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Alameda County  
Environmental Health

SUBSURFACE UTILITY STUDY, AREA WELL STUDY, AND WORKPLAN  
for  
ADDITIONAL SOIL AND GROUNDWATER ASSESSMENT  
at  
Yee Property  
(Formerly Chan's Shell Station)  
726 Harrison Street  
Oakland, California

Submitted by:  
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## **1.0 INTRODUCTION**

This report presents Aqua Science Engineers, Inc.'s (ASEs) workplan for additional soil and groundwater assessment activities at the former Shell Station located at 726 Harrison Street in Oakland, California (Figures 1 and 2). This document also presents a subsurface utility survey completed to determine whether subsurface utility lines in the site vicinity could present a preferred pathway for the movement of groundwater and an area well survey to determine whether any water supply wells are located in the site vicinity that could be potentially impacted by contamination originating from this site. This workplan was prepared as requested by the Alameda County Health Care Services Agency (ACHCSA) in their letter dated August 28, 2007.

## **2.0 SITE HISTORY AND BACKGROUND INFORMATION**

### **2.1 October 1995 Underground Storage Tank Removal**

In October 1995, All Environmental, Inc. removed four gasoline underground storage tanks (USTs) and one waste oil UST from the site. Up to 470 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPH-G) were detected in soil samples collected beneath the former gasoline USTs. Total oil and grease (TOG) was detected in the soil sample collected beneath the waste oil UST at 340 ppm.

### **2.2 December 1995 Overexcavation and Soil Disposal**

In December 1995, approximately 530 tons of contaminated soil was removed from the UST excavation areas to a depth of 20-feet below ground surface (bgs). This soil was subsequently disposed of at the Vasco Road Sanitary Landfill. Seven confirmation soil samples were collected from the bottom and sidewalls of the excavation. One sample collected near the northern portion of the excavation contained 20 ppm TPH-G, 2.9 ppm benzene, 0.33 ppm toluene, 3.7 ppm ethylbenzene, 22 ppm total xylenes and 16 ppm methyl tertiary butyl ether (MTBE). Another sample collected near the southern portion of the excavation contained 5,100 ppm TPH-G, 15 ppm benzene, 110 ppm toluene, 82 ppm ethylbenzene and 510 ppm total xylenes. All of the other samples contained low or non-detectable concentrations of hydrocarbons. Additional overexcavation was not possible due to the location of the building to the southeast and the street to the northwest.

### **2.3 July 1997 Monitoring Well Installation**

In July 1997, Lowney Associates drilled one soil boring at the site and installed groundwater monitoring well MW-1 in the boring (Figure 2). A soil sample collected from the boring at a depth near the capillary zone contained 650 ppm TPH-G, 1.2 ppm benzene, 2.2 ppm ethylbenzene and 2.8 ppm total xylenes. A groundwater sample collected from the well contained 18,000 parts per billion (ppb) TPH-G, 2,700 ppb benzene, 350 ppb toluene, 450 ppb ethylbenzene, 900 ppb total xylenes and 7,400 ppb MTBE.



#### 2.4 December 1998 Monitoring Well Installation

In December 1998, ASE drilled three soil borings at the site and installed monitoring wells MW-2 through MW-4 in the borings (Figure 2). No hydrocarbons were detected in any of the soil samples analyzed. Up to 18,000 ppb TPH-G, 1,500 ppb benzene, 270 ppb toluene, 260 ppb ethylbenzene, 560 ppb total xylenes and 14,000 ppb MTBE were detected in groundwater samples collected from monitoring well MW-1. Much lower hydrocarbon concentrations were detected in groundwater samples collected from monitoring wells MW-3 and MW-4. No hydrocarbons were detected in groundwater samples collected from monitoring well MW-2. The groundwater flow direction was to the southwest with a gradient of 0.01-feet/foot.

#### 2.5 August 2001 Soil and Groundwater Assessment

In August 2001, ASE drilled soil borings BH-A through BH-C at the site (Figure 2). Boring BH-A was located toward the eastern corner of the site building. Borings BH-B was located at the northern corner of the site building, and boring BH-C was located along the northwest property boundary adjacent to Harrison Street. The soil sample collected from 15-foot bgs in boring BH-B contained 360 ppm TPH-G, 0.55 ppm benzene, 5.0 ppm toluene, 3.4 ppm ethylbenzene, 23 ppm total xylenes, and 0.064 ppm MTBE. No hydrocarbons were detected in soil samples collected from borings BH-A and BH-C above laboratory reporting limits. The groundwater sample collected from BH-B contained 35,000 ppb TPH-G, 4,500 ppb benzene, 4,500 ppb toluene, 770 ppb ethylbenzene, 4,100 ppb total xylenes, and 5,600 ppb MTBE. The groundwater sample collected from BH-C contained 7,100 ppb TPH-G, 280 ppb benzene, 1,600 ppb toluene, 180 ppb ethylbenzene, 1,000 ppb total xylenes, and 2,500 ppb MTBE. No hydrocarbons were detected above laboratory reporting limits in the groundwater sample collected from boring BH-A. ASE also installed monitoring well MW-5 as part of this assessment. A soil sample collected from MW-5 at 14-foot bgs was analyzed and no hydrocarbons were detected above laboratory reporting limits. The groundwater sample collected from monitoring well MW-5 contained 14,000 ppb TPH-G, 1,300 ppb benzene, 470 ppb toluene, 230 ppb ethylbenzene, 800 ppb total xylenes, and 14,000 ppb MTBE.

#### 2.6 August 2001 Feasibility Tests

In August 2001, ASE installed extraction well EW-1, air sparge well AS-1, and vapor extraction wells VE-1 and VE-2 and conducted a series of feasibility tests.

On August 23, 2001, a step drawdown test was conducted at the site. Pumping rates of 0.5 gallons per minute (gpm), 0.75 gpm and 1.0 gpm were used for the step-drawdown pumping test. Based on the results of the step-drawdown test, a pumping rate of 0.5 gpm was selected for the constant rate pumping test.

In September 2001, a constant rate pumping test was performed at the site. The results of the constant rate pumping test shows the major hydraulic conductivity of 20.2 feet per day oriented approximately S 34 W, and the minor hydraulic conductivity of 5.02 feet per day oriented at a



right angle to the major conductivity. Assuming a maximum pumping rate (Q) of 0.5 gpm (96.25 cubic feet per day), a saturated thickness (B) of 10.75 feet, and a potentiometric surface gradient of 0.00997, the groundwater velocity will range between 1.34 and 6.7 feet per day, depending on the effective porosity used in the calculation. Based on the capture zone analysis, the spacing of wells to ensure capture of all groundwater crossing the downgradient property boundary would range between 0.67 and 3.33-feet, depending on the assumed effective porosity used in the calculation. Based on these calculations, pump and treat would not prove to be an effective or cost effective remediation strategy for the site.

On September 25, 2001, ASE conducted a vapor-extraction (VE) test at the site. The test was designed to remove a known rate of soil gas from vapor extraction well VE-1 and determine if that vacuum can influence the vadose zone in nearby observation wells. The airflow coming from VE-1 was immeasurable during the entire length of the test, allowing only approximately 1 to 2 cubic feet per minute (cfm) of air from VE-1. Dilution air was used to support combustion of the ICE. When the dilution air valve was closed, the vacuum on VE-1 increased, but the airflow from VE-1 never increased. The influence of the vapor extraction was measured on the surrounding observation wells during the test. None of the wells showed a significant increase of negative pressure, due to the inability to remove air from the extraction well because of low-permeable soils. Some of the wells actually showed a positive pressure at times during the test. Only observation well VE-2, a vapor-extraction well screened only in the vadose zone, showed a measurable increase in negative pressure. The data gathered during the vapor-extraction test proved that the technology of vapor extraction would not be a useful tool to capture a sizeable radius of impacted vadose zone hydrocarbons.

On September 25, 2001, ASE conducted an air sparging test at the site. The test was designed to inject air into air sparging well AS-1 and determine if that air would influence the pressure in nearby monitoring wells. At the beginning of the test, the blower began delivering air into the air sparging well at a rate of 0 cfm at 5 pounds per square inch (psi). Pressure levels in the four surrounding monitoring wells were measured to determine whether there was any pressure increase in the vadose zone. At the beginning of the test, AS-1 was not allowing any measurable air into the subsurface due to low-permeable geologic conditions. The flow of air into AS-1 was then increased until a measurable amount of air flowed into AS-1. After a short time, all of the observation wells showed a slight increase in pressure. Because the vapor extraction test proved that this technology was not suited for this site, the air sparging test was conducted for only a short period of time. In that amount of time, however, a slight increase in positive pressure in each of the observation wells was measured.

## 2.7 July 2002 Soil and Goundwater Assessment

In July 2002, ASE drilled soil borings BH-D through BH-H at the site using a Geoprobe hydraulic sampling rig (Figure 2). This assessment was designed to further define the extent of soil and groundwater contamination in the former tank backfill and excavation area and in Harrison Street downgradient of the site. Soil samples collected from 15.5 and 19.5-foot bgs in borings BH-D through BH-G, and 18-foot bgs in boring BH-H were selected for analysis. The



former UST excavation and overexcavation extended to a depth of approximately 11-feet bgs. Soil samples collected beneath this depth in the previous UST and overexcavation area contained elevated TPH-G, BTEX and/or MTBE concentrations. The highest concentrations were in boring BH-E, which contained up to 2,100 ppm TPH-G, 7.3 ppm benzene, 47 ppm toluene, 41 ppm ethylbenzene, 200 ppm total xylenes, and 40 ppm MTBE. Elevated TPH-G, BTEX and MTBE concentrations were also detected in groundwater samples collected from these same borings. The highest concentrations detected in groundwater were 63,000 ppb TPH-G, 8,600 ppb benzene, 3,700 ppb toluene, 2,800 ppb ethylbenzene, 8,800 ppb total xylenes, and 86,000 ppb MTBE.

No hydrocarbons were detected in soil and groundwater samples collected from boring BH-G at concentrations exceeding Risk Based Screening Levels (RBSLs). No hydrocarbons were detected in soil and groundwater samples collected from off-site, downgradient boring BH-H.

## 2.8 Quarterly Groundwater Monitoring

Since December 1998, ASE has collected and analyzed groundwater samples from all site wells on a quarterly basis. Groundwater elevation data during this period is tabulated in Table One. Hydrocarbon concentrations in groundwater during this period are tabulated in Table Two. The groundwater flow direction at the site has been consistently to the southwest during this period.

## 2.9 May 2003 Workplan for Chemical Oxidation Pilot Study

In May 2003, ASE prepared a workplan to conduct a chemical oxidation pilot study at the site. The pilot study was to inject hydrogen peroxide into soil and groundwater beneath the site to destroy hydrocarbon chains using Fenton's Chemistry. The workplan was approved by the ACHCSA and costs were pre-approved by the California State Underground Storage Tank Cleanup Fund. However, the UST Cleanup Fund recommended not completing this pilot study as they were concerned that contamination from the upgradient Unocal Service Station may recontaminate the site. They further suggested that these sites be placed into the co-mingled plume fund.

## **3.0 CONDUIT AND POTENTIAL PREFERENTIAL PATHWAY STUDY**

This study was conducted by reviewing Underground Service Alert (USA) markings in the site vicinity, reviewing as-built drawings supplied by the city, and contacting individuals that would have knowledge of the individual utility lines. Figure 3 presents the location of all known utility lines in the site vicinity. The location of the water line beneath Harrison Street was not marked but is known to exist beneath the site based on marking from service boxes in the sidewalk areas. Therefore, this water line is shown as dashed on the map. A discussion of each type of line is presented below along with an evaluation as to whether each line could present a potential preferred pathway for the movement of groundwater contamination.



