8810220COV COT

Woodward-Clyde Consultants

April 1989

PHASE II SITE EXPLORATION
RAILROAD AVENUE PROPERTY
LIVERMORE, CALIFORNIA

Prepared for

City of Livermore
Redevelopment Agency
1052 South Livermore Avenue
Livermore, California 94550

April, 1989

Prepared by

Woodward-Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

Oakland City Center
500 12th Street
Suite 100
Oakland, CA 94607-4014
(415) 893-3600

Woodward-Clyde Consultants

April 7, 1989
8810220A

City of Livermore
Redevelopment Agency
1052 South Livermore Avenue
Livermore, CA 94550

Attention: Ms. Karen Majors
Redevelopment Coordinator

Subject: Phase II Site Exploration,
Railroad Avenue Property, 1940
Livermore, California

Ladies and Gentlemen:

We are pleased to present the results of Phase II Site Exploration at the subject site. The purpose of the exploration is to explore the soil for possible petroleum contamination at the location of former, and existing underground storage tanks. The results of exploratory borings and laboratory testing of soil samples shows evidence of petroleum contamination to a depth of 25 feet at the Arrow Rentals site at 187 North "L" Street. As described in the following report we recommend that additional exploration be performed to explore the groundwater at the site for potential petroleum contamination.

Please call if you have any questions. We would be pleased to meet with you to discuss the results and recomendations presented in this report.

Sincerely,

WOODWARD-CLYDE CONSULTANTS

Ann McDonald, by APR
Ann McDonald
Assistant Project Scientist

Albert P. Ridley, C.E.G. 926
Senior Associate

AM/APR:tt
8810220LTR/COT

TABLE OF CONTENTS

PHASE II SITE EXPLORATION
RAILROAD AVENUE PROPERTY
LIVERMORE, CALIFORNIA

INTRODUCTION

This report presents the results of our Phase II Site Exploration for the presence of petroleum products in the soil at the Railroad Avenue Property, Alameda County, Livermore, California (Figure 1). The Phase II study included six exploratory borings, at the location of former and existing underground petroleum storage tanks. Soil samples were collected from the borings at five foot depth intervals and tested in the laboratory for petroleum products and selected metals. In addition a stack of ceiling tiles was sampled and analysed for asbestos. The borings were located at Arrow Rentals, 187 North "L" Street, and at 1934 Railroad Avenue. The approximate locations were previously identified in our proposal dated January 16, 1989. The actual boring locations are shown on Figure 2.

While drilling, a WCC geologist: 1) collected soil samples from each boring, 2) measured the volatile organic vapor content of the samples using an HNu photoionization detector, 3) prepared a field log for each boring describing the materials encountered using the Unified Soils Classification System.

Chemical analyses of the soil samples from the six borings were conducted by Sequoia Analytical Laboratory at their state-certified laboratory in Redwood City, California. Total petroleum hydrocarbons (TPH -gasoline) are reported as low boiling point hydrocarbons by the laboratory. Total petroleum hydrocarbons (TPH - diesel) are reported as high boiling point hydrocarbons by the laboratory (Appendix A). The soil samples from borings B-1 through B-5 were analyzed for TPH - gasoline, and benzene, toluene, ethylbenzene and xylene (BTEX); one sample from the 15 foot depth was

analyzed for TPH as diesel and BTEX; one sample from below the bottom of the former tanks in borings B-1, B-2, B-3 were analyzed for purgeable and extractable priority pollutants. Soil samples from boring B-6 at five foot depth intervals, were analyzed for TPH as gasoline and BTEX, two samples ~~at five foot depth intervals~~ from two and five foot depths were analysed for Cr, Cu, Ni, Pb, Zn, and Hg, and one sample was analysed for purgeable and extractable pollutants. The results of the field exploration and the laboratory analyses are summarized below.

FIELD EXPLORATION

Soil Borings

Six soil borings (B-1 to B-6) were drilled on March 2 and 3, 1988 at locations shown on Figure 2. The borings were drilled using a truck-mounted Mobile B-61 drill rig with 8 inch diameter, hollow-stem, continuous flight augers. The field log of each soil boring, prepared by a WCC geologist, is presented in Appendix B.

Boring B-1 was located between the former 6,000 and 4,000 gallon tanks in the present driveway area of 187 North "L" Street. Borings B-2 and B-3 were located in approximately the center of the northern and southernmost of three former 1,500 gallon tanks immediately west of B-1. Boring B-4 was relocated from the center of the pump island to the northwest corner of the pump island in order to avoid overhead wires. Boring B-5 was located next to the north side of the existing 1,000 gallon tank. Boring B-6 was relocated 10 feet south of the planned location at 1940 Railroad Avenue to avoid a eucalyptus tree. Five of the soil borings; B-1, B-2, B-3, B-5, and B-6, were drilled to 25-1/2 to 26 foot depths. Boring B-4 was drilled to a 15-1/5 foot depth. No free water was observed in any of the borings at the time of drilling activities.

Before use at the site, the augers were steam cleaned by the drilling company. Clean augers were used for each boring. The sampler was cleaned between sampling intervals with Alconox detergent and triple rinsed, the final rinse was with deionized water. Each boring was backfilled with a cement-bentonite slurry in order to reduce the potential vertical migration of possible contaminants in the borehole. The cuttings generated from the borings were placed in 55 gallon drums and stored temporarily on site. The soil should be disposed of properly based on the laboratory test results.

Soil Sampling

Soil Samples were collected at five-foot intervals by advancing a modified California Sampler through the hollow stem of the augers. The sampler was driven into the soil a maximum of 18 inches, using a 140 pound hammer with a 30-inch drop. The number of blows required to drive the sampler are shown on the boring log. The soil samples were retained in three four-inch long, two inch diameter brass liners within the sampler. The brass liners were identified as A through C from top to bottom. The liner retained for laboratory analysis is identified on the boring log (Appendix A). The sample selected for laboratory analysis was covered on both ends with teflon sheeting and dealed with plastic end caps and vinyl tape, labeled, placed in a plastic zip-lock type bag, and transported on ice to the laboratory at the end of each field day using WCC chain of custody procedures (Appendix A).

A second of the four soil samples was used to perform a head-space analysis in the field for volatile organic compounds. The test procedure involved emptying the contents of the brass liner into a zip-lock type plastic bag, sealing the bag, placing it in a warm area for 20 or 30 minutes, then inserting the probe. This technique provides a means for approximate evaluations of relative hydrocarbon levels in the soil. The total organic vapor is measured in parts per million (ppm-HNu units), with an HNu photoionization detector. The results of these tests appear on the boring logs and are summarized in Table 1.

Organic Vapor and Hydrocarbon Odors

Organic vapor was detected by the HNu photoionization detector in the field in samples from 4 of the borings located on the Arrow Rentals Property. In boring B-1 organic vapor was detected at 5.6 ppm at the 20 foot depth and 68.5 ppm at the 25 foot depth. In boring B-2 organic vapor was detected at 32.6 ppm at the 25 foot depth. In boring B-3 organic vapor was detected at 3.1 ppm at the 20 foot depth and 1.2 ppm at the 25 foot depth. In boring B-5 organic vapor was detected at 16.3 ppm at the 25 foot depth. No odors and no organic vapors were detected in soil from borings B-4 and B-6.

Laboratory Soil Analysis

187 North "L" Street, Arrow Rentals - Soil samples from four of the borings at the Arrow Rentals site showed detectable concentrations of TPH (total petroleum hydrocarbons) as gasoline. Soil from two of the borings showed detection of one or more components of BTEX (benzene, toluene ethylbenzene, xylenes) and soil from three borings showed detectable levels of TPH as diesel. Components of gasoline were also detected in soil from two borings, during analysis for volatile organics (EPA 8240) and semi-volatile organics (EPA 8270).

In boring B-1, TPH as gasoline was present at 170 ppm at 20 feet, and 220 ppm at 25 feet (see Table 2). TPH as diesel was present at 2.3 ppm at 15 feet. Benzene at 2.1 ppm, toluene at 1.4 ppm, ethylbenzene at 0.22 ppm, and xylene at 1.5 ppm were also present at 20 feet. Toluene at 2.4 ppm, ethylbenzene at 2.1, and xylene at 11.0 ppm were present at 25 feet. In the volatile organics analyses at the 25 foot depth benzene was present at 380 µ g/kg, ethylbenzene at 6,400 µ g/kg toluene at 7,100 µ g/kg and total xylenes at 52,000 µ g/kg. Two of the semi-volatile organics were present at the 25 foot depth; 2-methylnapthalene at 3500 µ g/kg, 2-naphthalene at 3,400 µ g/kg, and phenol at 300 µ g/kg (Table 2).

