FOR CONTRACT NO.: 04-154204

INFORMATION HANDOUT

WATER QUALITY

STORM WATER INFORMATION HANDOUT

MATERIALS INFORMATION

EXCERPTS FROM PRELIMINARY SITE INVESTIGATION REPORT

FOUNDATION RECOMMENDATION FOR RETAINING WALL

TUNNEL SAFETY ORDERS - UNDERGROUND CLASSIFICATIONS

ROUTE: 04-SCl-85-R18.0/R23.9

STORM WATER INFORMATION HANDOUT

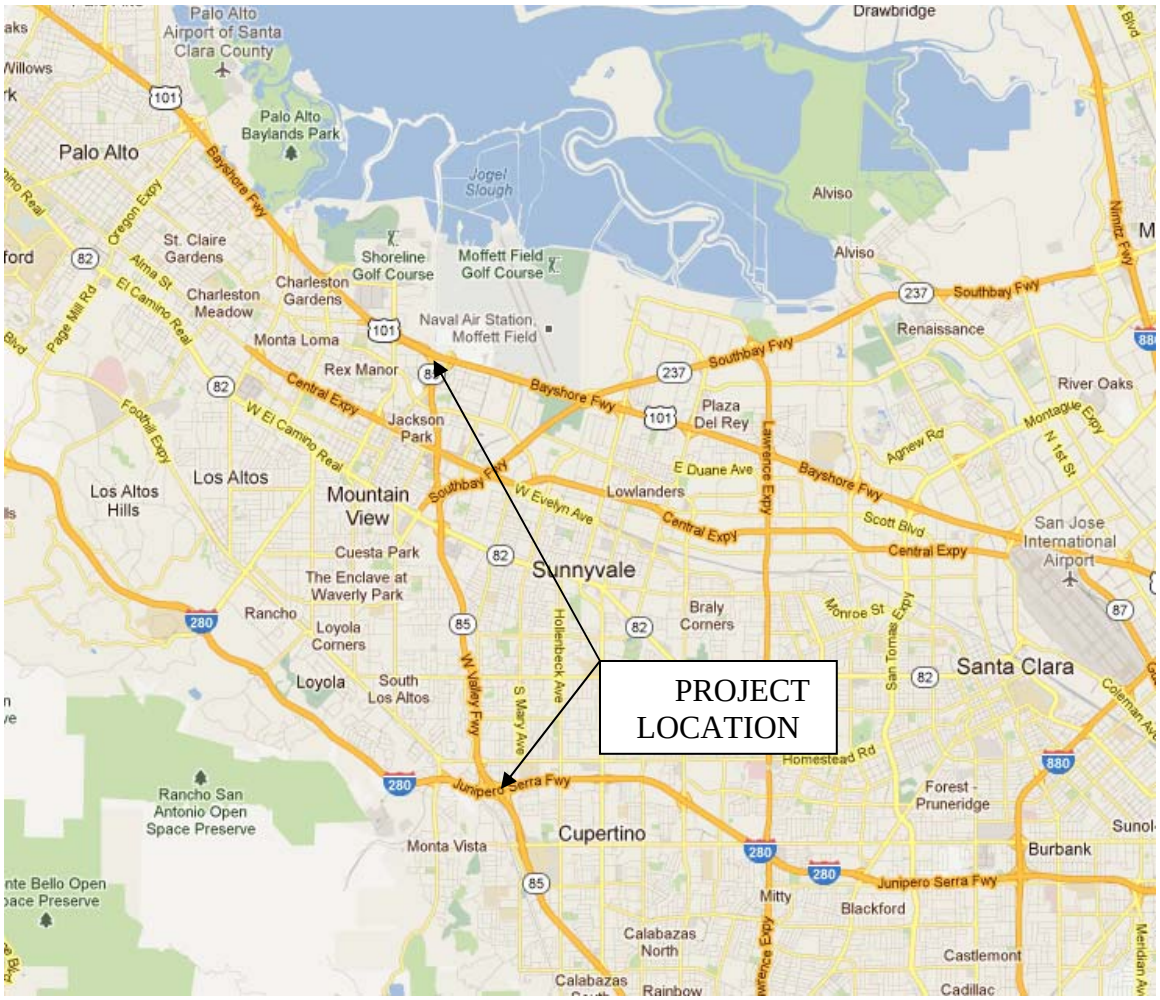
CONTRACT NO. 04-154204

04-Santa Clara-85-PM R18.0/R23.9

Install Ramp Metering and TOS Elements on Route 85 in Santa Clara County

California Department of Transportation
District 4
Water Quality Program
111 Grand Avenue
Oakland, California 94612

