04-235641
Electronic Information Handout
(EIH)

TABLE OF CONTENT

1. 04-235641-Materials-Recommendations.pdf

(From the parent EA 235610, PAED Phase)

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: TEBLEZ NEMARIAM
District Branch Chief
Design Peninsula

Attn: Aijun Ding

Date: January 20, 2010
File: 04-SM-101-PM 0.9/3.6
04-235631
Aux. Lane Widening

REGISTERED PROFESSIONAL ENGINEER
RICHARD M. D'ONOFRIO
C 66054
EXP. 6-30-2010
CIVIL
STATE OF CALIFORNIA

From: **RICK D'ONOFRIO, P.E.**
Materials Design Engineer
Engineering Services I – Materials C

RICHARD CHAN, P.E.
District Materials Engineer
District Branch Chief
Engineering Services I – Materials C

Subject: 65% PS&E Submitted Review.

This memo is in response to your request to review the 65% PS&E submittal for auxiliary lane widening on Route 101 in San Mateo County from PM 0.9 to 3.6.

After reviewing the submittal, we offer the following comments:

PS&E PLANS

TYPICAL X-SECTIONS, X-1

1) Under Structural Section Notes – Please add three Structural Sections (Structural Sections #5, #6 and #7):
   a. *Structural Section #5* (1.00' HMA(A)/0.55'AB(2)/0.85' PM (3) with filter fabric) is used in area for reconstructing Underdrain system with 0.15' RHMA-G Overlay.
   b. *Structural Section #6* (0.15' RHMA-G/1.00' HMA(A)/0.45'AB(2)/0.85' PM (3) with filter fabric) is used in area for reconstructing of Underdrain system that doesn't allow for 0.15' RHMA-G Overlay.
   c. *Structural Section #7* (0.15' RHMA-G/1.30' to 1.45' HMA (A)) is used at widening area for constructing storage tank.
2) Under Abbreviations – Please add PRF (Pavement Reinforcing Fabric) and CTB (Cement Treated Base).
3) For the lower Typical section –
   a. The existing shoulder section for both NB and SB should consisting of 0.15' RAC- G/0.10'AC/PRF/0.35'AC/0.50' CTB/0.50' ISM
   b. Please replace existing NB traveled way pavement section (0.75'-0.92' AC/0.33' CTS/0.50' ISM) with (0.67' PCC/0.33' CTS/0.50' ISM).
   c. Please replace Structural Section #3 with Structural Section #2.
4) For the Upper Typical section –

a. Please change the Station From (152+84 to 161.18.5) to (153+35 to 174+45) for NB direction and (152+86 to 174+90) for SB direction. This is the PCC area that the existing shoulder section can be used as traveled way.

b. For NB Direction-
   i. The existing shoulder section should be "0.25' AC/ 0.50'CTB/0.50'ISM".
   ii. Please add the last layer of 0.50' Filter Materials to the existing traveled way pavement section.

c. For SB direction –
   i. Please replace existing traveled way section "0.75'-0.92' PCC/0.33' CTS/0.50'ISM" with "0.75'-0.92' PCC/0.17' Cushion Course/0.50' ISM". This existing traveled way section is also the same for the existing shoulder section.
   ii. For the right side widening pavement section, please replace "Structural Section #1" with "Structural Section #5" or "Structural Section #6" to match the new permeable layer for the new Underdrain system or "Structural Section #7" for area reconstructing over storage tank.

TYPICAL X-SECTIONS X-2

5) This Typical Section X-2 can be deleted. Please see our comment 4a.

TYPICAL X-SECTIONS X-3

6) The bottom Typical Section can be deleted. Please see our comment 4a.
7) For the Upper Typical Section in SB Direction –
   a. The existing shoulder section should be "0.25' AC/0.50' CTB/0.50' ISM".
8) For Upper Typical Section in NB Direction –
   a. The existing shoulder section should be "0.15' RAC-G/0.10'AC/PRF/.30'AC/0.50'CTB/0.50' ISM".
   b. Also add a statement to the widening section stating that "Existing Edgedrain System to be removed."
   c. The existing traveled way section should be 0.15' RAC-G/0.10'AC/PRF/.10'AC to 0.95' Max. AC Leveling /0.67'PCC/0.33' CTS/0.50' ISM".
9) Please add painted post miles markers on the face of existing concrete barriers every 0.10 mile.

CONSTRUCTION DETAILS C-1

10) The new pavement section over storage box should be 0.15' RHMA-G/1.30' to 1.45' HMA (A).

CONSTRUCTION DETAILS C-2

11) Paving Comform at MBGR. Detail – The Word "Comform" is misspelled. The dimensions for conform detail should be in feet. Please change the thickness of "1¼" to 0.10' and also change the thickness of "¼" to "0.02"

CONSTRUCTION DETAILS C-3

12) The Choker area should be 3-feet wide instead of 1-foot wide.

13) For AC Pavement Longitudinal Conform- The overlay lip thickness should be 0.02' and the cold plane length should be 30 feet.

SPECIAL PROVISIONS

14) In SSP 39-150, Paragraph #15, the asphalt rubber binder grade must be PG 64-16.

15) In SSP 39-400, Paragraph #24, please delete it because there is no OGFC layer for this project; in Paragraph #34, under "MEASUREMENT AND PAYMENT", please also add " HMA Type A or RHMA-G" between "treating " and "aggregate".

16) In SSP 39-450, in Paragraph #374 under "MEASUREMENT AND PAYMENT", please also add "Type A or RHMA-G" between "HMA and "aggregate".
17) Please delete SSP 40-020 (Replace Concrete Pavement), PCC slab replacement is not needed.
18) Please add SSP 41-151 for spalled joint repair.

If you have any questions or need additional information, please contact Rick D'Onofrio at 622-1776.

c: Route File, Daily File
R. D'Onofrio

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: TEBLEZ NEMARIAM
District Branch Chief
Design Peninsula

Attn: Aijun Ding

Date: August 31, 2009
File: 04-SCL-101-PM 52.3/52.6
04-SM-101-PM 0.0/3.6
04-235611
Aux. Lane Widening

From: **RICK D'ONOFRIO, P.E.**
Materials Design Engineer
Engineering Services I – Materials C

REGISTERED PROFESSIONAL ENGINEER
RICHARD M. D'ONOFRIO
C 66054
EXP. 6-30-2010
CIVIL
STATE OF CALIFORNIA

RICHARD CHAN, P.E.
District Materials Engineer
District Branch Chief
Engineering Services I – Materials C

Subject: Revised R-Value and Alternative Pavement Sections (Permeable/ATPB/Storage Box Sections)

Based on the latest review of the existing R-value collected from previous jobs and our Materials files we are revising the R-value used in this job from 15 to 25.

Per a request made at a recent PDT meeting a request was made by Design for thinner pavement structural sections as a means of preventing possible conflicts with existing utilities. We feel there should be no concerns with utility interference with the current proposed Aux Lane/shoulder sections, but we are providing these sections nonetheless. The existing As-Built sections show thicknesses in the range of 1.48'-1.70'. Thus, the minimum alternative section (Structural Section Type II below) of 1.70' (-0.10' HMA (OGFC)) full depth HMA will meet the maximum pavement structural section thickness.

You Office has also made a request for us to provide a pavement structural section for permeable materials and ATPB (Structural Sections III and IV below, respectively) as well as the structural section above the "storage box" found under the SB lanes near the Henderson UP (Structure Type V).

I. Revised Proposed Structural Section:

Design Factors: TI_{40}=14 Rvalue = 25 Required G.E. =3.36'

Thickness	Gf	G.E.
0.10' HMA (OGFC*)		N/A
0.15' RHMA-G	1.64	0.25'
0.55' HMA (A)	1.64	0.90'
0.75' LCB	1.90	1.40'
0.95' AS (4)	1.00	0.95'
2.50'		3.50'

* Note: For NB direction only, between PM 52.3/52.6

II. Alternative Sections: (Full Depth HMA Section)

Design Factors: TI_{40}=14 Rvalue = 25 Required G.E. =3.36'

Thickness	Gf	G.E.
0.10' HMA (OGFC*)		N/A
0.15' RHMA-G	2.18	0.33'
1.45' HMA (A)	2.18	3.16'
1.70'		3.49'

* Note: For NB direction only, between PM 52.3/52.6

III. Permeable Section with Underdrain System (From NS3 157+34.46 to 166+34.46) SB Direction Only:

Design Factors: TI_{40}=14 Rvalue = 25 Required G.E. =3.36'

a) Permeable layer **without** RHMA Overlay

Thickness	Gf	G.E.
0.15' RHMA-G	1.94	0.29'
1.00' HMA (A)	1.94	1.94'
0.40' AB (3)	1.10	0.44'
0.85' PM (3)	1.00	0.85'
2.40'		3.52'

b) Permeable layer **with** RHMA Overlay

Thickness	Gf	G.E.
0.15' RHMA-G	1.94	0.29'
1.00' HMA (A)	1.94	1.94'
0.55' AB (3)	1.10	0.61
0.85' PM (3)	1.00	0.85'
2.55'		3.69'

Note: The Class 3 permeable materials should be wrapped around with filter fabric.

IV. ATPB Section (From NS# 134+16.29 to 139+09.29) SB Direction Only:

Design Factors: TI_{40}=14 Rvalue = 25 Required G.E. =3.36'

Thickness	Gf	G.E.
0.15' RHMA-G	1.65	0.25'
0.55' HMA (A)	1.65	0.91'

0.25' ATPB	1.40	0.35'
0.50' LCB	1.90	1.43'
0.95' AS (4)	1.00	0.95'
2.40'		3.89'

The existing shoulder sections can be saved and used as traveled way section except to remove and reconstruct the 6" wide edgedrain system.

V. Storage Box Section (NS3 162+72.69 to 162+90.51):

Design Factors: TI_{40}=14 Rvalue = 25 Required G.E. =3.36'

Thickness		Gf	G.E.
0.15'	RHMA-G	2.18	0.33'
1.45'	HMA (A)	2.18	3.16'
1.60'			3.49'

The minimum cover over the storage box per the provided Design Study is 1.45'. We therefore recommend a full depth HMA section of 0.15' RHMA-G/1.30' HMA (A) over the storage box area.

If you have any questions or need additional information, please contact Rick D'Onofrio at 622-1778.

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: TEBLEZ NEMARIAM
District Branch Chief
Design Peninsula

Attn: Aijun Ding

Date: August 24, 2009

File: 04-SCL-101-PM 52.3/52.6
04-SM-101-PM 0.0/3.6
04-235611
Aux. Lane Widening

From: **RICK D'ONOFRIO, P.E.**
Materials Design Engineer
Engineering Services I – Materials C

RICHARD CHAN, P.E.
District Materials Engineer
District Branch Chief
Engineering Services I – Materials C

Subject: Revised R-Value and Alternative Pavement Sections (Permeable/ATPB/Storage Box Sections)

Based on the latest review of the existing R-value collected from previous jobs and our Materials files we are revising the R-value used in this job from 15 to 25.

Per a request made at a recent PDT meeting a request was made by Design for thinner pavement structural sections as a means of preventing possible conflicts with existing utilities. We feel there should be no concerns with utility interference with the current proposed Aux Lane/shoulder sections, but we are providing these sections nonetheless. The existing As-Built sections show thicknesses in the range of 1.48'-1.70'. Thus, the minimum alternative section (Structural Section II below) of 1.70' (-0.10' HMA (OGFC) full depth HMA will meet the maximum pavement structural section thickness.

You Office has also made a request for us to provide a pavement structural section for permeable materials and ATPB (Structural Sections III and IV below, respectively) as well as the structural section above the "storage box" found under the SB lanes near the Henderson UP (Item V).

I. Revised Proposed Structural Section:

Design Factors: TI_{40}=14 Rvalue = 25 Required G.E. =3.36'

Thickness	Gf	G.E.
0.10' HMA (OGFC*)		N/A
0.15' RHMA-G	1.64	0.25'
0.55' HMA (A)	1.64	0.90'
0.75' LCB	1.90	1.40'
0.95' AS (4)	1.00	0.95'
2.50'		3.50'

* Note: For NB direction only, between PM 52.3/52.6

II. Alternative Sections: (Full Depth HMA Section)

Design Factors: TI_{40}=14 Rvalue = 25 Required G.E. =3.36'

Thickness	Gf	G.E.
0.10' HMA (OGFC*)		N/A
0.15' RHMA-G	2.18	0.33'
1.45' HMA (A)	2.18	3.16'
1.70'		3.49'

* Note: For NB direction only, between PM 52.3/52.6

III. Permeable Section with Underdrain System (From NS3 157+34.46 to 166+34.46) SB Direction Only:

Design Factors: TI_{40}=14 Rvalue = 25 Required G.E. =3.36'

Permeable layer **without** RHMA Overlay

Thickness	Gf	G.E.
0.15' RHMA-G	1.94	0.29'
1.00' HMA (A)	1.94	1.94'
0.40' AB (3)	1.10	0.44'
0.85' PM (3)	1.00	0.85'
2.40'		3.52'

Permeable layer **with** RHMA Overlay

Thickness	Gf	G.E.
0.15' RHMA-G	1.94	0.29'
1.00' HMA (A)	1.94	1.94'
0.55' AB (3)	1.10	0.61
0.85' PM (3)	1.00	0.85'
2.55'		3.69'

IV. ATPB Section (From NS# 134+16.29 to 139+09.29) SB Direction Only:

Design Factors: TI_{40}=14 Rvalue = 25 Required G.E. =3.36'

Thickness	Gf	G.E.
0.15' RHMA-G	1.65	0.25'
0.55' HMA (A)	1.65	0.91'
0.25' ATPB	1.40	0.35'
0.50' LCB	1.90	1.43'
0.95' AS (4)	1.00	0.95'
2.53'		3.89'

The existing shoulder sections can be saved and used as traveled way section except to remove and reconstruct the 6" wide edgedrain system.

V. Storage Box Section (NS3 162+72.69 to 162+90.51):

Design Factors: TI_{40}=14 Rvalue = 25 Required G.E. =3.36'

Thickness		Gf	G.E.
0.15'	RHMA-G	2.18	0.33'
1.45'	HMA (A)	2.18	3.16'
1.60'			3.49'

The minimum cover over the storage box per the provided Design Study is 1.45'. We therefore, recommend a full depth HMA section of 0.15'RHMA-G/1.30' HMA (A) over the storage box area.

If you have any questions or need additional information, please contact Rick D'Onofrio at 622-1778.

Richard Chan/D04/Caltrans/CAGov

08/26/2009 08:41 AM

To Teblez Nemariam/D04/Caltrans/CAGov@DOT, Aijun Ding/D04/Caltrans/CAGov@DOT, Taslima Khanum/D04/Caltrans/CAGov@DOT

cc

bcc

Subject Materials Recommendation for SM 101 Project (Ea 04-235611)

Hi Teblez/Aijun/Taslima,

Here is the materials recommendation memo for the SM 101 Project (Ea 04-235611). The signed Memo will email to you next week, because Rick is on vacation in Japan. Can you please save about 80k under supplemental fund for repair failed slabs and PCC spalls if needed. We can work with RE during Construction. I will be in the field in SCL County for the 280 project with Resident Engineer for looking at the additiona failed PCC slabs. If you have any question, please call my cell. Thanks.

memo-ea04235611-sm_scl-101.doc

Richard Chan, PE
District Materials Engineer
District 4 - Office of Engineering Services - I (Materials)
Office 510.286.5881 or Calnet 8.541.5881
Cell 510.719.7255
Fax 510.286.4839

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

DAILY FILE

Flex your power!
Be energy efficient!

To: TEBLEZ NEMARIAN
District Branch Chief
Office Design South-Peninsula

Date: July 17, 2007

File: 04-SM/SCL-101
PM 0.0/3.6 & 52.3/52.6
04-235610

Attention: Anand Garg

From: RICK D'ONOFRIO, P.E.
Materials Design Engineer
Engineering Services I – Materials C

REGISTERED PROFESSIONAL ENGINEER
RICHARD M. D'ONOFRIO
Rm Dey
C 66054
EXP. 6/30/08
CIVIL
STATE OF CALIFORNIA

Concurred by: RICHARD CHAN, P.E.
District Materials Engineer
District Branch Chief, Mat C

Subject: PSR/PR Review

This memo is in response to your PSR/PR package to, among other things, widen ramps and Route 101 from the Embarcadero Road Interchange to the Marsh Road Interchange in order to accommodate additional auxiliary lanes in both directions. This PSR presents two alternatives. Alternative #1 would require some narrowing of the left (median) shoulder in order to fit the new auxiliary lane within the existing sound walls. Alternative #2 proposes a standard left (median) shoulder of 10' and the subsequent relocation of some existing sound walls.

EXISTING CONDITIONS

Route 101 is a 4-lane freeway (each direction) with predominantly AC paving with approximately 3.8 miles of either 3 or 4 lane PCC. A site trip was conducted in 2006 as well as several in June and July of 2007. Contract #04-0C8904 (PM 40.2/52.6) shows that for the SCL portion (PM 52.3/52.6) of this proposed project, the AC surfaces in both the Northbound and Southbound lanes have recently been overlaid with 0.10' OGAC/0.10' RAC-G in the NB direction and remove/replace 0.15' RAC-G in the SB HOV lane only. The existing structural sections are defined further below.

Regarding the SM portion, Contract # 04-0C9504 is currently in construction and has either ground the existing PCC slabs or cold-planed and paved the existing OGAC ramps and mainline with 0.15' RAC-G. The existing structural sections, including the new RAC-G surfacing, is summarized below:

TABLE 1

EXISTING STRUCTURAL SECTIONS: SM-101 (PM 0.0/3.6)			
NORTHBOUND		SOUTHBOUND	
PM	Pavement Type	PM	Pavement Type
0.0-2.8	45 mm RAC-G/ 147 mm AC/204 mm PCC/100 mm CTS	0.0-3.4	204 mm PCC/100 mm CTS/150 mm ISM
2.8-3.2	229-279 mm PCC 100 mm CTS/150 mm ISM	3.4-5.0	45 mm RAC-G/76 mm AC/204 mm PCC/101 mm CTS
3.2-5.0	45 mm RAC-G/107 mm AC/204 mm PCC/101 mm CTS/150 mm ISM	HOV – Lane No. 1 consists of 45 mm RAC-G/320 mm AC between PM 0.0/3.2	

TABLE 2

EXISTING SHOULDER SECTIONS: SM-101 (PM 0.0/3.6)			
NORTHBOUND			
PM	Inside Shoulder	PM	Outside Shoulder
0.0-3.2	45 mm RAC-G/122 mm AC(A)/213 mm ACB(A)	0.0-2.8 3.2-3.4	45 mm RAC-G /var. AC Leveling/var. AS(4)
3.3-5.0	45 mm RAC-G/122 mm AC(A)/213 mm ACB(A)	2.8-3.2	Existing PCC pavement over CTB
SOUTHBOUND			
0.0-3.2	45 mm RAC-G/122 mm AC/213 mm ACB	0.0-3.6	45 mm RAC-G/180 mm AC/var. AS(4)
3.2-5.0	45 mm RAC-G/122 mm AC(A)/213 mm ACB(A)		

As previously mentioned, the short section of SCL 101 (PM 52.3/52.6), per Contract 04-0C8904, page X-2, shows the following:

Southbound Mainline:
HOV: 45 mm RAC-G/268 mm AC
Outside Lanes: 229 mm PCC/100 mm CTB
Outside Shoulders: 76 mm AC/152 mm AB(2)
Inside Shoulders: 45 mm RAC-G/107 mm AC(A)/213 mm ACB(A)

Northbound Mainline:
HOV: 30 mm OGAC-G/30 mm RAC-G/241 mm AC
Outside Lanes: 30 mm RAC-G/30 mm OGAC/52-186 mm AC/228-280 mm PCC
Outside Shoulders: 30 mm RAC-G/30 mm OGAC/76 mm AC/152 mm AB(2)
Inside Shoulders: 30 mm OGAC/30 mm RAC-G/30 mm OGAC/122 mm AC(A)/213 mm ACB(A)

Table 3, below, shows that all but one of the ramps for this proposed project have recently also been re-paved with 0.15' or 0.20' (45mm or 60 mm) RAC-G.

Ramps:

TABLE 3

#	Ramp Description	Existing Pavement Conditions
1	Embarcadero Rd NB diagonal on ramp	Newly paved, one lane. Remove/replace with 45 *or* 60 mm RAC-G
2	University Ave NB on ramp	Newly paved, one lane. Remove/replace with 45 mm RAC-G.
3	Willow Road NB loop on-ramp	Newly paved, one lane. Remove/replace with 45 mm RAC-G.
4	Willow Rd NB diagonal on ramp	Newly paved, one lane. Remove/replace with 45 mm RAC-G.
5	Marsh Rd SB diagonal on ramp	Newly paved, with additional diamond lane, 45 mm RAC-G
6	Willow Rd SB loop on ramp	Older, good condition, one lane
7	Willow Rd SB diagonal on ramp	Newly paved, one lane. Remove/replace with 45 mm RAC-G.
8	University Ave SB diagonal on ramp	1 lane newly paved, other lane older pavement. Remove/replace with 45 mm RAC-G.

RECOMMENDATIONS

PSR Alternative 1:

As mentioned above, Alternative #1 would require some narrowing of the left (median) shoulder in order to fit the new auxiliary lane within the existing sound walls. Therefore, some of the existing median would have to be used as a traveled way. The existing median sections are adequate for mainline traffic loading but the outside shoulders are not. Because most of the shoulders are now overlayed with either AC(A) or RAC-G, as well as the majority of the traveled-way, (including most of lane #1 of the PCC segment of roadway), only AC(A) and RAC-G structural sections will be considered.

Caltrans current policy regarding RAC-G placement is that it should not be put directly on base or sub-base materials. Therefore, the structural sections below will include a DGAC layer beneath the RAC-G. We have assumed the gravel factor (G_f) is the same for DGAC and RAC-G. Also, our preliminary weight estimate using 0.15' RAC-G shows the anticipated tonnage will easily exceed the minimum 5000-ton requirement. Finally, the Highway design manual does not encourage having AC(A) adjacent to RAC-G. Therefore, because new RAC-G is already on the traveled-way, the proposed new sections should include a RAG-G layer as well.

Because the mainline has just been overlaid, we do not recommend any overlay be placed there. The OGAC layer placed between PM 52.3/52.6 on the NB direction, though, will need to be removed and replaced due to staging construction. The auxiliary lane and right shoulders should have the following structural section:

I. Auxiliary Lane/Right Shoulders

Design Factors: $TI_{20} = 13$ $R_v = 15$ (Both our estimates) Required G.E. = 3.53'

Option 1

Thickness	G.E.
0.15' RAC-G	0.25'
0.50' AC(A)	0.82'
0.75' CTB(A)	1.26'
1.30' AS(4)	1.28'
2.70'	3.61'

Option 2 ("Full Depth" AC)

Thickness	G.E.
0.15' RAC-G	0.28'
0.75' AC(A)	1.38'
1.05 ACB'	1.96'
2.05'	3.62'

For the RAC-G material, we recommend a ½" max grading using a PG 64-16 binder. For the AC(A), a ¾" max coarse grading using a PG 64-10 binder is recommended.

PSR Alternative #2

This alternative proposes a standard left (median) shoulder of 3 meters. The existing median shoulder widths are in many cases less than that. Consequently, the entire lane striping would need to shift toward the right resulting in some of the #1 lane to be converted to shoulder. This would not require any structural changes. Therefore the above recommendations would still be valid for the auxiliary and right shoulders.

III. Ramps (*Both Alternatives*)

As stated earlier, 7 out of the 8 ramps listed in this project have just been overlaid with 45 or 60 mm RAC-G. Therefore, no additional paving of existing ramps where the new RAC-G is present is required. The two ramps, #6 and #8, with older existing AC, should remove and replace the AC with 0.15' RAC-G. For the widening or reconfiguring portions, we recommend the following structural sections:

Design Factors: $TI_{20} = 10$ (medium classification) $R_v = 15$ Req'd G.E. = 2.72'

Option 1

Thickness	G.E.
0.15' RAC-G	0.26'
0.40' AC(A)	0.61'
0.85' AB(3)	0.92'
0.95' AS(4)	0.94'
2.35'	2.73'

Option 2 ("Full Depth" AC)

Thickness	G.E.
0.15' RAC-G	0.35'
1.10' AC(A)	2.54'
1.25'	2.89'

We recommend the same gradings and binders used above.

Please contact Rick D'Onofrio at 622-1776 if you have any questions.

c: Route File, Daily File
R. D'Onofrio/

2. 04-235641-Preliminary-Geotechnical-Report.pdf

(From the parent EA 235611, PAED Phase)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
Division of Engineering Services
Office of Geotechnical Design - West

COPY FOR
DEPT.
ATTN. Arjun

PRELIMINARY GEOTECHNICAL REPORT

AUXILIARY LANES FROM EMBARCADERO ROAD TO MARSH ROAD

04 – SM-101 PM 0.0/3.6, SCL-101 PM 52.3/52.6
04 – 235610

REGISTERED GEOLOGIST
ANNA SOJOURNER
No. 7537
Exp. 12/31/2007
STATE OF CALIFORNIA

PREPARED BY:

ANNA SOJOURNER
Engineering Geologist
Geotechnical Design – West
Branch B

WORK SUPERVISED BY:

GRANT WILCOX
Branch Chief
Geotechnical Design - West
Branch B

JULY 2007

TABLE OF CONTENTS

APPENDIX 1

Log of Test Borings

LIST OF FIGURES

1. INTRODUCTION

This report evaluates the potential geotechnical impacts of the proposal to add lanes on Highway 101 between Embarcadero Road and Marsh Road in Santa Clara and San Mateo Counties (Figure 1). There are currently two alternatives under consideration. It is our conclusion that there are no significant unmitigable geotechnical conditions for either alternative and the project can be constructed as proposed.

The purpose of this report is to document subsurface geotechnical conditions, provide analyses of anticipated site conditions as they pertain to the project, and to recommend design and construction criteria. Foundation reports for structures within the project limits will be provided under separate cover.

Field work and subsurface exploration, laboratory tests and analyses will be performed as part of the Geotechnical Design Report to evaluate wall design, groundwater, and to determine soil strengths and any geotechnical mitigation needed.

2. PERTINENT REPORTS AND INVESTIGATIONS

A search of Caltrans records indicates that there have been no major slipouts, landslides, or other geotechnical problems in the project area. Preliminary Geotechnical Reports for adjacent sections of the freeway were written by Parikh Consultants. Published references used in this study can be found at the end of the report.

3. DESCRIPTION OF PROJECT ALTERNATIVES AND EXISTING FACILITIES

The proposed project will widen the existing six-lane freeway corridor by one lane in each direction from the Embarcadero Road Interchange in Palo Alto (Santa Clara County) to the Marsh Road Interchange in Menlo Park (San Mateo County). The lanes will be added to the outside.

Both alternatives will require realignment of on-ramps and off-ramps to accommodate HOV and auxiliary lanes. Two bridges will be replaced, the Henderson Underpass Railroad Bridge (San Mateo PM 3.4) and the Ringwood Avenue Pedestrian Overcrossing (San Mateo PM 2.57). A stormwater lift station near the Henderson Underpass will need to be relocated. The new alignment crosses the Hetch Hetchy Aqueduct at San Mateo PM 1.76.

The San Francisquito Creek Bridge (San Mateo PM 0.0) will be replaced in a separate project.

3.1 Alternative 1

Alternative 1 would keep the existing soundwalls in place, and narrow the shoulders as needed to accommodate the additional lanes. At the Henderson Underpass, two retaining walls will be placed in the depressed section. The left wall lies between Stations 249+10 and 260+00, and has a maximum height of about 18.5 feet at Station 255+90. The right wall lies between Stations 253+20 and 254+20 and has a maximum height of 18.75 feet at Station 254+00. Alternative 1 is the preferred alternative.

3.2 Alternative 2

Alternative 2 would move the existing soundwalls to keep standard shoulder widths throughout the corridor. Retaining walls would be required as described for Alternative 1. Alternative 2 would require right-of-way purchase, and the frontage road would have to be rebuilt.

4. PHYSICAL SETTING

4.1 Climate

The project site lies in East Palo Alto and Menlo Park, less than 2 miles west of the San Francisco Bay. The site has a Mediterranean climate, with moderate, wet winters, and warmer dry summers. Most rainfall occurs in winter, from December to February. Low fog may occur, particularly in the summer, but is less common here than at other Bay Area locations.

4.2 Topography and Drainage

The project lies on coalescing alluvial fans that drain the Coast Ranges to the west into the bay. The project is mostly flat, with a depressed section at the Henderson Underpass (San Mateo PM 3.4). To the west, the hills of the Coast Ranges rise to approximately 1,000 feet or higher.

San Francisquito Creek crosses the alignment at the San Mateo-Santa Clara County line.

4.3 Man-Made and Natural Features Of Engineering And Construction Significance

Bridges and overpasses will require widening to accommodate additional lanes. Soundwalls line the route and will require either narrower shoulders or will need to be moved.

The Ringwood Avenue Pedestrian Overcrossing and Henderson Underpass Railroad Structure will be replaced and lengthened. The Hetch Hetchy Bridge will be widened to accommodate the wider freeway. On-ramps will be widened at Embarcadero Road northbound, University Avenue, north- and southbound, Willow Avenue, north- and southbound, and Marsh Road southbound.

There is a stormwater lift station at the Henderson underpass that will require relocation to accommodate the widening of the freeway. The adequacy of the system to carry a 50-year storm will require study.

5. GEOLOGY

5.1 Regional

The site lies on the alluvial plain on the west side of southern San Francisco Bay, at the foot of the Coast Ranges. Alluvial fans and late Quaternary deposits coalesce in the plain. Numerous creeks and sloughs flow roughly from west to east and drain the hills into the bay.

The San Francisco Bay Area is highly seismically active, and several active faults lie within a few miles of the site.

5.2 Site

The freeway passes through Quaternary alluvium (Figure 2), including Holocene basin deposits and flood-plain deposits. Most of the native soil is unconsolidated sediments. Logs of Test Borings from several structures along the project area are included in Appendix 1. They generally show stiff clay with sand and silt.

The freeway lies on areas with moderate to high liquefaction susceptibility (Figure 3).

5.3 Soils

The project site soils are mapped by the Soils Conservation Service (Web Soil Survey) as Urban Fill, meaning that the native soils have been stripped or reworked in construction and are no longer mappable. Urban Fill soils may have widely different engineering properties, so testing would be required to determine the specific engineering properties of the site soils.

6. GEOTECHNICAL CONSIDERATIONS

6.1 Excavation Characteristics

The project site soils may vary, from very soft where disturbed to hard where consolidated or cemented alluvium is present. We have not performed site geologic mapping, but Quaternary alluvium is present all along the proposed alignment, and known to be several hundred feet thick in the South Bay. Hard rock is not expected to be encountered in construction. Studies for the Geotechnical Design Report will describe more specifically the characteristics of materials in the areas requiring excavation.

6.2 Erosion

The area is mostly flat and erosion is not considered a problem along this alignment. District 4 Landscape Architecture should be consulted for erosion protection along any proposed new slopes.

6.3 Groundwater

Logs of Test Borings (Appendix 1) show groundwater at approximately 2 feet elevation throughout the project site. The roadway lies at approximately 10 to 20 feet elevation. The proposed retaining walls may require construction dewatering.

6.4 Seismicity

The San Francisco Bay Area is highly seismically active, with numerous large regional faults. The San Andreas and Hayward Faults pass within a few miles of the site. Several major earthquakes were recorded in the last 150 years, all of which would have caused ground shaking at the site.

The USGS (2003) assigns a 62% probability that a major earthquake will occur on a fault in the Bay Area in the next 30 years (Working Group, 2003). A major earthquake in the Bay Area could result in severe groundshaking at the project site and trigger secondary damage such as liquefaction or settlement.

No known active or potentially active faults cross the proposed alignment. Faults close to the project alignment are tabulated below, and the expected peak ground accelerations (PGA) are given. Distances were measured from the closest point along the proposed alignment to the fault using Jennings (1997). The Maximum Credible Earthquake (MCE) and Peak Ground Acceleration, in g, were derived from Mualchin (1996).

Table 1 Peak Ground Acceleration

Fault	Distance (km)	MCE	PGA (g)
San Andreas	12.5	8	0.48
Hayward	16.75	7½	0.33
Monte Vista	6.25	6½	0.35

The hazard is controlled by the San Andreas Fault.

6.4.1 Historical Seismicity

The site experienced strong ground shaking during the 1906 Great San Francisco Earthquake and during the 1989 Loma Prieta Earthquake. The site is likely to experience strong shaking in the future.

6.5 Liquefaction Susceptibility

Highway 101 passes through areas mapped as having a moderate to high liquefaction susceptibility (Figure 3; Knudsen, et al., 2000). Logs of Test Borings indicate that the groundwater table lies approximately 6 to 18 feet below ground level (Appendix 1). Detailed soil borings should be drilled for all structures and retaining walls to determine if liquefiable sediments are present.

6.6 Settlement

Soft sediments can settle under load. As part of geotechnical exploration of the site, borings can help determine the settlement potential. Settlement is not known to have occurred at this site previously.

6.7 Slope Stability

The area is mostly flat and natural slope stability should not be a concern.

7. POTENTIAL PROJECT IMPACTS ON MAN-MADE AND NATURAL FEATURES

The Hetch Hetchy aqueduct at San Mateo PM 1.76 and the Ringwood Avenue Pedestrian Overcrossing at San Mateo PM 2.57 will both be widened as part of this widening project. A pump station at the Henderson Underpass at San Mateo PM 3.4 will need to be moved. If Alternative 2 is selected, soundwalls may be moved.

8. HAZARDOUS WASTE IMPACT

An Initial Site Assessment has been completed for the project. There is a potential for aerially deposited lead contamination in the right-of-way, but the ADL materials may be used as fill material on site.

9. PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

9.1 Exploration and Investigations

Geotechnical Exploration is necessary to determine groundwater levels, soil types and strengths, and susceptibility to liquefaction or settlement. Several investigative methods should be used, including but not limited to: geologic mapping, soil borings, cone penetrometry studies, and geophysical studies.

Vertical borings will be advanced where walls are proposed or where soil stability should be investigated. The borings will characterize the geologic materials at depth, determine the suitability of the sites, and provide input into wall design. Groundwater levels should be measured to determine the need for dewatering in construction or wall design.

To characterize the subsurface at proposed wall locations, at least one boring is required per 200 lineal feet of wall, to a depth 2 to 2½ times the height of the wall. The left wall will require 6 vertical borings of 50 feet depth, and the right wall will require one boring, also 50 feet deep. In addition to Standard Penetration Tests (SPT) performed every 5 feet, pocket penetrometer readings should be taken on core samples as they are logged. Samples should be taken for moisture content and corrosion.

Two additional Cone Penetrometry (CPT) borings for the longer wall may be useful to find soil type, strength, moisture content, and groundwater depth.

9.2 Dewatering

We are not aware of any areas that currently require dewatering or suffer settlement or other secondary effects of dewatering. The exploratory drilling for the Geotechnical Design Report will help characterize the site soils and determine the likelihood of settlement, and delineate any areas that will require dewatering during construction.

All walls proposed for the project should include dewatering features, such as horizontal drains or underdrains.

9.3 Corrosion

Corrosivity tests will be conducted as part of the Geotechnical Design Report.

10. REFERENCES

Brabb, E.E., Graymer, R.W., and Jones, D.L., 2000, Geologic Map and Database of the Palo Alto 30 x 60 Quadrangle, California, U.S. Department Of The Interior Miscellaneous Field Studies Map MF- 2332.

Jennings, C.W., 1994, Fault Activity Map of California and Adjacent Areas, Department of Conservation, State of California, Scale, 1: 750,000.

Knudsen, K.L., Sowers, J.M., Witter, R.C., Wentworth, C.M., and Helley, E.J., 2000, Preliminary maps of Quaternary deposits and liquefaction susceptibility, nine-county San Francisco Bay region, California: a digital database, U.S. Geological Survey Open-File Report 00-444

Mualchin, L., 1996, A technical report to accompany the Caltrans California seismic hazard map, Caltrans, 64 p.

Soil Conservation Service Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app/

Wagner, D.L., Bortugno, E.J., and McJunkin, R.D., 1990, Geologic Map of the San Francisco-San Jose Quadrangle, California Division of Mines and Geology, Scale 1: 250,000.

Working Group of California Earthquake Probabilities, 2003, Summary of Earthquake Probabilities in the San Francisco Bay Region: 2003 – 2032, USGS Open-File Report 03-214, 235 p.

FIGURES

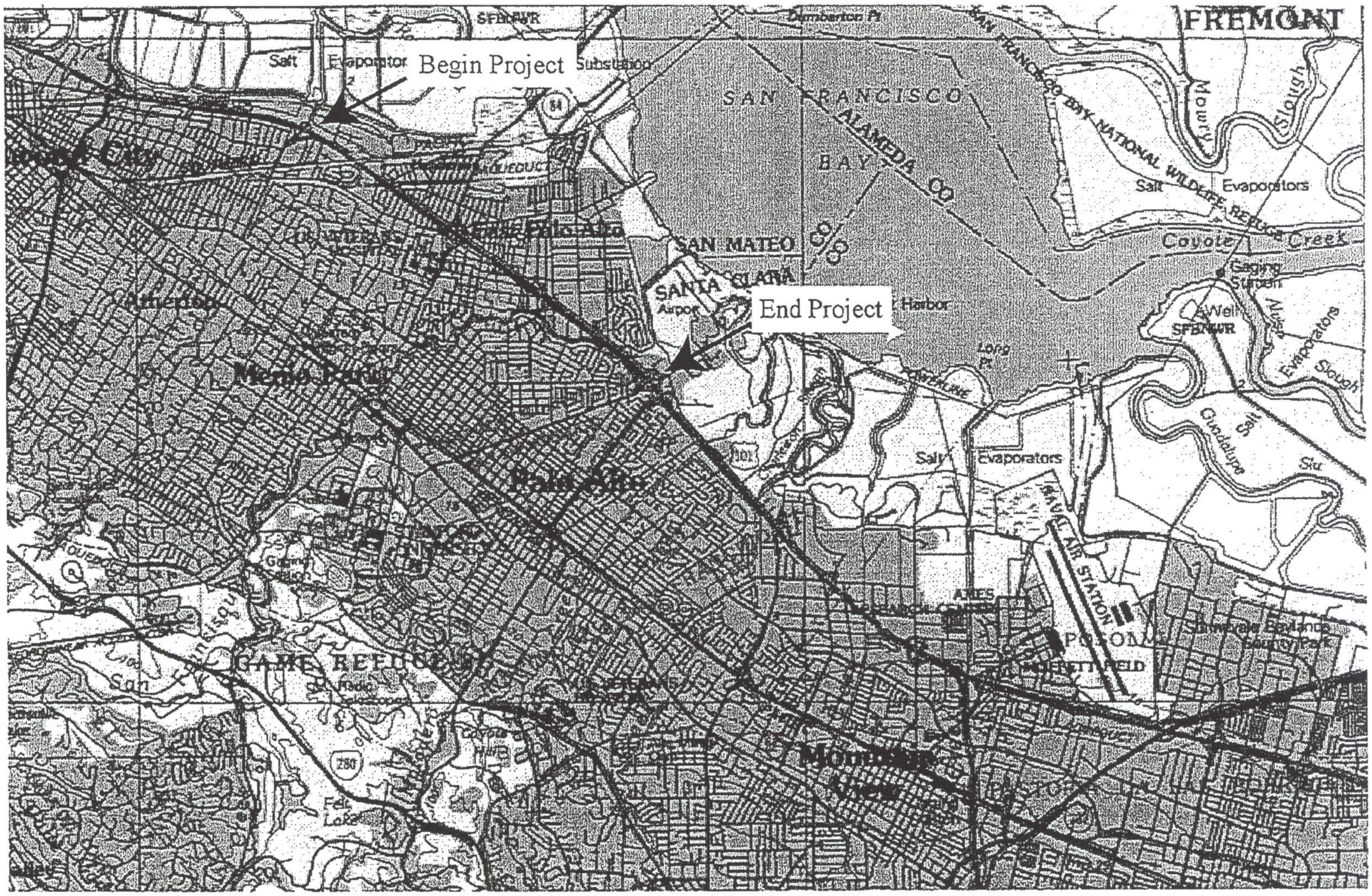
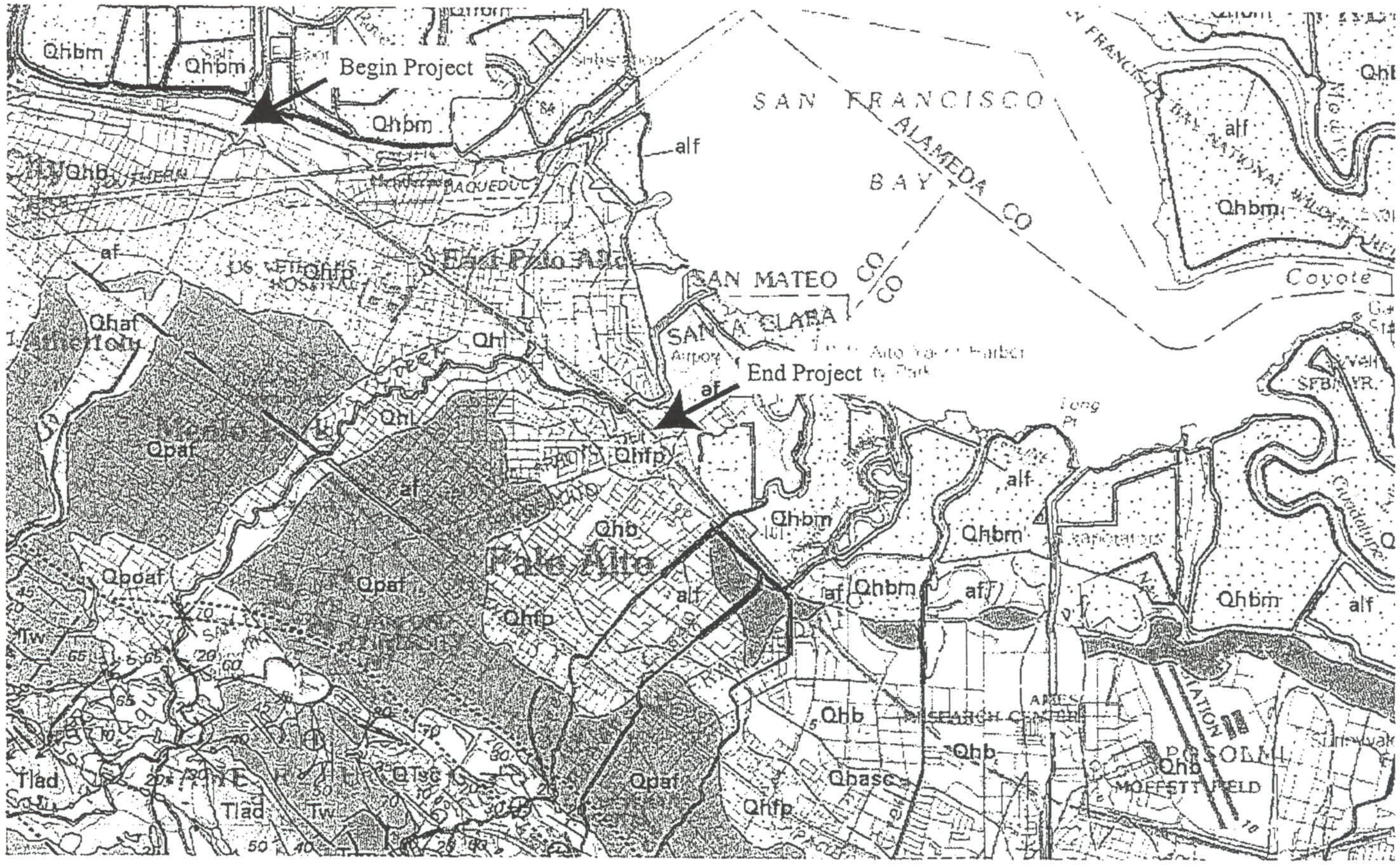


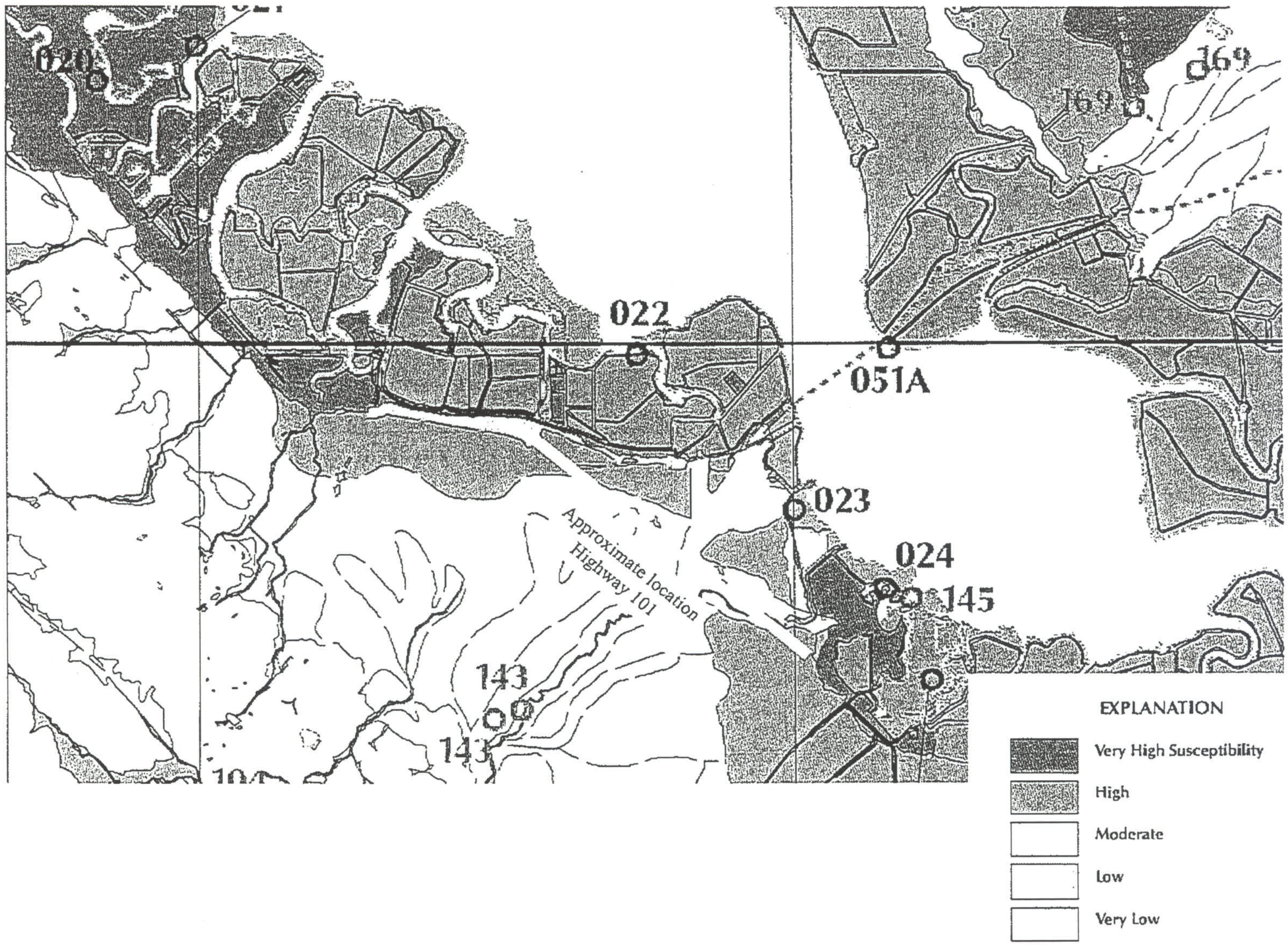
Figure 1	Location Map
SM 101 0.0-3.6 / SCL 101 52.3-52.6	
EA 04-235610	July, 2007



af Artificial Fill (Historic)
Qhb Basin Deposits (Holocene)
Qhfp Flood plain Deposits (Holocene)
Qhl Natural Leveee Deposits (Holocene)
Qpaf Alluvial Fan (Pleistocene)
Qhbm Bay Mud (Holocene)

Source: Brabb, E.E., Graymer, R.W., and Jones, D.L., 2000, Geologic Map and Database of the Palo Alto 30 x 60 Quadrangle, California, U.S. Department Of The Interior Miscellaneous Field Studies Map MF- 2332.

Figure 2	**Geology Map**
SM 101 0.0-3.6 / SCL 101 52.3-52.6	
EA 04-235610	July, 2007

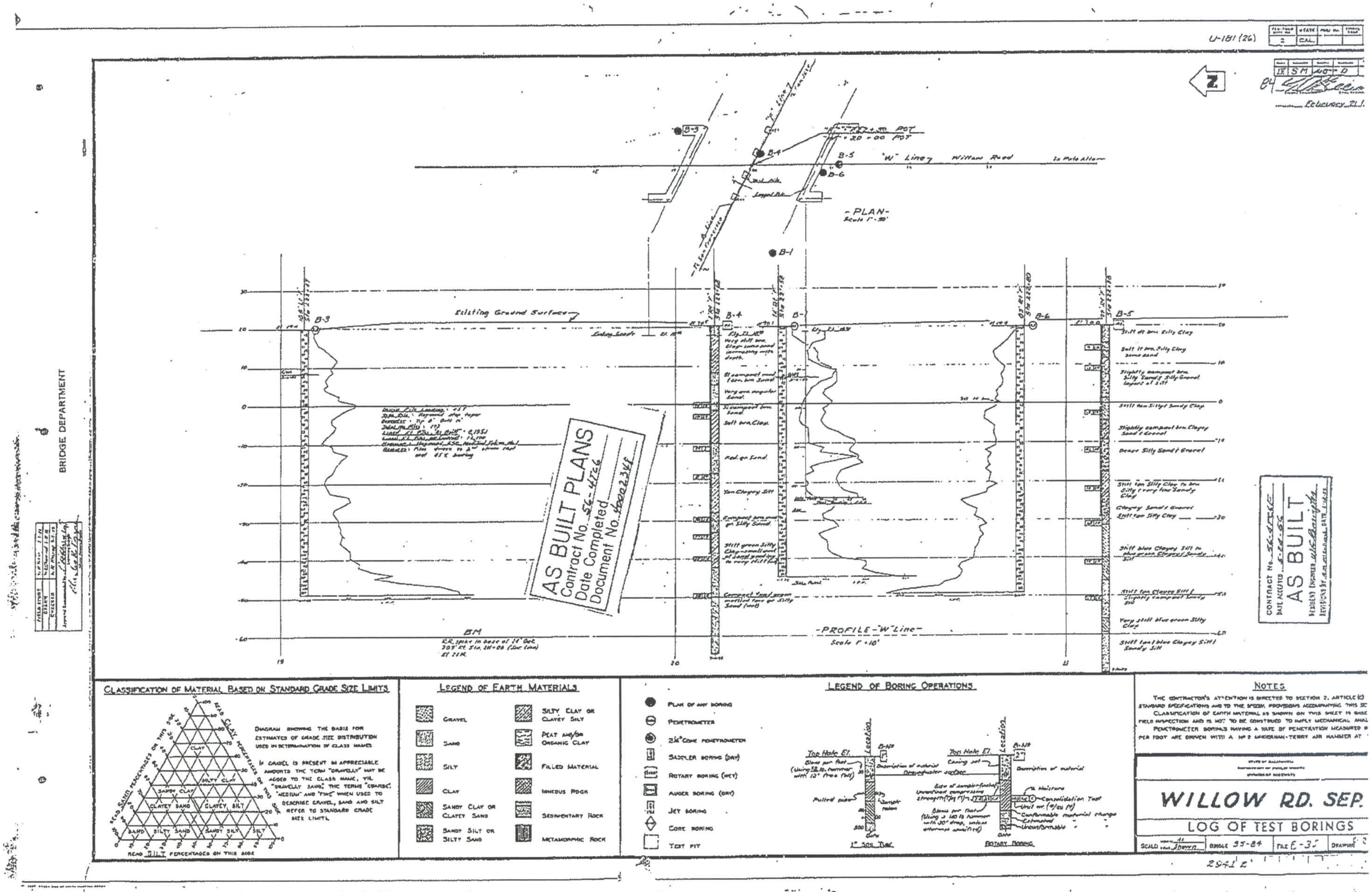


Source: Knudsen, K.L., Sowers, J.M., Witter, R.C., Wentworth, C.M., and Helley, E.J., 2000, Preliminary maps of Quaternary deposits and liquefaction susceptibility, nine-county San Francisco Bay region, California: a digital database, U.S. Geological Survey Open-File Report 00-444

Figure 3	**Liquefaction Susceptibility Map**
SM 101 0.0-3.6 / SCL 101 52.3-52.6	
EA 04-235610	July, 2007

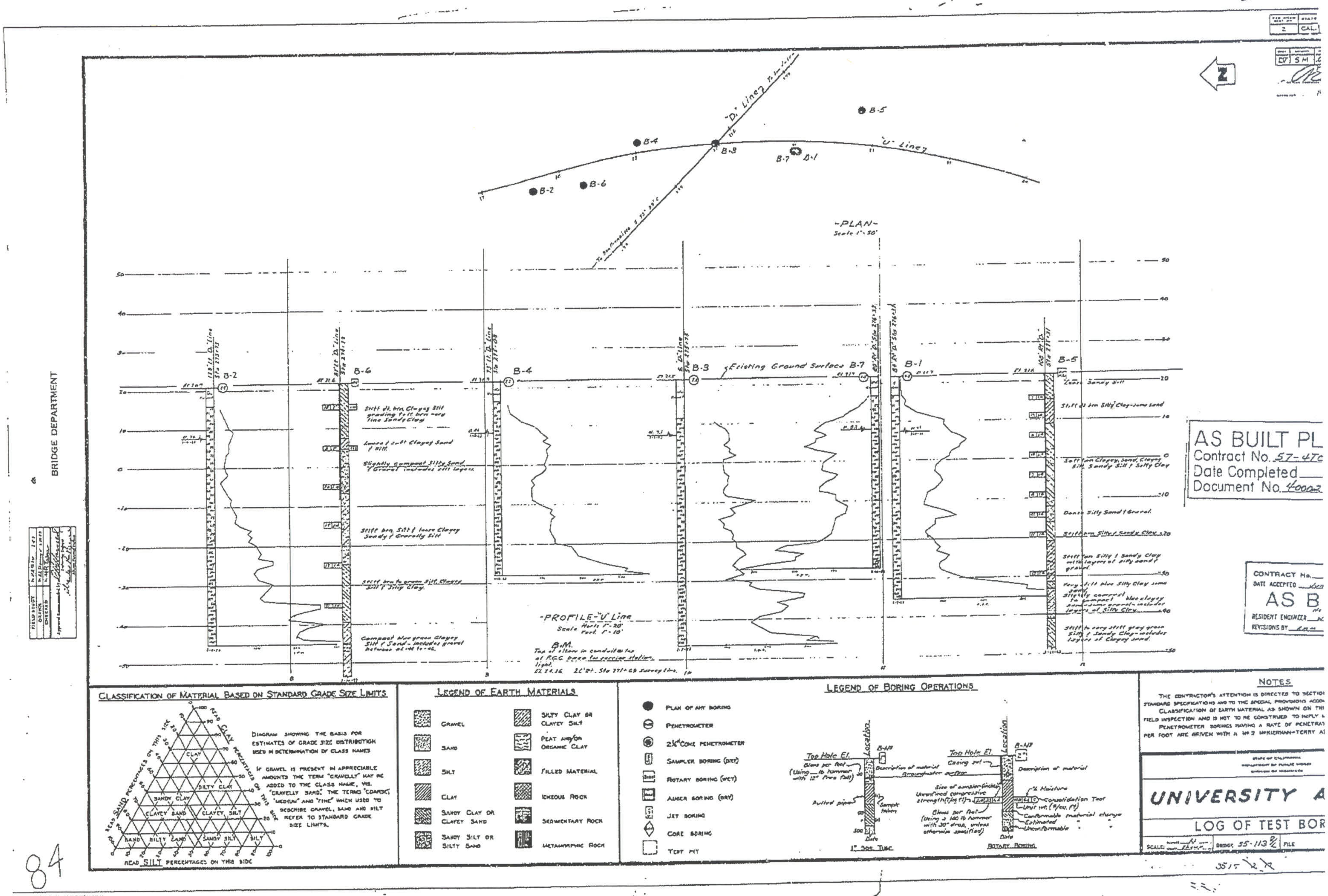
APPENDIX ONE

LOGS OF TEST BORINGS

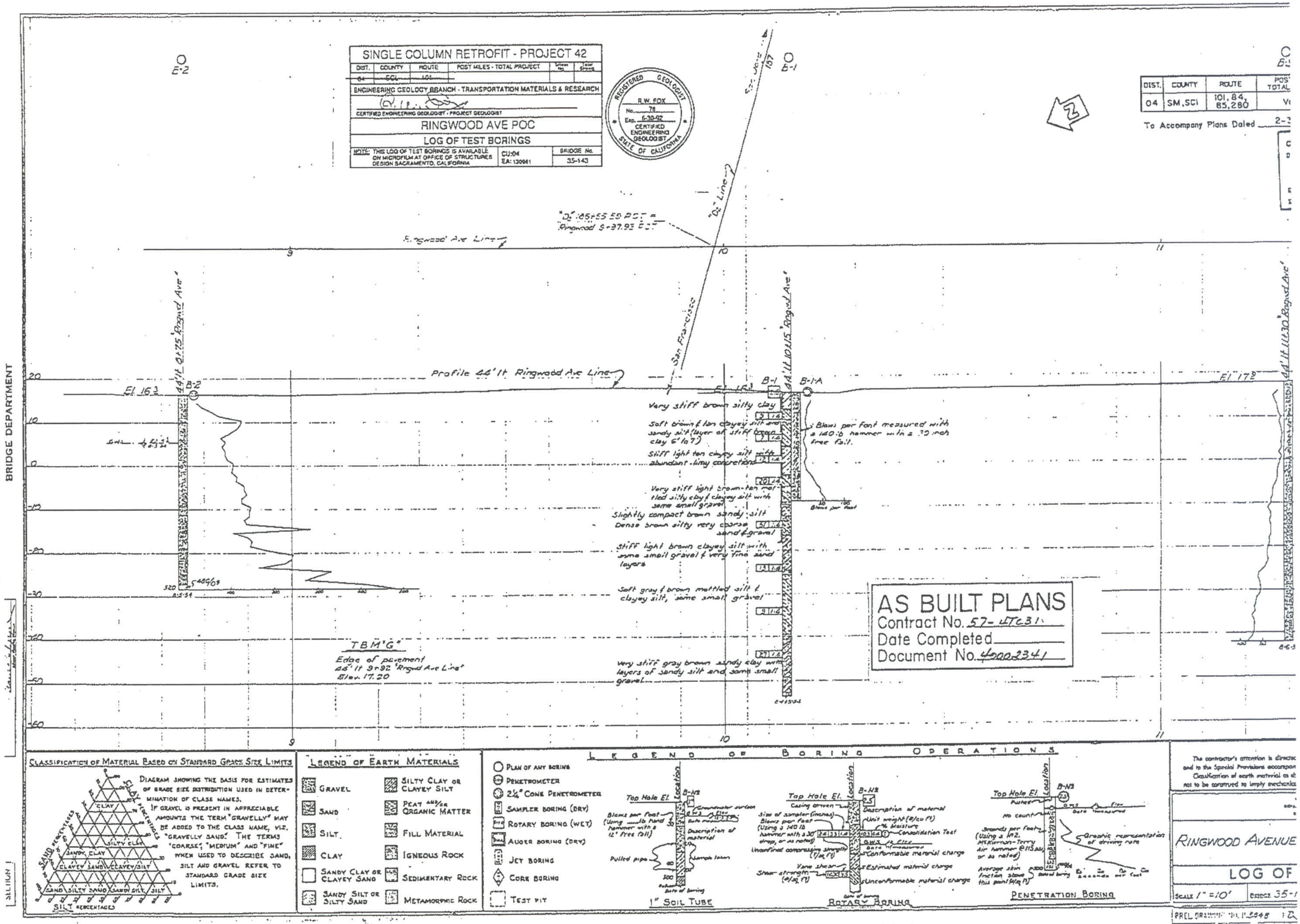


I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.

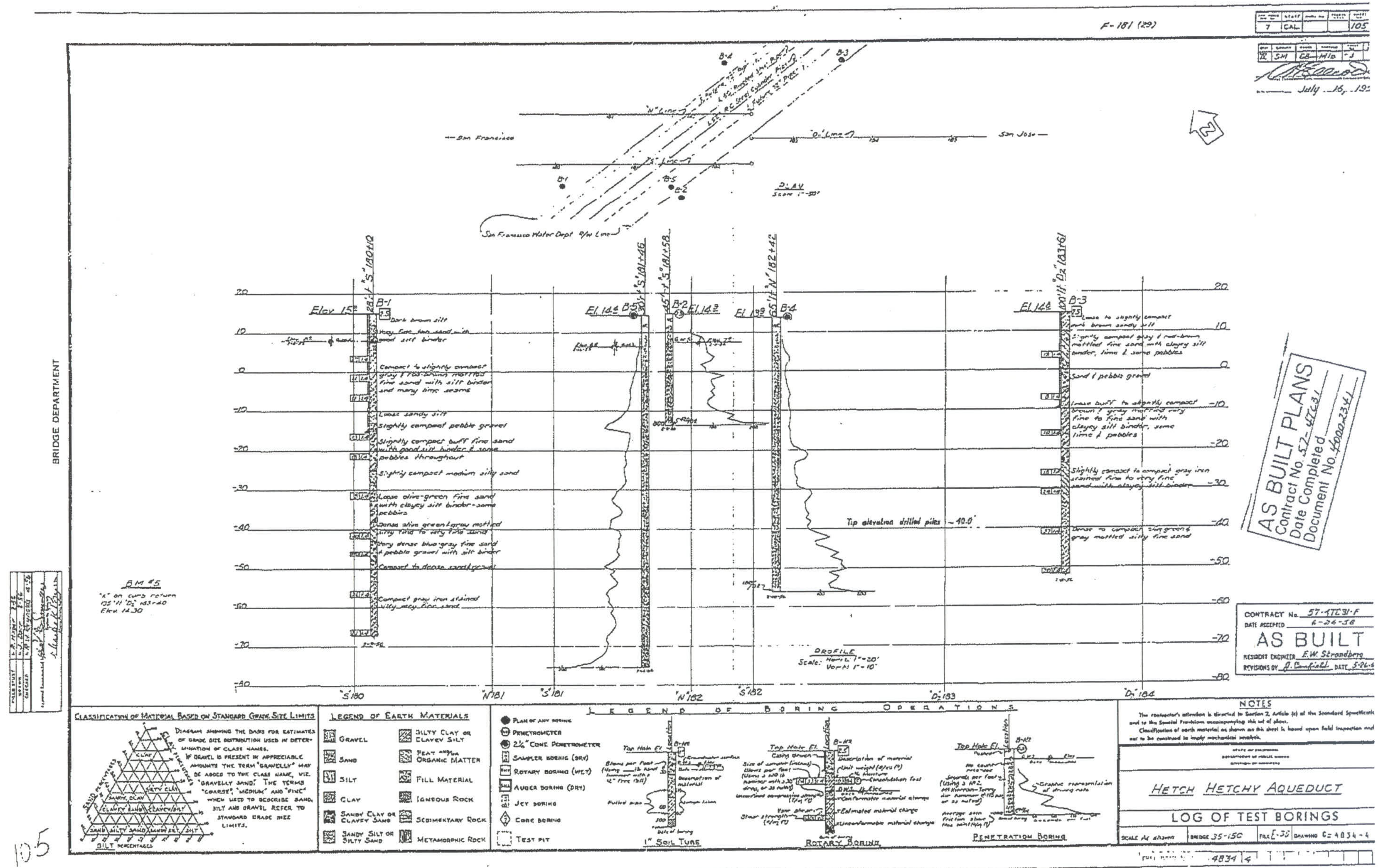
DATE ______ SIGNATURE ______ TITLE ______



-PLAN-
Scale 1" = 50'
"U" Line
"D" Line
B-1
B-2
B-3
B-4
B-5
B-6
B-7
D-1
Existing Ground Surface
-PROFILE-"U" Line
B.M.
AS BUILT PL
Contract No. 57-47c
Date Completed
Document No. 40002
CONTRACT No.
DATE ACCEPTED
AS B
RESIDENT ENGINEER
REVISIONS BY
CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS
DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES
IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND". THE TERMS "COARSE", "MEDIUM" AND "FINE" WHICH USED TO DESCRIBE GRAVEL, SAND AND SILT REFER TO STANDARD GRADE SIZE LIMITS.
READ CLAY PERCENTAGES ON THIS SIDE
READ SAND PERCENTAGES ON THIS SIDE
READ SILT PERCENTAGES ON THIS SIDE
CLAY
SILTY CLAY
SANDY CLAY
CLAYEY SAND
CLAYEY SILT
SAND
SILTY SAND
SANDY SILT
SILT
LEGEND OF EARTH MATERIALS
GRAVEL
SAND
SILT
CLAY
SANDY CLAY OR CLAYEY SAND
SANDY SILT OR SILTY SAND
SILTY CLAY OR CLAYEY SILT
PEAT AND/OR ORGANIC CLAY
FILLED MATERIAL
IGNEOUS ROCK
SEDIMENTARY ROCK
METAMORPHIC ROCK
LEGEND OF BORING OPERATIONS
PLAN OF ANY BORING
PENETROMETER
2½" CONE PENETROMETER
SAMPLER BORING (DRY)
ROTARY BORING (WET)
AUGER BORING (DRY)
JET BORING
CORE BORING
TEST PIT
Top Hole El.
Location
1" SOIL TUBE
ROTARY BORING
NOTES
THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTIO
UNIVERSITY A
LOG OF TEST BOR
BRIDGE DEPARTMENT
84

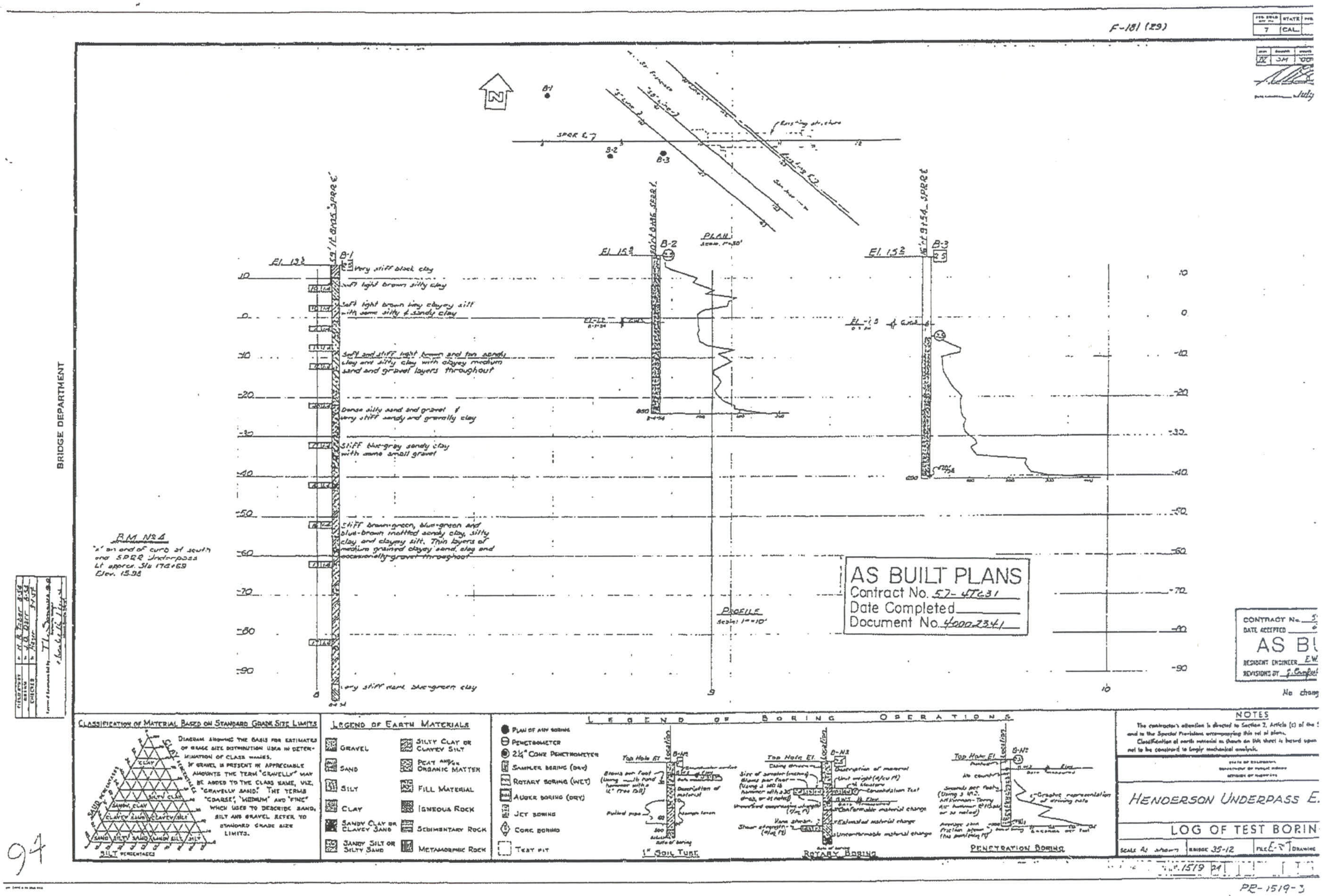


SINGLE COLUMN RETROFIT - PROJECT 42
ENGINEERING GEOLOGY BRANCH - TRANSPORTATION MATERIALS & RESEARCH
CERTIFIED ENGINEERING GEOLOGIST - PROJECT GEOLOGIST
RINGWOOD AVE POC
LOG OF TEST BORINGS
NOTE: THIS LOG OF TEST BORINGS IS AVAILABLE ON MICROFILM AT OFFICE OF STRUCTURES DESIGN SACRAMENTO, CALIFORNIA
CU:04
EA: 130961
BRIDGE No. 35-143
REGISTERED GEOLOGIST
R.W. FOX
No. 78
Exp. 6-30-92
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA
DIST. 04
COUNTY SM, SCl
ROUTE 101, 84, 85, 280
To Accompany Plans Dated
"D" Line
San Francisco
"D" 185+55.59 POT = Ringwood S-37.93 POT
Ringwood Ave Line
Profile 44' lt Ringwood Ave Line
B-2
44' lt 9+75 "Ringwd Ave"
El 16.3
B-1
B-1A
44' lt 10+15 "Ringwd Ave"
El 16.3
El 17.2
44' lt 11+30 "Ringwd Ave"
Very stiff brown silty clay
Soft brown & tan clayey silt and sandy silt (layer of stiff brown clay 6' to 7')
Stiff light tan clayey silt with abundant limy concretions
Very stiff light brown-tan mottled silty clay & clayey silt with some small gravel
Slightly compact brown sandy silt
Dense brown silty very coarse sand & gravel
Stiff light brown clayey silt with some small gravel & very fine sand layers
Soft gray & brown mottled silt & clayey silt, some small gravel
Very stiff gray brown sandy clay with layers of sandy silt and some small gravel
Blows per foot measured with a 140 lb hammer with a 30 inch free fall.
Blows per foot
TBM "G"
Edge of pavement
44' lt 9+92 "Ringwd Ave Line"
Elev. 17.20
AS BUILT PLANS
Contract No. 57-4TC31
Date Completed
Document No. 45002341
CLASSIFICATION OF MATERIAL BASED ON STANDARD GRAIN SIZE LIMITS
DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRAIN SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES.
IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ, "GRAVELLY SAND." THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL REFER TO STANDARD GRADE SIZE LIMITS.
CLAY PERCENTAGES
SAND PERCENTAGES
SILT PERCENTAGES
LEGEND OF EARTH MATERIALS
GRAVEL
SAND
SILT
CLAY
SANDY CLAY OR CLAYEY SAND
SANDY SILT OR SILTY SAND
SILTY CLAY OR CLAYEY SILT
PEAT AND/OR ORGANIC MATTER
FILL MATERIAL
IGNEOUS ROCK
SEDIMENTARY ROCK
METAMORPHIC ROCK
PLAN OF ANY BORING
PENETROMETER
2 1/2" CONE PENETROMETER
SAMPLER BORING (DRY)
ROTARY BORING (WET)
AUGER BORING (DRY)
JET BORING
CORE BORING
TEST PIT
LEGEND OF BORING OPERATIONS
1" SOIL TUBE
ROTARY BORING
PENETRATION BORING
The contractor's attention is directed to the Special Provisions accompanying ... Classification of earth material as ... not to be construed to imply mechanical ...
RINGWOOD AVENUE
LOG OF
SCALE 1" = 10'
BRIDGE DEPARTMENT



I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.

DATE [illegible] SIGNATURE [illegible] TITLE [illegible]



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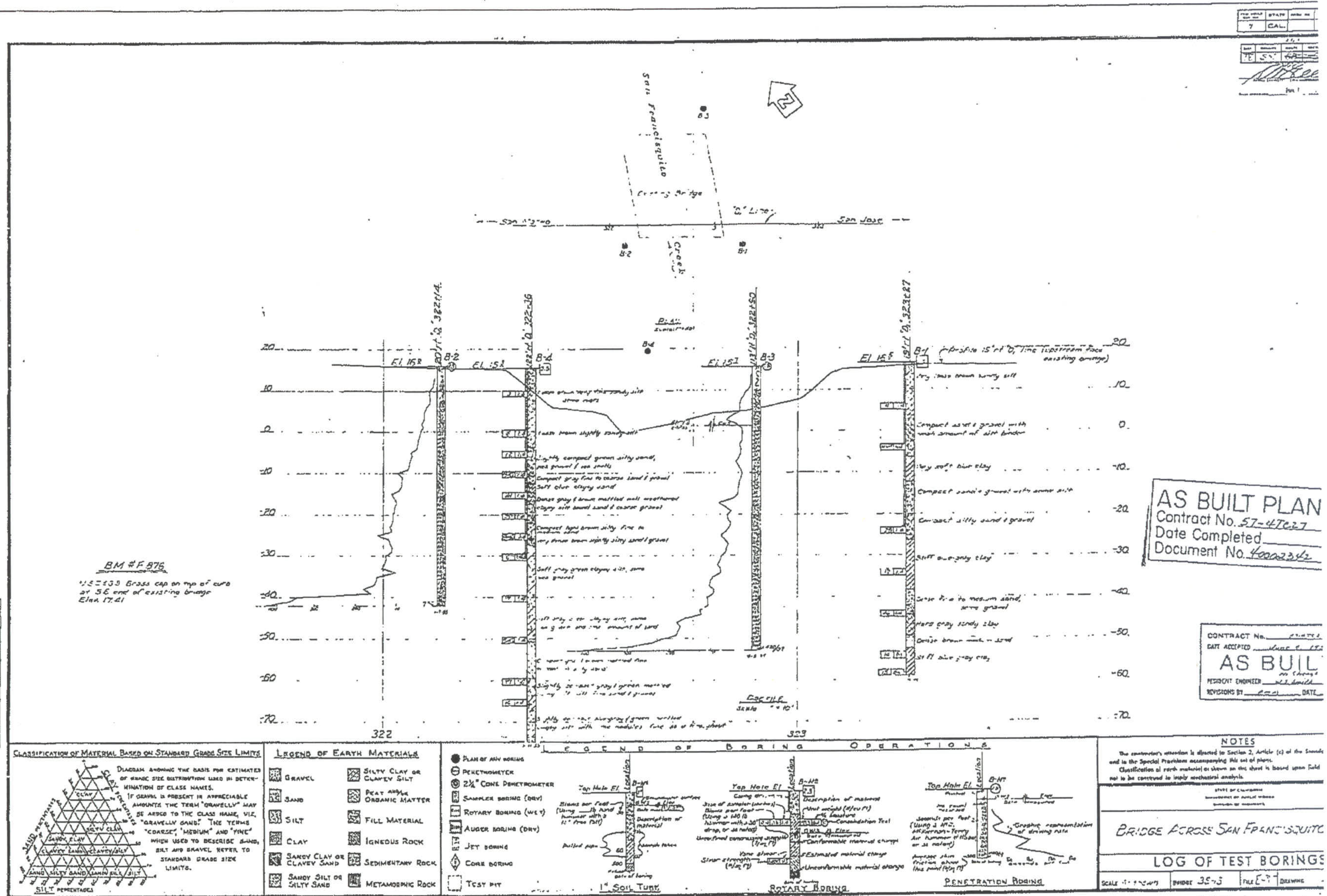
DATE [illegible] SIGNATURE [illegible] TITLE [illegible]

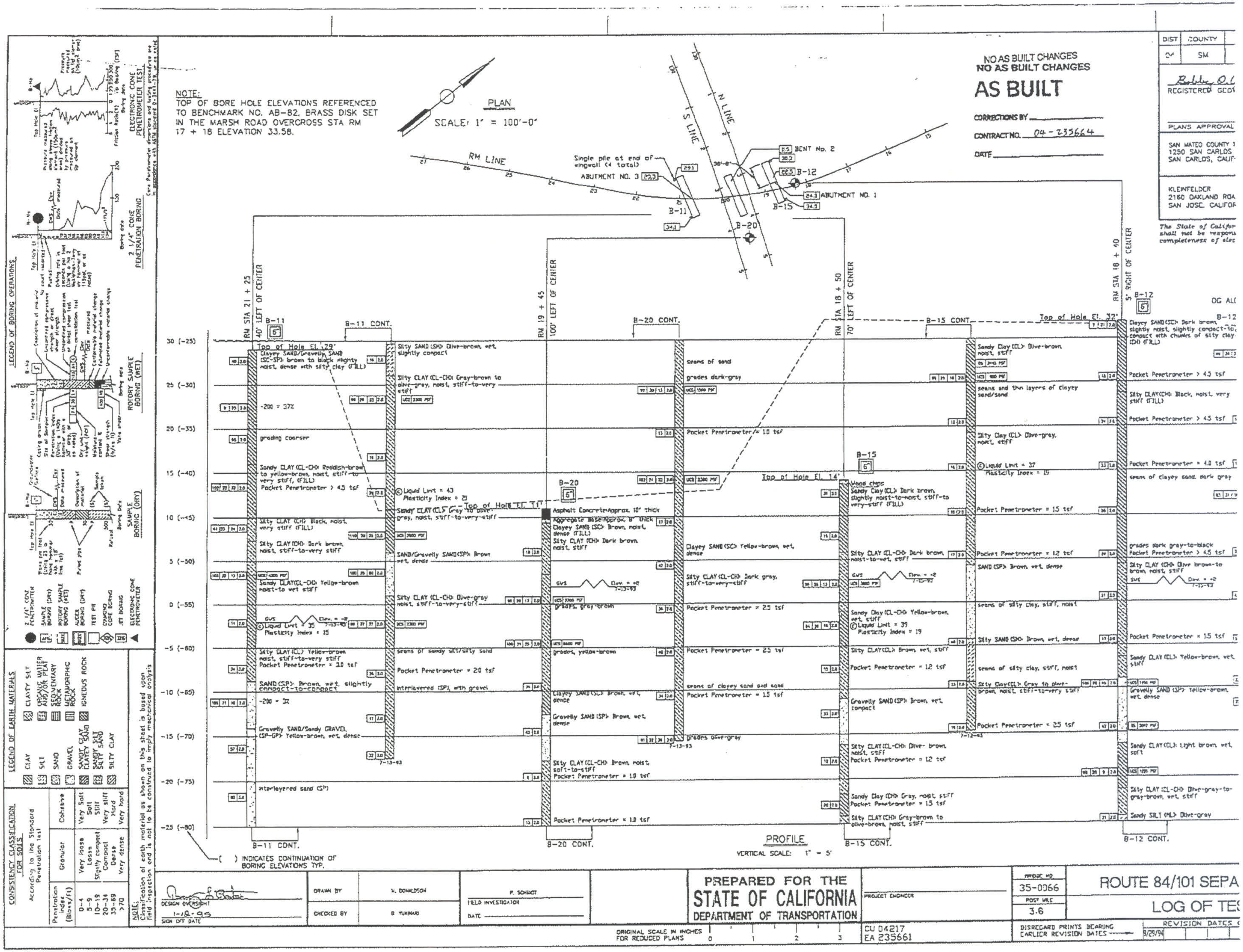


AS BUILT PLAN
Contract No. 57-47C27
Date Completed
Document No. 40002342

T-19

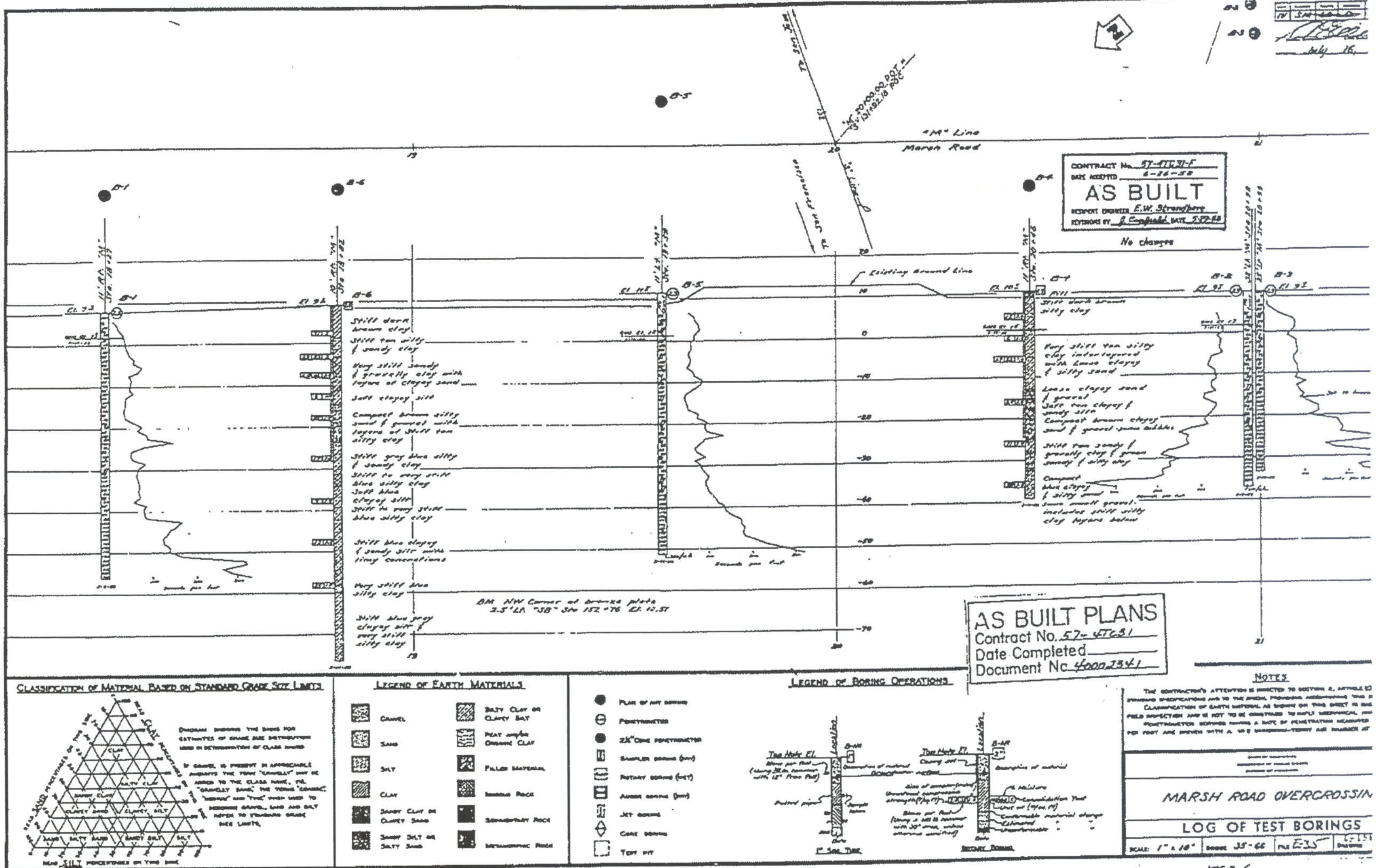
I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.