### 3.1 Water Lines

Water lines in the site vicinity belong to the East Bay Municipal Utility District (EBMUD). ASE spoke with Surg Perentiff of EBMUD regarding the lines in the site vicinity. Mr. Perentiff stated that the bottoms of the water lines in the site vicinity are between 3 and 4-feet deep with little or no pitch. Since the shallowest groundwater measured at the site since the project began was 12.3-feet bgs, the water lines and their trench backfill will not present a preferential pathway for the movement of groundwater in the site vicinity.

### 3.2 Natural Gas Lines

Natural gas lines in the site vicinity belong to Pacific Gas and Electric (PG&E). ASE spoke with John Nunes of PG&E regarding the depth of natural gas lines in the site vicinity. Mr. Nunes did not have specific depths of the lines in 8<sup>th</sup>, 7<sup>th</sup>, Alice and Harrison Streets, but he stated the lines are typically 4-feet deep in the downtown Oakland area.

Since the shallowest groundwater measured at the site since the project began was 12.3-feet bgs, the gas lines and their trench backfill will not present a preferential pathway for the movement of groundwater in the site vicinity.

### 3.3 Electric Lines

Electric lines in the site vicinity belong to PG&E. ASE spoke with John Nunes of PG&E regarding the depth of electric lines in the site vicinity. Mr. Nunes did not have specific depths of the lines in 8<sup>th</sup>, 7<sup>th</sup>, Alice and Harrison Streets, but he stated the lines are typically 4-feet deep in the downtown Oakland area unless placed in a joint trench. If in a joint trench, the lines may be slightly deeper. No information is available on the backfill material used. Since the shallowest groundwater measured at the site since the project began was 12.3-feet bgs, the electric lines and their trench backfill will not present a preferential pathway for the movement of groundwater in the site vicinity.

### 3.4 Telephone Lines

The telephone lines in the site vicinity belong to AT&T (previously Pacific Bell, then SBC). AT&T will not provide depth information on their lines, although they have previously stated that they do not bury lines deeper than 3 to 6-feet below grade unless they have to trench under other buried lines. Based on this information, this line will not present a conduit for the preferential flow of groundwater since the shallowest groundwater has been measured at the site since the project began was 12.3-feet bgs.

### 3.5 Cable Television Lines

The cable television lines in the City of Oakland belong to Comcast. ASE made several attempts to contact Comcast regarding their lines in the site vicinity, but none of our phone calls were





returned. ASE's past experience with cable television lines is that they are buried very shallow (no deeper than 3-feet bgs). Based on the depth to groundwater in the site vicinity, it is ASE's opinion that it is highly unlikely that cable television lines and their trench backfill will present at potential conduit for the preferential flow of groundwater in the site vicinity.

### 3.6 Sanitary Sewer Lines

The City of Oakland sewer maps show a sanitary sewer line just south of the center of 8<sup>th</sup> Street, and both sanitary and storm sewers running just west of the center of Harrison and Alice Streets. A sanitary sewer line also runs down a portion of 7<sup>th</sup> Street between Harrison and Alice Streets, but not the portion directly downgradient of the site. Available drawings for these lines are presented in Appendix A.

An 8-inch diameter sanitary sewer runs beneath 8<sup>th</sup> Street and is 10.1-foot deep at the intersection of 8<sup>th</sup> and Harrison Streets. The sewer line beneath Harrison Street is also 8-inches in diameter and pitches to the south. At the intersection of Harrison Street and 7<sup>th</sup> Street the sanitary sewer line is approximately 13.1-foot deep. The pitches of the lines are shown on Figure 3. The backfill material is unknown.

Since the shallowest groundwater measurement at the site since the project began was 12.3-foot bgs, the sanitary sewer line lies above the water table beneath 8<sup>th</sup> Street adjacent to the site. However, at 7<sup>th</sup> Street, a half block downgradient of the site, the sanitary sewer line beneath Harrison Street lies at a depth where, during periods of extremely high water levels, the sanitary sewer could be potentially at depths below the water table. Since ASE began measurements in December 1998, water levels were only as high as the bottom of the sewer line during a single measurement (April 2006). It also appears that trench plugs were placed at the intersections of both 8<sup>th</sup> and Harrison Streets and 7<sup>th</sup> and Harrison Streets to prevent the movement of groundwater through the trenches. Based on this information, it is possible, though not likely, that the sewer line trenches beneath Harrison Street could provide a preferred pathway for the movement of groundwater during rare periods of extremely high water levels.

### 3.7 Storm Water Sewer Lines

The City of Oakland sewer maps show storm sewers running beneath the centers of Alice and Harrison Streets. Available drawings for these lines are presented in Appendix A. No storm sewer is located beneath 8<sup>th</sup> and 7<sup>th</sup> Streets.

The storm sewer line beneath Alice Street is 18-inches in diameter and approximately 14-foot deep at the corner of 8<sup>th</sup> Street and Alice Street. The pitch of the line is shown on Figure 3. The backfill material is unknown. Since the shallowest groundwater measured at the site since the project began was 12.3-foot bgs, the storm sewer line lies below the water table during periods of extremely high water levels. At typical water levels (15 to 16-foot bgs), this line is above the water table. This line is well crossgradient of the site and does not appear to have been impacted from hydrocarbons with a source on the 726 Harrison Street site.



The storm sewer line beneath Harrison Street is 14-inches in diameter and is approximately 10-foot bgs for the entire block between 7<sup>th</sup> and 8<sup>th</sup> Streets. The pitch of the line is shown on Figure 3. The backfill material is unknown. Since the shallowest groundwater measured at the site since the project began was 12.3-foot bgs, this storm sewer line and its trench backfill will not present a preferential pathway for the movement of groundwater.

#### **4.0 AREA WELL SURVEY**

ASE conducted an area well survey to locate water wells within a 2,000-foot radius of the site. Records were reviewed from the California Department of Water Resources (DWR) and Alameda County Public Works Agency (ACPWA). ASE also had knowledge of several wells not located in the DWR and ACPWA records. The locations of all of the wells located are shown on Figure 4. Information regarding the wells is tabulated in Table Three.

A total of 166 wells are located within the study area. Of these wells, 136 are listed as monitoring or test wells, 10 are listed as piezometers, one is listed as a cathodic protection well, two are listed as extraction wells (for remediation), five are listed as injection wells (for remediation), two are listed as vapor extraction wells, three were listed as vapor extraction/air sparging combination wells, one is an air sparging well, one is listed as a domestic well, one is listed as an abandoned well, two are listed as destroyed wells, and two are of unknown usage. Although listed as a domestic well, the well labeled as domestic is owned by Western Union and has a listed depth of 33-feet. Based on this information, it is highly unlikely that this well is used for groundwater consumption.

All but five of the wells are listed as shallower than 60-feet. The deeper wells include monitoring/test wells owned by the City of Oakland (wells 50 and 55 at 66 and 64-feet bgs, respectively), an abandoned well from the Moose Club (well 71 at 150-feet bgs), a test well from the Division of Highways (well 75 at 130-feet bgs), and a cathodic protection well owned by PG&E (well 81 at 120-feet bgs)

Based on all of the information known from these wells, (a) no water supply wells are located in the site vicinity, and (b) none of the other wells downgradient of the site appear to present a potential conduit for the downward movement of contamination.

#### **5.0 BRIEF CONCEPTUAL SITE MODEL**

The site has had a release of gasoline from the former USTs, piping or dispensers. Some overexcavation has taken place at the site, although the excavation did not extend into groundwater. Soil with relatively high concentrations of petroleum hydrocarbons lie beneath the depth of the previous USTs and the water table. This soil will continue to act as a source of groundwater contamination until remediated.



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The groundwater flow direction is consistently to the south-southwest, which is consistent with the groundwater flow direction at nearby sites. The extent of hydrocarbons is defined crossgradient to the east and west. Some of the hydrocarbons beneath the subject site appear to be related to an upgradient source (the Unocal Service Station at 800 Harrison Street) and hydrocarbons from the subject site appear to have contributed to contamination beneath the adjacent, downgradient former Arco Service Station at 706 Harrison Street.

Due to the depth of groundwater and the depth of the underground utility lines in the site vicinity, it does not appear that there are any preferential pathways for the migration of groundwater contamination during normal water table conditions. During very rare periods of very high water levels, it may be possible that the sanitary sewer beneath Harrison Street near 7<sup>th</sup> Street could act as a conduit for the preferential movement of groundwater.

There are no drinking water wells in the site vicinity.

Although the soil beneath appears relatively sandy, the soil has a clayey matrix and does not appear to be as permeable as might be expected. Previous remediation feasibility tests indicate that the site is not suitable for groundwater pump and treat, soil vapor extraction and air sparging. ASE has previously recommended performing a pilot test to conduct in-situ chemical oxidation. ASE still recommends conducting this pilot study, although as recommended by the UST Cleanup Fund, remediation should be performed at the upgradient property at 800 Harrison Street prior to or concurrently with remediation at the subject site to avoid the possibility of the site being recontaminated from an upgradient source.

## **6.0 OUTLINE OF PROPOSED SCOPE OF WORK (SOW)**

The directive letter from the ACHCSA dated August 23, 2007 requests borings be completed in various transects suggesting a lack of previous data for the site. However, this is a very small property and there is a substantial amount of data from previous on-site investigations, including borings through the former UST excavation and soil and groundwater samples from beneath the former USTs and overexcavation areas (see section 2.7 of this report). For this reason, ASE recommends (a) one soil boring on-site in an area of known soil and groundwater contamination to determine whether any deeper water-bearing zones may be contaminated, and (b) to determine the downgradient extent of groundwater contamination. The specific scope of work for this project is to:

- 1) Obtain a drilling permit from the Alameda County Public Works Agency.
- 2) Obtain an access agreement to allow for the drilling of soil borings downgradient of the site.
- 3) Contract with a subsurface utility locating service to clear drilling locations of underground utility lines.



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- 4) Drill two shallow soil borings downgradient of the site using a Geoprobe and collect soil and groundwater samples for analysis.
- 5) Drill one deeper soil boring on-site to a depth of 60-feet bgs to determine the vertical extent of hydrocarbons using a dual-walled sampler and collect soil samples for analysis. Discrete depth water samples will be collected from a second boring drilled immediately adjacent to the first using a Hydropunch.
- 6) Following collection of the soil and groundwater samples, backfill the borings described in tasks 4 and 5 with neat cement placed by tremie pipe.
- 7) Analyze soil and groundwater samples collected from the borings at a CAL-DHS certified analytical laboratory for TPH-G, BTEX, and fuel oxygenates by EPA Method 8260B.
- 8) Prepare a report presenting results from this assessment. This report will present tabulated analytical results, an updated conceptual site model, conclusions, and recommendations.

## **7.0 DETAILS OF PROPOSED SOW**

Details of the assessment are presented below.

### **TASK 1 - *OBTAIN A DRILLING PERMIT FROM THE ALAMEDA COUNTY PUBLIC WORKS AGENCY***

Prior to drilling, ASE will obtain a drilling permit from the Alameda County Public Works Agency.

### **TASK 2 - *OBTAIN AN ACCESS AGREEMENT TO DRILL OFF-SITE SOIL BORINGS***

Prior to drilling, ASE will obtain an access agreement from the property owner south of 7<sup>th</sup> Street to drill soil borings on this property.

### **TASK 3 - *CONTRACT WITH AN UNDERGROUND UTILITY LINE LOCATING SERVICE TO CLEAR BORING LOCATIONS OF UNDERGROUND UTILITY LINES***

ASE will contact Underground Service Alert (USA) at least 48 hours prior to drilling. ASE will also contract with a private underground utility locating service to pinpoint the location of utility lines in the drilling locations.