8810220ÅΨ)→

In boring B-2, TPH as gasoline was present at 3.5 ppm at the 2 foot depth and 8.2 ppm at the 5 foot depth, and 1.7 ppm at the 25 foot depth (Table 2). Xylene was present at 0.1 ppm at the 2 foot, and 0.13 ppm at the 25 foot depth. TPH as diesel was present at 2.3 ppm at the 15 foot depth. Volatile organics were present at the 25 foot level as xylene at 550 µ g/kg (Table 2).

In boring B-3, TPH as gasoline was present at 1.3 ppm at the 25 foot depth, and TPH as diesel was present at 2.6 ppm at the 15 foot depth. In boring B-5, TPH as gasoline was present at 1.9 ppm at the 5 foot depth, and 1.7 ppm at the 25 foot depth. All test results for boring B-4 were reported as non-detected.

1934 Railroad Avenue

TPH as gasoline was present in boring B-6 at 1.8 ppm at the 5 foot depth. Metals were present at the following levels at the 2 foot and 5 foot depths respectively: Cr at 42 mg/kg and 43 mg/kg, Co at 34 mg/kg and 16 ug/kg, Ni at 100 mg/kg at both depths, Pb at 5.8 and 4.4 mg/kg, Hg at 0.035 mg/kg and 0.059 mg/kg, and Zn at 36 µ g/kg and 35 µ g/kg. All metals results from the 2 and 5 foot depths are below the Total Threshold Limit Concentration (TTLC) values as required by Titled 22, Section 66699., of the California Administrative Code. Since the results are less than 10 times the Soluble Threshold Limit Concentration (STLC) there is a low potential that if the samples were tested using the Waste Extraction Test (WET) that they would exceed the STLC values. Laboratory results are summarized in Table 2.

Ceiling Tile

No asbestos was detected in the ceiling tile sample collected from the storage lot southwest of the Arrow Rentals property. This material can be considered as non-hazardous. Laboratory test results are included in Appendix A.

LIMITATIONS

The scope of this investigation is limited by time constraints, expense, and practicality. A limited number of samples were taken at locations at the site and a limited number of laboratory chemical analyses were performed for those samples. Professional opinions concerning the presence of hazardous substances were developed based on the resulting data. It would be prohibitively expensive and time consuming to sample all locations at the site and analyze the samples for all substances which are now, or in the future might be, considered hazardous. Therefore, WCC cannot be held responsible should the investigation fail to detect the presence or quantity of all hazardous substances at all locations of the site.

CONCLUSIONS AND RECOMMENDATIONS

187 North "L" Street Arrow Rentals

The levels of TPH and benzene at the 20 and 25 foot depth of boring B-1 located between the former 4,000 and 6,000 gallon tanks indicate there is some contamination of the soil and since the petroleum was detected to the bottom of the boring, the possibility of groundwater being affected needs to be investigated. The Leaking Underground Fuel Tank Field Manual (LUFT) by the State Water Resources Control Board (Tables 2-1 and 2-2) were used to estimate levels of TPH and BTEX that can safely be left in place, using a leaching potential analysis. This provides a way to assess the possible threat to groundwater from contaminated soils. Benzene exceeded the acceptable cumulative soil contamination levels for protection of groundwater at the 20 and 25 foot depths in boring B-1. The acceptable level at 20 feet was 2.0 ppm and at 25 feet was 1.0 ppm; the cummulative concentration was 2.1 ppm for both depths (2.1 ppm + 0.0 ppm).

The increasing TPH, from 170 to 220 ppm, with increasing depth, and the presence of TPH in three other borings close to the B-1 location (B-2, B-3 and B-5) at the 25 foot depth, suggest that the extent of contamination has not been assessed, and that further investigation is required to assess

whether or not groundwater has been affected by the petroleum products. The concentration of TPH in the soil is between 100 ppm and 1,000 ppm which usually requires groundwater monitoring according to the Regional Board guidelines.

We recommend that three groundwater monitoring wells be installed, which extend to groundwater at a depth of 60 to 70 feet, soil samples should be collected from each boring in order to further explore the extent of petroleum contamination in the soil. Groundwater elevations should be measured to establish the direction of groundwater flow. The groundwater monitoring wells may also be used for future monitoring of groundwater if necessary.

1934 Railroad Avenue

The boring B-6, located near the existing underground tank, contained 1.8 ppm TPH as gasoline at the 1934 Railroad Avenue property. This was found at the 5 foot depth. It falls below the minimum concentration, 100 ppm TPH, which would require further investigation of possible groundwater contamination. Because the status and exact location of the 500 gallon gasoline tank are not know, it is recommended that the tank be located and removed, following county and state guidelines. It is also recommended that soil samples be collected at the time of tank removal from under the tank and that the soil samples be tested for petroleum products.

Ceiling Tile

The ceiling tile results report that no asbestos was detected in the material sampled. Since the laboratory test results show no detection of asbestos the stack of ceiling tile are not considered a hazardous waste.

Soil Cuttings

The soil cuttings from the drilling remain on site in 55 gallon drums. The cuttings from boring B-1 should be disposed of at a waste management facility suitable for the detected contaminants. We are available to assist the City with the disposal of the soil from B-1. The remaining soil from the other borings are not considered a hazardous waste.

DISCUSSION

We appreciate the opportunity to provide this Phase II Site Exploration report. Please call if you have any questions regarding this report or the recommendations. We can prepare an estimate of costs for the recommended groundwater monitoring wells, groundwater analyses and tanks removal at your request.

REFERENCES

Leaking Underground Fuel Tank Field Manual:
Guidelines for Assessment, Cleanup, and Underground Storage Tank Closure; State of California Leaking Underground Fuel Tank Task Force; State Water Resources Control Board, State of California; May 1988

Title 22, California Administrative Code,
Section 66699

Table 1

Organic Vapor Concentrations Measured with an HNu Photoionization Detector

Boring Number	Depth feet	Maximum HNU Reading* (ppm-HNu Units
B-1	2	0
	5	0
	10	0
	15	0
	20	5.6
	25	68.5
B-2	2	0
	5	0
	10	0
	15	0
	20	0
	25	32.6
B-3	2	0
	5	0
	10	0
	15	0
	20	3.1
	25	1.2
B-4	2	0
	5	0
	10	0
	15	0
B-5	2	0
	5	0
	10	0
	15	0
	20	0
	25	16.3
B-6	2	0
	5	0
	10	0
	15	0
	20	0
	25	0

* Relative hydrocarbon levels

8810220T/COT

Table 2

Summary of Laboratory Analyses of Soil Samples

Total Petroleum Hydrocarbons and BTEX (EPA 8015/8020)

Boring Number	Depth (feet)	TPH gasoline (ppm)	TPH diesel (ppm)	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	xylene ppm
B-1	2	ND	NT	ND	ND	ND	ND
	5	ND	NT	ND	ND	ND	ND
	10	ND	NT	ND	ND	ND	ND
	15	ND	2.3	ND	ND	ND	ND
	20	170	NT	2.1	1.4	0.22	1.5
	25	220	NT	ND	2.4	2.1	11.0
B-2	2	3.5	NT	ND	ND	ND	0.1
	5	8.2	NT	ND	ND	ND	ND
	10	ND	NT	ND	ND	ND	ND
	15	ND	2.3	ND	ND	ND	ND
	25	1.7	NT	ND	ND	ND	0.13
B-3	2	ND	NT	ND	ND	ND	ND
	5	ND	NT	ND	ND	ND	ND
	10	ND	NT	ND	ND	ND	ND
	15	ND	2.6	ND	ND	ND	ND
	20	ND	NT	ND	ND	ND	ND
	25	1.3	NT	ND	ND	ND	ND
B-4	2	ND	NT	ND	ND	ND	ND
	5	ND	NT	ND	ND	ND	ND
	10	ND	NT	ND	ND	ND	ND
	15	ND	NT	ND	ND	ND	ND
B-5	2	ND	NT	ND	ND	ND	ND
	5	1.9	NT	ND	ND	ND	ND
	10	ND	NT	ND	ND	ND	ND
	15	ND	NT	ND	ND	ND	ND
	20	ND	ND	ND	ND	ND	ND
	25	1.7	NT	ND	ND	ND	ND
B-6	5	1.8	NT	ND	ND	ND	ND
	10	ND	NT	ND	ND	ND	ND
	15	ND	NT	ND	ND	ND	ND
	20	ND	NT	ND	ND	ND	ND
	25	ND	NT	ND	ND	ND	ND

ND = Non-Detected
NT = Not-Tested

8810220T/COT

Table 2 (concluded)
Summary of Soil Samples Analytical Laboratory Results

Volatile Organics (EPA 8240)

Boring Number	Depth (feet)	Benzene µg/kg	toluene µg/kg	Ethyl-benzene µg/kg	xylene µg/kg
B-1	25	380	7,100	6,400	52,000
B-2	25	ND	ND	ND	550

Semi-Volatile Organics (EPA 8240)

Boring Number	Depth (feet)	Component	Concentration µg/kg
B-1	25	2-Methylnaphthalene	3,500
		2-Naphthalene	3,400
		phenol	300

Metals Analyses
1940 Railroad Ave.