DATE June 28 1971 SIGNATURE [illegible] TITLE [illegible]


NOTE:
TOP OF BORE HOLE ELEVATIONS REFERENCED TO BENCHMARK NO. AB-82, BRASS DISK SET IN THE MARSH ROAD OVERCROSS STA RM 17 + 18 ELEVATION 33.58.
PLAN
SCALE: 1" = 100'-0"
RM LINE
S LINE
N LINE
Single pile at end of wingwall (4 total)
ABUTMENT NO. 3
BENT No. 2
ABUTMENT NO. 1
B-11
B-12
B-15
B-20
NO AS BUILT CHANGES
NO AS BUILT CHANGES
AS BUILT
CORRECTIONS BY
CONTRACT NO. 04-235664
DATE
RM STA 21 + 25
40' LEFT OF CENTER
RM STA 19 + 45
100' LEFT OF CENTER
RM STA 18 + 50
70' LEFT OF CENTER
RM STA 18 + 40
5' RIGHT OF CENTER
B-11 CONT.
B-20 CONT.
B-15 CONT.
B-12 CONT.
Top of Hole El. 29'
Top of Hole El. 11'
Top of Hole El. 14'
Top of Hole El. 32'
PROFILE
VERTICAL SCALE: 1" = 5'
( ) INDICATES CONTINUATION OF BORING ELEVATIONS TYP.
LEGEND OF BORING OPERATIONS
LEGEND OF EARTH MATERIALS
CONSISTENCY CLASSIFICATION FOR SOILS
According to the Standard Penetration Test
NOTE:
Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.
DIST
COUNTY
04
SM
REGISTERED GEO
PLANS APPROVAL
SAN MATEO COUNTY
1250 SAN CARLOS
SAN CARLOS, CALIF
KLEINFELDER
2160 OAKLAND ROA
SAN JOSE, CALIFOR
DESIGN OVERSIGHT
1-12-95
DRAWN BY
W. DONALDSON
CHECKED BY
B. YUKNAD
P. SCHACT
FIELD INVESTIGATOR
PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
PROJECT ENGINEER
BRIDGE NO.
35-0066
POST MILE
3.6
ROUTE 84/101 SEPA
LOG OF TE
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
CU 04217
EA 235661
DISREGARD PRINTS BEARING EARLIER REVISION DATES
REVISION DATES
8/29/94

DIST	COUNTY
04	SM

TO ACCOMPANY PLANS DATED



80

NOTE:
ADDITIONAL AS-BUILT FOUNDATION DATA MAY BE AVAILABLE AT THE OFFICE OF TRANSPORTATION MATERIALS AND RESEARCH 5900 FOLSOM BOULEVARD SACRAMENTO, CALIFORNIA 95819.

1-18-95

DESIGN	BY	CHECKED
DETAILS	BY	CHECKED
QUANTITIES	BY	CHECKED

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT ENGINEER

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 04217
EA 235661

BRIDGE NO. 35-0066
POST MILE 3.6

ROUTE 84/101 SE
AS-BUILT LOG

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES

3. 04-235641-Geotechnical-Recommendation-CMS.pdf

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. TEBLEZ NEMARIAM
District Branch Chief
Office of Design South Peninsula

Date: April 04, 2011

Attention: Rachel Liu

File: 04-SM-101 PM 0.0/0.9
SCL-101 PM 52.2/52.6
04-235641
Auxiliary Lane

TN

From: TUNG NGUYEN
Transportation Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

M. Momenzadeh

MAHMOOD MOMENZADEH
Chief, Branch C
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Changeable Message Sign Foundation Recommendation

This memorandum is in reply to your request dated December 13, 2010 to provide foundation recommendation for a proposed changeable message sign (CMS) of the auxiliary lane project in San Mateo and San Clara Counties, California. The CMS was originally located about 1100 ft north from the Embarcadero Road Overcrossing in Santa Clara County on the northbound of State Route 101 (SR 101) as shown in layout sheet provided in the request. Subsequently, as shown in March 23, 2011 Plans and the request from the Office of Peninsula, Design South of March 25, 2011, the proposed CMS is relocated to the Station D2 319+00 on the northbound of SR 101 in San Mateo County.

The proposed site for CMS is generally flat between San Francisquito Creek Bridge and the University Avenue Overcrossing. Due to insufficient time to drill at the new proposed site, the boring R-10-001 and cone penetration test CPT-10-001 conducted in August 2010 for the San Francisquito Creek Bridge Replacement Project are used to characterize the subsurface conditions for the CMS site. These boring and CPT shown in the attached Log of Test Borings are located about 290 ft and 260 ft south and southwest from the proposed CMS site, respectively. The general geology of the subsurface within the expected foundation depth consists of surficial fill underlying by alluvial deposits of clayey and sandy materials.

Below is the summary of the subsurface soil conditions anticipated at the site and our foundation recommendations:

Subsurface Conditions:

Below the ground surface is about 5 feet of medium stiff fill material underlain by 8 feet of soft lean clay with sand. Below this deposit is 8 ft medium dense sand with silt underlain by 15 feet of medium stiff to stiff lean clay and lean clay with sand. Some variations of soil thicknesses from those indicated above should be anticipated. However, these variations may not be of a significant effect on the construction of the cast in drilled hole (CIDH) pile foundation. Groundwater was recorded at a depth of about 13 ft below the existing roadway surface. Groundwater level is expected to fluctuate and could be higher depending on the season and amount of rainfall. The medium dense sand with silt is subject to liquefy under the seismic event.

Foundation and Construction Recommendations:

1. The 5-ft diameter CIDH pile should be 33 ft long to support the proposed CMS due to the presence of soft and liquefied materials with permanent casing for the top 25 feet of CIDH pile. Please include this permanent casing in the special provisions.

2. The permanent casing thickness shall be sufficient for the stresses caused by driving or rotation, which ever is chosen by the contractor, during the casing installation.

3. The permanent casing shall not be installed by drilling an oversize hole and inserting the casing due to the soft and liquefied soil conditions, and the lateral load resistance requirements.

4. Caving of the drilled hole below the permanent casing and higher groundwater shall be anticipated. Therefore, the wet method for placing concrete will be required and should be included in the special provisions.

Any questions regarding the above comments should be directed to the attention of Tung Nguyen at 510-622-1775 or Mahmood Momenzadeh, Branch Chief at 510-286-5732.

c: TPokrywka, MMomenzadeh, ADing, JStayton, Structure RE, Pending File, MWillian, Archive

TNguyen/mm

REGISTERED PROFESSIONAL ENGINEER
TUNG NGUYEN
No. 72143
Exp. 06/30/2012
CIVIL
STATE OF CALIFORNIA

Attachment

LOG OF TEST BORINGS

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SCI, SM	101			

CERTIFIED ENGINEERING GEOLOGIST

PLANS APPROVAL DATE

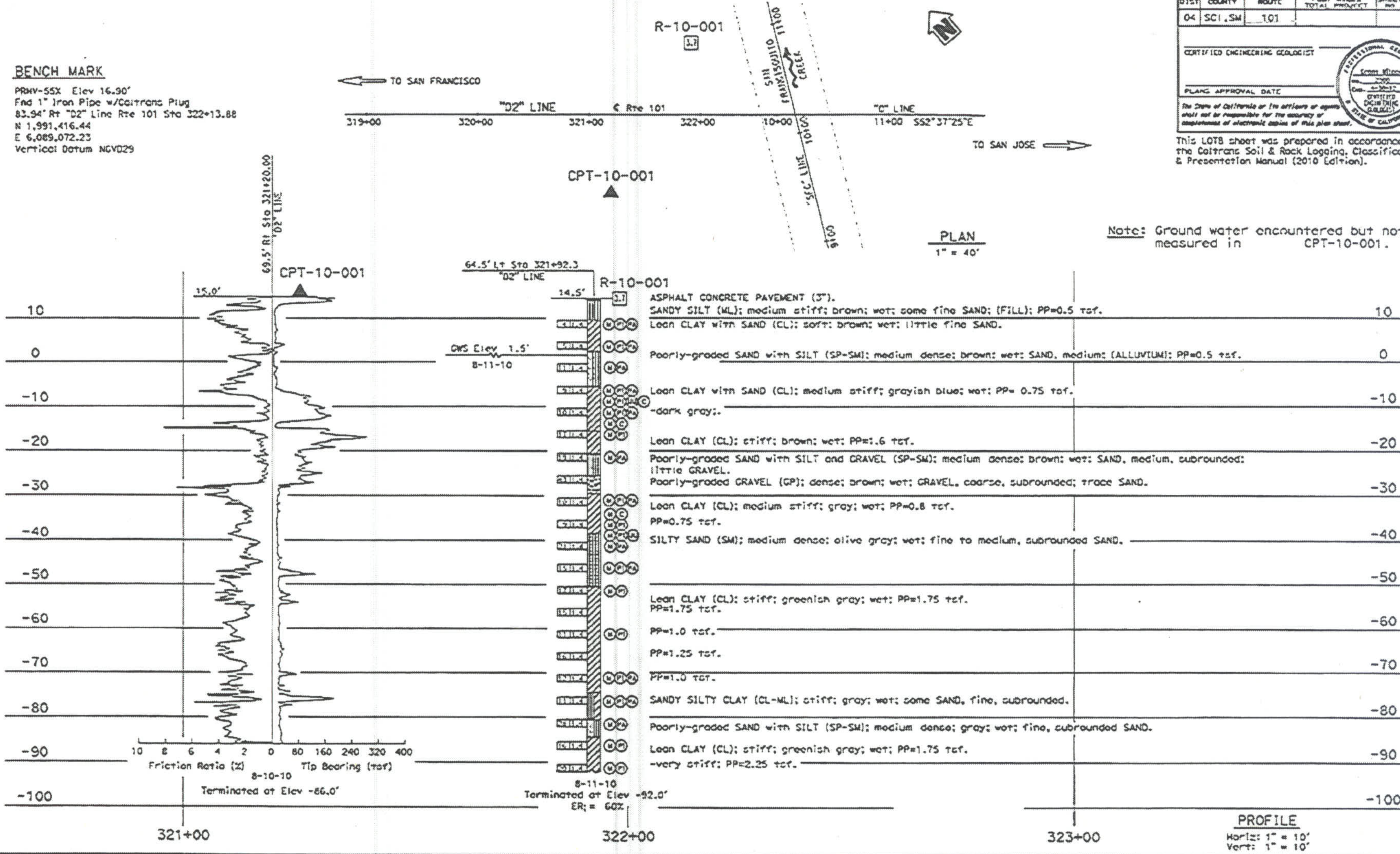
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

BENCH MARK

PRHV-55X Elev 16.90'
Fnd 1" Iron Pipe w/Caltrans Plug
83.94' Rt "D2" Line Rte 101 Sta 322+13.88
N 1,991,416.44
E 6,089,072.23
Vertical Datum NGVD29

Note: Ground water encountered but not measured in CPT-10-001.



ENGINEERING SERVICES		GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	CHANGEABLE MESSAGE SIGN
FUNCTIONAL SUPERVISOR NAME: M. Momenzadeh	DRAWN BY: I.C-Rennan CHECKED BY: D. Nesbitt	FIELD INVESTIGATION BY: T. Nguyen		DESIGN BRANCH	LOG OF TEST BORINGS 1 OF 3

CU 04
EA 235641

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI,SM	101			

CERTIFIED ENGINEERING GEOLOGIST

PLANS APPROVAL DATE

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CEMENTATION

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

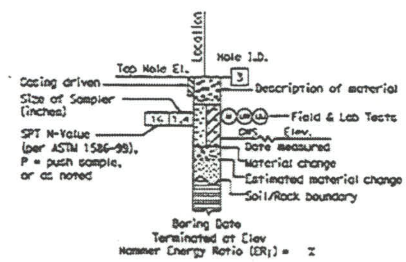
BOREHOLE IDENTIFICATION

Symbol	Hole Type	Description
	A	Auger Boring (hollow or solid stem bucket)
	R RW RC P	Rotary drilled boring (conventional) Rotary drilled with self-casing wire-line Rotary core with continuously-sampled, self-casing wire-line Rotary percussion boring (air)
	R	Rotary drilled diamond core
	HD HA	Hand driven (1-inch soil tube) Hand Auger
●	D	Dynamic Cone Penetration Boring
▲	CPT	Cone Penetration Test (ASTM D 5778)
	O	Other (note on LOTB)

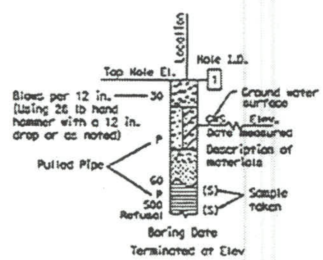
Note: Size in Inches.

CONSISTENCY OF COHESIVE SOILS

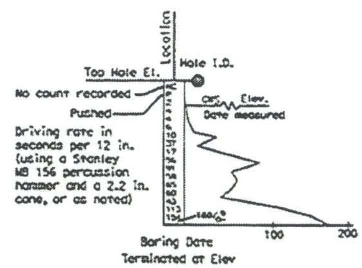
Description	Shear Strength (tsf)	Pocket Penetrometer Measurement, PP, (tsf)	Torvane Measurement, TV, (tsf)	Vane Shear Measurement, VS, (tsf)
Very Soft	Less than 0.12	Less than 0.25	Less than 0.12	Less than 0.12
Soft	0.12 - 0.25	0.25 - 0.5	0.12 - 0.25	0.12 - 0.25
Medium Stiff	0.25 - 0.5	0.5 - 1	0.25 - 0.5	0.25 - 0.5
Stiff	0.5 - 1	1 - 2	0.5 - 1	0.5 - 1
Very Stiff	1 - 2	2 - 4	1 - 2	1 - 2
Hard	Greater than 2	Greater than 4	Greater than 2	Greater than 2



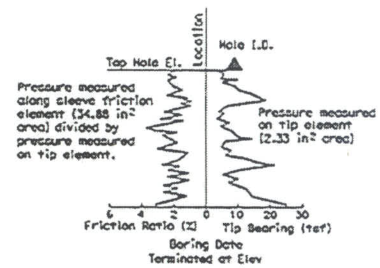
ROTARY BORING



HAND BORING



DYNAMIC CONE PENETRATION BORING



CONE PENETRATION TEST (CPT) BORING

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN DESIGN BRANCH	CHANGEABLE MESSAGE SIGN
	PREPARED BY: I. C-Rammon 3/11		CU 04 EA 235641	LOG OF TEST BORINGS 2 OF 3

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI,SM	101			

CERTIFIED ENGINEERING GEOLOGIST

PLANS APPROVAL DATE

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GROUP SYMBOLS AND NAMES

Graphic/Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND
GP	Poorly-graded GRAVEL Poorly-graded GRAVEL with SAND
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GP-GM	Poorly-graded GRAVEL with SILT Poorly-graded GRAVEL with SILT and SAND
GP-GC	Poorly-graded GRAVEL with CLAY (or SILTY CLAY) Poorly-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GM	SILTY GRAVEL SILTY GRAVEL with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL
SP	Poorly-graded SAND Poorly-graded SAND with GRAVEL
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SP-SM	Poorly-graded SAND with SILT Poorly-graded SAND with SILT and GRAVEL
SP-SC	Poorly-graded SAND with CLAY (or SILTY CLAY) Poorly-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SM	SILTY SAND SILTY SAND with GRAVEL
SC	CLAYEY SAND CLAYEY SAND with GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL
PT	PEAT
	COBBLES COBBLES and BOULDERS BOULDERS

Graphic/Symbol	Group Names
CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
OL	ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
OL	ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
CH	Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
MH	Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
OH	ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
OH	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
OL/OH	ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND

FIELD AND LABORATORY TESTING

- C Consolidation (ASTM D 2435)
- CL Collapse Potential (ASTM D 5333)
- CP Compaction Curve (CTM 216)
- CR Corrosivity Testing (CTM 643, CTM 422, CTM 417)
- CU Consolidated Undrained Triaxial (ASTM D 4767)
- DS Direct Shear (ASTM D 3080)
- EI Expansion Index (ASTM D 4829)
- M Moisture Content (ASTM D 2216)
- OC Organic Content-% (ASTM D 2974)
- P Permeability (CTM 220)
- PA Particle Size Analysis (ASTM D 422)
- PI Plasticity Index (AASHTO T 90) Liquid Limit (AASHTO T 89)
- PL Point Load Index (ASTM D 5731)
- PM Pressure Meter
- R R-Value (CTM 301)
- SE Sand Equivalent (CTM 217)
- SG Specific Gravity (AASHTO T 100)
- SL Shrinkage Limit (ASTM D 427)
- SW Swell Potential (ASTM D 4546)
- UC Unconfined Compression-Soil (ASTM D 2166) Unconfined Compression-Rock (ASTM D 2938)
- UU Unconsolidated Undrained Triaxial (ASTM D 2850)
- UW Unit Weight (ASTM D 4767)

APPARENT DENSITY OF COHESIONLESS SOILS

Description	SPT N_{60} (Blows / 12 in.)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Greater than 50

MOISTURE

Description	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Description	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5% - 10%
Little	15% - 25%
Some	30% - 45%
Mostly	50% - 100%

PARTICLE SIZE

Description		Size (in.)
Boulder		Greater than 12
Cobble		3 - 12
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay		Less than 1/300

ENGINEERING SERVICES

GEOTECHNICAL SERVICES

PREPARED BY: T. C-Reeman 3/11

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH

CU 04
EA 235641

CHANGEABLE MESSAGE SIGN
LOG OF TEST BORINGS 3 OF 3

4. 04-235641-Corrosion-Recommendation.pdf

(From the parent EA 235610)

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: TEBLEZ NEMARIAN
District Branch Chief
Design Peninsula

Attention: Aijun Ding

Date: June 17, 2009

File: 04-SM/SCL-101
PM 0.0/3.6 & 52.3/52.6
04-235611

REGISTERED PROFESSIONAL ENGINEER
RICHARD M. D'ONOFRIO
C 66054
EXP. 6-30-2010
CIVIL
STATE OF CALIFORNIA

From: RICK D'ONOFRIO, P.E.
Materials Design Engineer
Engineering Services I – Materials C

Concurred by: RICHARD CHAN, P.E.
District Materials Engineer
District Branch Chief, Mat C

Subject: Corrosion Study Recommendation

This memo gives our alternative Materials recommendation for concrete culvert, metal and plastic pipe materials. The corrosion input data was taken from previous Contract #04-360354, SM 101 (PM 0.0/6.6) in the early 1970's.

Based on the corrosion tests, we have concluded that the above site is corrosive. Results from the analysis are in the attached Table. All four samples were taken near the Hetch Hetchy Aqueduct.

Concrete Culverts

1. Use Type II modified Portland cement per Caltrans Standard Specifications for all culverts. This recommendation is based on the attached Culvert Corrosion Studies Sheet. Use the standard concrete cover over the reinforcing steel.
2. Use Standard RCP

Metal Pipes

For metal pipes, use the following alternatives:

1) 12 gauge (2.8 mm) corrugated steel pipe (CSP).
2) 18 gauge (1.3 mm) CSP with Polymeric Sheet Coating (PSC), both sides.
3) Do not use CAP/CASP.

Teblez Nemarian
Attn: Aijun Ding
June 17, 2009

Plastic Pipe

Thermoplastic pipes may be used as an alternate in this project for a 50-year service life. The maximum fill height over plastic culverts is a function of the type and size of the plastic pipe. Plastic pipes shall conform to Section 64 of Caltrans Standard Specification.

Please contact Rick D'Onofrio at 622-1776 if you have any questions.

c: Route File, Daily File
R. D'Onofrio/dg

CULVERT CORROSION STUDY

CO.-RTE.-K.P.: SM-101-PM 0.0/3.6
EA: 04-235611

Sample Dated:
Prepared By: Rick D'Onofrio

FIELD INVESTIGATION				LABORATORY TEST					CORRUGATED STEEL PIPE (CSP)									RCP, CAP AND CASP
		DESCRIPTION & REMARKS				SOLUBLE SALTS (PPM)			FACTORS (YEARS)									RECOMMENDATIONS FOR:
									*1.0	*1.3	*1.6	*2.2	*2.8	+25	+6/8	+15		
SITE	STATION	1. EXISTING CULVERT (SIZE, TYPE, GAGE, %LOSS)	ABRASION	SAMPLE	RESISTIVITY (OHMS-CM)				1.3	1.6	2	2.8	3.5	SOILS ONLY	WATER ONLY	BC	DESIGN LIFE	LINE 1) CONCRETE SPECIFICATIONS LINE 2) RCP SPECIFICATIONS LINE 3) CAP AND CASP SPECIFICATIONS
NO.	/OFFSET	2. CHANNEL	POTENTIAL	NO.		PH	SO4	Cl	mm	mm	mm	mm	mm	BC	BC	PI	YEARS	LINE 4) PSC for CSP SPECIFICATIONS
4	D-11	Soil Sample		1d	800	7.3			26	----	----	---- 57	---- ----	* ----	---- ----	---- ----	51 57	1) USE STD TYPE II CONCRETE SPECIFICATION 2) USE STANDARD RCP 3) DO NOT USE CAP/CASP 4) USE PSC FOR 1.3 MM CSP w/o BC
4	D-12	Soil Sample		2d	1200	8.2			27	----	----	---- 59	---- ----	* ----	---- ----	---- ----	52 59	1) USE STD TYPE II CONCRETE SPECIFICATION 2) USE STANDARD RCP 3) DO NOT USE CAP/CASP 4) USE PSC FOR 1.3 MM CSP w/o BC
4	D-13	Soil Sample		3d	1200	8.3			27	----	----	---- 59	---- ----	* ----	---- ----	---- ----	52 59	1) USE STD TYPE II CONCRETE SPECIFICATION 2) USE STANDARD RCP 3) DO NOT USE CAP/CASP 4) USE PSC FOR 1.3 MM CSP w/o BC
4	W-14	Water Sample		4w	1000	7.3			27	----	---- 44	---- ---- 60	---- ---- ----	---- ---- ----	---- * ----	---- ---- ----	NA 50 60	1) USE STD TYPE II CONCRETE SPECIFICATION 2) USE STANDARD RCP 3) DO NOT USE CAP/CASP 4) USE PSC FOR 1.3 MM CSP w/o BC
										###	###	###	###	######	#######	###	#######	
										###	###	###	###	######	#######	###	#######	
										###	###	###	###	######	#######	###	#######	
										###	###	###	###	######	#######	###	#######	

CMP - CORRUGATED METAL PIPE
CMPA - CORRUGATED METAL PIPE ARCH
CAP - CORRUGATED ALUMINIUM PIPE
CASP - CORRUGATED ALUMINIZED STEEL PIPE
RCP - REINFORCED CONCRETE PIPE
CSP - CORRUGATED STEEL PIPE

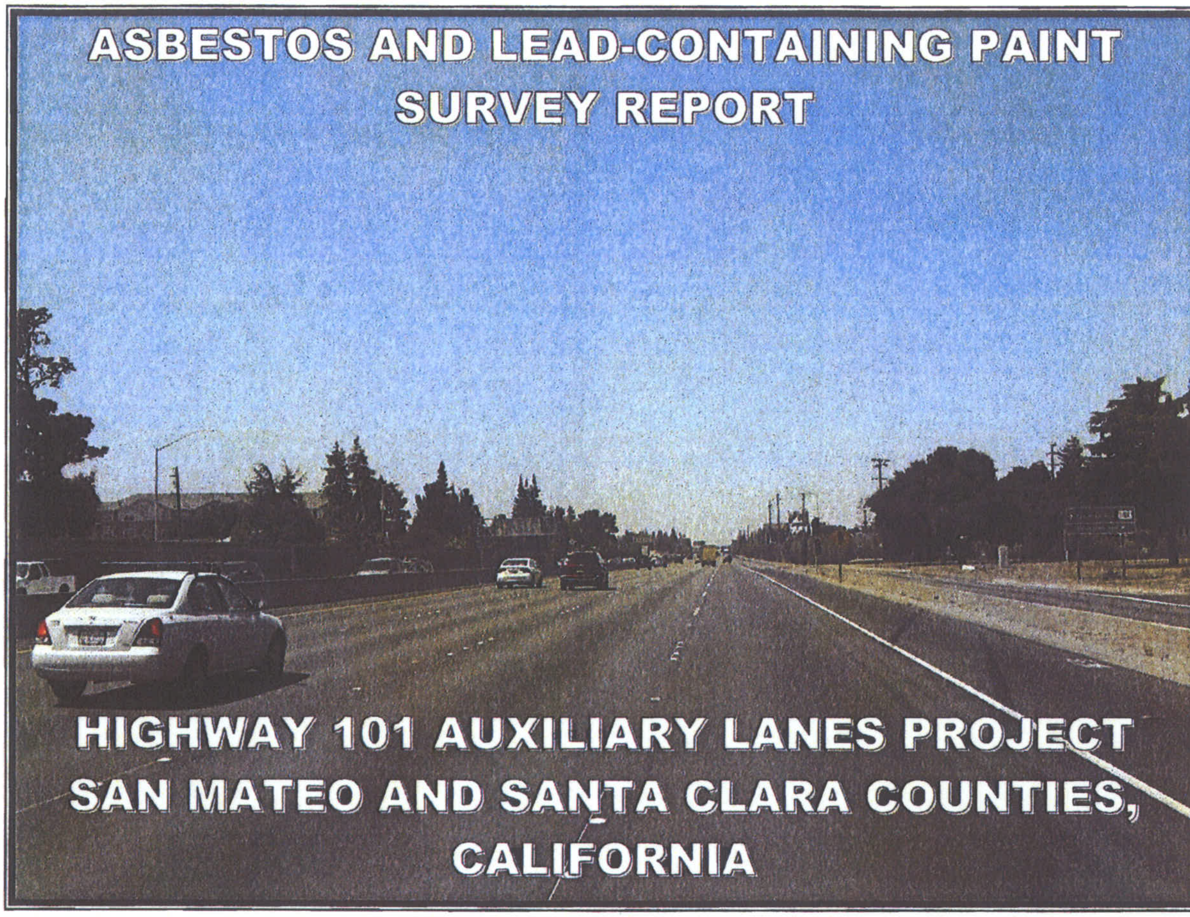
BC - BITUMINOUS COATED
PI - PAVED INVERT
CPI - PAVED INVERT CONCRETE
RCB - REINFORCED CONCRETE BOX
RCA - REINFORCED CONCRETE ARCH
PSC - POLYMERIC SHEET COATING FOR CSP

N - NONE
S - SLIGHT
M - MODERATE
H - HEAVY

NC - NON-CORROSIVE
(SULPHATE < 2000 PPM)
(CHLORIDE < 500 PPM)
" " NO SOLUBLE SALT ANALYSIS

5. 04-235641-Asbestos-Lead -Survey-Report.pdf
(From the parent EA 235610)

ASBESTOS AND LEAD-CONTAINING PAINT SURVEY REPORT



HIGHWAY 101 AUXILIARY LANES PROJECT SAN MATEO AND SANTA CLARA COUNTIES, CALIFORNIA

<u>*PREPARED FOR*</u>:
CALTRANS DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
111 GRAND AVENUE, MS8C
OAKLAND, CA 94612

<u>*PREPARED BY*</u>:
GEOCON CONSULTANTS, INC.
6671 BRISA STREET
LIVERMORE, CALIFORNIA

GEOCON PROJECT NO. E8435-06-36
TASK ORDER NO. 36
CALTRANS EA 04-235611

DECEMBER 2009

TABLE OF CONTENTS

REPORT LIMITATIONS

This asbestos and lead-containing paint (LCP) survey was conducted in conformance with generally accepted standards of practice for identifying and evaluating asbestos and LCP in structures. Due to the nature of structure surveys, asbestos and LCP use, and laboratory analytical limitations, some asbestos or LCP in the structures may not have been identified. Structure spaces such as cavities, crawlspaces, and pipe chases may have been concealed to our investigator. Previous structure renovation work may have concealed or covered spaces or materials, or may have partially demolished materials and left debris in inaccessible areas. Additionally, renovation activities may have partially replaced asbestos with indistinguishable non-asbestos materials. Asbestos or LCP may exist in areas of the structures not accessible or sampled in conjunction with this Task Order.

During renovation or demolition operations, suspect materials may be uncovered which are different from those accessible for sampling during this assessment. Personnel in charge of renovation/demolition should be alerted to note materials uncovered during such activities that differ substantially from those included in this or previous assessment reports. If suspect materials are found, additional sampling and analysis should be performed to determine if the materials contain asbestos or lead.

This report has been prepared exclusively for the State of California Department of Transportation (Caltrans) District 4. The information contained herein is only valid as of the date of the report, and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

The contents of this report reflect the views of the authors who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

GEOCON CONSULTANTS, INC

Chris Giuntoli, CAC
Senior Project Scientist

David Watts, CAC
Senior Project Scientist

CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING

Reviewed By:	Recommended by:	Approved By:
Ms. Ana Uribe Task Order Manager	Chris Wilson, P.E. District Branch Chief	Allen Baradar, P.E., REA District Office Chief

PROJECT TEAM

Contact	Affiliation	Responsibility
Romy Fuentes 510.622.8803 510.622.0198 fax romy_fuentes@dot.ca.gov	Caltrans -- District 4 Environmental Engineering 111 Grand Avenue, 14th Floor Oakland, California 94612	Contract Manager
Ana Uribe 510.286.4914 510.286.5642 fax ana_m_uribe@dot.ca.gov	Caltrans - District 4 Environmental Engineering 111 Grand Avenue, 14th Floor Oakland, California 94612	Task Order Manager
Richard Day, CEG, CHG David Watts, CAC Chris Giuntoli, CAC 925.371.5900 925.371.5915 fax livermore@geoconinc.com	Geocon Consultants, Inc. 6671 Brisa Street Livermore, CA 94550 (*Caltrans Contractor*)	Project Management Sample Collection Field QA/QC Investigation Report
Doug Krause, CIH 530.758.6397 530.758.6506 fax dskrause@pacbell.net	Krause & Associates 216 F. Street Suite 162 Davis, CA 95616 (*Geocon Subcontractor*)	Health and Safety
Diane Galvan 562.989.4045 562.989.4040 fax diane@atlglobal.com	Advanced Technology Laboratories 1510 E. 33rd Street Signal Hill, CA 90807 (*Geocon Subcontractor*)	Lead Analysis
Dan Kocher 408.934.7010 408.934.7015 fax sanleandrolab@emsl.com	EMSL Analytical, Inc. 2235 Polvorosa Avenue San Leandro, CA 94577 (*Geocon Subcontractor*)	Asbestos Analysis

EXECUTIVE SUMMARY

This asbestos and lead-containing paint (LCP) survey report for the San Mateo (SM) and Santa Clara (SCL) United States Highway 101 Auxiliary Lanes Project was prepared by Geocon Consultants, Inc., under California Department of Transportation (Caltrans) Contract No. 04A2912 and Task Order 36 (TO-36), under EA 04-235611. This work was conducted at Highway 101 Post Mile (PM) SCL 52.2 in the City of Palo Alto, Santa Clara County, to PM SM 3.6 in the City of Menlo Park, San Mateo County, California. We performed an asbestos and LCP survey on the following bridges and structures at the project location:

- San Francisquito Creek Bridge (Bridge No. 35-0013),
- Ringwood Pedestrian Overcrossing (POC) [Bridge No. 35-0143],
- Hetch Hetchy Aqueduct Bridge (Bridge No. 35-0150M).connectors to the northbound and southbound Marina Viaduct; and
- Northbound and southbound Highway 101 soundwalls (between Marsh Road and Embarcadero Road).

The project location is depicted on the Vicinity Map, Figure 1, and Site Plans, Figures 2 and 3. Caltrans has requested an investigation at the project location to provide data regarding the presence of asbestos and LCP at the bridges prior to roadway widening activities.

This report documents the investigation sampling methods and laboratory analytical data. The primary objective of our survey was to determine and quantify asbestos and LCP at the project location prior to renovation or demolition activities. The information obtained from this investigation will be used by Caltrans to coordinate proposed renovation or demolition activities, determine appropriate abatement/disposal costs, and identify health and safety concerns during improvements.

The field investigation was performed on July 7 and August 11, 2009. The following field activities were performed during asbestos and LCP sampling efforts:

- Collected 26 bulk suspect asbestos samples at the project location;
- Collected two suspect LCP samples at the project location; and
- Transported samples to Caltrans-approved, California-certified environmental laboratories.

Samples were collected from locations as shown on the Site Plans (Figures 2 and 3). Suspect asbestos and LCP sample identification numbers are presented in Tables 1 and 2, respectively. Materials represented by the samples collected are presented in the Site Photographs.

The Hetch Hetchy Aqueduct Bridge (Bridge No. 35-0150M) was observed to be a below grade structure and no above-ground bridge components were identified for sampling.

Bulk suspect asbestos samples were collected after first wetting friable material with a light mist of water. The samples were then cut from the substrate and transferred to labeled containers and sealed. Fourteen suspect materials were identified during the survey (see Table 1). Sampling locations were distributed throughout the homogeneous areas (spaces where the material was observed).

We relinquished bulk samples for asbestos analysis using standard chain-of-custody documentation. Asbestos content was determined using EPA Test Method 600/R-93/116 for polarized light microscopy (PLM). We requested laboratory analyses to be within a 5-day turn-around-time.

Bulk paint samples were collected using techniques presented in U.S. Department of Housing and Urban Development (HUD) guidelines. One paint system was identified during the survey (see Table 2).

> *It was not Geocon's intent during this inspection to conduct an evaluation of lead-based paint hazards in accordance with HUD guidelines. HUD protocol generally requires a very extensive sampling strategy that includes sampling of paint on each surface type.*

We relinquished the bulk paint samples for lead analysis using standard chain-of-custody documentation. Total lead content was determined using EPA Test Method 6010B. Waste Extraction Test (WET) lead content was determined following EPA Test Method 7420. We requested laboratory analyses to be within a 5-day turn-around-time.

No asbestos was detected in samples of the suspect materials collected. A summary of the analytical laboratory test results for asbestos is presented in Table 1. Reproductions of the laboratory report and chain-of-custody documentation are presented in Appendix A.

The laboratory analyses for lead paint indicated bulk samples representing intact multi-layer graffiti abatement paint used on the Ringwood POC (Bridge No. 35-0143) exhibited total lead concentrations of 130 milligrams per kilogram (mg/kg) and 150 mg/kg, and WET lead concentrations of 1.9 milligrams per liter (mg/l) and 4.6 mg/l, respectively.

Geocon paint sample laboratory results are summarized in Table 2. Reproductions of the lead laboratory report and chain-of-custody documentation are presented in Appendix A.

We provide the following conclusions and recommendations based on the results of our investigation.

In accordance with Bay Area Air Quality Management District (BAAQMD) Regulation 11, Rule 2, written notification is required ten working days prior to commencement of *any* demolition activity (whether asbestos is present or not). In accordance with Title 8, CCR 341.9, written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain asbestos-related work.

Based on the analytical test results, we recommend that all paints at the project location be treated as lead-containing for purposes of determining the applicability of the Cal/OSHA lead standard during any future maintenance, renovation, or demolition activities. This recommendation is based on LCP sample results and the fact that lead was a common ingredient of paints manufactured before 1978 and is still an ingredient of some industrial paints. In accordance with Title 8, CCR, Section 1532.1(p), written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain lead-related work.

ASBESTOS AND LEAD-CONTAINING PAINT SURVEY REPORT

1.0 INTRODUCTION

This asbestos and lead-containing paint (LCP) survey report for the San Mateo (SM) and Santa Clara (SCL) United States Highway 101 Auxiliary Lanes Project was prepared by Geocon Consultants, Inc., under California Department of Transportation (Caltrans) Contract No. 04A2912 and Task Order 36 (TO-36), under EA 04-235611. This work was conducted at Highway 101 Post Mile (PM) SCL 52.2 in the City of Palo Alto, Santa Clara County, to PM SM 3.6 in the City of Menlo Park, San Mateo County, California. This report documents the investigation sampling methods and laboratory analytical data.

1.1 Site Description and Proposed Improvements

We performed an asbestos and LCP survey on the following bridges and structures at the project location:

- San Francisquito Creek Bridge (Bridge No. 35-0013),
- Ringwood Pedestrian Overcrossing (POC) [Bridge No. 35-0143],
- Hetch Hetchy Aqueduct Bridge (Bridge No. 35-0150M).connectors to the northbound and southbound Marina Viaduct; and
- Northbound and southbound Highway 101 soundwalls (between Marsh Road and Embarcadero Road).

The project location is depicted on the Vicinity Map, Figure 1, and Site Plans, Figures 2 and 3. Caltrans has requested an investigation at the project location to provide data regarding the presence of asbestos and LCP prior to roadway widening activities.

1.2 Purpose

This report documents the investigation sampling methods and laboratory analytical data. The primary objective of our survey was to determine and quantify asbestos and LCP at the project location prior to renovation or demolition activities. The information obtained from this investigation will be used by Caltrans to coordinate proposed renovation or demolition activities, determine appropriate abatement/disposal costs, and identify health and safety concerns during improvements.

2.0 BACKGROUND

The *Code of Federal Regulations (CFR),* 40 CFR 61, Subpart M, National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Federal Occupational Safety and Health Administration (FED OSHA) classify asbestos-containing material (ACM) as any material or product that contains *greater than* 1% asbestos. Nonfriable ACM is classified by NESHAP as either Category I or Category II material defined as follows:

- **Category I** – asbestos-containing packings, gaskets, resilient floor coverings, and asphalt roofing products.
- **Category II** – all remaining types of nonfriable asbestos-containing material not included in Category I that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Regulated asbestos-containing material (RACM), a hazardous waste when friable, is classified as any manufactured material that contains *greater than* 1% asbestos by dry weight *and* is:

- Friable; or
- Category I material that has become friable; or
- Category I material that has been subjected to sanding, grinding, cutting, or abrading; or
- Category II nonfriable material that has a high probability of becoming crumbled, pulverized, or reduced to a powder during demolition or renovation activities.

Activities that disturb materials containing *any* amount of asbestos are subject to certain requirements of the Cal/OSHA asbestos standard contained in Title 8, CCR Section 1529. Typically, removal or disturbance of more than 100 square feet of material containing more than 0.1% asbestos must be performed by a registered asbestos abatement contractor, but associated waste labeling is not required if the material contains 1% or less asbestos. When the asbestos content of a material exceeds 1%, virtually all requirements of the standard become effective.

Materials containing more than 1% asbestos are also subject to NESHAP regulations (40 CFR Part 61, Subpart M). RACM (friable ACM and nonfriable ACM that will become friable during demolition operations) must be removed from structures prior to demolition. Certain nonfriable ACM and materials containing 1% or less asbestos may remain in structures during demolition; however, there are waste handling/disposal issues and Cal/OSHA work requirements that must be followed. Contractors are responsible for segregating and characterizing waste streams prior to disposal.

With respect to potential worker exposure, notification, and registration requirements, Cal/OSHA defines asbestos-containing construction material (ACCM) as construction material that contains more than 0.1% asbestos (Title 8, CCR 341.6).

2.2 Lead Paint

Construction activities (including demolition) that disturb materials or paints containing *any* amount of lead are subject to certain requirements of the Cal/OSHA lead standard contained in Title 8, CCR, Section 1532.1. Deteriorated paint is defined by Title 17, CCR, Division 1, Chapter 8, §35022 as a surface coating that is cracking, chalking, flaking, chipping, peeling, non-intact, failed, or otherwise separating from a component. Demolition of a deteriorated LCP component would require waste characterization and appropriate disposal. Most landfill facilities and recyclers currently accept intact LCP on a component; however, contractors are responsible for segregating and characterizing waste streams prior to disposal.

For a solid waste containing lead, the waste is classified as California hazardous when: 1) the total lead content equals or exceeds the respective Total Threshold Limit Concentration (TTLC) of 1,000 milligrams per kilogram (mg/kg); or 2) the soluble lead content equals or exceeds the respective Soluble Threshold Limit Concentration (STLC) of 5 milligrams per liter (mg/l) based on the standard Waste Extraction Test (WET). A waste has the potential for exceeding the lead STLC when the waste's total lead content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when total lead is detected at a concentration greater than or equal to 50 mg/kg, and assuming that 100 percent of the total lead is soluble, soluble lead analysis is required. Lead-containing waste is classified as "Resource, Conservation, and Recovery Act" (RCRA) hazardous, or Federal hazardous, when the soluble lead content equals or exceeds the Federal regulatory level of 5 mg/l based on the Toxicity Characteristic Leaching Procedure (TCLP).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

Potential hazards exist to workers who remove or cut through LCP coatings during demolition. Dust containing hazardous concentrations of lead may be generated during scraping or cutting materials coated with LCP. Torching of these materials may produce lead oxide fumes. Therefore, air monitoring and/or respiratory protection may be required during the demolition of materials coated with LCP. Guidelines regarding regulatory provisions for construction work where workers may be exposed to lead are presented in the Title 8, CCR, Section 1532.1.

2.3 Architectural Drawings and Previous Survey Activities

Architectural drawings and previous survey reports for the project were not available for our review.

3.0 SCOPE OF SERVICES

The following scope of services was performed:

3.1 Pre-Field Activities

- Retained the services of EMSL, Inc. (EMSL), a Caltrans-approved laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP), to perform the asbestos analyses.
- Retained the services of Advance Technology Laboratories, Inc. (ATL), a Caltrans-approved laboratory, to perform the lead paint analyses.

3.2 Field Activities

Mr. Chris Giuntoli, a California-certified Asbestos Consultant (CAC), Certification No. 02-3163 (expiration June 18, 2010), and Certified Lead Paint Inspector with the California Department of Public Health (DPH), Certification No. I-5502 (expiration June 14, 2010) performed the asbestos and LCP survey on July 7 and August 11, 2009. Twenty-six bulk samples of suspect ACM were collected. Two bulk samples of suspect LCP were collected.

4.0 INVESTIGATIVE METHODS

4.1 Asbestos

Bulk suspect asbestos samples were collected after first wetting friable material with a light mist of water. The samples were then cut from the substrate and transferred to labeled containers and sealed. We observed 14 suspect materials during the survey (see Table 1). Sampling locations were distributed throughout the homogeneous areas (spaces where the material was observed).

We relinquished bulk samples for asbestos analysis using standard chain-of-custody documentation. Asbestos content was determined using EPA Test Method 600/R-93/116 for polarized light microscopy (PLM). We requested laboratory analyses to be within a 5-day turn-around-time.

4.2 Lead Paint

Bulk paint samples were collected using techniques presented in U.S. Department of Housing and Urban Development (HUD) guidelines. One paint system was identified during the survey (see Table 2).

> *It was not Geocon's intent during this inspection to conduct an evaluation of lead-based paint hazards in accordance with HUD guidelines. HUD protocol generally requires a very extensive sampling strategy that includes sampling of paint on each surface type.*

We relinquished the bulk paint samples for lead analysis using standard chain-of-custody documentation. Total lead content was determined using EPA Test Method 6010B. WET lead content was determined following EPA Test Method 7420. We requested laboratory analyses to be within a 5-day turn-around-time.

5.0 INVESTIGATIVE RESULTS

5.1 Asbestos

No asbestos was detected in samples of the suspect materials collected. A summary of the analytical laboratory test results for asbestos is presented in Table 1. Reproductions of the laboratory report and chain-of-custody documentation are presented in Appendix A.

5.2 Lead Paint

The laboratory analyses for lead paint indicated bulk samples representing intact multi-layer graffiti abatement paint used on the Ringwood POC (Bridge No. 35-0143) exhibited total lead concentrations of 130 and 150 mg/kg, and WET lead concentrations of 1.9 and 4.6 mg/l, respectively.

Geocon paint sample laboratory results are summarized in Table 2. Reproductions of the lead laboratory report and chain-of-custody documentation are presented in Appendix A.

6.0 CONCLUSIONS

6.1 Asbestos

Asbestos was not detected in samples of the suspect materials collected during our survey of the bridges and structures at the project location. Consequently, the Cal/OSHA asbestos standard does not apply for activities disturbing materials at the bridges and structures included in our survey. In addition, debris from planned improvement activities would not be considered a California hazardous waste based on asbestos content.

In accordance with Bay Area Air Quality Management District (BAAQMD) Regulation 11, Rule 2, written notification is required ten working days prior to commencement of *any* demolition activity (whether asbestos is present or not). In accordance with Title 8, CCR 341.9, written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain asbestos-related work.

6.2 Lead Paint

Based on the analytical test results, we recommend that all paints at the project location be treated as lead-containing for purposes of determining the applicability of the Cal/OSHA lead standard during any future maintenance, renovation, and demolition activities. This recommendation is based on LCP sample results and the fact that lead was a common ingredient of paints manufactured before 1978 and is still an ingredient of some industrial paints. In accordance with Title 8, CCR, Section 1532.1(p), written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain lead-related work. The LCP identified during our survey would not be considered a California or Federal hazardous waste based on lead content.

TABLE 1
SUMMARY OF ANALYTICAL LABORATORY TEST RESULTS - ASBESTOS
HIGHWAY 101 AUXILIARY LANE PROJECT
SAN MATEO AND SANTA CLARA COUNTIES, CALIFORNIA

Polarized Light Microscopy (PLM) - EPA Test Method 600/R-93/116

Sample ID	Description of Suspect Material	Approximate Quantity	Friable	Site Photo	Asbestos Content
RAPOC-1A RAPOC-1B	Ringwood POC (Bridge 35-0143) brown fiber board	NA	NA	2	ND ND
SFC-1A SFC-1B	San Francisquito Creek Bridge (Bridge 35-0013) brown fiber board	NA	NA	9	ND ND
SM101-1A SM101-1B	Soundwall mortar	NA	NA	14	ND ND
SM101-2A SM101-2B	Brown fiber board (soundwall)	NA	NA	15	ND ND
SM101-3A SM101-3B	Soundwall mortar	NA	NA	14	ND ND
SM101-4A SM101-4B	Brown fiber board (soundwall)	NA	NA	15	ND ND
SM101-5A SM101-5B	Soundwall mortar	NA	NA	14	ND ND
SM101-6A SM101-6B	Brown fiber board (soundwall)	NA	NA	15	ND ND
SM101-7A SM101-7B	Soundwall mortar	NA	NA	14	ND ND

TABLE 1
SUMMARY OF ANALYTICAL LABORATORY TEST RESULTS - ASBESTOS
HIGHWAY 101 AUXILIARY LANE PROJECT
SAN MATEO AND SANTA CLARA COUNTIES, CALIFORNIA

Polarized Light Microscopy (PLM) - EPA Test Method 600/R-93/116

Sample ID	Description of Suspect Material	Approximate Quantity	Friable	Site Photo	Asbestos Content
SM101-8A SM101-8B	Brown fiber board (soundwall)	NA	NA	15	ND ND
SM101-9A SM101-9B	Soundwall mortar	NA	NA	14	ND ND
SM101-10A SM101-10B	Brown fiber board (soundwall)	NA	NA	15	ND ND
SM101-11A SM101-11B	Soundwall mortar	NA	NA	14	ND ND
SM101-12A SM101-12B	Brown fiber board (soundwall)	NA	NA	15	ND ND

Notes:
NA = Not applicable
ND = No asbestos fibers detected

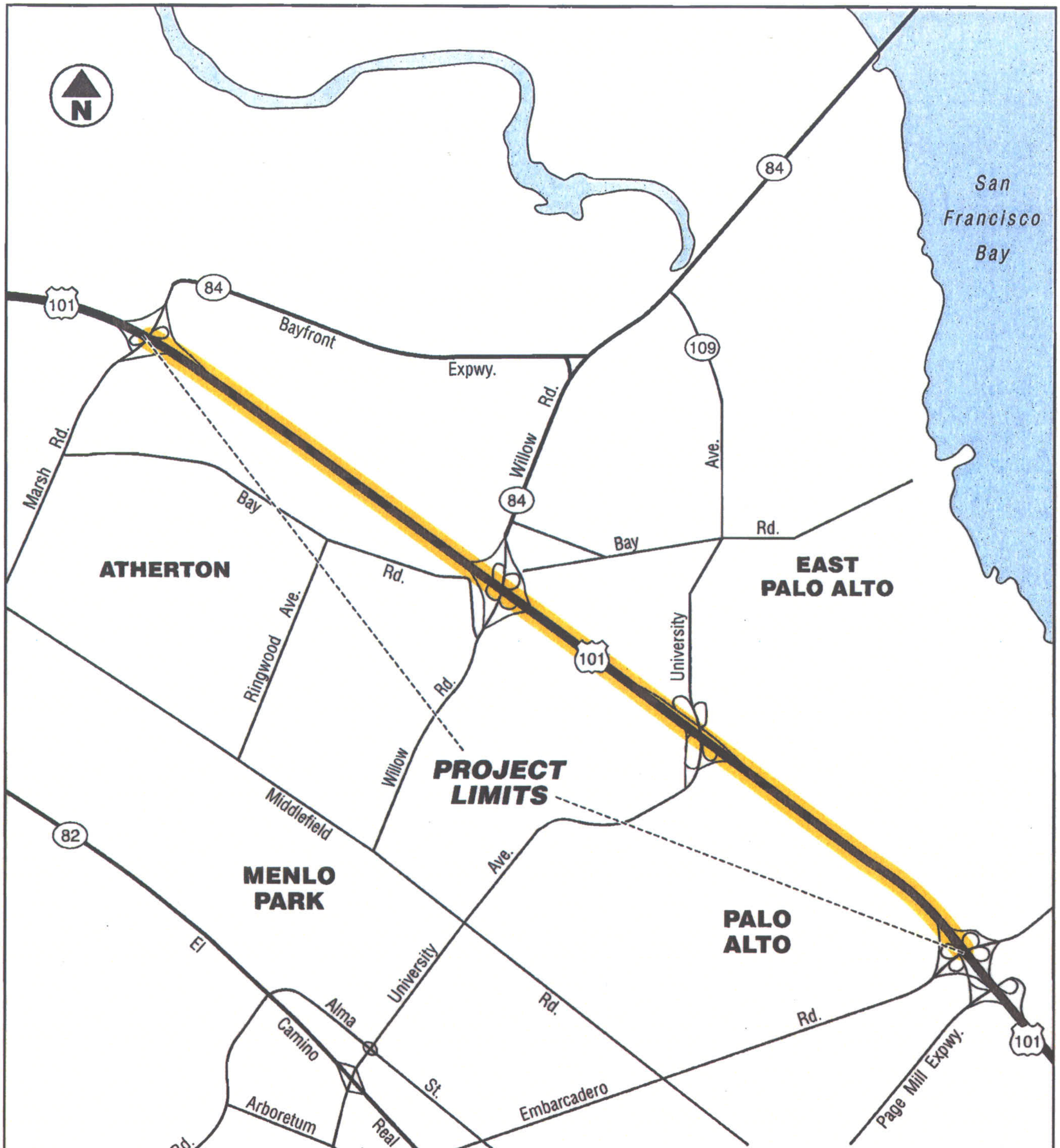
TABLE 2
SUMMARY OF ANALYTICAL LABORATORY TEST RESULTS - PAINT
HIGHWAY 101 AUXILIARY LANE PROJECT
SAN MATEO AND SANTA CLARA COUNTIES, CALIFORNIA

Total & Soluble Lead

Bridge No.	Sample No.	Paint Description	Approximate Quantity Peeling/Flaking	Site Photo	Total Lead (mg/kg)	WET Lead (mg/l)
35-0143	RAPOC-P1A	White graffiti abatement paint	Intact	3	130	1.9
	RAPOC-P1B				150	4.6

Notes:

mg/kg = milligrams per kilogram (EPA Test Method 6010)
WET = Waste Extraction Test (EPA Test Method 7420)
mg/l = milligrams per liter



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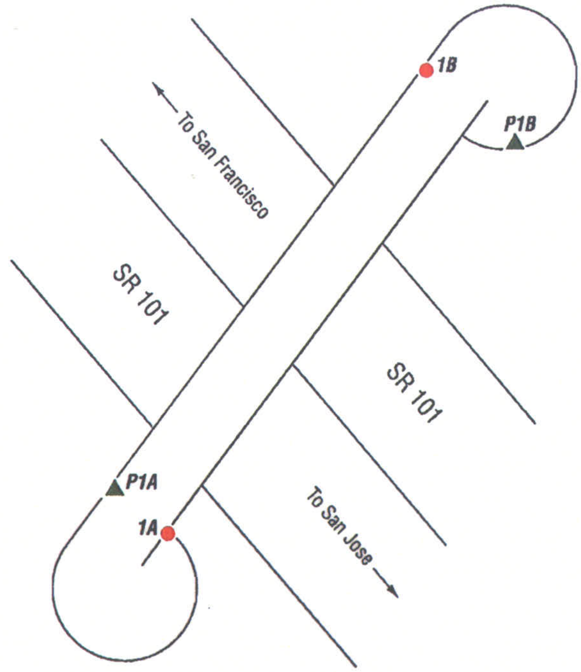
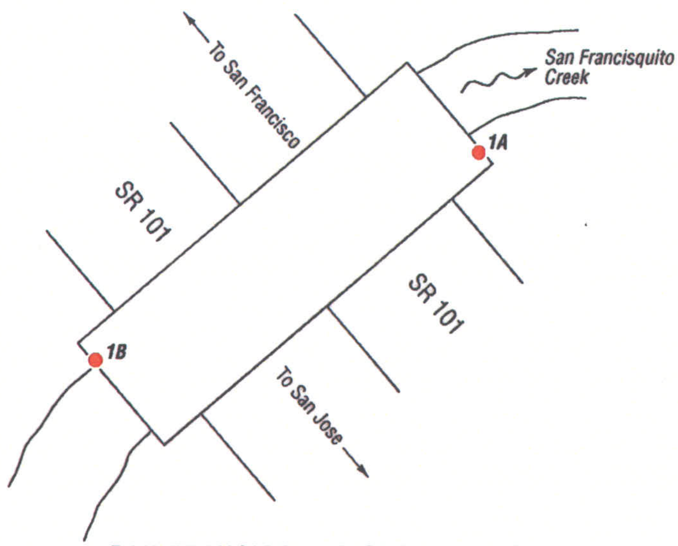
Highway 101 Auxiliary Lanes	
Santa Clara & San Mateo Counties, California	VICINITY MAP
GEOCON Proj. No. E8435-06-36	
Task Order No. 36, EA 04-235611	December 2009 — Figure 1



RINGWOOD POC
(Bridge 35-0143)



SAN FRANCISQUITO CREEK BRIDGE
(Bridge 35-0013)

NOT TO SCALE

LEGEND:

- ● Approximate Asbestos Sample Location
- ▲ Approximate Paint Sample Location

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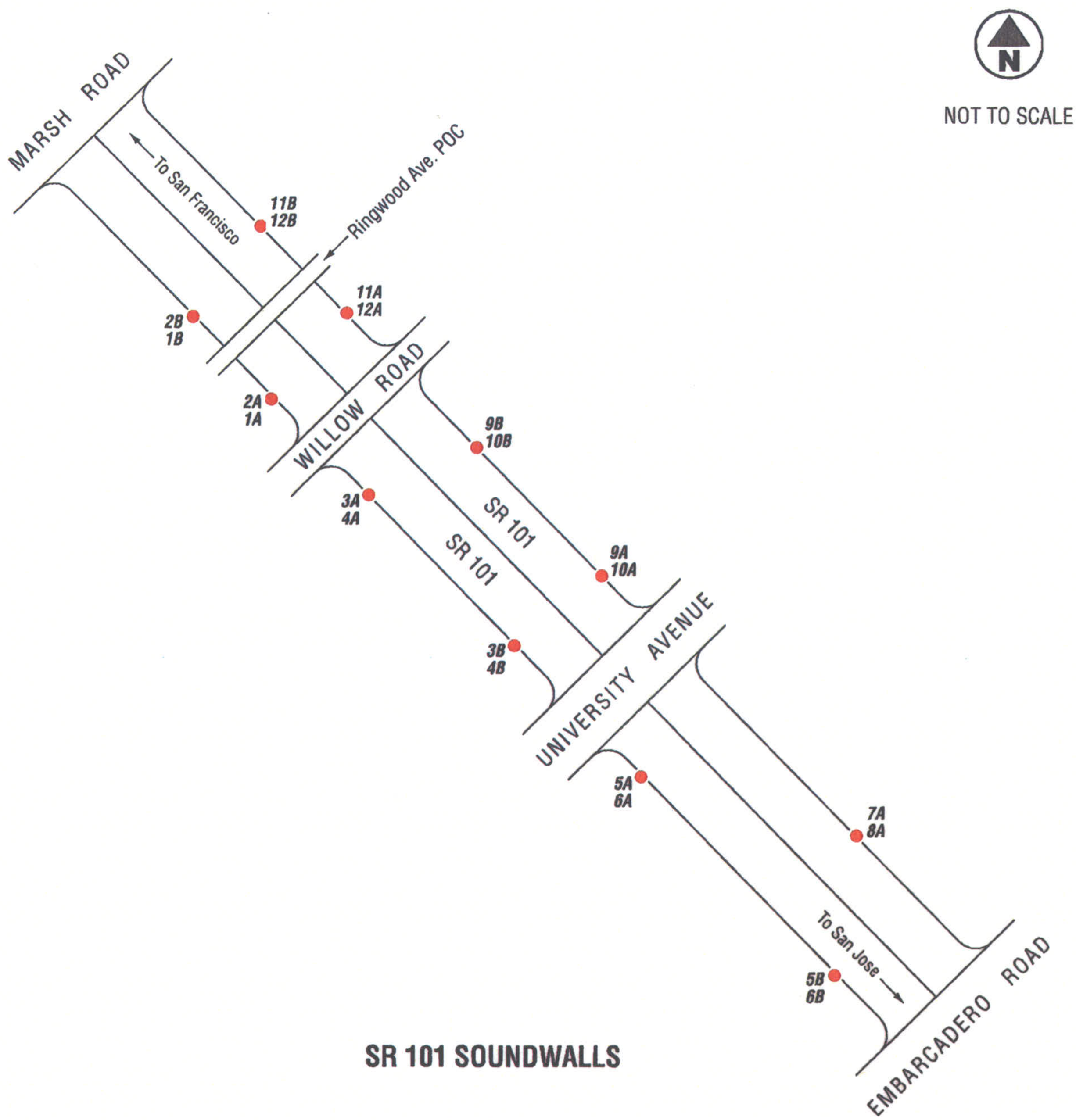
Highway 101 Auxiliary Lanes

Santa Clara & San Mateo Counties, California	**SITE PLAN – BRIDGES**
GEOCON Proj. No. E8435-06-36	
Task Order No. 36, EA 04-235611	December 2009 — Figure 2



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Highway 101 Auxiliary Lanes		
Santa Clara & San Mateo Counties, California	SITE PLAN - SOUNDWALLS	
GEOCON Proj. No. E8435-06-36		
Task Order No. 36, EA 04-235611	December 2009	Figure 3

LEGEND:

● Approximate Asbestos Sample Location

Photo 1 – Novato Creek Bridge, northbound SR 101 (Bridge No. 27-0089R)

Photo 2 – Bridge No. 27-0089R asbestos-containing guard rail shim

Photo 3 – Bridge No. 27-0089R black drain pipe

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PHOTOGRAPHS 1, 2, & 3		
Marin Sonoma Narrows – Segment A Project Marin County, California		
E8435-06-40	Task Order No. 40	December 2009

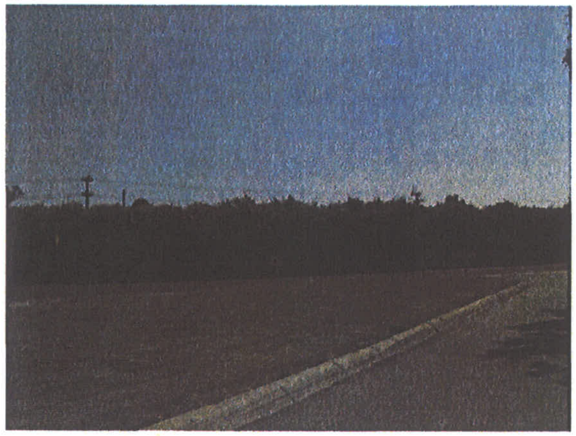

Photo 4 – Hetch Hetchy Aqueduct Bridge (Bridge No. 35-0150M) vicinity at Iris Lane and Van Buren Road (no aboveground bridge structure)

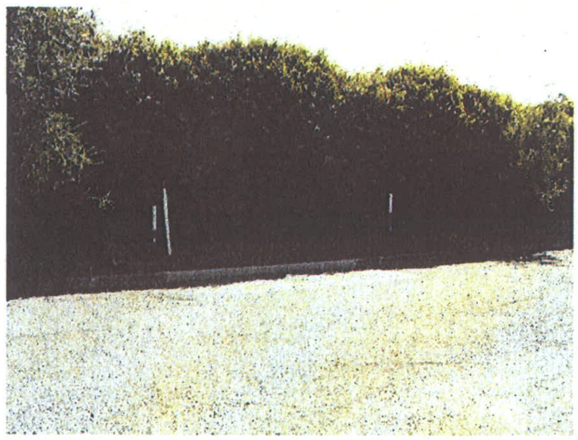

Photo 5 – Hetch Hetchy Aqueduct Bridge (Bridge No. 35-0150M) at southbound Highway 101/Van Buren Road soundwall (no aboveground bridge structure)

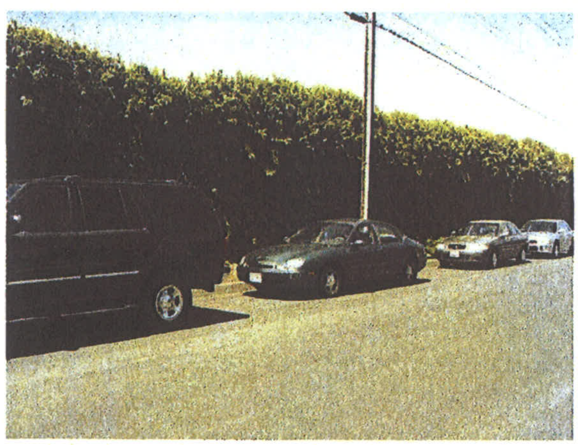

Photo 6 – Hetch Hetchy Aqueduct Bridge (Bridge No. 35-0150M) at northbound Highway 101/Pierce Road soundwall (no aboveground bridge structure)

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PHOTOGRAPHS 4, 5, & 6		
Highway 101 Auxiliary Lanes Project San Mateo and Santa Clara Counties, California		
E8435-06-36	Task Order No. 36	December 2009

Photo 7 – Hetch Hetchy Aqueduct Bridge (Bridge No. 35-0150M) utility marker at Iris Lane and Van Buren Road

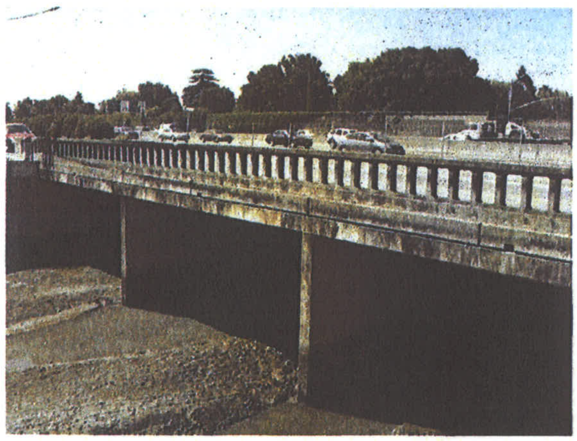

Photo 8 – San Francisquito Creek Bridge (Bridge No. 35-0013)

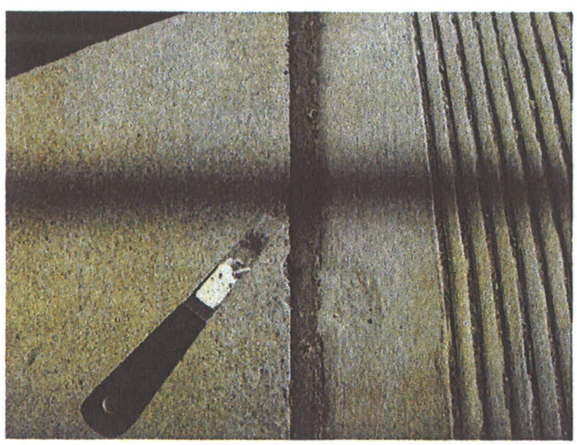

Photo 9 – San Francisquito Creek Bridge (Bridge No. 35-0013) brown fiberboard at sidewalk joints

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PHOTOGRAPHS 7, 8, & 9		
Highway 101 Auxiliary Lanes Project San Mateo and Santa Clara Counties, California		
E8435-06-36	Task Order No. 36	December 2009

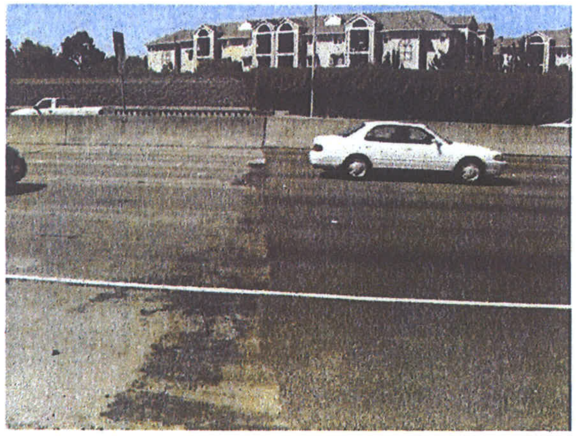

Photo 10 – San Francisquito Creek Bridge (Bridge No. 35-0013) north deck joint (no suspect materials)

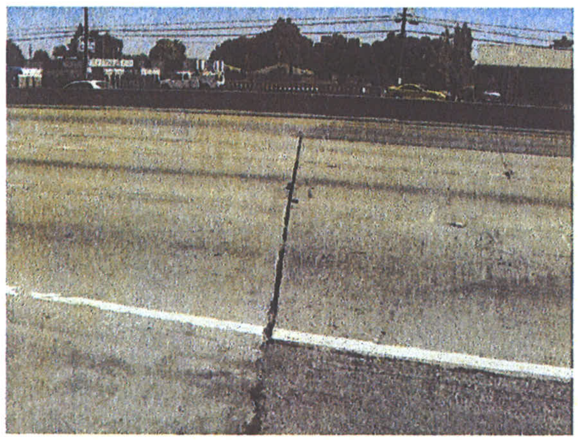

Photo 11 – San Francisquito Creek Bridge (Bridge No. 35-0013) south deck joint (non-suspect material)

Photo 12 – Typical soundwalls along southbound Highway 101 within the project limits

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PHOTOGRAPHS 10, 11, & 12		
Highway 101 Auxiliary Lanes Project San Mateo and Santa Clara Counties, California		
E8435-06-36	Task Order No. 36	December 2009

Photo 13 – Typical soundwalls along northbound Highway 101 within the project limits

Photo 14 – Typical soundwall mortar within the project limits

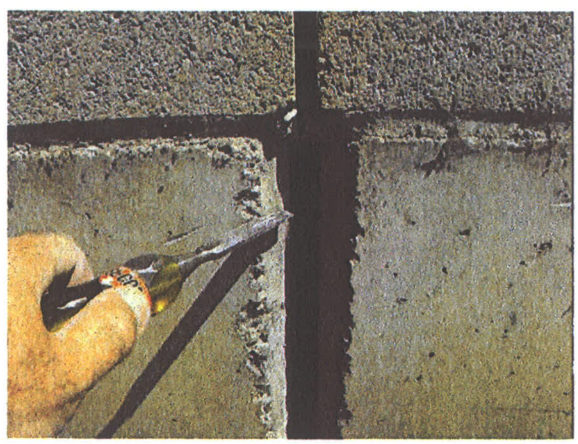

Photo 15 – Typical soundwall brown fiberboard within the project limits

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PHOTOGRAPHS 13, 14, & 15		
Highway 101 Auxiliary Lanes Project San Mateo and Santa Clara Counties, California		
E8435-06-36	Task Order No. 36	December 2009

APPENDIX A

EMSL Analytical, Inc
2235 Polvorosa Ave, Suite 230, San Leandro, CA 94577
Phone: (510) 895-3675 Fax: (510) 895-3680 Email: milpitaslab@emsl.com

Attn: **Chris Giuntoli**
Geocon Consultants
6671 Brisa Street
Livermore, CA 94550

Fax: (925) 371-5915 Phone: (925) 371-5900
Project: **E8435-06-36**

Customer ID: GECN21
Customer PO: E8435-06-36
Received: 07/07/09 5:43 PM
EMSL Order: 090905340

EMSL Proj:
Analysis Date: 7/10/2009

RECEIVED
JUL 2 3 2009
By ______

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos %	Non-Asbestos Fibrous	Non-Asbestos %	Non-Asbestos Non-Fibrous	Asbestos % Type
RAPOC-1A-Fiber board *090905340-0001*		Brown Fibrous Homogeneous	20%	Cellulose	80%	Non-fibrous (other)	**None Detected**
RAPOC-1B Fiber board *090905340-0002*		Brown Fibrous Homogeneous	70%	Cellulose	30%	Non-fibrous (other)	**None Detected**
SFC-1A-Fiber board *090905340-0003*		Brown Fibrous Homogeneous	60%	Cellulose	40%	Non-fibrous (other)	**None Detected**
SFC-1B Fiber board *090905340-0004*		Brown Fibrous Homogeneous	70%	Cellulose	30%	Non-fibrous (other)	**None Detected**

Analyst(s)

Jorge Leon (2)
Nonette Patron (2)

Baojia Ke, Laboratory Manager
or other approved signatory

0909D5340

EMSL – San Leandro • 2235 Polvorosa Ave, Suite 230, San Leandro, CA 94577

(888) 455-3675 • Phone (510) 895-3675 • Fax (510) 895-3680 • sanleandrolab@emsl.com

EMSL Rep:	DAN KOCHER	*Third Party Billing*	*requires written authorization from third party
Company:	GEOCON	EMSL-Bill to:	
Contact:	CHRIS GIUNTOLI	Contact:	
Address:	6671 BRISA ST	Address:	
City & State:	LIVERMORE, CA Zip 94550	City & State:	Zip
Phone:	925-371-5900	Fax:	
☒ Email Results	GIUNTOLI@GEOCONINC.COM	☐ Fax results	
Project Name or Number:	E8435-06-36	Purchase Order Number:	

TURNAROUND TIME

☐ 3 Hours	☐ 6 Hours	☐ 24 Hours	☐ 48 Hours	☐ 72 Hours	☒ 5 Days	☐ 10 Days

SAMPLE MATRIX

☐ Air	☒ Bulk	☐ Soil	☐ Wipe	☐ Micro-Vac	☐ Drinking Water	☐ Wastewater	☐ Chips	☐ Other

ASBESTOS ANALYSIS

PCM - Air
☐ NIOSH 7400 (A) Issue 2: August 1994
☐ OSHA w/ Time Weighted Average

TEM AIR
☐ AHERA 40 CFR, Part 763 Subpart E
☐ NIOSH 7402 Issue 2
☐ EPA Level II

PLM - Bulk
☒ EPA 600/R-93/116
☐ + Add Gravimetric Reduction (EPA NOB)
PLM CARB 435 Level: ☐ A (0.25%) ☐ B (0.1%)
☐ NIOSH 9002
☐ EPA Point Count (400 Points)
☐ + Add Gravimetric Reduction (EPA NOB)
☐ EPA Point Count (1,000 Points)
☐ + Add Gravimetric Reduction (EPA NOB)
☐ Standard Addition Point Count

SOILS
PLM CARB 435 Level: ☐ A (0.25%) ☐ B (0.1%)
TEM CARB 435 Level: ☐ B (0.1%) ☐ C (0.01%) ☐ D (0.001%) ☐ E (0.0005%) ☐ F (0.0001%)
☐ EMSL MSD 9000 Method fibers/gram
☐ Superfund EPA 540-R097-028 (dust generation)
EPA Protocol ☐ Qualitative ☐ Quantitative

TEM BULK
☐ TEM EPA NOB, EPA 600/R-93/116 Section 2.5.5.1 (TEM % by VAE)
☐ Chatfield SOP-1988-02
☐ TEM EPA 600/R-93/116 Section 2.5.5.2 (TEM % by Mass)

TEM MICROVAC
☐ ASTM D 5755 (Quantitative)

TEM WIPE
☐ ASTM D-6480 (Quantitative)

TEM WATER
☐ EPA 100.2 (≥10 microns)
☐ Modified EPA 100.2 (≥0.5 microns)
OTHER:

LEAD ANALYSIS

Flame Atomic Absorption
☐ Wipe, SW846-7420 ☐ ASTM ☐ non ASTM
☐ Soil, SW846-7420
☐ Air, NIOSH 7082
☐ Chips, SW846-7420 or AOAC 5.009 (974.02)
☐ Wastewater, SW 846-7420

☐ TCLP LEAD SW846-1311/7420

Graphite Furnace Atomic Absorption
☐ Air, NIOSH 7105
☐ Wastewater, SW846-7421
☐ Soil, SW846-7421
☐ Drinking Water, EPA 239.2

ICP – Inductively Coupled Plasma
☐ Wipe, SW846-6010 ☐ ASTM ☐ non ASTM
☐ Soil, SW846-6010
☐ Air, NIOSH 7300

MATERIALS ANALYSIS

☐ Particle Identification
☐ Full Particle Identification
☐ Dust Mites and Insect Fragments
☐ Particle Size & Distribution
☐ Product Comparison
☐ Paint Characterization
☐ Failure Analysis
☐ Corrosion Analysis
☐ Glove Box Containment Study
☐ Petrographic Examination of Concrete
☐ Portland Cement in Workplace Atmospheres (OSHA ID-143)
☐ Man Made Vitreous Fibers – MMVF's
☐ Synthetic Fiber Identification
☐ Other: ______

MICROBIAL ANALYSIS

Air Samples
☐ Mold & Fungi by Air O Cell
☐ Mold & Fungi by Agar Plate count & id
☐ Bacterial Count and Gram Stain
☐ Bacterial Count and Identification

Water Samples
☐ Total Coliforms, Fecal Coliforms
☐ Escherichia Coli, Fecal Streptococcus
☐ Legionella
☐ Salmonella
☐ Giardia and Cryptosporidium

Wipe and Bulk Samples
☐ Mold & Fungi – Direct Examination
☐ Mold & Fungi – (Culture follow up to direct examination if necessary)
☐ Mold & Fungi – Culture (Count & ID)
☐ Mold & Fungi – Culture (Count only)
☐ Bacterial Count & Gram Stain
☐ Bacterial Count & Identification (3 most prominent types)
☐ Other: ______

IAQ ANALYSIS

☐ Nuisance Dust (NIOSH 0500 & 0600)
☐ Airborne Dust (PM10, TSP)
☐ Silica Analysis by XRD ☐ NIOSH 7500
☐ HVAC Efficiency
☐ Carbon Black
☐ Airborne Oil Mist
☐ Other: ______

Relinquished:	[signature]	Date:	9/2/09	Time:	1541
Received:	[signature]	Date:	[illegible]	Time:	5:42pm
Relinquished:		Date:		Time:	
Received:		Date:		Time:	

EMSL ANALYTICAL INC

EMSL – San Leandro • 2235 Polvorosa Ave, Suite 230, San Leandro, CA 94577

	SAMPLE NUMBER	SAMPLE DESCRIPTION	LOCATION	VOLUME Air (L) Area (Inches sq.)
1	RAFCC-1A	BROWN FIBERBOARD		
2	RAFCC-1B	↓		
3	SFC-1A	BROWN FIBERBOARD		
4	SFC-1B	↓		
5				
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Client Sample # (S) ____________ - ____________ TOTAL SAMPLE # ____________

Relinquished: ____________ Date: ____________ Time: ____________
Received: ____________ Date: ____________ Time: ____________
Relinquished: ____________ Date: ____________ Time: ____________
Received: ____________ Date: ____________ Time: ____________

EMSL Analytical, Inc
2235 Polvorosa Ave , Suite 230, San Leandro, CA 94577
Phone: (510) 895-3675 Fax: (510) 895-3680 Email: milpitaslab@emsl.com

Attn: **Chris Giuntoli**
Geocon Consultants
6671 Brisa Street
Livermore, CA 94550

Fax: (925) 371-5915 Phone: (925) 371-5900
Project: **E8435-06-36**

Customer ID: GECN21
Customer PO: E8435-06
Received: 08/21/09 9:00 AM
EMSL Order: 090906820

EMSL Proj: E8435-06-**
Analysis Date: 8/25/2009

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
SM101-1A-Mortar *090906820-0001*		Red Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
SM101-1B-Mortar *090906820-0002*		Red Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
SM101-2A-Fiber Board *090906820-0003*		Brown Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (other)	None Detected
SM101-2B-Fiber Board *090906820-0004*		Brown Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (other)	None Detected
SM101-3A-Mortar *090906820-0005*		Red Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
SM101-3B-Mortar *090906820-0006*		Red Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
SM101-4A-Fiber Board *090906820-0007*		Brown Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (other)	None Detected

Analyst(s)

Grant Mays (22)

Baojia Ke, Laboratory Manager
or other approved signatory

EMSL Analytical, Inc
2235 Polvorosa Ave , Suite 230, San Leandro, CA 94577
Phone: (510) 895-3675 Fax: (510) 895-3680 Email: milpitaslab@emsl.com

Attn: **Chris Giuntoli**
Geocon Consultants
6671 Brisa Street
Livermore, CA 94550

Fax: (925) 371-5915 Phone: (925) 371-5900
Project: **E8435-06-36**

Customer ID: GECN21
Customer PO: E8435-06
Received: 08/21/09 9:00 AM
EMSL Order: 090906820

EMSL Proj: E8435-06-**
Analysis Date: 8/25/2009

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos %	Non-Asbestos Fibrous	Non-Asbestos %	Non-Asbestos Non-Fibrous	Asbestos % Type
SM101-4B-Fiber Board *090906820-0008*		Brown Fibrous Homogeneous	90%	Cellulose	10%	Non-fibrous (other)	**None Detected**
SM101-5A-Mortar *090906820-0009*		Red Non-Fibrous Homogeneous			100%	Non-fibrous (other)	**None Detected**
SM101-5B-Mortar *090906820-0010*		Red Non-Fibrous Homogeneous			100%	Non-fibrous (other)	**None Detected**
SM101-6A-Fiber Board *090906820-0011*		Brown Fibrous Homogeneous	90%	Cellulose	10%	Non-fibrous (other)	**None Detected**
SM101-6B-Fiber Board *090906820-0012*		Brown Fibrous Homogeneous	90%	Cellulose	10%	Non-fibrous (other)	**None Detected**
SM101-7A-Mortar *090906820-0013*		Red Non-Fibrous Homogeneous			100%	Non-fibrous (other)	**None Detected**

Analyst(s)

Grant Mays (22)

Baojia Ke, Laboratory Manager
or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc San Leandro 2235 Polvorosa Ave , Suite 230, San Leandro CA NVLAP Lab Code 101048-3, MA AA000201, WA C2007

EMSL Analytical, Inc
2235 Polvorosa Ave., Suite 230, San Leandro, CA 94577
Phone: (510) 895-3675 Fax: (510) 895-3680 Email: milpitaslab@emsl.com

Attn: **Chris Giuntoli**
Geocon Consultants
6671 Brisa Street
Livermore, CA 94550

Fax: (925) 371-5915 Phone: (925) 371-5900
Project: **E8435-06-36**

Customer ID: GECN21
Customer PO: E8435-06
Received: 08/21/09 9:00 AM
EMSL Order: 090906820

EMSL Proj: E8435-06-**
Analysis Date: 8/25/2009

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos %	Non-Asbestos Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
SM101-8A-Fiber Board *090906820-0014*		Brown Fibrous Homogeneous	90%	Cellulose	10% Non-fibrous (other)	**None Detected**
SM101-9A-Mortar *090906820-0015*		Red Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
SM101-9B-Mortar *090906820-0016*		Red Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
SM101-10A-Fiber Board *090906820-0017*		Brown Fibrous Homogeneous	90%	Cellulose	10% Non-fibrous (other)	**None Detected**
SM101-10B-Fiber Board *090906820-0018*		Brown Fibrous Homogeneous	90%	Cellulose	10% Non-fibrous (other)	**None Detected**
SM101-11A-Mortar *090906820-0019*		Red Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
SM101-11B-Mortar *090906820-0020*		Red Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**

Analyst(s)

Grant Mays (22)

Baojia Ke, Laboratory Manager
or other approved signatory

Attn: **Chris Giuntoli**
Geocon Consultants
6671 Brisa Street
Livermore, CA 94550

Fax: (925) 371-5915 Phone: (925) 371-5900
Project: **E8435-06-36**

Customer ID: GECN21
Customer PO: E8435-06
Received: 08/21/09 9:00 AM
EMSL Order: 090906820

EMSL Proj: E8435-06-**
Analysis Date: 8/25/2009

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos %	Fibrous	%	Non-Fibrous	Asbestos % Type
SM101-12A-Fiber Board *090906820-0021*		Brown Fibrous Homogeneous	90%	Cellulose	10%	Non-fibrous (other)	**None Detected**
SM101-12B-Fiber Board *090906820-0022*		Brown Fibrous Homogeneous	90%	Cellulose	10%	Non-fibrous (other)	**None Detected**

Analyst(s)

Grant Mays (22)

Baojia Ke, Laboratory Manager
or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc San Leandro 2235 Polvorosa Ave , Suite 230, San Leandro CA NVLAP Lab Code 101048-3, MA AA000201, WA C2007

C9090820

EMSL – San Leandro ❖ 2235 Polvorosa Ave, Suite 230, San Leandro, CA 94577

(888) 455-3675 • Phone (510) 895-3675 • Fax (510) 895-3680 • sanleandrolab@emsl.com

EMSL Rep:	DAN KOCHER	*Third Party Billing*	**requires written authorization from third party*
Company:	GEOCON	EMSL-Bill to:	
Contact:	CHRIS GIUNTOLI	Contact:	
Address:	6671 BRISA ST	Address:	
City & State:	LIVERMORE, CA Zip 94550	City & State:	Zip
Phone:	925-371-5900	Fax:	
☒ Email Results	GIUNTOLI@GEOCONINC.COM	☐ Fax results	
Project Name or Number:	E8435-06-36	Purchase Order Number:	

TURNAROUND TIME

☐ 3 Hours | ☐ 6 Hours | ☐ 24 Hours | ☐ 48 Hours | ☐ 72 Hours | ☒ 5 Days | ☐ 10 Days

SAMPLE MATRIX

☐ Air | ☒ Bulk | ☐ Soil | ☐ Wipe | ☐ Micro-Vac | ☐ Drinking Water | ☐ Wastewater | ☐ Chips | ☐ Other

ASBESTOS ANALYSIS

PCM - Air
- ☐ NIOSH 7400 (A) Issue 2: August 1994
- ☐ OSHA w/ Time Weighted Average

TEM AIR
- ☐ AHERA 40 CFR, Part 763 Subpart E
- ☐ NIOSH 7402 Issue 2
- ☐ EPA Level II

PLM - Bulk
- ☒ EPA 600/R-93/116
- ☐ + Add Gravimetric Reduction (EPA NOB)
- PLM CARB 435 Level: ☐ A (0.25%) ☐ B (0.1%)
- ☐ NIOSH 9002
- ☐ EPA Point Count (400 Points)
- ☐ + Add Gravimetric Reduction (EPA NOB)
- ☐ EPA Point Count (1,000 Points)
- ☐ + Add Gravimetric Reduction (EPA NOB)
- ☐ Standard Addition Point Count

SOILS
- PLM CARB 435 Level: ☐ A (0.25%) ☐ B (0.1%)
- TEM CARB 435 Level: ☐ B (0.1%) ☐ C (0.01%) ☐ D (0.001%) ☐ E (0.0005%) ☐ F (0.0001%)
- ☐ EMSL MSD 9000 Method fibers/gram
- ☐ Superfund EPA 540-R097-028 (dust generation)
- EPA Protocol ☐ Qualitative ☐ Quantitative

TEM BULK
- ☐ TEM EPA NOB, EPA 600/R-93/116 Section 2.5.5.1 (TEM % by VAE)
- ☐ Chatfield SOP-1988-02
- ☐ TEM EPA 600/R-93/116 Section 2.5.5.2 (TEM % by Mass)

TEM MICROVAC
- ☐ ASTM D 5755 (Quantitative)

TEM WIPE
- ☐ ASTM D-6480 (Quantitative)

TEM WATER
- ☐ EPA 100.2 (≥ 10 microns)
- ☐ Modified EPA 100.2 (≥ 0.5 microns)

OTHER

LEAD ANALYSIS

Flame Atomic Absorption
- ☐ Wipe, SW846-7420 ☐ ASTM ☐ non ASTM
- ☐ Soil, SW846-7420
- ☐ Air, NIOSH 7082
- ☐ Chips, SW846-7420 or AOAC 5.009 (974.02)
- ☐ Wastewater, SW 846-7420
- ☐ TCLP LEAD SW846-1311/7420

Graphite Furnace Atomic Absorption
- ☐ Air, NIOSH 7105
- ☐ Wastewater, SW846-7421
- ☐ Soil, SW846-7421
- ☐ Drinking Water, EPA 239.2

ICP – Inductively Coupled Plasma
- ☐ Wipe, SW846-6010 ☐ ASTM ☐ non ASTM
- ☐ Soil, SW846-6010
- ☐ Air, NIOSH 7300

MATERIALS ANALYSIS
- ☐ Particle Identification
- ☐ Full Particle Identification
- ☐ Dust Mites and Insect Fragments
- ☐ Particle Size & Distribution
- ☐ Product Comparison
- ☐ Paint Characterization
- ☐ Failure Analysis
- ☐ Corrosion Analysis
- ☐ Glove Box Containment Study
- ☐ Petrographic Examination of Concrete
- ☐ Portland Cement in Workplace Atmospheres (OSHA ID-143)
- ☐ Man Made Vitrous Fibers – MMVF's
- ☐ Synthetic Fiber Identification
- ☐ Other:

MICROBIAL ANALYSIS

Air Samples
- ☐ Mold & Fungi by Air O Cell
- ☐ Mold & Fungi by Agar Plate count & id
- ☐ Bacterial Count and Gram Stain
- ☐ Bacterial Count and Identification

Water Samples
- ☐ Total Coliforms, Fecal Coliforms
- ☐ Escherichia Coli, Fecal Streptococcus
- ☐ Legionella
- ☐ Salmonella
- ☐ Giardia and Cryptosporidium

Wipe and Bulk Samples
- ☐ Mold & Fungi – Direct Examination
- ☐ Mold & Fungi – (Culture follow up to direct examination if necessary)
- ☐ Mold & Fungi – Culture (Count & ID)
- ☐ Mold & Fungi – Culture (Count only)
- ☐ Bacterial Count & Gram Stain
- ☐ Bacterial Count & Identification (3 most prominent types)
- ☐ Other:

IAQ ANALYSIS
- ☐ Nuisance Dust (NIOSH 0500 & 0600)
- ☐ Airborne Dust (PM10, TSP)
- ☐ Silica Analysis by XRD ☐ NIOSH 7500
- ☐ HVAC Efficiency
- ☐ Carbon Black
- ☐ Airborne Oil Mist
- ☐ Other:

Relinquished:	[signature]	Date:	8/20/09	Time:	1245
Received:	[signature]	Date:	8/21/09	Time:	9:20 FE
Relinquished:		Date:		Time:	
Received:		Date:		Time:	

090900820

EMSL ANALYTICAL, INC.