Project Vicinity


PROJECT
LOCATION
Palo Alto
Palo Alto Airport of Santa Clara County
Palo Alto Baylands Park
Jogel Slough
Alviso
Drawbridge
St. Claire Gardens
Charleston Meadow
Charleston Gardens
Shoreline Golf Course
Moffett Field Golf Course
Naval Air Station, Moffett Field
Monta Loma
Rex Manor
Jackson Park
Renaissance
River Oaks
Plaza Del Rey
Los Altos
Los Altos Hills
Mountain View
Lowlanders
Sunnyvale
Cuesta Park
The Enclave at Waverly Park
Rancho
Loyola Corners
Loyola
South Los Altos
Braly Corners
Santa Clara
San Jose International Airport
Rancho San Antonio Open Space Preserve
Monta Vista
Cupertino
Forest - Pruneridge
Burbank
Mitty
Blackford
Calabazas North
Castlemont
Cadillac
Bayshore Fwy
Southbay Fwy
Central Expy
Junipero Serra Fwy
Lawrence Expy
Homestead Rd
Scott Blvd
Agnew Rd
Monroe St
Hollenbeck Ave
W Valley Fwy
S Mary Ave
W Evelyn Ave
E Duane Ave
Montague Expy
N 1st St
Nimitz Fwy
Coleman Ave
Meridian Ave
Foothill Expy
Page Mill Rd
El Camino Real
Alma St
Oregon Expy
Sunol

Risk Assessment

	A	B	C
1	**Sediment Risk Factor Worksheet**		**Entry**
2	**A) R Factor**		
3	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.		
4	http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm		
5	**R Factor Value**		61.46
6	**B) K Factor (weighted average, by area, for all site soils)**		
7	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.		
8	Site-specific K factor guidance		
9	**K Factor Value**		0.32
10	**C) LS Factor (weighted average, by area, for all slopes)**		
11	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.		
12	LS Table		
13	**LS Factor Value**		0.36
14			
15	**Watershed Erosion Estimate (=RxKxLS) in tons/acre**		7.080192
16	**Site Sediment Risk Factor**		**Low**
17	Low Sediment Risk: < 15 tons/acre		
18	Medium Sediment Risk: >=15 and <75 tons/acre		
19	High Sediment Risk: >= 75 tons/acre		
20			

Receiving Water (RW) Risk Factor Worksheet	Entry
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:	**yes**
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	

Combined Risk Level Matrix

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

Project Sediment Risk: **Medium**

Project RW Risk: **High**

Project Combined Risk: **Level 2**

Rainfall Data

Rainfall Intensity can be obtained by the following link:

http://www.wrcc.dri.edu/pcpnfreq/nca5y24.gif

Refer to Chapters 800, Highway Drainage Design of Highway Design Manual for information on runoff coefficient and shed map. The weighted runoff coefficient of 0.55 is recommended is recommended for the project area.

PRELIMINARY SITE INVESTIGATION REPORT

SCL – 85 RAMP METERING
SANTA CLARA COUNTY, CALIFORNIA

PREPARED FOR:
CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
111 GRAND AVENUE, MS8C
OAKLAND, CA 94612

PREPARED BY:
GEOCON CONSULTANTS, INC.
6671 BRISA STREET
LIVERMORE, CA 94550

GEOCON PROJECT NO. E8560-06-27
CALTRANS EA 04-154201
CALTRANS PROJECT # 04-0002-0481-1

NOVEMBER 2011

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 1 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 Lead in Soil

6.1.1 WB I-280 offramp to NB SR-85

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and predicted WET lead concentrations for data collected from this portion of 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 below and 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 1.5 ft	835	**49.8**	902	**Hazardous**
Underlying soil (1.5 to 3.5 ft)	*58*	*3.5*	*64*	*Non- hazardous*
0 to 3.0 ft	*455*	***27.2***	*492*	**Hazardous**
Underlying Soil (3.0 to3.5 ft)	*6.9*	*0.4*	*6.9*	*Non-hazardous*
0 to 3.5 ft	391	**23.4**	423	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 1.5 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the reported DI-WET and pH results, soil excavated from 0 to 1.5 feet may be reused onsite (as Caltrans Type Y1) in accordance with the DTSC Variance by placing the excavated soil under clean fill or pavement. Based on the TCLP lead results, excavated soil would not be classified as a RCRA hazardous waste. Underlying soil below a depth of 1.5 feet would be classified as non-hazardous.

6.1.2 NB SR-85 onramp

The maximum total lead concentration is less than the TTLC of 1,000 mg/kg and less than 50 mg/kg (i.e., less than ten times the STLC of 5 mg/l). Accordingly, excavated soil would be classified as non-hazardous based on lead content.

6.1.3 NB SR-85 onramp MVP

The maximum total lead concentration is less than the TTLC of 1,000 mg/kg and less than 50 mg/kg (i.e., less than ten times the STLC of 5 mg/l). Accordingly, excavated soil would be classified as non-hazardous based on lead content.

6.1.4 WB I-280 loop ramp MVP to SB SR-85

The maximum total lead concentration is less than the TTLC of 1,000 mg/kg and the maximum WET lead concentration is less than 5 mg/l. Accordingly, excavated soil would be classified as non-hazardous based on lead content.

6.1.5 EB I-280 loop ramp MVP to NB SR-85

The maximum total lead concentration is less than the TTLC of 1,000 mg/kg and the maximum WET lead concentration is less than 5 mg/l. Accordingly, excavated soil would be classified as non-hazardous based on lead content.

