REVISED PHASE II INVESTIGATION WORKPLAN

(Revision 2)

2145 35TH Avenue

Oakland, California

Prepared for:

Salisbury Avenue Associates LLC

2917 MacArthur Boulevard, #A3F

Oakland, CA 94602

Prepared by:

Eagle Environmental Company (EEC)

4909 Third Street

San Francisco, CA 94124

s.malaeb@comcast.net

June 4, 2010

Table of Contents

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

This revised Phase II investigation workplan (workplan) for the former gasoline service station located at 2145 35th Avenue, Oakland, California (Figure 1), is prepared in response to the letter from Alameda County Environmental Health (ACEH) Services dated April 4, 2008 (Appendix A). In addition to the information provided in Brighton Environmental Consulting workplan (Brighton, 2007c), dated October 2007, this revised workplan addresses the technical comments listed in the ACEH letter.

2.0 BACKGROUND AND PURPOSE

Salisbury Avenue Associates LLC purchased the subject site in 2007; the site was unoccupied at the time of purchase. As part of the purchase agreement, the previous owner, Maria Campos, ordered the preparation of a Phase I Environmental Site Assessment (ESA, Brighton, 2006) and subsequently a limited environmental investigation in the vicinity of the former gasoline underground storage tanks (Brighton, 2007a). The limited environmental investigation was submitted to the City of Oakland Fire Services Agency. After review by the Fire Services Agency, oversight of the project was transferred to ACEH Services.

The purpose of this revised Phase II Investigation workplan is to assess the nature as well as the vertical and lateral extent of the contamination in the soil and groundwater at the subject site.

2.1 Phase I Site Assessment

Based on the Phase I Environmental Site Assessment (Brighton, 2006), an automobile repair and fueling station operated at the Site from the 1930s until the early 1970s (Figure 2). An iron fence and grating company used the facility between the late 1970s and approximately 1990. Interviews with a former owner of the iron fence company revealed that two 500-gallon gasoline underground storage tanks (USTs) were removed in approximately 1984; however no records of the removal could be located at the City of Oakland or Alameda County. The ESA also stated that an attempt was made in 1999 to locate and remove a waste oil UST from the site. Although a closure permit and excavation were undertaken, the UST could not be located. Inspection of the site during the Phase 1 ESA revealed the presence of an auto maintenance pit in the rear garage and a hydraulic lift (Figure 2).

The ESA also revealed that the neighboring property along 35th Avenue to the southwest might have been used as a dry cleaner between the 1950s through the 1970s.

2.2 Limited Environmental Investigation at the UST location

To facilitate the sale of the property, a limited environmental investigation was conducted at the location of the former USTs (Brighton, 2007b). The UST location was identified by the iron grating company owner and by observing patches on the concrete surface. Four borings, B1 through B4, were advanced near the edges of the former tank pit. Soil samples were collected from each boring at the bottom of the pit, as estimated by the boring logs (Figure 2). One boring was advanced to groundwater, and a grab groundwater sample was collected for analysis. Appendix B contains a copy of the boring logs from the 2007 limited investigation.

2.2.1 Soil Lithology and PID Readings

Borings drilled in the area identified as the former tank location in 2007 (Appendix B) revealed the depth of the fill material between approximately 6 to 7 feet below ground surface (bgs). The fill was mottled, very dark gray (almost black) sandy clay with some traces of gravel. It did not appear to be impacted by volatile organic compounds (VOCs) and released no discernable odor. A PID reading of 0.0 parts per million by volume (ppmv) was recorded in this material for Boring B2. A brown to grayish brown clay was logged beneath the fill, except in Boring B4 where the underlying clay was dark greenish-gray. Between 10.5 feet and 13 feet bgs, a wet, clayey to silty sand and gravel were encountered. In Borings B2, B3, and B4 this coarse-grained material extended to the bottom of the borings. In Boring B1 a sharp contrast was observed at approximately 13 feet bgs with a yellowish-brown clay that extended to 20 feet bgs, the maximum depth drilled. No odor or noticeable staining associated with petroleum contamination was associated with this clay unit (a PID reading was not taken).

PID readings in the soil ranged from 0 to greater than 10,000 ppmv. PID readings above zero were not detected in borings B2 or B3. B1 had a maximum reading of 900 ppmv for a sample collected at 9 feet bgs. B2 had a PID reading of greater than 10,000 ppmv from the sample collected at 7 feet bgs. A strong petroleum odor was noted at the depths where these elevated PID readings were recorded. There was no free product observed although the soils did exhibit a greenish tint, which may have been due to exposure to petroleum product. Groundwater was encountered between 10 and 12 feet bgs.

2.2.2 Laboratory Analytical Results

Soil samples from 9 feet bgs at Boring B1 (Figure 3 and Tables 1 and 2) contained total petroleum hydrocarbons characterized as diesel (TPHd) at 360 milligrams per kilogram (mg/kg); TPH as Stoddard Solvent (TPHss) at 1,200 mg/kg; and TPH as gasoline (TPHg) at 2,100 mg/kg. Samples from 8 feet bgs to 8.5 feet bgs from Borings B2 and B3 contained no

petroleum hydrocarbons above laboratory reporting limits, with the exception of TPHd at 1.3 mg/kg. Samples from Boring B4 contained TPHd at 160 mg/kg and TPHg at 17 mg/kg (Table 1). Among the five Leaking Underground Fuel Tank (LUFT) metals, only Nickel (Ni) was detected at a maximum concentration of 260 mg/kg, exceeding the Tier I Environmental Screening Level (ESL) of 150 mg/kg (Table 2).

The grab groundwater sample from Boring B1 contained TPHd at 69,000 microgram per liter (µg/l); TPHg at 87,000 µg/l; TPHss at 71,000 µg/l; TPHmo 1,800 µg/l; and benzene at 250 µg/l. No chlorinated VOCs were reported in the groundwater grab sample (Table 5). The five LUFT metal concentrations in the grab groundwater sample, collected from boring B1 exceeded the Tier 1 final ESLs (Table 4). The high metal concentrations in the grab groundwater sample could be attributed to the high content of suspended solids or metals, and due to unfiltering the water before the laboratory analysis.

3.0 PRELIMINARY SITE CONCEPTUAL MODEL

This Preliminary Site Conceptual Model presents a summary of the current understanding of the geologic and hydrogeologic conditions; suspected contaminant sources; analytical findings to date; potential migration pathways; and potential receptors. This understanding forms the basis for the development and rationale of the proposed investigation activities.

Since the only sampling and analysis of soil and groundwater at this site was from borings B1 through B4 (Brighton, 2007b), data gaps of analytical results to adequately define the contamination extent in soil and groundwater still exist. Further revision and update of this Site Conceptual Model will be completed in the future, after completing the site characterization.

3.1 Geology and Hydrogeology

The site is located to the west of the Oakland-Berkeley Hills on the East Bay Plain, which slopes gently to the west. The site is located near the range front, and therefore within an area characterized by relatively shallow bedrock and minimal thickness of alluvium. The site is directly situated at the lateral margin of stream channel deposits attributed to the Temescal Formation. These deposits overlie and in the vicinity of the site are laterally adjacent to the Upper Member of the San Antonio formation, consisting of clay, silt sand and gravel (Radbruch, 1969). Helley and Graymer (Helley and Graymer, 1997) portray essentially the same geology, using differing terminology. Both formations are Quaternary in age (formed over the past approximately one million years). Younger relatively thick alluvial deposits characteristic of the East Bay Plain are situated approximately 1,500 feet to the southwest; these deposits thicken as one proceeds further to the southwest towards San Francisco Bay.

Based on the four borings drilled and logged in 2007 (Appendix B), the site lithology was explored to a maximum depth of 20 feet bgs. These borings revealed the depth of the fill material at between approximately 6 to 7 feet bgs. The fill was mottled, very dark gray (almost black) sandy clay with some traces of gravel. A brown to grayish brown clay was logged beneath the fill, except in Boring B4 where the underlying clay was dark greenish-gray. Between 10.5 feet and 13 feet bgs, a wet, clayey to silty sand and gravel was encountered. In Borings B2, B3, and B4 this coarse-grained material extended to the bottom of the borings, In Boring B1, a sharp contrast was observed at approximately 13 feet bgs with yellowish-brown clay that extended to 20 feet bgs (Brighton, 2007c). Figure 5 shows a cross section through the borings onsite.

The site is located in the East Bay Plain Subbasin. From 1860 to 1930, before Sierra water was imported into the area, groundwater from the East Bay Plain was the major water supply of the East Bay. By the late 1920's, the groundwater supply was too small to meet the growing population and the wells often became contaminated or impacted by saltwater intrusion. By 1929, East Bay Municipal Utility District (EBMUD) provided imported water to East Bay

communities via the Mokelumne Aqueduct. This high-quality, reliable supply soon eliminated the need for local groundwater wells (Conestoga-Rovers & Associates, 2008). In 1996, the Regional Board reviewed General Plans for Oakland and other communities. The Board found that Oakland and most other cities did not have any plans to develop local groundwater resources for drinking water, due to existing or potential saltwater intrusion, contamination, or poor or limited quality (Regional Water Quality Control Board, San Francisco Bay Region, June 1999).

Throughout most of the East Bay Plain, in the region of the site, surface elevation contours show a slope from the east towards the west to southwest (Figure 1). We expect the groundwater flow direction to correlate to the surface topography or flow towards the Peralta Creek, located approximately 700 feet northwest of the site. Therefore, groundwater flow direction could vary or be in the range to flow northwesterly to southwesterly. Calculation of the groundwater flow direction from future piezometers and monitoring wells will confirm or deny such groundwater flow projection. Depth to groundwater encountered in the borings drilled in 2007 onsite was between 10 to 12 feet bgs.

3.2 Well Survey

Review of documentation provided during an Environmental Data Resources (EDR) record search for the property revealed no public drinking water wells or environmental monitoring wells within 1/4 mile of the site. The search revealed no active environmental investigation sites where groundwater monitoring wells might be anticipated within 1/4 mile of the site (Brighton 2007c). These data were attached as appendices to the Phase I ESA. A field survey of the neighborhood within 1200 feet of the site revealed no evidence of dewatering wells or cathodic protection wells (Brighton 2007c).

Telephone interviews with staff at the Peralta Hacienda Historical Park indicate that a water well was located at or near that property between approximately 1821 and the 1890s. The well is no longer evident, although bricks from the well have been identified during archeological exploration at the park. Based on the age of the well, it was likely installed by hand (shallow well) and was not, to the knowledge of park staff, officially closed (Brighton, 2007c).

A recent well search within ¼ mile radius from the subject site (Figure 1), conducted by Alameda County Public Works Agency (Appendix C), revealed the following:

- 2678 Coolidge Avenue, Oakland, California – this facility has two monitoring wells. These wells are located upgradient and at or outside the ¼ mile radius from the subject site. These wells do not seem to pose any concern with regards to contaminant migration

- 325 Pacific Avenue, Oakland, California - a Geo well is listed at this facility. However, this facility is located more than a mile from the subject site.

- 3320 E 22nd Street – an irrigation well is listed at this facility. This facility is located just outside of the ¼ mile radius from the subject site and crossgradient. It is unlikely that this irrigation well would be impacted by the subject site.

3.3 Conduit and Subsurface Utility Survey

The purpose of this survey is to assess whether any of the subsurface utilities forms a preferential pathway (vertical or lateral) for the contaminants onsite or whether such utilities or conduits intercept, interfere with, or deviate the groundwater flow.

The conduit study consisted of the following:

- Reviewing records at the City of Oakland Department of Public Works and Building Department;
- Marking the site by Underground Services Alert (USA);
- Hiring a professional utility locator to perform a magnetic survey; and
- Onsite observation and inspection.

The results of the survey are documented in Figure 6. These results are as follows:

- The identified water, electrical, and gas lines onsite and offsite are less than three feet bgs. Since the depth to groundwater is at least 10 feet bgs, these utility lines are unlikely to interfere with or affect the groundwater flow direction, or form a preferential pathway for groundwater.

- The nearest storm water inlet is located approximately 300 feet from the site and at a depth of less than 5 feet bgs. The storm water line is unlikely to influence the groundwater flow.

- The sewer main is located at a depth of 10 to 12 feet bgs. This line is located upgradient to crossgradient and may have some influence on affecting the groundwater flow or be a preferential pathway. However, such a conclusion cannot be confirmed nor denied until completing the next site characterization and calculating a more accurate groundwater depth and flow direction.

3.4 Identified Sources of Contamination

The identified primary sources of contamination at this site are as follows (Figure 2):

- Two former 500-gallon USTs, used to contain gasoline fuel;

- the associated piping and gasoline dispenser island;
- a former or existing 500-gallon waste oil UST;
- a hydraulic lift; and
- a car maintenance pit

The identified secondary sources of contamination at this site are the impacted soil and groundwater.

