

September 8, 2016

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Mr. Mark Detterman  
Alameda County Health Care Services Agency  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502-6577

I, Michael Beritzhoff, hereby authorize ERAS Environmental, Inc. to submit the Workplan for Limited Phase II Subsurface Investigation for 2449-2451 Santa Clara Street, Alameda, California, dated August 24, 2014 to the Alameda County Health Care Services Agency.

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.

Signature: Michael Beritzhoff, TRUSTEE

Printed Name: Michael Waltz

Mr. Michael Beritzhoff, Trustee  
A.S. McDonald Trust  
(925) 988-9590  
mikeberitzhoff@sbcglobal.net

**ERAS**

**Environmental, Inc.**

1533 B Street

Hayward, CA 94541

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Phone (510) 247-9885 Facsimile: (510) 886-5399

[info@eras.biz](mailto:info@eras.biz)

**WORK PLAN FOR  
LIMITED PHASE II SUBSURFACE INVESTIGATION**

AT

**2449-2451 Santa Clara Street  
Alameda, California**

**ERAS PROJECT NUMBER: 16-002-02  
Alameda County Fuel Leak Case No. RO3225**

Prepared for

Mr. Michael Beritzhoff, Trustee  
A.S. Macdonald Trust  
1273 Laurel Lane  
Lafayette, CA 94549

August 24, 2016

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## CERTIFICATION

This **Work Plan for Limited Phase II Subsurface Investigation** at 2449-2451 Santa Clara Street in Alameda, California, has been prepared by ERAS Environmental, Inc. (ERAS) under the professional supervision of the Registered Professional Geologist whose signature appears hereon.

This work plan was prepared in general accordance with the accepted standard of practice that exists in Northern California at the time the investigation was performed. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the conditions present. More extensive studies, including additional environmental investigations, can tend to reduce the inherent uncertainties associated with such studies.

Our firm has prepared this work plan for the Client's exclusive use for this particular project and in accordance with generally accepted professional practices within the area at the time of our investigation. No other representations, expressed or implied, and no warranty or guarantee is included or intended.

This work plan may be used only by the client and only for the purposes stated within a reasonable time from its issuance. Land use, site conditions (both on-site and off-site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify ERAS of such intended use. Based on the intended use of report, ERAS may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release ERAS from any liability resulting from the use of this report by any unauthorized party.

Sincerely,  
ERAS Environmental, Inc.  
Sincerely,  
ERAS Environmental, Inc.



Curtis Payton  
California Registered Professional Geologist 5608



Andrew Savage  
Project Geologist

August 24, 2016

## 1.0 INTRODUCTION

The following is a work plan for the collection of soil and groundwater samples to characterize the lateral and vertical extent of contamination at a commercial site located at 2449-2451 Santa Clara Street in Alameda, California (the "Property").

Previous subsurface investigations conducted by ODIC Environmental (ODIC) and AEI on the Property identified contamination including concentrations of petroleum hydrocarbons quantified as oil range organics (TPH-oro<sup>1</sup>), diesel range organics (TPH-dro), gasoline range organics (TPH-gro), along with volatile organic compounds (VOCs) including 1,2,4-trimethylbenzene, sec-butyl benzene, para-isopropyl toluene, n-butyl benzene, and naphthalene.

This work plan was prepared to further investigate the detected contaminants of concern so that an environmental site case closure can be obtained from the Alameda County Environmental Health Care Services Agency (ACHCSA).

The Property is located on the northern corner of Santa Clara Street and Everett Street in the eastern portion of the City of Alameda. The Property consists of an approximately 0.1-acre rectangular shaped parcel of land that is improved with a single commercial building and associated paved areas. The Property is currently used for an art supply business and a pre-school facility.

The location of the Property is shown on **Figure 1**. The layout of the Property is shown on **Figure 2**.

## 1.1 BACKGROUND

Based on information presented in the ODIC Environmental (ODIC) Phase 1 Environmental Site Assessment (ESA) report for the Property dated January 6, 2016, a gasoline service station operated on the Property prior to the construction of the current commercial building. The report indicated that permits were present to install a gasoline station in 1925 and to demolish a gasoline station in 1966. There was no information presented to indicate the location of the former underground storage tanks (UST) or whether they had been removed. ODIC recommended a Phase 2 subsurface investigation to assess subsurface conditions at the Property.

ODIC conducted a geophysical survey that indicated a possible UST located near the center of the Property (a 350-gallon waste oil UST was later found in this vicinity and removed on May

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<sup>1</sup> TPH-gro, TPH-dro, and TPH-oro are methods that compare analytical results to standards for gasoline, diesel and motor oil, respectively. Therefore, analytical results are estimates of quantities based on what would be expected for the range of hydrocarbon results for the standard. Gasoline range organics (gro) are those hydrocarbon compounds that are in the range of C6 to C10, diesel range organics (dro) are those hydrocarbon compounds that are in the range of C10 to C23, and oil range organics (oro) are those hydrocarbon compounds that are in the range of C18 to C36. There can be overlap in reporting methods as well as identification of compounds that fall within the standard that may not necessarily be derived from gasoline, diesel, or oil.

