FOR CONTRACT NO.: **03-1C12U4**

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FOR 65TH STREET UC (WIDEN), Br. No.
24-0328, DATED JULY 27, 2009

ROUTE: 03-Sac-50-R0.6/17.4

AERIALLY DEPOSITED LEAD AND BRIDGE SURVEY SITE INVESTIGATION REPORT

State Route 50 Ramp Meters Project
Sacramento County, California

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 3
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MARYSVILLE, CALIFORNIA 95901

Caltrans

PREPARED BY:

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GEOCON

GEOCON PROJECT NO. S9300-06-91
TASK ORDER NO. 91, EA 03-1C1201

JANUARY 2010

Project No. S9300-06-91
January 13, 2010

Mr. Rajive Chadha
California Department of Transportation - District 3
Environmental Engineering Office
P.O. Box 911
Marysville, California 95901

Subject: STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA
CONTRACT NO. 03A1368, TASK ORDER NO. 91, EA 03-1C1201
AERIALLY DEPOSITED LEAD AND BRIDGE SURVEY SITE INVESTIGATION REPORT

Dear Mr. Chadha:

In accordance with California Department of Transportation (Caltrans) Contract No. 03A1368, Task Order Number 91, and Expense Authorization 03-1C1201, Geocon Consultants, Inc. has performed environmental engineering services for the subject project. The Site consists of Caltrans onramps along State Route 50 from Post Miles 0.6 to 16.9 in Sacramento County, California. The accompanying report summarizes the services performed, including the advancement of 96 direct-push and 50 hand-auger borings for soil sampling for aerially deposited lead testing, traffic stripe paint sampling, and asbestos-containing materials and lead-containing paint surveys.

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.

Please contact us if there are any questions concerning the contents of this report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

Gemma G. Reblando
Project Geologist

John E. Juhrend, PE, CEG
Project Manager

GGR:JEJ:krh

(5 + 3 CDs) Addressee

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AERIALLY DEPOSITED LEAD SITE INVESTIGATION REPORT

1.0 INTRODUCTION

This Aerially Deposited Lead (ADL) Site Investigation report for the State Route 50 (SAC-50) Ramp Meters project was prepared by Geocon Consultants, Inc. under California Department of Transportation (Caltrans) Contract No. 03A1368, Task Order (TO) Number 91, and Expense Authorization (EA) 03-1C1201.

1.1 Project Description and Proposed Improvements

The project area consists of eight onramps along eastbound (EB) SAC-50 between Stockton Boulevard and Folsom Boulevard located between Post Miles (PM) 0.6 to 16.9 (the Site), in Sacramento County, California. Caltrans proposes to improve the existing roadway, and eight onramps will be affected including those at Stockton Boulevard, 65th Street, Bradshaw Road, Hazel Avenue and Folsom Boulevard. The approximate project location is depicted on the Vicinity Map, Figure 1. The approximate sample locations are depicted on the Site Plans, Figures 2-1 through 2-5.

1.2 General Objectives

The purpose of the scope of services outlined in TO No. 91 was to evaluate whether impacts due to aerial lead deposition from motor vehicle exhaust exist in the surface and near surface soils within the project boundaries and to evaluate the yellow paint stripe for lead content. We also performed asbestos-containing material (ACM) and lead-containing paint (LCP) surveys on Bridges 24-0318 (65th Street Bridge) and 24-0120 (Natoma Overhead Bridge) located along SAC-50. The *Asbestos and Lead-containing Paint Survey Report* is presented in Appendix A.

The investigative results will be used by Caltrans to inform the construction contractor(s) if lead-impacted soil is present within the project boundaries for health, safety and soil management/disposal purposes.

2.0 BACKGROUND

2.1 Potential Lead Soil Impacts

Ongoing testing by Caltrans throughout California has indicated that ADL exists along major freeway routes due to emissions from vehicles powered by leaded gasoline.

2.2 Potential Lead-based Traffic Stripe Paint Impacts

Yellow traffic stripe paint utilized by Caltrans may contain lead. The potential presence of elevated lead requires sampling and analytical testing of the paint stripe materials to determine appropriate health and safety procedures and proper management and disposal practices. Disposal of removed

traffic stripe paint materials is dependent on the method utilized to remove these materials (i.e. focused stripe removal vs. pavement grinding).

2.3 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 may have 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 TTLC value for lead is 1,000 milligrams per kilogram (mg/kg). The STLC and TCLP values for lead are both 5.0 milligrams per liter (mg/l).

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 corrosivity. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

The Department of Toxic Substances Control (DTSC) regulates and interprets hazardous waste laws in California. DTSC generally considers excavated or transported materials that exhibit "hazardous waste" characteristics to be a "waste" requiring proper management, treatment and disposal. Soil that contains lead above hazardous waste thresholds and is left in-place would not be necessarily classified by DTSC as a "waste." The DTSC has provided site-specific determinations that "movement of wastes within an area of contamination does not constitute "land disposal" and, thus, does not trigger hazardous waste disposal requirements." Therefore, lead-impacted soil that is scarified in-place, moisture-conditioned, and recompacted during roadway improvement activities might not be considered a "waste." DTSC should be consulted to confirm waste classification. It is noted that in addition to DTSC regulations, health and safety requirements and other local agency requirements may also apply to the handling and disposal of lead-impacted soil.

2.4 DTSC Variance

The DTSC issued a statewide Variance effective July 1, 2009, regarding the reuse of ADL-impacted soils within Caltrans right-of-way. Under the Variance, soil that is classified as a non-RCRA hazardous waste, based primarily on ADL content, may be suitable for reuse within Caltrans right-of-way. ADL soil that is classified as a RCRA hazardous waste is not eligible for reuse under the Variance and must be disposed of as a RCRA hazardous waste (Caltrans Type Z3).

ADL soil reused under the Variance must always be at least 5 feet above the highest groundwater elevation and, depending on lead concentrations, must be covered with at least one foot of non-hazardous soil or a pavement structure. The ADL soil may not be placed in areas where it might contact groundwater or surface water (such as streams and rivers), and must be buried in locations that are protected from erosion that may result from storm water run-on and run-off.

Review of the statewide Variance indicates the following conditions regarding the reuse and management of ADL-impacted soil as fill material for construction and maintenance operations. If ADL soil meets the Variance criteria but is not intended to be reused within Caltrans right-of-way, then the excavated soil must be disposed of as a California hazardous waste (Caltrans Type Z2). A copy of the DTSC Variance is presented in Appendix B.

Caltrans Type Y1

ADL soil exhibiting a total lead concentration less than or equal to 1,411 mg/kg, a soluble lead concentration (based on a modified WET using deionized water as the extractant [DI-WET]) less than or equal to 1.5 mg/l, and a pH value greater than or equal to 5.5 may be reused within the same Caltrans corridor and must be covered with at least one foot of non-hazardous soil.

Caltrans Type Y2

ADL soil exhibiting a total lead concentration less than or equal to 1,411 mg/kg, a DI-WET soluble lead concentration less than or equal to 1.5 mg/l, and a pH value greater than 5 and less than 5.5 may be reused within the same Caltrans corridor and must be covered and protected from infiltration by a pavement structure.

ADL soil exhibiting a total lead concentration less than or equal to 1,411 mg/kg, a DI-WET soluble lead concentration greater than 1.5 mg/l and less than or equal to 150 mg/l, and a pH value greater than 5 may be reused within the same Caltrans corridor and must be covered and protected from infiltration by a pavement structure.

ADL soil exhibiting a total lead concentration greater than 1,411 mg/kg and less than or equal to 3,397 mg/kg, a DI-WET (using deionized water as the extractant) soluble lead concentration less than or

equal to 150 mg/l, and a pH value greater than 5 may be reused within the same Caltrans corridor and must be covered and protected from infiltration by a pavement structure.

Caltrans Type Z2

ADL soil exhibiting a total lead concentration greater than 3,397 mg/kg, a DI-WET soluble lead concentration greater than 150 mg/l, or a pH value less than or equal to 5 is not eligible for reuse under the Variance and must be disposed of as a California hazardous waste.

Caltrans Type Z3

ADL soil exhibiting a TCLP soluble lead concentration greater than or equal to 5.0 mg/l is not eligible for reuse under the Variance and must be disposed of as a RCRA hazardous waste.

3.0 SCOPE OF SERVICES

We performed the following scope of services as requested by Caltrans in TO No. 91:

3.1 Pre-field Activities

- Conducted a TO meeting on May 27, 2009, to discuss the TO scope of services. Caltrans TO Manager Rajive Chadha and Maintenance Supervisor Ben Ramirez and Geocon representative Michael O'Brien attended the meeting. The purpose of the TO meeting was to observe the project boundaries and conditions and identify Caltrans irrigation lines. The project limits were further outlined in white paint for subsequent utility clearance.
- Prepared a *Health and Safety Plan* dated June 5, 2009, to provide guidelines on the use of personal protective equipment and the health and safety procedures implemented during the field activities.
- Provided 48-hour notification to Underground Service Alert prior to job site mobilization (Ticket Nos. 159268, 159301, 159317, 159334, 159355, 377858, 377899 and 377948).
- Retained the services of Advanced Technology Laboratories (ATL) to perform the chemical analysis of soil and traffic stripe paint samples.
- Retained the services of EMSL Analytical, Inc. to perform the asbestos analysis of the samples.

3.2 Field Activities

On June 15 and 16, 2009, we collected 260 soil samples for lead analysis from 96 direct-push borings. The soil borings were excavated to an approximate maximum depth of 3.0 feet. Soil samples were collected at general depths of 0.0 to 1.0 foot, 1.0 to 2.0 feet and 2.0 to 3.0 feet.

Additionally, we performed an ACM and LCP survey of Bridges 24-0318 (65th Street Bridge) and 24-0120 (Natoma Overhead Bridge). The *Asbestos and Lead-containing Paint Survey Report* is presented in Appendix A.

We collected eight yellow traffic stripe paint samples (PC1 through PC8) at the Caltrans designated sampling locations.

We performed additional soil sampling on December 22, 2009, along the onramp of EB SAC-50 at Stockton Boulevard and along the slip onramp of EB SAC-50 at 65th Street. We collected 50 surface soil samples from a depth interval of 0.0 to 0.5 foot from 50 hand-auger borings.

Following sample collection, the borings were backfilled with the soil cuttings. Details of the field activities are presented in the following sections.

4.0 INVESTIGATIVE METHODS

4.1 Boring Location Rationale

The following soil boring locations were designated by Caltrans in the vicinity of proposed improvements. The approximate boring locations are depicted on Figures 2-1 through 2-5.

- Borings B1 through B12 and HA1 through HA15 were advanced along the onramp of EB SAC-50 at Stockton Boulevard (Figure 2-1);
- Borings B13 through B22 were advanced along the loop onramp of EB SAC-50 at 65th Street (Figure 2-2);
- Borings B23 through B31, B33 and HA16 through HA50 were advanced along the slip onramp of EB SAC-50 at 65th Street (Figure 2-2);
- Borings B34, B35 through B40 and B53 through B56 were advanced along the loop onramp of EB SAC-50 at Bradshaw Road (Figure 2-3);
- Borings B41 through B45 and B57 through B64 were advanced along the slip onramp of EB SAC-50 at Bradshaw Road (Figure 2-3);
- Borings B46 through B52 and B78 through B82 were advanced along the slip onramp of EB SAC-50 at Hazel Avenue (Figure 2-4);
- Borings B65 through B77 were advanced along the loop onramp of EB SAC-50 at Hazel Avenue (Figure 2-4); and
- Borings B83 through B97 were advanced along the onramp of EB SAC-50 at Folsom Boulevard (Figure 2-5);

Refusal was encountered in several borings at depths between 1.0 and 3.0 feet.

The coordinates of the boring locations were determined using a differential global positioning system (GPS). The GPS was utilized during the field activities to locate the horizontal position of each location with an error of no more than 3.0 feet. The latitude and longitude of the boring locations are summarized in Table 1.

4.2 Aerially Deposited Lead Soil Sampling Procedures

A total of 310 soil samples were collected from 96 direct-push and 50 hand-auger borings excavated at the Site. Soil samples obtained from the borings were collected in cellulose thermoplastic (acetate) liners driven by the direct-push rig. The acetate liners were cut to separate the sample by depth, then the sample from a particular interval was opened and the soil sample was transferred to a Ziploc® re-sealable plastic bag. Soil samples obtained using a hand-auger were transferred directly from the hand-auger to Ziploc® re-sealable plastic bags. The soil samples were field homogenized within the sample bags and subsequently labeled, placed in an ice chest, and delivered to ATL for analytical testing under chain-of-custody (COC) documentation.

Quality assurance/quality control (QA/QC) procedures were performed during the field exploration activities. These procedures included decontamination of sampling equipment before each boring was advanced and providing COC documentation for each sample submitted to the laboratory. The soil sampling equipment was cleansed between each boring by washing the equipment with an Alconox™ solution followed by a double rinse with deionized water. The field sampling activities were performed under the supervision of Geocon's field manager.

The borings were backfilled with the excess soil cuttings. The decontamination water was discharged to the ground surface away from surface water bodies or storm drain inlets.

4.3 ACM and LCP Bridge Surveys

A total of 14 bulk samples of suspect ACM were collected from the bridges. The samples were collected after the material was wetted with a light mist of water. The samples were then cut from the substrate and transferred to a labeled Ziploc® re-sealable plastic bag. Sampling locations were distributed throughout the homogeneous area (spaces where the material was observed).

We did not observe painted surfaces on either bridge during our surveys; therefore, paint samples were not collected for lead analysis. The *Asbestos and Lead-containing Paint Survey Report* is presented in Appendix A.

4.4 Traffic Control

Caltrans provided traffic control, including the use of an attenuator truck, during the field sampling activities.

4.5 Laboratory Analyses

The samples collected within the project boundaries were submitted to ATL and EMSL for laboratory analyses.

4.5.1 Lead

The soil samples were submitted to ATL for the following analyses under five-day turn-around-time (TAT). The laboratory was instructed to homogenize the soil samples prior to analysis for lead in accordance with Contract 03A1368 requirements.

- Three hundred ten soil samples were analyzed for total lead following United States Environmental Protection Agency (EPA) Test Method 6010B.
- Forty-five soil samples with total lead concentrations greater than or equal to 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l) were further analyzed for WET soluble lead by EPA Test Method 7420 under 72-hour TAT.
- Forty-four soil samples with total lead concentrations greater than or equal to 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l) were further analyzed for DI-WET soluble lead by EPA Test Method 7420.
- Six soil samples with total lead concentrations greater than or equal to 1,000 mg/kg (TTLC value for lead) were further analyzed for TCLP soluble lead by EPA Test Method 1311.
- Twenty-two soil samples were analyzed for soil pH following EPA Test Method 9045.
- Eight traffic stripe paint chip samples were analyzed for total lead following United States Environmental Protection Agency (EPA) Test Method 6010B.
- Four traffic stripe paint samples with total lead concentrations greater than or equal to 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l) were further analyzed for WET soluble lead by EPA Test Method 7420 under standard ten-day TAT.

4.5.2 ACM Bridge Survey Samples

The 14 samples collected during the bridge survey were analyzed by EMSL for asbestos analysis in accordance with EPA Test Method 600/R-93/116 using polarized light microscopy (PLM) under COC protocol.

4.5.3 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 the spike made at ten times the reporting limit or at the analyte level.

Prior to submitting the soil samples to the laboratory, the COC documentation was reviewed for accuracy and completeness. Reproductions of the laboratory reports and COC documentation are presented in Appendix C.

5.0 FIELD OBSERVATIONS AND INVESTIGATIVE RESULTS

5.1 Soil Conditions

Soil encountered during the excavation of borings was generally comprised of gravelly sand to the maximum sampling depth of approximately 3.0 feet. Groundwater was not encountered in the soil borings.

5.2 ADL Soil Analytical Results

A summary of the soil analytical results are presented in Table 2. The laboratory reports and COC documentation are presented in Appendix C.

5.2.1 Stockton Boulevard Onramp

Total lead was detected in 41 of the 51 soil samples analyzed at concentrations ranging from 5.1 to 520 mg/kg. Twenty-four of the 51 soil samples had reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l).

Thirteen of the 24 samples with reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l) collected in June 2009 were analyzed for WET soluble lead. WET soluble lead was reported for 12 of the 13 soil samples at concentrations ranging from 2.7 to 43 mg/l. Eleven of the 13 soil samples had reported WET soluble lead concentrations greater than the STLC value for lead of 5.0 mg/l.

Eleven of the 24 samples with reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l) collected in December 2009 were analyzed for DI-WET soluble lead. DI-WET soluble lead was not detected in the eleven soil samples analyzed.

Soil pH values ranged from 7.0 to 7.7.

5.2.2 65th Street Onramp – Loop

Total lead was detected in 20 of the 30 soil samples analyzed at concentrations ranging from 5.0 to 620 mg/kg. Five of the 30 soil samples had reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l).

WET soluble lead was reported for each of the five soil samples analyzed at concentrations ranging from 3.8 to 48 mg/l. Four of the five soil samples had reported WET soluble lead concentrations greater than the STLC value for lead of 5.0 mg/l.

Soil pH value for soil sample B16-0 was 7.9.

5.2.3 65th Street Onramp – Slip

Total lead was detected in 58 of the 65 soil samples analyzed at concentrations ranging from 5.0 to 1,500 mg/kg. Forty-one of the 65 soil samples had reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l). Six soil samples had total lead concentrations greater than or equal to the lead TTLC of 1,000 mg/kg.

Eight of the 41 samples with reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l) collected in June 2009 were analyzed for WET soluble lead. WET soluble lead was reported for each of the eight soil samples analyzed at concentrations ranging from 3.2 to 48 mg/l. Seven of the eight soil samples had reported WET soluble lead concentrations greater than the STLC value for lead of 5.0 mg/l.

Thirty-three of the 41 samples with reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l) collected in December 2009 were analyzed for DI-WET soluble lead. DI-WET soluble lead was detected in seven of the 33 soil samples analyzed at concentrations ranging from 0.34 to 0.95 mg/l.

TCLP lead was reported for the six soil samples analyzed at concentrations ranging from 1.3 to 4.5 mg/l, less than the TCLP value for lead of 5.0 mg/l.

Soil pH values ranged from 4.7 to 8.1.

5.2.4 Bradshaw Road Onramp – Loop

Total lead was detected in 25 of the 32 soil samples analyzed at concentrations ranging from 5.5 to 56 mg/kg. One of the 32 soil samples had a reported total lead concentration greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l).

Soil pH value for soil sample B35-0 was 7.5.

5.2.5 Bradshaw Road Onramp – Slip

Total lead was detected in 38 of the 39 soil samples analyzed at concentrations ranging from 5.5 to 85 mg/kg. One of the 39 soil samples had a reported total lead concentration greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l).

Soil pH value for soil sample B42-2 was 8.2.

5.2.6 Hazel Avenue Onramp – Slip

Total lead was detected in 20 of the 26 soil samples analyzed at concentrations ranging from 12 to 390 mg/kg. Sixteen of the 26 soil samples had reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l).

WET soluble lead was reported for 15 of the 16 soil samples analyzed at concentrations ranging from 0.53 to 18 mg/l. Five of the 16 soil samples had reported WET soluble lead concentrations greater than the STLC value for lead of 5.0 mg/l.

Soil pH value for soil sample B49-0 was 7.8.

5.2.7 Hazel Avenue Onramp – Loop

Total lead was detected in 31 of the 32 soil samples analyzed at concentrations ranging from 5.7 to 87 mg/kg. Three of the 32 soil samples had reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l).

Soil pH value for soil sample B68-1 was 7.5.

5.2.8 Folsom Boulevard Onramp

Total lead was detected in 31 of the 35 soil samples analyzed at concentrations ranging from 5.4 to 720 mg/kg. Three of the 35 soil samples had reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l).

WET soluble lead was reported for each of the three soil samples analyzed at concentrations ranging from 2.0 to 35 mg/l. Two of the three soil samples had reported WET soluble lead concentrations greater than the STLC value for lead of 5.0 mg/l.

5.3 Traffic Stripe Paint Analytical Results

Total lead was detected in five of the eight traffic stripe paint samples at concentrations ranging from 46 to 820 mg/kg, less than the California hazardous waste threshold (TTLC) of 1,000 mg/kg for lead.

Four of the eight traffic stripe paint samples had reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l).

WET soluble lead was reported for each of the four traffic stripe paint samples analyzed at concentrations ranging from 0.29 to 7.4 mg/l. Only one of four traffic stripe paint samples (PC4) had a reported WET soluble lead concentration greater than the STLC value for lead of 5.0 mg/l.

The analytical results of the traffic stripe paint will be used by Caltrans to provide contractors with preliminary analytical data of the traffic stripe paint. The analytical results of the traffic stripe paint samples are summarized on Table 3. Laboratory reports and COC documentation are presented in Appendix C.

5.4 ACM Bridge Sample Analytical Results

Chrysotile asbestos at a concentration of 50% was detected in a sample representing nonfriable sheet packing used as shims on the barrier rail systems of Bridge 24-0318 (65th Street Bridge). We were not able to quantify the amount of sheet packing due to safety concerns (i.e., traffic).

Chrysotile asbestos at a concentration of 50% was detected in samples representing nonfriable sheet packing used as shims on the barrier rail systems of Bridge 24-120 (Natoma Overhead Bridge). We were not able to quantify the amount of sheet packing due to safety concerns (i.e., traffic).

Chrysotile asbestos at a concentration of 3% was detected in a sample representing nonfriable thread compound used on the barrier rail systems of Bridge 24-120 (Natoma Overhead Bridge). We were not able to quantify the thread compound due to safety concerns (i.e., traffic).

No asbestos was detected in samples of the remaining suspect materials collected during our survey. The *Asbestos and Lead-containing Paint Survey Report* is presented in Appendix A.

5.5 Laboratory Quality Assurance/Quality Control

We reviewed the laboratory QA/QC provided with the laboratory reports. Duplicates, Matrix Spikes, and Matrix Spike Duplicates were outside criteria for several samples. However, the analytical batch was validated by the Laboratory Control Sample. The case narrative additionally states that dilution was necessary for several samples due to sample matrix for method 7420. Based on the laboratory QA/QC data, no additional qualification of the data presented herein is necessary, and the data are of sufficient quality for the purposes of this report.

5.6 Statistical Evaluation for Lead Detected in Soil Samples

The total lead data for the samples collected at the Site were separated into eight sample populations for statistical evaluation as described below:

- Sample Population 'A' consists of soil samples collected from borings B1 through B12 and HA1 through HA15 located along the Stockton Boulevard onramp.
- Sample Population 'B' consists of soil samples collected from borings B13 through B22 located along the 65th Street loop onramp.
- Sample Population 'C' consists of soil samples collected from borings B23 through B31, B33 and HA16 through HA50 located along the 65th Street slip onramp.
- Sample Population 'D' consists of soil samples collected from borings B34 through B40 and B53 through B56 located along the Bradshaw Road loop onramp.
- Sample Population 'E' consists of soil samples collected from borings B41 through B45 and B57 through B64 located along the Bradshaw Road slip onramp.
- Sample Population 'F' consists of soil samples collected from borings B65 through B77 located along the Hazel Avenue loop onramp.
- Sample Population 'G' consists of soil samples collected from borings B46 through B52 and B78 through B82 located along the Hazel Avenue slip onramp.
- Sample Population 'H' consists of soil samples collected from borings B83 through B97 located along the Folsom Boulevard onramp.

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 soluble lead concentrations exists that would allow the prediction of soluble 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.

5.6.1 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 MRL, a value equal to one-half of the reporting limit was used in the UCL calculation. The bootstrap results for each sample population are included in Appendix D. The calculated UCLs and statistical results are summarized in the following tables:

Sample Population 'A' - Borings B1 through B12 and HA1 through HA15 (Stockton Boulevard Onramp)

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 1.0	200.0	210.3	163.5	9.2	520
1.0 to 2.0	32.8	37.6	18.2	2.5	150
2.0 to 3.0	18.7	20.4	12.3	2.5	68

Sample Population 'B' - Borings B13 through B22 (65th Street Onramp - Loop)

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 1.0	193.1	218.1	126.5	20	620
1.0 to 2.0	7.9	8.5	6.0	2.5	18
2.0 to 3.0	5.1	5.3	4.3	2.5	6.8

Sample Population 'C' - Borings B23 through B31, B33 and HA16 through HA50 (65th Street Onramp - Slip)

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 1.0	460.3	483.4	376.4	18	1,500
1.0 to 2.0	6.1	6.3	5.2	2.5	8.8
2.0 to 3.0	10.4	11.1	7.6	2.5	24

Sample Population 'D' - Borings B34 through B40 and B53 through B56
(Bradshaw Road Onramp - Loop)

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 1.0	21.7	23.1	16.8	2.5	43
1.0 to 2.0	16.7	17.5	13.3	2.5	24
2.0 to 3.0	17.9	19.8	11.4	2.5	56

Sample Population 'E' - Borings B41 through B45 and B57 through B64
(Bradshaw Road Onramp - Slip)

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 1.0	15.0	15.5	13.4	6.2	22
1.0 to 2.0	22.1	23.9	14.8	2.5	85
2.0 to 3.0	11.8	12.2	10.2	5.5	19

Sample Population 'F' - Borings B65 through B77
(Hazel Avenue Onramp - Loop)

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 1.0	42.2	45.0	33.1	5.7	87
1.0 to 2.0	22.2	23.4	17.9	5.8	41
2.0 to 3.0	15.8	17.0	11.4	2.5	38

Sample Population 'G' - Borings B46 through B52 and B78 through B82
(Hazel Avenue Onramp - Slip)

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 1.0	119.2	124.6	97.8	30	220
1.0 to 2.0	141.5	154.4	85.2	2.5	390
2.0 to 3.0	45.0	50.2	27.1	2.5	92

Sample Population 'H' - Borings B83 through B97
(Folsom Boulevard Onramp)

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 1.0	145.1	160.1	87.2	5.4	720
1.0 to 2.0	14.4	15.2	11.6	2.5	26
2.0 to 3.0	12.0	12.8	9.5	2.5	19

5.6.2 Correlation of Total and Soluble Lead

Total and corresponding WET soluble lead concentrations are bivariate data with a linear structure. This linear structure should allow for the prediction of WET soluble lead concentrations based on the UCLs calculated above in Section 5.6.1.

To estimate the degree of interrelation between total and corresponding WET soluble 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 coefficients* for the Stockton Boulevard onramp, 65th Street onramps, Hazel Avenue onramps and Folsom Boulevard onramp were calculated for the (*x*, *y*) data points (i.e., soil samples analyzed for both total lead [*x*] and WET soluble lead [*y*]). A *correlation coefficient* greater than or equal to 0.8 is an acceptable indicator that a correlation exists.

The *correlation coefficients* for Sample Populations A (Stockton Boulevard onramp), B/C (65th Street loop/slip onramps), F/G (Hazel Avenue loop/slip onramps) and H (Folsom Boulevard onramp) equaled 0.8489, 0.9119, 0.8486 and 0.9871, respectively, which indicate a good correlation between total lead and WET soluble lead data. To achieve an acceptable correlation for Sample Populations B/C (65th Street loop/slip onramps), the total and WET soluble lead data from sample B31-0 (190, 48) were excluded from the regression analysis. The excluded total and WET soluble lead data have the highest squared residual WET soluble lead value (presented in Appendix D). Consequently, excluding this data point from the regression yields an acceptable *correlation coefficient* greater than 0.8.

For the *correlation coefficient* that indicates a linear relationship between total and WET soluble 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 $y = 0.0952(x)$ for Sample Population A (Stockton Boulevard onramp), $y = 0.0601(x)$ for Sample Populations B and C (65th Street onramps), $y = 0.0397(x)$ for Sample Populations F and G (Hazel Avenue onramps) and $y = 0.0498(x)$ for Sample Population H (Folsom Boulevard onramp), where *x* represents total lead concentrations and *y* represents predicted WET soluble lead concentrations.

Regression line was not determined for Sample Populations D and E (Bradshaw onramps) since the calculated 90% and 95% total lead UCLs for these sample populations are less than 50 mg/kg.