3.5 Identified Contaminants of Concerns (COCs) and Maximum Concentrations

The table below contains the contaminants of concern (COCs) and their maximum concentrations in soil and groundwater. These values are based on the limited drilling and sampling of borings B1 through B4, conducted in 2007.

COCs	Maximum Concentration in Soil (mg/kg)	Maximum Concentration in Grab Groundwater Sample (µg/l)
TPH as Gasoline	2,100	87.000
TPH as Stoddard Solvent	1,200	71,000
TPH as Diesel	360	69,000
TPH as Motor Oil	27	1,800
Benzene	<0.25	250
Toluene	<0.25	<5.0
Ethylbenzene	28	<5.0
Total Xylenes	<0.5	<10
Naphthalene	--	530
Cadmium	<0.25	29
Chromium	140	7,400
Lead	9.1	1,200
Nickel	260	8,700
Zinc	130	3,900
Volatile Organics by EPA Method 8260	--	(See the attached Table 5)

The analytical results and Tier I Environmental Screening Levels (ESLs) are listed in the attached Tables 1 through 5 for comparison only and not as cleanup levels. Future analytical findings and update of the Site Conceptual Model will determine the action levels for this site.

3.6 Potential Exposure Pathways and Receptors

The potential exposure pathways and Receptors are presented below:

Potential Pathway	Potential Receptors
Vapor intrusion to indoor air (inhalation route)	Occupants of the future building onsite
Contaminant leaching from soil to groundwater	End users of groundwater and terrestrial (nonhuman) receptors
Shallow groundwater leaching to deeper groundwater	Groundwater and end users of groundwater
Shallow groundwater possible discharging to surface water	Nearby Creek and Ultimately ecological receptors
Direct contact with the soil	Onsite workers and others
Gross contamination concerns (nuisance, odors, etc.) and general resource degradation.	Human, other receptors

The above pathways will be visited further in the future after compiling adequate analytical data and further evaluation of each pathway completeness.

3.7 Extent of Soil and Groundwater Impact

Figure 3 depicts the soil analytical results and Figure 4 depicts the groundwater analytical results from the 2007 limited sampling. Tables 1 through 5 summarize the analytical findings of the 2007 sampling. The extent of the soil and groundwater impact by petroleum hydrocarbons, volatile organics, and metals is not yet defined. However, the soil and groundwater samples collected to date indicate impact with petroleum hydrocarbons and metals exceeding the Tier I ESLs. Sampling and analysis of samples from the proposed borings, piezometers, and monitoring wells, which will be described later in this workplan, will further define the vertical and lateral extent of contamination.

4.0 PHASE II INVESTIGATION WORKPLAN

The intent of this Phase II Investigation is to define the nature as well as the vertical and lateral extent of the soil and groundwater impact with petroleum hydrocarbons and other contaminants onsite. The following steps will be completed to achieve the objective of the investigation:

Task 1: Building Demolishing and Removal of Onsite Features;

Task 2: Conducting a Magnetometer and Geophysical Survey;

Task 3: Drilling, Sampling and Surveying of Borings and Piezometers;

Task 4: Installation and Sampling of Monitoring Wells; and

Task 5: Report Preparation

4.1 Building Demolishing and Removal of Onsite Features

To locate site features and sources of contamination, prior to building demolishing, a surveyor will survey the corner of the building and provide an accurate figure to scale of the features onsite. Also, prior to building demolishing, the owner of the site will obtain the needed permits from the City of Oakland Building Department. The building, the dispenser island, and the concrete slabs will be removed and disposed of or recycled. Known below ground structures include a possible hydraulic lift and a maintenance pit will be removed (Figure 2). Before removing the hydraulic lift and maintenance pit, permits will be obtained if necessary. Also, the local fire department and Alameda County Environmental Health will be notified of the removal of the lift and maintenance pit. The hydraulic lift will be drained and the pit will be pressure washed before removal or disposal. The resulting waste will be profiled and disposed of or recycled according to the analytical results.

The consultant onsite will observe the removal of floors, foundations, pavement, and below ground structures to identify below ground pipes and conduits; staining; evidence of chemical spills; and possible remaining USTs. The consultant will monitor for volatile organic compounds with a photo ionization detector (PID).

4.1.1 Sampling and Analyses Below the Hydraulic Lift and Maintenance Pit

From field observation, one concrete print of a hydraulic lift and one below ground car maintenance pit were identified at the site (Figure 2). After the removal of the concrete slab, should the hydraulic lift be discovered, it will be removed as mentioned above. One soil sample will be collected one to two feet from beneath the hydraulic lift and another soil sample will be collected one to two feet beneath the maintenance pit. The soil samples will be collected by using a hand auger. Should groundwater be encountered after the removal of the hydraulic lift and the maintenance pit, grab groundwater samples will be collected by using disposable bailers. 1.5 inch diameter by 6 inch long brass tubes will be used for the soil samples. VOA vials, amber jars, and plastic bottles will be provided by the certified laboratory if needed for groundwater sampling (if encountered).

Samples to be collected will be analyzed by a State of California Department of Health Services certified laboratory.

The soil and groundwater samples to be collected from under the hydraulic lift will be analyzed for the following analytes:

- *Total Recoverable Petroleum Hydrocarbons (TRPH), EPA Method 8015 with silica gel cleanup for soil and EPA Method 1664-S for water with silica gel cleanup*;
- PCBs by EPA Method 8082;
- LUFT five metals (Cr, Cd, Pb, Ni, and Zn) by EPA Method 6010/7471; and
- Volatile Organics by the GC/MS EPA Method 8260

The soil and groundwater samples to be collected from under the maintenance pit will be analyzed for the following analytes:

- Total Petroleum Hydrocarbons as Gasoline (TPHg) by EPA Method 8015B;
- Total Petroleum Hydrocarbons as Diesel (TPHd) by EPA Method 8015B;
- Total Petroleum Hydrocarbons as Stoddard Solvent (TPHss) by EPA Method 8015B;
- *Total Recoverable Petroleum Hydrocarbons (TRPH), EPA Method 8015 with silica gel cleanup for soil and EPA Method 1664-S for water with silica gel cleanup*;
- LUFT five metals (Cr, Cd, Pb, Ni, and Zn) by EPA Method 6010/7471; and
- Volatile Organics by the GC/MS EPA Method 8260

4.2 Conducting a Magnetometer and Geophysical Survey

Once the building is demolished and the concrete slabs are removed, a professional utility locator will conduct magnetometer and geophysical surveys to identify any remaining pipes, USTs, or any other source of contamination onsite.

4.3 Drilling, Sampling and Surveying of Borings and Piezometers

Once this workplan is approved by ACEH, a drilling permit will be obtained and a health and safety plan will be prepared for this job. USA will be called and all utilities will be located prior to drilling. A total of 11 soil borings, B5 through B15, and 4 temporary piezometers, P1 through P4, will be installed to assess the vertical and lateral extent of the soil and groundwater impact with petroleum hydrocarbon constituents (Figure 7). Description of the borings and the sampling and analyses are presented below in the following sections:

4.3.1 Rational and Objective of the Boring Locations

The objective and rational for the boring locations are as follows (Figure 7):

- Borings B5, B6, B7, and B8 will be placed on all four sides of the already drilled and sampled boring B1. Boring B1 soil and grab groundwater sample analyses detected significant concentrations of petroleum hydrocarbons (Figures 3 and 4). In addition, boring B8 will assess the condition of the soil and groundwater under the former piping run between the dispenser island and the former gasoline USTs.

- Boring B9 is located in the fuel dispenser area to assess whether a leak has occurred in this location.

- Boring B10 will be drilled adjacent or in the location of the suspect hydraulic lift to assess whether the lift leaked oil to the soil or groundwater. Should the sampling described in section 4.1.1 prove no significant impact to the soil and groundwater, Boring B10 will be omitted and will not be drilled.

- Boring B11 will be drilled in the area of the car maintenance pit. Should the sampling and analysis described in section 4.1.1 prove no significant impact to the soil and groundwater, this boring will be omitted and will not be drilled.

- Boring B12 will be drilled in the former location of the waster oil UST.

- Borings B13 through B15 will be drilled to further define the extent of the soil and groundwater impact and to assess whether any of the contamination has left the site or any other source offsite has impacted the subject site.

This is an expedited subsurface investigation. Soil and groundwater samples will be analyzed on 24-hour or 48-hour turn-around time or by using an onsite mobile laboratory. Should the analytical findings from the soil and groundwater samples detect significant concentrations of petroleum hydrocarbons or volatile organics, step out borings will be drilled. The location of the future step out borings will be discussed and agreed upon with ACEH.

4.3.2 Drilling Method and Sampling Description

From drilling borings B1 through B4 in 2007, depth to groundwater was measured to be 10 to 12 feet bgs. The proposed soil borings B5 through B15 will be drilled to approximately 15 to 20 feet bgs, to be able to collect the needed soil and groundwater samples. Drilling will be conducted with a 6600 direct push Geoprobe™ drilling rig. See Appendix D for the soil and groundwater drilling and sampling procedures.

Soil will be collected continuously for logging by using core barrel lined with clear acetate sample tubes. Soil will be logged according to the Unified Soil Classification System (USCS) and a boring log will be generated for each boring. Soil samples will be screened onsite with the use of a PID to determine the presence of organic compounds. Prior to field use, the PID will be calibrated according to the manufacturer's specifications.

Soil samples for laboratory analysis will be collected in 1-inch diameter by 6-inch long brass tubes or by cutting a portion of the acetate tube. Soil samples for laboratory analysis will be collected from every 5 ft and near the soil/groundwater interface. In addition, soil samples will be collected if soil staining or elevated PID reading is encountered. All samples will be labeled, placed on blue ice in an ice chest, and delivered to a California Department of Health Services certified laboratory for analysis, under a chain-of-custody.

Groundwater samples will be collected from the first encountered groundwater by using the screen point sampler. See Appendix D for standard operating procedures.

After collecting the first grab groundwater samples from the first encountered water in borings B5, B9, and B12, and to assess the vertical extent of the groundwater impact, the screened and isolated tip of the hydraulically pushed rod will be advanced further to a depth of approximately 35 to 40 feet bgs to collect additional deeper and discrete water samples.

4.3.3 Drilling, Surveying, and Sampling of Piezometers

Four piezometers, P1 through P4, will be drilled to serve dual objectives. One objective is to collect soil and groundwater samples to assess the extent of the soil and groundwater impact with petroleum hydrocarbons. The other objective is to survey these piezometers and calculate the groundwater flow direction and gradient (Figure 7). The drilling and sampling of these piezometers will be similar to the rest of the borings described in section 4.3.2 above.

The temporary piezometers are simple two-inch borings drilled to approximately 20 feet bgs by direct push drill rig. A one-inch casing (5 feet of blank on top and 15 feet of slotted casing for the remaining depth) will be inserted in the borehole. The top of the casing will be retrofitted with a Christy Street Box flush with the surface. No fill will be used. A professional land surveyor will survey elevation, longitude, latitude, northing, and easting of the top of casing. Depth to groundwater will be measured in all four piezometers and grab ground water samples will be collected for analysis. Then, the groundwater flow direction will be calculated. The piezometers will then be closed by removing the top boxes and pressure grouting with slurried cement within two weeks of their installation.

The advantage of these piezometers is that they provide the groundwater flow direction to help better place and plan future monitoring wells. Completing four piezometers would be better than only three piezometers due to more accurate calculation of the groundwater flow direction from more than one triangle.

4.3.4 Laboratory Analyses

The soil and groundwater samples to be collected from borings B5 through B9 (Figure 7) will be analyzed for the fuel constituents as follows:

- Total Petroleum Hydrocarbons as Gasoline (TPHg) by EPA Method 8015B;
- Total Petroleum Hydrocarbons as Diesel (TPHd) by EPA Method 8015B;
- Total Petroleum Hydrocarbons as Stoddard Solvent (TPHss) by EPA Method 8015B;
- Volatile Organics by the GC/MS EPA Method 8260, which will include BTEX and Naphthalene.
- LUFT five metals (Cr, Cd, Pb, Ni, and Zn). Analysis for these metals will be conducted due to their detection above the Tier I ESL levels in the sampling conducted in 2007 (Tables 2 and 4). The groundwater samples to be analyzed for metals will be collected in unpreserved bottles and will be filtered by the laboratory before analysis .

The soil and groundwater samples to be collected from boring B10 (Figure 7), to be drilled near the hydraulic lift, will be analyzed for the following analytes:

- *Total Recoverable Petroleum Hydrocarbons (TRPH, Motor Oil), EPA Method 8015 with silica gel cleanup for soil and EPA Method 1664-S for water with silica gel cleanup*;
- PCBs by EPA Method 8082;
- LUFT five metals (Cr, Cd, Pb, Ni, and Zn) by EPA Method 6010/7471 (with water filtering before analysis); and
- Volatile Organics by the GC/MS EPA Method 8260.

