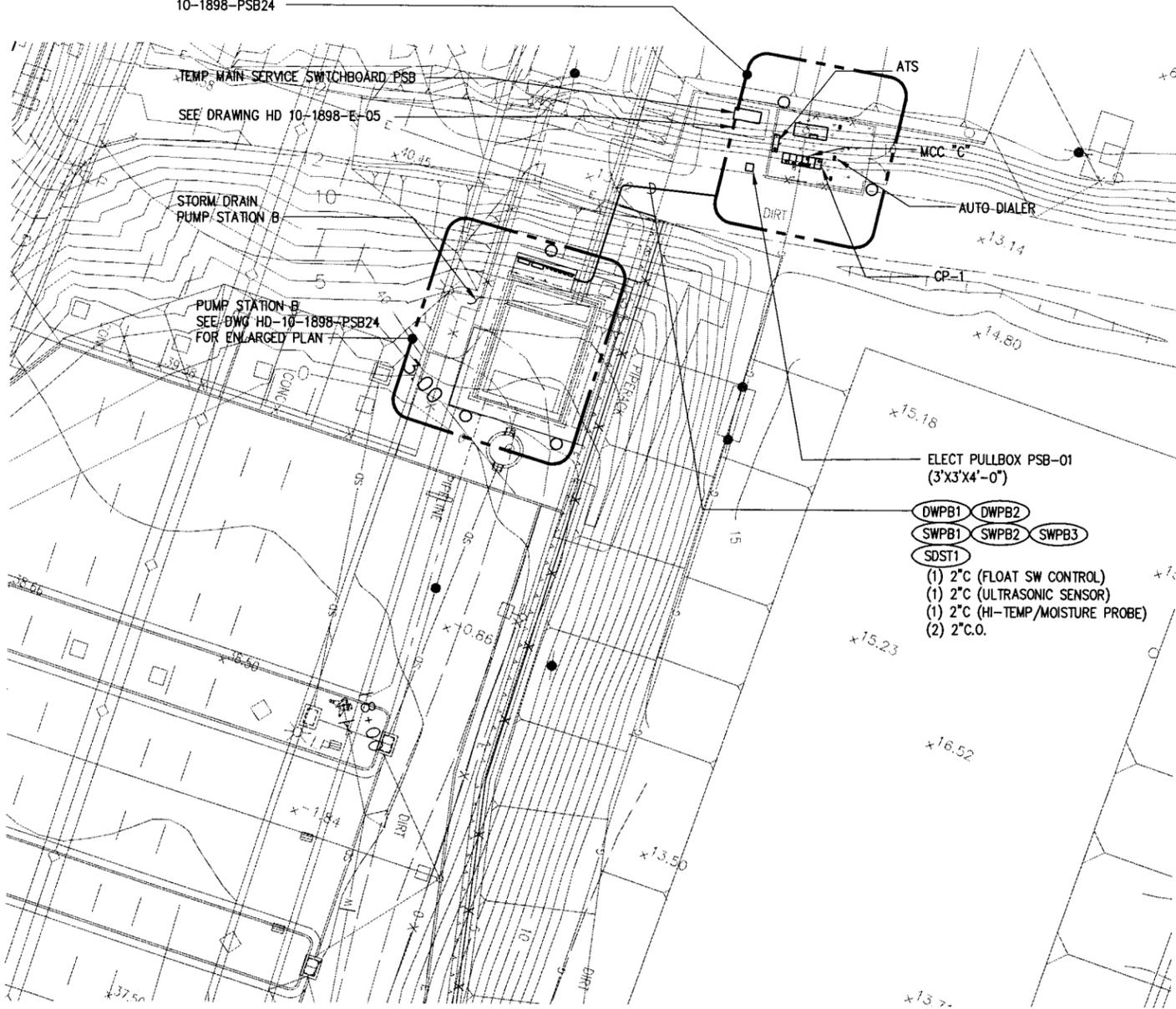




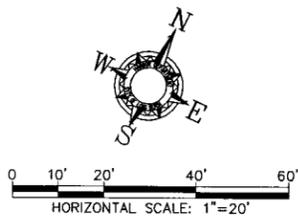
**NOTES:**

- SEE DRAWING HD-10-1898-PSB21 FOR SYMBOLS, GENERAL NOTES AND ABBREVIATIONS.
- SEE DRAWING HD-10-1898-PSB22 FOR FEEDER SCHEDULE.

STORM WATER PUMP STATION B  
ELECTRICAL LAYOUT. SEE OWG  
10-1898-PSB24

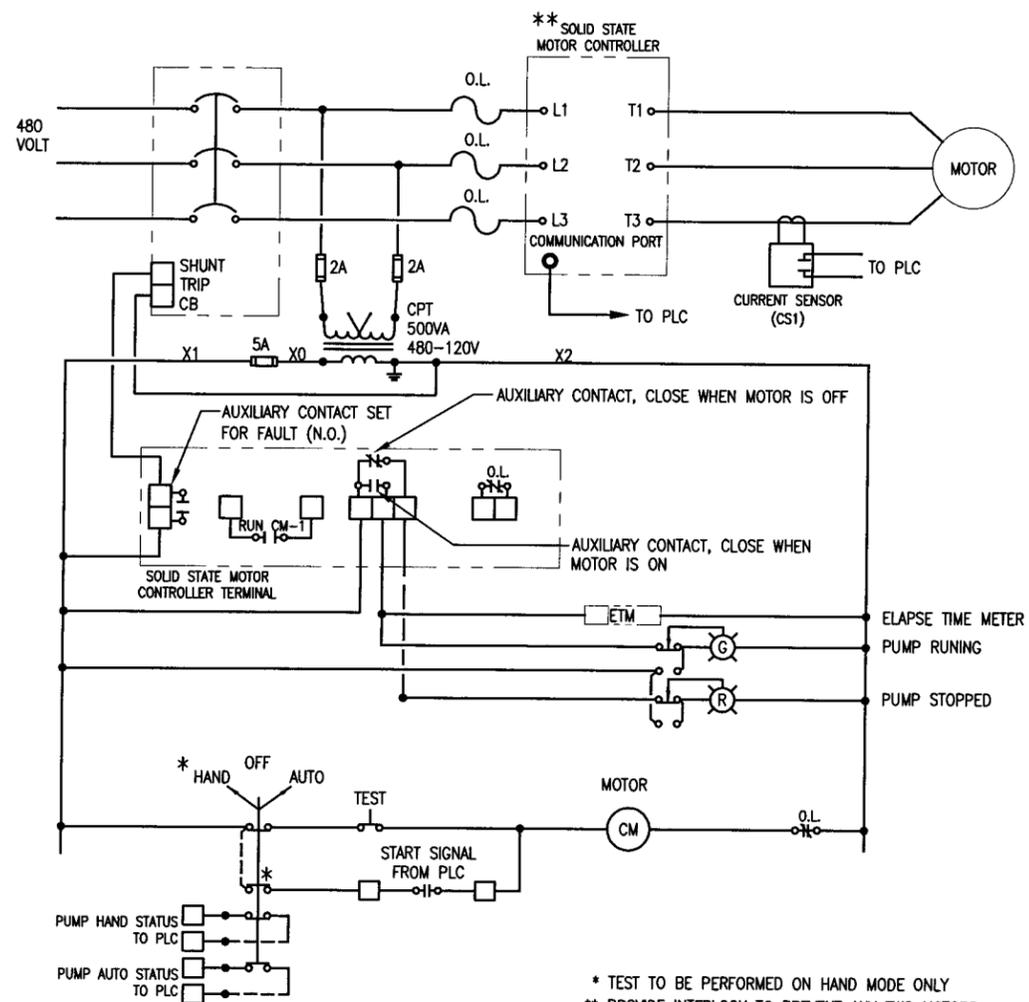


**SW PSB ELECTRICAL SITE PLAN**  
SCALE: 1"=20'-0"



**SYMBOLS AND ABBREVIATIONS**

- |    |  |      |                               |
|----|--|------|-------------------------------|
| ⊥  | NORMALLY OPEN CONTACT                                    | RTD  | RESISTANCE TEMP DETECTOR      |
| ⊥/ | NORMALLY CLOSED CONTACT                                  | PLC  | PROGRAMMABLE LOGIC CONTROLLER |
| ⊙  | SOLENOID VALVE   | ETM  | ELAPSE TIME METER             |
| □  | TERMINAL   | O.L. | OVERLOAD THERMAL RELAY        |
| ⊙  | RELAY, "CM" IS RELAY IDENTIFIER                          |      |                               |
| ⊂  | CURRENT TRANSFORMER                                      |      |                               |
| ⊙  | INDICATING LIGHT, "R" INDICATES RED, "G" INDICATES GREEN |      |                               |



**1 SCHEMATIC DIAGRAM**  
PSB23 TYPICAL FOR SWPB1, SWPB2 AND SWPB3

\* TEST TO BE PERFORMED ON HAND MODE ONLY  
\*\* PROVIDE INTERLOCK TO PREVENT ANY TWO MOTORS TO START SIMULTANEOUSLY. IN ADDITION PROVIDE CONTROL TO ALLOW A MAXIMUM OF 2 PUMPS TO RUN AT ANY GIVEN TIME.