These equations were used to estimate the expected WET soluble lead concentrations for the UCLs calculated in Section 5.6.1. Regression analysis results and a scatter plot depicting the (x, y) data points along with the regression lines are presented in Appendix D. The 90% and 95% UCL-predicted WET soluble lead concentrations are presented in Section 6.0.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Hazardous waste classification based on the 90% UCL is considered sufficient to satisfy a good faith effort as discussed in SW-846. Risk assessment characterization is typically based on the 95% UCL in accordance with the Risk Assessment Guidance for Superfund (RAGS) Volume 1 Documentation for Exposure Assessment. Per Caltrans, 90% UCLs are to be used to evaluate onsite reuse, and 95% UCLs are to be used to evaluate offsite reuse or disposal. In addition, the reuse of excavated soil at the Stockton Boulevard and 65th Street slip onramps was evaluated, as applicable, based on the DTSC requirements for the statewide Variance.

Based on the TCLP soluble lead result of less than 5.0 mg/l, soil generated at the Site will not require disposal as a RCRA hazardous waste. If soil within the project limits is scarified in-place, moisture-conditioned, and recompacted during roadway improvement activities, it may not be considered a "waste."

6.1 Stockton Boulevard Onramp – Borings B1 through B12 and HA1 through HA15

The table below summarizes the excavation scenarios, the UCL-predicted WET soluble lead calculations and the waste classification for excavated soil within this area based on the calculated total lead UCLs and the relationship between total and WET soluble lead.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	95% UCL Predicted WET Lead (mg/l)	Waste Classification
0.0 to 1.0 foot	200.0	**19.0**	210.3	**20.0**	**Hazardous**
Underlying soil (1.0 to 3.0 feet)	*25.8*	*2.5*	*29.0*	*2.8*	*Non-hazardous*
0.0 to 2.0 feet	116.4	**11.1**	124.0	**11.8**	**Hazardous**
Underlying soil (2.0 to 3.0 feet)	*18.7*	*1.8*	*20.4*	*1.9*	*Non-hazardous*
0.0 to 3.0 feet	83.8	**8.0**	89.4	**8.5**	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal
Predicted WET lead concentrations were calculated using the equation of the regression line: $y = 0.0952x$

Based on the above table, soil excavated from the surface to 1.0 foot and proposed for onsite reuse would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the STLC value for lead of 5.0 mg/l. Soil excavated from the surface to 1.0 foot may be reused onsite (as Caltrans Type Y1 material) in accordance with the DTSC Variance and must be covered by at least one foot of non-hazardous soil or a pavement structure since the DI-WET lead levels are less than 1.5 mg/l and the pH values are greater than 5.5. If the top 1.0 foot of excavated soil will not be reused onsite, then the excavated soil should be either (1) managed and

disposed of as a California hazardous waste since the 95% UCL-predicted WET lead concentration is greater than the STLC value for lead of 5.0 mg/l or (2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable.

Underlying soil (i.e., soil from depths of 1.0 to 3.0 feet) where excavated and managed separately would not be classified as a California hazardous waste and can be reused onsite or disposed of as non-hazardous soil since the 90% and 95% UCL-predicted WET lead concentrations are less than the STLC value for lead of 5.0 mg/l.

6.2 65th Street Onramp (Loop) – Borings B13 through B22

The table below summarizes the excavation scenarios, the UCL-predicted WET soluble lead calculations and the waste classification for excavated soil within this area based on the calculated total lead UCLs and the relationship between total and WET soluble lead.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	95% UCL Predicted WET Lead (mg/l)	Waste Classification
0.0 to 1.0 foot	193.1	**11.6**	218.1	**13.1**	**Hazardous**
Underlying soil (1.0 to 3.0 feet)	*6.5*	*0.4*	*6.9*	*0.4*	*Non-hazardous*
0.0 to 2.0 feet	100.5	**6.0**	113.3	**6.8**	**Hazardous**
Underlying soil (2.0 to 3.0 feet)	*5.1*	*0.3*	*5.3*	*0.3*	*Non-hazardous*
0.0 to 3.0 feet	68.7	4.1	77.3	4.6	Non-hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal
Predicted WET lead concentrations were calculated using the equation of the regression line: $y = 0.0601x$

Based on the above table, soil generated from excavations to 3.0 feet would not be classified as a California hazardous waste since the 90% and 95% UCL-predicted WET soluble lead concentrations are less than the lead STLC of 5.0 mg/l. Consequently, if the top 3.0 feet of soil is excavated as a whole, then soil generated from the top 3.0 feet could be reused or disposed of as non-hazardous soil with respect to lead content.

If excavation is 2.0 feet or shallower in depth, then soil generated from the top 2.0 feet would be classified as a California-hazardous waste since the 90% and 95% UCL-predicted WET soluble lead concentrations are greater than the STLC value for lead of 5.0 mg/l. Consequently, the top 2.0 feet of excavated soil should be either (1) managed and disposed of as a California-hazardous waste or (2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable.

The reuse of excavated soil from the top 2.0 feet was not evaluated based on the DTSC Variance due to lack of DI-WET soluble lead data for the soil samples collected at this location.

6.3 65th Street Onramp (Slip) – Borings B23 through B31, B33 and HA16 through HA50

The table below summarizes the excavation scenarios, the UCL-predicted WET soluble lead calculations and the waste classification for excavated soil within this area based on the calculated total lead UCLs and the relationship between total and WET soluble lead.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	95% UCL Predicted WET Lead (mg/l)	Waste Classification
0.0 to 1.0 foot	460.3	**27.7**	483.4	**29.1**	**Hazardous**
Underlying soil (1.0 to 3.0 feet)	*8.3*	*0.5*	*8.7*	*0.5*	*Non-hazardous*
0.0 to 2.0 feet	233.2	**14.0**	244.9	**14.7**	**Hazardous**
Underlying soil (2.0 to 3.0 feet)	*10.4*	*0.6*	*11.1*	*0.7*	*Non-hazardous*
0.0 to 3.0 feet	158.9	**9.6**	166.9	**10.0**	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal
Predicted WET lead concentrations were calculated using the equation of the regression line: $y = 0.0601x$

Based on the above table, soil excavated from the surface to 1.0 foot and proposed for onsite reuse would be classified as a California hazardous waste since the 90% UCL-predicted WET lead concentration is greater than the STLC value for lead of 5.0 mg/l. Soil excavated from the surface to 1.0 foot may be reused onsite (as Caltrans Type Y1 material) in accordance with the DTSC Variance and must be covered by at least one foot of non-hazardous soil or a pavement structure since the DI-WET lead levels are less than 1.5 mg/l and the average pH is 6.3. If the top 1.0 foot of excavated soil will not be reused onsite, then the excavated soil should be either (1) managed and disposed of as a California hazardous waste since the 95% UCL-predicted WET lead concentration is greater than the STLC value for lead of 5.0 mg/l or (2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable.

Underlying soil (i.e., soil from depths of 1.0 to 3.0 feet) where excavated and managed separately would not be classified as a California hazardous waste and can be reused onsite or disposed of as non-hazardous soil since the 90% and 95% UCL-predicted WET lead concentrations are less than the STLC value for lead of 5.0 mg/l.

6.4 Bradshaw Road Onramp (Loop) – Borings B34 through B40 and B53 through B56

Soil materials excavated to the maximum sampling depth of 3.0 feet within this area can be reused onsite or disposed of as non-hazardous soil since the calculated 90% and 95% total lead UCLs are less than 50 mg/kg.

6.5 Bradshaw Road Onramp (Slip) – Borings B41 through B45 and B57 through B64

Soil materials excavated to the maximum sampling depth of 3.0 feet within this area can be reused onsite or disposed of as non-hazardous soil since the calculated 90% and 95% total lead UCLs are less than 50 mg/kg.

6.6 Hazel Avenue Onramp (Slip) – Borings B46 through B52 and B78 through B82

The table below summarizes the excavation scenarios, the UCL-predicted WET soluble lead calculations and the waste classification for excavated soil within this area based on the calculated total lead UCLs and the relationship between total and WET soluble lead.

Excavation Depth	**90% UCL Total Lead (mg/kg)**	**90% UCL Predicted WET Lead (mg/l)**	**95% UCL Total Lead (mg/kg)**	**95% UCL Predicted WET Lead (mg/l)**	**Waste Classification**
0.0 to 1.0 foot	119.2	4.7	124.6	4.9	*Non-hazardous*
Underlying soil (1.0 to 3.0 feet)	*93.3*	*3.7*	*102.3*	*4.1*	*Non-hazardous*
0.0 to 2.0 feet	130.4	**5.2**	139.5	**5.5**	**Hazardous**
Underlying soil (2.0 to 3.0 feet)	*45.0*	*1.8*	*50.2*	*2.0*	*Non-hazardous*
0.0 to 3.0 feet	101.9	4.0	109.7	4.4	*Non-hazardous*

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal
Predicted WET lead concentrations were calculated using the equation of the regression line: $y = 0.0397x$

Based on the above table, soil generated from excavations to 3.0 feet would not be classified as a California hazardous waste since the 90% and 95% UCL-predicted WET soluble lead concentrations are less than the lead STLC of 5.0 mg/l. Consequently, if the top 3.0 feet of soil is excavated as a whole, then soil generated from the top 3.0 feet could be reused or disposed of as non-hazardous soil with respect to lead content.

If excavation is 1.0 foot in depth, then soil generated from excavations to 1.0 foot would not be classified as a California-hazardous waste and can be reused onsite or disposed of as non-hazardous soil since the 90% and 95% UCL-predicted WET soluble lead concentrations are less than the STLC value for lead of 5.0 mg/l.

If excavation is 2.0 feet in depth, then soil generated from excavations to 2.0 feet would be classified as a California-hazardous waste since the 90% and 95% UCL-predicted WET soluble lead concentrations are greater than the STLC value for lead of 5.0 mg/l. Consequently, soil generated from excavations to 2.0 feet should be either (1) managed and disposed of as a California-hazardous waste or (2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable.

The reuse of excavated soil from excavations to 2.0 feet was not evaluated based on the DTSC Variance due to lack of DI-WET soluble lead data for the soil samples collected at this location.

6.7 Hazel Avenue Onramp (Loop) – Borings B65 through B77

Soil materials excavated to the maximum sampling depth of 3.0 feet within this area can be reused onsite or disposed of as non-hazardous soil since the calculated 90% and 95% total lead UCLs are less than 50 mg/kg.

6.8 Folsom Boulevard Onramp – Borings B83 through B97

The table below summarizes the excavation scenarios, the UCL-predicted WET soluble lead calculations and the waste classification for excavated soil within this area based on the calculated total lead UCLs and the relationship between total and WET soluble lead.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	95% UCL Predicted WET Lead (mg/l)	Waste Classification
0.0 to 1.0 foot	145.1	**7.2**	160.1	**8.0**	**Hazardous**
Underlying soil (1.0 to 3.0 feet)	*13.2*	*0.7*	*14.0*	*0.7*	*Non-hazardous*
0.0 to 2.0 feet	79.8	4.0	87.7	4.4	Non-hazardous
Underlying soil (2.0 to 3.0 feet)	*12.0*	*0.6*	*12.8*	*0.6*	*Non-hazardous*
0.0 to 3.0 feet	57.2	2.8	62.7	3.1	Non-hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal
Predicted WET lead concentrations were calculated using the equation of the regression line: $y = 0.0498x$

Based on the above table, soil excavated from the top 2.0 to 3.0 feet would not be classified as a California hazardous waste since the 90% and 95% UCL-predicted WET soluble lead concentrations are less than the lead STLC of 5.0 mg/l. Consequently, the top 2.0 to 3.0 feet of excavated soil could be reused or disposed of as non-hazardous soil with respect to lead content.

If excavation is 1.0 foot or shallower in depth, then soil generated from the top 1.0 foot would be classified as a California-hazardous waste since the 90% and 95% UCL-predicted WET soluble lead

concentrations are greater than the STLC value for lead of 5.0 mg/l. Consequently, the top 1.0 foot of excavated soil should be either (1) managed and disposed of as a California-hazardous waste or (2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable.

The reuse of excavated soil from the top 1.0 foot was not evaluated based on the DTSC Variance due to lack of DI-WET soluble lead data for the soil samples collected at this location.

6.9 Traffic Paint Samples

The yellow traffic stripe paint was sampled per Caltrans' request since it may be removed from the underlying asphalt concrete by grinding or sand blasting, which would create a paint waste stream. The analytical results of the traffic stripe paint will be used by Caltrans to provide contractors with preliminary analytical data of the traffic stripe paint.

The highest reported concentration of total lead for the yellow traffic stripe paint samples was 820 mg/kg, less than the TTLC value for lead of 1,000 mg/kg. The yellow traffic stripe paint at the Site will not require disposal as a RCRA hazardous waste. The reported WET soluble lead levels for the traffic stripe paint samples ranged from 0.29 to 7.4 mg/l (PC4). Since one of the traffic stripe paint samples (PC4) collected at the Bradshaw Road loop onramp had a WET soluble lead concentration greater than the STLC value for lead of 5.0 mg/l, the yellow traffic stripe paint may require disposal as a California hazardous waste. Analytical testing of the yellow traffic stripe paint waste stream would be required to determine appropriate disposal options.

6.10 ACM Bridge Surveys

NESHAP regulations do not require that asbestos-containing sheet packing or thread compound (Category I nonfriable/nonhazardous materials) identified during our survey be removed prior to demolition or be treated as hazardous waste. However, the disturbance of these materials is still covered by the Cal/OSHA asbestos standard (Title 8, CCR Section 1529). We recommend that a licensed contractor registered with Cal/OSHA for asbestos-related work perform any activities that would disturb the materials. Contractors are responsible for informing the landfill of the contractor's intent to dispose of asbestos waste. Some landfills may require additional waste characterization. Contractors are responsible for segregating and characterizing waste streams prior to disposal.

Geocon also recommends the notification of contractors (that will be conducting renovation or related activities) of the presence of asbestos in their work areas (i.e., provide contractor[s] with a copy of this report and a list of asbestos removed during subsequent activities). Contractors not trained for asbestos work should be instructed not to disturb asbestos during their activities.

Written notification to U.S. EPA Region IX and the California Air Resources Board 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.

6.11 Worker Protection

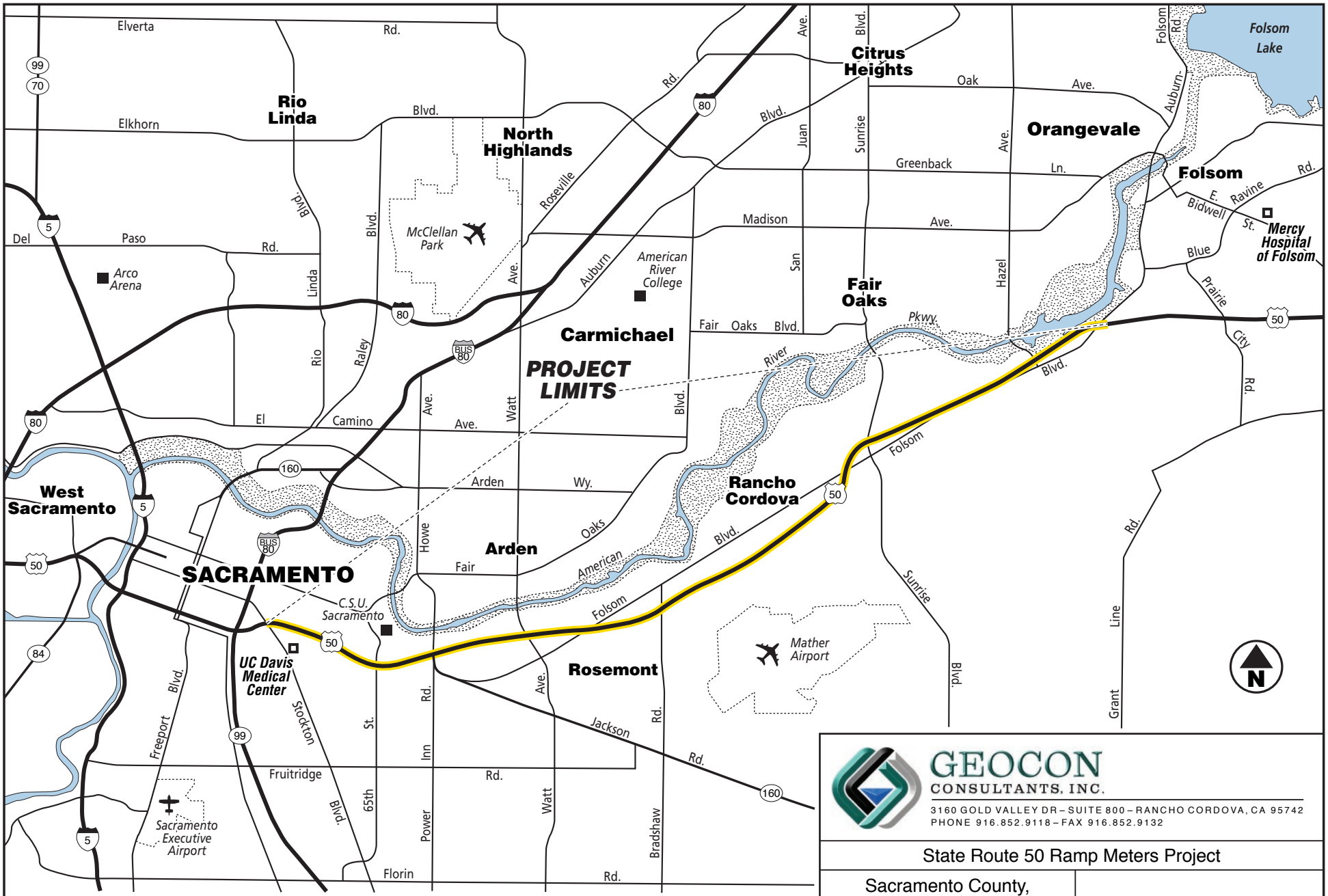
Per Caltrans' requirements, the contractor(s) should prepare a project-specific Lead Compliance Plan (CCR Title 8, Section 1532.1, the "Lead in Construction" standard) to minimize worker exposure to lead-impacted soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of lead-impacted soil.

Since material at the Site contains lead and according to Caltrans, removal of the yellow traffic stripe paint may produce toxic waste materials, we recommend that a health and safety plan be prepared to minimize worker exposure. The health and safety plan should include a discussion of the constituents of concern, routes of exposure, permissible exposure limits, and personal protective measures. The health and safety plan should be reviewed and signed by the onsite construction workers prior to any field activities. We also recommend that contractors on the Site grinding asphalt which has been coated with yellow traffic stripe paint prepare a dust control plan. The dust control plan should include dust mitigation and monitoring procedures.

7.0 REPORT LIMITATIONS

This report has been prepared exclusively for Caltrans. 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. We 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.



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State Route 50 Ramp Meters Project

Sacramento County, California

VICINITY MAP

GEOCON Proj. No. S9300-06-91

Task Order No. 91 | January 2010 | Figure 1

LEGEND:

HA1 ⊕ Approximate ADL Boring Location (December 2009)

B1 ⊗ Approximate ADL Boring Location (June 2009)

PC1 ▲ Approximate Paint Chip Sample Location

0 100

Scale in Feet

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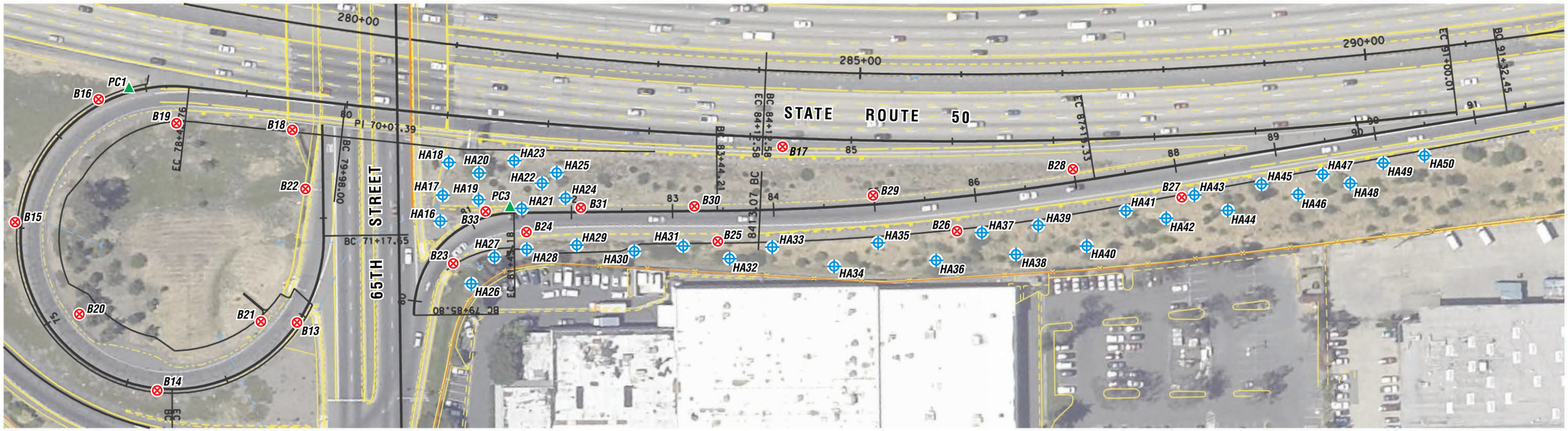
State Route 50 Ramp Meters Project

Sacramento County, California

SITE PLAN

GEOCON Proj. No. S9300-06-91

Task Order No. 91 | January 2010 | Figure 2-1



LEGEND:

- HA1 ⊕ Approximate ADL Boring Location (December 2009)
- B1 ⊗ Approximate ADL Boring Location (June 2009)
- PC1 ▲ Approximate Paint Chip Sample Location

0 100
Scale in Feet

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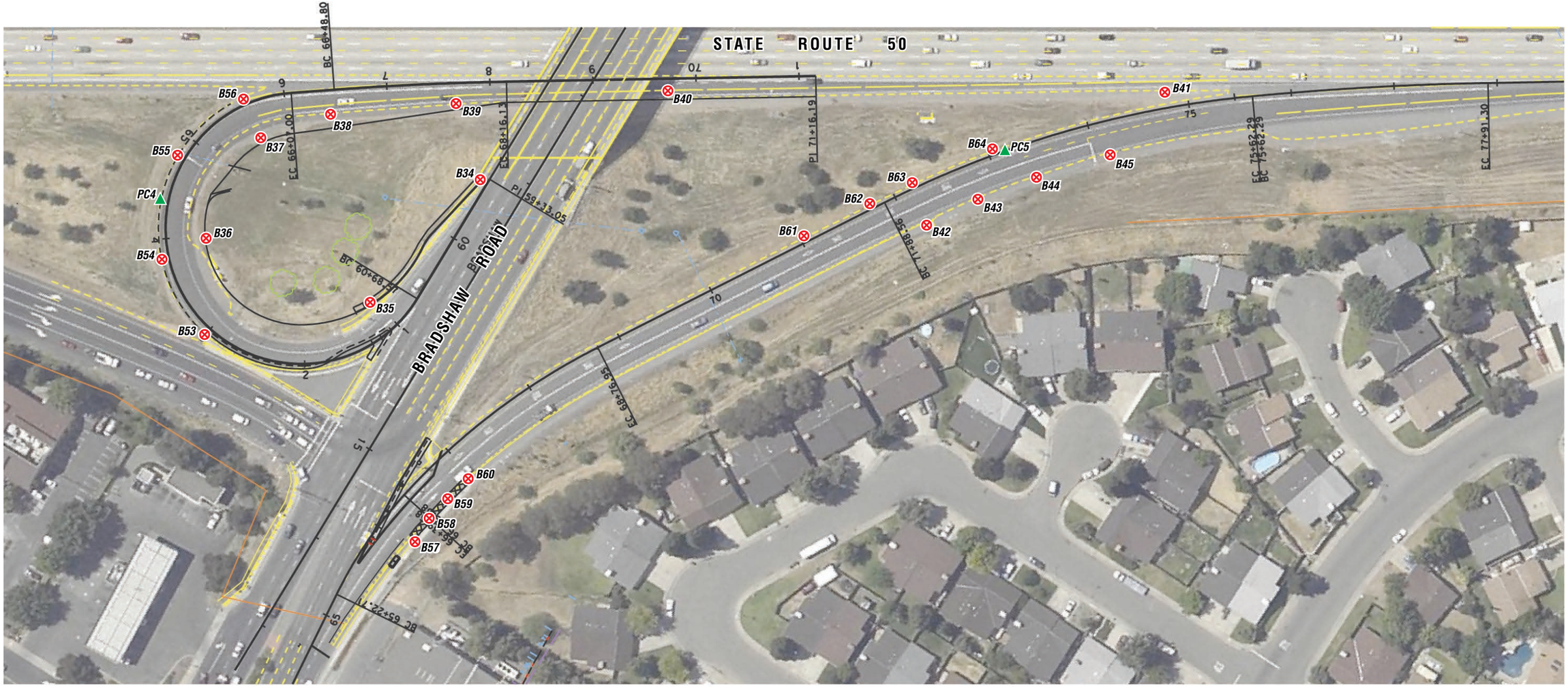
State Route 50 Ramp Meters Project

Sacramento County, California	**SITE PLAN**	
GEOCON Proj. No. S9300-06-91		
Task Order No. 91	January 2010	Figure 2-2



LEGEND:

B1 ⊗ Approximate ADL Boring Location (June 2009)

PC1 ▲ Approximate Paint Chip Sample Location

0 100
Scale in Feet

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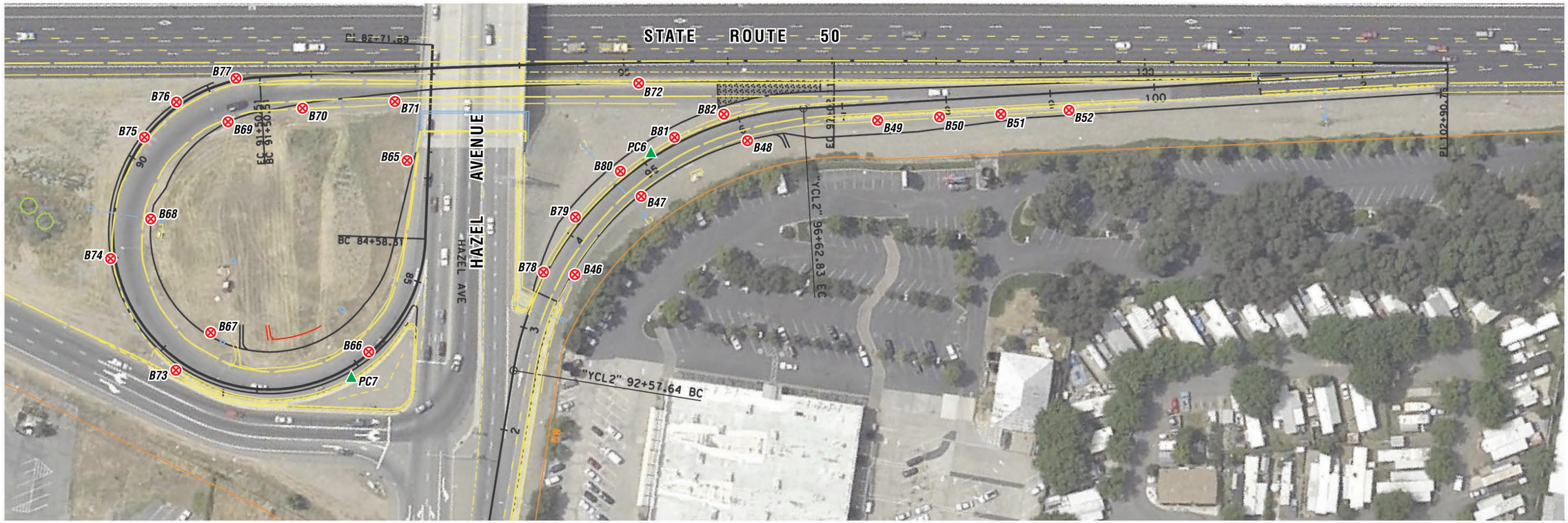
State Route 50 Ramp Meters Project