EMSL – San Leandro ◆ 2235 Polvorosa Ave, Suite 230, San Leandro, CA 94577

	SAMPLE NUMBER	SAMPLE DESCRIPTION	LOCATION	VOLUME Air (L) Area (Inches sq.)
1	SM101-1A	MORTAR		
2	SM101-1B	↓		
3	SM101-2A	BROWN FIBERBOARD		
4	SM101-2B	↓		
5	SM101-3A	MORTAR		
6	SM101-3B	↓		
7	SM101-4A	BROWN FIBER BOARD		
8	SM101-4B	↓		
9	SM101-5A	MORTAR		
10	SM101-5B	↓		
11	SM101-6A	BROWN FIBER BOARD		
12	SM101-6B	↓		
13	SM101-7A	MORTAR		
14	SM101-8A	BROWN FIBERBOARD		
15	SM101-9A	MORTAR		
16	SM101-9B	↓		
17	SM101-10A	BROWN FIBER BOARD		
18	SM101-10B	↓		
19	SM101-11A	MORTAR		
20	SM101-11B	↓		
21	SM101-12A	BROWN FIBERBOARD		
22	SM101-12B	↓		
23				
24				
25				

Client Sample # (S) ______ - ______ TOTAL SAMPLE # ______

Relinquished:		Date:		Time:	
Received:	M. Lamzon	Date:	8/21/09	Time:	0900 F/E.
Relinquished:		Date:		Time:	
Received:		Date:		Time:	

RECEIVED
JUL 24 2009
By____________

July 16, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 106308

RE: E8435-06-36

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on July 09, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

for Eddie F. Rodriguez
Laboratory Director

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *16-Jul-09*

CLIENT: Geocon Consultants, Inc.
Project: E8435-06-36
Lab Order: 106308

Lab ID: 106308-001 **Collection Date:** 7/7/2009
Client Sample ID: RAPOC-P1A **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B / EPA 6010B						
RunID: ICP6_090716A QC Batch: 56577 PrepDate: 7/14/2009 Analyst: **SRB**						
Lead	130	4.0		mg/Kg	1	7/16/2009 12:26 PM

Lab ID: 106308-002 **Collection Date:** 7/7/2009
Client Sample ID: RAPOC-P1B **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B / EPA 6010B						
RunID: ICP6_090716A QC Batch: 56577 PrepDate: 7/14/2009 Analyst: **SRB**						
Lead	150	4.0		mg/Kg	1	7/16/2009 12:27 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- S Spike Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- E Value above quantitation range
- ND Not Detected at the Reporting Limit

Results are wet unless otherwise specified

Advanced Technology Laboratories

Date: 16-Jul-09

CLIENT: Geocon Consultants, Inc.
Work Order: 106308
Project: E8435-06-36

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-56577** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/14/2009** RunNo: **110838**
Client ID: **PBS** Batch ID: **56577** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/15/2009** SeqNo: **1744611**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	1.0									

Sample ID: **LCS-56577** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/14/2009** RunNo: **110838**
Client ID: **LCSS** Batch ID: **56577** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/15/2009** SeqNo: **1744612**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	48.342	1.0	50.00	0	96.7	80	120				

Sample ID: **106317-009ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/14/2009** RunNo: **110838**
Client ID: **ZZZZZZ** Batch ID: **56577** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/15/2009** SeqNo: **1744615**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.194	1.0						5.500	5.72	20	

Sample ID: **106317-009AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/14/2009** RunNo: **110838**
Client ID: **ZZZZZZ** Batch ID: **56577** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/15/2009** SeqNo: **1744617**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	110.238	1.0	125.0	5.500	83.8	33	120				

Sample ID: **106317-009AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/14/2009** RunNo: **110838**
Client ID: **ZZZZZZ** Batch ID: **56577** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/15/2009** SeqNo: **1744618**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	111.159	1.0	125.0	5.500	84.5	33	120	110.2	0.832	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#:
Logged By: [illegible] Date: 7/9/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt:
1. CHILLED Y ☑ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTACT Y ☑ N ☐
4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

Client: GEOCON
Attn: CHRIS GIUNTOLI
Address: 6671 BRISA ST
City: LIVERMORE State: CA Zip Code: 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name:
Project #: E8435-06-36
Sampler: (Printed Name) CHRIS GIUNTOLI (Signature) [signature]

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
[signature]	7/8/09	1645	[signature]	7/9/09	[illegible]

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: C GIUNTOLI Print Name; Date 7/8/09; Signature [signature]

Send Report To: Attn: SAME; Cc:; Address; City; State; Zip

Bill To: Attn: SAME; Cc:; Address; City; State; Zip

Special Instructions/Comments:
* SOLUBLE LEAD MAY BE REQUESTED BASED ON TOTAL LEAD RESULTS

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.
Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO) / 8020 (BTEX), 8015B (DRO), 8021 (BTEX), TITLE 22 / CAM 17 (6010/7000), TOTAL LEAD *

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER, PAINT CHIP

QA / QC: RTNE ☐ CT ☒ SWRCB Logcode ☐ OTHER

ITEM	LAB USE ONLY: Batch #: Lab No.	Sample I.D. / Location	Date	Time	TOTAL LEAD *	PAINT CHIP	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	[illegible]	RAPCC-P1A	7/7/09		X	X	E	1	PB		
	[illegible]	RAPCC-P1B	↓		X	X	↓	↓	↓↓		

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report. **Yellow** to folder, **Pink** to submitter.

RECEIVED JUL 29 2009

ACCREDITED IN ACCORDANCE WITH nelac

July 24, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 106308

RE: E8435-06-36

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on July 09, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *24-Jul-09*

CLIENT: Geocon Consultants, Inc. **Lab Order:** 106308

Project: E8435-06-36

Lab ID: 106308-001 **Collection Date:** 7/7/2009

Client Sample ID: RAPOC-P1A **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
LEAD BY ATOMIC ABSORPTION (STLC)						
WET		WET/ EPA 7420				
RunID: AA2_090721A	QC Batch: 56673			PrepDate:	7/17/2009	Analyst: IL
Lead	1.9	0.25		mg/L	1	7/21/2009 09:39 AM

Lab ID: 106308-002 **Collection Date:** 7/7/2009

Client Sample ID: RAPOC-P1B **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
LEAD BY ATOMIC ABSORPTION (STLC)						
WET		WET/ EPA 7420				
RunID: AA2_090721A	QC Batch: 56673			PrepDate:	7/17/2009	Analyst: IL
Lead	4.6	0.25		mg/L	1	7/21/2009 09:40 AM

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- S Spike Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- E Value above quantitation range
- ND Not Detected at the Reporting Limit

Results are wet unless otherwise specified

Advanced Technology Laboratories

Date: 24-Jul-09

CLIENT: Geocon Consultants, Inc.
Work Order: 106308
Project: E8435-06-36

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **MB-56673A** SampType **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **7/17/2009** RunNo: **110970**
Client ID: **PBS** Batch ID: **56673** TestNo: **WET/ EPA 74 WET** Analysis Date: **7/21/2009** SeqNo: **1746912**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-56673** SampType: **LCS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **7/17/2009** RunNo: **110970**
Client ID: **LCSS** Batch ID: **56673** TestNo: **WET/ EPA 74 WET** Analysis Date: **7/21/2009** SeqNo: **1746913**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.152	0.25	5.000	0	103	80	120				

Sample ID: **106306-012A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **7/17/2009** RunNo: **110970**
Client ID: **ZZZZZZ** Batch ID: **56673** TestNo: **WET/ EPA 74 WET** Analysis Date: **7/21/2009** SeqNo: **1746918**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.463	0.25						0.4415	4.83	20	

Sample ID: **106306-012A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **7/17/2009** RunNo: **110970**
Client ID: **ZZZZZZ** Batch ID: **56673** TestNo: **WET/ EPA 74 WET** Analysis Date: **7/21/2009** SeqNo: **1746919**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.919	0.25	5.000	0.4415	110	80	120				

Sample ID: **106306-012A-MSD** SampType: **MSD** TestCode: **7420_ST** Units: **mg/L** Prep Date: **7/17/2009** RunNo: **110970**
Client ID: **ZZZZZZ** Batch ID: **56673** TestNo: **WET/ EPA 74 WET** Analysis Date: **7/21/2009** SeqNo: **1746920**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.868	0.25	5.000	0.4415	109	80	120	5.919	0.873	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories 3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

6. 04-235641-Storm-Water-Data-Report.pdf

Caltrans

Dist-County-Route: 04-SM-SCL 101
Post Mile Limits: 0.0/0.9-52.2/52.6,
Project Type: Highway Widening
Project ID (or EA): 0400002019 (235641)
Program Identification: HB4C
Phase: ☐ PID ☐ PA/ED ☒ PS&E

Regional Water Quality Control Board(s): San Francisco Bay Regional Water Quality Control Board (R-2)

Is the Project required to consider Treatment BMPs? Yes ☒ No ☐
If yes, can Treatment BMPs be incorporated into the project? Yes ☒ No ☐
If No, a Technical Data Report must be submitted to the RWQCB at least 30 days prior to the projects RTL date. List RTL Date: 9/1/2011

Total Disturbed Soil Area: 4.4 ac (2.71 ac new Added impervious area and 1.69 reworked area) Risk Level: 2
Estimated: Construction Start Date: 3/1/2012 Construction Completion Date: 12/1/2012
Notification of Construction (NOC) Date to be submitted: 9/1/2011

Erosivity Waiver	Yes ☐	Date:________	No ☒
Notification of ADL reuse (if Yes, provide date)	Yes ☐	Date:________	No ☒
Separate Dewatering Permit (if yes, permit number)	Yes ☐	Permit #________	No ☒

This Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the date upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

4/22/11
AIJUN DING, Registered Project Engineer/Landscape Architect — Date

I have reviewed the stormwater quality design issues and find this report to be complete, current and accurate:

for M. Suleiman — 4/28/11
RONALD MORIGUCHI, *Project Manager* — *Date*

Robert W. Braga — 5/2/11
ROBERT BRAGA, *Designated Maintenance Representative* — *Date*

David W. Yam — 4.28.11
DAVID YAM, *Designated Landscape Architect Representative* — *Date*

Norman Gonsalves — 04/28/2011
[Stamp Required for PS&E only) **NORMAN GONSALVES**, *Regional Design SW Coordinator or Designee* — *Date*

STORM WATER DATA INFORMATION

1. Project Description

This project proposes to widen US 101 to add auxiliary lanes in each direction from the Embarcadero Road Interchange in the City of Palo Alto in Santa Clara County (PM SCl 52.6) to the University Avenue interchange (PM SM 0.9) in the City of East Palo Alto in San Mateo County. In general, US 101 would be widened to the outside to accommodate the addition of the auxiliary lanes. Other major components of the project include modification of existing ramp metering system and install Intelligent Transportation System (ITS) equipment, realignment of existing off-ramps and on-ramps, widening of on-ramps within the existing sound walls and overlay the entire project.

The project proposes to widen US 101 to add auxiliary lanes in each direction from the Embarcadero Road Interchange in the City of Palo Alto in Santa Clara County (PM SCL 52.6) to the University Avenue interchange (PM SM 0.9) in the City of East Palo Alto in San Mateo County. In general, US 101 would be widened to the outside to accommodate the addition of the auxiliary lanes. In general, US 101 would be widened to the outside to accommodate the addition of the auxiliary lanes. Other major components of the project include modifying the Traffic Operation System (TOS) on the southbound on-ramp at the University Ave. Interchange; widen the southbound on-ramp at the University Ave. Interchange, the northbound on-ramp and the southbound off-ramp at the Embarcadero Road Interchange.

This project, Project 2, split from the San Mateo 101 Auxiliary lanes parent project, EA 235611. The parent project proposes to add auxiliary lanes from the Embarcadero Road interchange (PM52.2) in Santa Clara County to the Marsh Road interchange (PM 3.6) in San Mateo County. The Project Change Request was approved in May 2008 to split the project into two roadway projects and one landscape project. The Project 1, EA 235631, is from the University Avenue interchange (PM 0.9) in the City of East Palo Alto in San Mateo County to the Marsh Road interchange (PM 3.6) in the City of Menlo Park in San Mateo County. The Project 2, EA 235641, is from the Embarcadero Road interchange (PM 52.2) in the City of Palo Alto in Santa Clara County to the University Avenue interchange in the City of East Palo Alto in San Mateo County (PM 0.9). The Project 3 is the Replacement of Landscape project, EA 2356A, from the Embarcadero Road (PM 52.2) in Santa Clara County to the Marsh Road (PM 3.6) in San Mateo County.

The addition of auxiliary lanes will relieve congestion on mainline US 101 within the project limits. The project is in the Corridor Mobility Improvement Account (CMIA) program adopted by the California Transportation Commission (CTC) on May 5, 2007 and is a part of the improvements to US 101 included in the San Mateo County Transportation Expenditure Plan – Measure "A" approved by voters on June 7, 1988. Construction for the project is scheduled to begin in February 2012.

The Replacement of San Francisqito Bridge is not included in this Project (Project 2.-235641)

The project will disturb 3.83 acres of land and add 2.09 acres of impervious surface. The impervious surface added was calculated by subtracting the existing paved surface from the proposed paved surface. The reworked impervious area will be 1.74 acre. The areas were determined from an earthwork computer model.

This project is located in the San Mateo and Santa Clara County MS4.

2. Site Data and Storm Water Quality Design Issues (refer to Checklists SW-1, SW-2, and SW-3)

San Francisco Bay Regional Water Quality Control Board (R-2) has jurisdiction within the project. The project is located in Santa Clara Hydrologic Unit, Palo Alto Hydrologic Area and Undefined Hydrologic Sub Area (Hydrologic Sub-Area or HSA 205.50) with Watershed Area of 147267 acres (Water Quality Planning Tool, California State University at Sacramento, http://www.owp.csus.edu/research/stormwater/tools/wqpt.htm).

The direct receiving waterbody crossing project limits is San Francisquito, Creek

The ultimate receiving water body for this project is San Francisco Bay South. It receives water through series of unlined ditches and pipes.

San Francisco Bay South is 303(d) listed for chlordane, diazinon, dieldrin, dioxin compounds, dichlorodiphenyltrichloroethane (DDT), exotic species, furan compounds, mercury, polychlorinated biphenyl (PCBs), and selenium. None of these pollutants are Department targeted design constituents.

San Francisquito Creek is 303(d) listed for diazinon and sedimentation/siltation and it is considered impaired for steelhead habitat (2006 CWA Section). It crosses Route 101 within the project area.

401 Certificate is not required for this project.

Currently no high-risk areas are found in the vicinity of the project limits.

The general topography of area is primarily level train that slopes gradually toward the San Francisco Bay.

San Francisco Bay Region climate is Mediterranean in character with dry warm summers and wet cool winters. Rainy season is from October 15 to April 15. Rainfall on these hydrologic areas average 22 inches annually while temperatures range from 38°F to 73°F throughout the year (Statewide Stormwater Management Plan, 2007).

The project area is entirely covered by Holocene flood Basin deposits. The Basin deposits contains very fine silty clay to clay deposits occupying flat-floored basins at the distal edge of alluvial fans adjacent to the bay mud. Also contains unconsolidated, locally organic, plastic silt and silty clay deposited in very flat valley floor (USGS, OFR 98-348).

The project site is located 6.7 miles (10.79 km) east of San Andrea Fault (Peninsula section), 67.66 miles (11.79 km) west of Silver Creek Fault, and 7.58 miles (12.2 km) northwest of Cascade Fault. San Andrea Fault, Silver Creek Fault, and Cascade Fault are active faults with Maximum Magnitude (MMax) 7.9, 7.1, and 6.9 in order.

Ground water is not anticipated to be encountered during drilling to install CIDH piles (Caltrans Geotech. Memo. March 2010).

According to Natural Resources Conservation Service (NRCS), the soil is classified under hydrologic group "D" with low permeability and high runoff potential.

The project will be phased to minimize soil disturbance during the rainy season. Erosion control measures will be designed into the project. Construction Site BMP's will also be used during construction to avoid or reduce potential storm water impacts.

There are no known existing Treatment BMP's within the project limits.

A Caltrans internal memo from office of Environmental Engineering on march 23, 2010, noted that the soil excavated between 0 feet and 20 feet measured horizontally from the edges of the existing pavement and from a depth of 0 feet to 2.5 feet could be classified as hazardous waste and should be disposed at Class I disposal site.

There are currently no local agency requirements or concerns.

The project area is evaluated as a low gradient drainage area of bayside watershed in San Mateo and Santa Clara County. The surrounding area is depositional in nature and the new added impervious area poses an insignificant hydromodification impacts.

The proposed project is within the existing Caltrans' R/W and additional R/W acquisition is not anticipated for this project. The proposed treatment BMPs are designed to place within existing R/W.

3.Regional Water Quality Control Board Agreements

San Francisco Bay Regional Water Quality Board (RWQCB-2) has water quality jurisdiction of the project. Currently, there are no negotiated understanding or agreements yet with San Francisco Bay RWQCB pertaining to this Project.

Starting July 1, 2010, a new Construction General Permit (CGP, CAS000002) "National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities" regulates storm water runoff from construction sites.

Based on risk assessment set forth in the CGP, this project falls under Risk Level 2 (see Attachment). Risk Level 2 projects will be subject to Numeric Action Levels (NALs) and some additional monitoring requirements.

Risk Level 2 Dischargers shall comply with the requirements included in Attachment D of the CGP. This includes narrative and numeric effluent standards, good site management, non-storm water management, erosion control, sediment control, run-on and run-off control, inspection, maintenance and repair, rain event action plan, and monitoring and reporting.

4. Proposed Design Pollution Prevention BMPs to be used on the Project.

The proposed modifications to Route 101 will result in an increase in impervious surface area within project limits. This project will not involve widening of the existing bridge . The new added impervious area is 2.71 ac and the reworked area is 1.69 ac. The major work involves removing part of the paved shoulders and replacing with new pavement as auxiliary lanes.

Downstream Effects Related to Potentially Increased Flow, Checklist DPP-1, Parts 1 and 2

The project will

The project would increase the amount of impervious area slightly, resulting in an insignificant increase of volume or velocity of downstream flow and project would have minimal impacts on downstream runoff. Run off from project will be conveyed through a series of adjusted inlets and ditches into the drainage pipes The proposed drainage system will collect concentrated flows from existing pavement and new added road segments through new and existing drainage system throughout the project site. The storm water ultimately would discharge to San Francisco South Bay.

Slope/Surface Protection Systems, Checklist DPP-1, Parts 1 and 3

There are negligible cut and fill required throughout the project area. Except for the ramp interchanges for University Avenue and Embarcadero all slope gradients are very flat throughout the project limits due to sound walls, retaining walls and curbs bounding the edge of traveled way. All disturbed slopes will be stabilized with landscaping and measures will be considered to reduce concentrated flow.

Concentrated Flow Conveyance Systems, Checklist DPP-1, Parts 1 and 4

The project proposes to create and modify existing ditches, dikes, inlets and pipes. The proposed drainage design was modified either to fit with new drainage system or be abandoned and replaced by new system. Conveyances are mainly closed channels Pipes are connected to urban drain system discharging east towards San Francisco Bay South.

Preservation of Existing Vegetation, Checklist DPP-1, Parts 1 and 5

The trees and vegetated area that exempt from clearing and grubbing should be protected by means of proper fencing. Environmentally Sensitive Areas (ESA) have not been identified for this project.

5.Proposed Permanent Treatment BMPs to be used on the Project

Treatment BMP Strategy, Checklist T-1

The Targeted Design Constituents (TDCs) are sedimentation/siltation identified for San Francisquito River Sediment is the most of the concern among the constituents resulting from the project.

The treatment strategy for the project is to incorporate BMPs that are effective in removal of sediment. The approved Treatment BMPs in order of preference based on load reduction (performance) for sedimentation/siltation and lifetime costs for the device, excluding right-of-way, are (1) Infiltration Devices; (2) Austin Sand Filter, Delaware Filter, Wet Basin; (3) Detention Device, Biofiltration Strip, MCTT, and (4) Biofiltration Swale.

The project will incorporate a total of six biofiltration strips. The proposed Treatment BMPs will treat a road surface area of approximately 0.71 acres, which is about 26 % of the new added impervious surface area for this project.

Biofiltration Swales/Strips, Checklist T-1, Parts 1 and 2

The project will incorporate 6 biofiltration strips and The locations of the proposed biofiltration devices and the treated impervious areas are listed in Table 1.

Table 1. Biofiltration Devices Summary:

Device		Route	Direction	Begin	End	Treated Area
No.	Type			Station	Station	(acres)
1	Strip	101	RT (SB)	D2 278+20	D2..279+90	0.08
2	Strip	101	RT (SB)	D2 280+20	D2 282+30	0.24
3	Strip	101	RT (SB)	C 24+50	C 26+70	0.14
4	Strip	101	RT (SB)	C 28+20	C 29+00	0.05
5	Strip	101	LT (NB)	C 25+70	C 27+50	0.10
6	Strip	101	LT (NB)	C 28+40	C 29+50	0.10
					Total	0.71

Details of the proposed biofiltration devices can be found in Erosion Control plans (see Attachment).

Dry Weather Diversion, Checklist T-1, Parts 1 and 3

Dry weather diversion was not considered because no dry weather flows are persistent or anticipated for this project.

Infiltration Devices – Checklist T-1, Parts 1 and 4

The existing right-of-way makes infiltration basins infeasible. The infiltration trenches are also infeasible while the area is mostly covered by soil Type D.

Detention Devices, Checklist T-1, Parts 1 and 5

Detention devices are determined to be infeasible for this project due to inadequate right -of -way and insufficient hydraulic head.

Gross Solids Removal Devices (GSRDs), Checklist T-1, Parts 1 and 6

Gross Solids Removal Devices (GSRDs) are not feasible due to insufficient space and access for maintenance within the project limits. In addition receiving water bodies are not on the 303(d) list for litter/trash.

Traction Sand Traps, Checklist T-1, Parts 1 and 7

Traction Sand Traps are not incorporate into this project, because Traction Sand is not applied at least twice a year within project limits.

Media Filters, Checklist T-1, Parts 1 and 8

Due to project's land constrains, neither the Austin Sand Filter nor Delaware Filter's chambers can be sized and constructed within the project site limits. The project site also does not provide the required hydraulic head to operate media filters.

Multi-Chambered Treatment Trains (MCTTs), Checklist T-1, Parts 1 and 9

MCTTs are not incorporated into this project. There is not sufficient right -of -way to accommodate MCTTs

Wet Basins, Checklist T-1, Parts 1 and 10

Wet basins are not feasible because sufficient land within the project right- of - way .

6. Proposed Temporary Construction Site BMPs to be used on Project

This project will disturb more than 1 ac of soil , therefore Storm Water Pollution Prevention Plan (SWPPP) will be provided by contractor and will identify BMPs to reduce/eliminate water quality impacts during construction

Wherever possible early implementation of permanent BMPs and permanent erosion control seeding or landscape planting shall be performed.

The Construction Site BMP strategy for this project will consist of the soil stabilization sediment control , tracking control, waste management and material pollution control and non -storm water management,.

Soil Stabilization

The soil stabilization measures are temporary fence (Type ESA), temporary hydraulic mulch(Bonded Fiber Matrix) and temporary cover. They are included in separate bid line items

Sediment Control

The Sediment control measures as a separate bid line items are temporary fiber Rolls, Temporary check dams and temporary drainage inlet protection.

Street sweeping and vacuuming is a sediment control measure and will include as a lump sum item.

Tracking Control

Stabilized temporary construction site entrances for tracking control are included in a separate bid line items.

Waste Management and Materials Pollution Control

The project will involve activities using concrete materials Temporary concrete washout facilities are included in a separate bid line item. All other anticipated waste management and materials pollution control measures will be covered under the Construction Management lump sum.

Construction Site management

All remaining water pollution control items will be included in the Construction Site Management lump sum bid items

The lump sum costs include Spill Prevention and Control, material Management , Stock pile Management, Waste Management , Haz-Waste Management , Contaminated Soil, Concrete Waste, Liquid Waste, water Control and Conservation, Vehicle and Equipment Cleaning, Paving , Sealing, Saw Cutting, and Grinding Operations, Thermo plastic Striping and Pavement Markers, Concrete Curing and Concrete Finishing, potable Water / Irrigation , Training of employees and subcontractors and the proper selection , deployment , and repair of construction site BMPs used within Project limits.

Rain Event Action Plan

All RL2 and RL3 projects are to implement a Rain Event Action Plan (REAP) in advance of a forecasted storm. The contractor evaluates site readiness as part of formulating a REAP. This contract item is non-adjustable and will include as a separate bid line item

Storm Water Annual Report

Storm Water annual Submittal report to the RWQCB regarding project compliance with the CGP This contract item is non-adjustable and will include as a separate bid line item.

Storm Water Sampling and Analysis

Sampling and Analysis covers the cost of lab tests for water quality samples and will include as a separate bid line item.

The quantities and costs for construction site BMPs proposed for this Project are attached to this report.

7. Maintenance BMPs (Drain Inlet Stenciling

Drain Inlet Stenciling will not be required will not required for this project.

Required Attachments

- Vicinity Map
- Evaluation Documentation Form (EDF)
- Construction Site BMP Consideration Form (required at PS&E only)
- Risk Level Determination Documentation
- Treatment BMP Summary Spreadsheets (required, if Treatment BMPs are incorporated into project, required at PS&E only)
- Quantities for Construction Site BMPs (required at PS&E only)

Supplemental Attachments

Note: Supplement Attachments are to be supplied during the SWDR approval process; where noted, some of these items may only be required on a project-specific basis.

- Plans showing BMP Deployment (i.e. Layout Sheets, Drainage Sheets, Water Pollution Control Sheets, etc)
- Checklist SW-1, Site Data Sources
- Checklist SW-2, Storm Water Quality Issues Summary
- Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water BMPs
- Checklists DPP-1, Parts 1–5 (Design Pollution Prevention BMPs) [only those parts that are applicable]
- Checklists T-1, Parts 1–10 (Treatment BMPs) [only those Parts that are applicable]
- Checklists CS-1, Parts 1–6 (Construction Site BMPs) [only those Parts that are applicable, at PS&E only]
- District/Regional Design Storm Water Coordinator for review)

DATE: 04/28/2011

Project ID (or EA): 0400002019 (235641)

NO.	CRITERIA	YES ✓	NO ✓	SUPPLEMENTAL INFORMATION FOR EVALUATION
1.	Begin Project Evaluation regarding requirement for consideration of Treatment BMPs	✓		See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPs. Go to 2
2.	Is this an emergency project?		✓	If **Yes**, go to 10. If **No**, continue to 3.
3.	Have TMDLs or other Pollution Control Requirements been established for surface waters within the project limits? Information provided in the water quality assessment or equivalent document.		✓	If **Yes**, contact the District/Regional NPDES Coordinator to discuss the Department's obligations under the TMDL (if Applicable) or Pollution Control Requirements, go to 9 or 4. ______ *(Dist./Reg. SW Coordinator initials)* If **No**, continue to 4.
4.	Is the project located within an area of a local MS4 Permittee?	✓		If **Yes**. *(SM-SCL Counties)*, go to 5. If **No**, document in SWDR go to 5.
5.	Is the project directly or indirectly discharging to surface waters?	✓		If **Yes**, continue to 6. If **No**, go to 10.
6.	Is it a new facility or major reconstruction?	✓		If **Yes**, continue to 8. If **No**, go to 7.
7.	Will there be a change in line/grade or hydraulic capacity?	✓		If **Yes**, continue to 8. If **No**, go to 10.
8.	Does the project result in a net increase of one acre or more of new impervious surface?	✓		If **Yes**, continue to 9. If **No**, go to 10. 2.71 ac new Added impervious area and 1.69 reworked area *(Net Increase New Impervious Surface)*
9.	Project is required to consider approved Treatment BMPs.	✓	See Sections 2.4 and either Section 5.5or 6.5 for BMP Evaluation and Selection Process. Complete Checklist T-1 in this Appendix E.	
10.	Project is not required to consider Treatment BMPs. ______*(Dist./Reg. Design SW Coord. Initials)* ______*(Project Engineer Initials)* __________ *(Date)*		Document for Project Files by completing this form, and attaching it to the SWDR.	

See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPs

DATE: 04/28/2011

Project ID (or EA): 0400002019 (235641)

Project Evaluation Process for the Consideration of Construction Site BMPs

NO.	CRITERIA	YES ✓	NO ✓	SUPPLEMENTAL INFORMATION
1.	Will construction of the project result in areas of disturbed soil as defined by the Project Planning and Design Guide (PPDG)?	✓		If Yes, Construction Site BMPs for Soil Stabilization (SS) will be required. Complete CS-1, Part 1. Continue to 2. If No, Continue to 3.
2.	Is there a potential for disturbed soil areas within the project to discharge to storm drain inlets, drainage ditches, areas outside the right-of-way, etc?	✓		If Yes, Construction Site BMPs for Sediment Control (SC) will be required. Complete CS-1, Part 2. Continue to 3.
3.	Is there a potential for sediment or construction related materials and wastes to be tracked offsite and deposited on private or public paved roads by construction vehicles and equipment?	✓		If Yes, Construction Site BMPs for Tracking Control (TC) will be required. Complete CS-1, Part 3. Continue to 4.
4.	Is there a potential for wind to transport soil and dust offsite during the period of construction?		✓	If Yes, Construction Site BMPs for Wind Erosion Control (WE) will be required. Complete CS-1, Part 4. Continue to 5.
5.	Is dewatering anticipated or will construction activities occur within or adjacent to a live channel or stream?		✓	If Yes, Construction Site BMPs for Non-Storm Water Management (NS) will be required. Complete CS-1, Part 5. Continue to 6.
6.	Will construction include saw-cutting, grinding, drilling, concrete or mortar mixing, hydro-demolition, blasting, sandblasting, painting, paving, or other activities that produce residues?	✓		If Yes, Construction Site BMPs for Non-Storm Water Management (NS) will be required. Complete CS-1, Parts 5 & 6. Continue to 7.
7.	Are stockpiles of soil, construction related materials, and/or wastes anticipated?	✓		If Yes, Construction Site BMPs for Waste Management and Materials Pollution Control (WM) will be required. Complete CS-1, Part 6. Continue to 8.
8.	Is there a potential for construction related materials and wastes to have direct contact with precipitation; stormwater run-on, or stormwater runoff; be dispersed by wind; be dumped and/or spilled into storm drain systems?	✓		If Yes, Construction Site BMPs for Waste Management and Materials Pollution Control (WM) will be required. Complete CS-1, Part 6. Continue to 9.
9.	End of checklist.		Document for Project Files by completing this form, and attaching it to the SWDR.	

A.D. 5/17/11

PE to initialize after concurrence with Construction (PS&E only) *Date*

Sediment Risk Factor Worksheet	Entry
A) R Factor	
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site. http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm	
R Factor Value	16.56
B) K Factor (weighted average, by area, for all site soils)	
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted. Site-specific K factor guidance	
K Factor Value	0.24
C) LS Factor (weighted average, by area, for all slopes)	
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction. LS Table	
LS Factor Value	1.02
Watershed Erosion Estimate (=RxKxLS) in tons/acre	4
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >=15 and <75 tons/acre High Sediment Risk: >= 75 tons/acre	**Low**

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	yes/no	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below: 2006 Approved Sediment-impared WBs Worksheet http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml **OR** A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp	**Yes**	**High**

Combined Risk Level Matrix

Receiving Water Risk	Sediment Risk: Low	Sediment Risk: Medium	Sediment Risk: High
Low	Level 1	Level 2	Level 2
High	Level 2	Level 2	Level 3

Project Sediment Risk: Low

Project RW Risk: High

Project Combined Risk: Level 2

...ainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Facility Name: EA 235641
Start Date: 03/01/2012
End Date: 12/01/2012
Latitude: 37.4558
Longitutde: -122.1331

Erosivity Index Calculator Results

...I EROSIVITY INDEX VALUE OF **16.56** HAS BEEN DETERMINED FOR THE CONSTRUCTION ...ERIOD OF **03/01/2012 - 12/01/2012**.

...rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction.
...u do not qualify for a waiver from NPDES permitting requirements.


Contents
Boundary
District Bn
RWQCB Bn
KLS(CGP, Fsht p29)
EPA EMAP-K
EPA EMAP-LS
EPA EMAP-KLS
Risk(CGP, Fsht p30)
MS4/SUSMP(CGP, Fsht p39)
REAP/SWM(CGP, Fsht p32)
Web Soil Survey K value
RUSLE2 'R' value (in/yr)
NOT (in/yr)
ComplianceStormEvent (CGP, Order
CA Water Bodies
World_Street_Map
World_Imagery
USA_Topo_Maps
USA Topo Maps
K (0.24)
Palo Alto Airport of Santa Clara County
Embarcadero Way
E Bayshore Rd
W Bayshore Rd
Middlefield Rd
Channing Ave
0 303 606 1212 1818 2424 Feet
Questions? Please email to Will_Kuo@dot
2.132, Y = 37.442
Local intranet | Protected Mode: Off
100%

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	TMDL REQUIREMENT STATUS*	ESTIMATED SIZE AFFECTED	PROPOSED OR USEPA APPROVED TMDL COMPLETION
				Furan Compounds		A	9204 Acres	2019
				The specific compounds are 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, and OCDF. This listing was made by USEPA.				
					Atmospheric Deposition			
				Mercury		A	9204 Acres	2006
				Current data indicate fish consumption and wildlife consumption impacted uses: health consumption advisory in effect for multiple fish species including striped bass and shark. Major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs frompoint sources: water quality objective exceedances. Elevated sediment level and elevated tissue levels.				
					Atmospheric Deposition			
					Industrial Point Sources			
					Municipal Point Sources			
					Natural Sources			
					Nonpoint Source			
					Resource Extraction			
				PCBs (Polychlorinated biphenyls)		A	9204 Acres	2006
				This listing covers non dioxin-like PCBs.Interim health advisory for fish; uncertainty regarding water column concentration data.				
					Unknown Nonpoint Source			
				PCBs (Polychlorinated biphenyls) (dioxin-like)		A	9204 Acres	2019
				The specific dioxin like compounds are 3,4,4,5-TCB (81), 3,3,3,3-TCB (77), 3,3,4,4,5-PeCB (126), 3,3,4,4,4,4-HxCB (169), 2,3,3,4,4-PeCB (105), 2,3,4,4,5-PeCB (114), 2,3,4,4,5-PeCB (118), 2,3,4,4,5-PeCB (123), 2,3,3,4,4,5-HxCB (156), 2,3,3,4,4,5-HxCB (157), 2,3,4,4,5,5,-HxCB (167), 2,3,3,4,4,5,5-HpCB (189). This listing was made by USEPA.				
					Unknown Nonpoint Source			
				Selenium		A	9204 Acres	2019
				A formal health advisory has been issued by OEHHA for benthic-feeding ducks in South San Francisco Bay. This health advisory clearly establishes that water contact recreation beneficial use (REC-1) is not fully supported and standards are not fully met.				
					Agriculture			
					Domestic Use of Ground Water			
2	R	San Francisquito Creek	20550040					
				Diazinon		B	12 Miles	2007
				This listing was made by USEPA for the 1998 303(d) list. For 2006, diazinon was moved by USEPA from the 303(d) list to this being addressed list because of a completed USEPA approved TMDL.				
					Urban Runoff/Storm Sewers			

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	TMDL REQUIREMENT STATUS*	ESTIMATED SIZE AFFECTED	PROPOSED OR USEPA APPROVED TMDL COMPLETION
				Sedimentation/Siltation *Impairment to steelhead habitat.*		A	12 Miles	2008
					Nonpoint Source			
2	R	San Gregorio Creek	20230014					
				Coliform Bacteria		A	11 Miles	2019
					Nonpoint Source			
				Sedimentation/Siltation *Impairment to steelhead habitat.*		A	11 Miles	2019
					Nonpoint Source			
2	B	San Leandro Bay (part of SF Bay, Central)	20420040					
				Chlordane *This listing was made by USEPA.*		A	588 Acres	2008
					Nonpoint Source			
				Dieldrin *This listing was made by USEPA.*		A	588 Acres	2008
					Nonpoint Source			
				Dioxin Compounds (including 2,3,7,8-TCDD)		A	588 Acres	2019
					Atmospheric Deposition			
				Exotic Species *Disrupt natural benthos; change pollutant availability in food chain; disrupt food availability to native species.*		A	588 Acres	2019
					Ballast Water			
				Furan Compounds *The specific compounds are 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, and OCDF. This listing was made by USEPA.*		A	588 Acres	2019
					Atmospheric Deposition			
				Lead (sediment)		A	588 Acres	2019
					Source Unknown			

SANTA CLARA BASIN

	Human Consumptive Uses					Aquatic Life Uses									Wildlife Use	Recreational Uses		
COUNTY Waterbody	AGR	MUN	FRSH	GWR	IND	PROC	COMM	SHEL	COLD	EST	MAR	MIGR	RARE	SPWN	WARM	WILD	REC-1	REC-2	NAV
San Francisco Bay South					E		E	E		E		E	E	P		E	E	E	E
ALAMEDA COUNTY																			
Lake Elizabeth									E					E	E	E		E	
SAN MATEO AND SANTA CLARA COUNTIES																			
San Francisquito Creek									E			E		E	E	E	P	P	
Felt Lake	E													E	E	E	E	E	
Los Trancos Creek																			
West Union Creek																			
Searsville Lake	E								E					E	E	E	E	E	
SANTA CLARA COUNTY																			
Matedero Creek									E			E		E	E	E	E	E	
Permanente Creek									E					E		E	E	E	
Stevens Creek			E						E			E		P	E	E	E	E	
Stevens Creek Reservoir		E		E					E			E		E	E	E		E	
Calabazas Creek	E			E					E						E	E	E	E	
Saratoga Creek	E		E	E					E						E	E	E	E	
Guadalupe Reservoir									E			P		P	E	E	P	E	
Los Gatos Creek		E	E	E					E			P		P	E	E		P	
Vasona Lake				E					E					E	E	E	E	E	
Lexington Reservoir		E							E					E	E	E	E	E	
Lake Elsman		E							E							E		P	
Campbell Percolation Pond				E					E					E	E	E	E	E	
Guadalupe Creek																			
Guadalupe Reservoir		E		E					E					E	E	E	E	E	
Alamitos Creek																			
Calero Reservoir		E		E										E	E	E	E	E	
Almaden Reservoir		E		E					E					E	E	E	E	E	
Herbert Creek																			

Treatment BMP Summary Sheet

Dist-County-Route: 04-SM-SCL 101

Post Mile Limits: 0.0/0.9-52.2/52.6,

Project Type: Highway Widening

Project ID (or EA): 0400002019 (235641)

Device		Route	Direction	Begin	End	Treated Area
No.	Type			Station	Station	(acres)
1	Strip	101	RT (SB)	D2 278+20	D2..279+90	0.08
2	Strip	101	RT (SB)	D2 280+20	D2 282+30	0.24
3	Strip	101	RT (SB)	C 24+50	C 26+70	0.14
4	Strip	101	RT (SB)	C 28+20	C 29+00	0.05
5	Strip	101	LT (NB)	C 25+70	C 27+50	0.10
6	Strip	101	LT (NB)	C 28+40	C 29+50	0.10
					Total	0.71

Details of the proposed biofiltration devices can be found in Erosion Control plans (see Attachment).

Project ID 04000020191 (EA 04-235641)
US 101 Between University Avenue and Embarcadero Road
Quantities of Construction Site BMPs

No.	Item Code	Description	Quantity	Unit
1	74019	Prepare Storm Water Pollution Prevention Plan	1	LS
2	74016	Construction Site Management	1	LS
3		Temporay Fence (ESA Fencing)	3,400	LF
4	74028	Temporary Fiber Roll	1,030	LF
5	74033	Temporary Construction Entrance	4	EA
6	74034	Temporary Cover	5,000	SQFT
7	74035	Temporary Check Dam	150	LF
8	74037	Move-In/Move-Out (Temporary Erosion Control)	2	EA
9	74038	Temporary Drainage Inlet Protection	39	EA
10	74040	Temporary Hydraulic Mulch (Bonded Fiber Matrix)	5,000	SQYD
11	74041	Street Sweeping and Vacuuming	1	LS
12	74042	Temporary Concrete Washout (Portable	1	LS
13	74056	Rain Event Action Plan	40	EA
14	74057	Storm Water Annual Report	1	EA
15	74058	Storm Water Sampling and Analysis Day	22	EA
		(Supplemental Work)		
16	66595	Water Pollution Control Maintenance Sharing	1	LS
17	66596	Additional Water Pollution Control	1	LS
18	66597	Storm Water Sampling and Analysis Day	1	LS

Checklist SW-1, Site Data Sources

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : **0.0/0.9-52.2/52.6** Project ID (or EA): **0400002019 (235641)** RWQCB: **R-2**

Information for the following data categories should be obtained, reviewed and referenced as necessary throughout the project planning phase. Collect any available documents pertaining to the category and list them and reference your data source. For specific examples of documents within these categories, refer to Section 5.5 of this document. Example categories have been listed below; add additional categories, as needed. Summarize pertinent information in Section 2 of the SWDR.

DATA CATEGORY/SOURCES	Date
Topographic	
Caltrans	Jan 2011
• US Geological Survey	Accessed April 2011
• Google Earth	Accessed April 2011
Hydraulic	
California State University, Sacramento, Water Quality Planning Tool	Accessed March, 2011
• Caltrans, project Drainage Plans	April 2011
• Caltrans Highway Design Manual	July 2009
Soils	
• Caltrans, Preliminary Geotechnical Report	April, 2011
• Caltrans, Hazardous Site Investigation Test Results Analysis by GEOCON Consultants	Dec, 2009
• USDA, Natural Resources Conservation Service, Web Soil Survey	Accessed Jan 2011
Climatic	
• Caltrans, Statewide Storm water management Plan	June 2007
•	
•	
Water Quality	
• State water Resources Control Board. 2006 303(d) list for Water Quality Limited Segments	USEPA Approval Date June 2007
• Caltrans, Storm Water Quality Handbooks, Project Planning and Design Guide	July , 2010
•	
Other Data Categories	
• Caltrans Storm Water Data Report EA 04-235631	May, 2010
• San Francisco Bay Regional Water Quality Control Board	Accessed Feb 2011

Checklist SW-2, Storm Water Quality Issues Summary

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : **0.0/0.9-52.2/52.6** Project ID (or EA): **0400002019 (235641)** RWQCB: **R-2**

The following questions provide a guide to collecting critical information relevant to project stormwater quality issues. Complete responses to applicable questions, consulting other Caltrans functional units (Environmental, Landscape Architecture, Maintenance, etc.) and the District/Regional Storm Water Coordinator as necessary. Summarize pertinent responses in Section 2 of the SWDR.

1.	Determine the receiving waters that may be affected by the project throughout the project life cycle (i.e., construction, maintenance and operation).	☒Complete	☐NA
2.	For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern.	☒Complete	☐NA
3.	Determine if there are any municipal or domestic water supply reservoirs or groundwater percolation facilities within the project limits. Consider appropriate spill contamination and spill prevention control measures for these new areas.	☒Complete	☐NA
4.	Determine the RWQCB special requirements, including TMDLs, effluent limits, etc.	☒Complete	☐NA
5.	Determine regulatory agencies seasonal construction and construction exclusion dates or restrictions required by federal, state, or local agencies.	☒Complete	☐NA
6.	Determine if a 401 certification will be required.	☒Complete	☐NA
7.	List rainy season dates.	☒Complete	☐NA
8.	Determine the general climate of the project area. Identify annual rainfall and rainfall intensity curves.	☒Complete	☐NA
9.	If considering Treatment BMPs, determine the soil classification, permeability, erodibility, and depth to groundwater.	☒Complete	☐NA
10.	Determine contaminated soils within the project area.	☒Complete	☐NA
11.	Determine the total disturbed soil area of the project.	☒Complete	☐NA
12.	Describe the topography of the project site.	☒Complete	☐NA
13.	List any areas outside of the Caltrans right-of-way that will be included in the project (e.g. contractor's staging yard, work from barges, easements for staging, etc.).	☒Complete	☐NA
14.	Determine if additional right-of-way acquisition or easements and right-of-entry will be required for design, construction and maintenance of BMPs. If so, how much?	☐Complete	☒NA
15.	Determine if a right-of-way certification is required.	☐Complete	☒NA
16.	Determine the estimated unit costs for right-of-way should it be needed for Treatment BMPs, stabilized conveyance systems, lay-back slopes, or interception ditches.	☐Complete	☒NA
17.	Determine if project area has any slope stabilization concerns.	☐Complete	☒NA
18.	Describe the local land use within the project area and adjacent areas.	☒Complete	☐NA
19.	Evaluate the presence of dry weather flow.	☐Complete	☒NA

Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water Impacts

Prepared by:__Mostafa Faghihi__Date:__04/28/2011__District-Co-Route:__04--SM-SCL-101__

PM :__0.0/0.9-52.2/52.6__Project ID (or EA):__0400002019 (235641)__RWQCB:__R-2__

The PE must confer with other functional units, such as Landscape Architecture, Hydraulics, Environmental, Materials, Construction and Maintenance, as needed to assess these issues. Summarize pertinent responses in Section 2 of the SWDR.

Options for avoiding or reducing potential impacts during project planning include the following:

1. Can the project be relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions?	☐Yes	☒No	☐NA
2. Can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts?	☐Yes	☐No	☒NA
3. Can any of the following methods be utilized to minimize erosion from slopes:			
a. Disturbing existing slopes only when necessary?	☒Yes	☐No	☐NA
b. Minimizing cut and fill areas to reduce slope lengths?	☒Yes	☐No	☐NA
c. Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?	☐Yes	☐No	☒NA
d. Acquiring right-of-way easements (such as grading easements) to reduce steepness of slopes?	☐Yes	☐No	☒A
e. Avoiding soils or formations that will be particularly difficult to re-stabilize?	☒Yes	☐No	☐NA
f. Providing cut and fill slopes flat enough to allow re-vegetation and limit erosion to pre-construction rates?	☒es	☐No	☐NA
g. Providing benches or terraces on high cut and fill slopes to reduce concentration of flows?	☐Yes	☐No	☒NA
h. Rounding and shaping slopes to reduce concentrated flow?	☐Yes	☐No	☒NA
i. Collecting concentrated flows in stabilized drains and channels?	☒Yes	☐No	☐NA
4. Does the project design allow for the ease of maintaining all BMPs?	☒Yes	☐No	
5. Can the project be scheduled or phased to minimize soil-disturbing work during the rainy season?	☒Yes	☐No	
6. Can permanent storm water pollution controls such as paved slopes, vegetated slopes, basins, and conveyance systems be installed early in the construction process to provide additional protection and to possibly utilize them in addressing construction storm water impacts?	☒Yes	☐No	☐NA

Design Pollution Prevention BMPs
Checklist DPP-1, Part 1

Prepared by: Mostafa Faghihi Date: 04/28/2011 District-Co-Route: 04--SM-SCL-101

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641) RWQCB: R-2

Consideration of Design Pollution Prevention BMPs

Consideration of Downstream Effects Related to Potentially Increased Flow [to streams or channels]

Will project increase velocity or volume of downstream flow?	☒Yes	☐No	☐NA
Will the project discharge to unlined channels?	☒Yes	☐No	☐NA
Will project increase potential sediment load of downstream flow?	☒Yes	☐No	☐NA
Will project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?	☐Yes	☒No	☐NA

If Yes was answered to any of the above questions, consider ***Downstream Effects Related to Potentially Increased Flow***, complete the DPP-1, Part 2 checklist.

Slope/Surface Protection Systems

Will project create new slopes or modify existing slopes?	☐Yes	☒No	☐NA

If Yes was answered to the above question, consider ***Slope/Surface Protection Systems***, complete the DPP-1, Part 3 checklist.

Concentrated Flow Conveyance Systems

Will the project create or modify ditches, dikes, berms, or swales?	☒Yes	☐No	☐NA
Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA
Will it be necessary to direct or intercept surface runoff?	☒Yes	☐No	☐NA
Will cross drains be modified?	☒Yes	☐No	☐NA

If Yes was answered to any of the above questions, consider ***Concentrated Flow Conveyance Systems***; complete the DPP-1, Part 4 checklist.

Preservation of Existing Vegetation

It is the goal of the Storm Water Program to maximize the protection of desirable existing vegetation to provide erosion and sediment control benefits on all projects.

☒Complete

Consider ***Preservation of Existing Vegetation***, complete the DPP-1, Part 5 checklist.

Design Pollution Prevention BMPs

Checklist DPP-1, Part 2

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM :______________ Project ID (or EA): 0400002019 (235641) RWQCB: R-2

Downstream Effects Related to Potentially Increased Flow

1. Review total paved area and reduce to the maximum extent practicable. ☒Complete
2. Review channel lining materials and design for stream bank erosion control. ☒Complete
   (a) See Chapters 860 and 870 of the HDM. ☒Complete
   (b) Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity. ☒Complete
3. Include, where appropriate, energy dissipation devices at culvert outlets. ☒Complete
4. Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour. ☒Complete
5. Include, if appropriate, peak flow attenuation basins or devices to reduce peak discharges. ☒Complete

Design Pollution Prevention BMPs

Checklist DPP-1, Part 3

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641)

RWQCB: R-2

Slope / Surface Protection Systems

1.	What are the proposed areas of cut and fill? (attach plan or map)	☒ Complete
2.	Were benches or terraces provided on high cut and fill slopes to reduce concentration of flows?	☐ Yes ☒ No
3.	Were slopes rounded and/or shaped to reduce concentrated flow?	☐ Yes ☒ No
4.	Were concentrated flows collected in stabilized drains or channels?	☒ Yes ☐ No
5.	Are new or disturbed slopes > 4:1 horizontal:vertical (h:v)? If Yes, District Landscape Architect must prepare or approve an erosion control plan, at the District's discretion.	☐ Yes ☐ No
6.	Are new or disturbed slopes > 2:1 (h:v)? If Yes, Geotechnical Services must prepare a Geotechnical Design Report, and the District Landscape Architect should prepare or approve an erosion control plan. Concurrence must be obtained from the District Maintenance Storm Water Coordinator for slopes steeper than 2:1 (h:v).	☐ Yes ☒ No
7.	Estimate the net new impervious area that will result from this project. 2.09 acres	☒ Complete

VEGETATED SURFACES

1.	Identify existing vegetation.	☒ Complete
2.	Evaluate site to determine soil types, appropriate vegetation and planting strategies.	☒ Complete
3.	How long will it take for permanent vegetation to establish?	☒ Complete
4.	Minimize overland and concentrated flow depths and velocities.	☒ Complete

HARD SURFACES

1.	Are hard surfaces required?	☐ Yes ☒ No
	If Yes, document purpose (safety, maintenance, soil stabilization, etc.), types, and general locations of the installations.	☐ Complete
	Review appropriate SSPs for Vegetated Surface and Hard Surface Protection Systems.	☒ Complete

Design Pollution Prevention BMPs
Checklist DPP-1, Part 4

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641)

RWQCB: R-2

Concentrated Flow Conveyance Systems

Ditches, Berms, Dikes and Swales

1. Consider Ditches, Berms, Dikes, and Swales as per Topics 813, 834.3, and 835, and Chapter 860 of the HDM. ☒Complete
2. Evaluate risks due to erosion, overtopping, flow backups or washout. ☒Complete
3. Consider outlet protection where localized scour is anticipated. ☒Complete
4. Examine the site for run-on from off-site sources. ☒Complete
5. Consider channel lining when velocities exceed scour velocity for soil. ☒Complete

Overside Drains

1. Consider downdrains, as per Index 834.4 of the HDM. ☒Complete
2. Consider paved spillways for side slopes flatter than 4:1 h:v. ☒Complete

Flared Culvert End Sections

1. Consider flared end sections on culvert inlets and outlets as per Chapter 827 of the HDM. ☒Complete

Outlet Protection/Velocity Dissipation Devices

1. Consider outlet protection/velocity dissipation devices at outlets, including cross drains, as per Chapters 827 and 870 of the HDM. ☒Complete

Review appropriate SSPs for Concentrated Flow Conveyance Systems. ☒Complete

Design Pollution Prevention BMPs

Checklist DPP-1, Part 5

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641) RWQCB: R-2

Preservation of Existing Vegetation

1. Review Preservation of Property, Standard Specifications 16.1.01 and 16-1.02 (Clearing and Grubbing) to reduce clearing and grubbing and maximize preservation of existing vegetation. ☒Complete

2. Has all vegetation to be retained been coordinated with Environmental, and identified and defined in the contract plans? ☒Yes ☐No

3. Have steps been taken to minimize disturbed areas, such as locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce cutting and filling? ☒Complete

4. Have impacts to preserved vegetation been considered while work is occurring in disturbed areas? ☒Yes ☐No

5. Are all areas to be preserved delineated on the plans? ☒Yes ☐No

Treatment BMPs
Checklist T-1, Part 1

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641)

RWQCB: R-2

Consideration of Treatment BMPs

This checklist is used for projects that require the consideration of Approved Treatment BMPs, as determined from the process described in Section 4 (Project Treatment Consideration) and the Evaluation Documentation Form (EDF). This checklist will be used to determine which Treatment BMPs should be considered for each watershed and sub-watershed within the project. Supplemental data will be needed to verify siting and design applicability for final incorporation into a project.

Complete this checklist for each phase of the project, when considering Treatment BMPs. Use the responses to the questions as the basis when developing the narrative in Section 5 of the Storm Water Data Report to document that Treatment BMPs have been appropriately considered.

Answer all questions, unless otherwise directed. Questions 14 through 16 should be answered after all subwatershed (drainages) are considered using this checklist.

1. Is the project in a watershed with prescriptive TMDL treatment BMP requirements in an adopted TMDL implementation plan? ☐Yes ☒No

   If Yes, consult the District/Regional Storm Water Coordinator to determine whether the T-1 checklist should be used to propose alternative BMPs because the prescribed BMPs may not be feasible or other BMPs may be more cost-effective. Special documentation and regulatory response may be necessary.

2. Dry Weather Flow Diversion

   (a) Are dry weather flows generated by Caltrans anticipated to be persistent? ☐Yes ☒No

   (b) Is a sanitary sewer located on or near the site? ☒Yes ☐No

   If Yes to both 2 (a) and (b), continue to (c). If No to either, skip to question 3.

   (c) Is connection to the sanitary sewer possible without extraordinary plumbing, features or construction practices? ☐Yes ☐No

   (d) Is the domestic wastewater treatment authority willing to accept flow? ☐Yes ☐No

   If Yes was answered to all of these questions consider ***Dry Weather Flow Diversion***, complete and attach **Part 3** of this checklist

3. Is the receiving water on the 303(d) list for litter/trash or has a TMDL been issued for litter/trash? ☐Yes ☒No

If Yes, consider ***Gross Solids Removal Devices (GSRDs)***, complete and attach **Part 6** of this checklist. Note: Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins also can capture litter. Before considering GSRDs for stand-alone installation or in sequence with other BMPs, consult with District/Regional NPDES Storm Water Coordinator to determine whether Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins should be considered instead of GSRDs to meet litter/trash TMDL.

4. Is project located in an area (e.g., mountain regions) where traction sand is applied more than twice a year? ☐Yes ☒No

   If Yes, consider ***Traction Sand Traps***, complete and attach **Part 7** of this checklist.

5. Maximizing Biofiltration Strips and Swales

   Objectives:

   1) Quantify infiltration from biofiltration alone

   2) Identify highly infiltrating biofiltration (i.e. > 90%) and skip further BMP consideration.

   3) Identify whether amendments can substantially improve infiltration.

   (a) Have biofiltration strips and swales been designed for runoff from all project areas, including sheet flow and concentrated flow conveyance? If no, document justification in Section 5 of the SWDR. ☒Yes ☐No

   (b) Based on site conditions, estimate what percentage of the WQV[1] can be infiltrated. When calculating the WQV, use a 12-hour drawdown for Type A and B soils, a 24-hour drawdown for Type C soils, and a 48-hour drawdown for Type D soils.

   X < 20%
   ___ 20 % - 50%
   ___ 50% - 90%
   ___ > 90%

   ☒Complete

   (c) Is infiltration greater than 90 percent? If Yes, skip to question 13. ☐Yes ☒No

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[1] A complete methodology for determining WQV infiltration is available at: http://www.dot.ca.gov/hq/oppd/stormwtr/index.htm

(d) Can the infiltration ranking in question 5(b) above be increased by using soil amendments? Use the 'drain time' associated with the amended soil (the 12-hour WQV for Type A and B soils, the 24-hour WQV for Type C soils[2]). ☐Yes ☐No

If Yes, consider including soil amendments; increasing the infiltration ranking allows more flexibility in the selection of BMPs (strips and swales will show performance comparable to other BMPs). Record the new infiltration estimate below:

X < 20% (skip to 6)

___ 20 % - 50% (skip to 6)
___ 50% - 90% (skip to 6)
___ >90%

☒Complete

(e) Is infiltration greater than 90 percent? If Yes, skip to question 13. ☐Yes ☒No

6. Biofiltration in Rural Areas

Is the project in a rural area (outside of urban areas that is covered under an NDPES Municipal Stormwater Permit[3]). If Yes proceed to question 13. ☐Yes ☒No

7. Estimating Infiltration for BMP Combinations

Objectives:

1) Identify high-infiltration biofiltration or biofiltration and infiltration BMP combinations and skip further BMP consideration.

2) If high infiltration is infeasible, then identify the infiltration level of all feasible BMP combinations for use in the subsequent BMP selection matrices

(a) Has concentrated infiltration (i.e., via earthen basins or earthen filters) been prohibited? Consult your District/Regional Storm Water Coordinator and/or environmental documents. ☐Yes ☒No

If No proceed to 7 (b); if Yes skip to question 8 and do not consider earthen basin-type BMPs

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[2] Type D soils are not expected where amendments are incorporated

[3] See pages 39 and 40 of the Fact Sheets for the CGP.
http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_factsheet.pdf

(b) Assess infiltration of an infiltration BMP that is used in conjunction with biofiltration. Include infiltration losses from biofiltration, if biofiltration is feasible. ☒Complete

(use 24 hr WQV)

_X_< 20% (do not consider this BMP combination)

___ 20% - 50%

___ 50% - 90%

___ >90%

Is at least 90 percent infiltration estimated? If Yes proceed to 13. If No proceed to 7(c). ☐Yes ☒No

(c) Assess infiltration of biofiltration with combinations with remaining approved earthen BMPs using water quality volumes based on the drain time of those BMPs. This assessment will be used in subsequent BMP selection matrices.

Earthen Detention Basin (use 48 hr WQV)	Earthen Austin SF (use 48 hr WQV)	
___ < 20%	___ < 20%	☒Complete
___ 20% - 50%	___ 20% - 50%	
___ > 50%	___ > 50%	

Continue to Question 8

8. Identifying BMPs based on the Target Design Constituents

(a) Does the project discharge to a water body that has been placed on the 303-d list or has had a TMDL adopted? If "No," use Matrix A to select BMPs, consider designing to treat 100% of the WQV, then skip to question 12. ☒Yes ☐No

If Yes, is the identified pollutant(s) considered a Targeted Design Constituent (TDC) (check all that apply below)?

☒sediments
☐ phosphorus
☐ nitrogen
☐ copper (dissolved or total)
☐ lead (dissolved or total)
☐ zinc (dissolved or total)
☒ general metals (dissolved or total)[1]

(b) Treating Sediment. Is sediment a TDC? If Yes, use Matrix A to select BMPs, then skip to question 12. Otherwise, proceed to question 9. ☐Yes ☐No

[1] General metals include cadmium, nickel, chromium, and other trace metals. Note that selenium and arsenic are not metals. Mercury is a metal, but is considered later during BMP selection, under Question 12 below.

BMP Selection Matrix A: General Purpose Pollutant Removal			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Strip: HRT > 5 Austin filter (concrete) Austin filter (earthen) Delaware filter MCTT Wet basin	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip Biofiltration Swale
Tier 2	Strip: HRT < 5 Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Swale MCTT Wet basin	Austin filter (concrete) Delaware filter MCTT Wet basin
HRT = hydraulic residence time (min) *Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

9. Treating both Metals and Nutrients.

   Is copper, lead, zinc, or general metals *AND* nitrogen or phosphorous a TDC? If Yes use Matrix D to select BMPs, then skip to question 12. Otherwise, proceed to question 10. ☐Yes ☒No

10. Treating Only Metals.

    Are copper, lead, zinc, or general metals listed TDCs? If Yes use Matrix B below to select BMPs, and skip to question 12. Otherwise, proceed to question 11. ☒Yes ☐No

BMP Selection Matrix B: Any metal is the TDC, but not nitrogen or phosphorous			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	MCTT Wet basin Austin filter (earthen) Austin filter (concrete) Delaware filter	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* MCTT Wet basin	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* MCTT Biofiltration Strip Biofiltration Swale Wet basin
Tier 2	Strip: HRT > 5 Strip: HRT < 5 Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale	Austin filter (concrete) Delaware filter
HRT = hydraulic residence time (min) *Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

11. Treating Only Nutrients.
    Are nitrogen and/or phosphorus listed TDCs? If "Yes," use Matrix C to select BMPs. If "No", please check your answer to 8(a). At this point one of the matrices should have been used for BMP selection for the TDC in question, unless no BMPs are feasible. ☐Yes ☒No

BMP Selection Matrix C: Phosphorous and / or nitrogen is the TDC, but no metals are the TDC			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Austin filter (earthen) Austin filter (concrete) Delaware filter**	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches*	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip Biofiltration Swale
Tier 2	Wet basin Biofiltration Strip Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale Wet basin	Austin filter (concrete) Delaware filter Wet basin
* Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			
** Delaware filters would be ranked in Tier 2 if the TDC is nitrogen only, as opposed to phosphorous only or both nitrogen and phosphorous.			

BMP Selection Matrix D: Any metal, plus phosphorous and / or nitrogen are the TDCs			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Wet basin* Austin filter (earthen) Austin filter (concrete) Delaware filter**	Wet basin* Austin filter (earthen) Detention (unlined) Infiltration basins*** Infiltration trenches***	Wet basin* Austin filter (earthen) Detention (unlined) Infiltration basins*** Infiltration trenches*** Biofiltration Strip Biofiltration Swale
Tier 2	Biofiltration Strip Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale	Austin filter (concrete) Delaware filter
* The wet basin should only be considered for phosphorus			
** In cases where earthen BMPs can infiltrate, Delaware filters are ranked in Tier 2 if the TDC is nitrogen only, but they are Tier 1 for phosphorous only or both nitrogen and phosphorous.			
*** Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

12. Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for mercury or low dissolved oxygen? ☒Yes ☐No

    If Yes contact the District/Regional NPDES Storm Water Coordinator to determine if standing water in a Delaware filter, wet basin, or MCTT would be a risk to downstream water quality.

13. After completing the above, identify and attach the checklists shown below for every Treatment BMP under consideration. (use one checklist every time the BMP is considered for a different drainage within the project) ☒Complete

    _✓_ Biofiltration Strips and Biofiltration Swales: Checklist T-1, Part 2
    ____ Dry Weather Diversion: Checklist T-1, Part 3
    ____ Infiltration Devices: Checklist T-1, Part 4
    ____ Detention Devices: Checklist T-1, Part 5
    ____ GSRDs: Checklist T-1, Part 6
    ____ Traction Sand Traps: Checklist T-1, Part 7
    ____ Media Filter [Austin Sand Filter and Delaware Filter]: Checklist T-1, Part 8
    ____ Multi-Chambered Treatment Train: Checklist T-1, Part 9
    ____ Wet Basins: Checklist T-1, Part 10

14. Estimate what percentage of WQV (or WQF, depending upon the Treatment BMP selected) will be treated by the preferred Treatment BMP(s): 3.2 % ☒Complete

    (a) Have Treatment BMPs been considered for use in parallel or series to increase this percentage? ☐Yes ☒No

15. Estimate what percentage of the net WQV (for all new impervious surfaces within the project) that will be treated by the preferred treatment BMP(s): 26 % ☒Complete

16. Prepare cost estimate, including right-of-way, and site specific determination of feasibility (Section 2.4.2.1) for selected Treatment BMPs and include as supplemental information for SWDR approval. ☒Complete

Treatment BMPs
Checklist T-1, Part 2

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641) RWQCB: R-2

Biofiltration Swales / Biofiltration Strips

Feasibility

1. Do the climate and site conditions allow vegetation to be established? ☒Yes ☐No
2. Are flow velocities from a peak drainage facility design event < 4 fps (i.e. low enough to prevent scour of the vegetated biofiltration swale as per HDM Table 873.3E)? ☒Yes ☐No

   If "No" to either question above, Biofiltration Swales and Biofiltration Strips are not feasible.

3. Are Biofiltration Swales proposed at sites where known contaminated soils or groundwater plumes exist? ☒Yes ☐No
   If "Yes", consult with District/Regional NPDES Coordinator about how to proceed.
4. Does adequate area exist within the right-of-way to place Biofiltration device(s)? ☐Yes ☐No
   If "Yes", continue to Design Elements section. If "No", continue to Question 5.
5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Biofiltration devices and how much right-of-way would be needed to treat WQF? __________ acres ☐Yes ☒No
   If "Yes", continue to Design Elements section. If "No", continue to Question 6.
6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of these Treatment BMPs into the project. ☒Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Has the District Landscape Architect provided vegetation mixes appropriate for climate and location? * ☒Yes ☐No

2. Can the biofiltration swale be designed as a conveyance system under any expected flows > the WQF event, as per HDM Chapter 800? * (e.g. freeboard, minimum slope, etc.) ☐Yes ☒No

3. Can the biofiltration swale be designed as a water quality treatment device under the WQF while meeting the required HRT, depth, and velocity criteria? (Reference Appendix B, Section B.2.3.1)* ☐Yes ☒☐ No

4. Is the maximum length of a biofiltration strip ≤ 300 ft? * ☒Yes ☐No

5. Has the minimum width (in the direction of flow) of the invert of the biofiltration swale received the concurrence of Maintenance? * ☐Yes ☐No

6. Can biofiltration swales be located in natural or low cut sections to reduce maintenance problems caused by animals burrowing through the berm of the swale? ** ☐Yes ☐No

7. Is the biofiltration strip sized as long as possible in the direction of flow? ** ☒Yes ☐No

8. Have Biofiltration Systems been considered for locations upstream of other Treatment BMPs, as part of a treatment train? ** ☒Yes ☐No

Construction Site BMPs
Checklist CS-1, Part 1

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641) RWQCB: R-2

Soil Stabilization

General Parameters

1. How many rainy seasons are anticipated between begin and end of construction? 1
2. What is the total disturbed soil area for the project? (ac) 4.4
   - (a) How much of the project DSA consists of slopes 4:1 (h:v) or flatter? (ac) 4.4
   - (b) How much of the project DSA consists of 4:1 (h:v) < slopes < 2:1 (h:v)? (ac) 0
   - (c) How much of the project DSA consists of slopes 2:1 (h:v) and steeper? (ac) 0
   - (d) How much of the project DSA consists of slopes with slope lengths longer than 20 ft? (ac) 4.4
3. What rainfall area does the project lie within? (Refer to Table 2-1 of the Construction Site Best Management Practices Manual) 2
4. Review the required combination of temporary soil stabilization and temporary sediment controls and barriers for area, slope inclinations, rainy and non-rainy season, and active and non-active disturbed soil areas. (Refer to Tables 2-2, and 2-3 of the Construction Site Best Management Practices Manual for Rainfall Area requirements.) ☒Complete

Scheduling (SS-1)

5. Does the project have a duration of more than one rainy season and have disturbed soil area in excess of 25 acres? ☐Yes ☒No
   - (a) Include multiple mobilizations (Move-in/Move-out) as a separate contract bid line item to implement permanent erosion control or revegetation work on slopes that are substantially complete. (Estimate at least 6 mobilizations for each additional rainy season. Designated Construction Representative may suggest an alternate number of mobilizations.) ☐Complete

(b) Edit Order of Work specifications for permanent erosion control or revegetation work to be implemented on slopes that are substantially complete. ☐Complete

(c) Edit permanent erosion control or revegetation specifications to require seeding and planting work to be performed when optimal. ☐Complete

Preservation of Existing Vegetation (SS-2)

6. Do Environmentally Sensitive Areas (ESAs) exist within or adjacent to the project limits? (Verify the completion of DPP-1, Part 5) ☐Yes ☒No

   (a) Verify the protection of ESAs through delineation on all project plans. ☐Complete

   (b) Protect from clearing and grubbing and other construction disturbance by enclosing the ESA perimeter with high visibility plastic fence or other BMP. ☐Complete

7. Are there areas of existing vegetation (mature trees, native vegetation, landscape planting, etc.) that need not be disturbed by project construction? Will areas designated for proposed treatment BMPs need protection (infiltration characteristics, vegetative cover, etc.)? (Coordinate with District Environmental and Construction to determine limits of work necessary to preserve existing vegetation to the maximum extent practicable.) ☒Yes ☐No

   (a) Designate as outside of limits of work (or designate as ESAs) and show on all project plans. ☒Complete

   (b) Protect with high visibility plastic fence or other BMP. ☒Complete

8. If yes for 6, 7, or both, then designate ESA fencing as a separate contract bid line item, *if not already incorporated as part of design pollution prevention work (See DPP-1, Part 5).* ☒Complete

Slope Protection

9. Provide a soil stabilization BMP(s) appropriate for the DSA, slope steepness, slope length, and soil erodibility. (Consult with District/Regional Landscape Architect.)

   (a) Select SS-3 (Hydraulic Mulch), SS-4 (Hydroseeding), SS-5 (Soil Binders), SS-6 (Straw Mulch), SS-7 (Geotextiles, Mats, Plastic Covers, and Erosion Control Blankets), SS-8 (Wood Mulching), other BMPs or a combination to cover the DSA throughout the project's rainy season. ☒Complete

   (b) Increase the quantities by 25% for each additional rainy season. (Designated Construction Representative may suggest an alternate increase.) ☒Complete

(c) Designate as a separate contract bid line item. ☒Complete

Slope Interrupter Devices

10. Provide slope interrupter devices for all slopes with slope lengths equal to or greater than of 20 ft in length. (Consult with District/Regional Landscape Architect and Designated Construction Representative.)

    (a) Select SC-5 (Fiber Rolls) or other BMPs to protect slopes throughout the project's rainy season. ☒Complete

    (b) For slope inclination of 4:1 (h:v) and flatter, SC-5 (Fiber Rolls) or other BMPs shall be placed along the contour and spaced 20 ft on center. ☒Complete

    (c) For slope inclination between 4:1 (h:v) and 2:1 (h:v), SC-5 (Fiber Rolls) or other BMPs shall be placed along the contour and spaced 15 ft on center. ☒Complete

    (d) For slope inclination of 2:1 (h:v) and greater, SC-5 (Fiber Rolls) or other BMPs shall be placed along the contour and spaced 10 ft on center. ☒Complete

    (e) Increase the quantities by 25% for each additional rainy season. (Designated Construction Representative may suggest alternate increase.) ☒Complete

    (f) Designate as a separate contract bid line item. ☒Complete

Channelized Flow

11. Identify locations within the project site where concentrated flow from stormwater runoff can erode areas of soil disturbance. Identify locations of concentrated flow that enters the site from outside of the right-of-way (off-site run-on). ☒Complete

    (a) Utilize SS-7 (Geotextiles, Mats, Plastic Covers, and Erosion Control Blankets), SS-9 (Earth Dikes/Swales, Ditches), SS-10 (Outlet Protection/Velocity Dissipation), SS-11 (Slope Drains), SC-4 (Check Dams), or other BMPs to convey concentrated flows in a non-erosive manner. ☒Complete

    (b) Designate as a separate contract bid line item. ☒Complete

Construction Site BMPs
Checklist CS-1, Part 2

Prepared by: Mostafa Faghihi Date: 04/28/2011 District-Co-Route: 04--SM-SCL-101

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641) RWQCB: R-2

Sediment Control

Perimeter Controls - Run-off Control

1. Is there a potential for sediment laden sheet and concentrated flows to discharge offsite from runoff cleared and grubbed areas, below cut slopes, embankment slopes, etc.? ☒Yes ☐No

   (a) Select linear sediment barrier such as SC-1 (Silt Fence), SC-5 (Fiber Rolls), SC-6 (Gravel Bag Berm), SC-8 (Sand Bag Barrier), SC-9 (Straw Bale Barrier), or a combination to protect wetlands, water courses, roads (paved and unpaved), construction activities, and adjacent properties. (Coordinate with District Construction for selection and preference of linear sediment barrier BMPs.) ☒Complete

   (b) Increase the quantities by 25% for each additional rainy season. (Designated Construction Representative may suggest an alternate increase.) ☒Complete

   (c) Designate as a separate contract bid line item. ☒Complete

Perimeter Controls - Run-on Control

2. Do locations exist where sheet flow upslope of the project site and where concentrated flow upstream of the project site may contact DSA and construction activities? ☒Yes ☐No

   (a) Utilize linear sediment barriers such as SS-9 (Earth Dike/Drainage Swales and Lined Ditches), SC-5 (Fiber Rolls), SC-6 (Gravel Bag Berm), SC-8 (Sand Bag Barrier), SC-9 (Straw Bale Barrier), or other BMPs to convey flows through and/or around the project site. (Coordinate with District Construction for selection and preference of perimeter control BMPs.) ☒Complete

   (b) Designate as a separate contract bid line item. ☒Complete

Storm Drain Inlets

3. Do existing or proposed drainage inlets exist within the project limits? ☒Yes ☐No

   (a) Select SC-10 (Storm Drain Inlet Protection) to protect municipal storm drain systems or receiving waters wetlands at each drainage inlet. (Coordinate with District Construction for selection and preference of inlet protection BMPs.) ☒Complete

   (b) Designate as a separate contract bid line item. ☒Complete

4. Can existing or proposed drainage inlets utilize an excavated sediment trap as described in SC-10 (Storm Drain Inlet Protection- Type 2)? ☐Yes ☒No

   (a) Include with other types of SC-10 (Storm Drain Inlet Protection). ☒Complete

Sediment/Desilting Basin (SC-2)

5. Does the project lie within a Rainfall Area where the required combination of temporary soil stabilization and sediment control BMPs includes desilting basins? (Refer to Tables 2-1, 2-2, and 2-3 of the Construction Site Best Management Practices Manual for Rainfall Area requirements.) ☐Yes ☒No

   (a) Consider feasibility for desilting basin allowing for available right-of-way within the project limits, topography, soil type, disturbed soil area within the watershed, and climate conditions. Document if the inclusion of sediment/desilting basins is infeasible. ☐Complete

   (b) If feasible, design desilting basin(s) per the guidance in SC-2 Sediment/ Desilting Basins of the Construction Site BMP Manual to maximize capture of sediment-laden runoff. ☐Complete

   Designate as a separate contract bid item. ☐Complete

6. Is ATS to be used for controlling sediment? ☐Yes ☒No

   (a) If "yes", then will desilting basin or other means of natural storage be used? ☐Yes ☐No

   (b) If "no", then plan for storage tanks sufficient to hold treatment volume. ☐Comple

7. Will the project benefit from the early implementation of proposed permanent Treatment BMPs? (Coordinate with District Construction.) ☒Yes ☐No

   (a) Edit Order of Work specifications for permanent treatment BMP work to be implemented in a manner that will allow its use as a construction site BMP. ☒Complete

Sediment Trap (SC-3)

8. Can sediment traps be located to collect channelized runoff from disturbed soil areas prior to discharge? ☐Yes ☒No

   (a) Design sediment traps in accordance with the Construction Site BMP Manual. ☐Complete

   (b) Designate as a separate contract bid line item. ☐Complete

Construction Site BMPs
Checklist CS-1, Part 3

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641) RWQCB: R-2

Tracking Controls

Stabilized Construction Entrance/Exit (TC-1)

1. Are there points of entrance and exit from the project site to paved roads where mud and dirt could be transported offsite by construction equipment? (Coordinate with District Construction for selection and preference of tracking control BMPs.) ☒Yes ☐No

   (a) Identify and designate these entrance/exit points as stabilized construction entrances (TC-1). ☒Complete

   (b) Designate as a separate contract bid line item. ☒Complete

Tire/Wheel Wash (TC-3)

1. Are site conditions anticipated that would require additional or modified tracking controls such as entrance/outlet tire wash? (Coordinate with District Construction.) ☐Yes ☒No

   Designate as a separate contract bid line item. ☐Complete

Stabilized Construction Roadway (TC-2)

3. Are temporary access roads necessary to access remote construction activity locations or to transport materials and equipment? (In addition to controlling dust and sediment tracking, access roads limit impact to sensitive areas by limiting ingress, and provide enhanced bearing capacity.) (Coordinate with District Construction.) ☐Yes ☒No

   (a) Designate these temporary access roads as stabilized construction roadways (TC-2). ☐Complete

   (b) Designate as a separate contract bid line item. ☐Complete

Street Sweeping and Vacuuming (SC-7)

1. Is there a potential for tracked sediment or construction related residues to be transported offsite and deposited on public or private roads? (Coordinate with District Construction for preference of including street sweeping and vacuuming with tracking control BMPs.) ☒Yes ☐No

   Designate as a separate contract bid line item. ☒Complete

Construction Site BMPs
Checklist CS-1, Part 4

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641) RWQCB: R-2

Wind Erosion Controls

Wind Erosion Control (WE-1)

1. Is the project located in an area where standard dust control practices in accordance with Standard Specifications, Section 10: Dust Control, are anticipated to be inadequate during construction to prevent the transport of dust offsite by wind? *(Note: Dust control by water truck application is paid for through the various items of work. Dust palliative, if it is included, is paid for as a separate item.)* ☐Yes ☒No

   (a) Select SS-3 (Hydraulic Mulch), SS-4 (Hydroseeding), SS-5 (Soil Binders), SS-7 (Geotextiles, Mats, Plastic Covers, and Erosion Control Blankets), SS-8 (Wood Mulching) or a combination to cover the DSA subject to wind erosion year-round, especially when significant wind and dry conditions are anticipated during project construction. (Coordinate with District Construction for selection and preference of wind erosion control BMPs.) ☐Complete

   (b) Designate as a separate contract bid line item. ☐Complete

Construction Site BMPs
Checklist CS-1, Part 5

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : **0.0/0.9-52.2/52.6** Project ID (or EA): **0400002019 (235641)** RWQCB: **R-2**

Non-Storm Water Management

Temporary Stream Crossing (NS-4) & *Clear Water Diversion* (NS-5)

1. Will construction activities occur within a waterbody or watercourse such as a lake, wetland, or stream? (Coordinate with District Construction for selection and preference for stream crossing and clear water diversion BMPs.) ☐Yes ☒No

   (a) Select from types offered in NS-4 (Temporary Stream Crossing) to provide access through watercourses consistent with permits and agreements.[1] ☐Complete

   (b) Select from types offered in NS-5 (Clear Water Diversion) to divert watercourse consistent with permits and agreements.[1] ☐Complete

   (c) Designate as a separate contract bid line item(s). ☐Complete

Other Non-Storm Water Management BMPs

2. Are construction activities anticipated that will generate wastes or residues with the potential to discharge pollutants? ☒Yes ☐No

   (a) Identify potential pollutants associated with the anticipated construction activity and select the corresponding BMP such as NS-1 (Water Conservation Practices), NS-2 (Dewatering Operations), NS-3 (Paving and Grinding Operations), NS-7 (Potable Water/Irrigation), NS-8 (Vehicle and Equipment Cleaning), NS-9 (Vehicle and Equipment Fueling), NS-10 (Vehicle and Equipment Maintenance), NS-11 (Pile Driving Operations), NS-12 (Concrete Curing), NS-13 (Material and Equipment Use Over Water), NS-14 (Concrete Finishing), and NS-15 (Structure Demolition/Removal Over or Adjacent to Water).[1] ☒Complete

   (b) Verify that costs for non-stormwater management BMPs are identified in the contract documents. Designate BMP as a separate contract bid line item if the requirements in Construction Site Management (SSP 07-346) are anticipated to be inadequate or if requested by Construction. ☒Complete

[1] Coordinate with District Environmental for consistency with US Army Corps of Engineers 404 and 401 permits and Dept. of Fish and Game 1601 Streambed alteration Agreements.

Construction Site BMPs
Checklist CS-1, Part 6

Prepared by: **Mostafa Faghihi** Date: **04/28/2011** District-Co-Route: **04--SM-SCL-101**

PM : 0.0/0.9-52.2/52.6 Project ID (or EA): 0400002019 (235641) RWQCB: R-2

Waste Management & Materials Pollution Control

Concrete Waste Management (WM-8)

1. Does the project include concrete placement or mortar mixing? ☒Yes ☐No

   (a) Select from types offered in WM-8 (Concrete Waste Management) to provide concrete washout facilities. In addition, consider portable concrete washouts and vendor supplied concrete waste management services. (Coordinate with District Construction for selection and preference of waste management and materials pollution control BMPs.) ☒Complete

   (b) Designate as a separate contract bid line item if the quantity of concrete waste and washout are anticipated to exceed 5.2 yd^3 or if requested by Construction. ☒Complete

Other Waste Management and Materials Pollution Controls

2. Are construction activities anticipated that will generate wastes or residues with the potential to discharge pollutants? ☒Yes ☐No

   (a) Identify potential pollutants associated with the anticipated construction activity and select the corresponding BMP such as WM-1 (Material Delivery and Storage), WM-2 (Material Use), WM-4 (Spill Prevention and Control), WM-5 (Solid Waste Management), WM-6 (Hazardous Waste Management), WM-7 (Contaminated Soil Management), WM-9 (Sanitary/Septic Waste Management) and WM-10 (Liquid Waste Management) ☒Complete

   (b) Verify that costs for waste management and materials pollution control BMPs are identified in the contract documents. Designate BMP as a separate contract bid line item if the requirements in Construction Site Management (SSP 07-346) are anticipated to be inadequate or if requested by Construction. ☒Complete

Temporary Stockpiles (Soil, Materials, and Wastes)

3. Are stockpiles of soil, etc. anticipated during construction? ☒Yes ☐No

   (a) Select WM-3 (Stockpile Management), SS-3 (Hydraulic Mulch), SS-4 (Hydroseeding), SS-5 (Soil Binders), SS-7 (Geotextiles, Mats, Plastic Covers, and Erosion Control Blankets), or a combination as appropriate to cover temporary stockpiles of soil, etc. ☒Complete

(b) Select linear sediment barrier such as SC-1 (Silt Fence), SC-5 (Fiber Rolls), SC-6 (Gravel Bag Berm), SC-8 (Sand Bag Barrier), SC-9 (Straw Bale Barrier), or a combination to encircle temporary stockpiles of soil, etc. (Coordinate with District Construction for selection and preference of BMPs related to stockpiles.) ☒Complete

(c) Designate as a separate contract bid line item if the requirements in Construction Site Management (SSP 07-346) are anticipated to be inadequate or if requested by Construction. ☒Complete

4. Is there a potential for dust and debris from construction material (fill material, etc.) and waste (concrete, contaminated soil, etc.) stockpiles to be transported offsite by wind? ☐Yes ☒No

(a) Select SS-7, temporary cover, plastic sheeting or other BMP to cover stockpiles subject to wind erosion year-round, especially when significant wind and dry conditions are anticipated during project construction. (Coordinate with District Construction for selection and preference of wind erosion control BMPs.) ☐Complete

(b) Designate as a separate contract bid line item. ☐Complete

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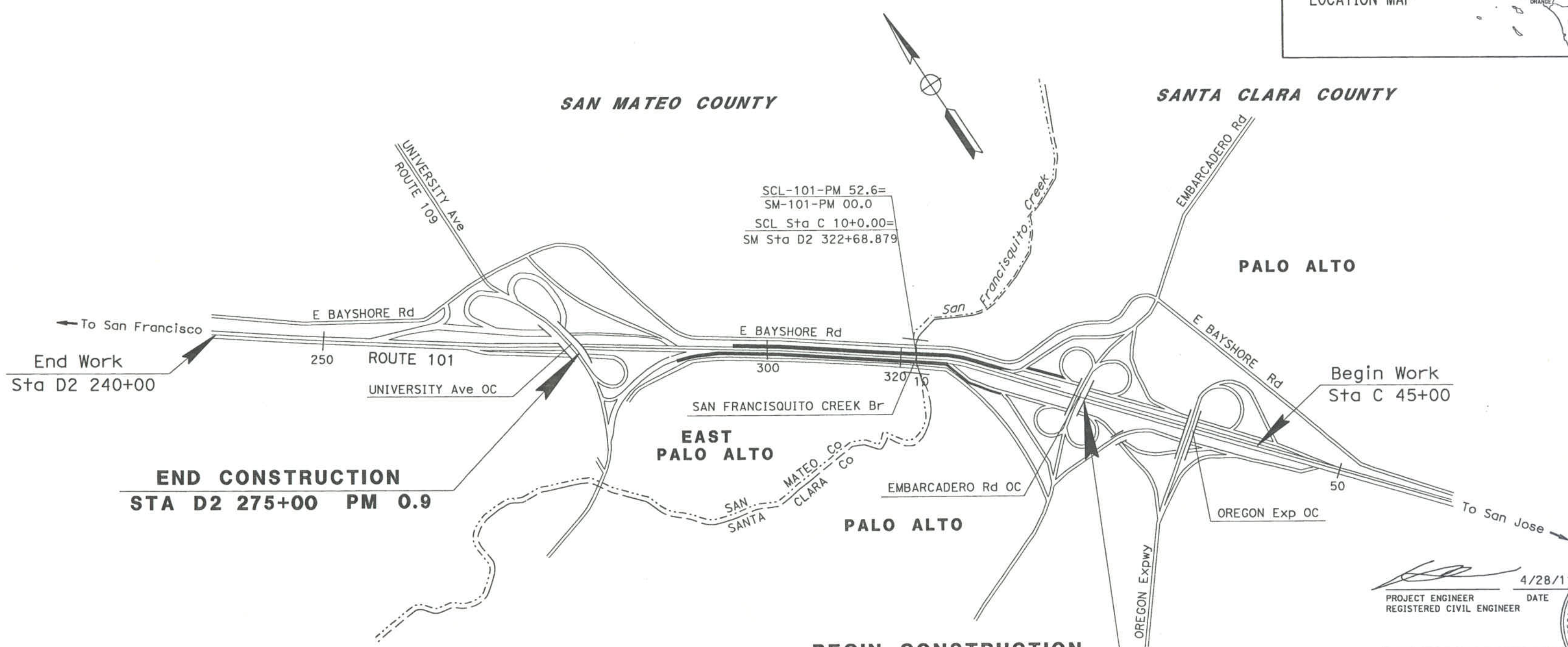
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl,SM	101	52.2/52.6, 0.0/0.9		

INDEX OF PLANS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN SANTA CLARA AND SAN MATEO COUNTIES IN PALO ALTO AND EAST PALO ALTO FROM EMBARCADERO ROAD OVERCROSSING TO UNIVERSITY AVENUE OVERCROSSING

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006



NO SCALE

4/28/11

PROJECT ENGINEER
REGISTERED CIVIL ENGINEER

DATE

REGISTERED PROFESSIONAL ENGINEER
Rachel Liu
No. 74807
Exp. 12-31-11
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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

CONTRACT No.	**04-235644**
PROJECT ID	**0400002019**

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

PROJECT MANAGER	DESIGN ENGINEER
RON MORIGUCHI	AIJUN DING

LAST REVISION 11-01-10 | DATE PLOTTED => 11-MAY-2011 | TIME PLOTTED => 09:55

BORDER LAST REVISED 7/2/2010 | CALTRANS WEB SITE IS: HTTP//WWW.DOT.CA.GOV/ | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => s129144 | DGN FILE => 0400002019ab001.dgn | UNIT 0720 | PROJECT NUMBER & PHASE 04000020191

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

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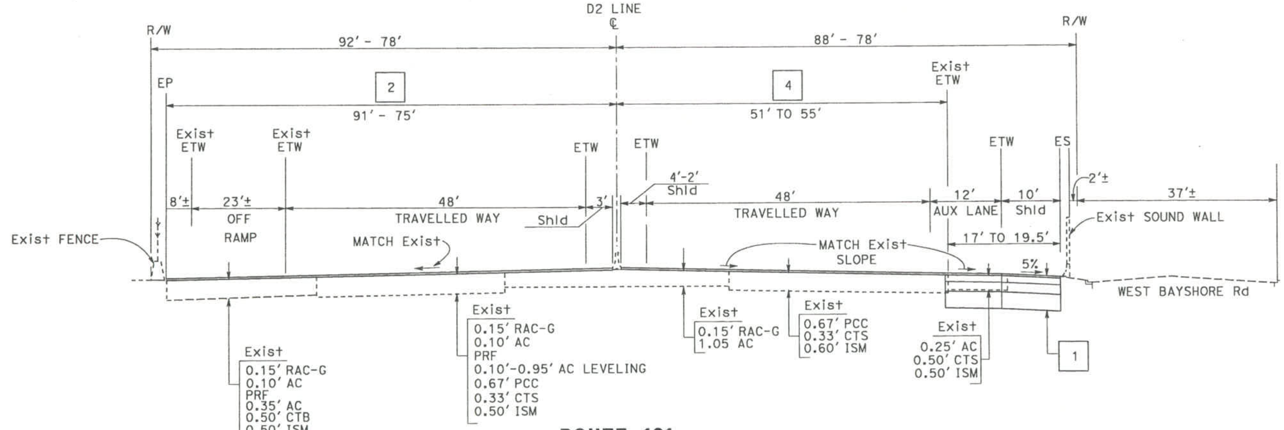
REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

NOTES:

1. DIMENSIONS OF THE STRUCTURAL SECTIONS ARE SUBJECT TO TOLERANCES SPECIFIED IN THE STANDARD SPECIFICATIONS.
2. SUPERELEVATION AS SHOWN OR AS DIRECTED BY THE ENGINEER.
3. REPLACE Conc PAVEMENT DETERMINED BY THE ENGINEER.
4. FOR EXACT DIKE LOCATIONS, SEE LAYOUT SHEETS.

ABBREVIATIONS:

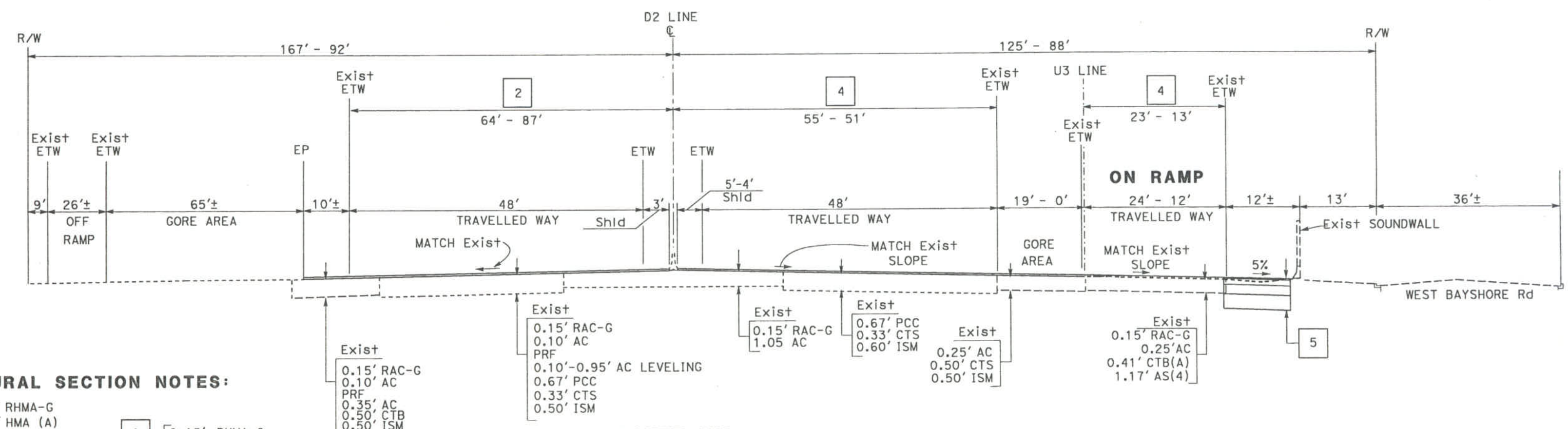
RHMA-G	RUBBERIZED HOT MIX ASPHALT(GAP GRADED)
ISM	IMPORTED SELECTED MATERIAL
CTS	CEMENT TREATED SUBBASE
RAC-G	RUBBERIZED ASPHALT CONCRETE(GAP GRADED)



NORTHBOUND
D2 284+00 TO 300+00

ROUTE 101

SOUTHBOUND
D2 288+89 TO 300+00



NORTHBOUND
D2 277+50 TO 284+00

ROUTE 101

SOUTHBOUND
D2 283+50 TO 288+89

STRUCTURAL SECTION NOTES:

1 — 0.15' RHMA-G, 0.55' HMA (A), 0.75' LCB, 0.95' AS (4)

2 — 0.15' RHMA-G, 0.15' COLD PLANE AC PAVEMENT

3 — 0.15' RHMA-G, 0.10' COLD PLANE AC PAVEMENT

4 — 0.15' RHMA-G

5 — 0.15' RHMA-G, 0.40' HMA (A), 0.85' AB (2), 0.95' AS (4)

TYPICAL CROSS SECTIONS

NO SCALE

X-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	EDGAR URBANO	REVISED BY
Caltrans DESIGN	TEBLEZ NEMARIAM	CHECKED BY	AIJUN DING	DATE REVISED

LAST REVISION 04-20-11 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 09:55

BORDER LAST REVISED 7/2/2010 USERNAME => s129144 DGN FILE => 0400002019ca001.dgn RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 UNIT 0720 PROJECT NUMBER & PHASE 04000020191

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

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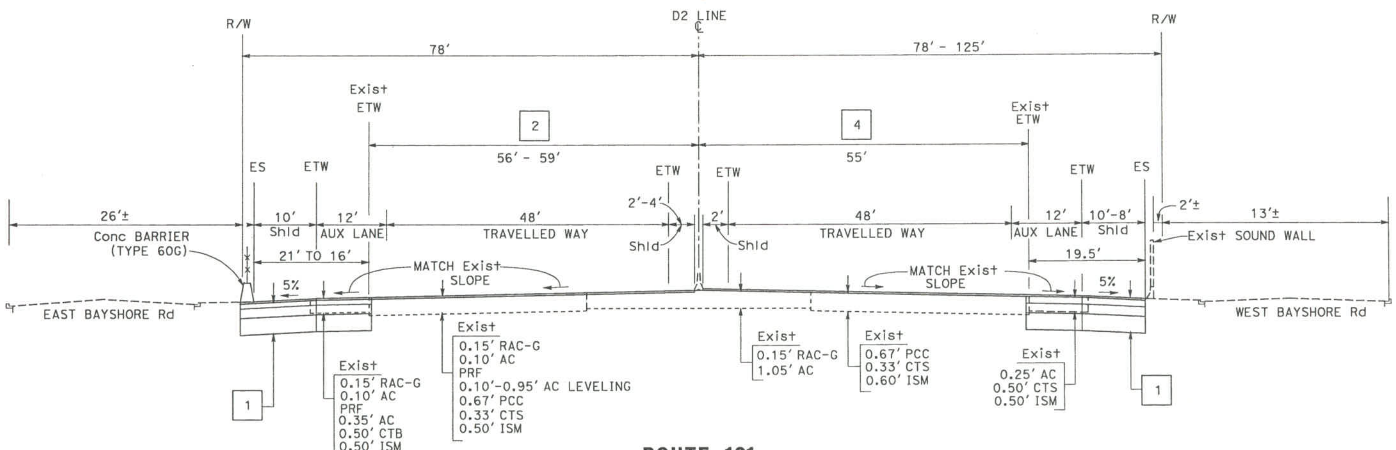
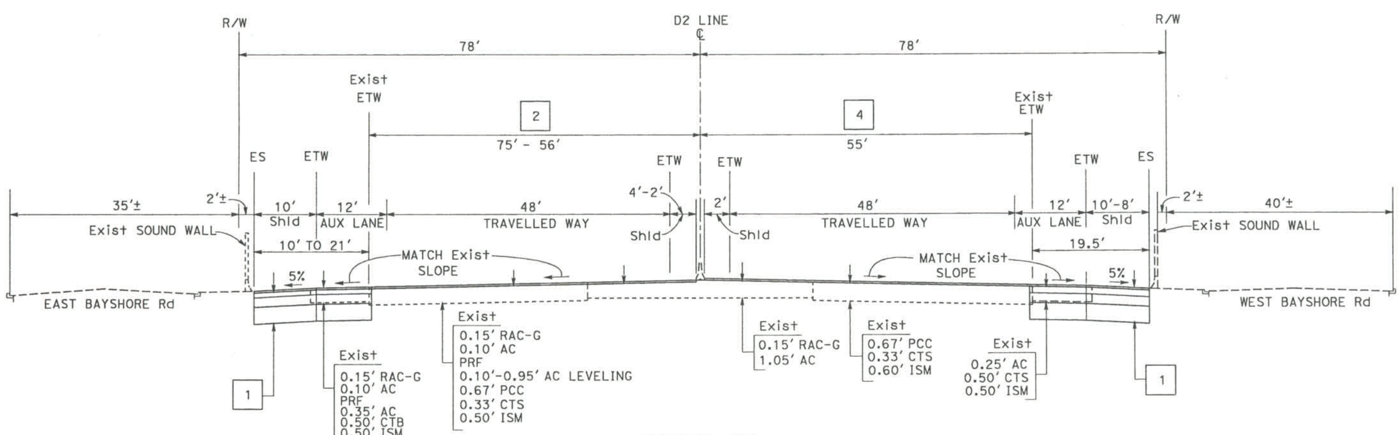
REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA



ROUTE 101
D2 314+33 TO 322+20



ROUTE 101
D2 300+00 TO 314+33

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET X-1

TYPICAL CROSS SECTIONS
NO SCALE

X-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY		REVISED BY
TEBLEZ NEMARIAM	CHECKED BY	EDGAR URBANO	DATE REVISED
		AIJUN DING	

LAST REVISION 04-20-11 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 09:55

BORDER LAST REVISED 7/2/2010 | USERNAME => s129144 DGN FILE => 0400002019ca002.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0720 | PROJECT NUMBER & PHASE 04000020191

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

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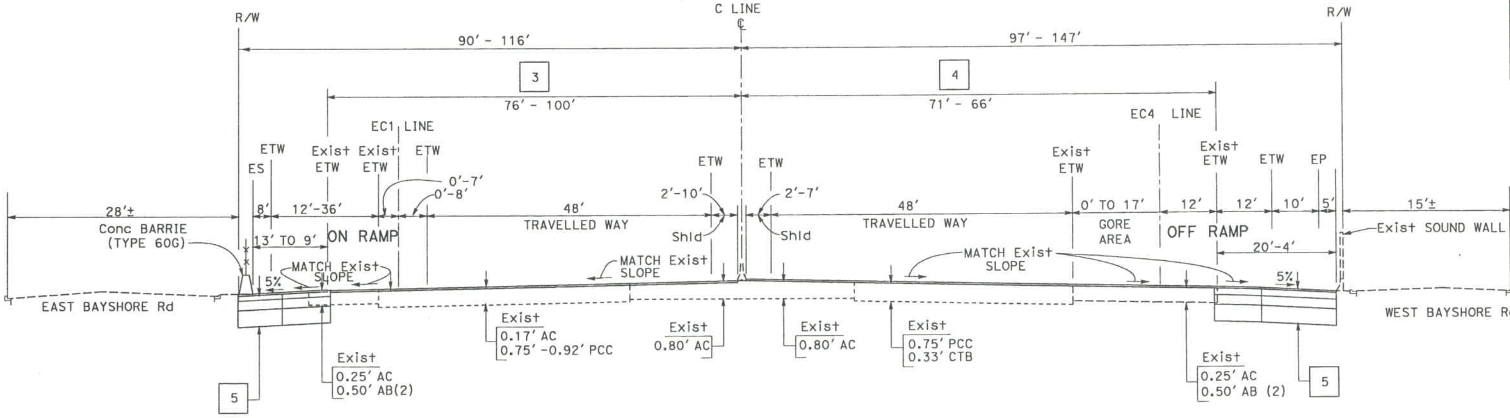
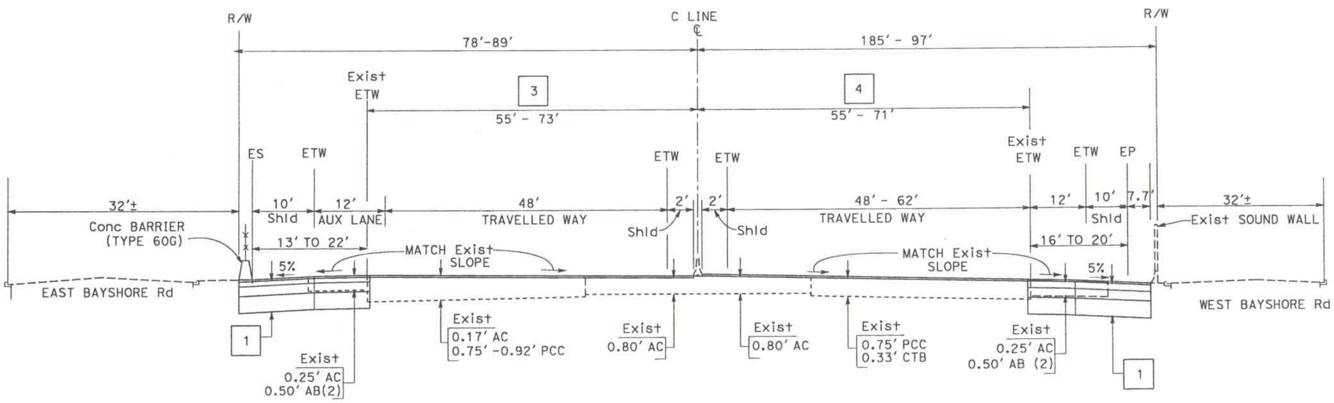


NORTHBOUND
C 20+39 TO 21+00

ROUTE 101

SOUTHBOUND
C 15+50 TO 23+00



NORTHBOUND
C 10+24 TO 20+39

ROUTE 101

SOUTHBOUND
C 10+60 TO 15+50

TYPICAL CROSS SECTIONS

NO SCALE

X-3

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET X-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR: TEBLEZ NEMARIAM

CALCULATED-DESIGNED BY: EDGAR URBANO

CHECKED BY: AIJUN DING

REVISED BY

DATE REVISED

LAST REVISION 04-20-11

DATE PLOTTED => 11-MAY-2011
TIME PLOTTED => 09:55

BORDER LAST REVISED 7/2/2010

USERNAME => s129144
DGN FILE => 0400002019ca003.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720

PROJECT NUMBER & PHASE 04000020191

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

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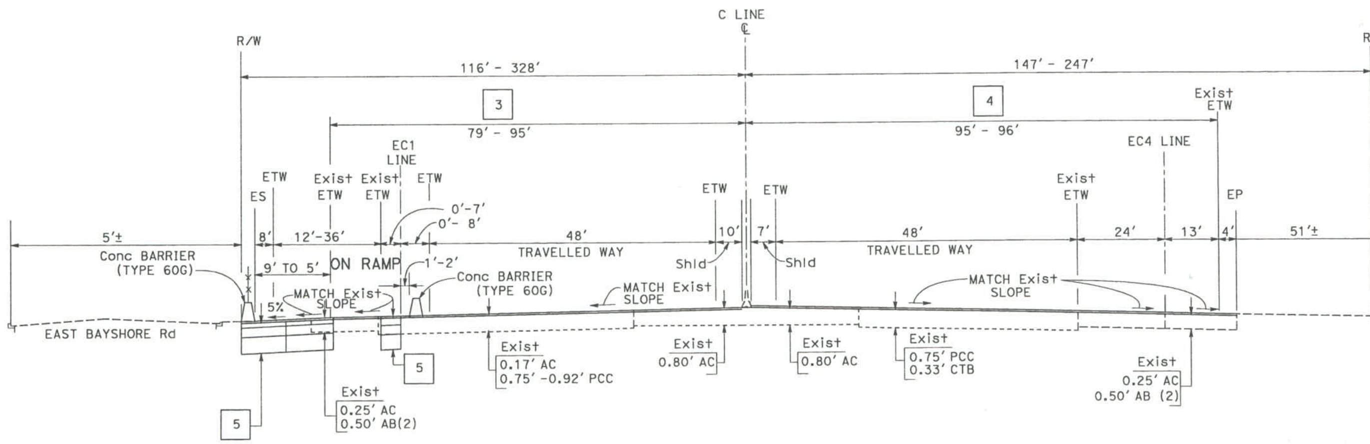
REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA



NORTHBOUND
C 21+00 TO 30+00

ROUTE 101

SOUTHBOUND
C 23+00 TO 25+00

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET X-1

TYPICAL CROSS SECTIONS

NO SCALE

X-4

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	REVISED BY
Caltrans DESIGN	TEBLEZ NEMARIAM	EDGAR URBANO	
		CHECKED BY	DATE REVISED
		AIJUN DING	

LAST REVISION 04-20-11 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 09:56

BORDER LAST REVISED 7/2/2010 | USERNAME => s129144 DGN FILE => 0400002019ca004.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0720 | PROJECT NUMBER & PHASE 04000020191

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

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NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

''COORDINATE VALUES SHOWN ARE CCS 83 ZONE 3 ''.

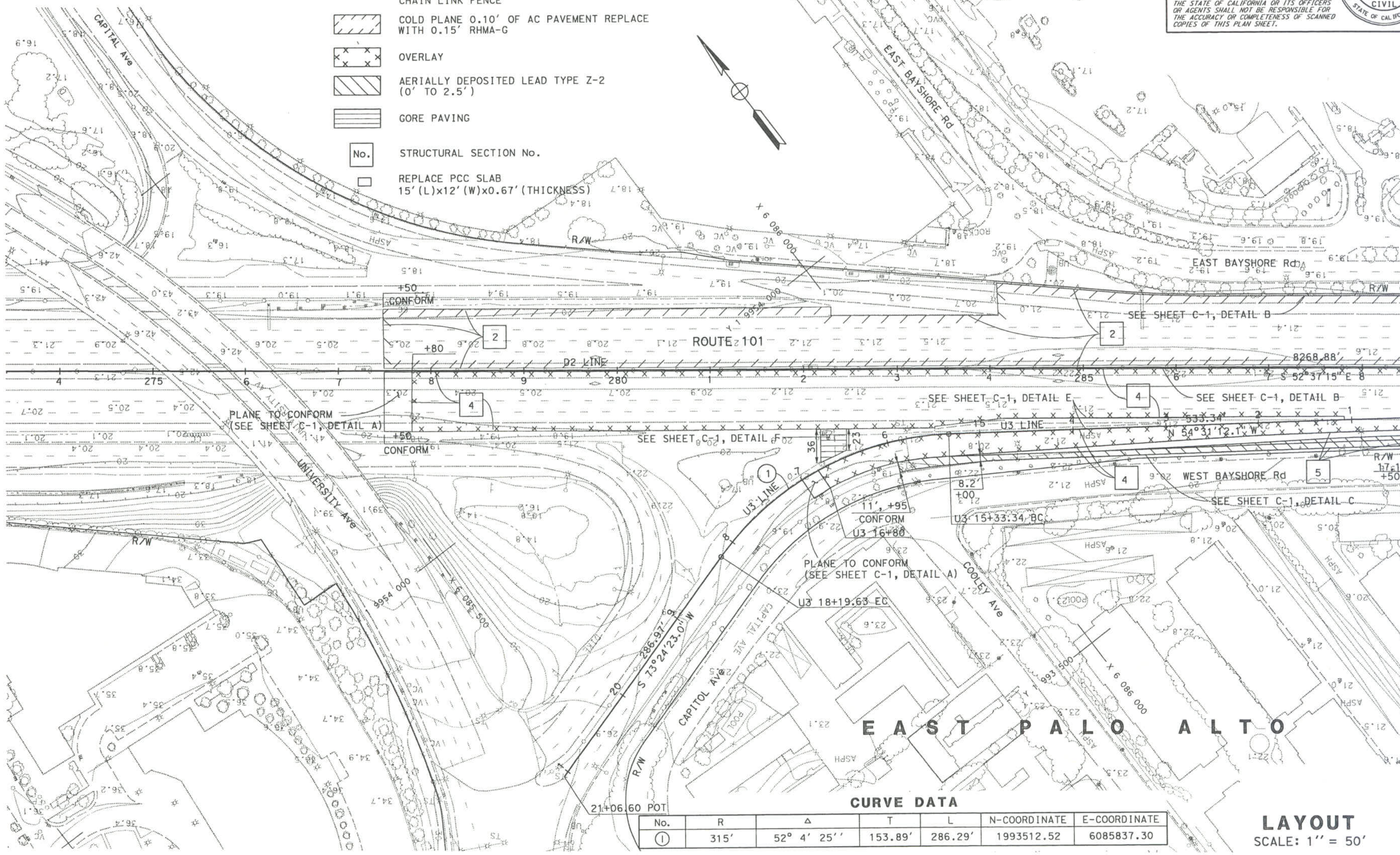
LEGEND:

- CONCRETE BARRIER
- METAL BEAM GUARD RAIL
- CHAIN LINK FENCE
- COLD PLANE 0.10' OF AC PAVEMENT REPLACE WITH 0.15' RHMA-G
- OVERLAY
- AERIALLY DEPOSITED LEAD TYPE Z-2 (0' TO 2.5')
- GORE PAVING
- No. STRUCTURAL SECTION No.
- REPLACE PCC SLAB 15'(L)x12'(W)x0.67'(THICKNESS)

ABBREVIATION:

MVP - MAINTENANCE VEHICLE PULLOUT

RSC - RAPID STRENGTH CONCRETE



CURVE DATA

No.	R	Δ	T	L	N-COORDINATE	E-COORDINATE
1	315'	52° 4' 25''	153.89'	286.29'	1993512.52	6085837.30

LAYOUT

SCALE: 1'' = 50'

L-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans DESIGN

FUNCTIONAL SUPERVISOR: TEBLEZ NEMARIAM

CALCULATED-DESIGNED BY: EDGAR URBANO

CHECKED BY: AIJUN DING

REVISED BY

DATE REVISED

LAST REVISION 04-30-11

DATE PLOTTED => 11-MAY-2011

TIME PLOTTED => 09:56

BORDER LAST REVISED 7/2/2010

USERNAME => s129144

DGN FILE => 0400002019ea001.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720

PROJECT NUMBER & PHASE 04000020191

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

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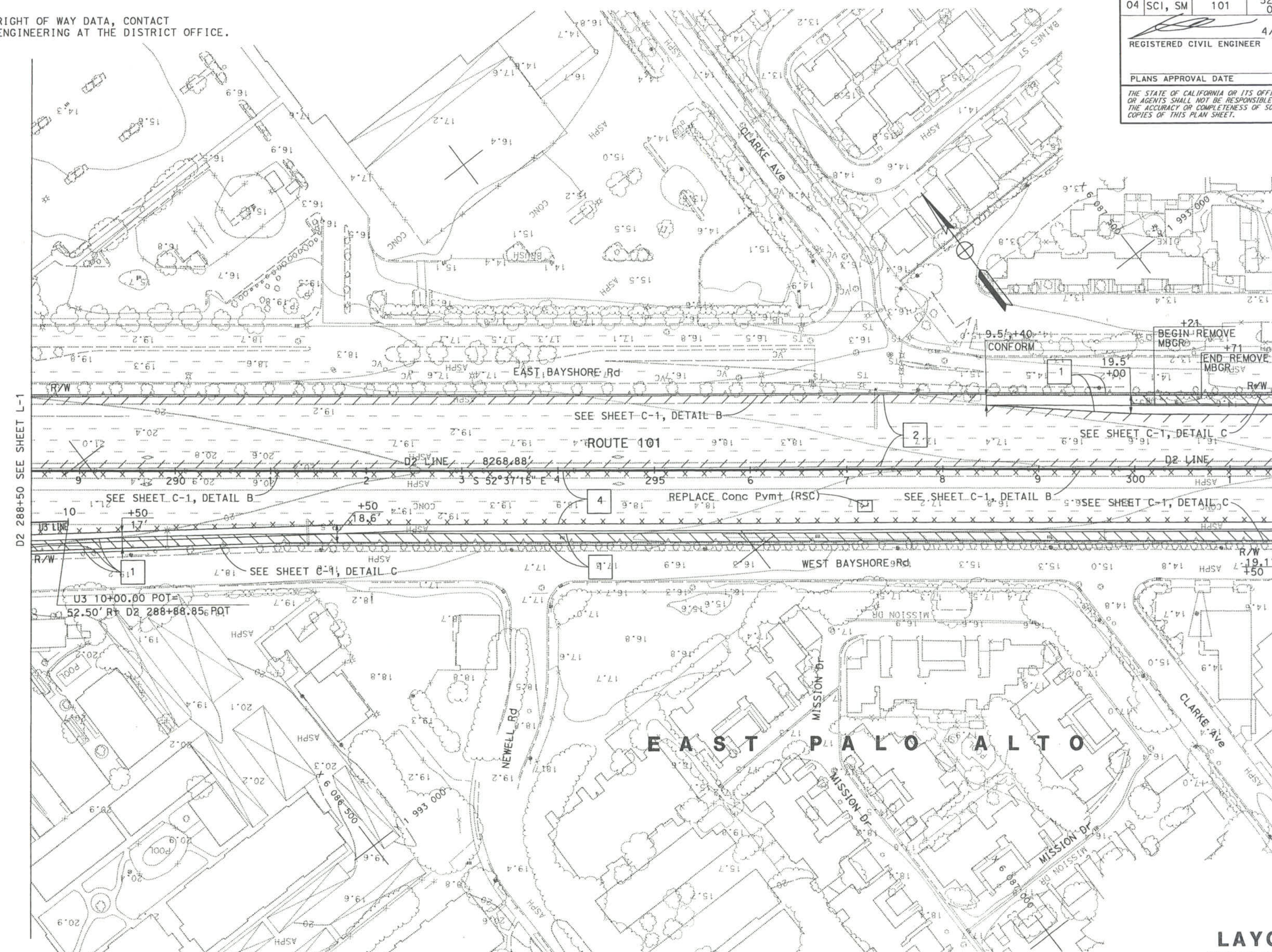
NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET L-1

LAYOUT

SCALE: 1'' = 50'

L-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	EDGAR URBANO	REVISED BY
Caltrans DESIGN	TEBLEZ NEMARIAM	CHECKED BY	AIJUN DING	DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => s129144
DGN FILE => 0400002019ea002.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720

PROJECT NUMBER & PHASE 04000020191

LAST REVISION 02-16-11 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 09:56

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

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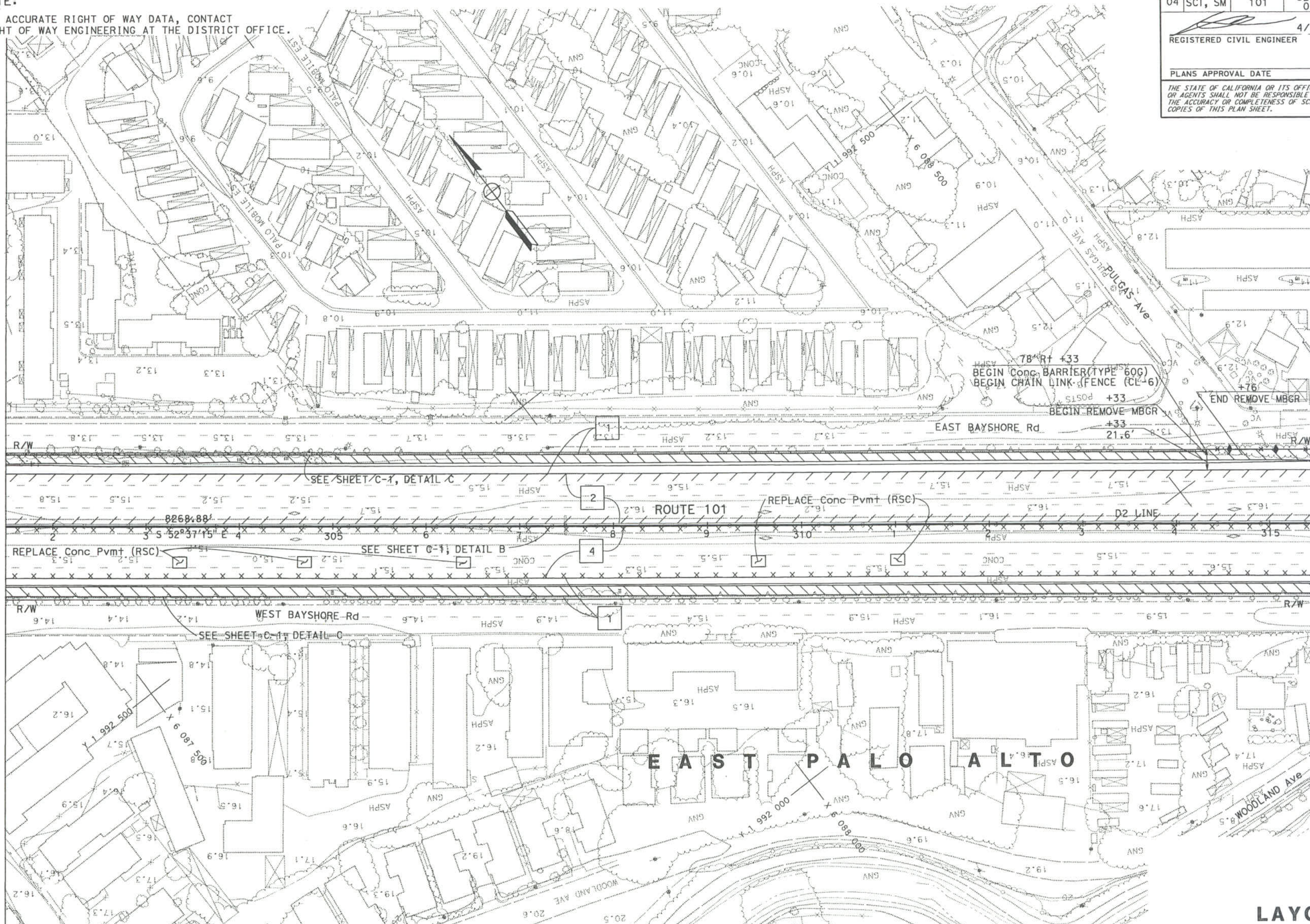

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET L-1

LAYOUT
SCALE: 1" = 50'

L-3

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	EDGAR URBANO	REVISED BY
Caltrans DESIGN	TEBLEZ NEMARIAM	CHECKED BY	AIJUN DING	DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => s129144
DGN FILE => 0400002019ea003.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720

PROJECT NUMBER & PHASE 04000020191

LAST REVISION 02-16-11 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 09:56

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

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NOTE:
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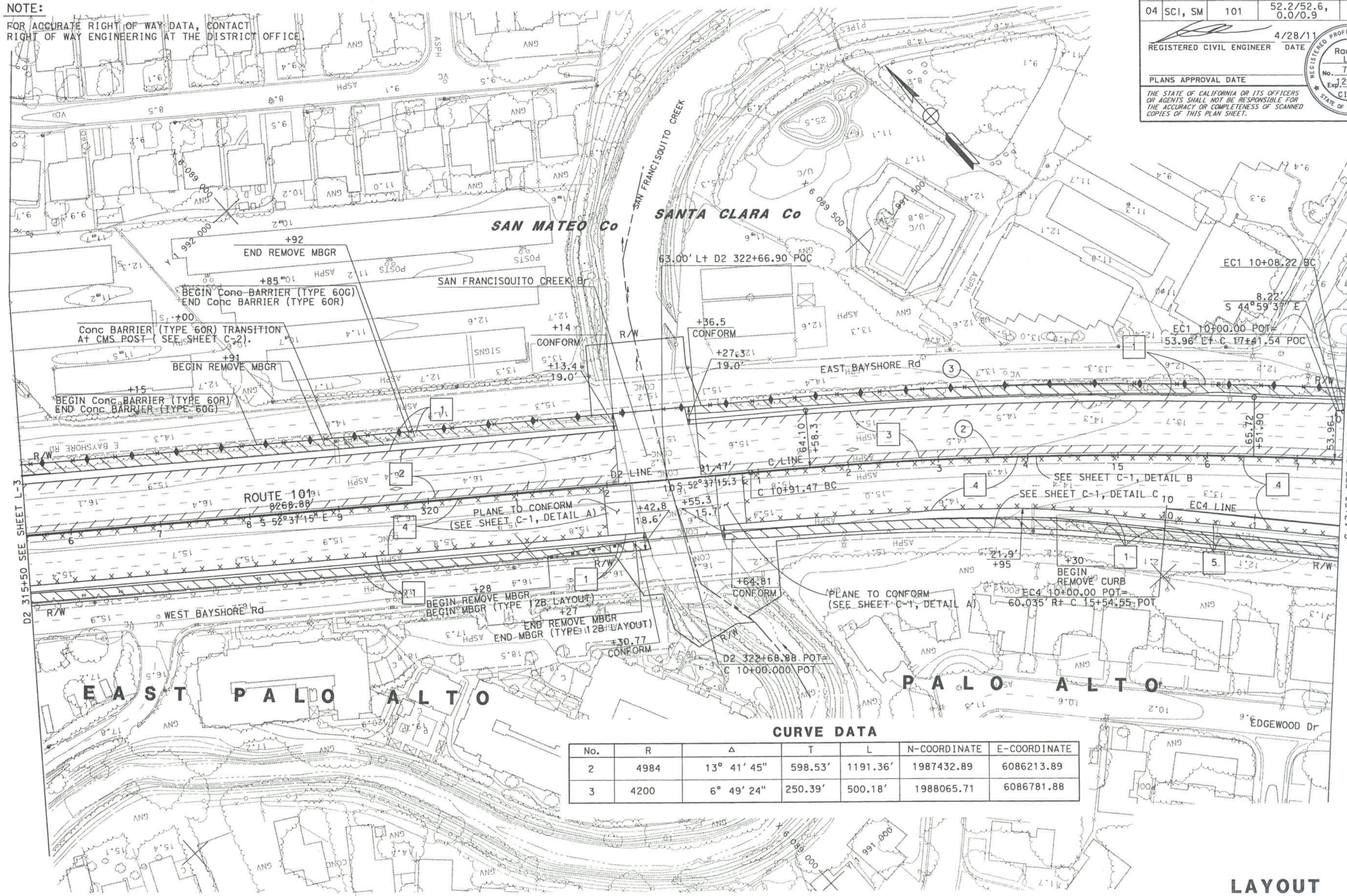


CURVE DATA

No.	R	Δ	T	L	N-COORDINATE	E-COORDINATE
2	4984	13° 41' 45"	598.53'	1191.36'	1987432.89	6086213.89
3	4200	6° 49' 24"	250.39'	500.18'	1988065.71	6086781.88

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET L-1

LAYOUT
SCALE: 1'' = 50'

L-4

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	EDGAR URBANO	REVISED BY
Caltrans DESIGN	TEBLEZ NEMARIAM	CHECKED BY	AIJUN DING	DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => s129144
DGN FILE => 0400002019ea004.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720

PROJECT NUMBER & PHASE 04000020191

LAST REVISION 03-22-11 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 09:56

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

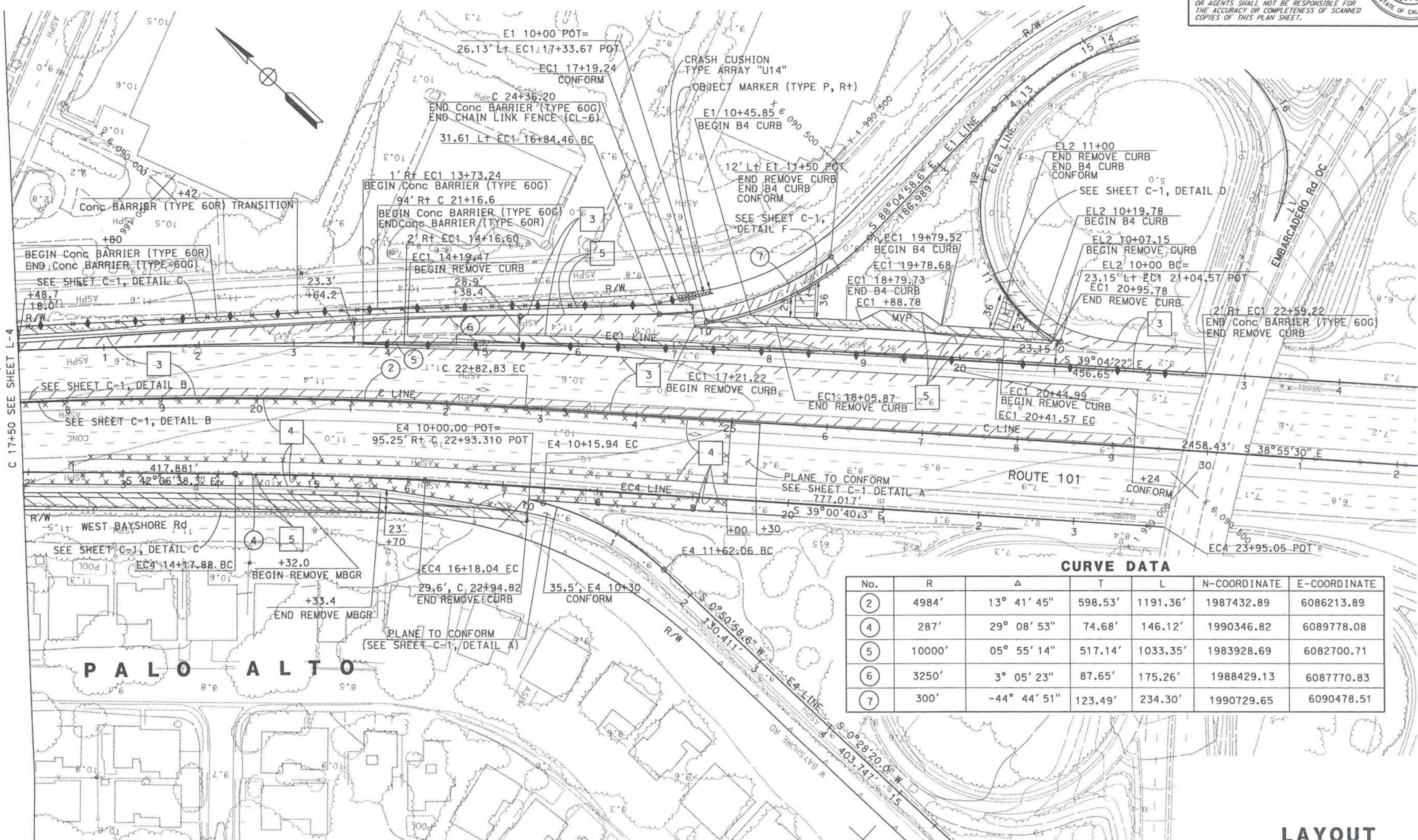
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL 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.



CURVE DATA

No.	R	Δ	T	L	N-COORDINATE	E-COORDINATE
2	4984'	13° 41' 45"	598.53'	1191.36'	1987432.89	6086213.89
4	287'	29° 08' 53"	74.68'	146.12'	1990346.82	6089778.08
5	10000'	05° 55' 14"	517.14'	1033.35'	1983928.69	6082700.71
6	3250'	3° 05' 23"	87.65'	175.26'	1988429.13	6087770.83
7	300'	-44° 44' 51"	123.49'	234.30'	1990729.65	6090478.51

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET L-1

LAYOUT
SCALE: 1'' = 50'

L-5

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY		REVISED BY
Caltrans DESIGN	TEBLEZ NEMARIAM	CHECKED BY	EDGAR URBANO / AIJUN DING	DATE REVISED

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl, SM	101	52.2/52.6, 0.0/0.9		

4/27/11
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Dixon T. Lau
No. 46706
Exp. 6-30-11
CIVIL
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.

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

NOTES:

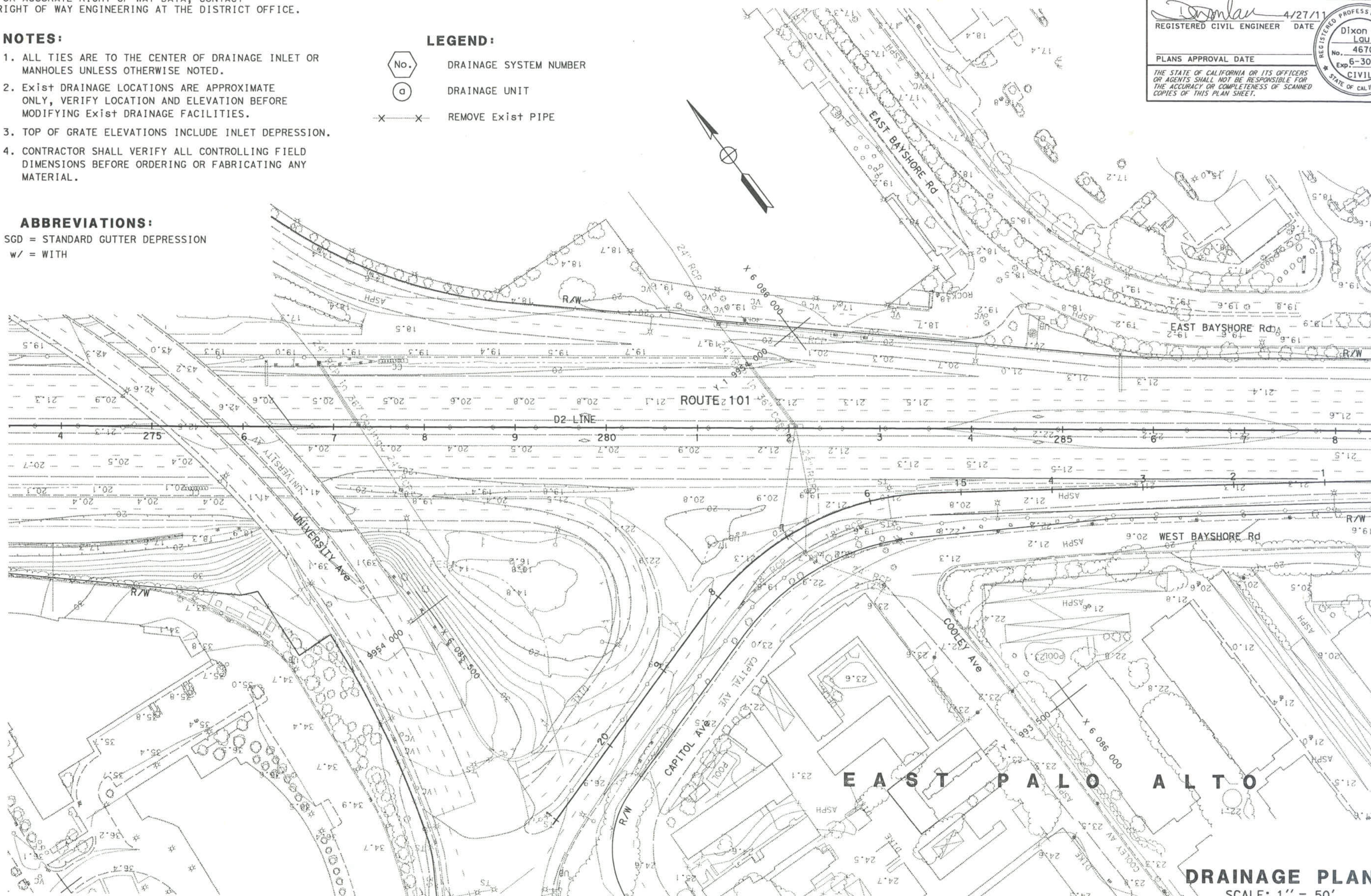
1. ALL TIES ARE TO THE CENTER OF DRAINAGE INLET OR MANHOLES UNLESS OTHERWISE NOTED.
2. Exist DRAINAGE LOCATIONS ARE APPROXIMATE ONLY, VERIFY LOCATION AND ELEVATION BEFORE MODIFYING Exist DRAINAGE FACILITIES.
3. TOP OF GRATE ELEVATIONS INCLUDE INLET DEPRESSION.
4. CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

LEGEND:

- No. — DRAINAGE SYSTEM NUMBER
- a — DRAINAGE UNIT
- —x——x— REMOVE Exist PIPE

ABBREVIATIONS:

SGD = STANDARD GUTTER DEPRESSION
w/ = WITH



DRAINAGE PLAN

SCALE: 1″ = 50′

THIS PLAN FOR DRAINAGE WORK ONLY

D-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	REVISED BY	
Caltrans HYDRAULICS	DIXON LAU	PO TIN LEUNG	A	
		CHECKED BY	DATE REVISED	
		DIXON LAU	A	

BORDER LAST REVISED 7/2/2010

USERNAME => s129144
DGN FILE => 0400002019ia001.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720

PROJECT NUMBER & PHASE 04000020191

LAST REVISION 03-29-11
DATE PLOTTED => 11-MAY-2011
TIME PLOTTED => 10:05

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

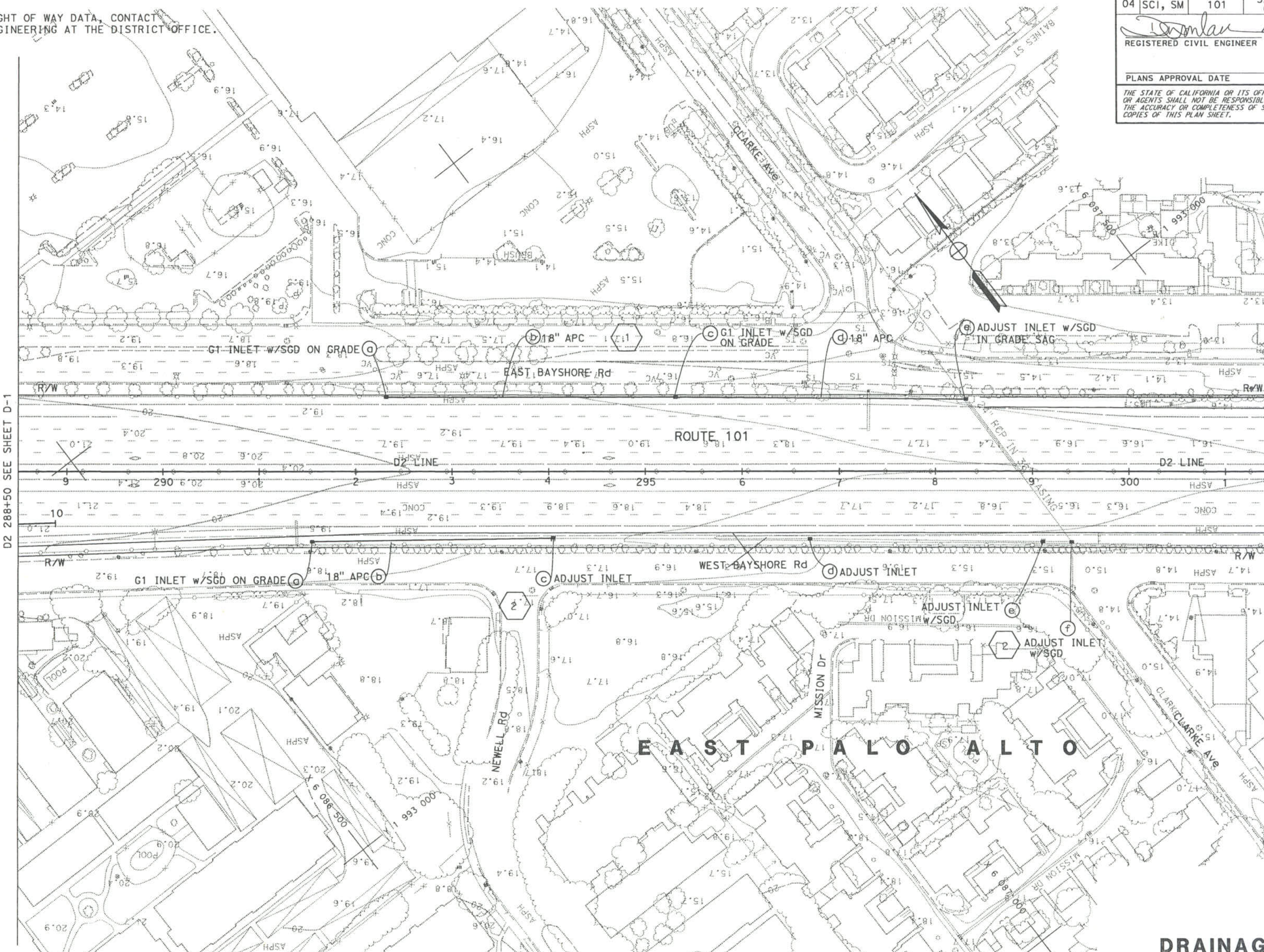
REGISTERED CIVIL ENGINEER 4/27/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Dixon T. Lau No. 46706 Exp. 6-30-11 CIVIL 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.

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET D-1

DRAINAGE PLAN
SCALE: 1'' = 50'

THIS PLAN FOR DRAINAGE WORK ONLY

D- 2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	REVISED BY	
Caltrans HYDRAULICS	DIXON LAU	CHECKED BY	DATE REVISED	
		PO TIN LEUNG	A	
		DIXON LAU	A	

BORDER LAST REVISED 7/2/2010

USERNAME => s129144
DGN FILE => 04000020191ia002.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720

PROJECT NUMBER & PHASE 04000020191

LAST REVISION 08-25-10
DATE PLOTTED => 11-MAY-2011
TIME PLOTTED => 10:05

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl, SM	101	52.2/52.6, 0.0/0.9		

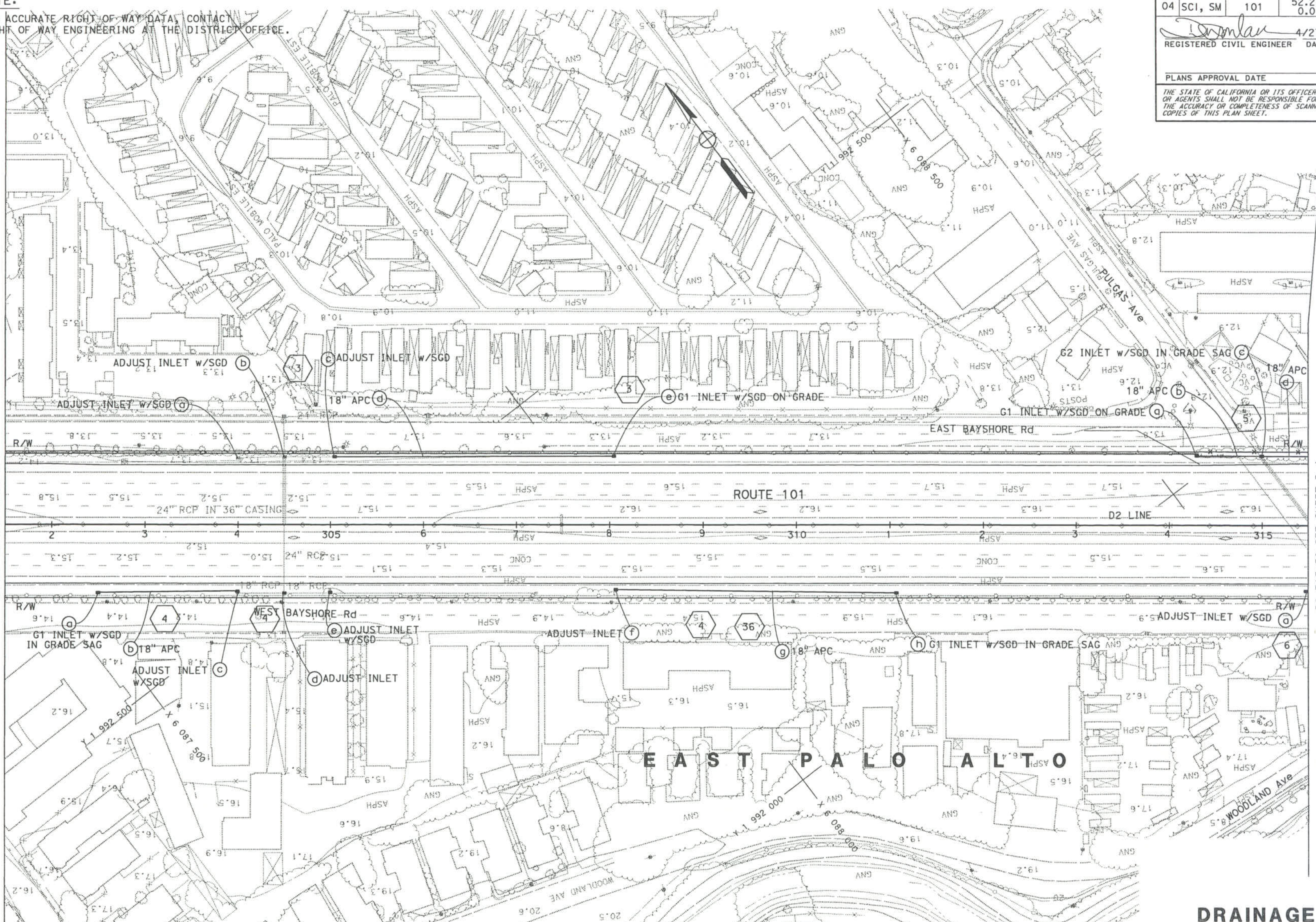
REGISTERED CIVIL ENGINEER DATE 4/27/11

PLANS APPROVAL DATE

Dixon T. Lau No. 46706 Exp. 6-30-11 CIVIL — 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.

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET D-1

DRAINAGE PLAN

SCALE: 1'' = 50'

THIS PLAN FOR DRAINAGE WORK ONLY

D-3

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	REVISED BY
Caltrans HYDRAULICS	DIXON LAU	PO TIN LEUNG	A
		CHECKED BY: DIXON LAU	DATE REVISED: A

BORDER LAST REVISED 7/2/2010 | USERNAME => s129144 DGN FILE => 04000020191id003.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0720 | PROJECT NUMBER & PHASE 04000020191

LAST REVISION 03-29-11 | DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 10:05

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

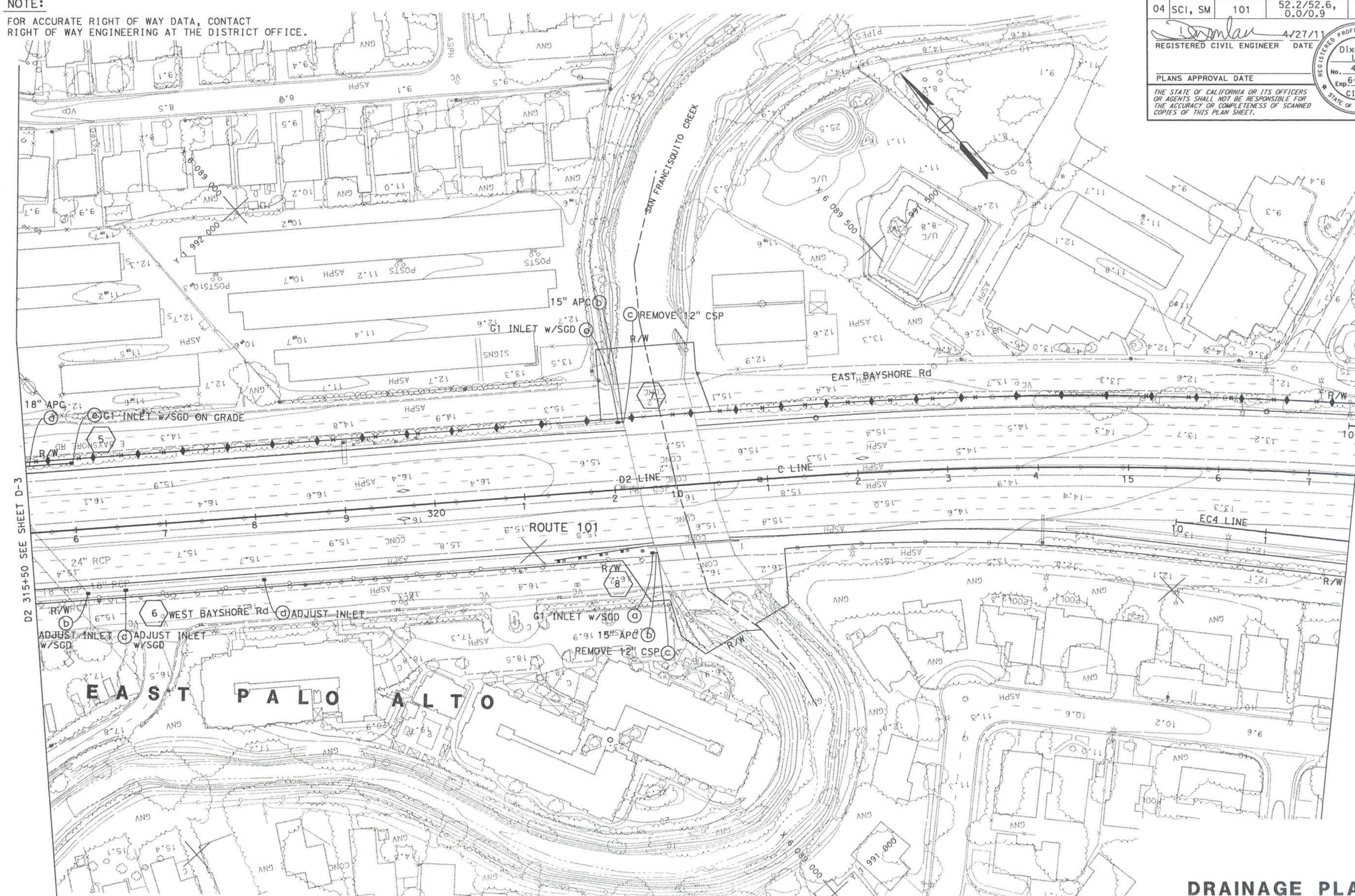
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/27/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Dixon T. Lau No. 46706 Exp. 6-30-11 CIVIL 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.



DRAINAGE PLAN

SCALE: 1'' = 50'

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET D-1

THIS PLAN FOR DRAINAGE WORK ONLY

D-4

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans **HYDRAULICS**

FUNCTIONAL SUPERVISOR: DIXON LAU

CALCULATED-DESIGNED BY: PO TIN LEUNG

CHECKED BY: DIXON LAU

REVISED BY

DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => s129144
DGN FILE => 0400002019Ia004.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720

PROJECT NUMBER & PHASE 04000020191

LAST REVISION 03-29-11

DATE PLOTTED => 11-MAY-2011
TIME PLOTTED => 10:05

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/27/11 DATE

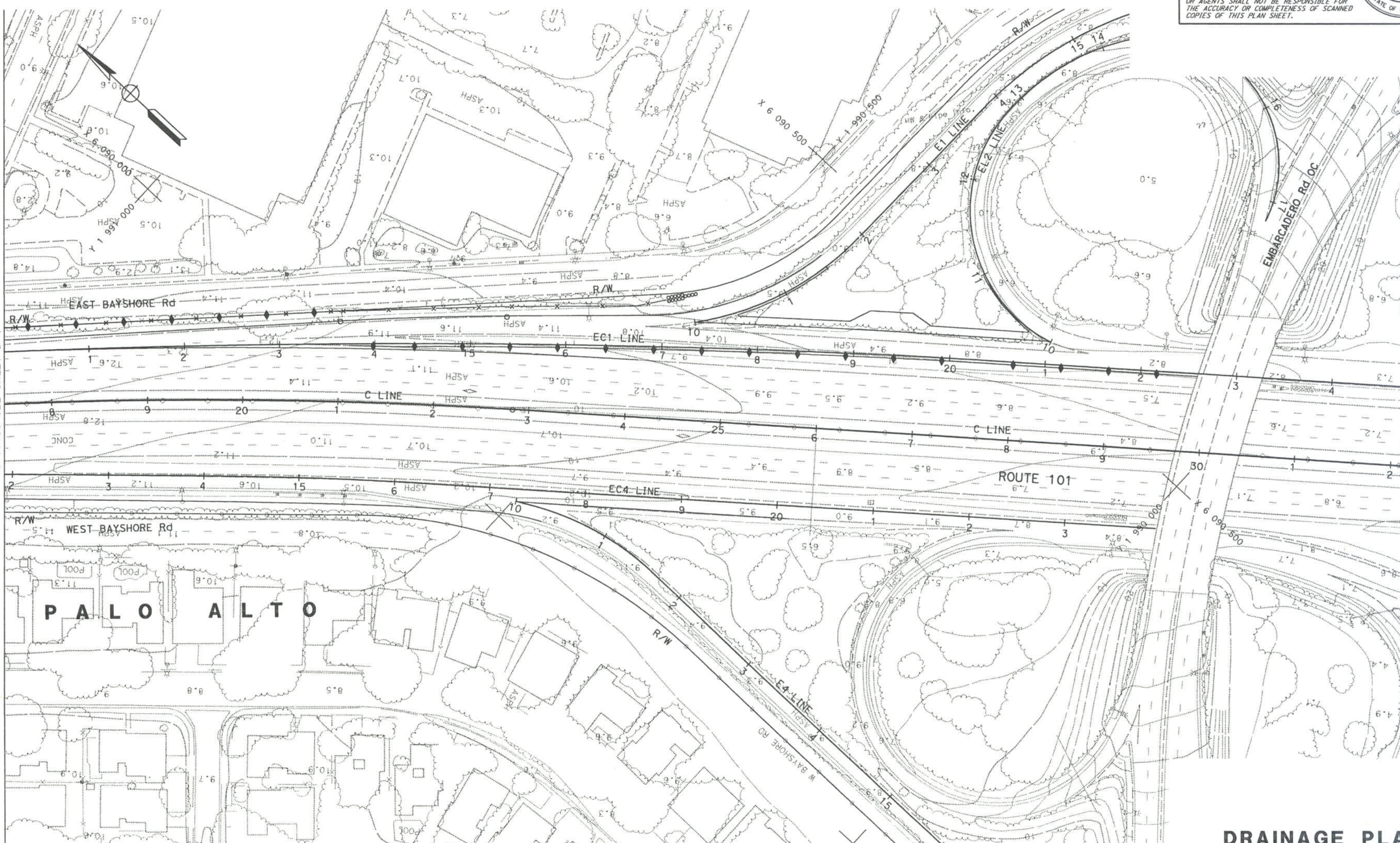
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Dixon T. Lau No. 46706 Exp. 6-30-11 CIVIL 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.

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



C 17+50 SEE SHEET D-4

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEET D-1

DRAINAGE PLAN

SCALE: 1'' = 50'

THIS PLAN FOR DRAINAGE WORK ONLY

D- 5

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	REVISED BY	
Caltrans HYDRAULICS	DIXON LAU	PO TIN LEUNG	A	
		CHECKED BY	DATE REVISED	
		DIXON LAU	A	

LAST REVISION 02-25-11 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 10:06

BORDER LAST REVISED 7/2/2010

USERNAME => s129144
DGN FILE => 0400002019ia005.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720 | PROJECT NUMBER & PHASE | 04000020191

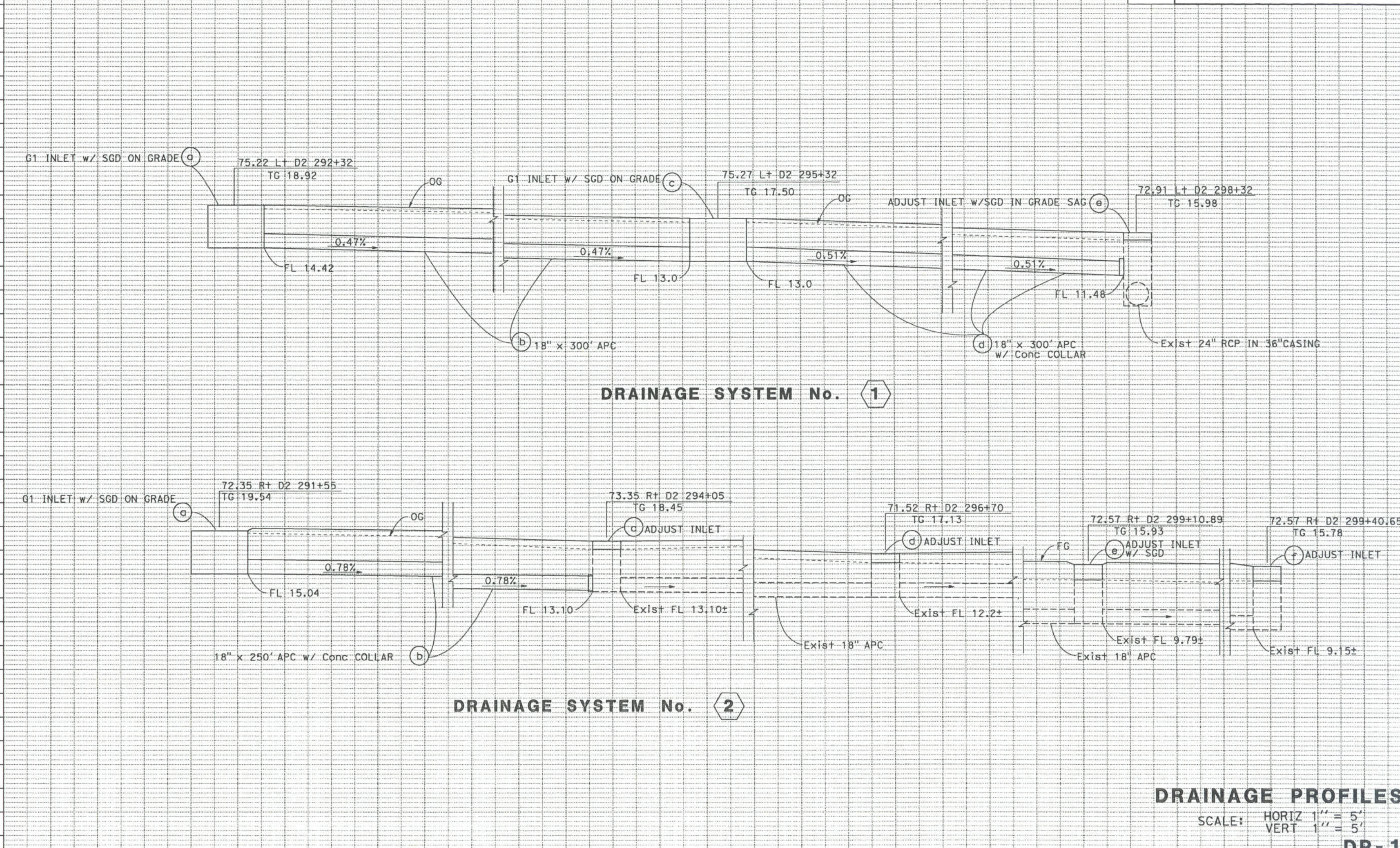
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL 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.



DRAINAGE PROFILES

SCALE: HORIZ 1" = 5' VERT 1" = 5'

DP-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR	TEBLEZ NEMARIAM
CALCULATED-DESIGNED BY	RACHEL LIU
CHECKED BY	REJA EREIOAT
REVISED BY	
DATE REVISED	

LAST REVISION 10-20-10

DATE PLOTTED => 11-MAY-2011
TIME PLOTTED => 10:06

BORDER LAST REVISED 7/2/2010

USERNAME => s129144
DGN FILE => 04000020191b001.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720

PROJECT NUMBER & PHASE 04000020191

J:\hermie\04000020191(235641)\working files\03-15-11\PSE_v8\04000020191b001.dgn

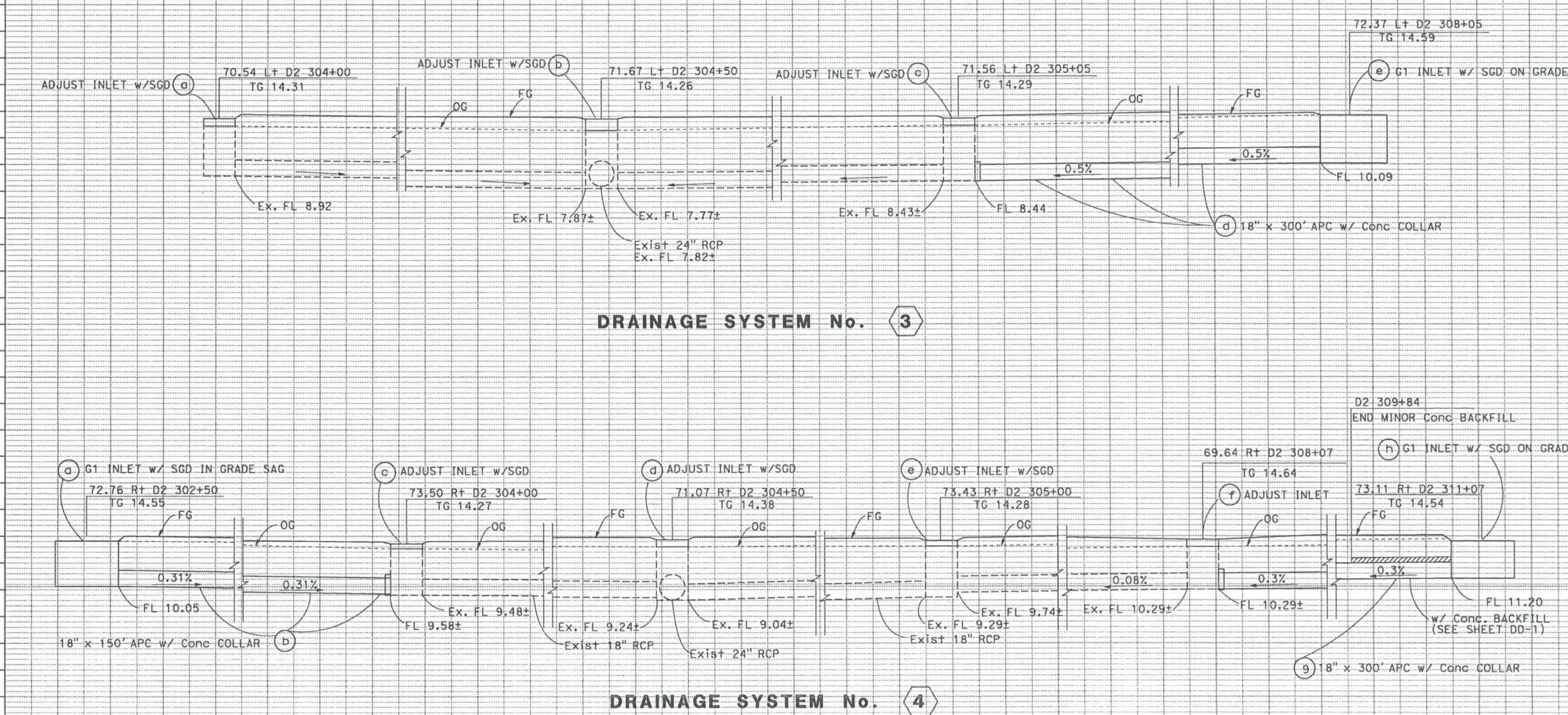
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl, SM	101	52.2/52.6, 0.0/0.9		

4/28/11
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL 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.



DRAINAGE PROFILES

SCALE: HORIZ 1" = 5'
VERT 1" = 5'

DP-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	CHECKED BY	REVISED BY	DATE REVISED
TEBLEZ NEMARIAM	RACHEL LIU	REJA EREIQAT		

LAST REVISION 10-20-10 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 10:06

BORDER LAST REVISED 7/2/2010 USERNAME => s129144 DGN FILE => 04000020191b002.dgn RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 UNIT 0720 PROJECT NUMBER & PHASE 04000020191

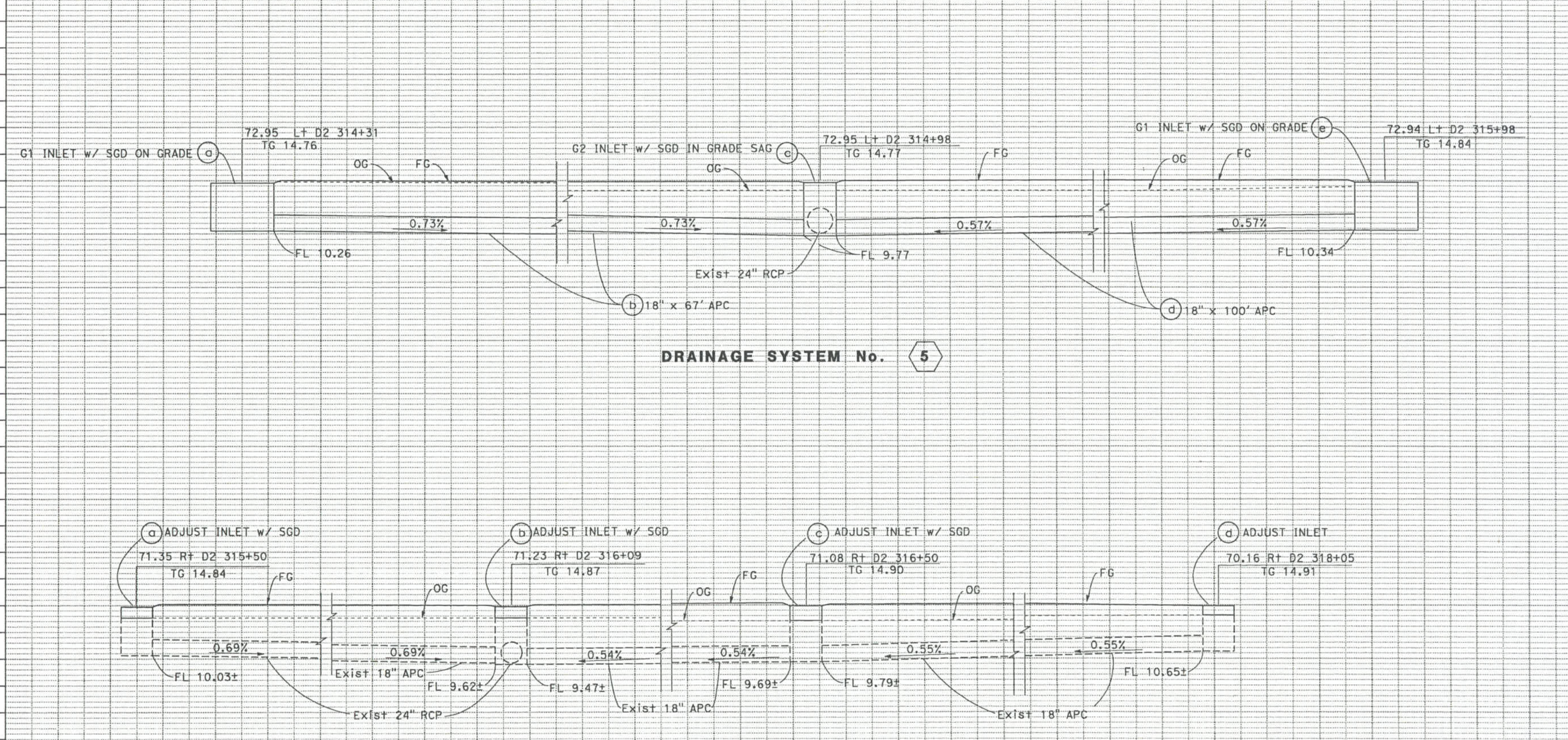
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

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.

REGISTERED PROFESSIONAL ENGINEER
Rachel Liu
No. 74807
Exp. 12-31-11
CIVIL
STATE OF CALIFORNIA



DRAINAGE SYSTEM No. 5

DRAINAGE SYSTEM No. 6

DRAINAGE PROFILES

SCALE: HORIZ 1" = 5'
VERT 1" = 5'

DP-3

REVISED BY	DATE REVISED
RACHEL LIU	REJA EREIOAT
CALCULATED-DESIGNED BY	CHECKED BY
FUNCTIONAL SUPERVISOR	TEBLEZ NEMARIAM

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans DESIGN

LAST REVISION 06-03-10 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 10:06

BORDER LAST REVISED 7/2/2010

USERNAME => s129144
DGN FILE => 04000020191b003.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0720

PROJECT NUMBER & PHASE 04000020191

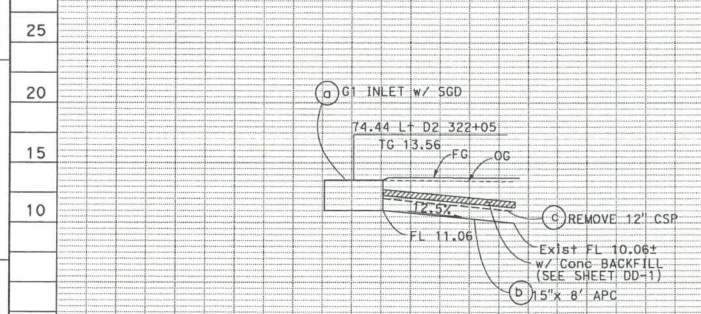
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

4/28/11
REGISTERED CIVIL ENGINEER DATE

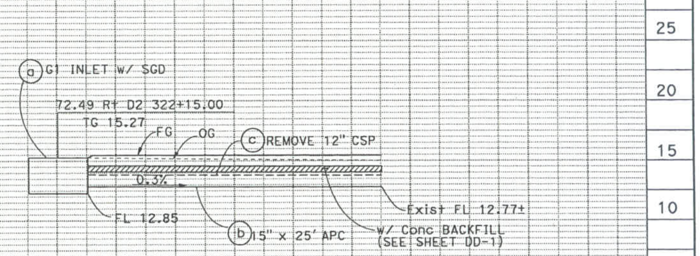
PROFESSIONAL ENGINEER, REGISTERED — Rachel Liu, No. 74807, Exp. 12-31-11, CIVIL, STATE OF CALIFORNIA

PLANS APPROVAL DATE

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



DRAINAGE SYSTEM No. 7



DRAINAGE SYSTEM No. 8

DRAINAGE PROFILES

SCALE: HORIZ 1" = 5'
VERT 1" = 5'

DP-4

CALCULATED-DESIGNED BY	RACHEL LIU
CHECKED BY	REJA EREIOAT
REVISED BY	
DATE REVISED	
FUNCTIONAL SUPERVISOR	TEBLEZ NEMARIAM

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

LAST REVISION 03-02-11
DATE PLOTTED => 11-MAY-2011
TIME PLOTTED => 10:06

BORDER LAST REVISED 7/2/2010
USERNAME => s129144
DGN FILE => 0400002019lb004.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0720
PROJECT NUMBER & PHASE 04000020191

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

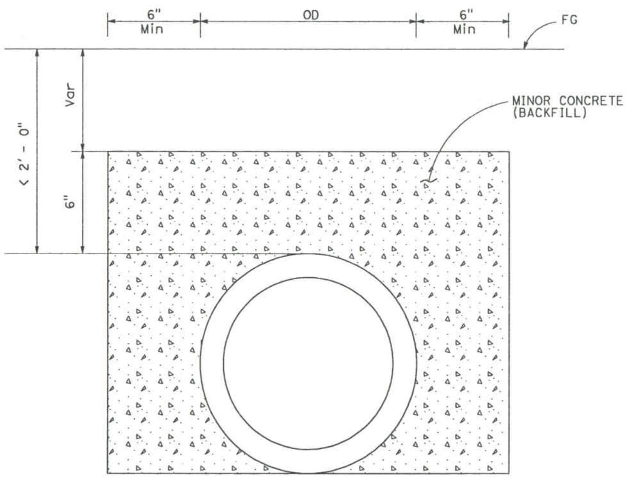
REGISTERED CIVIL ENGINEER 4/27/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Dixon T. Lau No. 46706 Exp. 6-30-11 CIVIL STATE OF CALIFORNIA

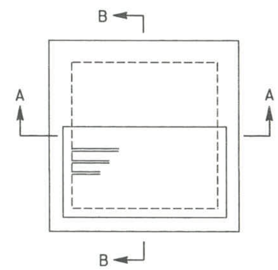
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

NOTE:
FOR DIMENSIONS NOT SHOWN, SEE STD PLAN D73.

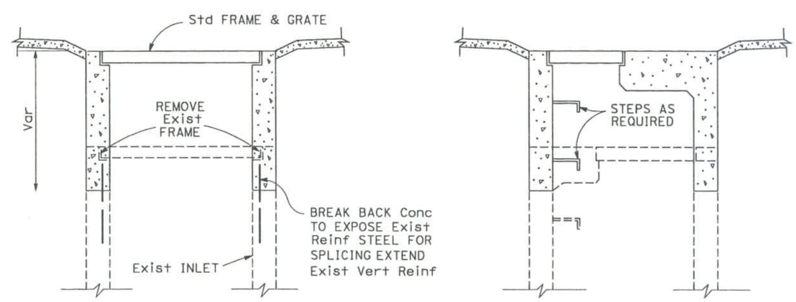


MINOR CONCRETE BACKFILL
PIPES WITH LESS THAN 2' COVER

4 g 7 b 8 b



PLAN



SECTION A-A

SECTION B-B

ADJUST INLETS
(FOR ADJUSTMENT >3")

1 e 2 c d e f 3 a b c

4 c d e 6 a b c d

DRAINAGE DETAILS
NO SCALE

DD-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	PO TIN LEUNG	REVISED BY		
Caltrans HYDRAULICS	DIXON LAU	CHECKED BY	DIXON LAU	DATE REVISED		

LAST REVISION 02-25-11 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 10:06

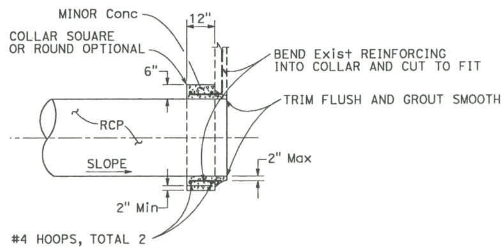
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/27/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Dixon T. Lau No. 46706 Exp. 6-30-11 CIVIL 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.



PIPE CONNECTION TO EXISTING INLET

1 d 2 b 3 d 4 b g

NOTES:
1. CUT REINFORCEMENT ON ALTERNATE SIDES AND BEND INTO COLLAR.
2. IF THERE ARE NO Exist REINFORCING BARS, THEN USE 6 #4 DOWELS, SPACED EVENLY AROUND NEW PIPE, AND DRILL AND GROUT INTO Exist INLET WALLS 6".

DRAINAGE DETAILS
NO SCALE

DD-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

FUNCTIONAL SUPERVISOR: DIXON LAU
CALCULATED-DESIGNED BY: PO TIN LEUNG
CHECKED BY: DIXON LAU
REVISED BY
DATE REVISED

BORDER LAST REVISED 7/2/2010
USERNAME => s129144
DGN FILE => 04000020191c002.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0720
PROJECT NUMBER & PHASE 04000020191

LAST REVISION 06-24-10
DATE PLOTTED => 11-MAY-2011
TIME PLOTTED => 10:06

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCI, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER 4/28/11 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL 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.

NOTES:

1. ALL OFFSETS ARE TO THE CENTER OF GRATE.

* SEE ROADWAY QUANTITIES FOR TOTAL MINOR CONCRETE(MISC CONSTRUCTION)

ABBREVIATIONS:

SGD = STANDARD GUTTER DEPRESSION
PSC = POLYMERIC SHEET COATING
S= STANDARD JOINT
W/= WITH

APC ALLOWABLE PIPE MATERIAL AND PROTECTION

DESIGNATION	RCP	CSP			PLASTIC PIPE	
	SIZE	SIZE	THICKNESS	COATING	SIZE	INTERIOR TYPE
15" APC	12"	12"	0.109"	NO	12"	SMOOTH INTERIOR
			0.052"	PSC		
18" APC	18"	18"	0.109"	NO	18"	SMOOTH INTERIOR
			0.052"	PSC		
24" APC	24"	24"	0.109"	NO	24"	SMOOTH INTERIOR
			0.052"	PSC		

DRAINAGE QUANTITIES

DRAINAGE SYSTEM No.	DRAINAGE UNIT	MINOR Conc: MINOR STRUCTURE (F)	MINOR Conc: Misc CONSTRUCTION *	MINOR Conc: BACKFILL	FRAMES GRATES COVERS (N) 24-12	Misc IRON & STEEL (F)	APC 15"	APC 18"	ADJUST INLET	REMOVE PIPE	PIPE JOINT CLASSIFICATION (N)	HEIGHT OF INLET (N)	DESCRIPTION	STATION	DRAINAGE PLAN SHEET No.	DRAINAGE SYSTEM No.	DRAINAGE UNIT
		CY	CY	CY	EA	LB	LF	LF	EA	LF		FT					
1	a	1.28	1.1		1	326						4.5	G1 INLET w/SGD ON GRADE	L+ D2 292+32	2	1	a
	b							300			S		18" APC	L+ D2 292+32	2		b
	c	1.28	1.1		1	326						4.5	G1 INLET w/SGD ON GRADE	L+ D2 295+32	2		c
	d							300			S		18" APC	L+ D2 295+32	2		d
	e		2.2		2	634			1				ADJUST INLET w/SGD IN GRADE SAG	L+ D2 298+32	2		e
2	a	1.28	1.1		1	326						4.5	G1 INLET w/SGD ON GRADE	R+ D2 291+55	2	2	a
	b							250			S		18" APC	R+ D2 291+55	2		b
	c				2	634			1				ADJUST INLET	R+ D2 294+05	2		c
	d				2	634			1				ADJUST INLET	R+ D2 296+70	2		d
	e		2.2		2	634			1				ADJUST INLET w/SGD	R+ D2 299+11	2		e
	f				2	634			1				ADJUST INLET	R+ D2 299+40	2		f
3	a		2.2		2	634			1				ADJUST INLET w/SGD	L+ D2 304+00	3	3	a
	b		1.1		1	326			1				ADJUST INLET w/SGD	L+ D2 304+50	3		b
	c		1.1		1	326			1				ADJUST INLET w/SGD	L+ D2 305+05	3		c
	d							300			S		18" APC	L+ D2 305+05	3		d
	e	1.28	1.1		1	326						4.5	G1 INLET w/SGD ON GRADE	L+ D2 308+05	3		e
4	a	1.28	1.1		1	326						4.5	G1 INLET w/SGD IN GRADE SAG	R+ D2 302+50	3	4	a
	b							150			S		18" APC	R+ D2 302+50	3		b
	c		2.2		2	634			1				ADJUST INLET w/SGD	R+ D2 304+00	3		c
	d				1	326			1				ADJUST INLET	R+ D2 304+50	3		d
	e		2.2		2	634			1				ADJUST INLET w/SGD	R+ D2 305+00	3		e
	f				2	634			1				ADJUST INLET	R+ D2 308+07	3		f
	g			8.1				300			S		18" APC w/ MINOR Conc. BACKFILL	R+ D2 308+07	3		g
	h	1.02	1.1		1	326						3.3	G1 INLET w/SGD IN GRADE SAG	R+ D2 311+07	3		h
5	a	1.28	1.1		1	326						4.5	G1 INLET w/SGD ON GRADE	L+ D2 314+31	3	5	a
	b							67			S		18" APC	L+ D2 314+31	3		b
	c	1.39	1.1		1	326						5.0	G2 INLET w/SGD IN GRADE SAG	L+ D2 314+98	3		c
	d							100			S		18" APC	L+ D2 314+98	3		d
	e	1.28	1.1		1	326						4.5	G1 INLET w/SGD ON GRADE	L+ D2 315+98	4		e
6	a		2.2		2	634			1				ADJUST INLET w/SGD	R+ D2 315+50	3	6	a
	b		1.1		1	326			1				ADJUST INLET w/SGD	R+ D2 316+09	4		b
	c		2.2		2	634			1				ADJUST INLET w/SGD	R+ D2 316+50	4		c
	d				2	634			1				ADJUST INLET	R+ D2 318+05	4		d
7	a	0.95	1.1		1	326						2.5	G1 INLET w/SGD	L+ D2 322+05	4	7	a
	b			0.8			8				S		15" APC w/ MINOR Conc. BACKFILL	L+ D2 322+05	4		b
	c									8			REMOVE 12" PIPE	L+ D2 322+05	4		c
SHEET TOTAL		12.32	29.7	8.9	38.0	12172	8	1767	16	8							

(N) NOT A SEPARATE PAY ITEM, FOR INFORMATION ONLY.

DRAINAGE QUANTITIES DQ-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION Caltrans DESIGN

FUNCTIONAL SUPERVISOR TEBLEZ NEMARIAM

CALCULATED-DESIGNED BY RACHEL LIU | CHECKED BY REJA EREIQAT

REVISED BY | DATE REVISED

LAST REVISION | DATE PLOTTED => 11-MAY-2011 | TIME PLOTTED => 10:06 | 024-26-1

BORDER LAST REVISED 7/2/2010 | USERNAME => s129144 | DGN FILE => 04000020191d001.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0720 | PROJECT NUMBER & PHASE 04000020191

DRAINAGE QUANTITIES

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SCl, SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER DATE 4/28/11

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Rachel Liu No. 74807 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

DRAINAGE SYSTEM No.	DRAINAGE UNIT	MINOR Conc: MINOR STRUCTURE (F)	MINOR Conc: MIsc CONSTRUCTION*	MINOR Conc: BACKFILL	FRAMES GRATES COVERS (N): 24-12	MIsc IRON & STEEL (F)	APC: 15"	APC: 18"	ADJUST INLET	REMOVE PIPE	PIPE JOINT CLASSIFICATION (N)	HEIGHT OF INLET (N)	DESCRIPTION	STATION	DRAINAGE PLAN SHEET No.	DRAINAGE SYSTEM No.	DRAINAGE UNIT
		CY	CY	CY	EA	LB	LF	LF	EA	LF		FT					
8	a	0.95	1.1		1	326						2.42	G1 INLET w/ SGD	Rt D2 322+15	4	8	a
↓	b			2.5			25				S		15" APC w/ MINOR Conc BACKFILL	Rt D2 322+15	4	↓	b
	c									25			REMOVE 12" PIPE	Rt D2 322+15	4		c
SHEET TOTAL		0.95	1.1	2.5	1	326	25			25							
DQ-1 TOTAL		12.32	29.7	8.9	38	12172	8	1767	16	8							
DQ-2 TOTAL		0.95	1.1	2.5	1	326	25			25							
TOTAL		13.27	30.8	11.4	39	12498	33	1767	16	33							

(N) NOT A SEPARATE PAY ITEM, FOR INFORMATION ONLY.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	RACHEL LIU	REVISED BY
Caltrans DESIGN	TEBLEZ NEMARIAM	CHECKED BY	REJA EREIQAT	DATE REVISED

DRAINAGE QUANTITIES

DQ-2

LAST REVISION 06-26-10 DATE PLOTTED => 11-MAY-2011 TIME PLOTTED => 10:06

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SM	101	0.9/3.6		

LICENSED LANDSCAPE ARCHITECT

PLANS APPROVAL DATE

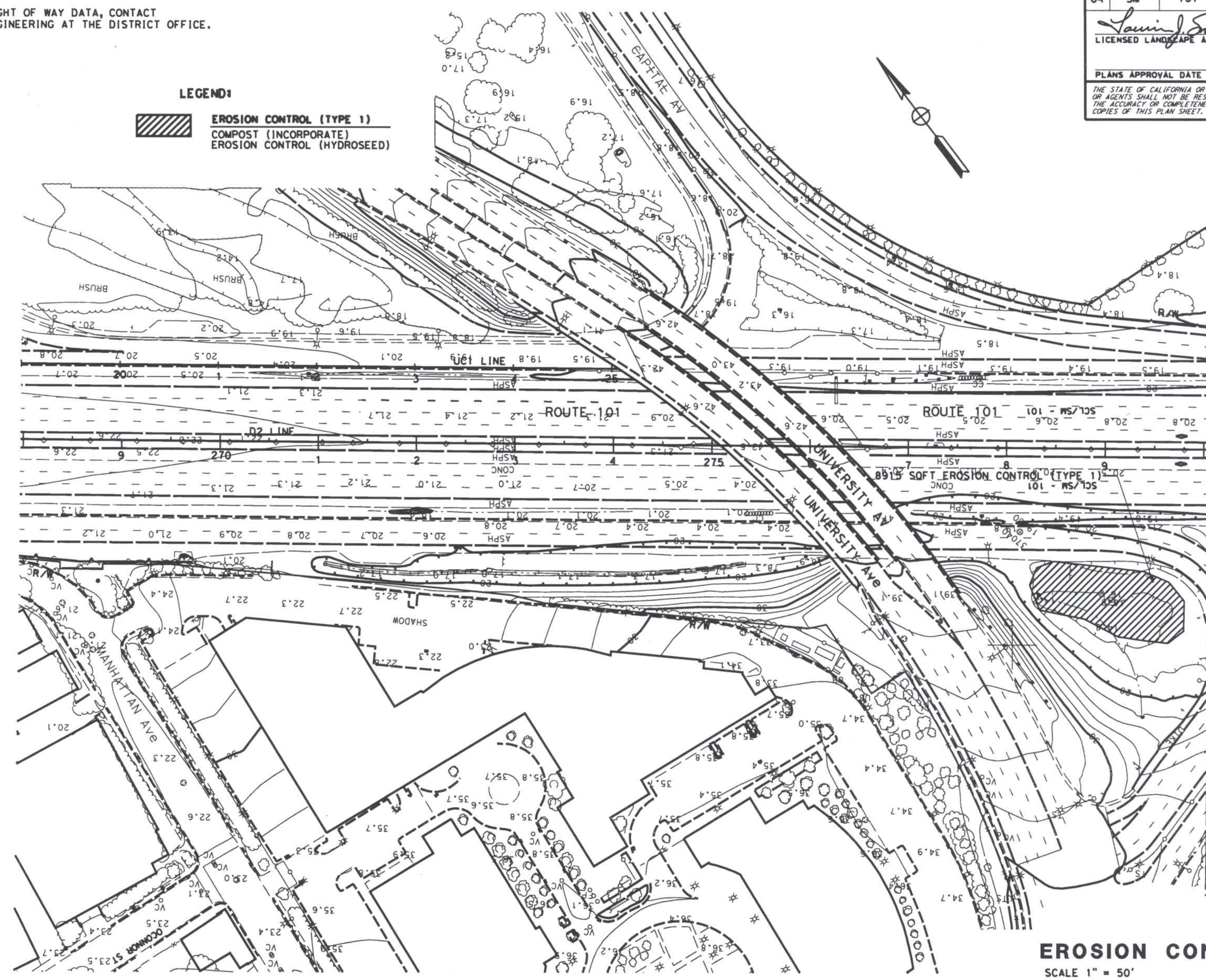
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

LICENSED LANDSCAPE ARCHITECT LAURIE J. SMITH No. 8-31-12 Renewal Date STATE OF CALIFORNIA

NOTE:
FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

LEGEND:

EROSION CONTROL (TYPE 1)
COMPOST (INCORPORATE)
EROSION CONTROL (HYDROSEED)



THIS PLAN IS ACCURATE FOR EROSION CONTROL WORK ONLY.

EROSION CONTROL PLAN
SCALE 1" = 50'

EC-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
WATER QUALITY

SENIOR LANDSCAPE ARCHITECT: DAVID W YAM

CALCULATED-DESIGNED BY: LAURIE J SMITH
CHECKED BY: ALEX MC DONALD

REVISED BY
DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0792

PROJECT NUMBER & PHASE 04000020191

LAST REVISION 10-06-10
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SM	101	0.9/3.6		

REGISTERED CIVIL ENGINEER DATE

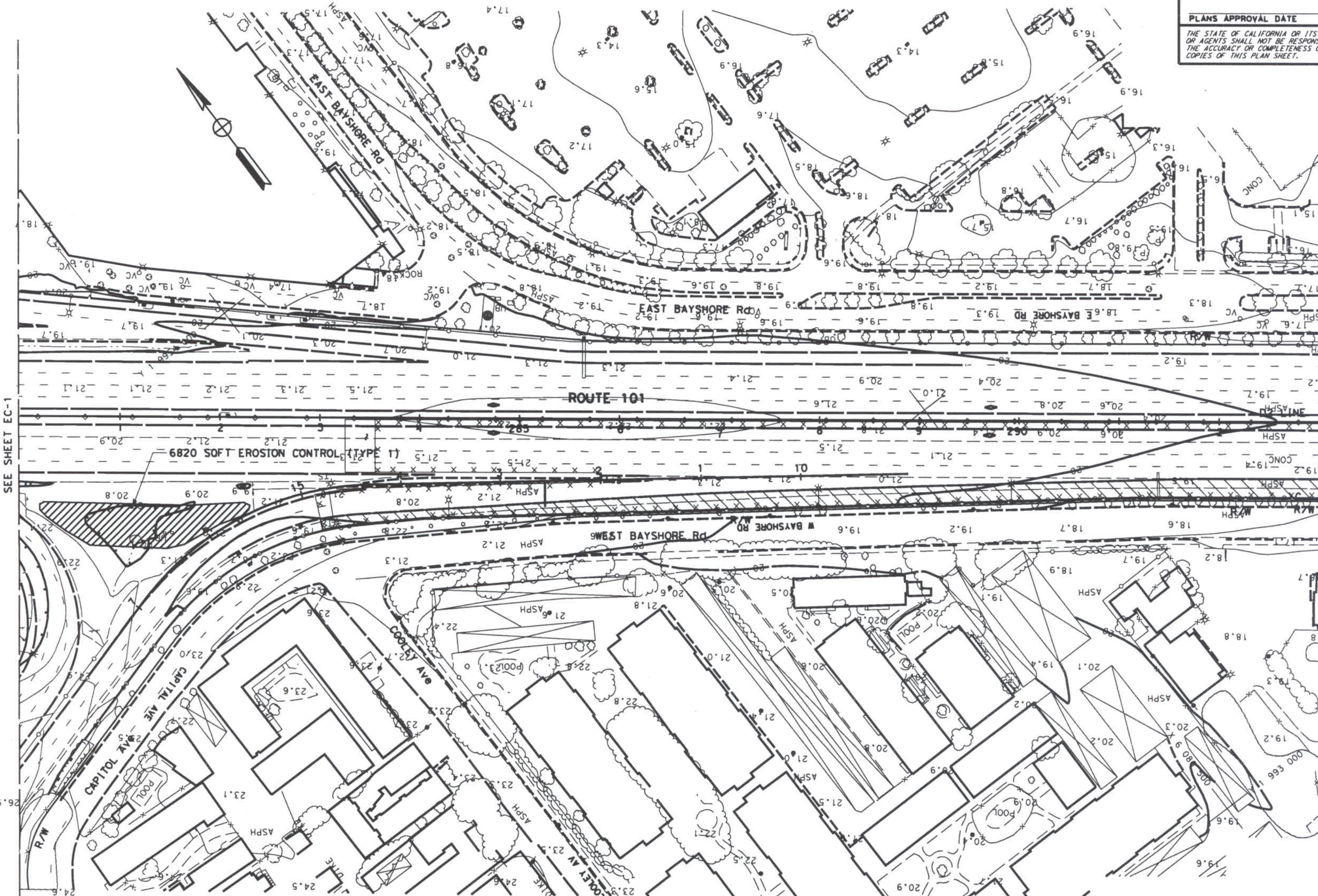
PLANS APPROVAL DATE

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.

LICENSED LANDSCAPE ARCHITECT
LAURIE J. SMITH
8-31-12
STATE OF CALIFORNIA

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



SEE SHEET EC-1

THIS PLAN ACCURATE FOR EROSION CONTROL WORK ONLY

EROSION CONTROL PLAN
EC-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	LAURIE J SMITH	REVISED BY
Caltrans WATER QUALITY	DAVID W YAM	CHECKED BY	ALEX MC DONALD	DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0792

PROJECT NUMBER & PHASE 04000020191

LAST REVISION 10-06-10

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

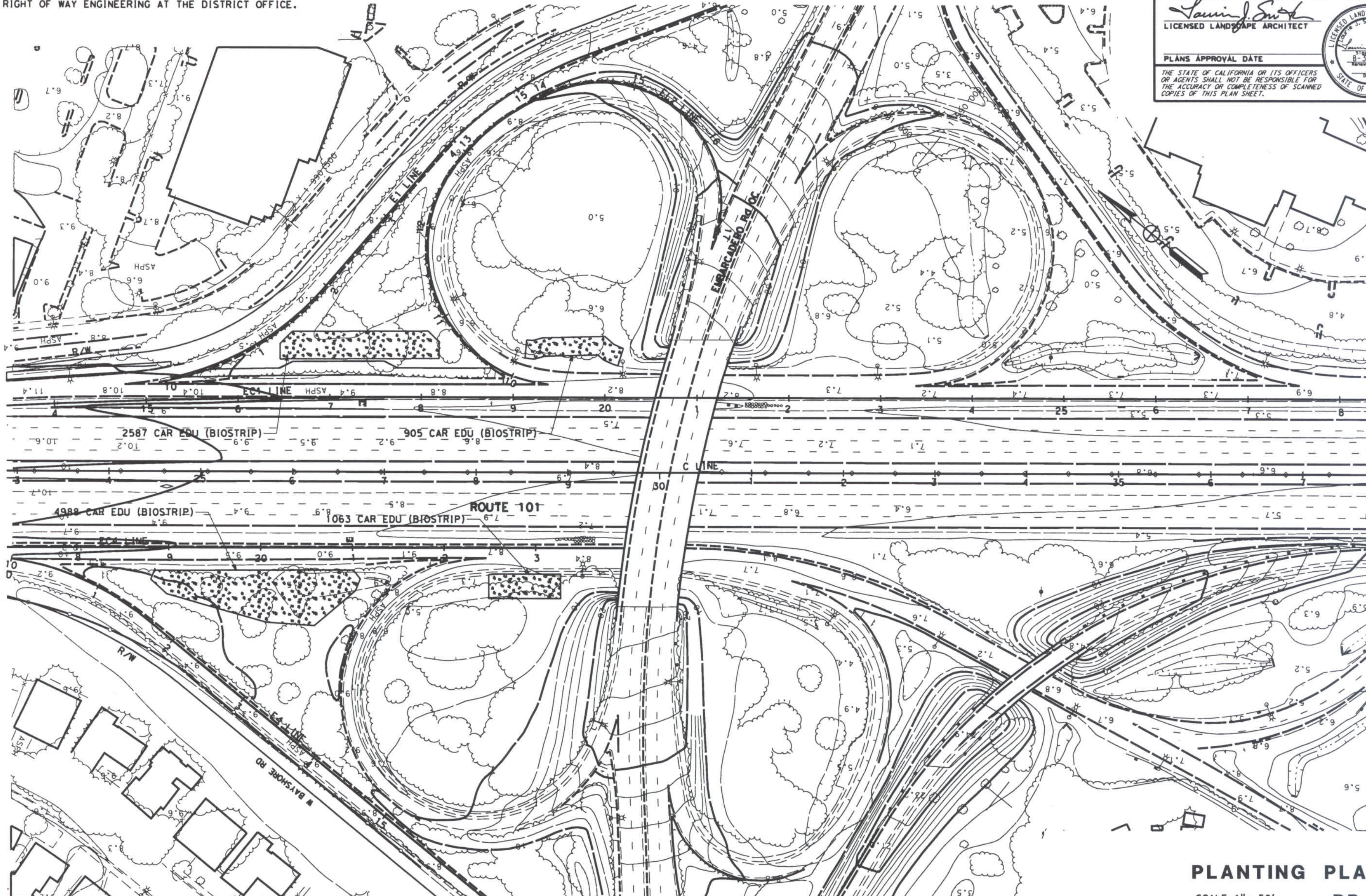
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SM	101	0.9/3.6		

LICENSED LANDSCAPE ARCHITECT

PLANS APPROVAL DATE

LICENSED LANDSCAPE ARCHITECT
Laurie J. Smith
Signature
8-31-12
Renewal Date
Date
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.



THIS PLAN ACCURATE FOR PLANTING WORK ONLY

PLANTING PLAN

SCALE 1"= 50'

PP-6

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans® LANDSCAPE ARCHITECTURE

SENIOR LANDSCAPE ARCHITECT	CALCULATED-DESIGNED BY		REVISED BY
LORENA WONG	CHECKED BY	LAURIE J SMITH	DATE REVISED
		SUSAN ALDRICH	

LAST REVISION 03-21-11 | DATE PLOTTED => $DATE | TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010 | USERNAME => $USER | DGN FILE => $REQUEST | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0792 | PROJECT NUMBER & PHASE 04000020191

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SM	101	0.9/3.6		

LICENSED LANDSCAPE ARCHITECT

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.

LICENSED LANDSCAPE ARCHITECT
STATE OF CALIFORNIA
8-31-12
Renewal Date

EROSION CONTROL QUANTITIES

SHEET No.	TYPE	AREA (SQFT)	COMPOST (INCORPORATE) (SQYD)	EROSION CONTROL (HYDROSEED) (SQFT)
EC-1	1	8,915	990	8,915
EC-2	1	6,820	758	6,820
TOTAL			1,748	15,735

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

WATER QUALITY

SENIOR LANDSCAPE ARCHITECT: DAVID W YAM

CALCULATED-DESIGNED BY: LAURIE J SMITH

CHECKED BY: ALEX MC DONALD

REVISED BY

DATE REVISED

EROSION CONTROL QUANTITIES

ECQ-1

LAST REVISION 00-00-00

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES

0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE

0400020191
0000000001

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

LICENSED LANDSCAPE ARCHITECT

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.

LICENSED LANDSCAPE ARCHITECT · Signature · Renewal Date · Date · STATE OF CALIFORNIA

PLANT LIST AND PLANTING SPECIFICATIONS

PLANT GROUP	PLANT No.	SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	QUANTITY EACH	HOLE SIZE (INCH)		BASIN TYPE	IRON SULFATE ①	SOIL AMEND ①	COMMERCIAL FERTILIZER ①		BASIN MULCH (CY)	STAKING	PLANTING LIMITS: MINIMUM DISTANCE (ft) FROM						ON CENTER (ft)	REMARKS
							Dia	DEPTH				PLANTING	PLT ESTB			ETW	Pvmt	FENCE	WALL	PAVED DITCH	EARTH DITCH		
H			CARPOBROTUS EDULIS	ICE PLANT	CUTTING	9543	⑧	⑧	-	-	-	-	-	-	-	-	6	6	6	6	8	18"	GROUNDCOVER

APPLICABLE WHEN CIRCLED:

1 - QUANTITIES SHOWN ARE "PER PLANT" UNLESS SHOWN AS SOFT OR SQYD APPLICATION RATES
2 - BASIN MULCH IS INCLUDED WITH MULCH QUANTITIES SHOWN ON PLANTING PLAN
3 - SUFFICIENT TO RECEIVE ROOT BALL AND AMENDMENTS IF REQUIRED
4 - SEE DETAIL
5 - SEE SPECIAL PROVISIONS
6 - SEE STANDARD SPECIFICATIONS
7 - AS SHOWN ON PLANS
8 - UNLESS OTHERWISE SHOWN ON PLANS
9 - FOLIAGE PROTECTOR REQUIRED
10 - ROOT PROTECTOR REQUIRED
11 - ROOT BARRIER REQUIRED
12 - STATE-FURNISHED

NOTE:
UNDERLINED PORTIONS OF BOTANICAL NAME INDICATE ABBREVIATIONS USED ON PLANTING PLANS.

PLANT LIST

PL-1

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

SENIOR LANDSCAPE ARCHITECT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => $DATE | TIME PLOTTED => $TIME

7. 04-235641-Storm-Water-Information-Handout.pdf

04-SCl/SM-101
PM 52.2/52.6 (SCl), 0.0/0.9 (SM)
04000020191 (EA 04-235641)

U.S. 101 Auxiliary Lanes
Santa Clara and San Mateo Counties, California
04000020191 (EA 04-235641)
April 2011

Storm Water Information Handout

Prepared for:

Caltrans

Prepared by:

WRECO

April 2011

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Table of Contents

Figures

Tables

Appendices

Disclaimer

A "Disclaimer" is required specifying that the information provided in the Storm Water Information Handout is just a guideline and is to be used for information purposes only and should not be considered a sole source document to adhere to the requirements of the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP), Number CAS000002, effective July 1, 2010. The contractor is required to provide water quality monitoring, sampling and implement best management practices (BMPs) based on standard industry operations, field conditions and conditions encountered based on the contractor's means and methods. The information in this handout is not to be construed in any way as a waiver of the provisions in the CGP. Bidders and contractors are cautioned to make independent investigations and examinations as they deem necessary to satisfy the conditions encountered in performance of work, with respect to the following: sampling and monitoring locations, distribution of watershed areas for sizing of BMPs, and selection of BMPs in order to conform to the requirement of the contract documents and the CGP.

04-SCl/SM-101
PM 52.2/52.6 (SCl), 0.0/0.9 (SM)
04000020191 (EA 04-235641)

U.S. 101 Auxiliary Lanes
Santa Clara and San Mateo Counties, California
04000020191 (EA 04-235641)
April 2011

Storm Water Information Handout

Prepared for:

Caltrans

Prepared by:

WRECO

July 2011

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1 OVERVIEW

1.1 Intent of this Document

The objectives of this Water Quality Information Handout are: to summarize general water quality information of the Project; to summarize updated requirements per the new Construction General Permit (CGP), which became effective on July 1, 2010; to aid in developing the Storm Water Pollution Prevention Plan (SWPPP) of the Project; and to highlight information necessary to file Project Registration Documents (PRDs) to the State Water Resources Control Board via the Stormwater Multi Application Reporting and Tracking System (SMARTS) and file the Notice-of-Intent (NOI) at the start of construction. The information in this handout will guide the Resident Engineer (RE) through the process of submitting PRDs.

1.2 Summary of New Requirements

The "National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities" (NPDES Number CAS000002), or CGP, regulates discharges from construction activities within the Project area.

The CGP is based on a risk level (RL) permitting approach. The RL is calculated by 1) project sediment risk and 2) receiving water risk. See the risk assessment calculations in Section 3.1 of this document for details.

A risk assessment was performed for the **U.S 101 Auxiliary Lanes Project, Project ID 04000020191 (EA 04-235641)**. The Project was determined to be **RL 2.**

RL 2 projects will be subject to best management practice (BMP) implementation and visual monitoring requirements, plus additional monitoring and sampling requirements. RL 2 projects are subject to Numeric Action Levels (NALs) for pH and turbidity.

All projects will have to upload stormwater data into SMARTS, including a NOI, SWPPP, annual reports, and monitoring data, as applicable.

2 GENERAL PROJECT INFORMATION

2.1 Location

The Project is located along U.S. 101 between the Embarcadero Road overcrossing (37°26’56” N, 122°07’19” W) and the University Avenue overcrossing (37°27’38” N, 122°08’23” W) in the cities of Palo Alto and East Palo Alto in Santa Clara and San Mateo counties, see Figure 1.

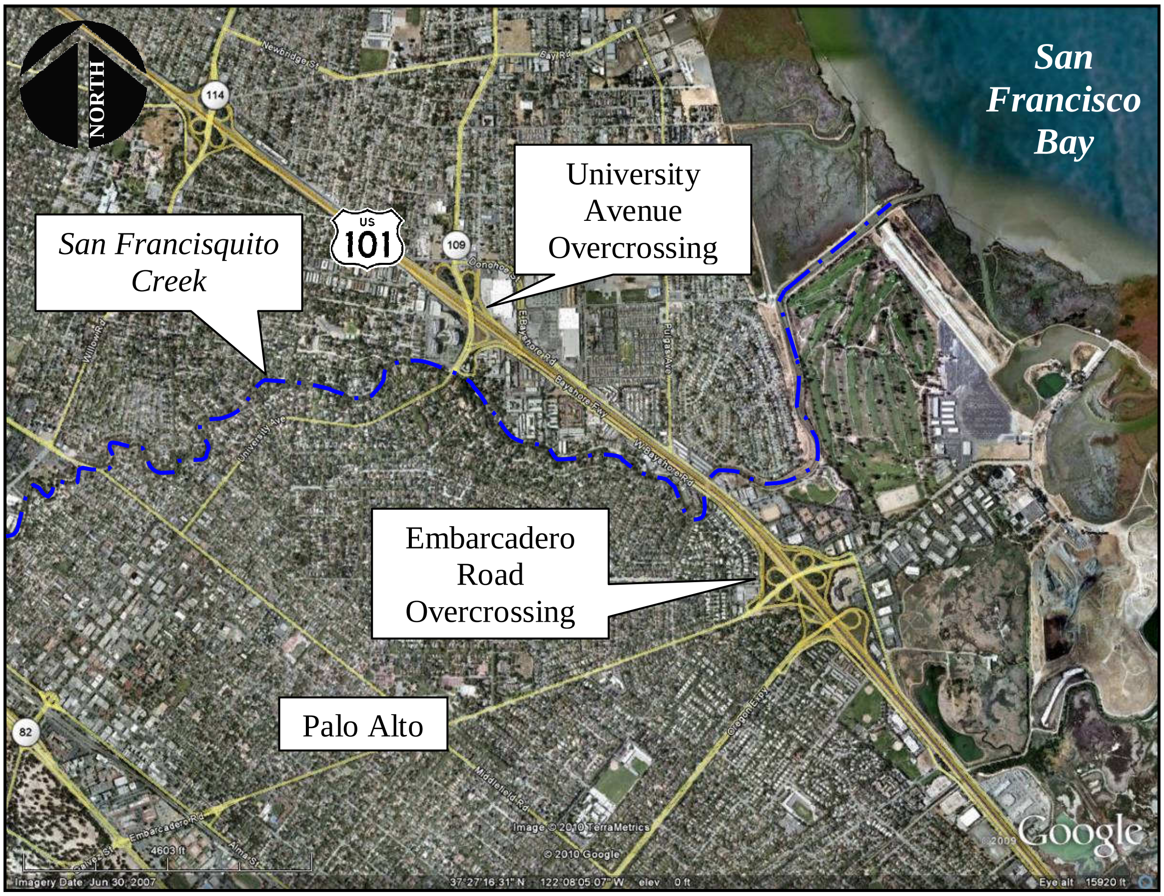


Figure 1. Aerial Vicinity Map

Source: Google Earth

2.2 Major Engineering Features

The Project will construct auxiliary lanes in both the northbound and southbound of U.S. 101 from post mile (PM) 52.2 to PM 52.6 in Santa Clara County and PM 0.0 to PM 0.9 in San Mateo County.

2.3 Receiving Water Bodies

The Project is within the Santa Clara hydrologic unit, the Palo Alto hydrologic area, and hydrologic sub-area 205.50. The direct receiving water body for the Project is San Francisquito

Creek. From the Project, the creek flows 1.5 miles northeasterly and discharges into the San Francisco Bay.

San Francisquito Creek is listed in the Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Segments for sedimentation/siltation and diazinon. The San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) website identifies the Total Maximum daily Load (TMDL) for sediment as "in development." The 303(d) identifies diazinon for San Francisquito Creek as being addressed by an approved U.S EPA approved TMDL.

The existing beneficial uses of San Francisquito Creek include:

- Cold freshwater habitat (COLD)
- Fish migration (MIGR)
- Fish spawning (SPWN)
- Warm freshwater habitat (WARM)
- Wildlife habitat (WILD)

The potential beneficial uses of San Francisquito Creek:

- Water contact recreation (REC-1)
- Noncontact water recreation (REC-2)

2.4 Creek Crossings

San Francisquito Creek crosses the Project at "C" Line Station 10+00. The creek is conveyed under U.S. 101 through a 3-span bridge (Bridge Number 350013); see Figure 2.

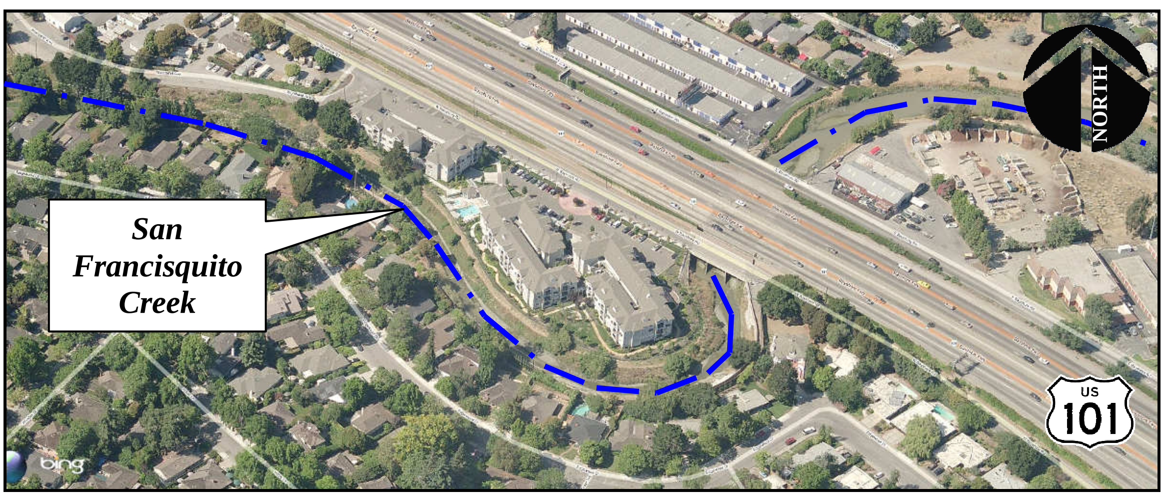


Figure 2. U.S. 101 Bridge over San Francisquito Creek

Source: Bing.com

2.5 Climate and Rainfall

A National Oceanic and Atmospheric Administration (NOAA) weather station located in Palo Alto, less than one mile east of the Project site, was used to obtain precipitation data (see Figure 3). The NOAA Atlas 2, Volume XI was used to determine the compliance storm event depth (see Figure 4).

Rainy days per year (assumed equal to precipitation 0.10 inches or greater): <u>36.1 days</u>

Qualifying rain events per year (precipitation 0.5 inches or greater): <u>9.7 days</u>

Compliance Storm Event (rainfall total for the 5 year, 24 hour storm) <u>2.8 inches</u>

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Service

Climatography of the United States No. 20 1971-2000

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801
www.ncdc.noaa.gov

Station: PALO ALTO, CA **COOP ID: 046646**

Climate Division: CA 4 **NWS Call Sign:** **Elevation: 25 Feet** **Lat: 37°27N** **Lon: 122°08W**

Precipitation (inches)

	Precipitation Totals									Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount										
	Means/ Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution										
Month	Mean	Med-ian	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= .00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	3.24	3.09	2.60	1982	5	7.91	1995	.28+	1991	10.9	6.8	2.0	.6	.28	.51	.94	1.39	1.88	2.44	3.11	3.94	5.10	7.02	8.91
Feb	3.18	2.45	3.75	1998	3	12.43	1998	.26	1997	9.9	6.3	2.1	.7	.24	.45	.86	1.30	1.78	2.34	3.02	3.87	5.05	7.03	8.99
Mar	2.65	2.42	1.52	1958	16	8.54	1983	.05	1988	10.0	5.9	1.6	.3	.20	.37	.71	1.08	1.48	1.95	2.51	3.22	4.20	5.85	7.47
Apr	.89	.66	1.55	1958	3	2.84	1978	.01	1977	5.1	3.0	.4	.0	.04	.09	.19	.31	.45	.61	.81	1.07	1.44	2.06	2.69
May	.35	.10	1.02	1994	7	2.49	1998	.00+	1992	2.5	1.3	.1	@	.00	.00	.00	.00	.04	.11	.22	.37	.61	1.03	1.47
Jun	.11	.01	.82	1995	16	1.04	1995	.00+	1998	.7	.3	@	.0	.00	.00	.00	.00	.00	.00	.04	.10	.19	.34	.50
Jul	.03	.00	.33	1966	31	.34	1980	.00+	2000	.4	.1	.0	.0	.00	.00	.00	.00	.00	.00	.00	.00	.03	.10	.17
Aug	.08	.00	.58	1997	20	.81	1976	.00+	1998	.6	.3	@	.0	.00	.00	.00	.00	.00	.00	.00	.02	.10	.26	.46
Sep	.19	.05	1.78	1959	19	1.09	1982	.00+	1996	1.6	.6	.1	.0	.00	.00	.00	.00	.00	.04	.10	.19	.33	.58	.85
Oct	.85	.61	1.86	1962	13	3.72	1972	.00+	1995	3.2	1.9	.6	.1	.00	.03	.13	.26	.40	.56	.77	1.03	1.41	2.05	2.69
Nov	1.83	1.22	2.48	1970	29	6.31	1972	.03	1995	7.2	4.1	1.3	.3	.07	.16	.36	.59	.87	1.21	1.63	2.18	2.97	4.32	5.68
Dec	2.31	2.12	2.77	1955	22	5.49	1996	.01	1989	8.8	5.5	1.5	.3	.18	.33	.63	.94	1.30	1.70	2.19	2.80	3.66	5.09	6.50
Ann	15.71	14.42	3.75	Feb 1998	3	12.43	Feb 1998	.00+	Jul 2000	60.9	36.1	9.7	2.3	7.03	8.42	10.36	11.93	13.40	14.88	16.46	18.28	20.56	24.02	27.15

+ Also occurred on an earlier date(s)
# Denotes amounts of a trace
@ Denotes mean number of days greater than 0 but less than .05
** Statistics not computed because less than six years out of thirty had measurable precipitation

(1) From the 1971-2000 Monthly Normals
(2) Derived from station's available digital record: 1953-2001
(3) Derived from 1971-2000 serially complete daily data
Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

162-B

Figure 3. NOAA Rainfall Data

Source: NOAA

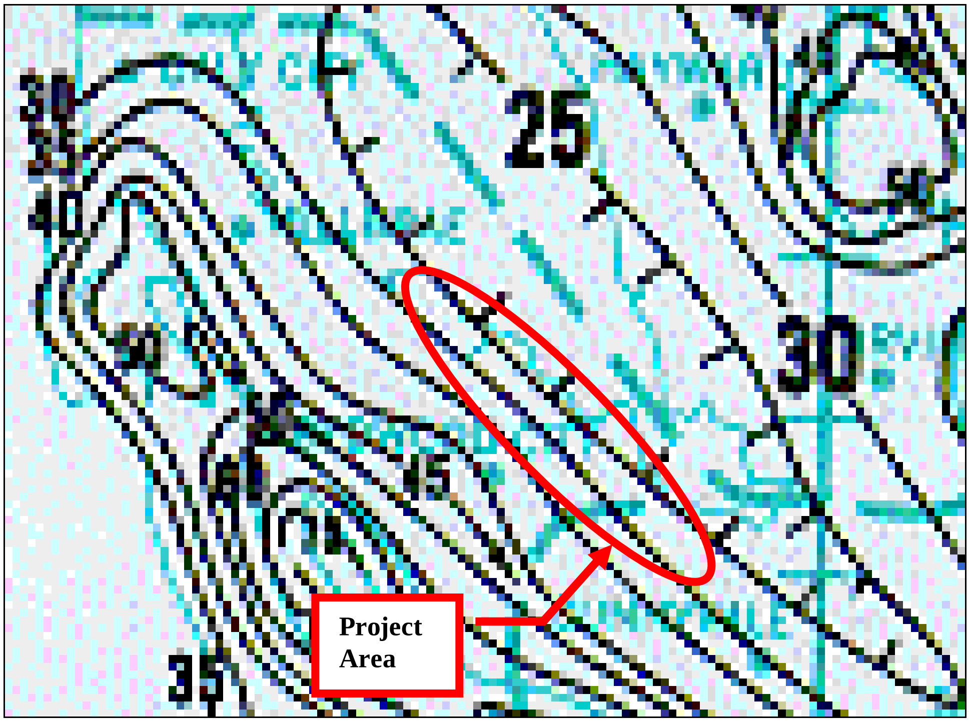


Figure 4. From NOAA Atlas 2, Volume XI (5-year, 24 hour, in tenths of inches)

Source: NOAA

2.6 Soils

The general soil erodibility factor (K) for the Project area is 0.24 and was determined from the Caltrans "Construction General Permit Info" GIS map.

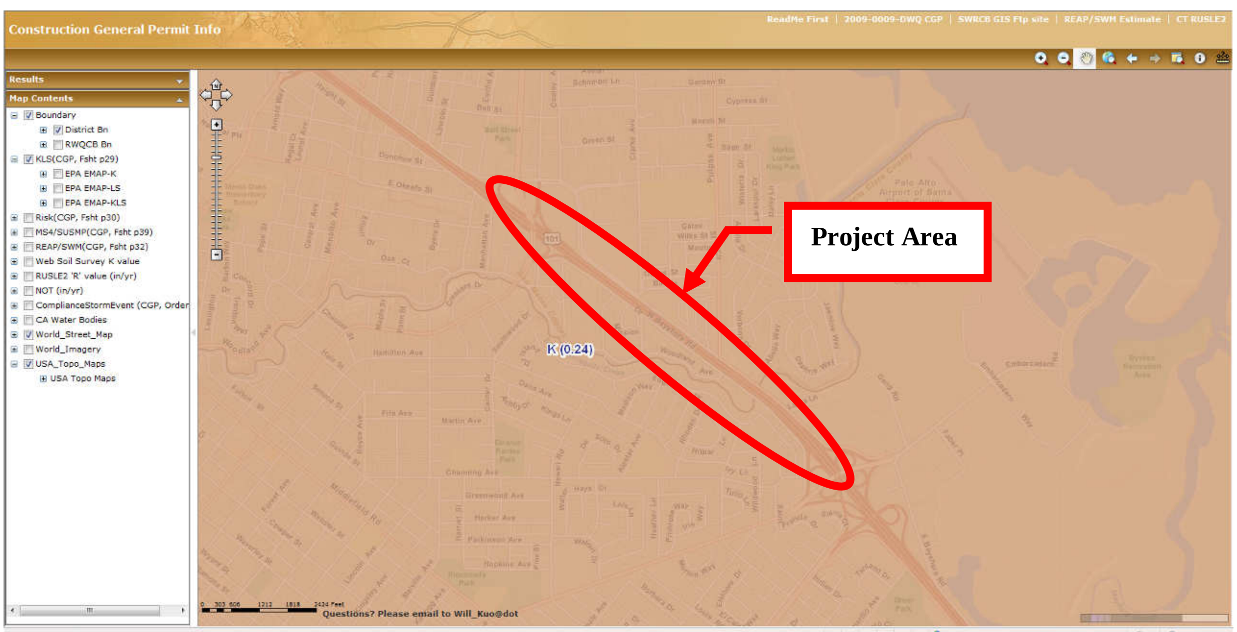


Figure 5. Soil Erodibility Factor from Caltrans

Source: Caltrans

3 CONSTRUCTION GENERAL PERMIT

In order to minimize the potential effects of construction runoff on the quality of the receiving water bodies, any construction activity affecting one acre or more must obtain coverage under the CGP. Permit applicants are required to prepare a SWPPP and implement BMPs to reduce construction effects on receiving water quality.

3.1 Risk Assessment

The CGP requirements include a risk assessment to determine the Project's impact risk to receiving water bodies. The risk assessment uses measurements of the Project's potential sediment risk and the sensitivity of the receiving water bodies to sediment to determine the risk level of the Project. This Project has a **Low Site Sediment Risk Factor** and a **High Receiving Water Risk Factor**; the combined risk is **Level 2**, see Table 4.

3.1.1 Sediment Risk

The sediment risk is based on the following equation from the CGP "Fact Sheet" (Section J.1.a pg. 28):

Equation 1. Sediment Risk Equation

$A = (R)(K)(LS)(C)(P)$

Where:

R = Rainfall-runoff erosivity factor
K = Soil erodibility factor
LS = Length-slope
C = Cover
P = Management operations and support practices
A = Rate of sheet and rill erosion (tons per acre)

The rainfall-runoff erosivity factor (R) of **16.56** was determined from the U.S. Environmental Protection Agency "Rainfall Erosivity Factor Calculator for Small Construction Sites," see Figure 6.

As stated in Section 2.6, the K factor is **0.24**.

The length-slope factor (LS) of **1.02** was determined by estimating the original grade and slope lengths delineated on the Typical Cross Sections included in the Contract Project Plans, see Table 1.

The cover factor (C) and management operations and support practices (P) are given values of 1.0 by the CGP to simulate bare ground conditions.

Based on these factors, the rate of sheet and rill erosion (A) is **4** tons per acre. This value is less than 15, so the sediment risk is **Low**, see Table 2.

Rainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Facility Name: EA 235641
Start Date: 03/01/2012
End Date: 12/01/2012
Latitude: 37.4558
Longitutde: -122.1331

Erosivity Index Calculator Results

AN EROSIVITY INDEX VALUE OF 16.56 HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF **03/01/2012 - 12/01/2012**.

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction.
You do not qualify for a waiver from NPDES permitting requirements.

Figure 6. Rainfall-Runoff Erosivity (R) Factor

Source: U.S. EPA

Table 1. Length-Slope (LS) Factor

	Average Watershed Slope (%)					
Sheet Flow Length (ft)	**2.0**	**3.0**	**4.0**	**5.0**	**6.0**	**8.0**
15	0.13	0.17	0.20	0.23	0.26	0.32
25	0.16	0.21	0.26	0.31	0.36	0.45
50	0.21	0.30	0.38	0.46	0.54	0.70
75	0.25	0.36	0.47	0.58	0.69	0.91
100	0.28	0.41	0.55	0.68	0.82	1.10
150	0.33	0.50	0.68	0.86	1.05	1.43
200	0.37	0.57	0.79	1.02	1.25	1.72
250	0.40	0.64	0.89	1.16	1.43	1.99
300	0.43	0.69	0.98	1.28	1.60	2.24
400	0.48	0.80	1.14	1.51	1.90	2.70
600	0.56	0.96	1.42	1.91	2.43	3.52
800	0.63	1.10	1.65	2.25	2.89	4.24
1000	0.69	1.23	1.86	2.55	3.30	4.91

Source: State Water Resources Control Board

Table 2. Sediment Risk Factor

Sediment Risk Factor Worksheet	**Entry**
A) R Factor	
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site. http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm	
R Factor Value	16.56
B) K Factor (weighted average, by area, for all site soils)	
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted. Site-specific K factor guidance	
K Factor Value	0.24
C) LS Factor (weighted average, by area, for all slopes)	
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction. LS Table	
LS Factor Value	1.02
Watershed Erosion Estimate (=RxKxLS) in tons/acre	4
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >=15 and <75 tons/acre High Sediment Risk: >= 75 tons/acre	**Low**

Source: State Water Resources Control Board

3.1.2 Receiving Water Body Risk

The receiving water risk is high because San Francisquito Creek is listed on the 303(d) as impaired for sedimentation/siltation, plus the creek has the beneficial uses of COLD, SPWN and MIGR. See Table 3.

Table 3. Receiving Water Risk Factor

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	yes/no	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below: 2006 Approved Sediment-impared WBs Worksheet http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml **OR** A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp	**Yes**	**High**

Source: State Water Resources Control Board

Table 4. Risk Level Determination

Combined Risk Level Matrix

Receiving Water Risk \ Sediment Risk	Low	Medium	High
Low	Level 1	Level 2	Level 2
High	Level 2	Level 2	Level 3

Project Sediment Risk:	**Low**
Project RW Risk:	**High**
Project Combined Risk:	**Level 2**

Source: State Water Resources Control Board

3.2 Notice-of-Termination (NOT)

The CGP provides both revised and new requirements for completion and approval of the NOT. The NOT requirements are presented in Section II.D of the CGP. These requirements include demonstrating that the terms of the NOT have been satisfied through photos, computational proof or other "custom methods," such as results of testing and analysis.

While these methods of demonstrating compliance are at the option of the contractor, should the RWQCB determine that the visual photos do not adequately show compliance, further computational efforts may be required. This computational proof is obtained through the use of the Revised Universal Soil Loss Equation 2 (RUSLE2) program.

3.3 Caltrans Forms

Below is a list forms have been developed by the Caltrans Division of Construction, as of 04/2011, to comply with the CGP. For a full list of Caltrans Division of Construction Forms go to: http://www.dot.ca.gov/hq/construc/forms.htm.

- CEM-2030 "Stormwater Site Inspection Report"
- CEM-2034 "Stormwater Best Management Status Report"
- CEM-2035 "Stormwater Site Inspection Report Corrective Actions Summary"
- CEM-2045 "Rain Event Action Plan-Highway Construction Phase"
- CEM-2046 "Rain Event Action Plan-Plant Establishment Phase"
- CEM-2047 "Rain Event Action Plan-Inactive Project"
- CEM-2048 "Storm Event Sampling and Analysis Plan"
- CEM-2061 "Notice of Discharge Form"
- CEM-2090 "Notice of Completion of Construction"

4 RUN-ON DISCHARGES

Run-on discharges are calculated to design stormwater BMPs during construction. There are no anticipated run-on discharges within the Project limits. The majority of U.S. 101 within the Project limits is currently in fill or has existing soundwalls, plus existing and proposed concrete barriers along the right-of-way that should prevent any run-on. While no run-on is anticipated, the contractor is responsible for determining if there will be any actual run-on discharges based on anticipated in-field work and document measures to address run-on discharges in the SWPPP. Generally, the Rational Method (see Equation 1) is used to calculate the run-on discharges.

Equation 1. Rational Method for run-on discharge

$$Q = CiA$$

Where:

Q = Run-on discharge (cubic feet per second)
C = Runoff coefficient = **0.58** (based on Figure 819.2A of the Caltrans Highway Design Manual)
i = 2-year, 24-hour rainfall intensity (inches/hour) = **0.083**
A = Drainage area (acre)

5 PROJECT REGISTRATION DOCUMENTS

In order to obtain permit coverage under the CGP, all dischargers must electronically file PRDs, NOTs, changes of information, sampling and monitoring information, annual reporting, and other compliance documents required by the CGP through the SWRCB's SMARTS. The Contractor will have to coordinate these submittals with Caltrans within the timeframe allotted in the contract's special provisions and as specified in the CGP. SMARTS is found under the following website:

https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp

PRDs include the following information:

1. Notice-of-Intent (NOI)
2. Site Map(s) includes:
    a. The project's surrounding area (vicinity)
    b. Site layout
    c. Construction site boundaries
    d. Drainage areas
    e. Discharge locations
    f. Sampling locations
    g. Areas of soil disturbance (temporary or permanent)
    h. Active areas of soil disturbance (cut or fill)
    i. Locations of all runoff BMPs
    j. Locations of all erosion control BMPs
    k. Locations of all sediment control BMPs
    l. Locations of sensitive habitats, watercourses, or other features which are not to be disturbed
    m. Locations of all post-construction BMPs
    n. Locations of storage areas for waste, vehicles, service, loading/unloading of materials, access (entrance/exits) points to construction site, fueling and water storage, water transfer for dust control, and compaction practices

3. **SWPPPs**

4. **Risk Assessment**
    a. The Standard Risk Assessment includes utilization of the following:
        i. Receiving water risk documentation
        ii. Sediment sensitive water bodies list
        iii. EPA Rainfall Erosivity Factor Calculator Website
        iv. Sediment risk documentation

5.1 General Information Included

The following is a list of information included in this Storm Water Information Handout that can be used for the PRDs:

- Vicinity Map
- Risk Assessment

5.2 Storm Water Pollution Prevention Plan

The Contractor for the Project is required to prepare a SWPPP because the Project involves disturbance of more than 1 ac of soil. The SWPPP must include the following information:

- o Active areas of soil disturbance (cut and fill)
- o Areas of soil disturbance (temporary and permanent)
- o Locations of storage areas for waste, vehicles, access, etc.
- o Locations of all runoff BMPs
- o Locations of all erosion control BMPs
- o Locations of all sediment control BMPs

The SWPPP should be submitted with the PRDs and will be forthcoming from the Contractor.

5.3 Notice-of-Intent (NOI)

The NOI must be submitted once the Contractor submits the SWPPP. A draft of the NOI is included in Appendix A.

5.4 Site Maps

Registration requirements can be met by the inclusion of the following plans, which can be found in the following appendices.

- Conceptual Sampling Plan (Appendix B)
  - o Discharge Locations (Subject to changes by the Contractor and approved by the Resident Engineer)
  - o Sampling Locations (Subject to changes by the Contractor and approved by the Resident Engineer)

Appendix A Notice-of-Intent (NOI)

Attachment 2

State Water Resources Control Board

NOTICE OF INTENT

TO COMPLY WITH THE TERMS OF THE
GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY (WQ ORDER No. 99-08-DWQ)

I. NOI STATUS (SEE INSTRUCTIONS)

MARK ONLY ONE ITEM 1. ☐ New Construction 2. ☐ Change of Information for WDID# ________

II. PROPERTY OWNER

Name CALTRANS DISTRICT 4	Contact Person BIJAN SARTIPI		
Mailing Address 111 GRAND AVENUE	Title DISTRICT DIRECTOR		
City OAKLAND	State CA	Zip 94623	Phone (510) 286-5900

Owner Type (*check one*) 1.[ ] Private Individual 2.[ ]Business 3.[ ]Municipal 4.[X]State 5.[ ]Federal 6.[ ]Other

III. DEVELOPER/CONTRACTOR INFORMATION

Developer/Contractor	Contact Person		
Mailing Address	Title		
City	State	Zip	Phone

IV. CONSTRUCTION PROJECT INFORMATION

Site/Project Name US 101 AUXILIARY LANES	Site Contact Person		
Physical Address/Location EMBARCADERO ROAD OC TO UNIVERSITY AVE. OC	Latitude 37.4558 °	Longitude -122.1331 °	County
City (or nearest City) PALO ALTO AND EAST PALO ALTO	Zip 94303	Site Phone Number	Emergency Phone Number

A. Total size of construction site area: ________ Acres

B. Total area to be disturbed: ________ Acres (% of total ______)

C. Percent of site imperviousness (including rooftops):

Before Construction: ________%

After Construction: ________%

D. Tract Number(s): ________, ________

E. Mile Post Marker: 52.2/52.6 & 0.0/0.9

F. Is the construction site part of a larger common plan of development or sale?

☐ YES ☒ NO

G. Name of plan or development:

H. Construction commencement date: 03 / 01 / 2012

I. % of site to be mass graded: ________

J. Projected construction dates:

Complete grading: ____/____/____ Complete project: 12 / 01 / 2012

K. Type of Construction (Check all that apply):

1. ☐ Residential 2. ☐ Commercial 3. ☐ Industrial 4. ☐ Reconstruction 5. ☒ Transportation

6. ☐ Utility Description: ________________ 7. ☐ Other (Please List): ________________

V. BILLING INFORMATION

SEND BILL TO: ☒ OWNER (as in II. above)	Name	Contact Person	
☐ DEVELOPER (as in III. above)	Mailing Address	Phone/Fax	
☐ OTHER (enter information at right)	City	State	Zip

VI. REGULATORY STATUS

A. Has a local agency approved a required erosion/sediment control plan?............ [X] YES [ ] NO

Does the erosion/sediment control plan address construction activities such as infrastructure and structures?............ [X] YES [ ] NO

Name of local agency: CALIFORNIA DEPARTMENT OF TRANSPORATION Phone: ____________

B. Is this project or any part thereof, subject to conditions imposed under a CWA Section 404 permit of 401 Water Quality Certification?............ [ ] YES [X] No

If yes, provide details: ____________

VII. RECEIVING WATER INFORMATION

A. Does the storm water runoff from the construction site discharge to (Check all that apply):

1. [ ] **Indirectly to waters of the U.S.**
2. [ ] **Storm drain system - Enter owner's name:** ____________
3. [X] **Directly to waters of U.S. (e.g. , river, lake, creek, stream, bay, ocean, etc.)**

B. Name of receiving water: (river, lake, creek, stream, bay, ocean): SAN FRANCISQUITO CREEK

VIII. IMPLEMENTATION OF NPDES PERMIT REQUIREMENTS

A. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) (check one)

[ ] A SWPPP has been prepared for this facility and is available for review: Date Prepared: ____/____/____ Date Amended: ____/____/____

[ ] A SWPPP will be prepared and ready for review by (enter date): ____/____/____

[ ] A tentative schedule has been included in the SWPPP for activities such as grading, street construction, home construction, etc.

B. MONITORING PROGRAM

[ ] A monitoring and maintenance schedule has been developed that includes inspection of the construction BMPs before anticipated storm events and after actual storm events and is available for review.

If checked above: A qualified person has been assigned responsibility for pre-storm and post-storm BMP inspections to identify effectiveness and necessary repairs or design changes............ [ ] YES [ ] NO

Name: ____________ Phone: ____________

C. PERMIT COMPLIANCE RESPONSIBILITY

A qualified person has been assigned responsibility to ensure full compliance with the Permit, and to implement all elements of the Storm Water Pollution Prevention Plan including:

1. Preparing an annual compliance evaluation............ [ ] YES [ ] NO

Name: ____________ Phone: ____________

2. Eliminating all unauthorized discharges............ [ ] YES [ ] NO

IX. VICINITY MAP AND FEE (must show site location in relation to nearest named streets, intersections, etc.)

Have you included a vicinity map with this submittal? .... [X] YES [ ] NO

Have you included payment of the annual fee with this submittal?............ [ ] YES [ ] NO

X. CERTIFICATIONS

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.
I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment. In addition, I certify that I have read the entire General Permit, including all attachments, and agree to comply with and be bound by all of the provisions, requirements, and prohibitions of the permit, including the development and implementation of a Storm Water Pollution Prevention Plan and a Monitoring Program Plan will be complied with."

Printed Name: ____________

Signature: ____________ **Date:** ____________

Title: ____________

Appendix B Conceptual Sampling Plan

FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

LEGEND:

- DISCHARGE LOCATION
- S2 DISCHARGE POINT AND SAMPLING LOCATION
- C2 ADDITIONAL SAMPLING LOCATION

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
4	SCI,SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER DATE

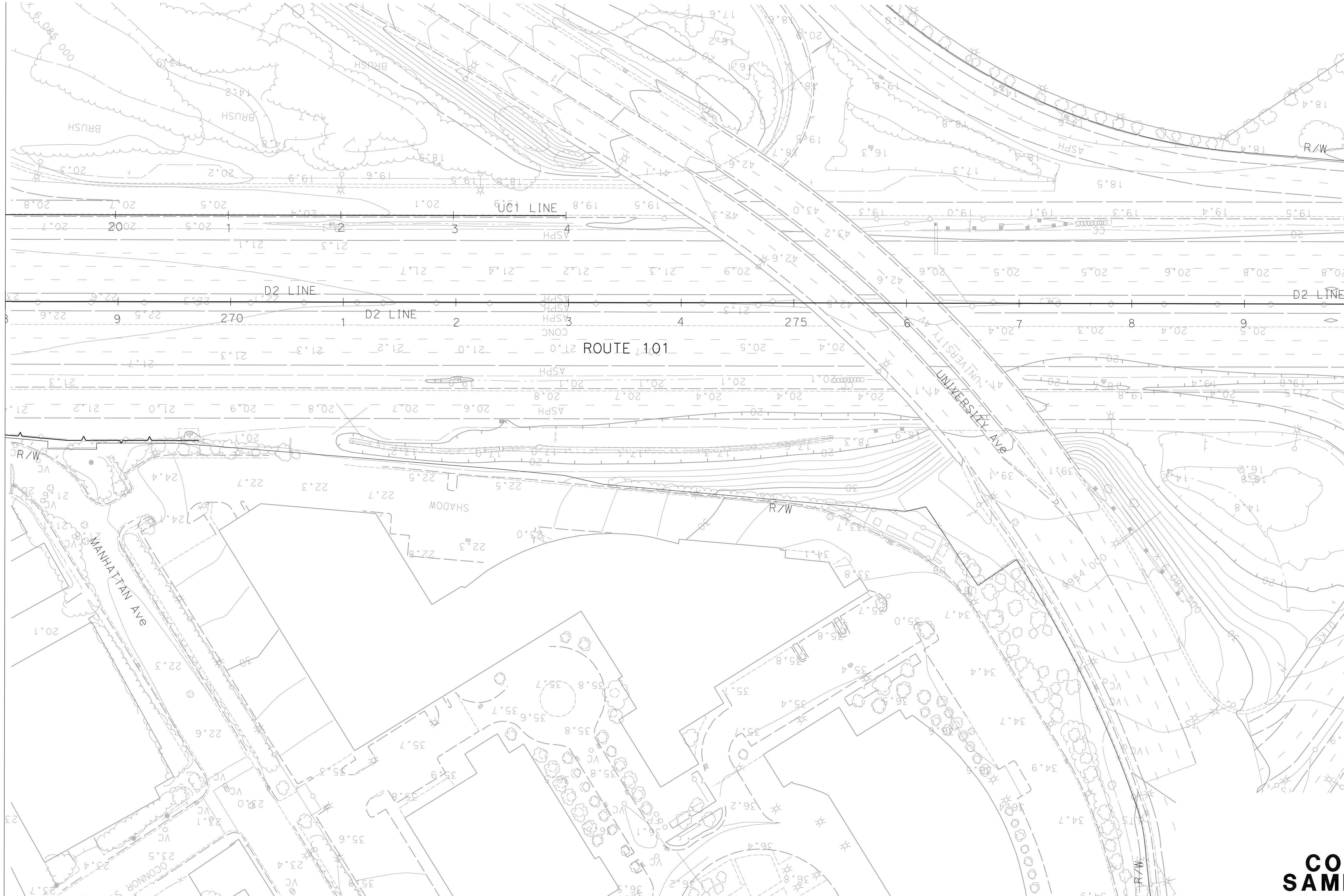
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
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.

WRECO
1243 ALPINE ROAD
SUITE 108
WALNUT CREEK, CA 94596

CALTRANS
111 GRAND AVENUE
OAKLAND, CA 94612



D2 280+00 SEE SHEET WPCD-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: HAN-BIN LIANG
CALCULATED-DESIGNED BY: ALVIN YIM
CHECKED BY: ANALETTE OCHOA
REVISED BY: AY
DATE REVISED: 04/25/11

CONCEPTUAL SAMPLING PLAN

SCALE: 1"=50'

CSP-1

LAST REVISION 00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010
USERNAME => $USER
DGN FILE => $REQUEST
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0720
PROJECT NUMBER & PHASE 04000020191

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
4	SCl,SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
STATE OF CALIFORNIA

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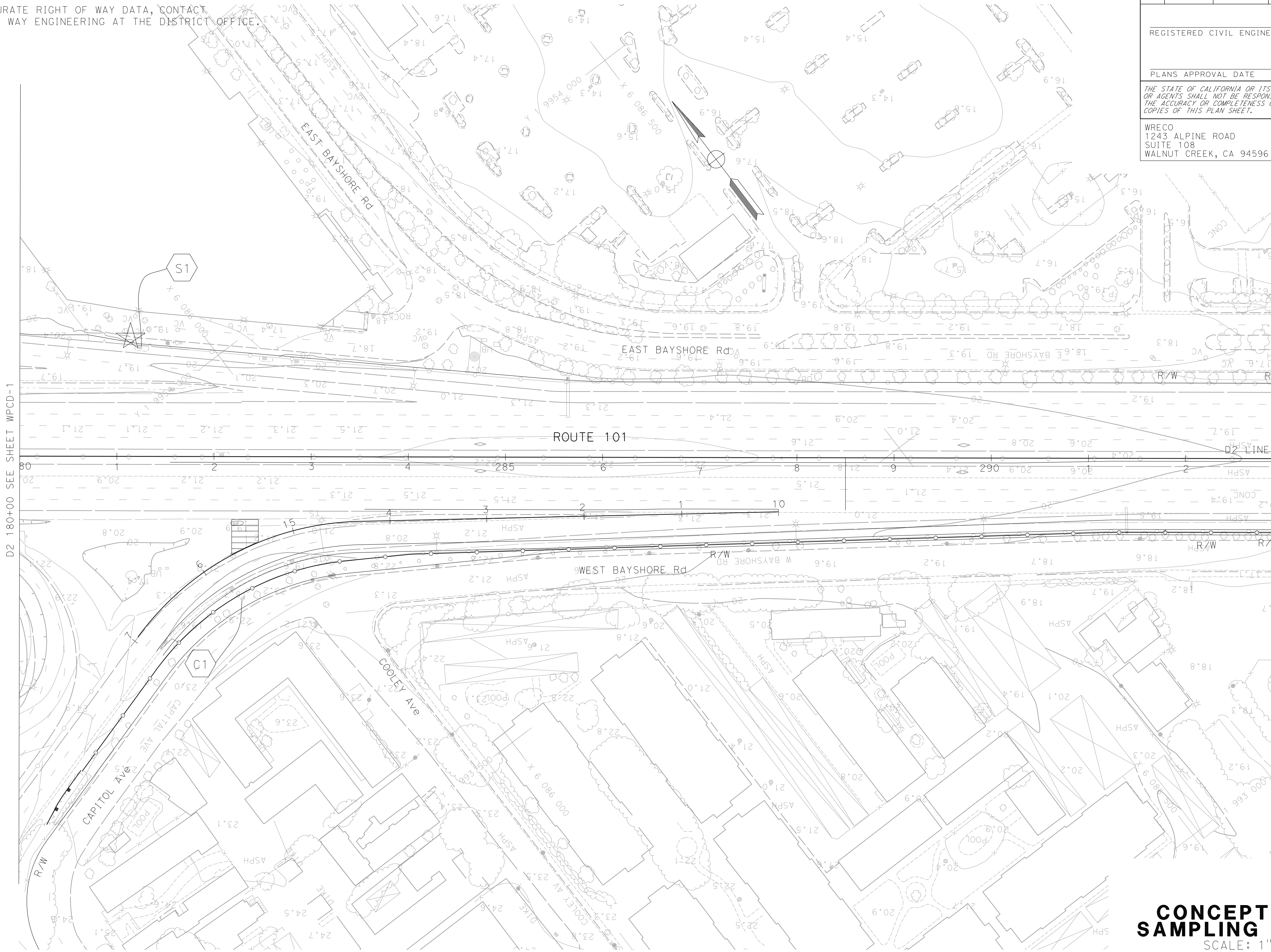
WRECO
1243 ALPINE ROAD
SUITE 108
WALNUT CREEK, CA 94596

CALTRANS
111 GRAND AVENUE
OAKLAND, CA 94612

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



CONCEPTUAL SAMPLING PLAN

SCALE: 1"=50'

CSP-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: HAN-BIN LIANG

CALCULATED-DESIGNED BY: ALVIN YIM

CHECKED BY: ANALETTE OCHOA

REVISED BY: AY

DATE REVISED: 04/25/11

LAST REVISION 00-00-00 | DATE PLOTTED => $DATE | TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010 | USERNAME => $USER | DGN FILE => $REQUEST | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0720 | PROJECT NUMBER & PHASE | 04000020191

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
4	SCI,SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
STATE OF CALIFORNIA

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WRECO
1243 ALPINE ROAD
SUITE 108
WALNUT CREEK, CA 94596

CALTRANS
111 GRAND AVENUE
OAKLAND, CA 94612

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

CONSULTANT FUNCTIONAL SUPERVISOR: HAN-BIN LIANG

CALCULATED-DESIGNED BY: ALVIN YIM

CHECKED BY: ANALETTE OCHOA

REVISED BY: AY

DATE REVISED: 04/25/11

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CONCEPTUAL SAMPLING PLAN

SCALE: 1"=50'

CSP- 3

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME
LAST REVISION 00-00-00

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
4	SCl,SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

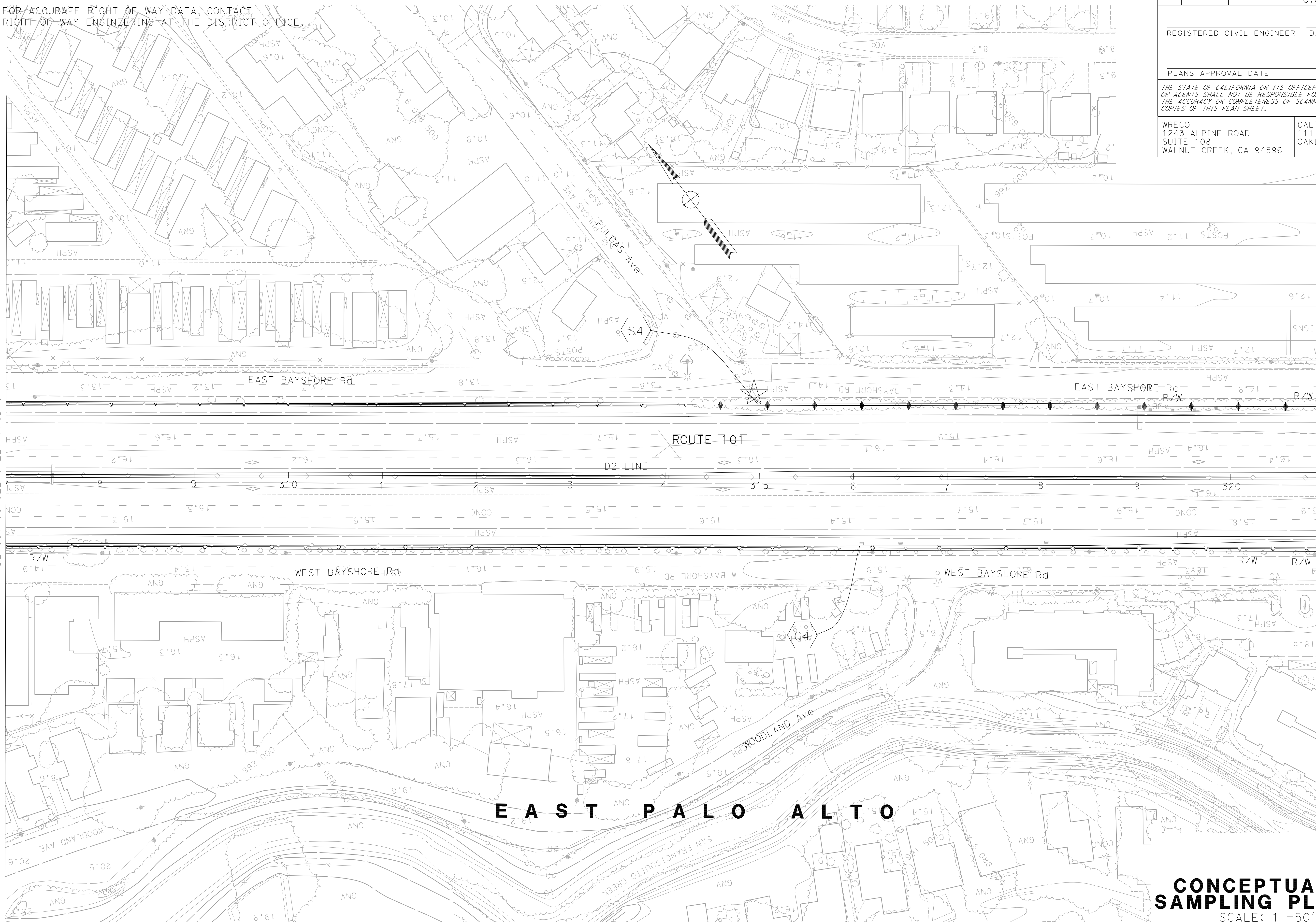
REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
STATE OF CALIFORNIA

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.

WRECO
1243 ALPINE ROAD
SUITE 108
WALNUT CREEK, CA 94596

CALTRANS
111 GRAND AVENUE
OAKLAND, CA 94612

FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



CONCEPTUAL SAMPLING PLAN

SCALE: 1"=50'

CSP-4

CALCULATED-DESIGNED BY	CHECKED BY
ALVIN YIM	ANALETTE OCHOA

REVISED BY: AY
DATE REVISED: 04/25/11

CONSULTANT FUNCTIONAL SUPERVISOR: HAN-BIN LIANG

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

LAST REVISION 00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
4	SCl,SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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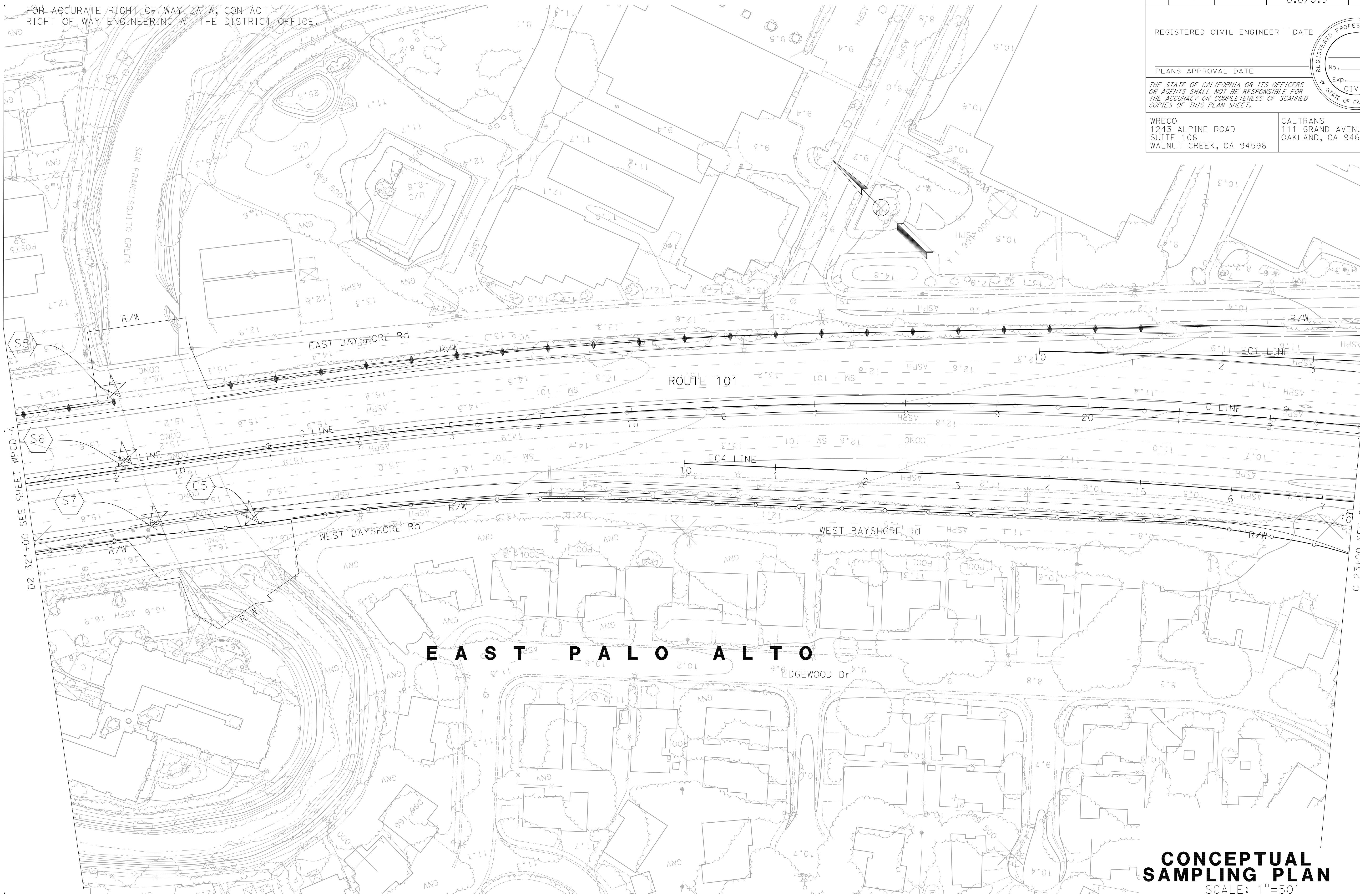

CONCEPTUAL SAMPLING PLAN

SCALE: 1"=50'

CSP-5

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: HAN-BIN LIANG

CALCULATED-DESIGNED BY: ALVIN YIM

CHECKED BY: ANALETTE OCHOA

REVISED BY: AY

DATE REVISED: 04/25/11

LAST REVISION: 00-00-00

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
4	SCI,SM	101	52.2/52.6, 0.0/0.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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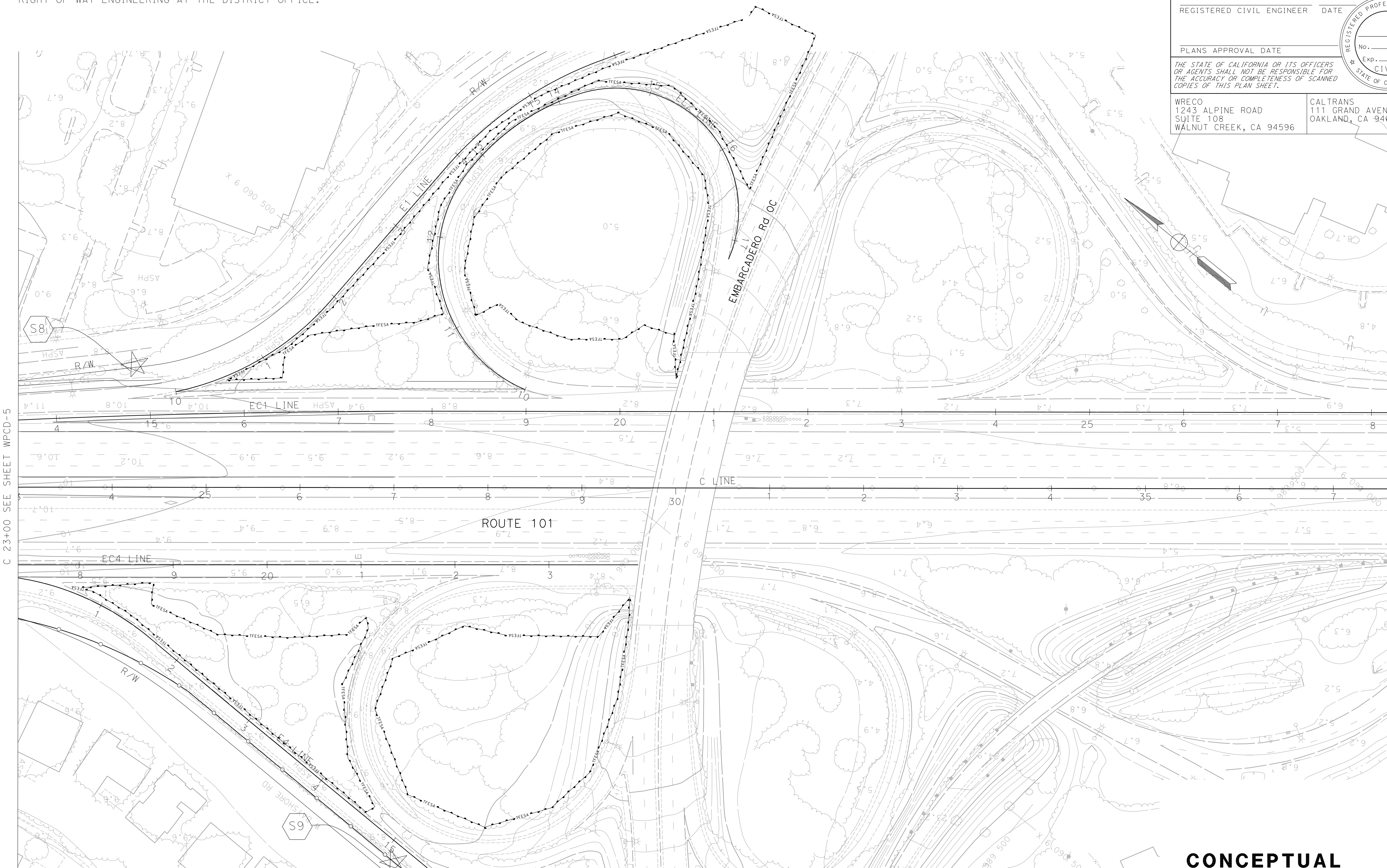

CONCEPTUAL SAMPLING PLAN

SCALE: 1"=50'

CSP- 6

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	REVISED BY	DATE REVISED
HAN-BIN LIANG	ALVIN YIM	AY	04/25/11
	CHECKED BY		
	ANALETTE OCHOA		

LAST REVISION 00-00-00

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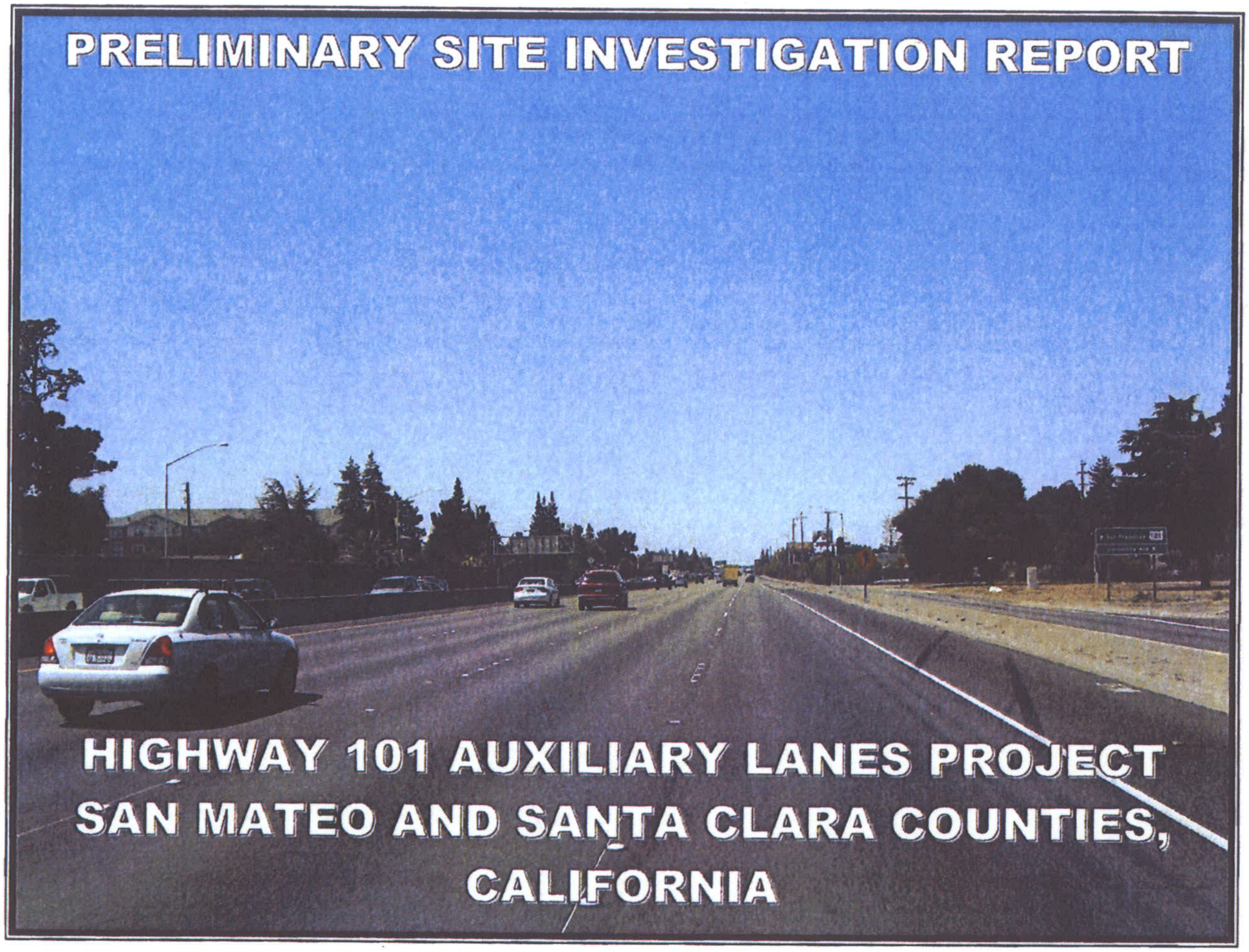
TIME PLOTTED => $TIME

8. 04-235641-Preliminary-Site-Investigation-Report.pdf

(From the parent EA 235611)



PRELIMINARY SITE INVESTIGATION REPORT

HIGHWAY 101 AUXILIARY LANES PROJECT SAN MATEO AND SANTA CLARA COUNTIES, CALIFORNIA

PREPARED FOR:
CALTRANS DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
111 GRAND AVENUE, MS8C
OAKLAND, CA 94612

Caltrans

PREPARED BY:
GEOCON CONSULTANTS, INC.
6671 BRISA STREET
LIVERMORE, CALIFORNIA

GEOCON

GEOCON PROJECT NO. E8435-06-36
CALTRANS EA 04-235611

DECEMBER 2009

TABLE OF CONTENTS

TABLE OF CONTENTS, CONT

FIGURES

TABLES

APPENDICES

REPORT LIMITATIONS

This report has been prepared exclusively for the State of California Department of Transportation (Caltrans) District 4. The information contained herein is only valid as of the date of the report and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

GEOCON CONSULTANTS, INC.

Lauren Vigliotti Senior Staff Geologist	Richard Day, CEG, CHG Senior Geologist, Vice President

PROFESSIONAL GEOLOGIST
RICHARD W. DAY
No. 5479
Exp. 09-30-11
STATE OF CALIFORNIA

CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING

Reviewed By:	Recommended By:	Approved By:
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PRELIMINARY SITE INVESTIGATION REPORT

EXECUTIVE SUMMARY

We prepared this Preliminary Site Investigation Report for the United States Highway 101 (US 101) Auxiliary Lane Addition project under California Department of Transportation (Caltrans) Contract No. 04A2912 and Task Order (TO) 36, EA 04-235611. The project location is depicted on the Vicinity Map, Figure 1, and the Site Plan, Figure 2.

The purpose of the investigation was to evaluate the concentrations of metals, including aerially deposited lead (ADL), in soil and total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs) in soil and groundwater at the Site. The information obtained from this investigation will be used by Caltrans to determine soil disposal costs and to identify health and safety concerns during proposed construction activities.

The field investigation was performed on August 10-13, 18, 24, 25, and 31, 2009, by Geocon staff John Love, Professional Geologist (PG), and Chris Merritt, PG. The following field activities were performed during the sampling efforts:

- Advanced a total of 136 soil borings at the Site to a maximum depth of 18 feet using direct-push drilling and hand-auger techniques. One-hundred-twenty-three borings were advanced to a depth of 2.5 feet, nine borings were advanced to a depth of 6 feet, and four borings were advanced to a depth of 18 feet.
- Collected a total of 438 soil samples. Selected soil samples were analyzed for total and soluble lead, California Assessment Manual (CAM) 17 metals, TPH and/or VOCs.
- Collected four grab-groundwater samples for analysis of TPH and VOCs.
- Transported samples to Advanced Technology Laboratories (ATL) for analysis under standard chain-of-custody (COC) documentation.

Laboratory analytical results are presented on Tables 2 through 5. Reproductions of the laboratory reports and chain-of-custody documentation are provided as Appendix A.

Predicted Soluble (Waste Extraction Test; WET) Lead Results

The lead data for the Site were treated as 16 separate sample populations for statistical evaluation. The waste classifications for each of the sample populations are provided in Tables 6a through 6p, and are summarized as follows:

Soil excavated to a depth of **2.0 feet** would be classified as California hazardous and will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous:

a) US 101 Southbound (SB) - Borings B-1 to B-67

b) US 101 SB excluding Willow Road Overcrossing (OC) and University Avenue OC - Borings B-1 to B-25, B-32 to B-42, and B-53 to B-67

c) US 101 SB excluding Willow Road OC - Borings B-1 to B-25 and B-32 to B-67

e) US 101 SB excluding University Avenue OC - Borings B-1 to B-42 and B-53 to B-67

f) US 101 SB at University Avenue OC - Borings B-43 to B-52

g) US 101 Northbound (NB) - Borings B-68 to B-137

h) US 101 NB excluding Willow Road OC and University Avenue OC - Borings B-68 to B-97, B-102 to B-111, and B-122 to B-137

i) US 101 NB excluding Willow Road OC - Borings B-68 to B-97 and B-102-B-137

k) US 101 NB excluding University Avenue OC - Borings B-68 to B-111 and B-122 to B-137

m) US 101 SB from Marsh Road to University Avenue – Borings B-1 to B-48

n) US 101 SB from University Avenue to Embarcadero Road – Borings B-49 to B-67

p) US 101 NB from University Avenue to Embarcadero Road – Borings B-117 to B-137

Soil excavated to a depth of **1.0 foot** would be classified as California hazardous and will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 1.0 foot) would be classified as non-hazardous:

d) US 101 SB at Willow Road OC - Borings B-26 to B-31

l) US 101 NB at University Avenue OC - Borings B-113 to B-121

Soil excavated to a depth of **2.5 feet** would be classified as California hazardous and will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.5 feet) would be classified as non-hazardous:

j) US 101 NB at Willow Road OC - Borings B-98- to B-101

o) US 101 NB from Marsh Road to University Avenue – Borings B-68 to B-116

CAM 17 Metals

The 95% UCL values for arsenic and vanadium in the soil samples collected at the Site are greater than their respective residential land use ESLs and are less than the commercial/industrial land use ESLs. The SFRWQCB *November 2007 Update to Environmental Screening Levels (ESLs) Technical Document* states that ambient background concentrations of arsenic typically exceed risk-based screening levels. In such instances, it may be more appropriate to compare site data to regionally specific established background levels.

background mean concentrations, with the exception of antimony, which is within the published background range.

Offsite reuse or disposal of excavated soil may be restricted based on metals content.

Organics

Soil

TPHg and VOCs were not detected above the laboratory reporting limits. The reported TPHd and TPHmo concentrations were below their respective ESLs.

Grab-Groundwater

Organic compounds were not detected above their respective laboratory reporting limits in the grab-groundwater samples, with the exception of 4-isopropyltoluene, which does not have a published ESL value.

Worker Protection

Per Caltrans' requirements, the contractor(s) should prepare a project-specific health and safety plan to prevent or minimize worker exposure to impacted soil and groundwater. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of soil and groundwater.

1.0 INTRODUCTION

This Preliminary Site Investigation Report for the United States Highway 101 (US 101) Auxiliary Lane Addition project was prepared by Geocon Consultants, Inc. under California Department of Transportation (Caltrans) Contract No. 04A2912 and Task Order (TO) 36, EA 04-235611.

Asbestos-containing materials (ACMs) surveys of the Ringwood pedestrian overcrossing (POC), the Hetch Hetchy Aqueduct Bridge, and the Francisquito Creek Bridge were also conducted under TO 36. The results of the ACM surveys are presented under separate cover in the *Asbestos and Lead-Containing Paint Survey Report,* dated December 2009.

1.1 Project Description and Proposed Improvements

The project area consists of US 101 from the intersection with Embarcadero Road in the City of Palo Alto to Marsh Road (the Site) in the City of Menlo Park, California. The Site extends between Post Miles (PM) 52.2 in Palo Alto, Santa Clara County, to PM 3.6 in Menlo Park, San Mateo County. Caltrans is proposing to add approximately four miles of auxiliary lane in both directions of US 101. The site location is depicted on the Vicinity Map, Figure 1.

1.2 General Objectives

The purpose of the investigation was to evaluate the concentrations of metals, including aerially deposited lead (ADL), in soil and total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs) in soil and groundwater at the Site. The information obtained from this investigation will be used by Caltrans to determine soil disposal costs and to identify health and safety concerns during proposed construction activities.

2.0 BACKGROUND

2.1 Hazardous Waste Determination Criteria

Regulatory criteria to classify a waste as California hazardous for handling and disposal purposes are contained in the CCR, Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as Resource, Conservation, and Recovery Act (RCRA) hazardous are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For waste containing metals, the waste is classified as California hazardous when: 1) the total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test (WET). A waste has the potential of exceeding the STLC when the waste's total metal content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the soluble metal content exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability and corrosivity; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

2.2 Environmental Screening Levels

The San Francisco Bay Regional Water Quality Control Board (SFRWQCB) has prepared a technical report entitled *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Interim Final* (May 2008), which presents Environmental Screening Levels (ESLs) for soil, groundwater, soil gas, and surface water, to assist in evaluating sites impacted by releases of hazardous chemicals. The ESLs are conservative values for more than 100 commonly detected contaminants, which may be used to compare with environmental data collected at a site. ESLs are strictly risk assessment tools and "not regulatory clean up standards." The presence of a chemical at concentrations in excess of an ESL does not necessarily indicate that adverse impacts to human health or the environment are occurring; this simply indicates that a potential for adverse risk may exist and that additional evaluation is or "may be" warranted (SFRWQCB, 2008).

The most conservative ESL tables were used for this characterization: Table A – Shallow Soil (≤3 meters below ground surface; bgs) – Groundwater is a Current or Potential Source of Drinking Water and Table K-2 – Direct Exposure Soil Screening Levels for Commercial / Industrial Worker Exposure Scenario. The respective ESLs are listed at the end of Tables 3 and 4 for comparative purposes.

3.0 SCOPE OF SERVICES

The scope of services requested by Caltrans under TO-36, EA 04-235611 included the following:

3.1 Pre-field Activities

- Prepared a *Workplan* dated June 25, 2009, that describes the requested scope of services and quality assurance/quality control (QA/QC) sampling and laboratory procedures.
- Prepared a site-specific health and safety plan to provide guidelines on the use of personal protective equipment and the health and safety procedures implemented during the field activities.
- Prepared a traffic control plan and obtained an encroachment permit from the City of Menlo Park Department of Public Works (a copy of the encroachment permit is provided in Appendix A).
- Obtained soil boring permit from the San Mateo County Health Services Division (a copy of the soil boring permit is provided in Appendix A).
- Retained the services of Caltrans-approved, California-licensed laboratories to perform the sample analyses.
- Retained the services of Caltrans-approved, utility location surveyor.
- Notified Underground Service Alert (USA) at least 48 hours prior to fieldwork involving drilling or direct-push sampling activities.
- Arranged traffic control on surface streets with D & M Traffic Services and along US 101 with Caltrans.

3.2 Field Activities

The field investigation was performed on August 10-13, 18, 24, 25, and 31, 2009, by Geocon staff John Love, Professional Geologist (PG), and Chris Merritt, PG. The following field activities were performed during the sampling efforts:

- Advanced a total of 136 soil borings at the Site to a maximum depth of 18 feet using direct-push drilling and hand-auger techniques. One-hundred-twenty-three borings were advanced to a depth of 2.5 feet, nine borings were advanced to a depth of 6 feet, and four borings were advanced to a depth of 18 feet.
- Collected a total of 438 soil samples. Selected soil samples were analyzed for total and soluble lead, California Assessment Manual (CAM) 17 metals, TPH and/or VOCs.
- Collected four grab-groundwater samples for analysis of TPH and VOCs.
- Transported samples to Advanced Technology Laboratories (ATL) for analysis under standard chain-of-custody (COC) documentation.

4.0 INVESTIGATIVE METHODS

4.1 Sampling Procedures

Soil samples were collected from 136 boring locations identified by the Caltrans TO Manager. Boring locations are shown on the Site Plans, Figure 2a-h, and were surveyed using Differential Global Positioning System (DGPS) equipment. Boring coordinates are presented on Table 1.
Soil samples were collected from the borings as follows:

- B-1 through B-111 and B-113 through B-137 (except for those borings listed below) at depth intervals of 0 to 0.5 foot, 1.0 to 1.5 feet, and 2.0 to 2.5 feet.
- B-7, B-60, B-73 through B-78 and B-131 at depth intervals of 0 to 0.5 foot, 1.0 to 1.5 feet, 2.0 to 2.5 feet, 4.0 to 4.5 feet and 6.0 to 6.5 feet.
- B17, B-19, B-84 and B-87 at depth intervals of 0 to 0.5 foot, 1.0 to 1.5 feet, 2.0 to 2.5 feet, 6.0 to 6.5 feet, 12 to 12.5 feet and 18 to 18.5 feet.

In addition, grab-groundwater samples were collected from borings B-17, B-19, B-75 and B-84.

Soil and groundwater samples were collected using a Geoprobe direct-push sample rig or a hand auger if access was limited. Soil samples collected using the Geoprobe direct-push rig were obtained by hydraulically advancing a three- to five-foot-long stainless steel core-barrel sampler lined with an acetate sample tube into undisturbed soil. Soil samples were collected for laboratory analysis by cutting an approximately 6-inch-long section of the acetate tube from the target sample depth, capping the ends with Teflon tape and plastic end caps, and then placing the sample tube in a chest cooled with ice for storage and delivery to the analytical laboratory. Soil samples collected using a hand-auger were placed in 8-ounce glass jars with threaded Teflon-lined plastic lids prior to being stored in a chest cooled with ice.

Grab-groundwater samples were collected by placing temporary PVC well casings into the open boreholes and then pumping groundwater through the well casing using ¼-inch-diameter disposable polyethylene tubing fitted with a check valve. Groundwater was discharged at ground surface into the appropriate sample containers where it was then placed in a chest cooled with ice for transport to the analytical laboratory.

Sample containers were labeled and transported to a Caltrans-approved, certified environmental laboratory using standard COC documentation. Shallow soil borings ($\leq$6 feet) were back-filled to surface with soil cuttings; borings advanced to groundwater were backfilled with neat cement grout.

Geocon and their subcontractors conducted QA/QC procedures during the field activities. These procedures included washing the sampling equipment with a Liqui-Nox® solution followed by a double rinse with deionized water. Decontamination water was disposed to the ground surface within Caltrans right-of-way in a manner not to create runoff, away from drain inlets or potential water bodies.

4.2 Laboratory Analyses

Laboratory analyses were performed by ATL under a standard seven-day turn-around-time. A CD containing the laboratory reports and COC documentation are presented as Appendix B.
Soil samples were analyzed as follows:

- Two-hundred-twenty-six samples for CAM 17 metals according to Title 22 CCR, Environmental Protection Agency (EPA) Test Methods 6010 ICAP and 7471A.
- Two-hundred-twelve samples for total lead using EPA Method 6010 ICAP.
- Per Caltrans request, 124 samples were further analyzed for WET lead using EPA Method 7420 and 45 samples were analyzed for TCLP lead using EPA Method 1445.
- Nine samples, which were collected from the 10 to 10.5-foot depth interval, for TPH as gasoline (TPHg), TPH as diesel (TPHd), and TPH as motor oil (TPHmo) using EPA Test Method 8015M.
- Nine samples for VOCs, including benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA Test Method 8260B.
- Seventy-six soil samples for pH using EPA Method 9045.

The four grab-groundwater samples were analyzed for the following:

- TPHg, TPHd, and TPHmo using EPA Test Method 8015M.
- VOCs, including BTEX, using EPA Test Method 8260B.

4.3 Laboratory QA/QC

QA/QC procedures were performed for each method of analysis with specificity for each analyte listed in the test method's QA/QC. The laboratory QA/QC procedures included the following:

- One method blank for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One spiked sample for every ten samples, batch of samples or type of matrix; whichever was more frequent, with spike made at ten times the detection limit or at the analyte level.

Prior to submitting the samples to the laboratories, the COC documentation was reviewed for accuracy and completeness (Appendix B).

5.0 INVESTIGATIVE RESULTS

5.1 Subsurface Conditions

Near surface soils (0 to 2 feet) encountered along the US 101 corridor between Embarcadero Road in Palo Alto and Marsh Road in Menlo Park consisted primarily of dry to slightly moist intermixed sand, silt, and gravel with some clay being observed throughout the area. Soils deeper than two feet typically consisted of dark brown silty and sandy clay.

Groundwater was measured in borings B-17, B-19, and B-84 drilled near the Ringwood POC at depths ranging from 12.5 to 13.5 feet.

5.2 Laboratory Analytical Results

A summary of the analytical results for soil and grab-groundwater samples collected at the Site are presented in Tables 2 through 5. A CD containing the laboratory reports and chain-of-custody documentation are presented as Appendix B.

5.2.1 Soil

- The following CAM 17 metals were not detected above their respective laboratory reporting limits: beryllium, silver, and thallium.
- Remaining CAM 17 metals, with the exception of lead, were reported in the samples at concentrations less than ten times their respective STLCs.
- Total lead was reported at concentrations ranging from of 1.5 mg/kg to 5,300 mg/kg, with 30 samples equal to or exceeding the TTLC of 1,000 mg/kg.
- WET lead was reported as <0.25 mg/l in 2 of the 124 sampled analyzed. It was reported at concentrations ranging from 0.39 mg/l to 71 mg/l in the other 122 samples.
- TCLP lead was reported as <0.25 mg/l in 7 of the 45 samples analyzed. It was reported at concentrations ranging from 0.30 mg/l to 71 mg/l in the other 38 samples.
- TPHg was not detected above the laboratory reporting limit of 1.0 mg/kg in the samples.
- TPHd was reported at concentrations ranging from <1.0 to 5.8 mg/kg.
- TPHmo was reported in the samples at concentrations ranging from <1.0 to 13 mg/kg.
- VOCs, including BTEX, were not detected above their respective laboratory reporting limits.
- Soil pH values ranged from 7.0 to 8.7.

5.2.2 Grab-Groundwater

- TPHg, TPHd and TPHmo were not detected above their respective laboratory reporting limits.
- VOCs were not detected in the samples, with the exception of 4-isopropyltoluene at a concentration of 0.82 micrograms per liter (μg/l) in sample B-75.

5.3 Laboratory QA/QC

We reviewed the QA/QC results provided with the laboratory analytical reports. The data indicate non-detect results for the method blanks.

Matrix spike and/or matrix spike duplicates (MS/MSDs) were outside recovery criteria for several samples. The relative percent differences (RPDs) of the duplicate samples for several of the analyses were outside criteria. The RPDs for several of the MSDs for the analyses were outside criteria. Additionally, the surrogate recoveries were diluted out of two samples. However, the Case Narratives in the laboratory reports state that each analytical batch was validated by the laboratory control sample (LCS). The data showed acceptable recoveries and RPDs for the remainder of the duplicates and matrix spikes. Dilution was necessary for several analyses due to sample matrix.

Based on this limited data review, no additional qualifications of the soil data are necessary, and the data are of sufficient quality for the purposes of this report.

5.4 Statistical Evaluation for Lead Detected in Soil Samples

The lead data for the Site were treated as 16 separate sample populations for statistical evaluation, which consisted of the following:

a) US 101 Southbound (SB) - Borings B-1 to B-67

b) US 101 SB excluding Willow Road Overcrossing (OC) and University Avenue OC - Borings B-1 to B-25, B-32 to B-42, and B-53 to B-67

c) US 101 SB excluding Willow Road OC - Borings B-1 to B-25 and B-32 to B-67

d) US 101 SB at Willow Road OC - Borings B-26 to B-31

e) US 101 SB excluding University Avenue OC - Borings B-1 to B-42 and B-53 to B-67

f) US 101 SB at University Avenue OC - Borings B-43 to B-52

g) US 101 Northbound (NB) - Borings B-68 to B-137

h) US 101 NB excluding Willow Road OC and University Avenue OC - Borings B-68 to B-97, B-102 to B-111, and B-122 to B-137

i) US 101 NB excluding Willow Road OC - Borings B-68 to B-97 and B-102-B-137

j) US 101 NB at Willow Road OC - Borings B-98- to B-101

k) US 101 NB excluding University Avenue OC - Borings B-68 to B-111 and B-122 to B-137

l) US 101 NB at University Avenue OC - Borings B-113 to B-121

m) US 101 SB from Marsh Road to University Avenue – Borings B-1 to B-48

n) US 101 SB from University Avenue to Embarcadero Road – Borings B-49 to B-67

o) US 101 NB from Marsh Road to University Avenue – Borings B-68 to B-116

p) US 101 NB from University Avenue to Embarcadero Road - Borings B-117 to B-137

Statistical methods were applied to the total lead data to evaluate: 1) the upper confidence limits (UCLs) of the arithmetic means of the total lead concentrations for each sampling depth; and 2) if an acceptable correlation between total and WET lead concentrations exists that would allow the prediction of WET lead concentrations based on calculated UCLs. The statistical methods used are discussed in a book entitled *Statistical Methods for Environmental Pollution Monitoring,* by Richard Gilbert; in an EPA *Technology Support Center Issue* document entitled, *The Lognormal Distribution in Environmental Applications,* by Ashok Singh et. al., dated December 1997; and in a book entitled *An Introduction to the Bootstrap,* by Bradley Efron and Robert J. Tibshirani.

5.4.1 Calculating the UCLs for the Arithmetic Mean

The upper one-sided 90% and 95% UCLs of the arithmetic mean are defined as the values that, when calculated repeatedly for randomly drawn subsets of site data, equal or exceed the true mean 90% and 95% of the time, respectively. Statistical confidence limits are the classical tool for addressing uncertainties of a distribution mean. The UCLs of the arithmetic mean concentration are used as the mean concentrations because it is not possible to know the true mean due to the essentially infinite number of soil samples that could be collected from a site. The UCLs therefore account for uncertainties due to limited sampling data. As data become less limited at a site, uncertainties decrease, and the UCLs move closer to the true mean.

Non-parametric bootstrap techniques used to calculate the UCLs are discussed in the previously referenced EPA document and in *An Introduction to the Bootstrap.* For those samples in which total lead was not detected at concentrations exceeding the laboratory reporting limit, a value equal to one-half of the detection limit was used in the UCL calculation. The bootstrap test results are included in Appendix C.

The following tables present the calculated UCLs and statistics for each data set.

US 101 SB
Borings B-1 to B-67

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	551.7	588.5	411.5	2.5	5,300
1.0 to 1.5	372.3	398.2	275.5	2.5	4,100
2.0 to 2.5	62.9	69.7	43.8	1.0	830

US 101 SB excluding Willow Road OC and University Avenue OC
Borings B-1 to B-25, B-32 to B-42, and B-53 to B-67

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	329.3	349.9	257.3	2.5	2,000
1.0 to 1.5	431.3	468.1	312.7	2.5	4,100
2.0 to 2.5	79.2	85.8	53.5	2.5	830

US 101 SB excluding Willow Road OC
Borings B-1 to B-25 and B-32 to B-67

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	431.8	463.9	322.3	2.5	4,600
1.0 to 1.5	394.5	423.6	294.6	2.5	4,100
2.0 to 2.5	68.3	72.9	46.5	1.0	830

US 101 SB at Willow Road OC
Borings B-26 to B-31

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	2,274	2,547	1,318	100	5,300
1.0 to 1.5	108.8	116.3	81.8	15	150
2.0 to 2.5	23.0	24.6	16.6	2.5	35

US 101 SB excluding University Avenue OC
Borings B-1 to B-42 and B-53 to B-67

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	502	536.6	369	2.5	5,300
1.0 to 1.5	392.3	426.8	288.4	2.5	4,100
2.0 to 2.5	72.2	78.8	49.6	2.5	830

US 101 SB at University Avenue OC
Borings B-43 to B-52

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	1,202	1,374	653.7	17	4,600
1.0 to 1.5	346.1	382.4	201.9	8.0	1,200
2.0 to 2.5	16.2	18.0	10.9	1.0	49

US 101 NB
Borings B-68 to B-137

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	649.7	683.5	525.7	2.5	5,300
1.0 to 1.5	227.1	240.9	182.7	1.5	1,300
2.0 to 2.5	70.8	78.2	41.5	2.4	1,900

US 101 NB excluding Willow Road OC and University Avenue OC
Borings B-68 to B-97, B-102 to B-111, and B-122 to B-137

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	585.4	615.2	485.6	2.5	2,700
1.0 to 1.5	242.1	258.8	192.1	1.5	1,300
2.0 to 2.5	87.3	101.1	44.4	2.4	1,900

US 101 NB excluding Willow Road
Borings B-68 to B-97 and B-102 to B-137

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	549.9	577	460	2.5	2,700
1.0 to 1.5	219.5	231.8	171.9	1.5	1,300
2.0 to 2.5	76.3	86.6	39.3	2.4	1,900

US 101 NB at Willow Road OC
Borings B-98 to B-101

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	Not Calculated	Not Calculated	1,594	27	5,300
1.0 to 1.5	Not Calculated	Not Calculated	357	65	790
2.0 to 2.5	Not Calculated	Not Calculated	260.8	15	820

US 101 NB excluding University Avenue OC
Borings B-68 to B-111 and B-122 to B-137

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	699.6	742.7	559.5	2.5	5,300
1.0 to 1.5	256.3	267	203.1	1.5	1,300
2.0 to 2.5	101	114.5	58.8	2.4	1,900

US 101 NB at University Avenue OC
Borings B-113 to B-121

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	496.1	547.6	300.3	21	1,500
1.0 to 1.5	62.3	66.7	46.6	8.5	100
2.0 to 2.5	9.0	9.3	7.6	2.5	14

US 101 SB from Marsh Road to University Avenue
Borings B-1 to B-48

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	626.8	667.1	441.9	2.5	5,300
1.0 to 1.5	257.1	275.3	197	2.5	1,400
2.0 to 2.5	57.5	62.0	39.9	2.5	560

US 101 SB from University Avenue to Embarcadero Road
Borings B-49 to B-67

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	492.6	538	334.6	19	2,000
1.0 to 1.5	760.3	839.5	473.8	5.3	4,100
2.0 to 2.5	106	122.7	53.8	1.0	830

US 101 NB from Marsh Road to University Avenue
Borings B-68 to B-116

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	705.3	753	547.2	2.5	5,300
1.0 to 1.5	236.3	252	182	1.5	1,300
2.0 to 2.5	123.8	139.1	70.4	2.4	1,900

US 101 NB from University Avenue to Embarcadero Road
Borings B-117 to B-137

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	648.1	690.9	476.6	12	1,900
1.0 to 1.5	264.8	287.7	184.1	2.5	1,200
2.0 to 2.5	11.8	12.3	10.3	2.5	20

5.4.2 Correlation of Total and WET Lead

Total and corresponding WET lead concentrations are bivariate data with a linear structure. This linear structure should allow for the prediction of WET lead concentrations based on the UCLs calculated above in Section 5.4.1.

To estimate the degree of interrelation between total and corresponding WET lead values (x and y, respectively), the *correlation coefficient [r]* is used. The correlation coefficient is a ratio that ranges from +1 to -1. A *correlation coefficient* of +1 indicates a perfect direct relationship between two variables; a *correlation coefficient* of -1 indicates that one variable changes inversely with relation to the other. Between the two extremes is a spectrum of less-than-perfect relationships, including zero, which indicates the lack of any sort of linear relationship at all. The *correlation coefficient* was calculated for the 124 (x, y) data points (i.e., soil samples analyzed for both total lead [x] and WET lead [y]). To achieve an acceptable correlation, the 15 data points with the highest squared residual WET lead concentrations were eliminated from the regression analysis. The resulting *coefficient of determination* (r^2) equaled 0.6573, which yields a corresponding *correlation coefficient* (r) of 0.81.

For the *correlation coefficient* that indicates a linear relationship between total and WET lead concentrations, it is possible to compute the line of dependence or a best-fit line between the two variables. A least squares method was used to find the equation of a best-fit line (regression line) by forcing the y-intercept equal to zero since that is a known point. The equation of the regression line was determined to be $y = 0.046(x)$, where x represents total lead concentrations and y represents predicted WET lead concentrations.

This equation was used to estimate the expected WET lead concentrations for the UCLs calculated in for samples collected from the Site (see Section 5.4.1). Regression analysis results and a scatter plot depicting the (x, y) data points along with the regression line are included in Appendix C. The predicted WET lead concentrations are summarized in Tables 6a to 6p.

6.0 CONCLUSIONS

Waste classifications are evaluated based on the 90% UCL of the lead content for the relevant excavation depths; this has historically been considered sufficient to satisfy a good faith effort by the EPA as discussed in SW-846. Risk assessment characterization is based on the 95% UCL of the lead content in the waste for the relevant depths; this is in accordance with the Risk Assessment Guidance for Superfund (RAGS) Volume I Documentation for Exposure Assessment. Per Caltrans, the 90% UCLs are to be used to evaluate onsite reuse and the 95% UCLs are to be used to evaluate offsite disposal.

6.1 Predicted WET Lead Results

6.1.1 US 101 SB

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. Weighted averages are calculated by using the total lead concentration for each 0.5-foot depth interval as the value for the underlying 0.5-foot depth interval (unless a sample was collected from the underlying depth interval). The total and WET lead calculations are summarized in Table 6a.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	552	**25**	589	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*269*	***12***	*289*	***Hazardous***
0 to 2.0 feet	462	**21**	493	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*63*	*2.9*	*70*	*Non-Hazardous*
0 to 2.5 feet	*382*	***18***	*409*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.2 US 101 SB excluding Willow Road OC and University Avenue OC

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6b.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	329	**15**	350	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*314*	***14***	*341*	***Hazardous***
0 to 2.0 feet	380	**17**	409	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*79*	*3.6*	*86*	*Non-Hazardous*
0 to 2.5 feet	*320*	***15***	*344*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.3 US 101 SB excluding Willow Road OC

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6c.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	432	**20**	464	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*286*	***13***	*307*	***Hazardous***
0 to 2.0 feet	413	**19**	444	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*68*	*3.1*	*73*	*Non-Hazardous*
0 to 2.5 feet	*344*	***16***	*370*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.4 US 101 SB at Willow Road OC

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6d.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	2,274	**105**	2,547	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*80*	*3.7*	*86*	*Non-Hazardous*
0 to 2.0 feet	1,191	**55**	1,332	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*23*	*1.1*	*25*	*Non-Hazardous*
0 to 2.5 feet	*958*	***44***	*1,070*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 1.0 foot would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 1.0 foot will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 1.0 foot) would be classified as non-hazardous.

6.1.5 US 101 SB excluding University Avenue OC

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6e.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	502	**23**	537	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*286*	***13***	*311*	***Hazardous***
0 to 2.0 feet	447	**21**	482	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*72*	*3.3*	*79*	*Non-Hazardous*
0 to 2.5 feet	*372*	*17*	*401*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.6 US 101 SB at University Avenue OC

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6f.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	1,202	**55**	1,374	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*236*	***11***	*261*	***Hazardous***
0 to 2.0 feet	774	**36**	878	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*16*	*0.74*	*18*	*Non-Hazardous*
0 to 2.5 feet	*622*	***29***	*706*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.7 US 101 NB

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6g.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	650	**30**	684	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*175*	***8.0***	*187*	***Hazardous***
0 to 2.0 feet	438	**20**	462	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*71*	*3.3*	*78*	*Non-Hazardous*
0 to 2.5 feet	*365*	***17***	*385*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be

considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.8 US 101 NB excluding Willow Road OC and University Avenue OC

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6h.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	585	**27**	615	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*191*	***8.8***	*206*	***Hazardous***
0 to 2.0 feet	414	**19**	437	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*87*	*4.0*	*101*	*Non-Hazardous*
0 to 2.5 feet	*348*	***16***	*370*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.9 US 101 NB excluding Willow Road OC

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6i.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	550	**25**	577	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*172*	*7.9*	*183*	***Hazardous***
0 to 2.0 feet	385	**18**	404	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*76*	*3.5*	*87*	*Non-Hazardous*
0 to 2.5 feet	*323*	***15***	*341*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.10 US 101 NB at Willow Road OC

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the maximum total lead concentrations and the relationship between total and WET lead for data collected at the Site. Maximum concentrations were conservatively used because UCLs cannot be calculated for a data set that consists of less than four unique values. The total and WET lead calculations are summarized in Table 6j.

Excavation Depth	Maximum Total Lead (mg/kg)	Predicted WET Lead (mg/l)	Waste Classification
0 to 1.0 foot	5,300	**244**	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*800*	*37*	***Hazardous***
0 to 2.0 feet	3,045	**140**	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*820*	***38***	***Hazardous***
0 to 2.5 feet	*2,600*	***120***	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.5 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be

considered a RCRA hazardous waste. Soil excavated to a depth of 2.5 feet will require disposal at a Class I landfill facility.

6.1.11 US 101 NB excluding University Avenue OC

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6k.

Excavation Depth	**90% UCL Total Lead (mg/kg)**	**90% UCL Predicted WET Lead (mg/l)**	**95% UCL Total Lead (mg/kg)**	**Waste Classification**
0 to 1.0 foot	700	**32**	743	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*205*	***9.4***	*216*	***Hazardous***
0 to 2.0 feet	478	**22**	505	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*101*	*4.6*	*115*	*Non-Hazardous*
0 to 2.5 feet	*403*	***19***	*427*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.12 US 101 NB at University Avenue OC

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6l.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	496	**23**	**548**	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*45*	*2.0*	*48*	*Non-Hazardous*
0 to 2.0 feet	279	**13**	**307**	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*9.0*	*0.41*	*9.3*	*Non-Hazardous*
0 to 2.5 feet	*225*	***10***	*248*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 1.0 foot would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 1.0 foot will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 1.0 foot) would be classified as non-hazardous.

6.1.13 US 101 SB from Marsh Road to University Avenue

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6m.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	627	**29**	667	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*191*	***8.8***	*204*	***Hazardous***
0 to 2.0 feet	442	**20**	471	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*57*	*2.6*	*62*	*Non-Hazardous*
0 to 2.5 feet	*365*	*17*	*389*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be

considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.14 US 101 SB from University Avenue to Embarcadero Road

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6n.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	493	**23**	538	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*542*	***25***	*601*	***Hazardous***
0 to 2.0 feet	626	**29**	689	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*106*	*4.9*	*123*	*Non-Hazardous*
0 to 2.5 feet	*522*	***24***	*576*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.1.15 US 101 NB from Marsh Road to University Avenue

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6o.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	705	**32**	753	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*199*	***9.1***	*214*	***Hazardous***
0 to 2.0 feet	471	**22**	503	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*124*	***5.7***	*139*	***Hazardous***
0 to 2.5 feet	*401*	***18***	*430*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.5 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.5 feet will require disposal at a Class I landfill facility.

6.1.16 US 101 NB from University Avenue to Embarcadero Road

The following table summarizes the predicted WET lead concentrations and the waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and the relationship between total and WET lead for data collected at the Site. The total and WET lead calculations are summarized in Table 6p.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1.0 foot	648	**30**	691	**Hazardous**
Underlying soil (1.0 to 2.5 ft)	*180*	***8.3***	*196*	***Hazardous***
0 to 2.0 feet	456	**21**	489	**Hazardous**
Underlying Soil (2.0 to 2.5 ft)	*12*	*0.54*	*12*	*Non-Hazardous*
0 to 2.5 feet	*368*	***17***	*394*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data in the above table, soil excavated from the surface to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentrations are greater than the lead STLC of 5.0 mg/l. Based on the TCLP lead results excavated soil would not be considered a RCRA hazardous waste. Soil excavated to a depth of 2.0 feet will require disposal at a

Class I landfill facility. Underlying soil (i.e., deeper than 2.0 feet) would be classified as non-hazardous.

6.2 CAM 17 Metals

The CAM 17 metals concentrations in site soil were compared to ESLs (Table A, SFRWQCB, May 2008). The following metals were reported at concentrations greater than their respective ESL values in the soil samples collected at the Site: antimony, arsenic, cadmium, chromium, mercury, vanadium, and zinc. Arsenic and zinc were reported at concentrations exceeding their respective residential and commercial/industrial land use ESLs for shallow soil ($\leq$3 meters; SFRWQCB, Table A). Antimony, cadmium, mercury, and vanadium were reported at concentrations exceeding their respective residential land use ESLs for shallow soil.

Upper one-sided 95% UCLs were calculated for the full set of metals concentrations with reported exceedances of ESLs. The 95% UCLs were compared with ESLs and with published background levels typically present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996). The bootstrap results are included in Appendix C. The calculated standard bootstrap UCLs, ESLs and published background concentrations are summarized in the table below:

95% UCLs, ESLs and Published Background Concentrations for Selected Metals

Metal	95% UCL	Shallow Soil Residential ESL	Shallow Soil Commercial/ Industrial ESL	Direct Exposure Construction Worker ESL	PUBLISHED BACKGROUND MEAN[1]	PUBLISHED BACKGROUND RANGE [1]
Antimony	1.9	6.3	40	310	0.60	0.15 to 1.95
Arsenic	1.4	0.39	1.6	15	3.5	0.6 to 11.0
Cadmium	1.2	1.7	7.4	39	0.36	0.05 to1.70
Chromium*	46.3	750	750	1,200,000	122	23 to 1,579
Mercury	0.10	1.3	10	58	0.26	0.05 to 0.90
Vanadium	53.8	16	200	770	112	39 to 288
Zinc	151.8	600	600	230,000	149	88 to 236

Concentrations reported in milligrams per kilogram (mg/kg)

[1] Kearney Foundation of Soil Science, March 1996

* = Value is for Chromium III, no standard for total chromium.

The 95% UCL values for arsenic and vanadium in the soil samples collected at the Site are greater than their respective residential land use ESLs and are less than the commercial/industrial land use

ESLs. The SFRWQCB *November 2007 Update to Environmental Screening Levels (ESLs) Technical Document* states that ambient background concentrations of arsenic typically exceed risk-based screening levels. In such instances, it may be more appropriate to compare site data to regionally specific established background levels.

The calculated 95% UCLs for antimony, cadmium, chromium, mercury and zinc are less than their respective ESLs. The 95% UCLs for these metals are all less than their respective published background mean concentrations, with the exception of antimony, which is within the published background range.

Offsite reuse or disposal of excavated soil may be restricted based on metals content.

6.3 Organics

6.3.1 Soil

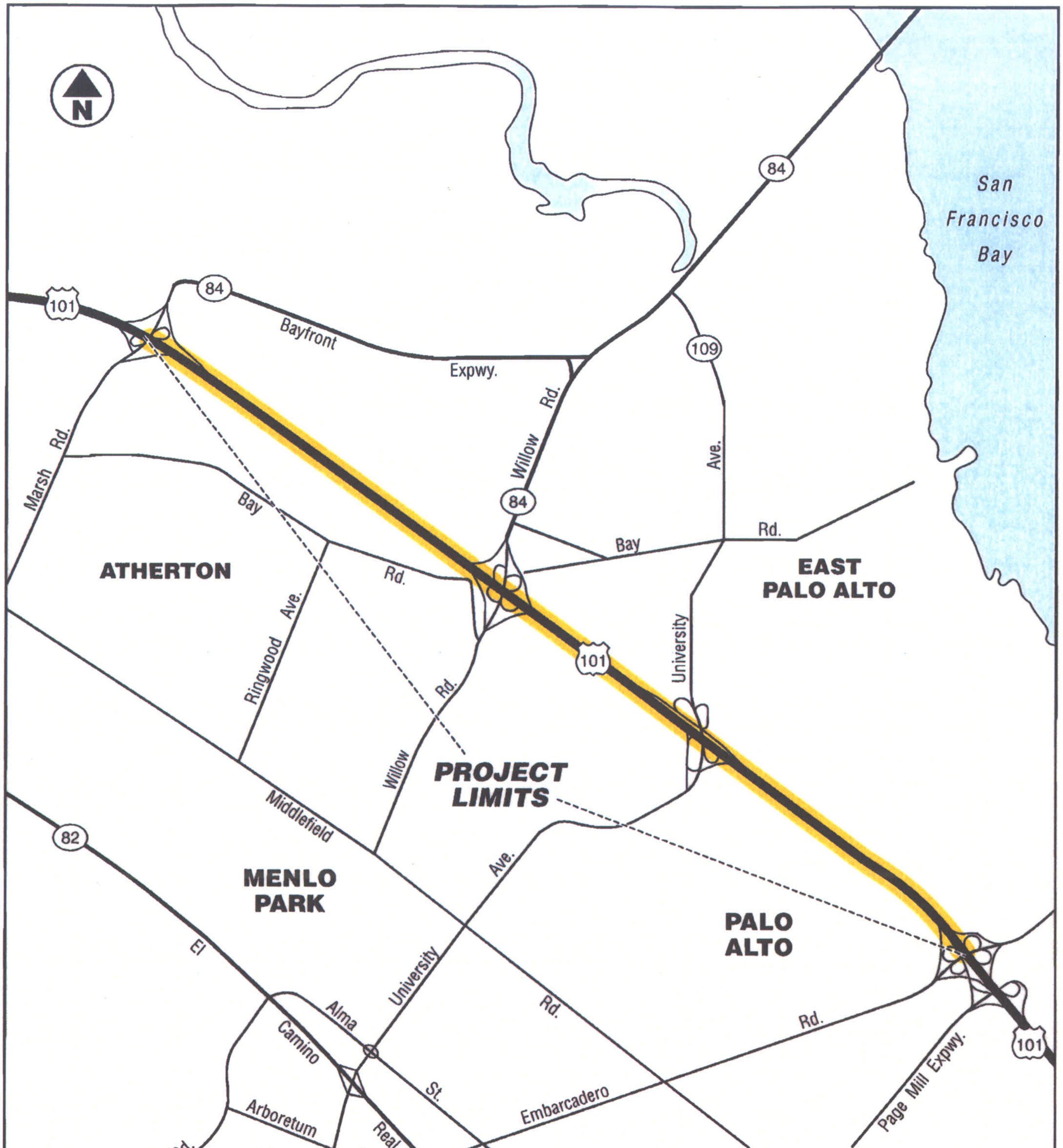
TPHg and VOCs were not detected above the laboratory reporting limits. The reported TPHd and TPHmo concentrations were below their respective ESLs.

6.3.2 Grab-Groundwater

Organic compounds were not detected above their respective laboratory reporting limits in the grab-groundwater samples, with the exception of 4-isopropyltoluene, which does not have a published ESL value.

6.4 Worker Protection

Per Caltrans' requirements, the contractor(s) should prepare a project-specific health and safety plan to prevent or minimize worker exposure to impacted soil and groundwater. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of soil and groundwater.