The soil and groundwater samples to be collected from borings B11 and B12 (Figure 7), to be drilled in the car maintenance pit and waste oil UST locations, respectively, will be analyzed for the following analytes:

- Total Petroleum Hydrocarbons as Gasoline (TPHg) by EPA Method 8015B;
- Total Petroleum Hydrocarbons as Diesel (TPHd) by EPA Method 8015B;
- Total Petroleum Hydrocarbons as Stoddard Solvent (TPHss) by EPA Method 8015B;
- *Total Recoverable Petroleum Hydrocarbons (TRPH), EPA Method 8015 with silica gel cleanup for soil and EPA Method 1664-S for water with silica gel cleanup*;
- LUFT five metals (Cr, Cd, Pb, Ni, and Zn) by EPA Method 6010/7471; and
- Volatile Organics by the GC/MS EPA Method 8260, including BTEX and Naphthalene.

The soil and groundwater samples to be collected from borings B13 through B15 and from the piezometers P1 through P4 will be analyzed for the following analytes:

- Total Petroleum Hydrocarbons as Gasoline (TPHg) by EPA Method 8015B;
- Total Petroleum Hydrocarbons as Diesel (TPHd) by EPA Method 8015B;
- Volatile Organics by the GC/MS EPA Method 8260, including BTEX and Naphthalene;
- Total Petroleum Hydrocarbons as Stoddard Solvent (TPHss) by EPA Method 8015B;
- *Total Recoverable Petroleum Hydrocarbons (TRPH), EPA Method 8015 with silica gel cleanup for soil and EPA Method 1664-S for water with silica gel cleanup*; and
- LUFT 5 Metals by EPA Method 6010/7471 (groundwater samples to be collected in unpreserved containers and be filtered by the laboratory).

5.0 Monitoring Well Installation and Sampling

To expedite the site characterization, following the completion of the borings and piezometers, obtaining the analytical findings from the proposed borings and piezometers, and calculating the groundwater flow direction, we propose the installation of four monitoring wells MW-1 through MW-4. We expect to install the wells within two to three weeks from completing the borings and piezometers. The location of these wells depends on the analytical findings and elevations from the proposed borings and piezometers. The location of these wells will be discussed and agreed upon with ACEH.

5.1 Pre-Field Activities

Prior to drilling the wells, a drilling permit will be obtained. A Health and Safety Plan will be prepared for the job. USA Locates will be called to mark the underground utilities in the drilling area. In addition, a private utility locator will be hired to locate the subsurface utilities.

5.2 Monitoring Well Construction

A California-licensed drilling contractor will drill the well borings with an 8-inch diameter hollow stem auger. The borings will be converted to 2-inch-diameter, groundwater monitoring wells. Based on depth to water encountered onsite at approximately 10 to 12 feet bgs, the proposed total well depth will be approximately 23.5 feet bgs. Depth of well may be adjusted based on the field condition encountered during drilling and the observed depth to water in the four temporary piezometers . The soil will be logged according to the unified soil classification system and a well log will be generated. The soil will be screened by using a PID. Soil samples will be collected for laboratory analysis at approximately 5 feet bgs and at the soil/groundwater interface. No soil samples will be collected below water for laboratory analysis. In addition, based on visual observations, additional soil samples may be collected from the observed depth and submitted for laboratory analysis. The soil samples will be taken from the split spoon sampler, collected in brass tubes, covered with Teflon liners and capped. The samples will be labeled, placed on blue ice in an ice chest, and delivered to a California State Department of Health Services Certified Laboratory, under a chain-of-custody for analysis.

Figure 8 is a Well Construction Diagram depicting the anticipated construction details of the proposed groundwater monitoring wells. The monitoring wells will be constructed of standard 2-inch diameter, Schedule 40 Polyvinyl Chloride (PVC) factory slotted well screen and blank riser casing. We propose using 0.010-inch slotted well screen sections for construction of the well. 0.01-inch slotted casing is proposed due to the appreciable fines encountered during drilling borings B1 through B4 in 2007. The screened casing interval will extend from approximately 7.5 to 22.5 feet bgs (15 feet of screen), depending upon field conditions. Blank riser casing will extend from

approximately 0.5 to 7.5 bgs (~7 feet of blank casing). A locking compression plug and threaded PVC bottom cap will be installed at the top and bottom of the well, respectively. Filter pack, consisting of No. 2/12 silica sand, will be placed within the annular space between the PVC casing and borehole as the auger sections are withdrawn from the borehole. Filter sand will extend approximately 1.5 feet above the upper limit of the screened well section to the bottom of the well.

Prior to setting the annular well seal, if a sufficient volume of water is present within the borehole, they will be surged by using a 2-inch-diameter surge block to remove native annular fines and settle the sand filter pack. If required, additional sand will be placed within the borehole/well annulus to maintain the proper amount above the well screen. Then hydrated bentonite chips will be placed above the annular filter pack up to approximately 1 foot bgs. The remainder of the annular space will be filled with neat Portland cement grout. A monitoring well box will be placed directly over the monitoring well casing and secured in place with concrete, flush to surface grade.

5.3 Monitoring Well Development

At least 72 hours following completion of the well installation activities, the wells will be developed to improve the groundwater hydraulic conductivity between the newly introduced sand filter pack and the surrounding native soil. The depth to water in the well will be monitoring and recorded and subsequently the well will be surged along the entire water column interval for approximately 20 to 30 minutes, using a surge block. Well development will continue by purging up to approximately 10 casing volumes of groundwater from the well using a diaphragm pump and polyethylene tubing, and continuing until the well water is relatively free of turbidity and suspended fines, or purged dry. If the well is purged dry, it will be allowed to recharge for one hour. If the water has not reached at least 50% of the starting total water column in the well after one hour, then the well will be purged dry again and left to recharge for one day. The next day, the process will be repeated again and if the well is purged dry again then the well is considered developed. The well purge water will be transferred to 55-gallon, DOT-approved, steel drums, which will be temporarily store them onsite pending transport and disposal to a licensed facility.

5.4 Professional Well Elevation and Location Survey

A Land Surveyor licensed in the State of California will survey the grade elevation and the elevation of the top of casing (TOC) of the newly installed monitoring wells relative to the North American Vertical Datum of 1988 (NVD88). In addition, the latitude, longitude, and coordinates of the well locations will be surveyed relative to the North American Datum of 1983 (NAD83). Subsequently the survey data will be uploaded to the State Water Resources Control Board's GeoTracker Database System.

5.5 Groundwater Sampling Activities

At least 72 hours following development activities, the depth to water will be measured in the newly installed wells relative to the TOC using an electronic water meter. All measurements will be obtained and recorded with an accuracy of 0.01 foot. Three to four casing volumes of groundwater from the wells will be purged while simultaneously monitoring the pH, temperature and conductivity of the purge water to evaluate groundwater stabilization. The purge water will be transferred to a 55-gallon storage drum.

After purging the well, groundwater samples will be collected by lowering a disposable bailer in the well casing. The water samples will be poured directly into laboratory cleaned 40-millileter volatile organic analysis (VOA) vials with HCL preservative to prevent loss of any volatile constituents. The vials will be filled slowly and in such a manner that the meniscus extends above the top of the VOA vial. After the vials are filled and capped, they will be inverted to insure there is no headspace or entrapped air bubbles. The groundwater VOAs will be labeled and placed in a cooler chilled to approximately 4°C. Equipment wash and rinse water will be transferred to a 55-gallon storage drum. The drum will be sealed with a steel lid and labeled. Other containers will be obtained from the laboratory and filled with water from the bailer for the appropriate analysis. The groundwater sampling will be repeated on a quarterly or semi-annual basis, depending on the regularity agency request, and a report will be generated for each sampling event.

5.6 Waste Management

All generated soil cuttings and purge water will be stored in labeled 55-gallon drums onsite. The drums will be profiled and disposed of at a regulated disposal facility.

5.7 Laboratory Analysis

The collected water samples will be submitted under a chain of custody to a laboratory licensed by the State of California Department of Health Services for chemical analysis. The groundwater and soil samples will be analyzed for the following:

- Total Petroleum Hydrocarbons as Gasoline (TPHg) by EPA Method 8015B;
- Total Petroleum Hydrocarbons as Diesel (TPHd) by EPA Method 8015B;
- Volatile Organics by the GC/MS EPA Method 8260, including BTEX and Naphthalene;
- Total Petroleum Hydrocarbons as Stoddard Solvent (TPHss) by EPA Method 8015B;
- *Total Recoverable Petroleum Hydrocarbons (TRPH), EPA Method 1664-S with silica gel cleanup (if needed)* ; and
- LUFT 5 Metals by EPA Method 6010/7471 (with filtering before analysis)

All associated laboratory analytical data will be reported in Electronic Deliverable Format (EDF) in general accordance with the State Water Resources Control Board's GeoTracker Database System.

6.0 DATA INTERPRETATION/ REPORT PREPARATION

Following completion of the borings, piezometers, and monitoring wells and receiving the analytical data, all field and analytical data will be reviewed and a technical report summarizing the activities, findings, and conclusions of the investigation will be prepared. The report will be submitted electronically to ACEH Department.

7.0 GEOTRACKER AB2886 ELECTRONIC SUBMITTAL

Following receipt of all electronic laboratory analytical reports, the consultant will upload the sample result (EDF) and all Fluid-Level Monitoring Data (GEO_WELL) to the State GeoTracker Database System, in general accordance with State Assembly Bill 2886. Also, pursuant to the SWRCB Guidance for GeoTracker electronic submission, the boring/well construction log (GEO_BORE), a site plan (GEO_MAP), and a copy of the site characterization report (GEO_REPORT) will be uploaded to the GeoTracker database in PDF format. Upload confirmation forms will be included in the report of findings.

8.0 SCHEDULE AND APPROVAL

We anticipate beginning the pre-field activities within 30 days from receiving written approval to proceed from ACEH and client. Drilling and sampling will occur within 30 days from the permitting approval. The report of findings will be available within 60 days of receipt of all soil and groundwater analytical results and waste disposal.

Thank you for your cooperation. If you have any questions, please call at (925) 858-9608 or email Sami Malaeb at s.malaeb@comcast.net.

All engineering information, conclusions, and recommendations contained in this workplan have been prepared by a California Professional Engineer.

Sami Malaeb, P.E.

Project Manager

I declare under penalty of perjury, that the information and/or recommendations contained in this worklplan are true and correct to the best of my knowledge.

Salisbury Avenue Associates LLC

Peter Robertson

Property Owner

9.0 REFERENCES

Brighton Environmental Consulting (Brighton), 2006, *Phase I Environmental Site Assessment, 2145 35th Avenue, Oakland, California*, December 2006.

Brighton, 2007a, *Phase I Environmental Site Assessment Addendum, 2145 35th Avenue, Oakland, California*, February 2007.

Brighton, 2007b, *Underground Storage Tank Removal Confirmation Report, 2145 35th Avenue, Oakland, California*, March 2007.

Brighton, 2007c, *Phase II Investigation Workplan, 2145 35th Avenue, Oakland, California*, October 2007.

Conestoga-Rovers & Associates, 2008, *Workplan for Additional Characterization and Soil Vapor Sampling, 3055 35th Avenue, Oakland, California*, April 2008.

Helley, E.J, and Graymer, R.W, 1997, *Quaternary Geology of Alameda County, and Parts of Contra Costa, Santa Clara, San Mateo, San Francisco, Stanislaus, and San Joaquin Counties, California: A Digital Database,* USGS Open File Report OF97-97, Scale 1:100,000.

Radbruch, Dorothy H, 1969, *Aerial and Engineering Geology of the Oakland East Quadrangle, California*, USGS Map GQ-769, Scale 1:24,000.