23, 2016). A total of 8 soil borings were drilled in mostly random locations on the southwestern 2/3 of the Property on February 12, 2016. Concentrations of TPH-gro, TPH-dro, TPH-oro, VOCs and metals were identified above the ESL in soil samples and groundwater samples analyzed in the vicinity of the former degreasing and motor oil storage areas at the northeast side (Boring SB-4) and northwest side (Boring SB-6) of the parking lot. ODIC indicated that additional investigation should be conducted to delineate the vertical and horizontal extent of petroleum hydrocarbons and VOCs in soil and groundwater beneath the Property.

ERAS requested information from the ACHCSA regarding the Property and was informed that no records were on file. City of Alameda records pertaining to the Property were reviewed and a letter dated April 21, 1947 was on file requesting permission to install four 1,000-gallon USTs. The letter indicated that two 550-gallon USTs and a 300-gallon UST were to be removed and one of the tanks was to be re-used for waste oil. A job card with this record indicated there were no records of the original UST installation. No information was found indicating the locations of the former USTs or the new USTs.

ERAS requested historical aerial photographs that include the Property from Quantum Spatial. Photographs dated in 1950, 1957, 1960 and 1968 which includes at least three dates when it is known the gasoline station was operating. The purpose of the aerial photograph review was to attempt to determine the location of the former USTs.

Gasoline stations that were constructed in the 1920's, as this one was, typically were constructed with the fuel USTs beneath the pump islands or under the sidewalk near the pump islands. The 1950 photograph showed a concrete pad in the location where the former waste oil UST was located. The pad does not appear to be large enough to have accommodated four 1,000-gallon fuel USTs. No other obvious concrete pads were visible on the former gasoline station. ERAS concludes the most likely place for the former fuel USTs were in the sidewalk on either the Santa Clara Avenue or Everett Street sides of the Property.

## **1.2 PREVIOUS SUBSURFACE INVESTIGATIONS**

### AEI, 1996

AEI performed subsurface investigation and the results were summarized in a report dated October 22, 1996. AEI advanced six borings in the vicinity of the Property which included four borings on the Property and two on an adjacent parcel for the collection of soil and groundwater samples. The samples were in a straight line across the center of the Property with no specific justification for targets noted and were designated BH-1 through BH-6.

All borings were advanced to a depth of approximately 15 feet below ground surface (bgs). Groundwater was indicated to have been encountered at a depth of approximately 8 feet bgs. Soil samples were collected from each boring from depths of 5, 10, and 15 feet bgs. Only the samples collected from 10 feet bgs in boring BH-1 and 5 feet bgs in borings BH-2, BH-3, BH-4, BH-5, and BH-6 were analyzed for the contaminants of concern.

The soil samples and a grab groundwater sample from each boring were analyzed for TPH-gro,

TPH-dro, benzene, toluene, ethylbenzene, xylenes (BTEX), and methyl tertiary butyl ether (MTBE).

The results of the soil and groundwater samples collected on the Property are displayed on the attached **Tables 1** and **3**.

No concentrations of TPH-gro, TPH-dro, BTEX, or MTBE were detected above the laboratory detection limits in the soil samples collected.

Groundwater was found to contain concentrations of TPH-dro ranging from 210 µg/L (BH-2) to 2,800 µg/L (BH-4). A concentration of TPH-gro was also found to be present in the sample collected from boring BH-1 at a concentration of 170 µg/L. It does not appear that silica gel cleanup was utilized during analysis and the elevated results may be partly due to measurements of total organics rather than total petroleum hydrocarbons. No concentrations of BTEX were detected above laboratory detection limits.

#### ODIC, 2016

ODIC performed subsurface investigation and the results were summarized in a report dated March 10, 2016. ODIC advanced eight borings on the Property. All borings were in random areas throughout the Property. Borings SB-7 and SB-8, however, were located in a close vicinity to what ODIC indicated was a possible UST.

All borings were advanced to a depth of approximately 10 feet bgs. Groundwater was indicated to have been encountered at a depth of approximately 8-9 feet bgs. Soil samples were collected from the borings at various depths for analysis for the contaminants of concern. A groundwater sample was also collected from each boring.

The soil and groundwater sample from each boring were analyzed for TPH-gro, TPH-dro, total petroleum hydrocarbons quantified as oil range organics (TPH-oro), VOC's, and metals (groundwater only).

The results of the soil and groundwater samples collected on the Property are displayed on the attached **Tables 1, 2** and **3**.

The only soil sample collected during this investigation that was found to contain the contaminants of concern above the ESL was collected from a depth of 6 feet in boring SB-6. This boring contained a concentration of TPH-oro of 10,000 mg/Kg, TPH-dro of 4,200 mg/Kg, and naphthalene of 2.1 mg/Kg. It does not appear that silica gel cleanup was utilized during analysis and the elevated results may be due partly to measurements of total organics rather than total petroleum hydrocarbons. The sample collected at a depth of 10 feet bgs in this boring did not contain any of these contaminants above their respective ESLs.

The groundwater samples collected from borings SB-4 and SB-6 were found to contain concentrations of TPH-oro ranging from 95,000-500,000 µg/L and TPH-dro ranging from 54,000-220,000 µg/L. It does not appear that silica gel cleanup was utilized during analysis and the elevated results may be due to measurements of total organics rather than total petroleum

hydrocarbons. None of the samples from the remaining borings were found to contain concentrations of TPH-oro or TPH-dro above their respective laboratory detection limit. Naphthalene was also detected at a concentration of 9.7 µg/L which was above the ESL of 0.12 µg/L. No concentrations of BTEX were detected above the laboratory detection limits.

