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January 19, 2012

Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Cover Letter
Work Plan Submittal
Fuel Leak Case No. RO0000152/ GeoTracker ID T0600101570.

Engineering/Remediation Resources Group, Inc. (ERRG) is pleased to submit this work plan for soil and groundwater sampling at 6159 Acacia Avenue, Oakland, CA.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

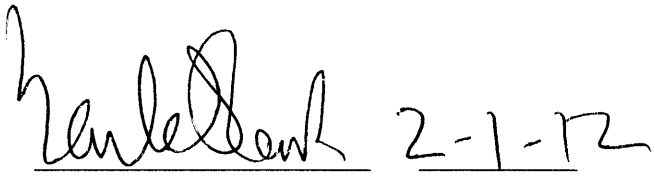
Please contact me at (415) 730-7658 if you have any questions.

Sincerely,

Tiffany Angus
Project Scientist

cc: Proposal File
Tyson Appel, ERRG Program Manager

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.



Earle Shenk Date

Draft
Work Plan for
Soil and Groundwater Sampling at
6159 Acacia Avenue, Oakland, California

February 2012

ERRG Project No. 2012-002

Prepared for:

Earle Shenk
674 Victoria Court
San Leandro, California 94577

Prepared by:

ERRG
Engineering/Remediation Resources Group, Inc.
115 Sansome Street, Suite 200
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(415) 395-9974

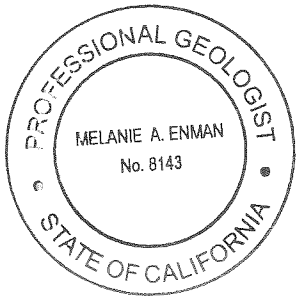
Draft
Work Plan for
Soil and Groundwater Sampling at
6159 Acacia Avenue, Oakland, California

Submitted by:
Engineering/Remediation Resources Group, Inc.

Signature	February 2, 2012
	Date
Tiffany Angus	Project Manager
Name	Title
Melanie Enman	February 2, 2012
Signature	Date
Melanie Enman, P.G.	Senior Geologist
Name	Title

CERTIFICATION

I hereby certify that the Work Plan for Soil and Groundwater Sampling at 6159 Acacia Avenue, Oakland California has been prepared under the direction and supervision of a qualified Professional Geologist.



Melanie Enman
California Professional Geologist No. 8143

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Acronyms and Abbreviations

ACEH	Alameda County Environmental Health
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
DRO	diesel-range organics
EPA	U.S. Environmental Protection Agency
ERRG	Engineering/Remediation Resources Group, Inc.
HASP	Health and Safety Plan
LCD	laboratory control duplicate
LCS	laboratory control sample
MRO	motor oil-range organics
MS	matrix spike
MSD	matrix spike duplicate
msl	mean sea level
PPE	personal protective equipment
ppm	parts per million
QC	quality control
RPD	relative percent difference
RWQCB	Regional Water Quality Control Board
TPH	total petroleum hydrocarbons
UST	underground storage tank

Section 1. Introduction

Engineering/Remediation Resources Group, Inc. (ERRG) has prepared this Work Plan for collection of soil and groundwater samples at 6159 Acacia, Oakland, California, to determine whether site soil and groundwater are contaminated. ERRG is collecting the samples on behalf of Earle Shenk, former owner of the 6159 Acacia residence, for submittal to Alameda County Environmental Health (ACEH).

This Work Plan is consistent with relevant sections of the following guidance documents:

- "Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Tank Sites" (Regional Water Quality Control Board [RWQCB], 1990)
- "Appendix A – Reports, Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Tank Sites" (RWQCB, 2004)
- "Data Quality Objectives Process for Hazardous Waste Site Investigations, EPA QA/G-4HW" (U.S. Environmental Protection Agency [EPA], 2000a)
- "Sampling and Analysis Plan Guidance and Template Version 1" (EPA, 2000b)
- "EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5" (EPA, 2001)
- "EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5" (EPA, 2002)
- "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846" (EPA, 2008)

The following subsections summarize the site background, geology and hydrogeology, and the organization of this Work Plan.

1.1. BACKGROUND

The site is a residential property located at 6159 Acacia Avenue in a residential area of Oakland, California (Figure 1). A letter dated July 26, 2011, indicated that a 500-gallon underground storage tank (UST) was removed on April 2, 1992, from the backyard of the residence at 6159 Acacia Avenue (ACEH, 2011). The UST was used to store oil to heat the residence. The tank was cylindrical and approximately 10 feet long by 3 feet in diameter, with the bottom resting at 3.5 feet below ground surface (bgs). The removed UST was reportedly in poor condition, with several holes in the bottom of the tank. Following removal, soil samples were collected from the tank excavation, and sample results indicated that total petroleum hydrocarbons (TPH) as diesel-range organics (DRO) were present at concentrations of 7,900 parts per million (ppm) at 3.5 feet bgs. Additional soil was excavated to 5 feet bgs, and soil samples were again collected at the bottom of the excavation. Results for the 5-foot samples indicated that TPH-DRO was present at a concentration of 1,400 ppm. In a letter dated April 22, 1992, ACEH requested additional

excavation and sampling; however, no documentation exists indicating that additional excavation and sampling was conducted (ACEH, 1992).

1.2. GEOLOGY AND HYDROGEOLOGY

Tank removal documents from 1992 lack any information about soil lithology or the presence of groundwater. However, a site investigation was conducted at a nearby residence, 5925 Ocean View Drive, located approximately 1,500 feet northwest of the site. Results of the site investigation at 5925 Ocean View Drive indicated the site was located at an elevation of 260 feet above mean sea level (msl) and groundwater was present at 16 feet bgs (Pangea, 2010). In addition, the ACEH Case Closure Summary Report for 5900 Acacia Avenue located 0.2 mile west of the site at approximately 350 feet above msl states that groundwater is "more than 100 feet bgs as the site is located in the Oakland hills" (ACEH, 1995).

The elevation at 6159 Acacia Avenue is approximately 400 feet above msl, which is 140 feet higher than 5925 Ocean Avenue, where groundwater is located at approximately 16 feet bgs, and 50 feet higher than 5900 Acacia Avenue, where groundwater is purported to be "greater than 100 feet bgs." These elevations indicate that groundwater at the site is likely greater than 50 feet bgs.

The local topography of 6159 Acacia Avenue slopes south–southwest. Based on the lithology at 5925 Ocean View Drive, which is about 1,500 feet northwest of 6159 Acacia Avenue, the lithology of the site is likely sandy clay underlain by silty clay and siltstone bedrock (Pangea, 2010).

1.3. REPORT ORGANIZATION

Following this section, this Work Plan is organized as follows.

- Section 2 presents the field sampling plan.
- Section 3 describes the data collection, documentation procedures, and analytical methods to be used during the project.
- Section 4 summarizes the laboratory quality control (QC) program.
- Section 5 describes demobilization activities and reporting.
- Section 6 lists the guidance and other documents used to prepare this Work Plan.

Figures and tables are presented following Section 6. A site-specific Health and Safety Plan (HASP) is provided in Appendix A.

Section 2. Field Sampling Plan

This section presents the field sampling plan to be following during this project. The purpose of the project is to collect soil and groundwater samples for analysis of chemicals to evaluate the nature and extent of contamination in soil and groundwater at the site.

2.1. MOBILIZATION AND SITE PREPARATION

The following subsections detail the site preparation activities.

