FOR CONTRACT No.: 07-215944
PROJECT ID 07000018341

INFORMATION HANDOUT

City of Norwalk, Standard Plans

Foundation Report for Sound Wall Nos. 220, 221, 231, 250, 251, 262, 266, 267, 290, 291 dated Dec. 13, 2011.

Foundation Report for Imperial Highway UC (Replace), Bridge No. 53-3061 dated Dec. 22, 2011.

Foundation Report for Imperial Highway Off-Ramp, Bridge No. 53-3071K dated Dec. 22, 2011.

Foundation Report for Pioneer Blvd UC (Replace), Bridge No. 53-3062 dated Dec. 22, 2011.

Foundation recommendation for San Antonio Dr.UC (Replace), Bridge No. 53-3060 dated Dec. 22, 2011.

Revised Foundation Report for Sound Walls 250 and 251 dated March 6, 2012

Foundation Review dated March 29, 2012

Battery backup system connection diagram and foundation details

Los Angeles County Flood Control District Permit: PCFL T201200873

Los Angeles County Flood Control District Permit: PCFL T201200541

Los Angeles County Flood Control District Permit: PCFL 201200542

Los Angeles County Flood Control District Permit: PCFL T201201032

Los Angeles County Flood Control District Permit: PCFL T201204481

ROUTE: 07-LA-5-PM 4.0/5.9

City of NORWALK

STANDARD PLANS FOR CONSTRUCTION

COMMUNITY DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

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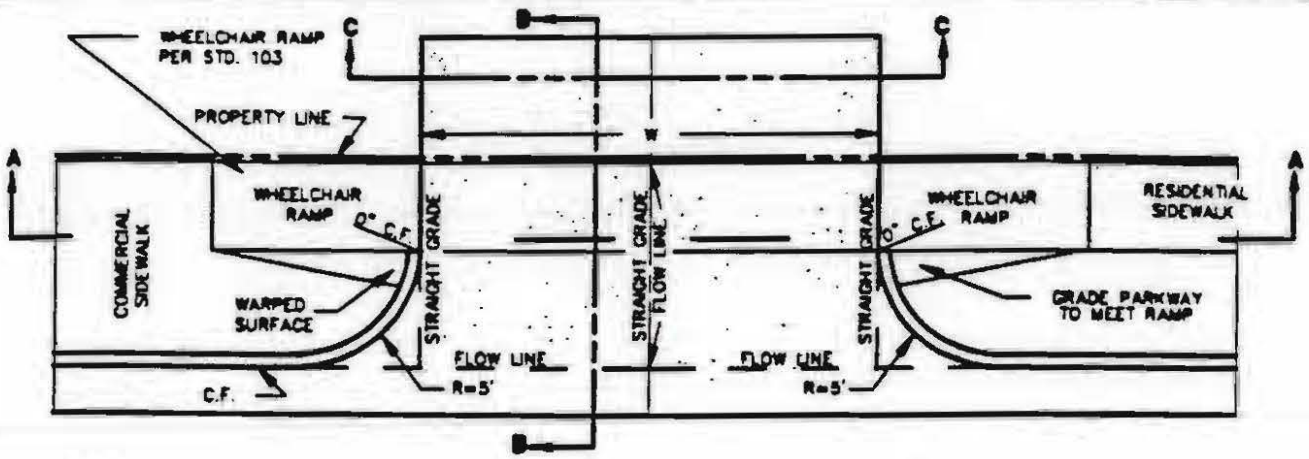
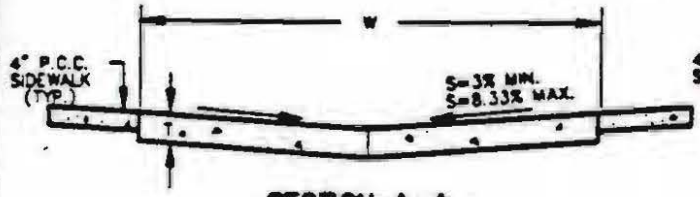
SECTION 1

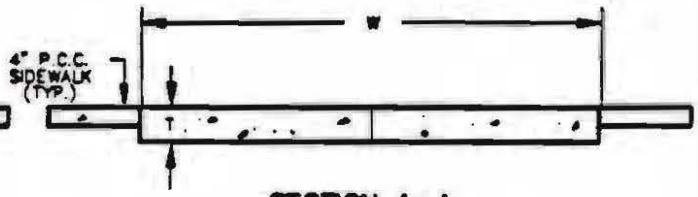
STREET





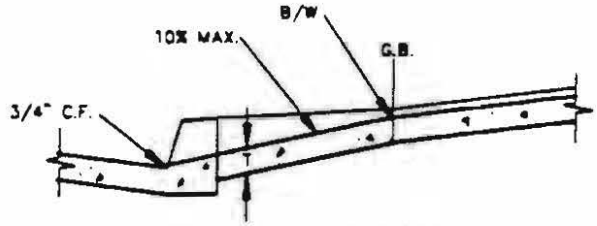
SECTION A–A

(DEPRESSED APRON WITH ALLEY FLOW TOWARDS APRON.)



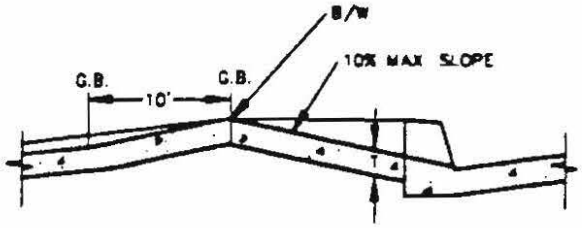
SECTION A–A

(STANDARD APRON WITH ALLEY FLOW AWAY FROM APRON.)



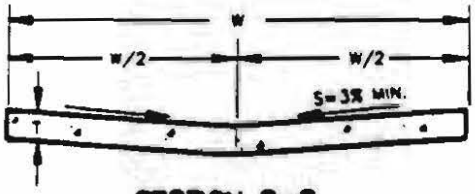
SECTION B–B

(DEPRESSED APRON WITH ALLEY FLOW TOWARDS APRON.)



SECTION B–B

(STANDARD APRON WITH ALLEY FLOW AWAY FROM APRON.)



SECTION C–C

NOTES

1. T = 6" THICK PCC OVER COMPACTED NATIVE FOR RESIDENTIAL AREA AND T = 7" THICK PCC OVER NATIVE FOR COMMERCIAL AREA.
2. TRANSVERSE WEAKENED PLANE JOINTS SHALL BE PROVIDED AT 15' MAXIMUM SPACING AND AT ALL UTILITIES (POWER POLES, METER BOXES, ETC.). JOINTS SHALL BE SAWCUT TO A DEPTH EQUAL TO 1/4 THICKNESS OF SLAB.
3. CONCRETE SHALL BE 520–C–2500.

City of NORWALK

ALLEY AND ALLEY APRON

TRANSPORTATION & ENGINEERING DEPARTMENT

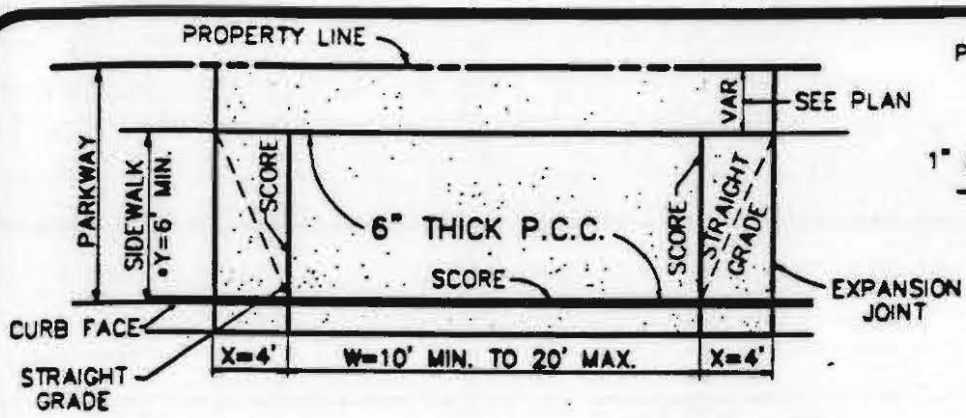
Approved C. A. Buchanan Date 9-20-90

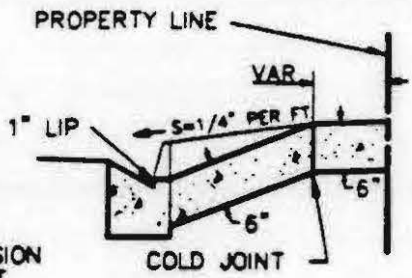
City Engineer R.C.E. 20903

DATE	REVISION

STD. PLAN NUMBER 100

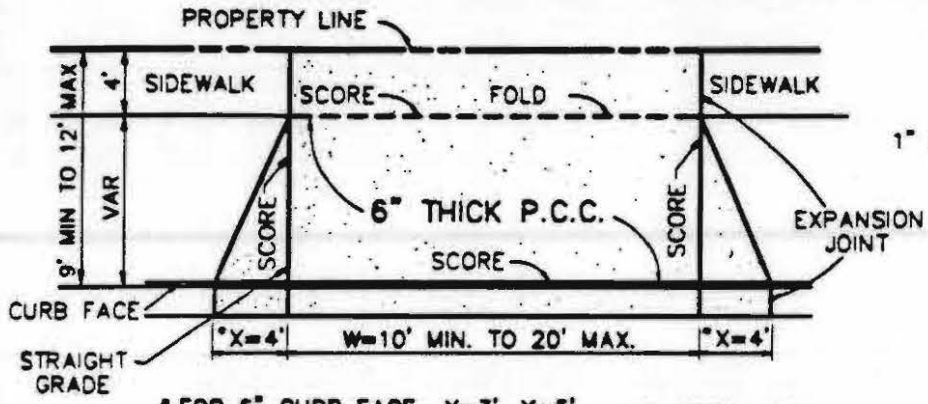
SHEET 1 OF 1

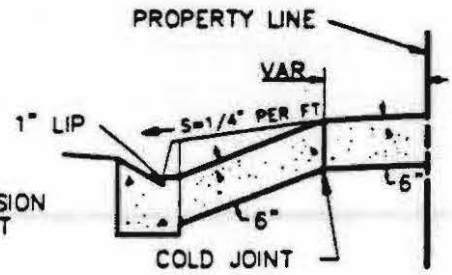




TYPE R2

RESIDENTIAL – SIDEWALK ADJACENT TO CURB OR PARKWAY LESS THAN 9'.

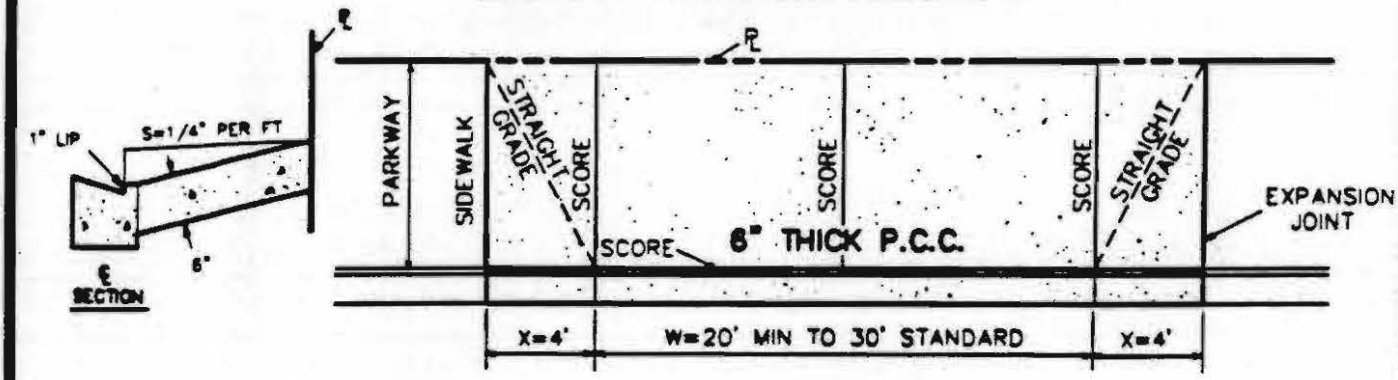




* FOR 6" CURB FACE X=3', Y=5'

TYPE R1

RESIDENTIAL – PARKWAY 9' AND GREATER



TYPE R3

RESIDENTIAL

City of NORWALK

RESIDENTIAL DRIVE APPROACHES

TRANSPORTATION & ENGINEERING DEPARTMENT	DATE	REVISION	STD. PLAN NUMBER
Approved C. A. Buchman Jr. Date 9-20-90			101A
City Engineer R.C.E. 20903			SHEET 1 OF 2

NOTES:

1. DRIVE APPROACHES SHALL BE MADE OF CLASS 520-C-2500 (5.5 SACK) PORTLAND CEMENT CONCRETE, PLACED ON WELL COMPACTED SOIL.
2. IF CONSTRUCTING NEW DRIVE APPROACH ON EXISTING STREET, CONTRACTOR TO SAWCUT, REMOVE AND REPLACE EXISTING PAVEMENT 12" FROM CONCRETE IMPROVEMENT. A.C. TO BE 4" OF TYPE C2-AR4000 ON 6" OF 90% COMPACTED AGGREGATE BASE.
3. CURB AND GUTTER SHALL BE PER NORWALK STANDARD 104.
4. PLACE WEAKENED PLANE JOINT ON CENTERLINE OF APPROACH WHEN W=12' OR MORE.
5. MINIMUM DISTANCE BETWEEN ADJACENT DRIVE APPROACHES IS 3 FEET, OTHERWISE A CONTINUOUS DRIVE IS REQUIRED.
6. DRIVE APPROACHES SHALL BE A MINIMUM OF 5' FROM CURB RETURNS.
7. A FULL DEPTH COLD JOINT IS REQUIRED BEHIND ALL DRIVE APPROACHES.
8. CONCRETE SURFACE TO HAVE MEDIUM BROOM FINISH.
9. IF EXISTING SIDEWALK IN BACK OF DRIVE APPROACH IS LESS THAN 6", IT SHALL BE REPLACED TO A 6" DEPTH.
10. TYPE R3 DRIVE APPROACH SHALL BE USED ONLY IF APPROVED BY THE CITY ENGINEER.

City of NORWALK

RESIDENTIAL DRIVE APPROACHES

TRANSPORTATION & ENGINEERING DEPARTMENT

Approved C. J. Buchanan Jr. Date 9-20-90

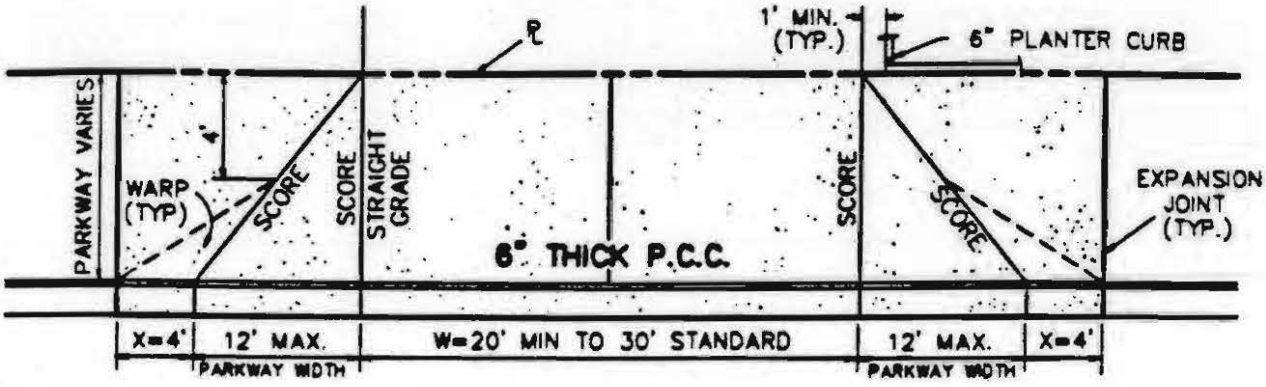
City Engineer R.C.E. 20903

DATE	REVISION

STD. PLAN NUMBER

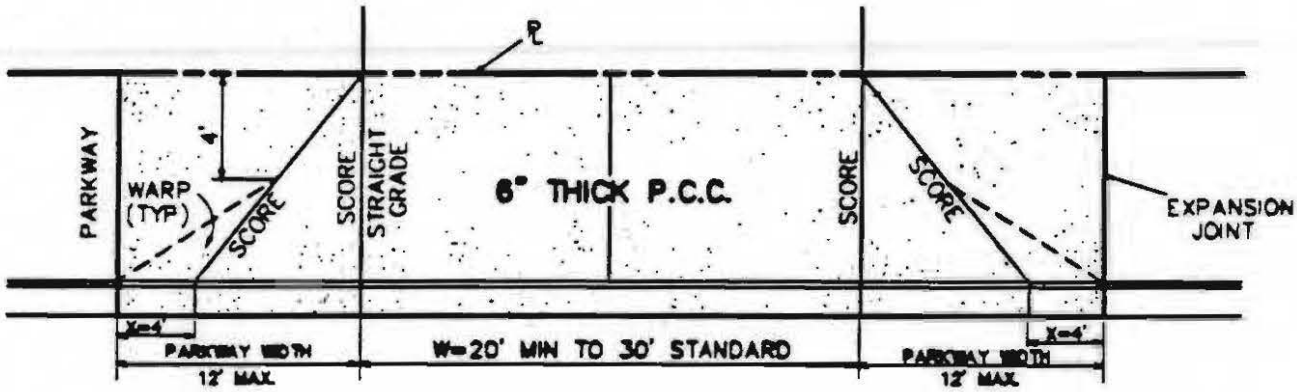
101B

SHEET 2 OF 2



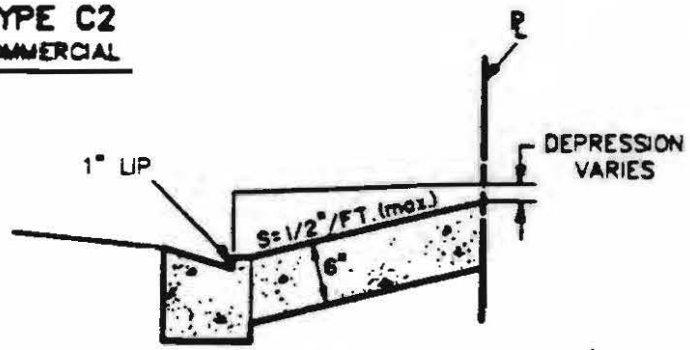
TYPE C1

COMMERCIAL–MAJOR HIGHWAY ADJACENT TO CURB LANE



TYPE C2

COMMERCIAL



℄ SECTION

City of NORWALK

COMMERCIAL DRIVE APPROACHES

TRANSPORTATION & ENGINEERING DEPARTMENT

Approved C. A. Buchanan Jr. Date 9-20-90

City Engineer R.C.E. 20903

DATE	REVISION	STD. PLAN NUMBER
		102A
		SHEET 1 OF 2

NOTES:

1. DRIVE APPROACHES SHALL BE MADE OF CLASS 520-C-2500 (5.5 SACK) PORTLAND CEMENT CONCRETE, PLACED ON COMPACTED SOIL.
2. IF CONSTRUCTING NEW DRIVE APPROACH ON EXISTING STREET, CONTRACTOR TO SAWCUT, REMOVE AND REPLACE EXISTING PAVEMENT 12" FROM CONCRETE IMPROVEMENT. A.C. TO BE TYPE C2-AR4000 ON 90% COMPACTED AGGREGATE BASE.
3. CURB AND GUTTER SHALL BE PER NORWALK STANDARD 104.
4. PLACE WEAKENED PLANE JOINT ON CENTERLINE OF APPROACH WHEN W=12' OR MORE.
5. MINIMUM DISTANCE BETWEEN ADJACENT DRIVE APPROACHES IS 3 FEET. OTHERWISE A CONTINUOUS DRIVE IS REQUIRED.
6. DRIVE APPEOACHES SHALL BE MINIMUM OF 5' FROM CURB RETURNS.
7. A FULL COLD JOINT IS REQUIRED BEHIND ALL DRIVE APPROACHES.
8. CONCRETE SURFACE TO HAVE FINE BROOM FINISH.

City of NORWALK

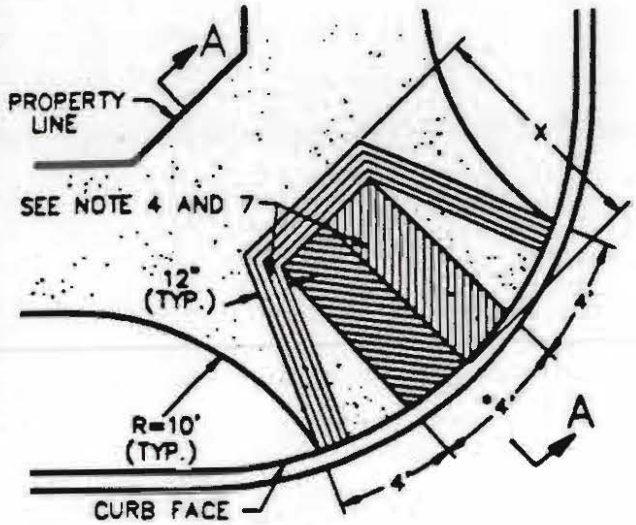
COMMERCIAL DRIVE APPROACHES

TRANSPORTATION & ENGINEERING DEPARTMENT

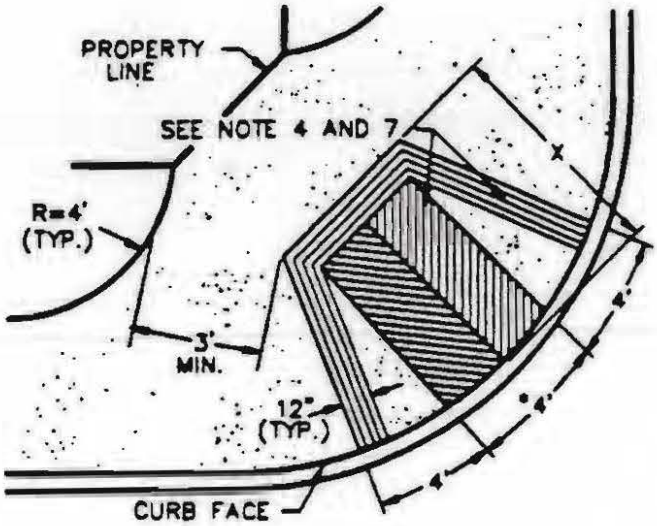
Approved C. L. Buchanan Jr. Date 9-20-99

City Engineer R.C.E. 20903

DATE	REVISION	STD. PLAN NUMBER
		102B
		SHEET 2 OF 2



CASE I



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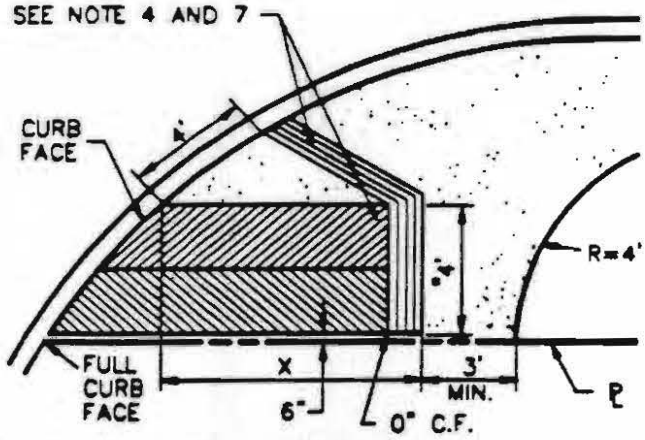
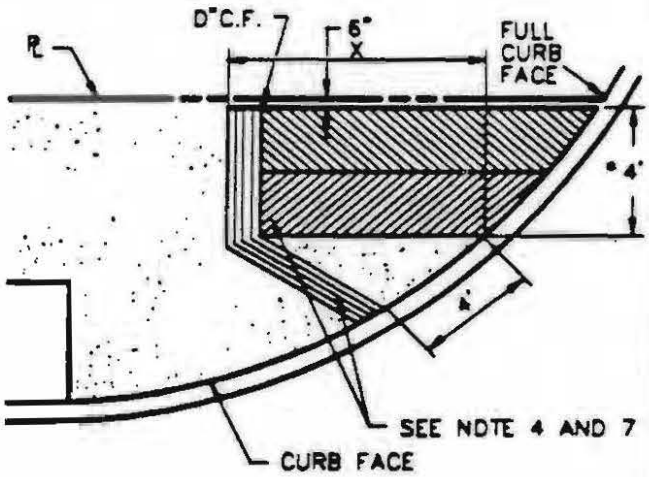


CASE III



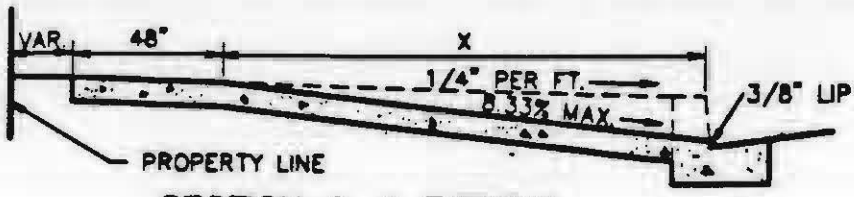
CASE IV

• SEE NOTE 5

City of NORWALK

WHEELCHAIR ACCESS RAMP

TRANSPORTATION & ENGINEERING DEPARTMENT	DATE	REVISION	STD. PLAN NUMBER
Approved C. J. Buchanan Date 9-20-90			103A
City Engineer R.C.E. 20903			SHEET 1 OF 2



X = 5' FOR 6" CURB FACE
X = 7' FOR 8" CURB FACE
X = 9' FOR 10" CURB FACE
X = 11' FOR 12" CURB FACE

SECTION A-A TYPICAL

NOTES:

1. ALL EXISTING CONCRETE SHALL BE SAWCUT PRIOR TO REMOVAL.
   A. ALL REMOVALS SHALL BE TO THE NEAREST SCORE LINE OR AS DIRECTED BY THE ENGINEER.
   B. CURB, GUTTER OR SPANDREL, SHALL BE REMOVED AND POURED MONOLITHICALLY WITH RAMP.
2. NEW CONCRETE SHALL BE CLASS 520-C-2500 (5.5 SACK) P.C.C., 4" THICK WITH A MEDIUM BROOM FINISH TRANSVERSE TO THE AXIS OF THE RAMP.
3. CURB FACE AT RAMP BOTTOM SHALL BE 3/8" IN HEIGHT OR AS SPECIFIED.
4. THE RAMP PERIMETER SHALL HAVE A 12" WIDE GROOVE STRIP WITH 1/4" GROOVES APPROXIMATELY 3/4" O.C. THE RAMP SHALL HAVE 1/4" x 1/4" GROOVES 1 1/2" O.C., 45° TO JOINT.
5. THE BOTTOM WIDTH SHALL BE 3' ON RESIDENTIAL STREETS.
6. CASE III AND IV FOR INTERSECTION WITH SIDEWALK ON ONE STREET.
7. HERRINGBONE PATTERN DIRECTION SHALL BE SPECIFIED BY THE ENGINEER AS A CROSSWALK DIRECTIONAL DEVICE FOR THE BLIND.

City of NORWALK

WHEELCHAIR ACCESS RAMP

TRANSPORTATION & ENGINEERING DEPARTMENT

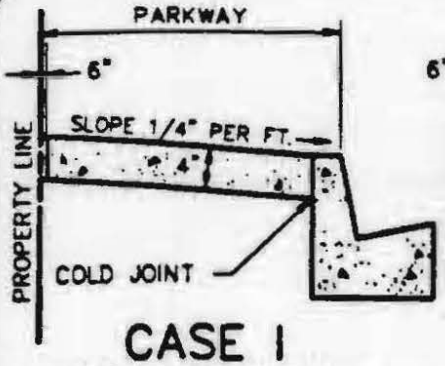
Approved C. A. Buchman for Date 9-20-90

City Engineer R.C.E. 20909

DATE	REVISION

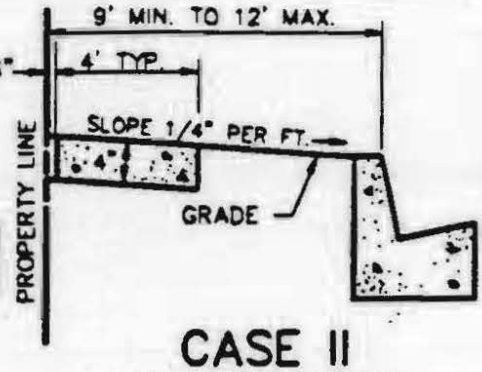
STD. PLAN NUMBER 103B

SHEET 2 OF 2



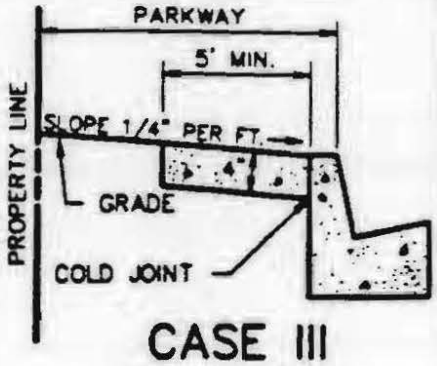
CASE I

COMMERCIAL OR PARKWAY
LESS THAN 9' WIDE



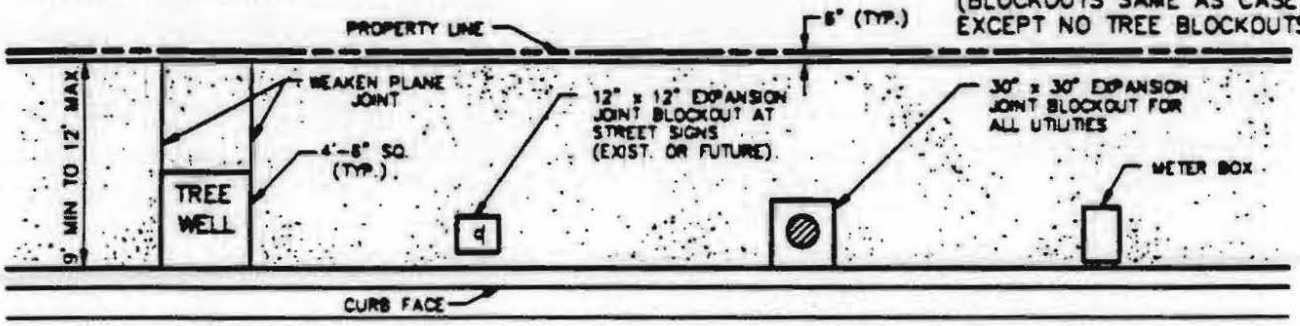
CASE II

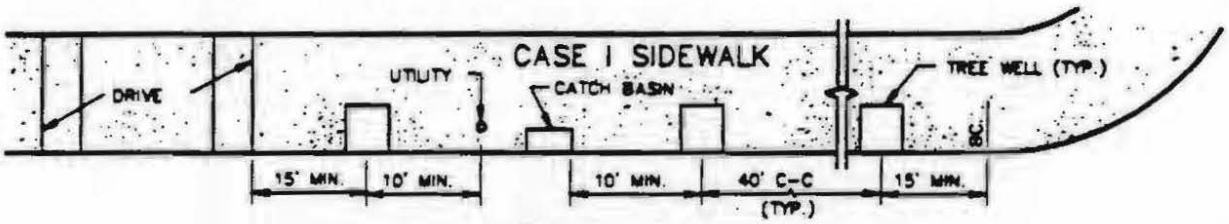
RESIDENTIAL PARKWAY
9' OR GREATER



CASE III

RESIDENTIAL SIDEWALK
ADJACENT TO CURB
(BLOCKOUTS SAME AS CASE I
EXCEPT NO TREE BLOCKOUTS)





NOTES:

1. SIDEWALKS SHALL BE CONSTRUCTED WITH A 6" MIN. CLEARANCE FROM STANDARD WIDTHS EXCEPT WHEN REQUIRED TO MATCH EXISTING IMPROVEMENTS.
2. REMOVE CONCRETE AT A SCORE LINE WITH A SAWCUT.
3. CONCRETE SHALL BE CLASS 520-C-2500 (5.5 SACK) PORTLAND CEMENT CONCRETE.
4. PLACE EXPANSION JOINTS AT CURB RETURNS AND AT A MAX. 60' SPACING. PLACE WEAKENED PLANE JOINTS AT 12' SPACING. SCORE AS DIRECTED BY THE INSPECTOR.
5. UNLESS OTHERWISE SPECIFIED, TYPE 1 CURING COMPOUND SHALL BE USED.
6. TROWEL SIDEWALK SMOOTH WITH LIGHT BROOM FINISH PERPENDICULAR TO THE CURB.
7. A FULL DEPTH COLD JOINT IS REQUIRED BEHIND ALL CURBS.

City of NORWALK

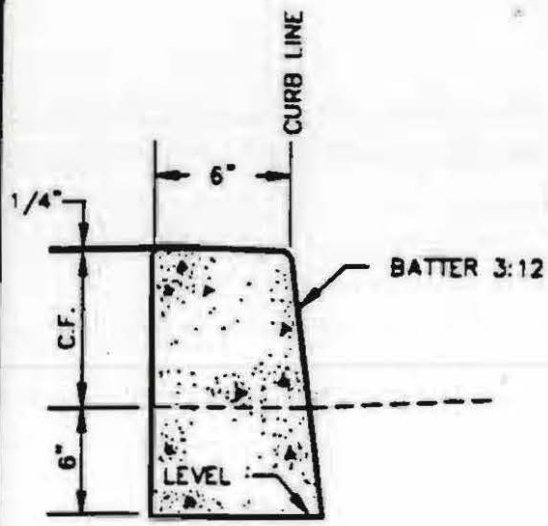
SIDEWALK DETAILS

TRANSPORTATION & ENGINEERING DEPARTMENT

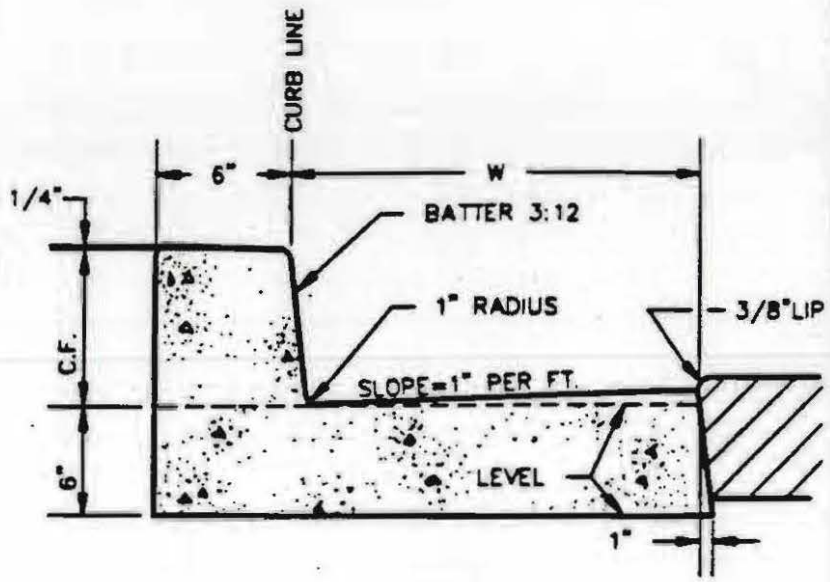
Approved C. A. Buchanan Date 9-20-90

City Engineer R.C.E. 20903

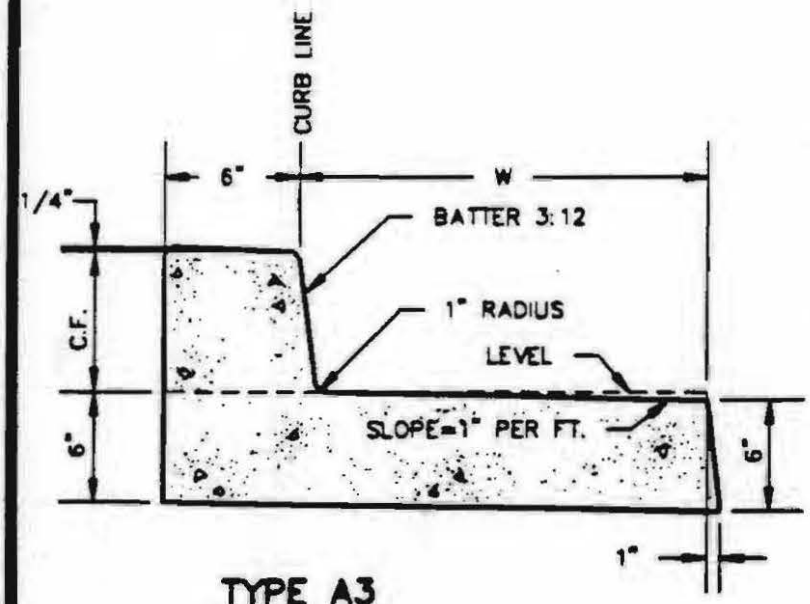
DATE	REVISION	STD. PLAN NUMBER
		104
		SHEET 1 OF 1



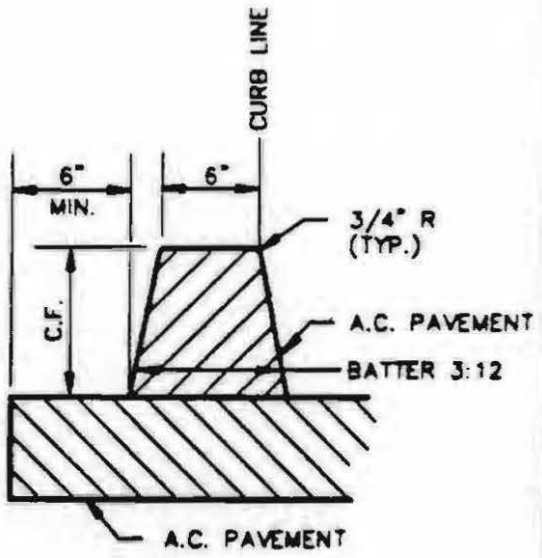
TYPE A1



TYPE A2



TYPE A3



TYPE B1

City of NORWALK

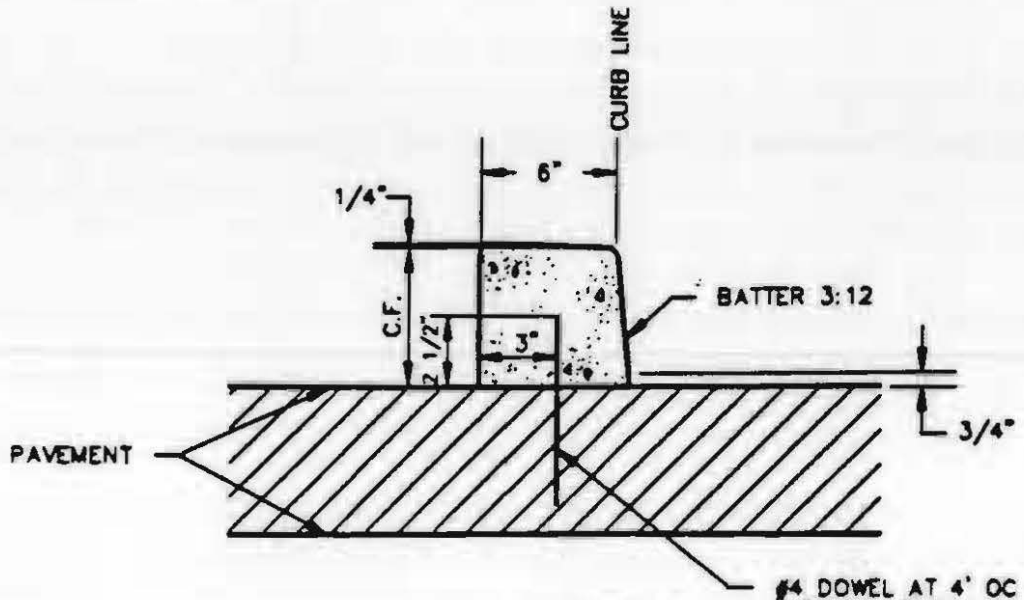
CURB AND GUTTER DETAILS

TRANSPORTATION & ENGINEERING DEPARTMENT

Approved: [signature] Date 9-20-90

City Engineer R.C.E. 20903

DATE	REVISION	STD. PLAN NUMBER
		105A
		SHEET 1 OF 2



TYPE C1

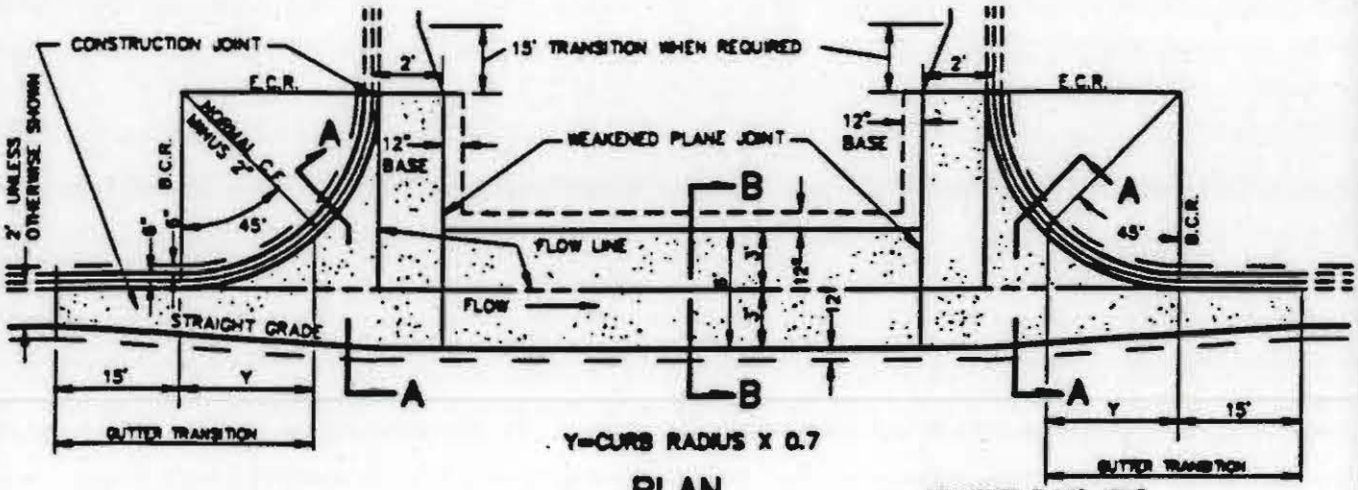
NOTES:

1. ALL DIMENSIONS ARE MEASURED IN INCHES.
2. CURB FACE HEIGHT PER PLAN.
3. "W" IS 24" UNLESS OTHERWISE SPECIFIED.
4. TYPES A1, A2, A3 AND C1 ARE CONSTRUCTED OF PORTLAND CEMENT CLASS 520-C-2500.
5. TYPE C1 CURB SHALL BE ANCHORED WITH DOWELS AS SHOWN, OR WITH AN EPOXY APPROVED BY THE ENGINEER.
6. GRADE SHALL BE MEASURED AT CURB LINE AT TOP OF CURB.
7. ALL EXPOSED CORNERS ON PCC CURBS AND GUTTERS TO BE ROUNDED WITH A 1/2" RADIUS, UNLESS OTHERWISE SPECIFIED.