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Highway 101 Auxiliary Lanes

Santa Clara & San Mateo Counties, California

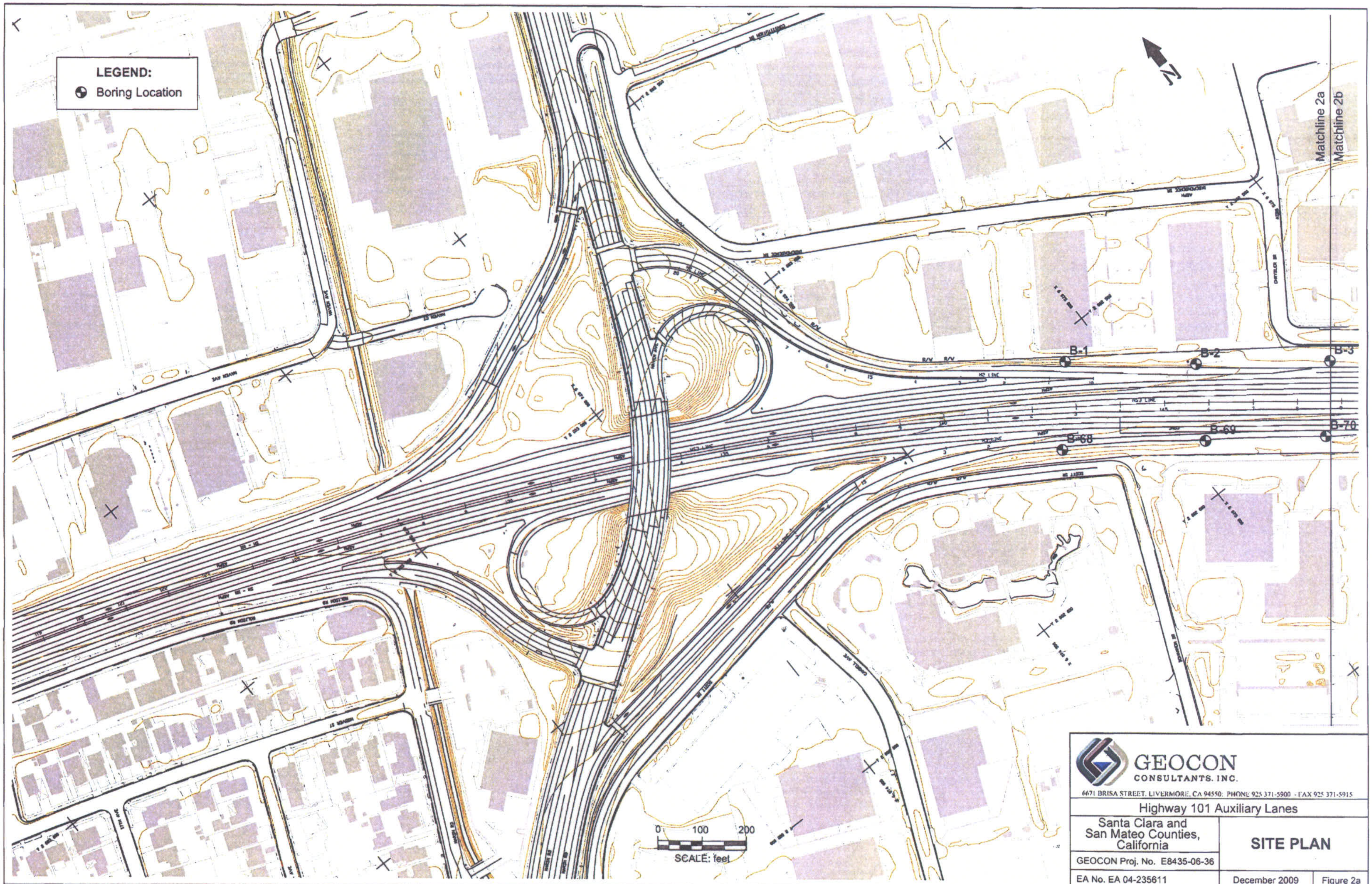
GEOCON Proj. No. E8435-06-36

Task Order No. 36, EA 04-235611

VICINITY MAP

December 2009

Figure 1



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Highway 101 Auxiliary Lanes

Santa Clara and San Mateo Counties, California

SITE PLAN

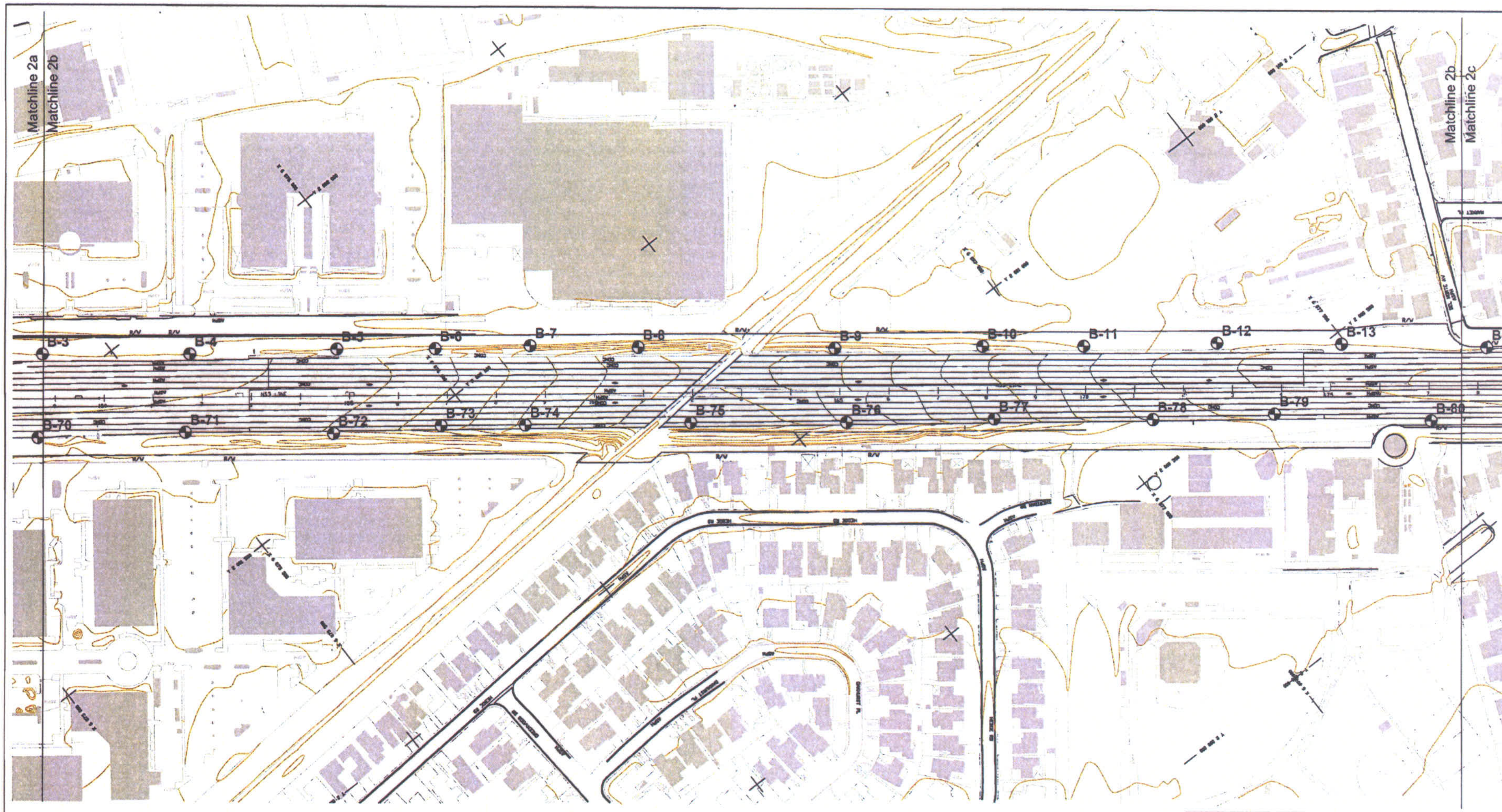
GEOCON Proj. No. E8435-06-36

EA No. EA 04-235611

December 2009

Figure 2a

SITE0110



LEGEND:
Boring Location

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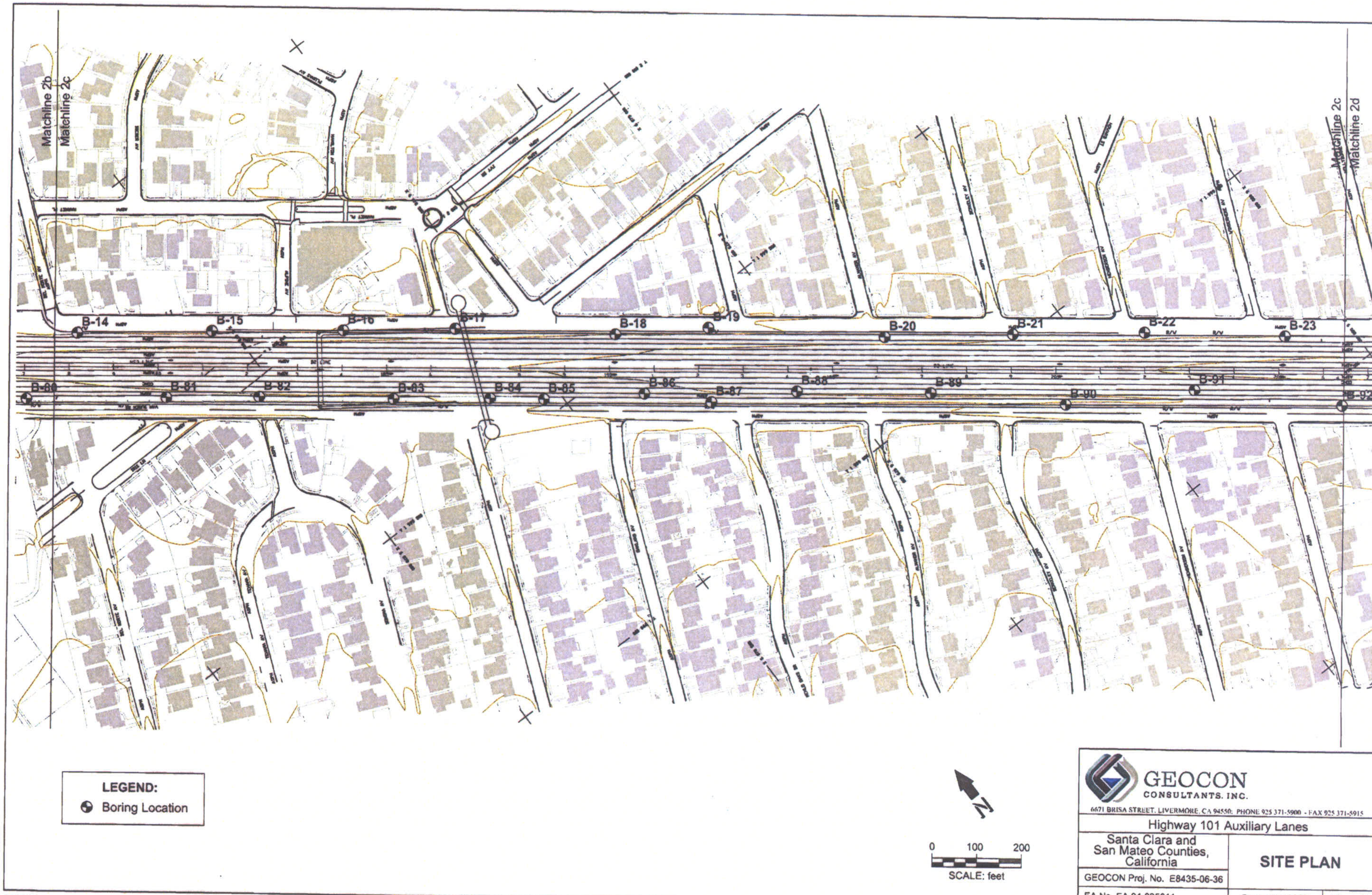
Highway 101 Auxiliary Lanes	
Santa Clara and San Mateo Counties, California	SITE PLAN
GEOCON Proj. No. E8435-06-36	
EA No. EA 04-235611	December 2009 — Figure 2b

SITE0110



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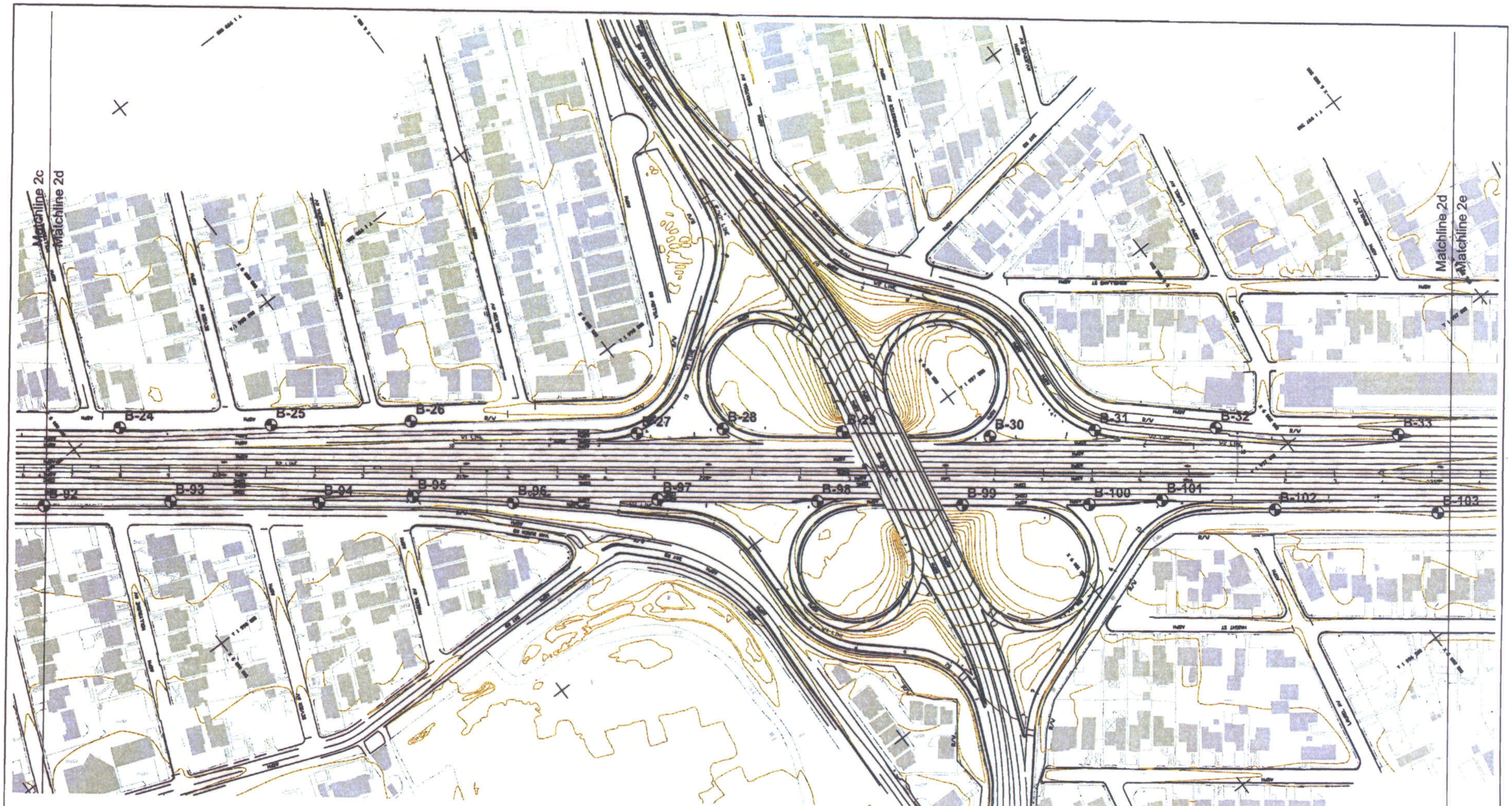
Highway 101 Auxiliary Lanes	
Santa Clara and San Mateo Counties, California	SITE PLAN
GEOCON Proj. No. E8435-06-36	
EA No. EA 04-235611	December 2009 / Figure 2c

SITE0110



LEGEND:
Boring Location

N

0 100 200
SCALE: feet

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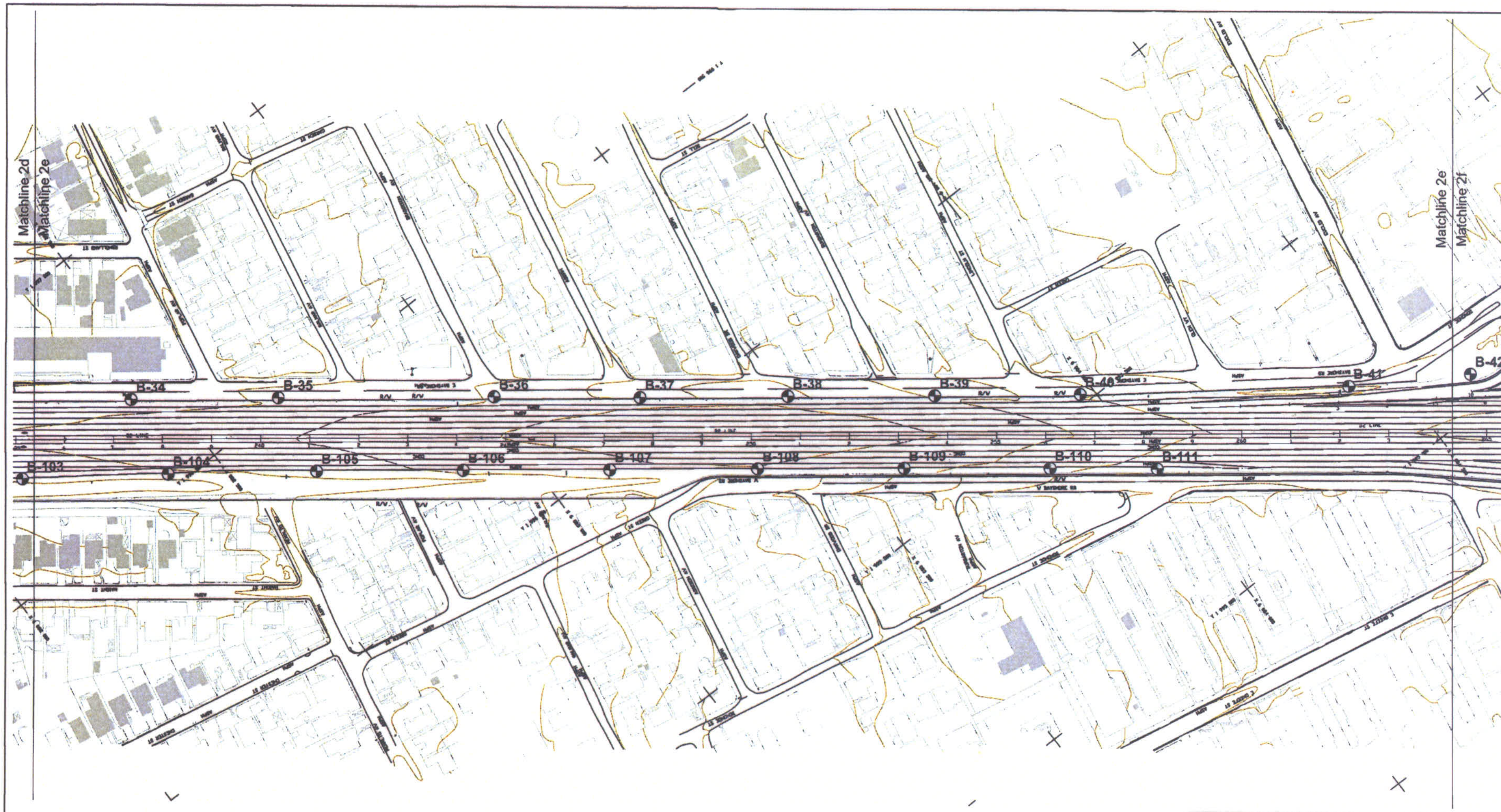
Highway 101 Auxiliary Lanes	
Santa Clara and San Mateo Counties, California	**SITE PLAN**
GEOCON Proj. No. E8435-06-36	
EA No. EA 04-235611	December 2009 / Figure 2d

SITE0110



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Boring Location

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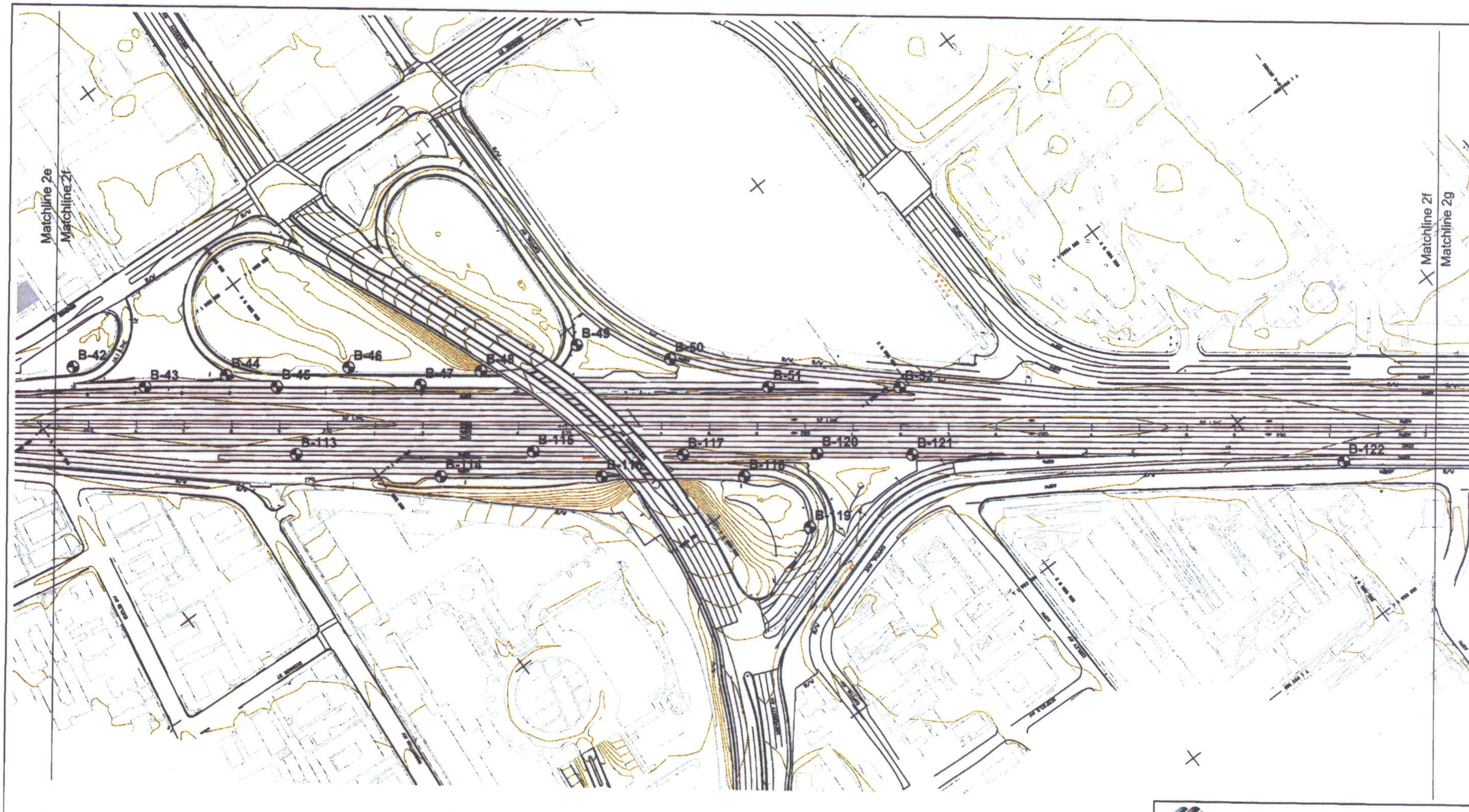
Highway 101 Auxiliary Lanes

Santa Clara and San Mateo Counties, California	SITE PLAN
GEOCON Proj. No. E8435-06-36	
EA No. EA 04-235611	December 2009 / Figure 2e

SITE0110



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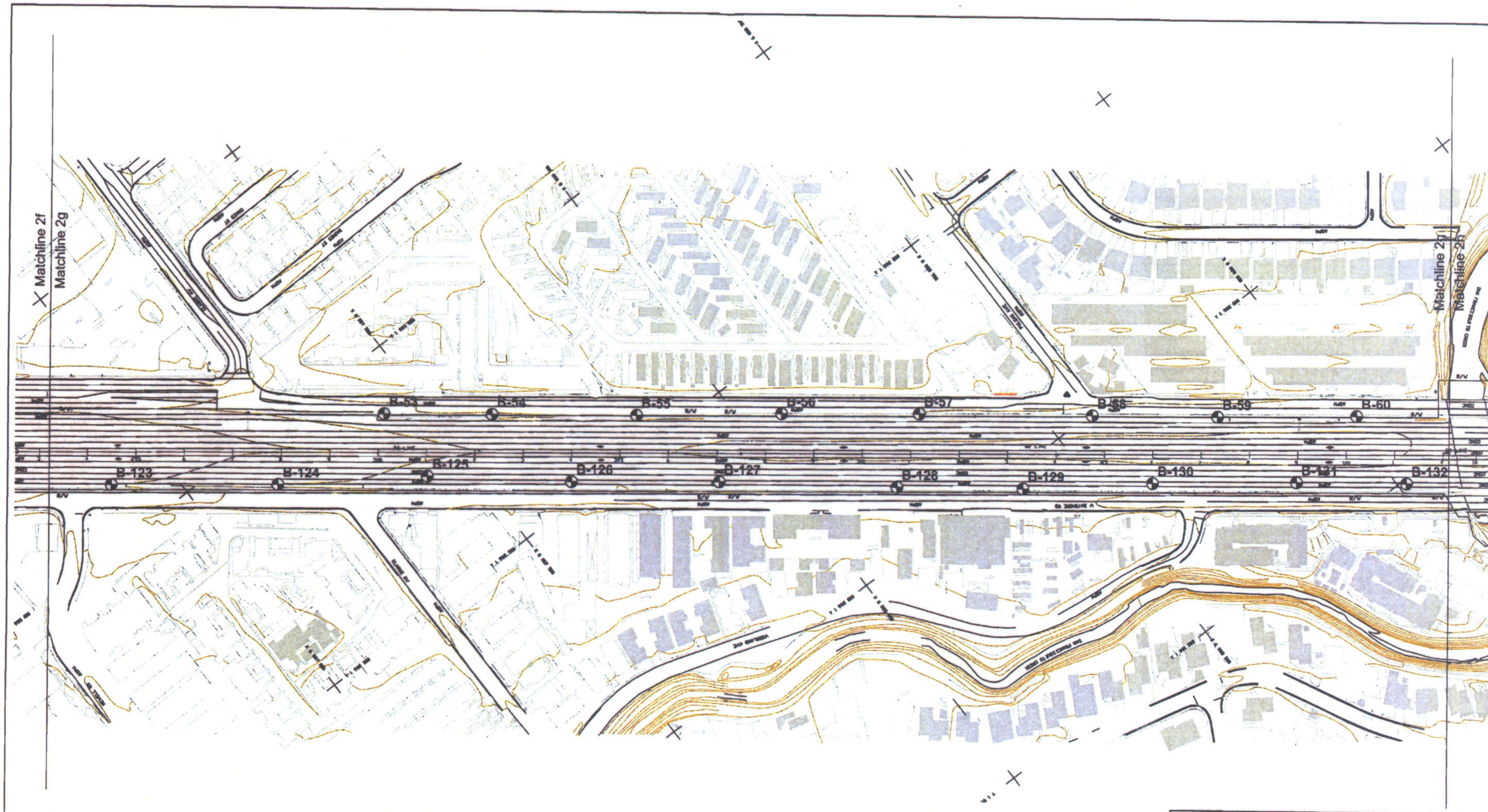
Highway 101 Auxiliary Lanes	
Santa Clara and San Mateo Counties, California	SITE PLAN
GEOCON Proj. No. E8435-06-36	
EA No. EA 04-235611	December 2009	Figure 2f

SITE0110



LEGEND:
Boring Location

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Highway 101 Auxiliary Lanes

Santa Clara and San Mateo Counties, California

SITE PLAN

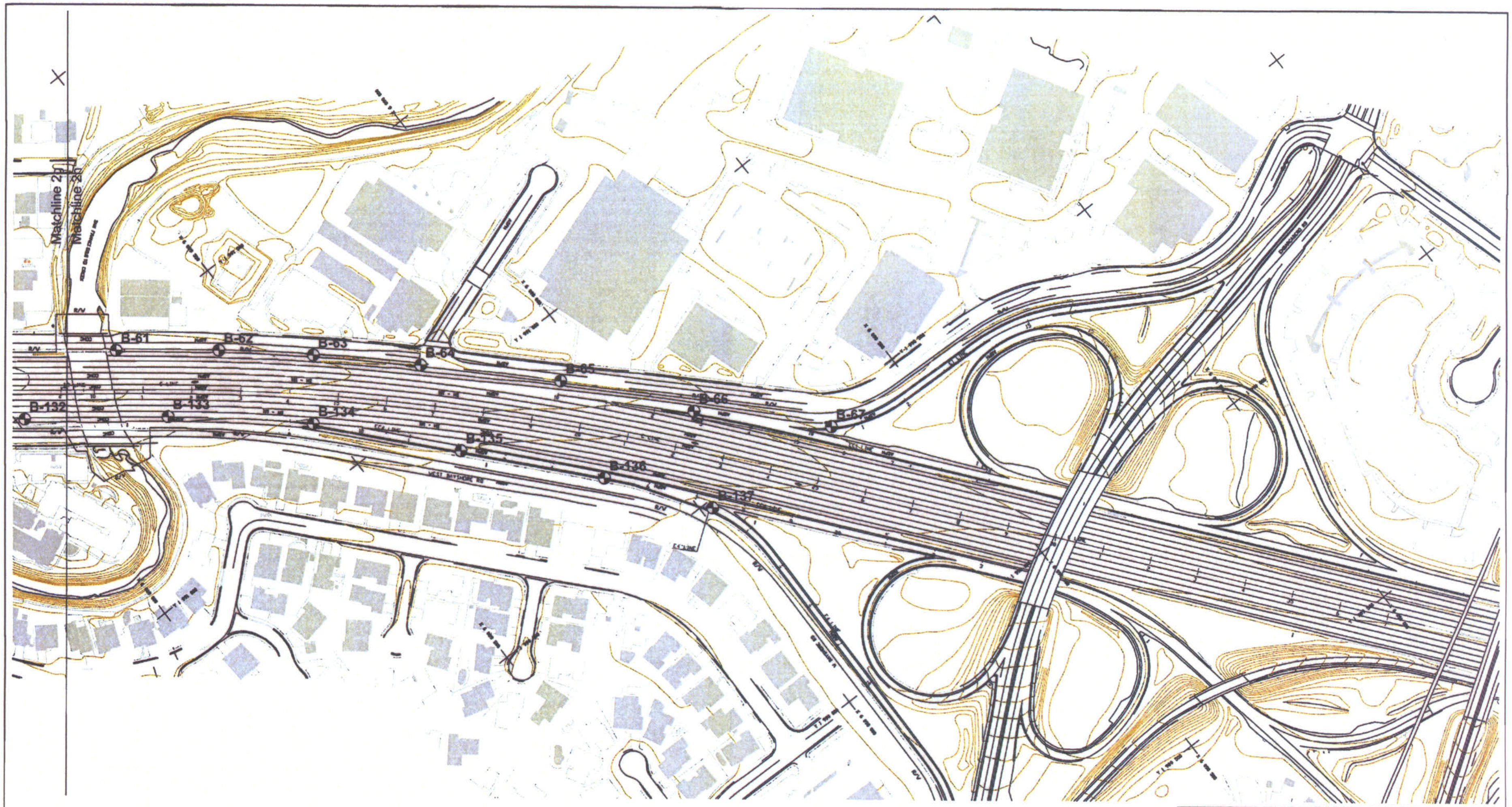
GEOCON Proj. No. E8435-06-36

EA No. EA 04-235611

December 2009

Figure 2g

SITE0110



LEGEND:
Boring Location

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Highway 101 Auxiliary Lanes	
Santa Clara and San Mateo Counties, California	SITE PLAN
GEOCON Proj. No. E8435-06-36	
EA No. EA 04-235611	December 2009 — Figure 2h

SITE0110

TABLE 1
Boring Coordinates
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Boring	Northing	Easting
B-1	2,002,446.309	6,074,910.656
B-2	2,002,260.699	6,075,141.045
B-3	2,002,081.012	6,075,384.226
B-4	2,001,896.906	6,075,622.235
B-5	2,001,721.634	6,075,865.281
B-6	2,001,599.343	6,076,024.775
B-7	2,001,485.651	6,076,181.794
B-8	2,001,348.256	6,076,353.959
B-9	2,001,101.857	6,076,669.769
B-10	2,000,920.889	6,076,909.823
B-11	2,000,795.027	6,077,073.107
B-12	2,000,633.868	6,077,292.202
B-13	2,000,476.731	6,077,491.387
B-14	2,000,289.795	6,077,721.038
B-15	2,000,110.089	6,077,963.512
B-16	1,999,933.837	6,078,198.398
B-17	1,999,784.338	6,078,401.617
B-18	1,999,557.533	6,078,679.334
B-19	1,999,443.181	6,078,854.631
B-20	1,999,188.014	6,079,156.451
B-21	1,999,019.430	6,079,388.881
B-22	1,998,843.345	6,079,627.035
B-23	1,998,646.847	6,079,872.078
B-24	1,998,479.016	6,080,102.407
B-25	1,998,295.232	6,080,353.437
B-26	1,998,127.871	6,080,587.959
B-27	1,997,826.559	6,080,943.772
B-28	1,997,727.394	6,081,090.707
B-29	1,997,574.285	6,081,283.255
B-30	1,997,382.996	6,081,519.355
B-31	1,997,262.815	6,081,699.530
B-32	1,997,115.492	6,081,901.848
B-33	1,996,878.079	6,082,192.356
B-34	1,996,693.327	6,082,435.960
B-35	1,996,513.039	6,082,675.252
B-36	1,996,245.678	6,083,025.233
B-37	1,996,062.921	6,083,259.489
B-38	1,995,881.099	6,083,499.797
B-39	1,995,699.235	6,083,736.981
B-40	1,995,519.944	6,083,973.414
B-41	1,995,198.136	6,084,417.155
B-42	1,995,065.897	6,084,628.631
B-43	1,994,941.101	6,084,723.766
B-44	1,994,857.484	6,084,873.638
B-45	1,994,775.042	6,084,943.491
B-46	1,994,715.919	6,085,087.448
B-47	1,994,595.605	6,085,184.900
B-48	1,994,542.400	6,085,303.800

TABLE 1
Boring Coordinates
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Boring	Northing	Easting
B-49	1,994,464.136	6,085,496.276
B-50	1,994,322.707	6,085,634.374
B-51	1,994,152.199	6,085,762.596
B-52	1,993,985.513	6,085,981.139
B-53	1,992,883.124	6,087,422.287
B-54	1,992,747.120	6,087,599.693
B-55	1,992,564.565	6,087,836.138
B-56	1,992,386.674	6,088,076.288
B-57	1,992,214.222	6,088,302.727
B-58	1,991,995.120	6,088,584.610
B-59	1,991,835.945	6,088,789.316
B-60	1,991,662.919	6,089,018.964
B-61	1,991,486.187	6,089,251.610
B-62	1,991,357.127	6,089,418.304
B-63	1,991,231.759	6,089,565.182
B-64	1,991,080.731	6,089,727.702
B-65	1,990,879.289	6,089,935.383
B-66	1,990,663.933	6,090,113.300
B-67	1,990,466.578	6,090,317.079
B-68	2,002,293.865	6,074,783.337
B-69	2,002,112.092	6,075,051.309
B-70	2,001,953.288	6,075,272.788
B-71	2,001,777.023	6,075,517.779
B-72	2,001,590.504	6,075,754.905
B-73	2,001,468.909	6,075,938.681
B-74	2,001,364.641	6,076,075.200
B-75	2,001,161.954	6,076,344.889
B-76	2,000,968.586	6,076,596.277
B-77	2,000,790.197	6,076,838.131
B-78	2,000,591.500	6,077,093.000
B-79	2,000,448.399	6,077,296.335
B-80	2,000,242.451	6,077,540.327
B-81	2,000,054.115	6,077,792.164
B-82	1,999,929.309	6,077,958.636
B-83	1,999,743.709	6,078,195.633
B-84	1,999,613.413	6,078,369.473
B-85	1,999,539.025	6,078,464.483
B-86	1,999,413.304	6,078,650.851
B-87	1,999,307.551	6,078,759.000
B-88	1,999,210.562	6,078,926.080
B-89	1,999,026.268	6,079,162.459
B-90	1,998,823.041	6,079,388.241
B-91	1,998,673.656	6,079,637.928
B-92	1,998,446.341	6,079,880.071
B-93	1,998,295.400	6,080,093.500
B-94	1,998,109.600	6,080,335.300
B-95	1,998,002.460	6,080,497.200
B-96	1,997,867.715	6,080,654.718

TABLE 1
Boring Coordinates
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Boring	Northing	Easting
B-97	1,997,693.249	6,080,895.934
B-98	1,997,492.071	6,081,155.618
B-99	1,997,305.630	6,081,388.927
B-100	1,997,148.695	6,081,598.021
B-101	1,997,065.091	6,081,723.148
B-102	1,996,909.019	6,081,897.283
B-103	1,996,702.240	6,082,160.371
B-104	1,996,527.514	6,082,402.142
B-105	1,996,347.624	6,082,644.878
B-106	1,996,166.356	6,082,883.210
B-107	1,995,984.822	6,083,120.212
B-108	1,995,802.596	6,083,360.245
B-109	1,995,621.262	6,083,597.176
B-110	1,995,439.129	6,083,832.155
B-111	1,995,304.594	6,084,004.851
B-113	1,994,638.534	6,084,889.559
B-114	1,994,418.667	6,085,103.087
B-115	1,994,343.108	6,085,288.846
B-116	1,994,214.590	6,085,371.682
B-117	1,994,147.996	6,085,534.702
B-118	1,994,034.961	6,085,609.209
B-119	1,993,868.179	6,085,654.594
B-120	1,993,980.797	6,085,760.024
B-121	1,993,858.388	6,085,916.835
B-122	1,993,300.933	6,086,628.733
B-123	1,993,108.195	6,086,885.007
B-124	1,992,899.838	6,087,158.911
B-125	1,992,726.744	6,087,415.110
B-126	1,992,537.556	6,087,645.595
B-127	1,992,353.060	6,087,888.189
B-128	1,992,122.300	6,088,173.500
B-129	1,991,962.200	6,088,378.400
B-130	1,991,809.183	6,088,598.583
B-131	1,991,630.026	6,088,836.873
B-132	1,991,490.706	6,089,016.371
B-133	1,991,313.858	6,089,253.131
B-134	1,991,120.836	6,089,479.066
B-135	1,990,891.680	6,089,685.518
B-136	1,990,667.528	6,089,884.164
B-137	1,990,484.322	6,090,022.272

Coordinates are shown in feet, NAD 83 (Zone 3)

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-1 0'	0	34	---	---	---
B-1 1'	1	<5.0	---	---	8.7
B-1 2'	2	<5.0	---	---	---
B-2 0'	0	40	---	---	---
B-2 1'	1	4.0	---	---	---
B-2 2'	2	2.8	---	---	---
B-3 0'	0	360	40	---	---
B-3 1'	1	25	---	---	---
B-3 2'	2	110	15	---	---
B-4 0'	0	130	8.0	---	---
B-4 1'	1	19	---	---	---
B-4 2'	2	92	1.8	---	---
B-5 0'	0	540	22	---	---
B-5 1'	1	390	18	---	---
B-5 2'	2	5.4	---	---	---
B-6 0'	0	290	11	---	---
B-6 1'	1	1,100	---	0.47	7.6
B-6 2'	2	220	2.3	---	---
B-7 0'	0	730	---	<0.25	---
B-7 1'	1	100	0.39	---	7.3
B-7 2'	2	280	14	---	---
B-7 4'	4	12	---	---	---
B-7 6'	6	3.7	---	---	---
B-8 0'	0	840	---	<0.25	---
B-8 1'	1	450	24	---	---
B-8 2'	2	560	6.1	---	---
B-9 0'	0	610	---	---	---
B-9 1'	1	470	19	---	7.7
B-9 2'	2	15	---	---	---
B-10 0'	0	680	---	<0.25	---
B-10 1'	1	56	1.2	---	---
B-10 2'	2	7.7	---	---	---
B-11 0'	0	1,100	---	0.51	---
B-11 1'	1	120	7.6	---	---
B-11 2'	2	21	---	---	---
B-12 0'	0	500	28	---	---
B-12 1'	1	320	12	---	7.8
B-12 2'	2	100	1.8	---	---
B-13 0'	0	15	---	---	---
B-13 1'	1	7.0	---	---	---
B-13 2'	2	50	---	---	---

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-14 0'	0	33	---	---	---
B-14 1'	1	12	---	---	7.8
B-14 2'	2	8.1	---	---	---
B-15 0'	0	170	5.6	---	---
B-15 1'	1	11	---	---	8.1
B-15 2'	2	4.1	---	---	---
B-16 0'	0	28	---	---	---
B-16 1'	1	11	---	---	---
B-16 2'	2	<5.0	---	---	---
B-17 0'	0	110	3.7	---	---
B-17 1'	1	120	8.7	---	---
B-17 2'	2	7.4	---	---	---
B-17 6'	6	5.5	---	---	---
B-17 12'	12	8.3	---	---	---
B-17 18'	18	6.8	---	---	---
B-18 0'	0	23	---	---	---
B-18 1'	1	6.6	---	---	---
B-18 2'	2	4.4	---	---	---
B-19 0'	0	190	10	---	---
B-19 1'	1	57	<0.25	---	---
B-19 2'	2	26	---	---	---
B-19 6'	6	7.4	---	---	---
B-19 12'	12	4.9	---	---	---
B-19 18'	18	4.9	---	---	---
B-20 0'	0	16	---	---	---
B-20 1'	1	10	---	---	8.1
B-20 2'	2	<5.0	---	---	---
B-21 0'	0	4.2	---	---	---
B-21 1'	1	18	---	---	---
B-21 2'	2	4.2	---	---	---
B-22 0'	0	55	4.5	---	---
B-22 1'	1	17	---	---	---
B-22 2'	2	6.4	---	---	---
B-23 0'	0	32	---	---	---
B-23 1'	1	4.1	---	---	8.3
B-23 2'	2	3.6	---	---	---
B-24 0'	0	26	---	---	---
B-24 1'	1	100	18	---	---
B-24 2'	2	7.2	---	---	---
B-25 0'	0	74	1.1	---	---
B-25 1'	1	2.8	---	---	---

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-25 2'	2	5.3	---	---	---
B-26 0'	0	450	7.5	---	---
B-26 1'	1	23	---	---	7.4
B-26 2'	2	12	---	---	---
B-27 0'	0	1,200	---	0.55	---
B-27 1'	1	15	---	---	---
B-27 2'	2	<5.0	---	---	---
B-28 0'	0	5,300	---	4.6	---
B-28 1'	1	150	6.3	---	---
B-28 2'	2	9.3	---	---	---
B-29 0'	0	270	4.7	---	---
B-29 1'	1	110	5.9	---	8.1
B-29 2'	2	31	---	---	---
B-30 0'	0	590	25	---	---
B-30 1'	1	63	1.9	---	---
B-30 2'	2	35	---	---	---
B-31 0'	0	100	71	---	---
B-31 1'	1	130	13	---	---
B-31 2'	2	9.6	---	---	---
B-32 0'	0	35	---	---	---
B-32 1'	1	140	13	---	7.7
B-32 2'	2	89	9.5	---	---
B-33 0'	0	50	---	---	---
B-33 1'	1	25	---	---	---
B-33 2'	2	8.7	---	---	---
B-34 0'	0	18	---	---	---
B-34 1'	1	110	<0.25	---	---
B-34 2'	2	7.2	---	---	---
B-35 0'	0	99	4.1	---	---
B-35 1'	1	560	29	---	7.3
B-35 2'	2	8.7	---	---	---
B-36 0'	0	23	---	---	---
B-36 1'	1	1,400	---	6.2	---
B-36 2'	2	5.1	---	---	---
B-37 0'	0	32	---	---	---
B-37 1'	1	360	4.3	---	---
B-37 2'	2	7.6	---	---	---
B-38 0'	0	30	---	---	---
B-38 1'	1	9.3	---	---	8.6
B-38 2'	2	22	---	---	---

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-39 0'	0	39	---	---	---
B-39 1'	1	990	---	0.30	---
B-39 2'	2	12	---	---	---
B-40 0'	0	16	---	---	---
B-40 1'	1	180	5.8	---	---
B-40 2'	2	12	---	---	---
B-41 0'	0	130	8.3	---	---
B-41 1'	1	290	0.70	---	8.3
B-41 2'	2	<5.0	---	---	---
B-42 0'	0	<5.0	---	---	---
B-42 1'	1	6.7	---	---	---
B-42 2'	2	6.4	---	---	---
B-43 0'	0	4,600	---	3.9	---
B-43 1'	1	8.6	---	---	---
B-43 2'	2	7.5	---	---	---
B-44 0'	0	910	---	0.68	---
B-44 1'	1	43	---	---	---
B-44 2'	2	<5.0	---	---	---
B-45 0'	0	17	---	---	---
B-45 1'	1	36	---	---	---
B-45 2'	2	12	---	---	---
B-46 0'	0	79	5.9	---	---
B-46 1'	1	34	---	---	---
B-46 2'	2	12	---	---	---
B-47 0'	0	390	16	---	---
B-47 1'	1	140	5.9	---	---
B-47 2'	2	<5.0	---	---	---
B-48 0'	0	200	4.0	---	---
B-48 1'	1	1,200	---	0.49	7.2
B-48 2'	2	49	---	---	---
B-49 0'	0	23	---	---	---
B-49 1'	1	8.0	---	---	---
B-49 2'	2	6.1	---	---	---
B-50 0'	0	49	---	---	---
B-50 1'	1	42	---	---	---
B-50 2'	2	14	---	---	---
B-51 0'	0	59	3.4	---	---
B-51 1'	1	37	---	---	8.2
B-51 2'	2	<5.0	---	---	---

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-52 0'	0	210	17	---	---
B-52 1'	1	470	0.51	---	---
B-52 2'	2	1.0	---	---	---
B-53 0'	0	27	---	---	---
B-53 1'	1	53	1.2	---	---
B-53 2'	2	51	0.93	---	---
B-54 0'	0	37	---	---	
B-54 1'	1	16	---	---	8.1
B-54 2'	2	12	---	---	---
B-55 0'	0	19	---	---	---
B-55 1'	1	57	10	---	---
B-55 2'	2	<5.0	---	---	---
B-56 0'	0	21	---	---	---
B-56 1'	1	1,100	---	0.77	---
B-56 2'	2	9.7	---	---	---
B-57 0'	0	310	11	---	---
B-57 1'	1	11	---	---	---
B-57 2'	2	<5.0	---	---	---
B-58 0'	0	260	19	---	---
B-58 1'	1	6.9	---	---	---
B-58 2'	2	10	---	---	---
B-59 0'	0	40	---	---	---
B-59 1'	1	5.3	---	---	8.3
B-59 2'	2	7.3	---	---	---
B-60 0'	0	39	---	---	---
B-60 1'	1	46	---	---	7.9
B-60 2'	2	6.5	---	---	---
B-60 4'	4	6.1	---	---	---
B-60 6'	6	6.3	---	---	---
B-61 0'	0	2,000	---	2.3	---
B-61 1'	1	33	---	---	---
B-61 2'	2	10	---	---	---
B-62 0'	0	260	12	---	---
B-62 1'	1	1,600	---	5.6	---
B-62 2'	2	23	---	---	---
B-63 0'	0	85	3.0	---	8.0
B-63 1'	1	4,100	---	5.6	8.1
B-63 2'	2	11	---	---	7.9
B-64 0'	0	78	6.1	---	---
B-64 1'	1	6.8	---	---	---
B-64 2'	2	7.9	---	---	---

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-65 0'	0	1,000	---	0.38	---
B-65 1'	1	1,200	---	0.71	---
B-65 2'	2	830	---	0.87	---
B-66 0'	0	1,400	---	1.7	---
B-66 1'	1	180	9.5	---	8.0
B-66 2'	2	11		---	---
B-67 0'	0	440	25	---	---
B-67 1'	1	31	---	---	---
B-67 2'	2	3.5	---	---	---
B-68 0'	0	140	7.1	---	---
B-68 1'	1	26	---	---	---
B-68 2'	2	1,900	---	<0.25	---
B-69 0'	0	7.8	---	---	8.1
B-69 1'	1	1.5	---	---	8.5
B-69 2'	2	55	2.0	---	8.3
B-70 0'	0	130	11	---	---
B-70 1'	1	29	---	---	---
B-70 2'	2	8.3	---	---	---
B-71 0'	0	1,000	---	0.75	---
B-71 1'	1	470	20	---	---
B-71 2'	2	7.2	---	---	---
B-72 0'	0	1,400	---	0.33	7.2
B-72 1'	1	330	9.3	---	8.1
B-72 2'	2	<5.0	---	---	8.7
B-73 0'	0	160	19	---	---
B-73 1'	1	10	---	---	7.9
B-73 2'	2	<5.0	---	---	---
B-73 4'	4	5.0	---	---	---
B-73 6'	6	4.4	---	---	---
B-74 0'	0	120	8.5	---	---
B-74 1'	1	160	5.9	---	7.9
B-74 2'	2	5.3	---	---	---
B-74 4'	4	3.5	---	---	---
B-74 6'	6	4.4	---	---	---
B-75 0'	0	370	24	---	---
B-75 1'	1	87	2.1	---	8.0
B-75 2'	2	57	1.6	---	---
B-75 4'	4	3.8	---	---	---
B-75 6'	6	3.2	---	---	---
B-76 0'	0	130	13	---	---
B-76 1'	1	8.2	---	---	8.0

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-76 2'	2	3.3	---	---	---
B-76 4'	4	4.4	---	---	---
B-76 6'	6	6.8	---	---	---
B-77 0'	0	210	3.9	---	---
B-77 1'	1	210	3.4	---	8.1
B-77 2'	2	5.6	---	---	---
B-77 4'	4	3.4	---	---	---
B-77 6'	6	2.8	---	---	---
B-78 0'	0	17	---	---	---
B-78 1'	1	27	---	---	7.8
B-78 2'	2	4.1	---	---	---
B-78 4'	4	6.0	---	---	---
B-78 6'	6	7.5	---	---	---
B-79 0'	0	2,700	---	0.86	---
B-79 1'	1	25	---	---	---
B-79 2'	2	2.4	---	---	---
B-80 0'	0	130	9.6	---	---
B-80 1'	1	1,100	---	0.44	---
B-80 2'	2	5.2	---	---	---
B-81 0'	0	450	3.8	---	7.5
B-81 1'	1	14	---	---	7.9
B-81 2'	2	16	---	---	8.4
B-82 0'	0	10	---	---	---
B-82 1'	1	870	---	<0.25	---
B-82 2'	2	8.9	---	---	---
B-83 0'	0	72	3.8	---	---
B-83 1'	1	1,300	---	2.9	---
B-83 2	2	12	---	---	---
B-84 0'	0	470	15	---	---
B-84 1'	1	9.5	---	---	---
B-84 2'	2	8.0	---	---	---
B-84 6'	6	8.5	---	---	---
B-84 12'	12	6.5	---	---	---
B-84 18'	18	4.8	---	---	---
B-85 0	0	11	---	---	8.4
B-85 1'	1	37	---	---	7.7
B-85 2'	2	6.1	---	---	7.6
B-86 0'	0	490	25	---	---
B-86 1'	1	150	9.0	---	---
B-86 2'	2	7.0	---	---	---
B-87 0'	0	300	14	---	---
B-87 1'	1	42	---	---	---

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-87 2'	2	8.0	---	---	---
B-87 6'	6	5.8	---	---	---
B-87 12'	12	4.5	---	---	---
B-87 18'	18	4.0	---	---	---
B-88 0'	0	1,100	---	2.2	---
B-88 1'	1	140	8.9	---	---
B-88 2'	2	8.0	---	---	---
B-89 0'	0	100	6.6	---	---
B-89 1'	1	630	---	---	---
B-89 2'	2	8.0	---	---	---
B-90 0'	0	30	---	---	---
B-90 1'	1	65	1.4	---	---
B-90 2'	2	7.1	---	---	---
B-91 0'	0	480	37	---	---
B-91 1'	1	9.1	---	---	---
B-91 2'	2	7.9	---	---	---
B-92 0'	0	560	25	---	7.6
B-92 1'	1	83	2.5	---	8.3
B-92 2'	2	8.4	---	---	7.9
B-93 0'	0	530	19	---	---
B-93 1'	1	160	7.4	---	---
B-93 2'	2	18	---	---	---
B-94 0'	0	46	---	---	---
B-94 1'	1	5.7	---	---	---
B-94 2'	2	6.7	---	---	---
B-95 0'	0	980	---	0.65	---
B-95 1'	1	22	---	---	---
B-95 2'	2	10	---	---	---
B-96 0'	0	1,100	---	0.50	7.4
B-96 1'	1	280	29	---	8.0
B-96 2'	2	8.2	---	---	7.7
B-97 0'	0	140	11	---	---
B-97 1'	1	22	---	---	---
B-97 2'	2	6.9	---	---	---
B-98 0'	0	240	15	---	---
B-98 1'	1	65	1.4	---	---
B-98 2'	2	15	---	---	---
B-99 0'	0	810	---	0.80	---
B-99 1'	1	790	---	1.3	7.8
B-99 2'	2	820	---	0.79	---

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-100 0'	0	5,300	---	1.1	---
B-100 1'	1	83	2.8	---	---
B-100 2'	2	18	---	---	---
B-101 0'	0	27	---	---	---
B-101 1'	1	490	40	---	---
B-101 2'	2	190	5.3	---	---
B-102 0'	0	170	12	---	7.4
B-102 1'	1	21	---	---	8.3
B-102 2'	2	11	---	---	8.3
B-103 0'	0	880	---	0.40	---
B-103 1'	1	79	1.5	---	---
B-103 2'	2	6.6	---	---	---
B-104 0'	0	1,800	---	51	---
B-104 1'	1	15	---	---	---
B-104 2'	2	15	---	---	---
B-105 0'	0	98	65	---	7.6
B-105 1'	1	16	---	---	7.8
B-105 2'	2	8.3	---	---	7.5
B-106 0'	0	1,200	---	1.9	---
B-106 1'	1	13	---	---	---
B-106 2'	2	8.6	---	---	---
B-107 0'	0	1,200	---	2.6	---
B-107 1'	1	6.1	---	---	---
B-107 2'	2	5.7	---	---	---
B-108 0'	0	56	4.1	---	7.8
B-108 1'	1	7.5	---	---	8.5
B-108 2'	2	7.0	---	---	7.5
B-109 0'	0	350	18	---	---
B-109 1'	1	540	38	---	---
B-109 2'	2	13	---	---	---
B-110 0'	0	30	---	---	---
B-110 1'	1	13	---	---	---
B-110 2'	2	6.3	---	---	---
B-111 0'	0	<5.0	---	---	7.4
B-111 1'	1	120	1.4	---	7.8
B-111 2'	2	8.6	---	---	7.1
B-113 0'	0	580	48	---	---
B-113 1'	1	45	---	---	---
B-113 2'	2	8.1	---	---	---
B-114 0'	0	21	---	---	---

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-114 1'	1	8.5	---	---	7.7
B-114 2'	2	6.0	---	---	---
B-115 0'	0	43	---	---	---
B-115 1'	1	10	---	---	---
B-115 2'	2	6.4	---	---	---
B-116 0'	0	75	3.1	---	---
B-116 1'	1	93	3.3	---	---
B-116 2'	2	14	---	---	---
B-117 0'	0	1,500	---	<0.25	---
B-117 1'	1	9.6	---	---	7.0
B-117 2'	2	5.9	---	---	---
B-118 0'	0	98	4.3	---	---
B-118 1'	1	100	7.0	---	---
B-118 2'	2	8.7	---	---	---
B-119 0'	0	83	1.7	---	---
B-119 1'	1	96	3.5	---	---
B-119 2'	2	6.1	---	---	---
B-120 0'	0	33	---	---	---
B-120 1'	1	36	---	---	7.2
B-120 2'	2	<5.0	---	---	---
B-121 0'	0	270	23	---	---
B-121 1'	1	21	---	---	---
B-121 2'	2	11	---	---	---
B-122 0'	0	1,900	---	2.1	---
B-122 1'	1	250	7.9	---	---
B-122 2'	2	20	---	---	---
B-123 0'	0	23	---	---	7.6
B-123 1'	1	540	4.1	---	8.0
B-123 2'	2	8.0	---	---	7.8
B-124 0'	0	89	---	---	---
B-124 1'	1	8.1	13	---	---
B-124 2'	2	6.6	---	---	---
B-125 0'	0	350	34	---	---
B-125 1'	1	79	0.59	---	---
B-125 2'	2	6.7	---	---	---
B-126 0'	0	260	16	---	7.9
B-126 1'	1	600	---	---	8.0
B-126 2'	2	19	---	---	8.0
B-127 0'	0	680	---	2.2	---
B-127 1'	1	100	4.5	---	---

TABLE 2
Summary of Lead and pH Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)	pH
B-127 2'	2	12	---	---	---
B-128 0'	0	50	---	---	---
B-128 1'	1	<5.0	---	---	---
B-128 2'	2	7.2	---	---	---
B-129 0'	0	120	0.82	---	---
B-129 1'	1	5.5	---	---	---
B-129 2'	2	19	---	---	---
B-130 0'	0	15	---	---	---
B-130 1'	1	20	---	---	---
B-130 2'	2	<5.0	---	---	---
B-131 4'	4	5.5	---	---	---
B-131 6'	6	4.5	---	---	---
B-131 0'	0	35	---	---	8.2
B-131 1'	1	15	---	---	7.7
B-131 2'	2	10	---	---	7.6
B-132 0'	0	910	---	0.51	---
B-132 1'	1	180	15	---	---
B-132 2'	2	8.1	---	---	---
B-133 0'	0	1,900	---	5.2	---
B-133 1'	1	1,200	---	<0.25	---
B-133 2'	2	18	---	---	---
B-134 0'	0	140	61	---	8.1
B-134 1'	1	5.6	---	---	8.4
B-134 2'	2	20	---	---	8.1
B-135 0'	0	590	31	---	---
B-135 1'	1	170	14	---	---
B-135 2'	2	10	---	---	---
B-136 0'	0	12	---	---	---
B-136 1'	1	7.1	---	---	---
B-136 2'	2	4.0	---	---	---
B-137 0'	0	950	---	0.53	---
B-137 1'	1	420	22	---	---
B-137 2'	2	10	---	---	---

Notes:

mg/kg Milligrams per kilogram
mg/l = Milligrams per liter
WET Waste Extraction Test using citric acid as the extraction fluid
TCLP = Toxicity Characteristic Leaching Procedure
--- = Not analyzed
<5.0 Analyte was not detected above the laboratory reporting limit

TABLE 3
Summary of CAM17 Metals Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
B-2 0'	0	<2.0	<1.0	290	<1.0	1.0	130	20	26	40	<1.0	350	<1.0	<1.0	<1.0	23	87	0.14
B-2 1'	1	<2.0	<1.0	210	<1.0	<1.0	4.6	4.0	<2.0	4.0	<1.0	3.5	<1.0	<1.0	<1.0	27	1,600	<0.10
B-2 2'	2	<2.0	<1.0	220	<1.0	<1.0	4.1	3.8	<2.0	2.8	<1.0	1.5	<1.0	<1.0	<1.0	27	85	<0.10
B-7 0'	0	<2.0	2.0	160	<1.0	1.1	37	7.1	51	730	14	39	<1.0	<1.0	<1.0	36	150	0.19
B-7 1'	1	<2.0	<1.0	410	<1.0	<1.0	20	11	29	100	11	58	<1.0	<1.0	<1.0	24	60	0.21
B-7 2'	2	<2.0	2.1	140	<1.0	<1.0	35	6.2	34	280	14	31	<1.0	<1.0	<1.0	38	95	<0.10
B-7 4'	4	12	10	150	<1.0	1.2	37	17	32	12	<1.0	71	1.7	<1.0	<1.0	51	130	0.10
B-7 6'	6	5.9	2.3	110	<1.0	<1.0	32	7.0	24	8.3	<1.0	36	1.4	<1.0	<1.0	40	51	<0.10
B-8 0'	0	3.7	<1.0	200	<1.0	2.2	53	9.8	61	840	<1.0	57	<1.0	<1.0	<1.0	40	260	0.19
B-8 1'	1	2.6	<1.0	130	<1.0	1.7	50	9.2	42	450	<1.0	50	<1.0	<1.0	<1.0	37	160	0.12
B-8 2'	2	2.8	<1.0	140	<1.0	1.7	54	9.8	41	5.2	<1.0	62	<1.0	<1.0	<1.0	39	160	0.17
B-11 0'	0	3.5	<1.0	210	<1.0	2.7	51	8.2	120	1,100	1.2	66	<1.0	<1.0	<1.0	34	420	0.26
B-11 1'	1	<2.0	<1.0	120	<1.0	1.3	32	7.1	22	120	<1.0	39	<1.0	<1.0	<1.0	32	73	<0.10
B-11 2'	2	<2.0	<1.0	130	<1.0	1.0	35	7.2	19	21	<1.0	34	<1.0	<1.0	<1.0	34	45	<0.10
B-13 0'	0	<2.0	<1.0	130	<1.0	<1.0	14	8.5	39	15	15	17	<1.0	<1.0	<1.0	32	26	<0.10
B-13 1'	1	<2.0	1.9	160	<1.0	1.3	32	8.6	34	7.0	1.8	42	<1.0	<1.0	<1.0	35	59	<0.10
B-13 2'	2	<2.0	<1.0	96	<1.0	<1.0	22	5.3	12	50	<1.0	24	<1.0	<1.0	<1.0	22	90	1.6
B-15 0'	0	<2.0	<1.0	150	<1.0	1.3	42	9.0	36	170	<1.0	39	<1.0	<1.0	<1.0	43	110	<0.10
B-15 1'	1	<2.0	<1.0	150	<1.0	<1.0	27	8.5	18	11	<1.0	33	<1.0	<1.0	<1.0	28	64	0.79
B-15 2'	2	<2.0	<1.0	100	<1.0	<1.0	61	6.8	17	4.1	<1.0	48	<1.0	<1.0	<1.0	33	43	<0.10
B-17 0'	0	<2.0	<1.0	140	<1.0	<1.0	46	11	32	110	<1.0	43	<1.0	<1.0	<1.0	54	120	<0.10
B-17 1'	1	<2.0	<1.0	130	<1.0	1.1	46	12	33	120	<1.0	45	<1.0	<1.0	<1.0	56	880	0.37
B-17 2'	2	<2.0	4.4	190	<1.0	<1.0	37	8.4	24	7.4	<1.0	39	<1.0	<1.0	<1.0	41	60	<0.10
B-17 6'	0	<2.0	2.4	150	<1.0	<1.0	38	6.2	22	5.5	<1.0	34	<1.0	<1.0	<1.0	39	49	<0.10
B-17 12'	12	<2.0	7.6	150	<1.0	<1.0	33	6.9	24	8.3	<1.0	32	<1.0	<1.0	<1.0	49	58	<0.10

TABLE 3

Summary of CAM17 Metals Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
B-17 18'	18	<2.0	5.2	83	<1.0	<1.0	33	8.1	21	6.8	<1.0	38	<1.0	<1.0	<1.0	39	60	<0.10
B-18 0'	0	<2.0	<1.0	220	<1.0	1.2	35	7.8	38	23	<1.0	47	<1.0	<1.0	<1.0	38	110	<0.10
B-18 1'	1	<2.0	<1.0	160	<1.0	1.2	24	7.0	15	6.6	<1.0	28	<1.0	<1.0	<1.0	25	52	<0.10
B-18 2'	2	<2.0	<1.0	77	<1.0	<1.0	33	5.4	18	4.4	<1.0	32	<1.0	<1.0	<1.0	28	46	<0.10
B-19 0'	0	<2.0	<1.0	110	<1.0	1.0	44	13	35	190	<1.0	42	<1.0	<1.0	<1.0	68	92	<0.10
B-19 1'	1	<2.0	3.0	160	<1.0	<1.0	47	9.8	25	57	<1.0	47	<1.0	<1.0	<1.0	40	79	<0.10
B-19 2'	2	<2.0	3.8	130	<1.0	<1.0	28	7.1	19	26	<1.0	34	<1.0	<1.0	<1.0	32	53	0.22
B-19 6'	6	<2.0	4.7	180	<1.0	<1.0	37	8.7	23	7.4	<1.0	41	<1.0	<1.0	<1.0	44	56	0.12
B-19 12'	12	<2.0	<1.0	91	<1.0	1.9	32	5.7	19	4.9	<1.0	34	<1.0	<1.0	<1.0	27	53	<0.10
B-19 18'	18	<2.0	<1.0	56	<1.0	<1.0	34	5.5	20	4.9	<1.0	40	<1.0	<1.0	<1.0	33	44	<0.10
B-21 0'	0	2.5	<1.0	260	<1.0	<1.0	24	8.5	19	4.2	<1.0	37	<1.0	<1.0	<1.0	49	39	<0.10
B-21 1'	1	4.7	<1.0	130	<1.0	1.2	41	13	40	18	<1.0	27	<1.0	<1.0	<1.0	70	39	<0.10
B-21 2'	2	2.1	<1.0	130	<1.0	<1.0	29	6.9	10	4.2	<1.0	30	<1.0	<1.0	<1.0	28	35	<0.10
B-23 0'	0	2.3	<1.0	430	<1.0	1.5	53	12	28	32	<1.0	85	<1.0	<1.0	<1.0	47	54	<0.10
B-23 1'	1	7.0	<1.0	46	<1.0	1.6	40	18	31	4.1	<1.0	26	<1.0	<1.0	<1.0	110	46	<0.10
B-23 2'	2	<2.0	<1.0	130	<1.0	<1.0	29	6.5	12	3.6	<1.0	30	<1.0	<1.0	<1.0	29	37	<0.10
B-25 0'	0	<2.0	<1.0	150	<1.0	1.0	33	8.6	61	74	1.3	35	<1.0	<1.0	<1.0	59	990	<0.10
B-25 1'	1	<2.0	<1.0	55	<1.0	1.7	84	21	44	2.8	<1.0	39	<1.0	<1.0	<1.0	140	50	<0.10
B-25 2'	2	2.3	<1.0	110	<1.0	<1.0	31	6.2	13	5.3	<1.0	26	<1.0	<1.0	<1.0	32	36	<0.10
B-28 0'	0	<2.0	<1.0	200	<1.0	2.8	50	11	82	5,300	<1.0	51	<1.0	<1.0	<1.0	51	470	0.11
B-28 1'	1	<2.0	<1.0	130	<1.0	1.5	56	16	40	150	<1.0	39	<1.0	<1.0	<1.0	96	84	<0.10
B-28 2'	2	<2.0	<1.0	180	<1.0	1.1	46	8.6	25	9.3	<1.0	37	<1.0	<1.0	<1.0	49	1,200	<0.10
B-31 0'	0	<2.0	<1.0	130	<1.0	1.4	46	11	32	100	1.4	35	<1.0	<1.0	<1.0	68	75	0.16
B-31 1'	1	<2.0	<1.0	190	<1.0	1.2	40	11	32	130	1.1	39	<1.0	<1.0	<1.0	43	87	<0.10

TABLE 3
Summary of CAM17 Metals Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
B-31 2'	2	<2.0	<1.0	180	<1.0	1.2	50	9.3	25	9.6	<1.0	41	<1.0	<1.0	<1.0	50	65	<0.10
B-32 0'	0	3.0	<1.0	320	<1.0	1.1	31	6.1	41	35	<1.0	33	<1.0	<1.0	<1.0	32	190	<0.10
B-32 1'	1	<2.0	<1.0	160	<1.0	1.2	38	8.5	25	140	<1.0	38	<1.0	<1.0	<1.0	39	110	<0.10
B-32 2'	2	2.0	<1.0	130	<1.0	1.3	39	9.4	25	89	<1.0	38	<1.0	<1.0	<1.0	43	85	<0.10
B-33 0'	0	<2.0	<1.0	370	<1.0	1.3	49	11	56	50	<1.0	61	<1.0	<1.0	<1.0	54	110	<0.10
B-33 1'	1	<2.0	1.3	190	<1.0	1.2	40	9.4	25	25	1.3	43	<1.0	<1.0	<1.0	39	64	<0.10
B-33 2'	2	<2.0	3.2	260	<1.0	1.4	50	10	27	8.7	<1.0	44	<1.0	<1.0	<1.0	54	77	<0.10
B-35 0'	0	<2.0	<1.0	320	<1.0	1.4	58	10	54	99	<1.0	69	<1.0	<1.0	<1.0	48	150	<0.10
B-35 1'	1	<2.0	<1.0	250	<1.0	1.7	42	11	41	560	1.4	45	<1.0	<1.0	<1.0	43	150	<0.10
B-35 2'	2	<2.0	2.4	190	<1.0	1.2	44	8.7	25	8.7	<1.0	39	<1.0	<1.0	<1.0	47	68	<0.10
B-37 0'	0	<2.0	<1.0	350	<1.0	1.5	50	13	67	32	1.7	74	<1.0	<1.0	<1.0	54	180	<0.10
B-37 1'	1	<2.0	<1.0	210	<1.0	1.3	41	9.0	30	360	2.3	39	<1.0	<1.0	<1.0	47	110	<0.10
B-37 2'	2	<2.0	1.6	190	<1.0	1.2	45	8.9	23	7.6	<1.0	42	<1.0	<1.0	<1.0	45	65	<0.10
B-39 0'	0	<2.0	<1.0	430	<1.0	1.8	68	16	67	39	2.2	91	<1.0	<1.0	<1.0	71	180	<0.10
B-39 1'	1	<2.0	<1.0	180	<1.0	1.9	90	15	48	990	1.0	150	<1.0	<1.0	<1.0	47	230	<0.10
B-39 2'	2	<2.0	<1.0	150	<1.0	<1.0	38	7.7	19	12	<1.0	36	<1.0	<1.0	<1.0	39	53	0.16
B-41 0'	0	<2.0	<1.0	470	<1.0	1.3	47	8.2	86	130	1.7	47	<1.0	<1.0	<1.0	37	170	<0.10
B-41 1'	1	<2.0	<1.0	86	<1.0	1.3	47	13	38	290	<1.0	70	<1.0	<1.0	<1.0	61	110	<0.10
B-41 2'	2	<2.0	<1.0	32	<1.0	1.4	37	22	44	6.4	<1.0	31	<1.0	<1.0	<1.0	97	80	<0.10
B-43 0'	0	<2.0	5.5	170	<1.0	3.5	52	9.8	96	4,600	<1.0	51	<1.0	<1.0	<1.0	37	2,300	0.18
B-43 1'	1	<2.0	<1.0	14	<1.0	1.6	47	17	60	8.6	<1.0	29	<1.0	<1.0	<1.0	88	60	<0.10
B-43 2'	2	<2.0	2.9	170	<1.0	1.1	30	8.1	21	12	<1.0	36	<1.0	<1.0	<1.0	29	61	<0.10
B-46 0'	0	<2.0	<1.0	76	<1.0	1.3	43	14	36	79	<1.0	29	<1.0	<1.0	<1.0	75	68	<0.10

TABLE 3
Summary of CAM17 Metals Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
B-46 1'	1	<2.0	<1.0	140	<1.0	1.2	36	15	44	34	<1.0	32	<1.0	<1.0	<1.0	70	88	<0.10
B-46 2'	2	<2.0	1.4	150	<1.0	1.1	32	7.4	25	49	<1.0	34	<1.0	<1.0	<1.0	34	79	0.51
B-49 0'	0	<2.0	<1.0	130	<1.0	1.3	47	13	40	23	<1.0	38	<1.0	<1.0	<1.0	63	110	<0.10
B-49 1'	1	<2.0	3.0	170	<1.0	1.3	31	9.0	23	8.0	<1.0	37	<1.0	<1.0	<1.0	33	75	0.16
B-49 2'	2	<2.0	1.4	140	<1.0	<1.0	28	6.6	20	<5.0	<1.0	30	<1.0	<1.0	<1.0	30	66	<0.10
B-52 0'	0	<2.0	<1.0	290	<1.0	1.2	36	8.2	53	210	<1.0	41	<1.0	<1.0	<1.0	38	140	<0.10
B-52 1'	1	<2.0	<1.0	160	<1.0	1.3	55	14	46	470	2.2	45	<1.0	<1.0	<1.0	46	87	<0.10
B-52 2'	2	<2.0	<1.0	51	<1.0	<1.0	46	19	40	51	<1.0	31	<1.0	<1.0	<1.0	66	40	<0.10
B-54 0'	0	<2.0	<1.0	280	<1.0	1.5	48	12	52	37	<1.0	72	<1.0	<1.0	<1.0	69	140	<0.10
B-54 1'	1	<2.0	<1.0	210	<1.0	1.5	46	13	33	16	<1.0	51	<1.0	<1.0	<1.0	55	75	<0.10
B-54 2'	2	<2.0	4.1	250	<1.0	1.9	49	12	37	<5.0	<1.0	56	<1.0	<1.0	<1.0	51	110	<0.10
B-56 0'	0	<2.0	<1.0	440	<1.0	1.0	44	8.9	41	21	<1.0	74	<1.0	<1.0	<1.0	37	120	0.11
B-56 1'	1	<2.0	<1.0	160	<1.0	2.3	57	10	78	1,100	1.2	56	<1.0	<1.0	<1.0	46	220	0.13
B-56 2'	2	<2.0	2.4	180	<1.0	1.3	34	9.0	25	220	<1.0	41	<1.0	<1.0	<1.0	35	76	<0.10
B-60 0'	0	8.2	<1.0	190	<1.0	1.0	45	8.9	84	39	2.4	47	<1.0	<1.0	<1.0	49	230	<0.10
B-60 1'	1	8.0	2.3	130	<1.0	<1.0	32	8.8	22	46	<1.0	34	<1.0	<1.0	<1.0	39	52	<0.10
B-60 2'	2	7.7	3.8	130	<1.0	<1.0	27	6.7	16	6.5	<1.0	31	<1.0	<1.0	<1.0	29	47	<0.10
B-60 4'	4	8.6	4.3	150	<1.0	<1.0	28	7.0	19	6.1	<1.0	33	<1.0	<1.0	<1.0	30	56	<0.10
B-60 6'	6	8.8	4.6	160	<1.0	1.1	28	6.4	20	23	<1.0	31	<1.0	<1.0	<1.0	32	56	<0.10
B-63 0'	0	<2.0	<1.0	230	<1.0	1.3	43	7.9	51	85	<1.0	45	<1.0	<1.0	<1.0	40	170	<0.10
B-63 1'	1	<2.0	<1.0	160	<1.0	2.6	71	13	59	4,100	<1.0	67	<1.0	<1.0	<1.0	56	320	0.11
B-63 2'	2	<2.0	<1.0	140	<1.0	<1.0	30	6.7	15	7.9	<1.0	30	<1.0	<1.0	<1.0	31	47	<0.10
B-65 0'	0	4.4	<1.0	240	<1.0	2.5	66	9.8	130	1,000	1.9	67	<1.0	<1.0	<1.0	46	450	0.16
B-65 1'	1	4.3	<1.0	110	<1.0	1.8	58	14	56	1,200	<1.0	48	<1.0	<1.0	<1.0	61	230	0.10

TABLE 3

Summary of CAM17 Metals Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
B-65 2'	2	4.1	<1.0	80	<1.0	1.7	54	18	49	11	<1.0	42	<1.0	<1.0	<1.0	73	120	0.10
B-67 0'	0	4.0	<1.0	160	<1.0	1.7	58	10	49	440	<1.0	47	<1.0	<1.0	<1.0	48	210	<0.10
B-67 1'	1	2.4	<1.0	81	<1.0	<1.0	39	12	32	31	<1.0	29	<1.0	<1.0	<1.0	50	42	0.34
B-67 2'	2	4.9	<1.0	23	<1.0	1.3	55	18	33	1,900	<1.0	35	<1.0	<1.0	<1.0	83	42	<0.10
B-69 0'	0	<2.0	<1.0	35	<1.0	<1.0	8.5	9.1	40	7.8	<1.0	12	<1.0	<1.0	<1.0	70	57	0.14
B-69 1'	1	<2.0	<1.0	64	<1.0	<1.0	12	12	41	1.5	<1.0	35	<1.0	<1.0	<1.0	71	38	<0.10
B-69 2'	2	<2.0	<1.0	66	<1.0	1.3	47	16	39	55	<1.0	36	<1.0	<1.0	<1.0	91	61	<0.10
B-71 0'	0	<2.0	<1.0	160	<1.0	2.5	68	11	68	1,000	<1.0	64	<1.0	<1.0	<1.0	46	260	0.14
B-71 1'	1	<2.0	<1.0	120	<1.0	1.9	61	14	43	470	<1.0	42	<1.0	<1.0	<1.0	74	100	0.18
B-71 2'	2	<2.0	<1.0	58	<1.0	1.6	45	20	36	<5.0	<1.0	30	<1.0	<1.0	<1.0	120	51	<0.10
B-73 0'	0	<2.0	1.3	150	<1.0	<1.0	34	8.0	55	160	13	37	<1.0	<1.0	<1.0	39	91	<0.10
B-73 1'	1	<2.0	1.7	150	<1.0	<1.0	37	7.6	22	10	14	38	<1.0	<1.0	<1.0	36	60	<0.10
B-73 2'	2	<2.0	<1.0	42	<1.0	<1.0	62	20	45	<5.0	21	37	<1.0	<1.0	<1.0	110	52	<0.10
B-73 4'	4	<2.0	5.0	260	<1.0	<1.0	31	8.8	24	5.0	14	29	<1.0	<1.0	<1.0	44	57	<0.10
B-73 6'	6	<2.0	<1.0	64	<1.0	<1.0	34	5.7	16	4.4	12	25	<1.0	<1.0	<1.0	30	55	<0.10
B-74 0'	0	<2.0	<1.0	130	<1.0	<1.0	30	8.5	27	120	13	40	<1.0	<1.0	<1.0	37	62	<0.10
B-74 1'	1	<2.0	<1.0	130	<1.0	<1.0	35	8.6	28	160	14	39	<1.0	<1.0	<1.0	40	75	<0.10
B-74 2'	2	<2.0	1.3	100	<1.0	<1.0	32	8.1	22	5.3	14	34	<1.0	<1.0	<1.0	39	61	<0.10
B-74 4'	4	<2.0	<1.0	68	<1.0	<1.0	27	4.8	16	3.5	11	26	<1.0	<1.0	<1.0	27	41	<0.10
B-74 6'	6	<2.0	1.9	140	<1.0	<1.0	30	9.0	29	4.4	14	45	<1.0	<1.0	<1.0	36	51	<0.10
B-75 0'	0	<2.0	<1.0	84	<1.0	<1.0	36	8.0	23	370	13	37	<1.0	<1.0	<1.0	42	58	<0.10
B-75 1'	1	<2.0	<1.0	57	<1.0	<1.0	52	12	27	87	15	35	<1.0	<1.0	<1.0	67	51	<0.10
B-75 2'	2	<2.0	<1.0	18	<1.0	<1.0	37	4.6	7.5	57	9.0	20	<1.0	<1.0	<1.0	41	45	<0.10
B-75 4'	4	<2.0	<1.0	62	<1.0	<1.0	36	5.2	20	3.8	14	30	<1.0	<1.0	<1.0	34	46	<0.10
B-75 6'	6	<2.0	<1.0	480	<1.0	<1.0	33	7.2	18	3.2	15	30	<1.0	<1.0	<1.0	41	43	<0.10

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B-76 0'	0	<2.0	<1.0	130	<1.0	<1.0	36	5.9	19	130	12	30	<1.0	<1.0	<1.0	35	55	<0.10
B-76 1'	1	<2.0	<1.0	97	<1.0	<1.0	31	6.1	16	8.2	11	27	<1.0	<1.0	<1.0	39	37	<0.10
B-76 2'	2	3.8	<1.0	43	<1.0	<1.0	29	8.1	17	3.3	<1.0	42	<1.0	<1.0	<1.0	34	30	<0.10
B-76 4'	4	3.5	1.9	200	<1.0	<1.0	28	4.1	15	4.4	<1.0	23	<1.0	<1.0	<1.0	31	37	<0.10
B-76 6'	6	5.9	2.7	86	<1.0	<1.0	33	7.6	21	6.8	<1.0	35	<1.0	<1.0	<1.0	44	63	<0.10
B-77 0'	0	5.0	<1.0	120	<1.0	<1.0	36	7.3	23	210	<1.0	32	<1.0	<1.0	<1.0	37	69	<0.10
B-77 1'	1	7.6	3.1	130	<1.0	<1.0	37	7.5	25	210	<1.0	34	<1.0	<1.0	<1.0	40	74	<0.10
B-77 2'	2	7.0	<1.0	85	<1.0	<1.0	34	6.9	17	5.6	<1.0	26	<1.0	<1.0	<1.0	31	51	<0.10
B-77 4'	4	<2.0	<1.0	110	<1.0	<1.0	28	6.2	18	3.4	10	24	<1.0	<1.0	<1.0	28	40	<0.10
B-77 6'	6	<2.0	1.5	100	<1.0	<1.0	25	4.8	15	2.8	10	27	<1.0	<1.0	<1.0	26	34	<0.10
B-78 0'	0	<2.0	<1.0	120	<1.0	<1.0	33	8.2	20	17	12	37	<1.0	<1.0	<1.0	33	47	<0.10
B-78 1'	1	<2.0	1.8	150	<1.0	<1.0	35	8.4	23	27	13	38	<1.0	<1.0	<1.0	35	55	0.15
B-78 2'	2	<2.0	<1.0	110	<1.0	<1.0	31	6.3	19	4.1	11	31	<1.0	<1.0	<1.0	31	37	<0.10
B-78 4'	4	<2.0	1.9	130	<1.0	<1.0	37	8.5	28	6.0	15	41	<1.0	<1.0	<1.0	37	60	<0.10
B-78 6'	6	<2.0	2.2	540	<1.0	<1.0	30	15	22	7.5	17	37	<1.0	<1.0	<1.0	37	58	<0.10
B-79 0'	0	5.0	<1.0	210	<1.0	2.4	55	8.5	77	2,700	1.7	46	<1.0	<1.0	<1.0	40	340	0.27
B-79 1'	1	2.2	<1.0	130	<1.0	1.2	38	7.7	21	25	<1.0	34	<1.0	<1.0	<1.0	41	52	<0.10
B-79 2'	2	7.6	<1.0	48	<1.0	1.9	70	23	47	2.4	<1.0	36	<1.0	<1.0	<1.0	120	47	<0.10
B-81 0'	0	<2.0	<1.0	160	<1.0	2.1	180	18	48	450	<1.0	210	<1.0	<1.0	<1.0	56	180	0.11
B-81 1'	1	<2.0	<1.0	86	<1.0	1.5	49	16	35	14	<1.0	34	<1.0	<1.0	<1.0	91	54	<0.10
B-81 2'	2	<2.0	<1.0	220	<1.0	1.5	49	15	30	8.9	<1.0	45	<1.0	<1.0	<1.0	72	56	<0.10
B-83 0'	0	<2.0	<1.0	370	<1.0	1.5	77	15	67	72	<1.0	93	<1.0	<1.0	<1.0	58	130	0.12
B-83 1'	1	<2.0	<1.0	110	<1.0	2.0	46	13	41	1,300	<1.0	50	<1.0	<1.0	<1.0	73	130	<0.10
B-83 2	2	<2.0	1.3	180	<1.0	1.2	44	8.6	22	12	<1.0	38	<1.0	<1.0	<1.0	45	61	<0.10

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B-84 0'	0	<2.0	2.1	150	<1.0	1.2	45	10	40	470	<1.0	42	<1.0	<1.0	<1.0	50	170	0.13
B-84 1'	1	<2.0	4.5	190	<1.0	<1.0	37	8.6	25	9.5	<1.0	39	<1.0	<1.0	<1.0	39	60	<0.10
B-84 2'	2	<2.0	4.3	180	<1.0	<1.0	37	8.4	24	8.0	<1.0	39	<1.0	<1.0	<1.0	42	58	<0.10
B-84 6'	6	<2.0	3.4	320	<1.0	<1.0	39	8.9	27	8.5	<1.0	41	<1.0	<1.0	<1.0	39	63	<0.10
B-84 12'	12	<2.0	4.7	89	<1.0	<1.0	28	7.3	18	6.5	<1.0	26	<1.0	<1.0	<1.0	35	49	<0.10
B-84 18'	18	<2.0	2.5	130	<1.0	<1.0	32	6.7	19	4.8	<1.0	31	<1.0	<1.0	<1.0	36	42	<0.10
B-86 0'	0	<2.0	<1.0	160	<1.0	1.7	69	12	51	490	<1.0	68	<1.0	<1.0	<1.0	53	180	0.20
B-86 1'	1	<2.0	<1.0	54	<1.0	1.6	57	21	44	150	<1.0	35	<1.0	<1.0	<1.0	100	59	0.64
B-86 2'	2	<2.0	2.3	170	<1.0	1.1	44	8.4	23	7.0	<1.0	38	<1.0	<1.0	<1.0	46	58	<0.10
B-87 0'	0	<2.0	2.7	150	<1.0	1.1	46	9.6	32	300	<1.0	40	<1.0	<1.0	<1.0	49	150	<0.10
B-87 1'	1	<2.0	3.7	190	<1.0	1.1	36	8.1	23	42	<1.0	36	<1.0	<1.0	<1.0	40	74	<0.10
B-87 12'	12	<2.0	1.1	100	<1.0	<1.0	33	5.7	17	4.5	<1.0	33	<1.0	<1.0	<1.0	27	53	<0.10
B-87 18'	18	<2.0	<1.0	88	<1.0	<1.0	31	4.5	15	4.0	<1.0	31	<1.0	<1.0	<1.0	26	45	<0.10
B-88 0'	0	<2.0	<1.0	150	<1.0	2.2	65	13	54	1,100	<1.0	55	<1.0	<1.0	<1.0	72	190	0.12
B-88 1'	1	<2.0	<1.0	75	<1.0	1.4	56	17	39	140	<1.0	36	<1.0	<1.0	<1.0	91	57	<0.10
B-88 2'	2	<2.0	2.4	250	<1.0	1.1	44	8.3	22	8.0	<1.0	37	<1.0	<1.0	<1.0	46	60	<0.10
B-90 0'	0	<2.0	<1.0	120	<1.0	1.3	50	11	28	30	<1.0	44	<1.0	<1.0	<1.0	58	51	0.19
B-90 1'	1	<2.0	<1.0	110	<1.0	1.6	52	14	35	65	<1.0	41	<1.0	<1.0	<1.0	76	62	<0.10
B-90 2'	2	<2.0	2.1	240	<1.0	1.3	49	9.2	23	7.1	<1.0	42	<1.0	<1.0	<1.0	49	59	<0.10
B-91 0'	0	<2.0	<1.0	84	<1.0	1.9	64	20	47	480	<1.0	41	<1.0	<1.0	<1.0	120	82	<0.10
B-91 1'	1	<2.0	1.4	150	<1.0	1.1	42	8.3	22	9.1	<1.0	35	<1.0	<1.0	<1.0	46	59	<0.10
B-91 2'	2	<2.0	1.6	210	<1.0	1.1	44	8.5	21	7.9	<1.0	38	<1.0	<1.0	<1.0	46	56	<0.10
B-93 0'	0	<2.0	<1.0	210	<1.0	1.7	45	11	49	530	<1.0	48	<1.0	<1.0	<1.0	57	140	0.14
B-93 1'	1	<2.0	<1.0	86	<1.0	1.3	51	17	40	160	<1.0	35	<1.0	<1.0	<1.0	85	65	<0.10
B-93 2'	2	<2.0	2.9	180	<1.0	1.2	43	11	26	18	<1.0	58	<1.0	<1.0	<1.0	46	77	0.10

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B-96 0'	0	<2.0	2.4	250	<1.0	2.2	54	13	57	1,100	<1.0	55	<1.0	<1.0	<1.0	61	260	0.12
B-96 1'	1	<2.0	<1.0	110	<1.0	1.3	51	11	34	280	<1.0	37	<1.0	<1.0	<1.0	58	81	0.22
B-96 2'	2	<2.0	2.4	170	<1.0	1.1	44	8.6	22	8.2	<1.0	38	<1.0	<1.0	<1.0	44	63	<0.10
B-99 0'	0	<2.0	<1.0	81	<1.0	1.6	51	17	48	810	<1.0	34	<1.0	<1.0	<1.0	83	230	<0.10
B-99 1'	1	<2.0	<1.0	61	<1.0	1.5	51	17	39	790	<1.0	30	<1.0	<1.0	<1.0	84	150	<0.10
B-99 2'	2	<2.0	<1.0	67	<1.0	1.5	46	16	40	820	<1.0	29	<1.0	<1.0	<1.0	81	150	<0.10
B-102 0'	0	<2.0	<1.0	170	<1.0	1.6	50	8.4	84	170	2.6	45	<1.0	<1.0	<1.0	45	350	<0.10
B-102 1'	1	<2.0	<1.0	46	<1.0	1.8	53	21	37	21	<1.0	34	<1.0	<1.0	<1.0	130	55	<0.10
B-102 2'	2	<2.0	<1.0	100	<1.0	1.5	65	18	38	11	<1.0	44	<1.0	<1.0	<1.0	88	58	<0.10
B-104 0'	0	<2.0	<1.0	64	<1.0	2.1	120	21	86	1,800	<1.0	57	<1.0	<1.0	<1.0	93	130	<0.10
B-104 1'	1	<2.0	1.9	140	<1.0	1.4	44	8.0	28	15	<1.0	37	<1.0	<1.0	<1.0	48	68	<0.10
B-104 2'	2	<2.0	2.9	250	<1.0	1.3	45	9.3	26	15	<1.0	40	<1.0	<1.0	<1.0	49	72	<0.10
B-106 0'	0	<2.0	<1.0	230	<1.0	1.6	56	13	67	1,200	<1.0	46	<1.0	<1.0	<1.0	67	160	<0.10
B-106 1'	1	<2.0	<1.0	100	<1.0	1.3	43	13	28	13	<1.0	32	<1.0	<1.0	<1.0	72	57	<0.10
B-106 2'	2	<2.0	<1.0	170	<1.0	1.2	47	9.2	22	8.6	<1.0	44	<1.0	<1.0	<1.0	47	65	0.14
B-108 0'	0	<2.0	<1.0	130	<1.0	1.1	36	9.1	30	56	<1.0	35	<1.0	<1.0	<1.0	50	65	<0.10
B-108 1'	1	<2.0	<1.0	110	<1.0	1.5	45	17	33	7.5	<1.0	36	<1.0	<1.0	<1.0	86	56	<0.10
B-108 2'	2	<2.0	1.4	180	<1.0	1.1	39	8.7	22	7.0	<1.0	39	<1.0	<1.0	<1.0	39	60	<0.10
B-110 0'	0	<2.0	<1.0	140	<1.0	1.3	40	10	26	30	<1.0	37	<1.0	<1.0	<1.0	51	66	<0.10
B-110 1'	1	<2.0	<1.0	100	<1.0	1.2	38	12	24	13	<1.0	36	<1.0	<1.0	<1.0	67	55	<0.10
B-110 2'	2	<2.0	1.3	150	<1.0	1.1	36	7.6	21	6.3	<1.0	35	<1.0	<1.0	<1.0	37	62	<0.10
B-113 0'	0	3.4	<1.0	140	<1.0	2.1	42	11	57	580	<1.0	40	<1.0	<1.0	<1.0	57	1,100	0.12
B-113 1'	1	<2.0	4.8	180	<1.0	1.2	33	6.9	26	45	<1.0	33	<1.0	<1.0	<1.0	33	130	0.11

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B-113 2'	2	<2.0	1.7	150	<1.0	1.0	31	6.8	19	8.1	<1.0	33	<1.0	<1.0	<1.0	33	60	<0.10
B-116 0'	0	2.0	<1.0	170	<1.0	1.3	36	8.6	34	75	<1.0	38	<1.0	<1.0	<1.0	38	150	<0.10
B-116 1'	1	<2.0	1.5	120	<1.0	1.2	30	7.1	25	93	<1.0	32	<1.0	<1.0	<1.0	31	140	<0.10
B-116 2'	2	<2.0	1.3	150	<1.0	1.0	29	7.0	19	14	<1.0	34	<1.0	<1.0	<1.0	30	60	<0.10
B-119 0'	0	<2.0	<1.0	140	<1.0	1.4	43	12	30	83	<1.0	47	<1.0	<1.0	<1.0	42	98	<0.10
B-119 1'	1	<2.0	<1.0	130	<1.0	1.2	36	10	24	96	<1.0	31	<1.0	<1.0	<1.0	56	88	<0.10
B-119 2'	2	<2.0	1.6	180	<1.0	1.0	33	7.3	18	6.1	<1.0	37	<1.0	<1.0	<1.0	33	57	<0.10
B-122 0'	0	<2.0	<1.0	160	<1.0	2.2	200	18	62	1,900	<1.0	290	<1.0	<1.0	<1.0	50	220	0.16
B-122 1'	1	<2.0	<1.0	170	<1.0	1.5	46	12	31	250	<1.0	44	<1.0	<1.0	<1.0	61	88	<0.10
B-122 2'	2	<2.0	<1.0	120	<1.0	1.4	42	15	28	20	<1.0	35	<1.0	<1.0	<1.0	78	57	<0.10
B-124 0'	0	<2.0	<1.0	280	<1.0	1.5	52	12	50	89	<1.0	64	<1.0	<1.0	<1.0	59	150	<0.10
B-124 1'	1	<2.0	<1.0	85	<1.0	1.3	41	14	28	8.1	<1.0	33	<1.0	<1.0	<1.0	79	64	<0.10
B-124 2'	2	<2.0	1.4	160	<1.0	1.1	37	7.7	20	6.6	<1.0	38	<1.0	<1.0	<1.0	36	59	<0.10
B-126 0'	0	<2.0	<1.0	110	<1.0	1.3	55	12	34	260	<1.0	54	<1.0	<1.0	<1.0	58	140	<0.10
B-126 1'	1	<2.0	6.2	110	<1.0	1.8	100	15	130	600	<1.0	110	<1.0	<1.0	<1.0	77	190	0.17
B-126 2'	2	<2.0	<1.0	140	<1.0	1.2	36	9.2	24	19	<1.0	36	<1.0	<1.0	<1.0	41	66	0.25
B-130 0'	0	<2.0	<1.0	60	<1.0	<1.0	16	4.4	10	15	<1.0	13	<1.0	<1.0	<1.0	24	24	<0.10
B-130 1'	1	<2.0	<1.0	89	<1.0	1.3	47	17	36	20	<1.0	34	<1.0	<1.0	<1.0	100	57	<0.10
B-130 2'	2	<2.0	<1.0	29	<1.0	<1.0	29	11	20	<5.0	<1.0	20	<1.0	<1.0	<1.0	69	28	<0.10
B-131 4'	4	7.7	4.7	150	<1.0	<1.0	26	6.8	16	5.5	<1.0	34	<1.0	<1.0	<1.0	27	55	<0.10
B-131 6'	6	6.7	3.2	130	<1.0	<1.0	27	7.5	13	4.5	<1.0	35	<1.0	<1.0	<1.0	26	41	<0.10
B-131 0'	0	<2.0	<1.0	150	<1.0	1.0	40	11	37	35	5.4	40	<1.0	<1.0	<1.0	48	62	<0.10
B-131 1'	1	<2.0	<1.0	150	<1.0	1.2	45	20	46	15	<1.0	38	<1.0	<1.0	<1.0	65	69	0.11
B-131 2'	2	<2.0	<1.0	140	<1.0	<1.0	27	5.9	17	10	<1.0	29	<1.0	<1.0	<1.0	27	53	<0.10

TABLE 3
Summary of CAM17 Metals Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
B-132 0'	0	<2.0	<1.0	150	<1.0	1.6	45	10	44	910	2.5	42	<1.0	<1.0	<1.0	51	160	0.18
B-132 1'	1	<2.0	<1.0	61	<1.0	1.7	94	21	52	180	<1.0	43	<1.0	<1.0	<1.0	110	66	<0.10
B-132 2'	2	<2.0	1.0	150	<1.0	1.0	35	7.9	20	8.1	<1.0	35	<1.0	<1.0	<1.0	35	58	<0.10
B-134 0'	0	<2.0	<1.0	60	<1.0	2.0	72	22	46	140	<1.0	38	<1.0	<1.0	<1.0	120	140	<0.10
B-134 1'	1	<2.0	<1.0	40	<1.0	1.8	73	21	41	5.6	<1.0	34	<1.0	<1.0	<1.0	120	52	<0.10
B-134 2'	2	<2.0	<1.0	130	<1.0	1.2	38	11	27	20	<1.0	35	<1.0	<1.0	<1.0	46	62	<0.10
B-136 0'	0	<2.0	<1.0	92	<1.0	1.2	41	16	36	12	<1.0	35	<1.0	<1.0	<1.0	67	49	<0.10
B-136 1'	1	<2.0	<1.0	530	<1.0	<1.0	20	17	63	7.1	<1.0	44	<1.0	<1.0	<1.0	37	51	<0.10
B-136 2'	2	<2.0	<1.0	99	<1.0	1.1	53	12	26	4.0	<1.0	41	<1.0	<1.0	<1.0	62	39	<0.10
ESLs																		
Residential Land Use		6.3	0.39	750	4.0	1.7	750	40	230	200	40	150	10	20	1.3	16	600	1.3
Comm/Ind Land Use		40	16	1500	8.0	7.4	750	80	230	750	40	150	10	40	16	200	600	10
Construction Exposure		310	15	2,600	98	39	1,200,000	94	310,000	750	78	260	3,900	3,900	62	770	230,000	58

Notes:

Results are shown in milligrams per kilogram (mg/kg).