2.1.1. Utility Location

Prior to sampling activities, ERRG will notify Underground Services Alert at least 2 working days before any intrusive activities to ensure clearance of underground utilities. In addition, ERRG will contract a private utility locator to locate and mark subsurface utilities in the sampling area prior to any intrusive activities. (Note: the underground utility locator is only capable of identifying lines that are traceable using standard metal-detecting equipment.)

2.1.2. Mobilization

ERRG and subcontractors will mobilize all equipment and supplies to the site the day field activities are scheduled.

2.1.3. Work Zones

Work zones will be established to buffer the surrounding environment from potential chemical and physical hazards and to regulate entry into the work zones. Temporary barriers will be erected to establish exclusion zones within the work areas. Access to the exclusion zones will be limited to appropriately trained personnel. Support zones will be established outside the exclusions zones for storage of equipment and supplies. In addition a health and safety station will be established near the work area. Additional information on work zones is provided in the HASP (Appendix A).

2.2. SAMPLE COLLECTION

ERRG will collect soil and groundwater samples to determine the nature and extent of contamination at the site. The samples will be collected and analyzed as follows:

- Soil: Three soil samples will be collected from one soil boring and analyzed for TPH-DRO and TPH as motor-oil range organics (MRO) by EPA Method 8015B and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8260B.
- Groundwater: If groundwater is encountered prior to reaching bedrock, one sample will be collected and submitted for analysis of TPH-DRO and TPH-MRO by EPA Method 8015B and BTEX by EPA Method 8260B.

2.2.1. Sample Locations

Samples will be collected from one boring 6 feet south of the location of the removed UST. Soil samples will be collected from three depth intervals, with the first sample collected at 5 feet bgs (the depth of previous sample) and the remaining two samples collected based on visual and olfactory observations such as staining and odor.

2.2.2. Sample Collection and Equipment

Prior to collecting samples, field personnel will review the Work Plan to ensure they are familiar with protocols and procedures established for this project. The appropriate sampling containers will be ordered for the sampling event, and the containers will be verified upon receipt. Samples will be collected using a portable drill. Drilling will continue until groundwater or refusal is reached.

Samples will be collected in accordance with the following guidelines:

- All field samplers will be properly trained in both correct sampling procedures and appropriate health and safety protocols (see Appendix A of this Work Plan).
- Upon arrival at the site, the samplers shall put on appropriate personal protective equipment (PPE).
- New, clean disposable gloves will be used for collection of all samples.
- Samples will be collected using new disposable equipment.
- Samples for off-site laboratory analysis will be sent to a state of California-certified analytical laboratory.

Soil samples will be collected with a split-spoon sampler lined with brass sleeves for the purpose of lithologic description, field screening, and laboratory analysis. After collecting each sample, the lithology will be logged and samples will be collected from the brass sleeve via disposable trowels and placed into glass jars to be sent to the laboratory for analysis. The groundwater sample will be collected using a disposable bailer.

Immediately after samples are collected, chain-of-custody documentation will be prepared in accordance with the procedures described in Section 3.3. All samples will be placed and stored in a cooler with

bagged ice to maintain them at approximately 4°C prior to sample delivery to the designated laboratory that will perform the prescribed chemical analyses.

Each soil and groundwater sample will be labeled with a unique sample identifier prior to placement in the sampling cooler, as described in Section 3.1.

2.2.3. Disposal of Investigation-Derived Waste

During sampling activities at the site, the following types of investigation-derived waste will be generated:

- PPE
- Disposable plastic trowels
- Soil cuttings

Used PPE and disposable plastic trowels will be double bagged in plastic trash bags and properly disposed of off site as municipal waste. After samples are collected, the soil cuttings will be used to backfill the boring.

2.3. LABORATORY ANALYSES

Soil and groundwater samples will be analyzed for TPH-DRO, TPH-MRO, and BTEX. Table 1 summarizes sample methods, containers, holding times, and preservatives. Section 3.4 and Section 4 describe the analytical methods and the laboratory QC program, respectively.

Section 3. Data Collection, Documentation Procedures, and Analytical Methods

This section describes data collection and documentation procedures that will be used during the project to properly document investigation activities. Documentation includes sample information, field logbooks, and a photographic log of site reconnaissance and field activities. This section also summarizes the analytical methods, laboratory QC samples, and criteria for evaluating analytical results. Section 4 summarizes the laboratory QC program.

3.1. SAMPLE DESIGNATION

A sample numbering scheme will be used to uniquely identify and track the samples from collection through laboratory analysis. The numbering scheme indicates the sample type and location and will be entered on labels and field forms. The system used to number field samples is presented below.

6159-SS-01

where:

6159	=	6159 Acacia
SS	=	Sample type; soil sample (SS), or groundwater (GW)
01	=	Sample number; used if more than one sample is collected per matrix, which will be noted on field logbook, sketch maps

For example, sample 6159-SS-01 indicates the first soil sample collected. The date will also be recorded on each sample. Any additional samples collected in the field will be numbered sequentially following the last proposed sample.

3.2. RECORDKEEPING

Daily log sheets will be used for recording all field activities. All entries will be recorded in indelible ink. Corrections will be written clearly and legibly with indelible ink. At a minimum, the daily log sheets will contain the following information:

- Project name and location
- Date and time of collection for each sample
- Sample number, location, and type

- Site sketch map, including sample locations
- Problems encountered and corrective action taken
- Sampling personnel and site visitors
- Any visual observations of the field sampler or unusual features of the samples or sampling location
- Any other observations or conditions that may affect the samples

3.3. SAMPLE HANDLING AND CHAIN OF CUSTODY

This section describes the sample labeling, sample packaging and shipment, and chain-of-custody procedures.

3.3.1. Sample Labeling

A sample label will be affixed directly to or recorded directly on each sample container immediately after each sample is collected. All samples for off-site laboratory analysis will have containers with printed labels affixed and completed in indelible black ink. Each sample label will contain, at a minimum, the following information:

- Sample identification number (designated in accordance with Section 3.1)
- Sample collection date (mm/dd/yy)
- Company name
- Project number and name

3.3.2. Chain-of-Custody Documentation for Analytical Samples

The chain-of-custody record will be the controlling document to ensure that sample custody is maintained. Upon collecting a sample, sampling personnel will initiate the chain-of-custody record. Each individual who has the sample(s) in his or her possession will sign the chain-of-custody record. Each time the sample custody is transferred, the former custodian will sign the chain-of-custody record in the "Relinquished by" line, and the new custodian will sign the chain-of-custody record in the "Received by" line. The date, time, and the name of the custodian's project or company affiliation will accompany each signature. After the laboratory receives the samples, the sample custodian will inventory each shipment before signing for it and will note on the original chain-of-custody record any discrepancy in the number of samples, the temperature of the cooler, and the presence of any broken sample containers. The laboratory will immediately notify the ERRG Project Manager of any problems identified with shipped samples and will determine the appropriate course of action.

3.4. ANALYTICAL METHODS

Table 2 describes the laboratory analytical methods for this project.

3.5. LABORATORY QUALITY CONTROL SAMPLES

At a minimum, the laboratory will analyze 1 laboratory control sample (LCS) and laboratory control duplicate (LCD) for every 10 field samples (or 1 per project, if fewer than 10 samples are collected). LCSs and LCDs are samples of clean water or soil spiked with a known concentration of a surrogate compound. These samples are used as a measurement of the laboratory's ability to properly process and analyze a sample by a given method.