Regional Water Quality Control Board, San Francisco Bay Region-Groundwater Committee, 1999. *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report. June 1999).*

TABLES

TABLE 1
SUMMARY OF CHEMICAL ANALYSES FOR TPH AND BTEX
SOIL CONFIRMATION SAMPLES (02/23/07)
2145 35th Avenue
Oakland, California

Sample ID	Location	Date Sampled	TEPH as Diesel (mg/kg)	TEPH as Motor Oil (mg/kg)	TPH as Stoddard Solvent (mg/kg)	TPH as Gasoline (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl benzene (mg/kg)	Total Xylenes (mg/kg)
B1@9'	Boring 1 at 9 feet bgs	02/23/07	**360**	27	**1,200**	**2,100**	**<0.25**	<0.25	**28**	<0.50
B2@8'	Boring 2 at 8 feet bgs	02/23/07	1.3	<5.0	<1.0	<1.0	<0.0051	<0.0051	<0.0051	<0.0102
B3@8.5'	Boring 3 at 8.5 feet bgs	02/23/07	<1.0	<5.0	<1.0	<1.0	<0.0051	<0.0051	<0.0051	<0.0102
B4@7.5'	Boring 4 at 7.5 feet bgs	02/23/07	**160**	40	9.7	17	<0.0048	<0.0048	<0.0048	<0.0096
***Tier 1 Environmental Screening Levels (ESLs), Shallow Soils (<3m bgs) Groundwater is Current or Potential Source of Drinking Water (mg/kg) (Table A)**										
Residential Land Use			83	370	83	83	0.044	2.9	2.3	2.3
***Tier 1 Environmental Screening Levels (ESLs), Shallow Soils (<3 m bgs) Groundwater is not a Current or Potential Source of Drinking Water (mg/kg) (Table B)**										
Residential Land Use			100	370	100	100	0.12	9.3	2.3	11

TEPH = Total extractable petroleum hydrocarbons by EPA Method 8015M
TPH = Total volatile petroleum hydrocarbons by EPA Method 8021B
mg/kg = milligrams per kilogram
bgs = Below ground surface
Bold = Concentration presented in bold where such a value is at or exceeds one of the environmental screening levels (ESLs) listed

* Screening for Environmental Concerns at Sites
with Contaminated Soil and Groundwater
Prepared by:
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612
INTERIM FINAL - November 2007
(Revised May 2008)

TABLE 2
SUMMARY OF CHEMICAL ANALYSES FOR LUFT 5 METALS
SOIL CONFIRMATION SAMPLES (02/23/07)
2145 35th Avenue
Oakland, California

Sample ID	Location	Date Sampled	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)
B1@9'	Boring 1 at 9 feet bgs	02/23/07	<0.25	140	9.1	**250**	37
B2@8'	Boring 2 at 8 feet bgs	02/23/07	<0.25	140	4.2	**240**	41
B3@8.5'	Boring 3 at 8.5 feet bgs	02/23/07	<0.25	120	4.1	**260**	38
B4@7.5'	Boring 4 at 7.5 feet bgs	02/23/07	<0.25	120	5.9	**250**	130
***Tier 1 Environmental Screening Levels (ESLs), Shallow Soils (<3m bgs) Groundwater is Current or Potential Source of Drinking Water (Table A)**							
Residential Land Use (drinking water)			1.7	--**	200	150	600
***Tier 1 Environmental Screening Levels (ESLs), Shallow Soils (<3 m bgs) Groundwater is not a Current or Potential Source of Drinking Water (Table B)**							
Residential Land Use (non-drinking water)			1.7	--	200	150	600

mg/kg = milligrams per kilogram
bgs = Below ground surface
--** = No established value for total Chromium. Chromium III 750 mg/kg; Chromium IV 8.00 mg/kg
Bold = Concentration presented in bold where such a value is at or exceeds one of the environmental screening levels (ESLs) listed

* Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater
Prepared by:
California Regional Water Quality Control Board
San Francisco Bay Region
INTERIM FINAL - November 2007
(Revised May 2008)

TABLE 3
SUMMARY OF CHEMICAL ANALYSES FOR TPH AND BTEX
GRAB GROUNDWATER SAMPLE (02/23/07)
2145 35th Avenue
Oakland, California

Sample ID	Location	Date Sampled	TEPH as Diesel (µg/l)	TEPH as Motor Oil (µg/l)	TPH as Stoddard Solvent (µg/l)	TPH as Gasoline (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl benzene (µg/l)	Total Xylenes (µg/l)
B1	Grab Sample from Boring 1	02/23/07	**69,000**	**1,800**	**71,000**	**87,000**	**250**	<5.0	<5.0	<10
***Tier 1 Groundwater Screening Levels (groundwater is a current or potential drinking water resource) (Table F-1a)**										
Vapor Intrusion Into Buildings			Use soil gas	--	Use soil gas	Use soil gas	540	380,000	170,000	160,000
Drinking Water (Toxicity)			210	210	210	210	1.0	150	300	1800
Ceiling Value (Taste and Odors, etc.)			100	100	100	100	170	40	30	20
Aquatic Habitat Goal (Chronic)			210	210	210	210	46	130	43	100
***Tier 1 Groundwater Screening Levels (groundwater is not a current or potential drinking water resource) (Table F-1b)**										
Vapor Intrusion Into Buildings			Use soil gas	--	Use soil gas	Use soil gas	540	380,000	170,000	160,000
Gross Contamination Ceiling Value (Odors, etc.)			5,000	2,500	5,000	5,000	20,000	400	300	5,300
Aquatic Habitat Goal (Chronic)			210	210	210	210	46	130	43	100

µg/l = Micrograms per liter
Bold = Concentration presented in bold where such a value is at or exceeds one of the environmental screening levels (ESLs) listed

* Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater
Prepared by:
California Regional Water Quality Control Board
San Francisco Bay Region
INTERIM FINAL - November 2007
(Revised May 2008)

TABLE 4
SUMMARY OF CHEMICAL ANALYSES FOR LUFT 5 METALS
GRAB GROUNDWATER SAMPLE (02/23/07)
2145 35th Avenue
Oakland, California

Sample ID	Location	Date Sampled	Cadmium (µg/l)	Chromium (µg/l)	Lead (µg/l)	Nickel (µg/l)	Zinc (µg/l)
B1	Grab sample from Boring 1	02/23/07	**29**	**7,400**	**1200**	**8,700**	**3,900**
****Tier 1 Groundwater Screening Levels in µg/l (groundwater is a current or potential drinking water resource) (Table F-1a)**							
Vapor Intrusion Into Buildings			--*	--	--	--	--
Drinking Water (Toxicity)			5.0	50	15	100	5,000
Ceiling Value (Taste and Odors, etc.)			50,000	50,000	50,000	50,000	5,000
Aquatic Habitat Goal (Chronic)			0.25	180	2.5	8.2	81
****Tier 1 Groundwater Screening Levels in µg/l (groundwater is not a current or potential drinking water resource) (Table F-1b)**							
Vapor Intrusion Into Buildings			--	--	--	--	--
Gross Contamination Ceiling Value (Odors, etc.)			50,00	50,000	50,000	50,000	50,000
Aquatic Habitat Goal (Chronic)			0.25	180	2.5	8.2	81

µg/l = Micrograms per liter
Bold = Concentration presented in bold where such a value is at or exceeds one of the environmental screening levels (ESLs) listed
--* = Not applicable. No established value.

** Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater
Prepared by:
California Regional Water Quality Control Board
San Francisco Bay Region
INTERIM FINAL - November 2007
(Revised May 2008)

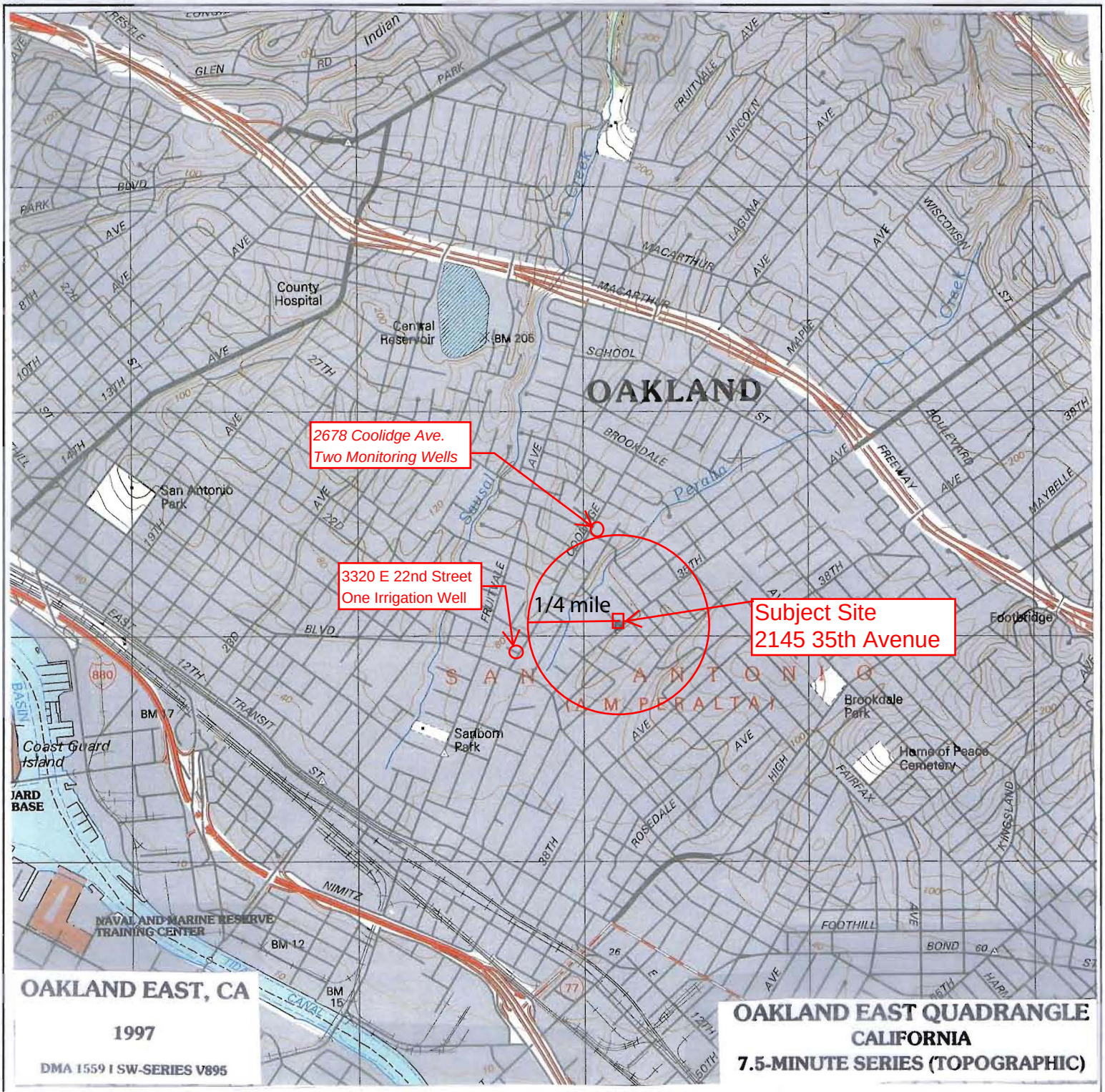
TABLE 5
SUMMARY OF CHEMICAL ANALYSES FOR VOLATILE ORGANICS BY GC/MS, EPA METHOD 8260
GRAB GROUNDWATER SAMPLE (02/23/07)
(ONLY DETECTED COMPOUNDS ARE LISTED)

2145 35th Avenue
Oakland, California

Sample ID	Location	Date Sampled	Acetone (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl -benzene (µg/l)	Total Xylenes (µg/l)	Iso-Propyl-benzene (µg/l)	Propyl-benzene (µg/l)	1,3,5-Trimethyl -benzene (µg/l)	Tert-Butyl-benzene (µg/l)	1,2,4-Trimethyl-benzene (µg/l)	SEC-Butyl-benzene (µg/l)	Para-Isopropyl Toluene (µg/l)	Naphthalene (µg/l)
B1	Grab sample from Boring 1	02/23/07	13	**39**	3.0	**55**	9.2	240	430	0.9	15	0.9	29	16	**530**
****Tier 1 Groundwater Screening Levels in µg/l (groundwater is a current or potential drinking water resource) (Table F-1a)**															
Vapor Intrusion Into Buildings			53,000000	540	380,000	170,000	160,000	--	--	--	--	--	--	--	3,200
Drinking Water (Toxicity)			6,300	1.0	150	300	1,800	--	--	--	--	--	--	--	17
Ceiling Value (Taste and Odors, etc.)			20,000	170	40	30	20	--	--	--	--	--	--	--	21
Aquatic Habitat Goal (Chronic)			1,500	46	130	43	100	--	--	--	--	--	--	--	24
****Tier 1 Groundwater Screening Levels in µg/l (groundwater is not a current or potential drinking water resource) (Table F-1b)**															
Vapor Intrusion Into Buildings			53,000000	540	380,000	170,000	160,000	--	--	--	--	--	--	--	3,200
Gross Contamination Ceiling Value (Odors, etc.)			50,000	20,000	400	300	5,300	--	--	--	--	--	--	--	210
Aquatic Habitat Goal (Chronic)			1500	46	130	43	100	--	--	--	--	--	--	--	24

µg/l = Micrograms per liter
Bold = Concentration presented in bold where such a value is at or exceeds one of the environmental screening levels (ESLs) listed
-- = No established value listed.
** Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater
Prepared by: California Regional Water Quality Control Board, San Francisco Bay Region, INTERIM FINAL - November 2007, (Revised May 2008)