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 Date: Jan 26, 2010 10:07:05  
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MARK	DATE	BY	REVISIONS
7/08	AG	AS-BUILT	

DRAWN	DE	DATE	10/05
DESIGNED	BAM	P.E. NO.	8130
PROJ. MGR.	SG	P.E. NO.	
SECT. HEAD	DJS	P.E. NO.	C-46837

ASS'T CHIEF HARBOR ENGR.	P.E. NO. C-25677	DATE	
CHIEF HARBOR ENGINEER	P.E. NO. C-43065	DATE	



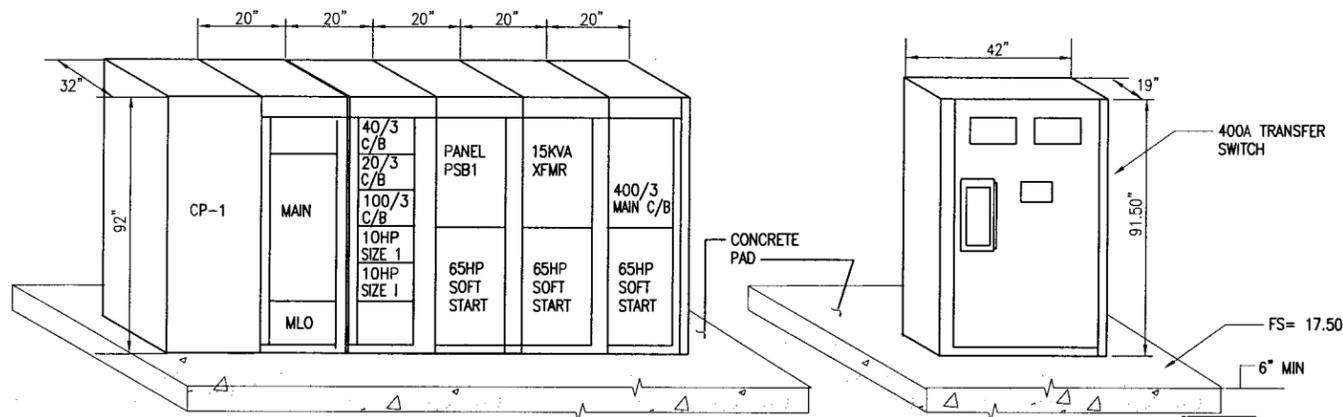
**THE PORT OF LONG BEACH**  
925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

PIER 5 BERTHS S102-S110  
GRADING, DRAINAGE & UTILITIES  
SW PSB ELECTRICAL SITE PLAN & SCHEMATIC DIAGRAM

**DMJM HARRIS**  
999 TOWN & COUNTRY ROAD  
ORANGE, CALIFORNIA 92668-4786  
Phone: (714) 567-2400  
Fax: (714) 567-2441

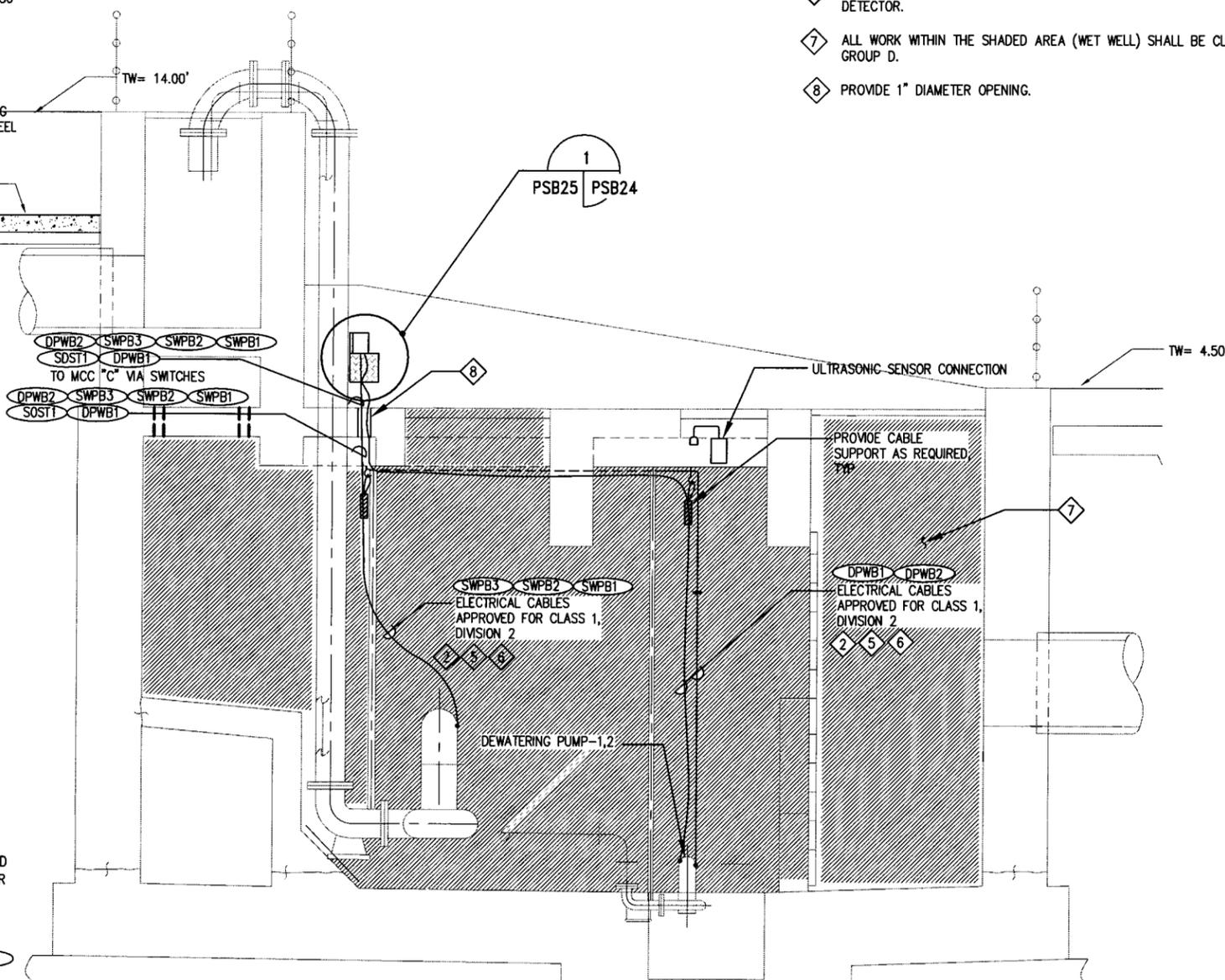
SCALE	1"=20'	SHEET	207	OF	262
SPECIFICATION NUMBER	HD-S2275				
DRAWING NUMBER	HD 10-1898-PSB23				



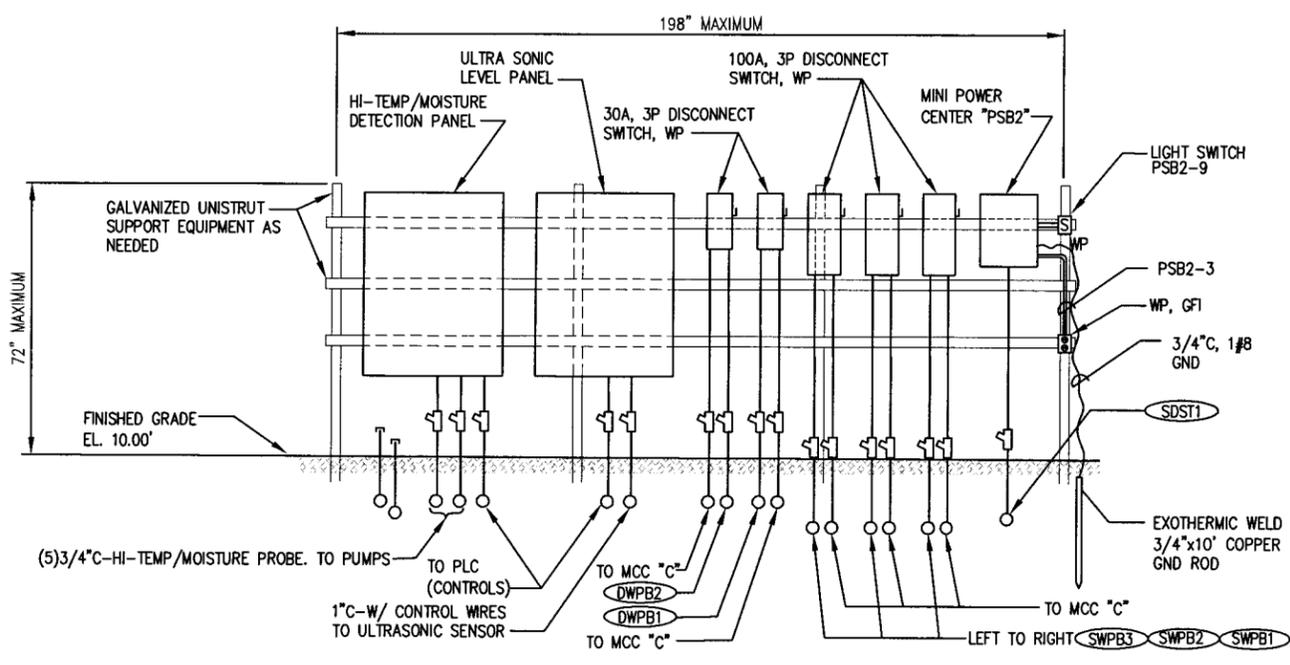


**A** MCC "C" ELEVATION  
PSB24 PSB25 N.T.S.

**C** TRANSFER SWITCH ELEVATION  
PSB24 PSB25 N.T.S.

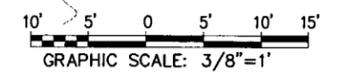


**B** STORM WATER PUMP STATION B ELECTRICAL ELEVATION  
PSB24 PSB25 SCALE: 3/8"=1'-0"



**D** RECEPTACLES & PANELBOARD MOUNTING ELEVATION  
PSB24 PSB25 SCALE 1/2"=1'

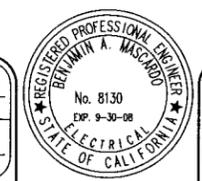
- NOTES:**
- FOR ELECTRICAL SYMBOLS, NOTES AND ABBREVIATIONS, SEE HD-10-1898-PSB21.
  - PROVIDE CABLE SUPPORT AS REQUIRED.
  - ELECTRICAL INSTALLATION WITHIN THE WET WALL SHALL BE EXPLOSION PROOF AND IN ACCORDANCE WITH ARTICLE 510 OF THE NEC FOR CLASS 1, DIVISION 2, GROUP D.
  - PROVIDE CONDUIT SEALS ON ALL CONDUIT WITHIN THE CLASS 1, DIV 2, GROUP D ENVIRONMENT.
  - ALL CABLES SHALL BE RATED FOR CLASS 1, DIVISION 2, GROUP D LOCATIONS.
  - FOR EACH PUMP, INSTALL ONE CABLE EACH FOR TEMP & MOISTURE DETECTOR.
  - ALL WORK WITHIN THE SHADED AREA (WET WELL) SHALL BE CLASS 1, DIV.2, GROUP D.
  - PROVIDE 1" DIAMETER OPENING.