Boring Number	Depth (feet)	Cr mg/kg	Cu mg/kg	Ni mg/kg	Pb mg/kg	Hg mg/kg	Zn mg/kg
B-6	2	42	34	100	5.8	0.035	36
	5	43	16	100	4.4	0.059	35
(TTLC)*		(2500)	(2500)	(2000)	(1000)	(20)	(5000)
(STLC)+		(560)	(25)	(20)	(5)	(0.2)	(250)

* TTLC = Total Threshold Limit Concentration (CAC, Title 22)
+ STLC = Soluble Threshold Limit Concentration (CAC, Title 22)

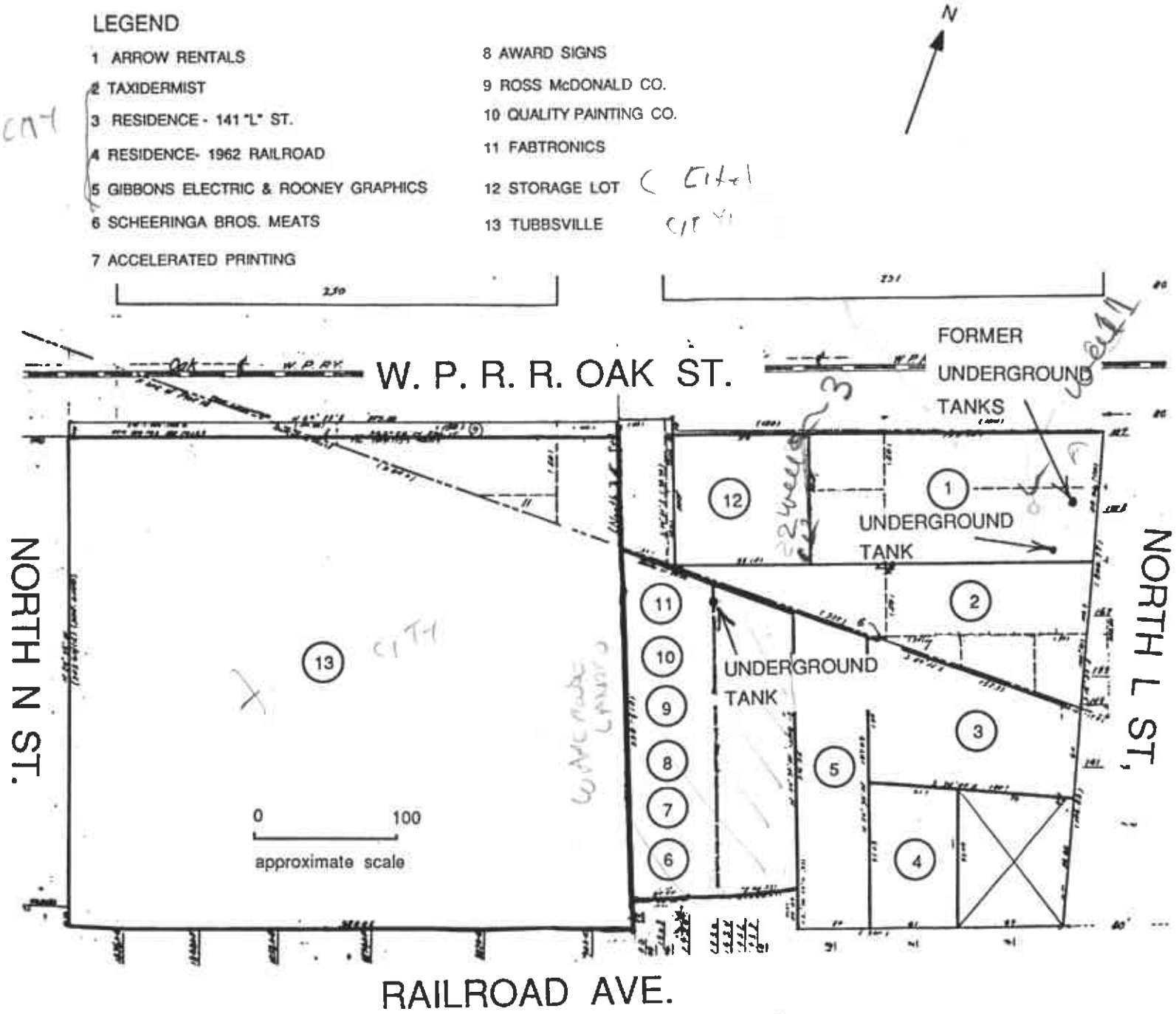
Woodward-Clyde Consultants

Project No. 88102220A

RAILROAD AVENUE PROPERTY

PROPERTY LOCATION MAP

FIGURE 1



APPENDIX A
LABORATORY TEST RESULTS

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Matrix Descript:	Soil	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 5030/8015/8020	Analyzed: Mar 17, 1989
Attention: Ann McDonald	First Sample #:	903-0794	Reported: Mar 27, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
903-0794	4-3-A	N.D.	N.D.	N.D.	N.D.	N.D.
903-0795	4-4-B	N.D.	N.D.	N.D.	N.D.	N.D.
903-0796	5-1-C	N.D.	N.D.	N.D.	N.D.	N.D.
903-0797	5-2-C	1.9	N.D.	N.D.	N.D.	N.D.
903-0798	5-3-C	N.D.	N.D.	N.D.	N.D.	N.D.
903-0799	5-4-A	N.D.	N.D.	N.D.	N.D.	N.D.
903-0800	5-5-A	N.D.	N.D.	N.D.	N.D.	N.D.
903-0801	5-6-A	1.7	N.D.	N.D.	N.D.	N.D.
903-0803	6-2-C	1.8	N.D.	N.D.	N.D.	N.D.
903-0804	6-3-A	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**1.0**	**0.05**	**0.1**	**0.1**	**0.1**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Matrix Descript:	Soil	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 5030/8015/8020	Analyzed: Mar 17, 1989
Attention: Ann McDonald	First Sample #:	903-0805	Reported: Mar 27, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
903-0805	6-4-A	N.D.	N.D.	N.D.	N.D.	N.D.
903-0806	6-5-A	N.D.	N.D.	N.D.	N.D.	N.D.
903-0807	6-6-A	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**1.0**	**0.05**	**0.1**	**0.1**	**0.1**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Matrix Descript:	Soil	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 3550/8015	Analyzed: Mar 16, 1989
Attention: Ann McDonald	First Sample #:	903-0777	Reported: Mar 27, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
903-0777	1-4-B	2.3
903-0783	2-4-B	2.3
903-0789	3-4-B	2.6

Detection Limits:	**1.0**

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Bulk Material	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	Polarized Light Microscopy	Analyzed: Mar 24, 1989
Attention: Ann McDonald	First Sample #:	903-0807	Reported: Mar 27, 1989

ASBESTOS ANALYSIS

Sample Number	Sample Description	Detection Limit %	Sample Result %	Asbestos Type (if present)	Other Fibers %	Nonfibrous Materials %
903-0807	#01	1.0	N.D.	-	15	85