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**TASK 4 - *DRILL TWO SOIL BORINGS DOWNGRADIENT OF THE SITE AND COLLECT SOIL AND GROUNDWATER SAMPLES FROM THE BORINGS FOR ANALYSIS***

ASE will drill two soil borings downgradient of the former Arco Station at 706 Harrison Street. These borings will be used to determine the downgradient extent of contamination that may have originated from either of these sites. It is important to note that any contamination that may be detected in these downgradient borings may not have originated from the 726 Harrison Street site as the 706 Harrison Street site, with known soil and groundwater contamination, lies between these downgradient borings and the 726 Harrison Street site. These borings will be drilled using a Geoprobe or similar type direct-push drill rig. A qualified ASE geologist will direct the drilling.

Undisturbed soil samples will be collected continuously for subsurface hydrogeologic description and possible chemical analysis. The geologist will describe the soil according to the Unified Soil Classification System (USCS). Samples to be retained for analysis will be immediately removed from the sampler, 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-DHS certified analytical laboratory. Samples will be retained for analysis at least every 5-feet, in areas of obvious soil contamination and at each lithologic contact.

Soil from the remaining tubes not sealed for analysis will be removed for hydrogeologic description and will be screened for volatile compounds with a photoionization detector (PID). The soil will be screened by emptying soil from one of the tubes into a plastic bag. The bag will be sealed and placed in the sun for approximately 10 minutes. After the hydrocarbons have been allowed to volatilize, the PID will measure the vapor through a small hole, punched in the bag. These PID readings will be used as a screening tool only since these procedures are not as rigorous as those used in an analytical laboratory.

Once groundwater is encountered, a groundwater sample will be collected from the boring using a bailer. Groundwater samples will be decanted from the bailer into 40-ml volatile organic analysis (VOA) vials, preserved with hydrochloric acid and sealed without headspace. The samples will then be labeled with the site location, sample designation, date and time the samples were collected, and the initials of the person collecting the samples. The samples will then be sealed in plastic bags and cooled in an ice chest with wet ice for transport to a state-certified analytical laboratory under chain-of-custody.

All sampling equipment will be cleaned in buckets with brushes and an Alconox solution, and then rinsed twice with tap water. Rinsates will be contained on-site in 55-gallon steel drums and stored on-site until off-site disposal can be arranged.



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**TASK 5 - *DRILL ONE SOIL BORING TO 60-FEET BGS AND COLLECT SOIL AND GROUNDWATER SAMPLES FROM THE BORING FOR ANALYSIS***

ASE will drill one soil boring on-site to a depth of 60-feet bgs in an area of known soil and groundwater contamination to verify the vertical extent of hydrocarbons at the site. The boring will be drilled using a Geoprobe or similar type drill rig. A qualified ASE geologist will direct the drilling.

The soil boring will be drilled using a dual-wall sampler to a depth of 60-feet bgs collecting soil samples continuously. The dual-wall sampler allows the boring to advance with an external conductor casing to minimize potential cross-contamination into deeper water-bearing zones. Undisturbed soil samples will be collected continuously for subsurface hydrogeologic description and possible chemical analysis. The internal drive sampler is lined with acetate tubes and the internal sampler will be removed and then replaced after each sampling run.

The geologist will describe the soil according to the USCS. Samples to be retained for analysis will be immediately removed from the sampler, 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-DHS certified analytical laboratory. Samples will be retained for analysis at least every 5-feet, in areas of obvious soil contamination and at each lithologic contact.

Soil from the remaining tubes not sealed for analysis will be removed for hydrogeologic description and will be screened for volatile compounds with a photoionization detector (PID). The soil will be screened by emptying soil from one of the tubes into a plastic bag. The bag will be sealed and placed in the sun for approximately 10 minutes. After the hydrocarbons have been allowed to volatilize, the PID will measure the vapor through a small hole, punched in the bag. These PID readings will be used as a screening tool only since these procedures are not as rigorous as those used in an analytical laboratory.

Once the lithology is known, ASE will collect groundwater samples from a second boring drilled immediately adjacent to the first boring. Groundwater samples will be collected from targeted zones using a Hydropunch sampler. Target sampling locations will include at least one location from each identified water-bearing zone. If water-bearing zones are greater than 5-feet in thickness, then multiple samples will be collected from the zones at vertical intervals of 10-feet.

The Hydropunch will be driven into the targeted sampling zone. The Hydropunch sampler will be checked to verify that there has been no leakage of groundwater into the rods prior to opening. Once the rods are shown to be dry, the Hydropunch screen will be opened and groundwater will be allowed to enter the rods. Groundwater samples will then be collected from within the rods using a bailer. Groundwater samples will then be decanted from the bailer into 40-ml volatile organic analysis (VOA) vials, preserved with hydrochloric acid and sealed without headspace. The samples will then be labeled with the site location, sample designation, date and time the



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samples were collected, and the initials of the person collecting the samples. The samples will then be sealed in plastic bags and cooled in an ice chest with wet ice for transport to a state-certified analytical laboratory under chain-of-custody.

All sampling equipment will be cleaned in buckets with brushes and an Alconox solution, and then rinsed twice with tap water. Rinsates will be contained on-site in 55-gallon steel drums and stored on-site until off-site disposal can be arranged.

If the extent of groundwater contamination is not defined (either laterally or vertically) based on these samples, then additional borings will be drilled to complete these definitions. If deeper drilling is required to complete the vertical definition, then ASE will likely utilize Cone Penetrometer Testing (CPT) for the deeper boring.

*TASK 6 - BACKFILL THE BORINGS WITH NEAT CEMENT*

Following collection of the soil and groundwater samples, the boreholes described in Tasks 4 and 5 will be backfilled with neat cement placed by tremie pipe.

*TASK 7 - ANALYZE SOIL AND GROUNDWATER SAMPLES COLLECTED FROM THE BORINGS*

At least one soil and one groundwater sample from each soil boring will be analyzed at a CAL-DHS certified environmental laboratory for TPH-G, BTEX, and five oxygenates by EPA Method 8260B. For the off-site borings, the soil sample selected for analysis will be the sample that appears to be most contaminated based on odors, staining, and or PID readings. If there is no evidence of contamination, then the sample collected from the capillary zone will be selected for analysis. If there appears to be significant contamination in any of the borings, then all of the samples collected in the area that appears contaminated will be analyzed, as well as the samples above and below the contamination. In the deeper soil boring, all of the samples that appear to be contaminated based on odors, staining, and or PID readings will be selected for analysis, as well as both soil and groundwater samples collected at 10-foot intervals to the total depth of the boring.

*TASK 8 - PREPARE A SUBSURFACE ASSESSMENT REPORT*

ASE will prepare a subsurface assessment report presenting the methods and findings of this assessment. This report will include a summary of the results, the site background and history, tabulated soil and groundwater analytical results, an updated conceptual site model, conclusions and recommendations. Formal boring logs, analytical reports, and chain of custody documents will be included as appendices. The report will also include at least two geologic cross-sections, with one of the cross-sections oriented north - south that includes data from the 800 Harrison Street site, the subject site at 726 Harrison Street, the former Arco Station at 706 Harrison Street, and the downgradient borings across 7<sup>th</sup> Street. This report will be submitted under the seal of a California professional civil engineer or geologist.



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## 8.0 SCHEDULE

ASE will proceed with this project immediately upon approval of this workplan by the ACHCSA. Depending on the difficulty to obtain an access agreement, ASE anticipates drilling the soil borings in the month of January 2008. ASE anticipates submitting the report in March 2008. This schedule is of course contingent on timely approval of this workplan by the ACHCSA.

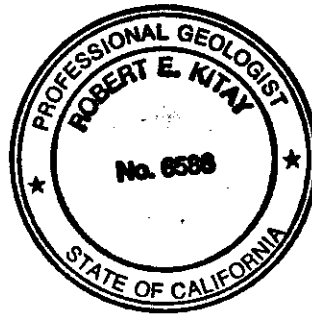
Should you have any questions or comments, please call us at (925) 820-9391.

Respectfully submitted,

AQUA SCIENCE ENGINEERS, INC.

A handwritten signature in black ink, appearing to read 'Robert E. Kitay', written in a cursive style.

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



cc: Mr. Peter Yee, 1000 San Antonio Avenue, Alameda, CA 94501

Mr. Steven Plunkett, Alameda County Health Care Services Agency, 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 94502



