SMITH-EMERY GEOSERVICES
A MEMBER OF THE SMITH-EMERY COMPANIES, ESTABLISHED 1904
HUNTERS POINT SHIPYARD, BUILDING 114
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SAN FRANCISCO, CALIFORNIA 94188-0550
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April 4, 1997

SEG File No. 90404
SEG Report No. 97-227

Alameda County Department of Environmental Health (ACDEH)
1131 Harbor Bay Parkway, Suite #250
Alameda, California 94502-6577

#3586

Attn: Mr. Barney Chan

REPORT - QUARTER 1, 1997 GROUNDWATER MONITORING
3925 ALAMEDA AVENUE
OAKLAND, CALIFORNIA

Gentlemen:

INTRODUCTION

In accordance with your request, Smith-Emery GeoServices is pleased to present this report of quarterly groundwater monitoring for the above referenced site. The location of the site is shown on Vicinity Map, Plate 1. The locations of the monitoring wells and the calculated groundwater gradient are presented on the Plot Plan, Plate 2.

The details of the original monitoring well installation were presented in Smith-Emery GeoServices Report No. 95-187, dated August 22, 1995. The Monitoring Well MW4 installation was reported in SEG Report No. 96-621, dated December 16, 1996.

PURPOSE

The purpose of this work is to continue to monitor the extent and concentrations of a plume of hydrocarbons dissolved in the shallow groundwater downgradient of the former onsite tank location.

This quarterly monitoring program was initiated at the request of the Alameda County Department of Environmental Health.

SCOPE OF SERVICES

Smith-Emery GeoServices' scope of services for the quarterly groundwater monitoring at 3925 Alameda Avenue, Oakland, California included:

- Groundwater level measurements
- Monitoring well purging
- Groundwater sampling and analytical testing
- Calculation of groundwater gradient and flow direction
- Presentation of this report of our findings

WELL MEASUREMENT

Groundwater level measurements were taken in groundwater monitoring wells MW1, MW2, MW3, and MW4 on March 24, 1997. Static water levels and well depths were measured to the nearest one-hundredth of a foot using an electronic groundwater level indicator. Well measurement and survey data obtained for the three wells are presented in Table 1 below.

The gradient is approximately four tenths of one vertical foot over 100 horizontal feet (0.4%) at a direction of South29°West. An updated gradient map showing the surveyed monitoring well locations and flow direction is included as the Plot Plan, Plate 2.

TABLE 1: WELL MEASUREMENT DATA

Well I.D.	Date of Measurement	Casing Elevation	Depth to water from top of casing	Water Elevation, Mean Sea Level
MW-1	3-24-97	8.73'	9.39'	-0.66'
MW-2	3-24-97	8.42'	9.07'	-0.65'
MW-3	3-24-97	9.26'	9.88'	-0.62'
MW-4	3-24-97	8.44'	9.43'	-0.99'

Gradient: 0.4% @ S29°W

Note: The benchmark elevation was set referenced to City of Oakland survey monument BM-19NW24 at elevation 9.664 feet above mean sea level. Per the USGS topographical map for the Oakland East Quadrangle, the ground surface elevation at the site is approximately 10 feet above mean sea level.

WATER PURGING

The monitoring wells were purged and sampled according to established guidelines and the approved workplan (previously submitted). Prior to the removal of any groundwater, all four wells were measured for the depth to water. Water depth was measured relative to a reference point at the top of the casing using an electronic water level meter, accurate to the nearest one-hundredth of a foot. A transparent bailer was then used to sample the surface of the water table in the wells for the purpose of observing any free product. No visible free product was noticed in the first bailer from each well. In MW1 and MW2, a slight petroleum odor and a transient, spotty sheen was noticed in the purge water. MW3 and MW4 displayed no sheen or petroleum odor.

Each well was purged with a one gallon development bailer after checking for free product. A minimum of 3 well volumes had been removed from each well. Water quality parameters of conductivity, temperature, and pH were monitored during the purging, and water levels were allowed to recover prior to taking samples. Detailed records of well purging and sampling data appear in Appendix I - Well Purge Data Sheets.