For matrix spike (MS) samples, a duplicate volume of a field sample is spiked by the laboratory with a known concentration of a target compound and analyzed with the field samples. The recovery of the target compound in the analytical process is a measure of the accuracy of the analytical method. It measures bias recovery due to matrix. A matrix spike duplicate (MSD) is a second duplicate volume of a field sample. The relative percent difference (RPD) between the MS, and the MSD analyses is a measure of the precision of the analytical method in the actual sample media. MS/MSD samples will be collected at a rate of 10 percent for this project. The laboratory will also analyze a laboratory blank and laboratory duplicate at a frequency of 10 percent for each analysis. In addition, the laboratory will analyze an instrument blank to monitor the cleanliness of the instrument portion of the sample analysis process. Instrument blanks usually consist only of the solvent or acid solution of the standard used to calibrate the instrument.

The data quality indicators and their use for assessment of data quality are presented in Section 4.

3.6. REPORT PREPARATION

Upon completion of field activities, ERRG will prepare a site assessment report. The report will discuss field activities and analytical results and will provide recommendations for further action, if needed. The report will be submitted to ACEH, who will determine if further action is required.

Section 4. Quality Control Program

This section describes the laboratory QC program to be implemented during the assessment of data quality. Specifically, this section defines the data quality indicators of precision, accuracy, representativeness, completeness, and comparability parameters and their use in the assessment of data quality.

4.1. PRECISION

Precision measures the reproducibility of measurements under a given set of conditions. The following equation illustrates the method for calculating the RPD to assess a method's precision:

$$Precision\ as\ RPD = \frac{2 \times (Result - Duplicate\ Result)}{Results + Duplicate\ Result} \times 100\%$$

Precision will be monitored by running duplicate samples to evaluate the sampling techniques, sample handling procedures, and homogeneity of the sample media.

4.2. ACCURACY

Accuracy measures the bias of an analytical system by comparing the difference of a measurement with a reference value. The percent recovery of a chemical, which has been added to the environmental samples at a known concentration before extraction and analysis, provides a quantitation tool for analytical accuracy. The spiking solutions used for accuracy determinations are not used for instrument calibrations. The following equation illustrates how accuracy as percent recovery is evaluated:

$$Accuracy\ as\ percent\ recovery = \frac{Spike\ Sample\ Result - Sample\ Result}{Sample\ True\ Value} \times 100\%$$

Percent recoveries for LCS/LCDs and MS/MSDs that are analyzed for every batch of up to 20 samples serve as a measure of analytical accuracy. Surrogate standards are added to all samples, blanks, and LCSs analyzed for organic chemicals to evaluate the method's accuracy and help determine matrix interferences.

Generally, the recovery of most elements spiked into samples falls within a range of 80 to 120 percent. This range represents the EPA advisory acceptability limits for MS, MSD, and LCS for all analyses (EPA, 2010).

Control limits are defined as the mean recovery, plus or minus 3 standard deviations, of the 20 data points, with the warning limits set as the mean plus or minus 2 standard deviations. The laboratory will review the QC samples and surrogate standard recoveries for each analysis to ensure that internal QC data are within the limits of acceptability. The laboratory will investigate any suspect trends, take appropriate corrective actions, and report the findings to the ERRG Project Manager.

4.3. REPRESENTATIVENESS

Unlike precision and accuracy, which can be expressed in quantitative terms, representativeness is a qualitative parameter. Representativeness is the degree to which sample data represent accurately and precisely a characteristic of a population, parameter variations at a sampling point, or an environmental condition. A qualitative parameter depends on proper design of the sampling program.

Field personnel will be responsible for ensuring that samples are representative of field conditions by collecting and handling samples in accordance with the approved plan. Errors in sample collection, packaging, preservation, or chain-of-custody procedures may result in samples being judged nonrepresentative and may form a basis for rejecting the data.

Data generated by the laboratory must be representative of the laboratory database of accuracy and precision measurements for analytes in different matrices. Laboratory procedures for sample preparation will ensure that aliquots used for analysis are representative of the whole sample.

4.4. COMPARABILITY

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another, whether it was generated by a single laboratory or during inter-laboratory studies. The use of standardized field and analytical procedures ensures comparability of analytical data. Sample collection and handling procedures will adhere to ASTM International-approved protocols. Laboratory procedures will follow standard analytical protocols, use standard units, use standardized report formats, follow the calculations as referenced in approved analytical methods, and use a standard statistical approach for QC measurements.

4.5. COMPLETENESS

Completeness is a measure of whether all data necessary to meet the project requirements have been collected. For the data to be considered complete, they must meet all acceptance criteria, including accuracy, precision, and other criteria specified for an analytical method.

Section 5. Demobilization and Reporting

Upon field work completion, ERRG will demobilize all equipment, materials, and personnel. ERRG will perform a through site inspection at the end of the day to ensure that all trash and construction materials, including temporary fencing and barricades, are removed from the site. ERRG will prepare a site assessment report that will discuss field activities, analytical results and recommendations for further action, if needed. The report will be submitted to ACEH, who will determine if further action is required.

Section 6. References

Alameda County Environmental Health (ACEH), 1992. Letter regarding Closure of Home Heating Fuel Tank at 6159 Acacia, Oakland Hills, CA 94168. April.

ACEH, 1995. "Remedial Action Completion Certificate, Ref: Residential Property, 5900 Acacia Ave, Oakland, CA." August.

ACEH, 2011. Letter regarding Work Plan Request for Fuel Leak Cause No. RO0000152 and Geo Tracker Global ID T0600101570, Earl Shenk Residence, 6159 Acacia Avenue, Oakland, CA 94618. July.

Pangea Environmental Services, Inc., 2010. "Site Investigation Report, Private Residence, 5925 Ocean View Drive, Oakland, California, ACEH RO0003003." October.