Analytes reported as N.D. were not present above the stated limit of detection. Percentages reported are an estimation. This report does not establish or represent product safety, hazard, or endorsement by Sequoia Analytical or the NVLAP.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Soil. 1-6-B	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 8240	Analyzed: Mar 16, 1989
Attention: Ann McDonald	Lab Number:	903-0779	Reported: Mar 27, 1989

VOLATILE ORGANICS by GC/MS (EPA 8240)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Acetone	500.0	N.D.
Benzene	**100.0**	**360**
Bromodichloromethane	100.0	N.D.
Bromoform	100.0	N.D.
Bromomethane	100.0	N.D.
2-Butanone	500.0	N.D.
Carbon disulfide	100.0	N.D.
Carbon tetrachloride	100.0	N.D.
Chlorobenzene	100.0	N.D.
Chlorodibromomethane	100.0	N.D.
Chloroethane	100.0	N.D.
2-Chloroethyl vinyl ether	500.0	N.D.
Chloroform	100.0	N.D.
Chloromethane	100.0	N.D.
1,1-Dichloroethane	100.0	N.D.
1,2-Dichloroethane	100.0	N.D.
1,1-Dichloroethene	100.0	N.D.
Total 1,2-Dichloroethene	100.0	N.D.
1,2-Dichloropropane	100.0	N.D.
cis 1,3-Dichloropropene	100.0	N.D.
trans 1,3-Dichloropropene	100.0	N.D.
Ethylbenzene	**100.0**	**6,400**
2-Hexanone	500.0	N.D.
Methylene chloride	100.0	N.D.
4-Methyl-2-pentanone	500.0	N.D.
Styrene	100.0	N.D.
1,1,2,2-Tetrachloroethane	100.0	N.D.
Tetrachloroethene	100.0	N.D.
Toluene	**100.0**	**7,100**
1,1,1-Trichloroethane	100.0	N.D.
1,1,2-Trichloroethane	100.0	N.D.
Trichloroethene	100.0	N.D.
Trichlorofluoromethane	100.0	N.D.
Vinyl acetate	100.0	N.D.
Vinyl chloride	100.0	N.D.
Total Xylenes	**100.0**	**52,000**

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Soil. 2-6-B	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 8240	Analyzed: Mar 16, 1989
Attention: Ann McDonald	Lab Number:	903-0785	Reported: Mar 27, 1989

VOLATILE ORGANICS by GC/MS (EPA 8240)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Acetone	500.0	N.D.
Benzene	100.0	N.D.
Bromodichloromethane	100.0	N.D.
Bromoform	100.0	N.D.
Bromomethane	100.0	N.D.
2-Butanone	500.0	N.D.
Carbon disulfide	100.0	N.D.
Carbon tetrachloride	100.0	N.D.
Chlorobenzene	100.0	N.D.
Chlorodibromomethane	100.0	N.D.
Chloroethane	100.0	N.D.
2-Chloroethyl vinyl ether	500.0	N.D.
Chloroform	100.0	N.D.
Chloromethane	100.0	N.D.
1,1-Dichloroethane	100.0	N.D.
1,2-Dichloroethane	100.0	N.D.
1,1-Dichloroethene	100.0	N.D.
Total 1,2-Dichloroethene	100.0	N.D.
1,2-Dichloropropane	100.0	N.D.
cis 1,3-Dichloropropene	100.0	N.D.
trans 1,3-Dichloropropene	100.0	N.D.
Ethylbenzene	100.0	N.D.
2-Hexanone	500.0	N.D.
Methylene chloride	100.0	N.D.
4-Methyl-2-pentanone	500.0	N.D.
Styrene	100.0	N.D.
1,1,2,2-Tetrachloroethane	100.0	N.D.
Tetrachloroethene	100.0	N.D.
Toluene	100.0	N.D.
1,1,1-Trichloroethane	100.0	N.D.
1,1,2-Trichloroethane	100.0	N.D.
Trichloroethene	100.0	N.D.
Trichlorofluoromethane	100.0	N.D.
Vinyl acetate	100.0	N.D.
Vinyl chloride	100.0	N.D.
Total Xylenes	100.0	550

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#88k10220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Soil. 6-4-B	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 8240	Analyzed: Mar 16, 1989
Attention: Ann McDonald	Lab Number:	903-0805	Reported: Mar 27, 1989

VOLATILE ORGANICS by GC/MS (EPA 8240)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Acetone	500.0	N.D.
Benzene	100.0	N.D.
Bromodichloromethane	100.0	N.D.
Bromoform	100.0	N.D.
Bromomethane	100.0	N.D.
2-Butanone	500.0	N.D.
Carbon disulfide	100.0	N.D.
Carbon tetrachloride	100.0	N.D.
Chlorobenzene	100.0	N.D.
Chlorodibromomethane	100.0	N.D.
Chloroethane	100.0	N.D.
2-Chloroethyl vinyl ether	500.0	N.D.
Chloroform	100.0	N.D.
Chloromethane	100.0	N.D.
1,1-Dichloroethane	100.0	N.D.
1,2-Dichloroethane	100.0	N.D.
1,1-Dichloroethene	100.0	N.D.
Total 1,2-Dichloroethene	100.0	N.D.
1,2-Dichloropropane	100.0	N.D.
cis 1,3-Dichloropropene	100.0	N.D.
trans 1,3-Dichloropropene	100.0	N.D.
Ethylbenzene	100.0	N.D.
2-Hexanone	500.0	N.D.
Methylene chloride	100.0	N.D.
4-Methyl-2-pentanone	500.0	N.D.
Styrene	100.0	N.D.
1,1,2,2-Tetrachloroethane	100.0	N.D.
Tetrachloroethene	100.0	N.D.
Toluene	100.0	N.D.
1,1,1-Trichloroethane	100.0	N.D.
1,1,2-Trichloroethane	100.0	N.D.
Trichloroethene	100.0	N.D.
Trichlorofluoromethane	100.0	N.D.
Vinyl acetate	100.0	N.D.
Vinyl chloride	100.0	N.D.
Total Xylenes	100.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Soil, 1-6-B	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 8270	Extracted: Mar 16, 1989
Attention: Ann McDonald	Lab Number:	903-0779	Analyzed: Mar 24, 1989
			Reported: Mar 27, 1989

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Acenaphthene	100.0	N.D.
Acenaphthylene	100.0	N.D.
Aniline	100.0	N.D.
Anthracene	100.0	N.D.
Benzidine	2,500.0	N.D.
Benzoic Acid	500.0	N.D.
Benzo(a)anthracene	100.0	N.D.
Benzo(b)fluoranthene	100.0	N.D.
Benzo(k)fluoranthene	100.0	N.D.
Benzo(g,h,i)perylene	100.0	N.D.
Benzo(a)pyrene	100.0	N.D.
Benzyl alcohol	100.0	N.D.
Bis(2-chloroethyoxy)methane	100.0	N.D.
Bis(2-chloroethyl)ether	100.0	N.D.
Bis(2-chloroisopropyl)ether	100.0	N.D.
Bis(2-ethylhexyl)phthalate	500.0	N.D.
4-Bromophenyl ether	100.0	N.D.
Butyl benzyl phthalate	100.0	N.D.
4-Chloroaniline	100.0	N.D.
2-Chloronaphthalene	100.0	N.D.
4-Chloro-3-methylphenol	100.0	N.D.
2-Chlorophenol	100.0	N.D.
4-Chlorophenyl phenyl ether	100.0	N.D.
Chrysene	100.0	N.D.
Dibenz(a,h)anthracene	100.0	N.D.
Dibenzofuran	100.0	N.D.
Di-N-butyl phthalate	500.0	N.D.
1,3-Dichlorobenzene	100.0	N.D.
1,4-Dichlorobenzene	100.0	N.D.
1,2-Dichlorobenzene	100.0	N.D.
3,3-Dichlorobenzidine	500.0	N.D.
2,4-Dichlorophenol	100.0	N.D.
Diethyl phthalate	100.0	N.D.
2,4-Dimethylphenol	100.0	N.D.
Dimethyl phthalate	100.0	N.D.
4,6-Dinitro-2-methylphenol	500.0	N.D.
2,4-Dinitrophenol	500.0	N.D.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Soil, 1-6-B	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 8270	Extracted: Mar 16, 1989
Attention: Ann McDonald	Lab Number:	903-0779	Analyzed: Mar 24, 1989
			Reported: Mar 27, 1989