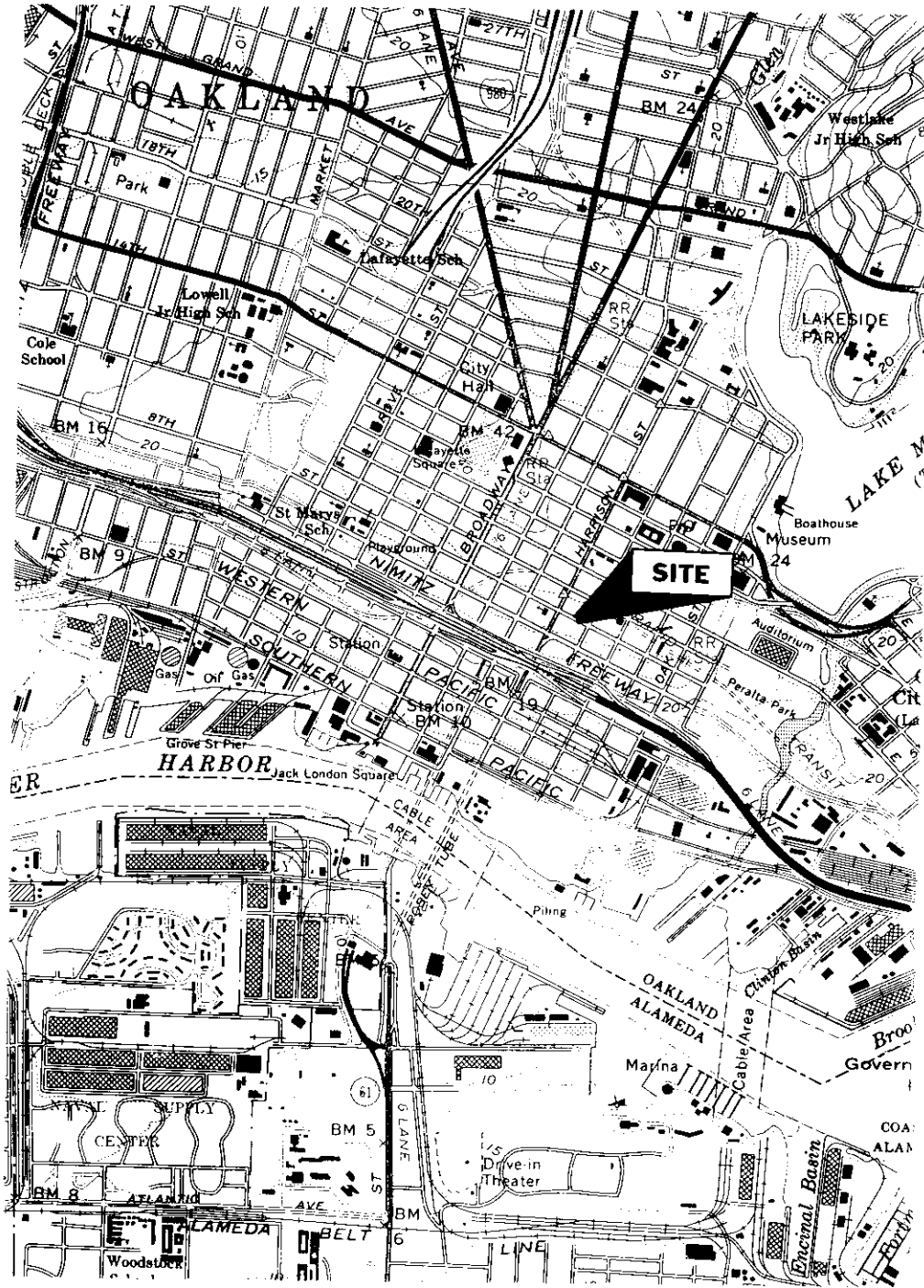


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## **FIGURES**



NORTH

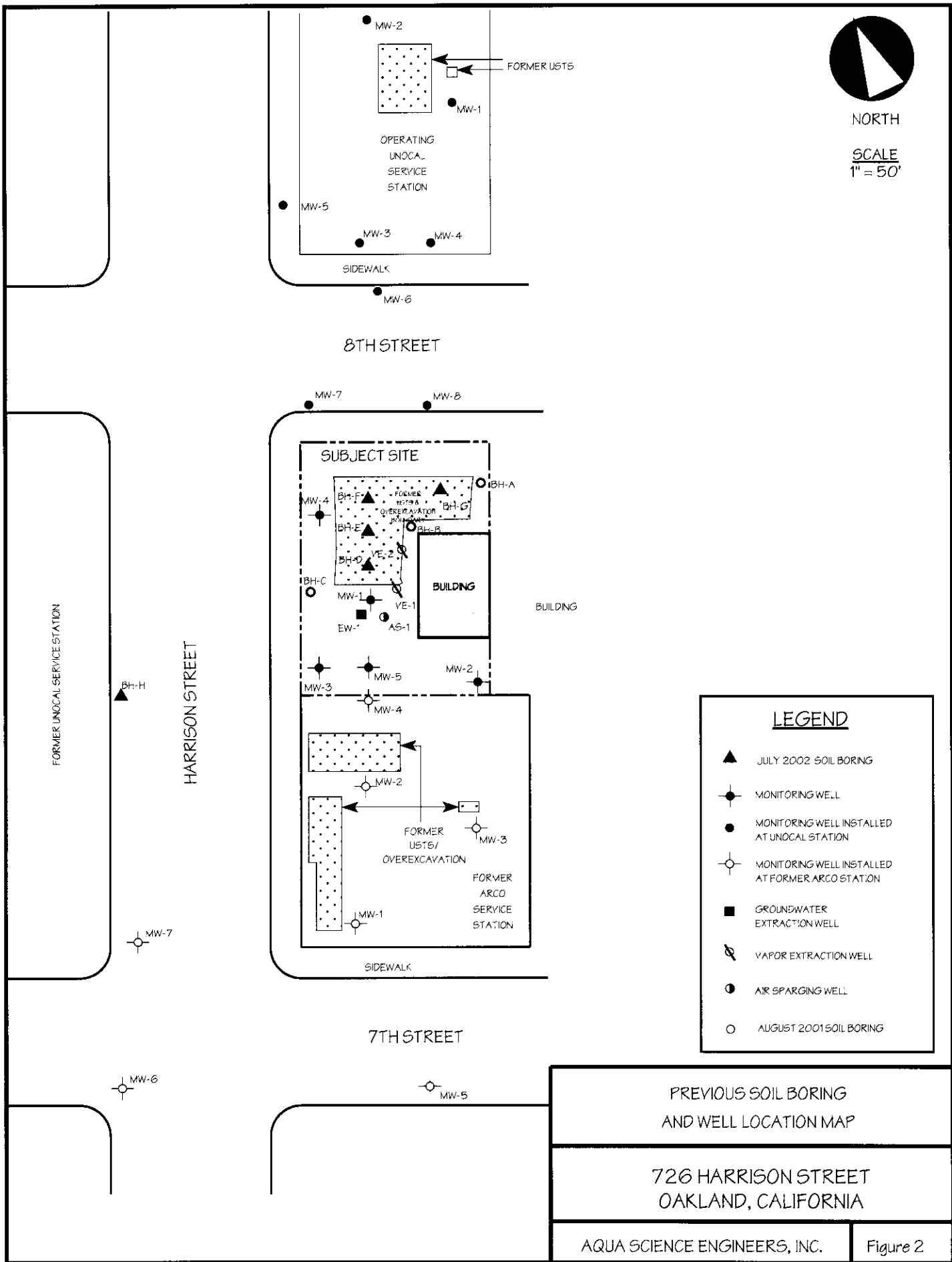


<b>SITE LOCATION MAP</b>	
YEE PROPERTY 726 HARRISON STREET OAKLAND, CALIFORNIA	
AQUA SCIENCE ENGINEERS	Figure 1



NORTH

SCALE  
1" = 50'



**LEGEND**

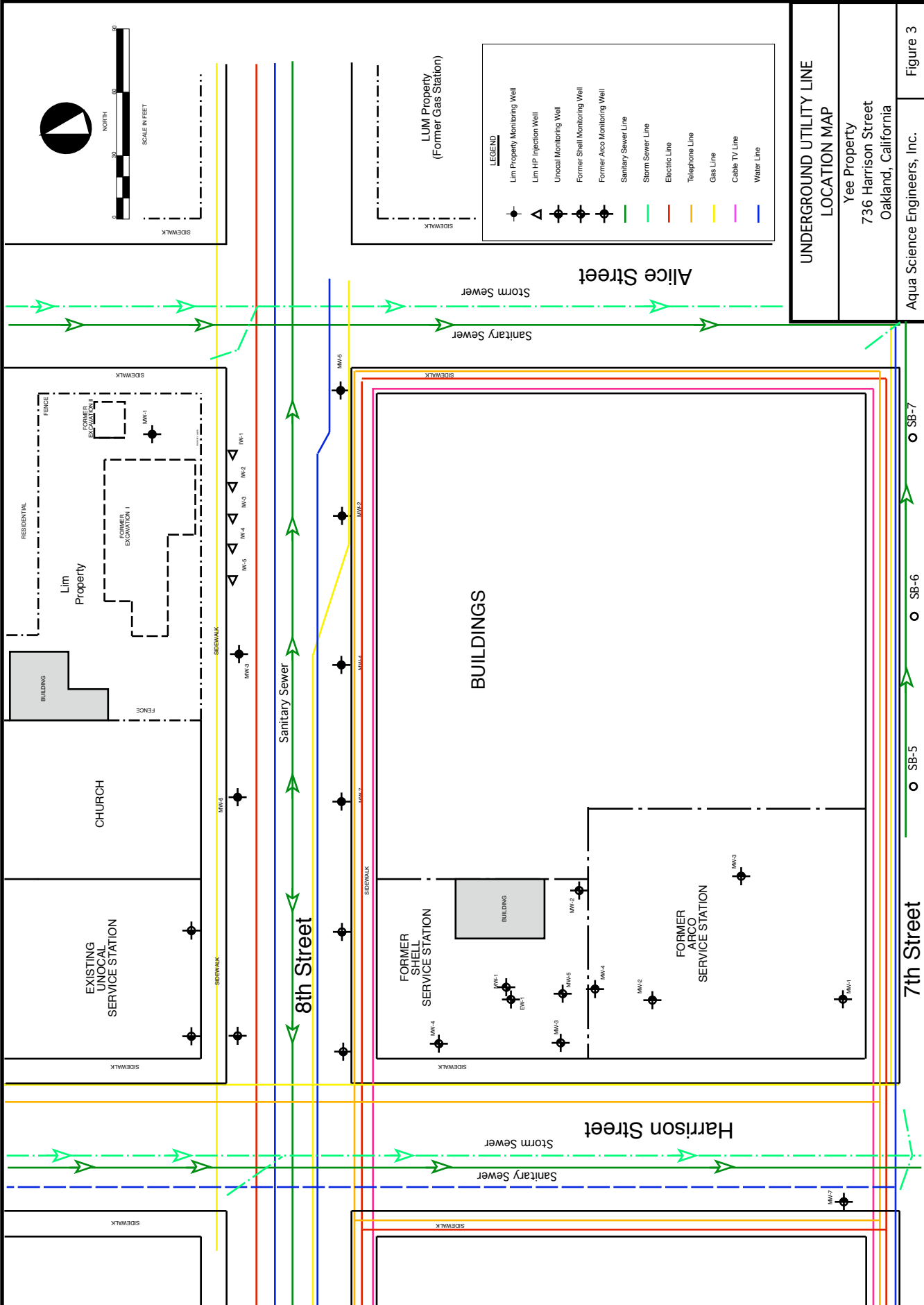
- ▲ JULY 2002 SOIL BORING
- ⊕ MONITORING WELL
- MONITORING WELL INSTALLED AT UNOCAL STATION
- ⊕ MONITORING WELL INSTALLED AT FORMER ARCO STATION
- GROUNDWATER EXTRACTION WELL
- ⊕ VAPOR EXTRACTION WELL
- AIR SPARGING WELL
- AUGUST 2001 SOIL BORING

PREVIOUS SOIL BORING  
AND WELL LOCATION MAP

726 HARRISON STREET  
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS, INC.

Figure 2



SCALE IN FEET  
0 10 20 30

LUM Property  
(Former Gas Station)

**LEGEND**

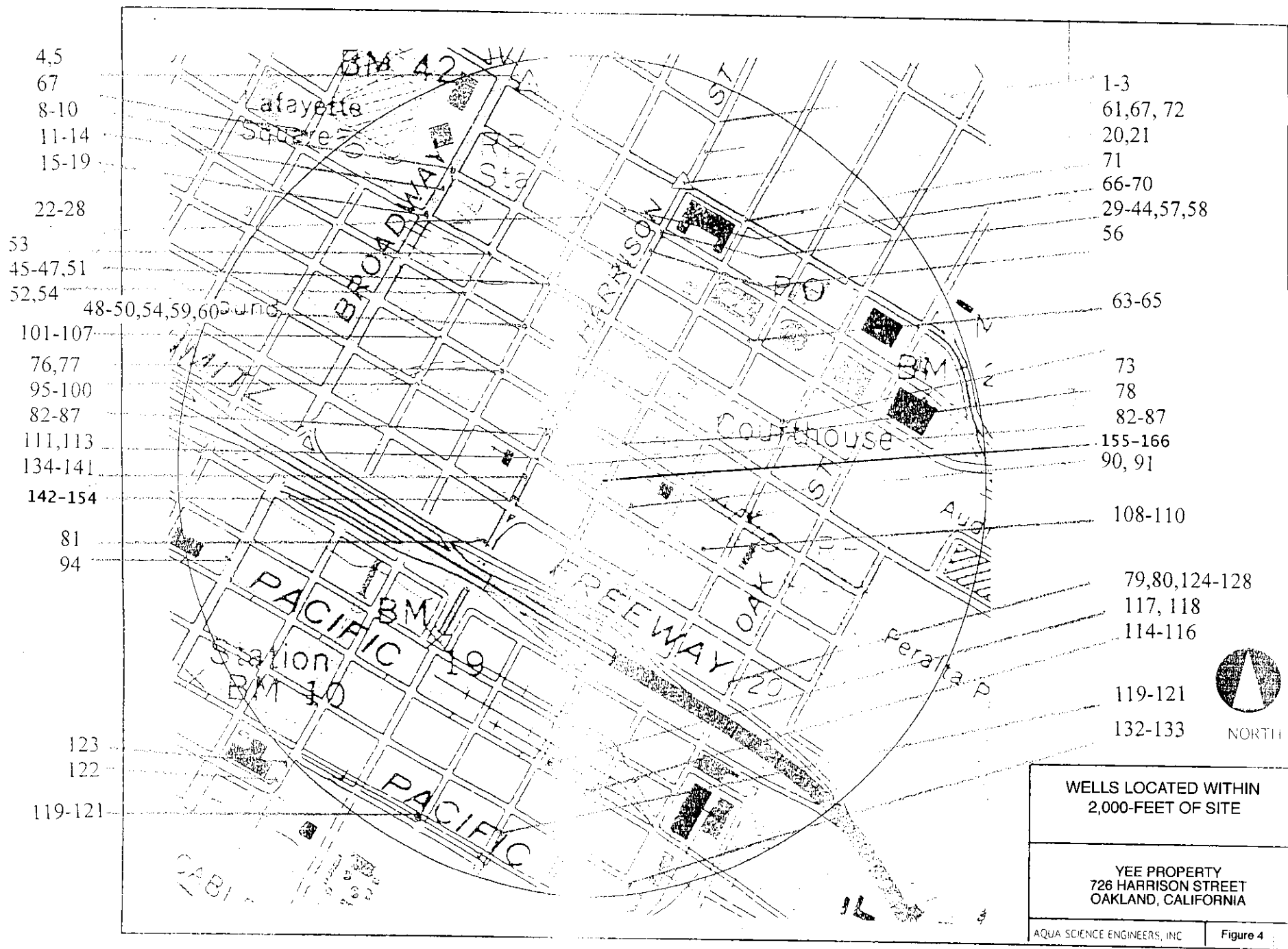
- Lim Property Monitoring Well
- ▲ Lim HP Injection Well
- ◆ Unocal Monitoring Well
- ◆ Former Shell Monitoring Well
- ◆ Former Arco Monitoring Well
- Sanitary Sewer Line
- Storm Sewer Line
- Electric Line
- Telephone Line
- Gas Line
- Cable TV Line
- Water Line

**UNDERGROUND UTILITY LINE  
LOCATION MAP**

Yee Property  
736 Harrison Street  
Oakland, California

Figure 3

Aqua Science Engineers, Inc.