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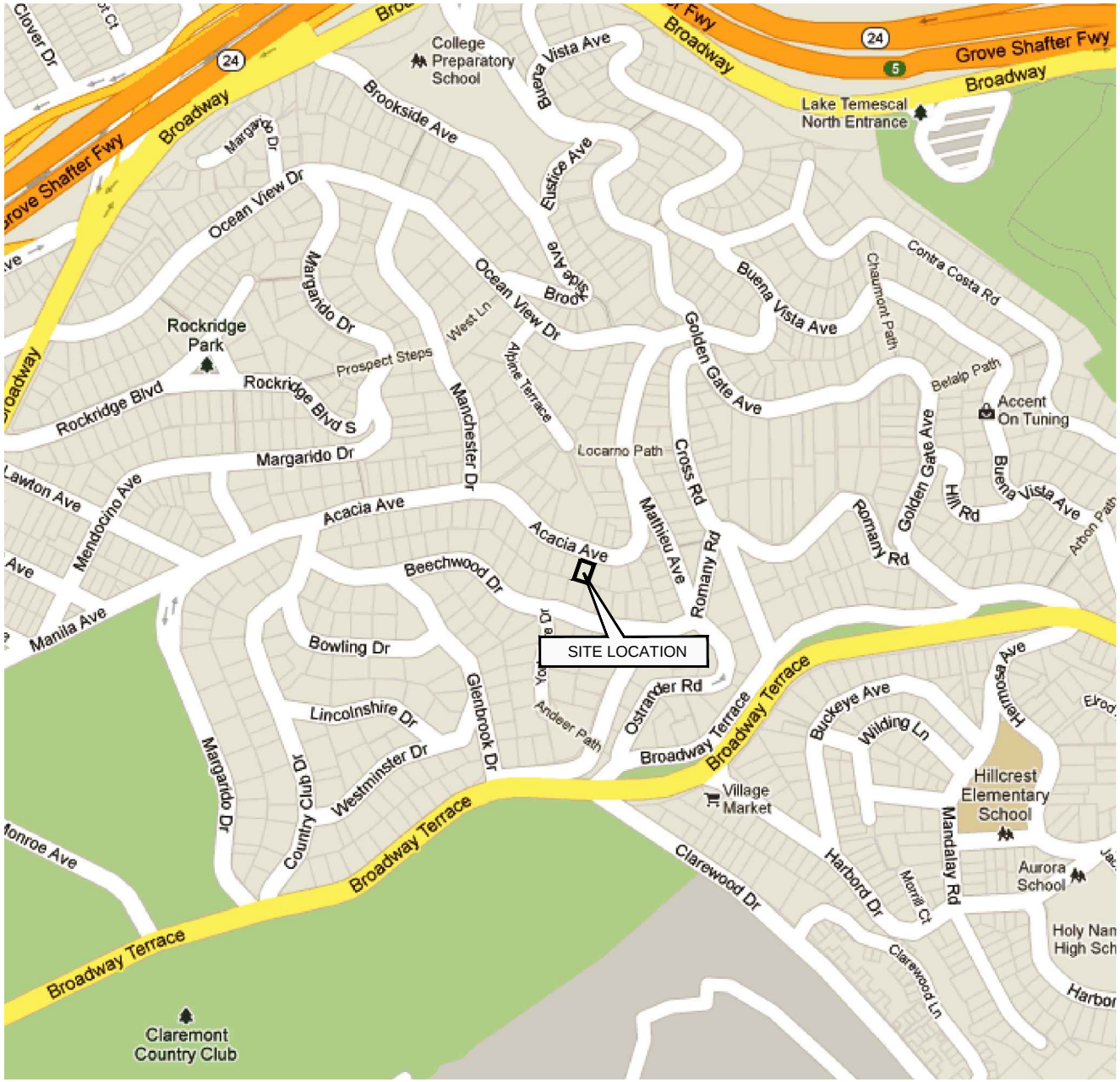
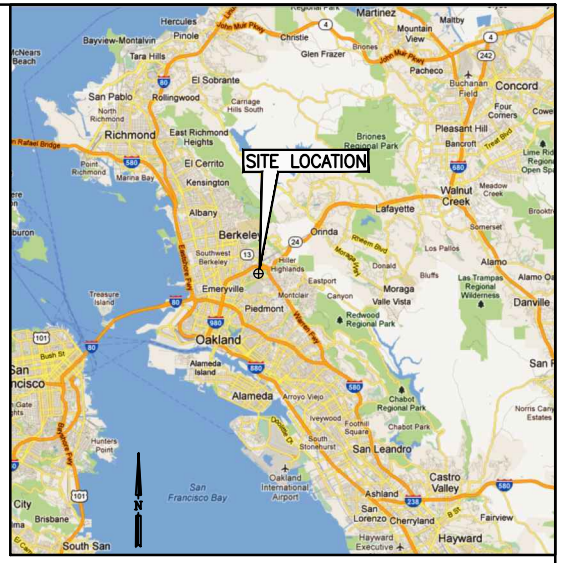
EPA, 2010. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review." OSWER 9240.1-51, EPA 540-R-10-011. January. Available Online at: <http://www.epa.gov/superfund/programs/clp/guidance.htm>.

Figures





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ERRG
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San Francisco, California 94104
(415) 395-9974

CLIENT: EARLE SHANK	SITE VICINITY AND LOCATION MAP			
LOCATION: 6159 ACACIA AVE. OAKLAND, CALIFORNIA	DRAWN BY: SC 01/09/12	CHECKED BY: TA 01/09/12	PROJECT NO. 2012-002	FIG NO. 1

Tables

Table 1. Sample Methods, Containers, Holding Times, and Preservatives

Matrix	Analyte	Method	Container	Holding Time	Preservative
Solid	TPH-DRO	EPA 8015B	8-oz glass jars with Teflon-lined cap	14 days	4°C (ice)
	TPH-MRO	EPA 8015B	8-oz glass jars with Teflon-lined cap	14 days	4°C (ice)
	BTEX	EPA 8260B	8-oz glass jars with Teflon-lined cap	14 days	4°C (ice)
Water	TPH-DRO	EPA 8015B	Pre-filtered into 250-mL polyethylene bottle pre-preserved with nitric acid	7 days	4°C (ice)
	TPH-MRO	EPA 8015B	Pre-filtered into 250-mL polyethylene bottle pre-preserved with nitric acid	7 days	4°C (ice)
	BTEX	EPA 8260B	Three 40-mL amber glass bottled pre-preserved with sulfuric acid	14 days	4°C (ice)

Notes:
BTEX = benzene, toluene, ethylbenzene, and xylenes
EPA = U.S. Environmental Protection Agency
mL = milliliters
TPH-DRO = total petroleum hydrocarbons as diesel-range organics
TPH-MRO = total petroleum hydrocarbons as motor oil-range organics

Table 2. Analytical Standards and Methods

Method	Standard Title	Method Procedure[1]
EPA 8015B	TPH-DRO and TPH-MRO	This method uses gas chromatography analysis to detect nonhalogenated volatile and semivolatile organic compounds. Samples are converted to a gas, which is transported along fuse-silica capillary columns. The column effluent is introduced into a hydrogen flame ionization detector. Hydrocarbons in the sample will produce ions when they are burnt, which are then detected using a metal collector plate that is biased with high DC voltage.
EPA 8260B	VOCs	This method is used to determine VOCs in a variety of solid waste matrices. The sample is introduced into the gas chromatograph by the purge-and-trap method. Analytes are directly introduced to a wide-bore capillary column before being flash evaporated to a narrow-bore capillary for analysis. The program is temperature-programed to separate the analytes, which are then detected with a mass spectrometer interfaced to the gas chromatograph.

Notes:

1 = Source of information provided in this table from SW-846 (EPA, 2008)

EPA = U.S. Environmental Protection Agency

TPH-DRO = total petroleum hydrocarbons as diesel-range organics

TPH-MRO = total petroleum hydrocarbons as motor oil-range organics

VOCs = volatile organic compound

Appendix A. Site-Specific Health and Safety Plan

A. INTRODUCTION

This plan has been prepared solely for implementation by ERRG employees and subcontractors, using operating procedures for which they are specifically trained. Any use of this plan by other parties is at their own risk.

B. GENERAL INFORMATION

Project No.: 2012-002 **Date:** January 13, 2012

Prepared by: Tiffany Angus

Approved by: Tim Woodson

Site Location: 6159 Acacia is located in the upper Rockridge area of Oakland, California.

Site Description: A 500-gallon oil underground storage tank (UST) was removed on April 2, 1992, from the backyard of a residence at 6159 Acacia, Oakland, California. The UST was used to store oil to heat the residence. The removed UST was reportedly in poor condition, with several holes in the bottom of the tank. Following removal, soil samples were collected from the tank excavation, and sample results indicated that total petroleum hydrocarbons (TPH) as diesel-range organics (DRO) were present at concentrations of 7,900 parts per million (ppm) at 3 to 3.5 feet below ground surface (bgs). Additional soil was excavated to 5 feet bgs, and soil samples were again collected at the bottom of the excavation. Results for the 5-foot samples indicated TPH-DRO was present at a concentration of 1,400 ppm. In a letter dated April 22, 1992, ACEH requested additional excavation and sampling but none was documented.