Groundwater samples were obtained in clean disposable Teflon bailers equipped with a flow control valve. Water samples for EPA Method 8015M/602 were placed in EPA-approved 40 ml vials capped with Teflon backed caps, and 1L glass bottles with Teflon backed caps. No air bubble or headspace was present in the samples taken. All samples were then labeled and placed in zip lock bags, preserved at approximately four degrees Celsius on blue ice, and transported with appropriate chain-of-custody documentation to a state-certified laboratory.

ANALYTICAL PROGRAM

Analytical tests on the samples taken for this project were performed by state-certified laboratories of North State Environmental in South San Francisco. The detailed results of all analytical work are contained in Appendix II - Report of Analytical Results.

Groundwater Samples

The groundwater samples obtained on 3-24-97 from the wells MW1, MW2, MW3, and MW4 were analyzed on 3-27-97 by Standard Method EPA 8015M/602 for Gasoline, BTEX (Benzene, Toluene, Ethylbenzene, and Xylenes), and MBTE. A four-point composite of water from the four wells was analyzed for Total Dissolved Solids (TDS). A summary of the analytical results is presented in the following table.

TABLE 2 - ANALYTICAL FINDINGS

MONITORING WELL SAMPLINGS

TESTS: BTEX, TPH AS GASOLINE, AND MBTE

ID	Gasoline	Benzene	Toluene	Ethyl-benzene	Xylene	MBTE	TDS
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW1	11.0	2.8	0.055	0.340	0.160	0.029	
MW2	10.0	3.3	0.440	0.800	2.000	0.015	
MW3	0.260	0.002	0.0007	0.016	0.008	ND	
MW4	15.0	1.0	0.150	1.600	1.100	0.042	
Composite	---	---	---	---	---	---	650