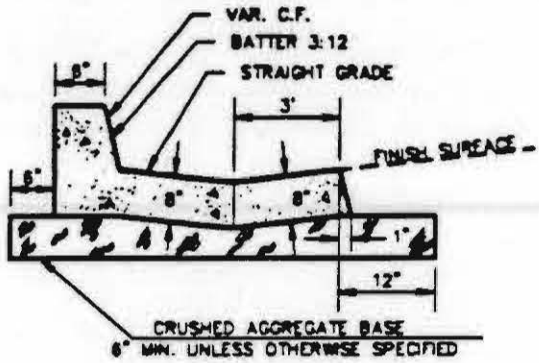
City of NORWALK

CURB AND GUTTER DETAILS

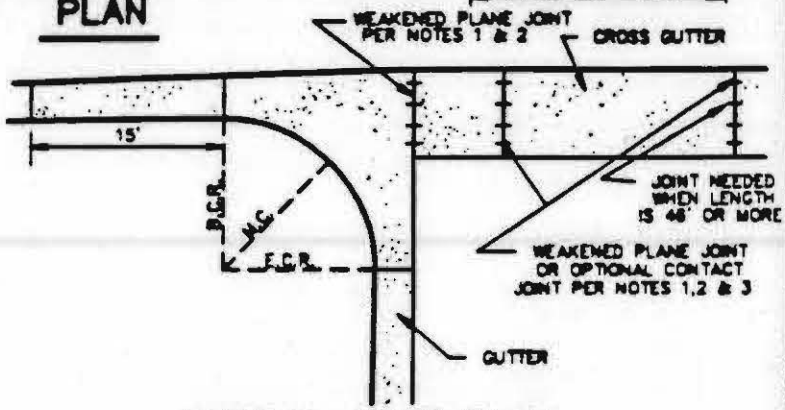
TRANSPORTATION & ENGINEERING DEPARTMENT	DATE	REVISION	STD. PLAN NUMBER
Approved C. T. Burkmark Date 9-20-90			105B
City Engineer R.C.E. 20903			SHEET 2 OF 2



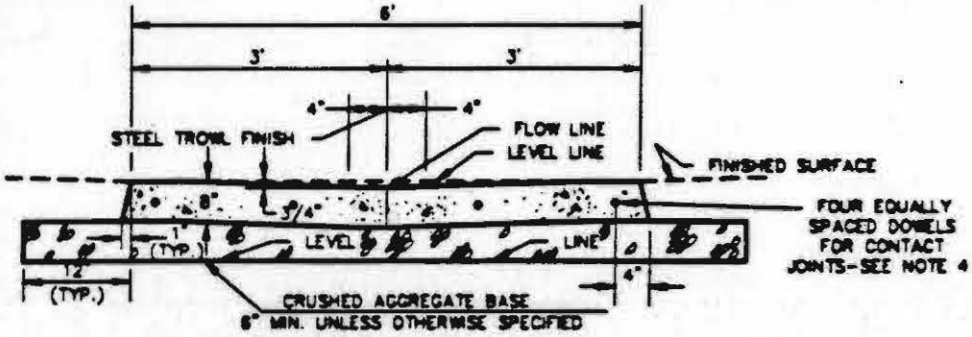
PLAN



SECTION A-A



TYPICAL JOINT PLAN



SECTION B-B

City of NORWALK

CROSS AND LONGITUDINAL GUTTERS

TRANSPORTATION & ENGINEERING DEPARTMENT

Approved C. A. Burkhalter Date 9-20-90

City Engineer R.C.E. 20903

DATE	REVISION

STD. PLAN NUMBER 106A

SHEET 1 OF 2

NOTES:

1. WEAKENED-PLANE AND/OR CONTACT JOINTS SHALL BE PLACED IN CURB AND GUTTER AT LOCATIONS SHOWN ON THE TYPICAL JOINT PLAN HEREON.
2. WEAKENED-PLANE JOINTS SHALL BE PLASTIC CONTROL JOINTS OR 1 1/2" DEEP SAW CUT. CONCRETE SAWING SHALL TAKE PLACE 24 HOURS AFTER CONCRETE IS PLACED.
3. DOWELS FOR CONTACT JOINTS SHALL BE No. 4 BARS 18 INCHES LONG.
4. PLACE A WEAKENED-PLANE OR CONTACT JOINT WHERE LONGITUDINAL GUTTER JOINS CONCRETE SPANDREL.
5. ALL EXPOSED CORNERS ON P.C.C. GUTTERS TO BE ROUNDED WITH 1/2" RADIUS.
6. CONCRETE SHALL BE INTEGRAL WITH CURB UNLESS OTHERWISE SPECIFIED.
7. CONCRETE SHALL BE CLASS 520-C-2500 (5.5 SACK) PORTLAND CEMENT CONCRETE.

City of NORWALK

CROSS AND LONGITUDINAL GUTTERS

TRANSPORTATION & ENGINEERING DEPARTMENT

Approved C. L. Buchanan Jr. Date 9-20-90

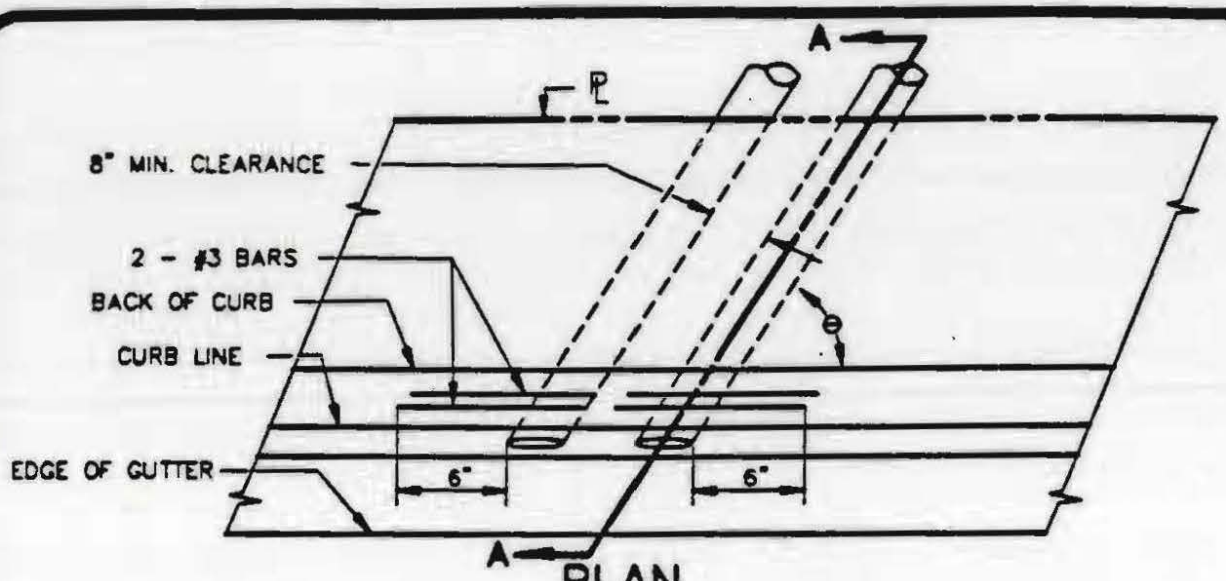
City Engineer R.C.E. 20903

DATE	REVISION

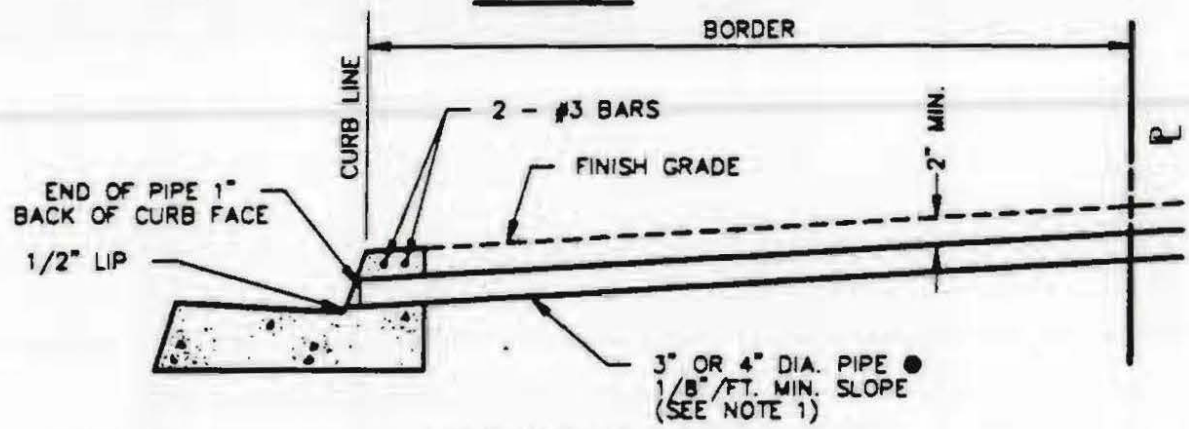
STD. PLAN NUMBER

106B

SHEET 2 OF 2



PLAN



SECTION A–A

NOTES:

1. DRAINS SHALL BE 3–INCH DIAMETER PIPES FOR 6–INCH CURB FACE AND 4–INCH DIAMETER PIPES FOR 8–INCH CURB FACE OR GREATER UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. ANGLE 'θ'=90°, UNLESS OTHERWISE SPECIFIED.
3. THE NUMBER OF PIPES AT ANY LOCATION SHALL NOT EXCEED 2.
4. PIPES SHALL BE CAST IRON OR P.V.C. SCHEDULE 40.

City of NORWALK

PARKWAY DRAIN

TRANSPORTATION & ENGINEERING DEPARTMENT

Approved: C. L. Buchanan Date: 9-20-90

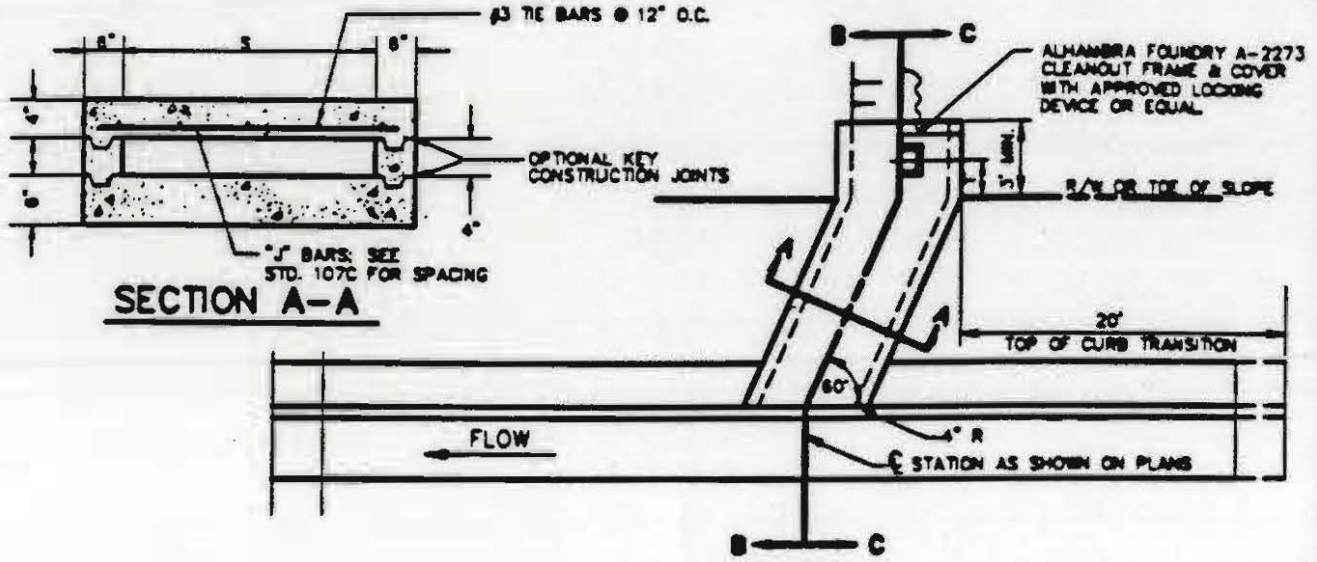
City Engineer R.C.E. 20903

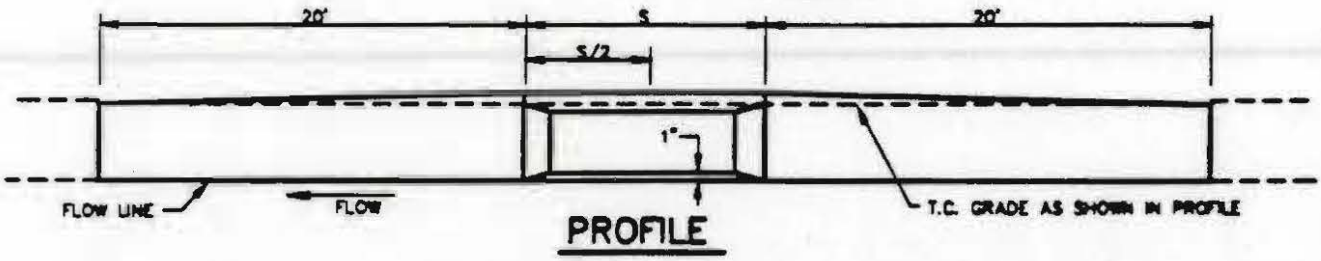
DATE	REVISION

STD. PLAN NUMBER

107A

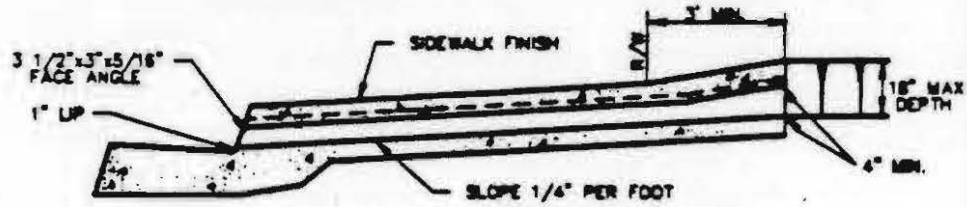
SHEET 1 OF 3

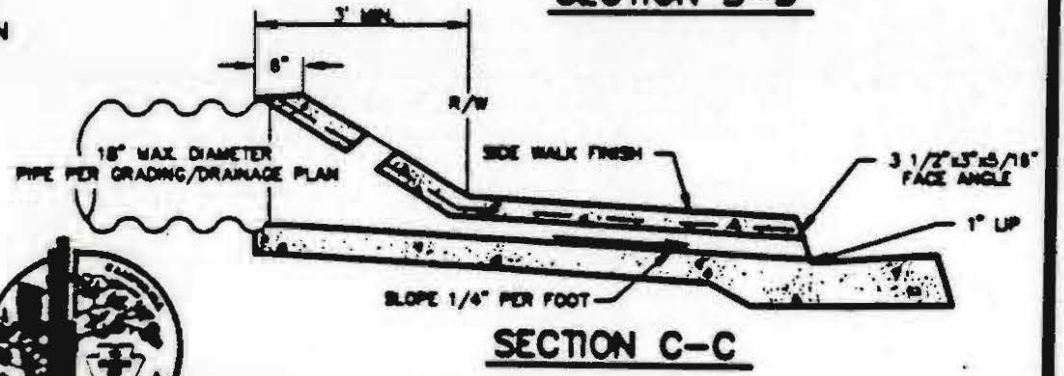




NOTES:

1. SEE STD. 107C FOR DETAILS AND NOTES.
2. SPAN "S" AND HEIGHT OF OPENING AND CURB FACE AT CULVERT SHALL BE NOTED ON PLANS.

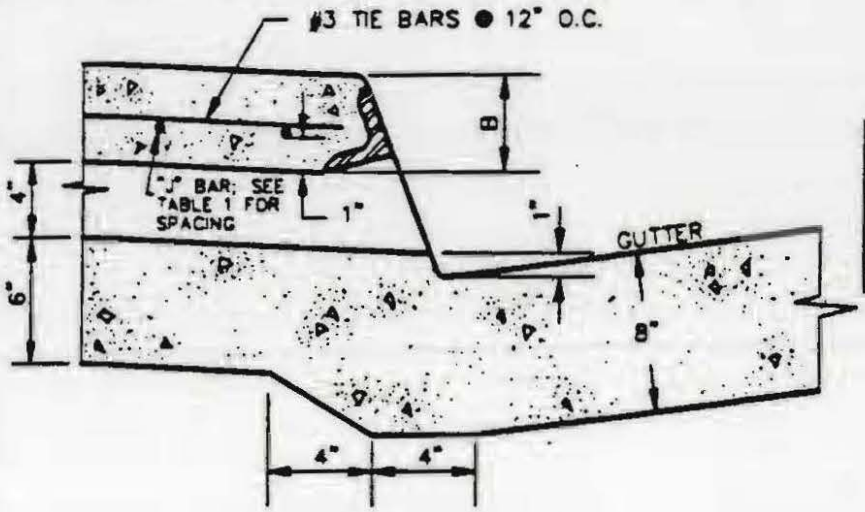




City of NORWALK

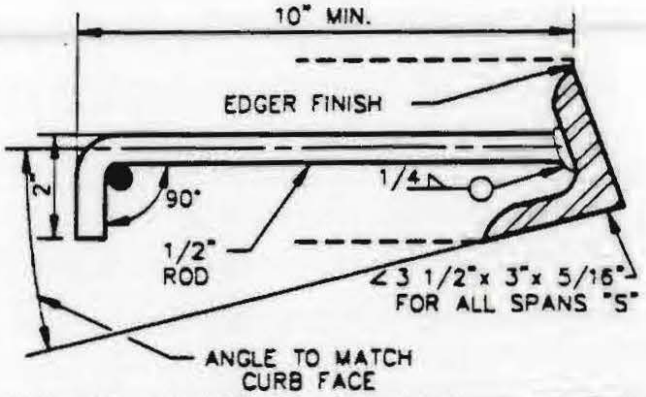
PARKWAY DRAIN

TRANSPORTATION & ENGINEERING DEPARTMENT	DATE	REVISION	STD. PLAN NUMBER
Approved C. L. Buchanan Jr. Date 9-20-90			107B
City Engineer R.C.E. 20903			SHEET 2 OF 3



LENGTH OF CURB OPENING	NO OF ANCHORS
3' OR LESS	2
3'-6" TO 6'-0"	3

OUTLET DETAIL



FACE ANGLE ANCHOR DETAIL

SPAN S	STEEL SCHEDULE J-BARS				ANCHOR
	B	SIZE	SPACING C-C	LENGTH	
2'-0"	3"	#3	7"	2'-9"	2
2'-6"	3"	#3	7"	3'-3"	2
3'-0"	3"	#3	7"	3'-9"	3
3'-6"	3"	#3	6"	4'-3"	3
4'-0"	3"	#3	5"	4'-9"	3
4'-6"	4"	#3	6 1/2"	5'-3"	3
5'-0"	4"	#3	5"	5'-9"	3
5'-6"	4"	#3	4"	6'-3"	3
6'-0"	4"	#3	3 1/2"	6'-9"	3

TABLE 1

GENERAL NOTES:

1. FLOOR OF PARKWAY CULVERT SHALL HAVE A STEEL TROWEL FINISH.
2. ALL EXPOSED METAL SHALL BE GALVANIZED AFTER FABRICATION.
3. HEIGHT OF CURB OPENING WILL VARY WITH TYPE OF CURB.
4. SPAN "S" AND HEIGHT OF CURB OPENING WILL BE DETERMINED FROM THE REQUIRED HYDRAULIC CAPACITY AND LIMITED TO THE DIMENSION IN TABLE 1.
5. REINFORCING STEEL SHALL BE 1" CLEAR TO INSIDE OF CULVERT UNLESS OTHERWISE SHOWN.

City of NORWALK

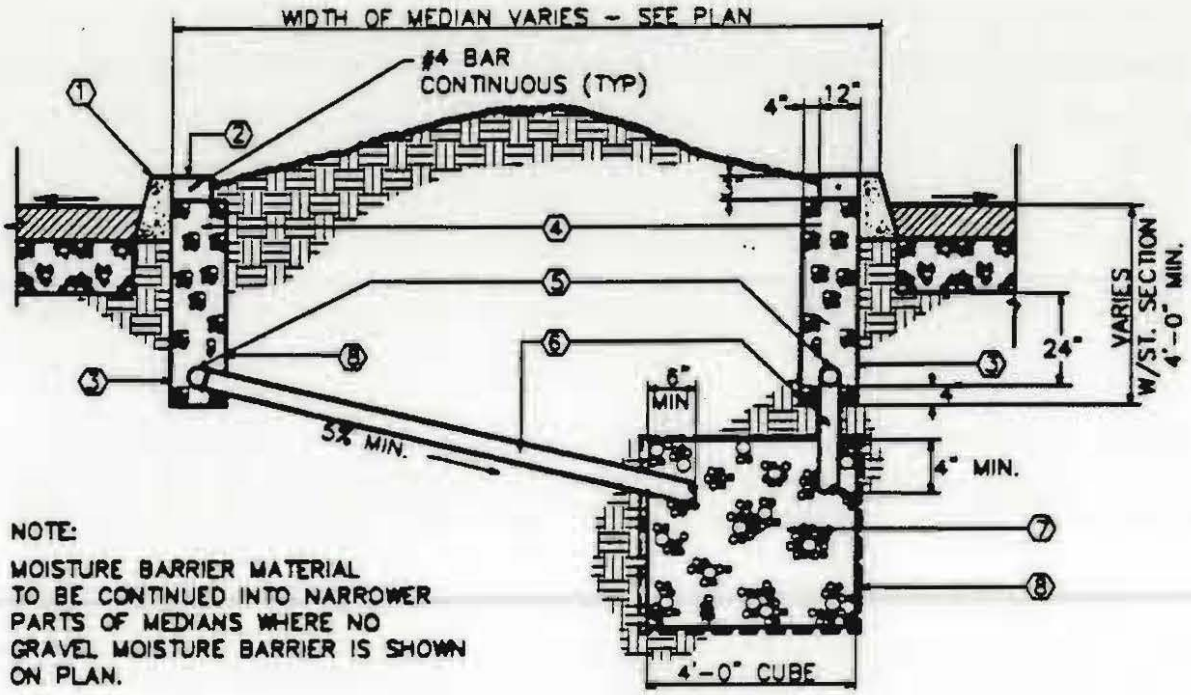
PARKWAY DRAIN

TRANSPORTATION & ENGINEERING DEPARTMENT

Approved C. T. Burnett Date 9-20-90

City Engineer R.C.E. 20903

DATE	REVISION	STD. PLAN NUMBER
		107C



NOTE:

MOISTURE BARRIER MATERIAL TO BE CONTINUED INTO NARROWER PARTS OF MEDIANS WHERE NO GRAVEL MOISTURE BARRIER IS SHOWN ON PLAN.

① TYPE A1 CURB, PER NORWALK STD. PLAN 105.

② 12" BOMANITE MOWBAND WITH #4 REBAR CONTINUOUS.

③ MOISTURE BARRIER MATERIAL (8 MIL POLYETHYLENE OR APPROVED EQUAL).

④ 1 1/2" - 2" DIA. GRAVEL MOISTURE BARRIER.

⑤ 4" DIAMETER PERFORATED DRAIN LINE STARTING 2 FT. BELOW BOTTOM OF STREET SECTION AND SLOPING AT .5% FOR 300 FT. TO 4' x 4' x 4' ROCK SUMP. DEPTH OF GRAVEL TRENCH VARIES. INSTALL 4" OF GRAVEL UNDER DRAINLINE.

⑥ 4" DIAMETER LATERAL PIPE CONNECTED FROM PERFORATED DRAINLINE, WITH ELL OR TEE AS REQUIRED, TO GRAVEL SUMP. THERE ARE TWO LATERALS PER SUMP - ONE ALONG EACH CURB. (5% SLOPE MIN.).

⑦ 4' x 4' x 4' ROCK SUMP. LOCATE PER PLANS.

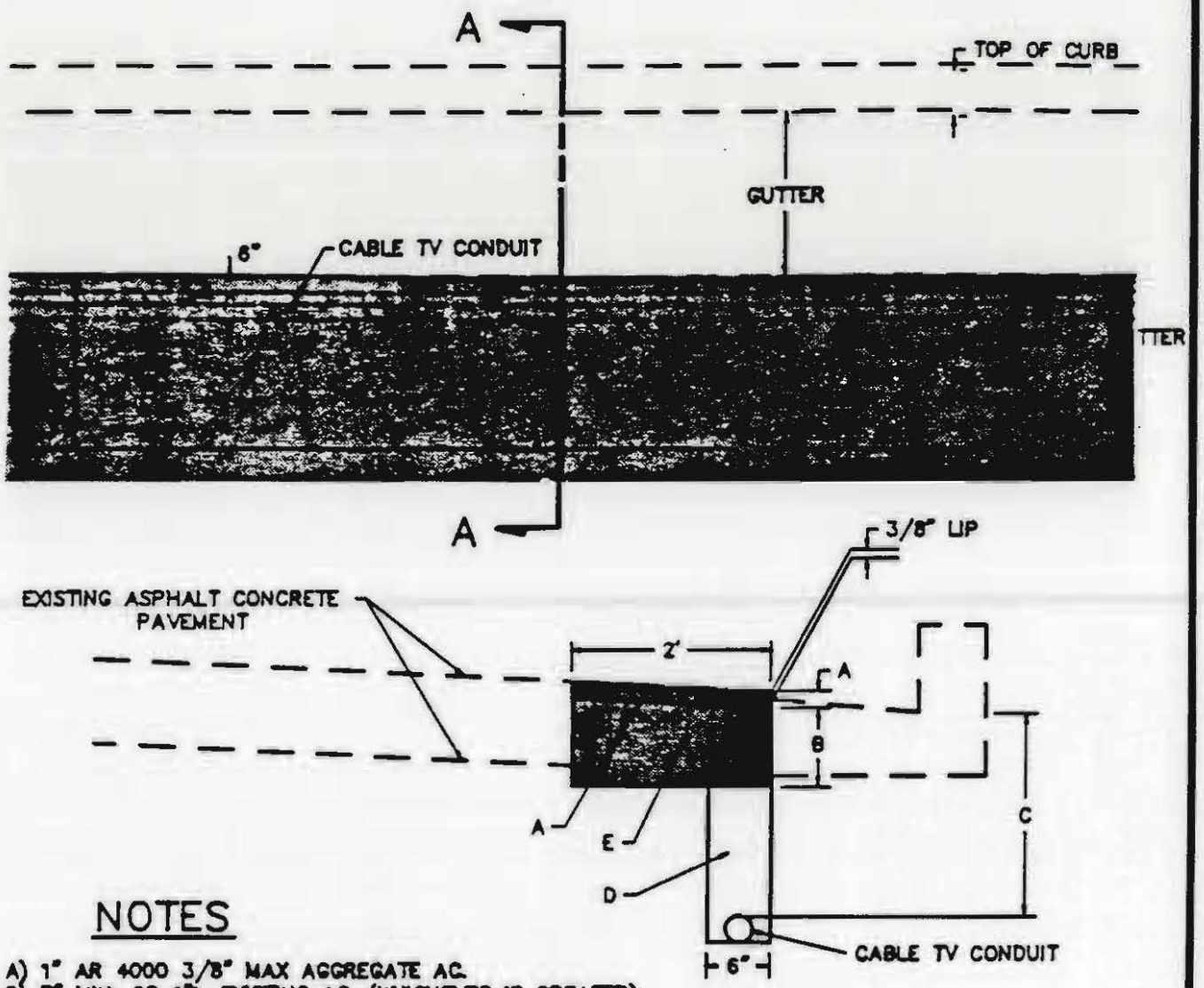
⑧ NON-WOVEN FILTER FABRIC (SUNPAC OR APPROVED EQUAL).

⑨ SUBGRADE.

City of NORWALK

MEDIANS

TRANSPORTATION & ENGINEERING DEPARTMENT	DATE	REVISION	STD. PLAN NUMBER
Approved C. L. Buchanan Date 9-20-90			108



NOTES

A) 1" AR 4000 3/8" MAX AGGREGATE AC.
B) 7" MIN. OR 1"> EXISTING AC. (WHICHEVER IS GREATER).
C) 24" MIN ON ALL STREETS (18" LOCAL RESIDENTIAL).
D) BACK-FILL WITH ONE SACK SAND-CEMENT SLURRY.
E) AR 4000 3/4" MAX AGGREGATE AC.

SECTION A-A

City of NORWALK

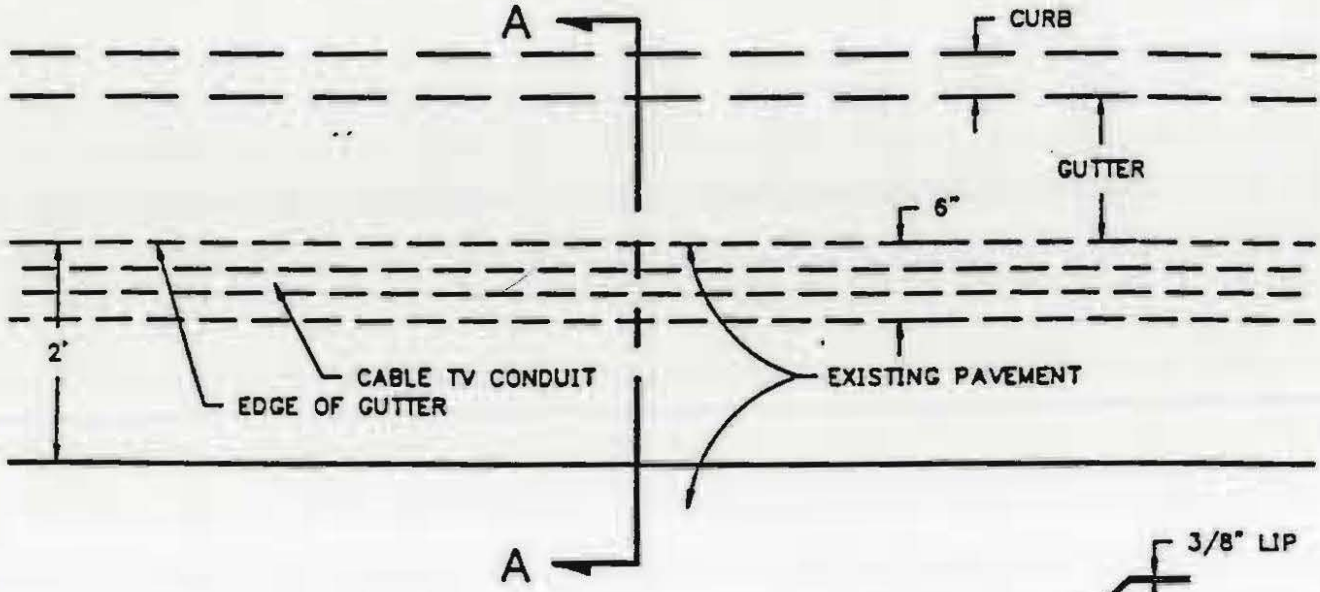
CABLE TV TRENCH

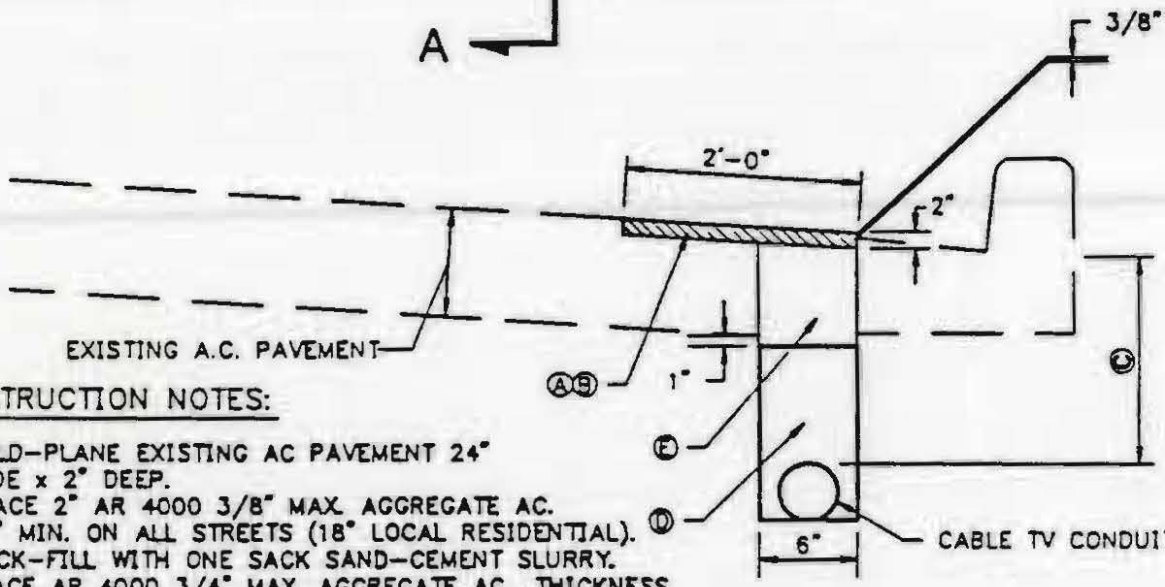
TRANSPORTATION & ENGINEERING DEPARTMENT

Approved: E. T. Bentley Date 7-11-90

City Engineer R.C.E. 20903

DATE	REVISION	STD. PLAN NUMBER
		109
		SHEET 1 OF 1





SECTION A – A

CONSTRUCTION NOTES:

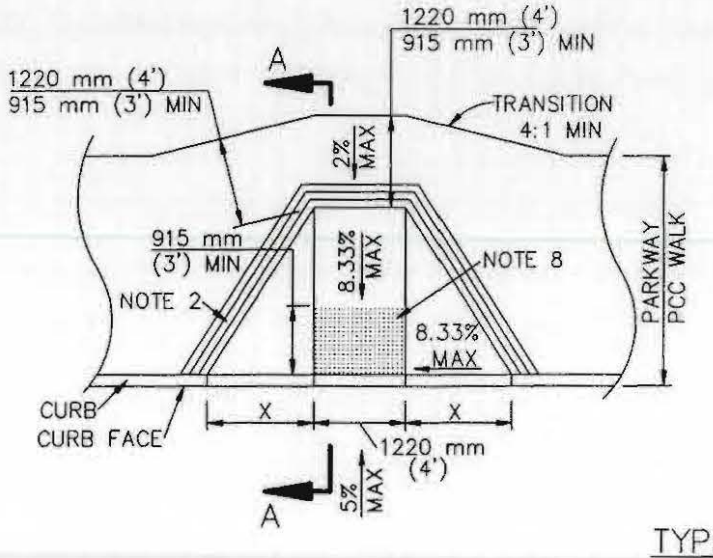
(A) COLD-PLANE EXISTING AC PAVEMENT 24" WIDE x 2" DEEP.
(B) PLACE 2" AR 4000 3/8" MAX. AGGREGATE AC.
(C) 24" MIN. ON ALL STREETS (18" LOCAL RESIDENTIAL).
(D) BACK-FILL WITH ONE SACK SAND-CEMENT SLURRY.
(E) PLACE AR 4000 3/4" MAX. AGGREGATE AC., THICKNESS EQUALS THICKNESS OF EXISTING AC. PLUS 1".

NOTE: THIS ALTERNATE SHALL BE USED ONLY ON ARTERIAL STREETS WHERE EXISTING A.C. PAVEMENT'S THICKNESS EQUALS OR GREATER THAN 6".

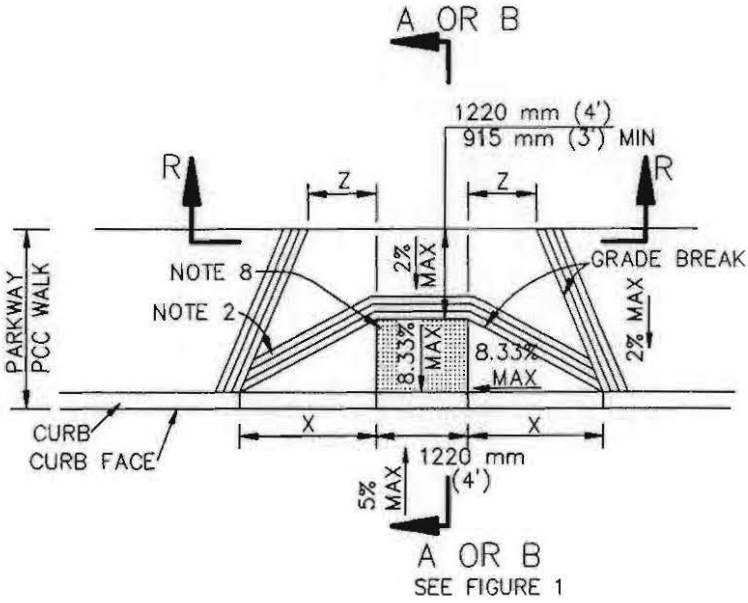
City of NORWALK

CABLE TV TRENCH (ALTERNATE)

TRANSPORTATION & ENGINEERING DEPARTMENT	DATE	REVISION	STD. PLAN NUMBER
Approved: C. Stephen Buchanan Date: 2-25-91			109A
City Engineer R.C.E. 10703			SHEET 1 OF 1



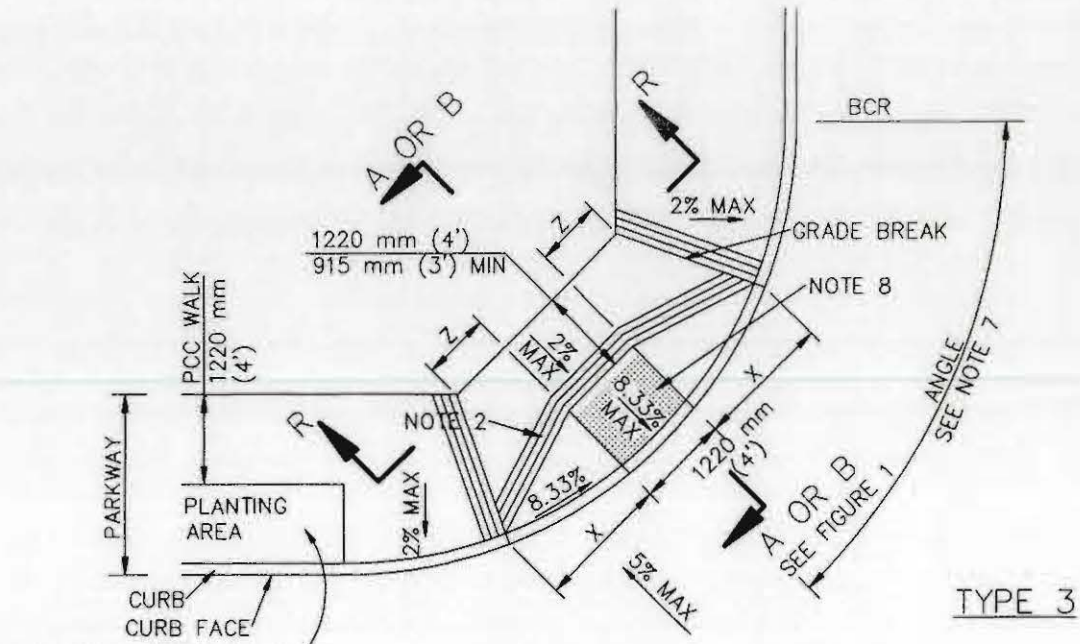
TYPE 1



TYPE 2

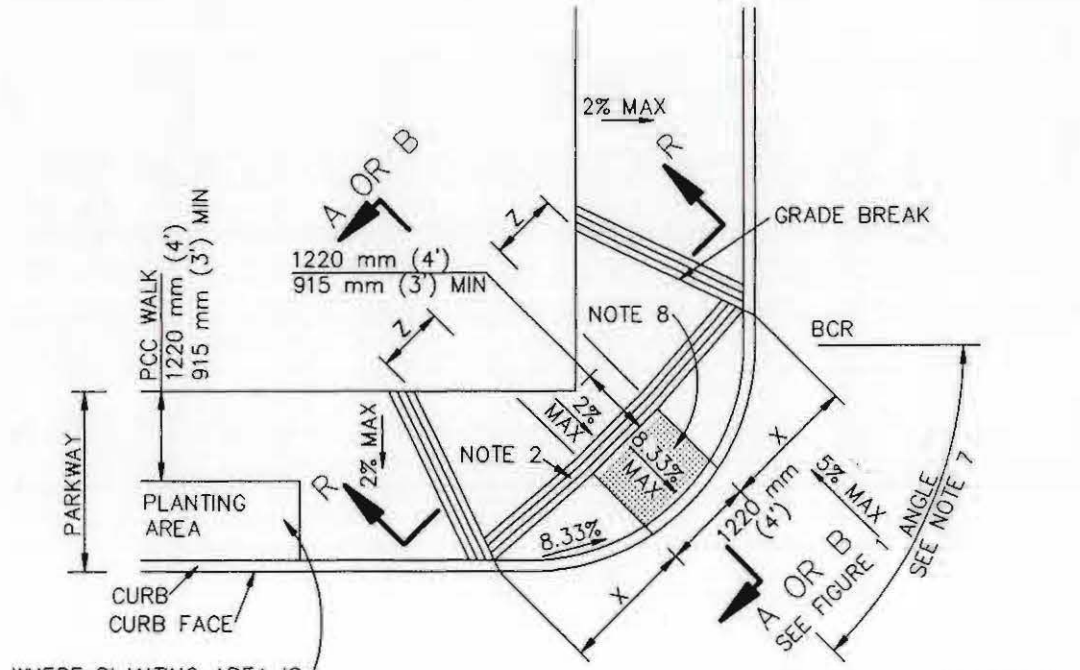
CASE A

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION		
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. GREENBOOK COMMITTEE 1992 REV. 1996, 2000, 2005	**CURB RAMP**	STANDARD PLAN METRIC 111-3
	USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION	SHEET 1 OF 10



WHERE PLANTING AREA IS ADJACENT TO THE CURB RAMP, USE CASE A, TYPE 6

TYPE 3

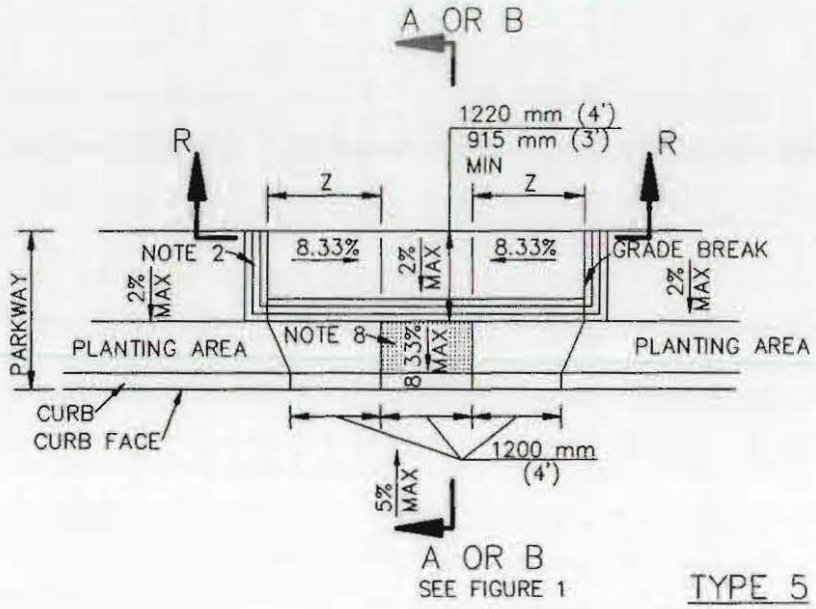


WHERE PLANTING AREA IS ADJACENT TO THE CURB RAMP, USE CASE A, TYPE 6

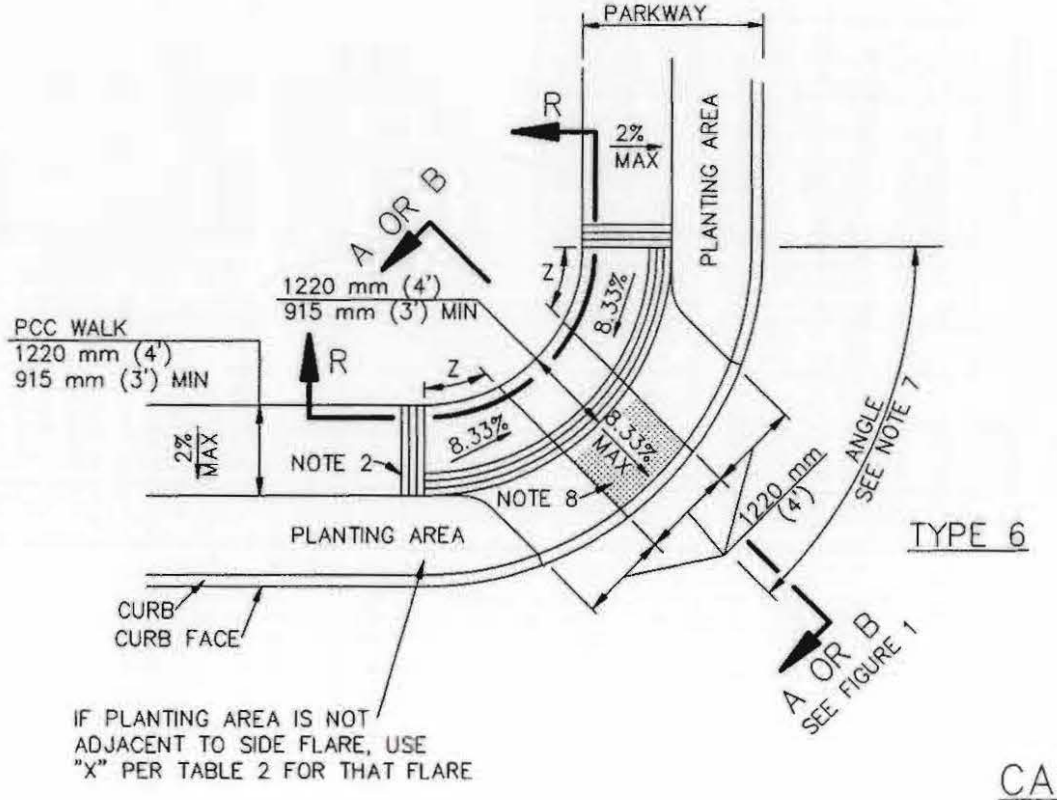
TYPE 4

CASE A

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC 111-3
CURB RAMP	SHEET 2 OF 10