6.1.6 SB SR-85 onramp from Fremont Avenue

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and predicted WET lead concentrations for data collected from this portion of 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 below and 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 1.5 ft	327	**19.5**	358	**Hazardous**
Underlying soil (1.5 to 2.0 ft)	*139*	***8.3***	*151*	***Hazardous***
0 to 2.0 ft	*280*	***16.7***	*306*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the reported DI-WET and pH results, soil excavated from 0 to 2.0 feet may be reused onsite (as Caltrans Type Y1) in accordance with the DTSC Variance by placing the excavated soil under clean fill or pavement. Based on the TCLP lead results, excavated soil would not be classified as a RCRA hazardous waste.

6.1.7 NB SR-85 onramp from Fremont Avenue

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and predicted WET lead concentrations for data collected from this portion of 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 below and 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 1.5 ft	342	**20.4**	362	**Hazardous**
Underlying soil (1.5 to 2.0 ft)	*228*	***13.6***	*243*	***Hazardous***
0 to 2.0 ft	*313*	***18.7***	*332*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 2.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the reported DI-WET and pH results, soil excavated from 0 to 2.0 feet may be reused onsite (as Caltrans Type Y1) in accordance with the DTSC Variance by placing the excavated soil under clean fill or pavement. Based on the TCLP lead results, excavated soil would not be classified as a RCRA hazardous waste.

6.1.8 NB SR-85 MVP

The following table summarizes the predicted waste classification for excavated soil based on the maximum total lead values and predicted WET lead concentrations for data collected from this portion of the Site. Weighted averages are calculated by using the maximum 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 below and in Table 6d.

Excavation Depth	Maximum Total Lead (mg/kg)	Predicted WET Lead (mg/l)	Waste Classification
0 to 1.5 ft	310	**18.5**	**Hazardous**
Underlying soil (1.5 to 2.0 ft)	*300*	***17.9***	***Hazardous***
0 to 2.0 ft	*308*	***18.4***	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 2.0 feet would be classified as a California hazardous waste since the UCL-predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the reported DI-WET and pH results, soil excavated from 0 to 2.0 feet may be reused onsite (as Caltrans Type Y1) in accordance with the DTSC Variance by placing the excavated soil under clean fill or pavement. Based on the TCLP lead results, excavated soil would not be classified as a RCRA hazardous waste.

6.1.9 SB SR-85 CMS/CCTV/MVP

The following table summarizes the predicted waste classification for excavated soil based on the maximum total lead concentrations and predicted WET lead concentrations for data collected from this portion of the Site. Weighted averages are calculated by using the maximum 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 below and in Table 6e.

Excavation Depth	Maximum Total Lead (mg/kg)	Predicted WET Lead (mg/l)	Waste Classification
0 to 1.5 ft	650	**38.8**	**Hazardous**
Underlying soil (1.5 to 3.5 ft)	*128*	***7.6***	***Hazardous***
0 to 3.0 ft	*410*	***24.5***	**Hazardous**
Underlying Soil (3.0 to3.5 ft)	*2.5*	*0.1*	*Non-hazardous*
0 to 3.5 ft	352	**21.0**	**Hazardous**

Based on the data presented in the above table, soil excavated to a depth of 3.0 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the reported DI-WET and pH results, soil excavated from 0 to 3.0 feet may be reused onsite (as Caltrans Type Y1) in accordance

with the DTSC Variance by placing the excavated soil under clean fill or pavement. Based on the TCLP lead results, excavated soil would not be classified as a RCRA hazardous waste. Underlying soil below a depth of 3.5 feet would be classified as non-hazardous.

6.1.10 SB SR-85 onramp from US-101

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and predicted WET lead concentrations for data collected from this portion of 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 below and 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 1.5 ft	467	**27.9**	503	**Hazardous**
Underlying soil (1.5 to 3.5 ft)	*39*	*2.3*	*42*	*Non- hazardous*
0 to 3.0 ft	*257*	***15.3***	*277*	**Hazardous**
Underlying Soil (3.0 to3.5 ft)	*15.0*	*0.9*	*15.0*	*Non-hazardous*
0 to 3.5 ft	222	**13.3**	239	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 1.5 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the reported DI-WET and pH results, soil excavated from 0 to 1.5 feet may be reused onsite (as Caltrans Type Y1) in accordance with the DTSC Variance by placing the excavated soil under clean fill or pavement. Based on the TCLP lead results, excavated soil would not be classified as a RCRA hazardous waste. Underlying soil below a depth of 1.5 feet would be classified as non-hazardous.

6.1.11 NB 85 onramp from US-101

The following table summarizes the predicted waste classification for excavated soil based on the calculated weighted averages of the total lead UCLs and predicted WET lead concentrations for data collected from this portion of 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 below and 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 1.5 ft	335	**20.0**	371	**Hazardous**
Underlying soil (1.5 to 2.0 ft)	*33*	*2.0*	*35*	*Non- hazardous*
0 to 2.0 ft	*259*	***15.5***	*287*	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated to a depth of 1.5 feet would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the lead STLC of 5.0 mg/l. Based on the reported DI-WET and pH results, soil excavated from 0 to 1.5 feet may be reused onsite (as Caltrans Type Y1) in accordance with the DTSC Variance by placing the excavated soil under clean fill or pavement. Based on the TCLP lead results, excavated soil would not be classified as a RCRA hazardous waste. Underlying soil below a depth of 1.5 feet would be classified as non-hazardous.

6.2 CAM 17 Metals in Soil

Based on a comparison of the total CAM17 metals concentrations to their respective STLCs and TTLCs and the predicted WET lead concentrations calculated above, soil excavated from the Site would not be considered a hazardous waste based on metal content.

The maximum CAM 17 metals concentrations in site soil were compared to ESLs (SFRWQCB, May 2008, Tables A and K-3) and 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.

Arsenic, Cadmium, lead, and vanadium were reported with concentrations equal to or greater than their respective residential land use ESL values. ESLs and published background concentrations for these elements are summarized in the table below:

Metal	Mean	Maximum	Shallow Soil Residential ESL	Shallow Soil Commercial/ Industrial ESL	Worker Direct Exposure ESL	PUBLISHED BACKGROUND MEAN[1]	PUBLISHED BACKGROUND RANGE [1]
Arsenic	1.1	3.6	0.39	1.6	15	3.5	0.6 to 11.0
Cadmium	0.7	1.7	1.7	7.4	39	0.36	0.05-1.7
Lead	259	2,100	200	750	750	11.43	6.8-16.1
Vanadium	39.7	60	16	200	770	112	39 to 288

Concentrations reported in mg/kg

1 Kearney Foundation of Soil Science, March 1996

The reported arsenic concentrations in the soil samples exceed the shallow soil residential and commercial/industrial land use ESLs, however, it is within the published background range and below the construction worker direct exposure ESL. The SFRWQCB *Update to Environmental Screening Levels (ESLs) Technical Document* (*November 2007, Revised May 2008)* 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 reported cadmium and vanadium concentrations in the soil samples exceed the shallow soil residential land use ESL, however, they are below the commercial/industrial and construction exposure ESLs and within the published background range.

Reported lead concentrations in soil exceed the residential, commercial/industrial and construction worker direct exposure ESLs and are above reported background ranges.

Based on the reported arsenic, cadmium, lead, or vanadium concentrations, offsite reuse or disposal of excavated soil may be restricted based on metals content depending on proposed use.

6.3 Organic Compounds in Soil

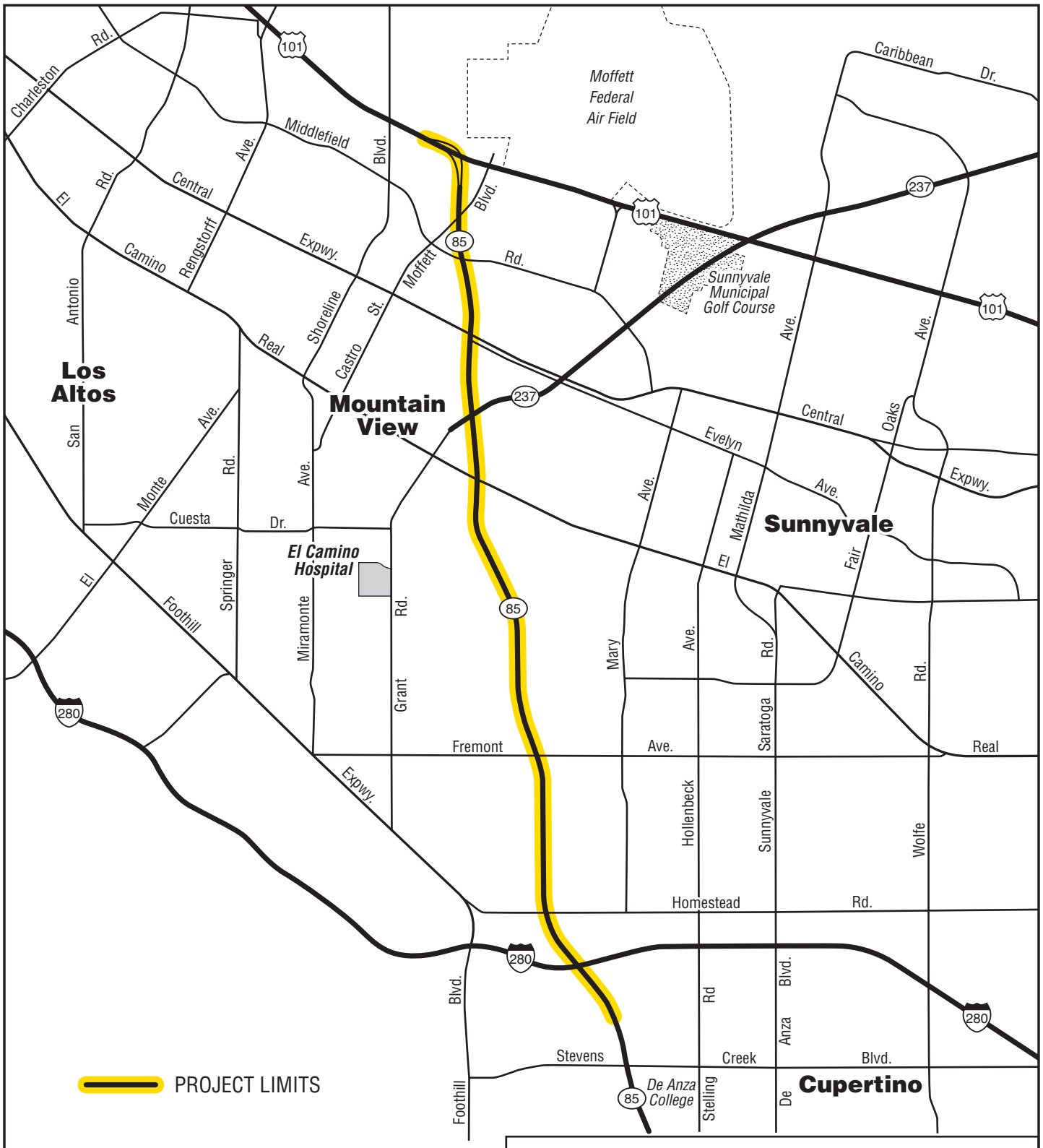
Organic concentrations in soil were compared to ESLs. TPHg, BTEX, MTBE, or VOCs were not detected at or above the laboratory reporting limits. TPHd was reported at concentrations ranging from <1.0 to 560 mg/kg and has a calculated 95% UCL concentration of 39.9 mg/kg below the residential and commercial/industrial land use ESLs of 83 mg/kg. TPHmo was reported at <1.0 to 2,600 mg/kg and a calculated 95% UCL of 168.3 mg/kg below the residential land use ESL of 370 mg/kg.

6.4 Naturally-Occurring Asbestos in Soil

NOA was not detected in soil samples collected at the Site at or above the laboratory reporting limits. Offsite disposal or reuse of Site soil should not be restricted based on NOA content.

6.5 Worker Protection

The contractor(s) should prepare a project-specific health and safety plan to prevent or minimize worker exposure to metals and petroleum hydrocarbons in soil 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.



GEOCON CONSULTANTS, INC.
6671 BRISA STREET – LIVERMORE, CA 94550
PHONE 925.371.5900 – FAX 925.371.5915

State Route 85 Stevens Creek Freeway

Santa Clara County, California

VICINITY MAP

GEOCON Proj. No. E8560-06-27

Task Order No. 27 | November 2011 | Figure 1

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. GORDON DANKE
Design Branch Chief, Branch 9
Structure Design
Division of Engineering Services

Date: August 29, 2011

Attention: Rosa Candiotti

File: 04-SCL-85 (PM 18.2-23.9)
04-154201
E-FIS: 0400020480- Phase 1
Ramp Metering & TOS

S.A S. Awad

From: S. AHMED/S. AWAD
Transportation Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

H. Nikoui

HOOSHMAND NIKOUI
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject : Foundation Report for Retaining Wall.

1. INTRODUCTION

This memo provides foundation recommendations for the proposed retaining wall. This Retaing wall is required due to the proposed widening of the ramp (approx. 20 feet). As per General Plan provided by your office, the wall is 262 ft long and constructed over 16 inches diameter CIDH pile (@ 7 feet spacing) foundations. The lateral design load on the piles is 80 kips and the axial design load is 40 kips. Concrete barrier of Type 736A (mod) will be used on top of the proposed cap beam over the CIDH pile foundations and the maximum wall height will be 5 feet. This project is the part of the "Ramp Metering Project" along Route 85 developed by Office of Special Design between PM R18.2 and PM R23.9 in Santa Clara County (City of Mountain View and Sunnyvale). Since we do not have any clear and specific guidelines for LRFD design, we provide the soil parameters based on Working Stress Design.

2. PROJECT LOCATION

Figure 1 shows the location of the project site. The proposed retaining wall is located at southbound on-ramp of SR 85 (PM R21.61) from eastbound SR 82. Existing Stevens Creek Trails is located just west side of the proposed retaining wall.

3. SCOPE OF WORK

- Site Reconnaissance
- Field Geotechnical Exploration including two soil borings.

- Visual Soil Inspection & Laboratory Testing for selected sample
- Foundation Design Analysis
- Preparation of Foundation Report

4. SITE GEOLOGY AND SUBSURFACE CONDITIONS

Executive Summary

It is our conclusion that there are no significant unmitigatable geotechnical conditions and the project can proceed as proposed. However, there are some geologic constraints that may require mitigation such as associated seismic risks.

Topography

The project site is located in Santa Clara County in west portion of the Santa Clara Valley. The location of the project site is at an elevation of approximately 30 feet above sea level. To the southwest of the site is Monte Bello Ridge, which is the highest point in the area with an elevation exceeding at 2400 ft.

The project area is just to the east of Stevens Creek, which runs from Santa Cruz Mountains across the alluvial plains into the San Francisco Bay.

Climate

The climate of the job site is considered Mediterranean Climate. Santa Clara County has warm, dry summers and mild, wet winters. Temperatures are highest in July and coldest in January, with an average temperate of 61.3°. The average high temperature in Mountain View is 69° degrees and average low temperature is 49°. The average amount of rainfall is approximately 15.08 inches. In the summer, little rainfall occurs. The rainy season begins about October, (0.87 inches) and ends about April (1.02 inches), with the most rain falling in January (3.25 inches). (Data taken from http://www.idcide.com/weather/ca/santa-clara.htm)

Site Geology

The project site is located within the California Coast Ranges geomorphic province. The site is just north of the northwest trending Santa Cruz Mountains, which separates the San Francisco Bay from the Pacific Ocean. State Route (SR) 85 is located on the land between the Santa Cruz Mountains and the San Francisco Bay, which is comprised of Holocene natural levee, alluvial fan and flood plain deposits, and Pleistocene flood plain deposits. (Figure 2: USGS Open –File Report 94-231, Quaternary Geology of Santa Clara Valley, Santa Clara, Alameda and San Mateo

Counties, California, Halley, et al, May 1994).

In a search of Caltrans records for the project site, Log of Test Borings (LOTBs) were found from 1958 and 1963. The LOTBs show that the underlying strata consisted of interlayered clays, silts, sands and gravels. These are consistent with natural levees, flood plain and alluvial fan deposits.

Seismicity

The project is located in the San Francisco Bay Area, which is an active seismic region. Historic earthquakes have occurred in the region on the San Andreas Fault, in 1906 with a magnitude of 7.9 and 1989 magnitude of 6.9, and also on the Hayward Fault, 1868 with a magnitude of 6.8,

The controlling fault is the Cascade Fault which has a maximum credible earthquake of 6.9. Table 2 presents the two controlling faults.

The site is not in the vicinity of any Alquist Priolo earthquake fault zones; therefore, surface rupture should not be an issue.

Table 2 – Faults

Fault	Minimum distance to project kilometers (miles)	MCE
Cascade	2.17 (1.35)	6.9
San Andreas (Peninsula Section)	12.28 (7.63)	7.9

Liquefaction

Liquefaction, according to the Association of Bay Area Government (ABAG), is considered to be moderate for this site location. No ground water was encountered during our subsoil investigation. The Association of Bay Area Government (ABAG) map for Liquefaction is attached.

Groundwater

No groundwater was encountered during our recent soil exploration. Seasonal fluctuations of water table may occur as seasons are changed. However, water level at Stevens Creek, which is located approximately 300 west of the site, can be considered as the groundwater elevation. In the search of the old LOTBs, groundwater was found at 85/237 junction at 60 feet elevation, 2000 feet north of the site. Our recent field investigations (from EB Route 237 to NB Route 85 on-ramp) indicate a ground water table between 27' and 35'which is very close to the Stevens creek.

Landslides

The flat area of flood plain and fan deposits are typically not prone to landslides. The ABAG map for landslides is attached.

5. SUBSURFACE INVESTIGATIONS AND SOIL CONDITIONS

The subsurface exploration was performed by Office of Geotechnical Design West (OGDW) in June 2011 consisted of two exploratory soil borings drilled to a maximum depths of 46 ½ feet below the existing ground surface. The borings was drilled with Mobil B-47 truck mounted drilling rig using an 3.8 inches I.D. continuous flight hollow stem auger with hammer efficiency of 57%. Soil samples were taken in every five (5') feet intervals and Standard Penetration Test (SPT) and Pocket Penetrometer (PP) test was performed during field logging. Soil classification was based on the current edition (2010 edition) of Caltrans "Soil and Rock Logging, Classification and Presentation Manual"

The soils encountered in the exploratory borings were consists of up to 5' of fill. Native soils encountered below fills are described as Sandy Silts or Silts (ML) at various depths. Pocket penetrometer (PP) results shows that the consistencies of cohesive soils varies between medium stiff to very stiff at various depth (PP 0.75 tsf to 3.7 tsf). A dense to very dense (blow count range between 14 and 62) layer of cohesionless granular soils (Sand and Gravels) were encountered between 30 ft and 45 ft. No groundwater was encountered at these two boring locations. Log of Test Borings (LOTBs) will be forward to you upon completion. Summary of LOTBs are given below in Table-1.

Table-1

Boring I.D.	Total Depth (ft)	Date of Completion	Hammer Efficiency (%)
A-11-001	46 ½	06-14-2011	57
A-11-002	41 ½	06-15-2011	57

6. CORROSION EVALUATION

One soil sample was collected from Boring #A-11-002 at a depth of 8 ft-10 ft for corrosion evaluation and sends to District 4 laboratory in San Fransisco. Corrosion test was performed by using California Test Method 643. Laboratory test result indicates that the site is in a relatively non-corrosive environment as pH and resistivity is greater than 500 and 1000 ohm-cm respectively.

pH	Resitivity (ohm-cm)
6.8	1566

7. FOUNDATION RECOMMENDATIONS

Earth Pressure

The wall should be designed for the following:
For *Active Pressure* against the wall, use the following:

Between 0 ft and 7 ft depth (Dredge Line)

- Internal Friction Angle φ =28°, C=0 & Moist unit weight γ =125 pcf
- For earth pressure distribution, use a triangular pressure distribution.
- A rectangular pressure diagram from top of the wall to a depth of 10 ft. for traffic surcharge equivalent to about 2 ft. of fill.
- The wall shall be capable of resisting an additional seismic uniform earth pressure estimated to be equal to 20H psf.

Passive Pressure (Below Dredge Line)

Between 7 ft and 30 ft depth

- Internal Friction Angle ϕ=20°, C=1000 psf & Moist unit weight γ= 115 pcf

Between 30 ft and 46 ft depth

- Internal Friction Angle ϕ=36°, C=0 psf & Moist unit weight γ= 130 pcf

Vertical CIDH Pile Capacities and Penetration Depth

SD provide us the 16 inches dia. CIDH pile will be used @ 7 ft spacing.
The ultimate vertical compression and tension capacities of piles may be calculated by using the following design parameters:

Use a unit pile shaft friction of 1.0 ksf per unit surface area of the pile length below the dredge line of the wall.

Use 60% of the compression shaft resistance values mentioned above to calculate the ultimate tension (uplift) resistance of the pile.

For ultimate pile tips compression, use bearing capacity of 12.5 ksf per unit tip.

The above recommendations are based on parameters established by our field exploration and engineering judgements.

8. CONSTRUCTION CONSIDERATIONS

Groundwater was not encountered in our borings at the time of drilling. However, there is possibility that groundwater may be encountered during drilling some of the piles at the low areas (near the beginning of the wall). The contractor should be prepared for dewatering during drilling holes for CIDH piles

If you have any questions, please contact Suja Ahmed at (510) 286-4752, Samuel Awad at 510-622-5443 or Hooshmand Nikoui at (510) 286-4811.