Note: ND = Not Detected
--- = not tested

TABLE 3 - WELL MONITORING HISTORY, 1995-1997

Well I.D.	Date of Meas.	Elevation (MSL)	Gradient	Flow Direction	TPH-G (mg/L)	Diesel (mg/L)	Kerosene (mg/L)	Mtr Oil (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	MTBE (mg/L)
Q1 97 ROUTINE QUARTERLY MONITORING													
MW-1	3-24-97	-0.66'	0.4%	S29°W	11	---	---	---	2.8	0.055	0.340	0.160	0.029
MW-2	3-24-97	-0.65'			10	---	---	---	3.3	0.440	0.800	2.000	0.015
MW-3	3-24-97	-0.62'			0.26	---	---	---	0.002	0.0007	0.016	0.008	ND
MW-4	3-24-97	-0.99'			15	---	---	---	1.0	0.150	1.600	1.100	0.042
Q4 96 ROUTINE QUARTERLY MONITORING													
MW-1	12-11-96	-0.63'	0.4%	S48°W	8.1	4.0	---	---	2.60	0.073	0.300	0.200	0.340
MW-2	12-11-96	-0.58'			5.2	3.0	---	---	2.1	0.340	0.400	1.500	0.170
MW-3	12-11-96	-0.40'			0.39	0.1	---	---	0.003	0.002	0.020	0.012	0.005
MW-4	12-11-96	-0.98'			2.4	2.0	---	---	0.390	0.070	0.540	0.840	0.160
Q3 96 ROUTINE QUARTERLY MONITORING													
MW-1	9-20-96	-0.95'	0.68%	S36°W	2.2	---	---	---	0.570	0.030	0.110	0.800	0.070
MW-2	9-20-96	-0.92'			11.0	---	---	---	2.7	0.600	0.500	1.500	0.370
MW-3	9-20-96	-0.67'			0.37	---	---	---	0.004	ND	0.026	0.013	0.006
MW-4	9-20-96	-1.34'			12.0	---	---	---	0.890	0.120	1.100	2.000	0.260
Q2 96 ROUTINE QUARTERLY MONITORING													
MW-1	6-26-96	-1.23'	1.3%	S46°W	7	ND	3	ND	2.3	0.062	0.230	0.160	0.093
MW-2	6-26-96	-1.15'			5	ND	1	ND	1.0	0.170	0.150	0.290	0.120
MW-3	6-26-96	-1.59'			0.4	ND	0.6	ND	0.004	0.004	0.025	0.012	0.009
Q1 96 ROUTINE QUARTERLY MONITORING													
MW-1	3-29-96	-0.85'	0.3%	S4°W	12	ND	4	ND	0.730	0.089	0.300	0.180	0.270
MW-2	3-29-96	-0.78'			6	ND	2	ND	0.640	0.300	0.190	0.490	0.078
MW-3	3-29-96	-0.69'			0.3	ND	0.2	ND	0.002	0.002	0.015	0.009	0.006
Q4 95 ROUTINE QUARTERLY MONITORING													
MW-1	12-7-95	-1.59'	0.6%	S37°E	6	ND	ND	ND	0.343	0.032	0.133	0.184	---
MW-2	12-7-95	-1.41'			8	ND	ND	ND	0.240	0.200	0.108	0.402	---
MW-3	12-7-95	-1.38'			ND	ND	ND	ND	ND	ND	0.013	0.013	---
Q3 95 ROUTINE QUARTERLY MONITORING													
MW-1	9-22-95	-1.78'	2.2%	S8°W	11.0	5	3	ND	2.3	0.081	0.390	0.560	---
MW-2	9-22-95	-1.27'			7.2	3.5	2	ND	1.2	0.560	0.250	1.0	---
MW-3	9-22-95	-0.62'			0.130	1.9	ND	ND	0.001	0.001	0.012	0.013	---
SOIL BORINGS, (Engeo, Inc.)													
B1-2	3/7/94	---	---	---	22	26	ND	---	0.034	ND	0.680	0.110	---
B2-3	3/7/94	---	---	---	150	19	ND	---	ND	ND	0.970	1.400	---
B3-1	3/7/94	---	---	---	ND	ND	ND	---	0.029	ND	ND	0.007	---
B4-2	3/7/94	---	---	---	370	150	150		0.180	ND	0.800	2.500	---
B2-W	3/7/94	---	---	---	52	2.30	0.410	---	2.30	2.1	0.710	3.00	---
B2-W	3/7/94	---	---	---	9.8	2.40	3.20	---	2.40	0.045	0.100	0.082	---
TANK REMOVAL, (Engeo, Inc.)													
1 Soil	3/18/88	---	---	---	---	210	---	---	0.420.33		---	0.840	---
2 Soil	3/18/88	---	---	---	---	450	---	---	ND 3.3		---	79	---
3 Soil	3/18/88	---	---	---	720	---	---	---	6.6 110		---	150	---
4 Soil	3/18/88	---	---	---	190	---	---	---	0.24 9.6		---	32	---
5 Water	3/18/88	---	---	---	---	150	---	---	--- ---		---	---	---

---Notes:ND = not detected above the method detection limit.
--- = not applicable

CONCLUSIONS

General Discussion

This sampling event was near the middle of the wet season of the hydrologic year. In this quarter, the groundwater beneath the project site was flowing in a direction of S29°W with a slope of approximately 0.4 percent. Analysis of our readings confirms that the present direction of groundwater flow has shifted about 19 degrees toward the south since the previous quarter, but groundwater elevations and slope have not changed appreciably since the last measurement on December 11, 1996. The groundwater gradients surrounding the project site may vary through time due to natural or man-made influences, such as subsurface recharge zones, tidal influences, subsurface geology, or groundwater extraction wells, and will influence the groundwater at the subject site.

Summary and Conclusions

The latest groundwater concentrations of gasoline are 15 mg/L and lower. Of the four wells, MW4 had the highest hydrocarbon levels, and MW3 had the lowest levels. This is the third sampling event that includes well MW4, which showed a rise in gasoline concentrations from 2.4 ppm to 15 ppm TPH-gasoline from last quarter.

