

SFCTA Contract Number 06/07-29

SOUTH ACCESS TO THE GOLDEN GATE BRIDGE

# DOYLE DRIVE

**DOYLE DRIVE REPLACEMENT PROJECT  
ENVIRONMENTAL SOIL CHARACTERIZATION  
DRAGONFLY CREEK  
Caltrans EA 04-163700**

**March 2010**

**Prepared By:**

**BASELINE Environmental Consulting**

Our ref 131558/FRG  
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**Re: Environmental Soil Characterization  
Caltrans EA 04-163700  
Doyle Drive Replacement Project  
Dragonfly Creek  
San Francisco, California**

Dear Mr. Boyer:

The Arup PB Joint Venture (JV) is pleased to present ten (10) copies of the Environmental Soil Characterization Report in the Dragonfly Creek wetland mitigation area near Doyle Drive in the Presidio. The report was prepared by BASELINE Environmental Consulting, who is engaged under an agreement with the JV to provide environmental soil investigation and consulting services.

The report describes and summarizes investigation objectives, the soil sampling work plan, field and laboratory methodologies used, soil reuse or disposal framework, investigation results, waste classification evaluation and soil management, conclusions, and limitations. The report contains 2 Figures and 12 Tables.

The report contains the following appendices that are presented in pdf format on a CD-ROM.

- Appendix A – Soil and Groundwater Sampling Workplan
- Appendix B – License to Enter and Dig Permits
- Appendix C – Boring Logs
- Appendix D – Responsibilities and Assumptions Document
- Appendix E – Waste Disposal Manifest
- Appendix F – Environmental Laboratory Reports
- Appendix G – Horticultural Analytical Reports
- Appendix H – Geotechnical R-Value Test Reports
- Appendix I – Statistical Analyses

Should you have any questions regarding this report, please contact Cheri Page of BASELINE at (707) 762-5233.

Yours sincerely

Francis R. Greguras, P.E., G.E.  
Arup PB JV

Distribution: Ray Boyer, Caltrans – 10 copies  
Cheri Page, BASELINE Environmental Consulting – 3 copies  
John Karn, Arup PB JV Project Manager – 1 copy  
Sabine van der Sluis, Parsons Brinckerhoff – 1 copy  
Project Files

# ENVIRONMENTAL SOIL CHARACTERIZATION

Caltrans EA 04-163700

MARCH 2010

DOYLE DRIVE REPLACEMENT  
PROJECT  
DRAGONFLY CREEK  
SAN FRANCISCO, CALIFORNIA

For:

ARUP  
San Francisco, California

Y0239-04.A9.01457

# ENVIRONMENTAL SOIL CHARACTERIZATION

Caltrans EA 04-163700

MARCH 2010

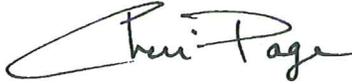
DOYLE DRIVE REPLACEMENT PROJECT  
DRAGONFLY CREEK  
SAN FRANCISCO, CALIFORNIA

For:

ARUP  
San Francisco, California

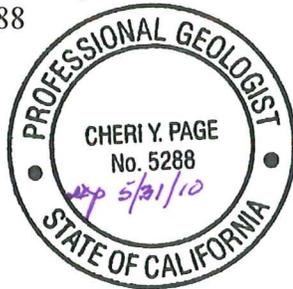
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This *Environmental Soil Investigation* report, dated 31 March 2010, has been prepared by BASELINE Environmental Consulting as part of Caltrans contract EA 04-163700



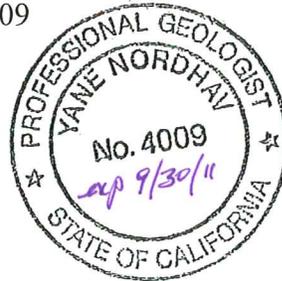
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- F: Environmental Laboratory Reports (includes pdfs and EDDs)
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# **ENVIRONMENTAL SOIL CHARACTERIZATION**

## **DOYLE DRIVE REPLACEMENT PROJECT**

### **DRAGONFLY CREEK AREA**

#### **San Francisco, California**

## **1 INTRODUCTION**

This report has been prepared by BASELINE Environmental Consulting for the Arup/PB Joint Venture. This report presents the results of environmental, horticultural, and geotechnical soil sampling and analysis in the Dragonfly Creek wetland mitigation area near Doyle Drive in the Presidio, San Francisco, California.

### **1.1 Project Description**

The Project is the Dragonfly Creek area near the Doyle Drive Replacement Project (“DDRP”) in the Presidio of San Francisco, California, as shown on Figure 1. The Dragonfly Creek Project and the DDRP are sponsored by the San Francisco County Transportation Authority and the State of California Department of Transportation (“Caltrans”). The DDRP will upgrade a portion of Doyle Drive within the Presidio to meet current design and safety standards; construction began in December 2009. DDRP construction will remove several acres of wetlands from the Presidio, and lower Dragonfly Creek will undergo wetland restoration as partial mitigation for the DDRP’s impact to wetlands.

The Project consists of 4.0 acres of lower Dragonfly Creek, located west of Highway 1 in the Fort Scott area of the Presidio (Figure 1). Approximately 1,800 cubic yards of fill material will be removed to lower the floodplain/wetland surface to closer proximity to the groundwater table, creating seasonally and perennially saturated conditions that will sustain wetland and riparian communities. Soil will be excavated up to seven to ten feet below ground surface (“bgs”) within the Project area. The Project area also includes about 67 cubic yards of previously stockpiled soil from unknown sources. Proposed excavation and existing stockpile locations are shown on Figure 2.

### **1.2 Investigation Objectives**

The objectives of the environmental soil sampling discussed in this report were to provide chemical quality information to support: 1) pre-characterization of soil to be excavated for potential disposal off-site at a permitted facility or off-site reuse; 2) pre-characterization of soil for potential reuse within the limits of the DDRP, or elsewhere in the Presidio, in accordance with Presidio Trust reuse criteria (EKI, 2002); and 3) preparation of future worker health and safety plan(s). This report provides soil sampling data and comparison of results against hazardous waste criteria and Regional Water Quality Control Board, San Francisco Bay Region (“Regional Water Board”) Environmental Screening Levels (“ESLs”). Specific reuse or disposal options may be evaluated in a separate report.

The objective of the horticultural soil sampling and analysis was to provide agricultural suitability information on the soil to be excavated or removed from the site to Presidio Trust for their evaluation. Presidio Trust may reuse the soil elsewhere within the Presidio.

The objective of the geotechnical sampling was to provide Caltrans resistance “R” value results. Caltrans will use this information to evaluate potential reuse options of the soil as subbase and basement material below pavements.

## **2 SOIL SAMPLING WORKPLAN**

Soil sampling was conducted in accordance with a Soil and Groundwater Sampling Workplan (“Workplan”) (Caltrans and ARUP PB Joint Venture, 2008), with the following exceptions. The Workplan scope included only borings along the Doyle Drive alignment, and this Project augments the soil sampling locations. Soil sample depth and compositing scheme also varied from that used along the alignment, as discussed below in Section 2.2. Horticultural and geotechnical soil sampling were not included in the Workplan. The Workplan was reviewed and accepted by the Presidio Trust and they issued a License to Enter and Conduct Geotechnical Investigations, Modification No. 2 (Presidio Trust, 2008). The Workplan and License to Enter are attached in Appendices A and B, respectively.

The scope of work was designed to meet the investigation objectives by: 1) collection of representative samples from soil to be excavated during Project construction in general accordance with U.S. Environmental Protection Agency (“EPA”) SW-846 (EPA, 1986) guidance; 2) selection of an analytical approach for soil samples that would meet landfill requirements for pre-approval of soil disposal, and that would meet Presidio Trust analytical requirements for potential reuse of soil within the Project limits without additional characterization after excavation; 3) collection and analysis of representative samples to allow Caltrans to prepare project specifications addressing worker health and safety; and 4) to allow the contractor to prepare an appropriate health and safety plan for construction workers.

### **2.1 Soil Boring Locations and Depths**

Soil samples were collected from 9 borings (DC01 through DC09) drilled within the Project area, as shown on Figure 2. The boring locations were selected by Caltrans, and all of the borings were located within the proposed excavation area. Borings were drilled to depths specified by Caltrans, and ranged from 5 to 10.5 feet bgs.

### **2.2 Soil Sampling and Analysis Approach**

Soil samples were collected for environmental analysis from all borings at depths of 0.5 to 1.0 foot bgs; 2.5 to 3.0 feet bgs; 4.5 to 5.0 feet bgs; and 9.5 to 10.0 feet bgs. Soil samples were collected for horticultural analysis from all borings at depths of 1.0 to 1.5 feet bgs; 3.0 to 3.5 feet bgs; 5.0 to 5.5 feet bgs; and 9.0 to 9.5 feet bgs. Soil samples were collected for geotechnical analysis from all borings at depths of 1.0 to 5.0 feet bgs, and 5.0 to 10.0 feet bgs.

Soil samples from similar depths from the borings were composited before analysis, as indicated on Tables 1A, 1B, and 1C. Samples for environmental and horticultural analysis consisted of no more than three subsamples. Soil samples for environmental analysis were composited by the

laboratory for depth intervals of 1.0, 3.0, 5.0, and 10.0 feet bgs. Soil samples for horticultural analysis were composited in the field for depth intervals of 1.5, 3.5, 5.5, and 9.5 feet bgs. Bulk soil samples for geotechnical analysis were composited in the field for depth intervals of 1.0 to 5.0 feet bgs, and 5.0 to 10.0 feet bgs.

Soil samples were collected from four locations in each stockpile. Stockpile samples were composited as described below in Section 3.3.1.

Environmental samples were analyzed for multiple chemicals identified by Presidio Trust as potential contaminants of concern in the Presidio (EKI, 2002). Horticultural samples were analyzed for comprehensive agricultural suitability including soil description, particle size distribution, minerals, salinity, sodium adsorption ratio, pH, and organic content, as requested by Presidio Trust. Geotechnical samples were analyzed only for “R value,” a soil resistance test, as requested by Caltrans. Soil sample analyses are summarized on Tables 2A, 2B, and 2C.

### **3 METHODOLOGY**

#### **3.1 Field Preparations**

A Dig Permit was obtained from the Presidio Trust before drilling was initiated (Appendix B). Each boring location was identified using a wooden stake and white paint. A private utility locator, Otis Haskin (“OHJ”), cleared all boring locations. Underground Service Alert (“USA”) was then contacted for utility clearance, and the Dig Permit was requested from Presidio Trust. Presidio Trust performed its own utility clearance before issuing the Dig Permit authorizing drilling to commence.

#### **3.2 Drilling Activities**

Drilling operations were performed in general accordance with the applicable Standard Operating Procedures (“SOPs”) included in the Presidio Trust’s Presidio-Wide Quality Assurance Project Plan (“QAPP”) (Tetra Tech EM, Inc., 2001). Deviations from the QAPP SOPs are described in the Workplan (Appendix A). BASELINE staff performed fieldwork in accordance with BASELINE’s site-specific Health and Site Safety Plan, included in the Workplan.

Drilling and hand augering activities were conducted by Gregg Drilling & Testing, Inc. (“Gregg Drilling”) of Martinez, California, a C-57 licensed driller. Borings were drilled using hollow-stem augers and direct-push sampling equipment. Drilling augers and rods were cleaned between borings with a steam cleaner. Soil sampling equipment was decontaminated between samples by scrubbing with a laboratory-grade detergent solution and rinsing in two sequential pails of potable water.

A professional BASELINE geologist supervised all drilling activities and logged lithology using the Unified Soil Classification System. Boring logs are included in Appendix C.

All borings were backfilled with a neat cement grout to one foot bgs. The grout was placed using a tremie pipe. Surface completions matched existing conditions (e.g., soil). After backfilling, each boring location was marked using a wooden stake in preparation for surveying. A licensed surveyor, Chaudhary & Associates, located the borings after completion in

accordance with the Presidio Trust QAPP. Survey coordinates are provided in both Project datum (NAD 83 and NAVD 88) and Presidio Trust datum (NAD27 and Presidio Low Water) on Table 3.

### **3.3 Soil Sampling and Handling Procedures**

#### **3.3.1 Environmental Samples**

Environmental soil samples were collected from the borings using a direct-push split-spoon sampler lined with clean six-inch long brass liners. The collected samples were capped with Teflon and plastic end caps, labeled, and immediately stored in ice-cooled chests. Discrete samples were labeled with the boring number (e.g., DC01), and sample depth in feet bgs. Composite sample instructions were provided to the laboratory within 24 hours of the sample collection date. Composite samples from the borings were identified with “EC” indicating Environmental Composite, followed by “DC” for Dragonfly Creek, the sample depth, and the composite number for that depth (e.g., ECDC-1.0-1).

Stockpile samples were composited in the field by collecting soil from four locations in each stockpile, at a depth of approximately six inches below the stockpile surface, into a new 5-gallon bucket. A composite soil sample was collected from the bucket in clean, six-inch long brass liners. Composite samples from the stockpiles were labeled “Stockpile” followed by the stockpile number.

A list of composite samples and the subsamples used to make up each composite sample is presented in Table 1A. The samples were delivered by BASELINE directly to Curtis & Tompkins, Ltd. of Berkeley, California, a state-certified laboratory. Samples were handled under chain-of-custody procedures.

#### **3.3.2 Horticultural and Geotechnical Samples**

Soil samples for horticultural analysis were collected directly from the split-spoon sampler into new, plastic, zip-lock baggies. Samples from four distinct depths (1.5, 3.5, 5.5, and 9.5 feet bgs) were composited in the field by adding soil from the target depth interval from three borings to the baggie. Samples from the borings were identified with “HOR” indicating horticultural sample, followed by sample depth, and the composite number for that depth (e.g., HOR-1.5-1). Samples from each of the three stockpiles were collected from four locations in each stockpile into a single baggie, and were labeled with the stockpile number (e.g., Stockpile-1). The samples were delivered by BASELINE directly to Soil & Plant Laboratory, Inc., of San Jose, California. A list of composite samples and the subsamples used to make up each composite sample is presented in Table 1B.

Bulk soil samples from the borings were collected in 5-gallon buckets for geotechnical analysis. Samples from target depth intervals indicated on Table 1C were added to the bucket as drilling progressed. Geotechnical samples were labeled with “DCGT” for Dragonfly Creek geotechnical, followed by the sample depth interval (e.g., DCGT-1.0-5.0). Soil samples from each stockpile were collected from four locations in the stockpile into one 5-gallon bucket, and were labeled with the stockpile number (e.g., DCGT-Stockpile-1). The samples were delivered directly to the Caltrans District laboratory in San Francisco, California for analysis.

### 3.4 Soil Sample Analyses

#### 3.4.1 Environmental Analyses

All environmental laboratory analyses were conducted by Curtis & Tompkins, Ltd. of Berkeley, California with the exception of herbicide analyses, which were performed by APPL, Inc. of Fresno, California. These laboratories are state-certified for the analyses conducted. Laboratory analyses performed on each sample are summarized in Table 2A. The analytical scheme for the collected samples is described below.

- Each composite sample, consisting of three discrete subsamples, was analyzed for **Sampling Suite A**.<sup>1</sup>
- If any metal concentration was greater than 10 times the Soluble Threshold Limit Concentration (“STLC”), the sample was also analyzed for the soluble metal by the Waste Extraction Test (“WET”). If any sample contained greater than 20 times the Toxicity Characteristic Leaching Procedure (“TCLP”), the sample was analyzed for leachable metal contents by TCLP.
- Discrete fill samples observed in the field to contain serpentinite would have also been analyzed for asbestos using the California Air Resources Board (“CARB”) Method. However, serpentinite was not observed in the borings or the stockpiles.

#### 3.4.2 Horticultural and Geotechnical Samples

Horticultural samples were analyzed for comprehensive agricultural suitability including soil description, particle size distribution, minerals, salinity, sodium adsorption ratio, pH, and organic content, as requested by Presidio Trust. Geotechnical samples were analyzed only for “R value,” a soil resistance test, as requested by Caltrans. Soil sample analyses are summarized on Tables 2B and 2C.

### 3.5 Laboratory Quality Assurance

Curtis & Tompkins and APPL, Inc. performed laboratory analyses and quality assurance/quality control procedures in accordance with Presidio Trust’s QAPP (Tetra Tech, 2001), with exceptions presented in the laboratory Responsibilities and Assumptions Document (BASELINE, 2008) attached as Appendix D. Presidio Trust reviewed the proposed QAPP deviations and did not request changes. An additional deviation from the QAPP was tentatively approved by Caltrans and Presidio Trust for this Project, due to the fast turnaround required for analysis and reporting; laboratory data was not third-party validated. This task can be conducted in the future, if required.

The environmental laboratory reports were reviewed by BASELINE to evaluate whether results were within acceptable ranges established by the laboratory. Results of this review are

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<sup>1</sup> **Sampling Suite A** consists of Title 22 metals by EPA Methods 6020/7000 series; volatile organic compounds (“VOCs”) by EPA Method 8260B; semi-volatile organic compounds (“SVOCs”) by EPA Method 8270C; total petroleum hydrocarbons (“TPH”) as gasoline (g), diesel (d), and motor oil (mo) by EPA Method 8015M/CA LUFT; silica gel cleanup on TPHd and TPHmo by EPA Method 3630; polycyclic aromatic hydrocarbons (“PAHs”) by EPA Method 8310; polychlorinated biphenyls (“PCBs”) by EPA Method 8082; cyanide by Standard Method 4500-CN-E; sulfide by EPA Method 9034; and corrosivity (pH) by EPA Method 9045D, organochlorine pesticides by EPA Method 8081A and herbicides by EPA Method 8151A.

summarized in the Quality Control Checklist provided in Appendix F behind each laboratory report. Laboratory quality control sample results were within the acceptable ranges established by the laboratory.

### **3.6 Data Evaluation Methodology**

Environmental chemical data from the laboratory were loaded into a database. Soil quality data were screened against federal and state hazardous waste thresholds and Regional Water Board residential and commercial/industrial ESLs (Regional Water Board, 2008). Analytical results and screening criteria are presented in Tables 4 through 11.

### **3.7 Investigation-Derived Waste Disposal**

Drill cuttings were placed in an approved U.S. Department of Transportation (“DOT”) 55-gallon drum. The drum was sealed, labeled, and stored at the DDRP CDSM test well location along Mason Street for no longer than 90 days. The drum was picked up by Clearwater Environmental of Union City, California on 17 March 2010, and was disposed of as non-hazardous waste at Alviso Independent Oil of Alviso, California. The waste disposal manifest is provided as Appendix E.

## **4 SOIL REUSE OR DISPOSAL FRAMEWORK**

### **4.1 Criteria for Federal and California Hazardous and Non-Hazardous Waste**

A soil, once excavated, may be classified as a federal hazardous waste, a California hazardous waste, or a non-hazardous waste depending on its characteristics. A soil is considered a federal hazardous waste if it contains leachable concentrations of select chemicals, determined by TCLP, equal to or greater than the thresholds established in Title 40 of the Code of Federal Regulations (“CFR”), Section 261.24. The TCLP method uses a dilution ratio of 20:1 in the extraction process; therefore, a waste with a total concentration equal to or greater than 20 times the TCLP threshold could potentially be a federal hazardous waste, depending on the fraction of the total concentration that is soluble. There are no thresholds for total concentrations of compounds for federal hazardous wastes.

In California, a waste is considered hazardous if the total concentration of a chemical is equal to or greater than the Total Threshold Limit Concentration (“TTLC”) and/or if the soluble concentration of a chemical, determined by the WET, is greater than or equal to the STLC. The WET method uses a dilution ratio of 10:1 in the extraction process; therefore, a waste with a total concentration equal to or greater than ten times the STLC value could potentially be a California hazardous waste, depending on the fraction of the total concentration that is soluble. The TTLC and STLC values are established in Title 22 of the California Code of Regulations, Section 66261.24.

A waste that does not exceed the federal and the California hazardous waste criteria is a non-hazardous waste. Federal hazardous wastes are only accepted for disposal at a Class I-permitted landfill. A nonfederal, California hazardous waste may be disposed of at a Class I-permitted landfill or an out-of-state landfill permitted to accept such waste. Non-hazardous wastes are generally accepted at Class II and Class III landfills, depending on the individual landfill’s permit.

## **4.2 ESLs**

Soil excavated during Project construction demonstrated to be a non-hazardous waste may be transported offsite and reused for other Caltrans projects and/or become the property of the contractor. The Regional Water Board has developed ESLs (Regional Water Board, 2008) for the protection of residential and commercial land uses and construction workers for chemical compounds commonly found on contaminated sites. The ESLs are chemical-specific concentrations that, if not exceeded, would not be expected to present a significant threat to human health and/or the environment. The screening values were developed by the Regional Water Board using conservative (worst-case) exposure assumptions. Since it is unknown where soils from the Project may be reused, ESLs for shallow soils for residential and commercial/industrial land uses where groundwater is considered an actual or potential drinking water source were used for screening purposes in this report.

## **5 INVESTIGATION RESULTS**

### **5.1 Soil Description and Occurrence of Groundwater**

Soil encountered during drilling consisted primarily of loose, sandy fill to the depth of the borings (5.0 to 10.5 feet bgs), with the following exceptions. Fill consisted of clay and silt from 0-2.0 feet bgs in Boring DC07. Loose sand that may be native sand was encountered below a depth of about 1.0 feet bgs in Boring DC05. Stiff clay was encountered from 7.5 to 10.5 feet bgs in Boring DC06, and from 9.0 to 10.5 feet bgs in Boring DC08. Boring logs are included in Appendix C.

Groundwater was observed in three of the nine borings. Groundwater was encountered at depths of 1.5, 2.5, and 7.0 feet bgs in Borings DC01, DC02, and DC04, respectively.

### **5.2 Analytical Results**

#### **5.2.1 Environmental Chemical Compounds**

Analytical results for all the soil samples are summarized in Tables 4 through 11. Only compounds that were identified above laboratory reporting limits in at least one sample are presented on the tables. Semi-volatile organic compounds (analyzed by EPA Method 8270C) and herbicides (analyzed by EPA Method 8151A) were not reported above laboratory reporting limits; therefore, the results are not tabulated.