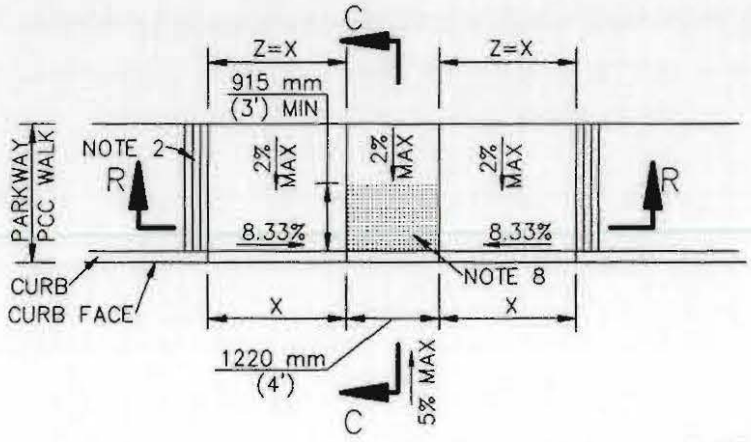
TYPE 5



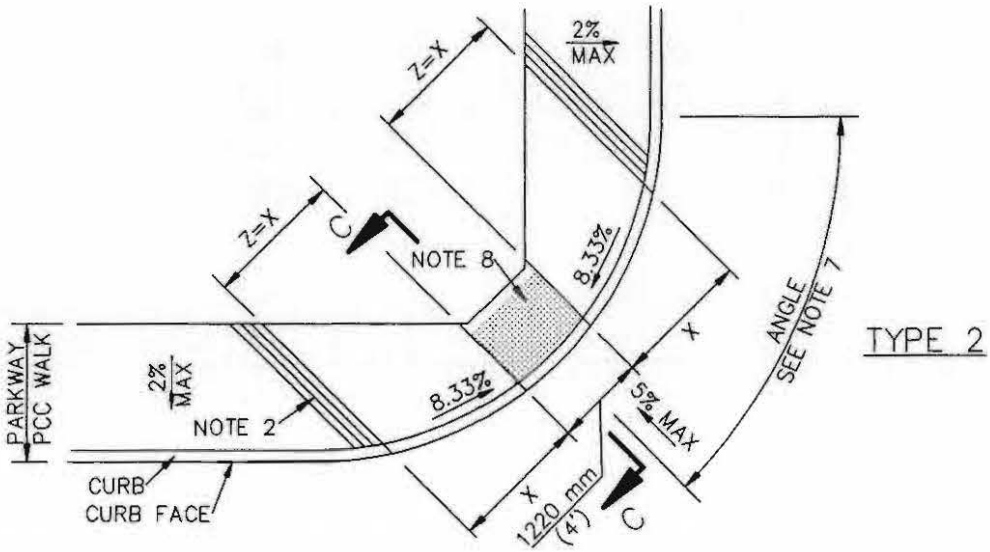
TYPE 6

CASE A

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC 111–3
CURB RAMP	SHEET 3 OF 10



TYPE 1

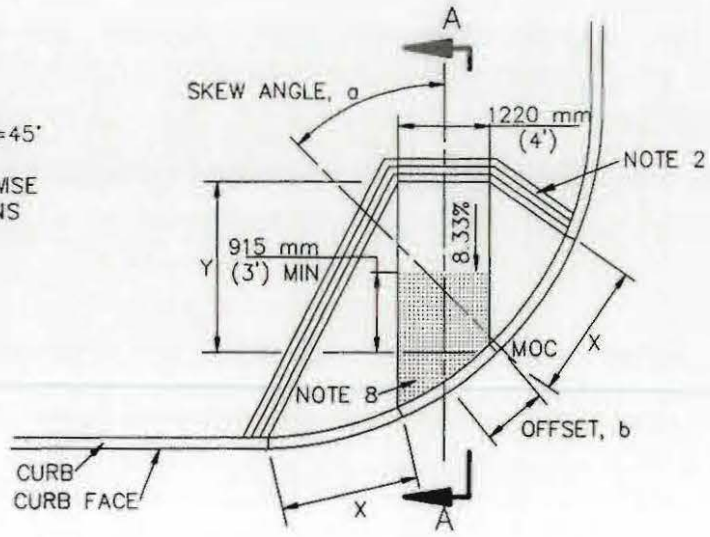


TYPE 2

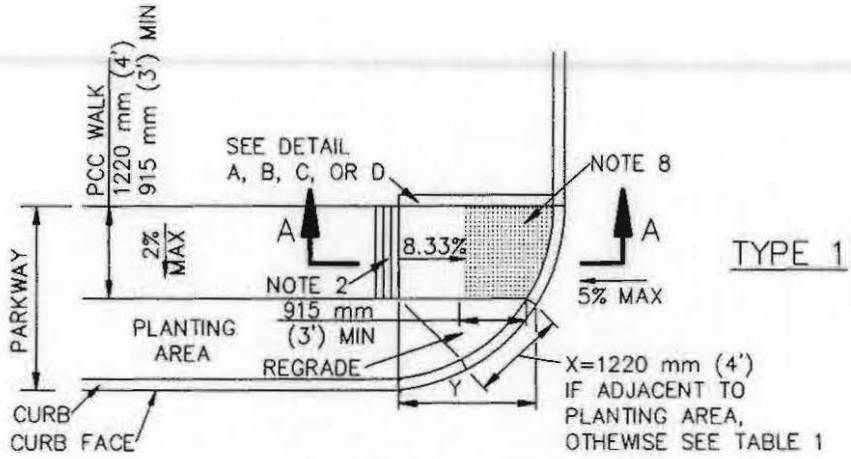
CASE B

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC 111-3
CURB RAMP	SHEET 4 OF 10

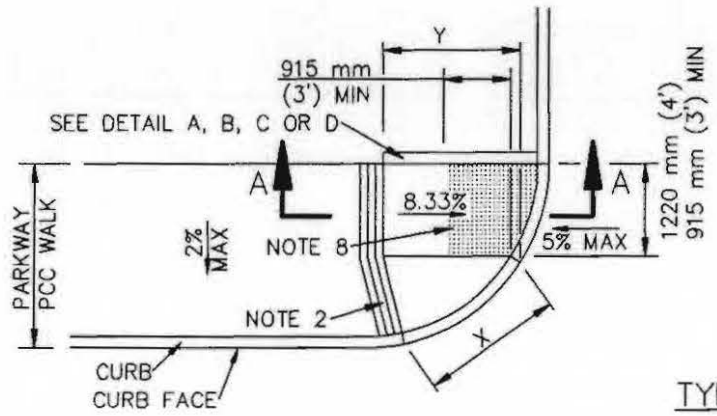
SKEW ANGLE a=45°
OFFSET b=0
UNLESS OTHERWISE
NOTED ON PLANS



CASE C



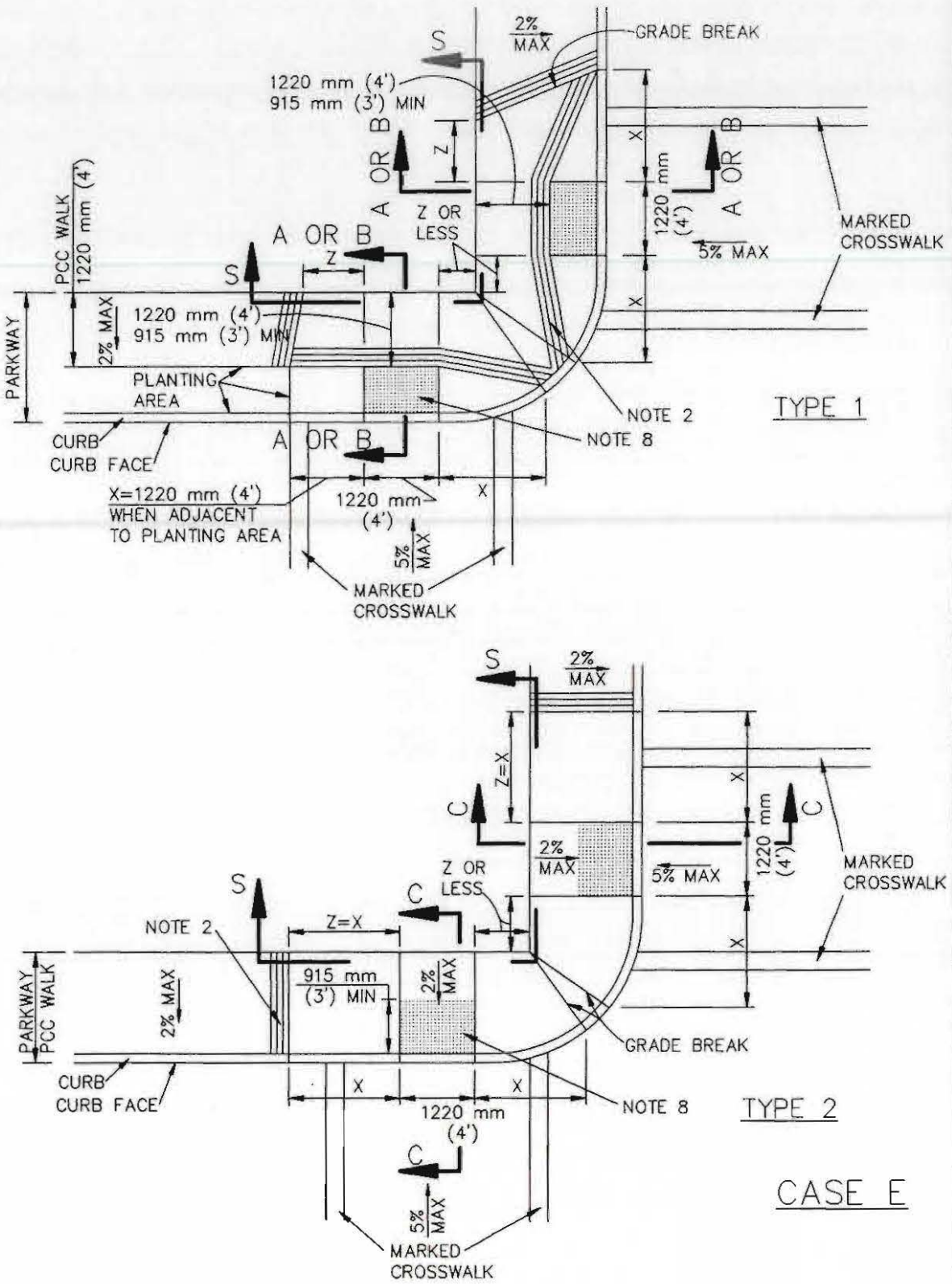
TYPE 1



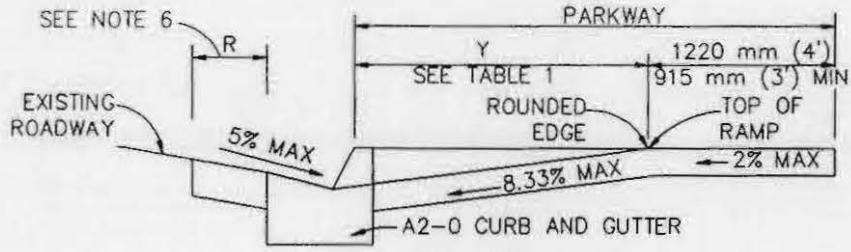
TYPE 2

CASE D

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC
CURB RAMP	**111-3**
	SHEET 5 OF 10

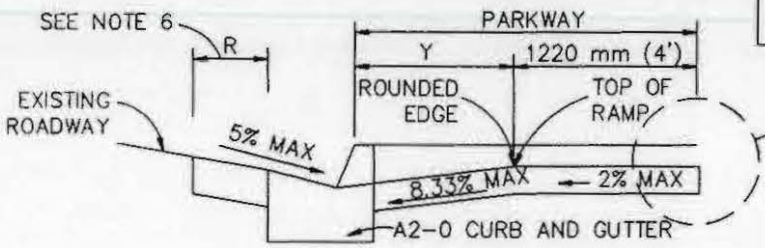


STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC 111–3
CURB RAMP	SHEET 6 OF 10

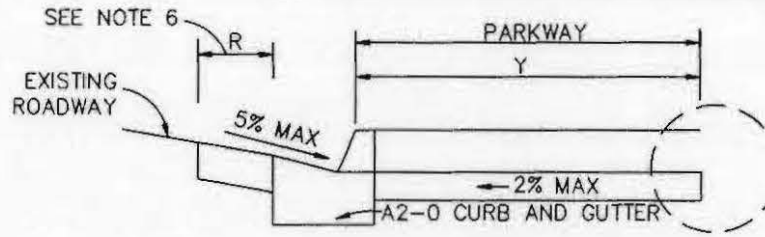


SECTION A-A

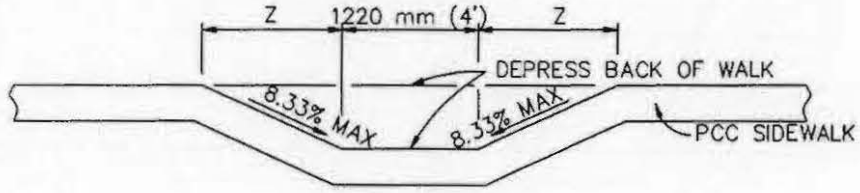
USE FIGURE 1 TO DETERMINE WHICH OF SECTIONS A-A, B-B OR C-C IS APPROPRIATE.



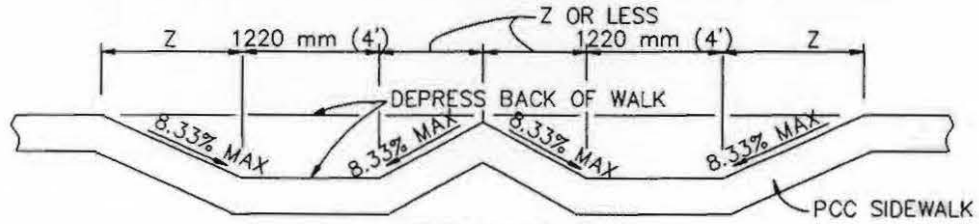
SECTION B-B



SECTION C-C



SECTION R-R



SECTION S-S

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC 111-3
CURB RAMP	SHEET 7 OF 10

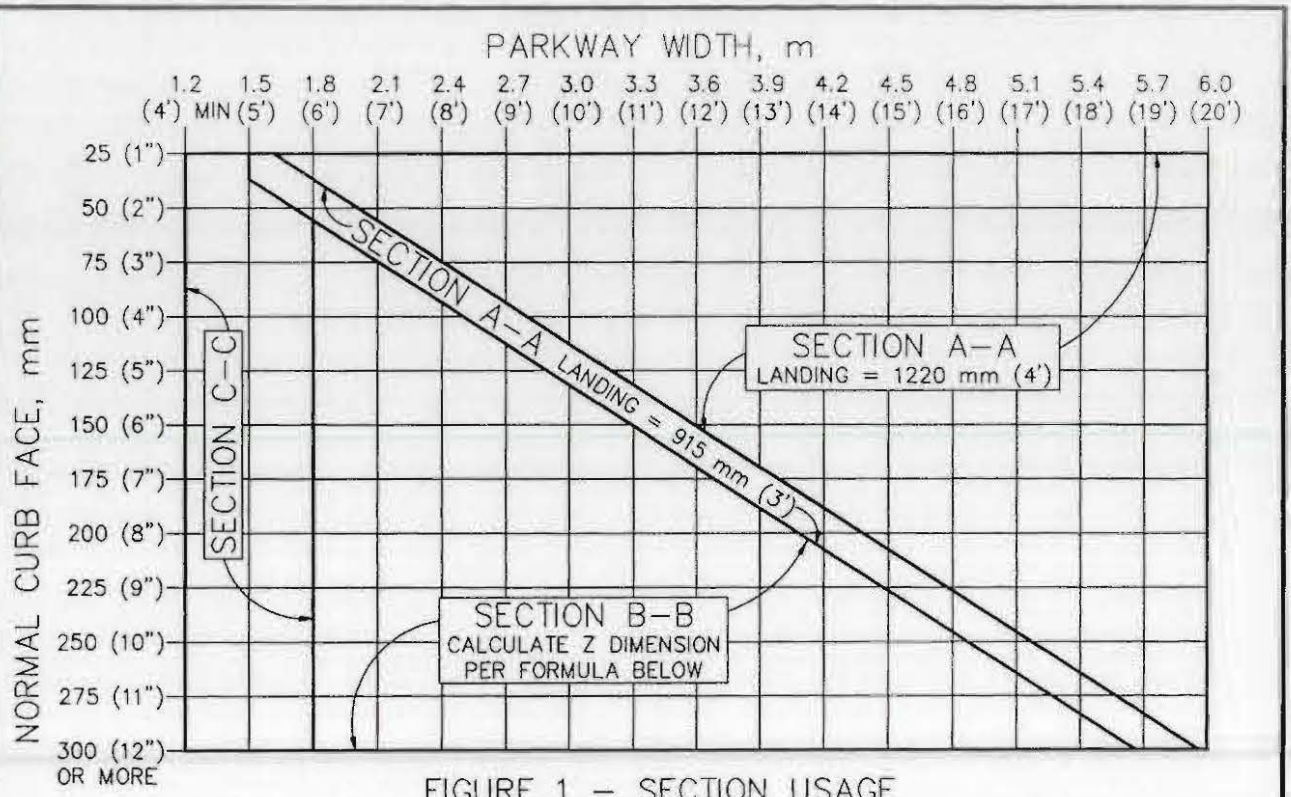


FIGURE 1 – SECTION USAGE

NORMAL CURB FACE, mm (INCHES)	X, mm (FT)	SECTION Y–Y Y, mm (FT)
50 (2")	1200 (4.00') MIN	790 (2.63')
75 (3")	1200 (4.00') MIN	1185 (3.95')
100 (4")	1200 (4.00')	1580 (5.26')
125 (5")	1500 (5.00')	1975 (6.58')
150 (6")	1800 (6.00')	2370 (7.90')
175 (7")	2100 (7.00')	2765 (9.21')
200 (8")	2400 (8.00')	3160 (10.53')
225 (9")	2700 (9.00')	3555 (11.84')
250 (10")	3000 (10.00')	3950 (13.16')
275 (11")	3300 (11.00')	4340 (14.47')
300 (12")	3600 (12.00')	4735 (15.79')

SEE SHEET 9 FOR STREET SLOPE ADJUSTMENT FACTORS, ALL STREETS

TABLE 1 – X AND Y VALUES

TABLE 1 REFERENCE FORMULAS:
X = CF / 8.333%
Y = CF / (8.333% – 2% WALK CROSS SLOPE)

WHERE FIGURE 1 SHOWS USE OF SECTION B–B, FIGURE Z DIMENSION AS FOLLOWS:

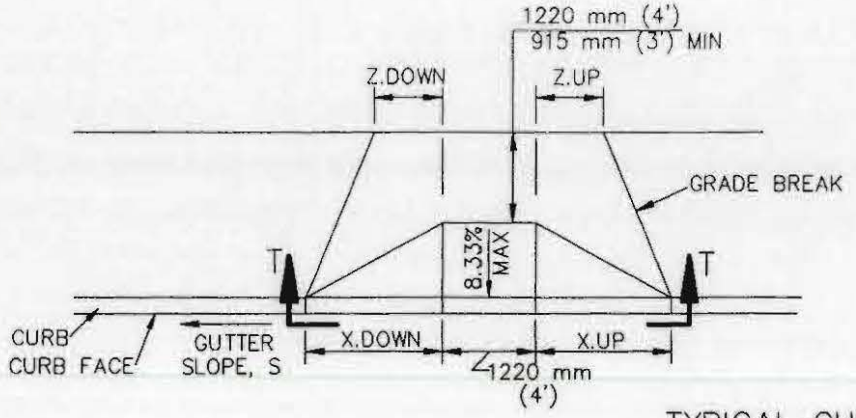
W = PARKWAY WIDTH
L = LANDING WIDTH, 1220 mm (4') TYP, 915 mm (3') MIN

$Z = [(Y+L)-W] \times 0.760$

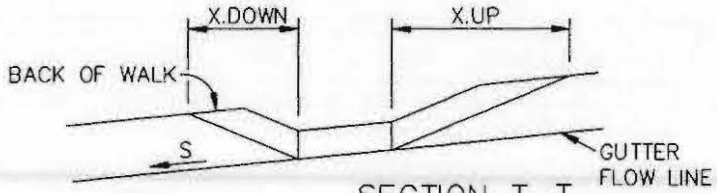
IF $(Y+L) < W$, THEN $Z = 0$

TABLE 1 SHOWS X FOR A FLARE SLOPE OF 8.33% AT THE CURB FACE. IF L IS 1220 mm (4') OR MORE, X MAY BE MULTIPLIED BY 0.833 FOR A MAXIMUM FLARE SLOPE OF 10% AT THE CURB FACE.

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC 111–3
CURB RAMP	SHEET 8 OF 10



TYPICAL CURB RAMP



SECTION T–T
SLOPED STREET

FOR SLOPED STREETS, MULTIPLY THE DIMENSIONS PARALLEL TO THE STREET, X AND Z, UPSTREAM AND DOWNSTREAM OF THE RAMP, BY THE FACTORS IN THE FOLLOWING TABLE.

FOR EXAMPLE, X.DOWN = X x K.DOWN

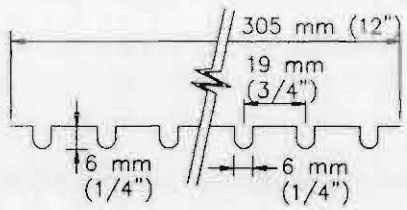
S	K.DOWN	K.UP
0%	1.000	1.000
0.2%	0.977	1.025
0.5%	0.943	1.064
1%	0.893	1.136
2%	0.806	1.316
3%	0.735	1.563
4%	0.676	1.923
5%	0.625	2.500

TABLE 2 – SLOPE ADJUSTMENTS

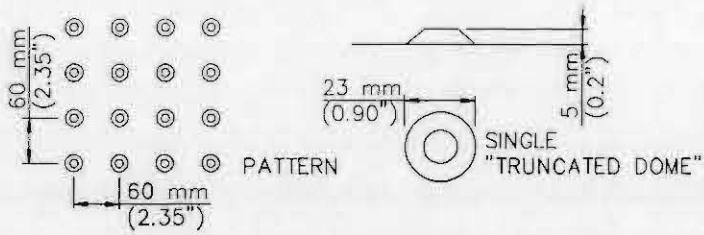
TABLE 2 REFERENCE FORMULAS:
K.DOWN = 8.333% / (8.333% + S)
K.UP = 8.333% / (8.333% – S)

STREET SLOPE ADJUSTMENTS

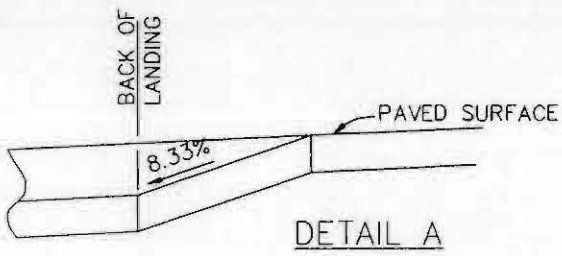
STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC 111–3
CURB RAMP	SHEET 9 OF 10



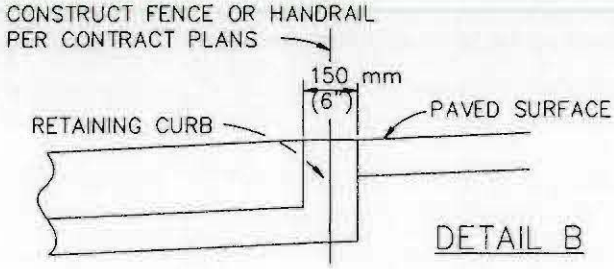
GROOVING DETAIL



DETECTABLE WARNING DETAIL



DETAIL A



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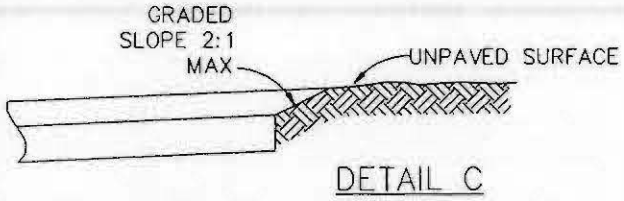

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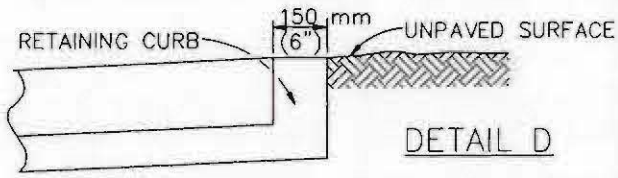
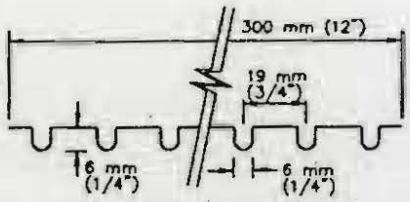


DETAIL D

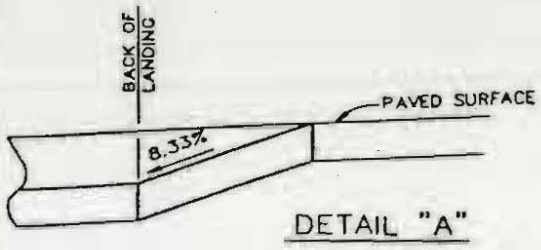
GENERAL NOTES:

1. CONCRETE SHALL BE CLASS 310-C-17 (520-C-2500) CONFORMING TO SSPWC 201-1.1.2 AND SHALL BE 100 mm (4") THICK.
2. THE RAMP SHALL HAVE A 305 mm (12") WIDE BORDER WITH 6 mm (1/4") GROOVES APPROXIMATELY 19 mm (3/4") OC. SEE GROOVING DETAIL.
3. THE RAMP SURFACE SHALL HAVE A TRANSVERSE BROOMED SURFACE TEXTURE CONFORMING TO SSPWC 303-1.9.
4. USE DETAIL "A" OR "B" IF EXISTING SURFACE BEHIND LANDING IS PAVED.
5. USE DETAIL "C" OR "D" IF EXISTING SURFACE BEHIND LANDING IS UNPAVED.
6. R = 900 mm (3') UNLESS OTHERWISE SHOWN ON PLAN.
7. ANGLE = $\Delta/2$ UNLESS OTHERWISE SHOWN ON PLAN.
8. CONSTRUCT DETECTABLE WARNING SURFACE PER DETAIL THIS SHEET. MATERIALS SHALL BE PER CONTRACT DOCUMENTS.

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC
CURB RAMP	111-3
	SHEET 10 OF 10



GROOVING DETAIL



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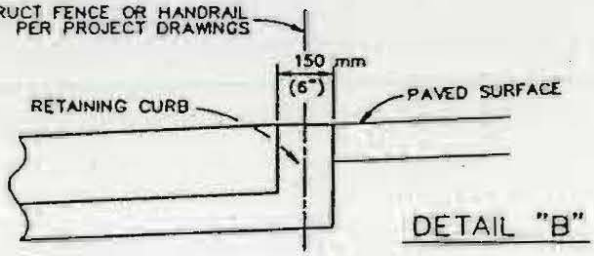

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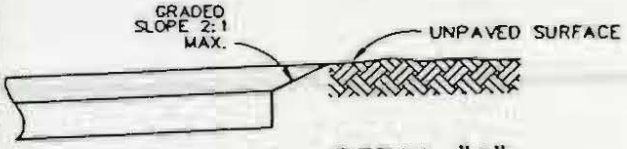

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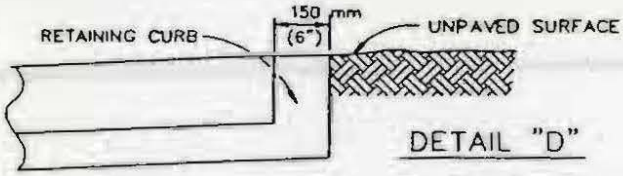

DETAIL "D"

GENERAL NOTES:

1. CONCRETE SHALL BE EITHER CLASS 310-C-17 (520-C-2500) OR 320-C-17 (560-D-2500) AND SHALL BE 100 mm (4") THICK.
2. THE RAMP SHALL HAVE A 300 mm (12") WIDE BORDER WITH 6 mm (1/4") GROOVES APPROXIMATELY 19 mm (3/4") OC. SEE GROOVING DETAIL.
3. THE RAMP SURFACE SHALL HAVE A TRANSVERSE BROOMED SURFACE TEXTURE.
4. USE DETAIL "A" OR "B" IF EXISTING SURFACE BEHIND RIGHT OF WAY IS PAVED.
5. USE DETAIL "C" OR "D" IF EXISTING SURFACE BEHIND RIGHT OF WAY IS UNPAVED.
6. W = 900 mm (3') UNLESS OTHERWISE SHOWN ON PLAN.
7. ANGLE = $\Delta/2$ UNLESS OTHERWISE SHOWN ON PLAN.
8. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACTLY EQUAL VALUES. IF METRIC UNITS ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES. IF ENGLISH UNITS ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH VALUES.

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: Mr. FRANK WEI
Senior Tansportation Engineer
Bridge Design Branch 21
Office of Bridge Design South 2

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1 MS # 18

Date: December 13, 2011
File: 07-LA-5- PM 4.0/5.9
0700001834 (07-215941)

Sound Walls 220, 221, 231
250, 251, 262, 266, 267, 290
and 291

Subject: Foundation Report

Introduction

This report presents the foundation recommendations for the proposed Sound Walls 220, 221, 231, 250, 251, 262, 266, 267, 290, and 291. Email attachments of final foundation recommendations and wall plans were received from Mr. Frank Wei (Design Branch 21, Office of Bridge Design South 2) on February 8, 2011.

1.0 Scope of Work

This report supersedes the District Preliminary Geotechnical Report (DPGR), for sound walls dated March 2, 2011. A review of the following resources provided information for the foundation evaluation and site condition.

- Recent Log of Test Borings completed by Caltrans in 2011, for the proposed walls.
- Cone Penetration Test (CPT) soundings completed by URS Corporation consultant in April and May of 2008, for retaining walls and Soundwalls.
- Wall Layouts revised 2-15-11, wall plans and Typical Sections and personal communications with District and Structure design engineers.
- Interpretation of subsurface soil and groundwater conditions, Performing engineering analyses and Preparation of Foundation Recommendations.

2.0 Project Description

The I-5 Corridor Improvement project proposes to reconstruct the I-5 freeway including bridge replacements, retaining walls and sound walls, between Los Angeles/Orange County line to the north of I-605, crossing cities of Norwalk, Santa Fe Springs and unincorporated cities. New and replacement bridges are part of the Segment 4 of I-5 Corridor Improvement in the City of Norwalk, which covers an area from north of Silver Bow POC (PM 4.0) to south of Orr and Day OH (PM 6.0).

Segment 4 encompasses one new structure (Imperial HWY Off-Ramp # 53-3071K), three bridge replacements (San Antonio Drive UC #53-3060, Imperial HWY UC #53-3061 and Pioneer Blvd. UC #53-3062), and approximately 17960 ft of sound walls and different types of retaining walls with and without sound walls. All elevations referenced in this report are based on 1988 NAVD datum. Table 1 shows the wall number, maximum height, location, and types.

Table 1. Summary of Wall Locations and Description

Wall No.	Wall Location	Wall Type	Wall Height	Stationing "A1-line"	
			(ft)	From	To
SW 220	NB-5	5SWBP	H=16	102.5 Rt, 214+00	173.3 Rt, 228+82
SW 221	SB-5	5SWBP	H=8	124.9 Lt, 222+78	145.6Lt , 230+43.5
SW 231	SB-5	1SWBP	H=24	102.5 Lt , 229+03	102.5 Lt , 233+35
SW 250	NB-5	1SWBP	H=28	102.5 Rt, 235+09	102.5 Rt, 243+25
SW 250	NB-5	5SWBP	H=30	102.5 Rt, 243+25	102.5 Rt, 258+49
SW 251	SB-5	1SWBP	H=32	102.5 Lt, 235+05	102.5 Lt , 259+69
SW262	NB-5	1SWBP	H=20	102.5 Rt, 261+55	102.5 Rt, 264+96
SW 266	NB-5	1SWBP	H=30	170.9 Rt , 262+25	118.3 Rt, 272+44
SW 267	SB-5	5SWBP	H=22	206.2 Lt , 264+04	165.2 Lt, 268+04
SW 290	NB-5	1SWBP	H=26	111.7 Rt, 275+09	102.5 Rt, 278+45
SW 290	NB-5	5SWBP	H=26	102.5 Rt, 278+45	102.5 Rt, 303+89
SW 290	NB-5	1SWBP	H=26	102.5 Rt, 303+89	102.5 Rt, 312+49
SW 291	SB-5	1SWBP	H=30	141.9 Lt, 270+81	102.5 Lt, 274+67
SW 291	SB-5	5SWBP	H=30	102.5 Lt, 274+67	114.2 Lt, 304+43
SW 291	SB-5	5SWBP	H=30	102.5 Lt, 304+43	114.2 Lt, 311+78

3.0 Field Investigation and Testing Program

In order to characterize the subsurface conditions and soil profile a site specific field investigation consisting of drilling 31 hollow stem auger borings (8" dia.) and 10 mud rotary borings (4.5" dia.) were performed between January 3 and March16, 2011. At every 5 foot interval, Standard Penetration Tests in accordance with ASTM Test Method D1586 were performed using standard 1.4 inch I.D. split spoon sampler with a 140 pound hammer dropped 30 inches. At intervals where cohesive soils encountered, relatively undisturbed samples were also obtained using 2.0 I.D. Modified California Sampler. Caltrans drill rig models CME-75 and Acker 398 (for limited access) were used.

Cone Penetration Tests (CPT) were used in 2008 by URS consultant as part of the preliminary soil investigation for segments 2, 3, 4 and 5. The CPT soundings were conducted using a 20-ton capacity cone with a tip area of 15 cm2 and a friction sleeve area of 225 cm2. A combination of tip resistance and sidewall friction are generated and digitally recorded as the cone tipped probe is advanced at a constant velocity into the ground. The sidewall friction/tip resistance ratio is plotted against the tip resistance and compared to standard charts to determine soil types.

Following completion of each CPT, the holes were backfilled using a retractable grouting system to prevent vertical migration of groundwater. Twenty seven (27) of the CPT soundings in close proximity to the wall alignment in segment 4 were utilized for this foundation report. A summary of borings is presented in Table 2. Surface elevations, stations, and offsets of the borings were provided by District 7 Surveys Branch and URS consultant for the CPT sounding locations. An electronic file of the completed new Log of Test Borings along with As-Built Log of Test Borings will be sent to Designer from URS Corporation drafting for inclusion in Contract Plans.

Table 2. Summary of Borings

Wall No.	Boring / CPT No.	Stationing "A1-Line"	Top of Boring/CPT Elevation (ft)	Total Depth (ft)	Date Drilled
SW220	R-11-051	53.04 Lt. 311+03.14	141.11	121.5	1/26/2011
	A-11-028	82.87 Rt. 214+92.52	99.33	37	1/4/2011
	A-11-028	82.87 Rt. 214+92.52	99.33	37	1/4/2011
	CPT-08-033	51.54 Rt. 220+29.11	102.957	57.3	4/9/2008
	A-11-029	90.38 Rt. 223+13.44	104.64	40	1/4/2011
	CPT-08-097	54.00 Rt. 227+37.06	109.721	90.2	7/7/2008
SW221	A-11-003	132.42 Lt. 223+01.97	100.57	40.5	1/13/2011
	A-11-004	139.61 Lt. 225+83.30	101.45	40.5	1/14/2011
	A-11-005	132.59 Lt. 229+36.87	101.08	65	1/14/2011
SW231	CPT-08-129	124.62 Lt. 230+66.67	100.745	93.8	7/17/2008
	R-11-006	89.87 Lt. 233+37.47	102.45	141.5	3/16/2011
	CPT-08-098	120.83 Lt. 233+42.75	101.779	75.6	5/27/2008
SW250	CPT-08-099	55.39 Rt. 236+15.06	122.028	57	8/27/2008
	CPT-08-037	119.89 Rt. 240+58.73	104.403	54	4/25/2008
	CPT-08-101	66.84 Rt. 244+71.71	105.425	100.1	7/9/2008
	A-11-032	92.76 Rt. 247+62.30	102.1	50.5	1/3/2011
	CPT-08-103	96.92 Rt. 256+24.37	112.77	100.1	7/9/2008
	R-11-033	111.49 Rt. 258+00.88	105.32	101.5	2/3/2011
SW251	CPT-08-036	167.11 Lt. 238+10.86	101.321	45.1	4/28/2008
	A-11-008	105.75 Lt. 240+73.43	101.93	61.5	2/11/2011
	A-11-009	73.26 Lt. 245+61.89	107.9	51.5	1/26/2011
	A-11-010	103.29 Lt. 248+93.34	109.05	51.5	1/25/2011
	A-11-011	90.42 Lt. 252+63.93	111.38	51.5	1/26/2011
	A-11-012	88.00 Lt. 255+57.57	118	61.5	1/25/2011
	CPT-08-104	63.09 Lt. 257+60.81	121.328	92.7	7/9/2008
	R-11-013	85.34 Lt. 260+13.15	106.66	101.5	2/2/2011
SW262	R-11-034	131.58 Rt. 260+69.91	108.03	146	1/20/2011

Table 2. (Continued)

Wall No.	Boring / CPT No.	Stationing "A1-Line"	Top of Boring/CPT Elevation (ft)	Total Depth (ft)	Date Drilled
SW266	CPT-08-106	49.59 Rt. 267+17.28	130.163	75	8/27/2008
	CPT-08-043	162.68 Rt. 272+41.24	106.952	39.9	4/21/2008
	A-11-035	69.9 Rt. 268+81.56	132.16	51.5	1/27/2011
	R-11-036	115.9 Rt. 272+42.81	108.36	141.5	2/9/2011
SW267	R-11-014	77.53 Lt. 261+95.68	107.57	121.5	2/9/2011
	R-11-015	78.16 Lt. 268+90.73	109	141.5	2/17/2011
SW290	R-11-037	120.71 Rt. 275+21.75	110.27	141.5	2/14/2011
	CPT-08-107	97.27 Rt. 276+86.63	111.822	42.2	5/22/2008
	CPT-08-045	62.63 Rt. 280+65.86	114.037	45.8	4/11/2008
	A-11-038	118.46 Rt. 282+11.92	110.63	40.5	1/5/2011
	A-11-039	112.18 Rt. 285+00.22	111.28	35.5	1/5/2011
	A-11-040	114.05 Rt. 288+40.82	112.08	35	1/5/2011
	CPT-08-109	86.01 Rt. 287+79.95	111.773	37.1	5/20/2008
	A-11-041	112.48 Rt. 291+83.70	112.7	35.5	1/6/2011
	CPT-08-047	49.96 Rt. 292+75.73	117.952	41.3	4/11/2008
	CPT-08-111	86.49 Rt. 296+29.38	113.407	42.5	5/20/2008
	A-11-042	113.5 Rt. 299+36.38	114.07	45.5	1/6/2011
	A-11-043	112.05 Rt. 305+84.08	116	55.5	1/6/2011
	CPT-08-113	124.34 Rt. 308+23.48	116.669	43	5/20/2008
	CPT-08-049	91.18 Rt. 302+79.03	115.117	40	4/25/2008
	A-11-044	42.57 Rt. 312+33.77	141.87	121.5	1/25/2011
SW291	R-11-016	114.75 Lt. 271+10.70	109.68	141.5	3/16/2011
	A-11-017	288.71 Lt. 276+85.40	110.28	60.5	2/23/2011
	A-11-018	79.01 Lt. 279+86.95	111.6	60.5	2/18/2011
	CPT-08-108	87.67 Lt. 283+80.34	110.915	39	5/21/2008
	A-11-019	63.28 Lt. 283+22.54	111.09	35.5	1/11/2011
	A-11-020	82.86 Lt. 286+11.09	111.48	40.5	1/11/2011
	CPT-08-046	90.04 Lt. 288+12.15	112.184	37.6	4/21/2008
	A-11-021	70.33 Lt. 289+27.53	112.7	40.5	1/12/2011
	CPT-08-110	88.82 Lt. 292+89.90	113.131	67.1	5/21/2008
	A-11-022	75.86 Lt. 293+57.73	112.91	40.5	1/12/2011
	A-11-023	80.12 Lt. 298+15.31	113.78	45.5	1/11/2011
	A-11-024	93.76 Lt. 301+37.20	114.7	50.5	1/11/2011
	A-11-025	87.21 Lt. 303+77.86	115.12	55.5	1/12/2011
	CPT-08-050	172.42 Lt. 307+78.84	114.964	42.7	4/18/2008
	R-11-051	53.04 Lt. 311+03.14	141.11	121.5	1/26/2011

4.0 Laboratory Testing

Selected soil samples were retained and submitted to the Caltrans material laboratories in District 7 and Sacramento for testing. The purpose of the laboratory testing was to aid in evaluating the engineering properties of the subsurface materials and to confirm visual classification of the soils. Laboratory tests performed include moisture content, dry unit weight, wash sieve analysis, Atterberg limits, unconfined compression tests, direct shear, and corrosion tests. All laboratory tests were performed in accordance with current ASTM standard procedures and California Test Methods. The summarized laboratory test data are shown in Table 3.

Table 3. Summary of Laboratory Tests

Testing Type	ASTM/CTM Designation	Testing Purpose
Mechanical Analysis	CTM 202, 203	Soil Classification
Atterberg Limits	CTM 204	Soil Classification
Moisture content	CTM 226; ASTM D2216	Soil Classification
Direct Shear	ASTM D3080	Shear Strength
Corrosion	CTM 417, 422, 643	Corrosion Potential
Unconfined Compression	ASTM D2166	Compressive Strength

5.0 Site Geology and Subsurface conditions

The entire project is located in a relatively flat southwest sloping Holocene to Late Pleistocene alluvial fan and valley deposits consisting of mostly poorly consolidated clay, Sandy silt, sand, gravels and cobbles (California Geologic Survey 1998). This alluvium was deposited primarily by San Gabriel River floods emanating from the mountains and hills to the north of the project site. Depth to rock-like material is estimated to be greater than 400 feet at the south end to greater than 600 feet at the north end. Based on information from the site investigation in 2011, the southern half of the subject area between Silver Bow Ave. to Pioneer Blvd. (Wall Nos. 220, 221, 231, 250, 251, 262, 266, & 267) generally consists of loose to medium dense silty sand with interbeds of soft to stiff silt to lean clay. The northern half between Pioneer Blvd. to Orr and Day Overhead (Wall Nos. 290 & 291) consists of interbeds of medium dense to dense poorly graded sand to silty sand with occasional gravel and stiff to hard silt to lean clay up to approximately 35 feet below the ground surface; and below that dense to very dense well graded sand with gravel and with possible cobbles to the maximum boring depths attained.

5.1 Groundwater

The depth to groundwater varies across the project area as presented in Table 4. Based on 2011 field investigation and 2008 Cone Penetration Tests (CPT), ground water was encountered at various elevations of 45 to 47 feet at southern end, and 19 to 26 feet at northern end of the project. In general, groundwater is dipping toward north.

It should be noted that groundwater levels could fluctuate with the change of season and other factors. According to preliminary groundwater data evaluation (September 24, 2009) provided by Caltrans Hazardous Waste Branch, South Region, there is no groundwater contamination plume in the Segment 4 area.

Table 4. Recent Groundwater Information

Wall No.	Boring No.	Stationing "A1-Line"	Depth to Ground Water Below Ground Surface (ft)	Ground Water Surface Elevation (ft)	Date Measured
SW 231	R-11-006	233+37.47	82.9	19.55	7-5-11
SW 250	R-11-033	258+00.88	86.2	19.12	4-4-11
SW 262	R-11-034	260+69.91	89.2	18.83	3-16-11
SW 266	R-11-036	272+42.81	86.8	21.56	7-5-11
SW 267	R-11-015	268+90.73	87.6	21.40	7-5-11
SW 290	R-11-037	275+21.75	89.5	20.77	4-18-11
SW 290	A-11-044	312+33.77	115.0	26.80	1-25-11
SW 291	R-11-051	311+03.14	115.0	26.10	1-27-11

6.0 Corrosion Evaluation

Composite soil samples taken from recent exploratory borings at different intervals were sent to District 7 laboratory for corrosion testing. The test results indicate a non-corrosive environment at the proposed bridge site. Normal construction material and design are advised. Refer to Table 5 for specific test results.

Table 5. Corrosion Test Summary

Boring No.	Depth Interval (ft)	SIC Number	Minimum Resistivity (Ohm-Cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
A-11-001	0-55.5	NA	1700	8.07	NA	NA
A-11-002	0-50.5		1200	8.29		
A-11-003	0-40.5		1300	8.22		
A-11-004	0-40.5		1900	8.51		
A-11-005	0-65.0		6500	8.45		
R-11-006	0-50.0		2600	8.27		
	50-100.0		3400	8.31		
	100-141.5		5300	8.82		
A-11-008	0-61.5		2900	8.55		
A-11-011	0-51.5	NA	1700	8.53	NA	NA
R-11-013	0-50.0		1900	8.2		
	50-101.5		2400	8.41		

Table 5 (continued)

Boring No.	Depth Interval (ft)	SIC Number	Minimum Resistivity (Ohm-Cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
R-11-017	0-50.0	NA	2400	8.34		
	50-100.0		2400	7.99		
	100-141.5		4900	8.82		
A-11-018	0-61.5		1500	8.5		
A-11-019	0-35.5		4700	8.25		
A-11-023	0-45.5		1500	8.14		
A-11-025	0-55.5		2800	8.42		
A-11-027	0-36.5		5600	8.2		
A-11-029	0-40.0		1700	8.68		
A-11-030	0-45.5		2300	8.19		
A-11-032	0-50.0		1800	8.56		
R-11-034	0-50.0		1900	8.12		
	50-135.5		4700	8.75		
A-11-035	0-51.5		3600	8.87		
R-11-036	0-70.0	**C101142**	**980**	7.97	550	140
	70-100.0	NA	2800	8.38	NA	NA
A-11-039	0-35.5		1700	8.07		
A-11-042	0-45.5		1300	8.26		
A-11-044	0-121.5		3400	8.5		

Note: It is the practice of Caltrans Corrosion Technology Section (with the exception of MSE walls) that 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 noncorrosive. For structural elements, Caltrans considers a site to be corrosive if one or more of the following conditions exist for representative soil and/or water samples taken at the site: Chloride concentration currently considers a site to be corrosive to foundation elements if one or more of the following conditions exists: Chloride concentration is greater or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less.