The groundwater samples analyzed for CAM 17 metals included samples collected from borings SB-1, SB-2, and SB-4. Almost every metal was detected above their respective ESL. The samples appear not have been properly filtered prior to adding HNO<sup>3</sup> for sample preservation.

#### ERS, 2016

ERS removed a 350-gallon waste oil UST from the Property on May 23, 2016. A soil sample was collected from near the bottom of the UST and a groundwater sample was collected from a depth of approximately 6 feet. The soil sample was found to contain detectable concentrations of metals that appeared to be at concentrations that are naturally occurring. No other contaminants analyzed for VOCs, SVOCs, PCBs) were detected.

The groundwater sample contained concentrations of TPH-oro and TPH-dro of 773 and 391 µg/L, which is above the ESLs of 100 µg/L. Acetone and methyl ethyl ketone were detected at concentrations below the ESLs for drinking water.

## **2.0 REGIONAL GEOLOGY/HYDROLOGY**

The Property is in the southeastern part of the City of Alameda, in the eastern part of the San Francisco Bay Area. The San Francisco Bay Area occupies the central part of the Santa Clara Valley, a broad alluvial valley that slopes gently northward toward San Francisco Bay and is flanked by alluvial fans deposited at the foot of the Diablo Range to the east and the Santa Cruz Mountains to the west (Goldman, 1967). The upland surfaces rising abruptly approximately 2.5 miles to the northeast of the Property are known as the East Bay Hills.

Surface topography in the vicinity of the Property slopes gently to the northeast. The Property is at an elevation of approximately 15-20 feet above Mean Sea Level according to the United States Geological Survey (USGS) Oakland East Quadrangle California 7.5 Minute Series topographic map. Regionally, topography in the area of the Property slopes down to the east toward the Tidal Canal between the San Leandro Bay and Oakland Inner Harbor portion of the San Francisco Bay.

The sediments in the vicinity of the Property are fine-grained alluvial sediments that represent distal deposits of alluvial fans that were deposited by rivers draining upland surfaces to the east of the Property. These sediments were deposited in a low energy environment on the margins of San Francisco Bay (Helley, et al, 1974). At shallow depths beneath these sediments are a series of Recent-age (<10,000 years) blue clay layers that become increasingly thicker toward San Francisco Bay. These clay layers are known as the Bay Mud and were deposited in San Francisco Bay during higher stands of sea level. In the vicinity of the Property it is likely that these sediments overlie bedrock of the Jurassic-aged Franciscan Assemblage.

The subject site is located on the San Francisco Bay Plain in the northernmost part of the Santa



Clara Valley Groundwater Basin, (RWQCB, 1986), the surface of which slopes gently down toward San Francisco Bay. The regional groundwater flow follows the topography, moving from areas of higher elevation to areas of lower elevation. In this area the groundwater flow direction is inferred to be to the northeast toward the tidal channel. Based on subsurface investigations at the Property, groundwater was encountered at depths ranging from approximately 6 to 9 feet bgs.

### **3.0 SITE CONCEPTUAL MODEL**

A summary of the current site conceptual model is included on **Table 4** and the current data gaps and proposed investigation are summarized on **Table 5**.

#### **3.1 GEOLOGIC AND HYDROGEOLOGIC SETTING**

Based on soil borings drilled on the Property, the shallow sediments consist of silty sand and sandy silt to depths of approximately 10 feet (ODIC, 2016). During drilling petroleum odors were noted in Borings SB-4 and SB-6.

Shallow groundwater has been observed between approximately 6-9 feet bgs. The shallow water-bearing zone appears to be located in silty sand and sand. The base of the shallow water-bearing zone has not been determined.

#### **3.2 EXTENT OF CONTAMINATION**

The extent of contamination has not been determined.

### **4.0 WORK PLAN**

#### **4.1 SCOPE OF PROPOSED INVESTIGATION**

ERAS proposes a scope of work for this investigation as follows.

- Obtain a permit for drilling from the Alameda County Public Works Department (ACPWD).
- Clear the boring locations for the presence of utilities by notifying Underground Service Alert and employing a private underground locating/clearance service.
- Advance soil borings using a direct push sample rig
- Collect groundwater samples from each boring for laboratory analysis.
- Prepare a report detailing the field procedures and results of the investigation.

## **4.2 FIELD WORK COORDINATION**

ERAS will procure a drilling permit from the ACPWD prior to drilling activities.

The boring locations will be marked with paint and Underground Service Alert notified at least 48 hours in advance to give owners of underground utilities an opportunity to mark their lines. Prior to drilling, each boring location will be cleared using a private underground utility locator.

## **4.3 BORING LOCATIONS AND SAMPLING**

The locations of the proposed borings are shown on **Figure 2**. The Standard Operating Procedures for direct-push sampling is included in **Appendix A**.

Seven borings will be advanced using a direct push sample rig to a maximum of approximately 12 feet in an attempt to vertically and horizontally delineate the extent of the contamination. These borings will be continuously logged by a field geologist.

Soil and groundwater samples will be collected from each boring. The soil and groundwater samples will be kept chilled pending transport under chain-of-custody procedures to a California certified environmental analytical laboratory.

A selected soil sample from each boring from the interval of 0-5 feet bgs will be analyzed for TPH-gro and BTEX.