DATE: 10/05/05  
 PROJECT: PIER 5 BERTHS S102-S110 GRADING, DRAINAGE & UTILITIES  
 DRAWING: SW PSB ELECTRICAL ELEVATION  
 SHEET: 209 OF 262  
 SCALE: 3/8"=1'-0"  
 DRAWN: DLE  
 DESIGNED: BAM  
 PROJ. MGR: SC  
 SECT. HEAD: DAS  
 DATE: 10/05  
 P.E. NO: 8130  
 P.E. NO: C-25677  
 P.E. NO: C-46837  
 P.E. NO: C-43065

MARK	DATE	BY	REVISIONS
7/08	AG	AS-BUILT	

DRAWN	DLE	DATE	10/05
DESIGNED	BAM	P.E. NO.	8130
PROJ. MGR.	SC	P.E. NO.	
SECT. HEAD	DAS	P.E. NO.	C-46837



**THE PORT OF LONG BEACH**  
 925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

PIER 5 BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 SW PSB ELECTRICAL ELEVATION

**DMJM HARRIS**  
 999 TOWN & COUNTRY ROAD  
 ORANGE, CALIFORNIA 92668-4786  
 Phone: (714) 567-2400  
 Fax: (714) 567-2441

SCALE AS SHOWN SHEET 209 OF 262  
 SPECIFICATION NUMBER HD-S2275  
 DRAWING NUMBER HD 10-1898-PSB25

FN: D1898PSB25

**INSTRUMENT TYPE IDENTIFICATION LETTERS**  
(THIS TABLE APPLIES ONLY TO THE FUNCTIONAL IDENTIFICATION OF INSTRUMENTS)

FIRST LETTER		SUCCEEDING LETTERS			
MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER	
A	ANALYSIS	ANALOG	ALARM		
B	BURNER FLAME		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	CONDUCTIVITY (ELECTRICAL)			CONTROL	
D	DENSITY (MASS) OR SPECIFIC GRAVITY	DIFFERENTIAL OR DIGITAL			
E	VOLTAGE (EMF)		PRIMARY ELEMENT		
F	FLOW RATE	RATIO (FRACTION)			
G	GAGING (DIMENSIONAL)		GLASS		
H	HAND (MANUALLY INITIATED)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE OR INPUT		
J	POWER	SCAN			
K	TIME OR TIME SCHEDULE			CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOISTURE OR HUMIDITY				MIDDLE OR INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE (RESTRICTION)		
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT	INTEGRATE OR TOTALIZE			
R	RADIOACTIVITY	RELIEF	RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION			VALVE, DAMPER OR LOUVER	
W	WEIGHT OR FORCE		WELL		
X	UNCLASSIFIED		UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	USER'S CHOICE			RELAY OR COMPUTE	
Z	POSITION			DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

**MISCELLANEOUS ABBREVIATIONS**

I/P	CURRENT TO PNEUMATIC CONVERTER	GBT	GRAVITY BELT THICKENER
E/I	VOLTAGE TO CURRENT CONVERTER	DO	DISSOLVED OXYGEN
Σ	ADD OR TOTALIZE	H2S	HYDROGEN SULFIDE
√	SQUARE ROOT	O2	OXYGEN
X	MULTIPLY	pH	HYDROGEN ION CONCENTRATION
$\frac{\square}{\square}$	DIVIDE	LP	LOCAL PANEL
>	HIGH SELECT	VFD	VARIABLE FREQUENCY DRIVE
MV	MEASURED VARIABLE	△	DIFFERENCE
<	LOW SELECT	I/O	INPUT / OUTPUT
S.P.	SET POINT	ER	ELECTRICAL ROOM
PLC	PROGRAMMABLE LOGIC CONTROLLER	LEL	LOWER EXPLOSIVE LIMIT
f(x)	CHARACTERISTIC	DW	DEWATERING
P	PROPORTIONAL CONTROL MODE	OC	ODOR CONTROL
D	DERIVATIVE	WW	WASTE WATER
		∫	INTEGRAL CONTROL MODE

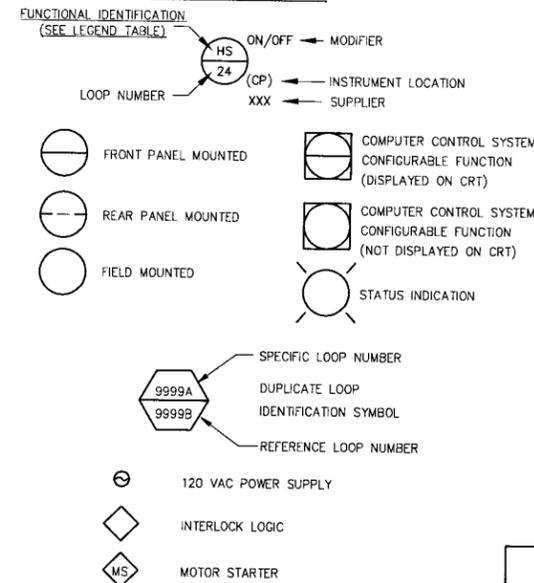
**SYMBOLS**

	HYDRAULIC CONTROL LINES		ACCUMULATOR		STATIC MIXER		AXIAL FLOW PUMP
	ELECTRIC INSTRUMENT LINES		AERATOR		TANK VENT		BLOWER
	PNEUMATIC SIGNAL		BAR SCREEN		UNION		CENTRIFUGAL PUMP
	PROCESS FLOW		CALIBRATION STANDPIPE		WEIR		CENTRIFUGE AND SLUDGE CAKE PUMP
	CAPILLARY TUBING		CHEMICAL SEAL		CYLINDER ACTUATOR		DIAPHRAGM PUMP
	ELECTROMAGNETIC OR SONIC SIGNAL		IN LINE SEAL		DIAPHRAGM ACTUATOR WITH POSITIONER		DIAPHRAGM PUMP
	BALL VALVE		CONCENTRIC REDUCER		HAND OPERATOR		HOSE PUMP
	BALL CHECK VALVE		DRAIN		HYDRAULIC OPERATOR		METERING PUMP
	SWING CHECK VALVE		DUPLEX FILTER		MOTOR OPERATOR		POSITIVE DISPLACEMENT PUMP
	BUTTERFLY VALVE, DAMPER, OR LOUVER		ECCENTRIC REDUCER		PNEUMATIC OPERATOR		PLUNGER PUMP
	PLUG VALVE		FLEXIBLE HOSE		SOLENOID OPERATOR		PRESSURE PUMP
	GATE VALVE		GRINDER		TERMINAL STRIP IN LOCAL PANEL FOR INTERFACE WITH COMPUTER/MUX		PROGRESSIVE CAVITY PUMP
	DIAPHRAGM VALVE		LOAD CELL		FLOW RATE CONTROLLER		ROTARY LOBE PUMP
	GLOBE VALVE		MIXER		FLOW ELEMENT (VENTURI)		VARIABLE INLET VANE DAMPER
	RESTRAINED FLEXIBLE COUPLING		VERTICAL SHAFT MIXER		INSERT FLOW ELEMENT (VENTURI)		INSERTION MASS FLOW METER
	FLOAT VALVE		PULSATION DAMPENERS		MAGNETIC FLOWMETER		LIMITS OF WORK (TRADE, CONTRACT, ETC.)
	3-WAY MIX VALVE		QUICK DISCONNECT		ORIFICE PLATE		POINT OF CONNECTION NEW WORK TO EXISTING WORK
	3-WAY DIVERTER VALVE		RADIO, ULTRASONIC, OR ACOUSTIC SIGNAL		PARSHALL FLUME		SEDIMENT & DRIP TRAP ASSEMBLY
	3-WAY SOLENOID VALVE		RUPTURE DISC (PRESSURE RELIEF)		ROTAMETER		
	4-WAY MIX VALVE		RUPTURE DISC (VACUUM RELIEF)		ACOUSTIC OR DOPPLER INLINE FLOWMETER		
	4-WAY SOLENOID VALVE		STRAINER		"V" NOTCH WEIR		
	ANGLE VALVE		CONE CHECK VALVE		WEIR GATE		
	SOLENOID VALVE		DOUBLE DISC CHECK VALVE				
	SELF-OPERATING BACK PRESSURE REGULATOR VALVE						
	SELF-OPERATING PRESSURE REGULATOR VALVE						
	PRESSURE REDUCING REGULATOR VALVE W/EXTERNAL PRESSURE TAP						
	PRESSURE RELIEF VALVE						
	VACUUM RELIEF VALVE						
	KNIFE GATE VALVE						
	PINCH VALVE						
	SLIDE GATE						
	SLUICE GATE						
	MULTI-BLADE DAMPER						
	DIFFUSER						

**GENERAL NOTES**

- INSTRUMENT SUFFIX:  
NUMERIC SUFFIXES IDENTIFY INSTRUMENTS WITH DIFFERENT FUNCTIONS (E.G., A RUN AND AN OUT OF SERVICE LIGHT) ARE PRECEDED BY A DECIMAL POINT (E.G., AA:ML-343.1 AND AA:ML-343.2)  
ALPHABETIC SUFFIXES IDENTIFY MULTIPLE OCCURRENCES OF INSTRUMENTS WITH THE SAME FUNCTION (E.G., TWO VALVE INDICATORS IN DIFFERENT PANELS, (E.G. AA:ZL-161.1A, AND AA:ZL-161.1B).