Project Description: ERRG will collect three soil samples and one groundwater sample from a single boring 6 feet south of the former location of the UST. A portable drill will be used to advance boring into the soil.

Hazard Summary:

Overall Chemical Hazard:	[ ] Serious	[ ] Moderate	[X] Low	[ ] Unknown
Overall Physical Hazard:	[ ] Serious	[X] Moderate	[ ] Low	[ ] Unknown

C. PROJECT TEAM

Personnel	Responsibilities
Tiffany Angus, ERRG	Project Manager/Site Safety and Health Officer (SSHO)
ERRG Drilling Subcontractor	Drilling activities and soil and groundwater sampling

D. CHEMICAL/SITE CHARACTERISTICS

Chemical:	Total petroleum hydrocarbons (TPH)-diesel range organics (DRO), TPH-motor-oil range organics (MRO), benzene, toluene, ethylbenzene and xylenes.			
Physical State:	[X] Liquid	[X] Solid	[ ] Sludge	[ ] Gas/Vapor
Characteristics:	[ ] Flammable	[ ] Combustible	[ ] Corrosive	[X] Poison
	[ ] Explosive	[ ] Reactive	[X] Volatile	[ ] Biological
	[ ] Radioactive	[X] Carcinogen		
Physical Hazards:	[ ] Overhead	[ ] Confined Space	[ ] Below Grade	[X] Trip/Fall
	[X] Puncture	[ ] Burn	[X] Noise	[X] Cut
	[ ] Splash	[X] Heat/Cold Stress		

Other: Vehicle traffic, contractor traffic, and weather building materials (such as metals, wood, glass sharp edges, and assorted debris). Insect bites.

E. HAZARD EVALUATION

E.1. PHYSICAL/BIOLOGICAL HAZARDS

NO.	TASK	PHYSICAL/BIOLOGICAL HAZARDS
1.	Mobilization/Site Preparation	• Trips, falls, cuts, and insect bites. • Lifting and back strain • Heat stress and cold stress • Vehicle traffic
2.	Sampling	• Chemical exposure • Trips, falls, cuts, and insect bites. • Defective equipment • Pinch point • Lifting and back strain • Bending and ergonomics • Heat stress and cold stress • Noise

4.	Demobilization	• Trips, falls, cuts, and insect bites • Lifting and back strain • Heat stress and cold stress • Vehicle traffic

Chemical Hazard Evaluation: See attached Hazard Evaluation Sheets for data on individual chemicals.

E.2. CHEMICAL HAZARDS

NO.	TASK	CHEMICAL HAZARDS	PROTECTION
1.	Mobilization/Site Preparation	None	None
2.	Sampling	TPH-DRO and motor oil-range organics (MRO) Benzene, toluene, ethylbenzene, and xylenes (BTEX)	Work gloves and safety glasses
4.	Demobilization	None	None

Discussion of Chemicals of Potential Concern (COPCs):

Total Petroleum Hydrocarbons: Affected organ systems include integumentary (skin), respiratory (lungs), neurological (central nervous system), ocular (eyes).

Benzene: Affected organ systems include integumentary (skin), circulatory (blood), respiratory (lungs), neurological (central nervous system), ocular (eyes), and skeletal (bone marrow).

Toluene: Affected organ systems include integumentary (skin), respiratory (lungs), neurological (central nervous system), ocular (eyes), digestive (liver), and urinary (kidney).

Ethylbenzene: Affected organ systems include integumentary (skin), respiratory (lungs), neurological (central nervous system), and ocular (eyes).

Xylenes: Affected organ systems include integumentary (skin), respiratory (lungs), circulatory (blood), neurological (central nervous system), ocular (eyes), digestive (liver and gastrointestinal tract), and urinary (kidney).

E.3. RADIOLOGICAL HAZARDS

Note: No radiological hazards are identified for this project.

NO.	TASK	RADIOLOGICAL HAZARDS	PROTECTION
1.	Mobilization/Site Preparation	None	Not Applicable
2.	Sampling	None	Not Applicable
3.	Demobilization	None	Not Applicable

All entries into an exclusion zone require use of the buddy system. All ERRG field staff participate in a medical monitoring program and have completed applicable training per Title 29 Code of Federal Regulations (CFR) 1910.120. ERRG's respiratory protection program meets the requirements of Title 29 CFR 1910.134.

The following action levels will be used for evacuation of the work zone pending reassessment of conditions:

- Level D: Oxygen (O_2) <19.5% or >25%; explosive atmosphere >20% lower explosive limit (LEL); organic vapors greater than background levels; and particulates > 5 milligrams per cubic meter (mg/m^3)
- Level C: O_2 <19.5% or >25%; explosive atmosphere >20% LEL; unknown organic vapor (in breathing zone) >5 ppm; particulates >5 mg/m^3
- Level B: O_2 <19.5% or >25%; explosive atmosphere >20% LEL; unknown organic vapor (in breathing zone) >500 ppm; particulates >5 mg/m^3
- Level A: O_2 <19.5% or >25%; explosive atmosphere >20% LEL; unknown organic vapor (in breathing zone) >500 ppm; particulates >5 mg/m^3

E.4. AIR MONITORING

Contaminant	OSHA PEL (mg/m^3)	Highest Concentration Detected On Site (mg/kg)	Calculated Action Level (mg/m^3)
THP-DRO,MRO	100[1]	1,400[2]	NA[4]
Benzene	3.19	NA[3]	NA[4]
Toluene	750	NA[3]	NA[4]
Ethylbenzene	435	NA[3]	NA[4]
xylenes	435	NA[3]	NA[4]

Notes:

1 = National Institute of Occupational Safety and Health recommended exposure limit for kerosene (OSHA PEL not available).

2 = Sample results for TPH-DRO from 1992.

3 = No previous results for BTEX.

4 = No airborne chemicals of concern exist for this project. Dust will be monitored visually and will be controlled by using water or stopping work and leaving the site if dust becomes an issue of concern. Dust levels will not exceed the California limit for visible construction dust of 50 micrograms per cubic meter.

mg/kg = milligrams per kilogram

mg/m^3 = milligrams per cubic meter

NA = not applicable

OSHA = Occupational Health and Safety Administration

PEL = permissible exposure limit

E.5. DECONTAMINATION PROCEDURES AND SOLUTIONS

Personnel: Prior to eating, drinking, and smoking, on-site workers are required to wash their hands thoroughly. Personnel will wash their hands and face prior to taking breaks, such as lunch; in addition, work boots should be brushed off or washed off with Alconox prior to leaving the site.

Equipment: All equipment will be rinsed with soap and water prior to leaving active work zones.

Instruments: No instruments will be used during this project.