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
2,4-Dinitrotoluene	100.0	N.D.
2,6-Dinitrotoluene	100.0	N.D.
Di-N-octyl phthalate	100.0	N.D.
Fluoranthene	100.0	N.D.
Fluorene	100.0	N.D.
Hexachlorobenzene	100.0	N.D.
Hexachlorobutadiene	100.0	N.D.
Hexachlorocyclopentadiene	100.0	N.D.
Hexachloroethane	100.0	N.D.
Indeno(1,2,3-cd)pyrene	100.0	N.D.
Isophorone	100.0	N.D.
2-Methylnaphthalene	100.0	3,500
2-Methylphenol	100.0	N.D.
4-Methylphenol	100.0	N.D.
Naphthalene	100.0	3,400
2-Nitroaniline	100.0	N.D.
3-Nitroaniline	100.0	N.D.
4-Nitroaniline	100.0	N.D.
Nitrobenzene	100.0	N.D.
2-Nitrophenol	100.0	N.D.
4-Nitrophenol	500.0	N.D.
N-Nitrosodiphenylamine	100.0	N.D.
N-Nitroso-di-N-propylamine	100.0	N.D.
Pentachlorophenol	500.0	N.D.
Phenathrene	100.0	N.D.
Phenol	100.0	330
Pyrene	100.0	N.D.
1,2,4-Trichlorobenzene	100.0	N.D.
2,4,5-Trichlorophenol	100.0	N.D.
2,4,6-Trichlorophenol	100.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Soil, 2-6-B	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 8270	Extracted: Mar 16, 1989
Attention: Ann McDonald	Lab Number:	903-0785	Analyzed: Mar 24, 1989
			Reported: Mar 27, 1989

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Acenaphthene	100.0	N.D.
Acenaphthylene	100.0	N.D.
Aniline	100.0	N.D.
Anthracene	100.0	N.D.
Benzidine	2,500.0	N.D.
Benzoic Acid	500.0	N.D.
Benzo(a)anthracene	100.0	N.D.
Benzo(b)fluoranthene	100.0	N.D.
Benzo(k)fluoranthene	100.0	N.D.
Benzo(g,h,i)perylene	100.0	N.D.
Benzo(a)pyrene	100.0	N.D.
Benzyl alcohol	100.0	N.D.
Bis(2-chloroethyoxy)methane	100.0	N.D.
Bis(2-chloroethyl)ether	100.0	N.D.
Bis(2-chloroisopropyl)ether	100.0	N.D.
Bis(2-ethylhexyl)phthalate	500.0	N.D.
4-Bromophenyl ether	100.0	N.D.
Butyl benzyl phthalate	100.0	N.D.
4-Chloroaniline	100.0	N.D.
2-Chloronaphthalene	100.0	N.D.
4-Chloro-3-methylphenol	100.0	N.D.
2-Chlorophenol	100.0	N.D.
4-Chlorophenyl phenyl ether	100.0	N.D.
Chrysene	100.0	N.D.
Dibenz(a,h)anthracene	100.0	N.D.
Dibenzofuran	100.0	N.D.
Di-N-butyl phthalate	500.0	N.D.
1,3-Dichlorobenzene	100.0	N.D.
1,4-Dichlorobenzene	100.0	N.D.
1,2-Dichlorobenzene	100.0	N.D.
3,3-Dichlorobenzidine	500.0	N.D.
2,4-Dichlorophenol	100.0	N.D.
Diethyl phthalate	100.0	N.D.
2,4-Dimethylphenol	100.0	N.D.
Dimethyl phthalate	100.0	N.D.
4,6-Dinitro-2-methylphenol	500.0	N.D.
2,4-Dinitrophenol	500.0	N.D.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Soil, 2-6-B	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 8270	Extracted: Mar 16, 1989
Attention: Ann McDonald	Lab Number:	903-0785	Analyzed: Mar 24, 1989
			Reported: Mar 27, 1989

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
2,4-Dinitrotoluene	100.0	N.D.
2,6-Dinitrotoluene	100.0	N.D.
Di-N-octyl phthalate	100.0	N.D.
Fluoranthene	100.0	N.D.
Fluorene	100.0	N.D.
Hexachlorobenzene	100.0	N.D.
Hexachlorobutadiene	100.0	N.D.
Hexachlorocyclopentadiene	100.0	N.D.
Hexachloroethane	100.0	N.D.
Indeno(1,2,3-cd)pyrene	100.0	N.D.
Isophorone	100.0	N.D.
2-Methylnaphthalene	100.0	N.D.
2-Methylphenol	100.0	N.D.
4-Methylphenol	100.0	N.D.
Naphthalene	100.0	N.D.
2-Nitroaniline	100.0	N.D.
3-Nitroaniline	100.0	N.D.
4-Nitroaniline	100.0	N.D.
Nitrobenzene	100.0	N.D.
2-Nitrophenol	100.0	N.D.
4-Nitrophenol	500.0	N.D.
N-Nitrosodiphenylamine	100.0	N.D.
N-Nitroso-di-N-propylamine	100.0	N.D.
Pentachlorophenol	500.0	N.D.
Phenathrene	100.0	N.D.
Phenol	100.0	N.D.
Pyrene	100.0	N.D.
1,2,4-Trichlorobenzene	100.0	N.D.
2,4,5-Trichlorophenol	100.0	N.D.
2,4,6-Trichlorophenol	100.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Soil, 6-4-A	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 8270	Extracted: Mar 16, 1989
Attention: Ann McDonald	Lab Number:	903-0805	Analyzed: Mar 24, 1989
			Reported: Mar 27, 1989

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Acenaphthene	100.0	N.D.
Acenaphthylene	100.0	N.D.
Aniline	100.0	N.D.
Anthracene	100.0	N.D.
Benzidine	2,500.0	N.D.
Benzoic Acid	500.0	N.D.
Benzo(a)anthracene	100.0	N.D.
Benzo(b)fluoranthene	100.0	N.D.
Benzo(k)fluoranthene	100.0	N.D.
Benzo(g,h,i)perylene	100.0	N.D.
Benzo(a)pyrene	100.0	N.D.
Benzyl alcohol	100.0	N.D.
Bis(2-chloroethyoxy)methane	100.0	N.D.
Bis(2-chloroethyl)ether	100.0	N.D.
Bis(2-chloroisopropyl)ether	100.0	N.D.
Bis(2-ethylhexyl)phthalate	500.0	N.D.
4-Bromophenyl ether	100.0	N.D.
Butyl benzyl phthalate	100.0	N.D.
4-Chloroaniline	100.0	N.D.
2-Chloronaphthalene	100.0	N.D.
4-Chloro-3-methylphenol	100.0	N.D.
2-Chlorophenol	100.0	N.D.
4-Chlorophenyl phenyl ether	100.0	N.D.
Chrysene	100.0	N.D.
Dibenz(a,h)anthracene	100.0	N.D.
Dibenzofuran	100.0	N.D.
Di-N-butyl phthalate	500.0	N.D.
1,3-Dichlorobenzene	100.0	N.D.
1,4-Dichlorobenzene	100.0	N.D.
1,2-Dichlorobenzene	100.0	N.D.
3,3-Dichlorobenzidine	500.0	N.D.
2,4-Dichlorophenol	100.0	N.D.
Diethyl phthalate	100.0	N.D.
2,4-Dimethylphenol	100.0	N.D.
Dimethyl phthalate	100.0	N.D.
4,6-Dinitro-2-methylphenol	500.0	N.D.
2,4-Dinitrophenol	500.0	N.D.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Soil, 6-4-A	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 8270	Extracted: Mar 16, 1989
Attention: Ann McDonald	Lab Number:	903-0805	Analyzed: Mar 24, 1989
			Reported: Mar 27, 1989