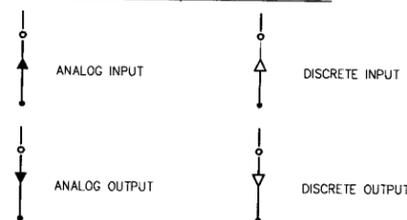
**INSTRUMENT SYMBOLS**



**SUPPLIERS**

- ALL INSTRUMENTS ARE SPECIFIED BY INSTRUMENTS UNLESS INDICATED BY:
- (E) SPECIFIED BY ELECTRICAL (X) EXISTING  
(M) SPECIFIED BY MECHANICAL (H) SPECIFIED BY HVAC  
(F) FURNISHED WITH EQUIPMENT (P) SPECIFIED BY PLUMBING

**PLC OR DCS INPUT/OUTPUT SYMBOLS**



**HAND SWITCH POSITION SYMBOLS**  
(UNLABELLED SWITCHES ARE TO BE ON-OFF)

A	AUTOMATIC	SBY	STANDBY
C	CLOSE	F/R	FORWARD / REVERSE
F	FAST OR FORWARD	L/R	LOCAL / REMOTE
H	HAND	L/S/R	LOCAL / STOP / REMOTE
J	JOG	HOR	HAND-OFF-REMOTE
L	LOCAL	HOA	HAND-OFF-AUTO
M	MANUAL	OSC	OPEN / STOP / CLOSE
O	OPEN OR OFF	FSR	FORWARD / STOP / REVERSE
R	RUN OR REMOTE	TSM	THRU / STOP / MIX
S/S	START / STOP	OSF	OFF / SLOW / FAST
E/S	EMERGENCY STOP	OTC	OPEN / TRAVEL / CLOSE

FN: D1898XXX

**DMJM HARRIS**  
999 TOWN & COUNTRY ROAD  
ORANGE, CALIFORNIA 92668-4786  
Phone: (714) 567-2400  
Fax: (714) 567-2441

DRAWN DW DATE 10/05  
DESIGNED ECS P.E. NO. \_\_\_\_\_  
PROJ. MGR. SC P.E. NO. \_\_\_\_\_  
SECT. HEAD DJS P.E. NO. C-46837

ASST CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE \_\_\_\_\_  
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE \_\_\_\_\_

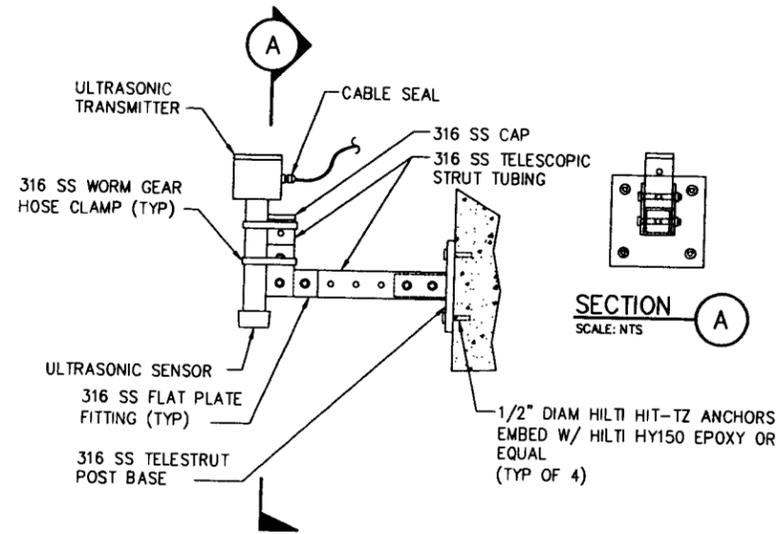


**THE PORT OF LONG BEACH**  
925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL. (562) 437-0041

PIER 5 BERTHS S102-S110  
GRADING, DRAINAGE & UTILITIES  
SW PSB INSTRUMENTATION NOTES & LEGEND

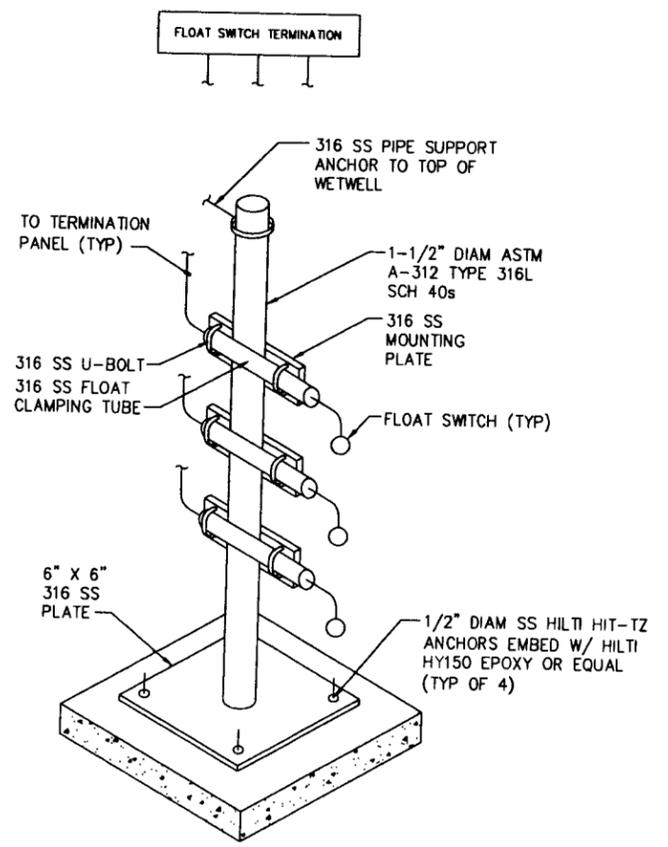
SCALE NONE SHEET 210 OF 262  
SPECIFICATION NUMBER HD-S2275  
DRAWING NUMBER HD 10-1898-PSB26



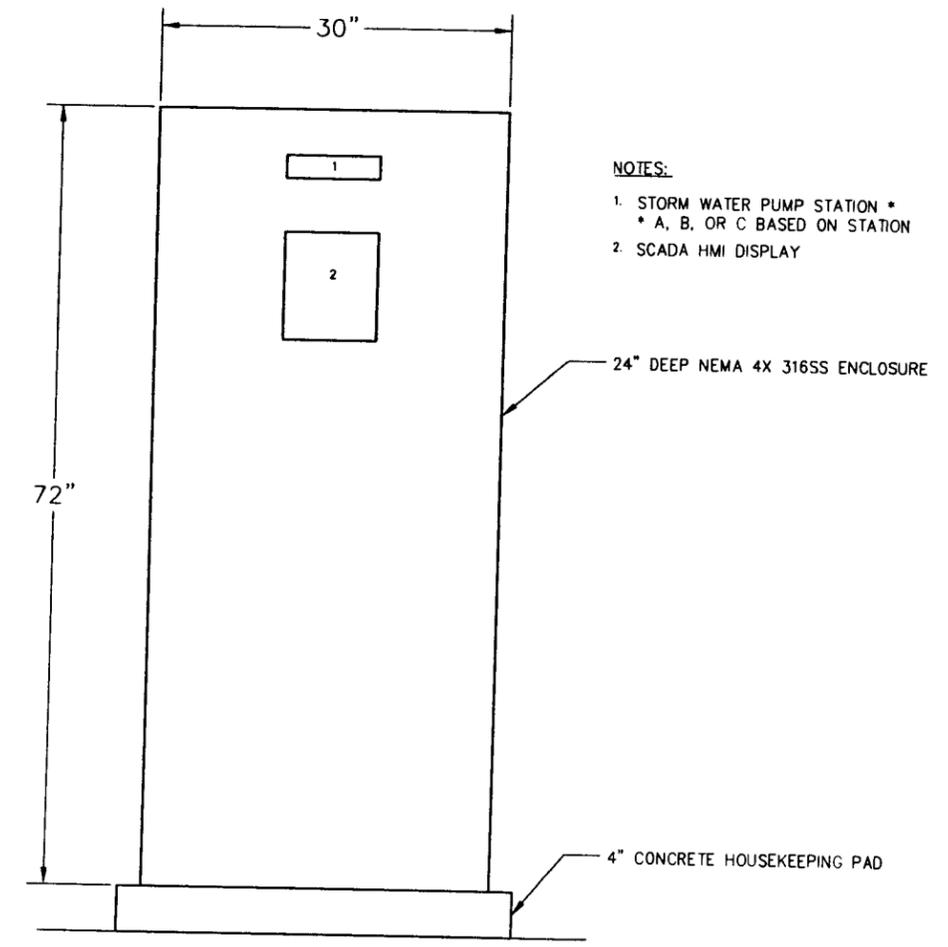


NOTE: ALL FASTENERS TO BE 316 SS

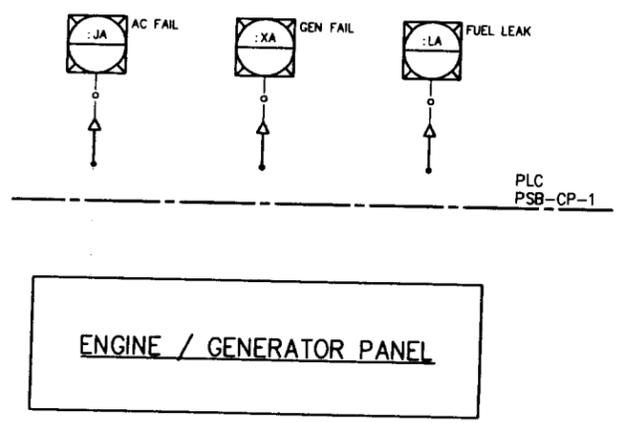
**ULTRASONIC LEVEL SENSOR MOUNTING DETAIL** 1  
PSB18 | PSB20



**POST MOUNTED LEVEL FLOAT SWITCH DETAIL** 2  
NOTE: SEE P&ID'S AND INSTRUMENT SPECIFICATION FOR SWITCH QUANTITIES AND FUNCTION PSB16 | PSB28



- NOTES:
1. STORM WATER PUMP STATION \*
  - \* A, B, OR C BASED ON STATION
  2. SCADA HMI DISPLAY



DWG: C:\DWG\PLS AS PSB28.dwg Version: 17.06 (LMS Tech) User: lee\_chung  
 DATE: Feb 24, 2009 11:01 am Images:  
 Xrefs: Xref-2275

MARK	DATE	BY	REVISIONS
	7/08	AG	AS-BUILT

DRAWN: MIS DATE: 10/05  
 DESIGNED: ECS P.E. NO. \_\_\_\_\_  
 PROJ. MGR.: SC P.E. NO. \_\_\_\_\_  
 SECT. HEAD: DJS P.E. NO. C-46837