E.6. FIRE AND EXPLOSION SAFETY

Site-specific elements of fire and explosion prevention include:

- Vehicles and equipment will contain fire extinguishers as required by federal OSHA regulations. ERRG and subcontractors will locate additional 10-pound type ABC fire extinguishers within the immediate work area, if required, so that the maximum travel distance does not exceed 75 feet.
- Park only in designated parking areas.
- Gasoline and diesel will not be used as a cleaning solvent or for any other purpose than to power vehicles.
- Trash and debris will be kept to a minimum, and emergency phone numbers will be posted at the work areas.
- All combustible or flammable COPCs brought to the site (e.g., motor oil, unleaded gasoline, diesel #2) will be stored in U.S. Department of Transportation- and/or National Fire Protection Association-rated containers. Quantities of these materials brought on site will be minimized.
- Smoking will not be permitted in the restricted work areas. Smoking will be permitted in designated areas in the support zone only. Smoking will not be permitted near fuel storage areas or similar potential fire hazards.

E.7. ELECTRICAL SAFETY

Note: No live power will be used on this project.

E.7.1. Overhead Power Lines

Note: No overhead power lines are present on this site.

E.7.2. Crossover Clearances

Note: No overhead power lines are present on this site.

E.7.3. Operating Clearances

Note: No heavy machinery or equipment will be used at this project.

E.8. HEAT AND COLD STRESS

The SSHO will routinely check with on-site staff to verify that they are not uncomfortably cold or hot. Simple preventive measures (e.g., rest breaks, availability of warm and cold clothing, and hydration) are anticipated to be adequate. Should heat and cold stress cause employee discomfort and possible employee health hazards, the SSHO will amend this HASP and will implement other procedures.

Solar radiation exposures will be minimized by:

- Employees wearing long-sleeved shirts, hats, UV-rated sunglasses, and gloves.
- Employees provided with high SPF (30) barrier cream for exposed skin areas.
- Encouraging employees to take cover out of direct sunlight when work activities permit.

E.9. GENERAL SAFETY HAZARDS

A number of general safety hazards exist at the site, including:

- Illumination: Adequate lighting is needed in all work areas. However, if work illumination levels fall below a reasonable level (i.e., less than 10-foot candles), supplemental lighting will be provided or work will be terminated.
- Contaminant Ingestion/Smoking: Eating, drinking, chewing gum or tobacco, smoking, or any practice that involves hand-to-mouth contact increases the probability of contaminant ingestion and is prohibited in any area where the possibility of contamination exists. Smoking will be allowed only in designated areas away from active work, fuel storage areas, or other fuel sources. The SSHO will designate smoking areas during the initial site safety briefing and at the daily safety briefings. Violators of these rules will be removed immediately from the site and the project.
- Sanitation: Drinking water will be obtained from off-site sources (e.g., bottled water). Hands and face must be washed thoroughly with soap and water upon leaving a contaminated or suspected contaminated area before eating, drinking, or smoking.
- Pathogen Exposures: PPE worn to protect against site hazards (i.e., coveralls and gloves) will also adequately protect against unforeseen pathogens.

E.10. EXCAVATION SAFETY

Note: No excavation activities are planned during this project.

E.11. HEAVY EQUIPMENT OPERATION

Note: No heavy equipment will be used during this project.

F. ACTIVITY HAZARD ANALYSIS TABLES

The task-specific safety hazards identified for this project are summarized in Tables 1, 2,and 3. The task-specific hazards analysis (THA) is based on the following primary site activities:

- Mobilization/Site Preparation
- Sampling
- Demobilization

Table 1: Mobilization/Site Preparation

Work Personnel	Principal Activities	Potential Hazards	Recommended Controls
▪ ERRG	▪ Mobilizing personnel and equipment	▪ Physical hazards	▪ Follow proper work practices to minimize physical hazards
		▪ Trips, falls, cuts, and insect bites	▪ Review and be aware of site structures, shoring for physical hazards and traffic flow
		▪ Lifting and back strain	▪ Proper body mechanics
		▪ Heat stress and cold stress	▪ Take routine work breaks ▪ Drink sufficient water ▪ Wear appropriate clothing
		▪ Vehicle traffic	▪ Be aware of surroundings
Minimum PPE	**Safety Monitoring Equipment**	**Inspection Requirement**	**Training Requirements**
▪ Steel-toed boots (ANSI Z41) ▪ Hardhat (ANSI Z89.1) ▪ Safety glasses with side shields (ANSI Z87.1) ▪ Safety vest ▪ First-aid kit ▪ Eyewash solution ▪ Fire extinguisher	▪ Not applicable	▪ Not applicable	▪ Review HASP and sign safety sheet ▪ On-site safety briefing and daily safety meetings

Notes:
ANSI = American National Standards Institute

Table 2: Sampling

Work Personnel	Principal Activities	Potential Hazards	Recommended Controls
▪ ERRG ▪ ERRG subcontractors	▪ Soil boring using portable drill ▪ Collecting samples	▪ Chemical exposure	▪ Use proper PPE
		▪ Physical hazards	▪ Follow proper work practices to minimize physical hazards
		▪ Trips, falls, cuts, and insect bites	▪ Review and be aware of site structures for physical hazards; be aware of surroundings
		▪ Equipment hazards	▪ Inspect equipment thoroughly before use
		▪ Pinch points	▪ Be aware of moving parts
		▪ Lifting and back strain	▪ Use proper body mechanics for lifting and bending
		▪ Heat stress and cold stress	▪ Take routine work breaks ▪ Drink sufficient water ▪ Wear appropriate clothing
		▪ Noise	▪ Use hearing protection
Minimum PPE	**Safety Monitoring Equipment**	**Inspection Requirement**	**Training Requirements**
▪ Steel-toed boots (ANSI Z41) ▪ Hardhat (ANSI Z89.1) ▪ Safety glasses with side shields (ANSI Z87.1) ▪ Safety vest ▪ Work gloves ▪ First-aid kit ▪ Eyewash solution ▪ Fire extinguisher	▪ Not applicable	▪ Fire extinguisher	▪ Review HASP and sign safety sheet ▪ On-site safety briefing and daily safety meetings

Table 3: Site Demobilization

Work Personnel	Principal Activities	Potential Hazards	Recommended Controls
▪ ERRG	▪ Demobilizing personnel and equipment	▪ Physical hazards	▪ Follow work practices established to minimize physical hazards
		▪ Trips, falls, cuts, and insect bites	▪ Review and be aware of site structures and shoring for physical hazards; be aware of surroundings
		▪ Lifting and back strain	▪ Use proper body mechanics for lifting and bending
		▪ Heat stress and cold stress	▪ Take routine work breaks ▪ Drink sufficient water ▪ Wear appropriate clothing
Minimum PPE	**Safety Monitoring Equipment**	**Inspection Requirement**	**Training Requirements**
▪ Steel-toed boots (ANSI Z41.1) ▪ Hardhat (ANSI Z89.1) ▪ Safety glasses with side shields (ANSI Z87.1) ▪ Safety vest ▪ First-aid kit ▪ Eyewash solution ▪ Fire extinguisher	▪ Not applicable	▪ Not applicable	▪ Review HASP and sign safety sheet ▪ On-site safety briefing and daily safety meetings

In addition, a Detailed Daily Safety Meeting Record form will be completed daily prior to field activities, following the process below.

- Define the task and describe the work activity, including the tools, equipment, materials, and personnel to perform the task.
- Identify and sequence the steps or subtasks required to complete the task.
- Identify and analyze the chemical, physical, safety, and biological and environmental hazards posed by each step in the task.
- Identify the hazard control measures for each health and safety hazard identified for each task step or subtask. Hazard control measures include any requirements for task training, equipment inspections, permits, air monitoring procedures, PPE, and emergency procedures.