Hazardous waste thresholds and ESLs are also listed in the tables for compounds with established values. Concentrations that exceed any of the thresholds or ESLs are shaded in the tables. Background concentrations for metals published by the Lawrence Berkeley National Laboratory (“LBNL”) are also listed in the tables for comparison purposes (LBNL, 2009).

#### **5.2.2 Horticultural Analyses**

Horticultural analytical results are tabulated in the Soil & Plant Laboratory report in Appendix G. These results were not evaluated by BASELINE.

### **5.2.3 Geotechnical Tests**

Geotechnical R-value test results are presented in the Caltrans District Laboratory test reports in Appendix H. These results were not evaluated by BASELINE.

## **6 WASTE CLASSIFICATION AND SOIL MANAGEMENT**

Data evaluation was limited to screening of environmental sample results against the federal and California hazardous waste criteria; the ESLs established by the Regional Water Board for residential and commercial/industrial land uses where the groundwater is considered a current or potential source of drinking water (Table A, Regional Water Board, 2008); and ESLs for construction/trench worker direct exposure (Table K-3, Regional Water Board, 2008). Screening against ESLs was performed to provide information for Caltrans and/or the contractor to assess health and safety concerns, and possible soil reuse options outside the Presidio. Evaluation of possible reuse of soils elsewhere within the Presidio in accordance with Presidio Trust reuse criteria can be presented in a separate report, if requested.

### **6.1 Comparison of Soil with Hazardous Waste Criteria**

None of the environmental sample results from the borings or the stockpiles exceeded the federal or California hazardous waste thresholds. Therefore, the soils are not considered federal or California hazardous wastes.

### **6.2 Comparison of Soil with ESLs**

One or more samples from the borings and the stockpiles exceeded residential and/or commercial ESLs. Therefore, further evaluation of soil against residential and commercial ESLs is provided below. None of the samples exceeded ESLs for construction/trench worker exposure.

Soils were grouped by potential waste stream for comparison against ESLs. Each stockpile, represented by one composite sample from each stockpile, was considered a unique waste stream since the stockpiles are from unknown, and possibly unique, sources. Soil proposed for excavation, represented by samples from the borings, was initially evaluated as one potential waste stream.

#### **6.2.1 Comparison of Soil from Stockpiles with ESLs**

Arsenic and vanadium concentrations exceeded the residential ESLs in all stockpile samples, and arsenic also exceeded the commercial ESL in all stockpile samples (Table 4). However, none of the arsenic or vanadium concentrations are above published background concentrations.

Background concentrations for arsenic established by the LBNL are substantially higher than the ESLs for residential and commercial/industrial land uses, and the LBNL background concentration for vanadium is above the residential ESL. The 99th percentile for arsenic determined by the LBNL is 28 milligrams per kilogram (“mg/kg”) (LBNL, 2009), whereas the residential and commercial/industrial ESLs are 0.39 and 1.6 mg/kg, respectively. The 99th percentile for vanadium is 90 mg/kg, well above the residential ESL of 16 mg/kg.

TPHd concentrations exceeded residential and commercial ESLs in Stockpiles 2 and 3, and TPHmo exceeded residential ESLs in Stockpile 2 (Table 6).

Dibenzo(a,h)anthracene exceeded residential ESLs in Stockpile 2 (Table 8). Two polychlorinated biphenyl compounds or “PCBs” (Aroclor-1254 and Aroclor-1260) exceeded residential ESLs in Stockpile 2 (Table 10).

## **6.2.2 Comparison of Soil Proposed for Excavation with ESLs**

Chemical compounds that exceeded ESLs in at least one of the ten samples from the borings were arsenic, vanadium, nickel, TPHd, TPHmo, benzo(a)pyrene, and dibenzo(a,h)anthracene. Therefore, these compounds were evaluated further to determine if representative concentrations exceeded ESLs.

### ***6.2.2.1 Soil Subset Represented by Sample ECDC-1.0-1***

Using ProUCL version 4.00.04 software, the data from all ten samples for the compounds listed above were screened for outliers using Dixon’s outlier test. Four compounds from sample ECDC-1.0-1 were identified as outliers, at a significance level of 1%, 5%, and 10%. The outlier compounds and concentrations were TPHd (210 mg/kg), TPHmo (1,400 mg/kg), benzo(a)pyrene (0.17 mg/kg), and dibenzo(a,h)anthracene (0.15 mg/kg). The total petroleum hydrocarbons and related polyaromatic hydrocarbons in this sample may indicate a localized source of these compounds. The ProUCL outlier test output and supporting graphs are presented in Appendix I.

Due to the identification of outlier compound concentrations in sample ECDC-1.0-1, this sample is not considered to be representative of the soil proposed for excavation as a whole. Results from this sample were evaluated separately from the other nine samples from the borings.

Arsenic and vanadium concentrations exceeded the residential ESLs in this sample, and arsenic also exceeded the commercial ESL (Table 4). However, the arsenic and vanadium concentrations are below published background concentrations (LBNL, 2009). Residential ESLs were exceeded in this sample due to TPHd, TPHmo, benzo(a)pyrene, and dibenzo(a,h)anthracene, and exceeded commercial ESLs due to TPHd, and benzo(a)pyrene.

### ***6.2.2.2 Soil Subset Represented by All Boring Samples Except ECDC-1.0-1***

All samples from the borings, excluding sample ECDC-1.0-1, appear to represent a single population, as discussed above. Chemical compounds that exceeded ESLs in at least one of the nine samples from this subset were arsenic, vanadium, nickel. Therefore, these compounds were evaluated further to determine if representative concentrations exceeded ESLs.

The EPA Risk Assessment Guidance for Superfund (“RAGS”) specifies that the 95% upper confidence limit (“UCL”) on the arithmetic average should be calculated and used as a reasonable estimate of the exposure concentration over time (EPA, 1989). Using ProUCL version 4.00.04 software, estimates of the 95% UCL for these compounds were calculated. The software tests the data to determine if they are consistent with normal, lognormal, or gamma distributions, and calculates UCLs assuming these three distributions as well as nonparametric methods.

A summary of the ProUCL recommended UCL for each compound that exceeded ESLs in at least one of the samples from this subset is listed on Table 12, and is discussed below. The data for the nine samples used for this calculation and the ProUCL output file are provided in Appendix I.

### *Arsenic and Vanadium*

Arsenic and vanadium concentrations exceeded the residential ESLs in all samples, and arsenic also equaled or exceeded the commercial ESL in eight of the nine samples (Table 4). However, none of the arsenic or vanadium concentrations are above published background concentrations.

Background concentrations for arsenic established by LBNL are substantially higher than the ESLs for residential and commercial/industrial land uses, and the LBNL background concentration for vanadium is above the residential ESL. The 99th percentile for arsenic determined by the LBNL is 28 mg/kg (LBNL, 2009), whereas the residential and commercial/industrial ESLs are 0.39 and 1.6 mg/kg, respectively. The 99<sup>th</sup> percentile for vanadium is 90 mg/kg, well above the residential ESL of 16 mg/kg.

### *Nickel*

Nickel exceeded the residential and commercial ESLs of 150 mg/kg in two of the nine samples (Table 4). ProUCL suggests using the lognormal, 95% H UCL for nickel. This 95% UCL of 215 mg/kg is above the residential and commercial ESLs of 150 mg/kg. However, none of the nickel concentrations are above published background concentrations.

The LBNL 99<sup>th</sup> percentile of background concentrations for nickel is substantially higher than the ESLs for residential and commercial/industrial land uses. The 99th percentile for nickel determined by the LBNL is 272 mg/kg (LBNL, 2009), whereas the residential and commercial/industrial ESLs are 150 mg/kg.

## **7 CONCLUSIONS**

A systematic investigation of the quality of the soils that are expected to be excavated and three stockpiles at Dragonfly Creek have been evaluated against hazardous waste criteria and ESLs established by the Regional Water Board. None of the environmental sample results from the borings or the stockpiles exceeded the federal or California hazardous waste thresholds. Therefore, the soils are not considered federal or California hazardous wastes.

All soil subsets, including soil from the stockpiles, exceeded residential and commercial/industrial ESLs for arsenic, and exceeded the residential ESL for vanadium. However, these metals appear to be present at concentrations below regional background levels, as discussed above.

The soil subsets where the representative concentrations exceeded ESLs are as follows:

- Stockpile 1 exceeded residential ESLs for arsenic and vanadium and commercial ESLs for arsenic. This stockpile could be disposed of off-site at a permitted facility, or concurrence could be sought from the Regional Water Board for off-site reuse.
- Stockpile 2 exceeded residential ESLs due to arsenic, vanadium, TPHd, TPHmo, dibenzo(a,h)anthracene, Aroclor-1254 and Aroclor-1260, and exceeded commercial ESLs due to arsenic and TPHd. This stockpile should be disposed of off-site at a permitted facility.
- Stockpile 3 exceeded residential ESLs due to TPHd, arsenic, vanadium, and total lead, and commercial ESLs due to arsenic and TPHd. This stockpile should be disposed of off-site at a permitted facility.

- The soil subset represented by sample ECDC-1.0-1 exceeded residential ESLs due to arsenic, vanadium, TPHd, TPHmo, benzo(a)pyrene, and dibenzo(a,h)anthracene, and exceeded commercial ESLs due to arsenic, TPHd, and benzo(a)pyrene. Because sample ECDC-1.0-1 appears to represent a separate population from the other samples, the area represented by this sample (Borings DC01, DC02, and DC03, at depths of 0-3 feet bgs) should be disposed of off-site at a permitted facility. Alternatively, additional sampling could be conducted in this area to further evaluate the representativeness of the concentrations reported.
- The soil subset represented by all boring samples except ECDC-1.0-1 exceeded residential ESLs due to arsenic, nickel, and vanadium and commercial ESLs due to nickel and arsenic. However, none of the metal concentrations are above published background concentrations. The soil could be disposed of off-site at a permitted facility or concurrence could be sought from the Regional Water Board for off-site reuse.

No compounds in any of the subsets were present in concentrations that exceeded the construction/trench worker ESLs.

## **8 LIMITATIONS**

BASELINE's objective is to perform our work with care, exercising the customary thoroughness and competence of earth science, environmental, and engineering consulting professionals, in accordance with the standard for professional services for a consulting firm at the time these services were provided. It is important to recognize that even the most comprehensive scope of services may fail to detect environmental conditions and potential liability at a particular site. Therefore, BASELINE cannot act as insurers and cannot "certify or underwrite" that a site is free of environmental contamination, and no expressed or implied representation or warranty is included or intended in this report except that the work was performed within the limits prescribed with the customary thoroughness and competence of our profession.

The passage of time, manifestation of latent conditions, or occurrence of future events may require further exploration at the Project site, analysis of the data, and re-evaluation of the findings, observations, conclusions, and recommendations expressed in the report.

The findings, observations, conclusions, and recommendations expressed by BASELINE in this report are limited by the scope of services and should not be considered an opinion concerning the compliance of any past or current owner or operator of the site with any federal, state, or local law or regulation. No warranty or guarantee, whether expressed or implied is made with respect to the data reported or findings, observations, conclusions, and recommendations expressed in this report.

## **9 REFERENCES**

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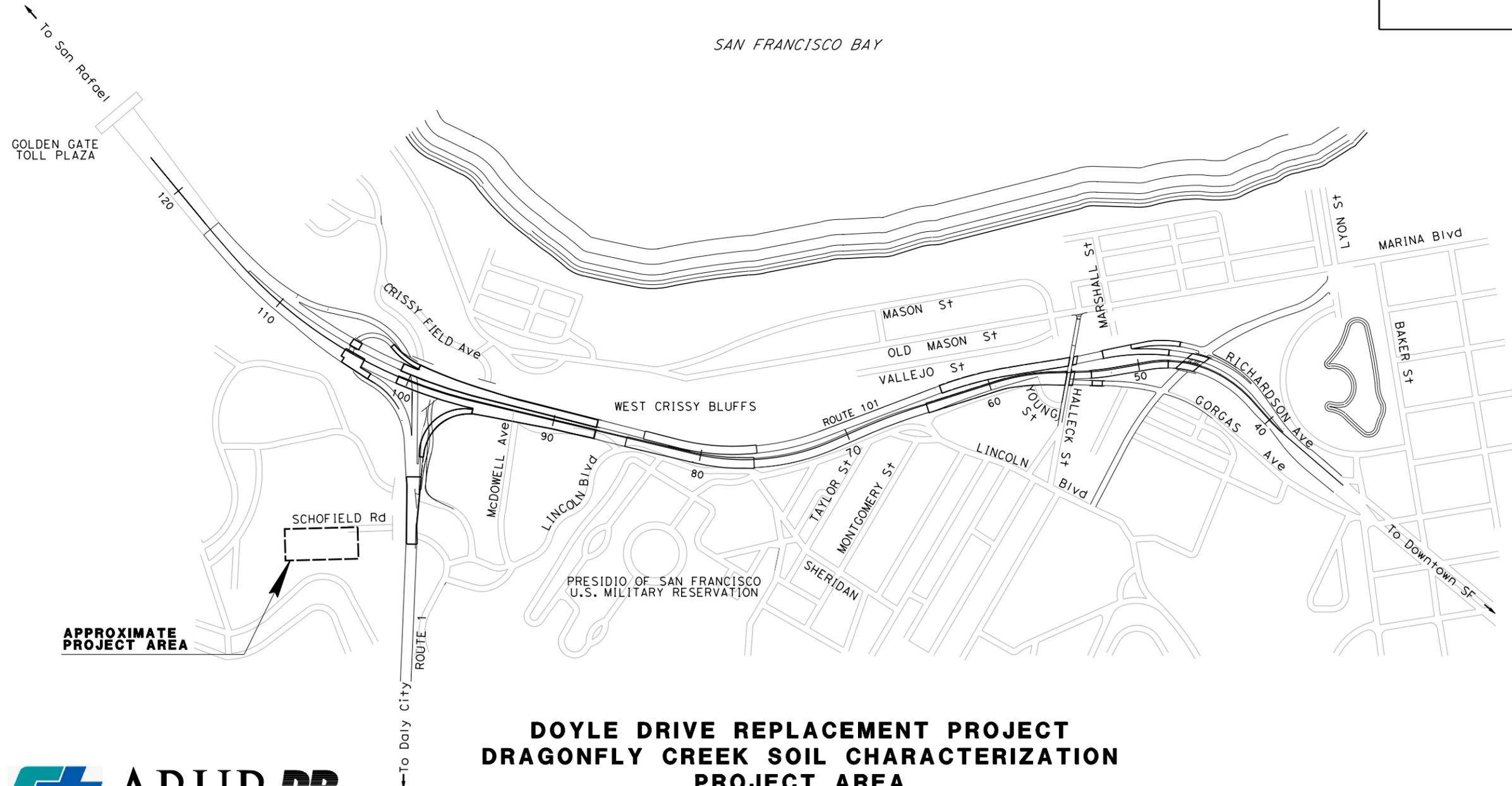
## **FIGURES**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
 PROJECT PLANS FOR CONSTRUCTION ON  
 STATE HIGHWAY

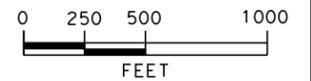
IN THE CITY AND COUNTY OF SAN FRANCISCO  
 AT THE ROUTE 101/1 SEPARATION  
 TO GOLDEN GATE TOLL PLAZA

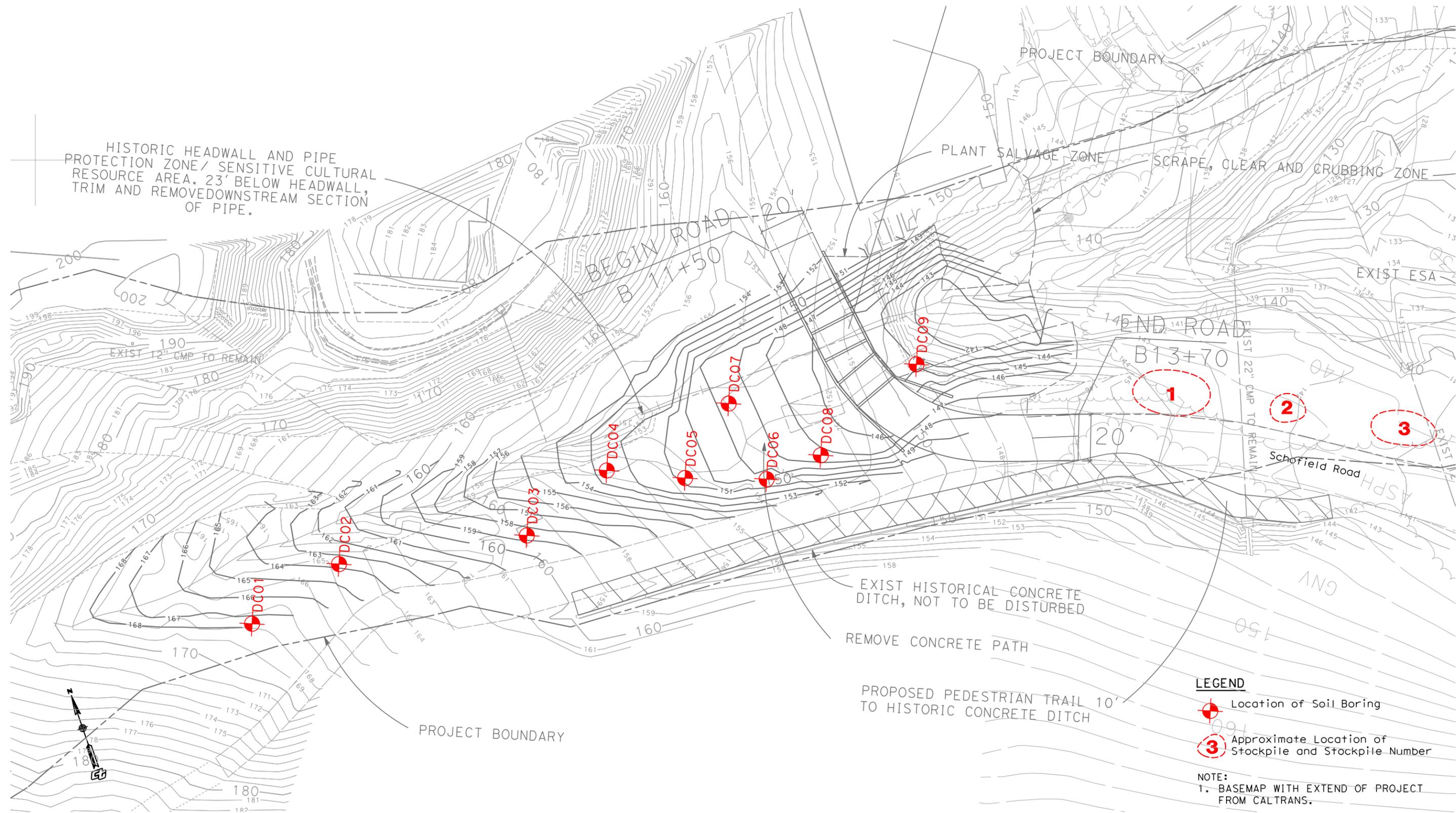
TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SF	101,1	9.2/9.8, 6.8/7.1		

**DOYLE DRIVE REPLACEMENT PROJECT  
 DRAGONFLY CREEK SOIL CHARACTERIZATION  
 PROJECT AREA  
 FIGURE 1 - March 18, 2010 - Rev.00**





**ARUP PB**  
joint venture

**DOYLE DRIVE REPLACEMENT PROJECT  
DRAGONFLY CREEK SOIL CHARACTERIZATION  
SOIL SAMPLING LOCATIONS  
FIGURE 2 - March 18, 2010 - Rev.00**



## **TABLES**

**Table 1A: Environmental Composite Soil Samples  
Doyle Drive Replacement Project, Dragonfly Creek**

<b>Composite Sample ID</b>	<b>Sample Location</b>	<b>Sample Depth (feet bgs)</b>	<b>Discrete Sample ID</b>
STOCKPILE 1	SP-1-E	0.5-1.0	--
	SP-1-N	0.5-1.0	--
	SP-1-S	0.5-1.0	--
	SP-1-W	0.5-1.0	--
STOCKPILE 2	SP-2-E	0.5-1.0	--
	SP-2-N	0.5-1.0	--
	SP-2-S	0.5-1.0	--
	SP-2-W	0.5-1.0	--
STOCKPILE 3	SP-3-E	0.5-1.0	--
	SP-3-N	0.5-1.0	--
	SP-3-S	0.5-1.0	--
	SP-3-W	0.5-1.0	--
ECDC-1.0-1	DC01	1.0	DC01-1.0
	DC02	1.0	DC02-1.0
	DC03	1.0	DC03-1.0
ECDC-1.0-2	DC04	1.0	DC04-1.0
	DC05	1.0	DC05-1.0
	DC06	1.0	DC06-1.0
ECDC-1.0-3	DC07	1.0	DC07-1.0
	DC08	1.0	DC08-1.0
	DC09	1.0	DC09-1.0
ECDC-3.0-1	DC01	3.0	DC01-3.0
	DC02	3.0	DC02-3.0
	DC03	3.0	DC03-3.0
ECDC-3.0-2	DC04	3.0	DC04-3.0
	DC05	3.0	DC05-3.0
	DC06	3.0	DC06-3.0
ECDC-3.0-3	DC07	3.0	DC07-3.0
	DC08	3.0	DC08-3.0
	DC09	3.0	DC09-3.0
ECDC-5.0-1	DC04	4.5	DC04-4.5
	DC05	5.0	DC05-5.0
	DC06	5.0	DC06-5.0
ECDC-5.0-2	DC07	5.0	DC07-5.0
	DC08	5.0	DC08-5.0
	DC09	5.0	DC09-5.0
ECDC-10.0-1	DC04	10.0	DC04-10.0
	DC05	10.0	DC05-10.0
	DC06	10.0	DC06-10.0
ECDC-10.0-2	DC07	10.0	DC07-10.0
	DC08	10.0	DC08-10.0
	DC09	10.0	DC09-10.0

Notes:

Environmental stockpile samples were composited in the field from four stockpile subsamples, and all other environmental samples were composited from discrete soil samples at the laboratory.

