

ENVIRONMENTAL
PROTECTION

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**Results of
Soil and Ground-Water Investigation
4003 Park Boulevard/4006 Brighton Avenue
Oakland, California**

**November 16, 1993
2986**

**Prepared for
James B. Wickersham
3200 A Danville Boulevard, Suite 1058
Alamo, California 94507**



LEVINE·FRICKE



LEVINE•FRICKE

ENGINEERS, HYDROGEOLOGISTS & APPLIED SCIENTISTS

November 12, 1993

LF 2986

Mr. James B. Wickersham
3200 A Danville Boulevard, Suite 1058
Alamo, California 94507

Subject: Results of Soil and Ground-Water Investigation,
4003 Park Boulevard/4006 Brighton Avenue, Oakland,
California

Dear Mr. Wickersham:

We have incorporated your review comments into the enclosed report.

It has been our pleasure to work with you on this project and we would look forward to working with you again if the need arises.

If you have any questions, please call either of the undersigned.

Sincerely,

Larry Lapuyade
Senior Staff Hydrogeologist

Donald T. Bradshaw, R.G.
Senior Associate
Hydrogeologist

Enclosures

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CERTIFICATION

All hydrogeologic and geologic information, conclusions, and recommendations presented in this report have been prepared under the supervision of and reviewed by a Levine·Fricke California Registered Geologist.



Donald T. Bradshaw
Senior Associate Hydrogeologist
California Registered Geologist (5300)

11/12/93
Date

November 16, 1993

LF 2986

**REPORT OF THE SOIL AND GROUND-WATER INVESTIGATION
AT 4003 PARK BOULEVARD/4006 BRIGHTON AVENUE
OAKLAND, CALIFORNIA**

1.0 INTRODUCTION

This report presents the results of the investigation of soil and ground-water quality at 4003 Park Boulevard/4006 Brighton Avenue, Oakland, California ("the Site"; Figure 1). This report has been prepared in accordance with the Levine-Fricke proposal dated August 17, 1993, entitled "Proposal for a Soil and Ground-Water Quality Investigation at 4003 Park Boulevard/4006 Brighton Avenue, Oakland, California."

1.1 Background

According to material supplied to Levine-Fricke by James B. Wickersham, on November 30, 1989, the Alameda County Health Department reportedly notified Desert Petroleum Station #793, located at 4035 Park Boulevard, Oakland, California, that gasoline was detected in a sewer line on Brighton Avenue. The product appeared to be entering the line through a crack in the bottom of the sewer manway. On December 6, 1989, the fuel underground storage tanks (USTs) at station #793 were reportedly tested for leaks. Tests on the tanks were inconclusive and on December 7, 1989, all fuel was removed from the tanks to prevent any possible further release of product. On December 7, 1989, tests on the fuel piping supply lines reportedly indicated a 0.5-inch hole in the unleaded product supply line.

An on-site soil-gas investigation was reportedly conducted on December 7, 1989. The results of the investigation indicated that the Site was largely unaffected by petroleum hydrocarbons. Reportedly there was one "hot spot" associated with the pump islands and some contamination associated with the sewer line located in the western portion of the property.

On December 11 through 13, 1989, Resna Industries' Water Works Corporation reportedly drilled and sampled six soil borings (RS-1 through RS-6), in the vicinity of 4035 Park Boulevard. Analysis of samples collected from each boring reportedly indicated low levels of petroleum hydrocarbons beneath the service station (Table 1). Three of the borings were converted to ground-water monitoring/extraction wells and one

boring was converted to a vapor extraction well. An excavation hole near boring RS-4 was backfilled and converted to ground-water extraction well RS-7.

On December 13 through 15, 1989, Resna Industries reportedly installed an S.A.V.E. vapor extraction/treatment system designed to remove petroleum vapors from soil and ground water in the vicinity of the service station. This system uses an internal combustion engine to burn gasoline vapors.

On July 24, 1990, Waterworks Corporation ^{not on Fig. 2} reportedly installed two soil borings (DPO-SS1 and DPO-SS2) behind the station along the sewer line to determine if the sewer line trench was acting as a conduit for gasoline migration. It was reported that soil samples collected from boring DPO-SS1 and analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) indicated no concentrations above detection limits for these compounds. Samples collected from boring DPO-SS2 indicated low concentrations of TPHg and BTEX (Table 1).

On August 21, 1990, Waterworks Corp. reportedly installed two additional soil borings, behind the station and downgradient from the sewer line. Analysis of soil samples collected from DPO-SB1 and DPO-SB2 reportedly indicated high levels of TPHg and BTEX. Analysis of a grab ground-water sample collected from DPO-SB1 indicated elevated levels of TPHg and BTEX (Table 1). ^{110 ppm benzene (?)}

On December 19, 1990, one additional boring (DP-SB3) was reportedly installed near Brighton Avenue behind the apartment building at 4003 Park Boulevard. Analysis of a soil sample collected from this boring reportedly indicated only low concentrations of xylene.

In a letter dated June 25, 1993, Mr. James B. Wickersham (representing Mr. Gerald Starrett, owner of the Site) asked Levine-Fricke to review previous reports on work conducted at and in the vicinity of Desert Petroleum Station #793. On August 15, 1993, Levine-Fricke agreed to conduct a soil and ground-water investigation at property located at 4003 Park Boulevard and 4006 Brighton Avenue, Oakland, California.

1.2 Objectives

Levine-Fricke conducted an investigation with the following objectives:

~~250~~ ppm benzene
up to 3.5

SB3 is shown to be at 4006 Brighton (Fig 2)
SB4 was behind apt bldg, but is not in Table 1

- to evaluate whether ground water and soil at 4003 Park Boulevard and 4006 Brighton Avenue have been affected by petroleum releases from USTs at 4035 Park Boulevard
- to evaluate whether additional investigation or remediation are required at the Site

These objectives were to be achieved by drilling three soil borings to ground water, collecting and analyzing soil and ground-water samples, and installing a monitoring well in one of the soil borings. The following text presents results, conclusions, and recommendations based on the results of this investigation.

2.0 FIELD ACTIVITIES

Levine-Fricke field activities commenced on September 8, 1993. The field investigation included drilling three soil borings; LF-1, SB-A, SB-B, to ground water; collecting soil and grab ground-water samples for chemical analyses; and installing one ground-water monitoring well into boring LF-1.

Figure 2 illustrates the locations of the soil borings and monitoring well, and Appendix A contains borehole logs. Appendix B describes field methods used during the investigation, and Appendix C contains laboratory certificates for soil and ground-water samples collected as part of this investigation.

3.0 ANALYTICAL RESULTS

Ground-water and soil samples collected during this investigation were submitted to American Environmental Network (AEN) of Pleasant Hill, California, a state-certified laboratory. Historical and current data from soil and ground-water sample analyses are summarized in Table 1.

3.1 4003 Park Boulevard: Soil and Ground Water

Soil samples were collected from two borings on this property (LF-1 and SB-A), and a total of four representative samples from depths of 6 and 15 feet below ground surface (bgs) in LF-1 and 5 and 15 feet in SB-A were submitted for chemical analysis. These samples were analyzed using modified EPA Method 8015 for TPHg and BTEX. Concentrations of TPHg and BTEX were below detection limits in samples collected from borings LF-1 and SB-A (Table 1).

A grab ground-water sample was collected from boring SB-A and analyzed for TPHg and BTEX using EPA Method 8015. Results of this analysis indicated concentrations were below detection limits for this sample. After well development, a ground-water sample was collected from well LF-1 and analyzed for TPHg and BTEX. Results indicated that chemical concentrations were below detection limits.

3.2 4006 Brighton Avenue: Soil and Ground Water

Analysis of a soil sample collected from boring SB-B at a depth of 5 feet bgs indicated that concentrations of TPHg and BTEX were below detection limits. Analysis of a sample collected from boring SB-B at 12.5 feet bgs indicated concentrations of TPHg (400 parts per million [ppm]), benzene (1.7 ppm), toluene (17 ppm), ethylbenzene (8.2 ppm) and total xylenes (44 ppm).

A grab ground-water sample was collected from SB-B and analyzed for TPHg and BTEX using EPA Method 8015. Sample results indicated 210 ppm TPHg and 42 ppm benzene were present in the sample (Table 1). *yes*

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the analytical results of soil and ground-water samples collected during this investigation, it appears that soil and ground water have not been affected on the property located at 4003 Park Boulevard. It appears that both soil and ground water on the property located at 4006 Brighton Avenue have been affected by petroleum releases at Desert Petroleum service station #793 (Figure 2).

4.1 Soil

4006 Brighton Avenue

Soil in the vicinity of boring SB-B appears to be affected by gasoline. Concentrations of gasoline in soil at SB-B, measured using a photoionization detector (PID), generally increased from 5 feet bgs to 18 feet bgs and then decreased below 18 feet bgs to relatively low concentrations just above the ground-water surface. Analytical data corroborate this pattern (Appendix A, Figure A-3, and Table 1).

4003 Park Boulevard

TPHg and BTEX were not detected in soil samples collected from the boring for well LF-1 and boring SB-A.

4.2 Ground Water**4006 Brighton Avenue**

Analytical results of a ground-water sample collected from boring SB-B indicate that ground water at 4006 Brighton Avenue has been affected by a petroleum release at the Desert Petroleum service station located at 4035 Park Boulevard.

4003 Park Boulevard

Analytical results for ground-water samples collected from well LF-1 and soil boring SB-A reported no detectable concentrations of TPHg or BTEX. Based upon these data, it appears that petroleum compounds have not migrated onto the property at 4003 Park Boulevard.

4.3 Recommendations

Based upon the relatively high concentrations of benzene and TPHg in ground water and soil at 4006 Brighton Avenue, it is probable that regulatory agencies will require remedial action to clean up both soil and ground water associated with leakage from the gasoline station.

Levine·Fricke proposes to install a ground-water extraction and vapor extraction system to remove petroleum hydrocarbons from both soil and ground water in the area. A regional remedial system to address all properties affected by the release would be the best remedial strategy to clean up the affected areas. However, current data are inadequate for designing and implementing a regional remedial strategy. With this in mind, Levine·Fricke has estimated costs to remediate only the 4006 Brighton Avenue property, which has been affected by releases from 4035 Park Boulevard. These costs assume that the 4035 Park Boulevard property has been or is being concurrently remediated and there are no continuing sources of contamination to the 4006 Brighton Avenue property. We also assume that treatment facilities would have to be purchased and that they would be located on the 4035 Park Boulevard property. Costs could be reduced if a regional remedial system were installed and costs shared between involved parties.

→ which? Desert?

To address ground water affected by fuel, Levine·Fricke proposes to install one ground-water extraction well and associated water level monitoring points at the downgradient edge of the property to capture fuel-affected ground water migrating through the Site. To address affected soil and accelerate any ground-water remediation, Levine·Fricke proposes to install a soil-vapor extraction/bioventing system in the rear of the 4006 Brighton Avenue property. This system would conceptually consist of four vapor extraction and four air inlet wells connected to a unit capable of burning the extracted vapors. The vapor removal would also aid in introducing air into the affected areas, which would accelerate biological activity to aid in reducing fuel concentrations in the affected soils.

→ where?

Design and implementation of both of these systems requires additional data. Full characterization of the ground-water plume would be required, which would necessitate installing an additional well in the street. Assuming this well is affected by petroleum, it would be converted into a ground-water extraction well, and four piezometers would also be installed. The extraction and surrounding piezometers would be used to conduct a field test to assess the pumping rate and area of capture of the well. For estimating removal costs, we assume that one extraction well and four piezometers would be sufficient. Based upon past experience with East Bay Municipal Water District, we assume that the water would be discharged to the sanitary sewer with a permit, after treatment by air stripping.

Design of the soil-vapor system would also require a field test. One vapor extraction well and four vapor pressure monitoring points would be installed at distances of 2, 5, 10, and 15 feet away from the vapor extraction well. A field test would then be conducted to assess the area of influence of the vapor extraction well. These data would then be used to design an appropriate vapor extraction system. For cost purposes, we are assuming that four vapor extraction and four air inlet wells will be sufficient to influence the shallow soils at the rear of the property that are affected by petroleum hydrocarbons. Vapors would be treated by burning using a thermal oxidizer unit. Estimated costs for the design, installation, and 10-year operation and maintenance of the soil and ground-water remedial systems are \$697,826 (see Table 2).

REFERENCES

Remediation Service, Int'l. 1990. Site Assessment and Remediation Report for Desert Petroleum Station No. 793, 4035 Park Boulevard, Oakland, California. January 5.

RESNA Industries, Water Works Corp. 1991. Progress Report/Evaluation of Remediation Alternatives. Desert Petroleum Incorporated, Former Station No. 793, 4035 Park Boulevard, Oakland, California, January 8.

Soil

TABLE 1
 CHEMICAL ANALYSIS DATA SUMMARY
 4003/4035 PARK BOULEVARD & 4006 BRIGHTON AVENUE
 OAKLAND, CALIFORNIA
 (all concentrations in parts per million (ppm))

Sample ID	Date Sampled	Sample Depth (feet)	Benzene	Toluene	Ethylbenzene	Xylenes	TPH	Oil & Grease
SOIL								

Samples collected by Resna Industries								
RS-1	Dec. 1989	5	NA	NA	NA	NA	16	
RS-1	Dec. 1989	10	NA	NA	NA	NA	33	
RS-1	Dec. 1989	15	NA	NA	NA	NA	<1.0	
RS-1	Dec. 1989	20	<3.0	0.008	<3.0	<3.0	<1.0	
RS-1	Dec. 1989	25	0.056	0.12	0.041	0.13	10	
RS-1	Dec. 1989	30	<3.0	0.012	<3.0	<3.0	<1.0	
RS-2	Dec. 1989	5	NA	NA	NA	NA	<1.0	
RS-2	Dec. 1989	10	NA	NA	NA	NA	11	
RS-2	Dec. 1989	15	NA	NA	NA	NA	<1.0	
RS-2	Dec. 1989	20	<3.0	0.017	<3.0	<3.0	<1.0	
RS-3	Dec. 1989	5	<3.0	0.043	<3.0	0.008	<1.0	
RS-3	Dec. 1989	10	<3.0	0.020	<3.0	<3.0	<1.0	
RS-4	Dec. 1989	5	0.78	3.4	0.74	4.1	50	
RS-4	Dec. 1989	10	0.25	0.94	0.17	0.92	8	
RS-5	Dec. 1989	5	NA	NA	NA	NA	<1.0	
RS-5	Dec. 1989	10	NA	NA	NA	NA	<1.0	
RS-5	Dec. 1989	15	NA	NA	NA	NA	<1.0	
RS-5	Dec. 1989	20	1.5	8.4	3.9	22.0	530	
RS-5	Dec. 1989	25	0.7	0.42	0.058	0.26	4	
RS-5	Dec. 1989	30	NA	NA	NA	NA	1,600	
RS-5	Dec. 1989	35	NA	NA	NA	NA	<1.0	
RS-5	Dec. 1989	40	0.036	0.069	0.009	0.043	1	
RS-6	Dec. 1989	5	NA	NA	NA	NA	<1.0	
RS-6	Dec. 1989	10	NA	NA	NA	NA	<1.0	
RS-6	Dec. 1989	15	NA	NA	NA	NA	<1.0	
RS-6	Dec. 1989	20	0.017	0.007	<3.0	0.015	<1.0	
RS-6	Dec. 1989	25	0.009	0.011	<3.0	<3.0	<1.0	
RS-6	Dec. 1989	30	NA	NA	NA	NA	<1.0	
RS-6	Dec. 1989	35	0.005	0.007	<3.0	0.006	<1.0	
SB-1	Dec. 1989	Pile	0.46	3.6	1.0	7.6	130	
SB-2	Dec. 1989	Pile	1.1	13.0	4.4	29.0	370	
DPO-SS1	24-Jul-90	3.5	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	NA
DPO-SS2	24-Jul-90	5	0.0050	<0.0050	<0.0050	0.011	<1.0	NA
DPO-SB1	21-Aug-90	5	2.5	17	9.4	47		<30
DPO-SB2	21-Aug-90	5	0.31	1.4	0.92	4.4	41	<30

TABLE 1
 CHEMICAL ANALYSIS DATA SUMMARY
 4003/4035 PARK BOULEVARD & 4006 BRIGHTON AVENUE
 OAKLAND, CALIFORNIA
 (all concentrations in parts per million (ppm))

Sample ID	Date Sampled	Sample Depth (feet)	Benzene	Toluene	Ethylbenzene	Xylenes	TPH	Oil & Grease
DPO-SB2	21-Aug-90	10	3.5	21	5.0	43	230	<30
DPO-SB2	21-Aug-90	15	0.052	0.13	0.019	0.099	<1.0	<30
DPO-SB2	21-Aug-90	20	0.030	0.033	0.0076	0.030	<1.0	<30
DPO-SB3	19-Sep-90	15	<0.0050	<0.0050	<0.0050	0.0073	<1.0	NA
Samples collected by Levine-Fricke								
SB-A	08-Sep-93	5	<0.005	<0.005	<0.005	<0.005	<0.2	NA
SB-A	08-Sep-93	15	<0.005	<0.005	<0.005	<0.005	<0.2	NA
SB-B	08-Sep-93	5	<0.005	<0.005	<0.005	<0.005	<0.2	NA
SB-B	08-Sep-93	12.5	17.0	8.2	44.0			NA
LF-1	09-Sep-93	6	<0.005	<0.005	<0.005	<0.005	<0.2	NA
LF-1	09-Sep-93	15.5	<0.005	<0.005	<0.005	<0.005	<0.2	NA
GROUND WATER - ppm								
Samples collected by Resno Industries								
RS-1	14-Dec-89	---	2.6	2.7	0.200	1.2	19.0	
RS-1	20-Dec-90	---	3.5	0.330	0.170	0.760	15.0	
RS-5	14-Dec-89	---	3.1	4.3	0.67	3.4	57.0	
RS-6	14-Dec-89	---	1.4	1.7	0.160	0.86	11.0	
RS-7	18-Jul-90	---	210	50	740	5,600		
DP-SB1-W	21-Aug-90	---	110	130	13	73	740	
Samples collected by Levine-Fricke								
GWSB-A	08-Sep-93	---	51.0	37.0	21.0	210		
GWSB-A	09-Sep-93	---	<0.0005	<0.0005	<0.0005	<0.002	<0.05	
LF-1	13-Sep-93	---	<0.0005	<0.0005	<0.0005	<0.002	<0.05	
duplicate	13-Sep-93	---	<0.0005	<0.0005	<0.0005	<0.002	<0.05	

ND
 STC Pb

NA - Not Analyzed
 TPH - Total Petroleum Hydrocarbons as gasoline.
 Data entered by DVN/24 Sep 93

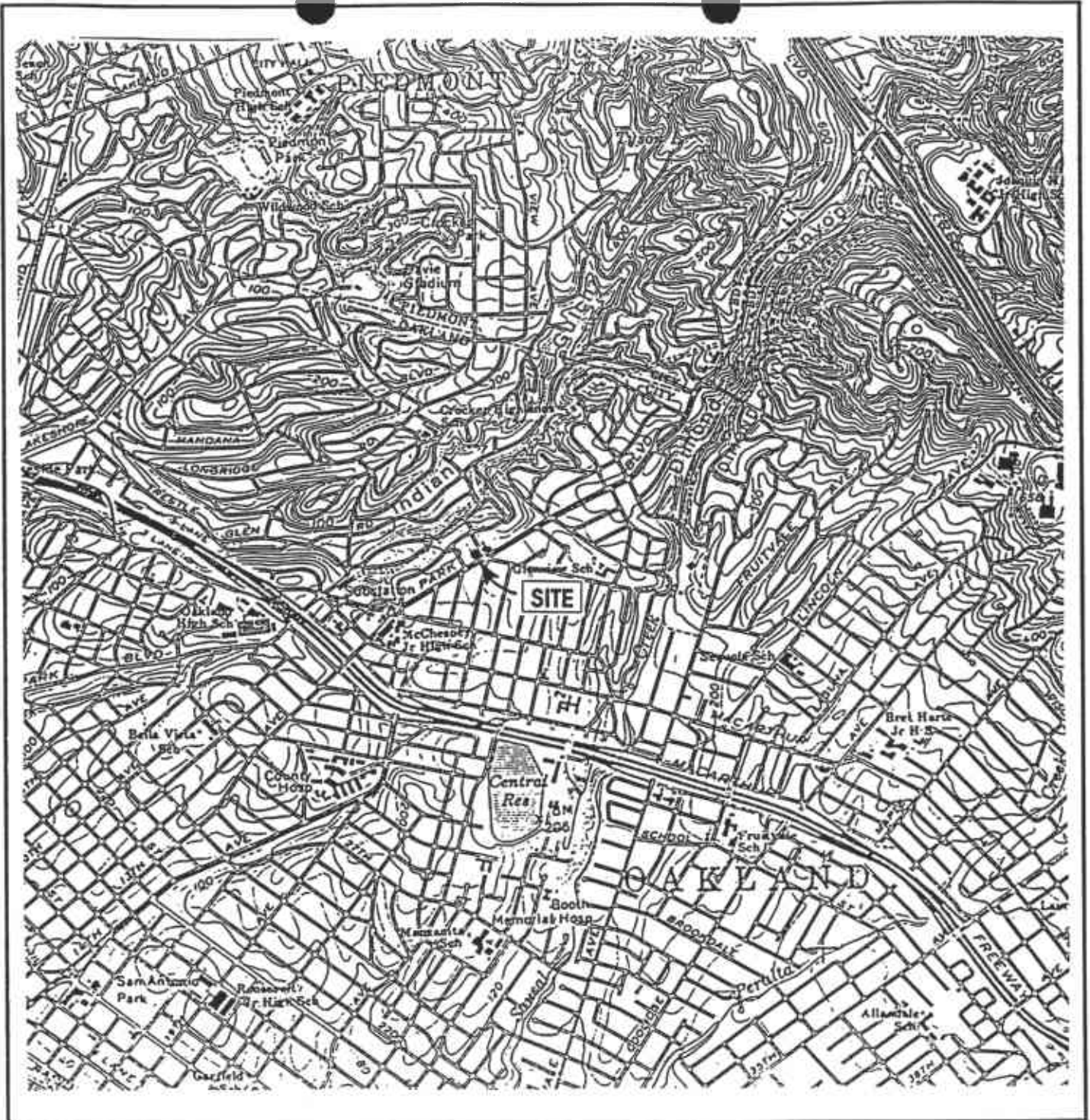
TABLE 2
Estimated Project Costs
Install Ground Water & Soil Vapor Extraction & Treatment Systems
Air Stripper, Offgases and Soil Vapor to Oxidizer
4003 Park Boulevard and 4006 Brighton Avenue, Oakland, California

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
A1. DIRECT CAPITAL COSTS - GWETS				
Excavation, piping, backfill, compaction, repaving	60	feet	\$70	\$4,200
Placement of piping on fence	100	feet	\$20	\$2,000
Installation of extraction well and 4 piezometers	5	wells	\$5,000	\$25,000
Installation of well pump, box, and valving	1	set	\$2,000	\$2,000
Air stripper	1	items	\$12,000	\$12,000
Scale control system	1	item	\$2,000	\$2,000
Connections, piping, valving	1	item	\$5,000	\$5,000
Concrete pad (12x16)	192	sq. ft.	\$35	\$6,720
Fencing	40	feet	\$24	\$960
Control panel	1	item	\$2,500	\$2,500
Wiring, controls, electrical	1	item	\$2,500	\$2,500
Power connection	1	item	\$1,200	\$1,200
Sewer connection	1	item	\$1,000	\$1,000
Mobilization/demobilization	1	item	\$2,000	\$2,000
Contingency	10	percent	\$69,080	\$6,908
TOTAL A1:				\$75,988
A2. DIRECT CAPITAL COSTS - SVETS				
Excavation, piping, backfill, compaction, repaving	60	feet	\$60	\$3,600
Placement of piping on fence	10	feet	\$20	\$200
Installation of 4 extraction & 4 inlet wells	8	wells	\$2,500	\$20,000
Installation of well boxes and valving	4	set	\$600	\$2,400
Connections, piping, valving	1	item	\$3,200	\$3,200
Mist eliminator	1	item	\$1,200	\$1,200
Blower	1	item	\$7,000	\$7,000
Therm/Cat Ox	1	item	\$32,000	\$32,000
Contingency	10	percent	\$69,600	\$6,960
TOTAL A2:				\$76,560
B1. INDIRECT CAPITAL COSTS				
Permitting (Bldg, EBMUD, BAAQMD)	1	lump sum		\$6,500
EBMUD Capacity Fee	3	gpm		\$8,370
Health and Safety Plan	1	lump sum		\$1,500
Engineering Design	1	lump sum		\$14,000
Construction Management	1	lump sum		\$8,000
Start Up	1	lump sum		\$4,000
Contingency	10	percent	\$42,370	\$4,237
TOTAL B1:				\$46,607
GRAND TOTAL				\$199,155
C1. ANNUAL OPERATIONS, MAINTENANCE, REPORTING, AND PROJECT MANAGEMENT COSTS				
Overnight, Project Management	52	hrs	\$115	\$5,980
Operations/Maintenance	120	hr	\$65	\$7,800
Equipment/Parts Replacement	1		\$2,000	\$2,000
Electricity (10.3 hp)	67,310	kwh	\$0.12	\$8,077
Fuel Supplement	365	days	\$80	\$29,200
Vapor sampling/analysis	12	ea	\$150	\$1,800
Water sampling/analysis	12	ea	\$80	\$960
Water District Extraction Fee (3 gpm)	4.84	ac.ft.	\$240	\$1,162
Quarterly reports (EBMUD)	4	ea	\$2,000	\$8,000
POTW supplemental sampling	3	rounds	\$700	\$2,100
Sewer discharge fee (3 gpm)	2,108	Ccf	\$0.32	\$675
Annual O&M Costs				\$67,753
GRAND TOTAL 10-YEAR CAPITAL AND O&M COSTS:				\$697,826

Calculated by ETH; Checked by

NOTE: All costs are in 1993 dollars.

Assumes no regulatory interface; assumes discount rate (i) = 6%



Source: U.S. Geological Survey 7.5 Minute Oakland East, California Quadrangle

Figure 1 : LOCATION MAP

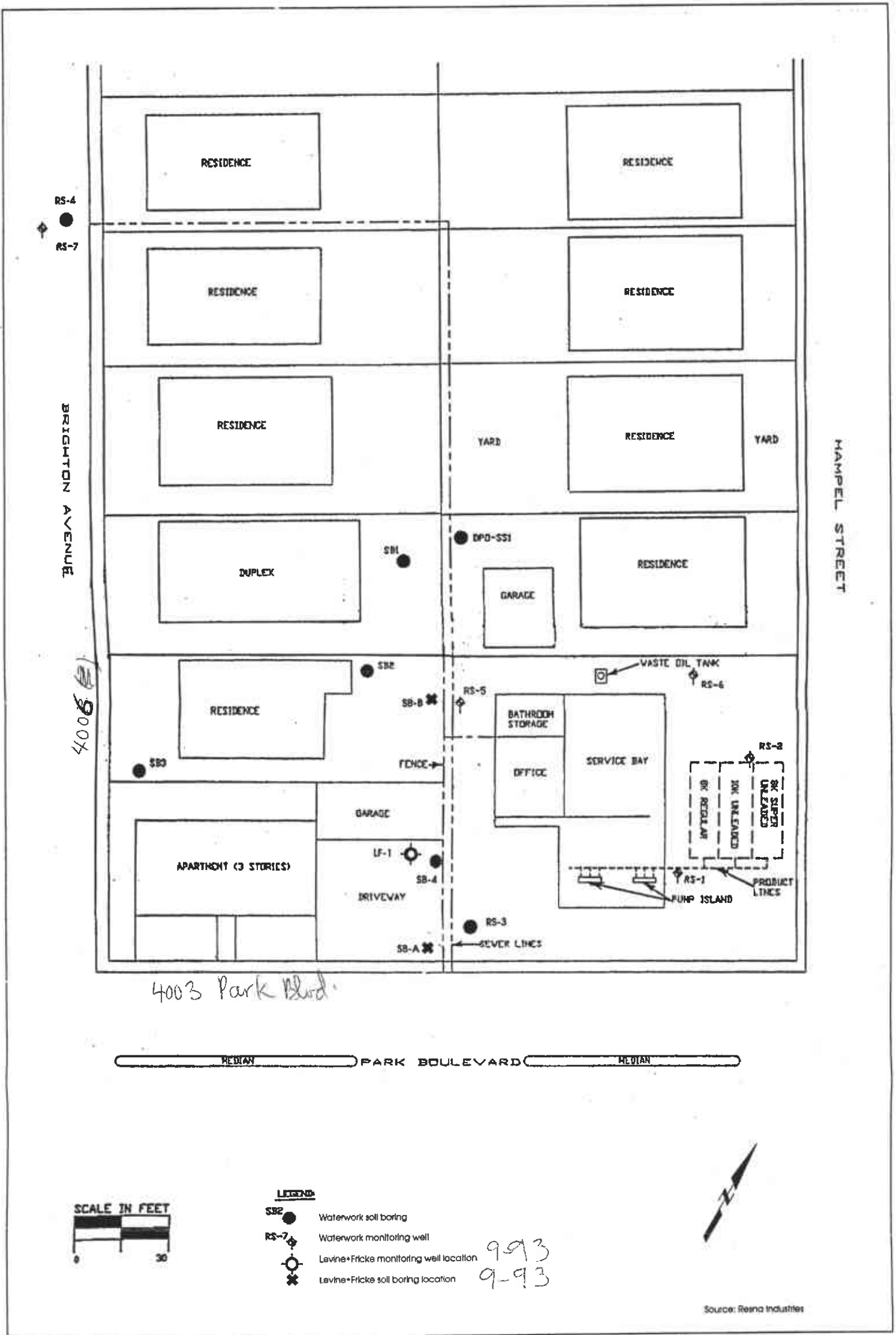


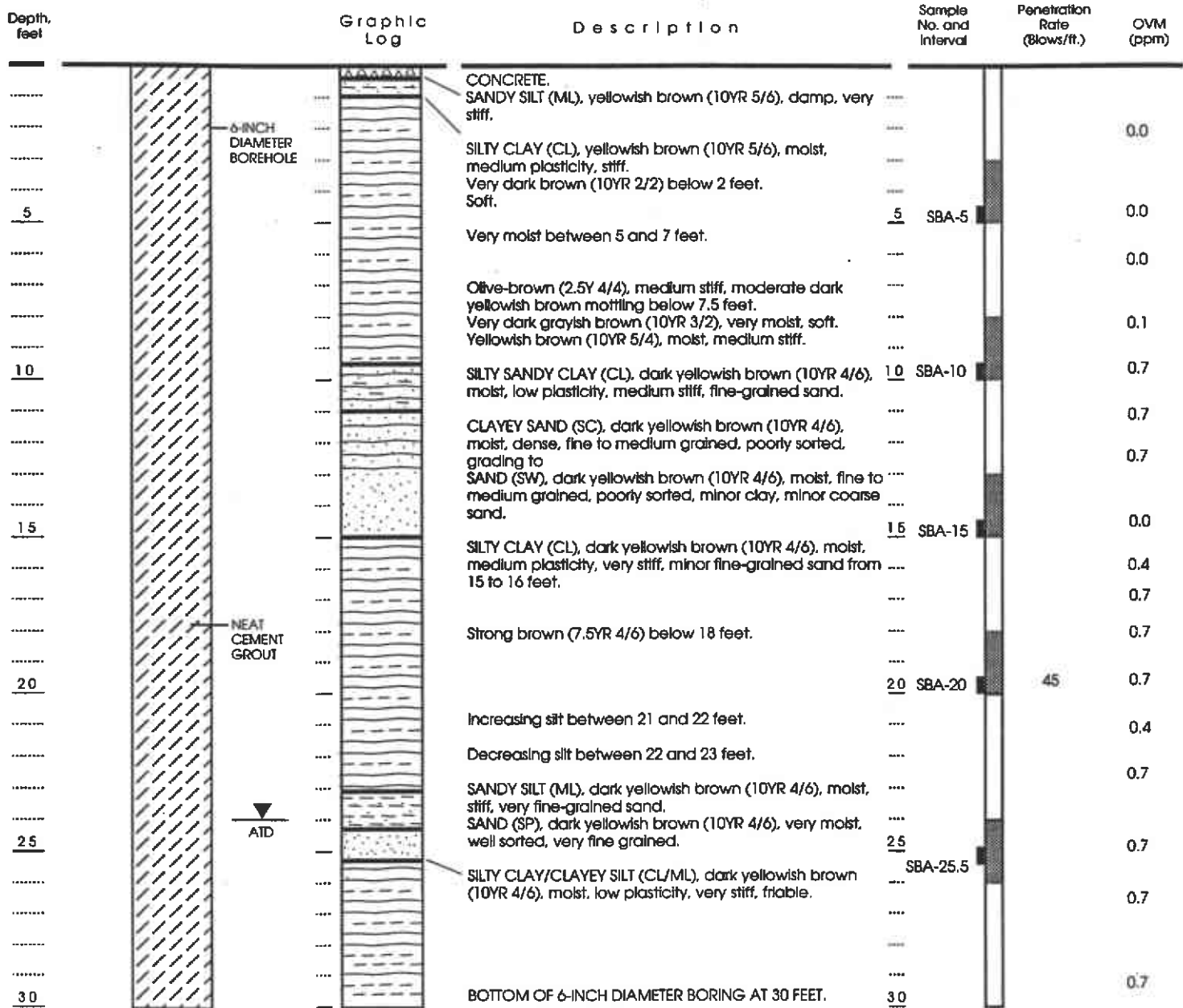
Figure 2 : MONITORING WELL AND SOIL BORING LOCATIONS

**APPENDIX A
BORING LOGS**

WELL CONSTRUCTION

LITHOLOGY

SAMPLE DATA



EXPLANATION

- Clay
- Silt
- Sand
- Gravel

Permit No.: 93491
 Date boring drilled: September 8-9, 1993
 Drilling method: Jack Hammer Driven Cores & Hollow Stem Auger
 Drilling company: Power Core/Gregg Drilling
 LF Geologist: Larry Lapuyade

- Modified California Sampler
- Sample retained for chemical analysis
- Continuous Core
- Water level at time of drilling

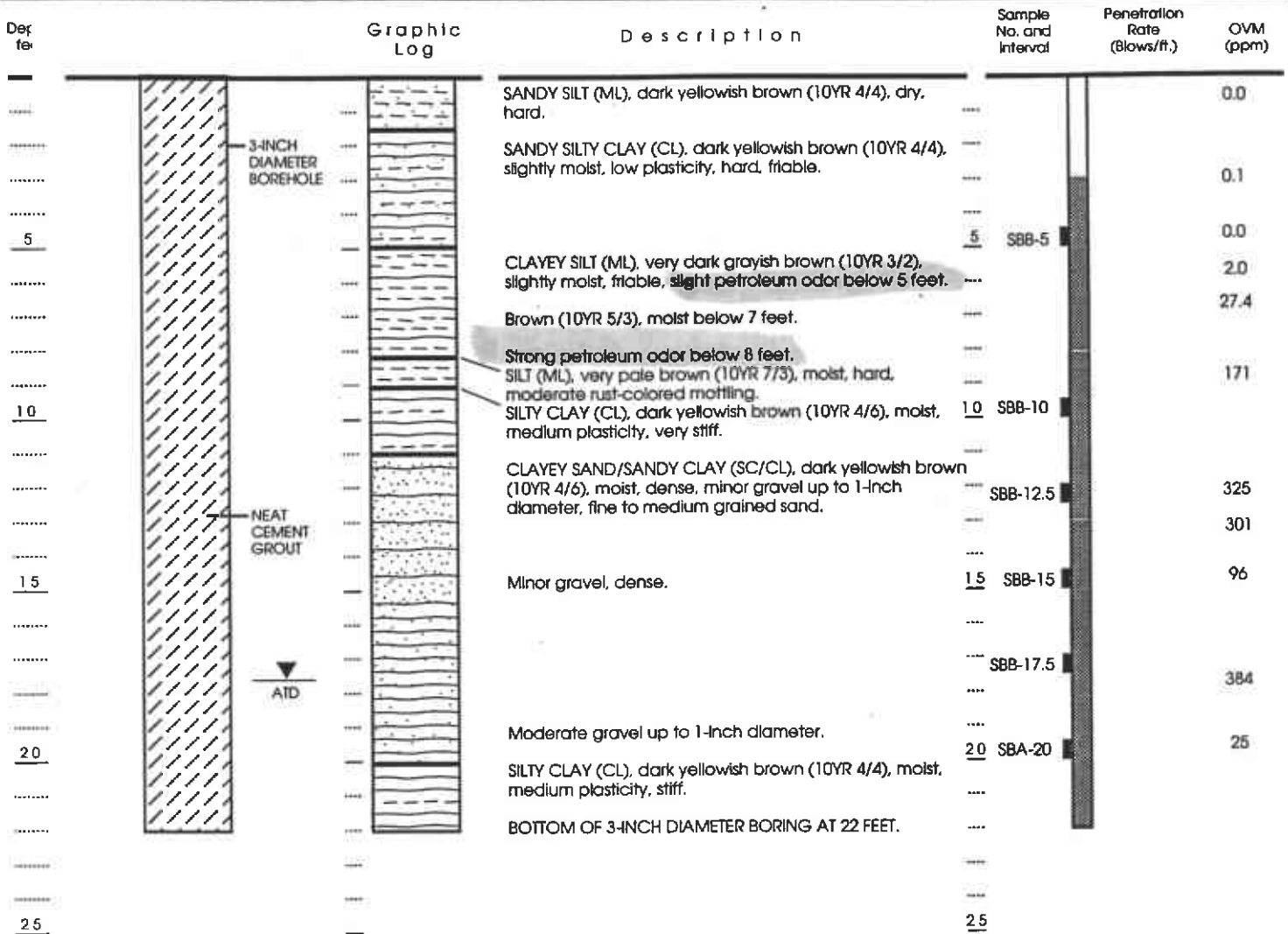
Approved by: *David R. G. 5300*

Figure A-2: LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-A
 4003 PARK BLVD./4006 BRIGHTON STREET

WELL CONSTRUCTION

LITHOLOGY

SAMPLE DATA



EXPLANATION

- Clay
- Silt
- Sand
- Gravel

Permit No.: 93491
 Date boring drilled: September 8, 1993
 Drilling method: Jack Hammer Driven Cores
 Drilling Company: Power Core
 LF Geologist: Larry Lapuyade

- Continuous Core
- Sample retained for chemical analysis
- Water level at time of drilling

Approved by: *[Signature]* R.G. 5300

Figure A-3 : LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-B
 4003 PARK BLVD./4006 BRIGHTON STREET

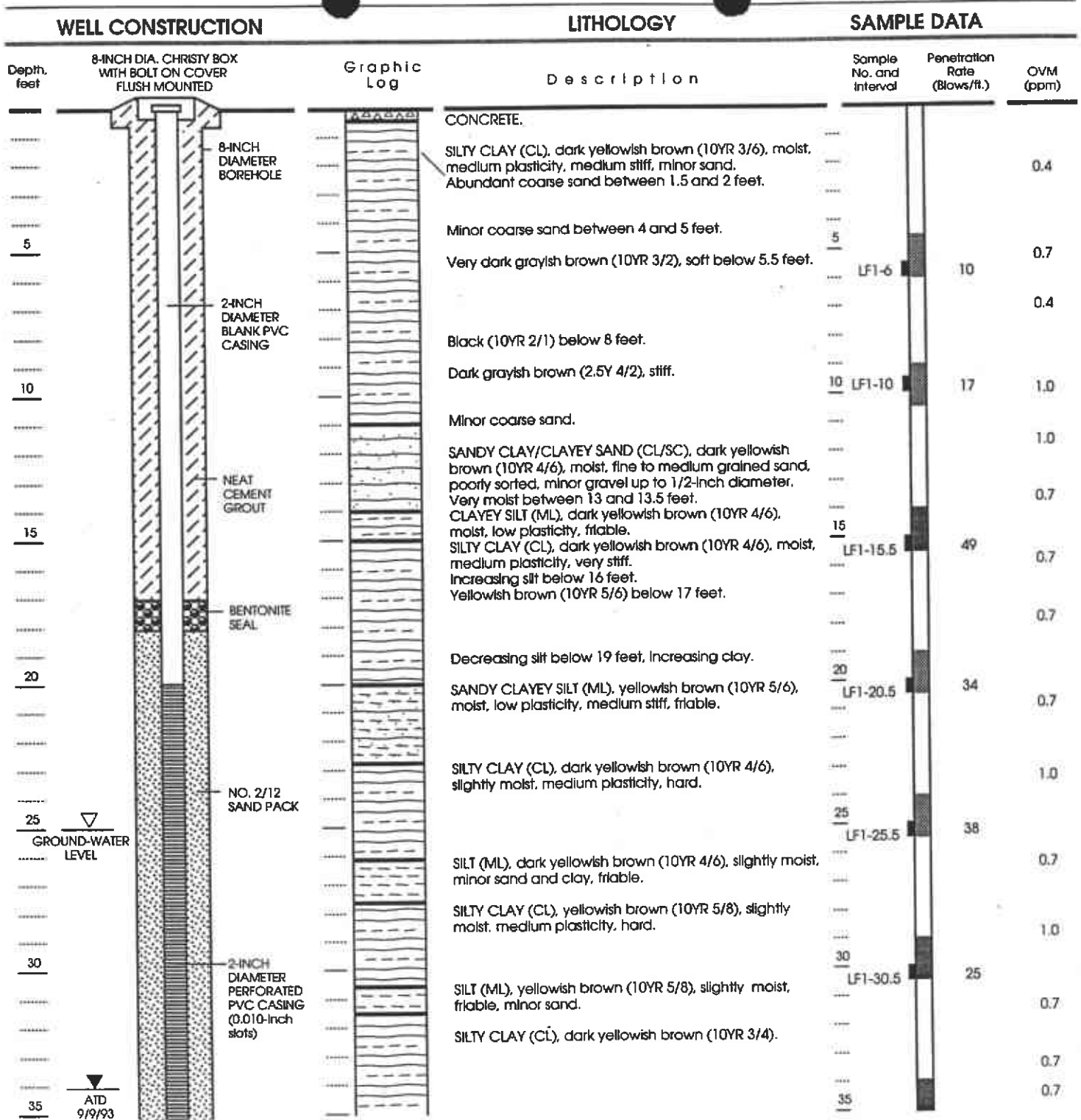
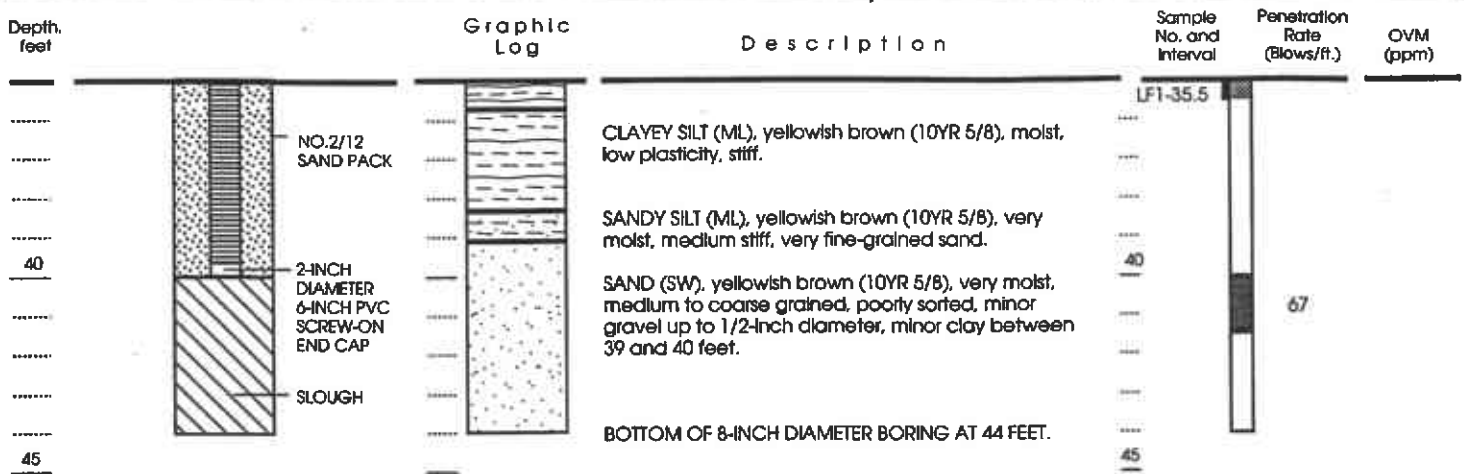



Figure A-1 : WELL CONSTRUCTION AND LITHOLOGY FOR 4003 PARK BLVD./4006 BRIGHTON STREET

WELL CONSTRUCTION






LITHOLOGY



EXPLANATION

-  Clay
-  Silt
-  Sand
-  Gravel

Permit No.: 93491
 Date well drilled: September 9, 1993
 Date Water Level measured: September 13, 1993
 Drilling method: Hollow Stem Auger
 Drilling company: Gregg Drilling
 LF Geologist: Larry Lapuyade

-  Modified California Sampler
-  Sample retained for chemical analysis
-  Continuous Core Sampler
-  Ground-water level at time of sampling September 13, 1993
-  Water level at time of drilling

Approved by *Duff B...* R.G. 5300

Figure A-1 : WELL CONSTRUCTION AND LITHOLOGY FOR WELL LF-1
 4003 PARK BLVD./4006 BRIGHTON STREET

**APPENDIX B
FIELD METHODS**

**APPENDIX B
FIELD METHODS**

Three shallow soil borings were drilled and one shallow monitoring well was installed in one of the borings at the Site on September 8 and 9, 1993. This appendix describes the drilling, soil sampling, well development, and ground-water sampling procedures followed during field activities. The methods used for soil and ground-water sample analyses and well construction data for the newly installed wells are also presented.

BOREHOLE DRILLING

Borehole drilling and well construction services were provided by Gregg Drilling, a licensed well drilling contractor located in Concord, California, and Power Core, a licensed drilling contractor located in Antioch, California. All drilling activities were conducted under the supervision of a Levine·Fricke California registered geologist.

Three boreholes were drilled at the Site to total depths of approximately 44 (LF-1), 30 (SB-A), and 22 (SB-B) feet bgs. Borehole LF-1 was drilled using a truck mounted-drilling rig equipped with 8-inch-diameter hollow-stem augers, and borehole SB-A was drilled with 6-inch-diameter hollow-stem augers. Borehole SB-B, a 3-inch-diameter borehole, was constructed by driving 3-inch-diameter, 2.5-foot-long sections of steel split-spoon type samplers into the ground. The sections were driven into the soil by a hydraulic jack hammer.

SOIL SAMPLING

During drilling, the lithology of the samples were described using the Unified Soil Classification System. Soil samples were also field tested for organic vapors using a PID. Lithologic descriptions and results from the field screening were recorded in the field on borehole log forms. Completed log forms are included in Appendix A. All downhole sampling and drilling equipment was steam cleaned between uses at borehole locations, washed with laboratory-grade soap, and rinsed with tap water between sampling intervals.

LEVINE-FRICKE

During drilling, soil samples were collected at intervals based on PID readings for possible chemical analyses by driving a split-spoon sampler lined with brass tubes ahead of the auger into undisturbed soil, or, in the case of the driven boring, by lining the 2.5-foot-long sections with brass tubes. Other samples were collected by driving a brass tube into a continuous core sample. Plastic tape and plastic caps were placed over the ends of the sample tube. Samples were stored in an ice-chilled chest until submittal to the laboratory for analysis.

SOIL SAMPLE ANALYTICAL METHODS

Soil samples were analyzed by AEN, a state-certified laboratory located in Concord, California. A total of six soil samples were submitted for analysis for TPHg and BTEX using EPA Method 8015. Laboratory certificates are included in Appendix C.

WELL INSTALLATION

The monitoring well was constructed of flush-threaded, 2-inch-diameter polyvinyl chloride (PVC) casing with factory-made 0.010-inch-wide slotted well screens. The total depth of well LF-1 was approximately 40 feet bgs with 20 feet of 0.010-inch slotted casing, so that 14 feet of slotted well screen extended above the first saturated sediments observed at the time of drilling.

The well casing was placed in the completed borehole through the hollow auger. A filter pack consisting of Number 2/12 graded sand was poured into the annular space between the hollow auger and the slotted PVC well casing as the auger was gradually removed from the borehole.

The filter pack extended approximately 2 feet above the top of the slotted PVC casing. A 1-foot-thick layer of bentonite pellets was placed above the sand pack to isolate the perforated interval from material above and prevent the entrance of grout into the sand pack. A neat cement grout was then placed down the annular space, above the bentonite seal, up to the ground surface to seal the remainder of the borehole interval from surface-water infiltration.

LEVINE·FRICKE

The well was completed below grade with a locking well cap to protect the well's integrity and a watertight cover, flush mounted to the ground surface, to restrict the entrance of surface-water runoff. Concrete was placed around the well cover to produce a durable finish.

Soil cuttings from borehole drilling were stored on site in 55-gallon drums.

WELL DEVELOPMENT AND SAMPLING

The newly installed monitoring well was developed on September 13, 1993, by bailing water out of the well to remove sediment from around the screened interval. Specific conductance, pH, temperature, and clarity of the purged water were recorded on field data sheets after each volume of water had been removed. Three volumes of water were purged from the well. The purged water is being stored on site in a 55-gallon drum.

After development, a sample was collected from the well using a clean Teflon bailer and gently poured into laboratory-supplied, 40-milliliter volatile organic analysis vials (two vials per sample). Each vial contained hydrochloric acid as a preservative. Samples were placed in an ice-chilled cooler and delivered to AEN under standard chain-of-custody protocol. To check laboratory quality control, a duplicate sample was collected from well LF-1 and submitted for analyses.

APPENDIX C
LABORATORY CERTIFICATES

2986

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172

AHA Accreditation 94523-001

PAGE 1 OF 8

SEP 28 1993

LEVINE-FRICKE
1900 POWELL ST., 12TH FLOOR
EMERYVILLE, CA 94608

REPORT DATE: 09/27/93

DATE SAMPLED: 09/13/93

ATTN: LARRY LAPUYADE

DATE RECEIVED: 09/13/93

CLIENT PROJECT ID: 2986.00
C.O.C. SERIAL NO: 11187
PROJ. NAME: 4003 PARK BLVD. & BRIGHTON

AEN JOB NO: 9309152

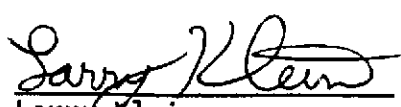
PROJECT SUMMARY:

On September 13, 1993, this laboratory received four (4) water samples.

Client requested samples be analyzed for Purgeable Hydrocarbons as Gasoline, Benzene, Toluene, Ethylbenzene and Total Xylenes by EPA Methods 8020, 5030 GCFID. Sample identification, results and dates analyzed are summarized on the following pages.

All laboratory quality control parameters were found to be within established limits. Batch QC data is included at the end of this report.

If you have any questions, please contact Client Services at (510) 930-9090.



Larry Klein
General Manager

Results FAXed 09/20/93

LEVINE-FRICKE

SAMPLE ID: DRUM-1
CLIENT PROJ. ID: 2986.00
DATE SAMPLED: 09/13/93
DATE RECEIVED: 09/13/93
REPORT DATE: 09/27/93

AEN LAB NO: 9309152-04A
AEN JOB NO: 9309152
DATE ANALYZED: 09/15/93
INSTRUMENT: F

BTEX AND HYDROCARBONS
METHOD: EPA 8020, 5030 GCFID
(WATER MATRIX)

COMPOUND	CAS #	CONCENTRATION (ug/L)	REPORTING LIMIT (ug/L)
Benzene	71-43-2	27	0.5
Toluene	108-88-3	180	0.5
Ethylbenzene	100-41-4	46	0.5
Xylenes, Total	1330-20-7	290	2

PURGEABLE HYDROCARBONS:

as Gasoline 2.2 mg/L 0.05 mg/L

ND = Not Detected

QUALITY CONTROL DATA

INSTRUMENT: F
 CLIENT PROJ. ID: 2986.00

AEN JOB NO: 9309152
 AEN LAB NO: 0915-BLANK
 DATE ANALYZED: 09/15/93

BTEX AND HYDROCARBONS (METHOD BLANK)
 METHOD: EPA 8020, 5030 GC/FID
 (WATER MATRIX)

	CAS #	CONCENTRATION (ug/L)	REPORTING LIMIT (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/L	0.05 mg/L

ND = Not Detected

QUALITY CONTROL DATA

CLIENT PROJ. ID: 2986.00

AEN JOB NO: 9309152

INSTRUMENT: F

SURROGATE STANDARD RECOVERY SUMMARY
METHOD: EPA 8020
(WATER MATRIX)

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)
	Client Id.	Lab Id.	Fluorobenzene
09/15/93	TRIP BLANK	01A	97.3
09/15/93	LF-1	02A	96.8
09/15/93	LF-101	03A	97.4
09/15/93	DRUM-1	04A	91.7
09/15/93		0915-BLANK	96.6

CURRENT QC LIMITS

<u>ANALYTE</u>	<u>PERCENT RECOVERY</u>
Fluorobenzene	(70-115)

QUALITY CONTROL DATA

DATE ANALYZED: 09/15/93
 SAMPLE SPIKED: 9309053-03B
 CLIENT PROJ. ID: 2986.00

AEN JOB NO: 9309152
 INSTRUMENT: F

MATRIX SPIKE RECOVERY SUMMARY
 METHOD: EPA 8020, 5030 GCFID
 (WATER MATRIX)

ANALYTE	Spike Conc. (ug/L)	Sample Result (ug/L)	MS Result (ug/L)	MSD Result (ug/L)	Average Percent Recovery	RPD
Benzene	11.1	ND	12.3	12.3	113.5	4.8
Toluene	40.7	ND	43.1	44.1	107.1	2.3
Hydrocarbons as Gasoline	500	ND	526	509	103.5	3.3

CURRENT QC LIMITS (Revised 05/14/92)

Analyte	Percent Recovery	RPD
Benzene	(81.4-115.3)	10.2
Toluene	(85.3-112.4)	9.4
Gasoline	(72.0-119.4)	12.8

MS = Matrix Spike
 MSD = Matrix Spike Duplicate
 RPD = Relative Percent Difference
 ND = Not Detected

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

9309152

Project No.: 2986.00			Field Logbook No.:			Date: 9/13/93			Serial No.: 11187		
Project Name: 4003 PARK BLVD + BRIGHTON			Project Location: OAKLAND						Samplers: JGB		
Sampler (Signature): <i>Jaime Beckman</i>			ANALYSES								
SAMPLES									HOLD RUSH		
SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CONTAINERS	SAMPLE TYPE	EPA 601	EPA 624	EPA 815	TRM 745 F	BLEX	REMARKS
Trip blank	9/10/93	900	01AB	2	H ₂ O			X	X		Normal TAT
LF-1	9/13/93	1130	02AB	2	↓			↓	↓		
LF-101	↓	1230	03AB	2	↓			↓	↓		
DRUM-1	↓	1115	04ABL	3	↓			↓	↓		Results to <i>Larry Lapuyade</i>
											9/13/93 Per Larry Lapuyade Results needed 9/20/93 1 wk TAT
RELINQUISHED BY: (Signature) <i>Jaime Beckman</i>			DATE 9/13/93	TIME	RECEIVED BY: (Signature) <i>Steph Hapt</i>			DATE 9/13/93	TIME 4:45		
RELINQUISHED BY: (Signature) <i>Steph Hapt</i>			DATE 9/13/93	TIME 5:20pm	RECEIVED BY: (Signature) <i>Dan Lee Vance</i>			DATE 9/13/93	TIME 1725		
RELINQUISHED BY: (Signature)			DATE	TIME	RECEIVED BY: (Signature)			DATE	TIME		
METHOD OF SHIPMENT:			DATE	TIME	LAB COMMENTS:						
Sample Collector: LEVINE-FRICKE 1900 Powell Street, 12th Floor Emeryville, Ca 94608 (415) 652-4500					Analytical Laboratory: AEN						

2986

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation 94523-001

PAGE 1 OF 20

LEVINE-FRICKE
1900 POWELL ST., 12TH FL.
EMERYVILLE, CA 94608

REPORT DATE: 09/29/93

DATE SAMPLED: 09/08-09/93

ATTN: LARRY LAPUYADE

DATE RECEIVED: 09/10/93

CLIENT PROJ. ID: 2986

ANALYSIS REQUESTED: 09/13/93

C.O.C. SERIAL NO: 9987,9988
PROJ. NAME: 4003 PARK BLVD.

AEN JOB NO: 9309121

PROJECT SUMMARY:

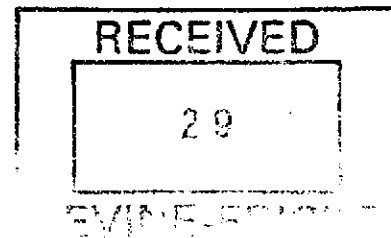
On September 10, 1993, this laboratory received eighteen (18) soil samples and two (2) water samples.

Per client request, six (6) soil samples were analyzed for inorganic and organic parameters. The water samples were analyzed for organic parameters. A portion of the soil sample for Reactivity was subcontracted to a DOHS certified laboratory. Subcontract report will follow at a later date. Twelve (12) soil samples were placed on hold. Sample identification, methodologies, results and dates analyzed are summarized on the following pages.

All laboratory quality control parameters were found to be within established limits. Batch QC data is included at the end of this report.

If you have any questions, please contact Client Services at (510) 930-9090.


Larry Klein
General Manager



Results FAXed 09/20-24/93

LEVINE-FRICKE

DATE SAMPLED: 09/09/93
 DATE RECEIVED: 09/10/93
 CLIENT PROJ. ID: 2986

REPORT DATE: 09/29/93
 AEN JOB NO: 9309121

Client Sample Id.	AEN Lab Id.	STLC Lead* (mg/L)	pH (S.U.)	Ignitability (F°)
LF-1-6	12A	---	7.0	NFD
LF-1-6	12B	ND	---	---
Reporting Limit		0.4	NA	NA
EPA Method:		6010	9040	1010
Instrument:		ICP	ISE	FLASH
Date Analyzed:		09/22/93	09/20/93	09/20/93

NA = Not Applicable
 ND = Not Detected
 NFD = No flash detected at or below 140° F

* Extracted utilizing California Code of Regulations, Title 22, Waste Extraction Test on 09/20/93.

LEVINE-FRICKE

SAMPLE ID: SB-B-5
 CLIENT PROJ. ID: 2986
 DATE SAMPLED: 09/08/93
 DATE RECEIVED: 09/10/93
 REPORT DATE: 09/29/93

AEN LAB NO: 9309121-01A
 AEN JOB NO: 9309121
 DATE ANALYZED: 09/15/93
 INSTRUMENT: H

BTEX AND HYDROCARBONS
 METHOD: EPA 8020, 5030 GCFID
 (SOIL MATRIX)

COMPOUND	CAS #	CONCENTRATION (ug/kg)	REPORTING LIMIT (ug/kg)
Benzene	71-43-2	ND	5
Toluene	108-88-3	ND	5
Ethylbenzene	100-41-4	ND	5
Xylenes, Total	1330-20-7	ND	5
PURGEABLE HYDROCARBONS:			
as Gasoline		ND mg/kg	0.2 mg/kg

ND = Not Detected

LEVINE-FRICKE

SAMPLE ID: SB-B-12.5
 CLIENT PROJ. ID: 2986
 DATE SAMPLED: 09/08/93
 DATE RECEIVED: 09/10/93
 REPORT DATE: 09/29/93

AEN LAB NO: 9309121-03A
 AEN JOB NO: 9309121
 DATE ANALYZED: 09/16/93
 INSTRUMENT: H

BTEX AND HYDROCARBONS
 METHOD: EPA 8020, 5030 GCFID
 (SOIL MATRIX)

COMPOUND	CAS #	CONCENTRATION (ug/kg)	REPORTING LIMIT (ug/kg)
Benzene	71-43-2	1,700	5
Toluene	108-88-3	17,000	5
Ethylbenzene	100-41-4	8,200	5
Xylenes, Total	1330-20-7	44,000	5

PURGEABLE HYDROCARBONS:

as Gasoline 400 mg/kg 0.2 mg/kg

LEVINE-FRICKE

SAMPLE ID: LF-1-6
CLIENT PROJ. ID: 2986
DATE SAMPLED: 09/09/93
DATE RECEIVED: 09/10/93
REPORT DATE: 09/29/93

AEN LAB NO: 9309121-12A
AEN JOB NO: 9309121
DATE ANALYZED: 09/14/93
INSTRUMENT: H

BTEX AND HYDROCARBONS
METHOD: EPA 8020, 5030 GCFID
(SOIL MATRIX)

COMPOUND	CAS #	CONCENTRATION (ug/kg)	REPORTING LIMIT (ug/kg)
Benzene	71-43-2	ND	5
Toluene	108-88-3	ND	5
Ethylbenzene	100-41-4	ND	5
Xylenes, Total	1330-20-7	ND	5
PURGEABLE HYDROCARBONS:			
as Gasoline		ND mg/kg	0.2 mg/kg

ND = Not Detected

LEVINE-FRICKE

SAMPLE ID: LF-1-15.5
 CLIENT PROJ. ID: 2986
 DATE SAMPLED: 09/09/93
 DATE RECEIVED: 09/10/93
 REPORT DATE: 09/29/93

AEN LAB NO: 9309121-14A
 AEN JOB NO: 9309121
 DATE ANALYZED: 09/15/93
 INSTRUMENT: H

BTEX AND HYDROCARBONS
 METHOD: EPA 8020, 5030 GCFID
 (SOIL MATRIX)

COMPOUND	CAS #	CONCENTRATION (ug/kg)	REPORTING LIMIT (ug/kg)
Benzene	71-43-2	ND	5
Toluene	108-88-3	ND	5
Ethylbenzene	100-41-4	ND	5
Xylenes, Total	1330-20-7	ND	5

PURGEABLE HYDROCARBONS:

as Gasoline ND mg/kg 0.2 mg/kg

ND = Not Detected

LEVINE-FRICKE

SAMPLE ID: GWSB-B
CLIENT PROJ. ID: 2986
DATE SAMPLED: 09/08/93
DATE RECEIVED: 09/10/93
REPORT DATE: 09/29/93

AEN LAB NO: 9309121-19A
AEN JOB NO: 9309121
DATE ANALYZED: 09/15-16/93
INSTRUMENT: F

BTEX AND HYDROCARBONS
METHOD: EPA 8020, 5030 GCFID
(WATER MATRIX)

COMPOUND	CAS #	CONCENTRATION (ug/L)	REPORTING LIMIT (ug/L)
Benzene	71-43-2	42,000	0.5
Toluene	108-88-3	51,000	0.5
Ethylbenzene	100-41-4	37,000	0.5
Xylenes, Total	1330-20-7	21,000	2

PURGEABLE HYDROCARBONS:

as Gasoline	210 mg/L	0.05 mg/L
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LEVINE-FRICKE

SAMPLE ID: GWSB-A
CLIENT PROJ. ID: 2986
DATE SAMPLED: 09/09/93
DATE RECEIVED: 09/10/93
REPORT DATE: 09/29/93

AEN LAB NO: 9309121-20A
AEN JOB NO: 9309121
DATE ANALYZED: 09/15-20/93
INSTRUMENT: F

BTEX AND HYDROCARBONS
METHOD: EPA 8020, 5030 GCFID
(WATER MATRIX)

COMPOUND	CAS #	CONCENTRATION (ug/L)	REPORTING LIMIT (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2

PURGEABLE HYDROCARBONS:

as Gasoline ND mg/L 0.05 mg/L

ND = Not Detected

QUALITY CONTROL DATA

INSTRUMENT: H

AEN JOB NO: 9309121

CLIENT PROJ. ID: 2986

AEN LAB NO: 0914-BLANK

DATE ANALYZED: 09/14/93

BTEX AND HYDROCARBONS (SOIL MATRIX)

METHOD: EPA 8020, 5030 GCFID

	CAS #	CONCENTRATION (ug/kg)	REPORTING LIMIT (ug/kg)
Benzene	71-43-2	ND	5
Toluene	108-88-3	ND	5
Ethylbenzene	100-41-4	ND	5
Xylenes, Total	1330-20-7	ND	5
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/kg	0.2 mg/kg

ND = Not Detected

QUALITY CONTROL DATA

INSTRUMENT: H

CLIENT PROJ. ID: 2986

AEN JOB NO: 9309121

AEN LAB NO: 0915-BLANK

DATE ANALYZED: 09/15/93

BTEX AND HYDROCARBONS (SOIL MATRIX)
METHOD: EPA 8020, 5030 GCFID

	CAS #	CONCENTRATION (ug/kg)	REPORTING LIMIT (ug/kg)
Benzene	71-43-2	ND	5
Toluene	108-88-3	ND	5
Ethylbenzene	100-41-4	ND	5
Xylenes, Total	1330-20-7	ND	5
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/kg	0.2 mg/kg

ND = Not Detected

QUALITY CONTROL DATA

INSTRUMENT: H

CLIENT PROJ. ID: 2986

AEN JOB NO: 9309121

AEN LAB NO: 0916-BLANK

DATE ANALYZED: 09/16/93

BTEX AND HYDROCARBONS (SOIL MATRIX)

METHOD: EPA 8020, 5030 GCFID

	CAS #	CONCENTRATION (ug/kg)	REPORTING LIMIT (ug/kg)
Benzene	71-43-2	ND	5
Toluene	108-88-3	ND	5
Ethylbenzene	100-41-4	ND	5
Xylenes, Total	1330-20-7	ND	5

PURGEABLE HYDROCARBONS AS:

Gasoline

ND mg/kg

0.2 mg/kg

ND = Not Detected

QUALITY CONTROL DATA

CLIENT PROJ. ID: 2986

AEN JOB NO: 9309121

INSTRUMENT: H

SURROGATE STANDARD RECOVERY SUMMARY
METHOD: EPA 8020
(SOIL MATRIX)

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)
	Client Id.	Lab Id.	Fluorobenzene
09/15/93	SB-B-5	01A	97.5
09/16/93	SB-B-12.5	03A	96.8
09/16/93	SB-A-5	07A	97.7
09/15/93	SB-A-15	09A	96.9
09/14/93	LF-1-6	12A	98.0
09/15/93	LF-1-15.5	14A	97.2
09/14/93		0914-BLANK	97.4
09/15/93		0915-BLANK	96.3
09/16/93		0916-BLANK	96.5

CURRENT QC LIMITS

ANALYTE PERCENT RECOVERY
Fluorobenzene (70-115)

QUALITY CONTROL DATA

DATE ANALYZED: 09/16/93
 SAMPLE SPIKED: 9309121-14A
 CLIENT PROJ. ID: 2986

AEN JOB NO: 9309121
 INSTRUMENT: H

MATRIX SPIKE RECOVERY SUMMARY
 METHOD: EPA 8020, 5030 GCFID
 (SOIL MATRIX)

ANALYTE	Spike Conc. (ug/kg)	Sample Result (ug/kg)	MS Result (ug/kg)	MSD Result (ug/kg)	Average Percent Recovery	RPD
Benzene	28.6	ND	27.2	27.0	94.8	0.7
Toluene	99.9	ND	95.6	92.4	94.1	3.4
Hydrocarbons as Gasoline	1000	ND	930	874	90.2	6.2

CURRENT QC LIMITS (Revised 05/14/92)

Analyte	Percent Recovery	RPD
Benzene	(79.4-125.2)	9.8
Toluene	(84.4-116.8)	10.0
Gasoline	(53.7-124.2)	15.1

MS = Matrix Spike
 MSD = Matrix Spike Duplicate
 RPD = Relative Percent Difference
 ND = Not Detected

QUALITY CONTROL DATA

INSTRUMENT: F

CLIENT PROJ. ID: 2986

AEN JOB NO: 9309121

AEN LAB NO: 0915-BLANK

DATE ANALYZED: 09/15/93

**BTEX AND HYDROCARBONS (WATER MATRIX)
METHOD: EPA 8020, 5030 GCFID**

	CAS #	CONCENTRATION (ug/L)	REPORTING LIMIT (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/L	0.05 mg/L

ND = Not Detected

QUALITY CONTROL DATA

INSTRUMENT: F
CLIENT PROJ. ID: 2986

AEN JOB NO: 9309121
AEN LAB NO: 0916-BLANK
DATE ANALYZED: 09/16/93

BTEX AND HYDROCARBONS (WATER MATRIX)
METHOD: EPA 8020, 5030 GCFID

	CAS #	CONCENTRATION (ug/L)	REPORTING LIMIT (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2

PURGEABLE HYDROCARBONS AS:

Gasoline ND mg/L 0.05 mg/L

ND = Not Detected

QUALITY CONTROL DATA

INSTRUMENT: F

CLIENT PROJ. ID: 2986

AEN JOB NO: 9309121

AEN LAB NO: 0920-BLANK

DATE ANALYZED: 09/20/93

BTEX AND HYDROCARBONS (WATER MATRIX)
METHOD: EPA 8020, 5030 GCFID

	CAS #	CONCENTRATION (ug/L)	REPORTING LIMIT (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/L	0.05 mg/L

ND = Not Detected

QUALITY CONTROL DATA

CLIENT PROJ. ID: 2986

AEN JOB NO: 9309121

INSTRUMENT: F

SURROGATE STANDARD RECOVERY SUMMARY
 METHOD: EPA 8020
 (WATER MATRIX)

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)
	Client Id.	Lab Id.	Fluorobenzene
09/15/93	GWSB-B	19A	102.8
09/20/93	GWSB-A	20B	96.8
09/15/93		0915-BLANK	96.6
09/16/93		0916-BLANK	96.7
09/20/93		0920-BLANK	96.1

CURRENT QC LIMITS

<u>ANALYTE</u>	<u>PERCENT RECOVERY</u>
Fluorobenzene	(70-115)

QUALITY CONTROL DATA

DATE ANALYZED: 09/15/93
 SAMPLE SPIKED: 9309053-03B
 CLIENT PROJ. ID: 2986

AEN JOB NO: 9309121
 INSTRUMENT: F

MATRIX SPIKE RECOVERY SUMMARY
 METHOD: EPA 8020, 5030 GCFID
 (WATER MATRIX)

ANALYTE	Spike Conc. (ug/L)	Sample Result (ug/L)	MS Result (ug/L)	MSD Result (ug/L)	Average Percent Recovery	RPD
Benzene	11.1	ND	12.3	12.9	113.5	4.8
Toluene	40.7	ND	43.1	44.1	107.1	2.3
Hydrocarbons as Gasoline	500	ND	526	509	103.5	3.3

CURRENT QC LIMITS (Revised 05/14/92)

Analyte	Percent Recovery	RPD
Benzene	(81.4-115.3)	10.2
Toluene	(85.3-112.4)	9.4
Gasoline	(72.0-119.4)	12.3

MS = Matrix Spike
 MSD = Matrix Spike Duplicate
 RPD = Relative Percent Difference
 ND = Not Detected

K-S, S-H
CHAIN OF CUSTODY / ANALYSES REQUEST FORM

9309121

Project No.: **2986** Field Logbook No.: _____ Date: **9-9-93** Serial No.: **9987**
 Project Name: **4003 Park Blvd / 4006 Brighton ST** Project Location: **Oakland**

Sampler (Signature): *Larry Lapuyade* ANALYSES: _____
 Samplers: **LPL**

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CON-TAINERS	SAMPLE TYPE	ANALYSES						REMARKS	
						EPA 601	EPA 624	EPA 801 TPH/BIEN	RCI	STLC-Lead	HOLD		RUSH
SB-B-5	9-8-93	—	01A	1	Soil			✓					NORMAL TURNAROUND RESULTS TO:
SB-B-10			02A										LARRY LAPUYADE
SB-B-12.5			03A					✓					
SB-B-15			04A										
SB-B-17.5			05A										
SB-B-20			06A										
SB-A-5			07A					✓					(9/13) Per Larry Lapuyade
SB-A-10			08A					✓					6 Soils & 2 Waters off
SB-A-15	✓		09A					✓					Hotel - Results needed
SB-A-20	9-9-93		10A										9-20-93 5 day TAT
SB-A-25.5			11A										also - add RCI to
LF-1-6			12A					✓	✓	*			LF-1-6 Normal TAT
LF-1-10			13A					✓					Also, STLC Pb standard
LF-1-15.5			14A										RB
LF-1-20.5			15A										
LF-1-25.5	✓		16A										

RELINQUISHED BY: (Signature) <i>Larry Lapuyade</i>	DATE: 9-9-93	TIME: 4:55	RECEIVED BY: (Signature) <i>[Signature]</i>	DATE: 9/10/93	TIME: 11:00
RELINQUISHED BY: (Signature) <i>[Signature]</i>	DATE: 9/10/93	TIME: 11:30	RECEIVED BY: (Signature) <i>Danella Vance</i>	DATE: 9/10/93	TIME: 11:50
RELINQUISHED BY: (Signature) _____	DATE: _____	TIME: _____	RECEIVED BY: (Signature) _____	DATE: _____	TIME: _____
METHOD OF SHIPMENT: Courier	DATE: _____	TIME: _____	LAB COMMENTS: _____		

Sample Collector: **LEVINE-FRICKE**
 1900 Powell Street, 12th Floor
 Emeryville, Ca 94608
 (415) 652-4500

Analytical Laboratory: **AEM**

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

9309121

Project No.: 2986	Field Logbook No.:	Date: 9-9-93	Serial No.: 9988
Project Name: 4003 Park Blvd / 4006 Brighton St		Project Location: OAKLAND	

Sampler (Signature): *[Signature]* ANALYSES

Samplers: **LPL**

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CON-TAINERS	SAMPLE TYPE	ANALYSES					HOLD	RUSH	REMARKS
						EPA 601	EPA 624	EPA 815	EPA 816	EPA 817			
LF1-30.5	9-9-93	—	17A	1	SOL						X		NORMAL TURNAROUND
LF1-35	9-9-93	↓	18A	1	↓						X		Time
GWSB-B	9-8-93		19A-D	4	GROUND WATER		✓				X		RESULTS TO LARRY
GWSB-A	9-9-93		20A-C	3	↓		✓				X		LAPUYA
													9/13 Per Larry Lapuyade 2 Waters off hold, results needed 9-20-93 5 day TAT

RELINQUISHED BY: (Signature) <i>[Signature]</i>	DATE: 9-9-93	TIME: 4:53	RECEIVED BY: (Signature) <i>[Signature]</i>	DATE: 9/10/93	TIME: 11:00
RELINQUISHED BY: (Signature) <i>[Signature]</i>	DATE: 9-9-93	TIME: 11:00	RECEIVED BY: (Signature) <i>[Signature]</i>	DATE: 9/10/93	TIME: 11:55
RELINQUISHED BY: (Signature)	DATE:	TIME:	RECEIVED BY: (Signature)	DATE:	TIME:
METHOD OF SHIPMENT: Courier	DATE:	TIME:	LAB COMMENTS:		

Sample Collector: LEVINE-FRICKE 1900 Powell Street, 12th Floor Emeryville, Ca 94608 (415) 652-4500	Analytical Laboratory: <div style="text-align: center; font-size: 2em; font-weight: bold;">AFEN</div>
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CHAIN OF CUSTODY / ANALYSES REQUEST FORM

9309121

Project No.: 2986 Field Logbook No.: Date: 9-9-93 Serial No.: 9988
 Project Name: 4003 Park Blvd / 4006 Brighton ST. Project Location: OAKLAND

Sampler (Signature): *[Signature]* ANALYSES Samplers: LPL

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CON-TAINERS	SAMPLE TYPE	ANALYSES						REMARKS	
						EPA 601	EPA 624	EPA 801	EPA 815	EPA 816	HOLD		RUSH
LF-1-30-S	9-9-93	—	17A	1	SOIL							X	NORMAL TURNAROUND
LF-1-35	9-9-93	↓	18A	1	↓							X	Time
GWSB-B	9-8-93		19A-D	4	GROUND WATER		✓					X	RESULTS TO LARRY
GWSB-A	9-9-93		20A-C	3	↓		✓					X	LAPUYADE
9/13 Per Larry Lapuyade 2 waters off hold, results needed 9-20-93 5 day TAT													

RELINQUISHED BY: (Signature) <i>[Signature]</i>	DATE 9-9-93	TIME 4:53	RECEIVED BY: (Signature) <i>[Signature]</i>	DATE 9/10/93	TIME 11:00
RELINQUISHED BY: (Signature) <i>[Signature]</i>	DATE 9-9-93	TIME 11:00	RECEIVED BY: (Signature) Danielle Vasquez	DATE 9/10/93	TIME 11:55
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME

METHOD OF SHIPMENT: Courier DATE TIME LAB COMMENTS:

Sample Collector: LEVINE-FRICKE
 1900 Powell Street, 12th Floor
 Emeryville, Ca 94608
 (415) 652-4500

Analytical Laboratory: AEM

R-5, S-H R-7-5-2

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

9309121

Project No.: 2986 Field Logbook No.: _____ Date: 9-9-93 Serial No.: 9987
 Project Name: 4003 Park Blvd / 4006 Brighton ST Project Location: Oakland

Sampler (Signature): Larry Lapuyade ANALYSES: _____
 Samplers: LPL

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CON-TAINERS	SAMPLE TYPE	ANALYSES						REMARKS		
						EPA 601	EPA 624	EPA 8015 POLYBLEX	RCI	STLC-Lead	HOLD		RUSH	
SB-B-5	9-8-93	—	01A	1	Soil			✓						NORMAL TURNDOWN
SB-B-10			02A					✓						RESULTS TO:
SB-B-12.5			03A					✓						LARRY LAPUYADE
SB-B-15			04A											
SB-B-17.5			05A											
SB-B-20			06A											
SB-A-5			07A					✓						(9/13) Per Larry Lapuyade
SB-A-10			08A					✓						6 Soils & 2 Waters off
SB-A-15		✓	09A					✓						Hotel - Results needed
SB-A-20	9-9-93		10A											9-20-93 5 day TAT
SB-A-25.5			11A											also - add RCI to
LF-1-6			12A					✓	✓	*				LF-1-6 Normal TAT
LF-1-10			13A					✓						Also, STLC Pb standard
LF-1-15.5			14A											RB
LF-1-20.5			15A											
LF-1-25.5			16A											

RELINQUISHED BY: (Signature) <u>Larry Lapuyade</u>	DATE <u>9-9-93</u>	TIME <u>4:53</u>	RECEIVED BY: (Signature) <u>[Signature]</u>	DATE <u>9/14/93</u>	TIME <u>11:00</u>
RELINQUISHED BY: (Signature) <u>[Signature]</u>	DATE <u>9/10/93</u>	TIME <u>11:30</u>	RECEIVED BY: (Signature) <u>Danielle Vance</u>	DATE <u>9/10/93</u>	TIME <u>1150</u>
RELINQUISHED BY: (Signature) _____	DATE _____	TIME _____	RECEIVED BY: (Signature) _____	DATE _____	TIME _____
METHOD OF SHIPMENT: <u>Courier</u>	DATE _____	TIME _____	LAB COMMENTS: _____		
Sample Collector: <u>LEVINE-FRICKE</u>	<u>1900 Powell Street, 12th Floor</u>		Analytical Laboratory: <u>AEM</u>		
	<u>Emeryville, Ca 94608</u>				
	<u>(415) 652-4500</u>				