Values listed for chromium are for Chromium III, as there is no standard for total chromium.

< = Analyte was not detected above the laboratory reporting limit.

ESLs = Environmental Screening Levels, Tables A and K-3, SFRWQCB, Revised May 2008.

TABLE 4
Summary of Organics Results - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	Sample Depth (ft)	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	BTEX (ug/kg)	VOCs (ug/kg)
B-3 10'	10	<1.0	2.1	<1.0	ND	ND
B-5 10'	10	<1.0	1.7	<1.0	ND	ND
B-42 10'	10	<1.0	3.2	23	ND	ND
B-57 10'	10	<1.0	1.0	13	ND	ND
B-58 10'	10	<1.0	<1.0	12	ND	ND
B-61 10'	10	<1.0	<1.0	6.0	ND	ND
B-94 10'	10	<1.0	4.1	<1.0	ND	ND
B-128 10'	10	<1.0	<1.0	1.2	ND	ND
B-129 10'	10	<1.0	5.8	2.9	ND	ND
	ESLs					
	Residential	83	83	370	---	---
	Commercial/Industrial	83	83	2,500	---	---
	Construction Exposure	4,200	4,200	12,000	---	---

Notes:

mg/kg = milligrams per kilogram
TPHg = Total Petroleum Hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
--- = Not Analyzed or Not Applicable
< = Not detected above the stated laboratory reporting limit
ESLs = Environmental Screening Levels, Tables A and K-3, SFRWQCB, Revised May 2008.

ug/kg = microgram per kilogram
BTEX = Benzene, toluene, ethylbenzene, and xylenes
VOCs = Volatile organic compounds

TABLE 5
Summary of Grab-Groundwater Sample Results
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Sample ID	TPHg	TPHd	TPHmo	BTEX	Other VOCs
B-17	<0.050	<0.050	<0.050	ND	ND
B-19	<0.050	<0.050	<0.050	ND	ND
B-75	<0.050	<0.050	<0.062	ND	4-isopropyltoluene=0.82
B-84	<0.050	<0.050	<0.050	ND	ND
ESLs					
GW is current/potential source	100	100	100	---	---
GW not current/potential source	2,100	2,100	2,100	---	---
Surface Water - Freshwater	100	100	100	---	---
Surface Water - Marine	2,100	2,100	2,100	---	---
Surface Water - Estuarine	2,100	2,100	2,100	---	---

Notes:

Data are shown in units of mucrograms per liter (µg/l).

TPHg = Total Petroleum Hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
--- = Not Analyzed or Not Applicable
<
ESLs = Environmental Screening Levels, Tables A, B, & F, SFRWQCB, Revised May 2008.
BTEX = Benzene, toluene, ethylbenzene, and xylenes
VOCs = Volatile organic compounds

TABLE 6a
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Southbound
Borings B1 to B67

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	551.7	588.5
1.0 to 1.5 ft	372.3	398.2
2.0 to 2.5 ft	62.9	69.7

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead* (mg/l)	Total Lead (mg/kg)
0 to 1.0 ft	552	25	589
Underlying Soil (1.0 to 2.5 ft.)	*269*	*12*	*289*
0 to 2.0 ft	462	21	493
Underlying Soil (2.0 to 2.5 ft)	*63*	*2.9*	*70*
0 to 2.5 ft	382	18	409

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line, where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6b
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Southbound excluding borings at Willow Road (B-26 to B-31)
and University Avenue (B-43 to B-52) Overcorssings
Borings B-1 to B-25, B-32 to B-42 and B-53 to B-67

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	329.3	349.9
1.0 to 1.5 ft	431.3	468.1
2.0 to 2.5 ft	79.2	85.8

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	**Total Lead (mg/kg)**	**Soluble (WET) Lead* (mg/l)**	**Total Lead (mg/kg)**
0 to 1.0 ft	329	15	350
Underlying Soil (1.0 to 2.5 ft.)	*314*	*14*	*341*
0 to 2.0 ft	380	17	409
Underlying Soil (2.0 to 2.5 ft)	*79*	*3.6*	*86*
0 to 2.5 ft	320	15	344

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line, where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6c
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Southbound excluding borings at Willow Road Overcorssing (B-26 to B-31)
Borings B-1 to B-25 and B-32 to B-67

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	431.8	463.9
1.0 to 1.5 ft	394.5	423.6
2.0 to 2.5 ft	68.3	72.9

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead* (mg/l)	Total Lead (mg/kg)
0 to 1.0 ft	432	20	464
Underlying Soil (1.0 to 2.5 ft.)	*286*	*13*	*307*
0 to 2.0 ft	413	19	444
Underlying Soil (2.0 to 2.5 ft)	*68*	*3.1*	*73*
0 to 2.5 ft	344	16	370

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line, where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6d
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Southbound at Willow Road Overcorssing
Borings B-26 to B-31

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	2,274	2,547
1.0 to 1.5 ft	108.8	116.3
2.0 to 2.5 ft	23.0	24.6

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	**Total Lead (mg/kg)**	**Soluble (WET) Lead* (mg/l)**	**Total Lead (mg/kg)**
0 to 1.0 ft	2,274	105	2,547
Underlying Soil (1.0 to 2.5 ft.)	*80*	*3.7*	*86*
0 to 2.0 ft	1,191	55	1,332
Underlying Soil (2.0 to 2.5 ft)	*23*	*1.1*	*25*
0 to 2.5 ft	958	44	1,070

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line, where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6e
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Southbound excluding borings at University Avenue Overcorssing (B-43 to B-52)
Borings B-1 to B-42 and B-53 to B-67

TOTAL LEAD

	UCLs (mg/kg)	
	90% UCL	95% UCL
0 to 0.5 ft	502	536.6
1.0 to 1.5 ft	392.3	426.8
2.0 to 2.5 ft	72.2	78.8

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead* (mg/l)	Total Lead (mg/kg)
0 to 1.0 ft	502	23	537
Underlying Soil (1.0 to 2.5 ft.)	*286*	*13*	*311*
0 to 2.0 ft	447	21	482
Underlying Soil (2.0 to 2.5 ft)	*72*	*3.3*	*79*
0 to 2.5 ft	372	17	401

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line, where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6f
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Southbound at University Avenue Overcorssing
Borings B-43 to B-52

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	1,202	1,374
1.0 to 1.5 ft	346.1	382.4
2.0 to 2.5 ft	16.2	18.0

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	**Total Lead (mg/kg)**	**Soluble (WET) Lead* (mg/l)**	**Total Lead (mg/kg)**
0 to 1.0 ft	1,202	55	1,374
Underlying Soil (1.0 to 2.5 ft.)	*236*	*11*	*261*
0 to 2.0 ft	774	36	878
Underlying Soil (2.0 to 2.5 ft)	*16*	*0.74*	*18*
0 to 2.5 ft	622	29	706

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line.
where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6g
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Northbound
Borings B68 to B137

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	649.7	683.5
1.0 to 1.5 ft	227.1	240.9
2.0 to 2.5 ft	70.8	78.2

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	**Total Lead (mg/kg)**	**Soluble (WET) Lead* (mg/l)**	**Total Lead (mg/kg)**
0 to 1.0 ft	650	30	684
Underlying Soil (1.0 to 2.5 ft.)	*175*	*8.0*	*187*
0 to 2.0 ft	438	20	462
Underlying Soil (2.0 to 2.5 ft)	*71*	*3.3*	*78*
0 to 2.5 ft	365	17	385

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line,
where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6h
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Northbound excluding borings at Willow Road (B-98 to B-101)
and University Avenue (B-113 to B-121) Overcorssings
Borings B-68 to B-97, B-102 to B-111 and B-122 to B-137

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	585.4	615.2
1.0 to 1.5 ft	242.1	258.8
2.0 to 2.5 ft	87.3	101.1

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	**Total Lead (mg/kg)**	**Soluble (WET) Lead* (mg/l)**	**Total Lead (mg/kg)**
0 to 1.0 ft	585	27	615
Underlying Soil (1.0 to 2.5 ft.)	*191*	*8.8*	*206*
0 to 2.0 ft	414	19	437
Underlying Soil (2.0 to 2.5 ft)	*87*	*4.0*	*101*
0 to 2.5 ft	348	16	370

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line,
where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6j
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Northbound at Willow Road Overcorssing
Borings B-98 to B-101

TOTAL LEAD

	Maximums (mg/kg)
0 to 0.5 ft	5,300
1.0 to 1.5 ft	790
2.0 to 2.5 ft	820

EXCAVATION SCENARIOS

	Weighted Averages Maximum	
Excavation Depth	**Total Lead (mg/kg)**	**Soluble (WET) Lead* (mg/l)**
0 to 1.0 ft	5,300	244
Underlying Soil (1.0 to 2.5 ft.)	*800*	*37*
0 to 2.0 ft	3,045	140
Underlying Soil (2.0 to 2.5 ft)	*820*	*38*
0 to 2.5 ft	2,600	120

Notes:

Maximum concentrations used because data set consists of four or less unique values.

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

Weighted average values are based upon calculated UCLs for each depth interval.

* = Soluble (WET) lead concentrations are predicted using slope of regression line, where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6k
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Northbound excluding borings at University Avenue Overcorssing (B-113 to B-121)
Borings B-68 to B111 and B-122 to B-137

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	699.6	742.7
1.0 to 1.5 ft	256.3	267
2.0 to 2.5 ft	101	114.5

EXCAVATION SCENARIOS

Excavation Depth	Weighted Averages 90% UCL Total Lead (mg/kg)	Soluble (WET) Lead* (mg/l)	95% UCL Total Lead (mg/kg)
0 to 1.0 ft	700	32	743
Underlying Soil (1.0 to 2.5 ft.)	*205*	*9.4*	*216*
0 to 2.0 ft	478	22	505
Underlying Soil (2.0 to 2.5 ft)	*101*	*4.6*	*115*
0 to 2.5 ft	403	19	427

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line, where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6I
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Northbound at University Avenue Overcorssing
Borings B-113 to B-121

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	496.1	547.6
1.0 to 1.5 ft	62.3	66.7
2.0 to 2.5 ft	9.0	9.3

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	**Total Lead (mg/kg)**	**Soluble (WET) Lead* (mg/l)**	**Total Lead (mg/kg)**
0 to 1.0 ft	496	23	548
Underlying Soil (1.0 to 2.5 ft.)	*45*	*2.0*	*48*
0 to 2.0 ft	279	13	307
Underlying Soil (2.0 to 2.5 ft)	*9.0*	*0.41*	*9.3*
0 to 2.5 ft	225	10	248

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line, where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046 x$

TABLE 6m
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Southbound - Marsh Road to University Avenue
Borings B1 to B48

TOTAL LEAD

	UCLs (mg/kg)	
	90% UCL	95% UCL
0 to 0.5 ft	626.8	667.1
1.0 to 1.5 ft	257.1	275.3
2.0 to 2.5 ft	57.5	62.0

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead* (mg/l)	Total Lead (mg/kg)
0 to 1.0 ft	627	29	667
Underlying Soil (1.0 to 2.5 ft.)	*191*	*8.8*	*204*
0 to 2.0 ft	442	20	471
Underlying Soil (2.0 to 2.5 ft)	*57*	*2.6*	*62*
0 to 2.5 ft	365	17	389

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line,
where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046 x$

TABLE 6n
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Southbound - University Avenue to Embarcadero
Borings B-49 to B-67

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	492.6	538.0
1.0 to 1.5 ft	760.3	839.5
2.0 to 2.5 ft	106	122.7

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead* (mg/l)	Total Lead (mg/kg)
0 to 1.0 ft	493	23	538
Underlying Soil (1.0 to 2.5 ft.)	*542*	*25*	*601*
0 to 2.0 ft	626	29	689
Underlying Soil (2.0 to 2.5 ft)	*106*	*4.9*	*123*
0 to 2.5 ft	522	24	576

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line, where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

TABLE 6o
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateco Counties, California

Highway 101 Northbound - Marsh Road to University Avenue
Borings B-68 to B-137

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	95% UCL
0 to 0.5 ft	705.3	753
1.0 to 1.5 ft	236.3	252
2.0 to 2.5 ft	123.8	139.1

EXCAVATION SCENARIOS

	Weighted Averages		
	90% UCL		95% UCL
Excavation Depth	**Total Lead (mg/kg)**	**Soluble (WET) Lead* (mg/l)**	**Total Lead (mg/kg)**
0 to 1.0 ft	705	32	753
Underlying Soil (1.0 to 2.5 ft.)	*199*	*9.1*	*214*
0 to 2.0 ft	471	22	503
Underlying Soil (2.0 to 2.5 ft)	*124*	*5.7*	*139*
0 to 2.5 ft	401	18	430

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
Weighted average values are based upon calculated UCLs for each depth interval.
* = Soluble (WET) lead concentrations are predicted using slope of regression line,
where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046 \; x$

TABLE 6p
Summary of Lead Statistical Analysis - Soil
Highway 101 Auxiliary Lane Addition Project
Santa Clara and San Mateo Counties, California

Highway 101 Northbound - University Avenue to Embarcadero
Borings B-117 to B-137

TOTAL LEAD

	UCLs (mg/kg) 90% UCL	UCLs (mg/kg) 95% UCL
0 to 0.5 ft	648.1	690.9
1.0 to 1.5 ft	264.8	287.7
2.0 to 2.5 ft	11.8	12.3

EXCAVATION SCENARIOS

Excavation Depth	Weighted Averages 90% UCL Total Lead (mg/kg)	Weighted Averages 90% UCL Soluble (WET) Lead* (mg/l)	Weighted Averages 95% UCL Total Lead (mg/kg)
0 to 1.0 ft	648	30	691
Underlying Soil (1.0 to 2.5 ft.)	*180*	*8.3*	*196*
0 to 2.0 ft	456	21	489
Underlying Soil (2.0 to 2.5 ft)	*12*	*0.54*	*12*
0 to 2.5 ft	368	17	394

Notes:

UCL = Upper Confidence Limit (90% UCL is applicable for waste classification; 95% UCL applicable for risk assessment)

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

Weighted average values are based upon calculated UCLs for each depth interval.

* = Soluble (WET) lead concentrations are predicted using slope of regression line, where y = predicted soluble (WET) lead and x = total lead.

Regression Line Slope: $y = 0.046\ x$

APPENDIX A

ORDINANCE: 04023

ENVIRONMENTAL HEALTH
SAN MATEO COUNTY

Protecting Our Health and Environment

PERMIT 09- 1469

P/E: 2010 MONITORING WELLS - INSTALLATION/DESTRUCTION

FACILITY:
ADJ TO HWY 101, MENLO PARK

OWNER:
CALTRANS-DISTRICT 4
111 GRAND AVENUE, MS8C
OAKLAND

WP0007720
NO APN LISTED
AMOUNT PAID: 544.00

CONTRACTOR:
VIRONEX, INC

TERMS & CONDITIONS:

CONSTRUCT SOIL BORINGS (13)
CONSULTANT: GEOCON CONSULTANTS, INC
(JOHN LOVE)

DENO MILANO
ENVIRONMENTAL HEALTH SPECIALIST

DATE ISSUED: 8/19/2009

EXPIRATION DATE: 12/19/2009

THIS PERMIT IS NONTRANSFERABLE AND MUST BE POSTED ON-SITE IN A CONSPICUOUS PLACE

SAN MATEO COUNTY ENVIRONMENTAL HEALTH

2009 SUBSURFACE DRILLING PERMIT APPLICATION

ENVIRONMENTAL HEALTH SERVICES DIVISION

SAN MATEO COUNTY HEALTH DEPARTMENT
2000 ALAMEDA DE LAS PULGAS, SUITE 100, SAN MATEO CA 94403
VOICE (650) 372-6200 FAX (650) 627-8244

AUG 1 2 2009 RECEIVED

ALLOW FIVE (5) WORKING DAYS FOR PROCESSING PERMIT

$544 V# 69292

Fees: $544 (env/wells) and $340 (geo borings only)

DRILLING DATE & TIME MUST BE SCHEDULED WITH COUNTY STAFF AT LEAST THREE (3) WORKING DAYS IN ADVANCE

PURPOSE OF APPLICATION ☐ GROUNDWATER MONITORING WELL INSTALLATION/DESTRUCTION ☐ CONSTRUCT SOIL BORINGS ☐ VAPOR WELL INSTALLATION/DESTRUCTION ☐ PERMIT EXTENSION OF PERMIT #MW____
NO. OF WELLS ____ NO. OF BORINGS 13 WELL/BORING NAMES BGW-17(POC), BGW-19, BGW-84(POC), BGW-87(POC), B-3(GW), B-5(GW), B-42(GW), B-57(GW), B-58(GW), B-61(GW), B-94(GW), B-128(GW), B-129(GW)

PURPOSE OF DRILLING ☒ ENVIRONMENTAL ☐ GEOTECHNICAL

REQUIRED BY ☐ COUNTY GROUNDWATER PROTECTION PROGRAM ☐ RWQCB/DTSC/USEPA (Provide approval letter) ☒ OTHER (i.e. voluntary)

Site Name Adj. to Hwy 101 Assessor's Parcel # NA (one per permit)
Drilling Location Address Hwy 101 between Marsh Rd + Embacadero Rd. City Menlo Park
To Be Constructed In: ☒ Public Property ☐ Private Property ☐ Refuse ☐ Other ____
Maximum Proposed Depth Wells/Borings 18 (feet) Drilling Method Direct Push
Boring Diameter 2" Casing Diameter ____ Screen Interval ____
Development Method ____ (additional 72 hour staff notification required)
Destruction Method (6 gallons water max per 94 lb cement, up to 5% bentonite): ☐ Pressure grouting (provide well construction logs) ☐ Overdrilling

WELL/BORING OWNER: (WELL/BORING OWNER NAME OR CONTACT NAME SHOULD MATCH SIGNATURE)

Name Caltrans - District 4 Contact Person Ana Uribe
Address 111 Grand Ave, MS 8C City, State, ZIP Oakland, CA 94623
Telephone (510) 286-4914 Email ana_m_uribe@dot.ca.gov

It is my responsibility to notify the County of any known changes in the purpose of this well/boring from that which is indicated on this application. It is my responsibility to notify the County of any known damage to the well, and to maintain the well in good condition. (*Letter signed by well/boring owner/contact person, containing above language and attesting to knowledge of all permit requirements and conditions, may be substituted for signature on permit application.*)

Well/Boring Owner's/Contact Person's Signature Ana Maria Uribe **Date** 08/10/09

PROPERTY OWNER: (NAME AS APPEARS ON ASSESSOR'S ROLES SHOULD MATCH SIGNATURE)

Name Caltrans - District 4 Contact Person Ana Uribe
Address 111 Grand Ave, MS 8C City, State, ZIP Oakland, CA 94623
Telephone (510) 286-4914 Email ana_uribe@dot.ca.gov

I understand that a well/boring is being installed on my property. I agree to notify the County and Well Owner of any known damage to the well. (*Letter signed by property owner, containing above language, or encroachment permit may be substituted for signature on permit application.*)

Property Owner's Signature Ana Maria Uribe **Date** 08/10/09

Drilling Company: Vironex, Inc. Contact Person ~~John~~ Angela Damanti
Address: 5292 Pacheco Blvd. C57 Drillers License # 705927
City, State, ZIP Pacheco, CA 94553 Telephone/Email 925-521-1490/

I certify that the well/boring will be constructed in compliance with the conditions of this permit (see reverse), the San Mateo County Ordinance, and the State Water Well Standards, and that the license listed above is considered current and active by the Contractors State License Board.

Driller's Signature See attached page **Date** ____

Consultant Company: Geocon Consultants, Inc Project Manager John Love
Address: 6671 Brisa St. Telephone (925) 371-5900
City, State, ZIP Livermore, CA 94550 Email love@geoconinc.com

I certify that this application is correct to the best of my knowledge. I certify the well/boring will be constructed/destroyed in compliance with the conditions of this permit (see reverse), the San Mateo County Ordinance, and the State Water Well Standards. I understand that I am responsible for General Conditions "D and E" of this permit. I certify if I indicated the purpose of drilling is geotechnical, then no one will use the boring to collect any samples for environmental analyses. (*Responsible Professional must be a California Professional Geologist or Civil Engineer.*)

Responsible Professional's Name (Please print legibly) John Love
Responsible Professional's Signature [signature] **Date** 8/10/09
California Professional Geologist (PG) No. 6315 **or Civil Engineer No.** ____

Please see additional pages of application for requirements, general permit conditions, instructions, and fees

Revised every January 1

REQUIREMENTS:
An accurate & correct map of existing and proposed well/boring locations **must** be included with the permit application. The well/boring location map **must** include the following.

1. North arrow, existing & historic site features, wells, approximate property lines and any other pertinent existing & historic features and information.
2. Proposed well/boring locations to scale.

A work plan describing the drilling and construction/destruction methodology, at a minimum, is **required** by County Staff. Upon review of information on this application and the submitted work plan, and subject to approval noted below, a permit will be issued allowing well/boring owner, driller, and responsible professional (consultant) to perform the specified work. The permit is subject to both General and Special Conditions stated below. A copy of the approved Subsurface Drilling Permit **must** be available on site while work related to the permit is being performed. Drilling date and time **must** be scheduled with County staff at least three (3) working days in advance of field work. Drilling may begin at the notified date and time whether County staff is present or not.

GENERAL CONDITIONS:

A. Well and boring construction and destruction under this permit is subject to the Standards for the Construction of Wells in San Mateo County, County Groundwater Protection Program (GPP) Guidelines, Policies & Procedures, the State Water Well Standards, and any instructions by a Health Department representative.

B. Well/Boring Owner, Driller, and Responsible Professional assume responsibility for all activities and uses under the permit, including compliance with Workmen's Compensation Laws, and indemnify, defend and save the County of San Mateo, its' officers, agents and employees, free and harmless from any and all expense, cost, or liability in connection with or resulting from work or stopped-work associated with the permit, including, but not limited to, property damage, personal injury, wrongful death, and loss of income.

C. All borings **must** be properly destroyed (grouted/sealed) within 24 hours of drilling unless special conditions are approved in writing as part of this permit.

D. Analytical results of all soil and groundwater samples collected during the execution of drilling under this permit **must** be submitted to County GPP staff by the Responsible Professional within 60 days of sample collection. If contamination is discovered during drilling, verbal notification to County GPP by the Responsible Professional is **required** within 72 hours of discovery. Proper storage, labeling & disposal of investigation-derived residual wastes are the responsibility of the consultant unless stated otherwise contractually.

E. In addition to the County copy of the State DWR Form 188, boring logs and well construction details for all borings/wells except geotechnical borings, signed by a Responsible Professional, **must** be submitted to County GPP by the Responsible Professional within 60 days of drilling/construction/destruction. As-built locations/dimensions **must** be finalized in subsequent report of findings submitted to County GPP by the Responsible Professional within 60 days of drilling/construction/destruction.

F. Permit is valid only for the purpose specified herein. No change in construction procedure, as described on this permit application, in the associated workplan, or in the special conditions below, will be allowed except upon written permission from the County.

G. Permit is valid for one mobilization only and is automatically canceled if not exercised, or if an extension is not applied for and granted by County GPP, within 120 days of the original permit issuance date. Failure to notify staff of cancellation or delay in start time, at least one minute prior to notified start time, will result in the Consultant will be billed an Inspection Cancellation fee of $249 for 2009 if GPP staff attempted to perform an inspection.

H. Wells installed under this permit may not be used for domestic, municipal, commercial, or irrigation water supply.

I. All work plans and reports related to work performed under County oversight **must** conform to County GPP guidelines, Regional Water Quality Control Board guidelines, and State Water Well Standards.

J. Top-of-casing elevation of all wells **must** be surveyed to the nearest 0.01-foot relative to Mean Sea Level (NAVD88) and submitted to County GPP within 60 days of drilling, and to State GeoTracker as appropriate.

K. Latitude and longitude of all wells **must** be surveyed with sub-meter accuracy relative to NAD83 and submitted to County GPP within 60 days of drilling, and to State GeoTracker as appropriate.

L. Violation of any requirement or general or special permit condition may result in an order by GPP staff to cease work under this permit, correct the violation, and potentially re-permit the work as a new mobilization.

SPECIAL CONDITIONS:______________________________

Approved: [signature] RO/SD#____________ Date: 8.13.09

Revised every January 1

APPENDIX B

APPENDIX C

APPENDIX C

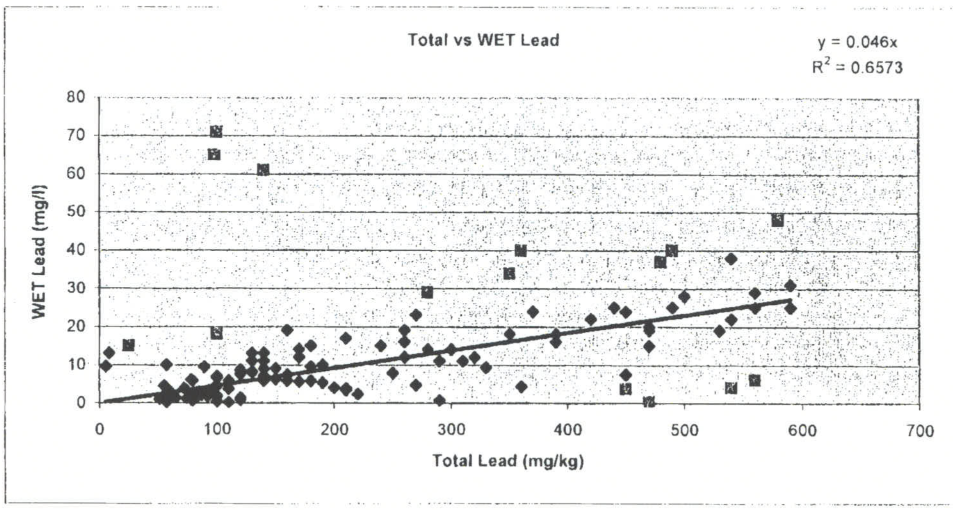
Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	Residual WET Lead (mg/l)	Squared Residual WET Lead (mg/l)
B-93 1'	1	160	7.4	0.04	0.00
B-62 0'	0	260	12	0.04	0.00
B-5 1'	1	390	18	0.07	0.00
B-127 1'	1	100	4.5	-0.10	0.01
B-87 0'	0	300	14	0.20	0.04
B-118 0'	0	98	4.3	-0.21	0.04
B-116 0'	0	75	3.1	-0.35	0.12
B-35 0'	0	99	4.1	-0.45	0.20
B-83 0'	0	72	3.8	0.49	0.24
B-69 2'	2	55	2.0	-0.53	0.28
B-47 1'	1	140	5.9	-0.54	0.29
B-28 1'	1	150	6.3	-0.60	0.36
B-68 0'	0	140	7.1	0.66	0.44
B-51 0'	0	59	3.4	0.69	0.47
B-92 0'	0	560	25	-0.75	0.57
B-29 1'	1	110	5.9	0.84	0.71
B-63 0'	0	85	3.0	-0.91	0.83
B-119 1'	1	96	3.5	-0.91	0.84
B-116 1'	1	93	3.3	-0.98	0.95
B-30 1'	1	63	1.9	-1.00	0.99
B-100 1'	1	83	2.8	-1.02	1.03
B-75 2'	2	57	1.6	-1.02	1.04
B-7 2'	2	280	14	1.12	1.26
B-66 1'	1	180	9.5	1.22	1.49
B-53 1'	1	53	1.2	-1.24	1.53
B-19 0'	0	190	10	1.26	1.59
B-92 1'	1	83	2.5	-1.32	1.73
B-17 0'	0	110	3.7	-1.36	1.85
B-10 1'	1	56	1.2	-1.38	1.89
B-53 2'	2	51	0.93	-1.42	2.00
B-74 1'	1	160	5.9	-1.46	2.12
B-108 0'	0	56	4.1	1.52	2.33
B-90 1'	1	65	1.4	-1.59	2.53
B-98 1'	1	65	1.4	-1.59	2.53
B-71 1'	1	470	20	-1.61	2.60
B-75 1'	1	87	2.1	-1.90	3.61
B-109 0'	0	350	18	1.91	3.63
B-47 0'	0	390	16	-1.93	3.74
B-22 0'	0	55	4.5	1.97	3.88
B-89 0'	0	100	6.6	2.00	4.01
B-4 0'	0	130	8.0	2.02	4.09
B-11 1'	1	120	7.6	2.08	4.33
B-86 1'	1	150	9.0	2.10	4.42
B-119 0'	0	83	1.7	-2.12	4.48
B-30 0'	0	590	25	-2.13	4.54
B-103 1'	1	79	1.5	-2.13	4.55
B-15 0'	0	170	5.6	-2.22	4.92
B-46 0'	0	79	5.9	2.27	5.14
B-25 0'	0	74	1.1	-2.30	5.30
B-41 0'	0	130	8.3	2.32	5.39
B-6 0'	0	290	11	-2.34	5.46
B-118 1'	1	100	7.0	2.40	5.77
B-4 2'	2	92	1.8	-2.43	5.91
B-88 1'	1	140	8.9	2.46	6.06

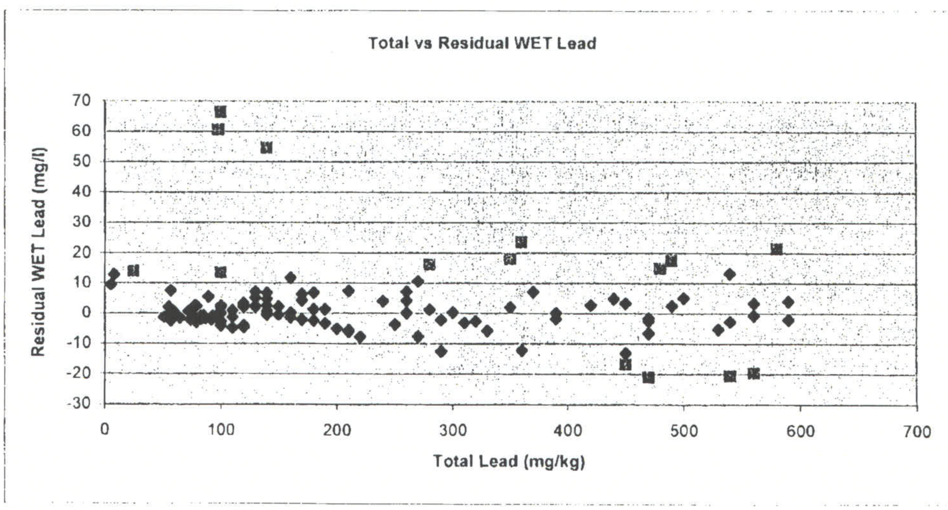
APPENDIX C

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	Residual WET Lead (mg/l)	Squared Residual WET Lead (mg/l)
B-86 0'	0	490	25	2.47	6.09
B-40 1'	1	180	5.8	-2.48	6.14
B-19 1'	1	57	0.125	-2.50	6.23
B-64 0'	0	78	6.1	2.51	6.32
B-9 1'	1	470	19	-2.61	6.83
B-137 1'	1	420	22	2.69	7.21
B-12 1'	1	320	12	-2.72	7.37
B-12 2'	2	100	1.8	-2.80	7.83
B-5 0'	0	540	22	-2.83	8.02
B-74 0'	0	120	8.5	2.98	8.89
B-125 1'	1	79	0.59	-3.04	9.26
B-17 1'	1	120	8.7	3.18	10.12
B-35 1'	1	560	29	3.25	10.55
B-57 0'	0	310	11	-3.26	10.60
B-8 1'	1	450	24	3.31	10.93
B-101 2'	2	190	5.3	-3.44	11.81
B-122 1'	1	250	7.9	-3.60	12.93
B-135 0'	0	590	31	3.87	14.97
B-98 0'	0	240	15	3.96	15.71
B-126 0'	0	260	16	4.04	16.35
B-111 1'	1	120	1.4	-4.12	16.96
B-102 0'	0	170	12	4.18	17.49
B-7 1'	1	100	0.39	-4.21	17.71
B-97 0'	0	140	11	4.56	20.81
B-129 0'	0	120	0.82	-4.70	22.07
B-67 0'	0	440	25	4.77	22.72
B-34 1'	1	110	0.125	-4.93	24.34
B-12 0'	0	500	28	5.01	25.07
B-70 0'	0	130	11	5.02	25.22
B-48 0'	0	200	4.0	-5.20	27.01
B-93 0'	0	530	19	-5.37	28.86
B-32 2'	2	89	9.5	5.41	29.24
B-77 0'	0	210	3.9	-5.76	33.14
B-72 1'	1	330	9.3	-5.88	34.52
B-135 1'	1	170	14	6.18	38.22
B-77 1'	1	210	3.4	-6.26	39.15
B-32 1'	1	140	13	6.56	43.06
B-84 0'	0	470	15	-6.61	43.74
B-132 1'	1	180	15	6.72	45.19
B-75 0'	0	370	24	6.99	48.79
B-31 1'	1	130	13	7.02	49.31
B-76 0'	0	130	13	7.02	49.31
B-58 0'	0	260	19	7.04	49.61
B-52 0'	0	210	17	7.34	53.92
B-55 1'	1	57	10	7.38	54.45
B-29 0'	0	270	4.7	-7.72	59.54
B-6 2'	2	220	2.3	-7.82	61.10
B-80 2'	2	5.2	9.6	9.36	87.63
B-121 0'	0	270	23	10.58	112.02
B-73 0'	0	160	19	11.64	135.54
B-37 1'	1	360	4.3	-12.25	150.18
B-124 1'	1	8.1	13	12.63	159.45
B-41 1'	1	290	0.70	-12.64	159.66
B-109 1'	1	540	38	13.17	173.39
B-26 0'	0	450	7.5	-13.19	174.07

APPENDIX C

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	Residual WET Lead (mg/l)	Squared Residual WET Lead (mg/l)
Not Used					
B-24 1'	1	100	18	13.40	179.60
B-3 1'	1	25	15	13.85	191.83
B-91 0'	0	480	37	14.93	222.81
B-96 1'	1	280	29	16.12	259.98
B-81 0'	0	450	3.8	-16.89	285.39
B-101 1'	1	490	40	17.47	305.10
B-125 0'	0	350	34	17.91	320.59
B-8 2'	2	560	6.1	-19.65	386.20
B-123 1'	1	540	4.1	-20.73	429.83
B-52 1'	1	470	0.51	-21.10	445.35
B-113 0'	0	580	48	21.33	454.90
B-3 0'	0	360	40	23.45	549.68
B-134 0'	0	140	61	54.56	2977.01
B-105 0'	0	98	65	60.49	3659.45
B-31 0'	0	100	71	66.40	4409.15





APPENDIX C

NB-0	
Number of Valid Observations	69
Number of Distinct Observations	58
Minimum	2.5
Maximum	5300
Mean	525.7
Median	170
SD	813.6
Variance	661985
Coefficient of Variation	1.548
Skewness	3.538
Mean of log data	5.212
SD of log data	1.653
90% Standard Bootstrap UCL	649.7
95% Standard Bootstrap UCL	683.5

NB-1	
Number of Valid Observations	69
Number of Distinct Observations	58
Minimum	1.5
Maximum	1300
Mean	182.7
Median	45
SD	295.9
Variance	87546
Coefficient of Variation	1.62
Skewness	2.291
Mean of log data	3.968
SD of log data	1.687
90% Standard Bootstrap UCL	227.1
95% Standard Bootstrap UCL	240.9

NB-2	
Number of Valid Observations	89
Number of Distinct Observations	59
Minimum	2.4
Maximum	1900
Mean	41.53
Median	7.2
SD	217.9
Variance	47481
Coefficient of Variation	5.247
Skewness	7.742
Mean of log data	2.146
SD of log data	1.029
90% Standard Bootstrap UCL	70.8
95% Standard Bootstrap UCL	78.2

SB-0	
Number of Valid Observations	67
Number of Distinct Observations	59
Minimum	2.5
Maximum	5300
Mean	411.5
Median	85
SD	893.1
Variance	797654
Coefficient of Variation	2.171
Skewness	4.265
Mean of log data	4.714
SD of log data	1.64
90% Standard Bootstrap UCL	551.7
95% Standard Bootstrap UCL	588.5

SB-1	
Number of Valid Observations	67
Number of Distinct Observations	55
Minimum	2.5
Maximum	4100
Mean	275.5
Median	46
SD	605.5
Variance	366652
Coefficient of Variation	2.198
Skewness	4.37
Mean of log data	4.056
SD of log data	1.826
90% Standard Bootstrap UCL	372.3
95% Standard Bootstrap UCL	398.2

SB-2	
Number of Valid Observations	67
Number of Distinct Observations	48
Minimum	1
Maximum	830
Mean	43.82
Median	8.7
SD	126.4
Variance	15970
Coefficient of Variation	2.884
Skewness	4.954
Mean of log data	2.418
SD of log data	1.368
90% Standard Bootstrap UCL	62.89
95% Standard Bootstrap UCL	69.65

TCLP Pb	
Number of Valid Observations	44
Number of Distinct Observations	36
Minimum	0.125
Maximum	51
Mean	2.624
Median	0.76
SD	7.647
Variance	58.48
Coefficient of Variation	2.915
Skewness	6.159
Mean of log data	-0.0966
SD of log data	1.29
95% Standard Bootstrap UCL	4.512

NB-WR-X-0		**SB-OCs-X-0**	
Number of Valid Observations	65	Number of Valid Observations	51
Number of Distinct Observations	54	Number of Distinct Observations	44
Minimum	2.5	Minimum	2.5
Maximum	2700	Maximum	2000
Mean	460	Mean	257.3
Median	160	Median	55
SD	580	SD	405.3
Variance	336390	Variance	164237
Coefficient of Variation	1.261	Coefficient of Variation	1.575
Skewness	1.766	Skewness	2.476
Mean of log data	5.163	Mean of log data	4.457
SD of log data	1.622	SD of log data	1.551
90% Standard Bootstrap UCL	549.9	90% Standard Bootstrap UCL	329.3
95% Standard Bootstrap UCL	577	95% Standard Bootstrap UCL	349.9
NB-WR-X-1		**SB-OCs-X-1**	
Number of Valid Observations	65	Number of Valid Observations	51
Number of Distinct Observations	56	Number of Distinct Observations	43
Minimum	1.5	Minimum	2.5
Maximum	1300	Maximum	4100
Mean	171.9	Mean	312.7
Median	37	Median	53
SD	292	SD	671.6
Variance	85290	Variance	451048
Coefficient of Variation	1.699	Coefficient of Variation	2.147
Skewness	2.488	Skewness	4.051
Mean of log data	3.882	Mean of log data	4.05
SD of log data	1.679	SD of log data	1.962
90% Standard Bootstrap UCL	219.5	90% Standard Bootstrap UCL	431.3
95% Standard Bootstrap UCL	231.8	95% Standard Bootstrap UCL	468.1
NB-WR-X-2		**SB_OCs-X-2**	
Number of Valid Observations	65	Number of Valid Observations	51
Number of Distinct Observations	42	Number of Distinct Observations	39
Minimum	2.4	Minimum	2.5
Maximum	1900	Maximum	830
Mean	39.28	Mean	53.47
Median	8	Median	8.1
SD	234.6	SD	143.6
Variance	55030	Variance	20626
Coefficient of Variation	5.971	Coefficient of Variation	2.686
Skewness	8.043	Skewness	4.293
Mean of log data	2.188	Mean of log data	2.53
SD of log data	0.912	SD of log data	1.434
90% Standard Bootstrap UCL	76.28	90% Standard Bootstrap UCL	79.21
95% Standard Bootstrap UCL	86.62	95% Standard Bootstrap UCL	85.83
NB-UA-X-0		**NB-UA-0**	
Number of Valid Observations	60	Number of Valid Observations	9
Number of Distinct Observations	50	Number of Distinct Observations	9
Minimum	2.5	Minimum	21
Maximum	5300	Maximum	1500
Mean	559.5	Mean	300.3
Median	225	Median	83
SD	849.9	SD	483.9
Variance	722309	Variance	234125
Coefficient of Variation	1.519	Coefficient of Variation	1.611
Skewness	3.462	Skewness	2.356
Mean of log data	5.279	Mean of log data	4.766
SD of log data	1.688	SD of log data	1.4
90% Standard Bootstrap UCL	699.6	90% Standard Bootstrap UCL	496.1
95% Standard Bootstrap UCL	742.7	95% Standard Bootstrap UCL	547.6
NB-UA-X-1		**NB-UA-1**	
Number of Valid Observations	60	Number of Valid Observations	9
Number of Distinct Observations	52	Number of Distinct Observations	9

Minimum	1.5
Maximum	1300
Mean	203.1
Median	65
SD	312.2
Variance	97442
Coefficient of Variation	1.537
Skewness	2.071
Mean of log data	4.049
SD of log data	1.756
90% Standard Bootstrap UCL	256.3
95% Standard Bootstrap UCL	267

NB-UA-X-2

Number of Valid Observations	60
Number of Distinct Observations	39
Minimum	2.4
Maximum	1900
Mean	58.8
Median	8.15
SD	264.4
Variance	69885
Coefficient of Variation	4.496
Skewness	6.338
Mean of log data	2.372
SD of log data	1.16
90% Standard Bootstrap UCL	101
95% Standard Bootstrap UCL	114.5

NB-OCs-X-0

Number of Valid Observations	56
Number of Distinct Observations	46
Minimum	2.5
Maximum	2700
Mean	485.6
Median	190
SD	593.8
Variance	352541
Coefficient of Variation	1.223
Skewness	1.726
Mean of log data	5.226
SD of log data	1.657
90% Standard Bootstrap UCL	585.4
95% Standard Bootstrap UCL	615.2

NB-OCs-X-1

Number of Valid Observations	56
Number of Distinct Observations	50
Minimum	1.5
Maximum	1300
Mean	192.1
Median	39.5
SD	309.9
Variance	96036
Coefficient of Variation	1.613
Skewness	2.247
Mean of log data	3.955
SD of log data	1.757
90% Standard Bootstrap UCL	242.1
95% Standard Bootstrap UCL	258.8

NB_OCs-X-2

Number of Valid Observations	56
Number of Distinct Observations	37
Minimum	2.4
Maximum	1900
Mean	44.37

Minimum	8.5
Maximum	100
Mean	46.57
Median	36
SD	39.33
Variance	1547
Coefficient of Variation	0.845
Skewness	0.531
Mean of log data	3.427
SD of log data	1.031
90% Standard Bootstrap UCL	62.33
95% Standard Bootstrap UCL	66.74

NB-UA-2

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	2.5
Maximum	14
Mean	7.633
Median	6.4
SD	3.338
Variance	11.14
Coefficient of Variation	0.437
Skewness	0.636
Mean of log data	1.938
SD of log data	0.486
90% Standard Bootstrap UCL	8.984
95% Standard Bootstrap UCL	9.324

SB-UA-0

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	17
Maximum	4600
Mean	653.7
Median	139.5
SD	1413
Variance	1996000
Coefficient of Variation	2.161
Skewness	2.962
Mean of log data	5.017
SD of log data	1.728
90% Standard Bootstrap UCL	1202
95% Standard Bootstrap UCL	1374

SB-UA-1

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	8
Maximum	1200
Mean	201.9
Median	39.5
SD	377.2
Variance	142289
Coefficient of Variation	1.869
Skewness	2.528
Mean of log data	4.064
SD of log data	1.592
90% Standard Bootstrap UCL	346.1
95% Standard Bootstrap UCL	382.4

SB-UA-2

Number of Valid Observations	10
Number of Distinct Observations	7
Minimum	1
Maximum	49
Mean	10.91

Median	8
SD	252.7
Variance	63843
Coefficient of Variation	5.694
Skewness	7.466
Mean of log data	2.228
SD of log data	0.96
90% Standard Bootstrap UCL	87.3
95% Standard Bootstrap UCL	101.1

SB-WR-X-0

Number of Valid Observations	61
Number of Distinct Observations	53
Minimum	2.5
Maximum	4600
Mean	322.3
Median	74
SD	676.9
Variance	458163
Coefficient of Variation	2.1
Skewness	4.705
Mean of log data	4.549
SD of log data	1.58
90% Standard Bootstrap UCL	431.8
95% Standard Bootstrap UCL	463.9

SB-WR-X-1

Number of Valid Observations	61
Number of Distinct Observations	50
Minimum	2.5
Maximum	4100
Mean	294.6
Median	43
SD	631.6
Variance	398930
Coefficient of Variation	2.144
Skewness	4.158
Mean of log data	4.052
SD of log data	1.895
90% Standard Bootstrap UCL	394.5
95% Standard Bootstrap UCL	423.6

SB-WR-X-2

Number of Valid Observations	61
Number of Distinct Observations	44
Minimum	1
Maximum	830
Mean	46.5
Median	7.9
SD	132.2
Variance	17471
Coefficient of Variation	2.843
Skewness	4.715
Mean of log data	2.412
SD of log data	1.407
90% Standard Bootstrap UCL	68.31
95% Standard Bootstrap UCL	72.91

SB-UA-X-0

Number of Valid Observations	57
Number of Distinct Observations	50
Minimum	2.5
Maximum	5300
Mean	369
Median	85
SD	779.1

Median	6.8
SD	14.17
Variance	200.9
Coefficient of Variation	1.299
Skewness	2.556
Mean of log data	1.807
SD of log data	1.138
90% Standard Bootstrap UCL	16.18
95% Standard Bootstrap UCL	17.96

NB-WR-0

Number of Valid Observations	4
Number of Distinct Observations	4
Minimum	27
Maximum	5300
Mean	1594

NB-WR-1

Number of Valid Observations	4
Number of Distinct Observations	4
Minimum	65
Maximum	790
Mean	357

NB-WR-2

Number of Valid Observations	4
Number of Distinct Observations	4
Minimum	15
Maximum	820
Mean	260.75

SB-WR-0

Number of Valid Observations	6
Number of Distinct Observations	6
Minimum	100
Maximum	5300
Mean	1318
Median	520
SD	1987
Variance	3947097
Coefficient of Variation	1.507
Skewness	2.262
Mean of log data	6.393
SD of log data	1.353
90% Standard Bootstrap UCL	2274
95% Standard Bootstrap UCL	2547

Variance	606989
Coefficient of Variation	2.112
Skewness	4.914
Mean of log data	4.661
SD of log data	1.634
90% Standard Bootstrap UCL	502
95% Standard Bootstrap UCL	536.6

SB-UA-X-1

Number of Valid Observations	57
Number of Distinct Observations	48
Minimum	2.5
Maximum	4100
Mean	288.4
Median	56
SD	638.8
Variance	408120
Coefficient of Variation	2.215
Skewness	4.297
Mean of log data	4.055
SD of log data	1.877
90% Standard Bootstrap UCL	392.3
95% Standard Bootstrap UCL	426.8

SB-UA-X-2

Number of Valid Observations	57
Number of Distinct Observations	43
Minimum	2.5
Maximum	830
Mean	49.59
Median	8.7
SD	136.2
Variance	18562
Coefficient of Variation	2.747
Skewness	4.556
Mean of log data	2.525
SD of log data	1.385
90% Standard Bootstrap UCL	72.17
95% Standard Bootstrap UCL	78.76

NB-68-116-0

Number of Valid Observations	48
Number of Distinct Observations	42
Minimum	2.5
Maximum	5300
Mean	547.2
Median	190
SD	891.7
Variance	795178
Coefficient of Variation	1.63
Skewness	3.704
Mean of log data	5.231
SD of log data	1.69
90% Standard Bootstrap UCL	705.3
95% Standard Bootstrap UCL	753

NB-68-116-1

Number of Valid Observations	48
Number of Distinct Observations	42
Minimum	1.5
Maximum	1300
Mean	182
Median	43.5
SD	300.2
Variance	90099
Coefficient of Variation	1.649

SB-WR-1

Number of Valid Observations	6
Number of Distinct Observations	6
Minimum	15
Maximum	150
Mean	81.83
Median	86.5
SD	56.64
Variance	3209
Coefficient of Variation	0.692
Skewness	-0.0957
Mean of log data	4.094
SD of log data	0.964
90% Standard Bootstrap UCL	108.8
95% Standard Bootstrap UCL	116.3

SB-WR-2

Number of Valid Observations	6
Number of Distinct Observations	6
Minimum	2.5
Maximum	35
Mean	16.57
Median	10.8
SD	13.18
Variance	173.6
Coefficient of Variation	0.795
Skewness	0.743
Mean of log data	2.48
SD of log data	0.961
90% Standard Bootstrap UCL	22.95
95% Standard Bootstrap UCL	24.61

SB-1-48-0

Number of Valid Observations	48
Number of Distinct Observations	44
Minimum	2.5
Maximum	5300
Mean	441.9
Median	99.5
SD	1002
Variance	1003417
Coefficient of Variation	2.267
Skewness	4.101
Mean of log data	4.701
SD of log data	1.714
90% Standard Bootstrap UCL	626.8
95% Standard Bootstrap UCL	667.1

SB-1-48-1

Number of Valid Observations	48
Number of Distinct Observations	42
Minimum	2.5
Maximum	1400
Mean	197
Median	56.5
SD	330.5
Variance	109249
Coefficient of Variation	1.678

Skewness	2.293
Mean of log data	3.979
SD of log data	1.65
90% Standard Bootstrap UCL	236.3
95% Standard Bootstrap UCL	252

NB-68-116-2	
Number of Valid Observations	48
Number of Distinct Observations	39
Minimum	2.4
Maximum	1900
Mean	70.44
Median	8
SD	295
Variance	87026
Coefficient of Variation	4.188
Skewness	5.653
Mean of log data	2.381
SD of log data	1.259
90% Standard Bootstrap UCL	123.8
95% Standard Bootstrap UCL	139.1

NB-117-137-0	
Number of Valid Observations	21
Number of Distinct Observations	20
Minimum	12
Maximum	1900
Mean	476.6
Median	140
SD	615.2
Variance	378435
Coefficient of Variation	1.291
Skewness	1.476
Mean of log data	5.167
SD of log data	1.605
90% Standard Bootstrap UCL	648.1
95% Standard Bootstrap UCL	690.9

NB-117-137-1	
Number of Valid Observations	21
Number of Distinct Observations	20
Minimum	2.5
Maximum	1200
Mean	184.1
Median	79
SD	293.1
Variance	85920
Coefficient of Variation	1.592
Skewness	2.47
Mean of log data	3.943
SD of log data	1.808
90% Standard Bootstrap UCL	264.8
95% Standard Bootstrap UCL	287.7

NB-117-137-2	
Number of Valid Observations	21
Number of Distinct Observations	16
Minimum	2.5
Maximum	20
Mean	10.25
Median	8.7
SD	5.7
Variance	32.49
Coefficient of Variation	0.556
Skewness	0.652
Mean of log data	2.165
SD of log data	0.614
90% Standard Bootstrap UCL	11.8
95% Standard Bootstrap UCL	12.29

Skewness	2.417
Mean of log data	3.994
SD of log data	1.744
90% Standard Bootstrap UCL	257.1
95% Standard Bootstrap UCL	275.3

SB-1-48-2	
Number of Valid Observations	48
Number of Distinct Observations	35
Minimum	2.5
Maximum	560
Mean	39.88
Median	8.4
SD	93.76
Variance	8791
Coefficient of Variation	2.351
Skewness	4.307
Mean of log data	2.493
SD of log data	1.359
90% Standard Bootstrap UCL	57.45
95% Standard Bootstrap UCL	61.99

SB-49-67-0	
Number of Valid Observations	19
Number of Distinct Observations	18
Minimum	19
Maximum	2000
Mean	334.6
Median	78
SD	544
Variance	295990
Coefficient of Variation	1.626
Skewness	2.254
Mean of log data	4.747
SD of log data	1.479
90% Standard Bootstrap UCL	492.6
95% Standard Bootstrap UCL	538

SB-49-67-1	
Number of Valid Observations	19
Number of Distinct Observations	19
Minimum	5.3
Maximum	4100
Mean	473.8
Median	42
SD	1001
Variance	1001179
Coefficient of Variation	2.112
Skewness	3.009
Mean of log data	4.212
SD of log data	2.061
90% Standard Bootstrap UCL	760.3
95% Standard Bootstrap UCL	839.5

SB-49-67-2	
Number of Valid Observations	19
Number of Distinct Observations	15
Minimum	1
Maximum	830
Mean	53.76
Median	9.7
SD	188.3
Variance	35456
Coefficient of Variation	3.502
Skewness	4.334
Mean of log data	2.227
SD of log data	1.408
90% Standard Bootstrap UCL	106
95% Standard Bootstrap UCL	122.7

9. 04-235641-Pavement-Selection-Check-List.pdf

(From the parent EA 235611)

PAVEMENT SELECTION REVIEW COMMITTEE CHECKLIST

Project Description and project elements:

The project proposes to widen US 101 to add auxiliary lanes in each direction from the Embarcadero Road Interchange (PM 52.2) in the City of Palo Alto in Santa Clara County to the Marsh Road interchange (PM 3.6) in the City of Menlo Park in San Mateo County. In addition to the auxiliary lanes, other major components of the project include:

- Replacement of the Ringwood Avenue Pedestrian Overcrossing (POC) to provide sufficient clearance for the proposed auxiliary lanes.
- Widening of the Hetch Hetchy Aqueduct Bridge.
- Realignment of existing off-ramps and on-ramps, widening of on-ramps to provide HOV bypass lane(s), and in conjunction with the modification of existing ramp metering.

The addition of auxiliary lanes will relieve congestion on mainline US 101 within the project limits. The proposed major funding source for the project is the Corridor Mobility Improvement Account (CMIA) Program. The San Mateo County Transportation Authority (SMCTA) will provide the Measure 'A' funds for construction capital and right of way (R/W) capital. Regional Transportation Improvement Plan (RTIP) will fund Project Report/Environmental Document (PA/ED), PS&E and R/W supports as well as construction capital. There are also Federal Earmark funds for R/W.

One build alternative for the project is being considered. The current 2007 construction estimate for the alternative is $61million, while the R/W cost is estimated to be $50,000. The estimated support cost for this project is $27 million in 2007 dollars. This project has been assigned the project development processing category "4B" because it does not require new R/W and does not substantially increase traffic capacity.

EA: 235610

Co/Rte: SCl/SM 101

Project Engineer: Aijun Ding

Design Senior: Teblez Nemariam

Project Manager: Ron Moriguchi

Office: Design South

Program: HB4C

PM Limits: SM-101 PM 0.0/3.6, SCl 101 PM 52.2/52.6

This project is at the following phase (please check one):

☐ PID (PSR, PSSR, etc.) ☒ PR ☐ PS&E ☐ OTHER

At present, we are preparing the Draft Project Report and the Draft Environmental Document.

What pavement types/structural sections does Materials propose?

Office of Engineering Services I recommends that the proposed outside widening be designed with a full depth.

The two following alternatives have been proposed for outside widening pavement and shoulders:

A. Auxiliary Lanes/Right Shoulders

From Embarcadero Road I/C to Marsh Road I/C (PM: SCl 52.2/52.6 and SM 0.0/3.6).
Design Factors: $TI_{40} = 14$ R-Value = 15 Required G.E = 3.81'

	Thickness	G.E.
Alternative I	0.10' OGFC*	N/A
	0.15' RHMA-G	0.25'
	0.55' HMA(A)	0.88'
	0.80' CTB(A)	1.34'
	1.40' AS(4)	1.38'
	3.0'	3.85'

	Thickness	G.E.
Alternative II	0.10' OGFC*	N/A
	0.15' RHMA-G	0.25'
	0.90' HMA(A)	1.71'
	1.00' ACB	1.87'
	2.15'	3.83'

* Note: For NB direction only, between PM 52.2/52.6 in Santa Clara County.

B. Ramps

Design Factors: $TI_{20} = 10$ R-Value = 15 Required G.E = 2.72'

Alternative I	0.15' RHMA-G	G.E = 0.26'
	0.40' MHA (A)	0.61'
	0.85' AB (3)	0.92'
	0.95' AS (4)	0.94'
	2.35'	2.73'

Alternative II	0.15' RHMA-G	G.E = 0.35'
	1.10' HMA (A)	2.54'
	1.25'	2.89'

☐ Entire project OR

☒ Part of the project

Pavement is only involved where widening is proposed.

Please provide information for all of the following items that apply to this project.

	Yes	No	Question
1.	☐	☒	Are you implementing an innovative strategy (e.g., cold foam AC, pre-cast concrete pavement, continuously reinforced pavement, etc)? The majority of the traveled-way and most of the shoulders are now overlaid with either HMA (A) or RHMA-G. The Office of Engr. Services I, Materials recommends that RHMA-G and HMA (A) structural sections be used as adding aux. lanes is small addition to existing roadway. Roadway within the project limits is newly overlaid in 2007.
2.	☐	☒	Has Rapid Rehab strategy been considered (e.g., weekend closures and lane replacements)? Work on this project consists of outside widening for lanes and shoulders. This work could be done by placing temporary railing (Type K). So Rapid Rehab strategy is not required.
3.	☒	☐	Are you using **RAC** in this project? Total quantity for RHMA (RAC)-G used in this project is 6,752 tons.
4.	☒	☐	Was Life Cycle Analysis performed? Based on the initial project data, HMA section provides less agency and user cost value compared to PCC section. See attached summary.
5.	☐	☒	Does existing pavement have a settlement problem?
6.	☒	☐	a) Is this project (or part of project) maintaining the grade profile? Maintaining grade profile only. b) If not, explain how the profile change affects the pavement strategy choice (cut v. fill):
7.	☒	☐	Will there be a new barrier? New barriers for Ringwood Ave. POC.
8.			Is the proposed structural section on cut or fill or both? Provide limits of both, if applicable. Mostly on cut. Will provide limits during PS&E phase.
9.	☐	☒	Are highly expansive basement soils present?
10.	☒	☐	Are as-builts (including structural section information regarding edge drains, under drains, lime treatment, permeable blanket, etc.) available? Existing edge drains are located approximately from south of the Henderson UP to Willow Road Interchange.
	☐	☐	If no, did you check map files and online? If yes, existing structural section was based on (check one): ☒ as-built ☐ actual boring

	Yes	No	Question
11.	☐	☒	Do the project limits have problems with groundwater (e.g., high water table, flow requirements, etc.)? Design contacted Area Superintendent and Hwy Maintenance Supervisor of the Foster City Maintenance Station. They said there is no ground water problem in the area. The soil has been pretty dry and there is no need for permeable fabrics. Therefore, Groundwater is not a concern to the rest of the project.
12.	☒	☐	Has the availability of pavement materials (i.e., long haul distances from plants) been considered? The RAC Plant is "Granite Rock" in Redwood City, about 7 miles away from the City of Menlo Park. If yes, how does material availability affect pavement type selection? N/A
13.	☐	☒	Will the existing pavement be rehabilitated? There will be no rehab on existing pavements as roadway was overlaid in 2007 for the project limits. What are the age and condition of the existing adjacent lanes? Recently overlaid in 2007.
14.			What is the type of pavement/structural section (corridor pavement type/structural section continuity) on upstream/downstream roadway? Explain if several: From SCL/SM County Line to Marsh Road I/C (PM 0.0/6.774) for the mainline (EA 0C9504): <u>PCC grind and selected PCC slab replacement for existing slabs. remove 0.10' OGAC and overlay with 0.15' RAC-G.</u> From SCL/SM County Line to Guadalupe River- (PM 52.6/40.2) for the mainline (EA 0C8904): <u>PCC grind and selected PCC slab replacement for existing slabs. remove 0.10' OGAC and overlay with 0.15' RAC-G.</u>
15.	☒ ☒	☐ ☐	Is TMP data (lane closure charts) available and was it considered? Will there be nighttime paving? If so, provide lane closure hours: <u>Will provide in PS&E phase.</u>

	Yes	No	Question
16.	☒	☐	Was field Maintenance input considered? Design met with Foster City Maintenance Station field people. Major concerns they have are: a). Wheel loads damage to PCC slab joints. b) How to achieve easy maintenance of the pump station is the major concern of the field people.
17.	☒	☐	Were climate conditions (extreme temperature, rainfall, etc.) considered? RHMA requires nighttime temperature above 55 deg F. The mean temperature above 55 deg F for both SCl & SM Counties is from March to November. Extreme temperature is anticipated affecting the pavement job.
18.			Which stage construction requirements (matching adjacent sections, temporary paving, etc.) were considered? Work on this project mostly consists of outside widening for lanes and shoulders. This work could be done by placing temporary railing (Type K).

	Yes	No	Question
19.	☒	☐	Is this a large-scale project? Explain all quantity take-off: The current total construction capital cost of this project is $83,607,000. Following are the relevant all quantity take off: Alternative 1: <u>1 - Earthwork</u> Roadway Excavation 73,360CY <u>2 - Pavement Structural Section</u> Open Grade Friction Concrete 364 Ton Rubberized Hot Mix Asphalt (G) 6,752 Ton Hot Mix Asphalt (A) 24,758Ton Cement-Treated Base (A) 17,784CY Aggregate Subbase (4) 31,121CY <u>3 - Specialty Items</u> Barriers and Guardrails 1,411 LF Alternative 2: <u>1 - Earthwork</u> Roadway Excavation 52,600CY <u>2 - Pavement Structural Section</u> Open Grade Friction Concrete 364 Ton Rubberized Hot Mix Asphalt (G) 6,752 Ton Hot Mix Asphalt (A) 40,514Ton Asphalt Concrete Base (ACB) 40,015Ton <u>3 - Specialty Items</u> Barriers and Guardrails 1,411 LF Cost of Structural Section plus Roadway Excavation Alternative 1: $ 9,257,000 Alternative 2: $11,597,000 Alternative 1 is cheaper than Alternative 2.

	Yes	No	Question
20.	☒	☐	Is there OGAC on the existing pavement? There is OGAC between PM 52.2/52.6 Northbound only from County Line to Embarcadero Road I/C.
21.	☒	☐	Was environmental impact considered? But there is no Environmental impact on the project.
22.			What is the proposed pavement design life? 40 years for mainline and 20 years for ramps.
23.			What is the final lane line configuration? From Embarcadero Rd. I/C to Marsh Rd. I/C the lane configuration is as follow: Five 12-ft lanes, 10 ft right shoulders. Most of median shoulders of the project are non-standard varies from 2 ft to 8 ft. <u>At the San Francisquito Creek Bridge:</u> Southbound: 11-ft for the no.1 lane, 4-12 ft lanes 2 ft non-standard median and right shoulders. Northbound: Five 12-ft lanes, 10 ft right shoulder and 3 ft median shoulder. <u>At Henderson Underpass:</u> Southbound/Northbound: 5- 11 ft lanes on southbound directions. Three inside lane-11 ft and 2 outside lane-12 ft on northbound direction. 2 ft non-standard median and right shoulders
24.	☒	☐	Are there vertical clearance issues? Non-standard vertical clearances (15'-1'') for the existing Henderson UP.
25.			What is the traffic index? TI_{40}=14 for auxiliary lane/right shoulder, TI_{20}=10 for ramps.
26.	☒	☐	Are existing retrofit edge drains present? (No existing underdrains)
27.	☒	☐	Will shoulders be used as detours? Median shoulders and mainline have the same pavement section and will be used for detour.

	Yes	No	Question
28.	☐	☒	Is there settlement at bridge approaches?
	☐	☒	Are bridge approach slabs being replaced? Does such replacement include shoulders? Consulted with structures maintenance representative on ________________.
29.	☒	☐	Is there a minimum standard (2% or 1.5%) cross-slope? 2% and varies.
30.			Provide the pavement condition report. See attached pavement condition report.
31	☐	☒	Other factors?

RECOMMENDATION:

Reviewed and discussed by Pavement Selection Review Committee on

___Please see below.____
(Date)

Committee's comments:

From February 14, 2008 Meeting:

1. Committee recommended to consider structural section with Lean Cement Base (LCB) layer instead of CTB layer and asked design team to do cost comparison for the alternatives.

2. Committee is concerned about pavement damaged due to striping lanes.

3. Committee is concerned about wheel load path on joints between slabs for permanently shifting traffic lanes toward the median barrier.

4. Committee ask design to look into using high barriers instead of using retaining walls or use steep slope to minimize cut.

5. Committee asked design to coordinate the installation of standby generator project with the relocation of the pump station.

6. Committee has asked team for further review of this project on March 13, 2008.

Responses:

1. Cost comparison was done for the recommended alternatives. Alternative 3 with LCB layer costs $11.6M (including roadway excavation) and Alternate 1 with CTB layer cost $9.2M (including roadway excavation).
Material Recommendations for LCB are as follows:

Alternative 3:

Design Factor: TI40 = 14 R-Value = 15 Require G.E. = 3.81'

Thickness	G.E.
0.10 OGFC*	N/A
0.15 RHMA-G	0.25'
0.55 HMA (A)	0.88'
0.75 LCB	1.40'
1.40 AS (4)	1.38'
2.95'	3.91'

* Note: for NB direction only, between PM 52.2/52.6 in SCl County.

2. According to the recent CAPM project (04-0C9504), the current pavement has marked with Type 13 markers on the mainline and yellow and white thermoplastic traffic stripe for the median and right shoulder respectively. Therefore, removing those existing Type 13 markers will not damage the RHMA-G or OGFC pavement as well. But sandblasting will be required in order to remove thermoplastic traffic stripe and diamond markers from the existing pavement.

3. For the aux. lanes project, there would be areas where the wheel loads apply to slab joints. Near the project limit, along US 101, from Broadway to Third Ave. the existing PCC wheel loads damage slab joints. Based on Maintenance's input, when slab joints are taking wheel loads, spalling, potholes corner breaks occur.

4. There is no need to construct the retaining walls since the Henderson Underpass will not be replaced and the pump station will not be relocated as well.

5. The Minor A project to install additional pump PS&E is in December 2008 and construction begin in Mid – 2009. Maintenance needs this generator to provide additional power for the pump to prevent flooding. Since the pump station will not be relocated that Minor A project can go ahead and start installing additional pump without any subsequent delay.

6. The second pavement selection review is scheduled on 3-13-2008.

Committee's comments:

From March 13, 2008 Meeting: -

1. Committee recommended doing Life Cycle Cost Analysis.

2. Committee also recommended for considering AC overlay on both side of the roadway in order to minimize scars on the pavement from existing stripe removal.

3. Committee is still concerned about wheel load path on joints between slabs for permanently shifting traffic lanes toward the median barrier. And if that certainly happens then recommended RAC thin overlay where it will not be possible to replace PCC pavements.

4. Committee has asked team to check the barrier height if need to do AC overlay.

5. Committee recommends distributing the final checklist before the DPR submittal.

Responses: -

1. Life Cycle Cost Analysis has been done according to committee's recommendation and the summary is attached with this checklist.

2. Yes, AC overlay will be considered only if it prevails that the lane shift will impose severe mark on the pavement (both for Rubberized and Open Graded Asphalt Concrete) and the existing barriers freeboard allows overlying as well. But still any damage on the pavement will be fixed. An additional fund of $7.0M is allocated to the project in order to perform overlay and/or replacement of the damaged PCC slabs.

3. The existing PCC pavements on northbound direction have an offset between the existing lane lines and PCC longitudinal joints within that stretch. Based on current observation pavement condition is good on that location. On the other hand, on southbound PCC pavements, the existing lane marking (or striping) falls on the PCC joints. When proposed lane shift towards the median barrier in several location of the southbound freeway, the joints will mostly fall on the middle of the proposed lane and few sections will have will wheel load path on the joints which is the same as the existing offsetting situation on the northbound direction. These issues have been discussed with Materials Division. Considering present condition on northbound direction, they recommend that variable offset will not affect the pavement serviceability especially for lane no 1 and 2. Therefore any additional amount of offset will not impact the pavement condition for all lanes on both directions. Any damaged PCC pavement will be fixed from the allocated fund.

4. Materials recommended a maximum of 0.25' overlay on southbound direction.

5. The final Checklist was submitted on March 26th, 2008 and approved on April 10, 2008.

Final Selection:

A cost comparison was done for the recommended alternatives. Alternative 1 is cheaper than Alternative 2 and 3. Design recommends choosing Alternative 1 because existing structure section of the road is of similar material and this alternative is cheaper than the other two alternatives. Life cycle cost analysis has been done based on the initial project data and it shows that the HMA section (Alternative 1) provides less agency and user cost value compare to PCC section for 40-years pavement design life. PCC section was provided from Materials division. See attached summary.

For all committee's concern on the pavement, an additional fund of $7.0M is allocated to the project for the pavement rehab.

Project Engineer

Aijun Ding
Print Name (ANAND GARG FOR)

Signature

Design Senior

Teblez Nemariam
Print Name

Signature

Committee concurrence:

for
Steve Whipple 4/10/08

Brian Kearney 4/10/08

04-10-08
John Hemiup

10. 04-235641-Risk-Accessment-Calculation.pdf

3 CONSTRUCTION GENERAL PERMIT

In order to minimize the potential effects of construction runoff on the quality of the receiving water bodies, any construction activity affecting one acre or more must obtain coverage under the CGP. Permit applicants are required to prepare a SWPPP and implement BMPs to reduce construction effects on receiving water quality.

3.1 Risk Assessment

The CGP requirements include a risk assessment to determine the Project's impact risk to receiving water bodies. The risk assessment uses measurements of the Project's potential sediment risk and the sensitivity of the receiving water bodies to sediment to determine the risk level of the Project. This Project has a **Low Site Sediment Risk Factor** and a **High Receiving Water Risk Factor**; the combined risk is **Level 2**, see Table 4.

3.1.1 Sediment Risk

The sediment risk is based on the following equation from the CGP "Fact Sheet" (Section J.1.a pg. 28):

Equation 1. Sediment Risk Equation

$A = (R)(K)(LS)(C)(P)$

Where:

R = Rainfall-runoff erosivity factor
K = Soil erodibility factor
LS = Length-slope
C = Cover
P = Management operations and support practices
A = Rate of sheet and rill erosion (tons per acre)

The rainfall-runoff erosivity factor (R) of **16.56** was determined from the U.S. Environmental Protection Agency "Rainfall Erosivity Factor Calculator for Small Construction Sites," see Figure 6.

As stated in Section 2.6, the K factor is **0.24**.

The length-slope factor (LS) of **1.02** was determined by estimating the original grade and slope lengths delineated on the Typical Cross Sections included in the Contract Project Plans, see Table 1.

The cover factor (C) and management operations and support practices (P) are given values of 1.0 by the CGP to simulate bare ground conditions.

Based on these factors, the rate of sheet and rill erosion (A) is **4** tons per acre. This value is less than 15, so the sediment risk is **Low**, see Table 2.

Rainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Facility Name: EA 235641
Start Date: 03/01/2012
End Date: 12/01/2012
Latitude: 37.4558
Longitutde: -122.1331

Erosivity Index Calculator Results

AN EROSIVITY INDEX VALUE OF 16.56 HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF **03/01/2012 - 12/01/2012**.

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction.
You do not qualify for a waiver from NPDES permitting requirements.

Figure 6. Rainfall-Runoff Erosivity (R) Factor

Source: U.S. EPA

Table 1. Length-Slope (LS) Factor

	Average Watershed Slope (%)					
Sheet Flow Length (ft)	**2.0**	**3.0**	**4.0**	**5.0**	**6.0**	**8.0**
15	0.13	0.17	0.20	0.23	0.26	0.32
25	0.16	0.21	0.26	0.31	0.36	0.45
50	0.21	0.30	0.38	0.46	0.54	0.70
75	0.25	0.36	0.47	0.58	0.69	0.91
100	0.28	0.41	0.55	0.68	0.82	1.10
150	0.33	0.50	0.68	0.86	1.05	1.43
200	0.37	0.57	0.79	1.02	1.25	1.72
250	0.40	0.64	0.89	1.16	1.43	1.99
300	0.43	0.69	0.98	1.28	1.60	2.24
400	0.48	0.80	1.14	1.51	1.90	2.70
600	0.56	0.96	1.42	1.91	2.43	3.52
800	0.63	1.10	1.65	2.25	2.89	4.24
1000	0.69	1.23	1.86	2.55	3.30	4.91

Source: State Water Resources Control Board

Table 2. Sediment Risk Factor

Sediment Risk Factor Worksheet	Entry
A) R Factor	
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site. http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm	
R Factor Value	16.56
B) K Factor (weighted average, by area, for all site soils)	
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted. Site-specific K factor guidance	
K Factor Value	0.24
C) LS Factor (weighted average, by area, for all slopes)	
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction. LS Table	
LS Factor Value	1.02
Watershed Erosion Estimate (=RxKxLS) in tons/acre	4
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >=15 and <75 tons/acre High Sediment Risk: >= 75 tons/acre	**Low**

Source: State Water Resources Control Board

3.1.2 Receiving Water Body Risk

The receiving water risk is high because San Francisquito Creek is listed on the 303(d) as impaired for sedimentation/siltation, plus the creek has the beneficial uses of COLD, SPWN and MIGR. See Table 3.

Table 3. Receiving Water Risk Factor

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	yes/no	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below: 2006 Approved Sediment-impared WBs Worksheet http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml **OR** A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp	Yes	High

Source: State Water Resources Control Board

Table 4. Risk Level Determination

Combined Risk Level Matrix

Receiving Water Risk	Sediment Risk: Low	Sediment Risk: Medium	Sediment Risk: High
Low	Level 1	Level 2	Level 2
High	Level 2	Level 2	Level 3

Project Sediment Risk:	Low
Project RW Risk:	High
Project Combined Risk:	Level 2

Source: State Water Resources Control Board

3.2 Notice-of-Termination (NOT)

The CGP provides both revised and new requirements for completion and approval of the NOT. The NOT requirements are presented in Section II.D of the CGP. These requirements include demonstrating that the terms of the NOT have been satisfied through photos, computational proof or other "custom methods," such as results of testing and analysis.

While these methods of demonstrating compliance are at the option of the contractor, should the RWQCB determine that the visual photos do not adequately show compliance, further computational efforts may be required. This computational proof is obtained through the use of the Revised Universal Soil Loss Equation 2 (RUSLE2) program.