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
2,4-Dinitrotoluene	100.0	N.D.
2,6-Dinitrotoluene	100.0	N.D.
Di-N-octyl phthalate	100.0	N.D.
Fluoranthene	100.0	N.D.
Fluorene	100.0	N.D.
Hexachlorobenzene	100.0	N.D.
Hexachlorobutadiene	100.0	N.D.
Hexachlorocyclopentadiene	100.0	N.D.
Hexachloroethane	100.0	N.D.
Indeno(1,2,3-cd)pyrene	100.0	N.D.
Isophorone	100.0	N.D.
2-Methylnaphthalene	100.0	N.D.
2-Methylphenol	100.0	N.D.
4-Methylphenol	100.0	N.D.
Naphthalene	100.0	N.D.
2-Nitroaniline	100.0	N.D.
3-Nitroaniline	100.0	N.D.
4-Nitroaniline	100.0	N.D.
Nitrobenzene	100.0	N.D.
2-Nitrophenol	100.0	N.D.
4-Nitrophenol	500.0	N.D.
N-Nitrosodiphenylamine	100.0	N.D.
N-Nitroso-di-N-propylamine	100.0	N.D.
Pentachlorophenol	500.0	N.D.
Phenathrene	100.0	N.D.
Phenol	100.0	N.D.
Pyrene	100.0	N.D.
1,2,4-Trichlorobenzene	100.0	N.D.
2,4,5-Trichlorophenol	100.0	N.D.
2,4,6-Trichlorophenol	100.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810110A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript:	Soil, 6-2-C	Received: Mar 3, 1989
Oakland, CA 94607-4041			Extracted: Mar 16, 1989
Attention: Ann McDonald	Lab Number:	903-0803	Analyzed: Mar 16, 1989
			Reported: Mar 27, 1989

LABORATORY ANALYSIS

Analyte	Detection Limit mg/kg	Sample Results mg/kg
Chromium	0.05	43
Copper	0.1	16
Nickel	0.5	100
Lead	0.05	4.4
Mercury	0.01	0.059
Zinc	0.1	35

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Matrix Descript:	Soil	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 5030/8015/8020	Analyzed: Mar 17, 1989
Attention: Ann McDonald	First Sample #:	903-0774	Reported: Mar 27, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
903-0774	1-1-C	N.D.	N.D.	N.D.	N.D.	N.D.
903-0775	1-2-C	N.D.	N.D.	N.D.	N.D.	N.D.
903-0776	1-3-C	N.D.	N.D.	N.D.	N.D.	N.D.
903-0777	1-4-C	N.D.	N.D.	N.D.	N.D.	N.D.
903-0778	1-5-B	170	2.1	1.4	0.22	1.5
903-0779	1-6-B	220	N.D.	2.4	2.1	11
903-0780	2-1-C	3.5	N.D.	N.D.	N.D.	0.1
903-0781	2-2-C	8.2	N.D.	N.D.	N.D.	N.D.
903-0782	2-3-B	N.D.	N.D.	N.D.	N.D.	N.D.
903-0783	2-4-B	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**1.0**	**0.05**	**0.1**	**0.1**	**0.1**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

9030774.WOO <1>

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Matrix Descript:	Soil	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 5030/8015/8020	Analyzed: Mar 17, 1989
Attention: Ann McDonald	First Sample #:	903-0784	Reported: Mar 27, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
903-0784	2-5-B	N.D.	N.D.	N.D.	N.D.	N.D.
903-0785	2-6-B	1.7	N.D.	N.D.	N.D.	0.13
903-0786	3-1-A	N.D.	N.D.	N.D.	N.D.	N.D.
903-0787	3-2-C	N.D.	N.D.	N.D.	N.D.	N.D.
903-0788	3-3-B	N.D.	N.D.	N.D.	N.D.	N.D.
903-0789	3-4-B	N.D.	N.D.	N.D.	N.D.	N.D.
903-0790	3-5-B	N.D.	N.D.	N.D.	N.D.	N.D.
903-0791	3-6-B	1.3	N.D.	N.D.	N.D.	N.D.
903-0792	4-1-B	N.D.	N.D.	N.D.	N.D.	N.D.
903-0793	4-2-B	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**1.0**	**0.05**	**0.1**	**0.1**	**0.1**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Woodward-Clyde Consultants	Client Project ID:	#8810220A	Sampled: Mar 3, 1989
500 12th St., Suite 100	Sample Descript.:	Soil, 6-1-B	Received: Mar 3, 1989
Oakland, CA 94607-4041	Analysis Method:	EPA 5030/8015/8020	Analyzed: Mar 17, 1989
Attention: Ann McDonald	Lab Number:	903-0802	Reported: Mar 29, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Low to Medium Boiling Point Hydrocarbons	1.0	N.D.
Benzene	0.05	N.D.
Toluene	0.1	N.D.
Ethyl Benzene	0.1	N.D.
Xylenes	0.1	N.D.

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL
680 Chesapeake Drive · Redwood City, CA 94063
(415) 364-9222 · FAX (415) 364-9233

FACSIMILE TRANSMISSION

TO

Name: Ann McDonald
Company: Woodward-Clyde
Fax #: 874-3268

FROM

Belinda Vega

SEQUOIA ANALYTICAL LABORATORY

Fax (415) 364-9233

Date: 3/29/89

Number of Pages (including this page): 2

APPENDIX B
LOGS OF BORINGS

Woodward-Clyde Consultants

PROJECT NAME Railroad Avenue Property NO. 8810220A - 3000

BORING LOCATION	Boring # 1: Approx. 13.5' S X 3' E of SW corner of Arrow Rental Bldg.	ELEVATION AND DATUM	Pavement Surface
DRILLING AGENCY	Kvilhaug Drilling	DRILLER C. Holoman	DATE STARTED / DATE FINISHED March 2, 1989
DRILLING EQUIPMENT	B - 61 Mobile Drill	COMPLETION DEPTH 26 ft.	SAMPLER 2.5" I.D. Modified California Type
DRILLING METHOD	8" Hollow Stem Augers	DRILL BIT Drag	NO. OF SAMPLES DIST. n/a / UNDIST. 6
SIZE AND TYPE OF CASING	n/a	WATER LEVEL FIRST n/a	COMPL. n/a / 24 HRS. n/a
TYPE OF PERFORATION	n/a	FROM n/a TO n/a Ft.	LOGGED BY: P. Respess / CHECKED BY: A. McDonald
SIZE AND TYPE OF PACK	n/a	FROM n/a TO n/a Ft.	
TYPE OF SEAL NO. 1	n/a	FROM n/a TO n/a Ft.	
TYPE OF SEAL NO. 2	n/a	FROM n/a TO n/a Ft.	

DEPTH (feet)	DESCRIPTION	Lithology	Piezometer Installation	Water Content	Piezometer Data	Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	4" Concrete									
	SANDY GRAVEL (GP) - brown - gravel fine to medium coarse - some fine-grained sand - medium dense - wet					1	A		16	OVM = 0 ppm No odor
							B		15	
							C		18	
5	CLAYEY GRAVEL (GC) - brown - gravel fine to coarse (to 2.5") - clay moderately plastic - loose - wet				5	2	A		5	OVM = 0 ppm No odor
							B		5	
							C		7	
10	CLAYEY GRAVEL (GC) - brown - gravel fine to coarse - clay moderately plastic - medium dense to dense - wet				10	3	A		13	OVM = 0 ppm No odor
							B		21	
							C		40	
15					15	4	A		20	OVM = 0 ppm No odor
							B		50	
20					20	5	A		25	OVM = 5.6 ppm Gasoline odor fairly strong
							B		50	
	CLAYEY GRAVEL (GC) - brown - fine to coarse gravel - fine to coarse-grained sand - little clay - dense to very dense - wet									
25					25	6	A		12	OVM = 68.5 ppm **Strong gasoline odor**
							B		50	
	Bottom of boring at 26 ft. No free water observed ATD									
30					30					
35					35					

LOG OF BORING NO. 1 SHEET 1 OF 1

Woodward-Clyde Consultants

PROJECT NAME Railroad Avenue Property NO. 8810220A - 3000

BORING LOCATION	Boring # 2: Approx. 14.5' S X 25' W of SW corner of Arrow Rental Bldg.	ELEVATION AND DATUM	Pavement Surface
DRILLING AGENCY	Kvilhaug Drilling	DRILLER C. Holoman	DATE STARTED / DATE FINISHED March 2, 1989
DRILLING EQUIPMENT	B - 61 Mobile Drill	COMPLETION DEPTH 26 ft.	SAMPLER 2.5" I.D. Modified California Type
DRILLING METHOD	8" Hollow Stem Augers	DRILL BIT Drag	NO. OF SAMPLES DIST. n/a / UNDIST. 6
SIZE AND TYPE OF CASING	n/a	WATER LEVEL FIRST n/a	COMPL. n/a / 24 HRS. n/a
TYPE OF PERFORATION	n/a	FROM n/a TO n/a Ft.	LOGGED BY: P. Respess
SIZE AND TYPE OF PACK	n/a	FROM n/a TO n/a Ft.	CHECKED BY: A. McDonald
TYPE OF SEAL NO. 1	n/a	FROM n/a TO n/a Ft.	
TYPE OF SEAL NO. 2	n/a	FROM n/a TO n/a Ft.	