7.0 Seismic Recommendations

The proposed wall sites are not within the Alquist – Priolo Earthquake Fault Zone. An analysis was performed to develop and recommend ground motion parameters for the seismic design of the above referenced walls. This analysis was performed in accordance with requirements specified in Appendix B of the Caltrans' 2009 Seismic Design Criteria (SDC, Version 1.5, August 2009) and utilizing the "Caltrans ARS Online" and other tools available at the internet sites. Based, on Boring No. R-11-051, the average shear wave velocities (V_{S30}) for the upper 100 feet of the subsurface profile are 255 m/sec (837 ft/sec).

The closest fault to the site is the Puente Hills Thrust Fault with an earthquake event magnitude of M=7.3 oriented as a low angle north dipping thrust fault approximately 0.81 mile north of the site, and is summarized in Table 6.

Table 6. Summary of Fault

Fault Name	Type	M_{max}	R_X	R_{JB}	R_{RUP}	PGA
Puente Hills Blind Thrust	R	7.3	0.81 mile (1.3 km)	0.81 mile (1.3 km)	1.83 mile (2.94 km)	0.67

Notes: R_X = Horizontal distance to the fault trace
R_{JB} = Shortest horizontal distance to the surface projection of the rupture area
R_{RUP} = Closest distance to the fault rupture plane

8.0 Liquefaction Potential

Based on current field investigation, the liquefaction potential at the wall sites are low to negligible due to absence of shallow groundwater. Accordingly, the potential for seismically induced settlement and lateral spreading are also considered to be low.

9.0 Foundation Recommendations

The following recommendations are developed by OGDS1 based on 1) Log of test borings and interpreted subsurface conditions and design parameters established through Laboratory tests and field data, 2) Updated wall plans, design Loads and alternative pile types proposed by OBDS2, and 3) Correspondence and personal communications with District and Structure designs.

OBDS2 has selected the wall Types and support based on height and close proximity to the residential areas. Where wall heights are 16 ft or less, and noise and vibrations are of concern due to close proximity of residential properties, CIDH piles are selected. Where walls are higher than 16 ft and at safe distance to the residential area, driven PS/PC concrete piles are selected.

9.1 General Recommendations

1. Proposed wall Types, 1SWBP and 5SWBP are Special design walls as specified in Standard drawings (XS sheet, 2010). Retaining walls 220, 250, 262, 266 and 290 are located on north bound side of I-5, and retaining walls 221, 231, 251, 267 and 291 are located on south bound side of I-5. Wall details including height and Types are described in table 1.

2. All earth work is expected to be carried out by conventional equipment. New fill placed on sloping existing fill shall be properly keyed and benched in to existing ground (fill) and placed as specified in Section 19-6 of the Caltrans Standard Specifications.

3. It is recommended that a slope ratio of 1V:1H or flatter for the temporary back cut slope be considered for construction. If there are constraints due to construction or traffic concerns, a feasible alternative would utilize shoring to accommodate a steeper slope for the excavations.

4. Subsurface drainage and pervious back fill material should be provided behind all walls to relieve the walls from hydrostatic pressure. The pervious material shall be in accordance with Section 19-3.065 of the Caltrans Standard Specifications.

9.2 Sound Walls 220 and 221

The maximum height for walls 220 and 221 are 16 ft. Type 5SWBP retaining wall is proposed due to limitation in right of way access. These walls will be supported on 16 inch dia. cast in drilled hole (CIDH) pile. These piles are designed using skin friction resistance. Driven piles are not recommended due to noise and possible damage to the nearby residential properties. The design and specified tip elevations are presented in Tables 7 and 8.

Table 7. Foundation Recommendation for SW 220

Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
				Compression	Tension		
H = 6	16" CIDH	94.00	90	180	90	64.0 (a) 74.0 (b)	64
		106.75				76.0 (a) 86.0 (b)	76
H = 8		94.00				64.0 (a) 74.0 (b)	64
		95.00				65.0 (a) 75.0 (b)	65
H = 10		95.00				65.0 (a) 75.0 (b)	65
		102.75				72.0 (a) 82.0 (b)	72
H = 12		96.00				66.0 (a) 76.0 (b)	66
		97.25				67.0 (a) 77.0 (b)	67
Over LACFCD RCP (114" dia.)		96.00	140	280	140	58.0 (a) 72.0 (b)	58
H =14		97.25	90	180	90	67.0 (a) 77.0 (b)	67
		98.50				68.0 (a) 78.0 (b)	68
H =16		97.25				67.0 (a) 77.0 (b)	67
		98.25				68.0 (a) 78.0 (b)	68

Table 8. Foundation Recommendation for SW 221

Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
				Compression	Tension		
Over LACFCD RCB	16" CIDH	93.00	140	280	140	55.0 (a) 69.0 (b)	55
H = 8		94.00	90	180	90	64.0 (a) 74.0 (b)	64
		95.00				65.0 (a) 75.0 (b)	65
		96.00				66.0 (a) 76.0 (b)	66
		97.00				67.0 (a) 77.0 (b)	67
		98.00				68.0 (a) 78.0 (b)	68
H = 6		98.00				68.0 (a) 78.0 (b)	68

9.3 Sound Walls 231, 262, 266, and 267

Sound walls 231, 262, 266, and 267 are located adjacent to bridges with various heights of 20 to 30 ft. Wall heights of H > 16 ft will be supported on driven T=14", PS/PC concrete piles. The design and specified tip elevations are presented in Tables 9, 10, 11, and 12.

Table 9. Foundation Recommendation for SW 231

Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
				Compression	Tension		
H=24	PS/PC Conc. Piles ALT. "X" T=14"	98.00	90	180	90	65 (a) 73 (b)	65
H=22		98.00				65 (a) 73 (b)	65
H=20		99.25				66 (a) 74 (b)	66
H=18		100.75				67 (a) 75 (b)	67
H=16		101.75				67 (a) 75 (b)	67
H=14		103.00				70 (a) 78 (b)	70
H=12		104.25				70 (a) 78 (b)	70

Table 10. Foundation Recommendation for SW 262

Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
				Compression	Tension		
H=20	PS/PC Conc. Piles ALT. "X" T=14″	111.50	90	180	90	79 (a) 87 (b)	79
		112.50				79 (a) 87 (b)	79
H=18		115.5				83 (a) 91 (b)	83
H=14		119.25				87 (a) 95 (b)	87
H=10		123.00				91 (a) 99 (b)	91
H=8		125.50				93 (a) 101 (b)	93
H=6		127.50				95 (a) 103 (b)	95

Table 11. Foundation Recommendation for SW 266

Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
				Compression	Tension		
H=10	PS/PC Conc. Piles ALT. "X" T=14””	102.50	90	180	90	71 (a) 84 (b)	71
H=14		102.25				71 (a) 84 (b)	71
H=20		101.50				70 (a) 83 (b)	70
H=24		101.25				70 (a) 83 (b)	70
H=26		101.00				70 (a) 83 (b)	70
		103.00				72 (a) 85 (b)	72
H=28		101.75				70 (a) 83 (b)	70
		102.75				71 (a) 84 (b)	71
		100.75				69 (a) 82 (b)	69
H=30		101.25				70 (a) 83 (b)	70

Table 12. Foundation Recommendation for SW 267

Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
				Compression	Tension		
H=12	PS/PC Conc. Piles ALT. "X" T=14"	104.50	90	180	90	67 (a) 75 (b)	67
H=14		104.25					
H=16		104.00					
H=18		104.00					
H=20		103.50					
H=22		103.50					

9.4 Sound Walls 250 and 251

Sound wall 250 is a combination of Type 1SWBP and Type 5SWBP with various heights of 18 to 28 ft, the design and specified tip elevations are presented in Table 13. Sound wall 251 is Type 1SWBP with various heights of 20 to 32 ft, the design and specified tip elevations are presented in Table 14. Both walls will be supported on driven T=14", PS/PC concrete piles. Segments of SW 250 and 251 cross over a 78" diameter Los Angeles County flood control pipe. In order to keep the pipe from any impact of vibration, some of the driven piles close to the pipe should be predrilled to 5 ft below the bottom of the pipe.

Table 13. Foundation Recommendation for SW 250

Wall Type	Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Compression	Tension		
1SWBP	H=28	PS/PC Conc. Piles ALT. "X" T=14"	97.75	90	180	90	66 (a) 77 (b)	66
	H=26		100.00				69 (a) 80 (b)	69
			98.00				67 (a) 78 (b)	67
	H=30		93.25				62 (a) 73 (b)	62
5SWBP	H=24		98.00	90	180	90	67 (a) 78 (b)	67
			97.25				66 (a) 77 (b)	66
	H=22		102.00				71 (a) 82 (b)	71
			97.25				66 (a) 77 (b)	66
			103.00				71 (a) 82 (b)	71
			100.75				68 (a) 79 (b)	68

Table 13 (continued)

Wall Type	Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Compression	Tension		
5SWBP	H=20	PS/PC Conc. Piles ALT. "X" T=14"	106.25	90	180	90	75 (a) 86 (b)	75
			98.00				67 (a) 78 (b)	67
			100.00				67 (a) 78 (b)	67
	H=30 Over 78" Dia. RCP		100.00	140	280	140	50 (a) 58 (b)	50*
							61 (a) 69 (b)	61
	H=18		109.75	90	180	90	78 (a) 89 (b)	78
			99.50				68 (a) 79 (b)	68
			100.50				68 (a) 79 (b)	68
			109.75				78 (a) 89 (b)	78
			112.00				82 (a) 92 (b)	82

* Piles should be predrilled to elevation 86'close to the 78" Dia. RCP.

Table. 14 Foundation Recommendation for SW 251

Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
				Compression	Tension		
H=28	PS/PC Conc. Piles ALT. "X" T=14""	96.50	90	180	90	63 (a) 76 (b)	63
		97.50				64 (a) 77 (b)	64
		105.00				72 (a) 85 (b)	72
H=30		96.00	90	180	90	63 (a) 76 (b)	63
		97.00				64 (a) 77 (b)	64
H=32		95.25	90	180	90	62 (a) 75 (b)	62
H=26		105.25				72 (a) 85 (b)	72
		98.75				65 (a) 78 (b)	65

Table. 14 (Continued)

Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation
				Compression	Tension		
H=24	PS/PC Conc. Piles ALT. "X" T=14"	100.00	90	180	90	67 (a) 80 (b)	67
		105.5				72 (a) 85 (b)	72
		104.50				71 (a) 84 (b)	71
Over 78" Dia. RCP		100.00	140	280	140	50 (a) 58 (b)	54*
						62 (a) 75 (b)	62
H=22		101.00	90	180	90	68 (a), 81 (b)	68
		104.50				71 (a) 84 (b)	71
H=20,		102.25				69 (a) 82 (b)	69
		103.25				70 (a) 83 (b)	70
		104.75				71 (a) 84 (b)	71
		101.25				68 (a) 81 (b)	68
H=26		109.00				76 (a) 89 (b)	76

* Piles should be predrilled to elevation 86' close to the 78" Dia. RCP.

9.5 Sound Walls 290 and 291

Sound walls 290 and 291 are a combination of Type 1SWBP and Type 5SWBP with various heights of 10 to 30 ft, the design and specified tip elevations are presented in Tables 15, and 16. Both walls will be supported on 16" CIDH (wall height less than 16 ft) and driven T=14", PS/PC concrete piles (wall height more than 16 ft).

Table. 15 Foundation Recommendation for SW 290

Wall Type	Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Compression	Tension		
1SWBP	H=22	PS/PC Conc. Piles ALT. "X" T=14"	106.25	90	180	90	73 (a) 82 (b)	73
	H=20		106.50				73 (a) 82 (b)	73
	H=18		107.00				74 (a) 83 (b)	74

Table. 15 Continued

Wall Type	Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Compression	Tension		
5SWBP	H=16	16" CIDH	108.50	90	180	90	75 (a) 86 (b)	75
			111.00				78 (a) 89 (b)	78
	H=14		108.75				75 (a) 86 (b)	75
			110.25				77 (a) 88 (b)	77
			111.25				78 (a) 89 (b)	78
	H=12		109.50				76 (a) 87 (b)	76
			110.50				77 (a) 88 (b)	77
	H=10		109.50				76 (a) 87 (b)	76
			110.50				77 (a) 88 (b)	77
	Over LACFCD 54" RCP		108.75				74 (a) 83 (b)	74
	H=8		110.50				77 (a) 88 (b)	77
5SWBP	H=18	PS/PC Conc. Piles ALT. "X" T=14"	111.00	90	180	90	78 (a) 87 (b)	78
	H=20		110.50				77 (a) 86 (b)	77
	H=22		110.75				77 (a) 86 (b)	77
	H=24		111.25				78 (a) 87 (b)	78
	H=26		111.00				78 (a) 87 (b)	78
			112.50				79 (a) 88 (b)	79
			113.25				80 (a) 89 (b)	80
			114.00				81 (a) 90 (b)	81
			114.75				81 (a) 90 (b)	81

Table. 16 Foundation Recommendation for SW 291

Wall Type	Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Compression	Tension		
1SWBP	H=26	PS/PC Conc. Piles ALT. "X" T=14""	103.50	90	180	90	70 (a) 79 (b)	70
	H=24		104.75				71 (a) 80 (b)	71
	H=22							
	H=20		106.00				73 (a) 82 (b)	73
	H=18		106.50				73 (a) 82 (b)	73
5SWBP	H=18	PS/PC Conc. Piles ALT. "X" T=14"	106.50	90	180	90	73 (a) 82 (b)	73
5SWBP	H=16	16" CIDH	106.50	90	180	90	73 (a) 84 (b)	73
			109.50				76 (a) 87 (b)	76
	H=14		107.75				74 (a) 87 (b)	74
			109.75				76 (a) 87 (b)	76
	Over LACFCD 54" RCP		107.25				74 (a) 87 (b)	74
	H=12		109.00				76 (a) 87 (b)	76
			110.00				77 (a) 88 (b)	77
	H=10		110.00				77 (a) 88 (b)	77
5SWBP	H=18	PS/PC Conc. Piles ALT. "X" T=14"	110.50	90	180	90	77 (a) 86 (b)	77
	H=20		110.00				77 (a) 86 (b)	77
	H=24		109.75				76 (a) 85 (b)	76
1SWBP	H=26		109.50				76 (a) 85 (b)	76
	H=28		109.25				76 (a) 85 (b)	76
			110.25				77 (a) 86 (b)	77
	H=30		109.75 110.75				76 (a) 85 (b)	76

General Notes for Tables 7 to 16:

1) Design Tip elevations are controlled by (a) Compression; (b) Tension.
2) The CIDH Specified Tip Elevation shall not be raised
3) The Specified Tip Elevation for driven PS/PC concrete piles shall not be raised above the design Tip elevation for Tension load.
4) PS/PC concrete pile Alt. ("X"; T=14") are being used for lateral load requirements and shall not be substituted.
5) LACFCD= Los Angeles county Flood Control Drain.

10.0 Notes to Designer

1. PS/PC driven concrete piles Alt "X", T=14" (Class 200 driven to Class 90) is structure design's request and is due to Lateral demand.

2. CIDH pile capacities were calculated using shaft for windows, V5.0 by ENSOFT Inc.

3. Driven pre-stressed precast concrete pile capacities were calculated using driven pile program V1.2.

4. The recommendations contained in this report are based on specific project information that has been provided by OBDS-Branch 21. If any conceptual changes are made during final project design, OGDS1-Branch C should review those changes to determine if these foundation recommendations are still applicable.

11.0 Construction Considerations

1. The contractor should monitor adjacent properties for vibrations to prevent damage due to pile driving, and take necessary precaution to minimize the impact.

2. Pile should be driven to the specified tip elevation and bearing value checked with the pile-driving formula given in Section 49-1.08.

3. Piles close to the 78" Dia. Los Angeles County Flood Control Drain pipe (LACFD), located between RW LOL STA 20+80.00 and 21+60.00, should be driven in oversized predrilled holes to 5 ft below the invert according to Standard Specification 49-1.06. Pre-drilling is performed to prevent damage to LACFD pipe from excessive vibration. However, there is a likelihood of caving and sloughing of the hole sidewall. Temporary casings or other methods may be necessary to prevent caving and sloughing.

4. If the minimum required bearing is not obtained at the specified pile tip elevation, driving of the remaining piles should be stopped a few inches above the specified tip elevation, and be driven to tip after a minimum set-up period of 24 hours.

5. Ground water is not anticipated during drilling and construction of CIDH piles.

6. Moderate to minor caving and sloughing should be expected during construction of the CIDH piles. Temporary casing or other suitable methods may be considered to prevent caving during construction of CIDH piles.

7. Free water shall not be allowed to stand in any excavations. If excavations become flooded, a minimum 6 inches of soil shall be removed and replaced with compacted material per Caltrans Specifications. If materials are disturbed to a further extent, more removal and replacement may be necessary. The bottom of CIDH pile excavations should be cleaned of loose debris before placing concrete.

If you have any questions, please contact Amare Tsegie at (213) 620-2133 or Faramarz Gerami at (213) 620-2149.

Prepared by: Date: 12/13/2011

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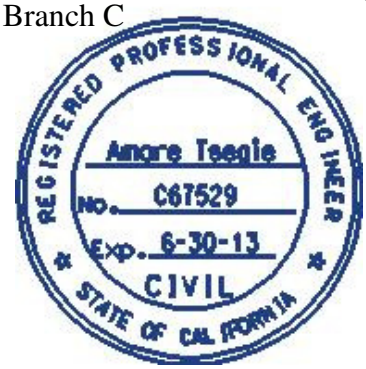

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Office of Bridge Design South 1
Att: Mr. Jose Higareda

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From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1 MS # 18

Imperial HWY UC (Replace)
Bridge No. 53-3061

Subject: Foundation Report

Introduction

This report presents the foundation recommendations for the proposed Imperial HWY UC Bridge No. 53-3061 which will replace the existing Imperial HWY UC Bridge No. 53-0593. Email attachments of bridge and wall foundation design loads, and latest downloaded pdf of Structure Plans including retaining wall at abutments with various revision dates were received from Mr. Jose Higareda on August 21, 2011 (bridge and wall design loads), and November 23, 2011, respectively.

1.0 Scope of Work

This report supersedes the Preliminary Foundation Report for Imperial HWY UC (Replace) dated January 6, 2011. A review of the following resources provided information for the foundation evaluation and site condition.

- Recent sampled borings completed by Caltrans in 2011, for the proposed Imperial HWY UC Bridge No. 53-3061.

- "As Built" Log of Test Borings for original Imperial HWY UC Bridge No. 53-0593, dated October 27, 1952, median widening in March 1, 1957, and "As Built" file maintained in Los Angeles Office.

- General Plans (2 sheets) revised 10-11-11 & 6-13-11, Foundation Plans (2 sheets) revised 10-3-11, abutments, wingwalls and bent layouts and details, retaining wall details with revision dates of between 7-28-11 to 11-21-11, design loads and alternative pile types for bridge and retaining walls (received 8-21-11).

- Develop geologic profiles, geotechnical recommendations and engineering parameters for design and construction of the bridge and retaining wall foundations.

- Present the results of investigations and interpretation of subsurface soil, and preparation of this report in accordance with Caltrans "Guidelines for Structures Foundation Reports, Version 2.0" Dec. 2009, and "Foundation Report Preparation for Bridge Foundations" Dec. 2009.

2.0 Project Description

The I-5 Corridor Improvement project proposes to reconstruct the I-5 freeway including bridge replacements, retaining walls and sound walls, between Los Angeles/Orange County line to the north of I-605, crossing cities of Norwalk, Santa Fe Springs and unincorporated cities. Replacement of the existing Imperial HWY UC is part of the Segment 4 of I-5 Corridor Improvement in the City of Norwalk, which covers an area from north of Silver Bow POC (PM 4.0) to south of Orr and Day OH (PM 6.0). Segment 4 encompasses one new structure (Imperial HWY Off-Ramp # 53-3071K), three bridge replacements (San Antonio Drive UC #53-3060, Imperial HWY UC #53-3061 and Pioneer Blvd. UC #53-3062), and approximately 17960 ft of sound walls and different types of retaining walls with and without sound walls. All elevations referenced in this report are based on 1988 NAVD datum. All elevations on the As-Built Log of Test Borings are referenced to the 1929 NGVD. The NGVD '29 As-Built elevations can be converted to NAVD '88 elevations by adding 2.408 ft to the NGVD '29 elevations.

3.0 Field Investigation and Testing Program

The site specific field investigation was performed between February and March 2011. The investigation included drilling four, 94 mm diameter, wet rotary borings. Caltrans operated drill rig models Acker-398 and CME-750 were used at exploratory borings. Soils were continuously logged and classified in accordance with the Unified Soil Classification System. Modifications of soil descriptions to reflect laboratory test results are presented in the Log of Test Borings. Bulk and relatively undisturbed (ring) soil samples were collected for laboratory tests. Ring samples were obtained using Modified California split spoon sampler with 2.0 inch inner diameter. In addition, soil samples were obtained at 5 foot intervals from Standard Penetration test (SPT) split spoon sampler with 1.4 inch inner diameter. Blow counts (SPT N-values) were performed at 5 foot intervals in accordance with ASTM Test Method D1586-84 using a 1.4 inch sampler with a 140 lb safety hammer dropped 30 inches. An electronic file of the new Log of Test Borings along with As-Built Log of Test Borings will be sent to Designer from URS Corporation drafting for inclusion in the contract plans.

4.0 Laboratory Testing Program

Selected representative soil samples were sent to Caltrans' laboratories in Los Angeles and Sacramento for testing to obtain or derive relevant physical and engineering soil properties. All laboratory tests were performed in general accordance with California Test Methods (CTM) or American Society for Testing and Materials (ASTM) Standards. In situ moisture content and total unit weight test results are shown on the Log of Test Boring sheets. The summarized laboratory tests data are shown in Table 1.

Table 1. Summary of Laboratory Tests

Testing Type	ASTM/CTM Designation	Testing Purpose
Mechanical Analysis	CTM 202, 203	Soil Classification
Atterberg	CTM 204	Soil Classification
Corrosion	CTM 417, 422, 532	Corrosion Potential
Direct Shear	ASTM D3080	Shear Strength
Unconfined Compression	ASTM D2166	Compression Strength

5.0 Site Geology and Subsurface conditions

The entire project is located within the Los Angeles Basin with physiographic of a lowland coastal plain. It is bounded on the east and southeast by the Santa Ana Mountains and San Joaquin Hills and on the north by the Santa Monica and San Gabriel Mountains. The bridge site is situated in a relatively flat southwest sloping Holocene to Late Pleistocene alluvial fan and valley deposits consisting of mostly poorly consolidated clay, sandy silt, sand, gravel and cobbles (California Geologic Survey 1998). This alluvium was deposited primarily by San Gabriel River floods emanating from the mountains and hills to the north of the project site. Depth to rock-like material is estimated to be greater than 400 feet. Based on information from the 2011 site investigation, different soil units are encountered at the proposed bridge supports, as characterized below.

Boring R-11-033 (Abut. 1R): Surface to approx. elevation +85 medium dense silty sand with lenses of silt; elevation +85 to +75 medium dense to dense fine sand; elevation +75 to +60 medium dense to dense well graded sand with silt and gravel; elevation +60 to +50 very stiff silt with interlayer of very dense fine sand; elevation +50 to +44 medium dense to very dense fine to medium sand; elevation +44 to +26 stiff lean clay and very stiff silt with lenses of fine sand; elevation +26 to +15 dense to very dense fine to coarse sand; elevation +15 to +4 (max. boring depth) interbeds of stiff to very stiff silty clay and silt and dense to very dense medium sand.

Boring R-11-013 (Abut. 1L): Surface to approx. elevation +96 loose fine sand; elevation +96 to +71 stiff to very stiff sandy silt with interbed (5 ft thick) of dense fine and medium sand; elevation +71 to +62 dense well graded sand with gravel; elevation +62 to +52 stiff silt; elevation +52 to +42 very dense fine to coarse sand; elevation +42 to +33 stiff sandy silt; elevation +33 to +23 very dense to dense fine sand: elevation +23 to +9 interbeds of hard to very stiff sandy silt, elastic silt and dense fine sand; elevation +9 to +5 (max. boring depth) very dense fine and medium sand.

Boring R-11-034 (Abut. 3R): Surface to approx. elevation +98 medium stiff sandy silt; elevation +98 to +88 medium dense silty sand; elevation +88 to +74 medium dense to dense fine and medium sand; elevation +74 to +70 medium dense silty sand with gravel; elevation +70 to +63 dense fine and medium sand with silt; elevation +63 to +55 stiff to hard silt and sandy silt; elevation +55 to +38 dense fine and medium sand with interbed of dense silty sand; elevation +38 to +30 stiff sandy silt; elevation +30 to +14 very dense medium sand; elevation +14 to +9 stiff silt; elevation +9 to -23 dense to very dense medium sand and silty sand; elevation -23 to -38 (max. boring depth) very stiff to soft sandy silt and silt with interbed of dense silty sand.

Boring R-11-014 (Abut. 3L): Surface to approx. elevation +103 loose well graded sand with gravel; elevation +103 to +93 interbeds of stiff to very stiff sandy silt and lean clay; elevation +93 to +78 medium dense fine and medium sand with interbed of (6 ft thick) soft sandy silt; elevation +78 to +54 stiff to very stiff sandy silt and silt with interbed of (5 ft thick) very dense well graded sand with silt and gravel; +54 to +32 very dense and medium dense fine and medium sand with interbed of (4 ft thick) stiff silt; elevation +32 to +8 dense and medium dense non-plastic silt with interbed of (7 ft thick) very dense fine sand with gravel; elevation +8 to -2 very dense fine and medium sand; elevation -2 to -15 (max. boring depth) dense and very dense well graded sand with gravel with interbed of (3 ft thick) very stiff sandy silt.

5.1 Groundwater

Static groundwater was measured in recent borings as presented in Table 2. The As Built Log of Test Borings for the existing bridge indicate that groundwater was not encountered during the 1953 (original structure) and 1957 (widening) investigations. The reason for absence of groundwater in As Built borings is that they were terminated above water level (the deepest boring was drilled to approx. current adjusted elevation of +35.5). It should be noted that groundwater levels could fluctuate with the change of season and other factors. According to preliminary groundwater data evaluation (September 24, 2009) provided by Caltrans Hazardous Waste Branch, South Region, there is no groundwater contamination plume in the Segment 4 area.

Table 2. Recent Groundwater Information

Support Location	Boring No.	Depth to Groundwater (Below Ground Surface)	Groundwater Surface Elevation	Date of Water Measurement
Abut. 1R	R-11-033	86.2 ft	19.1 ft	4-4-2011
Abut. 3R	R-11-034	89.2 ft	18.8 ft	3-16-2011

6.0 Corrosion Evaluation

Composite soil samples taken from recent exploratory borings at different intervals were sent to District 7 laboratory for corrosion testing. The test results indicate a non-corrosive environment at the proposed bridge site. Normal construction material and design are advised. Refer to Table 3 for specific test results.

Table 3. Corrosion Test Summary

Boring No.	Depth Interval (ft)	SIC Number	Minimum Resistivity (Ohm-Cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
R-11-013	0.0-50.0	N/A	1900	8.20	N/A	N/A
	50.0-101.5		2400	8.41		
R-11-034	0.0-50.0		1900	8.12		
	50.0-135.0		4700	8.75		

Note: It is the practice of Caltrans Corrosion Technology Section (with the exception of MSE walls) that 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 noncorrosive. Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist for representative soil and/or water samples taken at the site. Chloride concentration is greater or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less.

7.0 Seismic Recommendations

The proposed bridge site is not within an Alquist-Priolo Earthquake Fault Zone. An analysis was performed to develop and recommend ground motion parameters for the seismic design of the above referenced bridge structure. This analysis was performed in accordance with requirements specified in Appendix B of the Caltrans' 2009 Seismic Design Criteria (SDC, Version 1.5, August 2009) and utilizing the "Caltrans ARS Online" and other tools available at the internet sites. The average shear wave velocity (V_{s30}) for the upper 100 feet of the subsurface profile was estimated to be about 240.0 m/sec (778 ft/sec) based on recent field investigation. The closest fault to the site is the Puente Hills Thrust Fault oriented as a low angle north dipping thrust fault approximately 0.81 miles north of the site. The significant faults and fault zones are summarized in Table 4.

Table 4. Summary of Faults

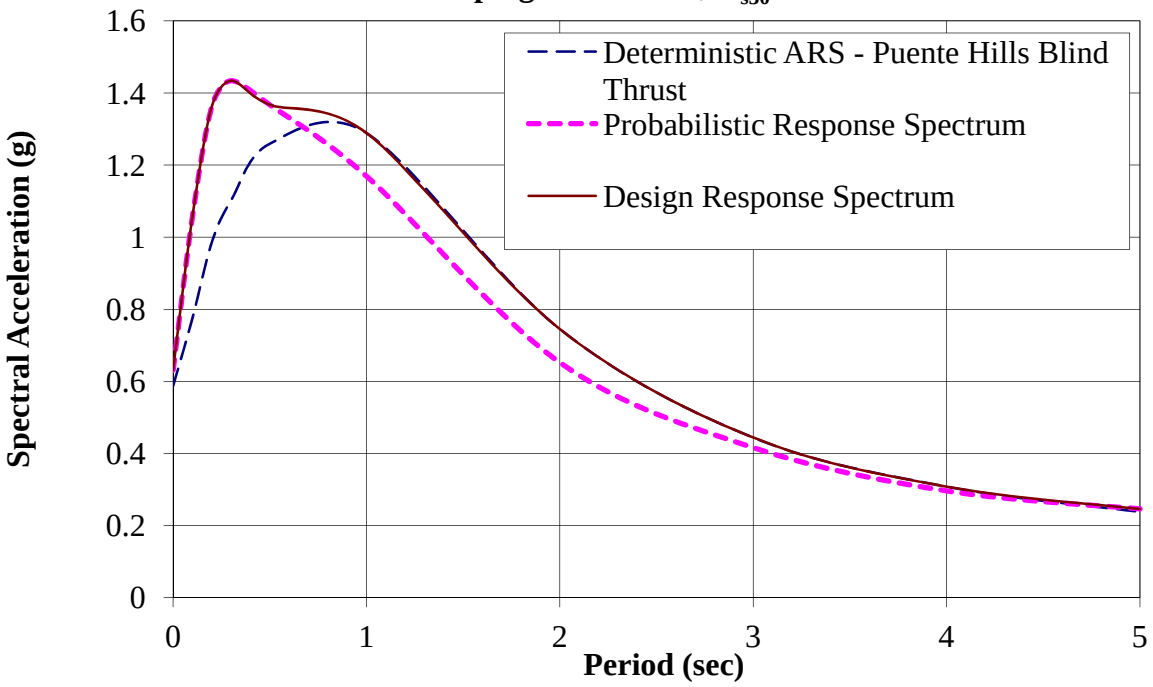
Fault Name	Type	M_{max}	R_X	R_{JB}	R_{RUP}	PGA
Puente Hills Blind Thrust	R	7.3	0.81 mile (1.3 km)	0.81 mile (1.3 km)	1.83 mile (2.94 km)	0.67
Elsinore Fault Zone (Whittier Section)	RLSS	7.6	5.16 mile (8.30 km)	5.16 mile (8.30 km)	5.16 mile (8.30 km)	0.40
New Port Inglewood – Rose Canyon Fault Zone	RLSS	7.5	9.3 mile (15.0 km)	9.3 mile (15.0 km)	9.3 mile (15.0 km)	0.29
Upper Elysian Park Blind Thrust	R	6.4	9.34 mile (15.04 km)	9.34 mile (15.04 km)	9.34 mile (15.04 km)	0.26

Notes: R_X = Horizontal distance to the fault trace
R_{JB} = Shortest horizontal distance to the surface projection of the rupture area
R_{RUP} = Closest distance to the fault rupture plane
RLSS = Right Lateral Strike Slip
R = Reverse

The design deterministic as well as the probabilistic acceleration response spectrum (ARS) curves developed are shown in Figure 1. The probabilistic ARS curve corresponds to a ground motion return period (RP) of 975-year (i.e., 5% probability of exceedance in 50 years). It should be noted that the design deterministic ARS curve shown in Figure 1 is due to an earthquake event of magnitude M=7.3 and site to fault rupture surface distance of 1.3 Km associated with the Puente Hills Blind thrust fault. Since all the site to fault distance measures (e.g., R_{rup}, R_x and R_{jb} etc.) used in the attenuation relationships utilized in this analysis are within 25 Km, the ARS curves shown in Figure 1 include the near fault effects as specified in the Seismic Design Criteria (SDC 2009). In addition, the project site being located in the Los Angeles Basin also includes basin effects ($Z_{1.0}$= 695 m and $Z_{2.5}$=4.45 km).

ARS curves were developed according to the Caltrans Geotechnical Services-Design Manual (Version 1.0, Aug. 2009). The design Peak Ground Acceleration (PGA) for the project site is 0.7g. The design ARS curve is an envelope of deterministic and probabilistic ARS curves (Figure 1).

Figure 1. Recommended Design Acceleration Response Spectrum (ARS) for Imperial HWY UC Bridge No. 53-3061 Damping Ratio = 5%; V_{s30} = 240 m/sec



8.0 Liquefaction Potential

Based on current field investigation, the liquefaction potential at the bridge site is low to negligible due to absence of shallow groundwater. Accordingly, the potential for seismically induced settlement and lateral spreading are also considered to be low.

9.0 As Built Foundation Data

The existing Imperial Hwy UC was built in 1953 and consists of a four span concrete slab, supported on driven Concrete Piles. In 1957 the bridge median was widened in which abutment foundations were placed during the 1953 construction. The "As Built" foundation data are shown in Tables 5 & 6.

Table 5. 1953 Original Structure - "As Built" Foundation Data

Support Location	Foundation Support	Design Load	Bottom of Pile footing Elevation (ft)	Min.Pile Tip Elev. (ft)	Average Pile Tip Elev. (ft)
Abut. 1	Concrete Pile Alt. "Z"	45 Ton	117.17-117.5 (Lt to Rt)	70.0	69+
Bent 2	Concrete Pile Alt."Z"	45 Ton	102.5	70.0	67+
Bent 3	Concrete Pile Alt."Z"	45 Ton	102.5	70.0	67+
Bent 4	Concrete Pile Alt."Z"	45 Ton	102.5	70.0	67+
Abut. 5	Concrete Pile Alt."Z"	45 Ton	114.1-115.1 (Lt to Rt)	70.0	69+

Table 6. 1957 median widening - "As Built" Foundation Data

Support Location	Foundation Support	Design Load	Bottom of Pile Footing Elev. (ft)	Specified Pile Tip Elev. (ft)	Average Pile Tip Elev. (ft)
Abut. 1	Concrete Pile Alt. "Z"	45 ton	117.22	70.0	69+
Bent 2	CIDH Pile Alt. "V"	45 ton	102.50	68.0	67.24 Lt 67.88 Rt
Bent 3	CIDH Pile Alt. "V"	45 ton	102.50	68.0	67.24 Lt 67.76 Rt
Bent 4	CIDH Pile Alt. "V"	45 ton	102.50	68.0	67.46 Lt 67.98 Rt
Abut. 5	Concrete Pile Alt. "Z"	45 ton	115.37	70.0	69+

10.0 Foundation Recommendations

The proposed bridge replacement is a two span CIP/PS Box Girder structure with seat type abutments and 4.5 ft 9-octagonal columns bent. There is a conflict between existing foundations and space restriction to the existing utilities at bent location. Although some of the utilities are assumed to be abandoned or relocated, the remaining should be protected, and existing foundations should be avoided. The following recommendations are developed by OGDS1 based on 1) Log of Test Borings and interpreted subsurface conditions and design parameters established through laboratory tests and field data, 2) updated Structure Plans, design loads and alternative pile types proposed by OBDS1 as referenced in page 1, and 3) email correspondences and personal communications with Mr. Jose Higareda.

10.1 Shallow Foundations

OBDS1 has indicated on wall plans and Foundation Design Data sheet (shown in Table 8) that the tail end of the Abutment 3 left wingwall with design heights of 6 to 8 ft will be supported on Standard Type 1 wall spread footings. The following recommendations are for Type 1 retaining walls with Loading Case I as shown in the 2006 Standard Plans, and are based on design information (i.e. wall height, minimum footing width and bottom of footing elevations). Spread footing can be used when placed on 95% compacted fill at the listed bottom of the footing elevations and minimum footing width. The Gross Allowable soil bearing pressures that may be used for design was calculated using Terzaghi's equation with interpreted soil properties of 95% compacted fill, and listed in Table 7.

Table 7. Spread Footing Data Table

Support Location	Wall Height (ft)	Minimum Footing Width (ft)	Bottom of Footing[2] Elevation (ft)	ASD[1] Gross Allowable Soil Bearing Pressure (q_{all})
Abut. 3L	H = 6	4.25	130.67	2.6 ksf
Abut. 3L	H = 8	5.25	128.67	2.6 ksf

Notes: 1) Allowable Stress Design (ASD). The Maximum Contact Pressure (q_{max}) is not to be exceeding the recommended Gross Allowable Soil Bearing Pressure (q_{all}). The Ultimate Soil Bearing Capacity (q_{ult}) will equal or exceed 3 times the recommended Gross Allowable Soil Bearing Pressure (q_{all}).

2) All footings are to be constructed at or below the elevations listed above in Table 7.

The recommended gross allowable soil bearing pressure to be used for design, listed above in Table 7, are based upon the following design criteria:

1. Spread footing locations shall have minimum footing dimensions as specified in Table 7.

2. All footings are to be positioned such that there will be a minimum horizontal distance of 4 feet from the near face at top of the footing to the face of the finished slope (Bridge Design Specifications 4.4.5.1).

3. All new fill material below the footings to the original ground are to be placed at 95% relative compaction.

If the minimum required footing dimensions and/or horizontal embedment depth are reduced or the wall heights and/or slopes are increased, OGDS1 should be contacted for re-evaluation.

10.2 Deep Foundations

The pile types proposed by OBDS1, consist of 200 kips HP14x89 at abutments and return walls (attached to abutments), 90 kips Alt. X, T=14" PS/PC piles at stand alone retaining walls, plumb, 84-inch diameter, cast-in-drilled hole (CIDH) Type II pile shafts at bent 2. Based on subsurface conditions obtained from recent field investigation, OGDS1 concurs with the feasibility of proposed pile types to support the new structure. Pile lengths required to resist the provided loads are computed based on Service-I Limit State load using computer program APILE (Version 4.0) at abutments and wingwalls for HP14x89 and Alt. X, T=14" PS/PC concrete piles for retaining walls, and Strength Limit State load using computer program SHAFT (Version 5.0) at bent for Type II pile shaft. The calculated axial geotechnical capacities of driven piles (HP14x89 & PS/PC) are based on skin friction with no end bearing considered due to variable interbeds of granular and cohesive soil layers. The calculated axial geotechnical capacities of the CIDH pile shafts are based on full skin friction within the soil from one pile diameter below the cut off elevation. End bearing was not considered in CIDH piles due to excessive settlement of the piles before mobilizing the end bearing and hard to clean out bottom of the pile borings.

General Foundation Information and Design Loads for bridge and walls are provided by OBDS1 and presented in Tables 8, 9 & 10. Recommended design and specified pile tip elevations for abutments, retaining walls and bent provided in Tables 11, 12, 13 & 14 are prepared by OGDS1.

Table 8. General Retaining Wall Foundation Information Provided By Structure Design

Wall Location	Wall Type	Wall Height (ft)	Support Type	Design Loading (kips)	Bottom of Footing Elevation (ft)
Abut. 1L	1SWBP	H = 24	ALT "X", T=14" PS/PC	90	109.25
Abut. 1R	Return wall	N/A	HP14x89	200	112.00
Abut. 3L	Type 1 (2006 SPECS)	H = 6	Spread Footing	Standard Type 1 Footing	130.67
	Type 1 (2006 SPECS)	H = 8			128.67
	1SWBP	H = 10	ALT "X", T=14" PS/PC	90	126.50
		H = 12		90	124.50
		H = 14		90	122.25
	Return wall STEP 2	N/A	HP14x89	200	121.00
	Return wall STEP 1	N/A		200	116.50
Abut. 3R	1SWBP	H = 20	ALT "X", T=14" PS/PC	90	111.50

Table 9. General Bridge Foundation Information Provided By Structure Design

Support Location	Design Method	Pile Type	Finished Grade Elevation (ft)	Cut-off Elevation (ft)	Pile Cap Size (ft)		Permissible Settlement under Service Load (in)*	Number of Piles per Support
					B	L		
Abut. 1	WSD	HP14x89	115	109	15	251	1	133
Bent 2	LRFD	84" CIDH	109.5	107	N/A	N/A	1	1
Abut. 3	WSD	HP14x89	117	112	15	245	1	129

* Based on CALTRANS' current practice, the total permissible settlement is one inch for multi-span structures with continuous spans or multi-column bents, one inch for single span structures with diaphragm abutments, and two inches for single span structures with seat abutments. Different permissible settlement under service loads may be allowed if astructural analysis verifies that required level of serviceability is met.

Table 10. Bridge Design Loads Provided By Structure Design

Support Location	Service-1 Limit State (kips)			Strength Limit State (Controlling Group, kips)				Extreme Event Limit State (Controlling Group, kips)			
	Total Load		Permanent Loads	Compression		Tension		Compression		Tension	
	Per Support	Max Per Pile	Per Support	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile
Abut 1	16205	172	14508	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bent 2	1654	1654	1297	2812	2812	N/A	N/A	1864	1864	N/A	N/A
Abut 3	16078	172	14401	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 11. Foundation Recommendations for Abutments

Support Location	Pile Type	Cut-off Elevation (ft)	LRFD Service-1 Limit State Load (kips) Per Support		LRFD Service-1 Limit State Total Load (kips) Per Pile (Compression)	Nominal Resistance (kips)	Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut. 1	HP14x89	109	16205	14508	200	400	+48 (a) +70 (c)	+48	400
Abut. 3	HP14X89	112	16078	14401	200	400	+46 (a) +72 (c)	+46	400

Notes: 1. Design tip elevations for Abutments are controlled by (a) Compression, (c) Settlement.
2. The specified tip elevation shall not be raised above the design tip elevations for tension load, lateral load, and tolerable settlement.

Table 12. Foundation Recommendations for Bent

Support Location	Pile Type	Cut-off Elevation (ft)	Service-1 Limit State Load (kips) Per Support	Total Permissible Support Settlement	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Strength Limit		Extreme Event			
					Comp. (Ø=0.7)	Tension (Ø=0.7)	Comp. (Ø= 1)	Tension (Ø= 1)		
Bent 2	84” CIDH	107	1654	1”	2812	0	1864	0	-2 (a-I) +43 (a-II) +51 (c)	-2

Notes: 1. Design tip elevations are controlled by: (a-l) Compression (Strength Limit), (a-ll) Compression (Extreme Event), (c) Settlement.
2. The CIDH specified tip elevation shall not be raised.

Table 13. Pile Data Table

Support Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut. 1	HP14x89	400	0	+48 (a) +70 (c)	+48	400
Abut. 1R Return wall	HP14x89	400	0	+51 (a)	+51	400
Bent 2	84” CIDH	4020	0	-2 (a) +51(c)	-2	N/A
Abut. 3	HP14x89	400	0	+46 (a) +72 (c)	+46	400
Abut. 3L Return wall Step-1	HP14x89	400	0	+48 (a)	+48	400
Abut. 3L Return wall Step-2	HP14x89	400	0	+50 (a)	+50	400

Notes: 1. Design tip elevations for Abutments are controlled by (a) Compression, (c) Settlement.
2. Design tip elevations for Bent are controlled by: (a) Compression, (c) Settlement, (d) Lateral Load.
3. The specified tip elevation shall not be raised above the design tip elevations for tension load, lateral load, and tolerable settlement.

Table 14. Retaining Walls Pile Data Table

Wall Location	Wall Type	Wall Height (ft)	Support Type	Nominal Resistance (kips)	Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
Abut. 1L	1SWBP	H = 24	PS/PC conc. piles ALT "X", T=14"	180	71 (a)	71	180
Abut. 3L		H = 10			79 (a)	79	
		H = 12					
		H = 14					
Abut. 3R		H = 20			75 (a)	75	

Notes: 1. Design tip elevations are controlled by (a) Compression.
2. PS/PC concrete piles (ALT "X", T=14") used as Class 90, are Structure Design's alternative due to high lateral load requirements and shall not be substituted.

10.3 Approach Fill Earthwork

New embankment fills will be placed on both sides of abutments 1 and 3 for the replacement bridge as part of the roadway widening. Calculated elastic settlements of the native soil below the new fill material at abutment foundations (wedge fill) and at a distance behind and away from the abutments (total fill prism) are shown in Table 15.

Table 15. Elastic Settlement Below Soil Embankment Fill

Support Location	Approximate Fill Height (ft)	Approximate Fill Width (ft)	Pre-Abutment Construction Settlement (new soil embankment fill)	Post Abutment Construction Settlement (secondary wedge fill)
Abut. 1R	H = 25	58	2.5"	1.7"
Abut. 1L	H = 25	60	3.5"	2.3"
Abut. 3R	H = 28	37	5.5"	3.9"
Abut. 3L	H = 28	75	5.0"	3.4"

Note:
In order to reduce the above post construction settlement and potential down drag effect on the piles and differential settlement effects on the structure, lightweight geosynthetic fill material (i.e. geofoam) or lightweight cellular concrete is recommended for the secondary wedge fill. Since the pile supported footing may settle less than the adjacent embankment, a continuous vertical joint in the lightweight fill may be necessary at the back edge of the bridge footing.