ASST. CHIEF HARBOR ENGR. P.E. NO. C-25677, DATE \_\_\_\_\_  
 CHIEF HARBOR ENGINEER P.E. NO. C-43065, DATE \_\_\_\_\_

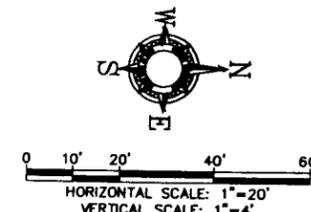
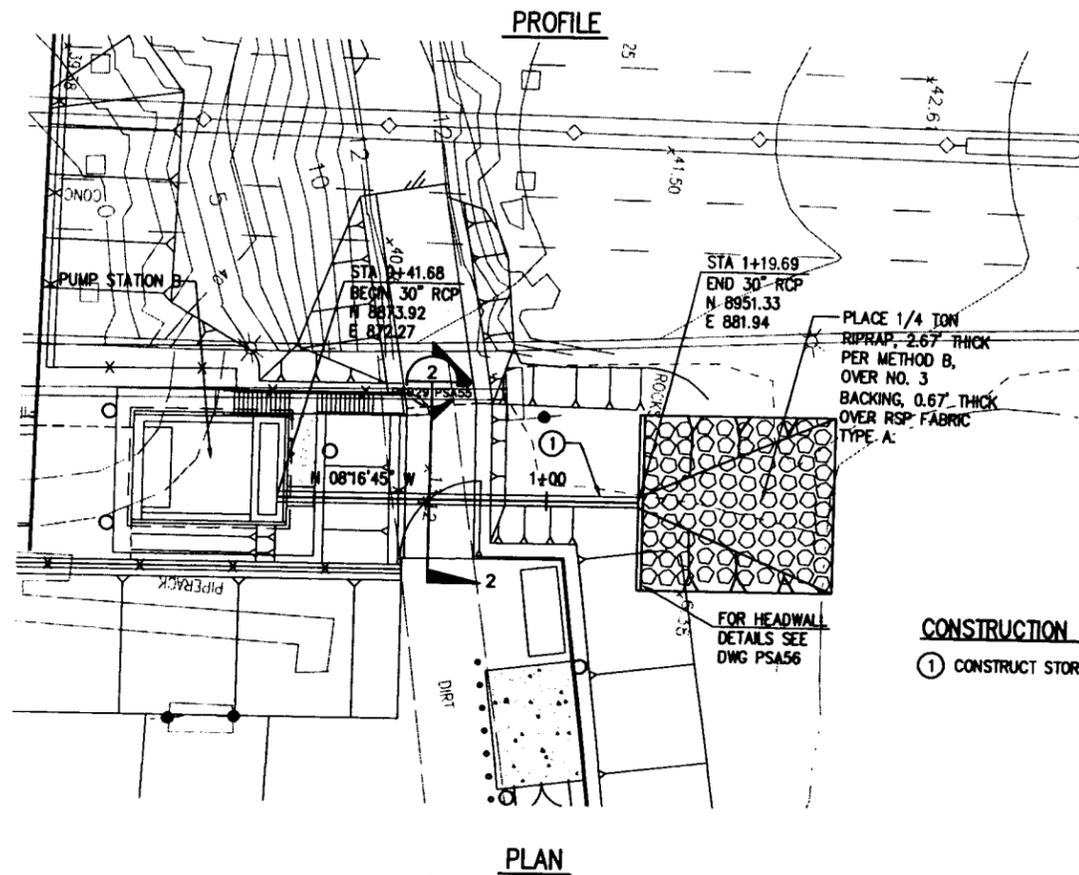
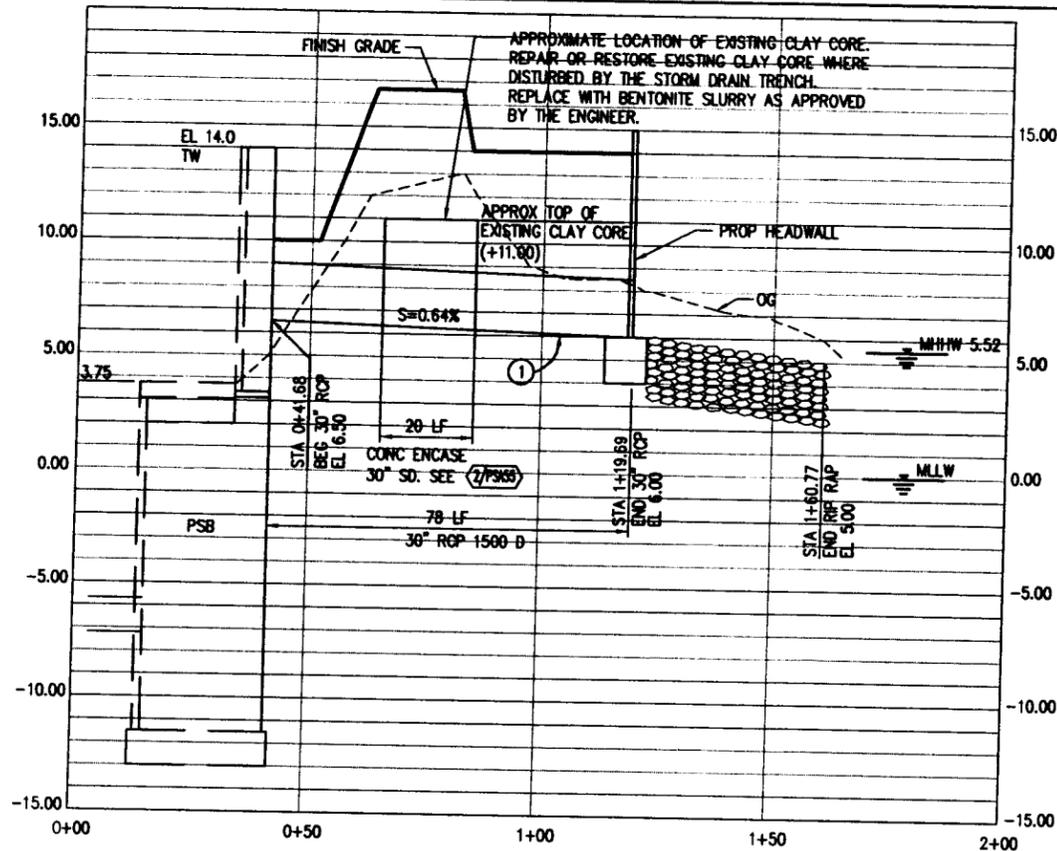


**THE PORT OF LONG BEACH**  
 925 HARBOR PLAZA P.O. BOX 570 LONG BEACH CALIFORNIA 90801 TEL (562) 437-0041

PIER 5 BERTHS S102-S110  
 GRADING, DRAINAGE & UTILITIES  
 SW PSB DETAILS

**DMJM HARRIS**  
 999 TOWN & COUNTRY ROAD  
 ORANGE, CALIFORNIA 92668-4786  
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SCALE	NTS	SHEET	212	OF	262
SPECIFICATION NUMBER	HD-S2275				
DRAWING NUMBER	HD 10-1898-PSB28				



DWG: C:\DWG\US AS-PSB29.dwg Version: 17.0s (LMS Tech) User: iie\_chung  
 DATE: Feb 24, 2005 3:08 pm Images:  
 Xrefs: "Riprap-2275" "psb29-2275" "PumpSta-2275" "X189Grading" "slope-2275"

MARK	DATE	BY	REVISIONS
7/00	AG	AS-BUILT	

DRAWN	LZ	DATE	10/05
DESIGNED	CS	P.E. NO.	C-37218
PROJ. MGR.	SC	P.E. NO.	
SECT. HEAD	DAS	P.E. NO.	C-46837

ASST CHIEF HARBOR ENGR. P.E. NO. C-25677, DATE  
 CHIEF HARBOR ENGINEER P.E. NO. C-43065, DATE  
 GARY SUELN  
 No. C 37218  
 EXP. 6-30-10  
 CIVIL  
 STATE OF CALIFORNIA

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SCALE	1"=20'	SHEET	213	OF	262
SPECIFICATION NUMBER	HD-S2275				
DRAWING NUMBER	HD 10-1898-PSB29				

FILE: D1898PSB29

**SCHUYLER HEIM BRIDGE  
RECONNAISSANCE INSPECTION DIVE**

**Investigation of Sunken Object  
Adjacent to the South Tower Pier**

**Schuyler Heim Bridge Replacement Project,  
Port of Long Beach, CA**



*Prepared for:*



**ALAMEDA CORRIDOR  
TRANSPORTATION AUTHORITY**

*Prepared by:*



**moffatt & nichol**  
3780 Kilroy Airport Way  
Long Beach California  
M&N File: 3927-05, Ph 2905  
June 2010

## 1.0 INTRODUCTION

### 1.1 Background

Alternative 1 of the Final Environmental Impact Statement / Environmental Impact Report (EIS/EIR) for the Schuyler Heim Bridge Replacement Project and State Route 47 Expressway Project combined the Schuyler Heim Bridge Replacement Project and the Alameda Corridor Expressway Project. The full scope of this preferred EIS/EIR Alternative cannot be completely funded at this time and as a consequence the current Caltrans project includes only the construction of a new fixed-span Schuyler Heim Bridge over the Cerritos channel and demolition of the existing vertical lift bridge.

As part of the demolition activities, the existing bridge piers located within the Cerritos Channel will be removed to a depth of approximately 2 feet below mudline. The proposed method of removing the underwater portions of these piers and footings includes the placement of sheet piles as a cofferdam around the perimeters of the footings, to isolate the piers for demolition and removal.

In anticipation of the placement of sheet piles around the footings, on December 12, 2007, Gahagan & Bryant Associates, Inc. (GBA) performed a sonar survey of the area below the Schuyler Heim Bridge, the results of which were issued in a report titled "Sector Scan Survey Bathymetric Survey, Port of Long Beach / Port of Los Angeles, California, SR-47 Bridge".



**Figure 1:** Image taken from GBA report on sonar survey performed 12/12/07

The survey revealed the presence of a variety of debris under the bridge, including a large object which appeared to be mostly or completely beneath the mudline adjacent to the south side of the south tower pier (see Figure 1, above). That object, labeled

“HCL\_LA#1” in the GBA report, appears to be potentially in conflict with the intended sheet pile placement along the south edge of this pier. This sunken object is the subject of this inspection report.

Although the sonar survey could not provide a definitive indication of what the sunken/buried object is, the GBA report noted that it may be a sunken barge or an abandoned support structure. A great deal of research was conducted by Alameda Corridor Transportation Authority (ACTA) personnel and by URS in an attempt to identify the sunken object. Throughout this research the general assumption was that the object was a large vessel, possibly a barge, that had sunk or been scuttled. On March 8, 2010, URS issued a memorandum titled “Report of Research Findings on Sunken Barges around Heim Bridge SR-47”, concluding that the sunken object “*could not be positively identified or specifically associated with historic events, people, [or] design/construction*”. The URS research “*failed to uncover any historic evidence which could positively identify the nature, context, or source of the [sunken object]*”, but the report did note that “*there is a low probability of the [object] being a National Register eligible vessel*” (i.e., a vessel of historic significance that would require preservation).