**Table 1B: Horticultural Composite Soil Samples  
Doyle Drive Replacement Project, Dragonfly Creek**

Composite Sample ID <sup>1</sup>	Sample Location	Sample Depth (feet bgs)
STOCKPILE 1	SP-1-E	0.5-1.0
	SP-1-N	0.5-1.0
	SP-1-S	0.5-1.0
	SP-1-W	0.5-1.0
STOCKPILE 2	SP-2-E	0.5-1.0
	SP-2-N	0.5-1.0
	SP-2-S	0.5-1.0
	SP-2-W	0.5-1.0
STOCKPILE 3	SP-3-E	0.5-1.0
	SP-3-N	0.5-1.0
	SP-3-S	0.5-1.0
	SP-3-W	0.5-1.0
HOR-1.5-1	DC01	1.5
	DC02	1.5
	DC03	1.5
HOR-1.5-2	DC04	1.5
	DC05	1.5
	DC06	1.5
	DC09	1.5
HOR-1.5-3	DC07	1.5
	DC08	1.5
HOR-3.5-1	DC01	3.5
	DC02	3.5
	DC03	3.5
HOR-3.5-2	DC04	3.5
	DC05	3.5
	DC06	3.5
HOR-3.5-3	DC07	3.5
	DC08	3.5
	DC09	3.5
HOR-5.5-1	DC04	5.5
	DC05	5.5
	DC06	5.5
HOR-5.5-2	DC07	5.5
	DC08	5.5
	DC09	5.5
HOR-9.5-1	DC04	9.5
	DC05	9.5
	DC06	9.5
HOR-9.5-2	DC07	9.5
	DC08	9.5
	DC09	9.5

Notes:

All soil samples were composited in the field.

<sup>1</sup> Horticultural stockpile samples were composited from four stockpile subsamples and all other horticultural samples were composited from discrete soil intervals.

**Table 1C: Geotechnical Composite Soil Samples**  
**Doyle Drive Replacement Project, Dragonfly Creek**

<b>Composite Sample ID<sup>2</sup></b>	<b>Sample Location</b>	<b>Sample Depth (feet bgs)</b>
DCGT STOCKPILE 1	SP-1-E	0.5-1.0
	SP-1-N	0.5-1.0
	SP-1-S	0.5-1.0
	SP-1-W	0.5-1.0
DCGT STOCKPILE 2	SP-2-E	0.5-1.0
	SP-2-N	0.5-1.0
	SP-2-S	0.5-1.0
	SP-2-W	0.5-1.0
DCGT STOCKPILE 3	SP-3-E	0.5-1.0
	SP-3-N	0.5-1.0
	SP-3-S	0.5-1.0
	SP-3-W	0.5-1.0
DCGT-1.0-5.0 West	DC01	1.0-5.0
	DC02	1.0-5.0
	DC03	1.0-5.0
DCGT-1.0-5.0 East	DC04	1.0-5.0
	DC05	1.0-5.0
	DC06	1.0-5.0
	DC07	1.0-5.0
	DC08	1.0-5.0
	DC09	1.0-5.0
DCGT-5.0-10.0	DC04	5.0-10.0
	DC05	5.0-10.0
	DC06	5.0-10.0
	DC07	5.0-10.0
	DC08	5.0-10.0
	DC09	5.0-10.0

Notes:

All soil samples were composited in the field.

<sup>1</sup> Geotechnical samples were composited from soil cuttings or stockpile subsamples.

**Table 2A: Summary of Environmental Soil Sample Analyses  
Doyle Drive Replacement Project, Dragonfly Creek**

Composite Sample ID	Sample Depth (feet bgs)	Sample Date	Title 22 Metals	Soluble Metals	Total Petroleum Hydrocarbons	Volatile Organic Compounds	Semi-Volatile Organic Compounds	Polycyclic Aromatic Hydrocarbons	Pesticides	Herbicides	Polychlorinated Biphenyls	Cyanide	Sulfide	pH	Ignitability	Moisture
<b>Table:</b>			<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>NT</b>	<b>8</b>	<b>9</b>	<b>NT</b>	<b>10</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>11</b>
STOCKPILE 1	0.5-1.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STOCKPILE 2	0.5-1.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STOCKPILE 3	0.5-1.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECDC-1.0-1	1.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECDC-1.0-2	1.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECDC-1.0-3	1.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECDC-3.0-1	3.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECDC-3.0-2	3.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECDC-3.0-3	3.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECDC-5.0-1	5.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECDC-5.0-2	5.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECDC-10.0-1	10.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECDC-10.0-2	10.0	3/1/2010	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes:

Environmental soil samples were submitted to Curtis & Tompkins, Ltd., of Berkeley, California.

Analytical results are presented in Appendix F.

Title 22 metals analyzed by EPA Methods 6020 and 7471A (Mercury).

Total petroleum hydrocarbons analyzed by EPA Method 8015B.

Silica gel cleanup was performed prior to analysis for diesel and motor oil.

Volatile organic compounds analyzed by EPA Method 8260B.

Semi-volatile organic compounds analyzed by EPA Method 8270C.

Polycyclic aromatic hydrocarbons analyzed by EPA Method 8310.

Pesticides analyzed by EPA Method 8081A.

Herbicides analyzed by EPA Method 8151A.

Polychlorinated biphenyls analyzed by EPA Method 8082.

Reactive cyanide analyzed by EPA Method SW-846 Chapter 7.

Reactive sulfide analyzed by EPA Method SW-846 Chapter 7.

pH analyzed by EPA Method 9045D.

Ignitability analyzed by EPA Method 1030.

Moisture analyzed by American Society for Testing and Materials Method D2216/CLP.

bgs = below ground surface.

-- = Not applicable.

NT = No table.

**Table 2B: Summary of Horticultural Soil Sample Analyses  
Doyle Drive Replacement Project, Dragonfly Creek**

<b>Composite Sample ID</b>	<b>Sample Depth (feet bgs)</b>	<b>Sample Date</b>	<b>Horticulture Parameters</b>
STOCKPILE 1	0.5-1.0	3/1/2010	X
STOCKPILE 2	0.5-1.0	3/1/2010	X
STOCKPILE 3	0.5-1.0	3/1/2010	X
HOR-1.5-1	1.5	3/1/2010	X
HOR-1.5-2	1.5	3/1/2010	X
HOR-1.5-3	1.5	3/1/2010	X
HOR-3.5-1	3.5	3/1/2010	X
HOR-3.5-2	3.5	3/1/2010	X
HOR-3.5-3	3.5	3/1/2010	X
HOR-5.5-1	5.5	3/1/2010	X
HOR-5.5-2	5.5	3/1/2010	X
HOR-9.5-1	9.5	3/1/2010	X
HOR-9.5-2	9.5	3/1/2010	X

Notes:

Analytical results for horticultural samples are presented in Appendix G.  
Horticultural samples were submitted to Soil and Plant Laboratory, Inc., and analyzed by Method A05-1 for comprehensive agricultural suitability.  
bgs = below ground surface.

**Table 2C: Summary of Geotechnical Soil Sample Analyses  
Doyle Drive Replacement Project, Dragonfly Creek**

<b>Composite Sample ID</b>	<b>Sample Depth (feet bgs)</b>	<b>Sample Date</b>	<b>Geotechnical R-Value</b>
DCGT STOCKPILE 1	0.5-1.0	3/1/2010	X
DCGT STOCKPILE 2	0.5-1.0	3/1/2010	X
DCGT STOCKPILE 3	0.5-1.0	3/1/2010	X
DCGT-1.0-5.0 West	1.0-5.0	3/1/2010	X
DCGT-1.0-5.0 East	1.0-5.0	3/1/2010	X
DCGT-5.0-10.0	5.0-10.0	3/1/2010	X

Notes:

Analytical results for geotechnical samples are presented in Appendix H.

Geotechnical samples were submitted to the Caltrans District laboratory in San Francisco and analyzed for "R-Value," a Caltrans pavement design test.

bgs = below ground surface.

**Table 3: Soil Boring Survey Data**  
**Doyle Drive Replacement Project, Dragonfly Creek**

Boring ID	Project Survey Coordinates <sup>1</sup>			Presidio Trust Survey Coordinates <sup>2</sup>		
	Northing	Easting	Elevation	Northing	Easting	Elevation
DC01	2119805.137	5992103.609	166.605	479397.830	1430735.505	166.975
DC02	2119832.722	5992139.837	164.446	479425.416	1430771.733	164.816
DC03	2119849.121	5992220.294	159.974	479441.816	1430852.191	160.344
DC04	2119878.840	5992253.396	155.569	479471.536	1430885.293	155.939
DC05	2119877.275	5992287.343	154.546	479469.972	1430919.240	154.916
DC06	2119878.588	5992322.582	153.462	479471.285	1430954.479	153.832
DC07	2119910.313	5992304.534	152.807	479503.010	1430936.431	153.177
DC08	2119890.085	5992345.431	152.526	479482.783	1430977.328	152.896
DC09	2119931.288	5992384.719	148.907	479523.987	1431016.616	149.277

Notes:

<sup>1</sup> Project survey coordinates and vertical datum in feet relative to NAD83 (State Plane System, California Zone III) and NAVD 88, respectively. Borings surveyed at ground elevation by Chaudhary & Associates.

<sup>2</sup> Presidio Trust survey coordinates and vertical datum are in feet relative to NAD27 and Presidio Low Low Water (PLLW), respectively. Survey data calculated by Chaudhary & Associates from NAD 83 and NAVD 88.

**Table 4: Total Metal Concentrations in Soil (mg/kg, dry weight basis)  
Doyle Drive Replacement Project, Dragonfly Creek**

Composite Sample ID	Sample Depth (feet bgs)	Sample Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
STOCKPILE 1	0.5-1.0	3/1/2010	0.40	7.5	510	0.36	0.32	52	18	130	83	0.16	0.66	52	0.39	<0.27	<0.27	75	100
STOCKPILE 2	0.5-1.0	3/1/2010	0.61	5.0	170	<0.29	2.3	54	7.6	35	30	0.19	1.3	41	<0.29	<0.29	<0.29	40	78
STOCKPILE 3	0.5-1.0	3/1/2010	0.46	3.8	67	<0.30	<0.30	43	7.2	24	280	0.070	0.58	35	<0.30	<0.30	<0.30	37	130
ECDC-1.0-1	1.0	3/1/2010	<0.32	3.0	45	<0.32	<0.32	49	11	16	67	0.088	<0.32	47	<0.32	<0.32	<0.32	48	210
ECDC-1.0-2	1.0	3/1/2010	<0.28	2.8	56	<0.28	<0.28	90	9.9	23	27	0.026	<0.28	67	<0.28	<0.28	<0.28	41	63
ECDC-1.0-3	1.0	3/1/2010	<0.28	4.0	190	0.33	<0.28	42	11	47	14	0.028	<0.28	40	<0.28	<0.28	<0.28	42	49
ECDC-3.0-1	3.0	3/1/2010	<0.29	1.2	26	<0.29	<0.29	57	4.6	3.5	3.3	<0.024	<0.29	31	<0.29	<0.29	<0.29	32	21
ECDC-3.0-2	3.0	3/1/2010	<0.27	3.3	25	<0.27	<0.27	53	4.7	3.6	1.8	<0.022	<0.27	27	<0.27	<0.27	<0.27	39	18
ECDC-3.0-3	3.0	3/1/2010	<0.27	3.2	37	<0.27	<0.27	49	5.7	6.4	4.3	<0.022	<0.27	28	<0.27	<0.27	<0.27	37	25
ECDC-5.0-1	5.0	3/1/2010	<0.27	2.6	17	<0.27	<0.27	35	4.0	3.1	1.4	<0.021	<0.27	21	<0.27	<0.27	<0.27	25	16
ECDC-5.0-2	5.0	3/1/2010	<0.27	2.1	15	<0.27	<0.27	34	4.3	3.0	2.7	<0.022	<0.27	19	<0.27	<0.27	<0.27	26	15
ECDC-10.0-1	10.0	3/1/2010	<0.30	3.3	43	<0.30	<0.30	210	23	12	2.6	<0.024	<0.30	250	<0.30	<0.30	<0.30	45	28
ECDC-10.0-2	10.0	3/1/2010	<0.28	2.8	65	<0.28	<0.28	93	20	11	1.9	<0.023	<0.28	200	<0.28	<0.28	<0.28	34	24
California Hazardous Waste Criteria - TTLC (mg/kg) <sup>1,2</sup>			500	500	10,000	75	100	2,500	8,000	2,500	1,000	20	3,500	2,000	100	500	700	2,400	5,000
California Hazardous Waste Criteria - STLC (mg/L) <sup>1</sup>			15	5.0	100	0.75	1.0	560	80	25	5.0	0.2	350	20	1.0	5.0	7.0	24	250
RCRA Hazardous Waste Criteria - TCLP (mg/L) <sup>3</sup>			NV	5.0	100	NV	1.0	5.0	NV	NV	5.0	0.2	NV	NV	1.0	5.0	NV	NV	NV
ESL for Residential Land Use (mg/kg) <sup>4</sup>			6.3	0.39	750	4.0	1.7	750 <sup>8</sup>	40	230	200	1.3	40	150	10	20	1.3	16	600
ESL for Commercial/Industrial Land Use (mg/kg) <sup>5</sup>			40	1.6	1,500	8.0	7.4	750 <sup>8</sup>	80	230	750	10	40	150	10	40	16	200	600
ESL for Construction/Trench Worker Exposure (mg/kg) <sup>6</sup>			310	15	2,600	98	39	1,200,000 <sup>8</sup>	94	310,000	750	58	3,900	260	3,900	3,900	62	770	230,000
LBNL 99th Percentile of Background Metals (mg/kg) <sup>7</sup>			<6	28	410	1.0	5.6	120	25	63	43	0.42	4.8	272	4.9	2.9	10	90	140

**Shading Key:**

-  Analytical results shaded gray indicate that concentrations were greater than ESLs and background metal concentrations.
-  ESL values shaded gray indicate that at least one analytical result exceeded the ESL value and background metal concentrations.
-  Analytical results partially shaded gray indicate that concentrations were greater than ESLs, but less than background metal concentrations.
-  ESL values partially shaded gray indicate that at least one analytical result exceeded the ESL value, but was less than background metal concentrations.

**Notes:**

- Soil results are reported on a dry weight basis in accordance with the Presidio Trust Quality Assurance Project Plan.
- Values shown in bold indicate analytes quantified above the laboratory reporting limit.
- Title 22 metals analyzed by EPA Methods 6020 and 7471A (Mercury).
- bgs = below ground surface.
- mg/kg = milligram per kilogram.
- mg/L = milligram per liter.
- <x.x = Analyte was not identified at or above the laboratory reporting limit of x.x.
- = Not applicable.
- NV = No Value.
- TTLC = Total Threshold Limit Concentration.
- STLC = Soluble Threshold Limit Concentration.
- RCRA = Resource Conservation and Recovery Act.
- TCLP = Toxicity Characteristic Leaching Procedure.
- ESLs = Environmental Screening Levels.
- LBNL = Lawrence Berkeley National Laboratory.

**Table 4: Total Metal Concentrations in Soil (mg/kg, dry weight basis)  
Doyle Drive Replacement Project, Dragonfly Creek**

<sup>1</sup> California Code of Regulations, Title 22, Division 4.5, Chapter 11.

<sup>2</sup> Wet weight basis.

<sup>3</sup> Code of Federal Regulations, Title 40, Chapter 1, Section 261.24.

<sup>4</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils ( $\leq 3$  meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Residential Land Use, May.

<sup>5</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils ( $\leq 3$  meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Commercial/Industrial Land Use, May.

<sup>6</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table K-3, Direct Exposure Soil Screening Levels, Construction/Trench Worker Exposure Scenario, May.

<sup>7</sup> Lawrence Berkeley National Laboratory, 2009, Analysis of Background Distributions of Metals in the Soil at Lawrence Berkeley National Laboratory, Revised, April.

<sup>8</sup> ESL value for chromium III.

**Table 5: Soluble Metal Concentrations in Soil (mg/L)**  
**Doyle Drive Replacement Project, Dragonfly Creek**

Composite Sample ID	Sample Depth (feet bgs)	Sample Date	Chromium, WET	Chromium, TCLP	Lead, WET	Lead, TCLP	Nickel, WET
STOCKPILE 1	0.5-1.0	3/1/2010	<0.25	--	<b>2.1</b>	--	--
STOCKPILE 2	0.5-1.0	3/1/2010	<b>0.68</b>	--	--	--	--
STOCKPILE 3	0.5-1.0	3/1/2010	--	--	<b>2.9</b>	<0.05	--
ECDC-1.0-1	1.0	3/1/2010	--	--	<b>1.8</b>	--	--
ECDC-1.0-2	1.0	3/1/2010	<b>0.28</b>	--	--	--	--
ECDC-1.0-3	1.0	3/1/2010	--	--	--	--	--
ECDC-3.0-1	3.0	3/1/2010	<b>0.32</b>	--	--	--	--
ECDC-3.0-2	3.0	3/1/2010	<0.25	--	--	--	--
ECDC-3.0-3	3.0	3/1/2010	--	--	--	--	--
ECDC-5.0-1	5.0	3/1/2010	--	--	--	--	--
ECDC-5.0-2	5.0	3/1/2010	--	--	--	--	--
ECDC-10.0-1	10.0	3/1/2010	<0.25	<b>0.15</b>	--	--	<b>1.7</b>
ECDC-10.0-2	10.0	3/1/2010	<0.25	--	--	--	<b>3.8</b>
California Hazardous Waste Criteria - STLC (mg/L) <sup>1</sup>			560	NV	5.0	NV	20
RCRA Hazardous Waste Criteria - TCLP (mg/L) <sup>2</sup>			NV	5.0	NV	5.0	NV

Notes:

Values shown in **bold** indicate analytes quantified above the laboratory reporting limit.

Soluble chromium, lead, and nickel analyzed by Waste Extraction Test ("WET") method.

Soluble chromium and lead analyzed by Toxicity Characteristic Leaching Procedure ("TCLP") method.

bgs = below ground surface.

mg/L = milligram per liter.

<x.x = Analyte was not identified at or above the laboratory reporting limit of x.x.

-- = Not applicable.

NV = No Value.

STLC = Soluble Threshold Limit Concentration.

RCRA = Resource Conservation and Recovery Act.

TCLP = Toxicity Characteristic Leaching Procedure.

<sup>1</sup> California Code of Regulations, Title 22, Division 4.5, Chapter 11.

<sup>2</sup> Code of Federal Regulations, Title 40, Chapter 1, Section 261.24.

**Table 6: Total Petroleum Hydrocarbon Concentrations in Soil (mg/kg, dry weight basis)  
Doyle Drive Replacement Project, Dragonfly Creek**

Composite Sample ID	Sample Depth (feet bgs)	Sample Date	TPH as Gasoline C7-C12	TPH as Diesel C10-C24	TPH as Motor Oil C24-C36
STOCKPILE 1	0.5-1.0	3/1/2010	<1.1	<b>29</b>	<b>110</b>
STOCKPILE 2	0.5-1.0	3/1/2010	<1.2	<b>260</b>	<b>540</b>
STOCKPILE 3	0.5-1.0	3/1/2010	<1.2	<b>120</b>	<b>320</b>
ECDC-1.0-1	1.0	3/1/2010	<1.4	<b>210</b>	<b>1,400</b>
ECDC-1.0-2	1.0	3/1/2010	<1.1	<b>14</b>	<b>56</b>
ECDC-1.0-3	1.0	3/1/2010	<1.1	<b>6.8</b>	<b>22</b>
ECDC-3.0-1	3.0	3/1/2010	<1.3	<1.2	<5.9
ECDC-3.0-2	3.0	3/1/2010	<1.1	<1.1	<5.4
ECDC-3.0-3	3.0	3/1/2010	<1.1	<b>1.4</b>	<b>5.7</b>
ECDC-5.0-1	5.0	3/1/2010	<1.0	<1.1	<5.3
ECDC-5.0-2	5.0	3/1/2010	<1.1	<1.1	<5.3
ECDC-10.0-1	10.0	3/1/2010	<1.2	<1.2	<5.9
ECDC-10.0-2	10.0	3/1/2010	<1.1	<1.1	<5.6
California Hazardous Waste Criteria (mg/kg) <sup>1</sup>			NV	NV	NV
ESL for Residential Land Use (mg/kg) <sup>2</sup>			83	<b>83</b>	<b>370</b>
ESL for Commercial/Industrial Land Use (mg/kg) <sup>3</sup>			83	<b>83</b>	2,500
ESL for Construction/Trench Worker Exposure (mg/kg) <sup>4</sup>			4,200	4,200	12,000

Shading Key:

Analytical results shaded gray indicate that concentrations were greater than ESLs.  
ESL values shaded gray indicate that at least one analytical result exceeded the ESL value.

Notes:

Soil results are reported on a dry weight basis in accordance with the Presidio Trust Quality Assurance Project Plan.

Values shown in **bold** indicate analytes quantified above the laboratory reporting limit.

Total petroleum hydrocarbons ("TPH") analyzed by EPA Method 8015B.

Silica gel cleanup was performed prior to analysis for diesel and motor oil.

bgs = below ground surface.

mg/kg = milligram per kilogram.

<x.x = Analyte was not identified at or above the laboratory reporting limit of x.x.

-- = Not applicable.

NV = No Value.

ESLs = Environmental Screening Levels.

<sup>1</sup> California Code of Regulations, Title 22, Division 4.5, Chapter 11.

<sup>2</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils (≤ 3 meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Residential Land Use, May.

<sup>3</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils (≤ 3 meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Commercial/Industrial Land Use, May.

<sup>4</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table K-3, Direct Exposure Soil Screening Levels, Construction/Trench Worker Exposure Scenario, May.