DEPTH (feet)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Piezometer Data	SAMPLES: Drive Number	SAMPLES: Sample Number	SAMPLES: Recov. (Feet)	SAMPLES: Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	4" Concrete									
	CLAYEY GRAVEL (GC) - brown - gravel fine to coarse - clay moderately plastic - medium dense - moist to wet					1	A		9	OVM = 0 ppm No odor
							B		11	
							C		14	
5					5	2	A		10	OVM = 0 ppm No odor
							B		10	
							C		10	
	→ some coarser gravel									
10	CLAYEY GRAVEL (GC) - brown - gravel fine to coarse - clay moderately plastic - dense to very dense - wet				10	3	A		20	OVM = 0 ppm No odor
							B		50	
15					15	4	A		30	OVM = 0 ppm No odor
							B		50	
20					20	5	A		20	OVM = 0 ppm No odor
							B		50	
25					25	6	A		25	OVM = 32.6 ppm Strong gasoline odor
							B		50	
	Bottom of boring at 26 ft. No free water observed ATD									
30					30					
35					35					

Woodward-Clyde Consultants

PROJECT NAME Railroad Avenue Property NO. 8810220A - 3000

BORING LOCATION	Boring # 3: Approx. 28' S X 25' W of SW corner of Arrow Rental Bldg.	ELEVATION AND DATUM	Pavement Surface
DRILLING AGENCY	Kvilhaug Drilling	DRILLER C. Holoman	DATE STARTED / DATE FINISHED March 2, 1989
DRILLING EQUIPMENT	B - 61 Mobile Drill	COMPLETION DEPTH 26 ft.	SAMPLER 2.5" I.D. Modified California Type
DRILLING METHOD	8" Hollow Stem Augers	DRILL BIT Drag	NO. OF SAMPLES DIST. n/a / UNDIST. 6
SIZE AND TYPE OF CASING	n/a	WATER LEVEL FIRST n/a	COMPL. n/a / 24 HRS. n/a
TYPE OF PERFORATION	n/a	FROM n/a TO n/a Ft.	LOGGED BY: P. Respess
SIZE AND TYPE OF PACK	n/a	FROM n/a TO n/a Ft.	CHECKED BY: A. McDonald
TYPE OF SEAL NO. 1	n/a	FROM n/a TO n/a Ft.	
TYPE OF SEAL NO. 2	n/a	FROM n/a TO n/a Ft.	

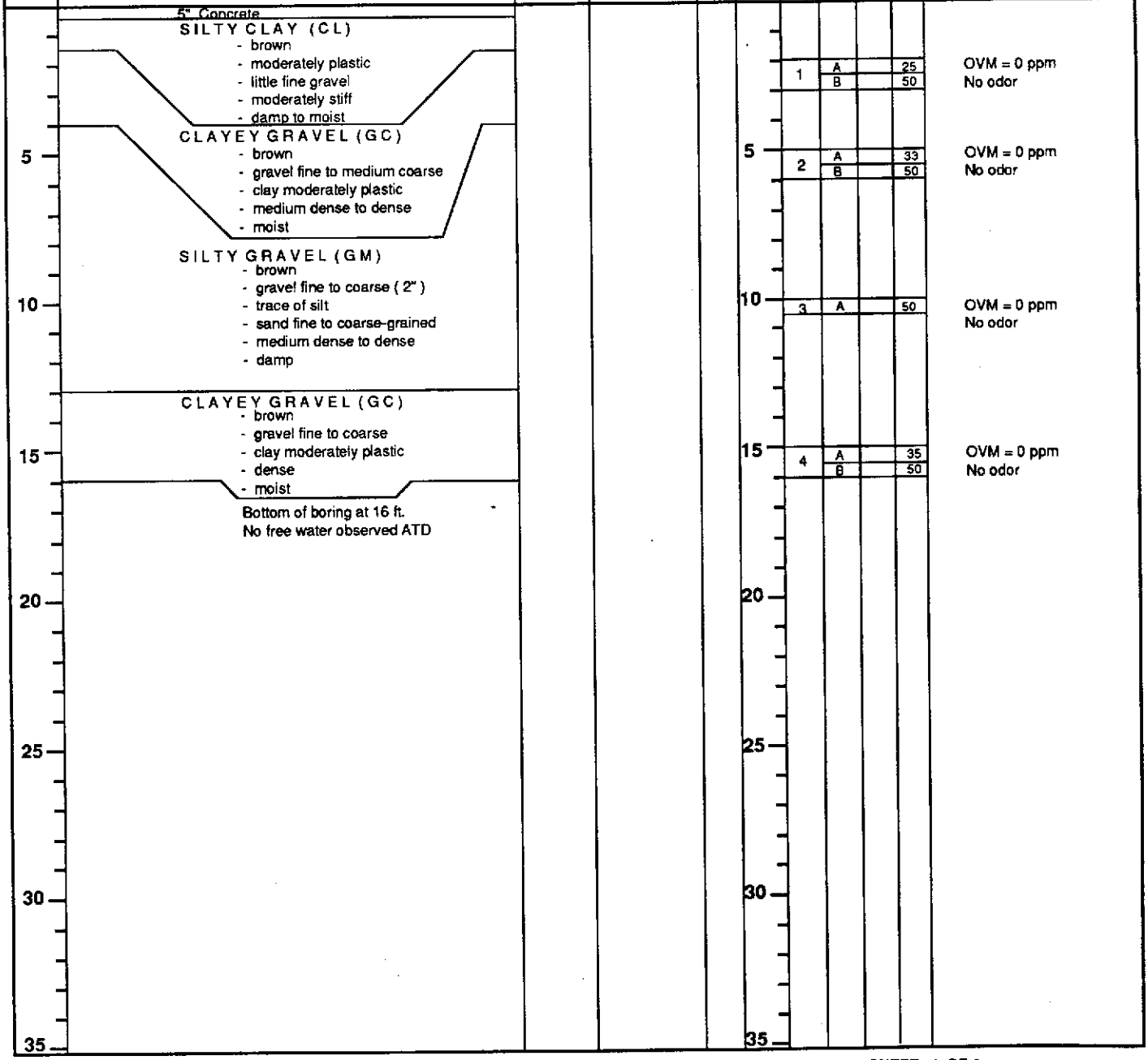
DEPTH (feet)	DESCRIPTION	Lithology	Piezometer Installation	Water Content	Piezometer Data	Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	4" Concrete									
	SILTY GRAVEL (GC) - brown - gravel fine to coarse - slightly rounded - very dense - damp					1	A		50	OVM = 0 ppm No odor
5	SILTY GRAVEL (GC) - brown - gravel fine to coarse - medium dense - damp					2	A B C		10 25 27	OVM = 0 ppm No odor
10	CLAYEY GRAVEL (GC) - brown - gravel fine to coarse - slightly clayey - medium dense to dense - moist					3	A B		24 50	OVM = 0 ppm No odor
15	SANDY GRAVEL (GW) - brown - gravel fine to medium coarse - sand fine to coarse-grained - trace of silt - medium dense to dense - moist					4	A B		27 50	OVM = 0 ppm No odor
20	CLAYEY GRAVEL (GC) - brown - gravel fine to coarse - sand fine to coarse-grained - clay moderately plastic - dense - moist					5	A B		30 50	OVM = 3.1 ppm No odor
25						6	A B		30 50	OVM = 1.2 ppm Slight gasoline odor
30	Bottom of boring at 26 ft. No free water observed ATD									
35										

LOG OF BORING NO. 3 SHEET 1 OF 1

Woodward-Clyde Consultants

PROJECT NAME Railroad Avenue Property NO. 8810220A - 3000

BORING LOCATION	Boring # 4: Approx. 11' N X 14.5' E of SE corner of Arrow Rental Bldg.	ELEVATION AND DATUM	Pavement Surface
DRILLING AGENCY	Kvilhaug Drilling	DRILLER C. Holoman	DATE STARTED / DATE FINISHED March 2, 1989
DRILLING EQUIPMENT	B - 61 Mobile Drill	COMPLETION DEPTH 16 ft.	SAMPLER 2.5" I.D. Modified California Type
DRILLING METHOD	8" Hollow Stem Augers	DRILL BIT Drag	NO. OF SAMPLES DIST. n/a / UNDIST. 4
SIZE AND TYPE OF CASING	n/a	WATER LEVEL FIRST n/a	COMPL. n/a / 24 HRS. n/a
TYPE OF PERFORATION	n/a	FROM n/a TO n/a Ft.	LOGGED BY: P. Respess / CHECKED BY: A. McDonald
SIZE AND TYPE OF PACK	n/a	FROM n/a TO n/a Ft.	
TYPE OF SEAL NO. 1	n/a	FROM n/a TO n/a Ft.	
TYPE OF SEAL NO. 2	n/a	FROM n/a TO n/a Ft.	