Moffatt & Nichol (M&N) was retained by the Alameda Corridor Transportation Authority (ACTA) to perform reconnaissance inspection dive operations on the sunken object at the south side of the south tower pier of the Schuyler Heim Bridge, with the objective of obtaining as much information as possible without utilizing heavy industrial or commercial equipment and without having to obtain any special permits. The primary goal of the information gathered during the reconnaissance was to identify potential conflicts or issues related to construction of a cofferdam around the south tower pier. M&N engineer-divers performed the underwater inspection on May 6 and May 7, 2010.

## 1.2 Description of Facility

The Schuyler Heim Bridge, constructed in 1946-47, is a vertical lift traffic bridge oriented in a north-south direction. The bridge, part of State Route 47, spans the Cerritos Channel, connects Terminal Island to the mainland. The bridge has two embankment piers, one founded on each shore of the channel, and two tower piers that are founded in the waters of the Cerritos Channel. The tower piers support the operation of the lift section of the bridge. The sunken object that is the subject of this investigation is adjacent to the south side of the foundation of the south tower pier, Pier 27.

See attached Exhibit 1, Drawing No. C-1321-214, titled “Bridge Across Cerritos Channel, Tower Piers #27 & 28”, which depicts the all-concrete pier structure that supports the steel bridge trusses and steel lift section tower, and contains handwritten notes dated 9-30-46, for reference and details.

Pier 27 is founded on a large mass concrete footing, 118 ft by 59 ft by 15 ft high, with the long dimension oriented east-west, perpendicular to the bridge alignment. There are

approximately 400 piles, each approximately 65 ft in length, driven into the material below the footing. At the time of this inspection the concrete footing was entirely below the mudline except for a small portion at the top of the southwest corner. It appears that this corner was exposed as a result of scour by tidal currents.

Two concrete tower columns extend upward from the top of the footing, one at each side of the bridge (at the east and west ends of the footing). These two towers are connected across the footing by a concrete “diaphragm” beam. The diaphragm, 40 ft wide at the footing and tapering to a 30 ft wide at 10 feet above the footing, extends up 30 ft from the top of the footing.

As this investigation is primarily concerned with the zone at and near the mudline adjacent to the south tower pier, further details of the towers, the diaphragm, and the bridge construction itself do not pertain to observations during this inspection.

Throughout the remainder of this report, all “pier” references will refer to the south tower pier and all “tower” references will refer to the two tower columns (at the west and east sides of the bridge) on the pier, unless otherwise noted.

### 1.3 Investigation Methodology

The underwater investigation was conducted by M&N engineer-divers on May 6<sup>th</sup> and 7<sup>th</sup>, 2010, under the direction of Team Leader Michael Breitenstein, PE. Dive mode used was surface supplied air. Operations were conducted from aboard the M&N dive boat *Pier Review*. During each dive, the Dive Supervisor monitored CCTV video feed from a video camera mounted on the diver’s helmet, and was in constant communication with the diver. The Dive Supervisor directed the diver’s investigation as appropriate, based on the dive plan/objectives and observations during the progress of the dive. Water depths at observed debris locations and at key points of the pier were determined using a pneumofathometer. These depths were recorded, along with the time for tidal elevation reference.

The dive investigation scope included a visual inspection and probing into the channel bottom material using a shaped piece of ½-inch diameter rebar with a 3 ft probe length. The end of the rebar was tapered somewhat by grinding, to facilitate penetration of densely packed bottom material. Probe resistance was generally felt within 2 feet of the bottom material surface and probe limits were typically less than the 3 foot length of the probe due to material density.

Initial investigation efforts targeted the area adjacent to the south edge of the footing. As debris was encountered, each debris field was explored to at least 10 feet beyond the termination of debris. See Exhibit 2 for a representation of investigation limits. Investigation efforts were conducted initially near the southwest corner of the Pier 27 footing, because the GBA survey indicates that this is the location with the greatest

chance of conflict between the sunken object and the cofferdam proposed for pier demolition (see Section 1.1 above). Before proceeding southward from the west tower, the diver oriented his direction by putting the south wall of the west tower at his back and checking his compass reading. The diver also attached the end of a 100 ft tape reel to a sand anchor fixed at the southwest corner of the west tower, and unreeled the tape as his investigation proceeded.

Primary investigation efforts were concentrated both in the general area near the south west corner of Pier 27 and within a 10 ft wide strip along the entire south side of the pier footing limits. The area near the south west corner was a primary inspection area because, in addition to the GBA sonar image showing proximity of the object to the pier in this area, this is where most of the observed debris was located. The 10 ft strip adjacent to the south footing edge was established as a primary investigation zone because this is where sheet piles would most likely driven during demolition efforts (see Section 1.1 above).

Establishment and inspection of the zone within 10 ft of the footing was accomplished by setting sand anchors in the channel bottom material at a measured 13 ft distance south of the southwest and southeast corners of both the west and the east tower of Pier 27, then securing a guide line pulled taut along the path between the sand anchors. The south edge of the pier footing is approximately 8.5 ft south of the south edge of the pier towers at mudline, so the guideline was parallel to the footing edge approximately 4.5 ft south of the edge. The diver followed the established guide line, observing the area to at least 5 ft away from the line on either side. In addition to this 10-ft-wide swath inspected in detail, any observed debris field was explored and investigated until it terminated or was too far beneath the mudline to detect with the 3-ft-long probe. See Exhibit 2 for a representation of the area investigated.

At ACTA's request, in addition to the above-described detailed investigation on the south side of the tower pier structure divers also conducted a visual inspection and probing of the mudline on the east, west, and north sides. This investigation was concentrated along a 6-ft-wide path centered approximately 3 ft outside the edges of the concrete footing. The footing edge locations on these three sides were established and confirmed at intervals, by measured reference to the sides of the towers and to the north side of the diaphragm member.

In addition to the underwater investigation, M&N conducted on-line research and interviewed long-time POLA/POLB area residents, workers, marina owners, and bridge operators (for both the Schuyler Heim and the Badger Bridge) to further the endeavor to identify the sunken object.

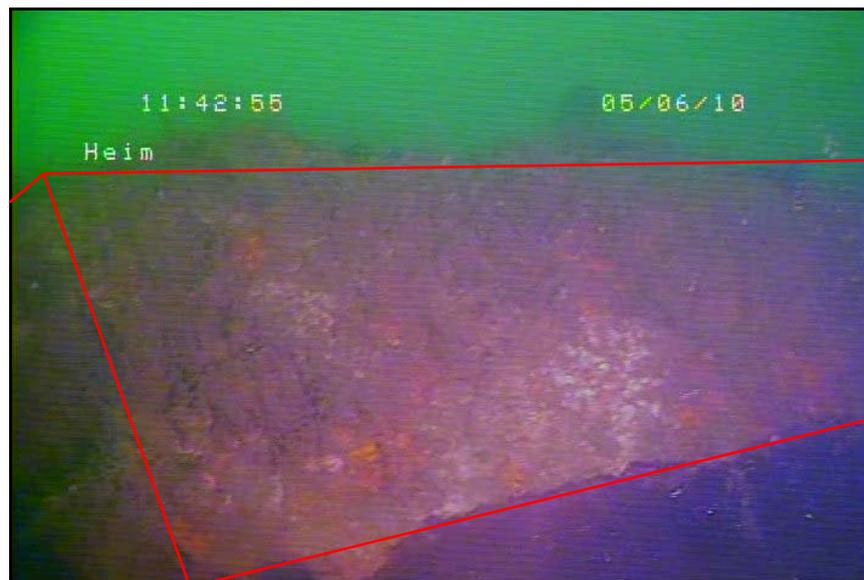
## 2.0 SUMMARY OF OBSERVATIONS

### 2.1 Sunken Object/Debris Observations, South Side of Pier 27

See Exhibit 2, attached, for approximate locations of debris observations as discussed below.

The northernmost limit of observed debris (closest to the pier) is 2 ft south of the southwest corner of the pier footing. This debris closest to the pier consists of two vertical timber members, both having a cross section approximately 4 in. by 6 in. and both in highly deteriorated condition, protruding 6 ft to 8 ft vertically from the mudline. Rigging line is entwined between the timbers. A severely corroded metal bar (possibly a 1 in. diameter reinforcing steel bar) protrudes horizontally from beneath the mudline adjacent to these vertical timber members. No other metal bars or structural steel of any type was observed during the investigation.

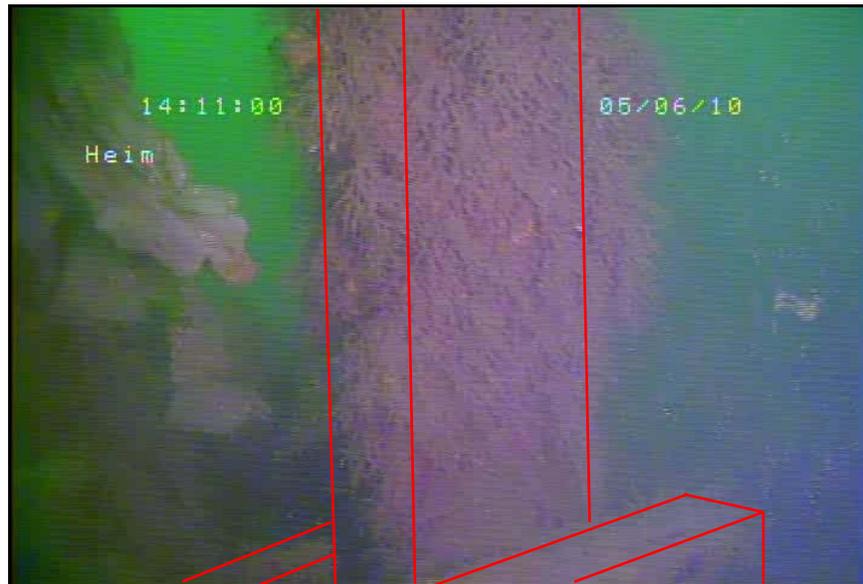
Three additional similar vertical timbers were observed approximately 5 feet further south. The side of a solid rectangular structure, apparently a metal tank, was observed from 2 to 6 feet south, and slightly west, of this 2<sup>nd</sup> group of vertical timbers (see Photo 1, from underwater video, below; shown as debris item no. 3 on Exhibit 2, attached). The tank was partially buried, but could be observed to be at least 5 ft by 2 ft, and approximately 9 in. high. There is a nearly vertical 4 ft drop-off of the mudline to the west of the tank and timber debris, into what appears to be a scour depression located in the



**Photo 1:** NW corner and west side of apparent metal tank. Near side, outlined in red, is approximately 9 in. tall. This is debris item no. 3 on Exhibit 2 drawing.

general vicinity of the southwest corner of the tower footing. A small portion of the bottom side of the tank is exposed as a result of this drop-off. No evidence was observed of any tank openings (either by design or by damage), associated piping, or previous tank filler substance.