c: TJPokrywka, HNikoui, Daily File, Route File

SAhmed/mm

REGISTERED PROFESSIONAL ENGINEER
SAMUEL AWAD
No. 64589
Exp. 6/30/13
CIVIL
STATE OF CALIFORNIA

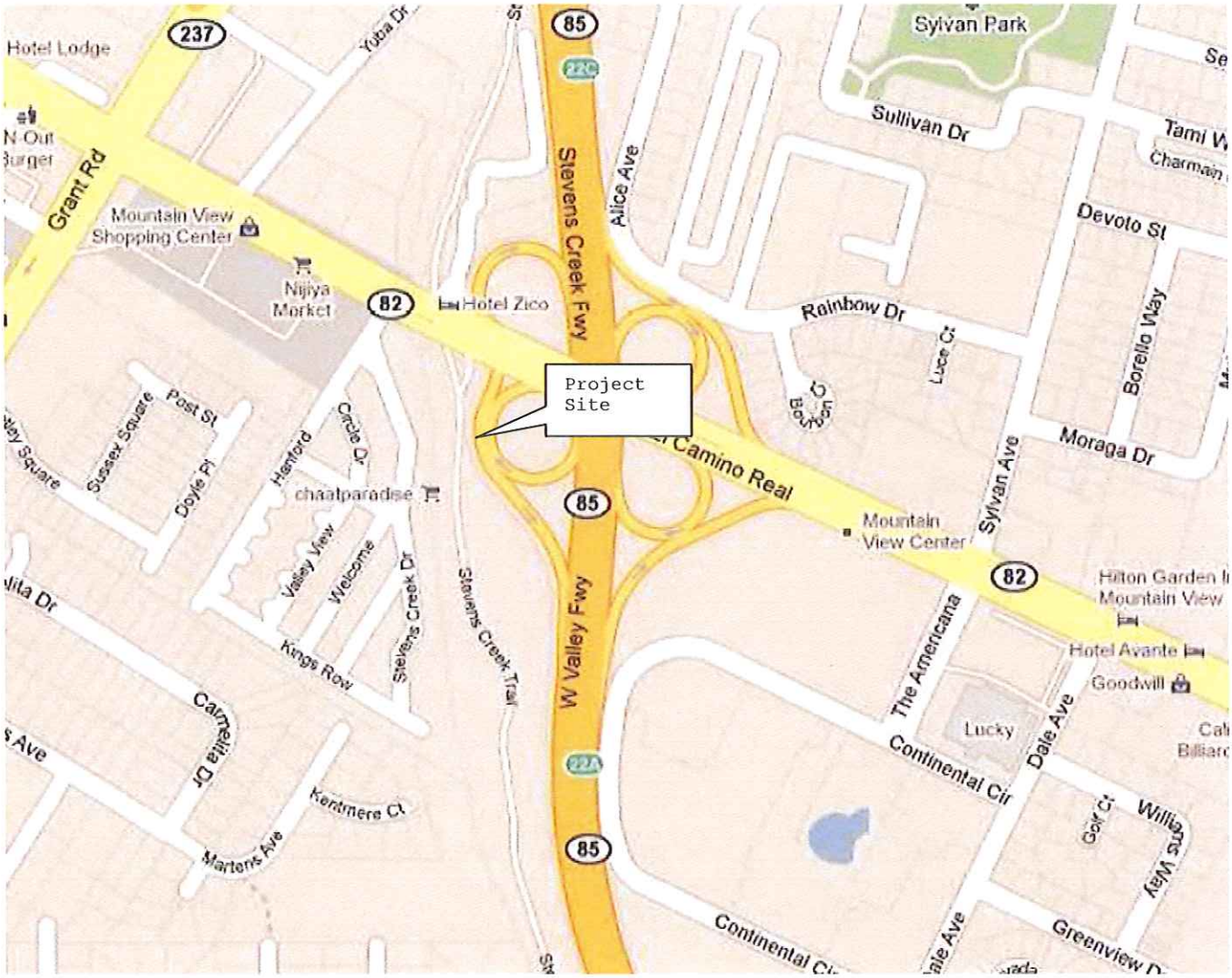
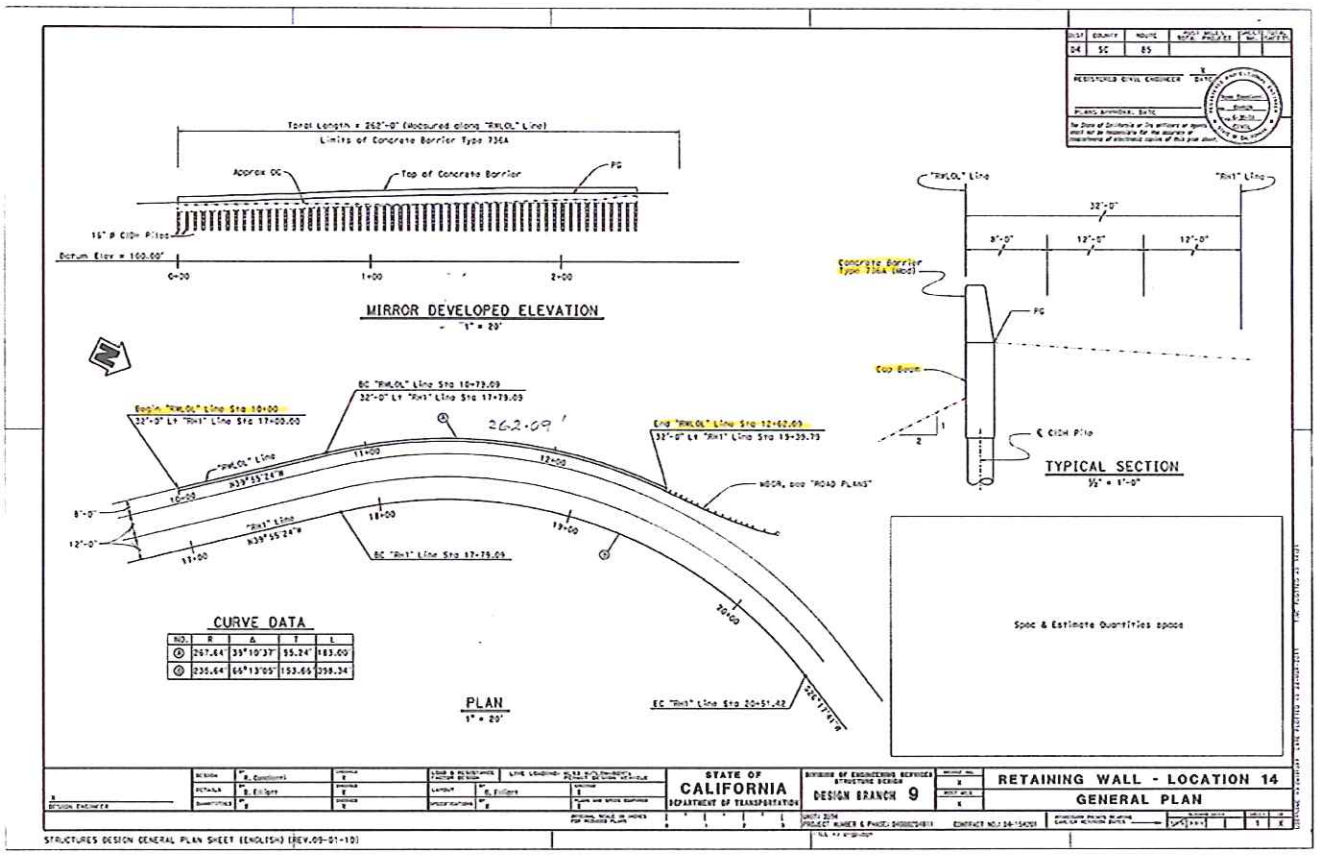


Fig. 1. Location Proposed Retaing Wall


MIRROR DEVELOPED ELEVATION
PLAN
TYPICAL SECTION
CURVE DATA
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DESIGN BRANCH 9
RETAINING WALL - LOCATION 14
GENERAL PLAN
STRUCTURES DESIGN GENERAL PLAN SHEET (ENGLISH) (REV.09-01-10)

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C047-085-12T

DEPARTMENT OF TRANSPORTATION
NAME OF TUNNEL OR MINE AND COMPANY NAME

of PO Box 23660, Oakland, CA 94623
MAILING ADDRESS

at SUNNYVALE RAMP METERING
LOCATION

has been classified as ***POTENTIALLY GASSY with Special Conditions***
CLASSIFICATION

as required by the California Labor Code § 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 22 feet deep drilled shaft (Changeable Message Sign) located on Highway 85 Southbound (PM 21.2), approximately 0.5 miles south of the intersection of Highway 85 and Highway 82, Sunnyvale, Santa Clara County.

This classification shall be conspicuously posted at the place of employment.

Date October 20, 2011

John R. Leahy, Senior Engineer