The groundwater samples will be analyzed for the presence of TPH-dro, TPH-oro and VOCs. In addition, the proposed borings located near previous borings BH-1 and SB-4 and near the corner of Santa Clara and Everett will be analyzed for TPH-gro and BTEX.

## **4.4 FIELD AND REPORT SCHEDULE**

The field work will be scheduled as soon as possible following approval of this work plan by the ACEHD. A report will be submitted within 30 working days of the completion of field activities.

## **5.0 REFERENCES**

AEI, Soil and Groundwater Investigation, 2477 Santa Clara Avenue, Alameda, California, October 22, 1996.

California Regional Water Quality Control Board, Water Quality Control Plan, San Francisco Bay Basin Region (2), December 1986.

Environmental Restoration Services, Underground Tank Technical Closure Report, 2449 Santa Clara Street, Alameda, California, May 23, 2016.

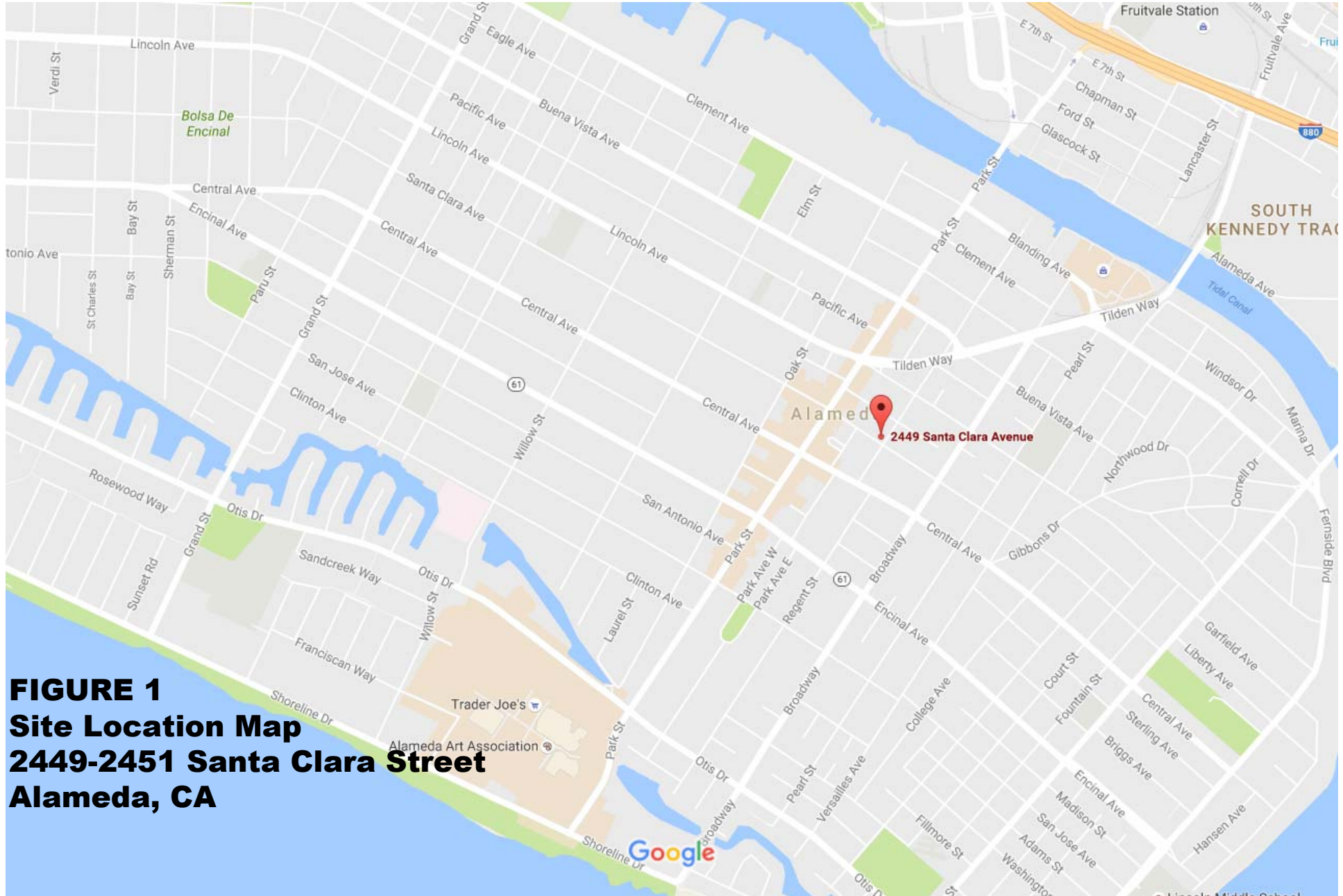
Goldman, Harold B., Geology of Burlingame Bay prepared for Burlingame Bay Conservation and Development Commission, February 1967.

ODIC Environmental Inc., Phase II Environmental Site Assessment, 2449-2451 Santa Clara Avenue, Alameda, California, March 10, 2016.