Fragmented zones of deteriorated timber debris projecting from beneath the mudline were observed within a field extending to the south and east of the debris observed near the southwest corner of the pier. Observed timber debris generally exhibits the appearance of structural framing with dimensions ranging from 2 in. to 8 in. (see Photo 2, from underwater video, below). There are also some planar timber surfaces typically composed of planking consistent with decking material, and one boxlike structure.



**Photo 2:** Typical timber debris. Red outlines show primary member projecting vertically from the channel bottom and smaller crossing timber members at the bottom of the frame. Second vertical timber (not outlined) is seen at back left. This is debris item 7a on Exhibit 2 drawing.

All observed timber debris was severely deteriorated and/or damaged, and not identifiable as a specific item or items. A cohesive continuous timber structure was not apparent. The timber was easily penetrated and fragmented by blows with a chipping hammer. One severely deteriorated metal fitting, possibly the remains of a cleat, was observed at the edge of a box-like timber structure, with a length of rope still attached (see Photo 3, from underwater video, below).

Portions of a total of five individual metal tanks (including the tank discussed above), were observed. See Exhibit 2 for tank locations. Only small portions of the tanks were visible, and densely packed mud and debris hindered hand excavation, thereby preventing sufficient exposure to observe and measure the full extents of any of the



**Photo 3:** Metal fitting attached to edge of box-like timber debris (item 7b on Exhibit 2 drawing). Red outline shows approximate fitting limits; white circle indicates metal exposed by striking fitting with chipping hammer (hammer visible at right side of frame. Attached rope extending to left.

tanks. The largest continuously visible edge was approximately 4.5 ft long. “Sounding” the tanks by striking with a chipping hammer gave the impression that none of the tanks are overly large. These tanks appear to be similar or perhaps identical moderately sized rectangular metal tanks, each one composed of thin metal which appeared to be steel (or possibly aluminum).

Small holes were observed in the wall of one of these tanks. Striking the tank walls with a chipping hammer resulted in breaking through the wall of another of the tanks. The diver did not have a clear view of the interior of any of the tanks. However, the limited visual observations provided by holes encountered or created did not suggest that any of the observed tanks held any liquid substances such as fuel, oil, or other petroleum products. There was no visually apparent evidence of tank fill openings, piping or valves seen at any location, throughout the entire investigation.

Observed debris was concentrated near the southwest corner of the pier. The debris field was followed and explored, with debris observed to be scattered to the south and east-south-easterly from the southwest corner of the pier. When the divers path away from the pier no longer provided debris observations, that line of investigation was discontinued. The debris observed furthest from the pier was approximately 20 to 25 ft south of the footing and 10 to 15 ft east of the bridge centerline (debris location 11 on Exhibit 2). An isolated small pocket of timber debris in proximity to the pier footing was observed, as shown on Exhibit 2, approximately 20 ft west of the east tower and 10 ft south of the footing (approximately 20 ft south of the south edge of the towers).



**Photo 4:** Top southwest corner of tower pier footing.  
A chipping hammer can be seen on the right.

While investigating near the southwest corner of the pier footing, a significant depression of the mudline surface was observed. Within this depression, the top southwest corner of the pier's concrete footing was exposed (see Photo 4 above). This depression extended to the east and south, sloping up gradually. As previously mentioned, this depression extended to immediately west of the tank observed approximately 13 ft from the southwest corner of the south tower (debris item 4 on Exhibit 2). Miscellaneous small debris was observed in the depression at the southwest corner of the pier. This small debris is minor, is not associated with the sunken object identified in the GBA report, and would have no impact on sheet pile cofferdam placement.

Investigation and observation limits covered by exploring exposed and probed debris fields include the area beginning immediately adjacent to the pier and extending at the furthest points to approximately 30 ft south of the pier footing. See Exhibit 2 for approximate limits of area investigated.

Following is a brief summary of debris observed at various locations near the south side of Pier 27 (see also Exhibit 2):

- Near Southwest corner of pier footing:
  - (a) Timber debris – Three primary exposed areas, from 2 feet to 13 feet south of the footing, and from 0 feet to 8 feet east of the southwest corner of the footing.
  - (b) Metal tanks – Two tanks, at approximately 7 feet and 12 feet south of the southwest corner of the footing.
- Center of west tower, approximately 18 feet south of the footing – One metal tank.
- Approximately 5 to 10 feet west of the east edge of the west tower, approximately 5 to 10 feet south of the footing – Timber debris, with two primary exposed locations.

- Approximately 5 to 10 feet east of the east edge of the west tower – Timber debris, at approximately 2 feet and 12 feet south of the footing.
- Near the east-west center of the bridge and pier:
  - (a) Metal tanks – Two tanks, one at approximately 5 feet east of the bridge centerline and 12 feet south of the footing, and one at approximately 10 feet west of the bridge centerline and 25 feet south of the footing.
  - (b) Timber debris – Approximately 15 feet west of the bridge centerline and 10 feet south of the footing.
- No debris was observed within approximately 13 feet south of the footing along the eastern 30 feet of the footing limits.

## 2.2 Observations at the North, West, and East Sides of Tower Pier

No debris or sunken objects were observed or discovered by probing the bottom material within six feet of the outer edge of the footing on the north, west, and east sides of the south tower pier foundation. On the north side of the west tower, a cable was observed to emerge from the channel bottom material in an upward sweeping curve, entering the tower through a 2 ft wide opening that can be seen on the Exhibit 1 reference drawing.

## 3.0 DISCUSSION OF POSSIBLE IDENTITY OF THE SUNKEN OBJECT

Observed debris was primarily timber, with the exception of five thin-walled metal tanks, a short length of metal bar, and an unidentified metal fitting attached to the edge of timber planking. The sizes and orientations of the timber and metal items were not indicative of vessel construction. Although it could not be confirmed by the observed debris, it is possible that the sunken object was at one time a floating dock. The framing and planking timber dimensions are consistent with decking construction. It is not current or standard practice to construct dock floatation units of metal, especially in salt water, and a search for instances of such construction in the Ports of Los Angeles and Long Beach did not produce any results; however, there is anecdotal corroboration that this dock floatation method has been employed in the past.

The frame-like appearance of the observed timber debris could also be indicative of a support structure or formwork associated with the construction of the bridge, but the metal tanks and general size and layout of the debris field do not appear to support that conclusion.

It is also possible that the sunken object was at one time a wooden barge, but this seems less likely than it being a floating dock. General use wooden barges were constructed in the mid-to-late 1800's, but after the first steel barge was constructed in the 1890's, very few wooden barges were produced. Most wooden barges used in the United States were river barges, the remains of which are more commonly found along

or near the east coast. However, 269 wooden barges were built in 1943 for wartime use (Frey & Ide, 1946). Documents reviewed during on-line research did not confirm where these vessels were constructed or used, but did indicate that some or possibly all of them were constructed at Port Brownsville, Texas.

One indicator contrary to identifying this sunken object as a wooden barge is the fact that the cross-sectional sizes of the timber elements observed in the debris field were generally of smaller dimensions, and it would be expected that barge construction would be more robust. It is also notable that, even if this sunken object was a wooden barge, it would almost certainly have been a flat barge, with no internal storage capacity for fuels or petroleum products.

There was no evidence of any salvageable portion of the sunken object, whether it was at one time a floating dock or a wooden barge or some other unknown object. No sea life was observed frequenting or inhabiting any part of the observed debris.

## 4.0 CONCLUSIONS & RECOMMENDATIONS

Observations indicate that the sunken/buried object immediately adjacent to the pier footing is not a sailing or motorized vessel, nor is it a steel barge. A positive identification of the sunken object is not possible based on observations during the reconnaissance dive inspection of May 6 and 7, 2010. As discussed above, the hypothesis that appears to be most consistent with the types and sizes of debris observed is that the sunken object in the vicinity of the south tower pier may possibly have been a floating wooden dock, utilizing metal tanks as flotation devices. It is possible that the object is a wooden flat barge, though the observed debris seems more consistent with a floating dock than with a barge.

There are no indications that the sunken object may be of historic value or that any parts of the debris are in any way salvageable.

There are no indications that the sunken object may have contained or may still contain any petroleum products or other environmentally deleterious materials.