FIGURES

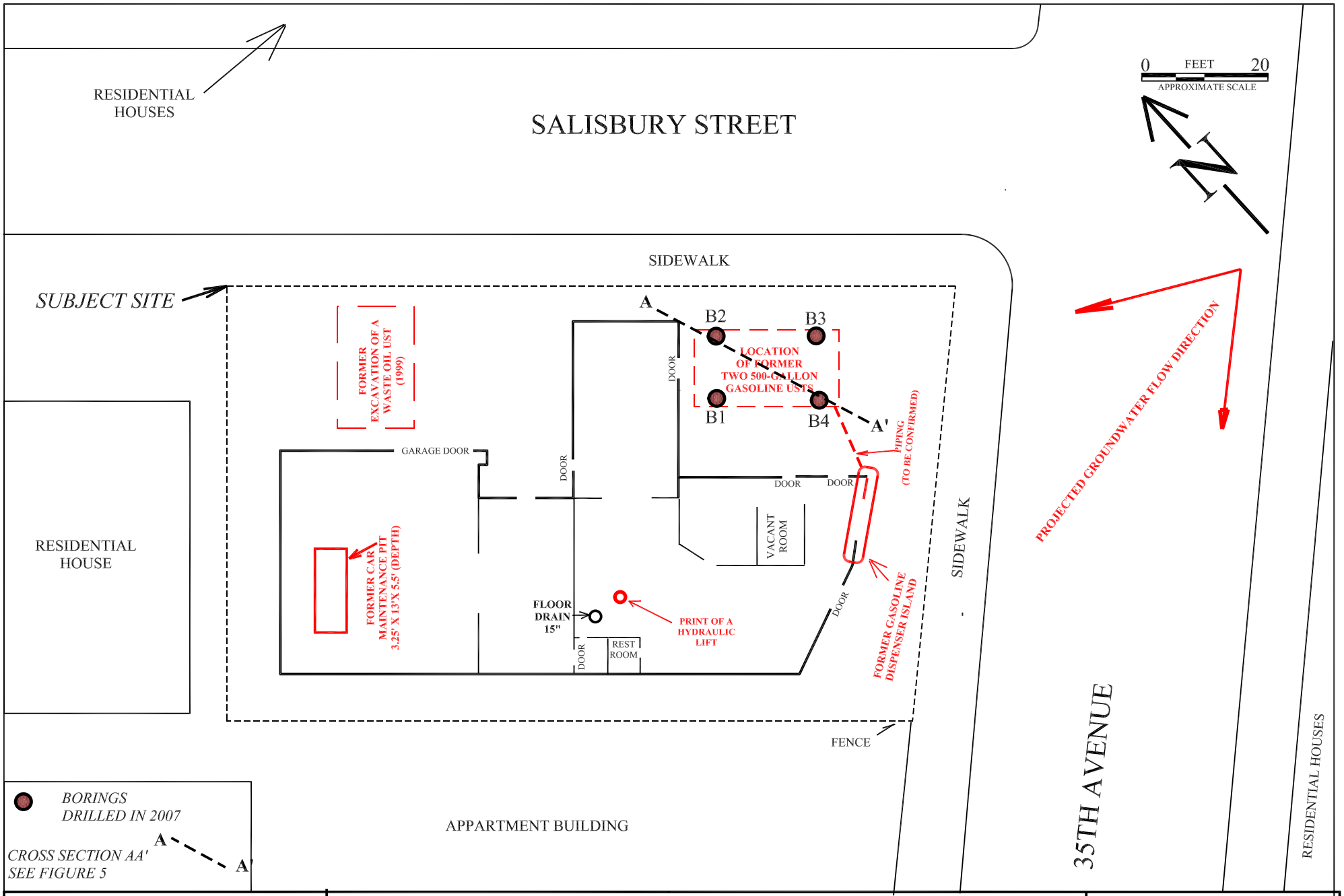


EAGLE ENVIRONMENTAL COMPANY
4909 Third Street, San Francisco, CA 94124
Office: 415-525-3116 Fax: 925-327-0716