As an alternative, shoring at both abutments may be used to preload to the outside edge of the footings and eliminate the post construction settlement and the need for light weight material. Surcharging could also be used to reduce settlement waiting period. Bridge construction schedule and staging will need to be coordinated with construction of the lightweight fill approach embankment (if considered).

11.0 Notes to Designer

1. Design pile tip elevation for lateral load at bent location is to be determined by designer. The specified pile tip elevation for each support location is to be controlled by the deepest design tip elevation for either compression or lateral loads. Should the design pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, OGDS1 must be contacted for further recommendations.

2. Contractor's driving system should be examined to verify the driving system is capable of installing the proposed piles at abutments and retaining wall, before commencement of pile driving.

3. The recommendations contained in this report are based on specific project information that has been provided by OBDS1-Branch 15. If any conceptual changes are made during final project design, OGDS1-Branch C should review those changes to determine if these foundation recommendations are still applicable.

12.0 Construction Considerations

DRIVEN PILES

1. Due to the irregular distribution of soil units, variable and erratic moderate to hard driving should be anticipated below elevation $\pm$52 to specified pile tip at both abutments. However, at Abutment 3L, in addition to above interval, hard driving could also be expected between elevations 70 to 63. Subsurface material through which the piles will be driven at different support locations are summarized below:

   Abut. 1R, surface to elevation 87 dense silty sand with interbed of very stiff silt; 87-80 dense fine to medium sand with interbed of medium dense silty sand; 80-65 interbeds of medium dense fine to medium sand, well graded sand with gravel, and very stiff silt; 65-55 interbeds of dense silty sand, and very stiff silt; 55-pile tip very dense fine and medium sand with interbed of very stiff silt. Abut. 1L, surface to elevation 96 loose fine sand; 96-72 stiff to very stiff silt with interbeds of dense fine to medium sand; 72-62 dense well graded sand with gravel; 62-52 stiff silt; 52-pile tip very dense fine to medium sand. Abut. 3R, surface to elevation 98 medium stiff silt; 98-83 interbeds of medium dense silty and fine to medium sand; 83-63 dense fine to medium sand with interbed of medium dense silty sand; 63-55 stiff to hard silt; 55-pile tip dense to very dense fine to medium sand.

Abut 3L, surface to elevation 70 soft to very soft silt and clay and interbeds of medium dense fine to medium sand; 70-63 very dense well graded sand with gravel; 63-54 stiff to very stiff silt; 54-pilt tip very dense fine to medium sand.

2. Subsurface characterization is based on the borings performed at particular accessible locations. Subsurface conditions between borings are interpolated between those points. Therefore, if conditions encountered during construction, excavation, or pile driving/drilling, are different than those assumed in the foundation design, OGDS1 should be notified to evaluate the impact on current recommendations and make appropriate modifications, if required.

3. Splicing or lugging of the steel piles may be needed if bearing is not achieved at the specified tip elevation. With approval of Structure Representative, any driven pile (steel or concrete) achieving refusal within 4.0 feet or less above specified pile tip elevation may be considered satisfactory.

4. If minimum required bearing (any pile type) is not obtained at specified pile tip elevation (SPTE) in the first pile of the pile group, the second pile should be stopped 1-foot above the SPTE. After a set-up period of 24 hours, re-strike the same pile and stop 6 inch above the SPTE and review the re-strike pile resistance. If pile bearing is adequate then drive to the recommended pile tip. If bearing is not adequate from the first re-strike then a 2-week set-up period is recommended before driving to SPTE and verifying the pile capacity.

5. At times, steel piles may not attain minimum bearing at specified tip elevation, even after re-driving. When this situation arises the only option is to splice on additional pile length and continue driving to a point where the nominal resistance is achieved, or alternatively lug the piles in order to increase resistance at specified pile tip. OGDS1 should be consulted to confirm the selected method.

6. The designer should identify on the plans, removal limits of the existing bridge structures and supporting elements (i.e. footings, piles). In general, all members of existing structures should be removed to a minimum of 3 feet below intended finish grade. If existing structure members are interfering with new construction, they should be removed in their entirety. When choosing to abandon or remove an existing foundation such as a pile cap, considerations should be given to the effect that the removal would have on any adjacent utilities. The designer may choose to abandon such elements but should consider potential interference with future planned work such as utility installation. Structure elements that are to remain should not prohibit proper compaction or uniform consolidation of new earth fills. The designer's removal plan should be forwarded to OGDS1 for concurrence. The Structure Representative should adjust proposed pile locations when necessary to avoid encountering abandoned piles. If a proposed pile needs to be relocated, the Structure Representative should consult with OBDS1 and OGDS1 to insure adequate foundation design is maintained.

7. The contractor should monitor adjacent structures or properties for vibrations to prevent potential damage due to pile driving. The contractor should take necessary precautions to minimize the impact on adjacent structures or properties.

DRILLED PILES

8. There is a likelihood of minor to moderate caving and/or sloughing of the hole sidewall during CIDH pile shaft installation. Caving could happen readily within shallow loose and/or saturated sand.

9. Groundwater will be encountered during CIDH pile drilling at all Bent 2 column locations. **Dewatering and/or slurry displacement construction methods would be necessary for Type II pile shafts.**

10. If slurry displacement method is used, requirements in Standard Special Provisions 49-310, CIDH shall be followed. If temporary casing is used to prevent caving or facilitate dewatering, provisions in Section 49-4.03, "Drilled Holes" of the Standard Specifications shall be followed.

11. Removal of in place piles at existing Bent 3 columns (column 3 at immediate right and columns 4 & 5 at center right of A1-Line) and subsequent drilling of the pile shaft borings, could cause excessive caving and over size holes. Also drilling of pile shafts next to those existing columns with no pile removal, could cause the same conditions. Contractor should be prepared for slurry back fill or other acceptable methods to Structure Representative and OGDS1, then re-drilling and possible shoring for protection of traveled lanes.

12. When casing used for aid of construction joint is left in place as a permanent casing, the annular space between the soil and the casing should be properly grouted with a 3-sack cement mix. If grouting procedure is not satisfactory, at discretion of the Resident Engineer, inspection windows should be cut randomly in the casing to evaluate the integrity of the completed grout.

SPREAD FOOTING

13. Quality control should be practiced to ensure that the bottom of the footing excavation is level and clear of any loose debris. Should any large rock be found at the bottom of the footing excavations, the contractor should be prepared to remove and replace them with granular material at 95% relative compaction or lean concrete.

14. Concrete for the spread footings shall be placed neat against the undisturbed soil at the bottom of footing excavation. Should the foundation soils at the bottom of the footing excavation be disturbed, the disturbed soils shall be re-compacted to 95% relative compaction to a depth of 1.0 foot prior to placement of the concrete.

EARTHWORK

15. The new approach fill at abutments is to be constructed in accordance with Sections 19-5.03 and 19-6.01 of the Standard Specifications and other requirements as directed by the Design Engineer. End dumping is not to be permitted.

16. Shoring at both abutments may be required which can be supported by sheet piles and/or soldier piles with or without lagging. However, method of shoring construction is the contractor's responsibility.

17. A maximum settlement of up to 5.5 inches (Abutment 3) and 3.5 inches (Abutment 1) in foundation soil are expected due to placement of new embankment fill. Most of the settlement will occur during embankment construction. Settlement in the fill is expected to be minimal; however, a 30-day fill stabilization is recommended before the construction of abutment foundations. The actual settlement period will be determined by the structure representative on the basis of settlement data in the field.

18. In conclusion, the commentary and recommendations in this report should not be considered an offering or implying an opinion of, or an approval concerning the foundation design and/or method of construction.

Any questions regarding the above comments should be directed to Faramarz Gerami at 213-620-2149 or Ted Liu at 213-620-2136.

Report by:

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Reviewed by: Date: 12/22/2011

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Attachments: Generalized soil profile and design strength parameters

c: Structure Construction R.E. pending File (RE_Pending_File@dot.ca.gov)
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Appendix 1 – Generalized soil profile and design strength parameters

Abutment 1R

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
109.0-85.0	Silty fine sand (SM)	16	115	32	-
85.0-60.0	Fine/medium/well graded sand (SP/SW)	33	120	35	-
60.0-49.0	Silt (ML)	49	120	-	3000
49.0-38.0	Fine/medium sand (SP)	30	120	35	-
38.0-25.0	Silt (ML)	22	120	-	1000
25.0-20.0	Fine/medium sand (SP)	51	130	34	-
20.0-15.0	Well graded sand with silt (SW-SM)	93	130	37	-
15.0-10.0	Silt (ML)	29	120	-	2500
10.0-3.5	Medium sand (SP)	47	130	36	-

Abutment 1L

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
109.0-98.0	Fine sand (SP)	6	95	28	-
98.0-92.0	Sandy silt (ML)	20	110	-	3000
92.0-87.0	Fine/medium sand (SP)	33	120	34	-
87.0-81.0	Sandy silt (ML)	16	100	-	1500
81.0-72.0	Sandy silt (ML)	18	100	-	3000
72.0-63.0	Well graded sand with gravel (SW)	38	130	36	-
63.0-53.0	Silt (ML)	6	85	-	1500
53.0-42.0	Fine/medium/well graded sand (SP/SW)	63	130	36	-
42.0-34.0	Sandy silt/silt (ML)	30	115	-	1500
34.0-24.0	Fine sand (SP)	51	130	34	-
24.0-15.0	Silty/fine sand (SM/SP)	43	130	35	-
15.0-9.0	Elastic silt (MH)	26	120	-	2500
9.0-5.0	Fine/medium sand (SP)	92	135	37	-

Abutment 3R

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
108.0-99.0	Sandy silt (ML)	6	85	-	500
99.0-64.0	Silty sand/fine/medium sand (SM/SP)	30	120	35	-
64.0-60.0	Silt (ML)	12	110	-	1500
60.0-55.0	Sandy silt (ML)	39	120	-	2500
55.0-44.0	Fine/medium sand (SP)	58	130	36	-
44.0-38.0	Silty sand/fine/medium sand (SM/SP)	48	120	35	-
38.0-31.0	Sandy silt (ML)	34	120	-	1000
31.0-14.0	Silty sand/medium sand (SM/SP)	77	130	38	-
14.0-9.0	Silt (ML)	57	125	-	1300
9.0-(-3.0)	Medium sand with silt (SP-SM)	44	130	38	-
(-3.0)-(-17.0)	Silty fine/medium sand (SM)	90	130	36	-
(-17.0)-(-24.0)	Silty fine/medium sand (SM)	40	130	34	-
(-24.0)-(-32.0)	Sandy silt (ML)	54	125	-	3500
(-32.0)-(-35.0)	Silty fine sand (SM)	49	130	34	-
(-35.0)-(-38.0)	Silt (ML)	45	125	-	500

Abutment 3L

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
108.0-99.0	Sandy silt (SM)	6	90	-	1500
99.0-94.0	Sandy lean clay (CL)	12	115	-	3000
94.0-89.0	Fine/medium sand (SP)	27	120	34	-
89.0-84.0	Sandy silt (ML)	15	110	-	500
84.0-79.0	Fine sand (SP)	57	130	34	-
79.0-74.0	Sandy silt (ML)	9	90	-	3500
74.0-69.0	Sandy silt (ML)	11	95	-	1000
69.0-64.0	Well graded sand with silt (SW-SM)	60	130	37	-
64.0-58.0	Silt (ML)	7	90	-	1000
58.0-54.0	Sandy silt (ML)	33	120	-	2500
54.0-44.0	Fine/medium sand (SP)	57	130	36	-
44.0-40.0	Silt (ML)	22	115	-	1500
40.0-34.0	Fine/medium sand (SP)	24	120	34	-
34.0-26.0	Non-plastic silt with sand (ML)	25	120	30	-
26.0-19.0	Fine sand with gravel (SP)	53	130	35	-
19.0-10.0	Non-plastic sandy silt (ML)	34	125	32	-
10.0-0.00	Fine/medium sand (SP)	62	130	36	-
0.00-(-9.0)	Well graded sand with gravel (SW)	32	130	38	-
(-9.0)-(-12.0)	Sandy silt (ML)	29	120	-	2500
(-12.0)-(14.0)	Well graded sand (SW)	95	135	40	-

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To: Ms. TRACI MENARD, CHIEF
Bridge Design Branch 15
Office of Bridge Design South 1
Att: Mr. Anthony Logus

Date: December 22, 2011
File: 07-LA-5- PM 5.12
0700001834 (07-215941)

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1 MS # 18

Imperial HWY Off-Ramp
Bridge No. 53-3071K

Subject: Foundation Report

Introduction

This report presents the foundation recommendations for the proposed new Imperial HWY Off-Ramp Bridge No. 53-3071K. Email attachments of bridge foundation design loads and Structure Plans including parallel retaining wall between abutments 1 of Imperial HWY Off-Ramp and Pioneer Blvd. UC, with various revision dates were received from Mr. Anthony Logus on July 29, 2011 and November 1, 2011, respectively. Also parallel retaining wall's design load, pile type and preliminary plans were emailed by Mr. Jose Higareda on August 29, 2011.

1.0 Scope of Work

This report supersedes the Preliminary Foundation Report for Imperial HWY Off-Ramp dated March 15, 2011. A review of the following resources provided information for the foundation evaluation and site condition.

- Recent sampled borings completed by Caltrans in 2011, for the proposed new Imperial HWY Off-Ramp Bridge No. 53-3071K.

- General Plan revised 9-13-11, Foundation Plan revised 4-30-11, abutments and bent Layouts and details, retaining details with revision dates of between 4-30-11 to 10-5-11, design loads and alternative pile types (design data sheet) for new bridge dated 4-20-11 and for parallel retaining wall dated 8-29-11.

- Develop geologic profiles, geotechnical recommendations and engineering parameters for design and construction of the bridge and retaining wall foundations.

- Present the results of investigations and interpretation of subsurface soil, and preparation of this report in accordance with Caltrans "Guidelines for Structures Foundation Reports, Version 2.0" Dec. 2009, and "Foundation Report Preparation for Bridge Foundations" Dec. 2009.

2.0 Project Description

The I-5 Corridor Improvement project proposes to reconstruct the I-5 freeway including bridge replacements, retaining walls and sound walls, between Los Angeles/Orange County line to the north of I-605, crossing cities of Norwalk, Santa Fe Springs and unincorporated cities. Construction of new Imperial HWY Off-Ramp is part of the Segment 4 of I-5 Corridor Improvement in the City of Norwalk, which covers an area from north of Silver Bow POC (PM 4.0) to south of Orr and Day OH (PM 6.0). Segment 4 encompasses one new structure (Imperial HWY Off-Ramp # 53-3071K), three bridge replacements (San Antonio Drive UC #53-3060, Imperial HWY UC #53-3061 and Pioneer Blvd. UC #53-3062), and approximately 17960 ft of sound walls and different types of retaining walls with and without sound walls. All elevations referenced in this report are based on 1988 NAVD datum.

3.0 Field Investigation and Testing Program

In order to characterize the subsurface conditions and soil profile a site specific field investigation consisting of drilling two, 4.5" diameter, wet rotary borings (one shared with Pioneer Blvd. UC) was performed in February and March of 2011. At 5 foot intervals, Standard Penetration Tests in accordance with ASTM Test Method D1586 were performed using standard 1.4 inch I.D. split spoon sampler with a 140 pound hammer dropped 30 inches. At intervals where cohesive soils encountered, relatively undisturbed samples were also obtained using 2.0 inch I.D. Modified California Sampler. An electronic file of the completed new Log of Test Borings will be sent to Designer from URS Corporation drafting for inclusion in Contract Plans.

4.0 Laboratory Testing

Selected soil samples were retained and submitted to the Caltrans material laboratories in District 7 and Sacramento for testing. The purpose of the laboratory testing was to aid in evaluating the engineering properties of the subsurface materials and to confirm visual classification of the soils. Laboratory tests performed include moisture content, dry unit weight, wash sieve analysis, Atterberg limits, unconfined compression tests, direct shear, and corrosion tests. All laboratory tests were performed in accordance with current ASTM standard procedures and California Test Methods. The summarized laboratory test data are shown in Table 1.

Table 1. Summary of Laboratory Tests

Testing Type	ASTM/CTM Designation	Testing Purpose
Mechanical Analysis	CTM 202, 203	Soil Classification
Atterberg Limits	CTM 204	Soil Classification
Corrosion	CTM 417, 422, 643	Corrosion Potential
Unconfined Compression	ASTM D2166	Compressive Strength

5.0 Site Geology and Subsurface conditions

The entire project is located within the Los Angeles Basin with physiographic of a lowland coastal plain. It is bounded on the east and southeast by the Santa Ana Mountains and San Joaquin Hills and on the north by the Santa Monica and San Gabriel Mountains. The bridge site is situated in a relatively flat southwest sloping with Holocene to Late Pleistocene alluvial fan and valley deposits consisting of mostly poorly consolidated clay, sandy silt, sand, gravel and cobbles (California Geologic Survey 1998). This alluvium was deposited primarily by San Gabriel River floods emanating from the mountains and hills to the north of the project site. Depth to rock-like material is estimated to be greater than 400 feet. Based on information from the 2011 site investigation, different soil units are encountered at the proposed bridge supports, as characterized below.

Boring R-11-017 (Abut 1): Surface to approx. elevation +88 loose to medium dense SM & SP; elevation +88 to +54 medium stiff to very stiff ML with intermittent layer of very dense SW; elevation +54 to +18 interbeds of dense to very dense SP & SW; elevation +18 to -2 interbeds of very dense/stiff ML & SP; elevation -2 to -33 (max. boring depth) medium dense to dense SM with very dense interbed of SP.

Boring R-11-016 (Abut 3): Surface to approx. elevation +89 medium dense SM & SP; elevation +89 to +80 Stiff ML & CL; elevation +80 to +55 interbeds of loose to dense/stiff SC, SM, GP & CL-ML; +55 to +25 dense to very dense SP; elevation +25 to +10 medium stiff to very stiff MH & ML; elevation +10 to -32 (max. boring depth) dense to very dense SM with intermittent layer of stiff MH.

Notes: SW = well graded sand, SP = poorly graded sand, SM = silty sand, SC = clayey sand, GW = well graded gravel, GP = poorly graded gravel, ML = silt, MH = elastic silt, CL = lean clay, CL-ML =silty clay, bgs = below ground surface

5.1 Groundwater

Groundwater was encountered in recent boring as presented in Table 2. Groundwater level in general vicinity fluctuates slightly between elevations 20.8 and 22.2 feet. It should be noted that groundwater levels could fluctuate with the change of season and other factors. According to preliminary groundwater data evaluation (9-24-09) provided by Caltrans Hazardous Waste Branch, South Region, there is no groundwater contamination plume in the Segment 4.

Table 2. Recent Groundwater Information

Support Location	Boring No.	Depth to Groundwater (Below Ground Surface)	Groundwater Surface Elevation	Date of Water Measurement
All Supports	R-11-016	88.2 ft	21.5 ft	7-13-2011

6.0 Corrosion Evaluation

Composite soil samples taken from recent exploratory borings at different intervals were sent to District 7 laboratory for corrosion testing. The test results indicate a non-corrosive environment at the proposed bridge site. Normal construction material and design are advised. Refer to Table 3 for specific test results.

Table 3. Corrosion Test Summary

Boring No.	Depth Interval (ft)	SIC Number	Minimum Resistivity (Ohm-Cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
R-11-017	0.0-50.0	N/A	2400	8.34	N/A	N/A
	50.0-100.0		2400	7.99		
	100.0-141.5		4900	8.82		

Note: It is the practice of Caltrans Corrosion Technology Section (with the exception of MSE walls) that 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 noncorrosive. Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist for representative soil and/or water samples taken at the site. Chloride concentration is greater or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less.

7.0 Seismic Recommendations

The proposed bridge site is not within an Alquist-Priolo Earthquake Fault Zone. An analysis was performed to develop and recommend ground motion parameters for the seismic design of the above referenced bridge structure. This analysis was performed in accordance with requirements specified in Appendix B of the Caltrans' 2009 Seismic Design Criteria (SDC, Version 1.5, August 2009) and utilizing the "Caltrans ARS Online" and other tools available at the internet sites. The average shear wave velocity (V_{s30}) for the upper 100 feet of the subsurface profile was estimated to be about 241.0 m/sec (790 ft/sec) based on recent field investigation. The closest fault to the site is the Puente Hills Thrust Fault oriented as a low angle north dipping thrust fault approximately 0.81 miles north of the site. The significant faults and fault zones are summarized in Table 4.

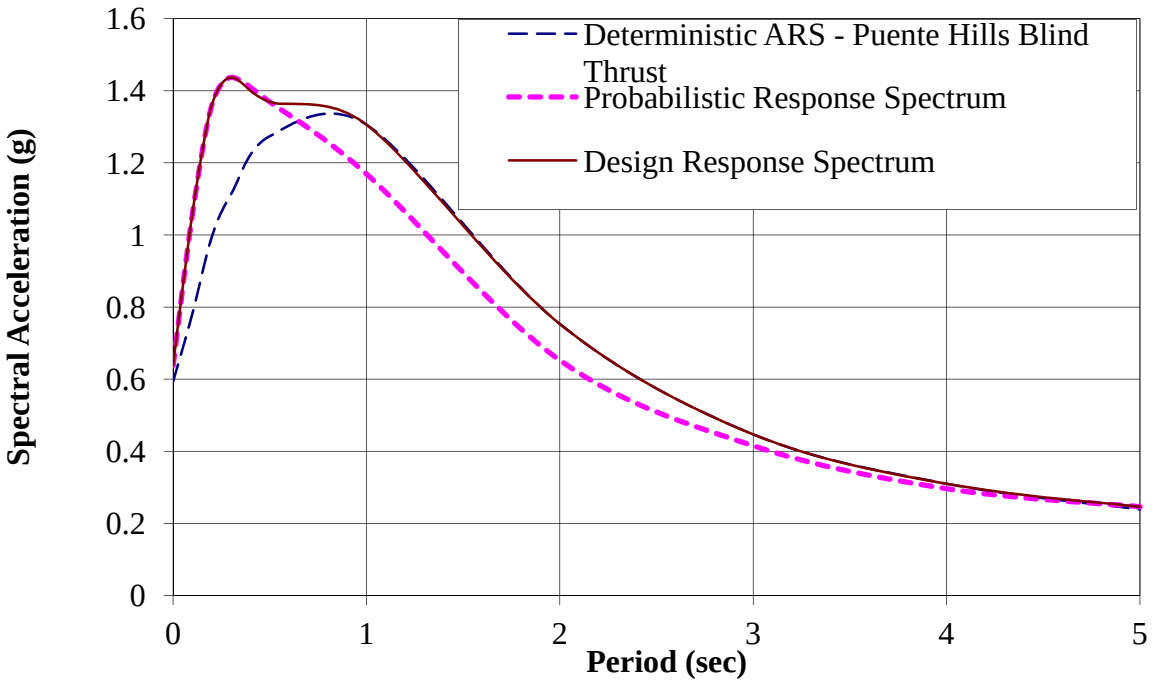
Table 4. Summary of Faults

Fault Name	Type	M_{max}	R_X	R_{JB}	R_{RUP}	PGA
Puente Hills Blind Thrust	R	7.3	0.81 mile (1.3 km)	0.81 mile (1.3 km)	1.83 mile (2.94 km)	0.67
Elsinore Fault Zone (Whittier Section)	RLSS	7.6	5.16 mile (8.30 km)	5.16 mile (8.30 km)	5.16 mile (8.30 km)	0.40
New Port Inglewood – Rose Canyon Fault Zone	RLSS	7.5	9.3 mile (15.0 km)	9.3 mile (15.0 km)	9.3 mile (15.0 km)	0.29
Upper Elysian Park Blind Thrust	R	6.4	9.34 mile (15.04 km)	9.34 mile (15.04 km)	9.34 mile (15.04 km)	0.26

Notes: R_X = Horizontal distance to the fault trace
R_{JB} = Shortest horizontal distance to the surface projection of the rupture area
R_{RUP} = Closest distance to the fault rupture plane
RLSS = Right Lateral Strike Slip
R = Reverse

The design deterministic as well as the probabilistic acceleration response spectrum (ARS) curves developed are shown in Figure 1. The probabilistic ARS curve corresponds to a ground motion return period (RP) of 975-year (i.e., 5% probability of exceedance in 50 years). It should be noted that the design deterministic ARS curve shown in Figure 1 is due to an earthquake event of magnitude M=7.3 and site to fault rupture surface distance of 1.3 Km associated with the Puente Hills Blind thrust fault. Since all the site to fault distance measures (e.g., R_{rup}, R_x and R_{jb} etc.) used in the attenuation relationships utilized in this analysis are within 25 Km, the ARS curves shown in Figure 1 include the near fault effects as specified in the Seismic Design Criteria (SDC 2009). In addition, the project site being located in the Los Angeles Basin also includes basin effects ($Z_{1.0}$= 695 m and $Z_{2.5}$=4.45 km). ARS curves were developed according to the Caltrans Geotechnical Services-Design Manual (Version 1.0, Aug. 2009). The design Peak Ground Acceleration (PGA) for the project site is 0.7g. The design ARS curve is an envelope of deterministic and probabilistic ARS curves (Figure 1).

Figure 1. Recommended Design Acceleration Response Spectrum (ARS) for Imperial Off -Ramp Bridge No. 53-3071k
Damping Ratio = 5%; V_{s30} = 241 m/sec



8.0 Liquefaction Potential

Based on current field investigation, the liquefaction potential at the bridge site is low to negligible due to absence of shallow groundwater. Accordingly, the potential for seismically induced settlement and lateral spreading are also considered to be low.

9.0 Foundation Recommendations

The proposed bridge replacement is a two span PC/PS Bulb Tee Girder structure with seat type abutments and 4 ft 3-octagonal columns bent. There is a conflict between utilities at abutment 1 and bent locations; however, utilities are assumed to be abandoned or relocated. The following recommendations are developed by OGDS1 based on 1) Log of Test Borings and interpreted subsurface conditions and design parameters established through laboratory tests and field data, 2) updated Structure Plans, design loads and alternative pile types proposed by OBDS1 as referenced in page 1, and 3) email correspondences and personal communications with Mr. Anthony Logus.

9.1 Deep Foundations

The pile types proposed by OBDS1, consist of 200 kips and 163 kips HP14x89 at abutments and parallel retaining wall (between abutments 1 of Imperial HWY Off-Ramp and Pioneer Blvd. UC), respectively; plumb, 54-inch diameter, cast-in-drilled hole (CIDH) Type I pile shafts at bent 2. Based on subsurface conditions obtained from recent field investigation, OGDS1 concurs with the feasibility of proposed pile types to support the new structure. Pile lengths required to resist the provided loads are computed based on Service-I Limit State load using computer program APILE (Version 4.0) at abutments and retaining wall for HP14x89 piles, and Extreme Event load using computer program SHAFT (Version 5.0) at bent for Type I pile shaft. The calculated axial geotechnical capacities of driven HP14x89 and CIDH piles are based on skin friction. End bearing was not considered in CIDH piles due to excessive settlement of the piles before mobilizing the end bearing. End bearing was not considered in driven piles due to variable interbeds of granular and cohesive soil layers. General Foundation Information and Design Loads provided by OBDS1 are presented in Tables 6 and 7, respectively. Recommended design and specified pile tip elevations for abutments and bent provided in Tables 8, 9 & 10 are prepared by OGDS1.

Table 6. General Foundation Information Provided By Structure Design

Support Location	Design Method	Pile Type	Finished Grade Elevation (ft)	Cut-off Elevation (ft)	Pile Cap Size (ft)		Permissible Settlement under Service Load (in)*	Number of Piles per Support
					B	L		
Abut. 1	LRFD	HP14x89	108.3	100	16	63	1	34
Bent 2	LRFD	54” CIDH	109.2	102	N/A	N/A	1	4
Abut. 3	LRFD	HP14x89	108.4	100	16	85	1	40

* Based on CALTRANS’ current practice, the total permissible settlement is one inch for multi-span structures with continuous spans or multi-column bents, one inch for single span structures with diaphragm abutments, and two inches for single span structures with seat abutments. Different permissible settlement under service loads may be allowed if a structural analysis verifies that required level of serviceability is met.

Table 7. Design Loads Provided By Structure Design

Support Location	Service-1 Limit State (kips)			Strength Limit State (Controlling Group, kips)				Extreme Event Limit State (Controlling Group, kips)			
	Total Load		Permanent Loads	Compression		Tension		Compression		Tension	
	Per Support	Max Per Pile	Per Support	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile
Abut 1	4552	200	4053	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Abut. 1 Ret. wall	N/A	163	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bent 2	-	700	-	800	800	0	0	1713	1713	850	850
Abut 3	5914	200	5369	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 8. Foundation Recommendations For Abutments And Retaining Wall

Support Location	Pile Type	Cut-off Elevation (ft)	LRFD Service-1 Limit State Load (kips) Per Support		LRFD Service-1 Limit State Total Load (kips) Per Pile (Compression)	Nominal Resistance (kips)	Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut. 1	HP14x89	100	4552	4053	200	400	33 (a) 55 (c)	33	400
Abut. 1 Ret. wall	HP14x89	100	N/A	N/A	163	330	40 (a) 62 (c)	40	330
Abut. 3	HP14x89	100	5914	5369	200	400	40 (a) 62 (c)	40	400

Notes:
1. Design tip elevations for Abutments and retaining wall are controlled by (a) Compression, (c) Settlement.
2. The specified tip elevation shall not be raised above the design tip elevations for tolerable settlement.

Table 9. Foundation Recommendations For Bent

Support Location	Pile Type	Cut-off Elevation (ft)	*Service-1 Limit State Load (kips) Per Support*	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Strength Limit		Extreme Event			
					Comp. (Ø=0.7)	Tension (Ø=0.7)	Comp. (Ø= 1)	Tension (Ø= 1)		
Bent 2	54" CIDH	102	700	1"	800	0	1713	850	36 (a-I) 22 (a-II) 48 (b) 56 (c)	22

Notes:
1. Design tip elevations are controlled by: (a-l) Compression (Strength Limit), (a-ll) Compression (Extreme Event), (b) Tension, (c) Settlement.
2. The CIDH specified tip elevation shall not be raised.
3. Design tip elevation for Lateral Load is to be provided by Structure Design.

Table 10. Pile Data Table

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut. 1	HP14x89	400	0	33 (a) 55 (c)	33	400
Abut. 1 Ret. wall	HP14x89	330	0	40 (a) 62 (c)	40	330
Bent 2	54" CIDH	1720	850	22 (a) 48 (b) 56 (c)	22	N/A
Abut. 3	HP14x89	400	0	40 (a) 62 (c)	40	400

Notes:
1. Design tip elevations are controlled by (a) Compression, (b) Tension, (c) Settlement.
2. The specified tip elevation at abutments shall not be raised above the design tip elevations for tolerable settlement.
3. The CIDH specified tip elevation at bent shall not be raised.
4. Design tip elevation for Lateral Load is to be provided by Structure Design.

9.2 Approach Fill Earthwork

New embankment fills will be placed on both sides of abutments 1 and 3 for the new structure as part of the off ramp grade separation, and new embankment fill retained by parallel wall. Calculated elastic settlements of the native soil below the new fill material at abutments and retaining wall foundations (wedge fill) and at a distance behind and away from the abutments and retaining wall (total fill prism) are shown in Table 11.

Table 11. Elastic Settlement Below Soil Embankment Fill

Support Location	Approximate Fill Height (ft)	Approximate Fill Width (ft)	Pre-Abutment/wall Construction Settlement (new soil embankment fill)	Post Abutment/wall Construction Settlement (secondary wedge fill)
Abut. 1and Ret. wall	H = 22	60	4.5"	2.0"
Abut. 3	H = 22	60	4.0"	1.5"

Note:
In order to reduce the above post construction settlement and potential down drag effect on the piles and differential settlement effects on the structure (s), lightweight geosynthetic fill material (i.e. geofoam) or lightweight cellular concrete is recommended for the secondary wedge fill. Since the pile supported footing may settle less than the adjacent embankment, a continuous vertical joint in the lightweight fill may be necessary at the back edge of the bridge and wall footings.

As an alternative, shoring at both abutments and retaining wall may be used to preload to the outside edge of the footings and eliminate the post construction settlement and the need for light weight material. Surcharging could also be used to reduce settlement waiting period. Bridge and wall construction schedule and staging will need to be coordinated with construction of the lightweight fill approach embankment (if considered).

10.0 Notes to Designer

1. Design pile tip elevation for lateral load at bent location, is to be determined by designer. The specified pile tip elevation for each support location is to be controlled by the deepest design tip elevation for either compression or lateral loads. Should the design pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, OGDS1 must be contacted for further recommendations.

2. Structure Design has indicated that no isolation casing or construction joint will be used for installation of pile shafts at Bent 2 location. However, if construction joint and/or isolation casing becomes necessary, OBDS1 should provide elevations to OGDS1 for recalculation of design tips since reduced skin friction up to construction joint and no bearing for the isolation casing has to be considered.

3. Contractor's driving system should be examined to verify the driving system is capable of installing the proposed piles at abutments and retaining wall, before commencement of pile driving.

4. The recommendations contained in this report are based on specific project information that has been provided by OBDS1-Branch 15. If any conceptual changes are made during final project design, OGDS1-Branch C should review those changes to determine if these foundation recommendations are still applicable.

11.0 Construction Considerations

<u>DRIVEN PILES</u>

1. Due to the irregular distribution of soil units, variable and erratic moderate to hard driving should be anticipated below elevation 38 to specified pile tip at abutment 1 and retaining wall, and below elevation 50 to specified pile tip at abutment 3. Subsurface material through which the piles will be driven, include loose to medium dense silty sand and fine to medium sand (to elev. 88); medium stiff to very stiff sandy silt with interbed of (8 ft thick) very dense well graded sand (to elev. 53); dense silty sand and well graded sand (to elev. 38); then very dense fine to medium sand (to pile tip elev.) at abutment 1 and retaining wall southern half of the bridge. Material at abutment 3 include medium dense silty sand and fine sand (to elev. 89); interbeds of stiff silt and loose silty sand (to elev. 75); dense well graded sand with silt and gravel (to elev. 68); stiff silt (to elev. 61); dense silty sand and fine sand (to elev. 50); then very dense well graded sand with interbeds of silty sand (to pile tip elevation).

2. Subsurface characterization is based on the borings performed at particular accessible locations. Subsurface conditions between borings are interpolated between those points. Therefore, if conditions different than those assumed in the foundation design are encountered during construction, excavation, or pile driving/drilling, OGDS1 should be notified to evaluate the impact on current recommendations and make appropriate modifications, if required.

3. Splicing or lugging of the steel piles may be needed if bearing is not achieved at the specified tip elevation. With approval of Structure Representative, any driven pile achieving refusal within 4.0 feet or less above specified pile tip elevation may be considered satisfactory.

4. If minimum required bearing is not obtained at specified pile tip elevation (SPTE) in the first pile of the pile group, the second pile should be stopped 1-foot above the SPTE. After a set-up period of 24 hours, re-strike the same pile and stop 6 inch above the SPTE and review the re-strike pile resistance. If pile bearing is adequate then drive to the recommended pile tip. If bearing is not adequate from the first re-strike then a 2-week set-up period is recommended before driving to SPTE and verifying the pile capacity.

5. At times, steel piles may not attain minimum bearing at specified tip elevation, even after re-driving. When this situation arises the only option is to splice on additional pile length and continue driving to a point where the nominal resistance is achieved, or alternatively lug the piles in order to increase resistance at specified pile tip. OGDS1 should be consulted to confirm the selected method.

6. The contractor should monitor adjacent structures or properties for vibrations to prevent potential damage due to pile driving. The contractor should take necessary precautions to minimize the impact on adjacent structures or properties.

DRILLED PILES

7. There is a likelihood of minor to moderate caving and/or sloughing of the hole sidewall during CIDH pile shaft installation. Caving could happen readily within shallow loose and/or saturated sand.

8. Groundwater is anticipated to be encountered during CIDH pile drilling. Groundwater surface elevation is subject to seasonal fluctuations and may occur higher or lower than indicated on the Log of Test Borings depending on the conditions and time of construction. Refer to Log of Test Borings for details. Dewatering and/or slurry displacement construction methods may be necessary for Type I pile shaft.

9. If slurry displacement method is used, requirements in Standard Special Provisions 49-310, CIDH shall be followed. If temporary casing is used to prevent caving or facilitate dewatering, provisions in Section 49-4.03, “Drilled Holes” of the Standard Specifications shall be followed.

EARTHWORK

10. The new approach fill at abutments is to be constructed in accordance with Sections 19-5.03 and 19-6.01 of the Standard Specifications and other requirements as directed by the Design Engineer. End dumping is not to be permitted.

11. Shoring at both abutments may be required which can be supported by sheet piles and/or soldier piles with or without lagging. However, method of shoring construction is the contractor's responsibility.

12. A maximum settlement of up to 4.5 inches in foundation soil is expected due to placement of new embankment fill. Most of the settlement will occur during embankment construction. Settlement in the fill is expected to be minimal; however, a 30-day fill stabilization is recommended before the construction of abutment foundations. The actual settlement period will be determined by the structure representative on the basis of settlement data in the field.

13. If Texaco oil and gas lines are not abandoned or relocated at abutment 1 location, they would most likely be damaged by pile driving operations. Also settlement due to additional load imposed by new embankment fill could cause irreparable damage to the existing utility lines. Therefore, if Texaco oil and gas lines are left in place, they should be protected and driven piles predrilled to about 8-10 ft below the bottom of the utility lines.

14. In conclusion, the commentary and recommendations in this report should not be considered an offering or implying an opinion of, or an approval concerning the foundation design and/or method of construction.

Any questions regarding the above comments should be directed to Faramarz Gerami at 213-620-2149 or Ted Liu at 213-620-2136.

Report by:

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Reviewed by: Date: 12/22/2011

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Attachments: Generalized soil profile and design strength parameters

c: Structure Construction R.E. pending File (RE_Pending_File@dot.ca.gov)
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Appendix 1 – Generalized soil profile and design strength parameters

Abutment 1

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
108.0-93.0	Silty fine sand (SM)	8	90	28	-
93.0-88.0	Fine sand (SP)	26	120	30	-
88.0-71.0	Sandy silt (ML)	12	95	-	1000
71.0-63.0	Well graded sand with gravel (SW)	63	135	38	-
63.0-53.0	Silt (ML)	5	90	-	700
53.0-48.0	Silty fine sand (SM)	38	127	32	-
48.0-43.0	Well graded sand with gravel (SW)	45	130	38	-
43.0-38.0	Silty fine sand (SM)	45	130	34	-
38.0-33.0	Fine sand (SP)	62	130	34	-
33.0-18.0	Well graded sand with gravel (SW)	103	140	40	-
18.0-13.0	Silt (ML)	21	115	-	1500
13.0-8.0	Fine and medium sand (SP)	68	130	36	-
8.0-3.0	Silt with sand (ML)	16	110	-	1500
3.0-(-2.0)	Fine and medium sand (SP)	79	130	36	-
(-2.0)-(-7.0)	Sandy lean clay (CL)	30	120	-	3500
(-7.0)-(-17.0)	Silt (ML)	39	125	-	700
(-17.0)-(-27.0)	Fine and medium sand (SP)	87	130	36	-
(-27.0)-(-30.0)	Sandy silt (ML)	49	125	-	3500
(-30.0)-(-34.0)	Fine and medium sand (SP)	71	130	36	-

Abutment 3

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
109.0-94.0	Silty fine sand (SM)	18	120	30	-
94.0-89.0	Fine sand (SP)	28	120	32	-
89.0-77.0	Silt (ML)	8	90	-	1200
77.0-72.0	Silty fine sand (SM)	27	120	32	-
72.0-67.0	Well graded sand with silt and gravel (SW-SM)	49	135	36	-
67.0-60.0	Silt with sand (ML)	8	90	-	1000
60.0-49.0	Silty sand/fine sand (SM/SP)	40	130	34	-
49.0-36.0	Silty sand/fine sand/well graded sand(SM/SP/SW)	80	130	36	-
36.0-26.0	Well graded sand with silt and gravel (SW-SM)	>100	135	40	-
26.0-15.0	Lean clay/silt with sand (CL/ML)	28	120	-	1500
15.0-(-1.0)	Non-plastic silt/fine sand (ML/SP)	54	130	34	-
(-1.0)-(-9.0)	Silty fine and medium sand (SM)	44	130	36	-
(-9.0)-(-18.0)	Silt with sand (ML)	23	115	-	1000
(-18.0)-(-32.0)	Silty fine sand (SM)	71	130	34	-

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To: Ms. TRACI MENARD, CHIEF
Bridge Design Branch 15
Office of Bridge Design South 1
Att: Mr. Anthony Logus

Date: December 22, 2011
File: 07-LA-5- PM 5.12
0700001834 (07-215941)

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1 MS # 18

Pioneer Blvd. UC (Replace)
Bridge No. 53-3062

Subject: Foundation Report

Introduction

This report presents the foundation recommendations for the proposed Pioneer Blvd. UC Bridge No. 53-3062 which will replace the existing Pioneer Blvd. UC Bridge No. 53-0844. Email attachments of foundation design loads and structure plans with various revision dates were received from Mr. Anthony Logus (Design Branch 15, Office of Bridge Design South1) on July 29, 2011 and November 1, 2011, respectively.

1.0 Scope of Work

This report supersedes the Preliminary Foundation Report for Pioneer Blvd. UC (Replace) dated March 15, 2011. A review of the following resources provided information for the foundation evaluation and site condition.

- Recent sampled borings completed by Caltrans in 2011, for the proposed Pioneer Blvd. UC (replacement) Bridge No. 53-3062.

- "As Built" Log of Test Borings for existing Pioneer Blvd. UC Bridge No. 53-0844, approved October 27, 1952 (original structure) and March 4, 1957 (median widening), and "As Built" file maintained in Los Angeles Office.

- General Plans (sheet Nos. 1 & 2) revised 7-28-11 & 6-27-11, respectively, Foundation Plan revised 8-24-11, abutments and bent Layouts and Details with revised dates of between 8-9-11 to 8-27-11, design loads and alternative pile types (design data sheet) dated 8-27-11.

- Develop geologic profiles, geotechnical recommendations and engineering parameters for design and construction of the bridge foundations.

- Present the results of investigations and interpretation of subsurface soil, and preparation of this report in accordance with Caltrans "Guidelines for Structures Foundation Reports, Version 2.0" Dec. 2009, and "Foundation Report Preparation for Bridge Foundations" Dec. 2009.

2.0 Project Description

The I-5 Corridor Improvement project proposes to reconstruct the I-5 freeway including bridge replacements, retaining walls and sound walls, between Los Angeles/Orange County line to the north of I-605, crossing cities of Norwalk, Santa Fe Springs and unincorporated cities. Replacement of the existing Pioneer Blvd. UC is part of the Segment 4 of I-5 Corridor Improvement in the City of Norwalk, which covers an area from north of Silver Bow POC (PM 4.0) to south of Orr and Day OH (PM 6.0). Segment 4 encompasses one new structure (Imperial HWY Off-Ramp # 53-3071K), three bridge replacements (San Antonio Drive UC #53-3060, Imperial HWY UC #53-3061 and Pioneer Blvd. UC #53-3062), and approximately 17960 ft of sound walls and different types of retaining walls with and without sound walls. All elevations referenced in this report are based on 1988 NAVD datum. All elevations on the As-Built Log of Test Borings are referenced to the 1929 NGVD. The NGVD ’29 As-Built elevations can be converted to NAVD ’88 elevations by adding 2.408 ft to the NGVD ’29 elevations.

3.0 Field Investigation and Testing Program

In order to characterize the subsurface conditions and soil profile a site specific field investigation consisting of drilling three, 4.5” diameter, wet rotary borings (and one shared boring with Imperial HWY Off ramp) was performed in February 2011. At 5 foot intervals, Standard Penetration Tests in accordance with ASTM Test Method D1586 were performed using standard 1.4 inch I.D. split spoon sampler with a 140 pound hammer dropped 30 inches. At intervals where cohesive soils encountered, relatively undisturbed samples were also obtained using 2.0 inch I.D. Modified California Sampler. An electronic file of the completed new Log of Test Borings along with As-Built Log of Test Borings will be sent to Designer from URS Corporation drafting for inclusion in Contract Plans.

4.0 Laboratory Testing

Selected soil samples were retained and submitted to the Caltrans material laboratories in District 7 and Sacramento for testing. The purpose of the laboratory testing was to aid in evaluating the engineering properties of the subsurface materials and to confirm visual classification of the soils. Laboratory tests performed include moisture content, dry unit weight, wash sieve analysis, Atterberg limits, unconfined compression tests, direct shear, and corrosion tests. All laboratory tests were performed in accordance with current ASTM standard procedures and California Test Methods. The summarized laboratory test data are shown in Table 1.

Table 1. Summary of Laboratory Tests

Testing Type	ASTM/CTM Designation	Testing Purpose
Mechanical Analysis	CTM 202, 203	Soil Classification
Atterberg Limits	CTM 204	Soil Classification
Direct Shear	ASTM D3080	Shear Strength
Corrosion	CTM 417, 422, 643	Corrosion Potential
Unconfined Compression	ASTM D2166	Compressive Strength

5.0 Site Geology and Subsurface conditions

The entire project is located within the Los Angeles Basin with physiographic of a lowland coastal plain. It is bounded on the east and southeast by the Santa Ana Mountains and San Joaquin Hills and on the north by the Santa Monica and San Gabriel Mountains. The bridge site is situated in a relatively flat southwest sloping with Holocene to Late Pleistocene alluvial fan and valley deposits consisting of mostly poorly consolidated clay, sandy silt, sand, gravel and cobbles (California Geologic Survey 1998). This alluvium was deposited primarily by San Gabriel River floods emanating from the mountains and hills to the north of the project site. Depth to rock-like material is estimated to be greater than 400 feet. Based on information from the 2011 site investigation, different soil units are encountered at the proposed bridge supports, as characterized below.