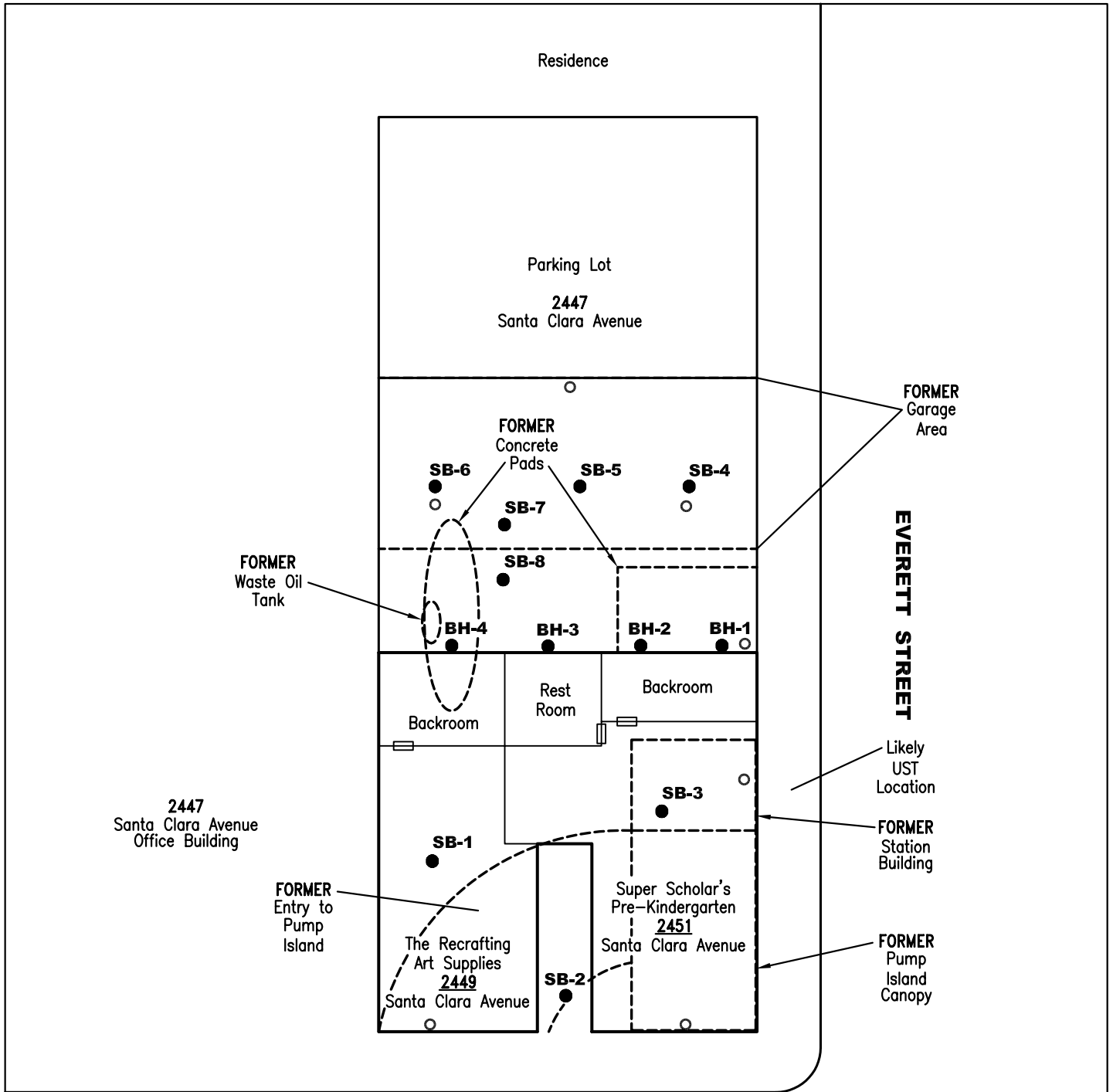
ODIC Environmental Inc., Phase I Environmental Site Assessment, 2449-2451 Santa Clara Avenue, Alameda, California, January 6, 2016.

## **FIGURES AND TABLES**

Google Maps 2449 Santa Clara Ave



**FIGURE 1**  
**Site Location Map**  
**2449-2451 Santa Clara Street**  
**Alameda, CA**



**EXPLANATION**

- Soil boring
- Proposed borings

**SITE PLAN w/PROPOSED BORINGS**

DATE  
06/2016  
REVIEWED BY  
AS/DS

2449-2451 Santa Clara Avenue  
Alameda, California

JOB NUMBER  
16080  
FIGURE  
2

**ERAS Environmental Inc.**

**TABLE 1 - HISTORIC GROUNDWATER ANALYTICAL RESULTS**

2449 Santa Clara Street, Alameda

Boring	Date	TPH-oro*	TPH-dro*	TPH-gro	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Other VOC's
		µg/L								
<i>AEI</i>										
BH-1	9-Oct-1996	NA	<b>240</b>	<b>170</b>	<0.5	0.64	<0.5	<0.5	<5.0	NA
BH-2	9-Oct-1996	NA	<b>210</b>	<50	<0.5	<0.5	<0.5	<0.5	<5.0	NA
BH-3	9-Oct-1996	NA	<b>660</b>	<50	<0.5	<0.5	<0.5	<0.5	<5.0	NA
BH-4	9-Oct-1996	NA	<b>2,800</b>	<50	<0.5	<0.5	<0.5	<0.5	<5.0	NA
<i>ODIC</i>										
SB-1	12-Feb-2016	<280	<47	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
SB-2	12-Feb-2016	<280	<47	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
SB-3	12-Feb-2016	NS	NS	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
SB-4	12-Feb-2016	<b>95,000</b>	<b>54,000</b>	140	<0.5	<0.5	<0.5	<0.5	<0.5	ND
SB-5	12-Feb-2016	<280	48	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
SB-6	12-Feb-2016	<b>500,000</b>	<b>220,000</b>	880	<0.5	<0.5	<0.5	<0.5	<0.5	<b>Napth</b>
SB-7	12-Feb-2016	NS	NS	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
SB-8	12-Feb-2016	<280	<47	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
<i>ERS</i>										
TNK-GW	23-May-16	773	391	<25	<0.2	0.25	<0.2	0.84	<0.2	Acetone
										MEK
ESL-DW		100	100	100	1	40	13	20	5	

Notes:

ESL – environmental screening limits set forth by the California Regional Water Quality Control Board as of February 2016 for commercial/industrial.