Sacramento County, California	**SITE PLAN**	
GEOCON Proj. No. S9300-06-91		
Task Order No. 91	January 2010	Figure 2-3



LEGEND:

B1 ⊗ Approximate ADL Boring Location (June 2009)

PC1 ▲ Approximate Paint Chip Sample Location

0 100

Scale in Feet

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CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

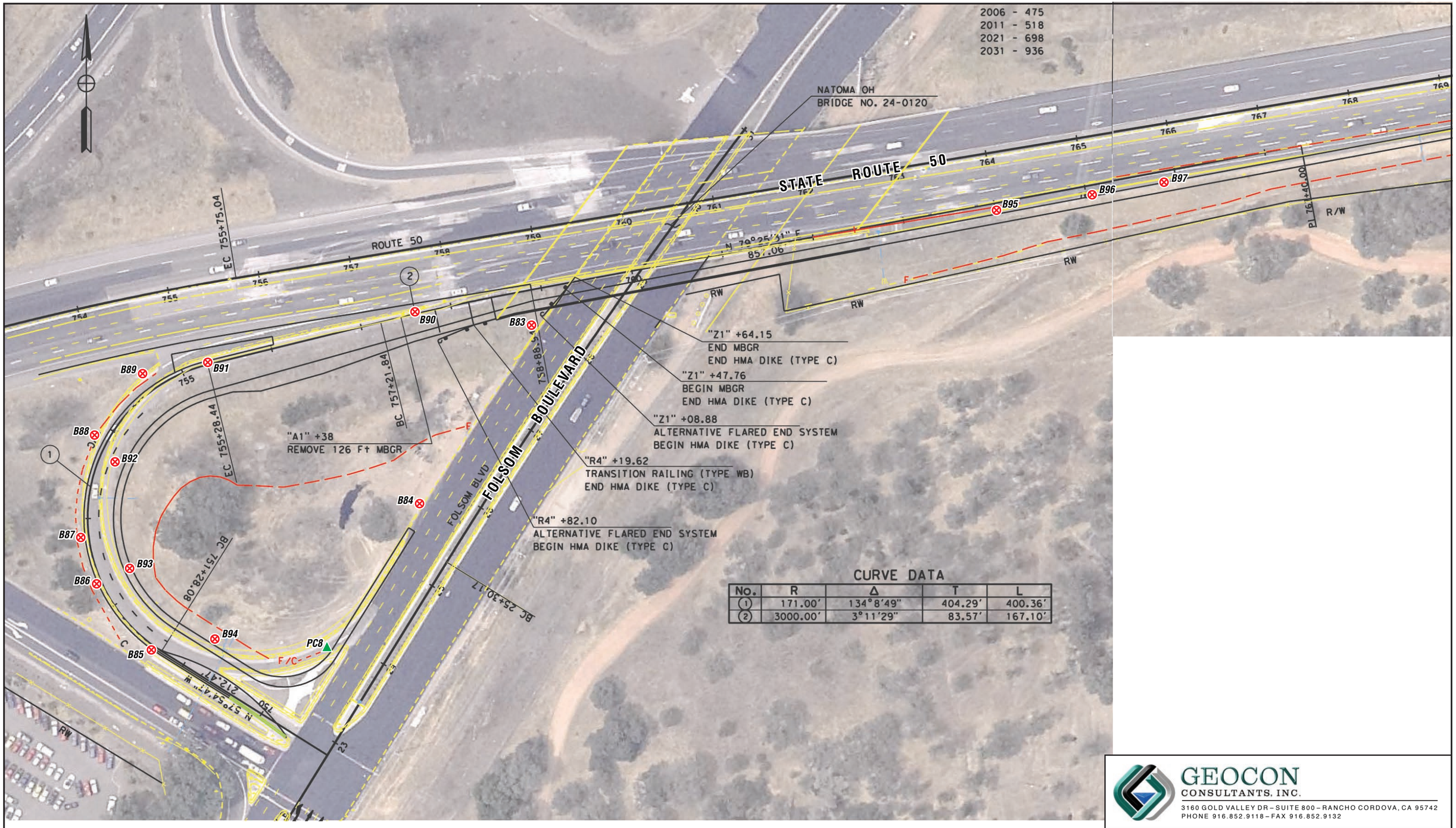
State Route 50 Ramp Meters Project

Sacramento County, California

SITE PLAN

GEOCON Proj. No. S9300-06-91

Task Order No. 91 | January 2010 | Figure 2-4



CURVE DATA

No.	R	Δ	T	L
(1)	171.00'	134°8'49"	404.29'	400.36'
(2)	3000.00'	3°11'29"	83.57'	167.10'

LEGEND:

B1 ⊗ Approximate ADL Boring Location (June 2009)

PC1 ▲ Approximate Paint Chip Sample Location

0 100
Scale in Feet

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
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State Route 50 Ramp Meters Project

Sacramento County, California	**SITE PLAN**	
GEOCON Proj. No. S9300-06-91		
Task Order No. 91	January 2010	Figure 2-5

TABLE 1
SUMMARY OF SOIL BORING COORDINATES
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	DATE	LATITUDE	LONGITUDE
B1	6/15/2009	38.560389427	-121.462638134
B2	6/15/2009	38.560545533	-121.459984349
B3	6/15/2009	38.560567417	-121.460207078
B4	6/15/2009	38.560583203	-121.460470087
B5	6/15/2009	38.560592402	-121.460707289
B6	6/15/2009	38.560596840	-121.460950783
B7	6/15/2009	38.560577257	-121.461281610
B8	6/15/2009	38.560541756	-121.461918897
B9	6/15/2009	38.560658421	-121.461654623
B10	6/15/2009	38.560640306	-121.461937611
B11	6/15/2009	38.560606532	-121.462235326
B12	6/15/2009	38.560539210	-121.462650374
B13	6/15/2009	38.549760416	-121.428106370
B14	6/15/2009	38.549641654	-121.428462987
B15	6/15/2009	38.549963348	-121.429000046
B16	6/15/2009	38.550453216	-121.428685874
B17	6/15/2009	38.550277382	-121.426330413
B18	6/15/2009	38.550413165	-121.428458800
B19	6/15/2009	38.550149495	-121.428913040
B20	6/15/2009	38.549775471	-121.428743461
B21	6/15/2009	38.549864864	-121.428216010
B22	6/15/2009	38.550133218	-121.428047602
B23	6/15/2009	38.550021729	-121.427440338
B24	6/15/2009	38.550058107	-121.427129179
B25	6/15/2009	38.550064548	-121.426492350
B26	6/15/2009	38.550118035	-121.425628256
B27	6/15/2009	38.550249981	-121.424461687
B28	6/15/2009	38.550231249	-121.425202870
B29	6/15/2009	38.550192984	-121.425643784
B30	6/15/2009	38.550160531	-121.426063668
B31	6/15/2009	38.550140196	-121.426590582
B33	6/15/2009	38.550107852	-121.427428720
B34	6/15/2009	38.565245568	-121.336531207
B35	6/15/2009	38.564717450	-121.336842734
B36	6/15/2009	38.565033939	-121.337286956
B37	6/15/2009	38.565177959	-121.337202655
B38	6/15/2009	38.565256890	-121.337083539
B39	6/15/2009	38.565513885	-121.336636974
B40	6/15/2009	38.565802819	-121.336081042
B41	6/15/2009	38.566444654	-121.334831496
B42	6/15/2009	38.565703151	-121.335283722
B43	6/15/2009	38.565835918	-121.335176244
B44	6/15/2009	38.566009341	-121.335026802
B45	6/15/2009	38.566174661	-121.334860111
B46	6/15/2009	38.630505931	-121.216282030
B47	6/15/2009	38.630705037	-121.216230170
B48	6/15/2009	38.630915414	-121.216086419
B49	6/15/2009	38.631085738	-121.215878537
B50	6/15/2009	38.631219727	-121.215653285
B51	6/15/2009	38.631481499	-121.215216794
B52	6/15/2009	38.631773894	-121.214723425
B53	6/16/2009	38.564622914	-121.337042893
B54	6/16/2009	38.564737841	-121.337278537
B55	6/16/2009	38.564922788	-121.337396973
B56	6/16/2009	38.565220751	-121.337295366
B57	6/16/2009	38.564465429	-121.336023133
B58	6/16/2009	38.564531767	-121.336004129
B59	6/16/2009	38.564609944	-121.335988183

TABLE 1
SUMMARY OF SOIL BORING COORDINATES
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	DATE	LATITUDE	LONGITUDE
B60	6/16/2009	38.564679362	-121.335962562
B61	6/16/2009	38.565742747	-121.335407268
B62	6/16/2009	38.565891201	-121.335300951
B63	6/16/2009	38.566061468	-121.335147591
B64	6/16/2009	38.566240068	-121.334969205
B65	6/16/2009	38.630378785	-121.216908209
B66	6/16/2009	38.629850127	-121.216849056
B67	6/16/2009	38.629701210	-121.217244393
B68	6/16/2009	38.629928396	-121.217584863
B69	6/16/2009	38.630167683	-121.217586935
B70	6/16/2009	38.630319664	-121.217393877
B71	6/16/2009	38.630458716	-121.217168673
B72	6/16/2009	38.630950846	-121.216259570
B73	6/16/2009	38.629629996	-121.217322999
B74	6/16/2009	38.629763930	-121.217596827
B75	6/16/2009	38.629924357	-121.217698013
B76	6/16/2009	38.630120211	-121.217724975
B77	6/16/2009	38.630318387	-121.217576224
B78	6/16/2009	38.630378514	-121.216369672
B79	6/16/2009	38.630540222	-121.216377728
B80	6/16/2009	38.630688063	-121.216344479
B81	6/16/2009	38.630792496	-121.216299121
B82	6/16/2009	38.630939191	-121.216190942
B83	6/16/2009	38.639514269	-121.197522378
B84	6/16/2009	38.638920575	-121.198005807
B85	6/16/2009	38.638631224	-121.198959999
B86	6/16/2009	38.638767409	-121.199096614
B87	6/16/2009	38.639000388	-121.199195076
B88	6/16/2009	38.639236615	-121.199123893
B89	6/16/2009	38.639446971	-121.198953355
B90	6/16/2009	38.639571365	-121.198074895
B91	6/16/2009	38.639434051	-121.198800566
B92	6/16/2009	38.639244319	-121.199049748
B93	6/16/2009	38.638932321	-121.199090494
B94	6/16/2009	38.638641204	-121.198761596
B95	6/16/2009	38.639882306	-121.195771640
B96	6/16/2009	38.639939943	-121.195424201
B97	6/16/2009	38.640015678	-121.194754477
HA1	12/22/2009	38.560512287	-121.461557781
HA2	12/22/2009	38.560556847	-121.461295636
HA3	12/22/2009	38.560501136	-121.461280935
HA4	12/22/2009	38.560527502	-121.461129314
HA5	12/22/2009	38.560575515	-121.460884676
HA6	12/22/2009	38.560495422	-121.460911464
HA7	12/22/2009	38.560515569	-121.460714164
HA8	12/22/2009	38.560563552	-121.460517427
HA9	12/22/2009	38.560490370	-121.460539172
HA10	12/22/2009	38.560508622	-121.460361671
HA11	12/22/2009	38.560526903	-121.460174098
HA12	12/22/2009	38.560460240	-121.460203293
HA13	12/22/2009	38.560475394	-121.460007727
HA14	12/22/2009	38.560493400	-121.459864462
HA15	12/22/2009	38.560430537	-121.459881645
HA17	12/22/2009	38.550208229	-121.427550689
HA18	12/22/2009	38.550291193	-121.427527647
HA16	12/22/2009	38.550163613	-121.427568895
HA19	12/22/2009	38.550194073	-121.427426414
HA20	12/22/2009	38.550253316	-121.427413684

TABLE 1
SUMMARY OF SOIL BORING COORDINATES
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	DATE	LATITUDE	LONGITUDE
HA21	12/22/2009	38.550167167	-121.427253685
HA22	12/22/2009	38.550218371	-121.427107509
HA23	12/22/2009	38.550272683	-121.427207596
HA24	12/22/2009	38.550171078	-121.427023037
HA25	12/22/2009	38.550254098	-121.427021272
HA26	12/22/2009	38.549947630	-121.427439273
HA27	12/22/2009	38.550012827	-121.427310314
HA28	12/22/2009	38.550038314	-121.427159027
HA29	12/22/2009	38.550040446	-121.426983586
HA30	12/22/2009	38.550017239	-121.426854380
HA31	12/22/2009	38.550040110	-121.426690267
HA32	12/22/2009	38.550008506	-121.426511986
HA33	12/22/2009	38.550050012	-121.426384029
HA34	12/22/2009	38.550002007	-121.426202514
HA35	12/22/2009	38.550059113	-121.426070396
HA36	12/22/2009	38.550022376	-121.425930189
HA37	12/22/2009	38.550077161	-121.425754941
HA38	12/22/2009	38.550037331	-121.425576730
HA39	12/22/2009	38.550114441	-121.425443904
HA40	12/22/2009	38.550073572	-121.425299001
HA41	12/22/2009	38.550143058	-121.425144777
HA42	12/22/2009	38.550115348	-121.424998134
HA43	12/22/2009	38.550183259	-121.424835569
HA44	12/22/2009	38.550153485	-121.424671339
HA45	12/22/2009	38.550220457	-121.424521723
HA46	12/22/2009	38.550194284	-121.424378247
HA47	12/22/2009	38.550266155	-121.424211512
HA48	12/22/2009	38.550256781	-121.424085900
HA49	12/22/2009	38.550306377	-121.423916877
HA50	12/22/2009	38.550318997	-121.423744000

TABLE 2
SUMMARY OF LEAD AND SOIL pH ANALYTICAL RESULTS
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
STOCKTON BOULEVARD ONRAMP						
B1-0	6/15/2009	79	**7.9**	---	---	---
B1-1	6/15/2009	19	---	---	---	---
B1-2	6/15/2009	<5.0	---	---	---	---
B2-0	6/15/2009	71	2.7	---	---	---
B2-1	6/15/2009	5.2	---	---	---	---
B2-2	6/15/2009	5.6	---	---	---	7.7
B3-0	6/15/2009	9.2	---	---	---	---
B3-1	6/15/2009	<5.0	---	---	---	---
B3-2	6/15/2009	8.9	---	---	---	---
B4-0	6/15/2009	320	**32**	---	---	---
B4-1	6/15/2009	<5.0	---	---	---	---
B4-2	6/15/2009	6.1	---	---	---	---
B5-0	6/15/2009	140	**14**	---	---	---
B5-1	6/15/2009	<5.0	---	---	---	---
B5-2	6/15/2009	5.1	---	---	---	---
B6-0	6/15/2009	60	**9.8**	---	---	---
B6-1	6/15/2009	<5.0	---	---	---	---
B6-2	6/15/2009	5.5	---	---	---	---
B7-0	6/15/2009	420	**29**	---	---	---
B7-1	6/15/2009	5.4	---	---	---	---
B7-2	6/15/2009	5.1	---	---	---	---
B8-0	6/15/2009	57	**8.1**	---	---	---
B8-1	6/15/2009	<5.0	---	---	---	---
B8-2	6/15/2009	19	---	---	---	---
B9-0	6/15/2009	290	**42**	---	---	---
B9-1	6/15/2009	<5.0	---	---	---	---
B9-2	6/15/2009	<5.0	---	---	---	---
B10-0	6/15/2009	460	**36**	---	---	---
B10-1	6/15/2009	21	---	---	---	---
B10-2	6/15/2009	<5.0	---	---	---	---
B11-0	6/15/2009	250	**39**	---	---	---
B11-1	6/15/2009	<5.0	---	---	---	---
B11-2	6/15/2009	17	---	---	---	---
B12-0	6/15/2009	410	**43**	---	---	---
B12-1	6/15/2009	150	<0.25	---	---	---
B12-2	6/15/2009	68	**6.7**	---	---	---
HA1-0	12/22/2009	73	---	<0.25	---	---
HA2-0	12/22/2009	520	---	<0.25	---	7.0
HA3-0	12/22/2009	46	---	---	---	---
HA4-0	12/22/2009	48	---	---	---	---
HA5-0	12/22/2009	320	---	<0.25	---	7.2

TABLE 2
SUMMARY OF LEAD AND SOIL pH ANALYTICAL RESULTS
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
HA6-0	12/22/2009	43	---	---	---	---
HA7-0	12/22/2009	60	---	<0.25	---	---
HA8-0	12/22/2009	120	---	<0.25	---	---
HA9-0	12/22/2009	43	---	---	---	---
HA10-0	12/22/2009	67	---	<0.25	---	---
HA11-0	12/22/2009	120	---	<0.25	---	7.2
HA12-0	12/22/2009	52	---	<0.25	---	---
HA13-0	12/22/2009	78	---	<0.25	---	---
HA14-0	12/22/2009	190	---	<0.25	---	---
HA15-0	12/22/2009	67	---	<0.25	---	---
65TH STREET ONRAMP (LOOP)						
B13-0	6/15/2009	36	---	---	---	---
B13-1	6/15/2009	5.7	---	---	---	---
B13-2	6/15/2009	6.3	---	---	---	---
B14-0	6/15/2009	120	**8.5**	---	---	---
B14-1	6/15/2009	10	---	---	---	---
B14-2	6/15/2009	<5.0	---	---	---	---
B15-0	6/15/2009	34	---	---	---	---
B15-1	6/15/2009	5.9	---	---	---	---
B15-2	6/15/2009	6.4	---	---	---	---
B16-0	6/15/2009	80	3.8	---	---	7.9
B16-1	6/15/2009	<5.0	---	---	---	---
B16-2	6/15/2009	6.2	---	---	---	---
B17-0	6/15/2009	620	**48**	---	---	---
B17-1	6/15/2009	18	---	---	---	---
B17-2	6/15/2009	<5.0	---	---	---	---
B18-0	6/15/2009	140	**5.0**	---	---	---
B18-1	6/15/2009	<5.0	---	---	---	---
B18-2	6/15/2009	<5.0	---	---	---	---
B19-0	6/15/2009	45	---	---	---	---
B19-1	6/15/2009	<5.0	---	---	---	---
B19-2	6/15/2009	<5.0	---	---	---	---
B20-0	6/15/2009	20	---	---	---	---
B20-1	6/15/2009	<5.0	---	---	---	---
B20-2	6/15/2009	5.0	---	---	---	---
B21-0	6/15/2009	40	---	---	---	---
B21-1	6/15/2009	<5.0	---	---	---	---
B21-2	6/15/2009	<5.0	---	---	---	---
B22-0	6/15/2009	130	**7.9**	---	---	---
B22-1	6/15/2009	7.7	---	---	---	---
B22-2	6/15/2009	6.8	---	---	---	---

TABLE 2
SUMMARY OF LEAD AND SOIL pH ANALYTICAL RESULTS
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
65TH STREET ONRAMP (SLIP)						
B23-0	6/15/2009	1,000	**48**	---	1.3	---
B23-1	6/15/2009	5.3	---	---	---	---
B23-2	6/15/2009	<5.0	---	---	---	---
B24-0	6/15/2009	89	**7.9**	---	---	---
B24-1	6/15/2009	8.8	---	---	---	---
B24-2	6/15/2009	17	---	---	---	---
B25-0	6/15/2009	130	**6.9**	---	---	---
B25-1	6/15/2009	5.2	---	---	---	---
B25-2	6/15/2009	<5.0	---	---	---	---
B26-0	6/15/2009	32	---	---	---	---
B26-1	6/15/2009	<5.0	---	---	---	8.1
B26-2	6/15/2009	24	---	---	---	---
B27-0	6/15/2009	360	**38**	---	---	---
B27-1	6/15/2009	<5.0	---	---	---	---
B27-2	6/15/2009	6.0	---	---	---	---
B28-0	6/15/2009	93	3.2	---	---	---
B28-1	6/15/2009	5.6	---	---	---	---
B28-2	6/15/2009	5.0	---	---	---	---
B29-0	6/15/2009	67	**6.4**	---	---	---
B29-1	6/15/2009	<5.0	---	---	---	---
B29-2	6/15/2009	<5.0	---	---	---	---
B30-0	6/15/2009	210	**12**	---	---	---
B30-1	6/15/2009	8.6	---	---	---	---
B30-2	6/15/2009	8.2	---	---	---	---
B31-0	6/15/2009	190	**48**	---	---	---
B31-1	6/15/2009	5.5	---	---	---	---
B31-2	6/15/2009	<5.0	---	---	---	---
B33-0	6/15/2009	18	---	---	---	---
B33-1	6/15/2009	5.6	---	---	---	---
B33-2	6/15/2009	6.0	---	---	---	---
HA16-0	12/22/2009	1,500	---	0.95	2.1	6.3
HA17-0	12/22/2009	150	---	<0.25	---	---
HA18-0	12/22/2009	220	---	<0.25	---	---
HA19-0	12/22/2009	100	---	<0.25	---	---
HA20-0	12/22/2009	220	---	<0.25	---	---
HA21-0	12/22/2009	150	---	<0.25	---	6.7
HA22-0	12/22/2009	45	---	---	---	---

TABLE 2
SUMMARY OF LEAD AND SOIL pH ANALYTICAL RESULTS
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
HA23-0	12/22/2009	96	---	<0.25	---	---
HA24-0	12/22/2009	330	---	<0.25	---	---
HA25-0	12/22/2009	160	---	<0.25	---	---
HA26-0	12/22/2009	500	---	<0.25	---	4.7
HA27-0	12/22/2009	190	---	<0.25	---	---
HA28-0	12/22/2009	260	---	<0.25	---	---
HA29-0	12/22/2009	280	---	<0.25	---	---
HA30-0	12/22/2009	49	---	---	---	---
HA31-0	12/22/2009	810	---	0.34	---	5.4
HA32-0	12/22/2009	72	---	<0.25	---	---
HA33-0	12/22/2009	240	---	<0.25	---	---
HA34-0	12/22/2009	55	---	<0.25	---	---
HA35-0	12/22/2009	460	---	0.39	---	---
HA36-0	12/22/2009	97	---	<0.25	---	---
HA37-0	12/22/2009	900	---	0.45	---	5.5
HA38-0	12/22/2009	52	---	<0.25	---	---
HA39-0	12/22/2009	590	---	<0.25	---	---
HA40-0	12/22/2009	81	---	<0.25	---	---
HA41-0	12/22/2009	1,200	---	<0.25	3.2	6.0
HA42-0	12/22/2009	76	---	<0.25	---	---
HA43-0	12/22/2009	1,500	---	<0.25	1.4	6.3
HA44-0	12/22/2009	89	---	<0.25	---	6.3
HA45-0	12/22/2009	1,500	---	0.34	4.5	6.7
HA46-0	12/22/2009	97	---	<0.25	---	---
HA47-0	12/22/2009	510	---	<0.25	---	---
HA48-0	12/22/2009	280	---	<0.25	---	6.4
HA49-0	12/22/2009	1,300	---	0.37	4.0	6.6
HA50-0	12/22/2009	590	---	0.34	---	6.6

TABLE 2
SUMMARY OF LEAD AND SOIL pH ANALYTICAL RESULTS
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
BRADSHAW ROAD ONRAMP (LOOP)						
B34-0	6/15/2009	6.1	---	---	---	---
B34-1	6/15/2009	<5.0	---	---	---	---
B34-2	6/15/2009	6.7	---	---	---	---
B35-0	6/15/2009	6.0	---	---	---	7.5
B35-1	6/15/2009	6.2	---	---	---	---
B35-2	6/15/2009	<5.0	---	---	---	---
B36-0	6/15/2009	15	---	---	---	---
B36-1	6/15/2009	24	---	---	---	---
B37-0	6/15/2009	<5.0	---	---	---	---
B37-1	6/15/2009	23	---	---	---	---
B37-2	6/15/2009	<5.0	---	---	---	---
B38-0	6/15/2009	14	---	---	---	---
B38-1	6/15/2009	7.3	---	---	---	---
B38-2	6/15/2009	<5.0	---	---	---	---
B39-0	6/15/2009	43	---	---	---	---
B39-1	6/15/2009	15	---	---	---	---
B39-2	6/15/2009	6.1	---	---	---	---
B40-0	6/15/2009	30	---	---	---	---
B40-1	6/15/2009	7.2	---	---	---	---
B40-2	6/15/2009	5.5	---	---	---	---
B53-0	6/16/2009	7.9	---	---	---	---
B53-1	6/16/2009	<5.0	---	---	---	---
B53-2	6/16/2009	<5.0	---	---	---	---
B54-0	6/16/2009	18	---	---	---	---
B54-1	6/16/2009	24	---	---	---	---
B54-2	6/16/2009	56	---	---	---	---
B55-0	6/16/2009	34	---	---	---	---
B55-1	6/16/2009	23	---	---	---	---
B55-2	6/16/2009	24	---	---	---	---
B56-0	6/16/2009	8.3	---	---	---	---
B56-1	6/16/2009	12	---	---	---	---
B56-2	6/16/2009	5.7	---	---	---	---

TABLE 2
SUMMARY OF LEAD AND SOIL pH ANALYTICAL RESULTS
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
BRADSHAW ROAD ONRAMP (SLIP)						
B41-0	6/15/2009	16	---	---	---	---
B41-1	6/15/2009	6.3	---	---	---	---
B41-2	6/15/2009	6.1	---	---	---	---
B42-0	6/15/2009	7.1	---	---	---	---
B42-1	6/15/2009	8.5	---	---	---	---
B42-2	6/15/2009	7.7	---	---	---	8.2
B43-0	6/15/2009	21	---	---	---	---
B43-1	6/15/2009	6.0	---	---	---	---
B43-2	6/15/2009	5.5	---	---	---	---
B44-0	6/15/2009	13	---	---	---	---
B44-1	6/15/2009	17	---	---	---	---
B44-2	6/15/2009	19	---	---	---	---
B45-0	6/15/2009	22	---	---	---	---
B45-1	6/15/2009	85	---	---	---	---
B45-2	6/15/2009	9.6	---	---	---	---
B57-0	6/16/2009	17	---	---	---	---
B57-1	6/16/2009	13	---	---	---	---
B57-2	6/16/2009	7.5	---	---	---	---
B58-0	6/16/2009	6.2	---	---	---	---
B58-1	6/16/2009	7.9	---	---	---	---
B58-2	6/16/2009	13	---	---	---	---
B59-0	6/16/2009	15	---	---	---	---
B59-1	6/16/2009	11	---	---	---	---
B59-2	6/16/2009	17	---	---	---	---
B60-0	6/16/2009	14	---	---	---	---
B60-1	6/16/2009	9.4	---	---	---	---
B60-2	6/16/2009	16	---	---	---	---
B61-0	6/16/2009	12	---	---	---	---
B61-1	6/16/2009	8.2	---	---	---	---
B61-2	6/16/2009	6.0	---	---	---	---
B62-0	6/16/2009	8.7	---	---	---	---
B62-1	6/16/2009	8.2	---	---	---	---
B62-2	6/16/2009	7.5	---	---	---	---
B63-0	6/16/2009	11	---	---	---	---
B63-1	6/16/2009	9.0	---	---	---	---
B63-2	6/16/2009	12	---	---	---	---
B64-0	6/16/2009	11	---	---	---	---
B64-1	6/16/2009	<5.0	---	---	---	---
B64-2	6/16/2009	5.6	---	---	---	---