SITE LOCATION
2145 35TH AVENUE
OAKLAND, CALIFORNIA

FIGURE 1

MAY 2010

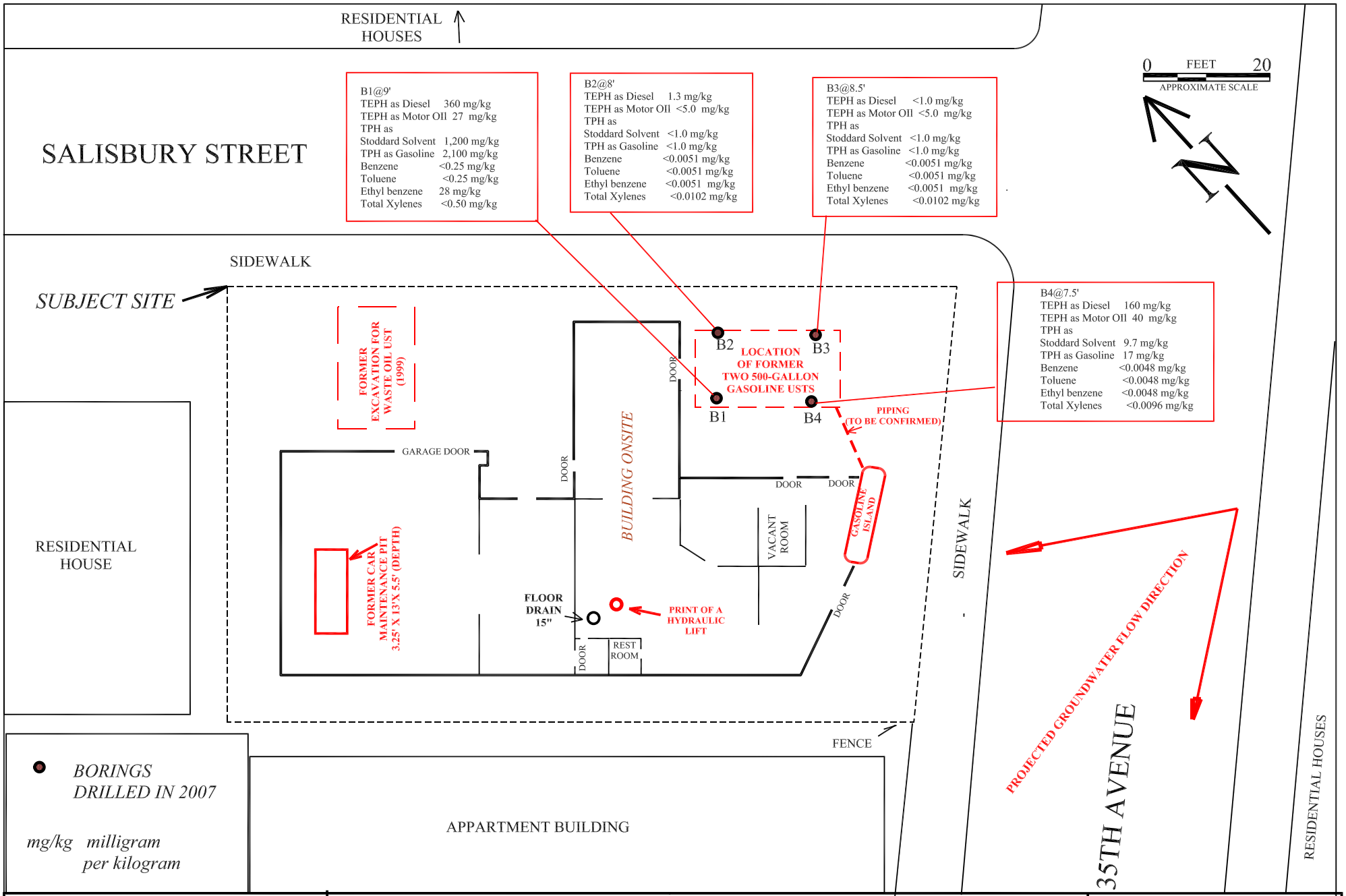


EAGLE ENVIRONMENTAL COMPANY
4909 THIRD STREET
SAN FRANCISCO, CA 94124

SITE PLAN
2145 35TH AVENUE, OAKLAND, CALIFORNIA

FIGURE 2

MAY 2010

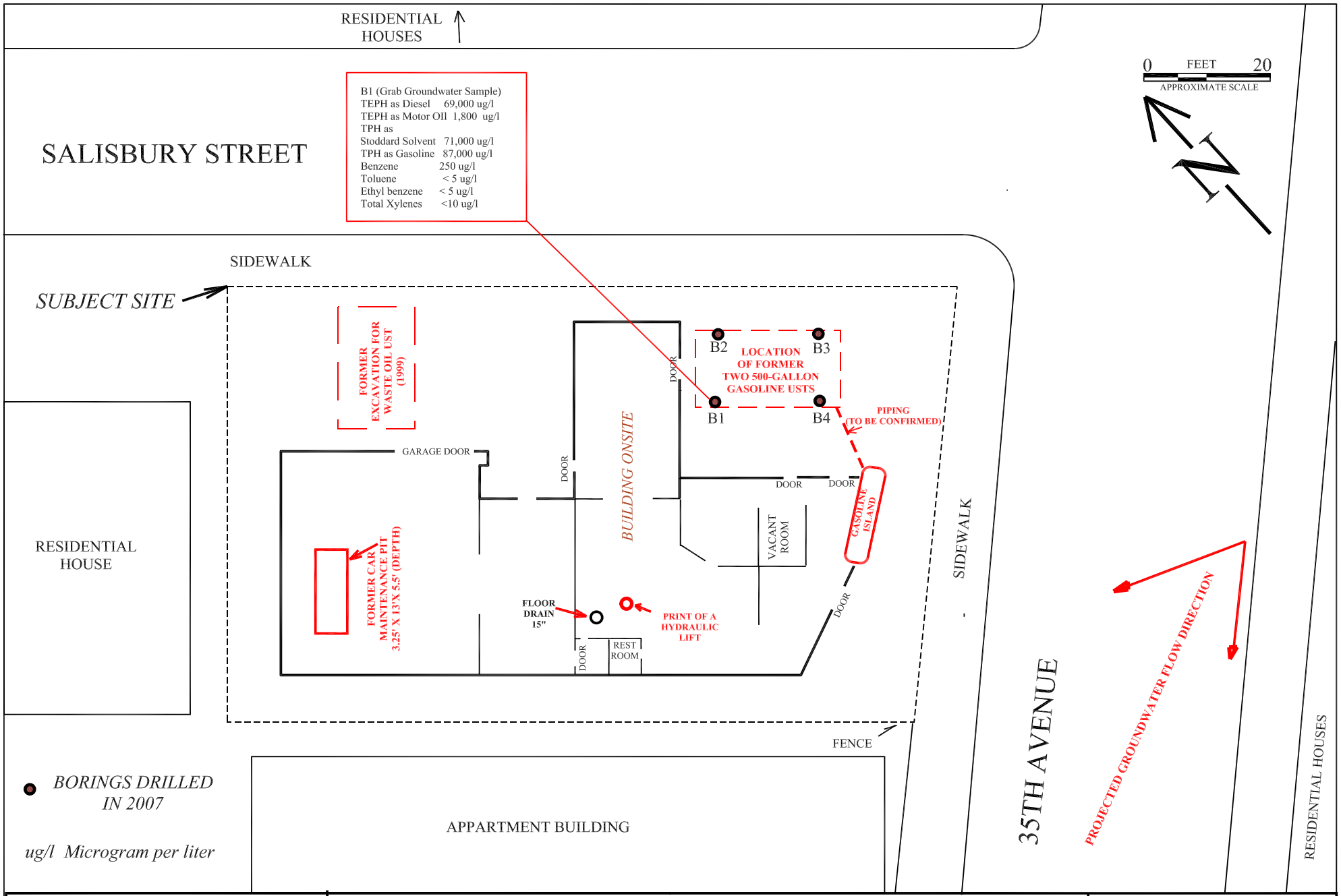


EAGLE ENVIRONMENTAL COMPANY
4909 THIRD STREET
SAN FRANCISCO, CA 94124

TANK INVESTIGATION BORING LOCATIONS AND SOIL ANALYTICAL RESULTS (02/23/2007) 2145 35TH AVENUE, OAKLAND, CALIFORNIA

FIGURE 3

MAY 2010

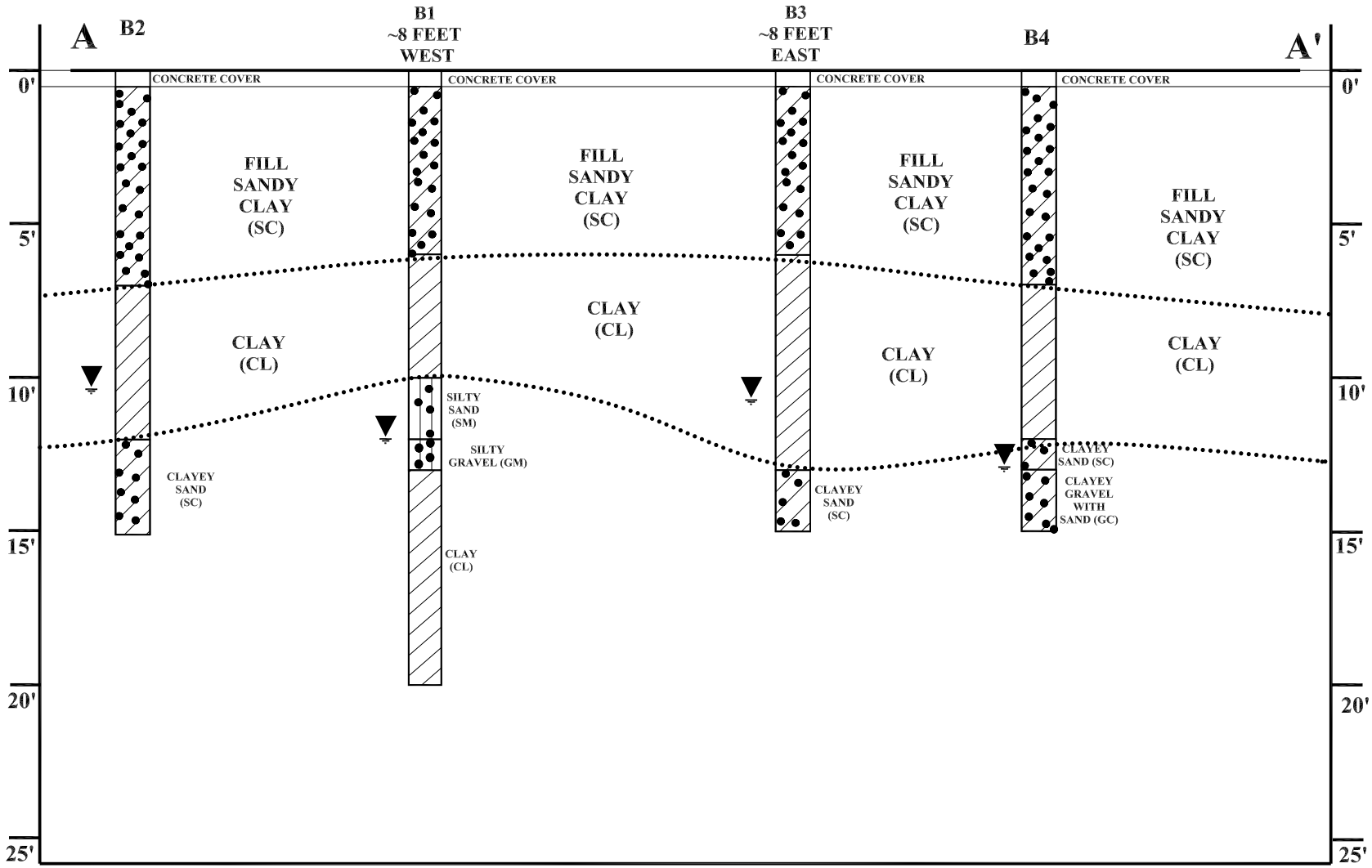


EAGLE ENVIRONMENTAL COMPANY
4909 THIRD STREET
SAN FRANCISCO, CA 94124

TANK INVESTIGATION BORING LOCATIONS AND GRAB GROUNDWATER SAMPLE ANALYTICAL RESULTS (02/23/2007) 2145 35TH AVENUE, OAKLAND, CALIFORNIA

FIGURE 4

MAY 2010



LEGEND:

APPROXIMATE SOIL TYPE BOUNDARY

WATER LEVEL MEASURED IN BORING

CROSS SECTION AA' IS DRAWN
DIAGONAL THROUGH BORINGS B2 AND B4
SEE FIGURE 2

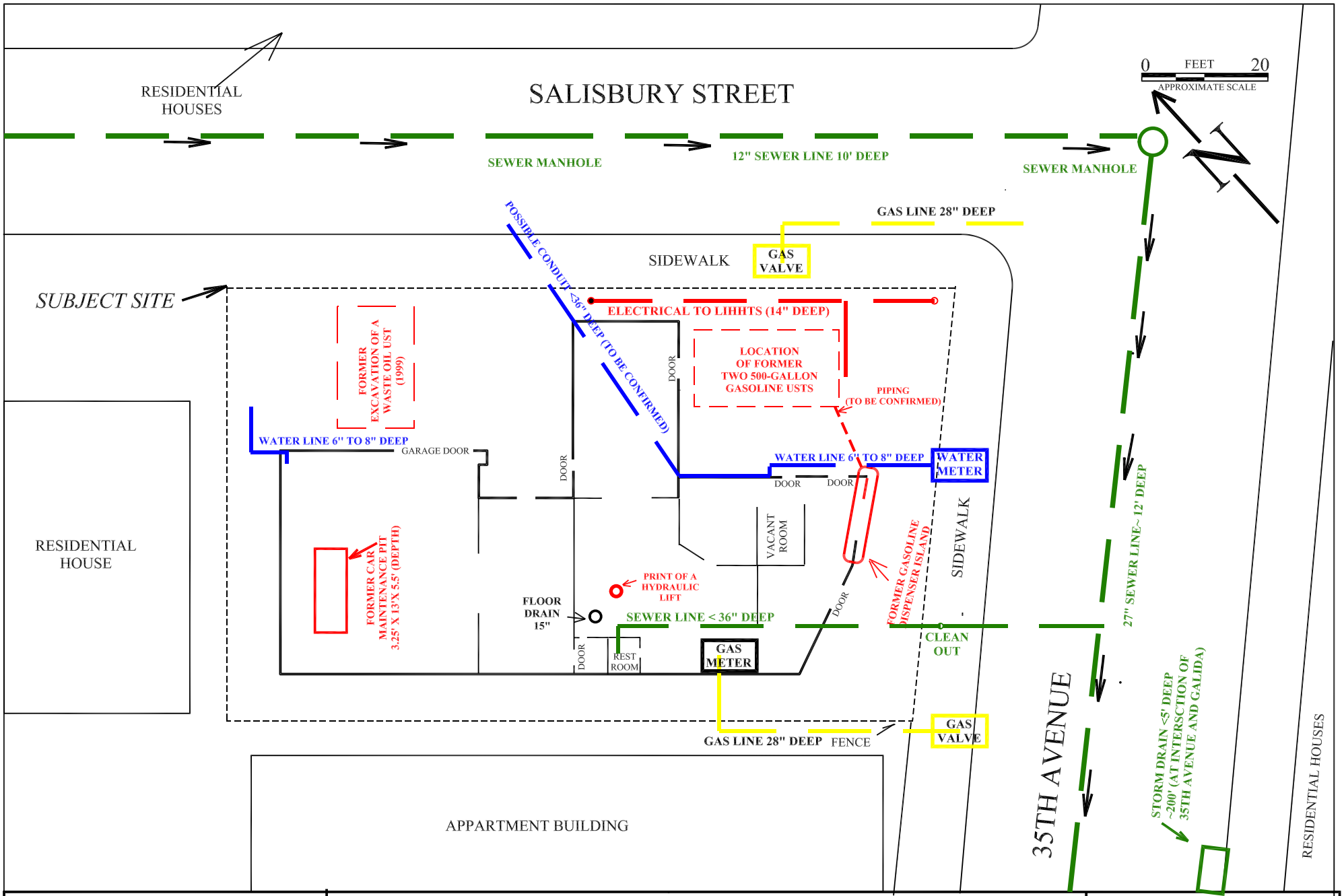
APPROXIMATE SCALE
ONE FOOT ~ 5 FEET

EAGLE ENVIRONMENTAL COMPANY
4909 THIRD STREET
SAN FRANCISCO, CA 94124

CROSS SECTION A-A'
2145 35TH AVENUE
OAKLAND, CALIFORNIA

FIGURE 5

MAY 2010

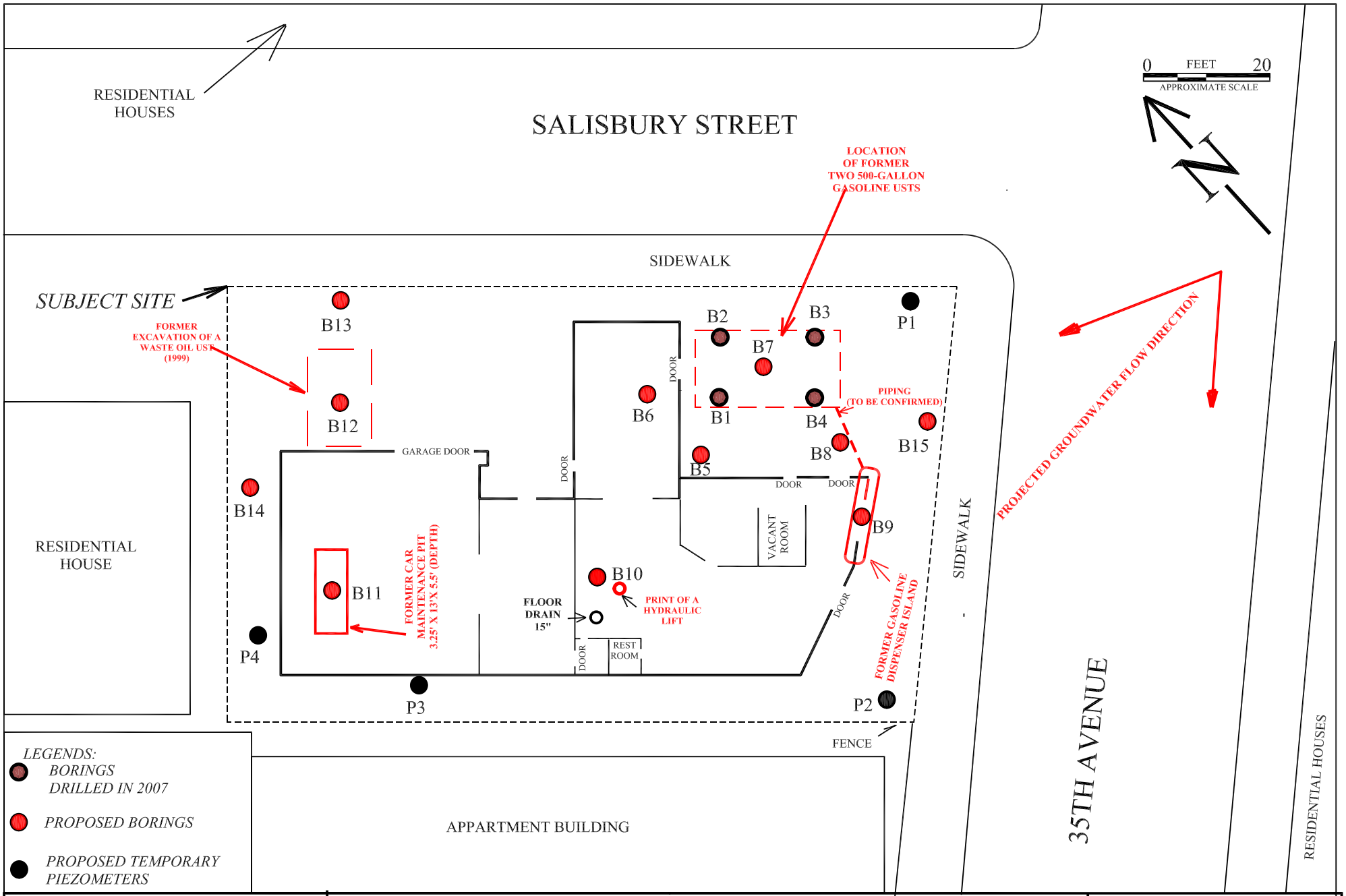


EAGLE ENVIRONMENTAL COMPANY
4909 THIRD STREET
SAN FRANCISCO, CA 94124

SUBSURFACE UTILITY MAP
2145 35TH AVENUE, OAKLAND, CALIFORNIA

FIGURE 6

MAY 2010



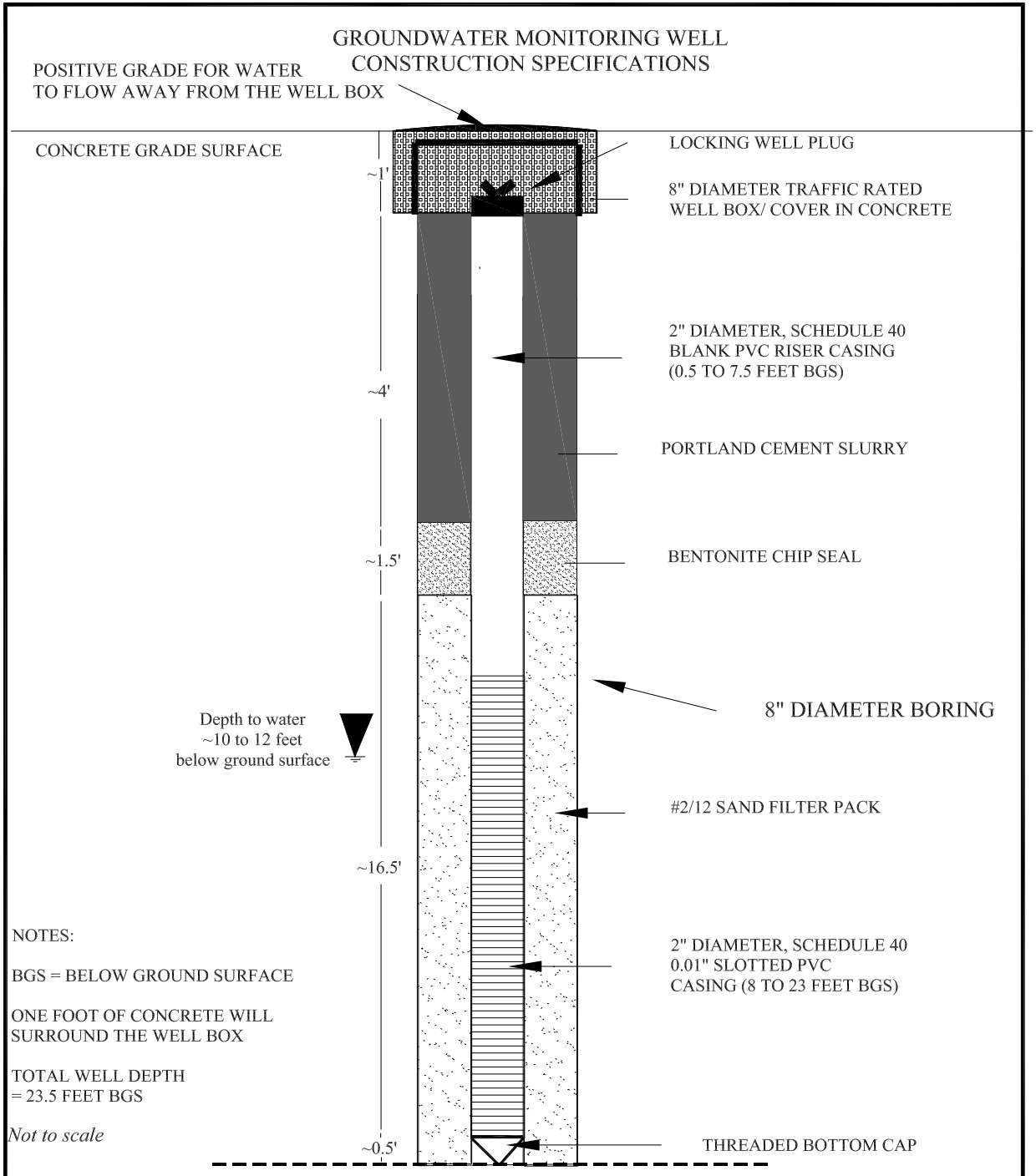
EAGLE ENVIRONMENTAL COMPANY
4909 THIRD STREET
SAN FRANCISCO, CA 94124

PROPOSED BORINGS AND PIEZOMETERS
2145 35TH AVENUE, OAKLAND, CALIFORNIA

FIGURE 7

MAY 2010

GROUNDWATER MONITORING WELL CONSTRUCTION SPECIFICATIONS



NOTES:

BGS = BELOW GROUND SURFACE

ONE FOOT OF CONCRETE WILL SURROUND THE WELL BOX

TOTAL WELL DEPTH = 23.5 FEET BGS

Not to scale

EAGLE ENVIRONMENTAL COMPANY
4909 THIRD STREET
SAN FRANCISCO, CA 94124

2145 35th AVENUE
OAKLAND, CALIFORNIA

(05/20/10) BY SM
NOT TO SCALE

FIGURE 8
PROPOSED WELL
CONSTRUCTION DIAGRAM

APPENDIX A
LETTER FROM
ALAMEDA COUNTY ENVIRONMENTAL HEALTH (ACEH) DEPARTMENT

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

F

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

April 4, 2008

Mr. Peter Robertson
Sailsbury Avenue Associates, LLC
2917 MacAurthur Blvd., #3F
Oakland, CA 94602

Ms. Maria Campos
1424 Fruitvale Ave.
Oakland, CA 94601.

Mr. & Mrs. John Madler
1030 Dutton Ave.
San Leandro, CA 94577

Subject: Fuel Leak Case No. RO0002945 and Geotracker Global ID T0619778840, Chevron #9-8861 (Independent), 2145 35th Avenue, Oakland, CA 94601

Dear Mr. Robertson, Ms. Campos, and Mr. & Ms. Madler:

Alameda County Environmental Health (ACEH) staff has reviewed the case file for the above-referenced site including the recently submitted document entitled, "Phase II Investigation Work Plan," dated November 1, 2007, which was prepared by Brighton Environmental Consulting for the subject site. The work plan, as presented, cannot be approved at this time. The proposed scope of work does not adequately address all potential source areas on-site, does not propose a scope of work to adequately define the extent of soil and groundwater contamination, an adequate conduit study was not presented, and the Site Conceptual Model appears incomplete.

ACEH requests that a work plan addendum is prepared with a revised scope of work that addresses the following technical comments described below.

TECHNICAL COMMENTS

1. **Preferential Pathway Study (Conduit Study)** – As requested in our September 5, 2007 correspondence, a conduit study was conducted and presented in Appendix A and B of the above-mentioned work plan. However, an adequate discussion on whether preferential pathway(s) exist at the site was not presented and only storm drains and sanitary sewer lines were presented in the appendices without any evaluations of potential migration discussions in the text. Other utilities (e.g. water lines, electrical lines, cable lines, gas lines, etc.) that may be present at the site do not appear to have been evaluated or illustrated on figures. Please complete the preferential pathway study and include the results in the work plan addendum due by the date specified below.

2. **Soil and Groundwater Characterization** – The present scope of work does not appear to adequately characterize all chemicals of concern detected at the site. Total petroleum hydrocarbons (TPH) as gasoline (g), TPH as Stoddard Solvent (ss), and TPH as diesel (d) were detected at concentrations of 2,100 milligrams per kilogram (mg/kg), 1,200 mg/kg, and

360 mg/kg, respectively, in soil samples collected in the vicinity of the former gasoline USTs indicating that an unauthorized release has occurred. "Grab" groundwater sample analytical results detected 87,000 micrograms per liter (µg/L) TPH-g, 69,000 µg/L TPH-d, 71,000 µg/L TPH-ss, 1,800 µg/L TPH as motor oil (mo), 39 µg/L benzene, and 530 µg/L naphthalene indicating that the groundwater has been impacted. Please include naphthalene in the proposed groundwater analytical suite. Based on the locations of borings proposed, the groundwater contaminant plume may not be adequately characterized. Please propose a revised scope of work to address the above-mentioned concerns and submit a work plan addendum by the date specified below.

3. **Contaminant Source Area Characterization** – There are several potential source areas on- site (e.g. former gasoline USTs, the dispenser island, former waste oil UST, the access pit, and hydraulic lift). Most the of proposed boring locations should provide some insight as to whether additional source area(s) exist at the site. However, the proposed sampling locations may not adequately characterize the vertical extent of soil contamination detected in the vicinity of the former gasoline USTs, nor do the borings locations adequately characterize the dispenser island. Please propose a revised scope of work to address the above-mentioned concerns and submit a work plan addendum by the date specified below. It is recommended that "step-out" borings be proposed in locations where contamination is obvious to expeditiously characterize the site.

4. **Site Conceptual Model** – A Site Conceptual Model (SCM) is presented in Section 4 of the above-mentioned work plan. However, potential exposure scenarios, potential migration pathways, etc. were not evaluated or discussed. At this juncture, it may be advantageous to develop a site conceptual model (SCM), which synthesizes all the analytical data and evaluates all potential exposure pathways and potential receptors that may exist at the site, including identifying or developing site cleanup goals. At a minimum, the SCM should include:

   (1) Local and regional plan view maps that illustrate the location of sources (former facilities, piping, tanks, etc.) extent of contamination, direction and rate of groundwater flow, potential preferential pathways, and locations of receptors;

   (2) Geologic cross section maps that illustrate subsurface features, man-made conduits, and lateral and vertical extent of contamination;

   (3) Plots of chemical concentrations versus time;

   (4) Plots of chemical concentrations versus distance from the source;

   (5) Summary tables of chemical concentrations in different media (i.e. soil, groundwater, and soil vapor); and

   (6) Well logs, boring logs, and well survey maps;

   (7) Discussion of likely contaminant fate and transport.

   If data gaps (i.e. potential contaminant volatilization to indoor air or contaminant migration along preferential pathways, etc.) are identified in the SCM, please propose a scope of work to address those data gaps. The work plan addendum may be included in the SCM.

5. **GeoTracker Compliance** – A review of the case file and the State Water Resources Control Board's (SWRCB) GeoTracker website indicate that electronic copies of analytical data have not been submitted, rendering the site to non-compliance status. Pursuant to California Code of Regulations, Title 23, Division 3, Chapter 16, Article 12, Sections 2729 and 2729.1, beginning September 1, 2001, all analytical data, including monitoring well samples, submitted in a report to a regulatory agency as part of the UST or LUST program, must be transmitted electronically to the SWRCB GeoTracker system via the internet. Additionally, beginning January 1, 2002, all permanent monitoring points utilized to collect groundwater samples (i.e. monitoring wells) and submitted in a report to a regulatory agency, must be surveyed (top of casing) to mean sea level and latitude and longitude to sub-meter accuracy using NAD 83. A California licensed surveyor may be required to perform this work. Additionally, pursuant to California Code of Regulations, Title 23, Division 3, Chapter 30, Articles 1 and 2, Sections 3893, 3894, and 3895, beginning July 1, 2005, the successful submittal of electronic information (i.e. report in PDF format) shall replace the requirement for the submittal of a paper copy. Please complete the surveying, if applicable, and upload all applicable electronic submittal types such as the analytical data (EDF), survey data (GEO_XY and GEO_Z), and PDF reports from July 1, 2005 to current to GeoTracker by the date specified below. Electronic reporting is described below.

TECHNICAL REPORT REQUEST

Please submit the work plan addendum to Alameda County Environmental Health (Attention: Paresh Khatri), according to the following schedule:

- **June 2, 2008** – SCM with Soil and Water Investigation Work Plan & Preferential Pathway Study

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program ftp site are provided on the attached "Electronic Report Upload (ftp) Instructions." Please do not submit reports as attachments to electronic mail.

Submission of reports to the Alameda County ftp site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) Geotracker website. Submission of reports to the Geotracker website does not fulfill the

requirement to submit documents to the Alameda County ftp site. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitor wells, and other data to the Geotracker database over the Internet. Beginning July 1, 2005, electronic submittal of a complete copy of all necessary reports was required in Geotracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.swrcb.ca.gov/ust/cleanup/electronic_reporting).

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "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." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

If you have any questions, please call me at (510) 777-2478 or send me an electronic mail message at paresh.khatri@acgov.org.

Sincerely,

Paresh C. Khatri
Hazardous Materials Specialist

Donna L. Drogos, PE
Supervising Hazardous Material Specialist

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Robert E. Roat, Brighton Environmental Consulting, 3815 Brighton Avenue, Oakland, CA 94602
Leroy Griffin, Oakland Fire Department, 250 Frank H. Ogawa Plaza, Ste. 3341, Oakland, CA 94612-2032
Donna Drogos, ACEH
Paresh Khatri, ACEH
File

Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC)	**ISSUE DATE:** July 5, 2005
	REVISION DATE: December 16, 2005
	PREVIOUS REVISIONS: October 31, 2005
SECTION: Miscellaneous Administrative Topics & Procedures	**SUBJECT:** Electronic Report Upload (ftp) Instructions

Effective **January 31, 2006**, the Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

REQUIREMENTS

- Entire report including cover letter must be submitted to the ftp site as a **single portable document format (PDF) with no password protection.** (Please do not submit reports as attachments to electronic mail.)
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- Signature pages and perjury statements **must** be included and have either original or electronic signature.
- **Do not password protect the document.** Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted.**
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:
  RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Additional Recommendations

- A separate copy of the tables in the document should be submitted by e-mail to your Caseworker in **Excel** format. These are for use by assigned Caseworker only.