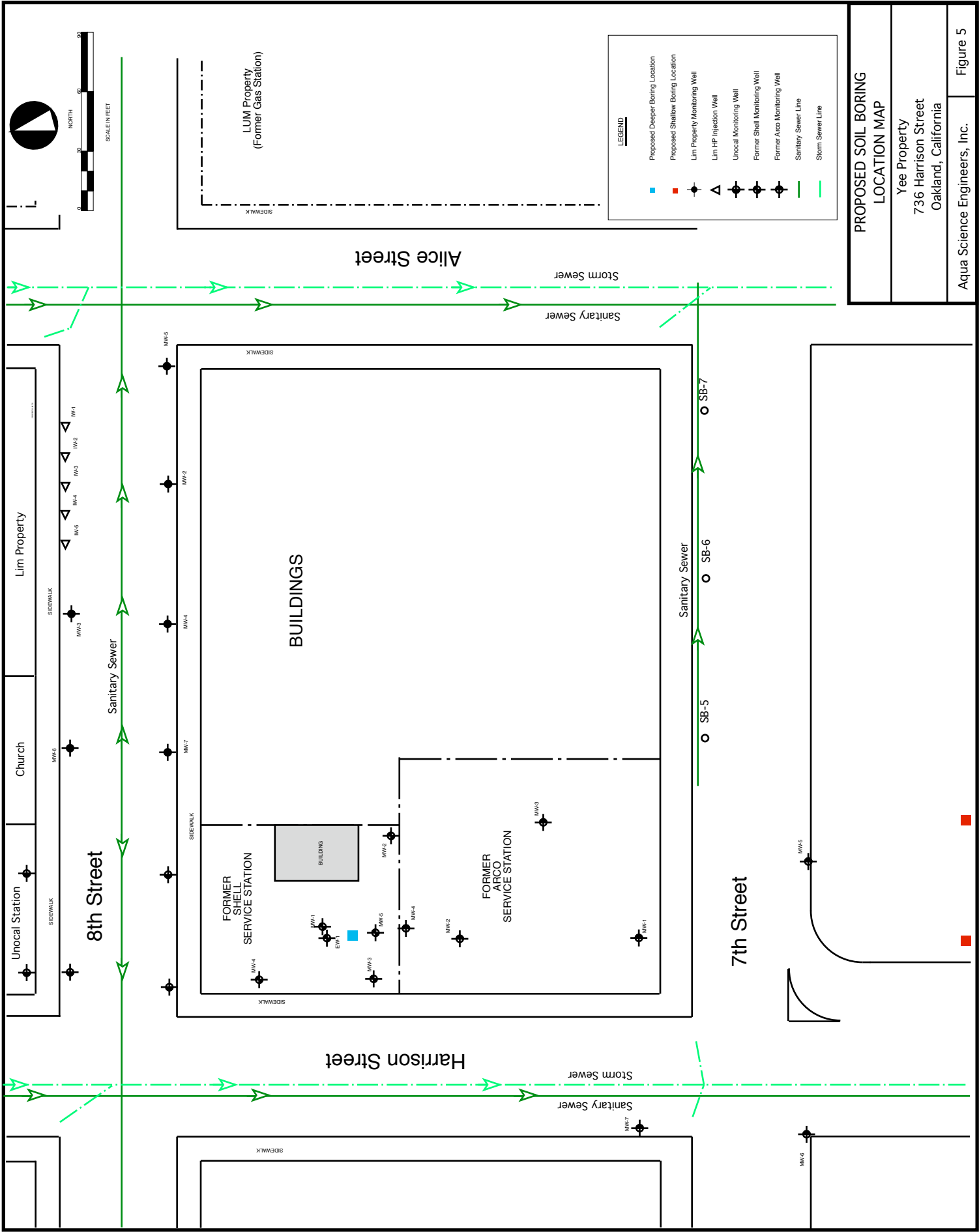


WELLS LOCATED WITHIN  
2,000-FEET OF SITE

YEE PROPERTY  
726 HARRISON STREET  
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS, INC

Figure 4



**PROPOSED SOIL BORING LOCATION MAP**  
 Yee Property  
 736 Harrison Street  
 Oakland, California  
 Aqua Science Engineers, Inc. Figure 5



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## **TABLES**

**TABLE ONE**  
**Groundwater Elevation Data**  
**Yee Property**  
**726 Harrison St., Oakland, CA**

Well ID	Date of Measurement	Top of Casing Elevation (Relative to Mean Sea Level)	Depth to Water (feet)	Groundwater Elevation (project data)
MW-1	12/15/98	31.95*	17.32	14.63
	3/4/99		15.52	16.43
	6/17/99		16.9	15.05
	8/27/99		17.39	14.56
	12/9/99		18.03	13.92
	3/7/00		15.11	16.84
	6/7/00		16.66	15.29
	10/11/00		18.08	13.87
	1/18/01		17.96	13.99
	4/5/01		16.35	15.60
	7/17/01	16.94	15.01	
	10/5/01	28.98	17.35	11.63
	1/18/02		15.40	13.58
	4/11/02		15.76	13.22
	7/8/02		16.17	12.81
	10/9/02		16.72	12.26
	1/29/03		16.26	12.72
	4/11/03		16.56	12.42
	7/18/03		16.42	12.56
	10/9/03		16.88	12.10
	1/28/04		16.10	12.88
	4/7/04	15.43	13.55	
	7/23/04	16.41	12.57	
	10/12/04	17.73	11.25	
	1/29/05	15.02	13.96	
	4/28/05	14.99	13.99	
	7/19/05	16.36	12.62	
	10/18/05	17.82	11.16	
	1/23/06	15.80	13.18	
	4/12/06	13.24	15.74	
	7/10/06	15.64	13.34	
10/16/06	17.51	11.47		
1/26/07	18.36	10.62		
4/18/07	17.79	11.19		
8/2/07	18.20	10.78		
MW-2	12/15/98	32.40*	18.03	14.37
	3/4/99		16.11	16.29
	6/17/99		17.72	14.68
	8/27/99		Inaccessible	
	12/9/99		Inaccessible	
	3/7/00		Inaccessible	
	6/7/00		17.67	14.73
	10/11/00		18.91	13.49
	1/18/01		18.66	13.74
	4/5/01		16.97	15.43
	7/17/01	17.54	14.86	
	10/5/01	29.44	17.98	11.46
	1/18/02		15.87	13.57
	4/11/02		16.36	13.08
	7/8/02		16.72	12.72
	10/9/02		17.33	12.11
	1/29/03		16.82	12.62
	4/11/03		17.15	12.29
	7/18/03		17.05	12.39
	10/9/03		17.52	11.92
	1/28/04		16.70	12.74
	4/7/04	16.02	13.42	
	7/23/04	Inaccessible		
	10/12/04	17.31	12.13	
	1/29/05	15.46	13.98	
	4/28/05	15.79	13.65	
	7/19/05	17.25	12.19	
	10/18/05	17.72	11.72	
	1/23/05	15.65	13.79	
	4/12/06	Inaccessible		
	7/10/06	16.58	12.86	
10/16/06	18.33	11.11		
1/26/07	19.21	10.23		
4/18/07	18.58	10.86		
8/2/07	19.02	10.42		



**TABLE ONE**  
**Groundwater Elevation Data**  
**Yee Property**  
**726 Harrison St., Oakland, CA**

Well ID	Date of Measurement	Top of Casing Elevation (Relative to Mean Sea Level)	Depth to Water (feet)	Groundwater Elevation (project data)
MW-3	12/15/98	31.61*	17.26	14.35
	3/4/99		15.47	16.14
	6/17/99		16.92	14.69
	8/27/99		17.40	14.21
	12/9/99		18.01	13.60
	3/7/00		16.15	15.46
	6/7/00		16.85	14.76
	10/11/00		18.07	13.54
	1/18/01		17.89	13.72
	4/5/01		16.21	15.40
	7/17/01	16.90	14.71	
	10/5/01	28.64	17.32	11.32
	1/18/02		15.35	13.29
	4/11/02		15.82	12.82
	7/8/02		16.15	12.49
	10/9/02		16.67	11.97
	1/29/03		16.19	12.45
	4/11/03		16.49	12.15
	7/18/03		16.42	12.22
	10/9/03		16.80	11.84
	1/28/03		15.94	12.70
	4/7/04	15.28	13.36	
	7/23/04	16.15	12.49	
	10/12/04	16.63	12.01	
	1/29/05	16.15	12.49	
	4/28/05	14.94	13.70	
	7/19/05	16.25	12.39	
	10/18/05	16.76	11.88	
	1/23/06	15.81	12.83	
	4/12/06	13.22	15.42	
	7/10/06	15.49	13.15	
	10/16/06	17.46	11.18	
1/26/07	18.02	10.62		
4/18/07	17.75	10.89		
8/2/07	18.38	10.26		
MW-4	12/15/98	32.53*	17.59	14.94
	3/4/99		15.88	16.65
	6/17/99		17.14	15.39
	8/27/99		17.65	14.88
	12/9/99		18.28	14.25
	3/7/00		15.41	17.12
	6/7/00		17.09	15.44
	10/11/00		18.33	14.20
	1/18/01		18.23	14.30
	4/5/01		16.69	15.84
	7/17/01	17.32	15.21	
	10/5/01	29.58	17.71	11.87
	1/18/02		15.85	13.73
	4/11/02		16.14	13.44
	7/8/02		16.56	13.02
	10/9/02		17.09	12.49
	1/29/03		16.65	12.93
	4/11/03		16.93	12.65
	7/18/03		16.78	12.80
	10/9/03		17.26	12.32
	1/28/04		16.38	13.20
	4/7/04	15.64	13.94	
	7/23/04	16.58	13.00	
	10/12/04	Inaccessible		
	1/29/05	14.90	14.68	
	4/28/05	15.18	14.40	
	7/19/05	16.48	13.10	
	10/18/05	16.99	12.59	
	1/23/06	15.09	14.49	
	4/12/06	13.49	16.09	
	7/10/06	14.99	14.59	
	10/16/06	17.29	12.29	
1/26/07	18.17	11.41		
4/18/07	18.06	11.52		
8/2/07	18.45	11.13		