The Project Manager and SSHO will review all project THAs with all personnel who will be performing the task in a safety briefing, prior to task performance. Any new crewmembers shall be briefed on the THAs prior to performing the task.

G. ACCIDENT PREVENTION

The Project Manager and SSHO will conduct daily safety and health inspections to assess whether site work complies with the approved HASP, as well as with OSHA. Daily safety briefings will reiterate means of avoiding physical accidents and exposure to COPCs during work procedures. These briefings will typically be of a "tailgate" type and will occur at the beginning of the workday.

H. LOSS PREVENTION OBSERVATIONS

The Project Manager and SSHO will conduct loss prevention observations (LPOs) for specific work activities, comparing the actual work process against established safe work procedures identified in the project-specific HASP and detailed THAs. LPOs are a tool for the Project Manager and SSHO to provide positive reinforcement for work activities performed correctly, while also identifying and eliminating deviations from safe work procedures that could result in a loss. The Project Manager and SSHO will perform one LPO each week for field activities addressed in the project-specific HASP or activities for which a detailed THA has been prepared. The Project Manager and SSHO will identify and implement corrective actions for any observed procedures that do not conform with safe work procedures or any unsafe conditions.

I. PUBLIC SAFETY

Public safety will be addressed through the designation of work and support areas and with the establishment of access controls.

I.1. WORK ZONES AND SUPPORT AREAS

Site control will be achieved by establishing work zones and project support zones that confine and delineate specific areas of work. These zones will protect the surrounding environment from potential chemical and physical hazards, establish a safety monitoring perimeter of the work area, regulate entry into the work area, and facilitate communication and emergency response between work activities and management support.

The work zone is where site activities occur; this zone is dynamic and can change based on the daily activity. Portable field support stations will be established near the active work areas on a daily basis to stage support supplies, including eyewash, first-aid supplies, and stress beverages. The project support zone will have provisions to accommodate personnel and vehicles. This zone is where non-heavy equipment, supplies, and site documents are located. Meetings and general office-type activities will also occur in this zone.

J. EMERGENCY INFORMATION

EMERGENCY CONTACTS	TELEPHONE NUMBER
Tiffany Angus, Project Manager/SSHO	(415) 848-7117 office; (415) 730-7658 cell
Tyson Appel, Program Manager	(415) 848-7106 office; (925) 250-4056 cell
Ed Grooman, Corporate Health and Safety Manager	(925) 839-2235 office; (925) 234-1333 cell

K. SITE RESOURCES

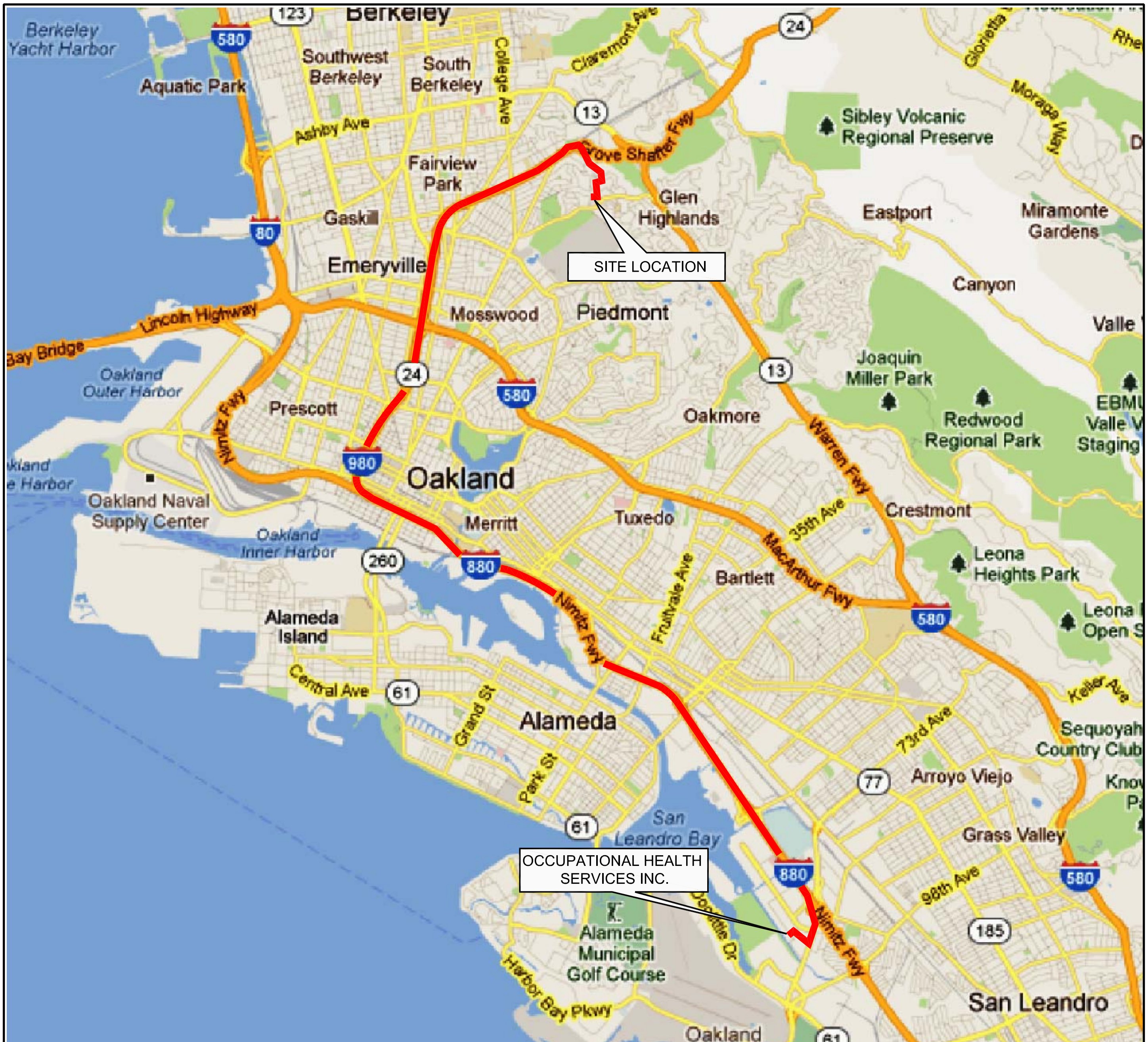
NOTE: To be completed prior to start of fieldwork.