Boring R-11-036 (Abut. 1R): Surface to approx. elevation +79 medium dense/stiff interbeds of SP & ML with lenses of SM & CL; elevation +79 to +52 medium dense to very dense interbeds of SP, SW & GW; elevation +52 to +38 stiff to very stiff ML; elevation +38 to +28 interbeds of very dense SP; elevation +28 to +15 interbeds of stiff to very stiff/dense SM, ML & CL; elevation +15 to +2 interbeds of very dense SP & SW; elevation +2 to -7 stiff ML; elevation -7 to -30 very dense SP. Below elevation -30 to -33.5 (maximum boring depth) hard ML.

Boring R-11-015 (Abut. 1L): Surface to approx. elevation +95 medium dense SM; elevation +95 to +90 dense SP; elevation +90 to +76 medium stiff to very stiff ML with interbed of medium dense SM; elevation +76 to -32.5 (maximum boring depth) interbeds of medium dense to very dense interbeds of SP & SW with intermittent layers of soft to stiff ML and very dense SM.

Boring R-11-037 (Abut. 3R): Surface to approx. elevation +78 medium dense SM with intermittent layers of medium stiff ML; elevation +78 to +54 medium dense to very dense interbeds of SW & SP with intermittent layer of medium dense SM; elevation +54 to +38 stiff ML with interbeds of medium dense to very dense SM & SP; elevation +38 to +30 very dense SW; elevation +30 to +17 medium stiff to very stiff ML with intermittent layer of dense SM; elevation +17 to +1 dense to very dense interbeds of SP & SW; elevation +1 to -31.5 (maximum boring depth) interbeds of dense to very dense/very stiff to hard SM, SP & CL-ML.

Boring R-11-016 (Abut. 3L): Surface to approx. elevation +89 medium dense SM & SP; elevation +89 to +80 stiff ML & CL; elevation +80 to +55 interbeds of loose to dense/stiff SC, SM, GP & CL-ML; +55 to +25 dense to very dense SP; elevation +25 to +10 medium stiff to very stiff MH & ML; elevation +10 to -32 (maximum boring depth) dense to very dense SM with intermittent layer of stiff MH.

Notes: SW = well graded sand, SP = poorly graded sand, SM = silty sand, SC = clayey sand, GW = well graded gravel, GP = poorly graded gravel, ML = silt, MH = elastic silt, CL = lean clay, CL-ML =silty clay, bgs = below ground surface

5.1 Groundwater

Groundwater was encountered in Recent and As Built borings as presented in Table 2. Groundwater level in general vicinity including adjacent Imperial HWY Off Ramp fluctuates slightly between elevations 20.8 and 22.2 feet. However, groundwater level has been dropped substantially (about 70 ft) since 1950s. It should be noted that groundwater levels could fluctuate with the change of season and other factors. According to preliminary groundwater data evaluation (9-24-09) provided by Caltrans Hazardous Waste Branch, South Region, there is no groundwater contamination plume in the Segment 4.

Table 2. Recent and As Built Groundwater Information

Support Location	Boring No.	Depth to Groundwater (Below Ground Surface)	Groundwater Surface Elevation	Date of Water Measurement
Abut. 1R	**R-11-036**	**86.8 ft**	**21.6 ft**	**7-5-2011**
Abut. 1L	B-4 (As Built)	20.0 ft	86.6 ft	11-22-1950
	R-11-015	**88.2 ft**	**20.8 ft**	**6-14-2011**
Abut. 3R	B-1 (As Built)	18.0 ft	89.5 ft	11-15-1950
	R-11-037	**89.5 ft**	**22.2 ft**	**4-18-2011**
Abut. 3L	B-2 (As Built)	18.7 ft	88.0 ft	11-15-1950
	R-11-016	**88.2 ft**	**21.5 ft**	**7-13-2011**

Bold = Recent borings and results

6.0 Corrosion Evaluation

Composite soil samples taken from recent exploratory borings at different intervals were sent to District 7 laboratory for corrosion testing. The test results indicate a non-corrosive environment at the proposed bridge site. Normal construction material and design are advised. Refer to Table 3 for specific test results.

Table 3. Corrosion Test Summary

Boring No.	Depth Interval (ft)	SIC Number	Minimum Resistivity (Ohm-Cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
R-11-036	0.0-70.0	C101142	980	7.97	140	550
	70.0-100.0	N/A	2800	8.38	N/A	N/A

Note: It is the practice of Caltrans Corrosion Technology Section (with the exception of MSE walls) that 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 noncorrosive. Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist for representative soil and/or water samples taken at the site. Chloride concentration is greater or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less.

7.0 Seismic Recommendations

The proposed bridge site is not within an Alquist-Priolo Earthquake Fault Zone. An analysis was performed to develop and recommend ground motion parameters for the seismic design of the above referenced bridge structure. This analysis was performed in accordance with requirements specified in Appendix B of the Caltrans' 2009 Seismic Design Criteria (SDC, Version 1.5, August 2009) and utilizing the "Caltrans ARS Online" and other tools available at the internet sites. The average shear wave velocity (V_{s30}) for the upper 100 feet of the subsurface profile was estimated to be about 241 m/sec (790 ft/sec) based on recent field investigation. The closest fault to the site is the Puente Hills Thrust Fault oriented as a low angle north dipping thrust fault approximately 0.81 miles north of the site. The significant faults and fault zones are summarized in Table 4.

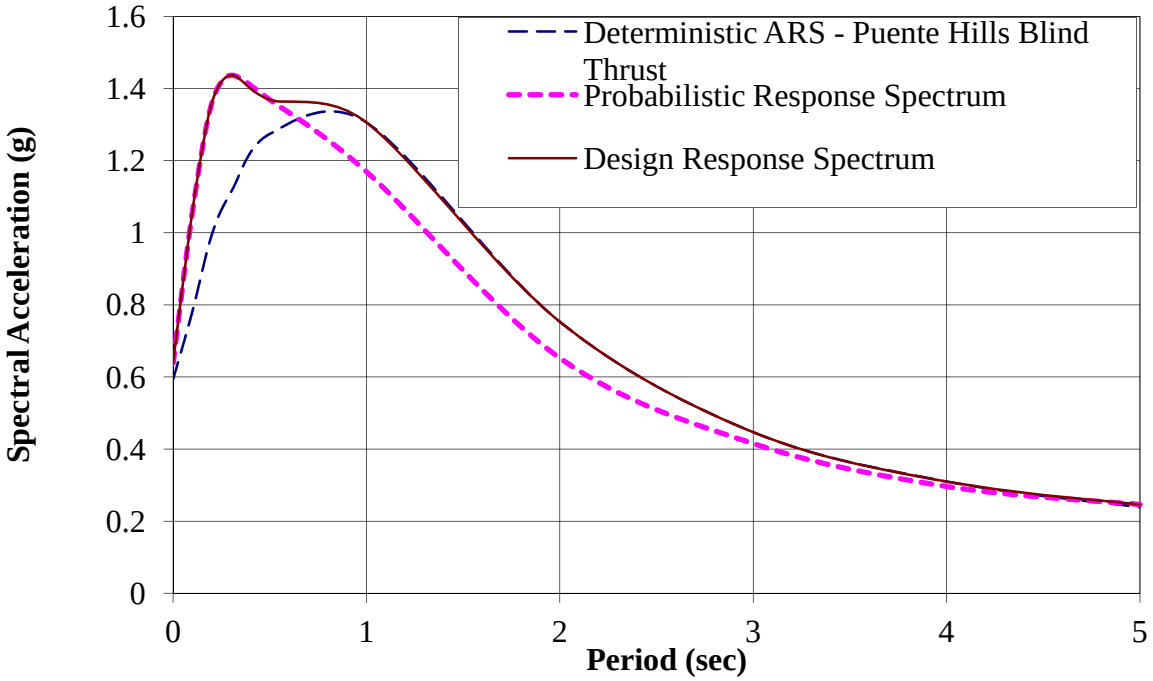
Table 4. Summary of Faults

Fault Name	Type	M_{max}	R_X	R_{JB}	R_{RUP}	PGA
Puente Hills Blind Thrust	R	7.3	0.81 mile (1.3 km)	0.81 mile (1.3 km)	1.83 mile (2.94 km)	0.67
Elsinore Fault Zone (Whittier Section)	RLSS	7.6	5.16 mile (8.30 km)	5.16 mile (8.30 km)	5.16 mile (8.30 km)	0.40
New Port Inglewood – Rose Canyon Fault Zone	RLSS	7.5	9.3 mile (15.0 km)	9.3 mile (15.0 km)	9.3 mile (15.0 km)	0.29
Upper Elysian Park Blind Thrust	R	6.4	9.34 mile (15.04 km)	9.34 mile (15.04 km)	9.34 mile (15.04 km)	0.26

Notes: R_X = Horizontal distance to the fault trace
R_{JB} = Shortest horizontal distance to the surface projection of the rupture area
R_{RUP} = Closest distance to the fault rupture plane
RLSS = Right Lateral Strike Slip
R = Reverse

The design deterministic as well as the probabilistic acceleration response spectrum (ARS) curves developed are shown in Figure 1. The probabilistic ARS curve corresponds to a ground motion return period (RP) of 975-year (i.e., 5% probability of exceedance in 50 years). It should be noted that the design deterministic ARS curve shown in Figure 1 is due to an earthquake event of magnitude M=7.3 and site to fault rupture surface distance of 1.3 Km associated with the Puente Hills Blind thrust fault. Since all the site to fault distance measures (e.g., R_{rup}, R_x and R_{jb} etc.) used in the attenuation relationships utilized in this analysis are within 25 Km, the ARS curves shown in Figure 1 include the near fault effects as specified in the Seismic Design Criteria (SDC 2009). In addition, the project site being located in the Los Angeles Basin also includes basin effects ($Z_{1.0}$= 695 m and $Z_{2.5}$=4.45 km). ARS curves were developed according to the Caltrans Geotechnical Services-Design Manual (Version 1.0, Aug. 2009). The design Peak Ground Acceleration (PGA) for the project site is 0.7g. The design ARS curve is an envelope of deterministic and probabilistic ARS curves (Figure 1).

Figure 1. Recommended Design Acceleration Response Spectrum (ARS) for Pioneer Blvd UC Bridge No. 53-3062 Damping Ratio = 5%; V_{s30} = 241 m/sec



8.0 Liquefaction Potential

Based on current field investigation, the liquefaction potential at the bridge site is low to negligible due to absence of shallow groundwater. Accordingly, the potential for seismically induced settlement and lateral spreading are also considered to be low.

9.0 As Built Foundation Data

The existing Pioneer Blvd. UC was built in 1954 and consists of a four span continuous RC T-beam with RC bents and open ended seated abutments, supported on cast-in-drilled hole (CIDH) piles (Alt. V). In 1958 bridge was widened in the median supported on same pile type and tips; however, abutment foundations were placed in 1954 construction. The As Built foundation data are shown in Table 5.

Table 5. As Built Foundation Data

Support Location	Foundation Support	Bottom of Pile Footing Elev.	Min. Pile Tip Elev.	Average Pile Tip Elevation	Specified Pile Tip Elevation
Abut. 1	45 ton CIDH Piles (Alt. V)	112.18 ft	68.0 ft	N/A	N/A
Bents 2, 3, 4		102.0 ft	62.4-64.2 ft	64.7-66.8 ft	65.0 ft
Abut. 5		121.11 ft	69.0 ft	N/A	N/A

10.0 Foundation Recommendations

The proposed bridge replacement is a two span PC/PS Bulb Tee Girder structure with seat type abutments and 4.0 ft 21-octagonal columns bent. There is a conflict between existing foundations and utilities at abutments and bent locations. Existing utilities are assumed to be abandoned or relocated but existing foundations should be avoided. The following recommendations are developed by OGDS1 based on 1) Log of Test Borings and interpreted subsurface conditions and design parameters established through laboratory tests and field data, 2) updated Structure Plans, design loads and alternative pile types proposed by OBDS1 as referenced in page 1, and 3) email correspondences and personal communications with Mr. Anthony Logus.

10.1 Deep Foundations

The pile types proposed by OBDS1, consist of 200 kips HP14x89 piles at Abutments; and plumb, 54-inch diameter, cast-in-drilled hole (CIDH) Type I pile shafts at bent 2. Based on subsurface conditions obtained from recent field investigation, OGDS1 concurs with the feasibility of proposed pile types to support the bridge replacement. Pile lengths required to resist the provided loads are computed based on Service-I Limit State load using computer program APILE (Version 4.0) at abutments for HP14x89 piles, and Strength Limit State load using computer program SHAFT (Version 5.0) at bent 2 for Type I pile shaft. The calculated axial geotechnical capacities of driven HP14x89 and CIDH piles are based on skin friction. End bearing was not considered in CIDH piles due to excessive settlement of the piles before mobilizing the end bearing. End bearing was not considered in driven piles due to variable interbeds of granular and cohesive soil layers. General Foundation Information and Design Loads (revised loads and pile types at abutments) provided by OBDS1 are presented in Tables 6 and 7, respectively. Recommended design and specified pile tip elevations for abutments and bent are prepared by OGDS1 and provided in Tables 8, 9 & 10.

Table 6. General Foundation Information Provided By Structure Design

Support Location	Design Method	Pile Type	Finished Grade Elevation (ft)	Cut-off Elevation (ft)	Pile Cap Size (ft)		Permissible Settlement under Service Load (in)*	Number of Piles per Support
					B	L		
Abut. 1	LRFD	Class 200	108.3	100	16	432	1	227
Bent 2	LRFD	54” CIDH	109.2	102	N/A	N/A	1	21
Abut. 3	LRFD	Class 200	108.4	100	16	445	1	209

* Based on CALTRANS’ current practice, the total permissible settlement is one inch for multi-span structures with continuous spans or multi-column bents, one inch for single span structures with diaphragm abutments, and two inches for single span structures with seat abutments. Different permissible settlement under service loads may be allowed if a structural analysis verifies that required level of serviceability is met.

Table 7. Design Loads Provided By Structure Design

Support Location	Service-1 Limit State (kips)			Strength Limit State (Controlling Group, kips)				Extreme Event Limit State (Controlling Group, kips)			
	Total Load		Permanent Loads	Compression		Tension		Compression		Tension	
	Per Support	Max Per Pile	Per Support	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile
Abut 1	32808	200	29362	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bent 2	-	700	-	900	900	0	0	1550	1550	0	0
Abut 3	32275	200	28900	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 8. Foundation Recommendations For Abutments

Support Location	Pile Type	Cut-off Elevation (ft)	LRFD Service-1 Limit State Load (kips) Per Support		LRFD Service-1 Limit State Total Load (kips) Per Pile (Compression)	Nominal Resistance (kips)	Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut. 1	HP14x89	100	32808	29362	200	400	40 (a) 68 (c)	40	400
Abut. 3	HP14x89	100	32275	28900	200	400	40 (a) 62 (c)	40	400

Notes:
1. Design tip elevations for Abutments are controlled by (a) Compression, (c) Settlement, (d) Lateral Load.
2. The specified tip elevation shall not be raised above the design tip elevations for tension, lateral and tolerable settlement.

Table 9. Foundation Recommendations For Bent

Support Location	Pile Type	Cut-off Elevation (ft)	*Service-1 Limit State Load (kips) Per Support*	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Strength Limit		Extreme Event			
					Comp. (Ø=0.7)	Tension (Ø=0.7)	Comp. (Ø= 1)	Tension (Ø= 1)		
Bent 2	54" CIDH	102	700	1"	900	0	1550	0	37 (a-I) 27 (a-II) 56 (c)	27

Notes:
1. Design tip elevations are controlled by: (a-l) Compression (Strength Limit), (a-ll) Compression (Extreme Event), (c) Settlement.
2. The CIDH specified tip elevation shall not be raised.

Table 10. Pile Data Table

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut. 1	HP14x89	400	0	40 (a) 68 (c)	40	400
Bent 2	54" CIDH	1550	0	27 (a) 58 (c)	27	N/A
Abut. 3	HP14x89	400	0	40 (a) 62 (c)	40	400

Notes:
1. Design tip elevations are controlled by (a) Compression, (c) Settlement.
2. The specified tip elevation at abutments shall not be raised above the design tip elevations for tolerable settlement.
3. The CIDH specified tip elevation at bent shall not be raised.

10.2 Approach Fill Earthwork

New embankment fills will be placed on both sides of abutments 1 and 3 for the replacement bridge as part of the roadway widening. Calculated elastic settlements of the native soil below the new fill material at abutment foundations (wedge fill) and at a distance behind and away from the abutments (total fill prism) are shown in Table 11.

Table 11. Elastic Settlement Below Soil Embankment Fill

Support Location	Approximate Fill Height (ft)	Approximate Fill Width (ft)	Pre-Abutment Construction Settlement (new soil embankment fill)	Post Abutment Construction Settlement (secondary wedge fill)
Abut. 1L	H = 25	160	2.0"	1.5"
Abut. 1R	H = 26	90	4.0"	2.5"
Abut. 3L	H = 23	180	2.0"	1.5"
Abut. 3R	H = 23	90	4.0"	2.5"

Note:
In order to reduce the above post construction settlement and potential down drag effect on the piles and differential settlement effects on the structure, lightweight geosynthetic fill material (i.e. geofoam) or lightweight cellular concrete is recommended for the secondary wedge fill. Since the pile supported footing may settle less than the adjacent embankment, a continuous vertical joint in the lightweight fill may be necessary at the back edge of the bridge footing.

As an alternative, shoring at both abutments may be used to preload to the outside edge of the footings and eliminate the post construction settlement and the need for light weight material. Surcharging could also be used to reduce settlement waiting period. Bridge construction schedule and staging will need to be coordinated with construction of the lightweight fill approach embankment (if considered).

11.0 Notes to Designer

1. Design pile tip elevation for lateral load at bent location, is to be determined by designer. The specified pile tip elevation for each support location is to be controlled by the deepest design tip elevation for either compression or lateral loads. Should the design pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, OGDS1 must be contacted for further recommendations.

2. Structure Design has indicated that no isolation casing or construction joint will be used for installation of pile shafts at Bent 2 location. However, if construction joint and/or isolation casing becomes necessary, OBDS1 should provide elevations to OGDS1 for recalculation of design tips since reduced skin friction up to construction joint and no bearing for the isolation casing has to be considered.

3. Contractor's driving system should be examined to verify the driving system is capable of installing the proposed piles at abutments and retaining wall, before commencement of pile driving.

4. The recommendations contained in this report are based on specific project information that has been provided by OBDS1-Branch 15. If any conceptual changes are made during final project design, OGDS1-Branch C should review those changes to determine if these foundation recommendations are still applicable.

12.0 Construction Considerations

<u>DRIVEN PILES</u>

1. Due to the irregular distribution of soil units, variable and erratic moderate to hard driving should be anticipated below elevation 50 to specified pile tip at southern half of the bridge (abutments 1L & 3L) and between elevations 70 to 55 at northern half of the bridge (abutments 1R & 3R). Subsurface material through which the piles will be driven, include medium dense to dense silty sand and fine to coarse sand with interbeds of (10 ft thick) stiff to medium stiff silt (to elevation 50); then very dense silty sand and fine to coarse sand (to pile tip elevation) at southern half of the bridge. Materials at northern half include (20-30 ft thick) stiff to very stiff silt and medium dense to dense silty sand and fine to coarse sand (to elev. 70); from elevations 70 to 55 very dense fine to coarse sand with occasional gravel; from elevation 55 to pile tip stiff to very stiff silt.

2. Subsurface characterization is based on the borings performed at particular accessible locations. Subsurface conditions between borings are interpolated between those points. Therefore, if conditions encountered during construction, excavation, or pile driving/drilling, are different than those assumed in the foundation design, OGDS1 should be notified to evaluate the impact on current recommendations and make appropriate modifications, if required.

3. Splicing of the steel piles may be necessary if bearing is not achieved at the specified tip elevation. With approval of Structure Representative, any driven pile achieving refusal within 4.0 feet or less above the specified pile tip elevation may be considered satisfactory.

4. If minimum required bearing is not obtained at specified pile tip elevation (SPTE) in the first pile of the pile group, the second pile should be stopped 1-foot above the SPTE. After a set-up period of 24 hours, re-strike the same pile and stop 6 inch above the SPTE and review the re-strike pile resistance. If pile bearing is adequate then drive to the recommended pile tip. If bearing is not adequate from the first re-strike then a 2-week set-up period is recommended before driving to SPTE and verifying the pile capacity.

5. At times steel piles may not attain minimum bearing at specified tip elevation, even after re-driving. When this situation arises, the only option is to splice on additional pile length and continue driving to a point where the nominal penetration is achieved, or alternatively lug the piles in order to increase resistance at specified pile tip. OGDS1 should be consulted to confirm the selected method.

6. The contractor should monitor adjacent structures or properties for vibrations to prevent potential damage due to pile driving. The contractor should take necessary precautions to minimize the impact on adjacent structures or properties.

7. The designer should identify on the plans, removal limits of the existing bridge structures and supporting elements (i.e. footings, piles). In general, all members of existing structures should be removed to a minimum of 3 feet below intended finish grade. If existing structure members are interfering with new construction, they should be removed in their entirety. When choosing to abandon or remove an existing foundation such as a pile cap, considerations should be given to the effect that the removal would have on any adjacent utilities. The designer may choose to abandon such elements but should consider potential interference with future planned work such as utility installation. Structure elements that are to remain should not prohibit proper compaction or uniform consolidation of new earth fills. The designer's removal plan should be forwarded to OGDS1 for concurrence. The Structure Representative should adjust proposed pile locations when necessary to avoid encountering abandoned piles. If a proposed pile needs to be relocated, the Structure Representative should consult with OBDS1 and OGDS1 to insure adequate foundation design is maintained.

<u>DRILLED PILES</u>

8. There is a likelihood of minor to moderate caving and/or sloughing of the hole sidewall during CIDH pile shaft installation. Caving could happen readily within shallow loose and/or saturated sand.

9. Groundwater may be encountered during CIDH pile drilling when piles penetrate below approximate depth of 85 feet below existing ground surface. Groundwater surface elevation is subject to seasonal fluctuations and may occur higher or lower than indicated on the Log of Test Borings depending on the conditions and time of construction. Dewatering and/or slurry displacement construction methods may be necessary for Type I pile shaft.

10. If slurry displacement method is used, requirements in Standard Special Provisions 49-310, CIDH shall be followed. If temporary casing is used to prevent caving or facilitate dewatering, provisions in Section 49-4.03, "Drilled Holes" of the Standard Specifications shall be followed.

EARTHWORK

11. The new approach fill at abutments are to be constructed in accordance with Sections 19-5.03 and 19-6.01 of the Standard Specifications and other requirements as directed by the Design Engineer. End dumping is not to be permitted.

12. A maximum settlement of up to 4.0 inches in foundation soil is expected due to placement of new embankment fill. Most of the settlement will occur during embankment construction. Settlement in the fill is expected to be minimal; however, a 30-day fill stabilization is recommended before the construction of abutment foundations. The actual settlement period will be determined by the structure representative on the basis of settlement data in the field.

13. Shoring at both abutments may be required which can be supported by sheet piles and/or soldier piles with or without lagging. However, method of shoring construction is the contractor's responsibility.

14. If Texaco oil and gas lines are not abandoned or relocated at abutment 1 location, they would most likely be damaged by pile driving operations. Also settlement due to additional load imposed by new embankment fill could cause irreparable damage to the existing utility lines. Therefore, if Texaco oil and gas lines are left in place, they should be protected and driven piles predrilled to about 8-10 ft below the bottom of the utility lines.

15. In conclusion, the commentary and recommendations in this report should not be considered an offering or implying an opinion of, or an approval concerning the foundation design and/or method of construction.

Any questions regarding the above comments should be directed to Faramarz Gerami at 213-620-2149 or Ted Liu at 213-620-2136.

Report by:

Reviewed by: Date: 12/22/2011

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Attachments: Generalized soil profile and design strength parameters

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Appendix 1 – Generalized soil profile and design strength parameters

Abutment 1R

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
108.0-103.0	Fine sand (SP)	10	95	28	-
103.0-85.0	Sandy silt (ML)	17	110	-	1000
85.0-75.0	Lean clay (CL)	28	120	-	3000
75.0-70.0	Well graded sand with silt and gravel (SW-SM)	41	125	36	-
70.0-65.0	Well graded sand with silt and gravel (SW-SM)	79	137	38	-
65.0-54.0	Medium sand (SM)	54	130	36	-
54.0-38.0	Silt with sand (ML)	29	115	-	1300
38.0-30.0	Medium, coarse sand (SP)	88	137	38	-
38.0-15.0	Sandy silt (ML)	32	120	-	1500
15.0-10.0	Medium, coarse sand (SP)	58	135	38	-
10.0-(0.00)	Fine, medium sand (SP)	85	130	36	-
(0.00)-(-7.0)	Gravelly silt (ML)	37	120	-	1500
(-7.0)-(-15.0)	Fine, medium sand (SP)	34	120	34	-
(-15.0)-(-30.0)	Fine, medium sand (SP)	99	130	36	-
(-30.0)-(-33.5)	Lean clay (CL)	37	120	-	4000

Abutment 1L

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
109.0-99.0	Silty fine sand (SM)	12	110	30	-
99.0-95.0	Silty fine sand (SM)	26	120	32	-
95.0-90.0	Medium sand (SP)	38	130	37	-
90.0-76.0	Sandy silt (ML)	13	110	-	1500
76.0-71.0	Fine sand (SP)	23	110	32	-
71.0-66.0	Well graded sand with silt and gravel (SW-SM)	40	127	37	-
66.0-61.0	Silty fine sand (SM)	11	95	30	-
61.0-56.0	Fine sand (SP)	40	130	34	-
56.0-46.0	Well graded sand with silt (SW-SM)	70	135	36	-
46.0-36.0	Fine sand (SP)	73	130	34	-
36.0-31.0	Well graded sand with gravel (SW)	86	135	40	-
31.0-26.0	Fine sand (SP)	40	130	34	-
26.0-21.0	Well graded sand with gravel (SW)	107	140	40	-
21.0-14.0	Sandy silt (ML)	18	110	-	1000
14.0-(-3.0)	Fine sand (SP)	80	130	34	-
(-3.0)-(-8.0)	Well graded sand (SW)	85	135	37	-
(-8.0)-(-16.0)	Silty/fine sand (SM/SP)	111	130	35	-
(-16.0)-(-21.0)	Well graded sand with gravel (SW)	97	140	40	-
(-21.0)-(-32.5)	Fine and medium sand (SP)	83	130	36	-

Abutment 3R

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
110.0-100.0	Silty fine sand (SM)	13	110	30	-
100.0-80.0	Sandy silt (ML)	14	110	-	1000
80.0-75.0	Silty fine sand (SM)	10	95	30	-
75.0-70.0	Well graded sand with silt and gravel (SW-SM)	45	130	37	-
70.0-66.0	Well graded sand with silt and gravel (SW-SM)	86	135	38	-
66.0-62.0	Sandy silt (ML)	27	115	-	1500
62.0-52.0	Fine and medium sand/well graded sand (SP/SW)	63	135	38	-
52.0-42.0	Silt/sandy silt (ML)	26	115	-	1200
42.0-32.0	Silty fine sand/well graded sand with gravel (SM/SW)	104	135	40	-
32.0-17.0	Sandy/gravelly silt (ML)	27	120	-	2500
17.0-(0.00)	Well graded sand with gravel/silty sand/medium sand (SW/SM/SP)	85	135	38	-
(0.00)-(-6.0)	Silt with sand (ML)	48	125	-	4000
(-6.0)-(-20.0)	Fine sand/silty fine sand (SP/SM)	29	120	34	-
(-20.0)-(-25.0)	Silty fine sand (SM)	49	130	34	-
(-25.0)-(-32.0)	Sandy lean clay (CL)	39	125	-	4500

Abutment 3L

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
109.0-94.0	Silty fine sand (SM)	18	120	30	-
94.0-89.0	Fine sand (SP)	28	120	32	-
89.0-77.0	Silt (ML)	8	90	-	1200
77.0-72.0	Silty fine sand (SM)	27	120	32	-
72.0-67.0	Well graded sand with silt and gravel (SW-SM)	49	135	36	-
67.0-60.0	Silt with sand (ML)	8	90	-	1000
60.0-49.0	Silty sand/fine sand (SM/SP)	40	130	34	-
49.0-36.0	Silty sand/fine sand/well graded sand(SM/SP/SW)	80	130	36	-
36.0-26.0	Well graded sand with silt and gravel (SW-SM)	>100	135	40	-
26.0-15.0	Lean clay/silt with sand (CL/ML)	28	120	-	1500
15.0-(-1.0)	Non-plastic silt/fine sand (ML/SP)	54	130	34	-
(-1.0)-(-9.0)	Silty fine and medium sand (SM)	44	130	36	-
(-9.0)-(-18.0)	Silt with sand (ML)	23	115	-	1000
(-18.0)-(-32.0)	Silty fine sand (SM)	71	130	34	-

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To: Ms. TRACI MENARD, CHIEF
Bridge Design Branch 15
Office of Bridge Design South 1
Att: Mr. Tony Skreslet

Date: December 22, 2011
File: 07-LA-5- PM 4.41
0700001834 (07-215941)

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1 MS # 18

San Antonio DR UC (Replace)
Bridge No. 53-3060

Subject: Foundation Report

Introduction

This report presents the foundation recommendations for the proposed San Antonio Drive UC Bridge No. 53-3060 which will replace the existing San Antonio Drive UC Bridge No. 53-0594. Foundation design loads and Structure Plans with various revision dates were emailed on August 31 and September 21, 2011 by Messrs David Muwanes and Tony Skreslet (Design Branch 14, Office of Bridge Design South1), respectively.

1.0 Scope of Work

This report supersedes the Preliminary Foundation Report for San Antonio DR UC (Replace) dated September 16, 2010. A review of the following resources provided information for the foundation evaluation and site condition.

- Recent sampled borings completed by Caltrans in 2011, for the proposed San Antonio DR UC (replacement) Bridge No. 53-3060.

- "As Built" Log of Test Borings for existing San Antonio DR UC Bridge No. 53-0594, dated April 1954, widening of the median in February 1958, seismic retrofit in April 1998 and "As Built" file maintained in Los Angeles Office.

- General Plans (sheet Nos. 1 & 2) revised 9-7-11, Foundation Plan revised 9-8-11, abutment Layouts and Details with revised dates of between 8-18-11 to 8-23-11, design loads and alternative pile types for bridge and retaining walls (General Foundation Information and design data sheet) dated 8-29-11.

- Present the results of investigations and interpretation of subsurface soil, and preparation of this report in accordance with Caltrans "Guidelines for Structures Foundation Reports, Version 2.0" Dec. 2009, and "Foundation Report Preparation for Bridge Foundations" Dec. 2009.

- Develop geologic profiles, geotechnical recommendations and engineering parameters for design and construction of the bridge foundations.

2.0 Project Description

The I-5 Corridor Improvement project proposes to reconstruct the I-5 freeway including bridge replacements, retaining walls and sound walls, between Los Angeles/Orange County line to the north of I-605, crossing cities of Norwalk, Santa Fe Springs and unincorporated cities. Replacement of the existing San Antonio DR. UC. is part of the Segment 4 of I-5 Corridor Improvement in the City of Norwalk, which covers an area from north of Silver Bow POC (PM 4.0) to south of Orr and Day OH (PM 6.0). Segment 4 encompasses one new structure (Imperial HWY Off-Ramp # 53-3071K), three bridge replacements (San Antonio Drive UC #53-3060, Imperial HWY UC #53-3061 and Pioneer Blvd. UC #53-3062), and approximately 17960 ft of sound walls and different types of retaining walls with and without sound walls. All elevations referenced in this report are based on 1988 NAVD datum. All elevations on the As-Built Log of Test Borings are referenced to the 1929 NGVD. The NGVD ’29 As-Built elevations can be converted to NAVD ’88 elevations by adding 2.408 ft to the NGVD ’29 elevations.

3.0 Field Investigation and Testing Program

In order to characterize the subsurface conditions and soil profile, site specific field investigation consisting of drilling two, 4.5” diameter, wet rotary borings was performed in March and July of 2011. At 5 foot intervals, Standard Penetration Tests in accordance with ASTM Test Method D1586 were performed using standard 1.4 inch I.D. split spoon sampler with a 140 pound hammer dropped 30 inches. At intervals where cohesive soils encountered, relatively undisturbed samples were also obtained using 2.0 inch I.D. Modified California Sampler. An electronic file of the completed new Log of Test Borings along with As-Built Log of Test Borings will be sent to Designer from URS Corporation drafting for inclusion in Contract Plans.

4.0 Laboratory Testing

Selected soil samples were retained and submitted to the Caltrans material laboratories in District 7 and Sacramento for testing. The purpose of the laboratory testing was to aid in evaluating the engineering properties of the subsurface materials and to confirm visual classification of the soils. Laboratory tests performed include moisture content, dry unit weight, wash sieve analysis, Atterberg limits, unconfined compression tests, direct shear, and corrosion tests. All laboratory tests were performed in accordance with current ASTM standard procedures and California Test Methods. The summarized laboratory test data are shown in Table 1.

Table 1. Summary of Laboratory Tests

Testing Type	ASTM/CTM Designation	Testing Purpose
Mechanical Analysis	CTM 202, 203	Soil Classification
Atterberg Limits	CTM 204	Soil Classification
Direct Shear	ASTM D3080	Shear Strength
Corrosion	CTM 417, 422, 643	Corrosion Potential
Unconfined Compression	ASTM D2166	Compressive Strength

5.0 Site Geology and Subsurface conditions

The entire project is located within the Los Angeles Basin with physiographic of a lowland coastal plain. It is bounded on the east and southeast by the Santa Ana Mountains and San Joaquin Hills and on the north by the Santa Monica and San Gabriel Mountains. The bridge site is situated in a relatively flat southwest sloping with Holocene to Late Pleistocene alluvial fan and valley deposits consisting of mostly poorly consolidated clay, sandy silt, sand, gravel and cobbles (California Geologic Survey 1998). This alluvium was deposited primarily by San Gabriel River floods emanating from the mountains and hills to the north of the project site. Depth to rock-like material is estimated to be greater than 400 feet. Based on information from the 2011 site investigation, different soil units are encountered at the proposed bridge supports, as characterized below.

Boring R-11-001 (Abut. 1R): Surface to approx. elevation +88 medium dense SP; elevation +88 to +54 interbeds of stiff to very stiff/dense ML, CL, SM, SP; elevation +54 to +40 very dense SP; elevation +40 to +33 dense non-plastic ML; elevation +33 to +13 interbeds of medium stiff to hard/dense to very dense ML, SM; elevation +13 to -17 interbeds of very dense SP, SM; elevation -17 to -31 medium stiff/very dense ML, CL, SP; elevation -31 to -38.5 (maximum boring depth) very dense SM.

Boring R-11-006 (Abut. 1L): Surface to approx. elevation +82 medium stiff ML; elevation +82 to +77 loose SP; elevation +77 to +67 interbeds of medium stiff to very stiff CL, ML; elevation +67 to +53 medium dense SM; elevation +53 to +22 interbeds of dense to very dense SP, SM; elevation +22 to +15 interbeds of medium dense/stiff SC, ML: elevation +15 to -39.5 (maximum boring depth) very dense SP.

Abut. 2: No boring was drilled at Abut. 2 due to right of way restrictions. Based on as built borings it appears to be underlain by sand, silty and clayey sand; silt, sandy and clayey silt.

Notes: SW = well graded sand, SP = poorly graded sand, SM = silty sand, SC = clayey sand, GW = well graded gravel, GP = poorly graded gravel, ML = silt, MH = elastic silt, CL = lean clay, CL-ML =silty clay, bgs = below ground surface

5.1 Groundwater

Groundwater was encountered in recent borings as presented in Table 2. However, groundwater was not encountered to elevation 39 (maximum boring depth) during 1950 field investigation. It should be noted that groundwater levels could fluctuate with the change of season and other factors. According to preliminary groundwater data evaluation (9-24-09) provided by Caltrans Hazardous Waste Branch, South Region, there is no groundwater contamination plume in the Segment 4.

Table 2. Recent Groundwater Information

Support Location	Boring No.	Depth to Groundwater (Below Ground Surface)	Groundwater Surface Elevation	Date of Water Measurement
Abut. 1L	R-11-006	83.0 ft	19.5 ft	7-13-2011

6.0 Corrosion Evaluation

Composite soil samples taken from recent exploratory borings at different intervals were sent to District 7 laboratory for corrosion testing. The test results indicate a non-corrosive environment at the proposed bridge site. Normal construction material and design are advised. Refer to Table 3 for specific test results.

Table 3. Corrosion Test Summary

Boring No.	Depth Interval (ft)	SIC Number	Minimum Resistivity (Ohm-Cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
R-11-006	0.0-50.0	N/A	2600	8.27	N/A	N/A
	50.0-100.0		3400	8.31		
	100.0-141.5		5300	8.82		

Note: It is the practice of Caltrans Corrosion Technology Section (with the exception of MSE walls) that 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 noncorrosive. Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist for representative soil and/or water samples taken at the site. Chloride concentration is greater or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less.

7.0 Seismic Recommendations

The proposed bridge site is not within an Alquist-Priolo Earthquake Fault Zone. An analysis was performed to develop and recommend ground motion parameters for the seismic design of the above referenced bridge structure. This analysis was performed in accordance with requirements specified in Appendix B of the Caltrans' 2009 Seismic Design Criteria (SDC, Version 1.5, August 2009) and utilizing the "Caltrans ARS Online" and other tools available at the internet sites. The average shear wave velocity (V_{s30}) for the upper 100 feet of the subsurface profile was estimated to be about 239 m/sec (784 ft/sec) based on recent field investigation. The closest fault to the site is the Puente Hills Thrust Fault oriented as a low angle north dipping thrust fault approximately 0.81 miles north of the site. The significant faults and fault zones are summarized in Table 4.

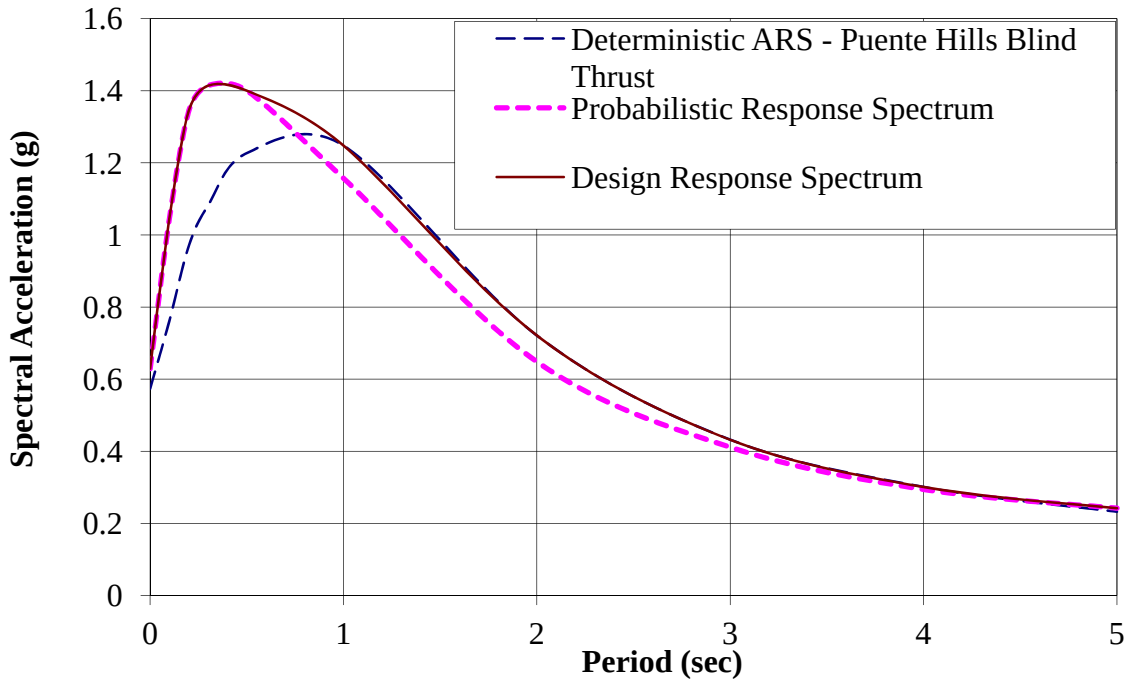
Table 4. Summary of Faults

Fault Name	Type	M_{max}	R_X	R_{JB}	R_{RUP}	PGA
Puente Hills Blind Thrust	R	7.3	0.81 mile (1.3 km)	0.81 mile (1.3 km)	1.83 mile (2.94 km)	0.67
Elsinore Fault Zone (Whittier Section)	RLSS	7.6	5.16 mile (8.30 km)	5.16 mile (8.30 km)	5.16 mile (8.30 km)	0.40
New Port Inglewood – Rose Canyon Fault Zone	RLSS	7.5	9.3 mile (15.0 km)	9.3 mile (15.0 km)	9.3 mile (15.0 km)	0.29
Upper Elysian Park Blind Thrust	R	6.4	9.34 mile (15.04 km)	9.34 mile (15.04 km)	9.34 mile (15.04 km)	0.26

Notes: R_X = Horizontal distance to the fault trace
R_{JB} = Shortest horizontal distance to the surface projection of the rupture area
R_{RUP} = Closest distance to the fault rupture plane
RLSS = Right Lateral Strike Slip
R = Reverse

The design deterministic as well as the probabilistic acceleration response spectrum (ARS) curves developed is shown in Figure 1. The probabilistic ARS curve corresponds to a ground motion return period (RP) of 975-year (i.e., 5% probability of exceedance in 50 years). It should be noted that the design deterministic ARS curve shown in Figure 1 is due to an earthquake event of magnitude M=7.3 and site to fault rupture surface distance of 1.3 Km associated with the Puente Hills Blind thrust fault. Since all the site to fault distance measures (e.g., R_{rup}, R_x and R_{jb} etc.) used in the attenuation relationships utilized in this analysis are within 25 Km, the ARS curves shown in Figure 1 include the near fault effects as specified in the Seismic Design Criteria (SDC 2009). In addition, the project site being located in the Los Angeles Basin also includes basin effects ($Z_{1.0}$= 695 m and $Z_{2.5}$=4.45 km). ARS curves were developed according to the Caltrans Geotechnical Services-Design Manual (Version 1.0, Aug. 2009). The design Peak Ground Acceleration (PGA) for the project site is 0.7g. The design ARS curve is an envelope of deterministic and probabilistic ARS curves (Figure 1).

Figure 1 - Recommended Design Acceleration Response Spectrum (ARS) for San Antonio DR UC Bridge No. 53-3060 Damping Ratio = 5%; V_{s30} = 239 m/sec



8.0 Liquefaction Potential

Based on current field investigation, the liquefaction potential at the bridge site is low to negligible due to absence of shallow groundwater. Accordingly, the potential for seismically induced settlement and lateral spreading are also considered to be low.

9.0 As Built Foundation Data

The existing San Antonio Drive UC. was built in 1953 and consists of a three span continuous RC T-beam with RC bents and open ended seated abutments, supported on driven steel shell Raymond step taper piles (Alt. Z). In 1957, bridge was widened in the median supported on cast-in-drilled hole (CIDH) piles at bent locations; however, abutment foundations were placed in 1953 construction. The As Built foundation data are shown in Tables 5 & 6.

Table 5. 1953 Original Structure, As Built Foundation Data

Support Location	Pile Type	Design Load	Bottom of Pile Footing Elevation	Specified Pile Tip Elevation
Abut. 1	Steel shell (Alt. Z)	45 tons	111.95 ft	65.0 ft
Bents 2, 3			95.0 ft	60.0 ft
Abut. 4			111.48 ft	65.0 ft

Table 6. 1957 Median Widening, As Built Foundation Data

Support Location	Pile Type	Design Load	Bottom of Pile Footing Elevation	Specified Pile Tip Elevation
Bents 2, 3	CIDH (Alt. V)	45 tons	95.0 ft	60.0 ft

10.0 Foundation Recommendations

The proposed bridge replacement is a single span PC/PS Bulb Tee Girder structure with seat type abutments. A sound wall will be constructed on top of the southbound side of the bridge. Most of the existing utilities in San Antonio Drive are assumed to be kept in place. The following recommendations are developed by OGDS1 based on 1) Log of Test Borings and interpreted subsurface conditions and design parameters established through laboratory tests and field data, 2) updated Structure Plans, design loads and alternative pile types proposed by OBDS1 as referenced in page 1, and 3) email correspondences and personal communications with Mr. Tony Skreslet.

10.1 Deep Foundations

The pile types proposed by OBDS1, consist of 200 kips HP14x89 at both abutments; 90 and 140 kips HP14x89 at Abutment 1R retaining wall. Based on subsurface conditions obtained from recent field investigation, OGDS1 concurs with the feasibility of proposed pile types to support the bridge replacement. Pile lengths required to resist the provided loads are computed based on Service-I Limit State load using computer program APILE (Version 4.0) at abutments and retaining walls for HP4x89 piles. The calculated axial geotechnical capacities of driven HP14x89 piles are based on skin friction. End bearing was not considered due to variable interbeds of granular and cohesive soil layers. General Foundation Information and Design Loads provided by OBDS1 are presented in Tables 7, 8 & 9. Recommended design and specified pile tip elevations for abutments and retaining wall provided in Tables 10, 11 & 12 are prepared by OGDS1.