DW – drinking water

\* - Analyzed without silica gel clean-up unknown

Napth - a concentration of 9.7 µg/L was detected which exceeded the ESL of 0.12 µg/L

Acetone - a concentration of 38.6 µg/L was detected which was below the ESL of 1,500 µg/L

MEK - a concentration of 5 µg/L was detected which was below the ESL of 5,600 µg/L

MEK - Methyl ethyl ketone

NS - No Sample

NA - Not Analyzed

**TABLE 2 - HISTORIC METALS IN GROUNDWATER ANALYTICAL RESULTS**

2449 Santa Clara Street, Alameda

Boring	Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
		µg/L																
SB-1	12-Feb-2016	<b>210</b>	<b>96</b>	<b>7,500</b>	<b>26</b>	<b>57</b>	<b>3,800</b>	<b>650</b>	<b>680</b>	<b>280</b>	<b>0.73</b>	<25	<b>4,400</b>	<b>&lt;50</b>	<b>&lt;25</b>	<b>&lt;50</b>	<b>2,300</b>	<b>2,600</b>
SB-2	12-Feb-2016	<b>140</b>	<b>160</b>	<b>5,400</b>	<b>17</b>	<b>&lt;25</b>	<b>2,800</b>	<b>490</b>	<b>550</b>	<b>360</b>	<b>1.1</b>	<25	<b>3,100</b>	<b>&lt;50</b>	<b>&lt;25</b>	<b>&lt;50</b>	<b>1,700</b>	<b>1,800</b>
SB-4	12-Feb-2016	<b>95</b>	<b>88</b>	<b>3,400</b>	<b>&lt;10</b>	<b>&lt;25</b>	<b>1,900</b>	<b>310</b>	<b>410</b>	<b>130</b>	<b>0.51</b>	70	<b>2,000</b>	<b>&lt;50</b>	<b>&lt;25</b>	<b>&lt;50</b>	<b>1,200</b>	<b>1,200</b>
ESL-DW		6.0	10	1,000	2.7	0.25	50	3.0	3.1	2.5	0.051	100	8.2	5	0.19	2	19	81

Notes:  
 ESL – environmental screening limits set forth by the California Regional Water Quality Control Board as of February 2016 for commercial/industrial.  
 DW – drinking water



**TABLE 3 - HISTORIC SOIL ANALYTICAL RESULTS**

2449 Santa Clara Street, Alameda

Boring	Date	TPH-oro*	TPH-dro*	TPH-gro	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Other VOC's
		mg/Kg								
<i>AEI</i>										
BH-1@10'	9-Oct-1996	NA	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	NA
BH-2@5'	9-Oct-1996	NA	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	NA
BH-3@5'	9-Oct-1996	NA	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	NA
BH-4@5'	9-Oct-1996	NA	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	NA
<i>ODIC</i>										
SB-1@9'	12-Feb-2016	<5.0	<1.0	<0.97	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	ND
SB-2@9'	12-Feb-2016	<5.0	<1.0	<0.97	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	ND
SB-3@9'	12-Feb-2016	<5.0	<1.0	<1.0	<0.0046	<0.0046	<0.0046	<0.0046	<0.0046	ND
SB-4@10'	12-Feb-2016	<5.0	2.8	<1.0	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	ND
SB-5@10'	12-Feb-2016	<5.0	<0.99	<1.0	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	ND
SB-6@6'	12-Feb-2016	<b>10,000</b>	<b>4,200</b>	660	<0.0046	<0.0046	<0.0046	<0.0046	<0.0046	<b>Naph</b>
SB-6@10'	12-Feb-2016	16	6.7	<0.97	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	ND
SB-7@5'	12-Feb-2016	<5.0	1.1	<0.97	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	ND
SB-7@10'	12-Feb-2016	<5.0	<1.0	<1.0	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	ND
SB-8@5'	12-Feb-2016	<5.0	1.5	<1.0	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	ND
SB-8@10'	12-Feb-2016	<5.0	1.6	<0.98	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	ND
ESL-DW										

Notes:

ESL – environmental screening limits set forth by the California Regional Water Quality Control Board as of February 2016 for commercial/industrial.