The groundwater elevation in Monitoring Well MW4 is at a lower elevation than would be predicted from the well levels in MW1, MW2, and MW3. The calculated groundwater gradient, as diagrammed on Plate No. 2, displays the increased slope of the groundwater surface between MW1 and MW4. Since the groundwater elevations were measured over a period of less than ten minutes, the piezometric surface was considered to have been in a stabilized condition. However, the rates of

recharge have been noticeably different among the wells, indicating that the wells respond differentially to elevation influences, such as tidal pull, thus influencing slope changes between measuring points and times. The reported slope was an average taken inside the area enclosed by the four wells.

LIMITS OF LIABILITY

The findings, conclusions and recommendations contained in this report are based on site conditions as they existed at the time of our investigation, and we further assume the explorations to be representative of the subsurface conditions throughout the site.

The factual data and interpretations pertain to the specific project described in this report and are solely for the use of **Smooke and Sons Investment Company.** and are not applicable to any other project or site. Any reliance on this document by any other person or entity shall be at that party's sole risk.

Our investigation was performed using the standard of care and level of skill ordinarily exercised under similar circumstances by reputable Environmental Assessors and Geologists currently practicing in these or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The following plates and appendices complete this report.

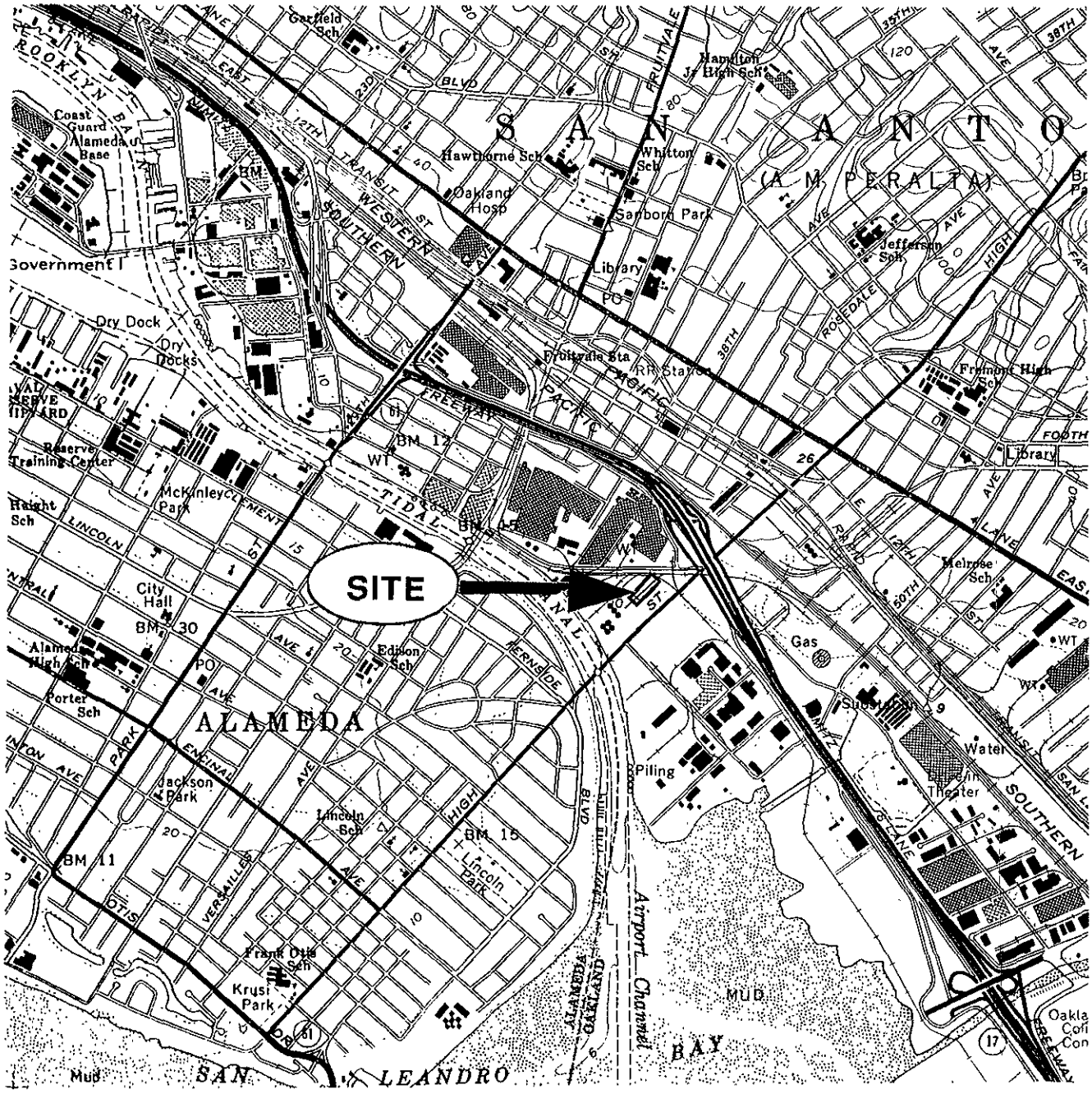
Plate 1	Vicinity Map
Plate 2	Plot Plan with Groundwater Gradient
Appendix I	Well Purge Data Sheets
Appendix II	Analytical Results
	Chain of Custody

Respectfully submitted,

SMITH-EMERY GEOSERVICES

RICK WIDEBROOK
Project Geologist

SCALE: 1" = 2000'



REFERENCE:
U.S.D.I. - GEOLOGICAL SURVEY
OAKLAND EAST QUADRANGLE
ALAMEDA COUNTY, CALIFORNIA

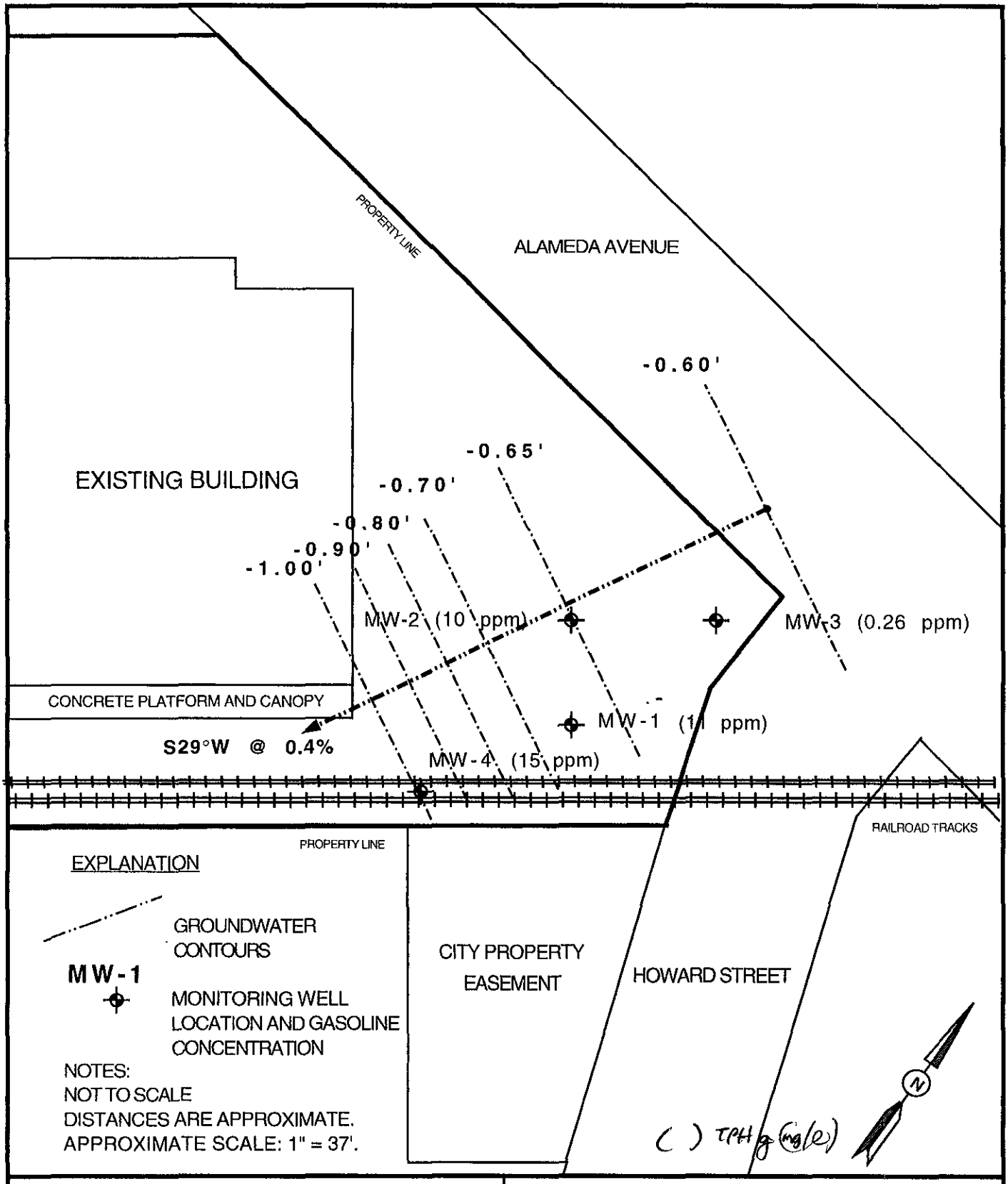
VICINITY MAP

FILE REVIEW
SMOOKE & SONS
3925 ALAMEDA AVENUE
OAKLAND, CALIFORNIA

SMITH-EMERY GEOSERVICES

JOB NO: 90404

PLATE 1



SMOOKE & SONS INVESTMENT CO.
3925 ALAMEDA AVENUE
OAKLAND, CALIFORNIA

1ST QUARTER 1997 GRADIENT

SMITH-EMERY GEOSERVICES

SEG JOB NO. 90404 PLATE NO. 2

APPENDIX I

WELL PURGE DATA SHEETS

SMITH-EMERY COMPANY

WATER QUALITY FIELD SAMPLING DATA SHEET

VOLUME = 1/4 Π D ^{2}H
= π r ^{2} H

1 cubic foot = 7.48 gallons
1 gallons = 0.134 cubic foot

Project Name: Smooke Project Number: 90404

Samplers: Rick WideBrook / Taylor Marcum

Well No.: MW-1 Date Sampled: 3/24/97

Starting Time: Ending Time:

Volume Single Well: 6 GAL Purge Rate:

Purge Volume: 18 GAL Starting Water Level: 9.39 / W.D.: 20.1

Ending Water Level: 9.42 Purge Method: Bailer

GAL	Time	T (°C.)	pH	Conductivity (Siemens)	Turbidity NTU	ORP	Description/ Purged Volume
6		21.0		1200			OLIVE GREY. SPOTTY CLOUDY SHEEN Slight HC ODOR
12		21.0		1420			OLIVE GREY. SPOTTY SHEEN Slight HC ODOR
18		21.0		1390			OLIVE GREY CLOUDY SPOTTY SHEEN SLIGHT HC ODOR

SMITH-EMERY COMPANY

WATER QUALITY FIELD SAMPLING DATA SHEET

VOLUME = 1/4 Π D^2 H
= πr^2 H

1 cubic foot = 7.48 gallons
1 gallons = 0.134 cubic foot

Project Name: Smoke Project Number: 904/04

Samplers: WILDERBook / MARCUM

Well No.: MW-2 Date Sampled: 3/24/97

Starting Time: Ending Time:

Volume Single Well: 6.15 Purge Rate:

Purge Volume: 18 G. Starting Water Level: 8.95'/9.91 (9.07)

Ending Water Level: 9.07 Purge Method: Bailer

GAL	Time	T (°C.)	pH	Conductivity (Siemens)	Turbidity NTU	ORP	Description/ Purged Volume
6		21.0		1430			DARK OLIVE GREY CLOUDY HC ODOR SPOTTY SHEEN
12		21.0		1460			OLIVE GREY CLOUDY HC ODOR SPOTTY SHEEN
18		20.5		1462			UNCHANGED

SMITH-EMERY COMPANY

WATER QUALITY FIELD SAMPLING DATA SHEET

VOLUME = 1/4 π D^{2}H
= πr^2 H

1 cubic foot = 7.48 gallons
1 gallons = 0.134 cubic foot

Project Name: Smoke Project Number: 90404

Samplers: Rick Widebrook Taylor Marcum

Well No.: MW-3 Date Sampled: 3/24/97

Starting Time: 11:05 am Ending Time:

WELL Depth 20.5'

Volume Single Well: 6.008 gal Purge Rate:

Purge Volume: 18 gal Starting Water Level: 9.88', 9.97' W.D. 20.5'

Ending Water Level: 9.88 Purge Method: Bailer

GAL	Time	T (°C.)	pH	Conductivity (microMhos)	Turbidity NTU	ORP	Description/ Purged Volume
6		20.5	7.0	1480			OLIVE GREY BROWN V. CLOUDY NO SHEEN ~~NO SHEEN~~ NO HC ODOR
12		21.0		1460			BEIGE GREY NO SHEEN CLOUDY NO ODOR
18		20.0		~~1480~~ 1560			YELLOWISH GREY NO SHEEN SLIGHTLY CLOUDY NO ODOR

SMITH-EMERY COMPANY

WATER QUALITY FIELD SAMPLING DATA SHEET

VOLUME = 1/4 π $D^2 H$

= $\pi r^2 H$

1 cubic foot = 7.48 gallons
1 gallons = 0.134 cubic foot

Project Name: Smoker Project Number: 905404

Samplers: Rick Widebrook/

Well No.: MW-4 Date Sampled: 3/24/97

Starting Time: Ending Time:

Volume Single Well: 6.19 gal Purge Rate:

Purge Volume: 18 gal Starting Water Level: 9.43' 20.6'

Ending Water Level: 9.43' Purge Method: Bailer

CAL	Time	T (°C.)	pH	Conductivity (Siemens)	Turbidity NTU	ORP	Description/ Purged Volume
6		22.5		1367			OLIVE GREY NO SHEEN NOM H-C ODOR
12		21.0		1460			OLIVE GREY NO SHEEN
18		21.0		1527			IT OLIVE GREY NO ODOR NO SHEEN

APPENDIX II

ANALYTICAL RESULTS

North State Environmental
Chemical Waste Disposal · Trucking · Consulting

CERTIFICATE OF ANALYSIS

Lab No:	97-254	Date Sampled:	03-24-97
Client:	Smith-Emery	Date Analyzed:	03-27-97
Project:	3925 Alameda	Date Reported:	04-01-97

Gasoline Range Hydrocarbons by Method 8015 M
MTBE, Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT	
97-254-01	MW1-Q1'97 Water	MTBE	8020	29	ug/L
		Benzene	8020	2800	ug/L
		Toluene	8020	55	ug/L
		Ethylbenzene	8020	340	ug/L
		Xylenes	8020	160	ug/L
		Gasoline	8015M	11000	ug/L
97-254-02	MW2-Q1'97 Water	MTBE	8020	15	ug/L
		Benzene	8020	3300	ug/L
		Toluene	8020	440	ug/L
		Ethylbenzene	8020	800	ug/L
		Xylenes	8020	2000	ug/L
		Gasoline	8015M	10000	ug/L
97-254-03	MW3-Q1'97 Water	MTBE	8020	ND	
		Benzene	8020	2	ug/L
		Toluene	8020	0.7	ug/L
		Ethylbenzene	8020	16	ug/L
		Xylenes	8020	8	ug/L
		Gasoline	8015M	260	ug/L