TABLE 2
SUMMARY OF LEAD AND SOIL pH ANALYTICAL RESULTS
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
HAZEL AVENUE ONRAMP (SLIP)						
B46-0	6/15/2009	30	---	---	---	---
B46-1	6/15/2009	47	---	---	---	---
B46-2	6/15/2009	12	---	---	---	---
B47-0	6/15/2009	57	2.7	---	---	---
B47-1	6/15/2009	78	**5.2**	---	---	---
B48-0	6/15/2009	40	---	---	---	---
B49-0	6/15/2009	220	**9.9**	---	---	7.8
B49-1	6/15/2009	390	**18**	---	---	---
B49-2	6/15/2009	51	1.0	---	---	---
B50-0	6/15/2009	150	0.53	---	---	---
B50-1	6/15/2009	<5.0	---	---	---	---
B50-2	6/15/2009	<5.0	---	---	---	---
B51-0	6/15/2009	130	0.84	---	---	---
B51-1	6/15/2009	<5.0	---	---	---	---
B51-2	6/15/2009	<5.0	---	---	---	---
B52-0	6/15/2009	51	<0.25	---	---	---
B52-1	6/15/2009	<5.0	---	---	---	---
B52-2	6/15/2009	<5.0	---	---	---	---
B78-0	6/16/2009	54	2.3	---	---	---
B79-0	6/16/2009	170	4.5	---	---	---
B80-0	6/16/2009	120	4.9	---	---	---
B81-0	6/16/2009	87	3.0	---	---	---
B81-1	6/16/2009	99	**5.8**	---	---	---
B81-2	6/16/2009	92	**5.1**	---	---	---
B82-0	6/16/2009	64	4.5	---	---	---
B82-1	6/16/2009	60	3.1	---	---	---

TABLE 2
SUMMARY OF LEAD AND SOIL pH ANALYTICAL RESULTS
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
HAZEL AVENUE ONRAMP (LOOP)						
B65-0	6/16/2009	10	---	---	---	---
B65-1	6/16/2009	14	---	---	---	---
B65-2	6/16/2009	10	---	---	---	---
B66-0	6/16/2009	18	---	---	---	---
B66-1	6/16/2009	41	---	---	---	---
B66-2	6/16/2009	38	---	---	---	---
B67-0	6/16/2009	17	---	---	---	---
B67-1	6/16/2009	8.1	---	---	---	---
B67-2	6/16/2009	6.1	---	---	---	---
B68-0	6/16/2009	5.7	---	---	---	---
B68-1	6/16/2009	5.8	---	---	---	7.5
B68-2	6/16/2009	6.0	---	---	---	---
B69-0	6/16/2009	11	---	---	---	---
B70-0	6/16/2009	32	---	---	---	---
B70-1	6/16/2009	9.1	---	---	---	---
B70-2	6/16/2009	<5.0	---	---	---	---
B71-0	6/16/2009	31	---	---	---	---
B71-1	6/16/2009	21	---	---	---	---
B71-2	6/16/2009	8.1	---	---	---	---
B72-0	6/16/2009	55	---	---	---	---
B72-1	6/16/2009	20	---	---	---	---
B72-2	6/16/2009	18	---	---	---	---
B73-0	6/16/2009	20	---	---	---	---
B73-1	6/16/2009	7.7	---	---	---	---
B74-0	6/16/2009	45	---	---	---	---
B74-1	6/16/2009	24	---	---	---	---
B74-2	6/16/2009	7.6	---	---	---	---
B75-0	6/16/2009	18	---	---	---	---
B76-0	6/16/2009	81	---	---	---	---
B76-1	6/16/2009	28	---	---	---	---
B76-2	6/16/2009	6.2	---	---	---	---
B77-0	6/16/2009	87	---	---	---	---

TABLE 2
SUMMARY OF LEAD AND SOIL pH ANALYTICAL RESULTS
STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
FOLSOM BOULEVARD ONRAMP						
B83-0	6/16/2009	45	---	---	---	---
B84-0	6/16/2009	5.4	---	---	---	---
B84-1	6/16/2009	26	---	---	---	---
B84-2	6/16/2009	15	---	---	---	---
B85-0	6/16/2009	35	---	---	---	---
B86-0	6/16/2009	19	---	---	---	---
B86-1	6/16/2009	6.2	---	---	---	---
B86-2	6/16/2009	7.3	---	---	---	---
B87-0	6/16/2009	18	---	---	---	---
B87-1	6/16/2009	7.3	---	---	---	---
B88-0	6/16/2009	43	---	---	---	---
B88-1	6/16/2009	9.5	---	---	---	---
B89-0	6/16/2009	7.3	---	---	---	---
B89-1	6/16/2009	23	---	---	---	---
B89-2	6/16/2009	8.1	---	---	---	---
B90-0	6/16/2009	190	**13**	---	---	---
B90-1	6/16/2009	5.6	---	---	---	---
B91-0	6/16/2009	31	---	---	---	---
B91-1	6/16/2009	<5.0	---	---	---	---
B91-2	6/16/2009	<5.0	---	---	---	---
B92-0	6/16/2009	26	---	---	---	---
B92-1	6/16/2009	<5.0	---	---	---	---
B92-2	6/16/2009	<5.0	---	---	---	---
B93-0	6/16/2009	23	---	---	---	---
B94-0	6/16/2009	36	---	---	---	---
B94-1	6/16/2009	13	---	---	---	---
B94-2	6/16/2009	19	---	---	---	---
B95-0	6/16/2009	720	**35**	---	---	---
B95-1	6/16/2009	19	---	---	---	---
B96-0	6/16/2009	62	2.0	---	---	---
B96-1	6/16/2009	6.2	---	---	---	---
B96-2	6/16/2009	7.8	---	---	---	---
B97-0	6/16/2009	48	---	---	---	---
B97-1	6/16/2009	18	---	---	---	---
B97-2	6/16/2009	14	---	---	---	---

Notes: B1-1
- Top of sample depth in feet below ground surface
- Boring identification

mg/kg = Milligrams per kilogram
mg/l = Milligrams per liter
< = Less than the laboratory reporting limit
--- = Not analyzed
WET = Waste Extraction Test
DI-WET = Waste Extraction Test using de-ionized water
TCLP = Toxicity Characteristic Leaching Procedure
Concentrations in **bold** type are greater than or equal to the Soluble Threshold Limit Concentration value for lead of 5.0 mg/l

TABLE 3

SUMMARY OF TRAFFIC STRIPE PAINT SAMPLE ANALYTICAL RESULTS

STATE ROUTE 50 (SAC-50) RAMP METERS PROJECT

SACRAMENTO COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	LOCATION	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)
PC1	6/15/2009	65TH STREET LOOP ONRAMP	<5.0	---
PC2	6/15/2009	STOCKTON BLVD ONRAMP	<5.0	---
PC3	6/15/2009	65TH STREET SLIP ONRAMP	<5.0	---
PC4	6/15/2009	BRADSHAW ROAD LOOP ONRAMP	700	**7.4**
PC5	6/16/2009	BRADSHAW ROAD SLIP ONRAMP	820	0.29
PC6	6/16/2009	HAZEL AVENUE SLIP ONRAMP	320	2.1
PC7	6/16/2009	HAZEL AVENUE LOOP ONRAMP	97	2.9
PC8	6/16/2009	FOLSOM BOULEVARD ONRAMP	46	---

Notes:
mg/kg = Milligrams per kilogram
mg/l = Milligrams per liter
< = Less than the laboratory reporting limit
--- = Not analyzed
WET = Waste Extraction Test
Concentration in **bold** type is greater than the Soluble Threshold Limit Concentration value for lead of 5.0 mg/l

California Environmental Protection Agency
Department of Toxic Substances Control

VARIANCE

Applicant Names:

State of California
Department of Transportation
(Caltrans)
1120 N Street
Sacramento, California 95814

Variance No. V09HQSCD006

Effective Date: July 1, 2009

Expiration Date: July 1, 2014

Modification History:

Pursuant to California Health and Safety Code, Section 25143, the Department of Toxic Substances Control hereby issues the attached Variance consisting of 9 pages to the Department of Transportation.

Beverly Rikala
Team Leader, Operating Facilities Team
Department of Toxic Substances Control

Date: 6/30/09

1. INTRODUCTION.

a) Pursuant to Health and Safety Code, section 25143, the California Department of Toxic Substances Control (DTSC) grants this variance to the applicant below for waste considered to be hazardous solely because of its lead concentrations and as further specified herein.

b) DTSC hereby grants this variance only from the requirements specified herein and only in accordance with all terms and conditions specified herein.

2. IDENTIFYING INFORMATION.

APPLICANT/OWNER/OPERATOR

State of California
Department of Transportation, (Caltrans)
All Districts

3. TYPE OF VARIANCE.

Generation, Manifest, Transportation, Storage and Disposal.

4. ISSUANCE AND EXPIRATION DATES.

DATE ISSUED: July 1, 2009 EXPIRATION DATE: July 1, 2014

5. APPLICABLE STATUTES AND REGULATIONS. The hazardous waste that is the subject of this variance is fully regulated under Health and Safety Code, section 25100, et seq. and California Code of Regulations, title 22, division 4.5 except as specifically identified in Section 8 of this variance.

6. DEFINITION. For purposes of this variance, "lead-contaminated soil(s)" shall mean soil that meets the criteria for hazardous waste but contains less than 3397 mg/kg total lead and is hazardous primarily because of aerially-deposited lead contamination associated with exhaust emissions from the operation of motor vehicles.

7. FINDINGS/DETERMINATIONS. DTSC has determined that the variance applicant meets the requirements set forth in Health and Safety Code, section 25143 for a variance from specific regulatory requirements as outlined in Section 8 of this variance. The specific determinations and findings made by DTSC are as follows:

a) Caltrans intends to excavate, stockpile, transport, bury and cover large volumes of soil associated with highway construction projects. In the more urbanized highway corridors around the State this soil is contaminated with lead, primarily due to historic emissions from automobile exhausts. In situ sampling and laboratory testing has shown that some of the soil contains concentrations of lead in excess of State regulatory thresholds, and thus any generated waste from disturbance of the soil

would be regulated as hazardous waste. Such soil contains a Total Threshold Limit Concentration (TTLC) of 1000 milligrams per kilogram (mg/kg) or more lead and/or it meets or exceeds the Soluble Threshold Limit Concentration (STLC) for lead of 5 milligrams per liter (mg/l). A Human Health Risk Assessment prepared for this variance concludes that soil contaminated with elevated concentrations of lead can be managed in a way that presents no significant risk to human health.

b) The lead-contaminated soil will be placed only in Caltrans' right-of-way. Depending on concentration levels, the wastes will be covered with a minimum thickness of one (1) foot of non-hazardous soil or asphalt/concrete cover and will always be at least five (5) feet above the highest groundwater elevation. Caltrans will assure that proper health and safety procedures will be followed for workers, including any persons engaged in maintenance work in areas where the waste has been buried and covered.

c) DTSC finds and requires that the lead-contaminated soil excavated, stockpiled, transported, buried and covered pursuant to this variance is a non-RCRA hazardous waste, and that the waste management activity is insignificant as a potential hazard to human health and safety and the environment, when managed in accordance with the conditions, limitations and other requirements specified in this variance.

8. PROVISIONS WAIVED.

Provided Caltrans meets the terms and conditions of this variance, DTSC waives the hazardous waste management requirements of Health and Safety Code, Chapter 6.5 and California Code of Regulations, title 22 for the lead-contaminated soil that Caltrans reuses in projects that would require Caltrans to obtain a permit for a disposal facility and any other generator requirements that concern the transportation, manifesting, storage and land disposal of hazardous waste.

9. SPECIFIC CONDITIONS, LIMITATIONS AND OTHER REQUIREMENTS.

In order for the provisions discussed in section 8 to be waived, lead-contaminated soil must not exceed the contaminant concentrations discussed below and Caltrans management practices must meet all the following conditions:

a) Caltrans implementation of this variance shall comply with all applicable state laws and regulations for water quality control, water quality control plans, waste discharge requirements (including storm water permits), and others issued by the State Water Resources Control Board (SWRCB) and/or a California Regional Water Quality Control Board (RWQCB). Caltrans shall provide written notification to the appropriate RWQCB at least 30 days prior to advertisement for bids of projects that involve invocation of this variance, or as otherwise negotiated with the SWRCB or appropriate RWQCB.

b) The waivers in this variance shall only be applied to lead-contaminated soil that is not a RCRA hazardous waste and is hazardous primarily because of aerially-

deposited lead contamination associated with exhaust emissions from the operation of motor vehicles. The variance is not applicable to any other hazardous waste.

c) Soil containing 1.5 mg/l extractable lead or less (based on a modified waste extraction test using deionized water as the extractant) and 1411 mg/kg or less total lead may be used as fill provided that the lead-contaminated soil is placed a minimum of five (5) feet above the maximum historic water table elevation and covered with at least one (1) foot of nonhazardous soil that will be maintained by Caltrans to prevent future erosion.

d) Soil containing 150 mg/L extractable lead or less (based on a modified waste extraction test using deionized water as the extractant) and 3397 mg/kg or less total lead may be used as fill provided that the lead-contaminated soils are placed a minimum of five (5) feet above the maximum historic water table elevation and protected from infiltration by a pavement structure which will be maintained by Caltrans.

e) Lead-contaminated soil with a pH less than 5.5 but greater than 5.0 shall only be used as fill material under the paved portion of the roadway. Lead-contaminated soil with a pH at or less than 5.0 shall be managed as a hazardous waste.

f) For each project that has the potential to generate waste by disturbing lead-contaminated soil (as defined in 6), Caltrans shall conduct sampling and analysis to adequately characterize the soils containing aerially deposited lead in the areas of planned excavation along the project route. Such sampling and analysis shall include the Toxicity Characteristic Leaching Procedure (TCLP) as prescribed by the United States Environmental Protection Agency to determine whether concentrations of contaminants in soil exceed federal criteria for classification as a hazardous waste.

g) Lead-contaminated soil managed pursuant to this variance shall not be moved outside the designated corridor boundaries (see paragraph t) below. All lead-contaminated soil not buried and covered within the same Caltrans corridor where it originated is not eligible for management under this variance and shall be managed as a hazardous waste.

h) Lead-contaminated soil managed pursuant to this variance shall not be placed in areas where it would become in contact with groundwater or surface water (such as streams and rivers).

i) Lead-contaminated soil managed pursuant to this variance shall be buried and covered only in locations that are protected from erosion that may result from storm water run-on and run-off.

j) The lead-contaminated soil shall be buried and covered in a manner that will prevent accidental or deliberate breach of the asphalt, concrete, and/or cover soil.

k) The presence of lead-contaminated soil shall be incorporated into the projects' as-built drawings. The as-built drawings shall be annotated with the location, representative analytical data, and volume of lead-contaminated soil. The as-built drawings shall also state the depth of the cover. These as-built drawings shall be retained by Caltrans.

l) Caltrans shall ensure that no other hazardous wastes, other than the lead-contaminated hazardous waste soil, are placed in the burial areas.

m) Lead-contaminated soil shall not be buried within ten (10) feet of culverts or locations subject to frequent worker exposure.

n) Excavated lead-contaminated soil not placed into the designated area (fill area, roadbed area) by the end of the working day shall be stockpiled and covered with sheets of polyethylene or at least one foot of non-hazardous soil. The lead-contaminated soil, while stockpiled or under transport, shall be protected from contacting surface water and from being dislodged or transported by wind or storm water. The stockpile covers shall be inspected at least once a week and within 24 hours after rainstorms. If the lead-contaminated soil is stockpiled for more than 4 days from the time of excavation, Caltrans shall restrict public access to the stockpile by using barriers that meet the safety requirements of the construction zone. The lead-contaminated soil shall be stockpiled for no more than 90 days from the time the soil is first excavated. If the contaminated soil is stockpiled beyond the 90 day limit Caltrans shall:

1. notify DTSC in writing of the 90 day exceedance and expected date of removal;
2. perform weekly inspections of the stockpiled material to ensure that there is adequate protection from run-on, runoff, public access, and wind dispersion; and
3. notify DTSC on weekly basis of the stockpile status until the stockpile is removed.

The lead-contaminated soil shall be stockpiled for no more than 180 days from the time the soil is first excavated.

o) Caltrans shall ensure that all stockpiling of lead-contaminated soil remains within the project area of the specified corridor. Stockpiling of lead-contaminated soil within the specified corridor, but outside the project area, is prohibited.

p) Caltrans shall conduct confirmatory sampling of any stockpile area in areas not known or expected to contain lead-contaminated soil after removal of the lead-contaminated soil to ensure that contamination has not been left behind or has not migrated from the stockpiled material to the surrounding soils.

q) Caltrans shall stockpile lead-contaminated soil only on high ground (i.e. no sump areas or low points) so that stockpiled soil will not come in contact with surface

water run-on or run-off.

r) Caltrans shall not stockpile lead-contaminated soil in environmentally and ecologically sensitive areas.

s) Caltrans shall ensure that storm/rain run-off that has come into contact with stockpiled lead-contaminated soil will not flow to storm drains, inlets, or waters of the State.

t) Caltrans may dispose of the lead-contaminated soil only within the operating right-of-way of an existing highway, as defined in Streets and Highways Code, section 23. Caltrans may move lead-contaminated soil from one Caltrans project to another Caltrans project only if the lead-contaminated soil remains within the same designated corridor.

Caltrans shall record any movement of lead-contaminated soil by using a bill of lading. The bill of lading must contain: 1) the US DOT description including shipping name, hazard class and ID number; 2) handling codes; 3) quantity of material; 4) volume of material; 5) date of shipment; 6) origin and destination of shipment; and 7) any specific handling instructions. The bill of lading shall be referenced in and kept on file with the project's as-built drawings. The lead-contaminated soil must be kept covered during transportation.

u) For each specific corridor where this variance is to be implemented, all of the following information shall be submitted in writing to DTSC at least five (5) days before construction of any project begins:

1. plan drawing designating the boundaries of the corridor where lead-contaminated soils will be excavated, stockpiled, buried and covered;

2. a list of the Caltrans projects that the corridor encompasses;

3. a list of Caltrans contractors that will be conducting any phase of work on any project affected by this variance;

4. duration of corridor construction;

5. location where sampling and analytical data used to make lead concentration level determinations are kept (e.g. a particular Caltrans project file);

6. name and phone number (including area code) of project resident engineer and project manager;

7. location where Caltrans and contractor health and safety plan and records are kept;

8. location of project special provisions (including page or section number) for soil excavation, transportation, stockpile, burial and placement of cover material;

9. location of project drawings (including drawing page number) for soil excavation, burial and placement of cover in plan and cross section (for example, "The project plans are located at the resident engineer's office located at 5th and Main Streets, City of Fresno, See pages xxxxx of contract xxxx");

10. updated information if a Caltrans project within the corridor is added, changed or deleted; and

11. type of environmental document prepared for each project, date of adoption, document title, Clearing House number and where the document is available for review. A copy of the Caltrans Categorical Exemption, Categorical Exclusion Form, or if filed, the Notice of Exemption for any project shall be submitted to the DTSC Headquarters Project Manager.

v) Changes in location of lead-contaminated soil placement, quantities or protection measures (field changes) shall be noted in the resident engineer's project log within five (5) days of the field change.

w) Caltrans shall ensure that field changes are in compliance with the requirements of this variance.

x) Operational procedures described in the California Environmental Quality Act (CEQA) Special Initial Study shall be followed by Caltrans for activities conducted under this variance.

y) Caltrans shall implement appropriate health and safety procedures to protect its employees and the public, and to prevent or minimize exposure to potentially hazardous wastes. A project-specific health and safety plan must be prepared and implemented. The monitoring and exposure standards shall be based on construction standards for exposure to lead in California Code of Regulations, title 8, section 1532.1.

z) Caltrans shall provide a district Coordinator for this variance. This Coordinator will be the primary point of contact for information flowing to, or received from, DTSC regarding any matter or submission under this variance. Caltrans shall promptly notify DTSC of the name of Coordinator and any change in the Coordinator.

aa) Caltrans shall conduct regular inspections, consistent with Caltrans' Maintenance Division's current Pavement Inspection and Slope Inspection programs, of the locations where lead-contaminated soil has been buried and/or covered pursuant to this variance. If site inspection reveals deterioration of cover so that conditions in the variance are not met, Caltrans shall repair or replace the cover.

bb) Caltrans shall develop and implement a record keeping mechanisms to record and retain permanent records of all locations where lead-contaminated soil has been buried per this variance. The records shall be made available to DTSC.

cc) If areas subject to the terms of this variance are sold, relinquished or abandoned (including roadways), all future property owners shall be notified in writing in advance by Caltrans of the requirements of this variance, and Caltrans shall provide the owner with a copy of the variance. A copy of such a notice shall be sent to DTSC and contain the corridor location and project. Caltrans shall also disclose to DTSC and the new owner the location of areas where lead-contaminated soil has been buried. Future property owners shall be subject to the same requirements as Caltrans.

dd) For the purposes of informing the public about instances where the variance is implemented, Caltrans shall:

1. maintain current fact sheets at all Caltrans resident engineer offices and the Caltrans District office. Caltrans shall make the fact sheets available to anyone expressing an interest in variance-related work.

2. maintain a binder(s) containing copies of all reports submitted to DTSC at the District office. Caltrans shall ensure that the binders are readily accessible to the public.

3. carry out the following actions when it identifies additional projects:

(A) notify the public via a display advertisement in a newspaper of general circulation in that area.

(B) update and distribute the fact sheet to the mailing list and repository locations.

ee) Lead-contaminated soil may be buried only in areas where access is limited or where lead-contaminated soil is covered and contained by a pavement structure.

ff) Dust containing lead-contaminated soil must be controlled. Water or dust palliative may be applied to control dust. If visible dust migration occurs, all excavation, stockpiling and truck loading and burying must be stopped. The granting of this variance confers no relief on Caltrans from compliance with the laws, regulations and requirements enforced by any local air district or the California Air Resources Board.

gg) Sampling and analysis is required to show the lead-contaminated soil meets the variance criteria. All sampling and analysis must be conducted in accordance with the appropriate methods specified in U.S. EPA SW-846.

hh) DTSC retains the right to require Caltrans or any future owner to remove, and properly dispose of, lead-contaminated soil in the event DTSC determines it is necessary for protection of public health, safety or the environment.

ii) DTSC finds that some projects involving lead-contaminated soil are joint projects between Caltrans and other government entities. In these joint projects, Caltrans may not be the lead agency implementing the project although Caltrans is still involved if the project occurs on its right-of-way.

Caltrans may invoke this variance for joint projects where Caltrans and local government entity are involved provided that 1) the project is within the Caltrans Right-of-Way; 2) Caltrans reviews/ oversees all phases of the project including design, contracting, environmental assessment, construction, operation, and maintenance; and 3) Caltrans oversees the project to verify all variance conditions are complied with. Caltrans will be fully responsible for the variance notification and implementation in these joint projects.

jj) All correspondence shall be directed to the following office:

Hazardous Waste Permitting
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, CA 95826

Attn: Caltrans Lead Variance Notification Unit

10. DISCLAIMER.

a) The issuance of this variance does not relieve Caltrans of the responsibility for compliance with Health and Safety Code, chapter 6.5, or the regulations adopted thereunder, and any other laws and regulations other than those specifically identified in Section 8 of this variance. Caltrans is subject to all terms and conditions herein. The granting of this variance confers no relief from compliance with any federal, State or local requirements other than those specifically provided herein.

b) The issuance of this variance does not release Caltrans from any liability associated with the handling of hazardous waste, except as specifically provided herein and subject to all terms and conditions of this variance.

11. VARIANCE MODIFICATION OR REVOCATION. This variance is subject to review at the discretion of DTSC and may be modified or revoked by DTSC upon change of ownership and at any other time pursuant to Health and Safety Code, section 25143.

12. CEQA DETERMINATION. DTSC adopted a Negative Declaration on June 30, 2009.

Approved:

6/30/09
Date

Beverly Rikala
Operating Facilities Team
Department of Toxic Substances Control

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	0.0 to 1.0 ft
Sample Location:	Stockton Boulevard Onramp
	Borings B1 through B12 and HA1 through HA15

DATA SET STATISTICS

Number of Valid Samples	27
Number of Distinct Samples	22
Minimum	9.2
Maximum	520
Mean	163.4518519
Median	78
Standard Deviation	151.1599926
Variance	22849.34336
Coefficient of Variation	0.924798287
Skewness	1.127923732
Mean of log data	4.675785646
Standard Deviation of log data	0.968987414
90% Non-parametric UCLs	
Standard Bootstrap UCL	200.0296115
95% Non-parametric UCLs	
Standard Bootstrap UCL	210.3207557

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	1.0 to 2.0 ft
Sample Location:	Stockton Boulevard Onramp (Borings B1 through B12)

DATA SET STATISTICS

Number of Valid Samples	12
Number of Distinct Samples	6
Minimum	2.5
Maximum	150
Mean	18.175
Median	2.5
Standard Deviation	42.036762
Variance	1767.089318
Coefficient of Variation	2.312889
Skewness	3.318466
Mean of log data	1.729057
Standard Deviation of log data	1.300656
90% Non-parametric UCLs	
Standard Bootstrap UCL	32.79564254
95% Non-parametric UCLs	
Standard Bootstrap UCL	37.56212183

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	2.0 to 3.0 ft
Sample Location:	Stockton Boulevard Onramp (Borings B1 through B12)

DATA SET STATISTICS

Number of Valid Samples	12
Number of Distinct Samples	9
Minimum	2.5
Maximum	68
Mean	12.31666667
Median	5.55
Standard Deviation	18.346158
Variance	336.581515
Coefficient of Variation	1.489539
Skewness	2.977976
Mean of log data	1.952197
Standard Deviation of log data	0.977874
90% Non-parametric UCLs	
Standard Bootstrap UCL	18.74668673
95% Non-parametric UCLs	
Standard Bootstrap UCL	20.4135575

State Route 50 Ramp Meters Project
S9300-06-91

STOCKTON BOULEVARD ONRAMP

Sample ID	Total Lead	WET Lead
B12-1	150	0.125
B2-0	71	2.7
B12-2	68	**6.7**
B1-0	79	**7.9**
B8-0	57	**8.1**
B6-0	60	**9.8**
B5-0	140	**14**
B7-0	420	**29**
B4-0	320	**32**
B10-0	460	**36**
B11-0	250	**39**
B9-0	290	**42**
B12-0	410	**43**

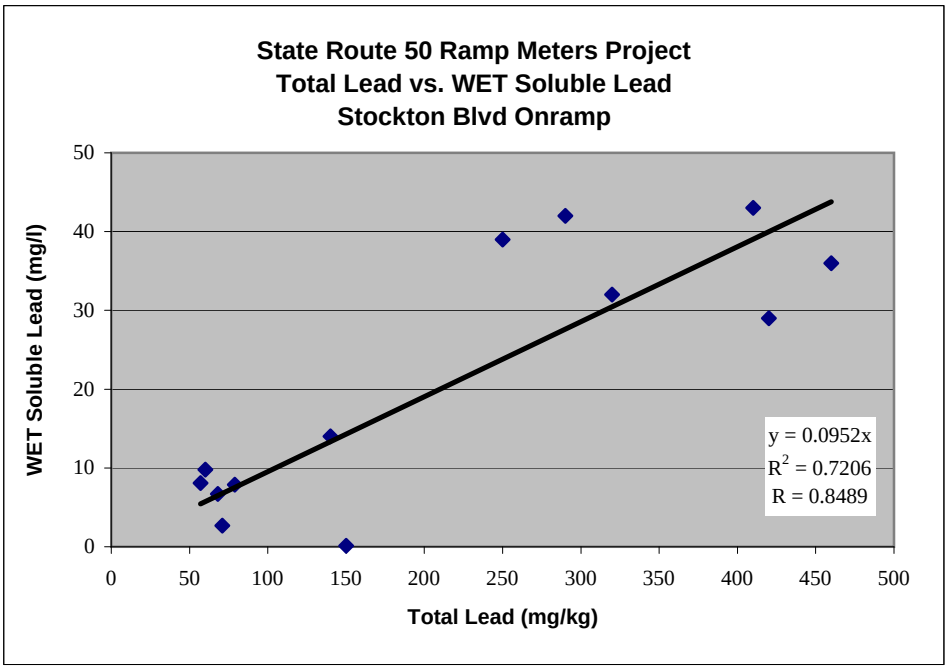


TABLE 3
SUMMARY OF STATISTICAL ANALYSIS
STATE ROUTE 50 RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

STOCKTON BOULEVARD ONRAMP

Total Lead UCLs (mg/kg)

Sample Interval (feet)	90% UCL	95% UCL
0.0 to 1.0	200.0	210.3
1.0 to 2.0	32.8	37.6
2.0 to 3.0	18.7	20.4

Excavation Scenarios

	90% UCL		95% UCL	
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)
0.0 to 1.0 foot	200.0	**19.0**	210.3	**20.0**
Underlying Soil (1.0 to 3.0 feet)	*25.8*	*2.5*	*29.0*	2.8
0.0 to 2.0 feet	116.4	**11.1**	124.0	**11.8**
Underlying Soil (2.0 to 3.0 feet)	*18.7*	*1.8*	*20.4*	1.9
0.0 to 3.0 feet	83.8	**8.0**	89.4	**8.5**

Notes:

UCL = Upper Confidence Level

90% UCL applicable for waste classification and onsite reuse

95% UCL applicable for risk assessment and offsite disposal

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

* = Soluble (WET) lead concentrations were predicted using slope of the regression line, where y = predicted soluble (WET) lead and x = total lead

Regression Line Slope: $y = 0.0952\ x$

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	0.0 to 1.0 ft
Sample Location:	65th Street Onramp - Loop (Borings B13 through B22)

DATA SET STATISTICS

Number of Valid Samples	10
Number of Distinct Samples	10
Minimum	20
Maximum	620
Mean	126.5
Median	62.5
Standard Deviation	178.9334141
Variance	32017.16667
Coefficient of Variation	1.414493392
Skewness	2.816125645
Mean of log data	4.300956841
Standard Deviation of log data	0.996867343
90% Non-parametric UCLs	
Standard Bootstrap UCL	193.0792279
95% Non-parametric UCLs	
Standard Bootstrap UCL	218.0859446

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	1.0 to 2.0 ft
Sample Location:	65th Street Onramp - Loop (Borings B13 through B22)

DATA SET STATISTICS

Number of Valid Samples	10
Number of Distinct Samples	6
Minimum	2.5
Maximum	18
Mean	5.98
Median	4.1
Standard Deviation	4.991504
Variance	24.915111
Coefficient of Variation	0.834700
Skewness	1.782364
Mean of log data	1.533105
Standard Deviation of log data	0.722360

90% Non-parametric UCLs

Standard Bootstrap UCL	7.910260546

95% Non-parametric UCLs

Standard Bootstrap UCL	8.529938584

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	2.0 to 3.0 ft
Sample Location:	65th Street Onramp - Loop (Borings B13 through B22)

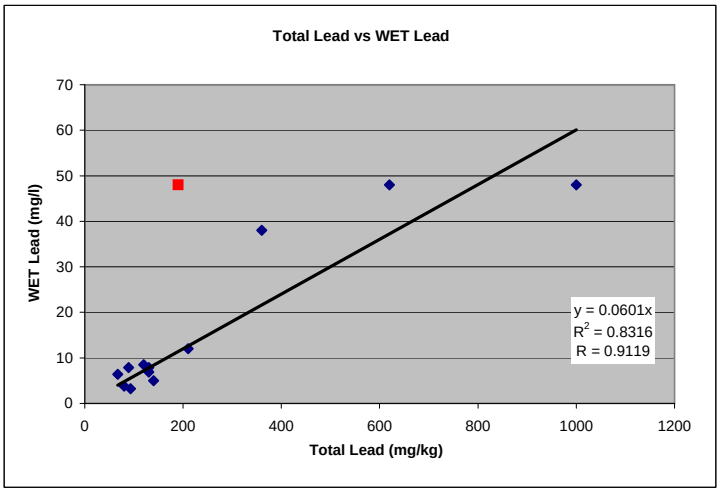
DATA SET STATISTICS

Number of Valid Samples	10
Number of Distinct Samples	6
Minimum	2.5
Maximum	6.8
Mean	4.32
Median	3.75
Standard Deviation	1.970787
Variance	3.884000
Coefficient of Variation	0.456201
Skewness	0.160227
Mean of log data	1.362921
Standard Deviation of log data	0.477230
90% Non-parametric UCLs	
Standard Bootstrap UCL	5.090744559
95% Non-parametric UCLs	
Standard Bootstrap UCL	5.264830537

State Route 50 Ramp Meters Project
S9300-06-91

65TH STREET ONRAMPS

Sample ID	Total Lead (mg/kg)	WET Lead (mg/l)	Residual WET Lead (mg/l)	Squared Residual WET Lead (mg/l)	slope	y-intercept	predicted WET	residual WET
					0.0601	0		
B22-0	130	**7.9**	0.09	0.01			7.8	0.09
B14-0	120	**8.5**	1.29	1.66			7.2	1.29
B16-0	80	3.8	-1.01	1.01			4.8	-1.01
B25-0	130	**6.9**	-0.91	0.83			7.8	-0.91
B30-0	210	**12**	-0.62	0.38			12.6	-0.62
B29-0	67	**6.4**	2.37	5.64			4.0	2.37
B24-0	89	**7.9**	2.55	6.52			5.3	2.55
B28-0	93	3.2	-2.39	5.70			5.6	-2.39
B18-0	140	**5.0**	-3.41	11.64			8.4	-3.41
B17-0	620	**48**	10.75	115.54			37.3	10.75
B27-0	360	**38**	16.37	267.99			21.6	16.37
B23-0	1000	**48**	-12.08	145.98			60.1	-12.08
Not Used								
B31-0	190	**48**	36.58	1338.42			11.4	36.58



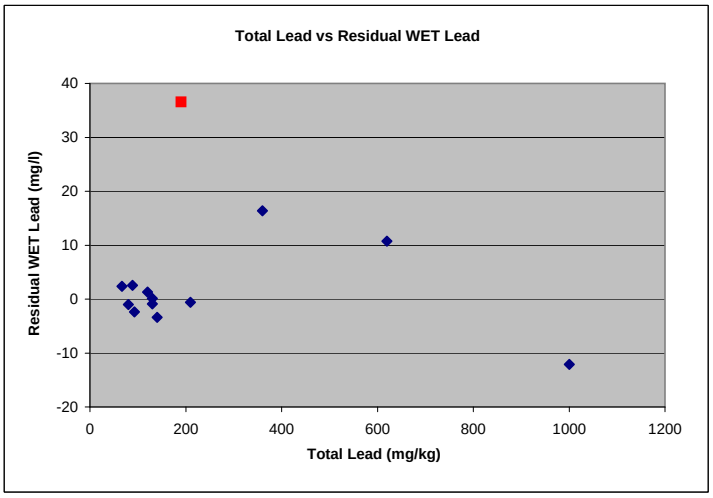


TABLE 3
SUMMARY OF STATISTICAL ANALYSIS
STATE ROUTE 50 RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

65th STREET ONRAMP (LOOP)

Total Lead UCLs (mg/kg)

Sample Interval (feet)	90% UCL	95% UCL
0.0 to 1.0	193.1	218.1
1.0 to 2.0	7.9	8.5
2.0 to 3.0	5.1	5.3

Excavation Scenarios

	90% UCL		95% UCL	
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)
0.0 to 1.0 foot	193.1	**11.6**	218.1	**13.1**
Underlying Soil (1.0 to 3.0 feet)	*6.5*	*0.4*	*6.9*	0.4
0.0 to 2.0 feet	100.5	**6.0**	113.3	**6.8**
Underlying Soil (2.0 to 3.0 feet)	*5.1*	*0.3*	*5.3*	0.3
0.0 to 3.0 feet	68.7	4.1	77.3	4.6

Notes:

UCL = Upper Confidence Level

90% UCL applicable for waste classification and onsite reuse

95% UCL applicable for risk assessment and offsite disposal

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

* = Soluble (WET) lead concentrations were predicted using slope of the regression line, where y = predicted soluble (WET) lead and x = total lead

Regression Line Slope: $y = 0.0601\ x$

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	0.0 to 1.0 ft
Sample Location:	65th Street Onramp (Slip) Borings B23 through B31, B33 and HA16 through HA50

DATA SET STATISTICS

Number of Valid Samples	45
Number of Distinct Samples	36
Minimum	18
Maximum	1500
Mean	376.4
Median	190
Standard Deviation	434.4713297
Variance	188765.3364
Coefficient of Variation	1.154280897
Skewness	1.601136151
Mean of log data	5.324100876
Standard Deviation of log data	1.133900916
90% Non-parametric UCLs	
Standard Bootstrap UCL	460.259101
95% Non-parametric UCLs	
Standard Bootstrap UCL	483.3883909

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	1.0 to 2.0 ft
Sample Location:	65th Street Onramp - Slip (Borings B23 through B31 and B33)

DATA SET STATISTICS

Number of Valid Samples	10
Number of Distinct Samples	7
Minimum	2.5
Maximum	8.8
Mean	5.21
Median	5.4
Standard Deviation	2.280570
Variance	5.201000
Coefficient of Variation	0.437729
Skewness	0.300497
Mean of log data	1.554203
Standard Deviation of log data	0.478917
90% Non-parametric UCLs	
Standard Bootstrap UCL	6.091107935
95% Non-parametric UCLs	
Standard Bootstrap UCL	6.345414286

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	2.0 to 3.0 ft
Sample Location:	65th Street Onramp - Slip (Borings B23 through B31 and B33)

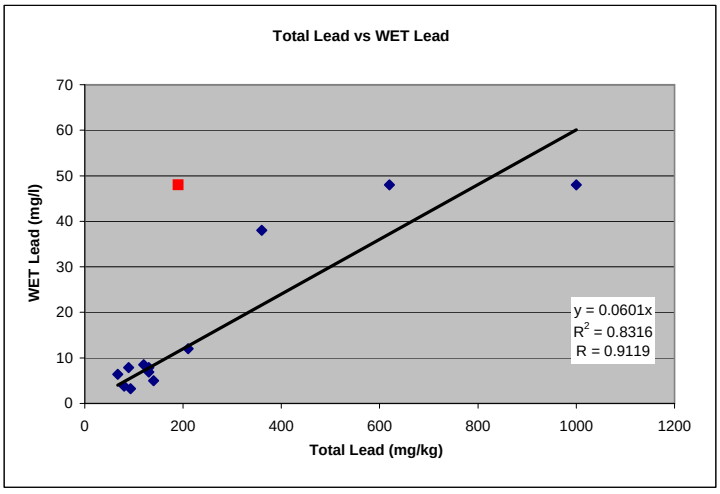
DATA SET STATISTICS

Number of Valid Samples	10
Number of Distinct Samples	6
Minimum	2.5
Maximum	24
Mean	7.62
Median	5.5
Standard Deviation	7.254087
Variance	52.621778
Coefficient of Variation	0.951980
Skewness	1.694421
Mean of log data	1.697352
Standard Deviation of log data	0.824211
90% Non-parametric UCLs	
Standard Bootstrap UCL	10.35510258
95% Non-parametric UCLs	
Standard Bootstrap UCL	11.14245909

State Route 50 Ramp Meters Project
S9300-06-91

65TH STREET ONRAMPS

Sample ID	Total Lead (mg/kg)	WET Lead (mg/l)	Residual WET Lead (mg/l)	Squared Residual WET Lead (mg/l)	slope	y-intercept	predicted WET	residual WET
					0.0601	0		
B22-0	130	**7.9**	0.09	0.01			7.8	0.09
B14-0	120	**8.5**	1.29	1.66			7.2	1.29
B16-0	80	3.8	-1.01	1.01			4.8	-1.01
B25-0	130	**6.9**	-0.91	0.83			7.8	-0.91
B30-0	210	**12**	-0.62	0.38			12.6	-0.62
B29-0	67	**6.4**	2.37	5.64			4.0	2.37
B24-0	89	**7.9**	2.55	6.52			5.3	2.55
B28-0	93	3.2	-2.39	5.70			5.6	-2.39
B18-0	140	**5.0**	-3.41	11.64			8.4	-3.41
B17-0	620	**48**	10.75	115.54			37.3	10.75
B27-0	360	**38**	16.37	267.99			21.6	16.37
B23-0	1000	**48**	-12.08	145.98			60.1	-12.08
Not Used								
B31-0	190	**48**	36.58	1338.42			11.4	36.58



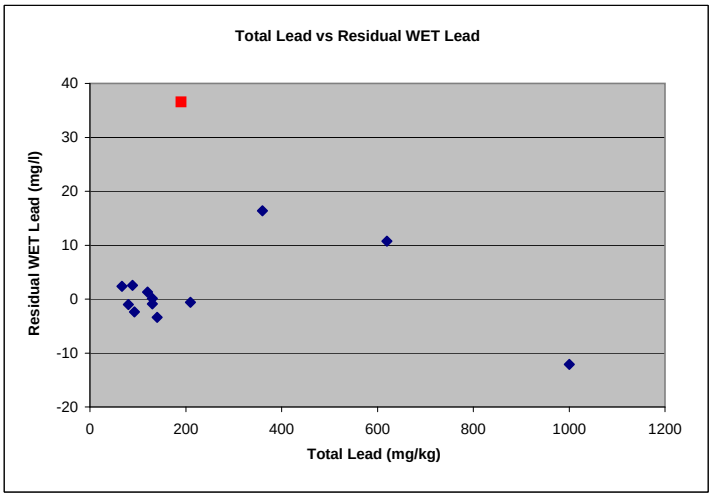


TABLE 3
SUMMARY OF STATISTICAL ANALYSIS
STATE ROUTE 50 RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

65th STREET ONRAMP (SLIP)

Total Lead UCLs (mg/kg)

Sample Interval (feet)	90% UCL	95% UCL
0.0 to 1.0	460.3	483.4
1.0 to 2.0	6.1	6.3
2.0 to 3.0	10.4	11.1

Excavation Scenarios

	90% UCL		95% UCL	
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)
0.0 to 1.0 foot	460.3	**27.7**	483.4	**29.1**
Underlying Soil (1.0 to 3.0 feet)	*8.3*	*0.5*	*8.7*	0.5
0.0 to 2.0 feet	233.2	**14.0**	244.9	**14.7**
Underlying Soil (2.0 to 3.0 feet)	*10.4*	*0.6*	*11.1*	0.7
0.0 to 3.0 feet	158.9	**9.6**	166.9	**10.0**

Notes:

UCL = Upper Confidence Level

90% UCL applicable for waste classification and onsite reuse

95% UCL applicable for risk assessment and offsite disposal

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

* = Soluble (WET) lead concentrations were predicted using slope of the regression line, where y = predicted soluble (WET) lead and x = total lead

Regression Line Slope: $y = 0.0601\ x$

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	0.0 to 1.0 ft
Sample Location:	Bradshaw Road Onramp - Loop (Borings B34 through B40 and B53 through B56)

DATA SET STATISTICS

Number of Valid Samples	11
Number of Distinct Samples	11
Minimum	2.5
Maximum	43
Mean	16.8
Median	14
Standard Deviation	13.25186779
Variance	175.612
Coefficient of Variation	0.788801654
Skewness	0.977858445
Mean of log data	2.511426778
Standard Deviation of log data	0.86561226
90% Non-parametric UCLs	
Standard Bootstrap UCL	21.66904355
95% Non-parametric UCLs	
Standard Bootstrap UCL	23.11709823

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	1.0 to 2.0 ft
Sample Location:	Bradshaw Road Onramp - Loop (Borings B34 through B40 and B53 through B56)

DATA SET STATISTICS

Number of Valid Samples	11
Number of Distinct Samples	8
Minimum	2.5
Maximum	24
Mean	13.33636364
Median	12
Standard Deviation	8.823976
Variance	77.862545
Coefficient of Variation	0.661648
Skewness	0.155281
Mean of log data	2.312649
Standard Deviation of log data	0.8599997
90% Non-parametric UCLs	
Standard Bootstrap UCL	16.65004619
95% Non-parametric UCLs	
Standard Bootstrap UCL	17.49168109

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	2.0 to 3.0 ft
Sample Location:	Bradshaw Road Onramp - Loop (Borings B34 through B40 and B53 through B56)

DATA SET STATISTICS

Number of Valid Samples	10
Number of Distinct Samples	7
Minimum	2.5
Maximum	56
Mean	11.4
Median	5.6
Standard Deviation	16.938582
Variance	286.915556
Coefficient of Variation	1.485841
Skewness	2.493564
Mean of log data	1.802418
Standard Deviation of log data	1.053989
90% Non-parametric UCLs	
Standard Bootstrap UCL	17.88336632
95% Non-parametric UCLs	
Standard Bootstrap UCL	19.76980788

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	0.0 to 1.0 ft
Sample Location:	Bradshaw Road Onramp - Slip (Borings B41 through B45 and B57 through B64)

DATA SET STATISTICS

Number of Valid Samples	13
Number of Distinct Samples	12
Minimum	6.2
Maximum	22
Mean	13.38461538
Median	13
Standard Deviation	4.844386124
Variance	23.46807692
Coefficient of Variation	0.361936894
Skewness	0.345641429
Mean of log data	2.529391396
Standard Deviation of log data	0.383942596
90% Non-parametric UCLs	
Standard Bootstrap UCL	15.04395698
95% Non-parametric UCLs	
Standard Bootstrap UCL	15.51942298

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	1.0 to 2.0 ft
Sample Location:	Bradshaw Road Onramp - Slip (Borings B41 through B45 and B57 through B64)

DATA SET STATISTICS

Number of Valid Samples	13
Number of Distinct Samples	12
Minimum	2.5
Maximum	85
Mean	14.76923077
Median	8.5
Standard Deviation	21.386810
Variance	457.395641
Coefficient of Variation	1.448065
Skewness	3.440569
Mean of log data	2.280034
Standard Deviation of log data	0.790815
90% Non-parametric UCLs	
Standard Bootstrap UCL	22.12650904
95% Non-parametric UCLs	
Standard Bootstrap UCL	23.88613473

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	2.0 to 3.0 ft
Sample Location:	Bradshaw Road Onramp - Slip (Borings B41 through B45 and B57 through B64)

DATA SET STATISTICS

Number of Valid Samples	13
Number of Distinct Samples	12
Minimum	5.5
Maximum	19
Mean	10.19230769
Median	7.7
Standard Deviation	4.719545
Variance	22.274103
Coefficient of Variation	0.463050
Skewness	0.773455
Mean of log data	2.227727
Standard Deviation of log data	0.445163
90% Non-parametric UCLs	
Standard Bootstrap UCL	11.77279569
95% Non-parametric UCLs	
Standard Bootstrap UCL	12.24743526

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	0.0 to 1.0 ft
Sample Location:	Hazel Avenue Onramp - Loop (Borings B65 through B77)

DATA SET STATISTICS

Number of Valid Samples	13
Number of Distinct Samples	12
Minimum	5.7
Maximum	87
Mean	33.13076923
Median	20
Standard Deviation	26.59271155
Variance	707.1723077
Coefficient of Variation	0.802659044
Skewness	1.15679509
Mean of log data	3.201900902
Standard Deviation of log data	0.82266531
90% Non-parametric UCLs	
Standard Bootstrap UCL	42.16634551
95% Non-parametric UCLs	
Standard Bootstrap UCL	45.00630446

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	1.0 to 2.0 ft
Sample Location:	Hazel Avenue Onramp - Loop (Borings B65 through B77)

DATA SET STATISTICS

Number of Valid Samples	10
Number of Distinct Samples	10
Minimum	5.8
Maximum	41
Mean	17.87
Median	17
Standard Deviation	11.185213
Variance	125.109000
Coefficient of Variation	0.625921
Skewness	0.914033
Mean of log data	2.700236
Standard Deviation of log data	0.649672

90% Non-parametric UCLs

Standard Bootstrap UCL	22.22319141

95% Non-parametric UCLs

Standard Bootstrap UCL	23.41116529

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	2.0 to 3.0 ft
Sample Location:	Hazel Avenue Onramp - Loop (Borings B65 through B77)

DATA SET STATISTICS

Number of Valid Samples	9
Number of Distinct Samples	9
Minimum	2.5
Maximum	38
Mean	11.38888889
Median	7.6
Standard Deviation	10.850742
Variance	117.738611
Coefficient of Variation	0.952748
Skewness	2.251107
Mean of log data	2.143494
Standard Deviation of log data	0.764465
90% Non-parametric UCLs	
Standard Bootstrap UCL	15.80136353
95% Non-parametric UCLs	
Standard Bootstrap UCL	16.97180783

State Route 50 Ramp Meters Project
S9300-06-91

HAZEL AVENUE ONRAMPS

Sample ID	Total Lead	WET Lead
B52-0	51	0.125
B50-0	150	0.53
B51-0	130	0.84
B49-2	51	1.0
B78-0	54	2.3
B47-0	57	2.7
B81-0	87	3.0
B82-1	60	3.1
B79-0	170	4.5
B82-0	64	4.5
B80-0	120	4.9
B81-2	92	5.1
B47-1	78	5.2
B81-1	99	5.8
B49-0	220	9.9
B49-1	390	18

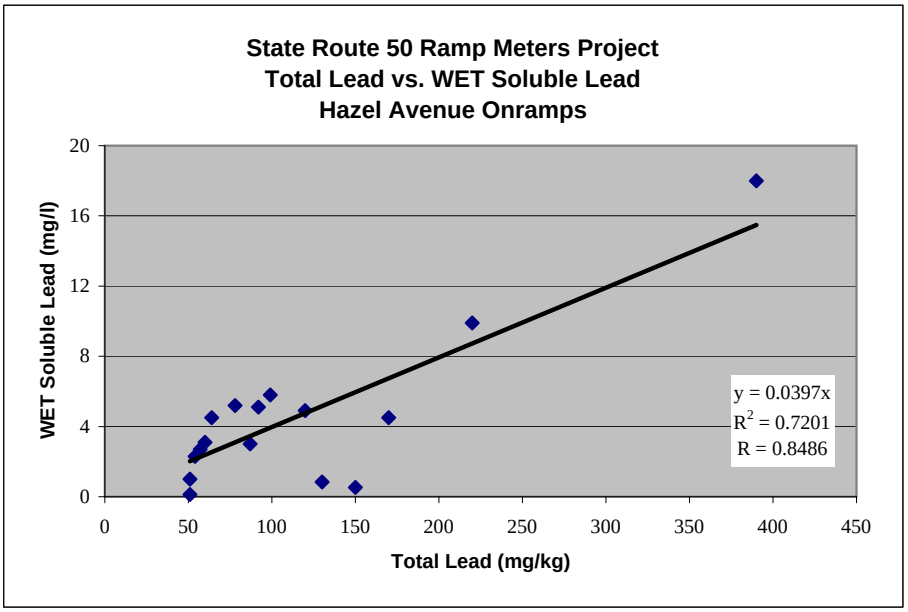


TABLE 3
SUMMARY OF STATISTICAL ANALYSIS
STATE ROUTE 50 RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

HAZEL AVENUE ONRAMP (LOOP)

Total Lead UCLs (mg/kg)

Sample Interval (feet)	90% UCL	95% UCL
0.0 to 1.0	42.2	45.0
1.0 to 2.0	22.2	23.4
2.0 to 3.0	15.8	17.0

Excavation Scenarios

	90% UCL		95% UCL	
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)
0.0 to 1.0 foot	42.2	1.7	45.0	1.8
Underlying Soil (1.0 to 3.0 feet)	*19.0*	*0.8*	*20.2*	0.8
0.0 to 2.0 feet	32.2	1.3	34.2	1.4
Underlying Soil (2.0 to 3.0 feet)	*15.8*	*0.6*	*17.0*	0.7
0.0 to 3.0 feet	26.7	1.1	28.5	1.1

Notes:

UCL = Upper Confidence Level

90% UCL applicable for waste classification and onsite reuse

95% UCL applicable for risk assessment and offsite disposal

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

* = Soluble (WET) lead concentrations were predicted using slope of the regression line, where y = predicted soluble (WET) lead and x = total lead

Regression Line Slope: $y = 0.0397\ x$

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	0.0 to 1.0 ft
Sample Location:	Hazel Avenue Onramp - Slip (Borings B46 through B52 and B78 through B82)

DATA SET STATISTICS

Number of Valid Samples	12
Number of Distinct Samples	12
Minimum	30
Maximum	220
Mean	97.75
Median	75.5
Standard Deviation	59.82569378
Variance	3579.113636
Coefficient of Variation	0.612027558
Skewness	0.812383299
Mean of log data	4.406151371
Standard Deviation of log data	0.628936248
90% Non-parametric UCLs	
Standard Bootstrap UCL	119.2492516
95% Non-parametric UCLs	
Standard Bootstrap UCL	124.6353826

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	1.0 to 2.0 ft
Sample Location:	Hazel Avenue Onramp - Slip (Borings B46 through B52 and B78 through B82)

DATA SET STATISTICS

Number of Valid Samples	8
Number of Distinct Samples	6
Minimum	2.5
Maximum	390
Mean	85.1875
Median	53.5
Standard Deviation	128.595417
Variance	16536.781250
Coefficient of Variation	1.509557
Skewness	2.378529
Mean of log data	3.201417
Standard Deviation of log data	1.993003
90% Non-parametric UCLs	
Standard Bootstrap UCL	141.5433538
95% Non-parametric UCLs	
Standard Bootstrap UCL	154.4093319

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	2.0 to 3.0 ft
Sample Location:	Hazel Avenue Onramp - Slip
	(Borings B46 through B52 and B78 through B82)

DATA SET STATISTICS

Number of Valid Samples	6
Number of Distinct Samples	4
Minimum	2.5
Maximum	92
Mean	27.08333333
Median	7.25
Standard Deviation	36.950530
Variance	1365.341667
Coefficient of Variation	1.364327
Skewness	1.422687
Mean of log data	2.281232
Standard Deviation of log data	1.635557
90% Non-parametric UCLs	
Standard Bootstrap UCL	45.03160897
95% Non-parametric UCLs	
Standard Bootstrap UCL	50.19460673

State Route 50 Ramp Meters Project
S9300-06-91

HAZEL AVENUE ONRAMPS

Sample ID	Total Lead	WET Lead
B52-0	51	0.125
B50-0	150	0.53
B51-0	130	0.84
B49-2	51	1.0
B78-0	54	2.3
B47-0	57	2.7
B81-0	87	3.0
B82-1	60	3.1
B79-0	170	4.5
B82-0	64	4.5
B80-0	120	4.9
B81-2	92	5.1
B47-1	78	5.2
B81-1	99	5.8
B49-0	220	9.9
B49-1	390	18

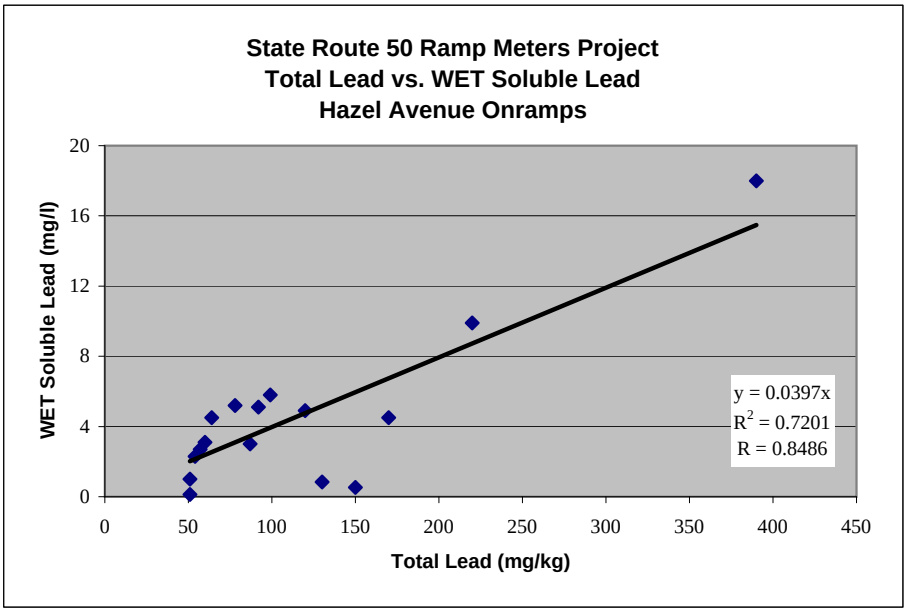


TABLE 3
SUMMARY OF STATISTICAL ANALYSIS
STATE ROUTE 50 RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

HAZEL AVENUE ONRAMP (SLIP)

Total Lead UCLs (mg/kg)

Sample Interval (feet)	90% UCL	95% UCL
0.0 to 1.0	119.2	124.6
1.0 to 2.0	141.5	154.4
2.0 to 3.0	45.0	50.2

Excavation Scenarios

	90% UCL		95% UCL	
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)
0.0 to 1.0 foot	119.2	4.7	124.6	4.9
Underlying Soil (1.0 to 3.0 feet)	*93.3*	*3.7*	*102.3*	4.1
0.0 to 2.0 feet	130.4	**5.2**	139.5	**5.5**
Underlying Soil (2.0 to 3.0 feet)	*45.0*	*1.8*	*50.2*	2.0
0.0 to 3.0 feet	101.9	4.0	109.7	4.4

Notes:

UCL = Upper Confidence Level

90% UCL applicable for waste classification and onsite reuse

95% UCL applicable for risk assessment and offsite disposal

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

* = Soluble (WET) lead concentrations were predicted using slope of the regression line, where y = predicted soluble (WET) lead and x = total lead

Regression Line Slope: $y = 0.0397\ x$

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	0.0 to 1.0 ft
Sample Location:	Folsom Boulevard Onramp (Borings B83 through B97)

DATA SET STATISTICS

Number of Valid Samples	15
Number of Distinct Samples	15
Minimum	5.4
Maximum	720
Mean	87.24666667
Median	35
Standard Deviation	180.4353341
Variance	32556.90981
Coefficient of Variation	2.068105763
Skewness	3.528900405
Mean of log data	3.591200152
Standard Deviation of log data	1.182135473
90% Non-parametric UCLs	
Standard Bootstrap UCL	145.1077203
95% Non-parametric UCLs	
Standard Bootstrap UCL	160.1416968

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	1.0 to 2.0 ft
Sample Location:	Folsom Boulevard Onramp (Borings B83 through B97)

DATA SET STATISTICS

Number of Valid Samples	12
Number of Distinct Samples	10
Minimum	2.5
Maximum	26
Mean	11.56666667
Median	8.4
Standard Deviation	8.078179
Variance	65.256970
Coefficient of Variation	0.698402
Skewness	0.637916
Mean of log data	2.186414
Standard Deviation of log data	0.798272
90% Non-parametric UCLs	
Standard Bootstrap UCL	14.40450475
95% Non-parametric UCLs	
Standard Bootstrap UCL	15.21773729

DESCRIPTION OF DATA SET

Project Name:	State Route 50 (SAC-50) Ramp Meters Project
Project No.:	S9300-06-91
Sample Interval:	2.0 to 3.0 ft
Sample Location:	Folsom Boulevard Onramp (Borings B83 through B97)

DATA SET STATISTICS

Number of Valid Samples	8
Number of Distinct Samples	7
Minimum	2.5
Maximum	19
Mean	9.525
Median	7.95
Standard Deviation	5.957408
Variance	35.490714
Coefficient of Variation	0.625450
Skewness	0.353090
Mean of log data	2.032249
Standard Deviation of log data	0.770319

90% Non-parametric UCLs

Standard Bootstrap UCL	12.03362026

95% Non-parametric UCLs

Standard Bootstrap UCL	12.78269431

State Route 50 Ramp Meters Project
S9300-06-91

FOLSOM BOULEVARD ONRAMP

Sample ID	Total Lead	WET Lead
B96-0	62	2.0
B90-0	190	13
B95-0	720	35

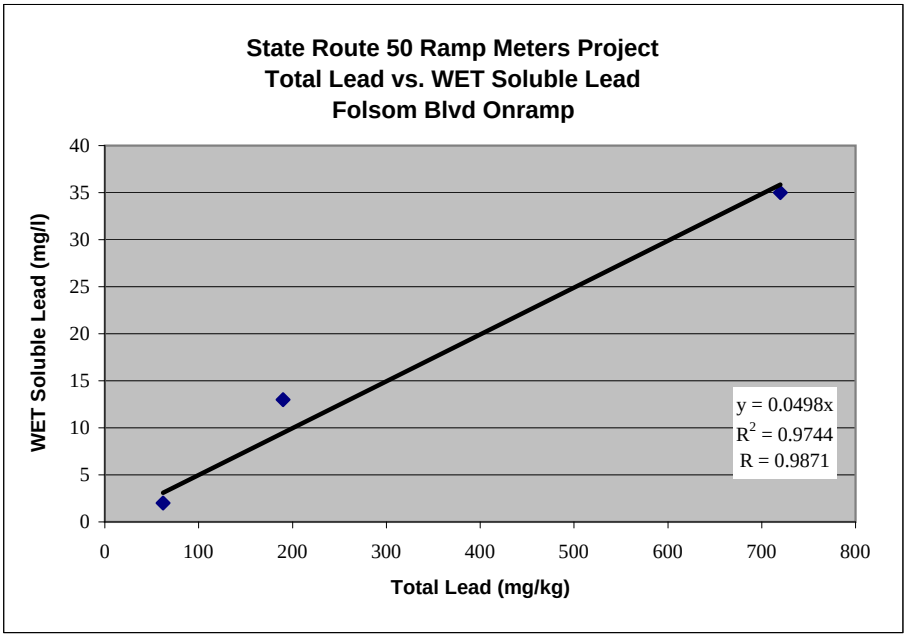


TABLE 3
SUMMARY OF STATISTICAL ANALYSIS
STATE ROUTE 50 RAMP METERS PROJECT
SACRAMENTO COUNTY, CALIFORNIA

FOLSOM BOULEVARD ONRAMP

Total Lead UCLs (mg/kg)

Sample Interval (feet)	90% UCL	95% UCL
0.0 to 1.0	145.1	160.1
1.0 to 2.0	14.4	15.2
2.0 to 3.0	12.0	12.8

Excavation Scenarios

	90% UCL		95% UCL	
Excavation Depth	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)	Total Lead (mg/kg)	Soluble (WET) Lead * (mg/l)
0.0 to 1.0 foot	145.1	**7.2**	160.1	**8.0**
Underlying Soil (1.0 to 3.0 feet)	*13.2*	*0.7*	*14.0*	0.7
0.0 to 2.0 feet	79.8	4.0	87.7	4.4
Underlying Soil (2.0 to 3.0 feet)	*12.0*	*0.6*	*12.8*	0.6
0.0 to 3.0 feet	57.2	2.8	62.7	3.1

Notes:

UCL = Upper Confidence Level

90% UCL applicable for waste classification and onsite reuse

95% UCL applicable for risk assessment and offsite disposal

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

* = Soluble (WET) lead concentrations were predicted using slope of the regression line, where y = predicted soluble (WET) lead and x = total lead

Regression Line Slope: $y = 0.0498\ x$

ASBESTOS AND LEAD-CONTAINING PAINT SURVEY

State Route 50 Bridges
Sacramento County, California

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 3
703 B STREET / P.O. BOX 911
MARYSVILLE, CALIFORNIA 95901

PREPARED BY:

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DRIVE, SUITE 800
RANCHO CORDOVA, CALIFORNIA 95742

GEOCON PROJECT NO. S9300-06-91
TASK ORDER NO. 91, EA 03-1C1201

JANUARY 2010

Project No. S9300-06-91
January 13, 2010

Rajive Chadha, Task Order Manager
Caltrans District 3
703 B Street/P.O. Box 911
Marysville, California 95901

Subject: STATE ROUTE 50 (SAC-50) BRIDGES
SACRAMENTO COUNTY, CALIFORNIA
CONTRACT NO. 03A1368
TASK ORDER NO. 91, EA NO. 03-1C1201
ASBESTOS AND LEAD-CONTAINING PAINT SURVEY REPORT

Dear Mr. Chadha:

In accordance with California Department of Transportation Contract No. 03A1368 and Task Order No. 91, we performed asbestos and lead-containing paint surveys of two bridge spans on State Route 50 in Sacramento County, California. The scope of services included surveying Bridges 24-0318 (65th Street Bridge) and 24-0120 (Natoma Overhead Bridge) for suspect asbestos-containing materials and lead-containing paint, collecting bulk samples, and submitting the samples for laboratory analysis.

The accompanying report summarizes the services performed and laboratory analysis.

The contents of this report reflect the views of Geocon Consultants, Inc., 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.

Please contact us if you have questions concerning the contents of this report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

Chris Giuntoli, CAC
Senior Project Scientist

John E. Juhrend, PE, CEG
Project Manager

JAG:JEJ:krh

(5 + 3 CDs) Addressee

TABLE OF CONTENTS

ASBESTOS AND LEAD-CONTAINING PAINT SURVEY REPORT

1.0 INTRODUCTION

This asbestos and lead-containing paint (LCP) survey report was prepared by Geocon Consultants, Inc. under Caltrans Contract No. 03A1368, Task Order No. 91.

1.1 Project Description

The project consists of Bridges 24-0318 (65th Street Bridge) and 24-0120 (Natoma Overhead Bridge) located along State Route 50 (SAC-50) in Sacramento County, California. The bridge locations are depicted on the Vicinity Map, Figure 1, and Site Plans, Figures 2-1 and 2-2.

1.2 General Objectives

The purpose of the scope of services outlined in Task Order 91 was to determine the presence and quantity of asbestos and deteriorated LCP at the project locations prior to renovation activities. The information obtained from this investigation will be used by Caltrans for waste profiling, determining California Occupational Safety and Health Administration (Cal/OSHA) applicability, and coordinating asbestos and LCP disturbance activities.

> *It was <u>not</u> Geocon's intent during this inspection to conduct an evaluation of lead-based paint hazards in accordance with U.S. Department of Housing and Urban Development (HUD) guidelines. HUD protocol generally requires a very extensive sampling strategy that includes sampling of paint on each surface type (e.g., wall, ceiling, window sill, window frame, door frame, molding, etc.) in each room.*

2.0 BACKGROUND

2.1 Asbestos

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 (can be crumbled, pulverized, or reduced to powder by hand pressure); 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 may make it cost ineffective to do so. 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. Intact LCP on a component is currently accepted by most landfill facilities; 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 lead-containing paint. 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

Caltrans did not provide architectural drawings of the subject bridges for our review.

3.0 SCOPE OF SERVICES

Mr. Joshua Goodwin, a California-Certified Asbestos Consultant (CAC), certification No. 05-3754 (expiration June 16, 2010), and Certified Lead Paint Inspector/Assessor with the California Department of Public Health (DPH), certification number I-19737 (expiration June 7, 2010), performed the asbestos and LCP survey at the project location on June 15, 2009.

3.1 Asbestos

Suspect ACM were grouped into homogeneous areas with representative samples randomly collected from each. In addition, each potential ACM was evaluated for friability. A total of 14 bulk asbestos samples representing 8 material types were collected.

Our procedures for inspection and sampling in accordance with Task Order 91 are discussed below:

- Collected bulk asbestos samples after first wetting friable material with a light mist of water. The samples were then cut from the substrate and transferred to a labeled container. Note that when multiple samples were collected, the sampling locations were distributed throughout the homogeneous area (spaces where the material was observed).
- Relinquished bulk asbestos samples under chain-of-custody protocol to EMSL Analytical, Inc., a California-licensed and Caltrans-approved subcontractor, for asbestos analysis in accordance with United States Environmental Protection Agency (EPA) Test Method 600/R-93/116 using polarized light microscopy (PLM). EMSL Analytical, Inc. is a laboratory accredited by the National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program (NIST-NVLAP) for bulk asbestos fiber analysis. The laboratory analyses were requested on a 3-workday turn-around-time.

Sample group identification numbers, material descriptions, approximate quantities, friability assessments, and photo references are summarized on Table 1. Approximate sample locations are presented on Figures 2-1 and 2-2. Materials represented by the samples collected are shown in the attached photographs.

3.2 Lead Paint

We did not observe suspect LCP at Bridges 24-0318 (65th Street Bridge) or 24-0120 (Natoma Overhead Bridge) during our survey activities.

4.0 INVESTIGATIVE RESULTS

4.1 Asbestos Analytical Results

Chrysotile asbestos at a concentration of 50% was detected in a sample representing nonfriable sheet packing used as shims on the barrier rail systems of Bridge 24-0318 (65th Street Bridge). We were not able to quantify the amount of sheet packing due to safety concerns (i.e., traffic).

Chrysotile asbestos at a concentration of 50% was detected in samples representing nonfriable sheet packing used as shims on the barrier rail systems of Bridge 24-0120 (Natoma Overhead Bridge). We were not able to quantify the amount of sheet packing due to safety concerns (i.e., traffic).

Chrysotile asbestos at a concentration of 3% was detected in a sample representing nonfriable thread compound used on the barrier rail systems of Bridge 24-0120 (Natoma Overhead Bridge). We were not able to quantify the thread compound due to safety concerns (i.e., traffic).

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

4.2 Paint Analytical Results

We did not observe painted surfaces on either bridge during our surveys; therefore, samples were not collected for lead analysis.

5.0 RECOMMENDATIONS

Based on our findings, we recommend the following:

5.1 Asbestos

NESHAP regulations do not require that asbestos-containing sheet packing or thread compound (Category I nonfriable/nonhazardous materials) identified during our survey be removed prior to demolition or be treated as hazardous waste. However, the disturbance of these materials is still covered by the Cal/OSHA asbestos standard (Title 8, CCR Section 1529). We recommend that a licensed contractor registered with Cal/OSHA for asbestos-related work perform any activities that would disturb the materials. Contractors are responsible for informing the landfill of the contractor's intent to dispose of asbestos waste. Some landfills may require additional waste characterization. Contractors are responsible for segregating and characterizing waste streams prior to disposal.

Geocon also recommends the notification of contractors (that will be conducting renovation or related activities) of the presence of asbestos in their work areas (i.e., provide contractor[s] with a copy of this report and a list of asbestos removed during subsequent activities). Contractors not trained for asbestos work should be instructed not to disturb asbestos during their activities.

Written notification to the Sacramento Metropolitan Air Quality Management District 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.

5.2 Lead Paint

LCP was not identified during our surveys as both bridges were concrete structures and void of painted surfaces.

6.0 REPORT LIMITATIONS

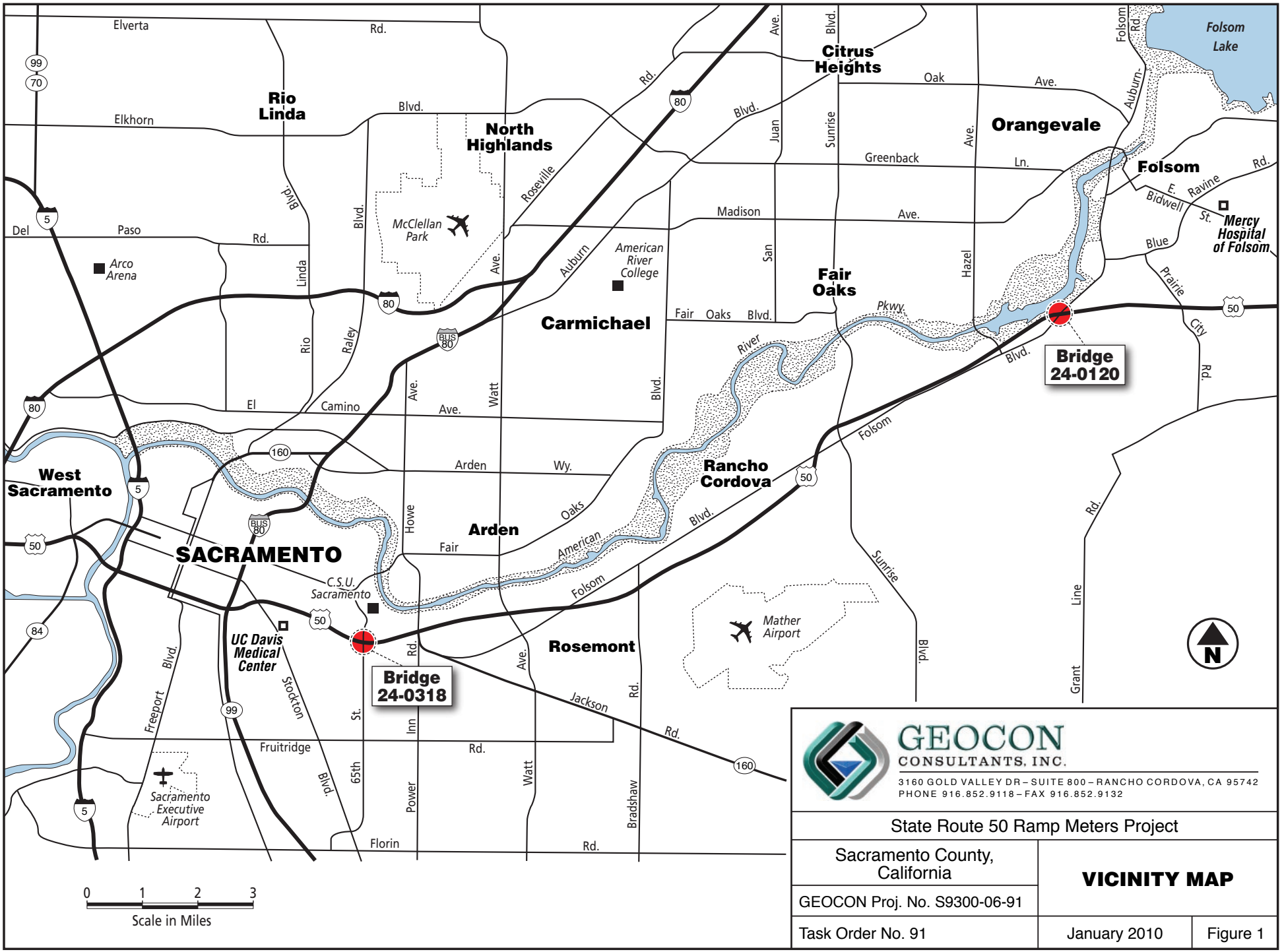
This asbestos and LCP survey was conducted in conformance with generally accepted standards of practice for identifying and evaluating asbestos and LCP in structures. The survey addressed only those structures identified in Section 1.1. Due to the nature of structure surveys, asbestos and LCP use, and laboratory analytical limitations, some ACM or LCP at the project location may not have been identified. Spaces such as cavities, voids, crawlspaces, and pipe chases may have been concealed to our investigator. Previous 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 ACM with indistinguishable non-ACM. Asbestos and/or LCP may exist in areas of the structures that were not accessible or sampled in conjunction with this TO.

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 ACM and/or LCP 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 Caltrans. 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.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

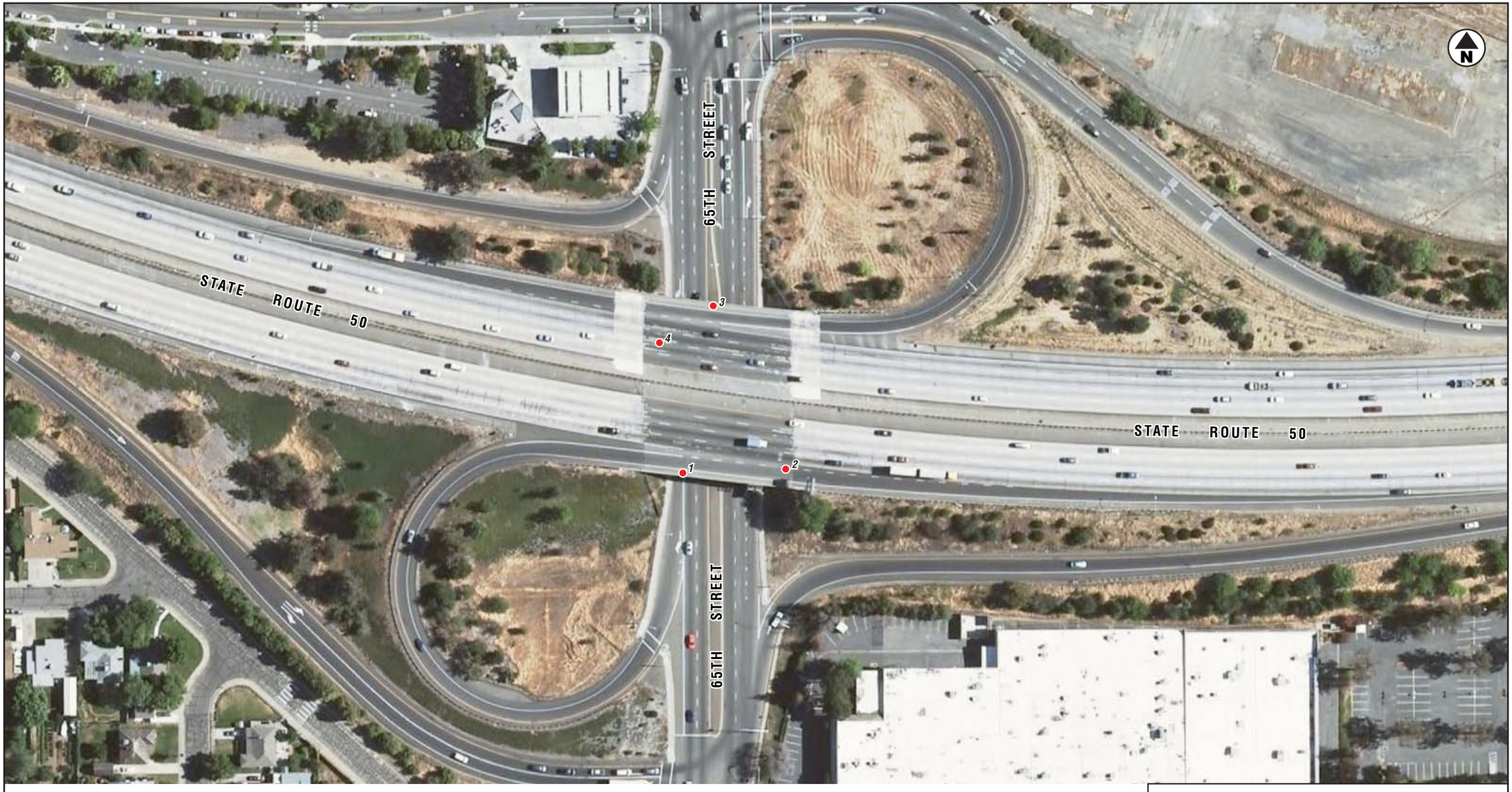
State Route 50 Ramp Meters Project

Sacramento County, California

VICINITY MAP

GEOCON Proj. No. S9300-06-91

Task Order No. 91 | January 2010 | Figure 1



LEGEND:

- Approximate Asbestos Sample Location

0 100

Scale in Feet

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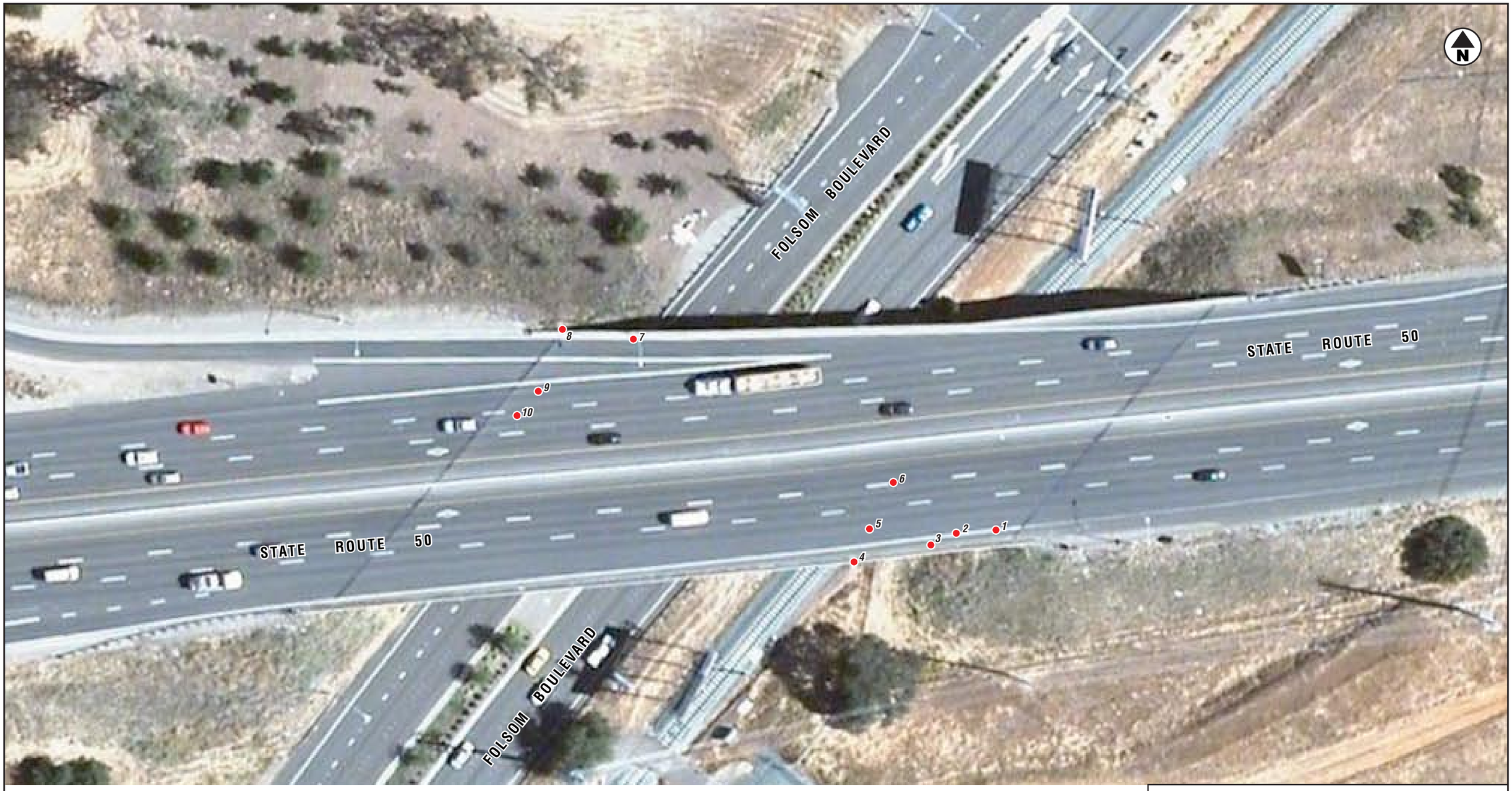
State Route 50 Ramp Meters Project

Sacramento County, California	**SITE PLAN** **Bridge No. 24-0318**	
GEOCON Proj. No. S9300-06-91		
Task Order No. 91	January 2010	Figure 2-1



LEGEND:

- Approximate Asbestos Sample Location

0 50

Scale in Feet

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State Route 50 Ramp Meters Project

Sacramento County, California	**SITE PLAN** **Bridge No. 24-0120**	
GEOCON Proj. No. S9300-06-91		
Task Order No. 91	January 2010	Figure 2-2

Photo 1 – 65th Street Bridge (Bridge 24-0318)

Photo 2 – Bridge 24-0318 barrier rail shim (50% chrysotile asbestos)

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PHOTOGRAPHS 1 & 2		
State Route 50 Bridges Sacramento County, California		
S9300-06-91	Task Order No. 91	January 2010

Photo 3 – Bridge 24-0318 expansion joint material

Photo 4 – Bridge 24-0318 barrier rail shim (50% chrysotile asbestos)

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Photo 5 – Bridge 24-0318 expansion joint material

Photo 6 – Bridge 24-0318 approach

Photo 7 – Natoma Overhead Bridge (Bridge 24-0120)

Photo 8 – Bridge 24-0120 abutment

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PHOTOGRAPHS 7 & 8		
State Route 50 Bridges Sacramento County, California		
S9300-06-91	Task Order No. 91	January 2010

Photo 9 –Bridge 24-0120 barrier rail shim (50% chrysotile asbestos)

Photo 10 – Bridge 24-0120 expansion joint fill material (brown)

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PHOTOGRAPHS 9 & 10		
State Route 50 Bridges Sacramento County, California		
S9300-06-91	Task Order No. 91	January 2010

Photo 11 – Bridge 24-0120 thread compound

Photo 12 – Bridge 24-0120 bearing material

Photo 13 – Bridge 24-0120 drain pipe

Photo 14 – Bridge 24-0120 expansion joint fill material (brown)

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Photo 15 – Bridge 24-0120 thread compound (3% chrysotile asbestos)

Photo 16 – Bridge 24-0120 bearing material

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PHOTOGRAPHS 15 & 16		
State Route 50 Bridges Sacramento County, California		
S9300-06-91	Task Order No. 91	January 2010

Photo 17 – Bridge 24-0120 drain pipe and black sealant material

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TABLE 1
SUMMARY OF ASBESTOS ANALYTICAL RESULTS
STATE ROUTE 50 (SAC-50) BRIDGES - 65th STREET (24-0318) AND NATOMA OVERHEAD (24-0120)
CALTRANS CONTRACT 03A1638, TASK ORDER NO. 91, EA 03-1C1201
SACRAMENTO COUNTY, CALIFORNIA

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

Bridge No.	Sample No.	Description of Material	Approximate Quantity	Friable	Site Photo	Asbestos Content
24-0318	24-0318-1	Sheet Packing (barrier rail shims)	Unable to safely quantify	No	2	50%
	24-0318-2	Expansion joint fill material	NA	NA	3	ND
	24-0318-3	Sheet Packing (barrier rail shims)	Unable to safely quantify	No	4	50%
	24-0318-4	Expansion joint fill material	NA	NA	5	ND
24-0120	24-0120-1	Sheet Packing (barrier rail shims)	Unable to safely quantify	No	9	50%
	24-0120-2	Expansion joint fill material	NA	NA	10	ND
	24-0120-3	Thread compound	NA	NA	11	ND
	24-0120-4	Bearing material	NA	NA	12	ND
	24-0120-5	Drain Pipe	NA	NA	13	ND
	24-0120-6	Expansion joint fill material	NA	NA	14	ND
	24-0120-7	Thread compound	Unable to safely quantify	No	15	3%
	24-0120-8	Bearing material	NA	NA	16	ND
	24-0120-9	Drain Pipe	NA	NA	17	ND
	24-0120-10	Black sealant material	NA	NA	17	ND

Notes:

NA = Not applicable (no asbestos detected)

ND = Not detected

= Sample reported with asbestos

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: **Josh Goodwin**
Geocon Consultants
3160 Gold Valley Drive
Suite 800
Rancho Cordova, CA 95742

Fax: (916) 852-9132 Phone: (916) 852-9118
Project: **S9300-06-91**

Customer ID: GECN80
Customer PO: S9300-06-91
Received: 06/16/09 11:00 AM
EMSL Order: 090904607

EMSL Proj: S9300-06-**
Analysis Date: 6/19/2009

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

			Non-Asbestos				Asbestos	
Sample	**Description**	**Appearance**	**%**	**Fibrous**	**%**	**Non-Fibrous**	**%**	**Type**
24-0120-1-Rail shim *090904607-0001*	East bound	Black Fibrous Homogeneous			50%	Non-fibrous (other)	**50%**	**Chrysotile**
24-0120-2-EB Joint material *090904607-0002*	East bound	Brown Fibrous Homogeneous	25%	Cellulose	75%	Non-fibrous (other)	**None Detected**	
24-0120-3-EB Thread compound *090904607-0003*	East bound	Gray Non-Fibrous Homogeneous	3%	Cellulose	97%	Non-fibrous (other)	**None Detected**	
24-0120-4-EB Joint material *090904607-0004*	East bound under styrofoam	Brown Fibrous Homogeneous	20%	Cellulose	80%	Non-fibrous (other)	**None Detected**	
24-0120-5-Drain pipe *090904607-0005*	Under East end	Brown Fibrous Homogeneous	20%	Cellulose	80%	Non-fibrous (other)	**None Detected**	
24-0120-6-Joint material *090904607-0006*	Under East end	Brown Fibrous Homogeneous	50%	Cellulose	50%	Non-fibrous (other)	**None Detected**	

Analyst(s)

Kelly Favero (14)

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
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EMSL Proj: S9300-06-**
Analysis Date: 6/19/2009

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

			Non-Asbestos				Asbestos	
Sample	**Description**	**Appearance**	**%**	**Fibrous**	**%**	**Non-Fibrous**	**%**	**Type**
24-0120-7-Thread compound *090904607-0007*	West bound	Gray Non-Fibrous Homogeneous			97%	Non-fibrous (other)	**3%**	**Chrysotile**
24-0120-8-Joint material *090904607-0008*	West bound under styrofoam	Brown Fibrous Homogeneous	20%	Cellulose	80%	Non-fibrous (other)	**None Detected**	
24-0120-9-Drain pipe *090904607-0009*	Under West end	Brown Fibrous Heterogeneous	10%	Cellulose	90%	Non-fibrous (other)	**None Detected**	
24-0120-10-Crack sealant *090904607-0010*		Black Non-Fibrous Homogeneous			100%	Non-fibrous (other)	**None Detected**	
24-0318-1-EB Rail shim *090904607-0011*	East bound	Gray Fibrous Homogeneous			50%	Non-fibrous (other)	**50%**	**Chrysotile**
24-0318-2-Joint material *090904607-0012*	Under East end	Brown Fibrous Homogeneous	35%	Cellulose	65%	Non-fibrous (other)	**None Detected**	

Analyst(s)

Kelly Favero (14)

Baojia Ke, Laboratory Manager
or other approved signatory

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EMSL Proj: S9300-06-**
Analysis Date: 6/19/2009

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

			Non-Asbestos				Asbestos	
Sample	**Description**	**Appearance**	**%**	**Fibrous**	**%**	**Non-Fibrous**	**%**	**Type**
24-0318-3-WB Rail shim *090904607-0013*	West bound	Various Fibrous Homogeneous			50%	Non-fibrous (other)	**50%**	**Chrysotile**
24-0318-4-Joint material *090904607-0014*	Under West end	Brown Fibrous Homogeneous	50%	Cellulose	50%	Non-fibrous (other)	**None Detected**	

Analyst(s)

Kelly Favero (14)

Baojia Ke, Laboratory Manager
or other approved signatory

THIS IS THE LAST PAGE OF THE REPORT.

90904607

Chain of Custody

Asbestos Lab Services

EMSL Analytical, Inc.
Suite 230
2235 Polvorosa Ave
San Leandro,
CA 94577
Phone: (510) 895-3675 (888) 455-3675
Fax: (510) 895-3680
http://www.emsl.com

Please print all information legibly.

Company:	Geocon Consultants, Inc.	***Bill To:***	Geocon Consultants, Inc.
Address1:	3160 Gold Valley Drive, Suite 800	*Address1:*	3160 Gold Valley Drive, Suite 800
Address2:		*Address2:*	
City, State:	Rancho Cordova, CA	*City, State:*	Rancho Cordova, CA
Zip/Post Code:	95742	*Zip/Post Code:*	95742
Country:	USA	*Country:*	USA
Contact Name:	Josh Goodwin	***Attn:***	Josh Goodwin
Phone:	916-852-9118	*Phone:*	916-852-9118
Fax:	916-852-9132	*Fax:*	916-852-9132
Email:	goodwin@geoconinc.com	*Email:*	goodwin@geoconinc.com
EMSL Rep:	Daniel Kocher	***P.O. Number:***	
Project Name/Number:	S9300-06-91		

MATRIX			TURNAROUND			
☐ Air	☐ Soil	☐ Micro-Vac	☐ 3 Hours	☐ 6 Hours		☐ 24 Hours (1 day)
☒ Bulk	☐ Drinking Water		☐ 48 Hours (2 days)	☐ 72 Hours (3 days)	☐ 96 Hours (4 days)	☒ 120 Hours (5 days)
☐ Wipe	☐ Wastewater		☐ 144+ hours (6-10 days)			

TEM AIR, 3 hours, 6 hours, Please call ahead to schedule. There is a premium charge for 3-hour tat, please call 1-800-220-3675 for price prior to sending samples. You will be asked to sign an authorization form for this service.

PCM - Air
- ☐ NIOSH 7400(A) Issue 2: August 1994
- ☐ OSHA w/TWA
- ☐ Other:

PLM - Bulk
- ☒ EPA 600/R-93/116
- ☐ EPA Point Count
- ☐ NY Stratified Point Count
- ☐ PLM NOB (Gravimetric) NYS 198.1
- ☐ NIOSH 9002:
- ☐ EMSL Standard Addition:

SEM Air or Bulk
- ☐ Qualitative
- ☐ Quantitative

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

TEM BULK
- ☐ Drop Mount (Qualitative)
- ☐ Chatfield SOP - 1988-02
- ☐ TEM NOB (Gravimetric) NYS 198.4
- ☐ EMSL Standard Addition:

PLM Soil
- ☐ EPA Protocol Qualitative
- ☐ EPA Protocol Quantitative
- ☐ EMSL MSD 9000 Method fibers/gram

TEM WATER
- ☐ EPA 100.1
- ☐ EPA 100.2
- ☐ NYS 198.2

TEM Microvac/Wipe
- ☐ ASTM D 5755-95 (quantative method)
- ☐ Wipe Qualitative

XRD
- ☐ Asbestos
- ☐ Silica NIOSH 7500

OTHER
- ☐

90904607

Chain of Custody

Asbestos Lab Services

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Fax: (510) 895-3680
http://www.emsl.com

Please print all information legibly.

Client Sample # (s): 24-0120-1 - 24-0318-4 **Total Samples #:** 14

Relinquished: [signature] **Date:** 6/15/09 **Time:** 1600

Received: [signature] **Date:** 6/16/09 **Time:** 19:00 ups

Relinquished: _____ **Date:** _____ **Time:** _____

Received: _____ **Date:** _____ **Time:** _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
24-0120-1	East Bound Rail shim	
24-0120-2	EB Joint Material	
24-0120-3	EB Thread Compound	
24-0120-4	EB Joint Material under styra foam	
24-0120-5	Drain pipe (under [redacted] East end)	
24-0120-6	Joint Material (under E. end)	
24-0120-7	West Bound Thread Compound	
24-0120-8	WB Joint Material under styra foam	
24-0120-9	Drain Pipe under W. end	
24-0120-10	Crack Sealant (Black)	
24-0318-1	EB Rail Shim	
24-0318-2	Joint Material under E. end	
24-0318-3	WB. Rail Shim	
24-0318-4	Joint Materia under W. End	

State of California

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. GUDMUND SETBERG, CHIEF
Bridge Design, Branch 2
Office of Bridge Design North
Division of Engineering Services
Structure Design, MS 9 4/11G

Date: April 16, 2009
File: 03-SAC-50-17.01
03-1C1301
Natoma Overhead
Br. No. 24-0120R
(widen)

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – North

Subject: Foundation Recommendations

This memorandum is in response to your request dated April 28, 2008 regarding foundation recommendations for the proposed Natoma Overhead right-side bridge widening project located on Route 50 in the County of Sacramento.

The information in this report is based on review of the following resources:

1. Two exploratory borings completed in 1999, for the median widening.
2. A Final Foundation Recommendations report dated November 17, 1999 for the median widening.
3. Pile quantity and driving records for both the original bridge and median widening.
4. The Caltrans Seismic Hazard Map, 1996 and Seismic Design Criteria.
5. Planning study sheets dated February, 2007.

Site Geology

The project site underlain by alluvium consisting of medium dense to very dense sand, silty sand, sandy clay with gravel, gravelly sand and cobbles and scattered boulders. Bedrock was encountered in the 1999 exploratory borings at an elevation of approximately 140 feet. The bedrock consists of coarse grained sandstone, siltstone and conglomerate.

Groundwater

Groundwater was encountered in the 1999 exploratory borings at an elevation of 141 feet. Groundwater is not expected to be a factor for design or construction.

Seismicity

Based on the Caltrans California Seismic Hazard Map 1996, the controlling fault is the Prairie Creek-Spenceville-Dentman (PSD, normal) with a maximum credible earthquake moment magnitude of Mw=6.5, and is located about 7 miles northeast of the site. The Peak Bedrock Acceleration, based on the above map is 0.3g.

Based on the log of test borings, a modified final Caltrans Seismic Design Criteria (CSDC) Acceleration Response Spectrum (ARS) curve corresponding to soil profile Type D is recommended for design. Please note that due to the close proximity of this structure to the fault, we have performed a second modification to the CSDC ARS curve (see attached Figure 1). The modification is such that there is no increase in spectral accelerations (SA) for periods less than 0.5 second, and a 20% increase in SA for periods greater than 1 second. Between the periods of 0.5 and 1 second, a linear interpolation was used to estimate the SA.

Surface Fault Rupture Hazard

The site is not located within any Earthquake Fault Zone (EFZ) as defined by the California Department of Conservation (Special Publication 42, 1997). There are no known faults crossing beneath or extending directly toward the site. Therefore, the potential hazard due to ground rupture is considered to be very low.

Corrosivity

Composite soil samples were taken from the 1999 exploratory borings for the median widening. The test results indicate that the subsurface materials are non-corrosive to construction materials or structural elements.

Liquefaction Potential

The site is not located in an area shown as potentially liquefiable on the State of California Seismic Hazard Map and the liquefaction potential should be considered low.

As-Built Bridge Foundation

The original structure was constructed in 1962. It is supported by spread footings at the bent locations using an allowable soil bearing pressure of 3.5 tons/sq. ft. The abutments are supported by 45-ton design load steel-shell lined concrete piles. The left side of the structure was widened in the median in 2000. The widening is supported by 11 feet wide spread footings at the bent locations using an allowable soil bearing pressure of 5.1 tons/sq. ft. The abutments for the median widening are supported by HP 10X57 steel H-piles.

Final Foundation Recommendations

Bents

The optimum foundation support type for the right-side bridge widening at the bent locations is spread footings.

Table 1 lists the recommended soil bearing and stress limits for spread footings:

Table 1
Spread Footing Data Table
Bent Locations

Support Location	Footing Size (ft)		Bottom of Footing Elevation (ft)	Minimum Footing Embedment Depth (ft)	Total Permissible Settlement (in)	WSD (LRFD) Service-I Limit Load State Combination		LRFD		
								Service	Strength $\phi_b = 0.45$	Extreme $\phi_b = 1.0$
	B	L				Permissible Gross Contact Stress (ksf)	Allowable Gross Bearing Capacity (ksf)	Permissible Net Contact Stress (ksf)	Factored Gross Nominal Bearing Resistance (ksf)	Factored Gross Nominal Bearing Resistance (ksf)
Bents 2-5	10.0	10.0	155	3	1	N/A	N/A	10.5	12.6	28.1

Abutments

The optimum foundation support type for the abutments is steel H-piles, HP 10 x 57.

Table 2 lists the foundation recommendation parameters for H-piles.

Table 2. Foundation Recommendations for Abutments

Steel H-piles

Abutment Foundation Design Recommendations									
Support Location	Pile Type	Cut-off Elevation (ft)	LRFD Service-I Limit State Load Per Support (kips)		LRFD Service-I Limit State Total Load Per Pile (kips)	Nominal Resistance (kips)	Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent	Compression				
Abut 1	HP 10X57	176	800	510	100	200	148.0	148.0	200
Abut 6	HP 10X57	183	590	410	100	200	148.0	148.0	200

Note: (a) Design tip elevations are controlled by compression.

Tables 3 and 4 are the foundation data tables to be included in the project contract documents.

Table 3
Spread Footing Data for Contract Plans

Support Location	Working Stress Design (WSD)		Load and Resistance Factor Design (LRFD)		
	Permissible Gross Contact Stress (Settlement) (ksf)	Allowable Gross Bearing Capacity (ksf)	**Service** Permissible Net Contact Stress (ksf)	**Strength** Factored Gross Nominal Bearing Resistance $\phi_b = 0.45$ (ksf)	**Extreme** Factored Gross Nominal Bearing Resistance $\phi_b = 1.0$ (ksf)
Bents 2-5	N/A	N/A	10.5	12.6	28.1

Table 4
Pile Data Table for Contract Plans

Support Location	Pile Type (ft)	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
		Compression	Tension			
Abut 1	HP 10X57	200	N/A	148.0 (a)	148.8	200
Abut 6	HP 10X57	200	N/A	148.0 (a)	148.8	200

Note: (a) Design tip elevations are controlled by compression.

Construction Considerations

Spread footing excavation areas may contain cobbles and/or boulders.

All foundation excavations, when completed, shall be inspected and approved by a representative of this Office prior to placement of any steel reinforcement or concrete.

Due to the granular nature of the soil at the site, primary settlement is expected to occur immediately and concurrent with embankment fill placement. No waiting period is required prior to installing piles through any new embankment fills.

Difficult driving conditions may be encountered below elevation 170.

Piles at the abutments may be cut of to within 10 feet of specified tip elevation with the Engineers approval if the acceptance criteria are met.

Project Information

Standard Special Provision S5-280, "Project Information", discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:
One Log of Test Borings, 1999 (2 borings).

Data and information included in the Information Handout provided to the bidders and contractors are: None.

Data and information available for inspection at the District Office: None.

Data and information available for inspection at the Transportation Laboratory are:
This report..

For further information, contact Christopher Koepke at 916-227-1040.

Christopher Koepke, C.E.G. 2207
Engineering Geologist
Office of Geotechnical Design – North
Branch E

REGISTERED GEOLOGIST
CHRISTOPHER W. KOEPKE
No. 2207
CERTIFIED ENGINEERING GEOLOGIST
Exp. 10/10
STATE OF CALIFORNIA

cc: Qiang Huang, R.E., Pending, Structures OE (E-copy), GDN File. D03 PCE – Jan Rutenburgs. D03 DME – Joe Peterson, GS File Room,

State of California
Department of Transportation

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: ALI ASNAASHARI
Senior Bridge Engineer
Office of Bridge Design North
Division of Engineering Services

Date: July 27, 2009

File: 03-SAC-50-PM 0.0/15.8
03-1C1201
65th Street U.C. (Widen)
Bridge No. 24-0318

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES – MS 5

Subject: **Revised Foundation Recommendations**

Introduction

This report presents the Revised Foundation Recommendations for the widening of 65th Street UC located on Route 50 in Sacramento County and supersedes the Foundation Recommendations dated February 15, 2009. The Office of Geotechnical Design North had prepared the Foundation Recommendations (FR) for the widening of the 65th Street UC Bridge following the December 12, 2008 request by the Office of Bridge Design North, Structure Design. Based on the Planning Study Plan the southern section or the outside of the eastbound lane of existing bridge lane will be widening 15 feet.

This revision presents corrected value of the Permissible Gross Contact Stress and Allowable Gross Bearing Capacity in Table 5 as a result of a re-valuation by our Office of the on-site soil conditions and the distance between the structure spread footings and the proposed end slope. The value for the Permissible Gross Contact Stress, as noted on Table 5 of the Foundation Recommendations report, dated February 25, 2009, was 3.5 ksf with a Total Permissible Support Settlement of 0.25 in. The re-valuated value for the Permissible Gross Contact Stress, presented in Table 5, is 4.0 ksf with a Total Permissible Support Settlement of 0.5 in. The revised Allowable Gross Bearing Capacity presented in this revised report is 5.0 ksf, whereas that shown in the original report was 7.0 ksf.

Pertinent Reports and Investigations

The following foundation recommendations are based on the subsurface information gathered during the recent foundation investigation (January 2009) along with the review of the previous foundation reports, As-Built records for 65th Street UC, and As-Built records for the Elmhurst Viaduct (Br. No. 24-0228) and on relevant geological records.

The Office of Bridge Design North has provided us with basic project information including Planning Study and General Plan and As-built Log of Test Boring for the 65th Street Bridge UC. Our research yielded the following documents and maps that were utilized in preparing this report.

- Geologic Map of California, Sacramento Quadrangle - Scale 1: 250,000 (1981) published by California Geologic Survey (CGS) (Second printing, 1987).
- Mualchin, L, A Technical Report to accompany the Caltrans-California Seismic Hazard Map 1996.
- Department of Transportation, Division of Engineering Services; Foundation Recommendations and As-Built Log of Test Borings for Elmhurst Viaduct, Bridge No. 24-0228, dated November 27, 1968 and March 24, 1967.
- Department of Transportation, Division of Engineering Services; Preliminary Foundation Recommendations for Elmhurst Viaduct, Bridge No. 24-0228, dated October 6, 2006.
- Department of Transportation, Division of Engineering Services; Foundation Recommendations for 65th Street UC, Bridge No. 24-0318 dated July 18, 1968.
- Department of Transportation, Division of Engineering Services; Foundation Plan dated December 1, 1969, and Log of As-Built Test Borings for 65th Street UC, Bridge No. 24-0318, dated July 18, 1968 and June 5, 1968.

Project and Site Description

In order to reduce congestion in the eastbound direction of US-50, ramp meters and High Occupancy Vehicle (HOV) bypass lanes are proposed at various locations, beginning at Stockton Boulevard extending to Folsom Boulevard. To accommodate these changes, the configuration of the existing structures will be modified, as it is the case of the bridge subject of this report.

The 65th Street UC Bridge is part of the interchange of the same name which is configured as standard partial cloverleaf (Type L-9) design with loop on-ramp and diagonal off-ramp (See Figure 1, Vicinity Map). The eastbound and westbound traffic lanes of the existing bridge are separated by a median barrier. The widening of the

existing structure is a result of the widening of the east bound loop on-ramp and diagonal on-ramp in order to provide one HOV bypass lane and one Mixed Flow Lane (MFL).

This report addresses foundation recommendations related to the widening of the 65th Street UC Bridge.

Regional Geology and Area Geology

The project site is located in the southern section of the Sacramento Valley which forms the northern segment of the Great Valley. (See Figure 2 and 3 Geologic Map and Geologic Map Legend) The Great Valley is elongated lowland of about 400 miles long and 50 miles wide flanked to the west by the Coast Ranges and to the east by the Sierra Nevada. It is divided in two segments, the northern, where the project is located, the Sacramento Valley and the southern, the San Joaquin Valley. The former occupies about two thirds of the Great Valley, whereas the latter makes up one third of the province. The south-flowing Sacramento River drains the northern Valley and the north-flowing San Joaquin River drains the southern portion of the Great Valley.

Unconsolidated Recent and Pleistocene Sediments from eroded sediments mainly from the Sierra Nevada, forms the surface of the Great Valley. Underlying the recent alluvium is a 65,000 feet thick sedimentary basin filled with a sequence of sedimentary rocks deposited from the Mesozoic (Jurassic and Cretaceous) to Cenozoic. This sequence of sedimentary rocks, also called the Great Valley Sequence, consists of marine and terrestrial sediments that reflect the geologic history of the Great Valley. Mesozoic sediments, consisting of sandstone, shale, and conglomerate, were deposited in an ocean basin that lay west of the Mesozoic North American Margin. The ocean basin formed part of a forearc basin located between the Sierran arc and the Mesozoic subduction zone. Cenozoic rocks deposited in increasingly shallow marine environments reflect the rapid uplift of the Sierra Nevada and gradual filling up of the sedimentary basin.

Terrestrial sediments began to be deposited in the Sacramento Valley as early as 24 million years ago when the Lovejoy Basalt buried alluvium across the Sacramento Valley. However, a deep marine environment persisted much longer in the San Joaquin Valley as marine shale and sandstone were deposited during early and middle Cenozoic time. Sediments from the Sierra Nevada and the newly formed Coast Ranges were deposited until the late Pliocene. During the same time, pyroclasts flows and ash from the Cascades were deposited throughout the Sacramento Valley particularly in the northern portion of the valley. During the late Pliocene more volcanic debris flows and pyroclastic lavas flowed into the northeastern portion of the Sacramento Valley. These deposits form the Tuscan Formation. At the same time, alluvial deposits eroded from the sediments of the

Coast Ranges deposited in the western portion of the Sacramento Valley as the Tehama Formation.

Three million years ago, during the Pliocene time, much of the southern portion of the San Joaquin Valley was open to the sea and formed a large embayment in the coastline. By the end of the Pliocene time, about 2 million years ago, the San Joaquin Valley emerged above sea level, and about one million years ago, during the Pleistocene time, the valley was completely cut off from the Pacific Ocean leaving an extensive lake that occupied the southern section of the Sacramento Valley and most of the San Joaquin Valley. The evidence of the existence of this lake is a 30 to 50 feet thick clay layer with Pleistocene fossils, known as the Corcoran Clay.

The Great Valley sequence was deposited on a sedimentary breccia containing angular clasts of mafic and ultramafic rocks. The valley sediments and the breccia are separated by an unconformity meaning that that was a period of erosion before the first sediments of the Great Valley sequence were deposited. The breccia is overlying the ultramafic rocks of the Coast Range ophiolite. The composition of the Coast Range ophiolite ranges from spilite and basalt to gabbro and peridotite, including rocks rich in serpentine, chlorite, epidote and albite. The age of this ophiolite has been determined from intrusions of igneous rocks and fossils derived from the oldest rocks of the Great Valley sequence. It is calculated that the age of this ophiolite is between 155 and 150 million years old. It is about the same age as the Josephine ophiolite of the Klamath province.

According to the Geologic Map of California, Sacramento Quadrangle (1987), and the As-Built LOTB's, the rocks that underlay the project sites are generally classified as alluvium.

For more site-specific information refer to the Field Investigation and Subsurface Conditions section of this report.

Field Investigation and Subsurface Conditions

This Office performed a subsurface exploration from January 14 to January 16, 2009, which consisted of one 5-inch diameter exploratory mud rotary sample boring (R-09-01). A piezometer was installed next to the exploratory boring (See figure 4, Boring Location Plan). The mud rotary boring was advanced using a self-casing wireline drilling method to a maximum depth of 71.5 feet or elevation -36.5 feet below ground surface (bgs). Equipment used for the subsurface investigation consisted of an Acker drill rig equipped with an automatic hammer. Continuous sampling was achieved by utilizing the Standard

Penetration Test (SPT) sampler at 5 feet intervals and "punch core" sampling in between SPT samples. Selected soil samples were bagged for laboratory testing.

Based on the 2009 subsurface exploration and the 1969 As-Buit LOTB, the proposed abutment 1 and 2 of the new bridge section locations are underlain by very dense to dense silty sand and clean dense sand with silt to maximum depth explored of 71.5 feet. The silty sand material is well indurated and locally cemented.

Test boring information, including exploration number, station, offset, top of borehole elevation, depth, and groundwater level measurement is summarized in Table 1. For subsurface data and boring locations, site-specific information and conditions please refer to the Log of Test Borings. These sheets will be forwarded to your office upon completion.

Table 1: Summary of the Geotechnical Exploration Information

Boring Number(1)	Station (ft)	Offset from "A1" Line (ft)	Top of Borehole Elevation (ft)	Exploration Depth (ft)	Ground Water Elevation (ft)
R-09-01	279 + 40*	180.0 Rt. CL*	35.0*	71.5	-3.0*

*Information is approximate until survey is available.

Groundwater

According to the As-Built LOTB's, groundwater at the 65th Street UC Bridge location was not encountered during the subsurface investigation performed in May 1968. However, groundwater level was measured in the piezometer installed during the January 2009, subsurface investigation. Ground water level was measured at the depth of 38 ft or elevation of -3 ft on January 30, 2009.

Groundwater surface elevations are subject to seasonal fluctuations and may occur at higher elevations depending on the conditions at the time of construction.

Laboratory Testing

Laboratory testing was performed on selected samples of the subsurface materials obtained from the 2009 field investigation. Tests were performed to determine the corrosivity and engineering properties of the subsurface materials for use in the foundation analysis. The tests performed included:

- Moisture Content (ASTM D 2216-05)

- Unit Weight (ASTM D 4767-04)
- Particle-Size Analysis (ASTM D 422-63)
- Liquid Limit, Plastic Limit and Plasticity Index (AASHTO T 89-02 & 90-00)
- Consolidation (ASTM D 2435-04)
- Direct Shear (ASTM D 3080-04)
- Soil Corrosivity (CTM 643)
- Sulfates (CTM 417)
- Chlorides (CTM 422)

All tests were performed in general accordance with American Society for Testing and Materials (ASTM) standards or California Test Methods (CTM). Laboratory test results will be available upon request.