DW – drinking water

\* - Analyzed without silica gel clean-up unknown

Naph - a concentration of 2.1 mg/Kg was detected which exceeded the ESL of 0.023 mg/Kg

ND - Below Laboratory Detection Limits

NA - Not Analyzed

**TABLE 4 - SITE CONCEPTUAL MODEL**  
**2449-2451 Santa Clara Street, Alameda**

CSM Element	CSM Sub-Element	Description	Potential Data Gap(s)
Geology and Hydrogeology	Regional	<p>The Property is in the southeastern part of the City of Alameda, in the eastern part of the San Francisco Bay Area. The San Francisco Bay Area occupies the central part of the Santa Clara Valley, a broad alluvial valley that slopes gently northward toward San Francisco Bay and is flanked by alluvial fans deposited at the foot of the Diablo Range to the east and the Santa Cruz Mountains to the west (Goldman, 1967). The upland surfaces rising abruptly approximately 2.5 miles to the northeast of the Property are known as the East Bay Hills.</p> <p>Surface topography in the vicinity of the Property slopes gently to the northeast. The Property is at an elevation of approximately 15-20 feet above Mean Sea Level according to the United States Geological Survey (USGS) Oakland East Quadrangle California 7.5 Minute Series topographic map. Regionally, topography in the area of the Property slopes down to the east toward the Tidal Canal between the San Leandro Bay and Oakland Inner Harbor portion of the San Francisco Bay.</p> <p>The sediments in the vicinity of the Property are fine-grained alluvial sediments that represent distal deposits of alluvial fans that were deposited by rivers draining upland surfaces to the east of the Property. These sediments were deposited in a low energy environment on the margins of San Francisco Bay (Helley, et al, 1974). At shallow depths beneath these sediments are a series of Recent-age (&lt;10,000 years) blue clay layers that become increasingly thicker toward San Francisco Bay. These clay layers are known as the Bay Mud and were deposited in San Francisco Bay during higher stands of sea level. In the vicinity of the Property it is likely that these</p>	None
	Site	<p><b>Geology:</b> Based on lithologic logs prepared from borings on the Property the subsurface lithology consists of silty clay underlain by the water bearing zone which consisted of silty sand and sand.</p>	None
		<p><b>Hydrogeology:</b> Groundwater at the Property is found in silty sand at depths of approximately 6-9 feet bgs.</p>	None
Surface Water Bodies	--	The closest surface water body is the Oakland Inner Harbor, a portion of San Francisco Bay which was located approximately 1/2 of a mile to the northeast of the Property.	None
Nearby Wells	--	A well survey has not been conducted but has been requested from Alameda County and State of California	Yes
CSM Element	CSM Sub-Element	Description	Potential Data Gap(s)
Constituents of Concern	--	<p>Constituents of concern have been identified by comparing analytical results to ESLs for commercial land use and for groundwater that is considered a current or potential drinking water source. Constituents of concern that have been identified include petroleum hydrocarbons quantified as diesel and oil range organics (TPH-dro, and TPH-oro) and naphthalene. The results of investigations completed indicate elevated concentrations of petroleum hydrocarbons in groundwater in the area of the former waste oil UST.</p>	None
Potential Sources	On-site	The Property formerly contained four USTs for gasoline and one UST for waste oil	None
		There is no record of the removal of the fuel USTs. The waste oil UST was removed on May 23, 2016	None
CSM Element	CSM Sub-Element	Description	Potential Data Gap(s)
Nature and Extent of Environmental Impacts	Extent in Soil, TPH-dro	Concentrations of TPH-dro above the commercial ESL for areas where groundwater is considered a potential source of drinking water was detected in the soil samples collected from boring SB-6 and from under the waste oil tank. Detected concentrations ranged from 2.5 to 4,200 mg/Kg.	The full extent of the contamination has not been determined
	Extent in Soil, TOG/TRPH	Concentrations of TPH-oro above the commercial ESL for areas where groundwater is considered a potential source of drinking water was detected in the soil samples collected from boring SB-6 and from under the waste oil tank. Detected concentrations ranged from 3.4 to 10,000 mg/Kg.	The full extent of the contamination has not been determined
	Extent in Soil, VOCs	The only VOC detected were naphthalene in SB-6 at a concentration of 2.1 mg/Kg.	The full extent of the contamination has not been determined
	Extent in Soil, SVOCs	No SVOCs were detected in soil under the waste oil tank.	None
			The full extent of the contamination has not been determined

**TABLE 4 - SITE CONCEPTUAL MODEL**  
**2449-2451 Santa Clara Street, Alameda**

	Extent in Soil, Metals	Metals detected to be present on the Property have included cadmium, chromium, lead, nickel, and zinc. None of the concentrations detected were found to be above the ESL for commercial areas where groundwater is considered a potential source of drinking water	The full extent of the contamination has not been determined
Nature and Extent of Environmental Impacts	Extent in Groundwater, TPH-dro	Concentrations of TPH-dro above the commercial ESL for areas where groundwater is considered a potential source of drinking water have been detected in groundwater samples collected from borings B-2 and B-3. Detected concentrations ranged from 210 to 220,000 µg/L.	The full extent of the contamination has not been determined
	Extent in Groundwater, TOG/TRPH	Concentrations of TPH-oro above the commercial ESL for areas where groundwater is considered a potential source of drinking water have been detected in groundwater samples collected from borings B-2 and B-3. Concentrations ranged from 95,000 to 500,000 µg/L.	The full extent of the contamination has not been determined
	Extent in Groundwater, VOCs	The only VOCs detected were naphthalene in SB-6 at a concentration of 9.7 µg/L, acetone and methyl ethyl ketone near BH-4 at concentrations of 38.6 and 5 µg/L, respectively.	The full extent of the contamination has not been determined
	Extent in Groundwater, SVOCs	No SVOCs were detected in groundwater under the waste oil tank	None
Nature and Extent of Environmental Impacts		The extent of contamination in groundwater is unknown.	The full extent of the contamination has not been determined
Migration Pathways	Potential Conduits	The locations of on-site utilities, including sanitary sewer laterals, water, gas, and electrical lines are unknown.	The locations of onsite utilities has not been determined
Potential Receptors/Risk	On-site	Potable water at the site currently is provided via municipal supply and will continue to be in the foreseeable future. As such, direct contact to groundwater is not contemplated.	Based on evaluation of the data relative to ESLs, it is likely that some risk for longer- term site
Potential Receptors/Risk	Off-site	A well survey has not been conducted.	A well survey has not been completed

