aqua science engineers inc.

ENVIRONMENTAL PROTECTION

99 NOV 15 PM 4:28

November 11, 1999

11/17/99. - Work plan acceptable
- Was HP done up gradient to determine if there is also a regional problem.

WORKPLAN
for
SOIL REMEDIATION
at
Former California Brake & Clutch Property
2221 Union Street
Oakland, California

Submitted by:
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(925) 820-9391

1.0 INTRODUCTION

This submittal outlines Aqua Science Engineers, Inc. (ASE's) workplan for a soil remediation project at the former California Brake & Clutch property located at 2221 Union Street in Oakland, California (Figure 1). The proposed activities have been designed to remediate the soil in the immediate area surrounding the outdoor drain (Figure 2). The goal is to achieve residual VOC concentrations in soil below the Oakland RBCA cleanup goals for vapor intrusion from subsurface soil to an indoor air scenario.

2.0 SITE HISTORY

The site is currently vacant and for sale by a Trustee of the property. The site houses two buildings, a concrete-surfaced yard and a dirt lot. Most recently, the site was the home of California Brake and Clutch. A recent Phase I Environmental Site Assessment prepared for the site identified a surface water drain located in the exterior yard area (Figure 2). The Phase I suggested drilling a soil boring near the drain for the collection of soil samples.

2.1 Hand Auger Drilling

On June 22, 1999, ASE removed the dirt and debris from the bottom of the drain, cored through the concrete bottom of the drain, and using a hand auger, drilled soil boring BH-A to a depth of 3-feet below the bottom of the drain (Figure 2). Soil samples BH-A @ 1' and BH-A @ 3' were collected from the boring. Soil sample BH-A @ 1' was analyzed by Chromalab, Inc. of Pleasanton, California (ELAP #1094) for total petroleum hydrocarbons as gasoline (TPH-G) and diesel (TPH-D) by EPA Method 8015M, benzene, toluene, ethylbenzene, and total xylenes (collectively known as BTEX) by EPA Method 8020, methyl tertiary butyl ether (MTBE) by EPA Method 8020, oil and grease by Standard Method 5520E, halogenated volatile organic compounds (HVOCs) by EPA Method 8010, and the LUFT five metals by EPA Method 6010. The only compound identified in the soil above action levels was tetrachloroethene (PCE) at 390 parts per million (ppm). Soil sample BH-A @ 3' was placed on hold at the laboratory. It was not subsequently analyzed because it was saturated, and had the same appearance and odor as the 1' sample.

2.2 Geoprobe Assessment

On July 12, 1999, ASE drilled six (6) soil borings at the site using a Geoprobe in an effort to delineate the extent of VOCs in soil and groundwater. Four of the borings were placed near the outdoor drain. Two of the borings were drilled inside one of the buildings at the location of two former parts cleaning bins that used methyl-ethyl-ketone (MEK) as a cleaning solvent (Figure 2). Detectable concentrations of PCE, up to 53 parts per billion (ppb), were identified in soil samples collected from borings BH-B and BH-C, near the former outdoor drain. Up to 230 ppb trichloroethene (TCE) and 17 ppb cis-1,2-dichloroethene (cis-1,2-DCE) were identified in soil samples collected from boring BH-C. None of the samples collected from the remaining soil borings contained detectable concentrations of any of the VOCs analyzed.

Grab water samples were collected from all seven of the borings. Detectable concentrations of VOCs were identified in all water samples except from borehole BH-G. Water samples from borehole BH-A had the most significant concentrations: 1,300 ppb PCE, 1,500 ppb TCE, and 190 ppb cis-1,2-DCE. The remaining compounds and concentrations were as follows: 42 ppb PCE in borehole BH-E; 170 ppb TCE in borehole BH-B; 130 ppb cis-1,2-DCE in borehole BH-B; 21 ppb trans-1,2-DCE in borehole BH-B; and 11 ppb 1,1-DCE in borehole BH-F. For complete details regarding the Geoprobe assessment activities, see the ASE report dated July 28, 1999.