	NAME/CONTACT	TELEPHONE NUMBER
Police/Fire/Ambulance	Emergency Response	911
Hospital	Highland Hospital	(510) 437-4800 Emergency (510) 437-4559 Non-emergency
Poison Control Center	NA	800-852-7550
Client	Earle Shenk	(510) 220-6407
Owner of 6159 Acacia residence	Nick Moore	(510) 653-1855 home (510) 334-1724 cell
Nearest Occupational Health Facility	Occupational Health Services Inc. 340 Pendleton Way, Oakland California	(510) 569-9889

Hospital Directions: Figure 1

Nearest Occupational Health Facility: Figure 2

Figures



SOURCE: GOGGLE MAPS

HEAD EAST ON ACACIA AVE. TOWARD MATHIEU AVE. 0.2 MI
TURN LEFT ONTO GOLDEN GATE AVE. 404 FT
TAKE THE 1st LEFT TO STAY ON GOLDEN GATE AVE. 0.1 MI
SLIGHT LEFT TO STAY ON GOLDEN GATE AVE. 0.3 MI
TURN LEFT ONTO CHABOT RD. 0.2 MI
TAKE THE 1st LEFT ONTO PATTON ST. 430 FT
PATTON ST. TURNS SLIGHTLY RIGHT AND BECOMES MILES AVE. 351 FT
MERGE ONTO CA-24 W/STATE HWY 24 W VIA THE RAMP ON THE LEFT TO DOWNTOWN OAKLAND 2.9 MI
CONTINUE ONTO I-980 W 1.8 MI
MERGE ONTO I-880 S 5.7 MI
TAKE EXIT 36 FOR HEGENBERGER RD. TOWARD COLISEUM OAKLAND AIRPORT 0.3 MI
TURN RIGHT ONTO HEGENBERGER RD. 0.2 MI
TURN RIGHT ONTO EDGEWATER DR. 0.1 MI
TURN LEFT ONTO PENDLETON WAY 351 FT

N

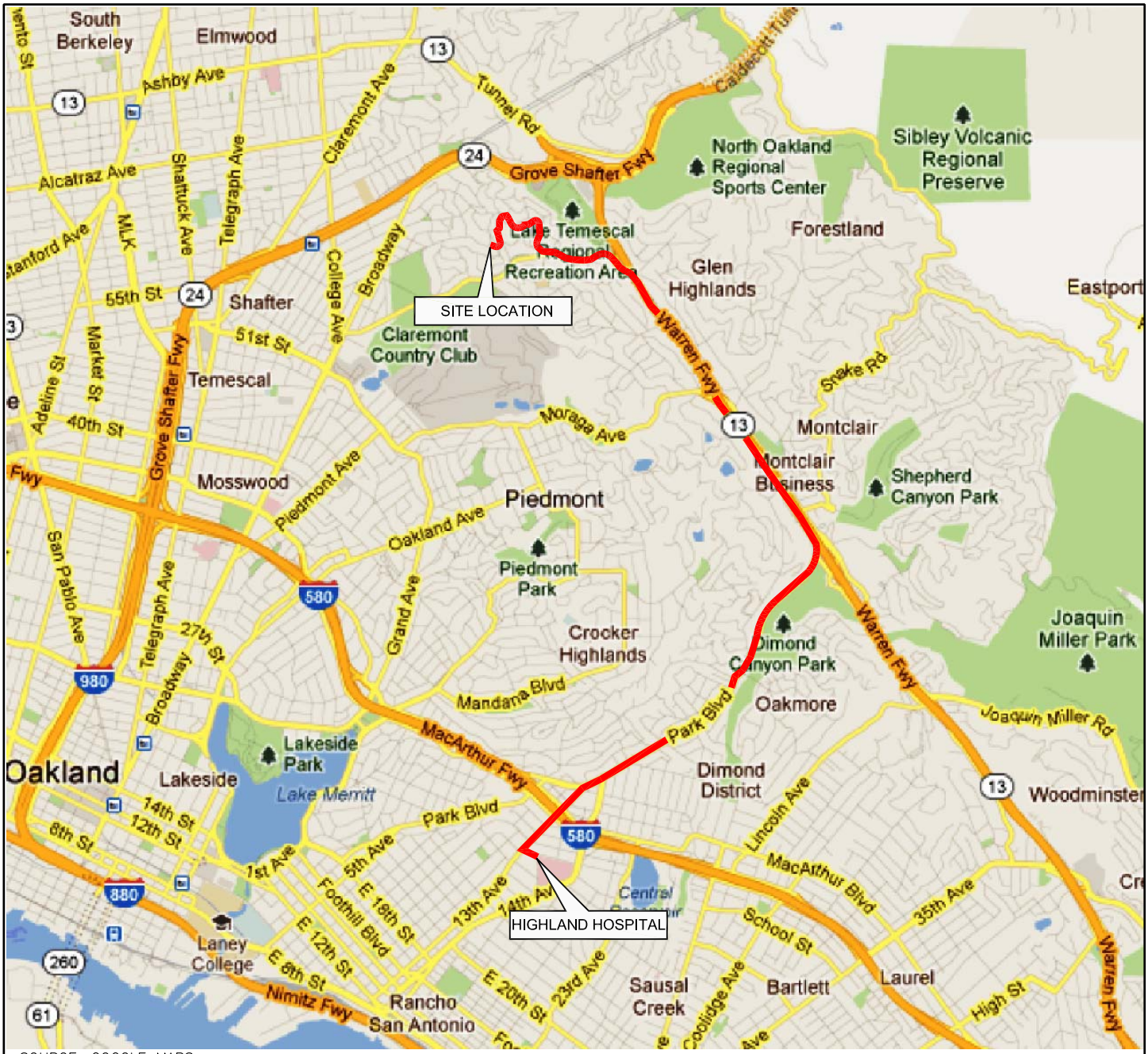
0' 2 MI

APPROXIMATE SCALE: 1"=2 MILES

OCCUPATIONAL HEALTH SERVICES INC.
340 PENDLETON WAY
OAKLAND, CA 94621
(510) 569-9889 (NON-EMERGENCY)

ERRG Engineering/Remediation Resources Group, Inc. 115 Sansome St., Suite 200 San Francisco, California 94104 (415) 395-9974	CLIENT: U.S. COAST GUARD-?	HOSPITAL ROUTE MAP			
	LOCATION: 6159 ACACIA AVE. OAKLAND, CALIFORNIA	DRAWN BY: SC 01/09/12	CHECKED BY: TA 01/09/12	PROJECT NO. XX-XX	FIG NO. 1

FILE NAME: N:\Proposals\6159 Acacia\N. Maps&Dwg\Fig1_2_HRM.dwg LAYOUT NAME: 1 PLOTTED: Friday, January 06, 2012 - 9:46am



SOURCE: GOGGLE MAPS

HEAD EAST ON ACACIA AVE. TOWARD MATHIEU AVE.	0.2 MI
TURN RIGHT ONTO GOLDEN GATE AVE.	0.4 ML
CONTINUE ONTO BROADWAY TERRACE	0.4 MI
SLIGHT RIGHT TO MERGE ONTO CA-13 S TOWARD HAYWARD	1.6 MI
TAKE EXIT 3 TOWARD PARK BLVD.	0.1 MI
MERGE ONTO TRAFALGAR PL.	217 FT
SLIGHT RIGHT ONTO PARK BLVD.	1.7 MI
SLIGHT LEFT ONTO 13th AVE.	0.5 MI
TURN LEFT ONTO E 31st ST.	468. FT

N

0' 2 MI

APPROXIMATE SCALE: 1"=2 MILES

HIGHLAND HOSPITAL
1411 E 31st STREET
OAKLAND, CA 94602
(510) 437-4559 (EMERGENCY)
(510) 437-4800 (NON-EMERGENCY)

FILE NAME: N:\Proposals\6159 Acacia\N. Maps&Dwg\Fig1_2_HRM.dwg LAYOUT NAME: 2 PLOTTED: Friday, January 06, 2012 - 9:47am

ERRG Engineering/Remediation Resources Group, Inc. 115 Sansome St., Suite 200 San Francisco, California 94104 (415) 395-9974	CLIENT: U.S. COAST GUARD?	HOSPITAL ROUTE MAP			
	LOCATION: 6159 ACACIA AVE. OAKLAND, CALIFORNIA	DRAWN BY: SC 01/09/12	CHECKED BY: TA 01/09/12	PROJECT NO. XX-XX	FIG NO. 2