Table 7. Bridge - General Foundation Information Provided By Structure Design

Support Location	Design Method	Pile Type	Bottom of Footing Elevation (ft)	Cut-off Elevation (ft)	Pile Cap Size (ft)		Permissible Settlement under Service Load (in)*	Number of Piles per Support
					B	L		
Abut. 1	LRFD	HP14x89	96.50	96.92	15	214.75	2	91
Abut. 2	LRFD	HP14x89	96.50	96.92	15	214.75	2	91

* Based on CALTRANS' current practice, the total permissible settlement is one inch for multi-span structures with continuous spans or multi-column bents, one inch for single span structures with diaphragm abutments, and two inches for single span structures with seat abutments. Different permissible settlement under service loads may be allowed if a structural analysis verifies that required level of serviceability is met.

Table 8. Retaining Wall - General Foundation Information Provided By Structure Design

Wall Height (ft)	Pile Type	Design Loading (kips)	Bottom of Footing Elevation (ft)	Nominal Resistance (kips)	
				Compression	Tension
H = 28	HP14x89	140	96.75	280	140
H = 22	HP14x89	90	106.00	180	90
H = 16	HP14x89	90	111.25	180	90
H = 10	HP14x89	90	117.75	180	90

Table 9. Bridge - Design Loads Provided By Structure Design

Support Location	**Service-1 Limit State (kips)**			**Strength Limit State (Controlling Group, kips)**				**Extreme Event Limit State (Controlling Group, kips)**			
	Total Load		**Permanent Loads**	**Compression**		**Tension**		**Compression**		**Tension**	
	Per Support	**Max Per Pile**	**Per Support**	**Per Support**	**Max Per Pile**	**Per Support**	**Max Per Pile**	**Per Support**	**Max Per Pile**	**Per Support**	**Max Per Pile**
Abut. 1	15023	198	13725	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Abut. 2	15023	198	13725	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 10. Foundation Recommendations For Abutments

Support Location	**Pile Type**	**Cut-off Elevation (ft)**	**LRFD Service-1 Limit State Load (kips) Per Support**		**LRFD Service-1 Limit State Total Load (kips) Per Pile (Compression)**	**Nominal Resistance (kips)**	**Design Tip Elevations (ft)**	**Specified Tip Elevation (ft)**	**Nominal Driving Resistance Required (kips)**
			Total	**Permanent**					
Abut. 1 & 2	HP14x89	96.92	15023	13725	200	400	33 (a) 58 (c)	33	400

Table 11. Foundation Recommendations For Abutment 1R Retaining Wall

Ret. Wall Heights (ft)	Pile Type	Bottom of Footing Elevation (ft)	LRFD Service-1 Limit State Total Load (kips) Per Pile (Compression)	Nominal Resistance (kips)	Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
H = 28	HP14x89	96.75	140	280	49 (a) 62 (b)	49	280
H = 22		106.00	90	180	62 (a) 74 (b)	62	180
H = 16		111.25	90	180	67 (a) 77 (b)	67	180
H = 10		117.75	90	180	74 (a) 82 (b)	74	180

Notes:
1. Design tip elevations are controlled by (a) Compression, (b) Tension.
2. The specified tip elevation shall not be raised above the design tip elevation for tolerable settlement.

Table 12. Pile Data Table

Location	Wall Height (ft)	Pile Type	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
			Compression	Tension			
Abut. 1 & 2	N/A	HP14x89	400	0	33 (a) 58 (c)	33	400
Abut. 1R Retaining Wall	H = 28		280	140	49 (a) 62 (b)	49	280
	H = 22		180	90	62 (a) 74 (b)	62	180
	H = 16		180	90	67 (a) 77 (b)	67	180
	H = 10		180	90	74 (a) 82 (b)	74	180

Notes:
1. Design tip elevations for abutments are controlled by (a) Compression, (c) Settlement.
2. Design tip elevations for retaining wall are controlled by (a) Compression, (b) Tension.
3. The specified tip elevation shall not be raised above the design tip elevations for tension and tolerable settlement.

10.2 Approach Fill Earthwork

New embankment fills will be placed on both sides of abutments 1 and 3 for the replacement bridge as part of the roadway widening. Calculated elastic settlements of the native soil below the new fill material at abutment foundations (wedge fill) and at a distance behind and away from the abutments (total fill prism) are shown in Table 13.

Table 13. Elastic Settlement Below Soil Embankment Fill

Support Location	Approximate Fill Height (ft)	Approximate Fill Width (ft)	Pre-Abutment Construction Settlement (new soil embankment fill)	Post Abutment Construction Settlement (secondary wedge fill)
Abut. 1L	H = 24	112	6.8”	4.0”
Abut. 1R	H = 22	38	2.8”	1.2”
Abut. 3L	H = 25	110	~7.0”	~4.0”
Abut. 3R	H = 24	43	~3.0”	~1.5”

Note:
In order to reduce the above post construction settlement and potential down drag effect on the piles and differential settlement effects on the structure, lightweight geosynthetic fill material (i.e. geofoam) or lightweight cellular concrete is recommended for the secondary wedge fill. Since the pile supported footing may settle less than the adjacent embankment, a continuous vertical joint in the lightweight fill may be necessary at the back edge of the bridge footing.

As an alternative, shoring at both abutments may be used to preload to the outside edge of the footings and eliminate the post construction settlement and the need for light weight material. Surcharging could also be used to reduce settlement waiting period. Bridge construction schedule and staging will need to be coordinated with construction of the lightweight fill approach embankment (if considered).

11.0 Notes to Designer

1. Contractor's driving system should be examined to verify the driving system is capable of installing the proposed piles at abutments and retaining wall, before commencement of pile driving.

2. The recommendations contained in this report are based on specific project information that has been provided by OBDS1-Branch 15. If any conceptual changes are made during final project design, OGDS1-Branch C should review those changes to determine if these foundation recommendations are still applicable.

12.0 Construction Considerations

DRIVEN PILES

1. Due to the intermittent and irregular distribution of dense to very dense soil units, variable and erratic moderate to hard driving should be anticipated below elevation $\pm$52 to specified pile tip at southern half of the bridge (abutments 1L & 2L) and between elevations $\pm$54 to $\pm$44 at northern half of the bridge (abutments 1R & 2R). Subsurface material through which the piles will be driven, include medium stiff to very stiff silt and clay with (5 ft thick) interbed of loose fine sand (to elev. 67); medium dense to dense silty fine sand (to elev. 52); then dense to very dense fine to medium sand and silty sand (to pile tip elev.) at southern half of the bridge. Material at northern half include medium dense fine sand (to elev. 88); interbeds of stiff to very stiff silt and clay (to elev. 66); interbeds of dense/very stiff fine and medium sand, silty sand and silt (to elev. 54); from elev. 54 to 44 very dense fine sand (hard driving); from elev. 44 to pile tip dense fine sand and non-plastic silt.

2. The contractor should monitor adjacent structures or properties for vibrations to prevent potential damage due to pile driving. The contractor should take necessary precautions to minimize the impact on adjacent structures or properties.

3. Subsurface characterization is based on the borings performed at particular accessible locations. Subsurface conditions between borings are interpolated between those points. Therefore, if conditions different than those assumed in the foundation design are encountered during construction, excavation, or pile driving, OGDS1 should be notified to evaluate the impact on current recommendations and make appropriate modifications, if required.

4. Splicing of the steel piles may be necessary if bearing is not achieved at the specified tip elevation. With approval of Structure Representative, any driven pile achieving refusal within 4.0 feet or less above the specified pile tip elevation may be considered satisfactory.

5. If minimum required bearing is not obtained at specified pile tip elevation (SPTE) in the first pile of the pile group, the second pile should be stopped 1-foot above the SPTE. After a set-up period of 24 hours, re-strike the same pile and stop 6 inch above the SPTE and review the re-strike pile resistance. If pile bearing is adequate then drive to the recommended pile tip. If bearing is not adequate from the first re-strike then a 2-week set-up period is recommended before driving to SPTE and verifying the pile capacity.

6. At times steel piles may not attain minimum bearing at specified tip elevation, even after re-driving. When this situation arises, the only option is to splice on additional pile length and continue driving to a point where the nominal penetration is achieved, or alternatively lug the piles in order to increase resistance at specified pile tip. OGDS1 should be consulted to confirm the selected method.

7. The designer should identify on the plans, removal limits of the existing bridge structures and supporting elements (i.e. footings, piles). In general, all members of existing structures should be removed to a minimum of 3 feet below intended finish grade. If existing structure members are interfering with new construction, they should be removed in their entirety. When choosing to abandon or remove an existing foundation such as a pile cap, considerations should be given to the effect that the removal would have on any adjacent utilities. The designer may choose to abandon such elements but should consider potential interference with future planned work such as utility installation. Structure elements that are to remain should not prohibit proper compaction or uniform consolidation of new earth fills. The designer's removal plan should be forwarded to OGDS1 for concurrence. The Structure Representative should adjust proposed pile locations when necessary to avoid encountering abandoned piles. If a proposed pile needs to be relocated, the Structure Representative should consult with OBDS1 and OGDS1 to insure adequate foundation design is maintained.

8. Drilling was not performed at Abutment 2 due to access restrictions. **It is necessary that one boring be drilled at each corner of the Abutment 2 (R & L) early in construction phase (at least 30 days before pile driving and prior to pile fabrication) to determine the subsurface conditions and verify the parameters assumed in foundation recommendations. If subsurface conditions are substantially different than those assumed in pile design, modification of pile tips will be required.**

EARTHWORK

9. The new approach fill at abutments is to be constructed by conventional equipment in accordance with Sections 19-5.03 and 19-6.01 of the Standard Specifications and other requirements as directed by the Design Engineer. End dumping is not to be permitted.

10. A maximum settlement of up to 7 inches on the left side and 3 inches on the right side, in foundation soil is expected due to placement of new embankment fill. Most of the settlement will occur during embankment construction. Settlement in the fill is expected to be minimal; however, a 30-day fill stabilization is recommended before the construction of abutment foundations. The actual settlement period will be determined by the structure representative on the basis of settlement data in the field.

11. Shoring at both abutments may be required which can be supported by sheet piles and/or soldier piles with or without lagging. However, method of shoring construction is the contractor's responsibility.

12. In conclusion, the commentary and recommendations in this report should not be considered an offering or implying an opinion of, or an approval concerning the foundation design and/or method of construction.

Any questions regarding the above comments should be directed to Faramarz Gerami at 213-620-2149 or Ted Liu at 213-620-2136.

Report by:

FARAMARZ GERAMI, P.G., C.E.G.
Engineering Geologist
Office of Geotechnical Design - South 1
Branch C

Reviewed by: Date: 12/22/2011

CHI-TSENG TED LIU, Ph.D., P.E., G.E.
Senior Transportation Engineer
Office of Geotechnical Design - South 1
Branch C

REGISTERED PROFESSIONAL ENGINEER
CHI-TSENG TED LIU
No. 2669
Exp. 6-30-2012
GEOTECHNICAL
STATE OF CALIFORNIA

Attachment: Generalized soil profile and design strength parameters

c: Structure Construction R.E. pending File (RE_Pending_File@dot.ca.gov)
District Project Manager – Syed_Huq@dot.ca.gov
District Materials Engineer –kirsten_Stahl@dot.ca.gov
Structure Design – Tony_skreslet@dot.ca.gov
GS Corporate – shira_rajendra@dot.ca.gov
GS File room (gs_file_room@dot.ca.gov)

Appendix 1 – Generalized soil profile and design strength parameters

Abutment 1L

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
102.0-82.0	Silt with sand (ML)	9	90	-	700
82.0-77.0	Fine sand (SP)	7	95	28	-
77.0-72.0	Lean clay (CL)	13	120	-	1000
72.0-67.0	Sandy silt (ML)	16	110	-	2000
67.0-54.0	Silty fine sand (SM)	31	115	32	-
54.0-49.0	Fine sand (SP)	41	130	34	-
49.0-44.0	Medium sand (SP)	68	130	38	-
44.0-24.0	Silty/fine sand (SM/SP)	46	130	34	-
24.0-15.0	Sandy silt (ML)	28	115	-	1400
15.0-5.0	Fine sand (SP)	43	130	34	-
5.0-(-39.5)	Fine and medium sand (SP)	71	130	38	-

Abutment 1R

Elevation Intervals (ft)	Soil Type	Average Blow Count (N_{60})	Total Unit Weight (pcf)	Friction Angle (degree)	Undrained Shear Strength (psf)
104.0-88.0	Fine sand (SP)	16	110	30	-
88.0-79.0	Silt/clay (ML/CL)	16	115	-	1500
79.0-74.0	Lean clay (CL)	11	120	-	2500
74.0-66.0	Silt with sand (ML)	16	110	-	1000
66.0-59.0	Silty/fine and medium sand (SM/SP)	38	130	37	-
59.0-54.0	Silt with sand (ML)	33	115	-	1400
54.0-40.0	Fine sand/non-plastic silt (SP/ML)	55	125	34	-
40.0-26.0	Silt (ML)	14	90	-	800
26.0-15.0	Sandy silt (ML)	34	115	-	1400
15.0-(-17.0)	Silty/fine sand (SM/SP)	69	130	35	-

State of California **Business, Transportation and Housing Agency**

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Be energy efficient!

To: Mr. FRANK WEI
Senior Tansportation Engineer
Bridge Design Branch 21
Office of Bridge Design South 2

Date: March 6, 2012
File: 07-LA-5- PM 4.0/5.9
0700001834 (07-215941)

Sound Walls 250, 251

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1 MS # 18

Subject: Revised Foundation Report

In response to the request on January 23, 2012, the Office of Geotechnical Design South 1 has prepared the foundation recommendations for part of sound wall Nos. 250 and 251 due to pre-drilling requirements over one existing and one new sewer lines over Kalnor Ave. and Paddison Ave. respectively. Driving pile operation adjacent to the utilities lines will impact the structural integrity of the sewer lines. To avoid inadvertent vibration adjacent to the lines, oversized pre-drilled holes to 5 ft below the pipe invert according to Standard Specification 49-1.06 are required. Tables below present the revised design tip elevations for parts of the Sound walls 250 and 251 where there are sewers line crossing. It should be mentioned that at the time of writing original foundation report, the request to pre-drill adjacent to the sewer lines was not submitted. The remainder of the original Foundation Report dated December 13, 2011 is still applicable.

Foundation Recommendation for part of SW 250 Spanning Utility

Wall Type	Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Pre-drill Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)
						Compression	Tension		
5SWBP	H=24, over 8"dia. Sewer (Paddison Ave. lin)	PS/PC Conc. Pile ALT. "X" T=14"	97.25	85.00	90	180	90	52 (a) 63 (b)	52
1SWBP	H=26, over 8"dia. Sewer (Kalnor Ave.)	PS/PC Conc. Pile ALT. "X" T=14"	100.00	87.00	90	180	90	54 (a) 65 (b)	54

Foundation Recommendation for part of SW 251 Spanning Utility

Wall Type	Wall Height Range (ft)	Pile Type	Bottom of Footing Elev. (ft)	Pre-drill Elev. (ft)	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)
						Compression	Tension		
1SWBP	H=26, over 8"dia. Sewer (Paddison Ave.)	PS/PC Conc. Pile ALT. "X" T=14"	98.75	86.00	90	180	90	53 (a) 64 (b)	53
1SWBP	H=24, over 8"dia. Sewer (Kalnor Ave.)	PS/PC Conc. Pile ALT. "X" T=14"	95.25	88.00	90	180	90	55 (a) 66 (b)	55

If you have any questions, please contact Amare Tsegie at (213) 620-2133 or Faramarz Gerami at (213) 620-2149.

Prepared by: Date: 03/06/2011

Amare Tsegie, P.E.
Transportation Engineer
Office of Geotechnical Design South 1
Branch C

Reviewed by: Date: 03/06/2011

Chi-Tseng Ted Liu, Ph.D., P.E., G.E.
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District Project Manager-Syed Huq (Electronic File)
District Material Engineer-Kirstin Stahl (Electronic File)
Structural Design – Jose Higareda (Electronic File)
GS Corporate- Shira Rajendra (Elecrobnic File)

FOUNDATION REVIEW

DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES

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2. R.E. Pending File
3. Specifications & Estimates
4. File

Geotechnical Services
1. GD - North ; South ; West
2 GS File Room

Date: 3/29/12

San Antonio Dr. UC
Structure Name

07 - LA - 005 - 4.41
District County Route ~~km~~ Post
m.

07- 1834
District Project Development
07-215941 E.A. Number
53-3060 Structure Number
District Project Engineer

Foundation Report By: F. Gerami Dated: 12/22/11

Reviewed By: J Higueda (SD) R. Price (GS)

General Plan Dated: 3/26/12 Foundation Plan Dated: 12/12/11

☒ No changes. ☐ The following changes are necessary.

FOUNDATION CHECKLIST

Pile Types and Design Loads
___ Pile Lengths
___ Predrilling
___ Pile Load Test
___ Substitution of H Piles For Concrete Piles ☐ Yes ☒ No

___ Footing Elevations, Design Loads, and Locations
___ Seismic Data
___ Location of Adjacent Structures and Utilities
___ Stability of Cuts or Fills
___ Fill Time Delay

Effect of Fills on Abutments and Bents
___ Fill Surcharge
___ Approach Paving Slabs
___ Scour
___ Ground Water
___ Tremie Seals/Type D Excavation

Jose L. Higueda 15
Structure Design Bridge Design Branch No.

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Date: 3/29/12

Imperial Highway UC
Structure Name

07-LA-005 — 4.91
District County Route ~~km~~ Post

07-1834

District Project Development — District Project Engineer

07-215941 E.A. Number — 53-3061 Structure Number

Foundation Report By: F. Gerami — Dated: 12/22/11

Reviewed By: J. Higareda (SD) — R. Price (GS)

General Plan Dated: 12/7/11 — Foundation Plan Dated: 1-13/11

☒ No changes. ☐ The following changes are necessary.

FOUNDATION CHECKLIST

Pile Types and Design Loads
__ Pile Lengths
__ Predrilling
__ Pile Load Test
__ Substitution of H Piles For Concrete Piles * ☐ Yes ☑ No

__ Footing Elevations, Design Loads, and Locations
__ Seismic Data
__ Location of Adjacent Structures and Utilities
__ Stability of Cuts or Fills
__ Fill Time Delay

Effect of Fills on Abutments and Bents
__ Fill Surcharge
__ Approach Paving Slabs
__ Scour
__ Ground Water
__ Tremie Seals/Type D Excavation

Jose I. Higareda 15
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Date: 3/29/12

Pioneer Blvd UC
Structure Name

07 - LA - 005 - 5.12
District County Route ~~km~~ Post
m

District Project Development
District Project Engineer

07-215941 53-3052
E.A. Number Structure Number

Foundation Report By: F. Gwarani Dated: 12/22/11

Reviewed By: J. Higareda (SD) R. Price (GS)

General Plan Dated: 3/16/12 Foundation Plan Dated: 3/16/12

☒ No changes. ☐ The following changes are necessary.

FOUNDATION CHECKLIST

Pile Types and Design Loads
- Pile Lengths
- Predrilling
- Pile Load Test
- Substitution of H Piles For Concrete Piles ☐ Yes ☐ No
- Footing Elevations, Design Loads, and Locations
- Seismic Data
- Location of Adjacent Structures and Utilities
- Stability of Cuts or Fills
- Fill Time Delay
- Effect of Fills on Abutments and Bents
- Fill Surcharge
- Approach Paving Slabs
- Scour
- Ground Water
- Tremie Seals/Type D Excavation

Jose J. Higareda 15
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Geotechnical Services

Rev. 06/02

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2 GS File Room

Date: 3/29/12

Imperial Highway OR
Structure Name

07 - LA - 005 - 5.12
District County Route ~~km~~ Post

District Project Development
District Project Engineer

07-245941 53-3071K
E.A. Number Structure Number

Foundation Report By: F. Gwami Dated: 12/22/11

Reviewed By: J. Higareda (SD) R. Price (GS)

General Plan Dated: 2/6/12 Foundation Plan Dated: 2/2/12

☒ No changes. ☐ The following changes are necessary.

FOUNDATION CHECKLIST

Pile Types and Design Loads
__ Pile Lengths
__ Predrilling
__ Pile Load Test
__ Substitution of H Piles For Concrete Piles ☐ Yes ☐ No

__ Footing Elevations, Design Loads, and Locations
__ Seismic Data
__ Location of Adjacent Structures and Utilities
__ Stability of Cuts or Fills
__ Fill Time Delay

__ Effect of Fills on Abutments and Bents
__ Fill Surcharge
__ Approach Paving Slabs
__ Scour
__ Ground Water
__ Tremie Seals/Type D Excavation

Jose I Higareda 15
Structure Design Bridge Design Branch No.

Geotechnical Services

Rev 06/02

INFORMATION HANDOUT

BATTERY BACKUP SYSTEM CONNECTION DIAGRAMS AND FOUNDATION DETAILS

PROJECT 0700001834
(EA 07-215941)

Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel — REGISTERED CIVIL ENGINEER — 12-20-07 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Theresa A. Gabriel — No. E15129 — Exp. 6-30-10 — ELECT — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

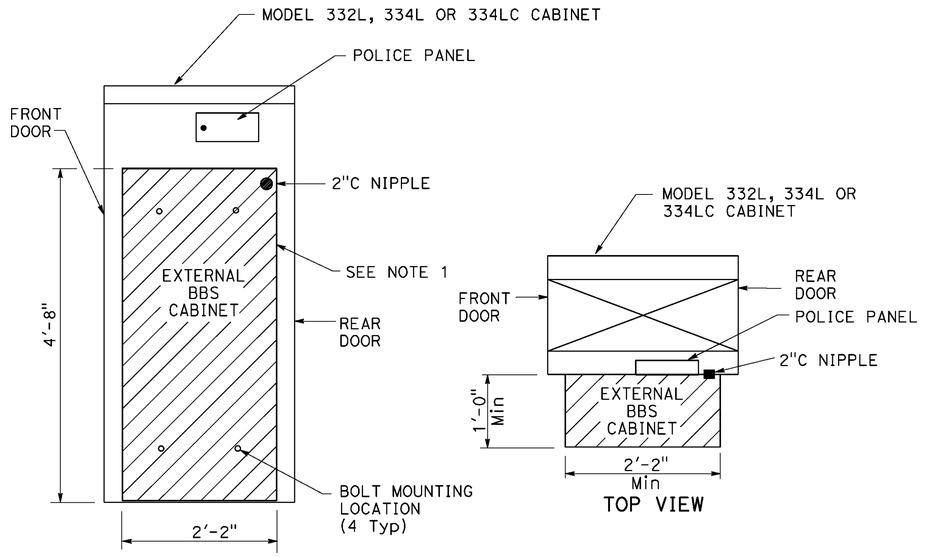
REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

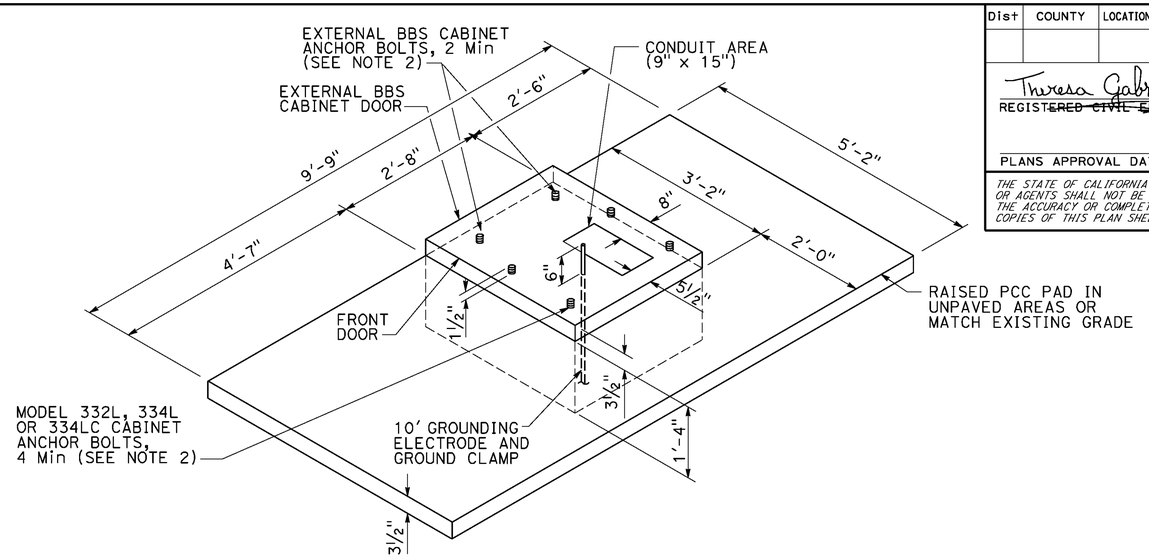
FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

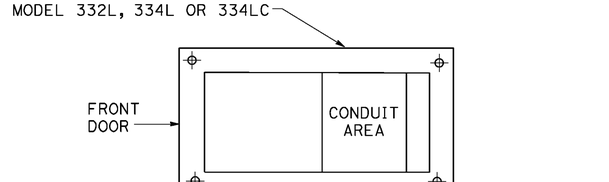
Caltrans



EXTERNAL BBS CABINET MOUNTED TO THE MODEL 332L, 334L OR 334LC CABINET

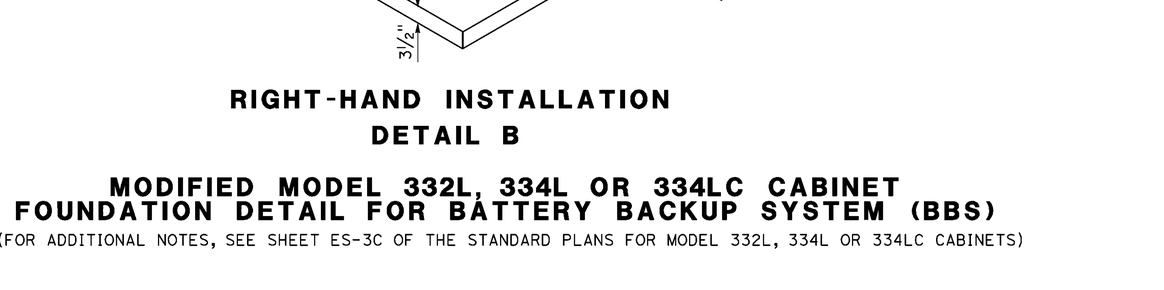


LEFT-HAND INSTALLATION DETAIL A



BASE PLAN FOR BBS MOUNTED TO THE MODEL 332L, 334L OR 334LC CABINET

(FOR DIMENSIONS AND DETAILS NOT SHOWN, SEE SHEET A6-1 TO A6-4, CABINET HOUSING DETAILS OF THE TRANSPORTATION ELECTRICAL EQUIPMENT SPECIFICATION (TEES))



RIGHT-HAND INSTALLATION DETAIL B

MODIFIED MODEL 332L, 334L OR 334LC CABINET FOUNDATION DETAIL FOR BATTERY BACKUP SYSTEM (BBS)

(FOR ADDITIONAL NOTES, SEE SHEET ES-3C OF THE STANDARD PLANS FOR MODEL 332L, 334L OR 334LC CABINETS)

NOTE: (THIS SHEET ONLY)

1. THE EXTERNAL BBS CABINET SHALL BE MOUNTED TO THE MODEL 332L, 334L OR 334LC CABINET WITH FOUR 18-8 STAINLESS STEEL Hex HEAD, FULLY-THREADED, ⅜"-16 x 1" BOLTS; TWO WASHERS PER BOLT, DESIGNED FOR ⅜" BOLTS AND ARE 18-8 STAINLESS STEEL, 1" OUTSIDE DIAMETER, ROUND, AND FLAT; AND ONE K-LOCK NUT PER BOLT THAT IS 18-8 STAINLESS STEEL AND A Hex-NUT. THE ENGINEER WILL HAVE TO APPROVE THE BOLT MOUNTING LOCATION PRIOR TO INSTALLATION.
2. THE ANCHOR BOLTS SHALL BE ¾" Dia x 15" WITH A 2"-90° BEND. THE CABINET MANUFACTURER'S SPECIFICATION SHALL DETERMINE THE LOCATION OF THE ANCHOR BOLTS IN THE FOUNDATION. THE ENGINEER WILL HAVE TO APPROVE THE ANCHOR BOLTS AND ITS LOCATION IN THE FOUNDATION PRIOR TO CONSTRUCTION.
3. THE CONTRACTOR SHALL VERIFY THE DIMENSIONS OF THE BBS CABINET PRIOR TO CONSTRUCTING THE FOUNDATION OF THE Std MODEL 332L, 334L OR 334LC CABINET FOUNDATION. THE ENGINEER WILL HAVE TO APPROVE ANY NECESSARY DEVIATIONS PRIOR TO CONSTRUCTION.
4. ALL DIMENSIONS ARE NOMINAL.

THIS PLAN IS ACCURATE FOR ELECTRICAL WORK ONLY.

ELECTRICAL SYSTEMS

(BACKUP BATTERY SYSTEM FOUNDATION DETAILS)

NO SCALE

LAST REVISION 2-2-09 | DATE PLOTTED => 11-AUG-2010 | TIME PLOTTED => 13:46

Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel 12-20-07
REGISTERED CIVIL ENGINEER DATE

Theresa A. Gabriel No. E15129 Exp. 6-30-10 ELECT — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

PLANS APPROVAL DATE

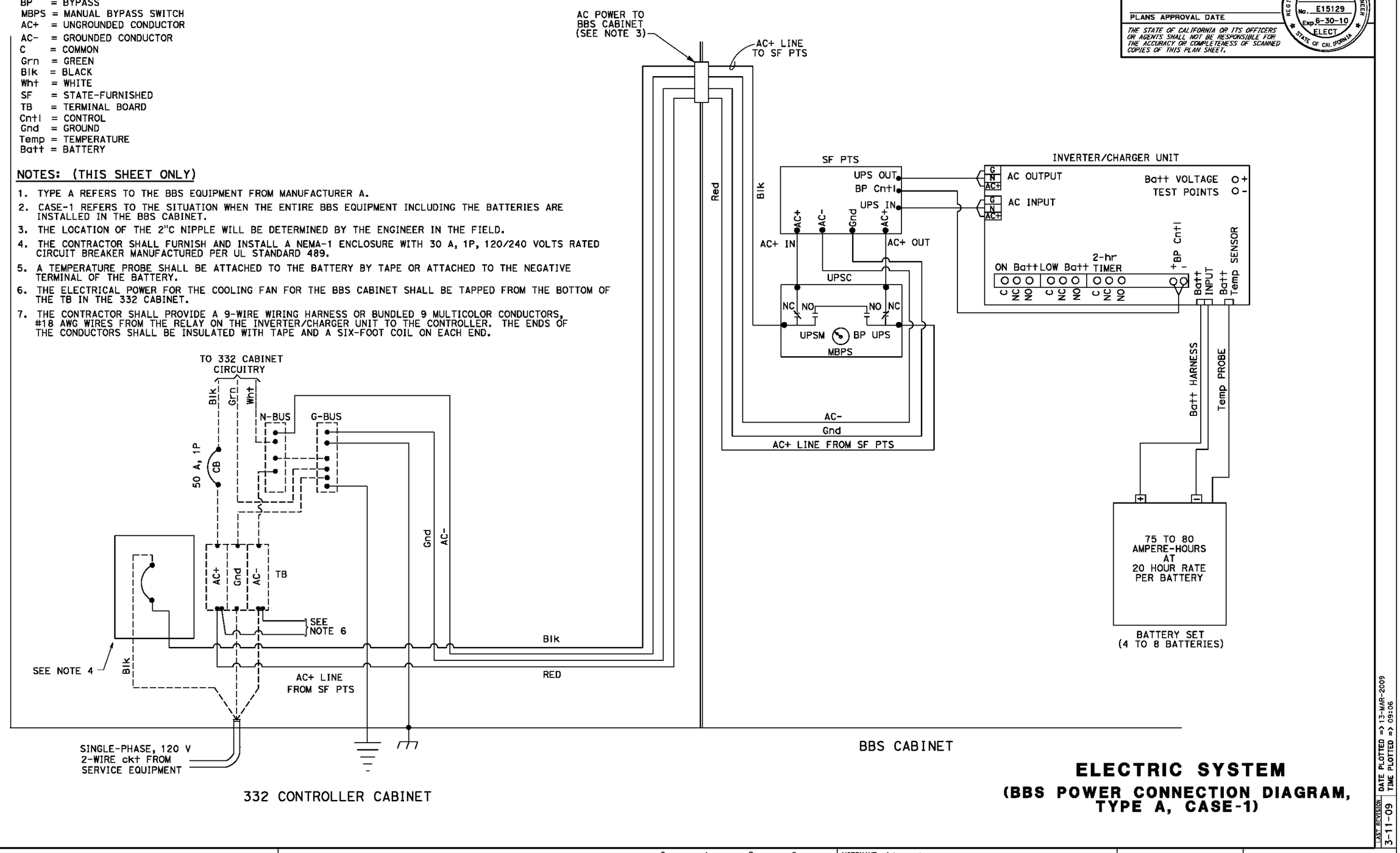
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

LEGEND: (THIS SHEET ONLY)

PTS = POWER TRANSFER SWITCH
UPS = UNINTERRUPTIBLE POWER SUPPLY
UPSC = UNINTERRUPTIBLE POWER SUPPLY CONTROLLER
UPSM = UPS MODE
BP = BYPASS
MBPS = MANUAL BYPASS SWITCH
AC+ = UNGROUNDED CONDUCTOR
AC- = GROUNDED CONDUCTOR
C = COMMON
Grn = GREEN
Blk = BLACK
Wht = WHITE
SF = STATE-FURNISHED
TB = TERMINAL BOARD
Cntl = CONTROL
Gnd = GROUND
Temp = TEMPERATURE
Batt = BATTERY

NOTES: (THIS SHEET ONLY)

1. TYPE A REFERS TO THE BBS EQUIPMENT FROM MANUFACTURER A.
2. CASE-1 REFERS TO THE SITUATION WHEN THE ENTIRE BBS EQUIPMENT INCLUDING THE BATTERIES ARE INSTALLED IN THE BBS CABINET.
3. THE LOCATION OF THE 2"C NIPPLE WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL A NEMA-1 ENCLOSURE WITH 30 A, 1P, 120/240 VOLTS RATED CIRCUIT BREAKER MANUFACTURED PER UL STANDARD 489.
5. A TEMPERATURE PROBE SHALL BE ATTACHED TO THE BATTERY BY TAPE OR ATTACHED TO THE NEGATIVE TERMINAL OF THE BATTERY.
6. THE ELECTRICAL POWER FOR THE COOLING FAN FOR THE BBS CABINET SHALL BE TAPPED FROM THE BOTTOM OF THE TB IN THE 332 CABINET.
7. THE CONTRACTOR SHALL PROVIDE A 9-WIRE WIRING HARNESS OR BUNDLED 9 MULTICOLOR CONDUCTORS, #18 AWG WIRES FROM THE RELAY ON THE INVERTER/CHARGER UNIT TO THE CONTROLLER. THE ENDS OF THE CONDUCTORS SHALL BE INSULATED WITH TAPE AND A SIX-FOOT COIL ON EACH END.



ELECTRIC SYSTEM
(BBS POWER CONNECTION DIAGRAM, TYPE A, CASE-1)

REVISED BY | DATE REVISED
CALCULATED-DESIGNED BY | CHECKED BY
FUNCTIONAL SUPERVISOR
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

LAST REVISION 3-11-09
DATE PLOTTED => 13-MAR-2009
TIME PLOTTED => 09:06

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => trcarol DGN FILE => BBS 1250FSM.dgn | CU 00000 | EA 000000

Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel 12-20-07
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

Theresa A. Gabriel No. E15129 Exp. 6-30-10 ELECT — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

LEGEND: (THIS SHEET ONLY)

PTS = POWER TRANSFER SWITCH
UPS = UNINTERRUPTIBLE POWER SUPPLY
UPSC = UNINTERRUPTIBLE POWER SUPPLY CONTROLLER
UPSM = UPS MODE
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MBPS = MANUAL BYPASS SWITCH
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AC- = GROUNDED CONDUCTOR
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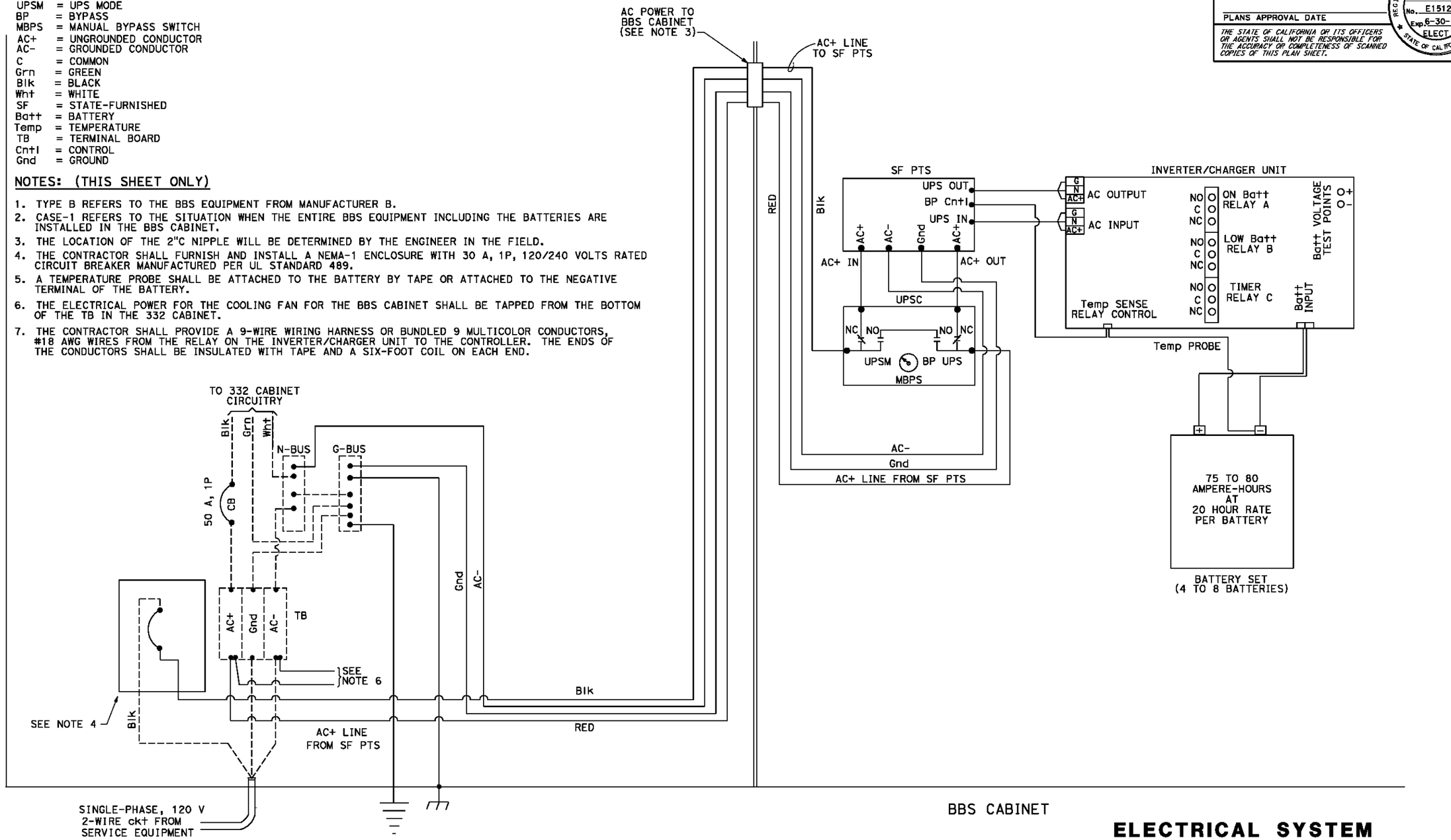
Grn = GREEN
Blk = BLACK
Wht = WHITE
SF = STATE-FURNISHED
Batt = BATTERY
Temp = TEMPERATURE
TB = TERMINAL BOARD
Cntl = CONTROL
Gnd = GROUND

NOTES: (THIS SHEET ONLY)

1. TYPE B REFERS TO THE BBS EQUIPMENT FROM MANUFACTURER B.
2. CASE-1 REFERS TO THE SITUATION WHEN THE ENTIRE BBS EQUIPMENT INCLUDING THE BATTERIES ARE INSTALLED IN THE BBS CABINET.
3. THE LOCATION OF THE 2"C NIPPLE WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL A NEMA-1 ENCLOSURE WITH 30 A, 1P, 120/240 VOLTS RATED CIRCUIT BREAKER MANUFACTURED PER UL STANDARD 489.
5. A TEMPERATURE PROBE SHALL BE ATTACHED TO THE BATTERY BY TAPE OR ATTACHED TO THE NEGATIVE TERMINAL OF THE BATTERY.
6. THE ELECTRICAL POWER FOR THE COOLING FAN FOR THE BBS CABINET SHALL BE TAPPED FROM THE BOTTOM OF THE TB IN THE 332 CABINET.
7. THE CONTRACTOR SHALL PROVIDE A 9-WIRE WIRING HARNESS OR BUNDLED 9 MULTICOLOR CONDUCTORS, #18 AWG WIRES FROM THE RELAY ON THE INVERTER/CHARGER UNIT TO THE CONTROLLER. THE ENDS OF THE CONDUCTORS SHALL BE INSULATED WITH TAPE AND A SIX-FOOT COIL ON EACH END.



ELECTRICAL SYSTEM

(BBS POWER CONNECTION DIAGRAM, TYPE B, CASE-1)

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
FUNCTIONAL SUPERVISOR
CALCULATED-DESIGNED BY
CHECKED BY
REVISED BY
DATE REVISED
LAST REVISION 3-11-09
DATE PLOTTED => 21-SEP-2009
TIME PLOTTED => 13:33

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => trcarol
DGN FILE => BBS DUIFSW.dgn
CU 00000
EA 000000

Tract #:

Issued By:
Issued Date:

Permit #: **PCFL T201200873**

Permit Office: 6

PC-MODIFIC
MODIFICATION OF FLOOD
CONTROL FACILITY

COUNTY OF LOS ANGELES-DPW
Department Of Public Works
Alhambra, CA 91803 - (626)458-3129
Flood Control District Permit

FOR BIDDING PURPOSES ONLY (NOT FOR CONSTRUCTION)

Individual's / Company Name	Address / City, State, Zip	Work Phone	Home Phone
(APP) STATE OF CALIFORNIA, D.O.T.	100 S. MAIN ST., #100, MS13	213-897-6362	
MIKE NOURI	LOS ANGELES, CA 90012		
(CNT) CH2MHILL	6 HUTTON CENTRE DR., #700		
GEORGE HSU	SANTA ANA, CA 92707		

Emergency Contact

Location

Site Address:
Description: PROJECT 21: BET. IMPERIAL HWY. AND UNION ST., NORWALK

Scope of Work

*** FOR BIDDING PURPOSES ONLY. NOT FOR CONSTRUCTION***

PURPOSE OF PERMIT: To authorize the work described below affecting the subject stream in accordance with the submitted plans, Los Angeles County Flood Control District Drawing Nos. 181-21-F60 .1 to .6 (Los Angeles County Department of Public Works Drawing Nos. PF560097 to PF560102).

WORK DESCRIPTION: Remove approx. 318 LF of 66-inch RCP and approx. 1, 015 LF of 78-inch RCP, and replace with approx. 1,323 LF of 78-inch RCP (strength per plans). Remove (2) catch basins in series and their laterals; seal mainline per SPPWC Standard Plan No. 381-2. Construct (2) catch basins per Std. 300-3 (W=7', V=5'); their 18-inch RCP (2000D) laterals (connections per plans); and local depressions per Std. 313-3, Case E (H=2"). Construct Caltrans maintained 12-, 24-, and 30-inch connections per Std. 332-2, and a 24-inch monolithic connection to a newly constructed manhole. Construct (5) manholes per Std. 320-2. Adjust the top of two catch basins per submitted details.

Permittee shall maintain the storm drain within the State right-of-way until permission is granted to the District allowing access for maintenance. This permit shall not be exercised during inclement weather or when the 5-day forecast predicts rain. Removal of any portion of the existing mainline shall not take place between October 15 and April 15 and until the Department has approved a Diversion Plan. Permittee must provide a schedule of their activities to avoid any potential conflicts with the Department's maintenance work and must notify the District of the date of final completion. Permittee shall submit as-built drawing for the competed construction authorized by this permit within 30 days from the completion of work. All activities covered under this permit are subject to final approval by City of Norwalk.

Work shall not begin until an inspection deposit of $30,000 has been paid; and contractor's insurance certificate, and additional insured endorsement are approved by the County.

PERMITTEE MUST NOTIFY PERMIT OFFICE NO. 4 AT TELEPHONE (562) 861-3580 LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS PERMIT. FAILURE TO SO NOTIFY THE PERMIT OFFICE IS CAUSE FOR REVOCATION OF PERMIT. A COPY OF THIS PERMIT SHALL BE KEPT AT THE WORK SITE DURING ALL PERIODS OF OPERATION WITHIN THE DISTRICT'S RIGHT OF WAY AND SHALL BE SHOWN TO ANY DISTRICT REPRESENTATIVE OR LAW ENFORCEMENT OFFICER UPON DEMAND.