2.3 Oil/Water Separator Identification

An unidentified underground pipe was noted exiting the outdoor drain. A request was made by Ms. Eva Chu of the Alameda County Health Care Services Agency (ACHCSA) to identify the endpoint of this pipe. On August 13, 1999, ASE subcontracted Subtronic Corporation to identify the pipe's path underground. An oil/water separator was identified approximately 15-feet northwest of the outdoor drain. The separator measured 4-feet square and approximately 3-feet deep. The underground piping connected the two units. An exit pipe was noted leaving the separator to the west and exiting the property underground, likely into a storm sewer pipe.

2.4 August 1999 Soil Borings and Well Installation

On August 27, 1999, Gregg Drilling of Martinez, California, drilled soil borings MW-1, MW-2, and MW-3 at the site using a Rhino drill rig equipped with 8-inch diameter hollow-stem augers (Figure 3). Groundwater monitoring wells MW-1, MW-2, and MW-3 were subsequently constructed in their respective borings.

The soil sample collected from soil boring MW-1 contained 53 ppb TCE and 180 ppb PCE. The soil sample collected from soil boring MW-2 contained 31 ppb PCE. The soil sample collected from soil boring MW-3 contained no HVOCs above the laboratory reporting limits.

The groundwater sample collected from monitoring well MW-1 contained 3.9 ppb cis-1,2-DCE, 58 ppb 1,1-DCA, 3.2 ppb TCE and 9.9 ppb PCE. The groundwater sample collected from monitoring well MW-2 contained 1.7 ppb cis-1,2-DCE, 4.5 ppb TCE and 48 ppb PCE. The groundwater sample collected from monitoring well MW-3 contained 34 ppb cis-1,2-DCE, 22 ppb 1,2-DCA, 21 ppb TCE and 38 ppb PCE. There were no other HVOCs detected in any of the groundwater samples analyzed above the laboratory reporting limits.

2.5 October 1999 Soil Boring and Well Installation

Using the three monitoring wells described in Section 2.4 above, the groundwater flow direction was measured and found to have a flow component toward the west. Because there was no monitoring well installed west of the outdoor drain, a fourth well was required. On October 27, 1999, ASE installed groundwater monitoring well MW-4 at the site in the location depicted on Figure 3. Soil and groundwater samples collected during this assessment were analyzed for VOCs by EPA Method 8010. The soil sample collected from boring MW-4 contained non-detectable concentrations of all the VOCs analyzed. The groundwater sample collected from monitoring well MW-4 contained 0.68 ppb PCE, 0.74 ppb TCE, 14 ppb 1,1-DCA, and 21 ppb cis-1,2-DCE 2.7 ppb 1,1-DCE, 2.1 ppb 1,2-DCA, 12 ppb chloroethane and 6.4 ppb vinyl chloride. The report detailing the installation and sampling of monitoring well MW-4 is currently not completed.

As detailed in Tables One and Two, within the Tables Section of this workplan, only the soil sample collected from borehole BH-A, directly beneath the outdoor drain, contains VOC concentrations above the City of Oakland RBCA cleanup goals for vapor intrusion for subsurface soil to an

indoor air scenario for commercial/industrial usage. None of the water samples collected to date, either from the boreholes or monitoring wells, contain VOC concentrations above the Oakland RBCA cleanup goal for vapor intrusion from groundwater to an indoor air scenario. The afore-mentioned groundwater cleanup goals have been recalculated for groundwater at 6-feet below ground surface.

3.0 PROPOSED SCOPE OF WORK (SOW)

On October 18, 1999, a meeting was held at the office of Ms. Eva Chu of the ACHCSA. This meeting was attended by the Trustee of the property, the potential buyer of the property and his realtor, and ASE. It was explained to Ms. Chu that due to the impending property transfer, rapid case closure would be necessary. As detailed on Tables One and Two, only the soil surrounding the outdoor drain contains VOCs above the Oakland RBCA cleanup goals for vapor intrusion from subsurface soil to an indoor air scenario. None of the groundwater samples collected to date from any of the seven soil borings or four monitoring wells contained any VOC above the Oakland RBCA cleanup goals for vapor intrusion from groundwater to an indoor air scenario. Therefore, ASE has prepared the following scope of work to remediate the soil in the immediate area surrounding the outdoor drain. The goal is to achieve residual VOC concentrations in soil below the Oakland RBCA cleanup goals for vapor intrusion from subsurface soil to an indoor air scenario.

ASE's specific scope of work is to:

1) Prepare a site-specific health and safety plan and notify Underground Service Alert to have all known public utility lines marked.

2) Sawcut the cement surface in the area to be excavated (Figure 4). Dispose of the concrete at a local recycler.

3) Excavate the soil in the immediate area around and beneath the drain. ASE estimates an excavation size of approximately 10-feet by 10-feet by 6-feet deep. The depth of the excavation will depend on the depth to groundwater within the excavation.

4) Spread the excavated soil on plastic adjacent to the excavation. The stockpile will be covered when unattended.

5) Collect up to six (6) soil samples from within the excavation after soil removal activities are completed. The locations of these samples will most likely be at the bottom/sidewall interface along the perimeter of the excavation.

6) Collect one composite soil sample from the stockpiled soil.

7) Analyze the excavation and stockpile soil samples for VOCs by EPA Method 8010. Analytical results will be available in 48-hours.

8) Backfill and compact the excavation immediately with imported material.

9) Resurface the excavation with concrete, and replace the drain to allow for drainage of the yard.

10) Use the stockpiled soil analytical results, and the analytical results from boring BH-A, to profile the material into a disposal facility.

11) Prepare a report detailing the methods and findings of the project.

TASK 1 - PREPARE A HEALTH AND SAFETY PLAN AND NOTIFY USA

Based on the site history and the analytical results of the soil and groundwater samples collected during the previous assessment at the site, ASE has prepared a site-specific health and safety plan. A nearby hospital is designated in the site safety plan as the emergency medical facility of first choice. A copy of the site specific Health and Safety Plan will be present at the site at all times. ASE will also notify Underground Service Alert (USA) to have underground utility lines marked in the site vicinity.

TASKS 2, 3 & 4 - EXCAVATE AND STOCKPILE CONTAMINATED SOIL

Using a backhoe, the concrete surface and drain above the contaminated soil will be removed and hauled to a local recycler. Contaminated soil will be removed from the excavation and stockpiled on top of and covered with plastic sheeting. Excavation activities will continue to a depth equal to the capillary fringe, estimated at approximately 5 to 6 feet below ground surface. ASE estimates the size of the excavated area to be 10-feet by 10-feet by 6-feet deep. An organic vapor meter (OVM) will be utilized to determine when all the contaminated soil has been removed.

TASKS 5 & 6 - COLLECT CONFIRMATION SOIL SAMPLES

When excavation activities are completed, ASE will collect confirmation soil samples from within the excavation. Confirmation soil samples will be collected either from (a) the bottom of the excavation, or (b) from the excavation sidewalls near the excavation bottom. These soil samples will be collected using the backhoe bucket. The stockpiled soil sample will be a composite of four locations from within the stockpiled soil. The samples will be collected in brass tubes. Each sample will be immediately trimmed, sealed with Teflon tape and plastic caps, secured with duct tape, labeled with the site location, sample designation, date and time the sample was collected, and the initials of the person collecting the sample. The samples will be placed into an ice chest containing wet ice for delivery under chain of custody to a CAL-EPA certified analytical laboratory.

TASK 7 - ANALYZE AT THE SOIL SAMPLES

Each soil sample described above will be analyzed at a CAL-EPA certified environmental laboratory for VOCs by EPA Method 8010.

TASKS 8 & 9 - BACKFILL AND RESURFACE THE EXCAVATION

The excavation will be backfilled with base rock and compacted to 6-inches below grade. The excavation will be resurfaced with concrete to match the existing surfaces. The removed drain will be reinstalled using new piping and a new box.

TASK 10 - PROFILE THE CONTAMINATED SOIL

The analytical results of the stockpiled soil, along with the results from boring BH-A, will be used to profile the soil into a local landfill facility for disposal.

TASK 11 - PREPARE A REMEDIATION COMPLETION REPORT

ASE will prepare a report upon completion of the field activities that details the effectiveness of the remediation activities.

4.0 SCHEDULE

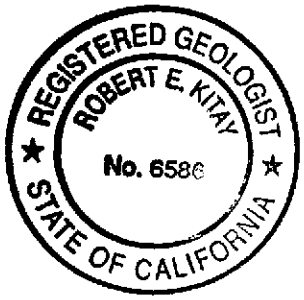
The property is currently in the process of being sold. Due to the impending property transfer, ASE has been asked to perform this work as quickly as possible. Excavation activities are tentatively scheduled for November 18, 1999.

We appreciate your time and effort in approving this workplan in such a short time. Should you have any questions or comments, please call us at (925) 820-9391.

Respectfully submitted,

AQUA SCIENCE ENGINEERS, INC.

David Allen, R.E.A.
Senior Project Manager



Robert E. Kitay, R.G., R.E.A.
Senior Geologist

Copies to: Ms. Eva Chu, ACHCSA
Mr. John Kendall, Trustee
Ms. Anne Bruff, Wells & Bennett Realtors

TABLE ONE

Summary of Chemical Analysis of **Soil Samples**

Volatile Organic Compounds

All results are in **parts per billion**

SAMPLE NAME	DATE COLLECTED	PCE	TCE	CIS-1,2-DCE	1,1-DCA	REMAINING VOCs
GEOPROBES						
BH-A, 1.0'	6/22/99	**390,000**	< 11,000	< 11,000	< 11,000	< 11,000 - < 22,000
BH-B, 2.5'	7/12/99	53	< 5	< 5	< 5	< 5 - < 10
BH-C, 2.5'	7/12/99	41	230	17	< 5	< 5 - < 25
BH-D, 2.5'	7/12/99	< 5	< 5	< 5	< 5	< 5 - < 10
BH-E, 2.5'	7/12/99	< 5	< 5	< 5	< 5	< 5 - < 10
BH-F, 2.5'	7/12/99	< 5	< 5	< 5	< 5	< 5 - < 10
BH-G, 2.5'	7/12/99	< 5	< 5	< 5	< 5	< 5 - < 10
MONITORING WELLS						
MW-1, 5.0'	8/27/99	180	18	< 5	< 5	< 5 - < 10
MW-2, 2.5'	8/27/99	31	< 5	< 5	< 5	< 5 - < 10
MW-3, 2.5'	8/27/99	< 5	< 5	< 5	< 5	< 5 - < 10
MW-4, 4.5'	10/27/99	< 5	< 5	< 5	< 5	< 5 - < 10
OAKLAND RBCA		92,000	330,000	840,000	280,000	VARIES

NOTES:

Concentrations that exceed the Oakland RBCA for and Indoor Air Scenario are **BOLD**.

Non-detectable concentrations are noted by the less than sign (<) followed by the laboratory detection limit.

Oakland Risk Based Corrective Action (RBCA) cleanup goal for vapor intrusion from subsurface soil to an INDOOR AIR Scenario.

TABLE TWO

Summary of Chemical Analysis of Water Samples

Volatile Organic Compounds

All results are in parts per billion

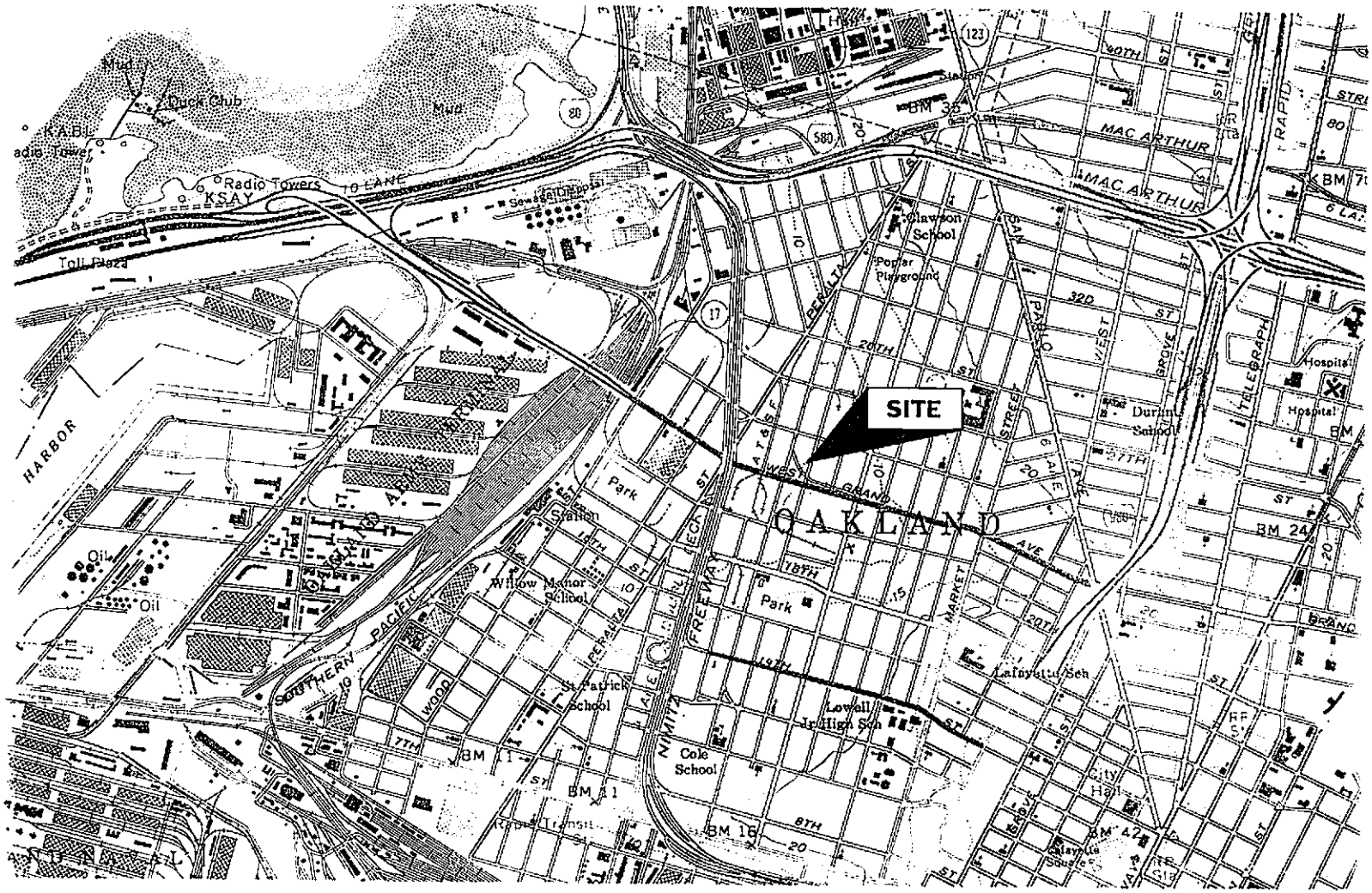
SAMPLE NAME	DATE	PCE	TCE	CIS 1,2-DCE	TRANS 1,2-DCE	1,1-DCA	1,1-DCE	1,2-DCA	CHLORO-ETHANE	VC	REMAINING VOCs
GEOPROBES											
BH-A, WATER	7/12/99	1300	1500	190	< 25	< 25	< 25	< 25	< 25	< 25	< 25 - < 250
BH-B, WATER	7/12/99	33	170	130	21	< 5	< 5	< 5	< 5	< 5	< 5 - < 30
BH-C, WATER	7/12/99	35	21	< 12	< 12	< 12	< 12	< 12	< 12	< 12	< 12
BH-D, WATER	7/12/99	< 0.5	< 0.5	11	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5 - < 5
BH-E, WATER	7/12/99	42	33	46	< 25	< 25	< 25	< 25	< 25	< 25	< 25 - < 250
BH-F, WATER	7/12/99	9.2	6.4	8.8	< 0.5	11	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5 - < 5
BH-G, WATER	7/12/99	< 5	< 5	< 5	< 5	< 5	< 5	< 12	< 5	< 5	< 5
MONITORING WELLS											
MW-1	9/2/99	9.9	3.2	3.9	< 1	58	< 1	< 1	< 1	< 1	< 1 - < 10
MW-2	9/2/99	48	4.5	1.7	< 1	< 1	< 1	< 1	< 1	< 1	< 1 - < 10
MW-3	9/2/99	38	21	34	< 0.5	22	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5 - < 5
MW-1	11/2/99	100	15	17	3.4	1.7	< 1	< 1	< 1	< 1	< 1 - < 10
MW-2	11/2/99	110	9.5	1.4	< 1	< 1	< 1	< 1	< 1	< 1	< 1 - < 10
MW-3	11/2/99	59	21	35	< 0.5	22	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5 - < 5
MW-4	11/2/99	0.68	0.74	21	< 0.5	14	2.7	2.1	12	6.3	< 0.5 - < 5
OAKLAND RBCA		200,000	460,000	2,100,000	3,000,000	940,000	16,000	170,000	NA	4,400	VARIES

NOTES:

Non-detectable concentrations are noted by the less than sign (<) followed by the laboratory detection limit.

The Oakland risk based corrective action (RBCA) number is the cleanup goal for vapor intrusion from groundwater to an INDOOR AIR Scenario modified for groundwater at depths of 6-feet below ground surface.

PCE is Tetrachloroethene
TCE is Trichloroethene
DCE is Dichloroethene
DCA is Dichloroethane
VC is Vinyl Chloride



NORTH

LOCATION MAP

2221 Union Street
Oakland, California

AQUA SCIENCE ENGINEERS, INC. | Figure 1

NEIGHBORING PROPERTY

FENCED-IN,
DIRT SURFACE
YARD

FENCE

OIL / WATER SEPARATOR

BH-B

OUTDOOR DRAIN

BH-C

BH-G

BH-A

BUILDING

SIDEWALK

FENCE

BH-D

MEZZANINE

BUILDING

SIDEWALK

BH-F

BH-E

PARTS CLEANING BINS

NEIGHBORING PROPERTY

UNION STREET

SIDEWALK

0 30 60 90

SCALE IN FEET

NORTH

LEGEND

BH-G ● ASE Soil Boring

SOIL BORING LOCATION MAP

2221 UNION STREET
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS, INC. | FIGURE 2

NEIGHBORING PROPERTY

FENCED-IN,
DIRT SURFACE
YARD

FENCE

OIL / WATER SEPARATOR

MW-1

OUTDOOR DRAIN

MW-2

MW-4

BUILDING

SIDEWALK

UNION STREET

FENCE

SIDEWALK

MEZZANINE

BUILDING

VW-3

PARTS CLEANING BINS

NEIGHBORING PROPERTY

SIDEWALK

0 30 60 90

SCALE IN FEET

NORTH

LEGEND

MW-4 ASE Monitoring Well

MONITORING WELL LOCATION MAP

2221 UNION STREET
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS, INC. | FIGURE 3

NEIGHBORING PROPERTY

FENCED-IN,
DIRT SURFACE
YARD

FENCE

OIL / WATER SEPARATOR

OUTDOOR DRAIN

BH-A

PROPOSED
EXCAVATION
BOUNDARY

BUILDING

SIDEWALK

FENCE

MEZZANINE

BUILDING

SIDEWALK

UNION STREET

SIDEWALK

NEIGHBORING PROPERTY

0 30 60 90

SCALE IN FEET

NORTH

LEGEND

BH-A ● ASE Soil Boring

PROPOSED SOIL EXCAVATION MAP

2221 UNION STREET
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS, INC. | FIGURE 4