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North State Environmental
Chemical Waste Disposal · Trucking · Consulting

CERTIFICATE OF ANALYSIS

Lab No:	97-254	Date Sampled:	03-24-97
Client:	Smith-Emery	Date Analyzed:	03-27-97
Project:	3925 Alameda	Date Reported:	04-01-97

Gasoline Range Hydrocarbons by Method 8015 M
MTBE, Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
97-254-04	MW4-Q1'97 Water	MTBE	8020	42 ug/L
		Benzene	8020	1000 ug/L
		Toluene	8020	150 ug/L
		Ethylbenzene	8020	1600 ug/L
		Xylenes	8020	1100 ug/L
		Gasoline	8015M	15000 ug/L

Quality Control/Quality Assurance Summary- Water

Analyte	Method	Reporting Limit	Blank	MS/MSD Recovery	RPD
MTBE	8020	0.5 ug/L	ND	90	22
Benzene	8020	0.5 ug/L	ND	81	5
Toluene	8020	0.5 ug/L	ND	88	6
Ethylbenzene	8020	0.5 ug/L	ND	100	6
Xylenes	8020	1.0 ug/L	ND	103	2
Gasoline	8015M	50 ug/L	ND	94	1

ELAP Certificate NO: 1753
Reviewed and Approved:

John A. Murphy, Laboratory Director

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North State Environmental
Chemical Waste Disposal · Trucking · Consulting

CERTIFICATE OF ANALYSIS

Lab No:	97-254	Date Sampled:	3/24/97
Client:	Smith Emery Inc.	Date Analyzed:	4/1/97
Project:	3925 Alameda	Date Reported:	4/3/97

Total Suspended Solids (TDS) by Method 2540 B

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
97-254-01	TDS-Q1'97 Water	TDS	2540 B	650 mg/L

Quality Control/Quality Assurance Summary-Water

Analyte	Method	Reporting Limit	Blank	MS/MSD Recovery	RPD
TDS	2540 B	1 mg/L	ND	NA	NA

ELAP Certificate NO: 1753

Reviewed and Approved:

Edward A. Murphy

John A. Murphy, Laboratory Director

P.O.Box 5624 · South San Francisco, California 94083 · 415-588-2838 FAX 588 1950

97-254

North State Environmental Analytical Laboratory

Phone: (415) 588-9652 Fax: (415) 588-1950

Chain of Custody / Request for Analysis

Lab Job No.: _____ Page ___ of ___

Client: SMITH-EMERY	Report to: RICK WILDERSON	Phone: 330 3000	Turnaround Time: STD
Mailing Address:	Billing to: SAME	Fax:	
		PO# / Billing Reference: 90404	Date:
			Sampler:

Project / Site Address: 3925 ALAMEDA

Analysis Requested

	Sample ID	Sample Type	Container No. / Type	Pres.	Sampling Date / Time	EPA 8015m TPH-GAS	BTEX	MTBE	TDS	Comments/Hazards
1	MW1-Q197	WATER	3/V	4°C/HCl	3/24/97 11:30	/	/	/		
2	MW2-Q197	"	3/V	"	15:00	/	/	/		
3	MW3-Q197	"	3/V	"	15:30	/	/	/		
4	MW4-Q197	"	3/V	"	16:00	/	/	/		
5	TDS-Q197	1L WATER AMBER	1/1L	4°C	16:00				/	

Relinquished by: Rick Wilder	Date: 3/25/97	Time: 3:50	Received by: Edward P. Cruz	Lab Comments
Relinquished by:	Date:	Time:	Received by:	
Relinquished by:	Date:	Time:	Received by:	