CC: City of Norwalk, Design (Zandieh), Flood Maintenance (South), Survey/Mapping and Property Management (Rothman), Land Development (Office, P.O. 4, Berhan)

Permit Detail

FILE CODE NO.	181-21.032
FLOOD FACILITY NAME :	STORM DRAIN BOND ISSUE PROJECT NO. 21, U-2, L-B
FLOOD STATION :	~ 102+90 TO 119+50
INSPECTION CHARGE #:	TBD
LOCATION 1:	BET. IMPERIAL HWY. AND UNION ST., NORWALK
THOMAS GUIDE :	736-H1

Comments

PCFL T201200873

REPORT: lapwrp028

Tract #:

Issued By:
Issued Date:

Permit #: **PCFL T201200873**

Permit Office: 6

Fees	Fee Code	Acount Code	Amount
INSPECT MAJOR MODIFICATION - ACTUAL COST	PCMJMINSP	B07_8371	$30,000.00
		Total Fees:	$30,000.00

Is hereby permitted to complete scope of work on the public highways subject to provisions required by County of Los Angeles Highway Permit Ordinance (Division 1 of Title 16, Los Angeles County Code), the Municipal Code, and City Ordinance governing the area where this work is to be done, and the attachments hereon specified. Permit revocable at option of Public Works Director, in consideration of granting of this permit, it is agreed by the applicant that the County of Los Angeles and/or the city wherein the permit work is to be performed and any of their officers or employees thereof shall be saved harmless by the applicant from any liability or responsibility for any accident, loss, or damage to persons or property, happening occurring as the proximate result of any of the work undertaken under the terms of this application and the permit or permits which may be granted in response thereto, and that all of said liabilities are hereby assumed by the applicant, it is further agreed that if any part of this installation interferes with the future use of the highway by the general public, it must be removed or relocated, asdesignated by the Director of Public Works or Superintendent of Streets, at the expense of the permittee of his successor in interest. The permit is void if the permittee is not in compliance with Section 3800 of the Labor Code

Performance of the work of activity under this permit is tantamount to agreeing to the conditions of this permit, Copy of this permit shall be kept at work site during period of operation within District's/Road right of way and shall be shown to District's representative or any law enforcement officer upon demand.

INSPECTION REQUIRED

CALL PERMIT OFFICER 24 HOURS BEFORE STARTING WORK UNDER THIS PERMIT. FAILURE TO DO SO IS CAUSE FOR REVOCATION OF THIS PERMIT. THIS PERMIT IS VOID IF WORK NOT STARTED IN 60 DAYS (FOR ROAD PERMIT) OR 180 DAYS (FOR FLOOD PERMIT) FROM THE DATE OF THE ISSUANCE.

PERMIT OFFICE NO. PCHQ
PUBLIC WORKS CONSTRUCTION
900 S. Fremont Ave.
Los Angeles County, CA 91803
PHONE NO. 626-458-3129
FAX NO. 626-576-7739

PCFL T201200873

REPORT: lapwrp028

Conditions of Approval
By Permit

Run Date: Wednesday April 11, 2012 4:8 p

Permit: PCFL - T201200873

The following Conditions of Approval are required to complete the permit:

Condition of Approval	Entered	By	Completed	By
GENERAL FLOOD PROVISION NO. 1	01-MAR-12	LCERVANT		
Use of District's right of way for the construction or activity authorized under this permit is tantamount to agreeing to the conditions herein.(G1)				
GENERAL PROVISION NO.2	01-MAR-12	LCERVANT		
Permittee shall be responsible for notifying his contractor and all subcontractors of the provisions of this permit. No work will be started until a copy of this permit is given to the contractor and each of his subcontractors. Further, the copy will be left at the site of the work being done by each contractor.(G2)				
GENERAL PROVISION NO.3	09-APR-12	EBERHAN		
Permittee is notified that in accordance with the STATE OF CALIFORNIA CONSTRUCTION SAFETY ORDERS, Section 1503, the permittee or his contractor may be required to acquire a permit from CALOSHA if the work authorized herein more than 5 feet deep. The inspection provided by the District can in no way be construed as a safety inspection.(G3)				
GENERAL PROVISION NO. 4	01-MAR-12	LCERVANT		
Unless otherwise indicated in this permit, all work authorized by this permit shall conform to the latest edition of the Standard Specifications for Public Work Construction, as amended, and published by Building News, Inc., 3055 Overland Avenue, Los Angeles, CA 90034 and the latest edition of the Los Angeles County Department of Public Works "Additions and Amendments to the Standard Specifications for Public Works Construction".(G4)				
GENERAL PROVISION NO.5	01-MAR-12	LCERVANT		
This permit is subject to such further conditions as the Director or his representative may issue during the period of this use. When possible, such additional conditions shall be promptly delivered in writing to the address shown on page one of this permit. Conditions delivered orally of necessity shall be promptly confirmed in writing.(G5)				
GENERAL PROVISION NO.6	01-MAR-12	LCERVANT		
Upon satisfactory completion of construction AND upon the Permittee granting the District access rights for maintenance, the District will assume operation and maintenance of its affected facilities as shown on the approved plans. (G6)				
GENERAL PROVISION NO. 24	01-MAR-12	LCERVANT		
During the period of operations conducted under the permit, Permittee shall maintain in effect an insurance policy (minimum limit $ ONE million) naming the Los Angeles County Flood Control District/Los Angeles County Department of Public Works as co-insured with respect to these operations. A copy of this policy shall be submitted to the District for inclusion in the District file copy of this permit. Expiration or cancellation of the insurance policy shall constitute revocation of this permit.(G24)				
PROVISION CONNECTION NO. 6	09-APR-12	EBERHAN		
Should work (except mailine work) take place between October 15 and April 15, permittee shall obtain a long-range clear weather forecast before breaking into the main line storm drain. Construction of facilities connecting to the main line will be permitted only during a clear weather forecast that is acceptable to this District's representative. Once operations under this permit are initiated, the work shall be conducted in a continuous manner until completed.(C6)				
PROVISION CONNECTION NO.23	09-APR-12	EBERHAN		
Permittee shall take all precautions to prevent unauthorized discharge of pollutants into the District's channel.(C23)				
PROVISION CONNECTION NO.30	09-APR-12	EBERHAN		
The only auhorized discharge is storm run-off and shall confirm to the requirements of the Califorina Regional Water Quality Control Board. The discharge of industial waste or sewage is prohibited.(C30)				
PROVISION POLUTION NO. 02	09-APR-12	EBERHAN		
Permittee shall be responsible for the selection and implementation of Best Management Practices (BMP's) for construction activities. If the Director or authorized representative determines that additional BMP's or corrective steps for existing ones are necessary, permittee shall immediately comply with the requests. (P2)				
PROVISION MANHOLE NO. 1	09-APR-12	EBERHAN		
Neither the letters "LACFCD" nor "LACDPW" shall be on the manhole covers and catch basin lids to be maintained by Permittee.(M1)				

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

Date: 04/11/2012
Permit No: PCFL T201200873

STANDARD FLOOD CONTROL PERMIT PROVISIONS

A. This permit is valid only for the purpose specified herein. No change of purpose as outlined in application or drawings submitted with application is permitted except upon written permission of the Chief Engineer or his representative.

B. Activities and uses authorized under this permit are subject to any instructions of the Chief Engineer or his representative. **ALL INSTRUCTIONS MUST BE STRICTLY OBSERVED.**

C. Permittee shall assume entire responsibility for all activities and uses under this permit and shall save the District and Los Angeles County free and harmless from any and all expense, cost, or liability in connection with or resulting from the exercise of this permit including, but not limited to, property damage, personal injury, and wrongful death.

D. Any damage caused to Flood Control structures by reason of exercise of this permit shall be repaired, at the permittee's sole expense, to the satisfaction of the District. Should the permittee neglect to promptly make repairs, the District may perform such work or have others perform the work, and the permittee agrees to reimburse the District for all costs of the work so performed upon receipt of a statement thereof.

E. Any structure or portions thereof or plantings placed on District rights of way or which affect District structures must be removed, revised, and/or relocated by permittee without cost to the District, or any other public agency the District shall so designate, should future activities or policy so require.

F. This permit is valid only to the extent of District jurisdiction. Acquisition of permits required by other affected agencies and consent of underlying fee owner(s) of District easement lands are the responsibility of the permittee. **NOTHING CONTAINED IN THIS PERMIT SHALL BE CONSTRUED AS A RELINQUISHMENT OF ANY RIGHTS NOW HELD BY THE DISTRICT.**

G. This permit is subject to all prior unexpired permits, agreements, easements, privileges, or other rights, whether recorded or unrecorded, in the area specified by this permit. Permittee shall make his own arrangements with holders of such prior rights.

H. Unless otherwise specified herein, this permit may be revoked or canceled at any time by the Chief Engineer or his representative when required for District purposes.

I. Upon written notice of cancellation or revocation of this permit for any cause whatsoever, permittee shall restore [illegible] District right of way and structures to their condition prior to the issuance of the permit and then shall vacate District property. Should permittee neglect to restore the premises or structures to a condition satisfactory to the Chief Engineer or his representative, the District may perform such work or have others perform the work, and the permittee agrees to reimburse the District for all costs of the work so performed upon receipt of a statement thereof.

J. In the event of a District employee work stoppage, the Chief Engineer or his representative reserves the right to suspend all activity authorized under this permit which requires inspection by the District. Activity authorized by the permit shall not resume until District approval to do so is given.

K. Unless otherwise specifically provided, all costs incurred by permittee as a result of the conditions of the permit or exercise by District of any right, authority, or reservation contained therein shall be the sole responsibility of and shall be borne entirely by the permittee.

Tract #:

Issued By:
Issued Date:

Permit #: **PCFL T201200541**

FOR BIDDING PURPOSES ONLY

Permit Office: 6

PC-OVERBUI
OVEBUILD WITHIN OR
ACROSS FLOOD FACILITY

COUNTY OF LOS ANGELES-DPW
Department Of Public Works
Alhambra, CA 91803 - (626)458-3129

Flood Control District Permit

Individual's / Company Name	Address / City, State Zip	Work Phone	Home Phone
(APP) CALTRANS MIKE NOURI (CNT)	100 S. MAIN ST., #100, MS13 LOS ANGELES, CA 90012	213-897-6262	

Emergency Contact

Location

Site Address:

Description: PROJECT 5902: I-5 FREEWAY & HERCULES STREET., NORWALK

Scope of Work

********** FOR BIDDING PURPOSES ONLY **********

PURPOSE:
TO AUTHORIZE THE WORK DESCRIBED BELOW AFFECTING THE SUBJECT STREAM IN ACCORDANCE WITH THE SUBMITTED PLANS, LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DRAWING Nos. 364-5902-F10.1-.8 (LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS DRAWING Nos. PF559963-970).

WORK DESCRIPTION:
TO RAISE THE EXISTING GRADE TO A MAXIMUM OF 8' AND CONSTRUCT TWO RETAINING WALLS OVER THE SUBJECT STREAM. THE EXISTING DISTRICT STORM DRAIN SHALL BE PROTECTED AND STRENGTHEN PER THE ATTACHED PLANS.

THE EXISTING STORM DRAIN SHALL BE INSPECTED PRIOR TO THE START OF CONSTRUCTION AND DOCUMENTATION OF SAID INSPECTION (VIDEO) SHALL BE SUBMITTED TO THE DISTRICT. AFTER COMPLETION OF THE PERMITTED WORK AND PRIOR TO FIELD ACCEPTANCE, THE STORM DRAIN SHALL BE RE-INSPECTED. IN THE EVENT THAT ANY DAMAGE TO THE DISTRICT'S FACILITIES IS IDENTIFIED, IT SHALL IMMEDIATELY BE CORRECTED (REPAIR OR REPLACEMENT) TO THE SATISFACTION OF THE DISTRICT AT NO COST TO THE DISTRICT.

WORK ON THIS PERMIT SHALL NOT COMMENCE UNTIL AN INSPECTION DEPOSIT OF $20,000 HAS BEEN PAID AND THE PERMITTEE HAS PROVIDED ITS CONTRACTOR'S CONTACT INFORMATION AND INSURANCE (INCLUDING ADDITIONAL INSURED ENDORSEMENT) HAS BEEN REVIEWED AND APPROVED BY THE DISTRICT.

PERMITTEE MUST NOTIFY PERMIT OFFICE No. 4 (7:00 AM TO 3:30 PM) AT TELEPHONE (562) 861-3580 AT LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS PERMIT. FAILURE TO SO NOTIFY THE PERMIT OFFICE IS CAUSE FOR REVOCATION OF PERMIT. SHOULD PERMITTEE FAIL TO TAKE ACTION WITHIN 180 DAYS FROM DATE OF ISSUANCE OF THIS PERMIT OR FAIL TO ACTIVELY AND DILIGENTLY EXERCISE THE PRIVILEGES OF THIS PERMIT, THE PERMIT BECOMES NULL AND VOID.
A COPY OF THIS PERMIT SHALL BE KEPT AT THE WORK SITE DURING ALL PERIODS OF OPERATION WITHIN THE DISTRICT'S RIGHT OF WAY AND SHALL BE SHOWN TO ANY DISTRICT REPRESENTATIVE OR LAW ENFORCEMENT OFFICER UPON DEMAND.

CC: Design (Chang, Zandieh)
Flood Maintenance (South)
Land Development (Office, P.O. #4, Houmsi)

********** FOR BIDDING PURPOSES ONLY **********

Permit Detail

FILE CODE NO. :	364-5902.032
FLOOD FACILITY NAME :	PROJECT NO. 5902, NORWALK STORM DRAIN LINE A
FLOOD STATION :	STA 26+42 TO STA 28+69
INSPECTION CHARGE #:	TBD
INSURANCE EXPIRE	TO BE PROVIDED
LOCATION 1:	I-5 FREEWAY @ HERCULES STREET, NORWALK
PLAN CHECK CHARGE #	LCALTRPLCK
THOMAS GUIDE :	706-G7

PCFL T201200541

REPORT: lapwrp028

Tract #:

Issued By:
Issued Date:

Permit #: **PCFL T201200541**

FOR BIDDING PURPOSES ONLY

Permit Office: 6

Comments

Fees	Fee Code	Acount Code	Amount
INSPECT FLOOD OVERBUILD - ACTUAL COST	PCOVBINSP	B07_8371	$20,000.00
		Total Fees:	$20,000.00

Is hereby permitted to complete scope of work on the public highways subject to provisions required by County of Los Angeles Highway Permit Ordinance (Division 1 of Title 16, Los Angeles County Code), the Municipal Code, and City Ordinance governing the area where this work is to be done, and the attachments hereon specified. Permit revocable at option of Public Works Director, in consideration of granting of this permit, it is agreed by the applicant that the County of Los Angeles and/or the city wherein the permit work is to be performed and any of their officers or employees thereof shall be saved harmless by the applicant from any liability or responsibility for any accident, loss, or damage to persons or property, happening occurring as the proximate result of any of the work undertaken under the terms of this application and the permit or permits which may be granted in response thereto, and that all of said liabilities are hereby assumed by the applicant, it is further agreed that if any part of this installation interferes with the future use of the highway by the general public, it must be removed or relocated, asdesignated by the Director of Public Works or Superintendent of Streets, at the expense of the permittee of his successor in interest. The permit is void if the permittee is not in compliance with Section 3800 of the Labor Code

Performance of the work of activity under this permit is tantamount to agreeing to the conditions of this permit, Copy of this permit shall be kept at work site during period of operation within District's/Road right of way and shall be shown to District's representative or any law enforcement officer upon demand.

INSPECTION REQUIRED

CALL PERMIT OFFICER 24 HOURS BEFORE STARTING WORK UNDER THIS PERMIT. FAILURE TO DO SO IS CAUSE FOR REVOCATION OF THIS PERMIT. THIS PERMIT IS VOID IF WORK NOT STARTED IN 60 DAYS (FOR ROAD PERMIT) OR 180 DAYS (FOR FLOOD PERMIT) FROM THE DATE OF THE ISSUANCE.

PERMIT OFFICE NO. PCHQ
PUBLIC WORKS CONSTRUCTION
900 S. Fremont Ave.
Los Angeles County, CA 91803
PHONE NO. 626-458-3129
FAX NO. 626-576-7739

PCFL T201200541

REPORT: lapwrp028

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

Date: 04/09/2012
Permit No: PCFL T201200541

STANDARD FLOOD CONTROL PERMIT PROVISIONS

A. This permit is valid only for the purpose specified herein. No change of purpose as outlined in application or drawings submitted with application is permitted except upon written permission of the Chief Engineer or his representative.

B. Activities and uses authorized under this permit are subject to any instructions of the Chief Engineer or his representative. **ALL INSTRUCTIONS MUST BE STRICTLY OBSERVED.**

C. Permittee shall assume entire responsibility for all activities and uses under this permit and shall save the District and Los Angeles County free and harmless from any and all expense, cost, or liability in connection with or resulting from the exercise of this permit including, but not limited to, property damage, personal injury, and wrongful death.

D. Any damage caused to Flood Control structures by reason of exercise of this permit shall be repaired, at the permittee's sole expense, to the satisfaction of the District. Should the permittee neglect to promptly make repairs, the District may perform such work or have others perform the work, and the permittee agrees to reimburse the District for all costs of the work so performed upon receipt of a statement thereof.

E. Any structure or portions thereof or plantings placed on District rights of way or which affect District structures must be removed, revised, and/or relocated by permittee without cost to the District, or any other public agency the District shall so designate, should future activities or policy so require.

F. This permit is valid only to the extent of District jurisdiction. Acquisition of permits required by other affected agencies and consent of underlying fee owner(s) of District easement lands are the responsibility of the permittee. **NOTHING CONTAINED IN THIS PERMIT SHALL BE CONSTRUED AS A RELINQUISHMENT OF ANY RIGHTS NOW HELD BY THE DISTRICT.**

G. This permit is subject to all prior unexpired permits, agreements, easements, privileges, or other rights, whether recorded or unrecorded, in the area specified by this permit. Permittee shall make his own arrangements with holders of such prior rights.

H. Unless otherwise specified herein, this permit may be revoked or canceled at any time by the Chief Engineer or his representative when required for District purposes.

I. Upon written notice of cancellation or revocation of this permit for any cause whatsoever, permittee shall restore District right of way and structures to their condition prior to the issuance of the permit and then shall vacate District property. Should permittee neglect to restore the premises or structures to a condition satisfactory to the Chief Engineer or his representative, the District may perform such work or have others perform the work, and the permittee agrees to reimburse the District for all costs of the work so performed upon receipt of a statement thereof.

J. In the event of a District employee work stoppage, the Chief Engineer or his representative reserves the right to suspend all activity authorized under this permit which requires inspection by the District. Activity authorized by the permit shall not resume until District approval to do so is given.

K. Unless otherwise specifically provided, all costs incurred by permittee as a result of the conditions of the permit or exercise by District of any right, authority, or reservation contained therein shall be the sole responsibility of and shall be borne entirely by the permittee.

Conditions of Approval
By Permit

Run Date: Monday April 9, 2012 5:21 pm

Permit: PCFL - T201200541

The following Conditions of Approval are required to complete the permit:

Condition of Approval	Entered	By	Completed	By
GENERAL FLOOD PROVISION NO. 1	09-APR-12	HHOUMSI		
Use of District's right of way for the construction or activity authorized under this permit is tantamount to agreeing to the conditions herein.(G1)				
GENERAL PROVISION NO.2	09-APR-12	HHOUMSI		
Permittee shall be responsible for notifying his contractor and all subcontractors of the provisions of this permit. No work will be started until a copy of this permit is given to the contractor and each of his subcontractors. Further. the copy will be left at the site of the work being done by each contractor.(G2)				
GENERAL PROVISION NO.3	09-APR-12	HHOUMSI		
Permittee is notified that in accordance with the STATE OF CALIFORNIA CONSTRUCTION SAFETY ORDERS. Section 1503. the permittee or his contractor may be required to acquire a permit from CALIOSHA if the work authorized herein more than 5 feet deep. The inspection provided by the District can in no way be construed as a safety inspection.(G3)				
GENERAL PROVISION NO. 4	09-APR-12	HHOUMSI		
Unless otherwise indicated in this permit. all work authorized by this permit shall conform to the latest edition of the Standard Specifications for Public Work Construction. as amended. and published by Building News. Inc.. 3055 Overland Avenue. Los Angeles. CA 90034 and the latest edition of the Los Angeles County Department of Public Works "Additions and Amendments to the Standard Specifications for Public Works Construction".(G4)				
GENERAL PROVISION NO.5	09-APR-12	HHOUMSI		
This permit is subject to such further conditions as the Director or his representative may issue during the period of this use. When possible. such additional conditions shall be promptly delivered in writing to the address shown on page one of this permit. Conditions delivered orally of necessity shall be promptly confirmed in writing.(G5)				
PROVISION OVERBUILT NO. 01	09-APR-12	HHOUMSI		
The inspection fee deposited with the District is the estimated cost to inspect the work authorized under this permit. Should the actual cost be more than the amount deposited. permittee shall submit the difference to the District upon receipt of a written request. In no case will the fee for the actual cost inspection be less than $1,500. Actual cost will include cost to the District for inspector's time. if required; interim and/or actual cost inspection; and the connection fees to District's facilities. where applicable.(O1)				
PROVISION OVERBUILT NO. 02	09-APR-12	HHOUMSI		
Permittee shall submit in writing the name and telephone number of individual(s) authorized to request interim and/or inspections. Should permittee fail to provide same. it is understood that permittee's contractor has the authority to request inspections. Cost for said inspections will be taken from the amount deposited for actual cost inspection as set forth in the paragraph above.(O2)				
PROVISION OVERBUILT NO. 08	09-APR-12	HHOUMSI		
In the event the storm drain fails or needs to be replaced or repaired after the improvements have been constructed. the permittee shall be responsible for all costs to the District in excess of costs that would have been incurred by the District to replace said drain had the land been left vacant.(O8)				
GENERAL PROVISION NO. 24	09-APR-12	HHOUMSI		
During the period of operations conducted under the permit. Permittee shall maintain in effect an insurance policy (minimum limit $ONE million) naming the Los Angeles County Flood Control District/Los Angeles County Department of Public Works and/or U.S. Army Corps of Engineers as co-insured with respect to these operations. A copy of this policy shall be submitted to the District for inclusion in the District file copy of this permit. Expiration or cancellation of the insurance policy shall constitute revocation of this permit.(G24)				
GENERAL PROVISION NO. 35	09-APR-12	HHOUMSI		
Permittee shall submit a copy of the as-built drawings for the completed construction authorized by this permit.(G35)				
GENERAL PROVISION NO. 48	09-APR-12	HHOUMSI		
The contractor shall use caution in placing concrete and compacting fill on top of the existing storm drain so as not to damage the drain. Selection of compaction equipment and methods shall be made accordingly.(G48)				
GENERAL PROVISION NO. 52	09-APR-12	HHOUMSI		
The District's existing storm drain shall be protected in place at all times during construction. Permittee shall make exploratory borings over the District's storm drain to verify depth of cover and location of the drain.(G52)				
PROVISION POLUTION NO. 02	09-APR-12	HHOUMSI		
Permittee shall be responsible for the selection and implementation of Best Management Practices (BMP's) for construction activities. If the Director or authorized representative determines that additional BMP's or corrective steps for existing ones are necessary. permittee shall immediately comply with the requests. (P2)				

Tract #:

Issued By: WNEZART
Issued Date: 28-FEB-12

Permit #: **PCFL 201200542**

Permit Office: 6

PC-MODIFIC
MODIFICATION OF FLOOD
CONTROL FACILITY

COUNTY OF LOS ANGELES DPW
Department Of Public Works
Alhambra, CA 91803 - (626)458-3129

Flood Control District Permit

FOR BIDDING PURPOSES ONLY

(NOT FOR CONSTRUCTION)

Individual's / Company Name	Address / City, State Zip	Work Phone	Home Phone
(APP) CALTRANS MIKE NOURI (CNT)	100 S. MAIN ST., #100, MS13 LOS ANGELES, CA 90012	(3-	

Emergency Contact

Location

Site Address:

Description: PROJECT 9001: NEAR INT. OF DELAVAN AVE. & SPROUL ST., NORWALK

Scope of Work

*** FOR BIDDING PURPOSES ONLY. NOT FOR CONSTRUCTION***

PURPOSE OF PERMIT: To authorize the work described below affecting the subject stream in accordance with the submitted plans, Los Angeles County Flood Control District Drawing Nos. 470-9001-F15.1 to .3 (Los Angeles County Department of Public Works Drawing Nos. PF559633 to PF559635).

WORK DESCRIPTION: Remove a manhole and seal mainline per SPPWC Standard Plan No. 381-2. Construct a manhole per Std. 327-2, per submitted plans.

Activities under this Permit shall not start until District receives payment for permit processing and inspection ($375.00), receives the contractor's contact information and has reviewed and approved the contractor's insurance (including additional insured endorsement).

This permit shall not be exercised during inclement weather or when the 5-day forecast predicts rain.

PERMITTEE MUST NOTIFY PERMIT OFFICE NO. 4 AT TELEPHONE (562) 861-3580 LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS PERMIT. FAILURE TO SO NOTIFY THE PERMIT OFFICE IS CAUSE FOR REVOCATION OF PERMIT. A COPY OF THIS PERMIT SHALL BE KEPT AT THE WORK SITE DURING ALL PERIODS OF OPERATION WITHIN THE DISTRICT'S RIGHT OF WAY AND SHALL BE SHOWN TO ANY DISTRICT REPRESENTATIVE OR LAW ENFORCEMENT OFFICER UPON DEMAND.

cc: City of Norwalk, Flood Maintenance (South); Land Development (Office, P.O. 4, Garcia)

Permit Detail

FILE CODE NO. :	470-9001.032
FLOOD FACILITY NAME :	STORM DRAIN BOND ISSUE PROJECT NO. 9001
FLOOD STATION :	69+85
LOCATION 1:	NEAR INT. OF DELAVAN AVE. & SPROUL ST., NORWALK
THOMAS GUIDE :	736-J2

Comments

Fees	Fee Code	Acount Code	Amount
			$0.00
		Total Fees:	$0.00

PCFL 201200542

REPORT: lapwrp028

Tract #:

Issued By: WNEZART
Issued Date: 28-FEB-12

Permit #: **PCFL 201200542**

Permit Office: 6

Is hereby permitted to complete scope of work on the public highways subject to provisions required by County of Los Angeles Highway Permit Ordinance (Division 1 of Title 16, Los Angeles County Code), the Municipal Code, and City Ordinance governing the area where this work is to be done, and the attachments hereon specified. Permit revocable at option of Public Works Director, in consideration of granting of this permit, it is agreed by the applicant that the County of Los Angeles and/or the city wherein the permit work is to be performed and any of their officers or employees thereof shall be saved harmless by the applicant from any liability or responsibility for any accident, loss, or damage to persons or property, happening occurring as the proximate result of any of the work undertaken under the terms of this application and the permit or permits which may be granted in response thereto, and that all of said liabilities are hereby assumed by the applicant, it is further agreed that if any part of this installation interferes with the future use of the highway by the general public, it must be removed or relocated, asdesignated by the Director of Public Works or Superintendent of Streets, at the expense of the permittee of his successor in interest. The permit is void if the permittee is not in compliance with Section 3800 of the Labor Code

Performance of the work of activity under this permit is tantamount to agreeing to the conditions of this permit, Copy of this permit shall be kept at work site during period of operation within District's/Road right of way and shall be shown to District's representative or any law enforcement officer upon demand.

INSPECTION REQUIRED

CALL PERMIT OFFICER 24 HOURS BEFORE STARTING WORK UNDER THIS PERMIT. FAILURE TO DO SO IS CAUSE FOR REVOCATION OF THIS PERMIT. THIS PERMIT IS VOID IF WORK NOT STARTED IN 60 DAYS (FOR ROAD PERMIT) OR 180 DAYS (FOR FLOOD PERMIT) FROM THE DATE OF THE ISSUANCE.

PCFL 201200542

REPORT: lapwrp028

Tract #:

Issued By:
Issued Date:

Permit #: **PCFL T201201032**

Permit Office: 6

PC-CONNECT
CONNECTION INTO FLOOD CONTROL FACILITY

COUNTY OF LOS ANGELES-DPW
Department Of Public Works
Alhambra, CA 91803 - (626)458-3129

Flood Control District Permit

Individual's / Company Name	Address / City, State Zip	Work Phone	Home Phone
(APP) CALTRANS	100 S. MAIN ST., #100 MS13 LOS ANGELES, CA 90012	213 897-0448	
(CNT)			

Emergency Contact

Location

Site Address:
Description: PROJECT 21: 13607 SILVERBOW AVE., NORWALK

Scope of Work

FOR BIDDING PURPOSES--NOT FOR CONSTRUCTION

PURPOSE OF PERMIT: To authorize the work described below affecting the subject stream in accordance with the submitted plans, Los Angeles County Flood Control District Drawing Nos. 181-21-F59.1 to .6 (Los Angeles County Department of Public Works Drawing Nos. PF559653 to).

WORK DESCRIPTION: Construct one 15-inch RCP (2000D) connections per SPPWC Standard Plan No. 335-2.

The proposed connection shall be maintained by the Permittee. Work shall NOT start until a deposit of $4,529 has been paid, and the contractor's insurance (including additional insured endorsement) has been reviewed and approved by the District.

PERMITTEE MUST NOTIFY PERMIT OFFICE NO. 4 (7:00 AM TO 3:30 PM) AT TELEPHONE (562) 861-3580 AT LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS PERMIT. FAILURE TO NOTIFY THE PERMIT OFFICE IS CAUSE FOR REVOCATION OF PERMIT. SHOULD PERMITTEE FAIL TO TAKE ACTION WITHIN 180 DAYS FROM DATE OF ISSUANCE OF THIS PERMIT OR FAIL TO ACTIVELY AND DILIGENTLY EXERCISE THE PRIVILEGES OF THIS PERMIT, THE PERMIT BECOMES NULL AND VOID. A COPY OF THIS PERMIT SHALL BE KEPT AT THE WORK SITE DURING ALL PERIODS OF OPERATION WITHIN THE DISTRICT'S RIGHT OF WAY AND SHALL BE SHOWN TO ANY DISTRICT REPRESENTATIVE OR LAW ENFORCEMENT OFFICER UPON DEMAND.

CC: Flood Maintenance (South); Land Development (Office, P.O. 4, Cervantes)

Permit Detail

FILE CODE NO. :	181-21.032
FLOOD FACILITY NAME :	STORM DRAIN BOND ISSUE PROJECT NO. 21, U2, LINE A
FLOOD STATION :	277+25
INSPECTION CHARGE #:	TBD
LOCATION 1:	13607 SILVERBOW AVE., NORWALK
THOMAS GUIDE :	736-J2

Comments

Fees	Fee Code	Acount Code	Amount
			$0.00
		Total Fees:	$0.00

PCFL T201201032

REPORT: lapwrp028

Tract #:

Issued By:
Issued Date:

Permit #: **PCFL T201201032**

Permit Office: 6

Is hereby permitted to complete scope of work on the public highways subject to provisions required by County of Los Angeles Highway Permit Ordinance (Division 1 of Title 16, Los Angeles County Code), the Municipal Code, and City Ordinance governing the area where this work is to be done, and the attachments hereon specified. Permit revocable at option of Public Works Director, in consideration of granting of this permit, it is agreed by the applicant that the County of Los Angeles and/or the city wherein the permit work is to be performed and any of their officers or employees thereof shall be saved harmless by the applicant from any liability or responsibility for any accident, loss, or damage to persons or property, happening occurring as the proximate result of any of the work undertaken under the terms of this application and the permit or permits which may be granted in response thereto, and that all of said liabilities are hereby assumed by the applicant, it is further agreed that if any part of this installation interferes with the future use of the highway by the general public, it must be removed or relocated, asdesignated by the Director of Public Works or Superintendent of Streets, at the expense of the permittee of his successor in interest. The permit is void if the permittee is not in compliance with Section 3800 of the Labor Code

Performance of the work of activity under this permit is tantamount to agreeing to the conditions of this permit, Copy of this permit shall be kept at work site during period of operation within District's/Road right of way and shall be shown to District's representative or any law enforcement officer upon demand.

INSPECTION REQUIRED

CALL PERMIT OFFICER 24 HOURS BEFORE STARTING WORK UNDER THIS PERMIT. FAILURE TO DO SO IS CAUSE FOR REVOCATION OF THIS PERMIT. THIS PERMIT IS VOID IF WORK NOT STARTED IN 60 DAYS (FOR ROAD PERMIT) OR 180 DAYS (FOR FLOOD PERMIT) FROM THE DATE OF THE ISSUANCE.

PCFL T201201032

REPORT: lapwrp028

Tract #:

Issued By:
Issued Date:

Permit #: **PCFL T201104481**

Permit Office: 6

COUNTY OF LOS ANGELES-DPW
Department Of Public Works
Alhambra, CA 91803 - (626) 458-4129

PC-CONNECT
CONNECTION INTO FLOOD
CONTROL FACILITY

Flood Control District Permit

FOR BIDDING PURPOSES ONLY

(NOT FOR CONSTRUCTION)

Individual's / Company Name	Address / City, State Zip	Work Phone	Home Phone
(APP) CALTRANS MIKE NOURI (CNT)	100 S MAIN ST., SUITE 100, MS1 LOS ANGELES, CA 90012	213 897-6362	

Emergency Contact

Location

Site Address:

Description: PROJECT 5902: NEAREST HERCULES ST. & DOLLISON DR., NORWALK

Scope of Work

PERMIT PURPOSE: To authorize the work described below affecting the subject stream in accordance with the submitted plans, Los Angeles County Flood Control District Drawing Nos. 364-5902-F9.1 to .6 (Los Angeles County Department of Public Works Drawing Nos. PF559896 to PF559901).

WORK DESCRIPTION: Relocate existing catch basin per SPPWC Std Plan 340-2 and abandon 15-inch connector pipe per SPPWC Std Plan 381-2. Construct an 18-inch (2000D) connection and local depresssion per SPPWC Std Plan 335-2, Case 3 and SPPWC Std Plan 313-3, Case A (H=2"). Construct 24-inch (2000D) connection per SPPWC Std Plan 331-3. Construct an 18" pipe crossing the District storm drain, per submitted plans.

WORK SHALL NOT START UNTIL THE PERMITTEE HAS PROVIDED THE CONTRACTOR'S CONTACT INFORMATION AND INSURANCE (INCLUDING ADDITIONAL INSURED ENDORSEMENT) TO THE DISTRICT FOR APPROVAL, THE BEST MANAGEMENT PRACTICES ATTACHMENT, AND A $9,305 DEPOSIT FOR INSPECTION.

PERMITTEE MUST NOTIFY PERMIT OFFICE NO. 4 (7:00 AM TO 3:30 PM) AT TELEPHONE (562) 861-3580 AT LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS PERMIT. FAILURE TO NOTIFY THE PERMIT OFFICE IS CAUSE FOR REVOCATION OF PERMIT. SHOULD PERMITTEE FAIL TO TAKE ACTION WITHIN 180 DAYS FROM DATE OF ISSUANCE OF THIS PERMIT OR FAIL TO ACTIVELY AND DILIGENTLY EXERCISE THE PRIVILEGES OF THIS PERMIT, THE PERMIT BECOMES NULL AND VOID. A COPY OF THIS PERMIT SHALL BE KEPT AT THE WORK SITE DURING ALL PERIODS OF OPERATION WITHIN THE DISTRICT'S RIGHT OF WAY AND SHALL BE SHOWN TO ANY DISTRICT REPRESENTATIVE OR LAW ENFORCEMENT OFFICER UPON DEMAND.

CC: City of Norwalk; Design (Zandieh); Flood Maintenance (South); Land Development (Office, P.O. 4, Paraoan)

Permit Detail

FILE CODE NO. :	364-5902.032
FLOOD FACILITY NAME :	STORM DRAIN BOND ISSUE PROJECT NO. 5902
FLOOD STATION :	26+59; 25+76; 26+24
INSURANCE EXPIRE	TBD
LOCATION 1:	NEAREST HERCULES ST. & DOLLISON DR., NORWALK
PLAN CHECK CHARGE #	LCALTRPLCK
THOMAS GUIDE :	706-G7

Comments

Fees	Fee Code	Acount Code	Amount
CAL TRANS PLAN CHECK - FLOOD R/W NO FEE	PCALTRNPLC	B07_8371	$0.00
		Total Fees:	$0.00

PCFL T201104481

REPORT: lapwrp028

Tract #:

Permit #: PCFL T201104481

Issued By:
Issued Date:

Permit Office: 6

Is hereby permitted to complete scope of work on the public highways subject to provisions required by County of Los Angeles Highway Permit Ordinance (Division 1 of Title 16, Los Angeles County Code), the Municipal Code, and City Ordinance governing the area where this work is to be done, and the attachments hereon specified. Permit revocable at option of Public Works Director, in consideration of granting of this permit, it is agreed by the applicant that the County of Los Angeles and/or the city wherein the permit work is to be performed and any of their officers or employees thereof shall be saved harmless by the applicant from any liability or responsibility for any accident, loss, or damage to persons or property, happening occurring as the proximate result of any of the work undertaken under the terms of this application and the permit or permits which may be granted in response thereto, and that all of said liabilities are hereby assumed by the applicant, it is further agreed that if any part of this installation interferes with the future use of the highway by the general public, it must be removed or relocated, asdesignated by the Director of Public Works or Superintendent of Streets, at the expense of the permittee of his successor in interest. The permit is void if the permittee is not in compliance with Section 3800 of the Labor Code

Performance of the work of activity under this permit is tantamount to agreeing to the conditions of this permit, Copy of this permit shall be kept at work site during period of operation within District's/Road right of way and shall be shown to District's representative or any law enforcement officer upon demand.

INSPECTION REQUIRED

CALL PERMIT OFFICER 24 HOURS BEFORE STARTING WORK UNDER THIS PERMIT. FAILURE TO DO SO IS CAUSE FOR REVOCATION OF THIS PERMIT. THIS PERMIT IS VOID IF WORK NOT STARTED IN 60 DAYS (FOR ROAD PERMIT) OR 180 DAYS (FOR FLOOD PERMIT) FROM THE DATE OF THE ISSUANCE.

PERMIT OFFICE NO. PCHQ
PUBLIC WORKS CONSTRUCTION
900 S. Fremont Ave.
Los Angeles County, CA 91803
PHONE NO. 626-458-3129
FAX NO. 626-576-7739

FOR BIDDING PURPOSES

ONLY

(NOT FOR CONSTRUCTION)

PCFL T201104481

REPORT: lapwrp028

Conditions of Approval
By Permit

Run Date: Wednesday March 21, 2012 3:4

Permit: PCFL - T201104481

The following Conditions of Approval are required to complete the permit:

Condition of Approval	Entered	By	Completed	By
GENERAL FLOOD PROVISION NO. 1	05-DEC-11	HPARAOAN		
Use of District's right of way for the construction or activity authorized under this permit is subject to the agreeing to the conditions herein.(G1)				
GENERAL PROVISION NO.2	05-DEC-11	HPARAOAN		
Permittee shall be responsible for notifying his contractor and all subcontractors of the provisions of this permit. No work will be started until a copy of this permit is given to the contractor and each of his subcontractors. Further, the copy will be left at the site of the work being done by each contractor.(G2)				
GENERAL PROVISION NO.3	05-DEC-11	HPARAOAN		
Permittee is notified that in accordance with the STATE OF CALIFORNIA CONSTRUCTION SAFETY ORDERS, Section 1503, the permittee or his contractor may be required to acquire a permit from CAUOSHA if the work authorized herein more than 5 feet deep. The inspection provided by the District can in no way be construed as a safety inspection.(G3)				
GENERAL PROVISION NO. 4	05-DEC-11	HPARAOAN		
Unless otherwise indicated in this permit, all work authorized by this permit shall conform to the latest edition of the Standard Specifications for Public Work Construction, as amended, and published by Building News, Inc., 3055 Overland Avenue, Los Angeles, CA 90034 and the latest edition of the Los Angeles County Department of Public Works "Additions and Amendments to the Standard Specifications for Public Works Construction".(G4)				
GENERAL PROVISION NO.5	05-DEC-11	HPARAOAN		
This permit is subject to such further conditions as the Director or his representative may issue during the period of this use. When possible, such additional conditions shall be promptly delivered in writing to the address shown on page one of this permit. Conditions delivered orally of necessity shall be promptly confirmed in writing.(G5)				
PROVISION CONNECTION NO. 1	05-DEC-11	HPARAOAN		
The only authorized discharge is storm run-off.(C1)				
GENERAL PROVISION NO.8	05-DEC-11	HPARAOAN		
Issuance of this permit shall not be construed as an obligation on the part of this District for the operation and maintenance of the proposed facilities.(G8)				
PROVISION CONNECTION NO. 6	05-DEC-11	HPARAOAN		
Should work take place between October 15 and April 15, permittee shall obtain a long-range clear weather forecast before breaking into the main line storm drain. Construction of facilities connecting to the main line will be permitted only during a clear weather forecast that is acceptable to this District's representative. Once operations under this permit are initiated, the work shall be conducted in a continuous manner until completed.(C6)				
PROVISION CONNECTION NO.24	05-DEC-11	HPARAOAN		
No flushing water or pressure test water should be discharged to the District's facility without a current permit from the California Regional Water Quality Control Board.(C24)				
PROVISION CONNECTION NO.28	05-DEC-11	HPARAOAN		
Issuance of this permit shall not be construed as an obligation on the part of the District to assume responsibility for any damages incurred to the permittee's improvements in the event of storm drain and/or channel failure or flooding from rain storms.(C28)				
PROVISION POLUTION NO. 02	05-DEC-11	HPARAOAN		
Permittee shall be responsible for the selection and implementation of Best Management Practices (BMP's) for construction activities. If the Director or authorized representative determines that additional BMP's or corrective steps for existing ones are necessary, permittee shall immediately comply with the requests. (P2)				
GENERAL PROVISION NO. 24	05-DEC-11	HPARAOAN		
During the period of operations conducted under the permit, Permittee shall maintain in effect an insurance policy (minimum limit $ ONE million) naming the Los Angeles County Flood Control District/Los Angeles County Department of Public Works and/or U.S. Army Corps of Engineers as co-insured with respect to these operations. A copy of this policy shall be submitted to the District for inclusion in the District file copy of this permit. Expiration or cancellation of the insurance policy shall constitute revocation of this permit.(G24)				
GENERAL PROVISION NO. 35	19-JAN-12	HPARAOAN		
Permittee shall submit a copy of the as-built drawings for the completed construction authorized by this permit.(G35)				
GENERAL PROVISION NO. 50	19-JAN-12	HPARAOAN		
All activities covered by this permit are subject to final approval by the City of Norwalk.(G50)				

FOR BIDDING PURPOSES ONLY (NOT FOR CONSTRUCTION)

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

Date: 03/21/2012
Permit No: PCFL T201104481

STANDARD FLOOD CONTROL PERMIT PROVISIONS

A. This permit is valid only for the purpose specified herein. No change of purpose as outlined in application or drawings submitted with application is permitted except upon written permission of the Chief Engineer or his representative.

B. Activities and uses authorized under this permit are subject to any instructions of the Chief Engineer or his representative. **ALL INSTRUCTIONS MUST BE STRICTLY OBSERVED.**

C. Permittee shall assume entire responsibility for all activities and uses under this permit and shall save the District and Los Angeles County free and harmless from any and all expense, cost, or liability in connection with or resulting from the exercise of this permit including, but not limited to, property damage, personal injury, and wrongful death.

D. Any damage caused to Flood Control structures by reason of exercise of this permit shall be repaired, at the permittee's sole expense, to the satisfaction of the District. Should the permittee neglect to promptly make repairs, the District may perform such work or have others perform the work, and the permittee agrees to reimburse the District for all costs of the work so performed upon receipt of a statement thereof.

E. Any structure or portions thereof or plantings placed on District rights of way or which affect District structures must be removed, revised, and/or relocated by permittee without cost to the District, or any other public agency the District shall so designate, should future activities or policy so require.

F. This permit is valid only to the extent of District jurisdiction. Acquisition of permits required by other affected agencies and consent of underlying fee owner(s) of District easement lands are the responsibility of the permittee. **NOTHING CONTAINED IN THIS PERMIT SHALL BE CONSTRUED AS A RELINQUISHMENT OF ANY RIGHTS NOW HELD BY THE DISTRICT.**

G. This permit is subject to all prior unexpired permits, agreements, easements, privileges, or other rights, whether recorded or unrecorded, in the area specified by this permit. Permittee shall make his own arrangements with holders of such prior rights.

H. Unless otherwise specified herein, this permit may be revoked or canceled at any time by the Chief Engineer or his representative when required for District purposes.

I. Upon written notice of cancellation or revocation of this permit for any cause whatsoever, permittee shall restore District right of way and structures to their condition prior to the issuance of the permit and then shall vacate District property. Should permittee neglect to restore the premises or structures to a condition satisfactory to the Chief Engineer or his representative, the District may perform such work or have others perform the work, and the permittee agrees to reimburse the District for all costs of the work so performed upon receipt of a statement thereof.

J. In the event of a District employee work stoppage, the Chief Engineer or his representative reserves the right to suspend all activity authorized under this permit which requires inspection by the District. Activity authorized by the permit shall not resume until District approval to do so is given.

K. Unless otherwise specifically provided, all costs incurred by permittee as a result of the conditions of the permit or exercise by District of any right, authority, or reservation contained therein shall be the sole responsibility of and shall be borne entirely by the permittee.