Seismicity

According to the Caltrans California Seismic Hazard Map dated 1996, the controlling fault for the 65th Street UC is the Prairie Creek-Spenceville-Dentman (PSD) located northwest of the project locations approximately 21 miles (See figure 5, California Seismic Hazard Index Map 1966). Caltrans has assigned this fault a maximum credible earthquake of moment magnitude (M_w) of 6.5. Based on the above map, it is estimated that the bridge location is likely to experience an estimated Peak Horizontal Bedrock Acceleration (PBA) of 0.2g in the event of a strong ground shaking associated with the PSD Fault. Acceleration Response Spectra curve (ARS) for this location is presented in Figure 6. Due to the distance, greater than 10 miles, of the bridge location to the controlling fault, the SDC ARS curve has not been modified for directivity.

Based on the results of the subsurface exploration for the 65th Street UC, the soil profile may be classified as Type D as defined in the Department's Seismic Design Criteria (SDC, 2006, Version 1.4).

Liquefaction Evaluation

Liquefaction can occur when loose to medium dense, granular, saturated soils (generally within 50 ft of the surface) are subjected to ground shaking. Results from the subsurface investigation for the bridge indicate that the site for 65th Street UC bridge is are underlain by a dense to very dense mixture of silt and sand. Based on the presence of these materials, and the low seismicity of the project site, the potential for liquefaction is considered insignificant at these locations.

Fault Rupture

The site does not lay within or adjacent to an Alquist-Priolo Earthquake Fault Zone for fault rupture hazard, and no known active faults cross the 65th Street UC Bridge. Therefore, the potential for fault rupture and ground displacement to adversely affect the proposed structure is non-existent.

Seismic Settlement

During a seismic event, ground shaking can cause densification of relatively loose granular soil above the water table that can result in settlement of ground surface. Because most of soils in the study area are considered dense to very dense, the potential for seismic settlement is insignificant.

Corrosion Evaluation

Two composite soil samples were collected from Boring R-09-01 during the 2009 subsurface investigation. The Office of Testing and Technology Services, Corrosive Technology Branch tested the composite samples for corrosive potential. A site is considered to be corrosive if one or more of the following conditions exist for the representative soil: chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. The minimum resistivity serves only as an indicator parameter for the possible presence of soluble salts and is not included to define a corrosive site. It is the practice of the Corrosion Technology Branch that if the minimum resistivity of the sample is greater than 1000 ohm-cm, the sample is considered to be non-corrosive and testing to determine the sulfate and chloride content is not performed.

The results of the laboratory tests determined that the composite samples were considered to be non-corrosive at this site. Refer to Table 2 below for specific test results.

Table 2: Corrosion Test Summary-Composite Samples for 65th Street UC Bridge (Br. No. 24-0318

Approx. Support Location/ SIC* Corrosion Number	Boring Number	Sample Depth (ft)	PH	Minimum Resistivity (Ohm-Cm)	Sulfate Content (PPM)*	Chloride Content (PPM)*
C644087	R-09-01	0.0-2.0	6.87	1766	--	--
C644088	R-09-02	16.5 – 19.0	7.59	5133	--	--

*SIC means Sample Identification Card

As-Built Foundation Information

According to the As-built General Plan the bridge has a prestressed cast in-in-place concrete box girder span with reinforced concrete open ended diaphragm abutments. The length of the span is 159.2 ft and total length of the bridge is 161.0 ft. The width of the eastbound lanes is 89.4 ft and the westbound lanes is 94.4 ft.

The As-Built Foundation Plan indicates that the existing structure, a one span-bridge constructed in 1971, is supported on spread footings built in engineered fill. The allowable bearing pressure of the spread footings is 2.0 tsf. The bottom of footing elevation for Abutment 1 is 46.5 ft and for the Abutment 2 is 48.0 ft.

Foundation Recommendations

The following foundation recommendations are for the proposed Abutments of 65th Street UC Bridge (Bridge No. 24-0318). These recommendations are based on the subsurface conditions encountered in the exploratory borings performed in January 2009 and the As-Built LOTB's. The site is conducive to spread footings due to the presence of a locally cemented, very dense sand and silt.

The Designer provided the following foundation information in table 3 and 4.

Table 3: Foundation Design Data Provided by the Designer

Foundation Design Data						
Support No.	Design Method	Finished Grade Elev. (ft)	BOF Elev. (ft)	Footing Size (ft)		Permissible Settlement under Service Load (in)*
				B	L	
Abut 1	WSD	64.90	46.5	10	18	0.5
Abut 2	WSD	65.94	48.0	10	18	0.5

* Based on CALTRANS' current practice, the total permissible settlement is one inch for structures with continuous spans or multi-column bents, and two inches for simple span structures.

Table 4: Foundation Design Loads Provided by Designer

Support No.	Total Load					Permanent Load		
	Vertical Load (kip)	Effective Dimensions (ft)		Horizontal Load (kip)		Vertical Load (kip)	Effective Dimensions (ft)	
		B'	L'	Longitudinal Direction	Transverse Direction		B'	L'
Abut 1	710	10	18	142	N/A	588	10	18
Abut 2	710	10	18	142	N/A	588	10	18

*Total Load = Permanent Loads + Transient Loads

**Permanent Loads = See Section 3 of AASHTO 3rd Edition and CA Amendments.

Our Office used the above foundation design data and loading conditions to evaluate abutments using Caltrans November 2003 Bridge Design Specifications for foundations using Working Stress Design methods. Foundation recommendations are shown in the following tables.

Table 5: Foundation Design Recommendations

Support Location	Footing Size (ft)		Bottom Of Footing Elevation (ft)	Total Permissible Support Settlement (in)	WSD (LRFD Service Limit State Load)		LRFD		
	B'	L'			Permissible Gross Contact Stress (ksf)	Allowable Gross Bearing Capacity (ksf)	Service	Strength $\varphi_{b=x}$	Extreme Event $\varphi_{b=1.00}$
							Net Permissible Net Contact Stress $q_{permissible\ net}$ (ksf)	Factored Gross Nominal Bearing Resistance q_R (ksf)	Factored Gross Nominal Bearing Resistance q_R (ksf)
Abut 1	10	18	46.5	0.50	4.0	5.0	N/A	N/A	N/A
Abut 2	10	18	48.0	0.50	4.0	5.0	N/A	N/A	N/A

Settlement

The presence of layers of very dense, locally cemented silty sand and fine-grained sand in the foundation will produce settlements under the weight of the proposed embankment. Settlement will take place during the construction of the embankment. It is anticipated that settlement of the subgrade due to the weight of the structure and the embankment fill will be less approximately 0.25 of an inch and will occur during fill placement.

Additional settlement of the embankment fill itself will take place and it is considered minimal, provided the fill material is compacted in accordance with Caltrans Standard Specifications. It is anticipated that the total settlement in the embankment zone a year after its completion will be approximately 0.12 of an inch.

Construction Considerations

The footing concrete shall be placed neat against undisturbed soil at the bottom of the footing excavation. If the soils at the bottom of the excavation are disturbed or loosened, they shall be re-compacted to 95% relative density prior to placing any concrete or steel.

When the footing excavations has been completed to the required elevation, the footing excavation is to be inspected and approved by a representative of the Office of Geotechnical Design North prior to placing any steel, forms of concrete in to the footing excavation.

It is anticipated that groundwater will not be encountered during construction of the widening. Groundwater surface elevation is subject to seasonal fluctuations and may occur higher or lower depending on seasonal conditions at time of construction.

Quality control should be practiced to ensure that the bottom of the footing excavation is level and clear of loose debris. Should any large rock, concrete, rebar or other objects, be found in the existing embankment fill (not consistent with the Standard Specifications) at the bottom of the footing elevations of both abutments, the contractor should be prepared to remove, and replace them with granular material at 95% relative density or lean concrete.

It is anticipated that an immediate ground settlement will occur during the fill placement. Because of the presence of dense silt and sand at the 65th Street UC Bridge location the potential for a long term consolidation is considered low and no waiting period is required.

It is anticipated that rippable materials may be encountered on the existing bridge location. Soil deposits and existing fill can be excavated with typical grading equipment such as scrapers, dozers, backhoes and excavators.

The placement of the new embankment fill shall be in accordance with Section 19.5 of Caltrans Standard Specifications that provides recommendations for compaction of the material in the embankment.

Project Information

Standard Special Provision S5-280, "Project Information", discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

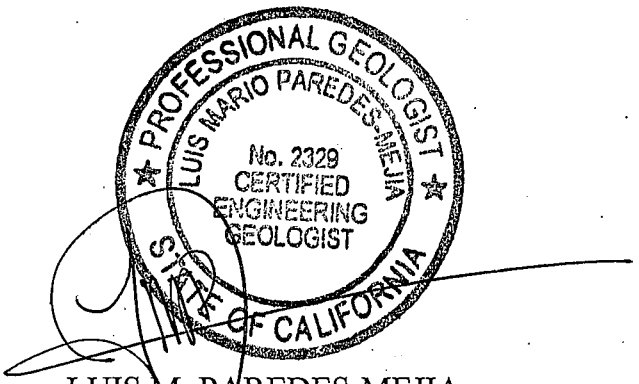
1. Log of Test Boring for 65th Street UC Bridge, Bridge No. 24-0318.
2. As-Built Log of Test Boring for 65th Street UC Bridge, Bridge No. 24-0318 dated March 24, 1967.

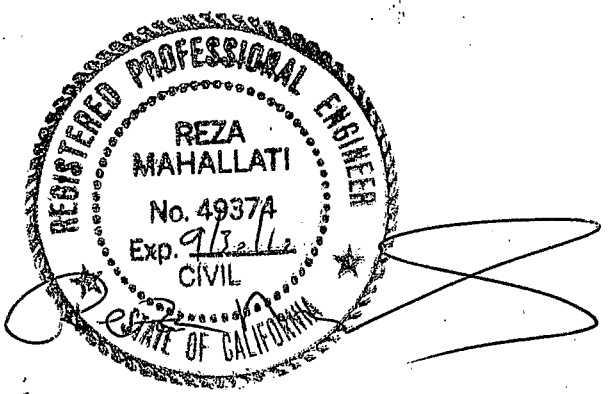
Data and Information included in the Information Handout provided to the bidders and Contractors are:

1. Foundation Recommendations report for 65th Street UC Bridge, Bridge No. 24-0318, dated February 15, 2009.
2. Revised Foundation Recommendations report for 65th Street UC Bridge, Bridge No. 24-0318, dated July 27, 2009.

The recommendations contained in this report are based on specific project information regarding structure type, location, and design loads that have been provided by Structure Design, Office of Bridge Design North. If any conceptual changes are made during final project design, the Office of Geotechnical North, Branch C should review those changes to determine if these foundation recommendations are still applicable.

Any questions regarding the above recommendations should be directed to Luis Paredes-Mejia at (916) 227-1047 or Douglas Brittsan at (916) 227-1079 of the Office of Geotechnical Design North, Branch C.

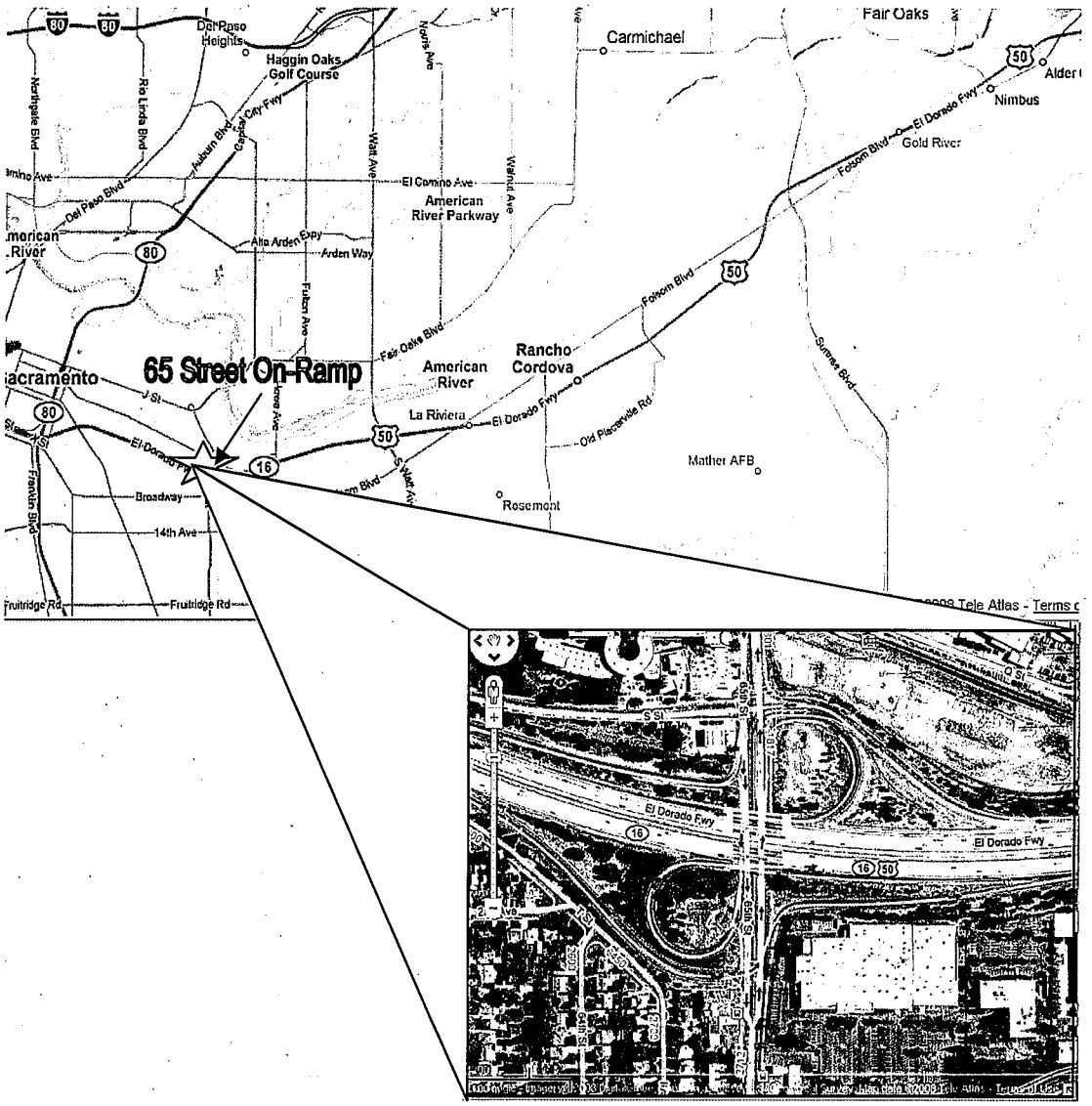




LUIS M. PAREDES-MEJIA
Engineering Geologist, CEG 2329
Geotechnical Design – North, Branch C

REZA MAHALLATI
Senior Material & Research Engineer
Office of Geotechnical Design-North

C: Douglas Brittsan
GDN File
DME D3 (e-copy)
RE Pending File
GS File



CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 03-1C1201	**Vicinity Map**	
	03-SAC-50-PM0.0/15.8 65th Street UC Bridge (Bridge # 24-0138)		Figure 1

CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 03-1C1201	**Geologic Map**
	03-SAC-50-PM0.0/15.8 65th Street UC Bridge (Bridge # 24-0138)	Figure 2

SEDIMENTARY AND
METASEDIMENTARY ROCKS

CENOZOIC

QUATERNARY

- Q — Alluvium
- — Mine and dredge tailings
- Qa — Levee and channel deposits
- Qb — Basin deposits *(Alluvium)*
- Qi — Intertidal deposits *(Peaty mud)*
- Qs — Dune sand
- QL — Lake deposits
- Qo — Older alluvium
- Qg — Glacial deposits
- Qm — Modesto Formation *(Alluvium)* — Qm_1 / Qm_2 Upper and lower members
- Qr — Riverbank Formation *(Alluvium)*
- Qmr — Modesto-Riverbank Formations *(Arkosic alluvium)*
- Qmz — Montezuma Formation *(Poorly consolidated, clayey sand)*
- Qtl — Turlock Lake Formation *(Sand, silt, and gravel)*
- Qrb — Red Bluff Formation *(Gravel in reddish, silty or sandy matrix)*
- Qnm — North Merced Gravel *(Thin pediment veneer)*

- Tt — Tehama Formation *(Sand, silt, and volcaniclastic rocks)*
- Tl — Laguna Formation *(Consolidated alluvial deposits)*
- Tsp — San Pablo Group *(Marine sandstone and shale)*
- Tm — Mehrten Formation *(Andesitic conglomerate, sandstone, and breccia)*
- Tvs — Valley Springs Formation *(Rhyolitic tuff and sedimentary rocks)*

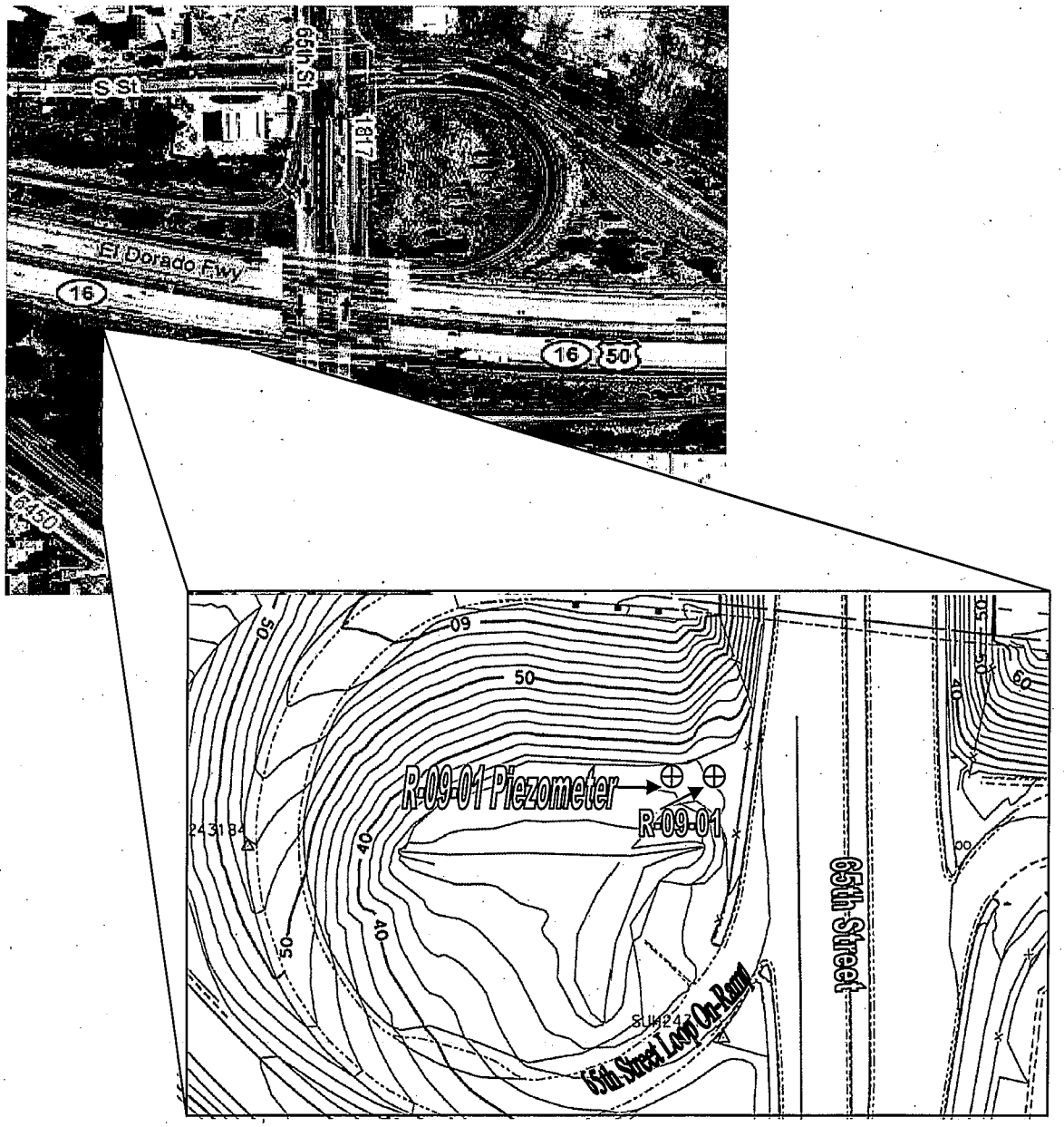
CALTRANS
Division of Engineering Services
Geotechnical Services
Geotechnical Design – North

EA: 03-1C1201

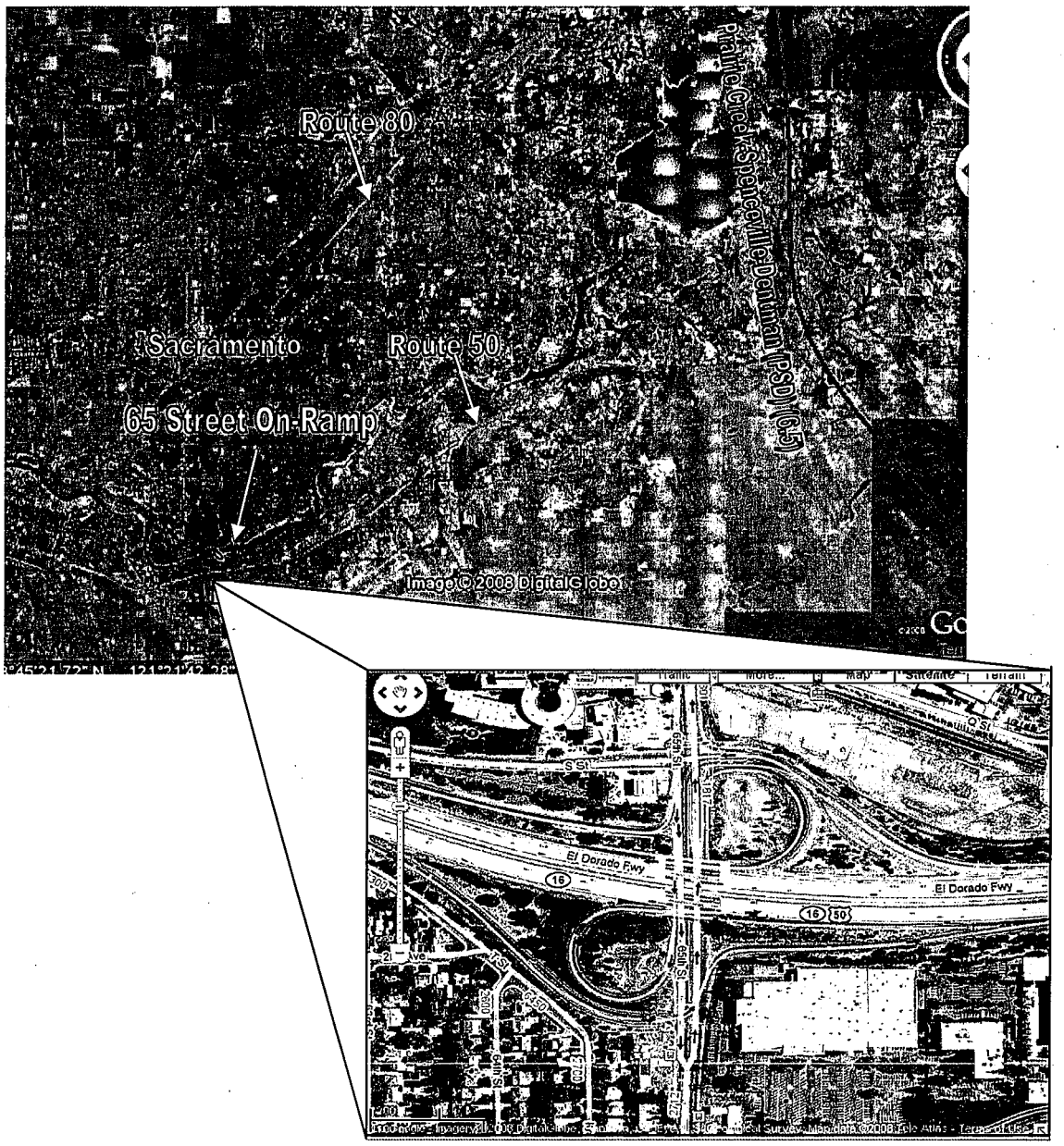
Geologic Map Legend

03-SAC-50-PM0.0/15.8
65th Street UC Bridge (Bridge # 24-0138)

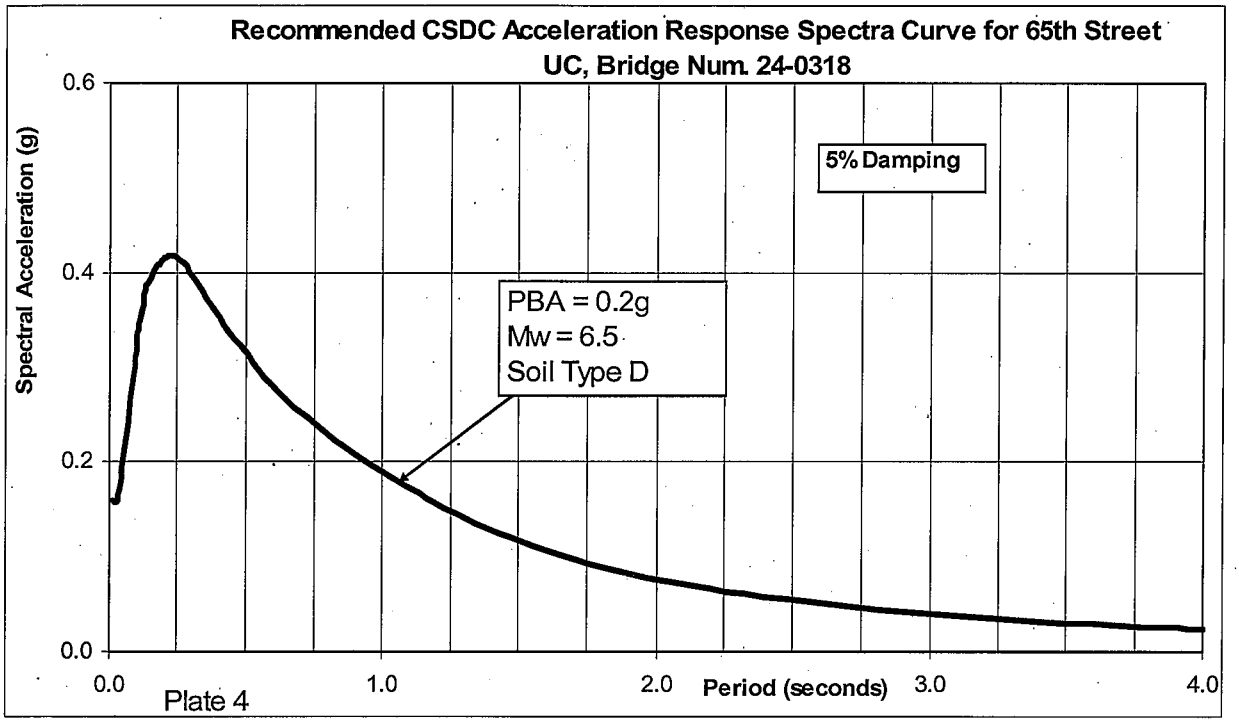
Figure 3



CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 03-1C1201	**Boring Location Plan**
	03-SAC-50-PM0.0/15.8 **65th Street UC Bridge (Bridge # 24-0138)**	Figure 4



CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 03-1C1201	California Seismic Hazard Map 1996
	03-SAC-50-PM0.0/15.8 65th Street UC Bridge (Bridge # 24-0138)	Figure 5



CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 03-1C1201	Acceleration Response Spectra Curve	
	03-SAC-50-PM0.0/15.8 65th Street UC Bridge (Bridge # 24-0138)		Figure 6