**TABLE ONE**  
**Groundwater Elevation Data**  
**Yee Property**  
**726 Harrison St., Oakland, CA**

Well ID	Date of Measurement	Top of Casing Elevation (Relative to Mean Sea Level)	Depth to Water (feet)	Groundwater Elevation (project data)
<b>MW-5</b>	8/29/01	29.06	17.42	11.64
	1/18/02		15.68	13.38
	4/11/02		16.17	12.89
	7/8/02		16.51	12.55
	10/9/02		17.10	11.96
	1/29/03		16.58	12.48
	4/11/03		16.87	12.19
	7/18/03		16.77	12.29
	10/9/03		17.21	11.85
	1/28/04		16.34	12.72
	4/7/04		15.38	13.68
	7/23/04		16.55	12.51
	10/12/04		17.02	12.04
	1/29/05		15.23	13.83
	4/28/05		15.41	13.65
	7/19/05		16.79	12.27
	10/18/05		17.28	11.78
	1/23/06		15.28	13.78
	4/12/06		13.66	15.40
	7/10/06		16.14	12.92
10/16/06		19.33	9.73	
1/26/07		18.94	10.12	
4/18/07		18.21	10.85	
8/2/07			<b>19.00</b>	<b>10.06</b>

\* Top of casing elevation relative to arbitrary project datum

**TABLE TWO**  
**Summary of Analytical Results for GROUNDWATER Samples**  
**Yee Property**  
**726 Harrison St., Oakland, CA**  
**All results are in parts per billion (ppb)**

Well ID & Dates Sampled	TPH-G	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-1</b>						
7/3/97	18,000	2,700	350	450	900	7,400
12/5/98	18,000	1,500	270	260	560	14,000
3/4/99	44,000	2,800	400	440	960	43,000
6/17/99	33,000	2,200	250	460	660	25,000
8/27/99	6,000	1,000	97	190	230	14,000/ 16,000*
12/9/99	15,000	1,500	160	220	420	17,000
3/7/00	9,300	1,500	210	66	530	12,000
6/7/00	26,000**	1,700	< 250	360	580	30,000
10/11/00	13,000**	1,600	< 100	140	160	19,000
1/18/01	14,000**	450	< 100	110	230	9,600
4/5/01	38,000	2,200	180	290	590	35,000
7/17/01	35,000**	1,800	< 100	300	170	35,000
10/5/01	17,000	1,500	210	420	790	27,000
1/18/02	18,000	1,500	120	160	220	22,000
4/11/02	41,000	2,700	210	340	380	30,000
7/8/02	36,000	2,800	140	360	300	31,000
10/9/02	30,000	1,700	310	< 100	< 100	19,000
1/29/03	26,000	2,400	< 100	310	520	20,000
4/11/03	22,000	1,700	< 100	270	580	16,000
7/18/03	40,000	3,200	290	480	830	39,000
10/9/03	54,000**	3,300	< 130	350	310	49,000
1/28/04	26,000***	3,000	310	420	800	31,000
4/7/04	33,000***	2,800	130	310	310	39,000
7/23/04	56,000***	4,500	< 250	390	< 500	53,000
10/12/04	25,000***	1,400	< 250	< 250	< 500	25,000
1/29/05	24,000	1,600	< 100	160	< 200	19,000
4/28/05	< 10,000	2,000	< 100	160	100	34,000
7/19/05	37,000	2,100	83	210	230	28,000
10/18/05	37,000	1,300	< 250	< 250	< 250	23,000
1/24/06	23,000	780	< 100	160	260	11,000
4/12/06	11,000	1,500	87	360	670	17,000
7/10/06	72,000	4,700	< 250	350	< 500	66,000
10/16/06	26,000	1,600	< 250	330	< 500	22,000
1/26/07	7,200	1,500	< 70	140	96	34,000
4/18/07	5,400	1,100	< 50	200	120	21,000
<b>8/2/07</b>	<b>6,600</b>	<b>1,500</b>	<b>64</b>	<b>240</b>	<b>190</b>	<b>32,000</b>

**TABLE TWO**  
**Summary of Analytical Results for GROUNDWATER Samples**  
**Yee Property**  
**726 Harrison St., Oakland, CA**  
**All results are in parts per billion (ppb)**

Well ID & Dates Sampled	TPH-G	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-2</b>						
12/5/98	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
3/4/99	Inaccessible due to car parked over well					
6/17/99	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
8/27/99	Inaccessible due to car parked over well					
12/9/99	Inaccessible due to car parked over well					
3/7/00	Inaccessible due to car parked over well					
6/7/00	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
10/11/00	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
1/18/01	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
4/5/01	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
7/17/01	No longer sampled					
7/10/06	< 50	< 0.50	< 0.50	< 0.50	< 1.0	4.5
10/16/07	< 50	< 0.50	< 0.50	< 0.50	< 1.0	< 0.5
1/26/07	< 50	0.55	1.0	< 0.50	1.4	0.97
4/18/07	< 50	1.5	2.6	0.93	3.2	0.64
<b>8/2/07</b>	<b>&lt; 50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>2.2</b>

**TABLE TWO**  
**Summary of Analytical Results for GROUNDWATER Samples**  
**Yee Property**  
**726 Harrison St., Oakland, CA**  
**All results are in parts per billion (ppb)**

Well ID & Dates Sampled	TPH-G	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-3</b>						
12/5/98	6,500	< 50	50	60	502	3,900
3/4/99	2,800	< 25	< 25	< 25	< 25	1,600
6/17/99	1,000	< 10	< 10	< 10	< 10	1,400
8/27/99	230	< 0.5	0.51	0.5	1	1,500/ 1,600*
12/9/99	870**	< 0.5	< 0.5	< 0.5	< 0.5	2,100
3/7/00	150**	4	< 0.5	< 0.5	< 0.5	830
6/7/00	140**	< 0.5	< 0.5	< 0.5	< 0.5	1,100
10/11/00	620**	< 5.0	< 5.0	< 5.0	< 5.0	1,500
1/18/01	1,200**	< 5.0	< 5.0	< 5.0	< 5.0	1,000
4/5/01	1,700**	< 5.0	< 5.0	< 5.0	< 5.0	1,900
7/17/01	1,400**	< 10	< 10	< 10	< 10	1,700
10/5/01	< 1,000	< 10	< 10	< 10	< 10	1,700
1/18/02	1,600	26	20	16	54	2,100
4/11/02	2,600	21	16	< 10	21	2,300
7/8/02	2,800	< 10	< 10	< 10	< 10	3,800
10/9/02	6,000	< 50	< 50	< 50	< 50	4,900
1/29/03	1,800	< 10	< 10	< 10	< 10	2,300
4/11/03	2,900	< 25	< 25	< 25	< 25	3,100
7/18/03	3,400	< 10	< 10	< 10	< 10	3,200
10/9/03	2,300	< 10	< 10	< 10	< 10	2,700
1/28/03	1,700**	< 10	< 10	< 10	< 10	2,900
4/7/04	2,700**	< 10	< 10	< 10	< 20	3,600
7/23/04	4,200**	< 25	< 25	< 25	< 50	4,900
10/12/04	5,000**	< 50	< 50	< 50	< 100	5,900
1/29/05	< 1,000	< 10	< 10	< 10	< 20	3,100
4/28/05	< 200	< 2.0	< 2.0	< 2.0	< 2.0	1,300
7/19/05	4,400	< 20	< 20	< 20	< 40	3,000
10/18/05	18,000	< 50	< 50	< 50	< 50	6,800
1/24/06	17,000	< 100	< 100	< 100	< 200	7,000
4/12/06	< 200	< 2.0	< 2.0	< 2.0	< 2.0	7,800
7/10/06	11,000	< 100	< 100	< 100	< 200	12,000
10/16/06	< 10,000	< 100	< 100	< 100	< 100	17,000
1/26/07	< 200	< 2.0	< 2.0	< 2.0	< 2.0	4,000
4/18/07	< 900	< 9.0	< 9.0	< 9.0	< 9.0	11,000
<b>8/2/07</b>	<b>110</b>	<b>&lt; 0.80</b>	<b>&lt; 0.80</b>	<b>&lt; 0.80</b>	<b>2.0</b>	<b>410</b>

**TABLE TWO**  
**Summary of Analytical Results for GROUNDWATER Samples**  
**Yee Property**  
**726 Harrison St., Oakland, CA**  
**All results are in parts per billion (ppb)**

Well ID & Dates Sampled	TPH-G	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-4</b>						
12/5/98	880	3	< 0.5	< 0.5	< 0.5	950
3/4/99	3,800	< 25	< 25	< 25	< 25	3,700
6/17/99	2,700	< 25	< 25	< 25	< 25	2,700
8/27/99	440	4.7	1.1	0.58	1.3	1,600/ 1,700*
12/9/99	1,100**	< 2.5	< 2.5	< 2.5	< 2.5	1,700
3/7/00	< 250	< 2.5	< 2.5	< 2.5	< 2.5	1,700
6/7/00	530**	8.8	< 2.5	< 2.5	< 2.5	440
10/11/00	700**	3.9	< 2.5	< 2.5	< 2.5	680
1/18/01	2,000**	< 2.5	< 2.5	< 2.5	< 2.5	780
4/5/01	810**	< 2.5	< 2.5	< 2.5	< 2.5	620
7/17/01	880**	< 2.5	< 2.5	< 2.5	< 2.5	570
10/5/01	550**	< 2.5	< 2.5	< 2.5	< 2.5	710
1/18/02	960**	< 5.0	< 5.0	< 5.0	< 5.0	1,300
4/11/02	1,100**	< 5.0	< 5.0	< 5.0	< 5.0	550
7/8/02	1,200**	< 5.0	< 5.0	< 5.0	< 5.0	890
10/9/02	1,300**	< 5.0	< 5.0	< 5.0	< 5.0	880
1/29/03	530**	< 1.0	< 1.0	< 1.0	< 1.0	190
4/11/03	690**	< 2.5	< 2.5	< 2.5	< 2.5	310
7/18/03	1,600**	< 10	< 10	< 10	< 10	1,300
10/9/03	1500***	< 10	< 10	< 10	< 10	1,400
1/28/04	1,200**	< 10	< 10	< 10	< 10	1,900
4/7/04	1,900**	< 10	< 10	< 10	< 20	2,200
7/23/04	1,800**	< 10	< 10	< 10	< 20	1,600
10/12/04	Inaccessible due to car parked over well					
1/29/05	< 1,300	< 13	< 13	< 13	< 25	3,900
4/28/05	510	< 1.5	< 1.5	< 1.5	< 1.5	510
7/19/05	5,400	< 50	< 50	< 50	< 100	2,700
10/18/05	10,000	< 50	< 50	< 50	< 50	9,000
1/24/06	10,000	< 100	< 100	< 100	< 200	8,300
4/12/06	1,900	< 10	< 10	< 10	< 20	2,200
7/10/06	750	5.4	< 5.0	< 5.0	< 10	790
10/16/06	2,400	< 10	< 10	< 10	< 10	2,200
1/26/07	250	< 1.5	< 1.5	< 1.5	< 1.5	7,000
4/18/07	< 400	< 4.0	< 4.0	< 4.0	< 4.0	2,300
<b>8/2/07</b>	<b>400</b>	<b>&lt; 4.0</b>	<b>&lt; 4.0</b>	<b>&lt; 4.0</b>	<b>&lt; 4.0</b>	<b>4,500</b>

**TABLE TWO**  
**Summary of Analytical Results for GROUNDWATER Samples**  
**Yee Property**  
**726 Harrison St., Oakland, CA**  
**All results are in parts per billion (ppb)**

Well ID & Dates Sampled	TPH-G	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-5</b>						
8/29/01	14,000	1,300	470	230	800	14,000
1/18/02	24,000	3,200	1,300	390	1,500	5,700
4/11/02	23,000	2,700	980	38	950	4,300
7/8/02	19,000	3,300	25	360	1,100	2,100
10/9/02	24,000	2,800	990	360	820	2,400
1/29/03	17,000	2,100	1,400	380	1,400	< 250
4/11/03	26,000	2,900	2,200	590	2,200	630
7/18/03	26,000	3,500	1,700	480	1,300	1,300
10/9/03	27,000	3,800	1,900	510	1,700	1,200
1/28/04	29,000	4,800	2,900	770	2,300	3,300
4/7/04	23,000	4,400	2,700	720	2,200	1,700
7/23/04	29,000	5,200	2,200	810	1,400	2,200
10/12/04	26,000	4,300	2,000	670	1,300	2,200
7/18/03	8,200	650	77	99	140	4,300
10/9/03	5,700**	500	28	53	35	3,600
1/28/04	17,000***	1,600	90	250	280	9,700
4/7/04			No longer sampled			
1/24/06	21,000	1,800	1,200	270	820	13,000
7/10/06	45,000	3,700	2,600	650	1,800	23,000
10/16/06	66,000	4,200	3,300	800	2,100	35,000
1/26/07	30,000	3,200	2,600	610	2,400	38,000
4/18/07	30,000	4,300	3,300	800	2,600	27,000
<b>8/2/07</b>	<b>26,000</b>	<b>3,700</b>	<b>2,800</b>	<b>690</b>	<b>1,900</b>	<b>32,000</b>
<b>ESL</b>	<b>100</b>	<b>1</b>	<b>40</b>	<b>30</b>	<b>20</b>	<b>5</b>

Notes:

\* EPA Method 8020/EPA Method 8260 (MTBE confirmation)

\*\* Hydrocarbon reported in the gasoline range does not match the laboratory gasoline standard

\*\*\* Sample contains a discrete peak in addition to gasoline

ESL = Environmental screening levels presented in the "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater (July 2003)" document prepared by the California Regional Water Quality Control Board, San Francisco Bay Region.

Most current data is in **Bold**

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

**TABLE THREE**  
**WELLS WITHIN 2,000-FOOT RADIUS OF 726 HARRISON STREET, OAKLAND,**  
**CALIFORNIA**

ASE ID	Address	Owner	Date Drilled	Total Depth	Diameter	Use
1	Harrison St && 15th St	Alvin H. Bacharach and Ba	10/96	25	2	MON
2	Harrison St && 15th St	Alvin H. Bacharach and Ba	10/96	29	2	MON
3	Harrison St && 15th St	Alvin H. Bacharach and Ba	10/96	29	2	MON
4	San Pablo Ave. & Broadway	Taldan Property B1-P	8/92	42	2	PIE
5	San Pablo Ave. & Broadway	Taldan Property B2-P	8/92	42	2	PIE
6	11th & Clay Streets	City Oakland, Econ. Devel	2/90	35	2	PIE
7	11th & Clay Streets	City Oakland, Econ. Devel	2/90	35	2	PIE
8	Corner of 12th & Broadway	APC Building	9/88	31	2	MON
9	Corner of 12th & Broadway	APC Building	7/88	30	2	MON
10	Corner of 12th & Broadway	APC Building	7/88	30	2	MON
11	1111 Broadway	Bramalea Pacific, Inc.	9/90	35	2	MON
12	1111 Broadway	Bramalea-APC	12/88	25	2	MON
13	1111 Broadway	Bramalea-APC	12/88	23	2	MON
14	1111 Broadway	Bramalea-APC	12/88	25	2	MON
15	Broadway & 11th Streets	City Center ESA	4/90	21	3	MON
16	11th Street & Broadway	City Oakland, Econ. Devel	2/90	35	2	PIE
17	11th Street & Broadway	City Oakland, Econ. Devel	2/90	35	2	PIE
18	11th Street & Broadway	City Oakland, Econ. Devel	2/90	35	2	PIE
19	11th & Clay Streets	City Oakland, Econ. Devel	2/90	35	2	PIE
20	1432 Harrison St	Alvin H Bacharach & Barba	10/96	25	2	MON
21	1432 Harrison St	Alvin H Bacharach & Barba	10/96	29	2	MON
22	1225 Webster St	Bank of the Orient	12/93	34	2	MON
23	1225 Webster St	Bank of the Orient	12/93	35	2	MON
24	1225 Webster St	Bank of the Orient	12/93	35	2	MON
25	1225 Webster St	Bank of the Orient	12/93	34	2	MON
26	1225 Webster St	Bank of the Orient	2/94	34	2	MON
27	1225 Webster St	Bank of the Orient	3/94	35	2	MON
28	1225 Webster St	Bank of the Orient	3/94	35	2	MON
29	301 14th Street	Chevron USA	6/90	60	4	MON
30	301 14th Street	Chevron USA	6/90	34	2	MON
31	301 14th Street	Chevron USA	6/90	33	2	MON
32	301 14th Street	Chevron USA	6/90	33	2	MON
33	301 14th Street	Chevron USA	6/90	33	2	MON
34	301 14th Street	Chevron USA	8/90	15	4	MON
35	301 14th Street	Chevron USA	10/90	32	2	MON
36	301 14th Street	Chevron USA	4/91	14	2	MON
37	301 14th Street	Chevron USA	2/91	20	2	MON
38	301 14th Street	Chevron USA	4/91	30	2	MON
39	301 14th Street	Chevron USA	4/91	35	2	MON
40	301 14th Street	Chevron USA MW10	6/92	35	2	MON
41	301 14th St.	Chevron USA VEW-1	6/92	20	2	MON
42	301 14th St.	Chevron USA VEW-2	6/92	20	2	MON
43	301 14th St	Chevron USA Products Co	4/94	30	4	MON
44	301 14th St.	Chevron VEW-3	3/93	31	4	MON
45	11th & Webster Sts.	City of Oakland	5/87	39	4	MON
46	11th & Webster Sts.	City of Oakland	12/87	45	4	MON
47	11th & Webster Sts.	City of Oakland	12/87	44	4	MON
48	10th & Webster Sts.	City of Oakland	12/87	40	4	MON
49	10th & Webster Sts.	City of Oakland	12/87	42	4	MON
50	10th & Webster Sts.	City of Oakland	3/88	66	4	MON
51	11th & Webster Sts.	City of Oakland	3/88	44	4	TES
52	10th & Franklin Sts.	City of Oakland	3/88	43	4	TES
53	11th & Franklin Sts.	City of Oakland	3/88	40	4	TES
54	10th & Webster Sts.	City of Oakland	3/88	40	4	TES
55	10th & Franklin Sts.	City of Oakland	4/88	64	4	TEST
56	1220 Harrison St	Frank G. Mar Assoc MW-1	4/92	36	2	MON
57	13th & Harrison Street	Frank Mar Comm. Housing	Unknown	Unknown	Unknown	Unknown
58	13th & Harrison Street	Frank Mar Comm. Housing	Unknown	Unknown	Unknown	Unknown
59	10th & Webster Sts.	Oakland Redevelopment Agency	2/89	40	4	MON
60	10th & Webster Sts.	Oakland Redevelopment Agency	2/89	40	4	MON



**TABLE THREE**  
**WELLS WITHIN 2,000-FOOT RADIUS OF 726 HARRISON STREET, OAKLAND,**  
**CALIFORNIA**

ASE ID	Address	Owner	Date Drilled	Total Depth	Diameter	Use
61	1432 Harrison St	Unknown	7/94	26	2	MON
62	1432 Harrison St	Unknown	1/94	27	4	MON
63	387 12th St	Unknown	6/93	25	2	MON
64	387 12th St	Unknown	6/93	25	2	MON
65	387 12th St	Unknown	6/93	25	2	MON
66	165 13th Street	Alameda County Services	10/92	20	2	MON
67	165 13th Street	Alameda County Services	3/89	35	4	MON
68	165 13th Street	Alameda County Services	3/89	24	2	MON
69	165 13th Street	Alameda County Services	3/89	35	2	MON
70	165 13th Street	Alameda County Services	3/89	35	4	MON
71	Alice & 14th Street	Moose Club	1/27	150	0	ABN
72	1439 Alice St	Unknown	7/94	25	2	MON
73	1106 Madison St	Alameda County GSA	5/97	35	2	MON
74	125 12th Street	Western Union	5/91	33	6	DOM
75	Clay Street	Division of Highways	2/55	130	0	TES
76	Webster St. & 9th St.	City of Oakland	11/90	46	4	TES
77	Webster & 9th Streets	City of Oakland Redevelopment	7/90	37	4	MON
78	9th Street & Alice Street	Fire Station #12	6/89	37	2	MON
79	610 Oak St.	American Fund Plan MW1	4/93	25	2	DES
80	610 Oak St.	American Fund Plan MW1R	5/93	25	2	MON
81	6th Street & Harrison Street	Pacific Gas & Electric	6/73	120	0	CAT
82	800 Harrison St.	Unocal #0752 MW-7	4/93	33	2	MON
83	800 Harrison St.	Unocal #0752 MW-8	4/93	31	2	MON
84	800 Harrison Street	Unocal Corporation	6/91	33	2	MON
85	800 Harrison Street	Unocal Corporation MW4	9/92	33	2	MON
86	800 Harrison Street	Unocal Corporation MW5	10/92	32	2	MON
87	800 Harrison Street	Unocal Corporation MW6	10/92	32	2	MON
88	245 8th St	Victor Lum	7/95	28	4	MON
89	245 8th St	Victor Lum	7/95	28	4	MON
90	280 6th St	Unknown	1/95	14	4	MON
91	280 6th St	Unknown	1/95	14	4	MON
92	280 6th St	Unknown	1/95	14	4	MON
93	280 6th St	Unknown	1/95	14	4	MON
94	333 Broadway	John Leonardini	9/93	26	2	MON
95	800 Franklin Street	Alex Shaw, Dynagroup	9/89	35	2	MON
96	800 Franklin Street	Alex Shaw, Dynagroup	9/89	35	2	MON
97	800 Franklin Street	Alex Shaw, Dynagroup	9/89	34	2	MON
98	800 Franklin St	Chiu	5/97	36	2	MON
99	800 Franklin St	Tom Chiu MW-4	10/91	35	2	MON
100	800 Franklin St	Tom Chiu MW-5	10/91	35	2	MON
101	Webster St. & 9th St.	City of Oakland	12/89	38	4	MON
102	Webster & 9th St.	City of Oakland	1/91	40	4	MON
103	Webster & 9th St.	City of Oakland	11/90	37	2	PIE
104	Webster & 9th St.	City of Oakland	11/90	37	2	PIE
105	9th and Webster Streets	City of Oakland Redevelopment	1/90	45	6	DES
106	Webster & 9th Streets	City of Oakland Redevelopment	8/90	19	4	MON
107	Webster & 9th Streets	City of Oakland Redevelopment	8/90	19	4	MON
108	461 8th St	Shell Oil Company	12/94	30	4	MON
109	461 8th St	Shell Oil Company	12/94	30	4	MON
110	461 8th St	Shell Oil Company	12/94	37	4	MON
111	800 Harrison St	Unocal Corp MW1	5/91	35	2	MON
112	800 Harrison St	Unocal Corp MW2	5/91	33	2	MON
113	800 Harrison St	Unocal Corp MW3	5/91	33	2	MON
114	499 5th St.	Alameda County Health MW-1	4/92	35	4	MON
115	499 5th St.	Alameda County Health MW-2	4/92	35	4	MON
116	499 5th St.	Alameda County Health MW-2	4/92	30	4	MON
117	400 Oak St	Post Tool MW-1	12/91	20	4	MON
118	400 Oak St	Post Tool MW-2	12/91	20	4	MON
119	2nd St Near Alice St	Port of Oakland/Amtrack	6/95	17	2	MON
120	2nd St Near Alice St	Port of Oakland/Amtrack	6/95	17	2	MON

**TABLE THREE**  
**WELLS WITHIN 2,000-FOOT RADIUS OF 726 HARRISON STREET, OAKLAND,**  
**CALIFORNIA**

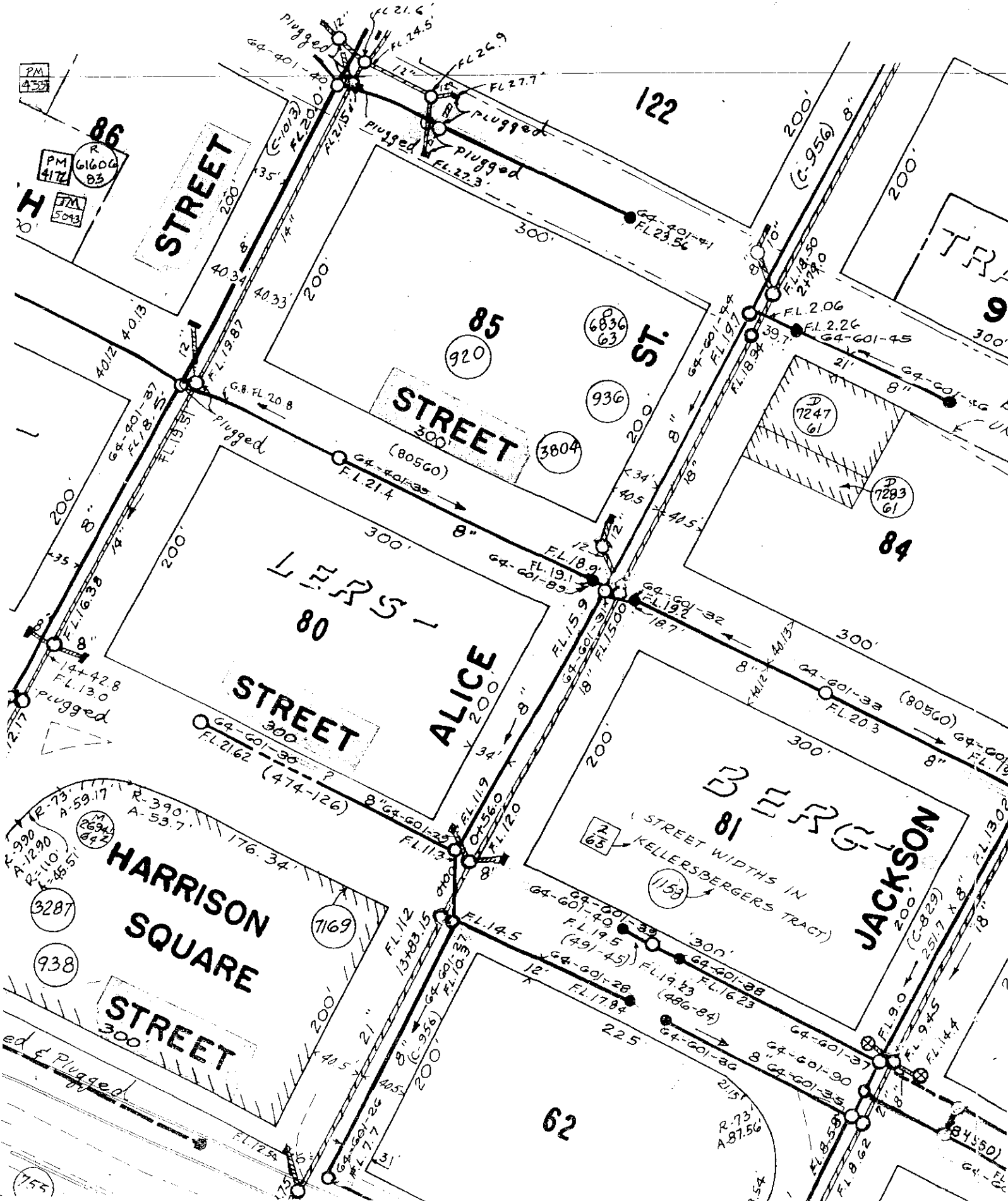
<b>ASE ID</b>	<b>Address</b>	<b>Owner</b>	<b>Date Drilled</b>	<b>Total Depth</b>	<b>Diameter</b>	<b>Use</b>
121	2nd St Near Alice St	Port of Oakland/Amtrack	6/95	15	2	MON
122	125 Webster St	Bank of the Orient	8/94	35	2	MON
123	125 Webster St	Bank of the Orient	3/94	35	2	MON
124	609 Oak Street	Chevron	11/90	17	2	MON
125	609 Oak Street	Chevron USA	8/90	26	2	MON
126	609 Oak Street	Chevron USA	9/90	15	2	MON
127	609 Oak Street	Chevron USA	9/90	30	2	MON
128	609 Oak Street	Chevron USA	9/90	30	2	MON
129	208 Jackson Street	East Bay Parking	5/90	10	2	MON
130	208 Jackson Street	East Bay Parking	5/90	10	2	MON
131	208 Jackson Street	East Bay Parking	5/90	10	2	MON
132	300 Oak Street	Nancy Cotteral	12/91	20	4	MON
133	300 Oak Street	Nancy Cotteral	12/91	20	4	MON
134	726 Harrison St	Kin Chan	7/97	28	2	MON
135	726 Harrison St	Kin Chan	12/98	30	2	MON
136	726 Harrison St	Kin Chan	12/98	30	2	MON
137	726 Harrison St	Kin Chan	12/98	30	2	MON
138	726 Harrison St	Kin Chan	12/98	30	2	MON
139	726 Harrison St	Kin Chan	8/01	29	2	MON
140	726 Harrison St	Kin Chan	8/01	29	6	EXT
141	726 Harrison St	Kin Chan	8/01	28	2	Sparge
142	706 Harrison St	Oakland Auto Parts	8/93	15	2	MON
143	706 Harrison St	Oakland Auto Parts	8/93	15	2	EXT
144	706 Harrison St	Bo Gin	11/94	30	2	MON
145	706 Harrison St	Bo Gin	Unknown	30	2	MON
146	706 Harrison St	Bo Gin	Unknown	30	2	MON
147	706 Harrison St	Bo Gin	Unknown	30	2	MON
148	706 Harrison St	Bo Gin	Unknown	30	2	MON
149	706 Harrison St	Bo Gin	Unknown	30	2	MON
150	706 Harrison St	Bo Gin	12/94	Unknown	Unknown	VE
151	706 Harrison St	Bo Gin	12/94	Unknown	Unknown	VE
152	706 Harrison St	Bo Gin	12/94	Unknown	Unknown	VE/Sparge
153	706 Harrison St	Bo Gin	12/94	Unknown	Unknown	VE/Sparge
154	706 Harrison St	Bo Gin	12/94	Unknown	Unknown	VE/Sparge
155	250 8th Street	Lim Family	1/95	30	2	MON
156	250 8th Street	Lim Family	1/95	30	2	MON
157	250 8th Street	Lim Family	1/00	30	2	MON
158	250 8th Street	Lim Family	1/00	30	2	MON
159	250 8th Street	Lim Family	5/02	30	2	MON
160	250 8th Street	Lim Family	5/02	30	2	MON
161	250 8th Street	Lim Family	5/02	30	2	MON
162	250 8th Street	Lim Family	2/99	25	2	INJ
163	250 8th Street	Lim Family	2/99	25	2	INJ
164	250 8th Street	Lim Family	2/99	25	2	INJ
165	250 8th Street	Lim Family	2/99	25	2	INJ
166	250 8th Street	Lim Family	2/99	25	2	INJ

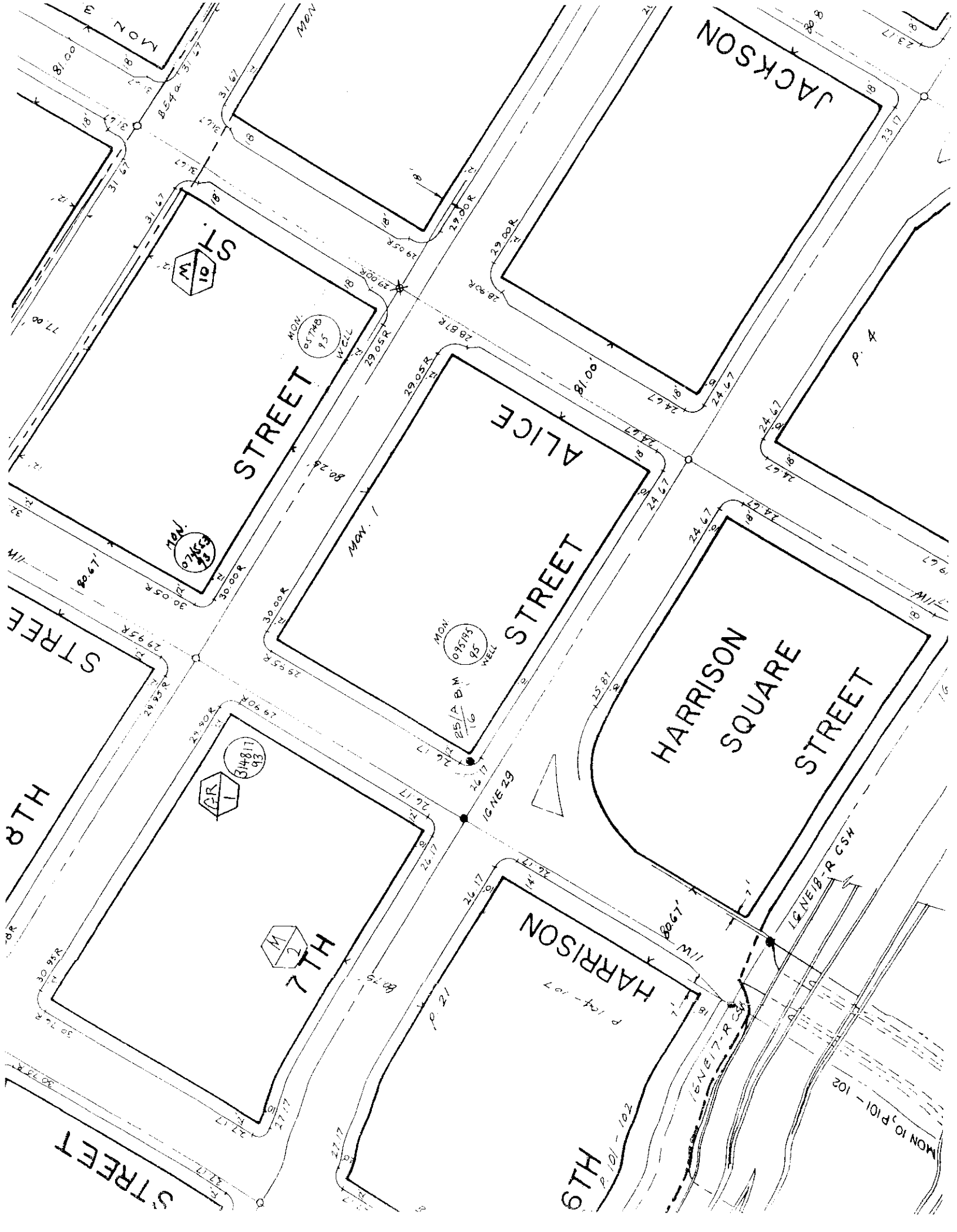


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## **APPENDIX A**

City of Oakland Sewer Maps





JACKSON

STREET

ALICE

STREET

HARRISON SQUARE

STREET

STREET

7TH

HARRISON

8TH

STREET

MON. 07452 95

MON. 05748 95

MON. 093195 95

314811 93

P 101-102

MON 103 P101-102



MON. 8558 3147

MON. 3167

2905R

2900R

3000R

2905R

2900R

2995R

2990R

2617

2581

3095R

3077

879

2617

8867

16 NE 18 R CSH

16 NE 17 R CSH

2317

2317

2467

2467

2467

2617

2617

2717

2717