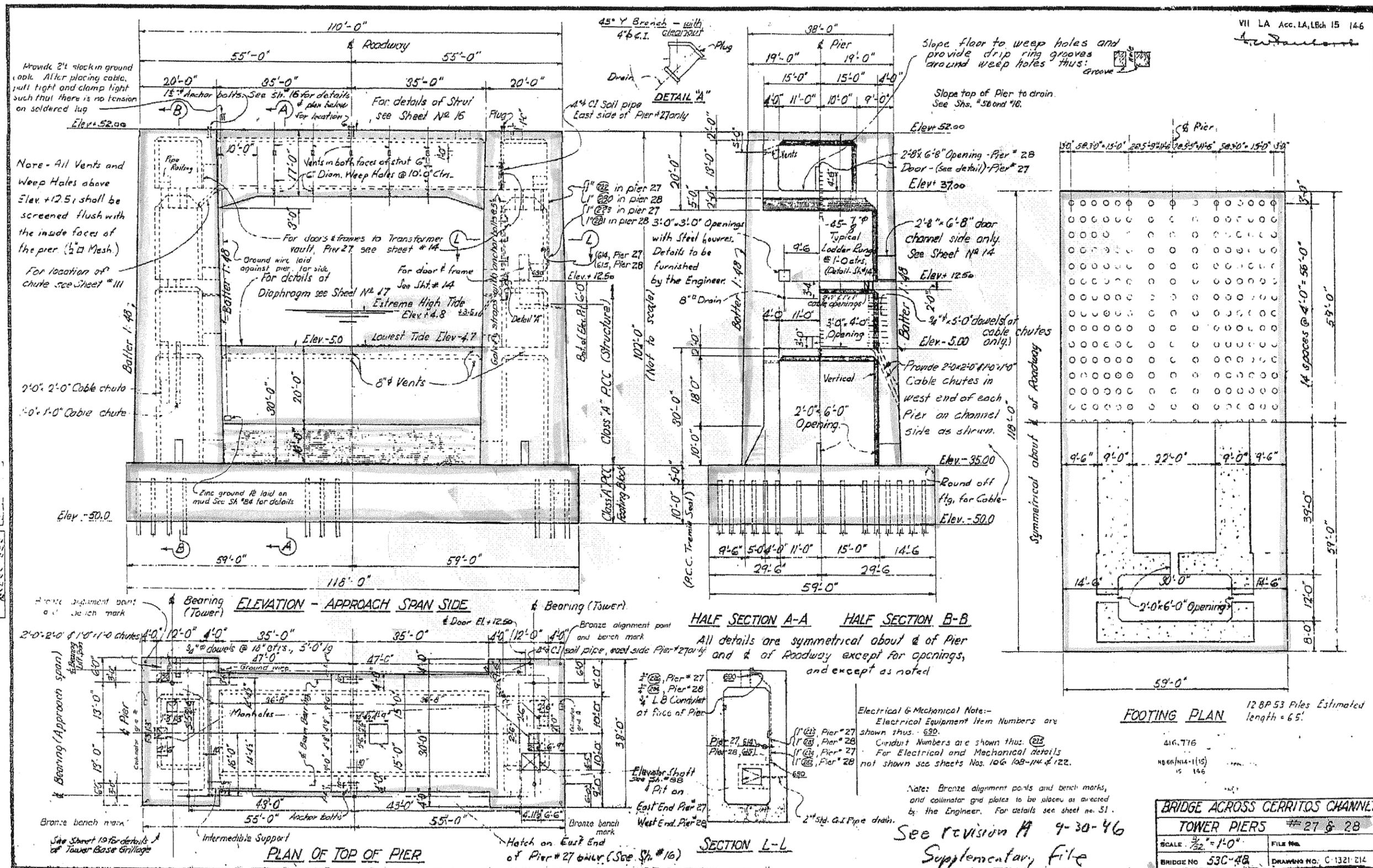
No underwater habitat areas or other environmentally sensitive zones were observed in association with the sunken object during this investigation.

Observed debris appears is within 10 ft of the pier footing (close enough to the footing to potentially conflict with driving sheet piles for a cofferdam) at and near the southwest corner of the pier footing. Observed debris is within 5 ft of the footing at the mudline at the southwest corner of the footing and approximately 5 ft east of the west side of the west tower. Though most of the observed debris is more than 5 ft away from the footing at the mudline, which could allow sheet piling to be driven between the footing and the

debris, this same debris could still potentially conflict with a cofferdam sheet pile line if the debris angles to the north below the mud.

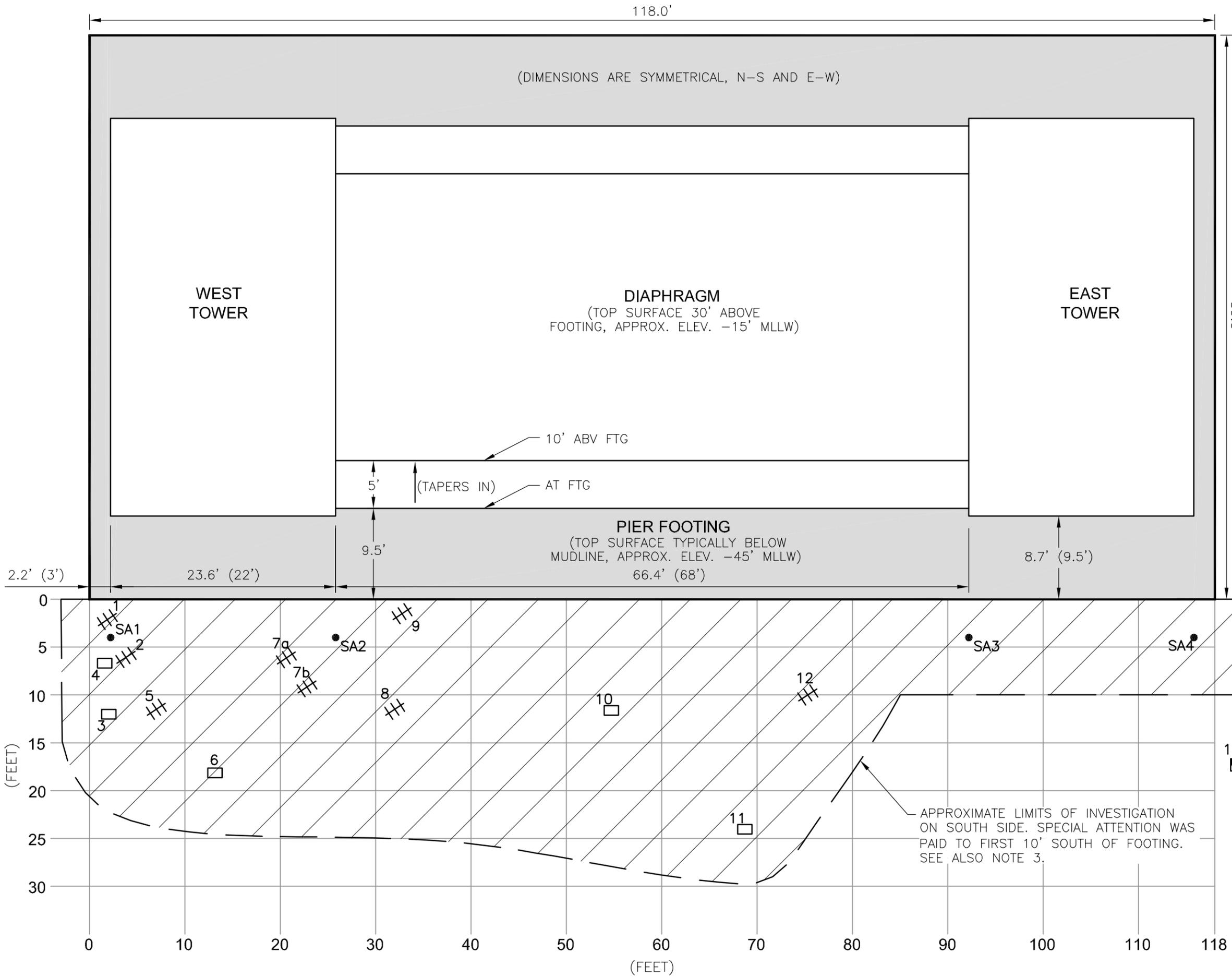
Based on the types and deteriorated condition of material observed in the debris field in the vicinity of the pier, it is possible that steel sheet piling for cofferdam construction around the pier footing could be driven through the debris. However, sheet pile drivability without debris removal cannot be guaranteed because observations were limited to debris at and near the mudline surface. If any portion of the object/debris buried below the mudline is comprised of larger dimension timbers or includes any steel or concrete members, sheet piles could possibly be deflected or stopped by such debris. Because the types of debris below mudline and the proximity of debris to the footing below mudline cannot be confirmed based on this investigation's observations, it would be prudent to remove observed debris and potential below-mudline debris from adjacent to the footing, prior to placing sheet piling.

The observations during this investigation did not extend any further than approximately 30 ft south from the pier foundation (see Exhibit 2). It is possible that other types of debris or other separate object(s) comprise the remainder of the volume indicated in the GBA sonar survey results. It is also possible that there is debris beneath the mudline that comprised of material(s) and/or configurations other than those observed during this investigation, and that the unidentified buried debris could impact construction activities.



BRIDGE ACROSS GERRITOS CHANNEL	
TOWER PIERS #27 & 28	
SCALE: 3/32" = 1'-0"	FILE NO.
BRIDGE NO. 53C-4B	DRAWING NO. C-1321-214

TOWER PIERS



**DEBRIS COORDINATES**

NUMBER	SOUTH*	EAST*
1	2'	2'
2	6'	4'
3	12'	2'
4	7'	2'
5	12'	8'
6	18'	13'
7a	7'	20'
7b	9'	23'
8	13'	31'
9	2'	32'
10	12'	55'
11	24'	69'
12	10'	75'

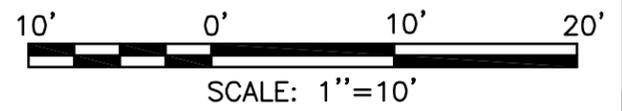
\*DISTANCES ARE FROM THE SOUTHWEST CORNER OF THE FOOTING (APPROXIMATE)

**NOTES**

1. TOWERS BATTER AT 1:48 ON ALL FOUR SIDES (LARGER AT BASE ON FTG). PIER ELEMENT DIMENSIONS NOTED AS X'(Y') ARE X' AT TOP OF FTG & APPROXIMATELY Y' AT ELEV. +3' MLLW (TYP WATERLINE).
2. ALL DEBRIS ITEM LOCATIONS ARE APPROXIMATE ONLY, ICONS REPRESENT CENTER OF OBSERVED DEBRIS, NOT ACTUAL SIZE OR SHAPE.
3. NORTH, EAST & WEST SIDE OF THE PIER WERE ALSO INVESTIGATED, MIN. 6' WIDE PATHS CENTERED 3' OUTSIDE OF FOOTING LIMITS. NO DEBRIS OR OBJECTS WERE OBSERVED ON THESE 3 SIDES.

**LEGEND**

- ⌘ SUBMERGED TIMBER DEBRIS
- SUBMERGED TANK
- SA SAND ANCHOR FOR FIELD GRID



**EXHIBIT 2**  
SCHUYLER HEIM BRIDGE  
SOUTH TOWER PIER  
OBSERVED SUNKEN OBJECTS/DEBRIS