Submission Instructions

1) Obtain User Name and Password:
   a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
      i) Send an e-mail to dehloptoxic@acgov.org
         or
      ii) Send a fax on company letterhead to (510) 337-9335, to the attention of Alicia Lam-Finneke.
   b) In the subject line of your request, be sure to include **"ftp PASSWORD REQUEST"** and in the body of your request, include the **Contact Information, Site Addresses**, and the **Case Numbers (RO# available in Geotracker) you will be posting for.**

2) Upload Files to the ftp Site
   a) Using Internet Explorer (IE4+), go to ftp://alcoftp1.acgov.org
      (i) Note: Netscape and Firefox browsers will not open the FTP site.
   b) Click on File, then on Login As.
   c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
   d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
   e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.

3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
   a) Send email to dehloptoxic@acgov.org notify us that you have placed a report on our ftp site.
   b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name at acgov.org. (e.g., firstname.lastname@acgov.org)
   c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload)

APPENDIX B
BORING LOGS FROM THE 2007 DRILLING AND SAMPLING

Log of Exploratory Boring

Brighton Environmental Consulting — **Boring No. B1** — **Sheet 1 of 1**

Client: Campos — Date begin: 2/23/07	Hole diameter: 2-1/4" — Total depth of boring: 20'
Site: 2145 35th Avenue, Oakland — Date finish: 2/23/07	Local agency: ACPWA — Local permit no. W2007-0172
	Installed temporary slotted PVC casing to collect groundwater sample.
Logged by: Allen J. Waldman, PG 6323	Backfilled boring with neat cement.
Drilling Co.: Precision Sampling, Inc.	
Driller: Roberto — Drill rig model: Geoprobe 7720DT	
Drilling method: Direct-push with Macro-Core sampler (MC)	Depth to first encountered water: 12'

Pocket Penetrometer (tsf)	PID reading (ppmv)	Sampler Type	Recovery (ft/ft)	Sample Interval	Depth (ft)	Soil/Rock Symbol	Graphic Log	Soil/Rock Description
		MC	4/4.5					CONCRETE (5")
					2	FILL		FILL-SANDY CLAY (SC): mottled very dark gray (10YR 3/1) to yellowish brown (10YR 5/4), damp, no odor.
					4			
								@5': some asphalt.
		MC	5/5		6			
	44					CL		@6': CLAY with SAND (CL), brown (10YR 5/3), medium plasticity,
					8			15% fine sand, damp, no odor.
@9' retained analytical sample								@9': CLAY (CL), dark gray (5Y 4/1), medium plasticity, slightly silty,
	900				10	CL		soft, moist, strong petroleum odor.
		MC	4/5			SM		@10.2: SILTY SAND (SM), dark gray (5Y 4/1), 15-30% low plasticity
					12	▽		fines, 70-85% fine sand, moist, strong petroleum odor.
						GM		@11.5': wet.
					14	CL		@12': SILTY GRAVEL (GM), dark gray (5Y 4/1), 15% low plasticity fines,
								35% fine to coarse sand, 50% fine gravel, wet.
		MC	4.1/5		16			@13.2': CLAY (CL), yellowish brown (10YR 5/4), medium
								plasticity, slightly silty, moist, no petroleum odor, oxide staining
					18			throughout, sharp contact with overlying gravel.
					20			
								Bottom of Boring = 20'

Log of Exploratory Boring

Brighton Environmental Consulting — **Boring No. B2** **Sheet 1 of 1**

Client: Campos — Date begin: 2/23/07	Hole diameter: 2-1/4" Total depth of boring: 15'
Site: 2145 35th Avenue, Oakland — Date finish: 2/23/07	Local agency: ACPWA Local permit no. W2007-0172
	Backfilled boring with neat cement.
Logged by: Allen J. Waldman, PG 6323	
Drilling Co.: Precision Sampling, Inc.	
Driller: Roberto — Drill rig model: Geoprobe 7720DT	
Drilling method: Direct-push with Macro-Core sampler (MC)	Depth to first encountered water: 10'

Pocket Penetrometer (tsf)	PID reading (ppmv)	Sampler Type	Recovery (ft/ft)	Sample Interval	Depth (ft)	Soil/Rock Symbol	Graphic Log	Soil/Rock Description
		MC	4.5/4.5		0			CONCRETE (4")
					2	FILL		FILL-SANDY CLAY (SC): very dark gray (10YR 3/1), stiff, damp.
	0							
2.5					4			
		MC	5/5		6			
								@7': CLAY (CL), grayish brown (10YR 5/2), medium plasticity,
	0				8	CL		slightly mottled by oxidation, trace rootlets (<1mm), moist.
	@8' retained analytical sample							
					10	▽		@10': wet.
		MC	3.5/5					
					12	SC		@11': CLAYEY SAND (SC), mottled dark gray (5Y 4/1) with greenish tint to yellowish brown (2.5Y 5/4), 45% low-plasticity fines, 55% fine sand, wet.
					14			@12.5': mottling absent, slightly coarser grained sand, fewer fines and more silty, wet.
					16			Bottom of Boring = 15'

Log of Exploratory Boring

Brighton Environmental Consulting — **Boring No. B3** — **Sheet 1 of 1**

Client: Campos — Date begin: 2/23/07	Hole diameter: 2-1/4" — Total depth of boring: 15'
Site: 2145 35th Avenue, Oakland — Date finish: 2/23/07	Local agency: ACPWA — Local permit no. W2007-0172
	Backfilled boring with neat cement
Logged by: Allen J. Waldman, PG 6323	
Drilling Co.: Precision Sampling, Inc.	
Driller: Roberto — Drill rig model: Geoprobe 7720DT	
Drilling method: Direct-push with Macro-Core sampler (MC)	Depth to first encountered water: 11'

Pocket Penetrometer (tsf)	PID reading (ppmv)	Sampler Type	Recovery (ft/ft)	Sample Interval	Depth (ft)	Soil/Rock Symbol	Graphic Log	Soil/Rock Description
		MC	4.5/4.5					CONCRETE (5")
					2	FILL		FILL-SANDY CLAY (SC): very dark gray (10YR 3/1), stiff, damp.
					4			
		MC	5/5		6			
.5						CL		@6': CLAY with SAND (CL), grayish brown (2.5Y 5/2) with oxide
	0				8			staining, medium plasticity, ~15% sand, trace fine gravel,
@ .5' retained analytical sample								stiff, damp, no noticeable petroleum odor, the pattern of oxide
					10			staining looks like rootlets.
		MC	.5			▽		@11.0': oxide staining absent, silty, 10-15% fine sand, wet.
					12			@11.5': olive green mottling, 20 -25% fine to medium grained sand.
	0				14	SC		@13': CLAYEY SAND with GRAVEL (SC), strong brown (7.5Y 4/6), 15% fines, fine to coarse sand, 25% fine gravel, hard, wet, highly oxidized, no odor.
					16			Bottom of Boring = 15'

Log of Exploratory Boring

Brighton Environmental Consulting — **Boring No. B4** **Sheet 1 of 1**

Client: Campos — Date begin: 2/23/07	Hole diameter: 2-1/4" Total depth of boring: 15'
Site: 2145 35th Avenue, Oakland — Date finish: 2/23/07	Local agency: ACPWA Local permit no. W2007-0172
	Backfilled boring with neat cement
Logged by: Allen J. Waldman, PG 6323	
Drilling Co.: Precision Sampling, Inc.	
Driller: Roberto — Drill rig model: Geoprobe 7720DT	
Drilling method: Direct-push with Macro-Core sampler (MC)	Depth to first encountered water: 12'

Pocket Penetrometer (tsf)	PID reading (ppmv)	Sampler Type	Recovery (ft/ft)	Sample Interval	Depth (ft)	Soil/Rock Symbol	Graphic Log	Soil/Rock Description
		MC	4.5/4.5		2	FILL		CONCRETE (5") FILL-SANDY CLAY (SC): mottled very dark gray (10YR 3/1) to yellowish brown (10YR 5/4), damp, no odor.
		MC	3/5		6			@7': CLAY (CL), dark gray (5Y 4/1) with greenish tint, medium plasticity, medium stiff, damp to moist, strong petroleum odor.
	@7.5' retained analytical sample				8	CL		
2.0	>10,000				10			
		MC	4.5/5		12	▽		@12': CLAYEY SAND (SC), dark gray (5Y 4/1), 40% medium plasticity fines, fine to medium sand, strong petroleum odor., wet.
						SC		
	0				14	GC		@13': CLAYEY GRAVEL with SAND (GC), dark gray (5Y 4/1), up to 30% fines (varying percentages in layered sequences), fine to course sand, ~50% gravel, wet, strong petroleum odor.
					16			Bottom of Boring = 15'

APPENDIX C
WELL SEARCH DATA

Permit	Well Information	Well Information	Well Information	Well Information
Tr	2S/3W	2S/3W	2S/3W	2S/3W
Section	5F 1	5F 2	5M 2	5M 1
Address	2678 Coolidge Av	2678 Coolidge Av	325 PACIFIC AVE	3320 E 22ND ST
Longcity	Oakland	Oakland	Oakland	Oakland
Owner	Snow Cleaners	Snow Cleaners	CONVERSE DAVIS DIXON ASS.	ROY OVERALL
Update	9/11/1997	9/11/1997	7/30/1984	8/3/1984
Xcoord	122215697	122215697	122221529	122220158
Ycoord	37788801	37788801	37784561	37784104
Matchlevel	1	1	9	0
Tsrqq	2S/3W 5F	2S/3W 5F	2S/3W 5M	2S/3W 5M
Rec_code	0	0	2908	2907
Phone	0	0	0	0
City	OAK	OAK	OAK	OAK
Drilldate	1/94	1/94	6/77	/46
Elevation	0	0	0	0
Totaldepth	45	26	0	100
Waterdepth	42	19	0	12
Diameter	2	4	0	12
Use	MON	MON	GEO	IRR

Well Legend

MON= Monitoring well

IRR=Irrigation well

APPENDIX D
DIRECT PUSH DRILLING STANDARD PROCEDURES

Drilling and Soil Sampling Procedures

Macro Core Sampler: The Macro Core Sampler is used primarily for continuous core and discrete depth soil sampling. The sampler is comprised of a cylindrical hardened steel tube that measures 4 feet in length with an outside diameter (OD) of 2 inches. A removable cutting shoe and drive head are placed on either end of the sample tube. Each sampler houses replaceable inner sleeves to store the sample. Sample sleeves are available in different materials: clear acetate or Teflon sleeves (1.75-inch diameter x 4-foot length), or brass or stainless steel sleeves (eight sections of 1.75-inch diameter x 6-foot length). The final component of the system is a retractable drive point and piston, which remains stationary while driving, but is then released to collect the sample.

The Macro Core Sampler is assembled with a cutting shoe, drive head and the desired sample sleeves. The sampler is driven into the subsurface using the percussion of the direct push rig. The initial core sample collects in the sleeve and sampler. The sampler is then extracted from the boring and the sample sleeve is removed. A new sleeve is placed in the sample tube. The sampler is advanced to the last depth of penetration by adding a series of drive rods, and the procedure is repeated. The Macro Core Sampler also utilizes a retractable drive point in cases where the boring collapses or the walls constrict. The retractable drive point and piston are added to the Macro Core Sampler assembly. As before, the sampler is advanced to the last depth of penetration by adding a series of drive rods. As each drive rod is added, an inner rod is placed in the center of the drive rod to insure the drive point and piston remain in place. A final drive rod is added without the inner rod. This allows the drive point to retract into the sample tube as the sampler is advanced for one final push and the sample collects in the sleeve. The tool chain is then extracted from the boring and the sample sleeve is removed from the sample tube.

Groundwater Sampling Procedures

Screen Point 15 Sampler: The Screen Point 15 Sampler is a very common tool for groundwater grab samples. The sampler is comprised of a hollow cylindrical sheath of hardened steel that measures four feet in length with an outside diameter (OD) of 1.5 inches. An expendable drive point and a drive head are placed on either end of the sampler, which is then driven to the desired depth. The Screen Point 15 uses either a stainless steel screen or a Schedule 80 PVC screen that is sealed inside the sheath with Neoprene O-rings to prevent infiltration of formation fluids until the desired depth is attained.

The Groundwater Sampler is assembled with the expendable drive point, the drive head, the protective sheath, the inner stainless steel screen (or PVC) and the O-ring seal. A drive rod is added to the top of the sampler and the entire assembly is driven into the subsurface using the percussion of the direct push rig. By adding a series of hardened steel, hollow drive rods, the sampler is advanced to the desired depth. Once the desired depth is achieved, extension rods

are placed down the center of the drive rods to knock the expendable point loose and to hold the screen in position as the rods are retracted approximately 4 feet. The stainless steel screen is exposed to the aquifer and fills with groundwater. The groundwater is extracted using tubing which is inserted down the center of the rods into the stainless screen sampler. The most common methods of extracting the groundwater are a bailer, a check valve, or a peristaltic pump, depending upon the contaminant, the volume desired, and the local protocols.