Notes

AEI, Soil and Groundwater Investigation, 2477 Santa Clara Avenue, Alameda, California, October 22, 1996.

ODIC Environmental Inc., Phase II Environmental Site Assessment, 2449-2451 Santa Clara Avenue, Alameda, California, March 10, 2016.

Environmental Restoration Services, Underground Tank Technical Closure Report, 2449 Santa Clara Street, Alameda, California, May 23, 2016

Abbreviations

bgs = below ground surface

VOCs = volatile organic compounds

SVOCs = semi volatile organic compounds

TPH-dro = total petroleum hydrocarbons quantified as diesel range organics

TOG = total oil and grease

TRPH = total residual petroleum hydrocarbons

µg/L = micrograms per liter

## TABLE 5 - DATA GAPS AND PROPOSED INVESTIGATION

2449-2451 Santa Clara Street, Alameda

Item	Data Gap	Proposed Investigation	Rational	Analysis
1	The full extent of the contamination associated with the former USTs has not been determined	<p>Advance seven borings using a direct push sample rig to about 12 feet bgs in the areas that were found to contain groundwater contamination and in the likely area of the former USTs in an attempt to vertically and laterally delineate the extent of the contamination. These borings will be continuously logged.</p> <p>Soil and groundwater samples will be collected from each boring.</p> <p>The soil and groundwater samples will be kept chilled pending transport under chain-of-custody procedures to a California certified environmental analytical laboratory.</p>	Vertically and horizontally delineate the extent of the contamination associated with the former USTs.	The soil and groundwater samples will be analyzed for the presence of TPH-dro, TPH-oro and VOCs.

Abbreviations

bgs = below ground surface

TPH-dro = total petroleum hydrocarbons quantified as diesel range organics

TPH-oro = total petroleum hydrocarbons quantified as oil range organics

SVOCs = semi-volatile organic compounds

**APPENDIX A**

**Standard Operating Procedures**

## **STANDARD OPERATING PROCEDURE – DIRECT PUSH BORINGS**

### **SOIL CORING AND SAMPLING PROCEDURES**

Prior to drilling, all boreholes will be hand dug to a depth of 4-5 feet below ground surface (bgs) to check for underground utilities.

Soil and groundwater samples are collected for lithologic and chemical analyses using a direct driven soil coring system. A hydraulic hammer drives sampling rods into the ground to collect continuous soil cores. As the rods are advanced, soil is driven into an approximately 2.5-inch-diameter sample barrel that is attached to the end of the rods. Soil samples are collected in sleeves inside the sample barrel as the rods are advanced. After being driven 4 to 5 feet into the ground, the rods are removed from the borehole. The sleeve containing the soil core is removed from the sample barrel, and can then be preserved for chemical analyses, or used for lithologic description. This process is repeated until the desired depth or instrument refusal is reached.

A soil core interval selected for analyses is cut from the sleeve using a pre-cleaned hacksaw. The ends of the tube are covered with aluminum foil or Teflon liner and sealed with plastic caps. The soil-filled liner is labeled with the bore number, sample depth, site location, date, and time. The samples are placed in bags and stored in a cooler containing ice. Soil from the core adjacent to the interval selected for analyses is placed in a plastic zip-top bag. The soil is allowed to volatilize for a period of time, depending on the ambient temperature. The soil is scanned with a flame-ionization detector (FID) or photo-ionization detector (PID).

All sample barrels, rods, and tools (e.g. hacksaw) are cleaned with Alconox or equivalent detergent and de-ionized water. All rinsate from the cleaning is contained in 55-gallon drums at the project site.

### **GROUNDWATER SAMPLING FROM DIRECT PUSH BORINGS**

After the targeted water-bearing zone has been penetrated, the soil-sample barrel is removed from the borehole. Small-diameter well casing with 0.010-inch slotted well screen may be installed in the borehole to facilitate the collection of groundwater samples. Threaded sections of PVC are lowered into the borehole. Groundwater samples may then be collected with a bailer, peristaltic pump, submersible or other appropriate pump until adequate sample volume is obtained. Peristaltic pumps are not used in applications requiring a lift of greater than 1 foot of net head.

Groundwater samples are preserved, stored in an ice-filled cooler, and are delivered, under chain-of-custody, to a laboratory certified by the California Department of Health Services (DHS) for hazardous materials analysis.

### **BOREHOLE GROUTING FOR DIRECT PUSH BORINGS**

Upon completion of soil and water sampling, boreholes will be abandoned with neat cement grout to the surface. If the borehole was advanced into groundwater, the grout is pumped through a grouting tube positioned at the bottom of the borehole.