**Table 7: Volatile Organic Compound Concentrations in Soil (mg/kg, dry weight basis)  
Doyle Drive Replacement Project, Dragonfly Creek**

Composite Sample ID	Sample Depth (feet bgs)	Sample Date	Acetone
STOCKPILE 1	0.5-1.0	3/1/2010	<0.021
STOCKPILE 2	0.5-1.0	3/1/2010	<b>0.029</b>
STOCKPILE 3	0.5-1.0	3/1/2010	<0.022
ECDC-1.0-1	1.0	3/1/2010	<0.025
ECDC-1.0-2	1.0	3/1/2010	<0.022
ECDC-1.0-3	1.0	3/1/2010	<0.021
ECDC-3.0-1	3.0	3/1/2010	<0.022
ECDC-3.0-2	3.0	3/1/2010	<0.021
ECDC-3.0-3	3.0	3/1/2010	<0.020
ECDC-5.0-1	5.0	3/1/2010	<0.020
ECDC-5.0-2	5.0	3/1/2010	<0.020
ECDC-10.0-1	10.0	3/1/2010	<0.022
ECDC-10.0-2	10.0	3/1/2010	<0.022
California Hazardous Waste Criteria (mg/kg) <sup>1</sup>			NV
ESL for Residential Land Use (mg/kg) <sup>2</sup>			0.5
ESL for Commercial/Industrial Land Use (mg/kg) <sup>3</sup>			0.5
ESL for Construction/Trench Worker Exposure (mg/kg) <sup>4</sup>			100,000

Notes:

Soil results are reported on a dry weight basis in accordance with the Presidio Trust Quality Assurance Project Plan.

Values shown in **bold** indicate analytes quantified above the laboratory reporting limit.

Only analytes that were identified above laboratory reporting limits in at least one sample are presented.

Volatile organic compounds analyzed by EPA Method 8260B.

bgs = below ground surface.

mg/kg = milligram per kilogram.

<x.x = Analyte was not identified at or above the laboratory reporting limit of x.x.

-- = Not applicable.

NV = No Value.

ESLs = Environmental Screening Levels.

<sup>1</sup> California Code of Regulations, Title 22, Division 4.5, Chapter 11.

<sup>2</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils (≤ 3 meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Residential Land Use, May.

<sup>3</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils (≤ 3 meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Commercial/Industrial Land Use, May.

<sup>4</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table K-3, Direct Exposure Soil Screening Levels, Construction/Trench Worker Exposure Scenario, May.

**Table 8: Polycyclic Aromatic Hydrocarbon Concentrations in Soil (mg/kg, dry weight basis)  
Doyle Drive Replacement Project, Dragonfly Creek**

Composite Sample ID	Sample Depth (feet bgs)	Sample Date	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
STOCKPILE 1	0.5-1.0	3/1/2010	<b>0.0050</b>	<b>0.0088</b>	<b>0.029</b>	<b>0.034</b>	<b>0.053</b>	<b>0.012</b>	<b>0.050</b>	<b>0.052</b>	<b>0.072</b>	<b>0.025</b>	<b>0.027</b>	<b>0.044</b>
STOCKPILE 2	0.5-1.0	3/1/2010	<b>0.033</b>	<0.015	<b>0.037</b>	<b>0.081</b>	<b>0.063</b>	<b>0.020</b>	<b>0.22</b>	<b>0.10</b>	<b>0.27</b>	<b>0.039</b>	<b>0.19</b>	<b>0.12</b>
STOCKPILE 3	0.5-1.0	3/1/2010	<0.016	<0.016	<b>0.030</b>	<b>0.062</b>	<b>0.040</b>	<b>0.018</b>	<b>0.12</b>	<0.032	<b>0.22</b>	<b>0.020</b>	<b>0.064</b>	<b>0.12</b>
ECDC-1.0-1	1.0	3/1/2010	<b>0.053</b>	<b>0.24</b>	<b>0.17</b>	<b>0.17</b>	<b>0.12</b>	<b>0.091</b>	<b>0.27</b>	<b>0.15</b>	<b>0.51</b>	<b>0.035</b>	<b>0.27</b>	<b>0.41</b>
ECDC-1.0-2	1.0	3/1/2010	<0.0037	<b>0.0041</b>	<b>0.0049</b>	<b>0.0076</b>	<b>0.013</b>	<0.0037	<b>0.0093</b>	<0.0073	<b>0.014</b>	<0.0037	<b>0.0039</b>	<b>0.0086</b>
ECDC-1.0-3	1.0	3/1/2010	<0.0037	<0.0037	<0.0037	<0.0073	<0.0073	<0.0037	<0.0037	<0.0073	<0.0073	<0.0037	<0.0037	<0.0037
ECDC-3.0-1	3.0	3/1/2010	<0.0039	<0.0039	<0.0039	<0.0078	<0.0078	<0.0039	<0.0039	<0.0078	<0.0078	<0.0039	<0.0039	<0.0039
ECDC-3.0-2	3.0	3/1/2010	<0.0036	<0.0036	<0.0036	<0.0072	<0.0072	<0.0036	<0.0036	<0.0072	<0.0072	<0.0036	<0.0036	<0.0036
ECDC-3.0-3	3.0	3/1/2010	<0.0036	<0.0036	<0.0036	<0.0072	<0.0072	<0.0036	<0.0036	<0.0072	<0.0072	<0.0036	<0.0036	<0.0036
ECDC-5.0-1	5.0	3/1/2010	<0.0035	<0.0035	<0.0035	<0.0071	<0.0071	<0.0035	<0.0035	<0.0071	<0.0071	<0.0035	<0.0035	<0.0035
ECDC-5.0-2	5.0	3/1/2010	<0.0035	<0.0035	<0.0035	<0.0071	<0.0071	<0.0035	<0.0035	<0.0071	<0.0071	<0.0035	<0.0035	<0.0035
ECDC-10.0-1	10.0	3/1/2010	<0.0040	<0.0040	<0.0040	<0.0079	<0.0079	<0.0040	<0.0040	<0.0079	<0.0079	<0.0040	<0.0040	<0.0040
ECDC-10.0-2	10.0	3/1/2010	<0.0037	<0.0037	<0.0037	<0.0074	<0.0074	<0.0037	<0.0037	<0.0074	<0.0074	<0.0037	<0.0037	<0.0037
California Hazardous Waste Criteria (mg/kg) <sup>1</sup>			NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
ESL for Residential Land Use (mg/kg) <sup>2</sup>			2.8	0.38	<b>0.038</b>	0.38	27	0.38	23	<b>0.062</b>	40	0.62	11	85
ESL for Commercial/Industrial Land Use (mg/kg) <sup>3</sup>			2.8	1.3	<b>0.13</b>	1.3	27	1.3	23	0.21	40	2.1	11	85
ESL for Construction/Trench Worker Exposure (mg/kg) <sup>4</sup>			100,000	15	1.5	15	11,000	15	2,400	2.4	14,000	24	11,000	21,000

**Shading Key:**

Analytical results shaded gray indicate that concentrations were greater than ESLs.  
ESL values shaded gray indicate that at least one analytical result exceeded the ESL value.

**Notes:**

Soil results are reported on a dry weight basis in accordance with the Presidio Trust Quality Assurance Project Plan.

Values shown in **bold** indicate analytes quantified above the laboratory reporting limit.

Only analytes that were identified above laboratory reporting limits in at least one sample are presented.

Polycyclic aromatic hydrocarbons analyzed by EPA Method 8310.

bgs = below ground surface.

mg/kg = milligram per kilogram.

<x.x = Analyte was not identified at or above the laboratory reporting limit of x.x.

-- = Not applicable.

NV = No Value.

ESLs = Environmental Screening Levels.

<sup>1</sup> California Code of Regulations, Title 22, Division 4.5, Chapter 11.

<sup>2</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils (≤ 3 meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Residential Land Use, May.

<sup>3</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils (≤ 3 meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Commercial/Industrial Land Use, May.

<sup>4</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table K-3, Direct Exposure Soil Screening Levels, Construction/Trench Worker Exposure Scenario, May.

**Table 9: Pesticide Concentrations in Soil (mg/kg, dry weight basis)**  
**Doyle Drive Replacement Project, Dragonfly Creek**

Composite Sample ID	Sample Depth (feet bgs)	Sample Date	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-Chlordane	delta-BHC	Endosulfan sulfate	gamma-Chlordane
STOCKPILE 1	0.5-1.0	3/1/2010	<0.036	<0.036	<b>0.049</b>	<0.018	<0.018	<0.018	<0.036	<0.018
STOCKPILE 2	0.5-1.0	3/1/2010	<0.19	<0.19	<b>0.27</b>	<0.097	<0.097	<0.097	<b>0.19</b>	<0.097
STOCKPILE 3	0.5-1.0	3/1/2010	<0.039	<0.039	<b>0.062</b>	<0.02	<0.02	<0.02	<0.039	<b>0.029</b>
ECDC-1.0-1	1.0	3/1/2010	<b>0.015</b>	<b>0.0043</b>	<b>0.0097</b>	<b>0.0029</b>	<b>0.0028</b>	<b>0.0041</b>	<b>0.0043</b>	<b>0.0032</b>
ECDC-1.0-2	1.0	3/1/2010	<0.0036	<b>0.0043</b>	<b>0.0064</b>	<0.0019	<0.0019	<0.0019	<b>0.0038</b>	<0.0019
ECDC-1.0-3	1.0	3/1/2010	<0.0037	<0.0037	<0.0037	<0.0019	<0.0019	<0.0019	<0.0037	<0.0019
ECDC-3.0-1	3.0	3/1/2010	<0.0039	<0.0039	<b>0.0045</b>	<0.002	<0.002	<0.002	<0.0039	<0.002
ECDC-3.0-2	3.0	3/1/2010	<0.0036	<0.0036	<0.0036	<0.0018	<0.0018	<0.0018	<0.0036	<0.0018
ECDC-3.0-3	3.0	3/1/2010	<0.0036	<0.0036	<0.0036	<0.0018	<0.0018	<0.0018	<0.0036	<0.0018
ECDC-5.0-1	5.0	3/1/2010	<0.0035	<0.0035	<0.0035	<0.0018	<0.0018	<0.0018	<0.0035	<0.0018
ECDC-5.0-2	5.0	3/1/2010	<0.0035	<0.0035	<0.0035	<0.0018	<0.0018	<0.0018	<0.0035	<0.0018
ECDC-10.0-1	10.0	3/1/2010	<0.0039	<0.0039	<0.0039	<0.002	<0.002	<0.002	<0.0039	<0.002
ECDC-10.0-2	10.0	3/1/2010	<0.0037	<0.0037	<0.0037	<0.0019	<0.0019	<0.0019	<0.0037	<0.0019
California Hazardous Waste Criteria (mg/kg) <sup>1</sup>			1.0	1.0	1.0	1.4	2.5	NV	NV	2.5
ESL for Residential Land Use (mg/kg) <sup>2</sup>			2.4	1.7	1.7	<b>0.032</b>	0.44	NV	NV	0.44
ESL for Commercial/Industrial Land Use (mg/kg) <sup>3</sup>			10	4.0	4.0	0.13	1.7	NV	NV	1.7
ESL for Construction/Trench Worker Exposure (mg/kg) <sup>4</sup>			120	87	87	1.5	21	NV	NV	21

Shading Key:

 Analytical results partially shaded orange indicate that laboratory reporting limits were greater than residential ESLs.  
Residential ESL values partially shaded orange indicate that the laboratory reporting limit of at least one analytical result exceeded the ESL value.

Notes:

Soil results are reported on a dry weight basis in accordance with the Presidio Trust Quality Assurance Project Plan.  
Values shown in **bold** indicate analytes quantified above the laboratory reporting limit.  
Only analytes that were identified above laboratory reporting limits in at least one sample are presented.  
Pesticides analyzed by EPA Method 8081A.  
bgs = below ground surface.  
mg/kg = milligram per kilogram.

**Table 9: Pesticide Concentrations in Soil (mg/kg, dry weight basis)**  
**Doyle Drive Replacement Project, Dragonfly Creek**

<x.x = Analyte was not identified at or above the laboratory reporting limit of x.x.

-- = Not applicable.

NV = No Value.

ESLs = Environmental Screening Levels.

<sup>1</sup> California Code of Regulations, Title 22, Division 4.5, Chapter 11.

<sup>2</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils ( $\leq$  3 meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Residential Land Use, May.

<sup>3</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils ( $\leq$  3 meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Commercial/Industrial Land Use, May.

<sup>4</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table K-3, Direct Exposure Soil Screening Levels, Construction/Trench Worker Exposure Scenario, May.

**Table 10: Polychlorinated Biphenyl Concentrations in Soil (mg/kg, dry weight basis)  
Doyle Drive Replacement Project, Dragonfly Creek**

Composite Sample ID	Sample Depth (feet bgs)	Sample Date	Aroclor-1254	Aroclor-1260
STOCKPILE 1	0.5-1.0	3/1/2010	<0.013	<0.013
STOCKPILE 2	0.5-1.0	3/1/2010	<b>0.34</b>	<b>0.30</b>
STOCKPILE 3	0.5-1.0	3/1/2010	<b>0.039</b>	<b>0.036</b>
ECDC-1.0-1	1.0	3/1/2010	<0.016	<0.016
ECDC-1.0-2	1.0	3/1/2010	<0.013	<0.013
ECDC-1.0-3	1.0	3/1/2010	<0.013	<0.013
ECDC-3.0-1	3.0	3/1/2010	<0.014	<0.014
ECDC-3.0-2	3.0	3/1/2010	<0.013	<0.013
ECDC-3.0-3	3.0	3/1/2010	<0.013	<0.013
ECDC-5.0-1	5.0	3/1/2010	<0.013	<0.013
ECDC-5.0-2	5.0	3/1/2010	<0.013	<0.013
ECDC-10.0-1	10.0	3/1/2010	<0.014	<0.014
ECDC-10.0-2	10.0	3/1/2010	<0.013	<0.013
California Hazardous Waste Criteria (mg/kg) <sup>1,2</sup>			50	50
ESL for Residential Land Use (mg/kg) <sup>3</sup>			<b>0.22</b>	<b>0.22</b>
ESL for Commerical/Industrial Land Use (mg/kg) <sup>4</sup>			0.74	0.74
ESL for Construction/Trench Worker Exposure (mg/kg) <sup>5</sup>			6.7	6.7

Shading Key:

Analytical results shaded gray indicate that concentrations were greater than ESLs.  
ESL values shaded gray indicate that at least one analytical result exceeded the ESL value.

Notes:

Soil results are reported on a dry weight basis in accordance with the Presidio Trust Quality Assurance Project Plan.

Values shown in **bold** indicate analytes quantified above the laboratory reporting limit.

Only analytes that were identified above laboratory reporting limits in at least one sample are presented.

Polychlorinated biphenyls analyzed by EPA Method 8082.

bgs = below ground surface.

mg/kg = milligram per kilogram.

<x.x = Analyte was not identified at or above the laboratory reporting limit of x.x.

-- = Not applicable.

ESLs = Environmental Screening Levels.

<sup>1</sup> California Code of Regulations, Title 22, Division 4.5, Chapter 11.

<sup>2</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils (≤ 3 meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Residential Land Use, May.

<sup>3</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils (≤ 3 meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Commercial/Industrial Land Use, May.

<sup>4</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table K-3, Direct Exposure Soil Screening Levels, Construction/Trench Worker Exposure Scenario, May.

**Table 11: Miscellaneous Parameters in Soil**  
**Doyle Drive Replacement Project, Dragonfly Creek**

Composite Sample ID	Sample Depth (feet bgs)	Sample Date	Reactive Cyanide <sup>1</sup>	Reactive Sulfide <sup>1</sup>	pH	Ignitability	Moisture
			Units: mg/kg	mg/kg	SU	°F	%
STOCKPILE 1	0.5-1.0	3/1/2010	<11	<11	<b>8.0</b>	>1,000	<b>8</b>
STOCKPILE 2	0.5-1.0	3/1/2010	<11	<11	<b>11.6</b>	>1,000	<b>13</b>
STOCKPILE 3	0.5-1.0	3/1/2010	<12	<12	<b>7.6</b>	>1,000	<b>16</b>
ECDC-1.0-1	1.0	3/1/2010	<13	<13	<b>5.7</b>	>1,000	<b>23</b>
ECDC-1.0-2	1.0	3/1/2010	<11	<11	<b>6.4</b>	>1,000	<b>10</b>
ECDC-1.0-3	1.0	3/1/2010	<11	<11	<b>6.2</b>	>1,000	<b>10</b>
ECDC-3.0-1	3.0	3/1/2010	<12	<12	<b>6.3</b>	>1,000	<b>15</b>
ECDC-3.0-2	3.0	3/1/2010	<11	<11	<b>6.3</b>	>1,000	<b>8</b>
ECDC-3.0-3	3.0	3/1/2010	<11	<11	<b>5.8</b>	>1,000	<b>8</b>
ECDC-5.0-1	5.0	3/1/2010	<11	<11	<b>6.6</b>	>1,000	<b>6</b>
ECDC-5.0-2	5.0	3/1/2010	<11	<11	<b>5.8</b>	>1,000	<b>6</b>
ECDC-10.0-1	10.0	3/1/2010	<12	<12	<b>6.9</b>	>1,000	<b>16</b>
ECDC-10.0-2	10.0	3/1/2010	<11	<11	<b>6.3</b>	>1,000	<b>11</b>

Notes:

Values shown in **bold** indicate analytes quantified above the laboratory reporting limit.

Reactive cyanide analyzed by EPA Method SW-846 Chapter 7.

Reactive sulfide analyzed by EPA Method SW-846 Chapter 7.

pH analyzed by EPA Method 9045D.

Ignitability analyzed by EPA Method 1030.

Moisture analyzed by American Society for Testing and Materials Method D2216/CLP.

bgs = below ground surface.

mg/kg = milligram per kilogram.

F° = degrees fahrenheit.

SU = standard units.

% = percent.

<x.x = Analyte was not identified at or above the laboratory reporting limit of x.x.

-- = Not applicable.

<sup>1</sup> Soil results are reported on a dry weight basis in accordance with the Presidio Trust Quality Assurance Project Plan.

**Table 12: Summary of Upper Confidence Limits in Soil Proposed for Excavation (mg/kg, dry weight basis)  
Doyle Drive Replacement Project, Dragonfly Creek**

Analyte	ProUCL Recommendation		Environmental Screening Levels		LBNL Background <sup>3</sup>
	Distribution	UCL	Residential <sup>1</sup>	Commercial <sup>2</sup>	
Arsenic	95% Student's-t	3.3	0.39	1.6	28
Vanadium	95% Student's-t	40	16	200	90
Nickel	95% H	215	150	150	272

Notes:

Statistics were calculated with ProUCL 4.00.04, using detected and non-detected values.

Results for sample ECDC-1.0-1 were not used for this analysis because concentrations of motor oil, diesel, benzo(a)pyrene, and dibenzo(a,h) anthracene were determined to be outliers using ProUCL's Dixon's Outlier test. Soil represented by this sample should be considered a separate population.

mg/kg = milligram per kilogram.

UCL = upper confidence limit.

LBNL = Lawrence Berkeley National Laboratory.

<sup>1</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils ( $\leq 3$  meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Residential Land Use, May.

<sup>2</sup> California Regional Water Quality Control Board, San Francisco Bay Region, 2008, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, May, Table A, Environmental Screening Levels, Shallow Soils ( $\leq 3$  meters bgs), Groundwater is a Current or Potential Source of Drinking Water, Commercial/Industrial Land Use, May.

<sup>3</sup> Lawrence Berkeley National Laboratory, 2009, Analysis of Background Distributions of Metals in the Soil at Lawrence Berkeley National Laboratory, Revised, April.

**APPENDICES**  
**(IN PDF FORMAT ON CD ROM)**

**APPENDIX A**

**SOIL AND GROUNDWATER SAMPLING WORKPLAN**

**SFCTA Contract Number 06/07-29**

**Caltrans EA Number 04-163701**

**SOUTH ACCESS TO THE GOLDEN GATE BRIDGE**

# **DOYLE DRIVE**

**DOYLE DRIVE REPLACEMENT PROJECT  
LICENSE TO ENTER AND CONDUCT  
GEOTECHNICAL INVESTIGATIONS**

**Exhibit No. 3**

**Soil and Groundwater Sampling – Work Plan**

**October 2008**

**Prepared By:**

**Caltrans and Arup PB Joint Venture**

San Francisco County  
Transportation Authority

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**Doyle Drive  
Replacement Project**

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License to Enter and  
Conduct Geotechnical  
Investigations

San Francisco County  
Transportation Authority

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**Doyle Drive  
Replacement Project**

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License to Enter and  
Conduct Geotechnical  
Investigations

Exhibit No. 3

Soil and Groundwater  
Sampling

October 2008



This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

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Job number 131558

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Site Health and Safety Plan

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Categorical Exemption

## 1 Overview

The Doyle Drive Replacement Project (“Project”) will include both cut and fill areas, as shown on Figures 1 and 2. Excavation will be required within the cut zones, and may be required within the fill zones to prepare the ground surface prior to receiving surcharge materials. The excavated soil may contain hazardous substances.

Soil and groundwater samples are proposed to be collected from 133 soil borings within the construction zone before construction begins to determine the quality of the excavated soil and groundwater that may require management during construction. The analytical data will be used to evaluate whether the excavated soil can be reused within the Presidio or will need to be removed from the Presidio. Analytical results will be screened against Presidio Trust reuse criteria for all Presidio Trust Cleanup Zones encountered by the Project.

A draft Site Investigation Report and Soil Management Plan (SIR/SMP) will be developed that documents the site investigation and delineates soil reuse and off-site removal options. The draft SIR/SMP will be submitted to the Presidio Trust for review and comments. The SIR/SMP will be finalized for the Presidio Trust’s approval.

The borings will be advanced with hollow-stem auger, direct push, hand auger, and/or rotary drill rig methods. Proposed excavation areas and boring locations are shown on Figures 1 and 2, and the boring depths are presented on Table 1. Proposed boring depths range from approximately 2.5 feet to 120 feet below ground surface. The drilling is expected to be conducted in one phase in accordance with drilling permits obtained from Presidio Trust.

## 2 Objectives

The objectives of the environmental sampling are to: 1) pre-characterize soil for either reuse within the Presidio or removal from the Presidio; 2) pre-characterize groundwater that may be encountered during construction dewatering to support development of groundwater disposal options; and 3) obtain chemical quality information of the soil and groundwater for preparation of future worker health and safety plan(s).

The proposed sampling collection plan, presented below, has been designed to meet the four sampling objectives by: 1) collection of representative samples from soil to be excavated during Project construction in general accordance with U.S. Environmental Protection Agency (EPA) SW-846<sup>1</sup> guidance; 2) selection of an analytical approach for soil samples that would meet landfill requirements for pre-approval of soil disposal, and that would meet Presidio Trust analytical requirements for potential re-use of soil within the Project limits without additional characterization after excavation; 3) collection of representative grab groundwater samples from a limited number of locations to evaluate management options for dewatered groundwater; 4) selection of an analytical approach for the groundwater samples that would meet City and County of San Francisco (San Francisco Public Utilities Commission) batch discharge requirements; and 5) collection and analysis of representative samples to allow the contractor to prepare an appropriate health and safety plan for the construction workers.

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[1] <sup>1</sup> U.S. Environmental Protection Agency, 1986, Test Methods for Evaluating Hazardous Waste, Physical/Chemical Methods (SW-846), Third Edition, Volumes 1A, 1B, and 1C, revisions through 1996.

### 3 Proposed Boring and Sample Locations

Proposed boring locations are shown on Figures 1 and 2. The borings were selected using a systematic, random approach. An initial, random boring location was selected, and subsequent boring locations were identified approximately every 200 lateral feet along the north- and southbound portions of the Project alignment for a total of 133 borings. North- and southbound lane borings will be offset. Actual boring locations may vary slightly from those proposed due to constraints such as utilities, traffic flow, and drilling access.

Proposed cut and fill areas for the Project are shown on Figures 1 and 2. The majority of the borings (75) are located within proposed cut areas, and the remainder of the borings (59) is located in proposed fill areas.

Proposed boring depths are listed in Table 1. Borings located in proposed fill areas will be drilled to a depth of 2.5 feet below ground surface (bgs) to characterize only surficial soil, which may be removed in potential surcharge areas. Borings located within proposed cut areas will be drilled to a depth of approximately two feet below the proposed depth of cut, or five feet below top of bedrock if bedrock is encountered. Select locations nearest proposed piers in the high viaduct area are intended to represent waste soil generated from pier drilling. These borings (E84, E86, E88, E92, E94, and E95) will be sampled to the depth of the pier, or five feet below the top of bedrock if bedrock is encountered.

### 4 Pre-Exploration Activities

Each boring location will be marked in white paint, and locations not covered by asphalt or concrete will also be identified using a wooden or metal stake. Underground Service Alert (USA) will be contacted for utility clearance. Borings to be drilled with a drill rig, as opposed to a hand auger, will also be cleared by a private utility locator.

Dig Permits will be requested from the Presidio Trust for all borings after utility clearance has been completed. Each Dig Permit request will include a maximum of 45 borings and will be submitted to the Presidio Trust a minimum of 10 working days prior to starting work on the locations included in the permit. We understand that after the Dig Permit is submitted, the Presidio Trust will review and check the borehole locations with their equipment, maps, and site knowledge before issuing the Dig Permit authorizing drilling to commence.

### 5 Borehole Drilling Procedures

A professional BASELINE geologist will supervise all drilling activities. Drilling will be conducted by Gregg Drilling & Testing, Inc. ("Gregg Drilling") of Martinez, California, a C-57 licensed driller. Hand auger borings may be advanced by BASELINE or Gregg Drilling. Borings will be drilled using direct-push equipment, a hollow-stem auger drill rig, a rotary drill rig, or a hand auger as indicated on Table 1. These drilling techniques are described in Appendix A.

Drilling operations will be performed in general accordance with the applicable *Standard Operating Procedures* included in the Presidio Trust's *Presidio-Wide Quality Assurance Project Plan: Sampling and Analysis Plan* ("QAPP") dated April 2001. Proposed deviations from the QAPP are described in Appendix B. BASELINE staff will perform work in accordance with BASELINE's site-specific Health and Site Safety Plan (Appendix C). The BASELINE Health and Safety Plan will be provided to the Gregg Drilling for their information in preparing a Health and Safety Plan for their employees.

The boreholes will range in diameter from 2 to 8 inches. Each boring field crew of 3 to 4 personnel will have 3 to 4 pieces of equipment and occupy an area of up to 12 feet by 80 feet (a drill rig, an equipment truck, and one to two field vehicles).

Borings completed without encountering groundwater will be backfilled with bentonite pellets or chips, hydrated in one-foot lifts, to one foot below ground surface. All borings that encountered groundwater will be backfilled with a neat cement grout to one foot below the existing ground surface. Surface completions will match existing conditions (e.g. soil or asphalt). The grout will be placed using a tremie pipe. After backfilling, each boring location will be marked using a small stake approximately 1.5 feet high, or white paint if the boring is located on concrete or asphalt, in preparation for surveying. A licensed surveyor will locate all borings after completion in accordance with the Presidio Trust QAPP. Surveying will be conducted in accordance with the project specifications for horizontal coordinates and vertical datum. In addition, survey coordinates and vertical datum will be provided in NAD27 and Presidio Low Low Water (PLLW), respectively.

Each boring will generate drill cuttings (typically dry to wet soil or rock, including drilling mud for rotary borings) which will be placed in approved U.S. Department of Transportation (DOT) 55-gallon drums. The drums will be sealed, labeled, and stored for no longer than 90 days at the drum storage area along Mason Street, shown on Figure 2. Drums will be hauled off-site to an appropriate disposal facility as soon as possible after laboratory results are available, and pick-up by a licensed waste hauler can be scheduled. Dust generated during drilling of borings encountering serpentinite will be controlled by spraying the cuttings with water.

Should any unexpected hazardous materials or conditions be encountered during the field work, the Presidio Trust Remediation Department will be contacted immediately. The main and alternate contact personnel are as follows:

Main Contact: Jennifer Yata  
67 Martinez Street  
San Francisco, CA 94129  
Telephone: (415) 561-4272

Alternate Contact: Eileen Fanelli  
67 Martinez Street  
San Francisco, CA 94129  
Telephone: (415) 561-4259

## 6 Soil Sampling

Soil samples will be collected at depths of 0.5 to 1.0 foot and 2.0 to 2.5 feet bgs in all borings. If asphalt or baserock are present, the first sample interval will be below the asphalt and baserock. Soil samples within cut areas will also be collected every five vertical feet within each soil type (fill, Bay Mud, and native alluvium/colluvium) within the depth of the cut. If bedrock is encountered within the planned depth of the boring, a sample will be collected at the top of the bedrock and, if possible, five feet below top of bedrock. Additional bedrock samples will not be collected if bedrock is encountered, as it will be assumed that the same type of bedrock will be present at depth. Bedrock expected to be encountered includes serpentinite, chert/shale, basalt, sandstone, Franciscan Melange, and Colma Sand. Colma Sand is included as a bedrock formation because although it is not consolidated, BASELINE understands it will be used as a bearing formation for construction.

Soil samples will be collected directly into clean brass or stainless liners for hollow-stem auger drilling, or in new butyrate liners for direct-push sampling. Samples collected for lead

or Title 22 metals analysis, only, may be collected in a new plastic bags. Encore<sup>®</sup> samples will not be collected because the analytical results will be used to characterize soil that will be moved from its original location. Samples collected in liners will be capped with Teflon and plastic end caps, labeled, and immediately stored in ice-cooled chests.

## 7 Groundwater Sampling

Grab groundwater samples will be collected from systematic random soil boring locations in cut areas. The grab groundwater sample borings will be selected based on lithology. Grab groundwater samples from borings penetrating each type or combination of lithology (e.g., Fill, Bay Mud, native alluvium/colluvium, Colma Sand or other bedrock) will be collected. In addition, grab groundwater samples will be collected from cut areas underlain by known contaminated groundwater.

## 8 Soil Analyses

The samples will be delivered under chain-of-custody procedures to Curtis & Tompkins, Ltd. of Berkeley, California, a state-certified laboratory, within 24 hours of collection. All analyses will be conducted by Curtis & Tompkins with the exception of asbestos, which will be subcontracted to Forensic Analytical, a state-certified laboratory for that analysis. All analyses and quality assurance/quality control procedures will be conducted in accordance with Presidio Trust's QAPP.

Laboratory analysis will be performed on soil samples as follows:

### A1.1 Fill samples

- Discrete samples from the top 2.5 feet and all fill samples will be analyzed for total lead (EPA Method 6020). If total lead were >50 mg/kg and <1,000 mg/kg, the samples will be analyzed for soluble lead by the State of California Waste Extraction Test (WET), and if the results were greater than the Soluble Threshold Limit Concentration (STLC) of 5 mg/L, or the total lead is greater than 100 mg/kg, the samples will also be analyzed by the Toxicity Characteristic Leaching Procedure (TCLP).
- All fill samples observed with serpentinite will be analyzed discretely for asbestos using polarized light microscopy (PLM).
- Every five successively collected (within seven days) discrete fill samples within the same proposed cut area will be composited and analyzed for **Sampling Suite A**.<sup>2</sup>

### A1.2 Alluvium/Colluvium Samples

- Every five successively collected (within seven days) Bay Mud samples within the same proposed cut area would be composited and analyzed for **Sampling Suite B**.<sup>3</sup>
- Every five successively collected (within seven days) native alluvial/colluvial deposit samples within the same cut area would be composited for analysis of **Sampling Suite B**.

[2] <sup>2</sup> **Sampling Suite A** consists of Sampling Suite B, listed below, plus organochlorine pesticides by EPA Method 8081A and herbicides by EPA Method 8151A.

[3] <sup>3</sup> **Sampling Suite B** consists of Title 22 metals by EPA Methods 6020/7000 series, volatile organic compounds (VOCs) by EPA Method 8260B, semi-volatile organic compounds (SVOCs) by EPA Method 8270C, total petroleum hydrocarbons (TPH) as gasoline (g), diesel (d), and fuel oil (fo) by EPA Method 8015M/CA LUFT; silica gel cleanup on TPHd and TPHfo by EPA Method 3630; polyaromatic hydrocarbons (PAHs) by EPA Method 8310, polychlorinated biphenols (PCBs) by EPA Method 8082; and reactivity, corrosivity, and ignitability (RCI).

### A1.3 Bedrock Samples

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- Every five successively collected (within seven days) bedrock samples consisting of Colma Sand collected within the same cut area will be composited for analysis of **Sampling Suite B**.
- Every five consecutive bedrock samples consisting of serpentinite will be composited and analyzed for asbestos.
- Every five consecutive bedrock samples consisting of anything other than Colma Sand will be composited and analyzed for Title 22 metals. If any metal concentration were greater than 10 times the STLC, the sample will also be analyzed for the soluble metal by WET. If any sample contained greater than 20 times the TCLP, the sample will be analyzed by TCLP.
- Every five successively collected bedrock samples will be composited and analyzed for reactivity, corrosivity, and ignitability (RCI).

In addition to these analyses, hexavalent chromium will be analyzed on 10 percent of all samples analyzed for total chromium.

## 9 Groundwater Laboratory Analysis

The samples will be delivered under chain-of-custody procedures to Curtis & Tompkins, Ltd. of Berkeley, California, a state-certified laboratory, within 24 hours of collection.

Groundwater samples will be analyzed in accordance with San Francisco Public Utilities Commission batch discharge permit requirements.

## 10 Data Evaluation

Soil quality data from each type of lithology representative of potential waste streams within subsections of the alignment will be evaluated separately. Subsection boundaries have not been determined at this time, but are expected to reflect continuous segments of the alignment delineated either based on construction considerations and/or apparent chemical variations. Soil quality data will be screened against hazardous waste thresholds, Presidio Trust reuse criteria,<sup>4</sup> and/or nonhazardous landfill acceptance criteria, as appropriate, depending on soil management considerations. If necessary, statistical analysis of subsets of data will be performed using guidelines and/or software developed by the EPA and standard-industry practices to determine representative concentrations of constituents for comparison against screening values. The results of the data evaluation, including analytical results, statistical calculations, and recommendations for on-site reuse and/or off-site disposal of soil generated during construction, will be presented in a draft SIR/SMP that documents the site investigation and delineates soil reuse and off-site disposal options. The draft SIR/SMP will be submitted to the Presidio trust for their review and comments. The SIR/SMP will be finalized for the Presidio Trust approval by incorporating agreed upon comments and edits into the final SIR/SMP.

## 11 Categorical Exemption

This project has been determined to be categorically exempt from CEQA by Caltrans and the Federal Highway Administration (FHWA). A copy of the Categorical Exemption Determination Form is attached as Appendix D. Measures to minimize adverse impacts on

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[4] <sup>4</sup> EKI, 2002, Development of Presidio-Wide Cleanup Levels for Soil, Sediment, Groundwater, and Surface Water, October.

archaeological, biological, and hydrological resources, as well as noise and traffic mitigations, are described in the Categorical Exemption.

## 12 Work Schedule

We estimate that the drilling and soil and groundwater sampling will require about three months to complete. Drilling will normally take place from Monday through Friday during the day with a 10-hour work shift. No drilling will start before 8:00 A.M.

Drilling locations will be planned two weeks ahead, and the Presidio Trust will be provided the schedule. Locations needing traffic control or tenant notification and drilling outside normal work hours, if any, will be identified two weeks ahead.

## **TABLES**

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**TABLE 1**  
**Proposed Environmental Borings**  
**Doyle Drive Replacement Project Preferred Alternative**  
**29 July 2008**

Boring ID	Proposed Depth of Boring	Drilling Method
E1	2.5	DP/HSA
E2	2.5	HA
E3	2.5	DP/HSA
E4	2.5	HA
E5	2.5	DP/HSA
E6	2.5	DP/HSA
E7	2.5	DP/HSA
E8	8.0	DP/HSA
E9	8.0	DP/HSA
E10	2.5	DP/HSA
E11	2.5	DP/HSA
E12	2.5	DP/HSA
E13	10.0	DP/HSA
E14	2.5	DP/HSA
E15	2.5	DP/HSA
E16	3.0	DP/HSA
E17	3.0	DP/HSA
E18	4.0	DP/HSA
E19	4.0	DP/HSA
E20	4.0	DP/HSA
E21	5.0	DP/HSA
E22	8.0	DP/HSA
E23	22.0	DP/HSA
E24	22.0	DP/HSA
E25	22.0	DP/HSA
E26	22.0	DP/HSA
E27	22.0	DP/HSA
E28	10.0	DP/HSA
E29	7.0	DP/HSA
E30	5.0	DP/HSA
E31	8.0	DP/HSA
E32	6.0	DP/HSA
E33	3.0	DP/HSA
E34	2.5	HA
E35	2.5	DP/HSA
E36	2.5	HA
E37	5.0	DP/HSA
E38	2.5	DP/HSA
E39	2.5	DP/HSA
E40	8.0	DP/HSA
E41	10.0	DP/HSA
E42	2.5	DP/HSA
E43	8.0	DP/HSA
E44	2.5	DP/HSA
E45	6.0	DP/HSA
E46	5.0	DP/HSA
E47	2.5	DP/HSA
E48	2.5	DP/HSA
E49	14.0	DP/HSA
E50	12.0	DP/HSA
E51	12.0	DP/HSA
E52	4.0	DP/HSA

**TABLE 1**  
**Proposed Environmental Borings**  
**Doyle Drive Replacement Project Preferred Alternative**  
**29 July 2008**

<b>Boring ID</b>	<b>Proposed Depth of Boring</b>	<b>Drilling Method</b>
E53	4.0	DP/HSA
E54	12.0	DP/HSA
E55	12.0	DP/HSA
E56	12.0	DP/HSA
E57	7.0	DP/HSA
E58	11.0	DP/HSA
E59	9.0	DP/HSA
E60	9.0	DP/HSA
E61	12.0	DP/HSA
E62	2.5	DP/HSA
E63	22.0	HSA
E64	2.5	DP/HSA
E65	22.0	HSA
E66	2.5	DP/HSA
E67	22.0	HSA
E68	2.5	DP/HSA
E69	26.0	HSA
E70	2.5	DP/HSA
E71	29.0	HSA
E72	2.5	DP/HSA
E73	34.0	HSA
E74	36.0	HSA
E75	29.0	HSA
E76	37.0	HSA
E77	22.0	HSA
E78	22.0	HSA
E79	27.0	HSA
E80	27.0	HSA
E81	27.0	HSA
E82	25.0	HSA
E83	10.0	DP/HSA
E84	25.0	HSA
E85	2.5	DP/HSA
E86	5.0	DP/HSA
E87	2.5	DP/HSA
E88	120.0	HSA/Rotary
E89	3.5	DP/HSA
E90	2.5	DP/HSA
E91	2.5	DP/HSA
E92	80.0	HSA/Rotary
E93	2.5	HA
E94	40.0	HSA
E95	15.0	HSA
E96	2.5	DP/HSA
E97	2.5	DP/HSA
E98	15.0	DP/HSA
E99	15.0	DP/HSA
E100	2.5	DP/HSA
E101	2.5	DP/HSA
E102	2.5	HA
E103	7.0	DP/HSA
E104	2.5	HA
E105	5.0	HA

<b>TABLE 1</b> <b>Proposed Environmental Borings</b> <b>Doyle Drive Replacement Project Preferred Alternative</b> <b>29 July 2008</b>		
<b>Boring ID</b>	<b>Proposed Depth of Boring</b>	<b>Drilling Method</b>
E106	15.0	Dry/Rotary
E107	15.0	Dry/Rotary
E108	2.5	HA
E109	12.0	DP/HSA
E110	10.0	HA
E111	20.0	HSA
E112	32.0	HSA
E113	37.0	HSA
E114	25.0	HSA
E115	7.0	HA
E116	2.5	HA
E117	2.5	HA
E118	2.5	HA
E119	2.5	HA
E120	2.5	HA
E121	4.5	HA
E122	3.0	HA
E123	4.0	HA
E124	3.0	HA
E125	4.0	HA
E126	3.0	HA
E127	3.0	HA
E128	5.0	DP/HSA
E129	3.0	HA
E130	3.0	HA
E131	2.5	HA
E132	2.5	HA
E133	2.5	HA

**Notes:**

■ Shaded rows indicate borings within areas of proposed excavation ("cut areas"). All other borings are located within proposed fill areas.

Boring depths are in feet below existing ground surface.

Methods of boring advancement:

HSA = hollow stem auger

DP = direct push

Dry = start with dry auger

Rotary = rotary

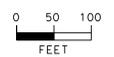
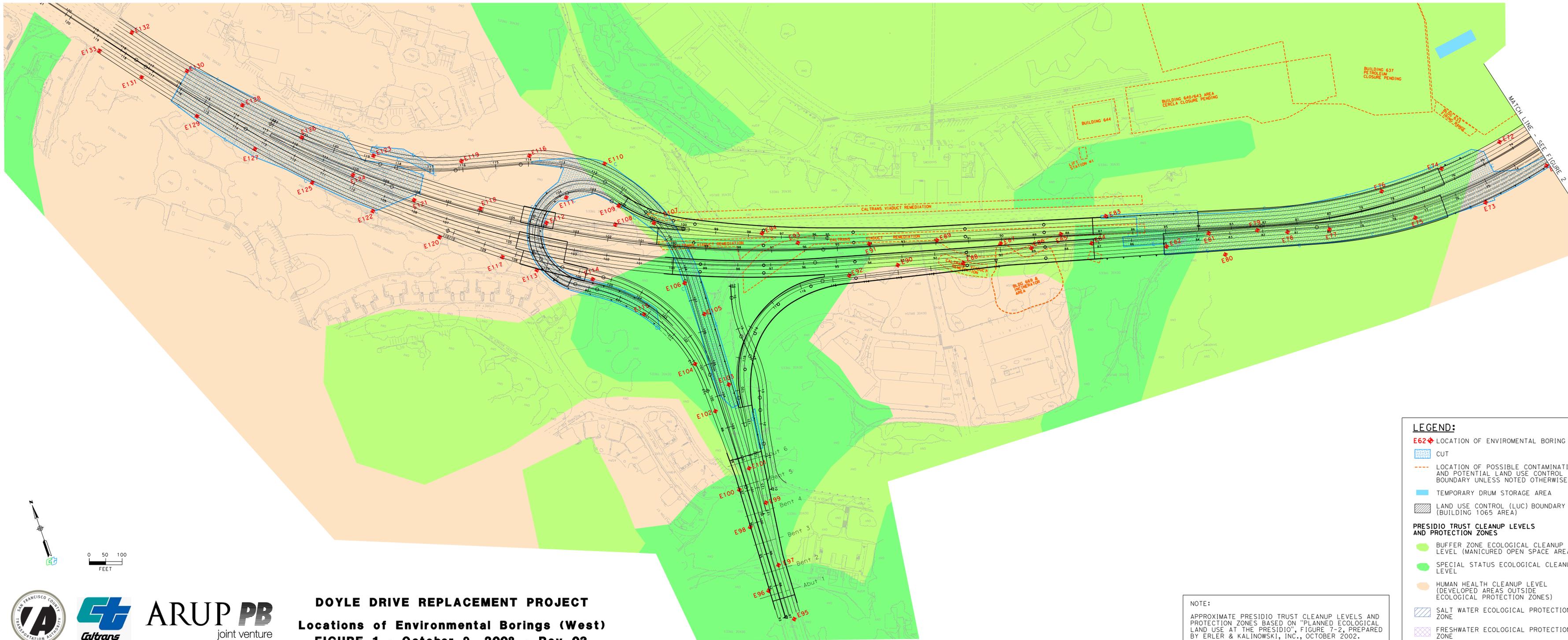
HA = hand auger

Boring locations are shown on Figures 1 and 2.

Borings E106, E107, and E95 were completed on July 14, 16, and 24, 2008, respectively, under a Caltrans/ARUP Dig permit in order to limit road closures. These borings are equivalent to Caltrans borings 34-0157-NB-A7, 34-0157-SB-A7, and A2-R5. Boring E105 was advanced with a hand auger on July 14, 2008 to a depth of 2.0 feet bgs.

## **FIGURES**

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**DOYLE DRIVE REPLACEMENT PROJECT**  
**Locations of Environmental Borings (West)**  
**FIGURE 1 - October 9, 2008 - Rev 03**

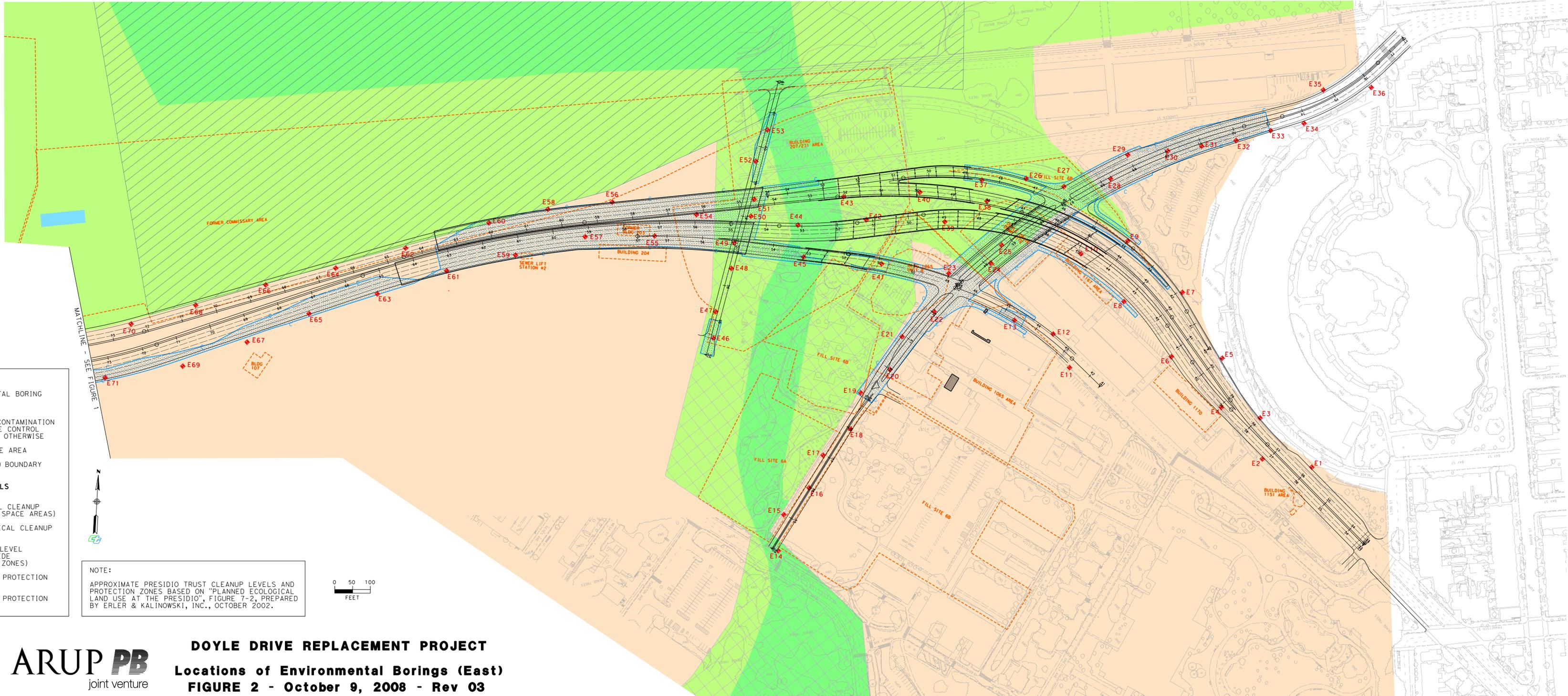
**NOTE:**  
 APPROXIMATE PRESIDIO TRUST CLEANUP LEVELS AND PROTECTION ZONES BASED ON "PLANNED ECOLOGICAL LAND USE AT THE PRESIDIO", FIGURE 7-2, PREPARED BY ERLER & KALINOWSKI, INC., OCTOBER 2002.

**LEGEND:**

- ◆ E62 LOCATION OF ENVIROMENTAL BORING
- CUT
- LOCATION OF POSSIBLE CONTAMINATION AND POTENTIAL LAND USE CONTROL BOUNDARY UNLESS NOTED OTHERWISE
- TEMPORARY DRUM STORAGE AREA
- LAND USE CONTROL (LUC) BOUNDARY (BUILDING 1065 AREA)

**PRESIDIO TRUST CLEANUP LEVELS AND PROTECTION ZONES**

- BUFFER ZONE ECOLOGICAL CLEANUP LEVEL (MANICURED OPEN SPACE AREAS)
- SPECIAL STATUS ECOLOGICAL CLEANUP LEVEL
- HUMAN HEALTH CLEANUP LEVEL (DEVELOPED AREAS OUTSIDE ECOLOGICAL PROTECTION ZONES)
- SALT WATER ECOLOGICAL PROTECTION ZONE
- FRESHWATER ECOLOGICAL PROTECTION ZONE



**LEGEND:**

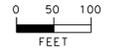
- ◆ E62 LOCATION OF ENVIRONMENTAL BORING
- CUT
- LOCATION OF POSSIBLE CONTAMINATION AND POTENTIAL LAND USE CONTROL BOUNDARY UNLESS NOTED OTHERWISE
- TEMPORARY DRUM STORAGE AREA
- LAND USE CONTROL (LUC) BOUNDARY (BUILDING 1065 AREA)

**PRESIDIO TRUST CLEANUP LEVELS AND PROTECTION ZONES**

- BUFFER ZONE ECOLOGICAL CLEANUP LEVEL (MANICURED OPEN SPACE AREAS)
- SPECIAL STATUS ECOLOGICAL CLEANUP LEVEL
- HUMAN HEALTH CLEANUP LEVEL (DEVELOPED AREAS OUTSIDE ECOLOGICAL PROTECTION ZONES)
- SALT WATER ECOLOGICAL PROTECTION ZONE
- FRESHWATER ECOLOGICAL PROTECTION ZONE



**NOTE:**  
 APPROXIMATE PRESIDIO TRUST CLEANUP LEVELS AND PROTECTION ZONES BASED ON "PLANNED ECOLOGICAL LAND USE AT THE PRESIDIO", FIGURE 7-2, PREPARED BY ERLER & KALINOWSKI, INC., OCTOBER 2002.



**DOYLE DRIVE REPLACEMENT PROJECT**  
**Locations of Environmental Borings (East)**  
**FIGURE 2 - October 9, 2008 - Rev 03**

Appendix A

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**Descriptions of Drilling  
Techniques**



## HOLLOW-STEM AUGER DRILLING

For Sampling and Well Installation

The standard technique for environmental drilling is hollow-stem auger drilling. Similar to hand augering, you can add numerous sections or flights of augers (typically 5 ft long each) to reach a range of depths. In hollow-stem augering, once the sampling depth is attained, the inside rods and plug are removed - leaving the outer augers holding the borehole open and the undisturbed sediments below the borehole available for sampling.

### AUGER DRILLING

- a helical or spiral tool form is used to move material from the subsurface to the surface
- a bit at the bottom cuts into the subsurface material
- spiral augers on outside convey the material to the surface while spinning

### HOLLOW-STEM AUGER

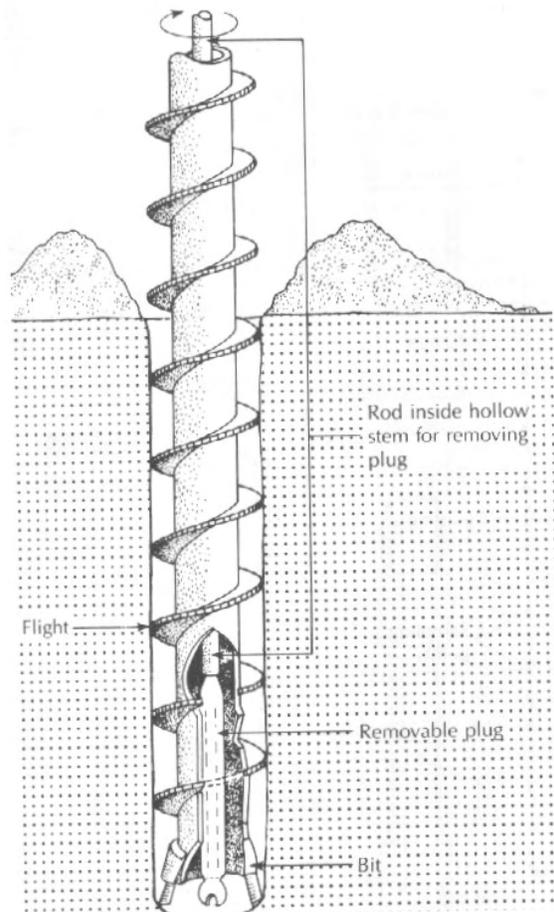
- center of auger is hollow like a straw when the inner drive rods and plug are removed
- during drilling or formation cutting, the center is filled with rods connected to a plug at the bottom bit
- once the desired drilling depth is reached, the center plug and rods can be pulled out - leaving the hollow augers in place
- the hollow augers hold the borehole open for sediment sampling and well installation

### SEDIMENT SAMPLING

Coring devices are lowered through the hollow-stem augers to allow sampling of the undisturbed sediments below the auger bit

### WELL INSTALLATION

Sections of connected PVC casing, screens and bottom cap are put together to create a well. The well is placed within the hollow-stem augers. While each section or flight of augers is lifted, materials are dropped into the region outside the well in the borehole - filter pack sands (adjacent to screened sections), bentonite clay and cement grout for sealing the annulus around solid casing up to the ground surface.





## DIRECT PUSH METHODS

For Sampling and Well Installation

Soil probing techniques can be thought of as a subcategory of what are commonly referred to as "Direct Push" techniques. Direct Push refers to tools and sensors that are "pushed" into the ground without the use of drilling to remove soil or to make a path for the tool. A Geoprobe® (or similar) direct push machine relies on a relatively small amount of static (vehicle) weight combined with percussion as the energy for advancement of a tool string.

Gregg Drilling & Testing, Inc. has effective, state-of-the-art equipment available to apply direct push technology. When applicable, this method allows for the collection of high-quality samples in less time and at lower cost. Unlike conventional drilling, direct push technology does not generate soil cuttings which, if contaminated, require special handling and costly disposal.

Gregg operates a range of truck mounted, track mounted, and limited access direct push sampling rigs. These rigs can be used to obtain a variety of soil, soil vapor, and groundwater samples or can be used with our portable cone penetration testing (CPT) system to complete CPT soundings and our hydraulic profiling tool (HPT). Gregg also owns and operates a number of combination drill/direct push rigs that can be converted from the direct push mode to the hollow stem auger mode when direct push refusal is encountered. This gives clients the opportunity to meet project objectives without having to mobilize a second rig.





## MUD ROTARY DRILLING

For Sampling and Well Installation

Direct rotary drilling uses a rotating drill bit at the end of a string of drill pipe. Drilling mud, a water-based drilling fluid that can be composed of all sorts of materials, is pumped into the drill pipe and escapes through the bottom of the bit. Drill cuttings are carried by the mud to the surface, where they settle out of the mud in a settling pit. The mud is then re-circulated back into the borehole. Additional mud is added as the well gets deeper and mud is lost to the formation(s) being drilled.

Mud rotary drilling is used primarily in unconsolidated or semi-consolidated formations. The mud provides effective cuttings removal while stabilizing the borehole walls at the same time.

After the borehole is drilled to the desired depth, the screen and casing for the well are installed in the hole. The mud is partially or fully pumped from the well and borehole. Then, the gravel pack, bentonite plug, and grout seal are emplaced in the well.

Gregg Drilling & Testing, Inc. maintains a large inventory of rotary drilling and coring drill rigs to meet a wide range of environmental drilling and geotechnical drilling site investigation and remediation needs. Our full-time mechanics and preventative maintenance program ensure that all necessary equipment is available and operating at maximum efficiency. This commitment to quality allows us to offer the most responsive and cost-effective drilling services.



## **REFERENCES:**

Gregg Drilling's website: [www.greggdrilling.com](http://www.greggdrilling.com)

Other links:

<http://www.geology.sdsu.edu/classes/geo1552/hollowstem.htm>

[http://www.geoprobe.com/what\\_is/directpush.htm](http://www.geoprobe.com/what_is/directpush.htm)

[http://www.ncwater.org/Education and Technical Assistance/Ground Water/Network/Well Construction/mud.php](http://www.ncwater.org/Education_and_Technical_Assistance/Ground_Water/Network/Well_Construction/mud.php)

Appendix B

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**Proposed Deviations  
from Presidio Trust's  
QAPP**

## B1 Proposed Deviations from Presidio Trust's QAPP Proposed Doyle Drive Replacement Project

BASELINE will adhere to Presidio Trust's *Presidio-Wide Quality Assurance Project Plan, Sampling and Analysis Plan* dated April 2001 with the following deviations:

- Field forms and sample naming conventions will be unique to the Doyle Drive Replacement Project.
- No soil field screening for chemicals will be conducted. PID and LEL meters will be on-site at all times for worker health and safety purposes.
- Encore<sup>®</sup> samples will be not be collected because the analytical results will be used to characterize soil that will be moved from its original location, and because most of the samples will be composited before analysis.
- Drum storage will be located at the drum storage area along Mason Street rather than at the Central Magazine.
- Field duplicates and equipment blanks for soil samples will not be collected.
- Source water samples from the deionized water used to clean the soil sample liners will not be collected.
- Samples will be composited by the laboratory for VOCs, as discussed in the text of this Exhibit.
- Laboratory results will be provided to Presidio Trust after all laboratory results have been received and a proposed strategy for soil re-use has been developed, or on request.
- Custody seals will be used as described in Presidio Trust's QAPP unless the samples are delivered directly to the laboratory by Sampler and samples never leave the custody of the sampler.

Appendix C

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**Site Health and Safety  
Plan**

## SITE HEALTH AND SAFETY PLAN

PROJECT/CLIENT INFORMATION			
Project No.:	Project Manager:	Site Health and Safety Manager:	Field Activities Date:
Y0239-03.B2	Cheri Page, P.G.	Bill Scott, P.G, CEG, CHg	November 2008
Client: Parsons Brinckerhoff Quade & Douglas, Inc. 303 Second Street, Suite 700N San Francisco, CA 94107-1317	Contact Person: Phone:	Gary Kennerley (415) 243-4609  Or  John Karn (415) 946-0213	Site Address: Doyle Drive, between the south approach to Golden Gate Bridge and Lyon Street, San Francisco, California  Subcontractors: Gregg Drilling and Testing, Incorporated Traffic Management, Incorporated Curtis and Tompkins, Ltd.
And ARUP 901 Market Street, Suite 260 San Francisco, CA 94103			
<p><b>PROJECT DESCRIPTION:</b> The project involves the collection of soil samples from 133 borings that will be advanced along Doyle Drive between the south approach to Golden Gate Bridge and Lyon Street in The Presidio of San Francisco (The Presidio) in San Francisco, California. In addition to soil samples, a limited number of groundwater samples will be collected from some of the soil borings. The purpose of this investigation is to characterize soils that will be affected by the Doyle Drive Replacement Project for off-site disposal and for potential reuse in accordance with the reuse criteria of Presidio Trust, the federal agency responsible for oversight and management of The Presidio. Groundwater data will be evaluated to determine management options of dewatered groundwater during construction.</p> <p>Collection and analysis of soil and groundwater samples will be performed in accordance with the <i>License to Enter and Conduct Environmental Investigation</i> submitted to Presidio Trust on behalf of the San Francisco Transportation Authority. Prior to field activities, an access and drilling permit will be obtained from Presidio Trust. In addition, the proposed boring locations will be cleared for underground utilities with Underground Service Alert and/or a private utility locator. The soil samples will be collected between two and 120 feet below ground surface using a drilling rig. Hand sampling tools will be used to collect shallow soil samples at locations inaccessible by a drilling rig. The drilling rig will be operated by a California-licensed operator. Groundwater samples will be collected by grab method from a temporary well point installed in the open borehole. Investigation-derived wastes will be placed in properly labeled 55-gallon drums stored in a secure location pending receipt of results.</p> <p>Collection and analysis of soil and groundwater samples will be performed in accordance with the <i>License to Enter and Conduct Environmental Investigation</i> submitted to Presidio Trust on behalf of the San Francisco Transportation Authority. Prior to field activities, an access and drilling permit will be obtained from Presidio Trust. In addition, the proposed boring locations will be cleared for underground utilities with Underground Service Alert and/or a private utility locator. The soil samples will be collected between two and 120 feet below ground surface using a drilling rig. Hand sampling tools will be used to collect shallow soil samples at locations inaccessible by a drilling rig. The drilling rig will be operated by a California-licensed operator. Groundwater samples will be collected by grab method from a temporary well point installed in the open borehole. Investigation-derived wastes will be placed in properly labeled 55-gallon drums stored in a secure location pending receipt of results.</p> <p>All samples will be submitted for laboratory analysis, under chain-of-custody procedures. The soil samples may be analyzed for total petroleum hydrocarbons (EPA 8015M), Title 22 metals (EPA 6010B/7470A), volatile organic compounds (EPA 8260), semi-volatile organic compounds (EPA 8270), polychlorinated biphenyls (EPA 8082), organochlorine pesticides (EPA 8081A), polynuclear aromatic hydrocarbons by EPA Method 8310; and RCI (reactivity, corrosivity, and ignitability) characteristics. Depending on the concentration of metals, soil samples may be tested for soluble metals by waste extraction test and/or toxicity characteristic leaching procedure methods. The groundwater samples will be analyzed for the requirements of the San Francisco Public Utilities Commission under a batch wastewater discharge permit.</p> <p>No confined space entry is included in the scope of work. The project area is accessible via several surface streets. Traffic control will be required in many boring locations and will be provided by a subcontractor.</p>			
<p><b>SITE HISTORY:</b> The Presidio was used as a military base from 1776 through 1994 when the US Army transferred jurisdiction to the National Park Service. Previous environmental investigations conducted at The Presidio have identified several hazardous materials issues affecting soil and groundwater at various locations within the site. The presence of hazardous materials in soil and groundwater on the project site has the potential to affect the project and pose a health risk to construction workers and future users of the site.</p>			

**BASELINE PERSONNEL:** Yane Nordhav, P.G., is the Principal-in-charge. Cheri Page, P.G. is the Project Manager. Other BASELINE personnel include: Lydia Huang, P.E., Senior Engineer, Bill Scott, P.G., CEG, CHg, Field Geologist, and Redgy Ramirez, P.E., Environmental Engineer.

Responsibilities of BASELINE personnel include the following: The project manager or principal-in-charge shall: 1) be available by telephone at all times during on-site work; 2) have overall responsibility for preparation, implementation, and modifications to this Plan; and 3) designate a BASELINE Site Health and Safety Manager to carry out the requirements of this Plan during all sampling activities. The responsibilities of Bill Scott, the designated BASELINE Site Health and Safety Manager/Project Supervisor, include: 1) being present at all times during on-site work; 2) enforcing this Plan (including the Emergency Response Plan, below); 3) stopping field operation if personnel safety and health may be jeopardized; 4) requesting site evacuation, if necessary; 5) conducting and evaluating or supervising the collection/evaluation of air monitoring data, if necessary, for the purpose of making decisions regarding the safety of on-site personnel; 6) designating other qualified personnel to work under the direction of the Site Health and Safety Manager, as necessary, for purposes of implementing this Plan; and 6) overseeing completion of the sampling activities as described above.

**TRAINING REQUIREMENTS:** All on-site workers, including subcontractors and regulatory agency personnel, entering the contamination reduction (warm), exclusion (hot), or any other areas of the site with potential or suspected contamination must be 40-hour trained in accordance with the Federal and State OSHA HAZWOPER standard (including 3 days of supervised field experience and annual refresher training), and must be medically surveilled and have received annual respirator training and fit testing in accordance with this Standard and the requirements of their company’s health and safety plan. All visitors entering the contamination reduction or exclusion area or other areas of the site with potential or suspected contamination must also be 40-hour trained. The Site Health and Safety Manager will inquire whether each visitor is trained.

A copy of this site-specific Health and Safety Plan will be provided at the site and will be reviewed by the Site Health and Safety Manager prior to the start of work at the site, as part of a tailgate safety meeting. This site-specific Plan applies to all BASELINE employees engaged in hazardous materials activities on-site. This Plan, or an equally protective plan, shall be adopted by the subcontractors as a supplement to their existing health and safety programs. All on-site personnel will be asked to sign a consent form included in this Plan, prior to each day of field activities, indicating that they have read the Plan, have participated in the tailgate safety meeting, meet the training requirements, and agree to all Plan conditions. Should other employers elect to adopt this Plan, BASELINE shall be held harmless and indemnified against any claims associated with this Plan. If a separate health and safety plan is developed, it must be submitted for review by BASELINE prior to the commencement of field activities, and the subcontractor must designate a Site Safety Officer to monitor implementation of their plan. The subcontractors’ Site Safety Officer will be subordinate to the designated BASELINE Site Health and Safety Manager.

This Plan is intended to act as an extension of BASELINE’s in-house Health and Safety Program, including a Medical Surveillance Program, Hazard Communication Program, Hearing Conservation Program, Respiratory Protection Program, Personal Protective Equipment Program, Injury and Illness Program, Emergency Action Plan, and Fire Prevention Plan. BASELINE employees receive initial and annual training in these programs.

<b>CHEMICAL HAZARDS</b>					
The following known/suspected chemical hazards identified below may be encountered by site personnel during sampling or other on-site activities.					
<b>Chemical</b>	<b>Description</b>	<b>Health and Safety Standards</b>	<b>Persons Exposed** and Potential Exposure Routes</b>	<b>Target Organs</b>	<b>Symptoms of Acute Exposure</b>
Asbestos	Fibrous minerals in solids or as dust	PEL= 0.1 fiber/cubic centimeter REL= 0.1 fiber/cubic centimeter STEL= -- IDLH= --	Inhalation	Respiratory system, eyes (lung cancer)	Irritated eyes, difficulty breathing, restricted pulmonary function
Petroleum hydrocarbons (gasoline)	Combustible liquid with a characteristic odor. UEL=7.6% LEL=1.4%	PEL= -- REL= -- STEL= -- IDLH= --	Inhalation, skin absorption, skin or eye contact, ingestion	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage; [potential occupational carcinogen]

Benzene	Colorless to light-yellow liquid with an aromatic odor. UEL=7.8% LEL=1.2% VP=75 mm Hg	PEL= 1 ppm REL=0.1 ppm STEL=5 ppm (OSHA); 1 ppm (NIOSH) IDLH=500 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eyes, skin, respiratory system, blood, central nervous system, bone marrow	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]
Toluene	Colorless liquid with a sweet, pungent, benzene-like odor. UEL=7.1% LEL =1.1% VP=21 mm Hg	PEL=200 ppm REL=100 ppm (375 mg/m <sup>3</sup> ) STEL=150 ppm (560 mg/m <sup>3</sup> ) (NIOSH) C=300 ppm; 500 ppm (10-minute maximum) (OSHA) IDLH=500 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage
Ethyl benzene	Colorless liquid with an aromatic odor. UEL=6.7% LEL=0.8% VP=7 mm Hg	PEL=100 ppm (435 mg/m <sup>3</sup> ) REL=100 ppm (435 mg/m <sup>3</sup> ) STEL=125 ppm (545 mg/m <sup>3</sup> ) (NIOSH) IDLH=800 ppm	Inhalation, ingestion, skin and/or eye contact	Eyes, skin, respiratory system, central nervous system	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma
Xylenes	Colorless liquid with an aromatic odor. UEL=7.0% (m & p-xylenes) LEL=1.1% (m & p-xylenes) VP=9 mm Hg  UEL=6.7% (o-xylenes) LEL=0.9% (o-xylenes) VP=7 mm Hg	PEL=100 ppm (435 mg/m <sup>3</sup> ) REL=100 ppm (435 mg/m <sup>3</sup> ) STEL=150 ppm (655 mg/m <sup>3</sup> ) (NIOSH) IDLH=900 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis
Methyl tert butyl ether	Methyl <i>tert</i> -butyl ether (MTBE) is a flammable liquid with a distinctive, disagreeable odor. (ATSDR) UEL=NA LEL=NA	EPA drinking water standard=4 mg/L (short-term exposure); 3 mg/L (long-term exposure) REL=40 ppm (8-hour work day, 40-hour work week) (ACGIH)	Dermal contact, inhalation, and ingestion	Liver, kidney, and nervous system.	Nose or throat irritation, headaches, nausea, dizziness, and mental confusion.
Methyl chloride	Colorless gas with a faint, sweet odor which is not noticeable at dangerous concentrations. UEL=17.4% LEL=8.1% VP=5 atm	PEL=100 ppm REL= -- C=200 ppm; 300 ppm (5-minute maximum peak in any three hours) (OSHA) STEL= -- IDLH=2,000 ppm	Inhalation, skin and/or eye contact (liquid)	central nervous system, liver, kidneys, reproductive system	Dizziness, nausea, vomiting; visual disturbance, stagger, slurred speech, convulsions, coma; liver, kidney damage; liquid: frostbite; reproductive, teratogenic effects; [potential occupational carcinogen]
Methylene chloride	Colorless liquid with a chloroform-like odor. UEL=23% LEL=13% VP=350 mm Hg	REL= -- PEL=25 ppm STEL=125 ppm IDLH=2,300 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eyes, skin, cardiovascular system, central nervous system	Irritation eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numbness, tingle limbs; nausea; [potential occupational carcinogen]
Vinyl Chloride	Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations. UEL=33.0% LEL=3.6% VP=3.3 atm	PEL=1 ppm REL= -- C=5 ppm (15-minute) (OSHA) STEL= -- IDLH= --	Inhalation, skin, and/or eye contact (liquid)	Liver, central nervous system, blood, respiratory system, lymphatic system	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]

Lead	A heavy, ductile, soft, gray solid. UEL=NA LEL=NA	PEL=0.05 mg/m <sup>3</sup> REL=0.05 mg/m <sup>3</sup> TWA (8-hour) STEL= -- IDLH=100 mg/m <sup>3</sup>	Inhalation, ingestion, skin and/or eye contact	Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; gastrointestinal disturbances, constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension
Arsenic	Silver-gray or white metal, brittle, odorless solid UEL=NA LEL=NA	PEL=0.01 mg/m <sup>3</sup> REL= -- C=0.002 mg/m <sup>3</sup> (15-minute) (NIOSH) STEL= -- IDLH=5 mg/m <sup>3</sup>	Inhalation, skin absorption, skin and/or eye contact ingestion	Liver, kidneys, skin, lungs, lymphatic system	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, [potential occupational carcinogen]
Copper	Reddish, lustrous, malleable, odorless solid UEL=NA LEL=NA	PEL=1 mg/m <sup>3</sup> REL=1 mg/m <sup>3</sup> STEL= -- IDLH=100 mg/m <sup>3</sup>	Inhalation, ingestion, skin and/or eye contact	Eyes, skin, respiratory system, liver, kidneys	Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing
Chromium	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid. LEL=NA UEL=NA	REL=0.5 mg/m <sup>3</sup> PEL=1.0 mg/m <sup>3</sup> STEL= -- IDLH=250 mg/m <sup>3</sup>	Inhalation, ingestion, skin and/or eye contact	Eyes, skin, respiratory system	Irritation eyes, skin; lung fibrosis
Mercury	Silver-white metal, heavy, odorless liquid LEL=NA UEL=NA VP=0.0012 mm Hg	REL=0.05 mg/m <sup>3</sup> PEL=0.1 mg/m <sup>3</sup> C=0.1 mg/m <sup>3</sup> (NIOSH) IDLH=10 mg/m <sup>3</sup>	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eyes, skin, respiratory system, central nervous system, kidneys	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
Nickel	Metal: Lustrous, silvery, odorless solid. UEL=NA LEL=NA	REL=0.015 mg/m <sup>3</sup> PEL=1 mg/m <sup>3</sup> IDLH=10 mg/m <sup>3</sup>	Inhalation, ingestion, skin and/or eye contact	Nasal cavities, lungs, skin	Sensitization dermatitis, allergic asthma, pneumonitis [potential occupational carcinogen]
Coal tar pitch volatiles e.g., pyrene, phenanthrene, acridine, chrysene, anthracene & benzo(a)pyrene).	Black or dark-brown amorphous residue. UEL=NA LEL=NA	PEL=0.2mg/m <sup>3</sup> (benzene soluble fraction) REL=0.1mg/m <sup>3</sup> (cyclohexane-extractable fraction) STEL= -- IDLH=80mg/m <sup>3</sup>	Inhalation, skin and/or eye contact	Respiratory system, skin, bladder, kidneys	Dermatitis and bronchitis
Trichloroethylene (TCE)	Colorless liquid (unless dyed blue) with a chloroform-like odor. UEL(77°F)=10.5% LEL(77°F)=8% VP=58 mm Hg	PEL=100 ppm REL= -- C=200 ppm; 300 ppm (5-minute maximum peak in any 2 hours) (OSHA) IDLH=1,000 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury [potential occupational carcinogen]
Tetrachloroethylene (PCE) (a.k.a., perchloroethylene)	Colorless liquid with a mild, chloroform-like odor UEL=NA LEL=NA VP=14 mm Hg	PEL=100 ppm REL= -- C=200 ppm (5-minutes in any 3-hour period), with a maximum peak of 300 ppm (OSHA) IDLH=150 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eyes, skin, respiratory system, liver, kidneys, central nervous system	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage [potential occupational carcinogen]

Pentachlorophenol	Colorless to white, crystalline solid with a benzene-like odor. UEL=NA LEL=NA VP(77°F)=0.0001 mm Hg	REL/TLV=0.5 mg/m <sup>3</sup> PEL=0.5 mg/m <sup>3</sup> STEL=-- IDLH=2.5 mg/m <sup>3</sup>	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eyes, skin, respiratory system, cardiovascular system, liver, kidneys, central nervous system	Irritation eyes, nose, throat; sneezing, cough; lassitude (weakness, exhaustion), anorexia, weight loss; sweating; headache, dizziness; nausea, vomiting; dyspnea (breathing difficulty), chest pain; high fever; dermatitis
Phenol	Colorless to light-pink, crystalline solid with a sweet, acrid odor. UEL=8.6% LEL=1.8% VP=0.4 mm Hg	REL=5 ppm (19 mg/m <sup>3</sup> ) PEL=5 ppm (19 mg/m <sup>3</sup> ) C=15.6 ppm (60 mg/m <sup>3</sup> )(15-minute) (NIOSH) IDLH=250 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eyes, skin, respiratory system, liver, kidneys	Irritation eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine; cyanosis; liver, kidney damage; skin burns; dermatitis; ochronosis; tremor, convulsions, twitching
Naphthalene	Colorless to brown solid with an odor of mothballs. UEL=5.9% LEL=0.9% VP=0.08 mm Hg	REL=10 ppm (50 mg/m <sup>3</sup> ) PEL=10 ppm (50 mg/m <sup>3</sup> ) STEL=15 ppm (75 mg/m <sup>3</sup> ) (NIOSH) IDLH=250 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eyes, skin, blood, liver, kidneys, central nervous system	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage
Chlorodiphenyl (42% chlorine) Aroclor® 1242, PCBs	Colorless to light-colored, viscous liquid with a mild, hydrocarbon odor. UEL=NA LEL=NA VP=0.001 mm Hg	REL=0.001 mg/m <sup>3</sup> PEL=1 mg/m <sup>3</sup> IDLH=5 mg/m <sup>3</sup>	Inhalation, skin absorption, ingestion, skin and/or eye contact	Skin, eyes, liver, reproductive system	Irritation eyes; chloracne; liver damage; reproductive effects; [potential occupational carcinogen]
Carbon Tetrachloride	Colorless liquid with a characteristic ether-like odor. UEL=NA LEL=NA VP=91 mm Hg	REL=-- PEL=10 ppm C=25 ppm; 200 ppm (5-minute maximum in any 4 hours) (OSHA) STEL=2 ppm (12.6 mg/m <sup>3</sup> ) (60-minute) (NIOSH) IDLH=200 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	central nervous system, eyes, lungs, liver, kidneys, skin	Irritation eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen]
<p>Source: National Institute for Occupational Health and Safety, Pocket Guide to Chemical Hazards, September 2005.</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>IDLH = immediately dangerous to life and health; a condition from which one cannot escape within 30 minutes without permanent damage or death.</li> <li>LEL = lower explosive limit.</li> <li>NA = not available or not applicable.</li> <li>OSHA = California Department of Industrial Relations, Division of Occupational Safety and Health, which enforces the Occupational and Safety Health Act.</li> <li>PEL = permissible exposure limit. Time-weighted average concentrations for a normal 8-hour work period for a 40-hour work week; PELs are enforced by OSHA.</li> <li>REL = recommended exposure limit. Time-weighted average concentrations for up to a 10-hour day during a 40-hour work week. RELs are recommended by NIOSH, but are not regulatorily enforceable.</li> <li>STEL = short term exposure limit. A 15-minute time weighted average exposure which is not to be exceeded at any time during a workday even if the 8-hr time-weighted average is below the PEL; regulated by OSHA. Up to 4 exposures at the STEL with one hour of no exposure between each exposure event may be experienced in an 8-hour working day.</li> <li>UEL = upper explosive limit.</li> <li>-- = none.</li> <li>atm = atmospheric pressure.</li> <li>ppm = parts per million.</li> <li>mg/m<sup>3</sup> = milligrams per cubic meter.</li> <li>VP = vapor pressure.</li> <li>C = ceiling value.</li> <li>NIOSH = National Institute for Occupational Safety and Health.</li> <li>mm Hg = millimeters of mercury.</li> <li>ATSDR = Agency for Toxic Substances and Disease Registry.</li> <li>ACGIH = American Conference of Governmental Industrial Hygienist.</li> <li>PCBs = polychlorinated biphenyls.</li> </ul> <p>** BASELINE, drillers, and regulatory agency personnel.</p>					

**PHYSICAL HAZARDS**

Fire and explosion, heavy equipment, traffic, heat or cold stress, noise, over- and underground utilities, tripping and falling hazards, insect bites, and poison oak. Traffic control will be provided by a subcontractor. Underground utilities will be cleared with Underground Service Alert and/or a private utility locator. BASELINE employees will follow standard operating procedures (SOPs) for sampling and quality assurance/control, as found in BASELINE's *Quality Assurance Program Plan*.

Drill rig safety requirements are the responsibility of the operator. The drilling contractor shall be responsible for complying with all OSHA requirements and accepted industry practices for protection of employee health and safety. The drilling contractor shall ensure that all equipments are in good working order prior to starting work and shall ensure that proper housekeeping is maintained around the work area at all times. Drillers shall inform sampling personnel of safety features of the rig.

BASELINE employees, subcontractors, and other personnel shall observe the following precautions:

- 1) Watch for slippery ground;
- 2) All unattended boreholes must be adequately covered;
- 3) Wear required personal protective equipment (PPE) at all times (see below);
- 4) Prevent strain injuries by using small sampling shipping containers and/or material handling aids.
- 5) Avoid heat/cold stress by taking regular work breaks, liquids intake, and appropriate attire, as needed; and
- 6) Watch for traffic and heavy equipment while sampling.
- 7) Wear traffic safety vests at all times and implement a traffic control plan, including use of traffic cones and signs as necessary.
- 8) Maximize distance from the rig and do not take readings at the rig during drive sampling.

**PERSONAL PROTECTIVE EQUIPMENT REQUIRED:** SOPs shall be implemented to minimize exposure to hazardous materials potentially occurring at the site. However, it is anticipated that SOPs cannot completely prevent exposure to all hazardous materials at the site. Potential hazards include inhalation and dermal contact with contaminated materials during sampling events. Ingestion of hazardous materials is assumed to be negligible if personal hygiene measures discussed below are implemented. All personnel should have the following personal protective equipment: hard hats, respirators equipped with high efficiency particulate filters (HEPA) (use to be designated by Site Health and Safety Manager), nitrile gloves, safety goggles (use to be designated by Site Health and Safety Manager), steel-toed boots, water supply for washing, decontamination, and for drinking, disposable Tyvek® overalls, first aid-kit, noise protection (ear plugs), traffic safety vests, and fire extinguisher. Note that Tyvek® suits do not provide protection against solvents or fuels. They are only for protection against dust and dirt (including lead). Avoid contact with on-site soils on disposable Tyvek® suits to the extent possible. If your (or one of the driller's) Tyvek® suits becomes heavily soiled, the Tyvek® should be removed and exchanged for a new one. The nitrile gloves provide protection against volatile organics, chlorinated organics, and polynuclear aromatic hydrocarbons (PNAs) (unless saturated in soil; if saturated, double up gloves and exchange gloves frequently). Decontaminate gloves between each sample collected and sample location.

The rationale for selection of PPE is based on the known and/or suspected hazardous materials at the site, the anticipated amount of contact with potentially contaminated materials as part of site-specific tasks, and PPE performance characteristics. The need for respiratory protection shall be selected based on the results of the air monitoring (see Air Monitoring Strategy below). On-site personnel shall be required to don respiratory protection (Level C) if deemed necessary by the designated Site Health and Safety Manager. All respiratory protection must be NIOSH approved. On-site workers must be trained, as provided by their employer, in PPE use, care, proper fitting (including respirator fit-testing), donning and doffing, and limitations on at least an annual basis. All PPE must be properly maintained and stored to ensure it is in good working condition at the time of use. All PPE must be inspected before and after use. (BASELINE's PPE program is included in BASELINE's *Health and Safety Program Plan*).

The need for Level B PPE (respiratory protection) is not anticipated at the site. In the event Level B respiratory protection is warranted, on-site personnel will be asked to leave the area immediately by the Site Health and Safety Manager and the manager will notify the BASELINE Project Manager(s) immediately to determine future site actions. If PPE is deemed to be ineffective by the designated Site Health and Safety Manager, the Manager or his designee shall take immediate action to mitigate the problem(s).

**AIR MONITORING STRATEGY (INCLUDING ACTION LEVELS):** Air monitoring shall be conducted and evaluated by the Site Health and Safety Manager or his designee prior to and during drilling of borings, as described below. After calibration of field monitoring equipments, readings shall be collected at perimeter locations, at the breathing zone, and near the boring location using a photo ionization detector (PID) and a 4-gas meter to ensure that PELs and other appropriate limits are not exceeded during field activities. If PELs or other exposure levels are exceeded, or have the potential to be exceeded, personnel will be instructed by the designated Site Health and Safety Manager to wear appropriate respiratory protection (half face respirator with OV/HEPA cartridges, as applicable) to reduce potential exposure below the applicable exposure limits. In addition, personnel will be asked to don respirators with HEPA filters and goggles if dusty conditions are observed. The Site Health and Safety Manager will request that respiratory protection (OV/HEPA cartridges) also be donned if PNA materials are encountered visually and/or can be smelled. Most PNAs stick to dust, but some are moderately volatile.

For purposes of this Air Monitoring Strategy, respiratory protection (Level C) shall be used for exposures up to 10 times the applicable PELs. Level C shall be deemed to be warranted if organic compounds measured using the PID are 1 to 10 ppm above background levels for more than 1 minute. This is based on the assumption that all of the reading from the PID is benzene, which has the lowest PEL (and an exposure to this for eight hours wearing a half-face respirator). The Dräger pump and colorimetric tubes (e.g., benzene) may be used to characterize vapors when the PID is 1-10 ppm over background for greater than one minute (wear your respirator while using the Dräger pump; the benzene test takes 15 minutes). Level B respiratory protection shall be deemed warranted when conditions in excess of 10 ppm above background concentrations (for benzene) or ten times the exposure limit for other contaminants (for half face air purifying respirators) are observed. If Level B respiratory protection is warranted, on-site field personnel will be asked to evacuate by the Site Health and Safety Manager. If the atmosphere in the boring is greater than 20% LEL, the Site Health and Safety Manager shall stop work to air out boring until less than 20% LEL. In addition, if methane is detected or suspected at any concentration, stop drilling, remove any other ignition sources, vacate the area, and ventilate to prevent flammable mixtures from forming. Resume drilling only after air monitoring indicates that methane is not detected using the 4-gas meter. The results of air monitoring shall be relayed to on-site workers and documented. No IDLH or oxygen deficient conditions are expected at the site. Air monitoring equipment shall be maintained and calibrated in accordance with the manufacturer's specifications and BASELINE's *Quality Assurance Program Plan* and *Health and Safety Program Plan*.

**SITE CONTROL MEASURES:** Sampling personnel will define and demarcate exclusion, decontamination, and clean zones for each boring location; the need for multiple exclusion/decontamination zones will be determined in the field. No eating or drinking shall be permitted in the exclusion zone; workers may go through partial decontamination (wash gloves, hands, and arms) to consume fluids in the warm zone. Avoid skin and eye contact with soil to the maximum extent possible. Personal hygiene is imperative to prevent prolonged contact with site soils and dusts.

In the event of a minor (incidental) release of a hazardous material, the spill will be immediately cleaned up by on-site BASELINE personnel, and spill cleanup materials placed in labeled containers. In the event of a larger than incidental (major) spill of hazardous materials, follow emergency procedures below.

Place all cuttings and rinsate/purge water and used PPE in drums, secure, and label. The location for temporary storage of drummed materials generated during field activities is to be determined; the Site Health and Safety Manager will consult with the Project Manager and the client about where to securely store these drums.

**DECONTAMINATION PROCEDURES (PERSONAL AND EQUIPMENT):** All personal and equipment decontamination procedures shall be implemented prior to leaving the site. A decontamination area will be established from the work area (hot zone) to the control (cold) zone for soil sampling activities. The location of the decontamination area and the need for multiple decontamination areas shall be determined by the Field Geologist/Project Supervisor and documented in the field after selection. Decontaminate sampling equipment, boots, and PPE according to the decontamination procedures below, and remove. Decontaminate boots, non-disposable PPE and sampling equipment on-site using trisodium phosphate (or Alconox) and water, then rinse with water followed by a deionized water rinse. The equipment to be used for decontamination of sampling equipment, boots, and PPE will include three 5-gallon buckets (TSP or Alconox/tap water, tap water rinse, and deionized water rinse, to be completed in that order) and brushes (for TSP or Alconox bucket). Antiseptic towelettes will be used for cleaning respirators and washing hands and arms. Decontamination of sampling and drilling equipment will also be required prior to sampling and between sampling locations to avoid cross-contamination, as will decontamination or replacement of gloves at a new sampling location. All personnel should shower as soon as possible after leaving the site. Contain all decontamination rinsate in labeled containers.

Decontamination procedures shall be monitored by the Site Health and Safety Manager to determine their effectiveness. If decontamination measures are found to be ineffective, the Site Health and Safety Manager or his designee shall take appropriate action to immediately correct any deficiencies.

All drums used at the site for the sampling activities described above must meet DOT, OSHA, and U.S. EPA regulations for the wastes they contain. Site operations shall be organized to minimize the amount of drum movement. Before moving drums, inform all immediate workers of the potential hazards associated with the contents of the drums and containers being moved or handled. Inspect the integrity of drums and containers prior to moving them. Immediately label all drums used to contain waste materials. Unlabeled drums shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled. Drums that cannot be moved without rupture, leaking, or spillage shall be emptied into a sound container (supplied by the drilling contractors). Workers not involved in opening drums or containers shall remain at a safe distance from drums and containers being opened. If flammable atmospheres are possible, non-sparking tools shall be used to open drums and containers. In addition, handling equipment used to transfer drums and containers shall be selected, positioned, and operated to minimize sources of ignition related to the equipment from igniting vapors released from ruptured drums or containers. Standing on drums or containers shall not be permitted at any time.

Any deficiencies in this Site Health and Safety Plan, identified by the Site Health and Safety Manager, shall be immediately corrected. On-site workers, identifying any deficiencies in this Plan, shall immediately notify the Site Health and Safety Manager of such deficiencies.

**EMERGENCY PROCEDURES:** A cellular phone is carried by BASELINE personnel. In the event of a major emergency (e.g., fire, major spill, medical, explosion), the Site Health and Safety Manager or his designee shall use the cellular phone to contact “911,” Yane Nordhav (510-420-8686), the client (phone number listed above), and other emergency numbers listed below, as applicable. The designated BASELINE Site Health and Safety Manager shall verbally request evacuation of site personnel (personnel must first go through decontamination prior to evacuation).

Evacuation shall be requested by repeatedly honking the horn of a vehicle for personnel who are not within voice range. The honking will continue until personnel can be verbally notified of the emergency and the need for evacuation. Personnel shall evacuate the site to the reassembly area. The site Health and Safety Manager will be responsible for notifying personnel and any visitors of an appropriate evacuation route and reassembly area prior to the field work during the tailgate safety meeting. The notification of the evacuation route and reassembly area may be made during the daily tailgate safety meeting and should be documented in the field log. An evacuation route and a reassembly area are therefore not included herein. Any injured personnel shall be brought to the decontamination area prior to evacuation, and shall be assisted in decontamination, according to the procedures above, unless the transport or decontamination may potentially cause further injury, where transport and decontamination shall be requested by the paramedics. The designated Site Health and Safety Manager shall account for all on-site personnel following evacuation.

Rescue and medical duties (other than first aid/CPR by trained personnel), as required, shall be provided by off-site emergency responders (e.g., paramedics, fire fighters). Injured personnel may only be transported to the Hospital Emergency Room if the injury is non-threatening and does not require immediate attention (e.g., scrapes, minor cuts). (The hospital emergency route is included in Figure 1.)

Following evacuation, the designated BASELINE Health and Safety Manager shall request on-site personnel to maintain security of the site (by preventing unauthorized entry) until the site has been released to off-site emergency responders (fire fighters, police, etc.). Evacuated personnel will direct emergency responders to the emergency and inform them of site hazards and the emergency. Other emergency notifications may be required, for example, the Emergency Management System (911), the Office of Emergency Services (800 852-7550), San Francisco Department of Public Health (415 252-3900), State Department of Fish and Game (707 944-5512), and U.S. Environmental Protection Agency, Region IX (415 744-2000). The need for emergency notifications will be determined by the designated BASELINE Health and Safety Manager and Project Manager(s), based on the emergency at hand. All notifications will be documented.

Following the emergency, the designated Site Health and Safety Manager shall be responsible for preparing a post-incident critique, for the purpose of identifying the cause of the emergency, response initiated, and need for additional training, procedures, or equipment. The designated Site Health and Safety Manager and Project Manager(s) shall take corrective action to prevent reoccurrence of the emergency. At any time if any deficiencies in these Emergency Procedures are identified, they shall be immediately corrected by the Site Health and Safety Manager. On-site workers identifying any deficiencies in the emergency procedures shall immediately notify the Site Health and Safety Manager of such deficiencies.

Prepared by: Reginald Ramirez, P.E. 	Date: 10 October 2008	Reviewed/Approved by: Cheri Page, P.G. 	Date: 10 October 2008
Read by/Date: _____ / _____ _____ / _____			

HOSPITAL MAP



<p><b>Hospital/Clinic Name and Address:</b>                  California Pacific Medical Center                  Sacramento and Buchanan                  San Francisco, CA</p>	<p><b>Hospital Phone:</b>                  (415) 600-3333</p>	<p><b>Paramedic/Fire &amp; Police Dept. Phone:</b>                  415-561-5656                  911</p>
<p><b>Directions:</b> Head towards U.S. 101/CA-1 and then turn south on Lincoln Boulevard (toward Cowles Street). Lincoln Boulevard becomes Sheridan Avenue; continue on Sheridan Avenue to Arguello Boulevard. Turn right on Arguello Boulevard and continue to Jackson Street. Turn left onto Jackson Street and continue to Buchanan Street. Turn right on Buchanan Street and follow to emergency entrance (on Buchanan between Washington and Sacramento).</p>		

Appendix D

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**Categorical Exemption**

CATEGORICAL EXEMPTION/ CATEGORICAL EXCLUSION DETERMINATION FORM

04-SF-101  
Dist.-Co.-Rte.

8.0-9.8  
P.M/P.M.

163700  
E.A. (State project)

PROJECT DESCRIPTION: (Briefly describe project, purpose, location, limits, right-of-way requirements, and activities)

This project consists of a hazardous waste investigation in the immediate vicinity of the proposed new Doyle Drive Approach to the Golden Gate Bridge in San Francisco City and County, California. 134 bores will be drilled at various locations along Doyle Drive. Boring sites will be restored to pre-existing conditions. An expanded project description and discussion of environmental issues appears on the following pages.

CEQA COMPLIANCE (for State Projects only)

Based on an examination of this proposal, supporting information, and the following statements (See 14 CCR 15300 et seq.):

- If this project falls within exempt class 3, 4, 5, 6 or 11, it does not impact an environmental resource of hazardous or critical concern where designated, precisely mapped and officially adopted pursuant to law.
• There will not be a significant cumulative effect by this project and successive projects of the same type in the same place, over time.
• There is not a reasonable possibility that the project will have a significant effect on the environment due to unusual circumstances.
• This project does not damage a scenic resource within an officially designated state scenic highway.
• This project is not located on a site included on any list compiled pursuant to Govt. Code § 65962.5 ("Cortese List").
• This project does not cause a substantial adverse change in the significance of a historical resource.

CALTRANS CEQA DETERMINATION

Exempt by Statute. (PRC 21080[b]; 14 CCR 15260 et seq.)

Based on an examination of this proposal, supporting information, and the above statements, the project is:

- [X] Categorically Exempt. Class 6. (PRC 21084; 14 CCR 15300 et seq.)
[ ] Categorically Exempt. General Rule exemption. [This project does not fall within an exempt class, but it can be seen with certainty that there is no possibility that the activity may have a significant effect on the environment (CCR 15061[b][3])]

Handwritten signatures and dates for Environmental Branch Chief and Project Manager.

NEPA COMPLIANCE

In accordance with 23 CFR 771.117, and based on an examination of this proposal and supporting information, the State has determined that this project:

- does not individually or cumulatively have a significant impact on the environment as defined by NEPA and is excluded from the requirements to prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS), and
• has considered unusual circumstances pursuant to 23 CFR 771.117(b) (http://www.fhwa.dot.gov/hep/23cfr771.htm - sec.771.117).

In non-attainment or maintenance areas for Federal air quality standards, the project is either exempt from all conformity requirements, or conformity analysis has been completed pursuant to 42 USC 7506(c) and 40 CFR 93.

CALTRANS NEPA DETERMINATION

[X] Section 6004: The State has been assigned, and hereby certifies that it has carried out, the responsibility to make this determination pursuant to Chapter 3 of Title 23, United States Code, Section 326 and a Memorandum of Understanding (MOU) dated June 7, 2007, executed between the FHWA and the State. The State has determined that the project is a Categorical Exclusion under:

- 23 CFR 771 activity (c)( )
• 23 CFR 771 activity (d)( )
• Activity 7 listed in the MOU between FHWA and the State

[ ] Section 6005: Based on an examination of this proposal and supporting information, the State has determined that the project is a CE under Section 6005 of 23 U.S.C. 327.

Handwritten signatures and dates for Environmental Branch Chief and Project Manager/DLA Engineer.

Briefly list environmental commitments on continuation sheet. Reference additional information, as appropriate (e.g., air quality studies, documentation of conformity exemption, FHWA conformity determination if Section 6005 project; §106 commitments; § 4(f); § 7 results; Wetlands Finding; Floodplain Finding; additional studies; and design conditions). Revised September 6, 2007

**CATEGORICAL EXEMPTION/CATEGORICAL EXCLUSION DETERMINATION FORM**  
**Continuation Sheet**

***Project Description and Work Site Conditions***

134 bores will be drilled at various locations along Doyle Drive. Boring sites will be restored to pre-existing conditions.

The location of all proposed tests is depicted on the attached map. Locations shown are accurate to a distance of plus or minus 10 feet. The spreadsheet accompanying the map lists the specific test sites that are covered by this categorical exemption/categorical exclusion (CE/CE). The following characteristics apply to all tests included here:

- **Work Schedule:** Testing will take about 3 months to complete. Drilling, sounding, and field-testing will normally take place from Monday through Friday during the day with a 10- hour work shift.
- **Coordination:** Drilling locations will be planned two weeks ahead, and the Presidio Trust will be provided the schedule. Dig permits will be obtained from the Trust prior to the commencement of work.
- **Traffic Coordination:** Boring activities will be timed to minimize traffic disruption.
- **Site Access:** Site access will be by motor vehicle or by foot. Motor vehicle access will be confined to lawns, existing roads, or other heavily traveled areas, or by the access routes shown on the attached map.
- **Equipment Storage:** Unless placed in a designated and secure construction area, no equipment will be stored on-site. All equipment is portable and will be secured in vehicles when not in use.
- **Spoils Disposal:** All spoils from borings will be removed from the testing site, and disposed of as set forth in the *Doyle Drive Replacement License to Enter and Conduct Geotechnical Investigations*, executed November 15, 2007. All materials brought on site are removed when work is completed.
- **Roads and Grounds:** All necessary precautions will be taken to protect existing site structures. These include but are not limited to existing signs, curb and gutter, sidewalks, and paved roads and parking areas. Any damage to existing structures will be the responsibility of the testing contractor and will be corrected by the testing contractor at no additional expense to the Trust. The Trust will approve methods of repair to correct damage to existing structures. Finish treatment will match existing.
- **Asphalt Removal:** Specifications for repair and replacement of asphalt removed for excavation shall be reviewed and approved by the Trust. Please coordinate all roads and grounds work with Bob Carlsen, Associate Director for Landscape Maintenance, 415-561-4294.
- **Litter and Debris:** All litter and debris will be confined to the construction site and will be placed in receptacles, trashcans, and/or dumpsters. The testing contractor will be responsible for the daily clean up of debris that blows from the construction site to adjacent areas.

**CATEGORICAL EXEMPTION/CATEGORICAL EXCLUSION DETERMINATION FORM**  
**Continuation Sheet**

Based on a review of the project description, planned boring locations and various studies completed for the Doyle Drive replacement project, the project may cause adverse impacts in the following environmental resource areas: archeology, biology, hazardous materials, hydrology, and noise. A discussion of impacts related to these areas and measures that will be employed to avoid and minimize impacts follows:

*Archeological Resources:* Some proposed test sites are near archeologically sensitive locations. It is therefore possible that testing could disturb archeological resources. The following measures will be incorporated to preclude adverse impacts: 1) Ground disturbing activities will be confined to areas where there are no known archeological resources. 2) An archeological monitor will be present for the entire time that the borings are occurring.

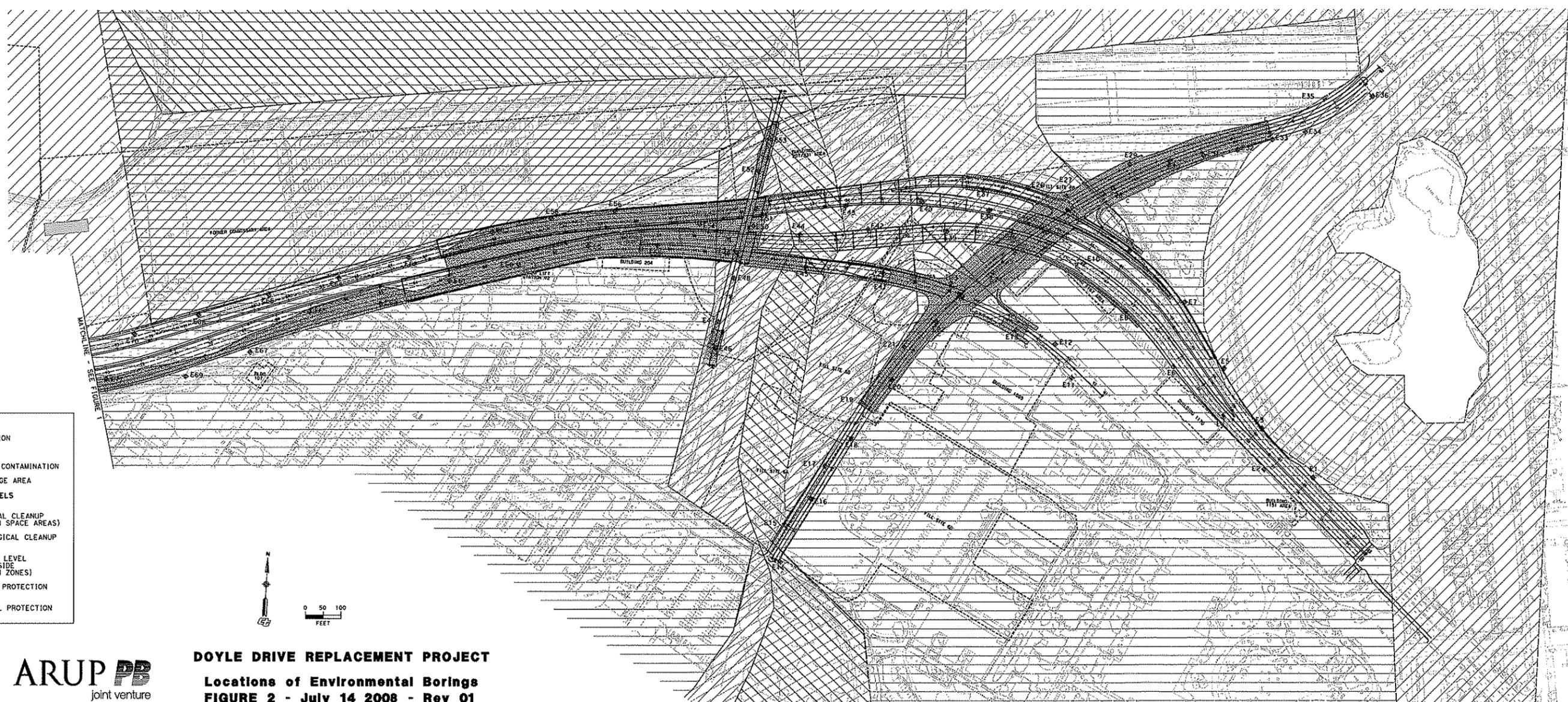
*Biological Resources:* Although the area of ground disturbance associated with each test site is small, the fact that there are many of them and that they are distributed over a wide area raises the possibility that trees or biological features may be adversely impacted. 1) All borings must take place a minimum of 10 feet from trees. 2) If testing is conducted during the nesting season, February 1 to August 15, an avian monitor will inspect designated sites no more than 3 days before boring to determine if active nesting birds are present and would be adversely impacted. If so, boring will be delayed or other measures employed to protect active nests.

*Hazardous Materials:* Any hazardous materials encountered during the testing will be handled according to the guidelines set forth in the *Doyle Drive Replacement Project License to Enter and Conduct Geotechnical Investigations*, executed November 15, 2007.

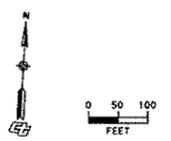
*Hydrological Resources:* It is possible that sediment and/or turbid groundwater could be discharged to the surface around the boring during drilling. Standard site control and drilling practices will be used to contain and collect these materials for proper disposal. Soil cuttings, spent drilling fluid, and other fluids extracted directly from the borings will be treated as hazardous waste and handled as described above. Equipment cleaning and associated surface drilling operations will also generate rinse water, which the contractor will either remove from site or discharge into the Presidio sanitary sewer system. In the latter event prior approval and permitting by the Presidio would be required.

*Noise:* Testing operations will generate noise that could pose a nuisance to nearby park users. To minimize this possibility, the testing contractor will provide the Presidio Trust advanced notice of the time and place of testing activities.

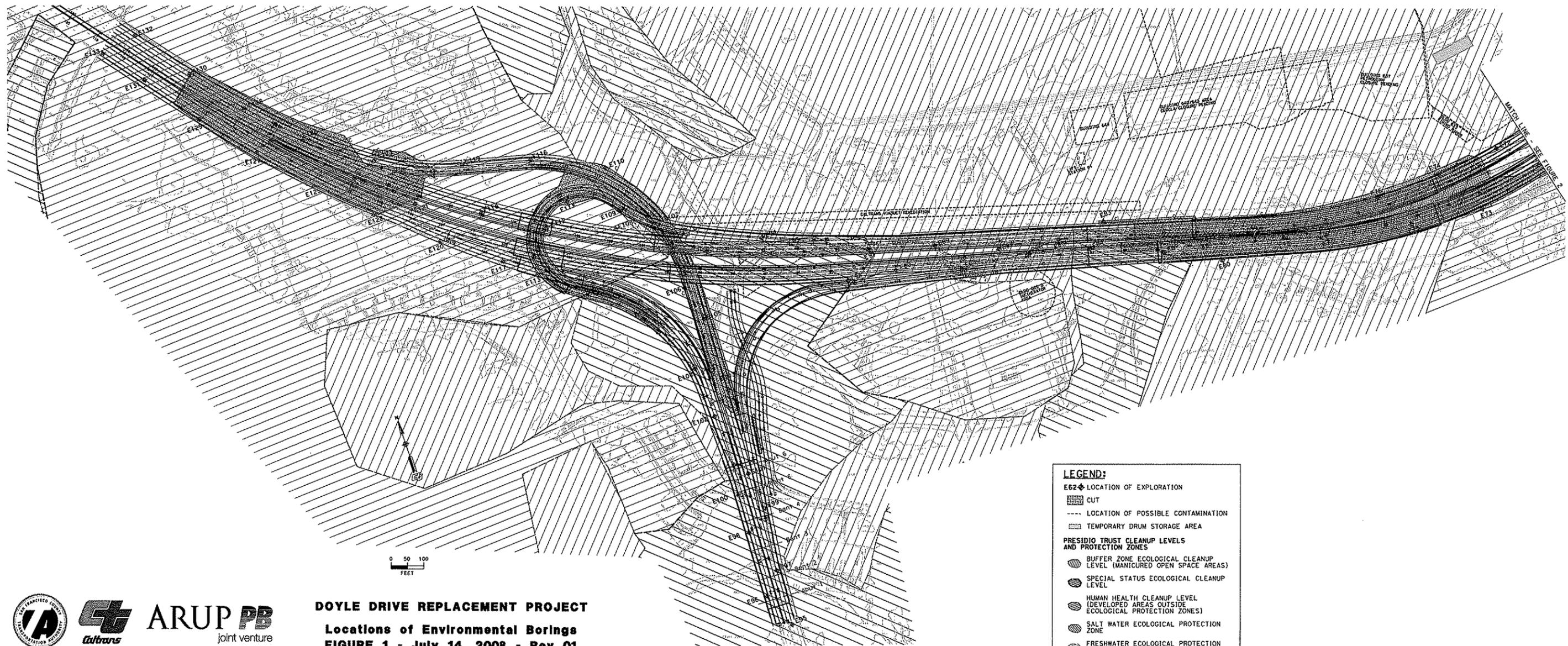
*Traffic:* Boring on or near roadways has the potential to disrupt traffic. To minimize this possibility, the testing contractor will coordinate with Caltrans and the Presidio Trust to develop traffic control measures, such as signage or alternative routing, for each affected site. All lights, barriers, warning signs as required for public safety will be provided, erected and maintained by Caltrans. Road closure impacts to MUNI and PresidiGo Services should be avoided. Any road closures that cause detours for either transit service need to be coordinated 30 days in advance.



- LEGEND:**
- E62 ◊ LOCATION OF EXPLORATION
  - [Hatched Box] CUT
  - LOCATION OF POSSIBLE CONTAMINATION
  - [Dotted Box] TEMPORARY DRUM STORAGE AREA
  - PRESIDIO TRUST CLEANUP LEVELS AND PROTECTION ZONES**
  - [Diagonal Hatched Box] BUFFER ZONE ECOLOGICAL CLEANUP LEVEL (MANICURED OPEN SPACE AREAS)
  - [Cross-hatched Box] SPECIAL STATUS ECOLOGICAL CLEANUP LEVEL
  - [Horizontal Hatched Box] HUMAN HEALTH CLEANUP LEVEL (DEVELOPED AREAS OUTSIDE ECOLOGICAL PROTECTION ZONES)
  - [Vertical Hatched Box] SALTWATER ECOLOGICAL PROTECTION ZONE
  - [Stippled Box] FRESHWATER ECOLOGICAL PROTECTION ZONE



**DOYLE DRIVE REPLACEMENT PROJECT**  
**Locations of Environmental Borings**  
**FIGURE 2 - July 14 2008 - Rev 01**



**DOYLE DRIVE REPLACEMENT PROJECT**  
**Locations of Environmental Borings**  
**FIGURE 1 - July 14, 2008 - Rev 01**

**LEGEND:**

- E62+ LOCATION OF EXPLORATION
- CUT
- LOCATION OF POSSIBLE CONTAMINATION
- TEMPORARY DRUM STORAGE AREA
- PRESIDIO TRUST CLEANUP LEVELS AND PROTECTION ZONES**
- BUFFER ZONE ECOLOGICAL CLEANUP LEVEL (MANICURED OPEN SPACE AREAS)
- SPECIAL STATUS ECOLOGICAL CLEANUP LEVEL
- HUMAN HEALTH CLEANUP LEVEL (DEVELOPED AREAS OUTSIDE ECOLOGICAL PROTECTION ZONES)
- SALT WATER ECOLOGICAL PROTECTION ZONE
- FRESHWATER ECOLOGICAL PROTECTION ZONE