LOG OF BORING NO. 4 SHEET 1 OF 1

Woodward-Clyde Consultants

PROJECT NAME Railroad Avenue Property NO. 8810220A - 3000

BORING LOCATION	Boring # 5: Approx. 32.5' S X 8.5' E of SE corner of Arrow Rental Bldg.	ELEVATION AND DATUM	Pavement Surface
DRILLING AGENCY	Kvilhaug Drilling	DRILLER C. Holoman	DATE STARTED / DATE FINISHED March 3, 1989
DRILLING EQUIPMENT	B - 61 Mobile Drill	COMPLETION DEPTH 25.5 ft.	SAMPLER 2.5" I.D. Modified California Type
DRILLING METHOD	8" Hollow Stem Augers	DRILL BIT Drag	NO. OF SAMPLES DIST. n/a / UNDIST. 6
SIZE AND TYPE OF CASING	n/a	WATER LEVEL FIRST n/a	COMPL. n/a / 24 HRS. n/a
TYPE OF PERFORATION	n/a	FROM n/a TO n/a Ft.	LOGGED BY: P. Respess / CHECKED BY: A. McDonald
SIZE AND TYPE OF PACK	n/a	FROM n/a TO n/a Ft.	
TYPE OF SEAL NO. 1	n/a	FROM n/a TO n/a Ft.	
TYPE OF SEAL NO. 2	n/a	FROM n/a TO n/a Ft.	

DEPTH (feet)	DESCRIPTION	Graphic Log: Lithology	Graphic Log: Piezometer Installation	Water Content	Piezometer Data	Samples: Drive Number	Samples: Sample Number	Samples: Recov. (Feet)	Samples: Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	3" Asphalt Concrete + 6" Aggregate Base									
	SANDY GRAVEL (GP) - brown - gravel fine to medium coarse (2") - sand fine to coarse-grained - loose - wet					1	A		6	OVM = 0 ppm No odor
							B		4	
							C		9	
5	→ slightly clayey				5	2	A		13	OVM = 0 ppm No odor
							B		14	
							C		17	
10	CLAYEY GRAVEL (GC) - brown - gravel fine to coarse (2"), rounded - sand fine to coarse - trace of clay - moderately plastic - medium dense to dense - wet				10	3	A		17	OVM = 0 ppm No odor
							B		30	
							C		50	
15					15	4	A		50	OVM = 0 ppm No odor
20					20	5	A		50	OVM = 0 ppm No odor
25					25	6	A		50	OVM = 16.3 ppm Slight gasoline odor
	Bottom of boring at 25.5 ft. No free water observed ATD									
30					30					
35					35					

Woodward-Clyde Consultants

PROJECT NAME Railroad Avenue Property NO. 8810220A - 3000

BORING LOCATION	Boring # 6: Approx. 10' S X 10' E of NE corner of Fabtronics Bldg.	ELEVATION AND DATUM	Pavement Surface
DRILLING AGENCY	Kvilhaug Drilling	DRILLER C. Holoman	DATE STARTED / DATE FINISHED March 3, 1989
DRILLING EQUIPMENT	B - 61 Mobile Drill	COMPLETION DEPTH 25.5 ft.	SAMPLER 2.5" I.D. Modified California Type
DRILLING METHOD	8" Hollow Stem Augers	DRILL BIT Drag	NO. OF SAMPLES DIST. n/a / UNDIST. 6
SIZE AND TYPE OF CASING	n/a	WATER LEVEL FIRST n/a	COMPL. n/a / 24 HRS. n/a
TYPE OF PERFORATION	n/a	FROM n/a TO n/a Ft.	LOGGED BY: P. Respess / CHECKED BY: A. McDonald
SIZE AND TYPE OF PACK	n/a	FROM n/a TO n/a Ft.	
TYPE OF SEAL NO. 1	n/a	FROM n/a TO n/a Ft.	
TYPE OF SEAL NO. 2	n/a	FROM n/a TO n/a Ft.	

DEPTH (feet)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Piezometer Data	SAMPLES: Drive Number	SAMPLES: Sample Number	SAMPLES: Recov. (Feet.)	SAMPLES: Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	2" Asphalt Concrete + 4" Aggregate Base									
	SILTY SAND (SM) - brown - sand fine to medium-grained - little coarse gravel - loose - damp					1	A		35	OVM = 0 ppm No odor
							B		50	
5	SILTY GRAVEL (GM) - brown - gravel to 2" - sand fine-grained - medium dense to dense - damp				5	2	A		18	OVM = 0 ppm No odor
							B		30	
							C		35	
10	SANDY GRAVEL (GP) - brown - gravel to 2" (coarse) - sand medium to coarse-grained - dense to very dense - moist				10	3	A		50	OVM = 0 ppm No odor
15					15	4	A		50	OVM = 0 ppm No odor
20	CLAYEY GRAVEL (GC) - brown - gravel to 2" - sand fine to coarse-grained - trace of clay - moderately plastic				20	5	A		50	OVM = 0 ppm No odor
25	→ more clay in sample than above				25	6	A		50	OVM = 0 ppm No odor
	Bottom of boring at 25.5 ft. No free water observed ATD									
30					30					
35					35					

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. 8810220A

SAMPLERS: (Signature) [signature]

DATE	TIME	SAMPLE NUMBER	General Mineral	Priority Pollutant Metals	EPA Method 624	EPA Method 625	EPA Method 608	TPH + BTEX 8015 mod	[illegible]	Purg. vol. org. 8240 & 8270	Metals - Cr Cu Ni Pb Hg Zn		Bulk Asbestos	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
3/3/89		5-1-C						X						1	frozen & [illegible] Block ice in chest
↓		5-2-C						X						1	
		5-3-C						X						1	
		5-4-A						X						1	
		5-5-A						X						1	
		5-6-A						X						1	
		6-1-B									X			1	
		6-2-C						X			X			1	
		6-3-A						X						1	
		6-4-A						X		X				1	
		6-5-A						X						1	
		6-6-A						X						1	
↓		ASBESTOS SAMPLE #01											X	1	

TOTAL NUMBER OF CONTAINERS: 13 [illegible] ~~12~~

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	3/3/89 1600	[signature]	[signature]	3/3/89 16:40	[signature] Waller III

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. 8810220A

SAMPLERS: (Signature) [signature]

DATE	TIME	SAMPLE NUMBER	General Mineral	Priority Pollutant Metals	EPA Method 624	EPA Method 625	EPA Method 608	TPH-G BTEX 7015 mod.	TPH-BTEX-Diesel	[illegible]	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
3/2/89		1-1-C						X			1	[illegible] Block ice chest
		1-2-C						X			1	
		1-3-C						X			1	
		1-4-B						X	X		1	
		1-5-B						X			1	
		1-6-B						X		X	1	
		2-1-C						X			1	
		2-2-C						X			1	
		2-3-B						X			1	
		2-4-B						X	X		1	
		2-5-B						X			1	
		2-6-B						X		X	1	
		3-1-A						X			1	
		3-2-C						X			1	
		3-3-B						X			1	
		3-4-B						X	X		1	
		3-5-B						X			1	
		3-6-B						X			1	
		4-1-B						X			1	
		4-2-B						X			1	
		4-3-A						X			1	
		4-4-B						X			1	

TOTAL NUMBER OF CONTAINERS: 22

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	3/3/89 1610	[signature]	[signature]	3/3/89 16:40	[signature]

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME