RO 134

ETIC ENGINEERING

October 26, 2004

Mr. Don Hwang
Hazardous Materials Specialist
Local Oversight Program
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Subject: **LETTER REPORT**
Technical Response to the August 20, 2004 Alameda County Health Cares Services Agency Correspondence
Former Val Strough Chevrolet
327 34th Street
Oakland, California

Dear Mr. Hwang:

On behalf of Strough Family Trust of 1983, ETIC Engineering, Inc. (ETIC) has prepared this Letter Report – Technical Response to the August 20, 2004 Alameda County Health Care Services Agency (ACHCSA) Correspondence (Letter Report) regarding the June 25, 2004 *Dual Phase Extraction Pilot Test Report and Interim Remedial Action Plan* (IRAP) for the referenced site. This ACHCSA correspondence provided general concurrence with the dual-phase extraction (DPE) scope of work described in the IRAP. Accordingly, ETIC has begun installation of the temporary DPE system.

The ACHCSA correspondence also requested incorporation of technical comments, performance of requested work, and submittal of several technical reports, including a Work Plan. As summarized below the ACHCSA requested that the Work Plan include proposed boring locations to delineate the lateral and vertical extent of soil contamination in the source area, a proposal to remediate residual shallow soil contamination near well MW-2, and a discussion of the probability that subsurface utilities and identified wells could contribute to the spread of site contaminants laterally and vertically. As described in detail below, ETIC is of the opinion that the source area characterization and shallow soil remediation do not appear to be necessary, and we have prepared this Letter Report in lieu of the Work Plan. If you do not concur with our conclusions after reviewing this Letter Report, please call us to discuss at your earliest convenience. Otherwise, we will trust that this response satisfies the August 20, 2004 ACHCSA request.

The following presents the ACHCSA technical comments (in bold-italics) and ETIC's response.

1. ***Limit Drawdown in Extraction Wells MW-2 and MW-3 – The depth of groundwater extraction needs to be limited to the depth of the plume to prevent drawdown to the deeper coarser soil where the contaminated plume could be disseminated. Limiting the drawdown will reduce the volume of uncontaminated groundwater extracted. Please indicate how drawdown will be limited.***

   Soil analytical results for samples collected during monitoring well installation and the supplemental site investigation indicate that hydrocarbon-impacted soil is limited to the upper 25 feet of the subsurface summarized in the February 2004 *Supplemental Site Investigation Report and Dual-Phase Extraction Pilot Test Workplan (SSI/DPE*

Workplan) (see Figure 1 and Appendix A). During DPE operations, the depth of stingers in the extraction wells control the depth of drawdown. During the combined well DPE pilot test, the maximum depth for the stingers in extraction wells MW2 and MW3 were 25 feet and 21 feet below ground surface (bgs), respectively. The absence of separate-phase hydrocarbons (SPH) in well MW3 (which reported sheen or thicker accumulations historically) during monitoring events since the DPE pilot test suggests effective removal hydrocarbon mass near the extraction well under these operational conditions. It should be noted that due to well inefficiencies, the drawdown in the formation will be less than drawdown in the extraction well; accordingly, water levels in the extraction wells may intermittently be below 25 feet bgs. Hence, ETIC will control the depth of drawdown using the stingers and will limit drawdown near the extraction wells to the depth of the hydrocarbon-impacted soil (i.e. 21 to 25 feet bgs) to optimize the effectiveness of the system.

2. ***Source Characterization - 10,000 mg/kg Total Petroleum Hydrocarbons – Gasoline (TPH-G) and 100 mg/kg benzene were detected in the soil boring at 19.5 to 21 feet below ground surface from MW-2. Thus, the lateral and vertical extent of soil contamination by the adjacent underground storage tank and dispenser needs to be delineated. We request that you propose additional borings to delineate the lateral and vertical extent of soil contamination in the source area. Please propose boring locations in the Work Plan requested below.***

   Natural attenuation since the primary sources (the underground storage tanks and fuel dispenser) were removed and the referenced sample was analyzed in 1993 have likely reduced hydrocarbon concentrations currently present in soil beneath the site. Groundwater monitoring results indicate that the hydrocarbon plume is stable to declining, suggesting that the hydrocarbon contribution for soil to groundwater is limited.

   Notwithstanding this, the soil data collected during the supplemental site investigation (December 2003) indicate that the lateral and vertical extent of hydrocarbons in the subsurface have been adequately defined. Specifically, soil borings (SB1 and SB2) were advanced to 35 feet bgs in the immediate vicinity of wells MW-2 and MW-3 using a direct push continuous core sampling rig. The results of this investigation were illustrated in schematic geologic cross-sections (see Figure 1), which were previously included in both the *SSI/DPE Workplan* and the *IRAP*.

   As illustrated on the schematic geologic cross-section included as Figure 1 herein, the vertical extent of soil contamination, and in particular the extent of the historical 10,000 milligrams per kilogram (mg/kg) total petroleum hydrocarbons as gasoline (TPH-g) concentrations at approximately 20 feet bgs in well MW2, has been defined by deeper samples collected in well MW2 (TPH-g = 19 mg/kg at 25 feet bgs) and by deeper samples collected in boring SB1 (TPH-g = 1,100 mg/kg at approximately 22 feet bgs and TPH-g below reporting limits at 35 feet bgs) and boring SB2 (TPH-g below reporting limits at approximately 23 feet bgs).

   Similarly, lateral characterization of the hydrocarbon-impacted soil has also been completed based on results of samples from borings SB2, MW3, and MW1 (see analytical results on Figure 1). To the southeast, the extent of hydrocarbon-impacted soil has been defined samples in borings SB2 and MW1 (see Figure 1). Because well MW-2 is located on the upgradient boundary of the property (see plan view inset on Figure 1) and immediately adjacent to the sidewalk and street (34th Street), no additional characterization has been performed farther upgradient and in the street. Such characterization is considered infeasible

due to limited street access and unnecessary because it is clearly upgradient of the former underground storage tank and fuel dispenser areas. Any site-related contamination potentially present upgradient of well MW-2 would be at negligible levels.

In addition, ETIC has shown through DPE pilot testing that the radius of influence of the proposed system targets the entire source area for cleanup and influences an extensive area beyond the source in both upgradient (beyond well MW-2) and downgradient directions (see potential radius of influence on Figure 2). Therefore, any residual hydrocarbons present outside of the source area mapped by ETIC (see Figures 1 and 2) would be addressed through the proposed DPE operation.

To summarize, the extent of hydrocarbon-impacted soil has been adequately characterized both vertically and laterally and the zone of DPE influence of the forthcoming DPE system reaches well beyond the documented extent of hydrocarbons. Monitoring of groundwater following cessation of DPE operation can serve to confirm adequate removal of the documented hydrocarbon mass. Therefore, ETIC is of the opinion that additional characterization of soil and groundwater and the associated Work Plan requested in the ACHCSA correspondence does not appear necessary.

3. ***Soil Contamination above MW-2's Screen – Up to 2,000 mg/kg TPH-G and 7.2 mg/kg benzene were detected in the soil borings above MW-2's screen at 15 feet bgs. The DPE proposed appears to be inadequate to remediate the residual soil contamination in this area. Please submit a proposal to remediate the residual soil contamination in this area in the Work Plan requested below.***

   As mentioned above, natural attenuation since the primary sources (the underground storage tanks and fuel dispenser) were removed and the referenced sample was analyzed in 1993 have likely reduced hydrocarbon concentrations currently present in soil beneath the site. Shallow soil samples from boring SB1, located within approximately 10 feet of well MW2 did not report similar hydrocarbon concentrations (see Figure 1)

   Notwithstanding this, operation of the DPE system will necessarily create a vacuum beneath the capped surface at the site, drawing in soil vapor from a radius around the well including above the screened interval (see potential zone of influence on Figure 1). As such, the hydrocarbons that have been historically adsorbed onto the soils within the vadose zone, including those referenced in the above comment, will be mobilized and extracted by the vacuum created by the DPE system. Hence, the proposed remediation system already accounts for the referenced contamination above well MW-2's screen and throughout the area under vacuum influence (see Figure 2). Also worth noting is that the DPE operation process will mobilize soil-vapors and pull atmospheric air into the subsurface, thereby increasing oxygen levels in the soil, promoting an aerobic environment, and enhancing the potential for continued biodegradation following cessation of the active remediation activities. Based on these findings, additional shallow soil remediation evaluation does not appear necessary.

4. ***DPE Operation & Monitoring Plans – The startup phase should include daily monitoring of flow measurements, constituent concentrations, and vacuum readings for at least 1 week. Please also report these same parameters from weekly system operation in the interim remedial action reports.***

Daily site visits will be conducted during the first week of startup to optimize initial system operation. As described in the IRAP, applied vacuum and flowrates at the system, applied vacuum and stinger depths at the extraction wells, and extracted vapors entering and exiting the thermal oxidizer will be monitored using a photoionization detector (PID) or flame ionization detector (FID). We plan to analyze vapor samples of the system influent and effluent samples for TPH-g, benzene, toluene, ethylbenzene, xylenes (BTEX) and methyl tert butyl ether (MTBE) to confirm field measurements during the first day of DPE operation. Because extracted concentrations are anticipated to decline over several weeks or months, additional TPH-g, BTEX and MTBE analyses will be evaluated based on PID/FID readings and system operational parameters. The requested DPE monitoring parameters and associated analytical results will be included as part of groundwater monitoring reports following system startup.

5. ***Preferential Pathways –***
   a) ***Utility Survey – Utility map(s) were included in the September 17, 2003 submittal prepared by ETIC Engineering. However, an evaluation of the probability of the contaminant plumes encountering preferential pathways and conduits that could spread the contamination, particularly in the vertical direction to deeper aquifers was omitted. Include in cross-sections the location and depth of all utility lines and trenches (including sewers, storm drains, pipelines, trench backfills, etc.) within and near the site and plume area(s). Please submit with the Work Plan requested below.***

      As documented in past monitoring and investigation reports, the horizontal hydraulic gradient beneath the site is consistently toward the south-southwest, and the dissolved hydrocarbon plume in groundwater appears to be stable to declining and largely limited to the property boundaries. Groundwater is typically observed at depths of 15 to 25 feet bgs. In general, the existing utilities located in the vicinity of the site do not extend depth enough to encounter groundwater and are not likely to intercept the dissolved hydrocarbon plume. These utilities include: the sanitary sewer, located on 34th Street, upgradient of the site; and the storm drain, located on Broadway, approximately 150 feet from the corner of Broadway and 34th Street, crossgradient and downgradient from the site. These utilities are not likely to be impacted due to their location upgradient of the source area and hydrocarbon plume (sanitary sewer) and beyond the extent of the hydrocarbon plume (storm drain). These utilities are within the fill material depicted on the previously presented schematic geologic cross-sections (see Appendix A).

      A box culvert for a former tributary of Glen Echo Creek is located at depths of approximately 17-22 feet bgs beneath the eastern portion of the site, crossgradient of the source area. The box culvert is likely to encounter groundwater at least seasonally. Wells MW6 and MW7 are located south and north of the box culvert, respectively. At well MW6, saturated soils predominantly consist of sands, and the residual hydrocarbon concentrations reported represent the crossgradient edge of the hydrocarbon plume. At well MW7, saturated soils consist of clays, and no hydrocarbons are typically reported in well MW7. Based on these low concentrations and the sandy soil types observed in well MW6, the box culvert is not likely to act as a preferential pathway. In addition, based on the depth to water and the depth to utilities, the utilities identified at the site are not likely to act as vertical conduits to deeper water-bearing zones. The planned remediation activities will significantly limit this likelihood by further reducing the potential for migration offsite and to deeper zones.

b) ***Well Survey – Locate wells within a quarter mile radius of the site. A map showing the locations of the wells and the site and a table with well construction details were included in the September 17, 2003 submittal prepared by ETIC Engineering. Evaluate the probability of the contaminant plumes encountering wells that could spread the contamination, particularly in the vertical direction to deeper water aquifers. Please submit with the Work Plan requested below.***

The likelihood of hydrocarbons migrating to a deeper aquifer through an offsite well is low. Based on the information reviewed, the wells identified within ¼-mile of the site are shallow monitoring wells associated with other underground storage tank sites (see Appendix A). As mentioned above, the horizontal hydraulic gradient beneath the site is consistently toward the south-southwest, and the dissolved hydrocarbon plume in groundwater appears to be stable to declining and largely limited to within the property boundaries. Therefore, the potential for hydrocarbons from the site to reach the identified wells and migrate to deeper zones is very low. The planned remediation activities will significantly limit this likelihood by further reducing the potential for migration offsite and deeper.

Based on these findings, identified utilities and wells are not likely to contribute to the lateral or vertical spread of site contaminants.

6. ***Underground Storage Tank Unauthorized Release (Leak)/Contamination Site Report- Please complete (enclosed).***

The site is a participant in the California UST reimbursement fund (UST Fund), which typically requires submittal of an unauthorized release form during the application approval process. ETIC has not received a response from the UST Fund to our requests for a copy of the form. A new form has been completed and is enclosed.

7. ***Groundwater Analytical Table*** – **"Table 2 Cumulative Groundwater Analytical Data"** ***did not include the other fuel oxygenates Tertiary Amyl Methyl Ether (TAME), Ethyl Tertiary Butyl Ether (ETBE), Di-Isopropyl Ether (DIPE), and Tertiary Butyl Alcohol (TBA), Ethanol by EPA Method 8260 and the lead scavengers, Ethylene Dibromide (EDB), Ethylene Dichloride (EDC) for analyses of the grab and monitoring well groundwater samples, and for the lead scavengers, EDB and EDC. Please include these results in tables.***

Consistent with the September 2003 *Supplemental Site Investigation Work Plan*, grab groundwater and soil samples from select borings were analyzed for the fuel oxygenates and lead scavengers. Based on the general absence or presence at concentrations near detection limits in during the supplemental site investigation (SSI/DPE Workplan) (see Appendix A), ETIC determined future analysis for these constituents was unnecessary. As such, samples from monitoring wells were not analyzed for fuel oxygenates and lead scavengers. ETIC will include a separate table with the grab groundwater results (including these additional analytes) in future quarterly monitoring reports.

ETIC ENGINEERING

CONCLUSIONS

Based on the responses presented above, ETIC is of the opinion that the source characterization and shallow soil remediation evaluation requested in the ACHCSA correspondence are not necessary. The requested preferential pathway discussion is presented herein. We anticipate that quarterly reports, including a DPE operational data following system startup and a summary of the existing fuel oxygenate and lead scavenger data, will be submitted on the schedule requested in the ACHCSA correspondence.

CLOSING

We trust that this letter report satisfies the August 20, 2004 ACHSA request. If you do not concur with our conclusions after reviewing this Letter Report, please call us to discuss at your earliest convenience.

We appreciate your assistance with this project. If you have any questions or comments, please do not hesitate to call us at (510) 208-1600 - Katherine Brandt at ext. 11 or Khaled Rahman at ext. 13.

Sincerely,
ETIC ENGINEERING, INC.

Katherine Brandt

Katherine A. Brandt
Project Manager

Khaled Rahman

Khaled B. Rahman, R.G., C.Hg.
Senior Geologist

Attachments

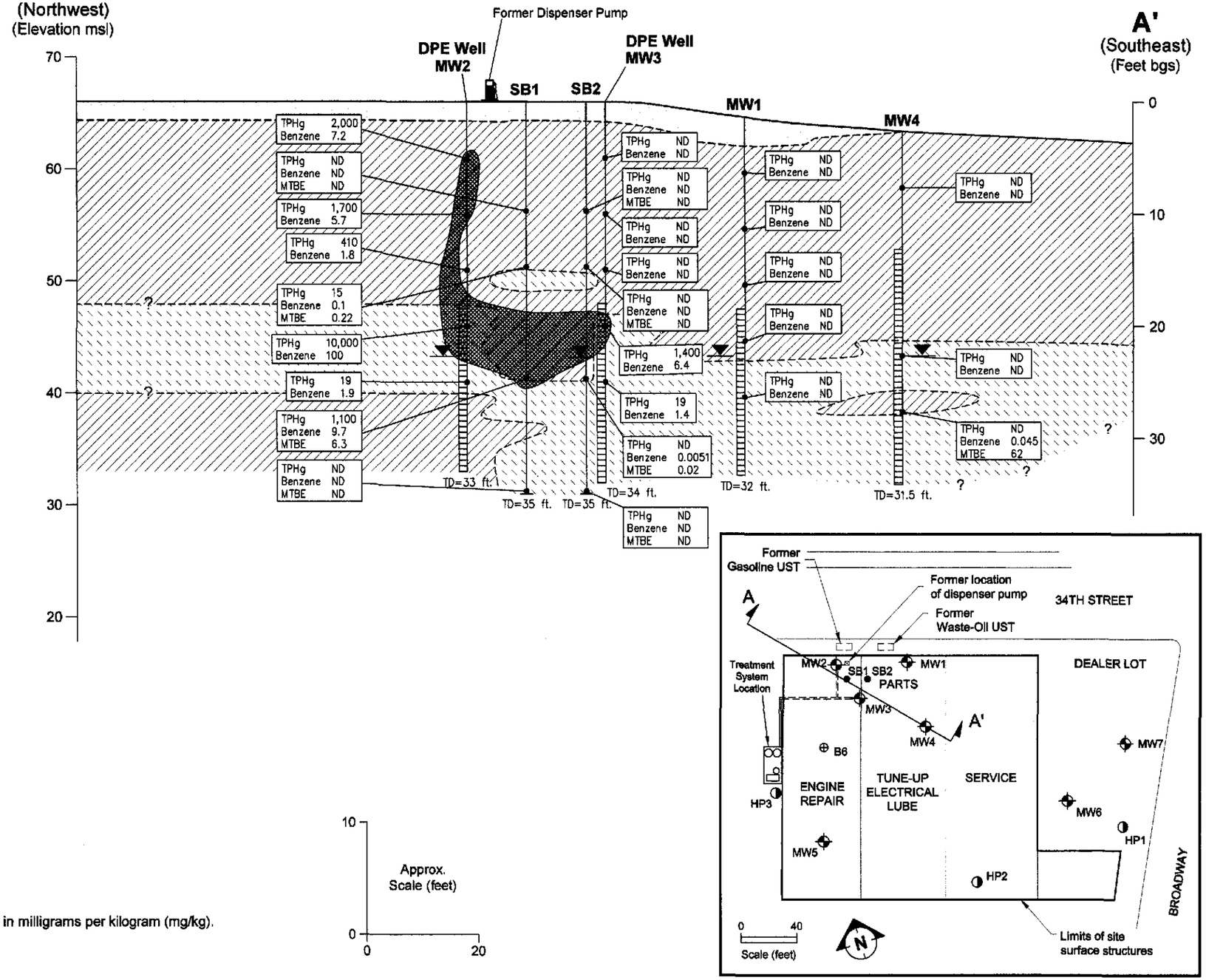
Figure 1 – Schematic Geologic Cross-Section A-A'
Figure 2 – Potential Vapor Flow Lines in the Radius of Influence

Appendix A – Background Documents

Enclosure

Unauthorized Release Form

Cc: Jonathan Redding, Wendel Rosen Black and Dean, 1111 Broadway, 24th Floor, Oakland, California 94607
Don Strough, Strough Family Trust of 1983, PO Box 489, Orinda, California 94563



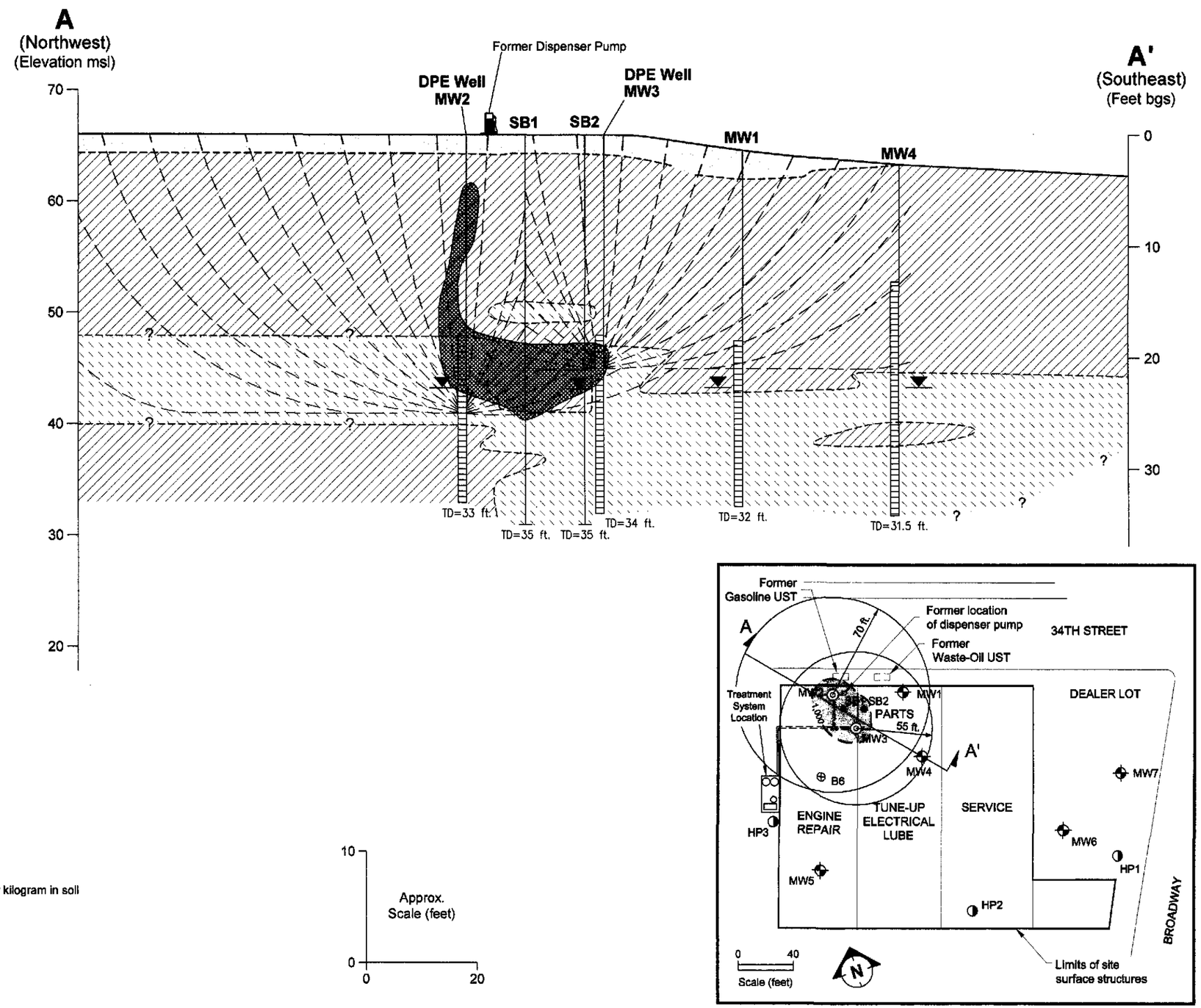
NOTE:
Historic analytical data reported in milligrams per kilogram (mg/kg).

FILENAME: CROSS-SECTIONS2004.DWG 10/05/04

ETIC ENGINEERING

CROSS SECTION A-A' SHOWING ANALYTICAL RESULTS
FORMER VAL STROUGH CHEVROLET
327 34TH STREET
OAKLAND, CALIFORNIA

FIGURE: 1



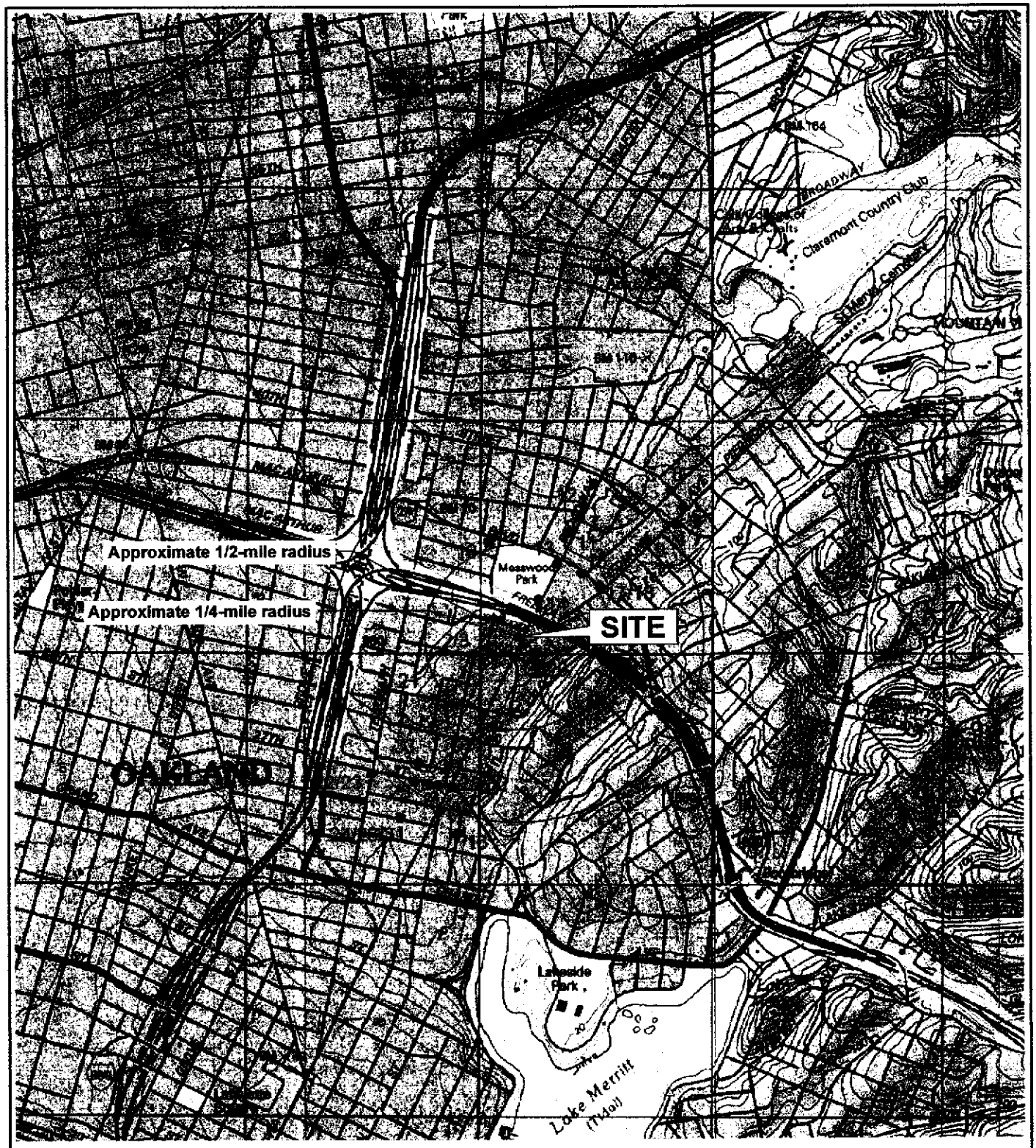
FILENAME: CROSS--SECTION092904.FWC 09/29/04

ETIC ENGINEERING

POTENTIAL VAPOR FLOW LINES IN THE RADIUS OF INFLUENCE
FORMER VAL STROUGH CHEVROLET
327 34TH STREET
OAKLAND, CALIFORNIA

FIGURE: **2**

Figures



N

0 2,000

Scale (feet)

ETIC ENGINEERING

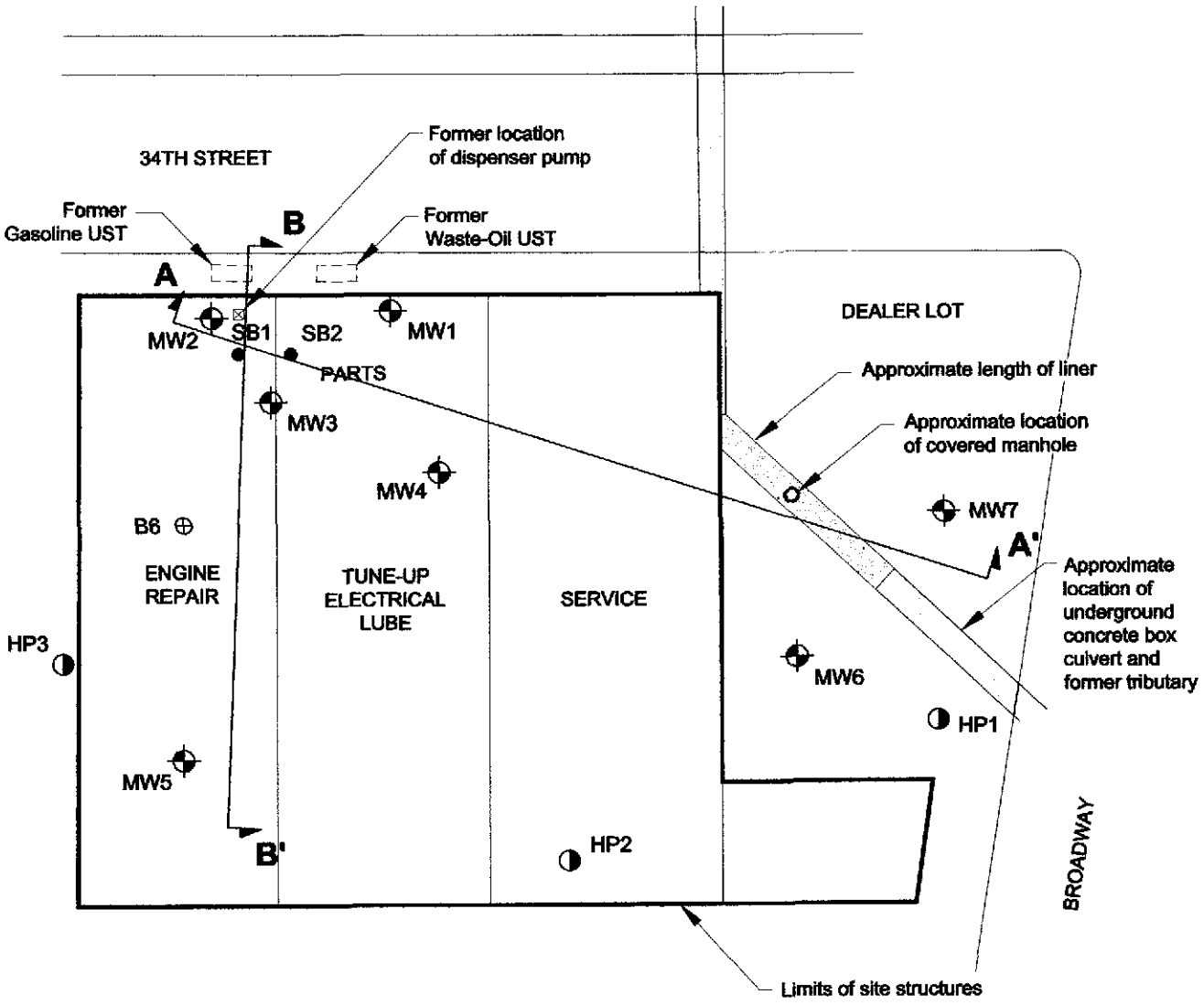
ACWD WELL SEARCH MAP
VAL STROUGH CHEVROLET
327 34TH STREET
OAKLAND, CALIFORNIA

FIGURE: 6

FILENAME: SITEPLAN.DWG 09/12/03

Appendix A

Background Documents



LEGEND:

- Groundwater monitoring well
- Boring location
- Soil boring
- Hydropunch
- Culvert liner
- Underground concrete box culvert
- Line of geologic cross section

N

0 25 50

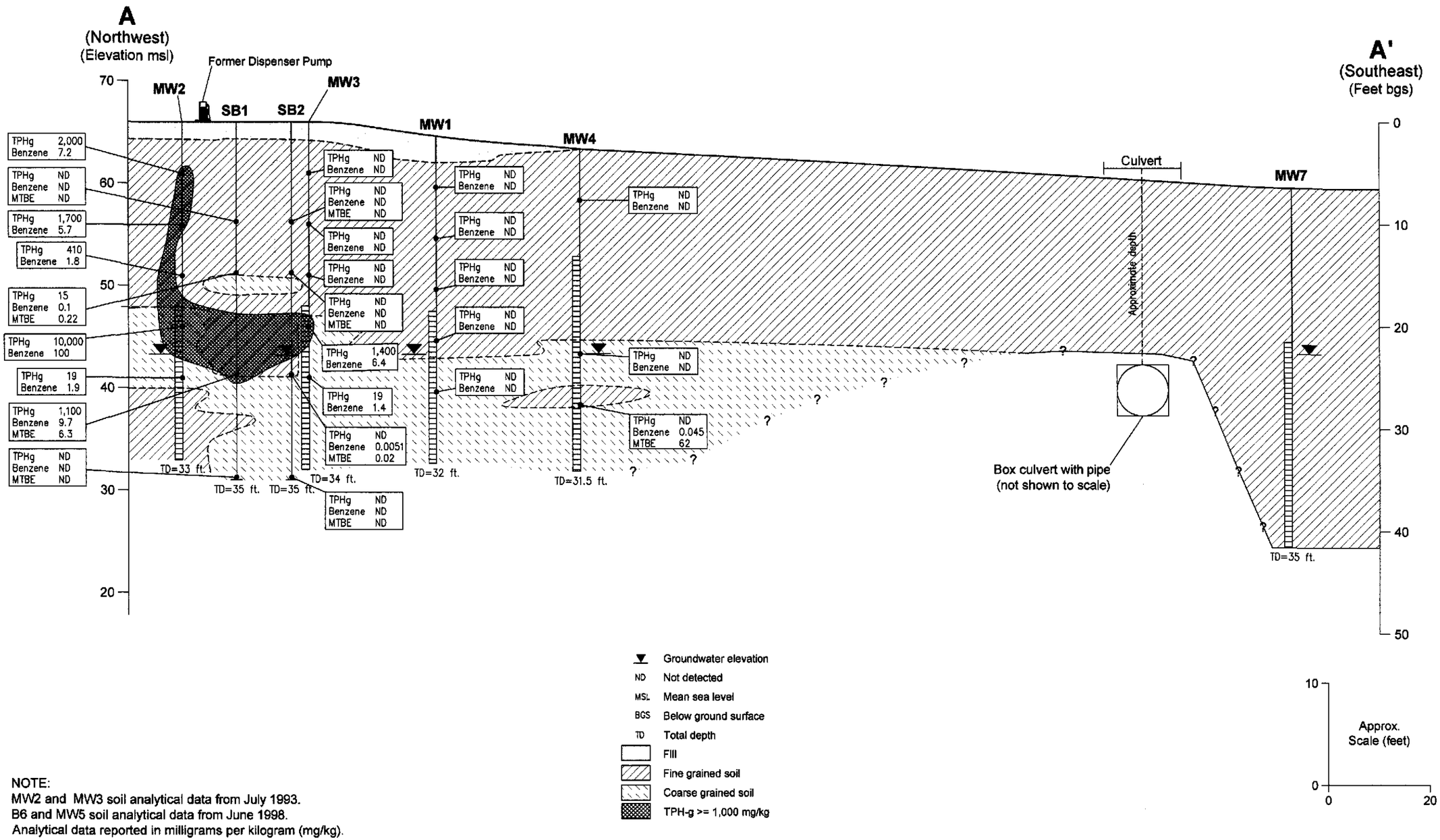
Scale (feet)

ETIC ENGINEERING

SITE PLAN
VAL STROUGH CHEVROLET
327 34TH STREET
OAKLAND, CALIFORNIA

FIGURE: **2**

FILENAME: SITEMAP0604.DWG 05/21/2004



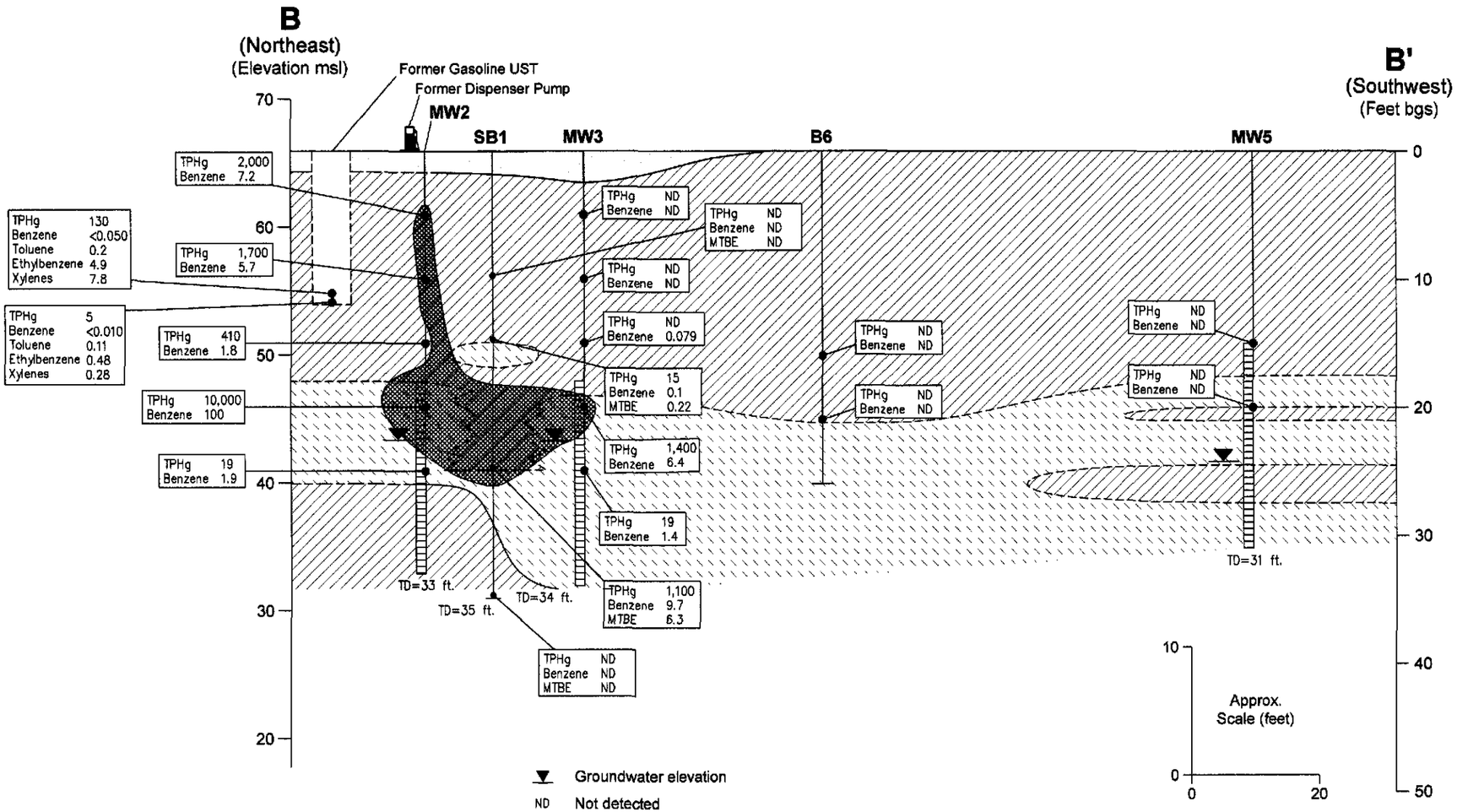
NOTE:
MW2 and MW3 soil analytical data from July 1993.
B6 and MW5 soil analytical data from June 1998.
Analytical data reported in milligrams per kilogram (mg/kg).

FILENAME: CROSS-SECTION050604.DWG 06/21/04

ETIC ENGINEERING

SCHEMATIC GEOLOGIC CROSS-SECTION A-A'
FORMER VAL STROUGH CHEVROLET
327 34TH STREET
OAKLAND, CALIFORNIA

FIGURE: **3**



▼ Groundwater elevation
ND Not detected
MSL Mean sea level
BGS Below ground surface
TD Total depth
Fill
Fine grained soil
Corase grained soil
TPH-g >= 1,000 mg/kg

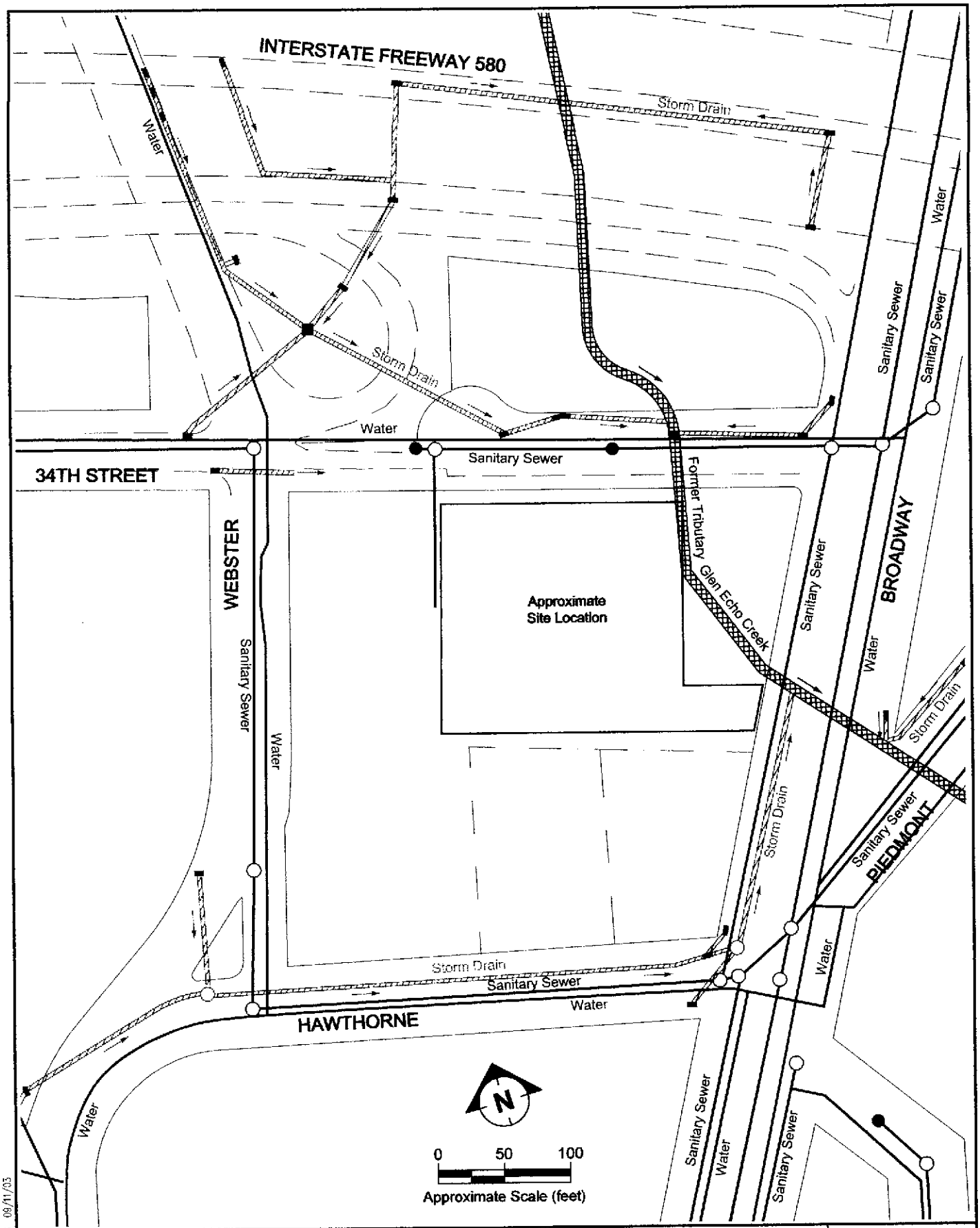
NOTE:
MW2 and MW3 soil analytical data from July 1993.
B6 and MW5 soil analytical data from June 1998.
Analytical data reported in milligrams per kilogram (mg/kg).

ETIC ENGINEERING

SCHEMATIC GEOLOGIC CROSS-SECTION B-B'
FORMER VAL STROUGH CHEVROLET
327 34TH STREET
OAKLAND, CALIFORNIA

FIGURE: **4**

FILENAME: CROSS-SECTIONS9604.DWG 06/21/04



ETIC ENGINEERING

SITE VICINITY PLAN SHOWING UTILITIES
STROUGH PROPERTY
327 34TH STREET
OAKLAND, CALIFORNIA

APPENDIX: **C**

FILENAME: VICINITY.DWG 09/11/03

TABLE 4 ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY WELL SEARCH DATA FOR STROUGH FAMILY TRUST 327-34TH STREET OAKLAND, CALIFORNIA

Map ID	Township and Range	Section	Address	City	Owner	Use
1	1S/4W	23K 1	731 W. MacArthur & West	Oakland	ARCO SVCE. STA. #4931	MONITORING
2	1S/4W	23R	3300 Webster St	Oakland	PAUL FABERMAN & CO	MONITORING
3	1S/4W	23R 7	350 Hawthorne Ave	Oakland	Summit Medical Center MW1	MONITORING
4	1S/4W	24L	14 Glen Ave.	Oakland	Erma Delluchi	MONITORING
5	1S/4W	24L 1	4082 Piedment Ave	Oakland	JOHN BOND	MONITORING
6	1S/4W	24L 7	3943 Broadway	Oakland	Unocal Corporation	IRRIGATION
7	1S/4W	24L13	3810 Broadway	Oakland	Friedkin - Becker MW-2	MONITORING
8	1S/4W	24L18	175 41 Street	Oakland	Piedmont Plaza MW-3	MONITORING
9	1S/4W	24L27	3900 Piedmont Ave	Oakland	Chevron Products Co	MONITORING
10	1S/4W	24M 1	411 W. MacArthur Blvd.	Oakland	Unocal Corporation	MONITORING
11	1S/4W	24M 5	3785 Broadway	Oakland	Firestone Tire & Rubber	MONITORING
12	1S/4W	24M 8	3810 Broadway	Oakland	Friedkin	MONITORING
13	1S/4W	24N 1	3701 Broadway	Oakland	Chevron, USA	MONITORING
14	1S/4W	24N 3	3505 Broadway	Oakland	Kaiser Foundation	MONITORING
15	1S/4W	24N 8	280 W. MacArthur Blvd.	Oakland	Kaiser Hospital	MONITORING
16	1S/4W	26H28	Valdez St & 26th St	Oakland	Broadway Motors Ford	MONITORING
17	1S/4W	24N24	240 W. MacArthur Blvd	Oakland		MONITORING
18	1S/4W	24P	230 MacArthur Blvd	Oakland	Shell Oil Company	MONITORING
19	1S/4W	25D	3093 Broadway	Oakland	Connell Oldsmobile	MONITORING
20	1S/4W	25D 6	3080 Broadway	Oakland	Gereld Shirar	MONITORING
21	1S/4W	26B 2	3045 Telegraph Av	Oakland		MONITORING
22	1S/4W	26G 1	2800 Telegraph Ave	Oakland	SHELL OIL COMPANY	MONITORING
23	1S/4W	26G16	2633 Telegraph Ave.	Oakland	Sears Roebuck & Co. MW1	MONITORING
24	1S/4W	26G21	477 25th St.	Oakland	United Glass MW-1	MONITORING
25	1S/4W	26G26	554 27th St	Oakland	Joan Schoonbrood	MONITORING
26	1S/4W	26G29	450 25th St	Oakland	Friction Materials, Inc	MONITORING
27	1S/4W	26H 6	2915 Broadway	Oakland	European Motors	MONITORING
28	1S/4W	26H10	2740 Broadway	Oakland	Vorelco, Inc.	MONITORING
29	1S/4W	26H12	294 27th St	Oakland	MR & RB Partnership MW-1	MONITORING
30	1S/4W	26H15	2630 Broadway	Oakland	Chevron Oil B-9 (MW-9)	MONITORING
31	1S/4W	26H19	434 25th St	Oakland	Andre Mercier	MONITORING
32	1S/4W	26H22	2735 Broadway	Oakland	Ravizza Comm. Real Estate	MONITORING
33	1S/4W	26H26	403 28th St	Oakland	Chrysler Realty Corporati	MONITORING

Table 3
Soil Analytical Data
Supplemental Investigation and Feasibility Evaluation of Proposed Remedial Action
Val Strough Chevrolet
327 34th Street
Oakland, California

Well Number	Date	Depth (feet)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH-g	TPH-d	TPH-mo	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB
SB1	12/18/2003	9.5-10	<0.005	<0.005	<0.005	<0.005	<1	<1	<50	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005
SB1	12/18/2003	14.5-15	**0.1**	**0.23**	**0.03**	**0.34**	**15**	**1.6**	<50	**0.096**	**0.22**	<0.010	<0.005	<0.005	<0.005	<0.005
SB1	12/18/2003	25-25.5	**9.7**	**130**	**52**	**360**	**1100**	**95**	<50	<25	**6.3**	<10	<5	<5	<5	<5
SB1	12/18/2003	34.5-35	<0.005	**0.01**	**0.0056**	**0.03**	<1	<1	<50	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005
SB2	12/18/2003	9.5-10	<0.005	<0.005	<0.005	<0.005	<1	**3.1**	<50	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005
SB2	12/18/2003	14.5-15	<0.005	<0.005	<0.005	<0.005	<1	**1.8**	<50	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005
SB2	12/18/2003	24.5-25	**0.0051**	<0.005	**0.019**	**0.021**	<1	**1.2**	<50	**0.011**	**0.02**	<0.010	<0.005	<0.005	<0.005	<0.005
SB2	12/18/2003	34.5-35	<0.005	<0.005	<0.005	<0.005	<1	**3.2**	<50	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005

Concentrations reported in milligrams per kilograms

TPH-g	Total Petroleum Hydrocarbons as gasoline.	TBA	t-butyl alcohol
TPH-d	Total Petroleum Hydrocarbons as diesel.	DIPE	di-isopropyl ether
TPH-mo	Total Petroleum Hydrocarbons as motor oil.	ETBE	ethyl t-butyl ether
MTBE	Methyl tertiary butyl ether.	TAME	t-amyl methyl ether
–	Not analyzed.	1,2-DCA	1,2-dicholorehtnane
		EDB	ethylene dibromide

Table 4
Hydropunch Groundwater Grab Sample-Analytical Data
Supplemental Investigation and Feasibility Evaluation of Proposed Remedial Action
Val Strough Chevrolet
327 34th Street
Oakland, California

Boring ID	Date	Depth (feet)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH-g		TPH-d	TPH-mo	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB
HP1	12/18/2003	26-30	<0.50	<0.50	<0.50	**11**	**410**	dp	**180**	<500	<50	**480**	<10	<0.50	<0.50	<0.50	<0.50
HP3	12/18/2003	32-36	<0.50	<0.50	<0.50	<1.0	<50		**75**	<500	<5.0	**0.55**	<1.0	<0.50	<0.50	**1.3**	<0.50

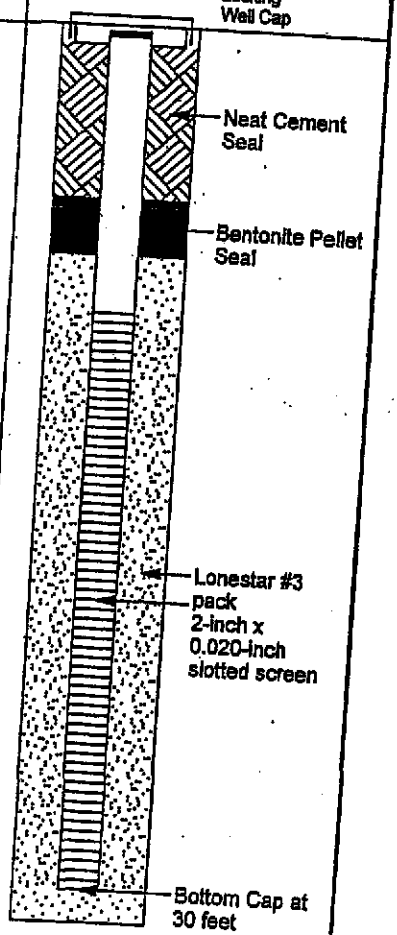
Concentrations reported in micrograms per liter

TPH-g	Total Petroleum Hydrocarbons as gasoline.
TPH-d	Total Petroleum Hydrocarbons as diesel.
TPH-mo	Total Petroleum Hydrocarbons as motor oil.
TBA	t-butyl alcohol
MTBE	Methyl tertiary butyl ether.
DIPE	di-isopropyl ether
ETBE	ethyl t-butyl ether
TAME	t-amyl methyl ether
1,2-DCA	1,2-dichloroethane
EDB	ethylene dibromide
<	less than the laboratory reporting limits
dp	Sample contains discrete peak in addition to gasoline

Project Name & Location: 327 34th Street, Oakland, California	Ground Surface Elevation:
	Top of Casing Elevation 96.60 feet
Drilling Coordinates: not surveyed	Elevation Datum: TOC of MW-3 = 100 feet
Drilling Company & Driller: BAEI, Jeff	Start: Date 7/17/00 Time 08:45 / Finish: Date 7/17/00 Time 12:30
Rig Type & Drilling Method: CME 75 / Hollow Stem Auger	Drilling Fluid: None / Hole Diameter: 8"
Sampler Type(s): A) California (2.5" O.D., 2.0" I.D.)	Logged By: ES / ▼ G.W.L. During Drilling ▼ Before developement on 7/20/00
Sampling Method(s): A) 140 lb automatically tripped hammer w/30" drop	Backfill Method: Well constructed / Date: 7/17/00

Depth (feet)	Sampler Type	Blows/6 inches or Pressure	Blows/12 inches	OVM (ppm)	Sample Interval	Graphic Log	SOIL DESCRIPTIONS GROUP NAME (GROUP SYMBOL) color, consistency/density, moisture condition, other descriptions (Local Name or Material Type)
0				13			ASPHALT 8 - INCHES THICK COBBLES UP TO 8 - INCHES IN DIMETER CLAYEY SAND WITH GRAVEL (SC) Dark brown, loose, moist, medium to coarse grain sand, with brick fragments (fill)
5	A	3 3 4	7	96			LEAN CLAY WITH SAND (CL) Dark brown, soft, moist CLAYEY SAND WITH GRAVEL (SC) Dark brown, loose, moist, medium to coarse grain sand, with brick fragments (fill)
10	A	1 2 4	6	13			LEAN CLAY WITH SAND (CL) Mottled brown and orange soft, moist, with brick fragments
15	A	3 4 4	8	0			CLAYEY SAND (SC) Mottled brown, loose, soft, moist
20	A	1 1 2	3	0			POORLY GRADED SILTY SAND (SM) Grayish green, loose, moist
25	A	3 5 8	13	0			LEAN CLAY WITH SAND (CL) Light brown, very soft, moist POORLY GRADED SAND WITH SILT(SP) Gray, loose, wet
30	A	8 11 28	39	0			WELL GRADED SAND WITH GRAVEL (SW) Orange, loose, wet, clay lens from 30.25 to 30.75 feet
35							Bottom of boring at 31.5 feet below ground surface.
40							

WELL CONSTRUCTION



LOG OF BORING 1039-008.GPJ GEO-ENV.GDT 12/7/00

SCI Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

327 34th Street
Oakland, California

JOB NUMBER 1039.008

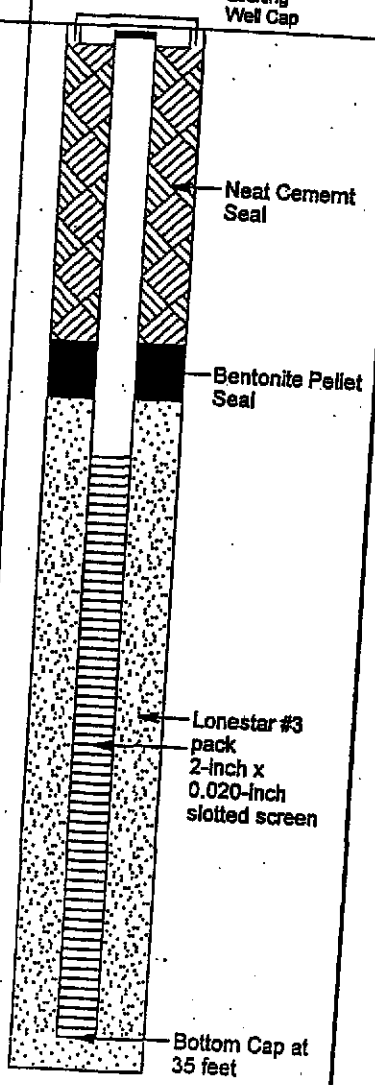
DATE 12/00

BORING MW-6

Project Name & Location: 327 34th Street, Oakland, California	Ground Surface Elevation:
	Top of Casing Elevation 96.60 feet
	Elevation Datum: TOC of MW-3 = 100 feet
Drilling Coordinates: not surveyed	Start: Date 7/17/00 Time 13:00 / Finish: Date 7/17/00 Time 15:00
Drilling Company & Driller: BAEI, Jeff	
Rig Type & Drilling Method: CME 75 / Hollow Stem Auger	Drilling Fluid: None / Hole Diameter: 8"
Sampler Type(s): A) California (2.5" O.D., 2.0" I.D.)	Logged By: ES
Sampling Method(s): A) 140 lb automatically tripped hammer w/30" drop	▽ G.W.L. During Drilling ▽ Before developement on 7/20/00
	Backfill Method: Well constructed / Date: 7/17/00

Depth (feet)	Sampler Type	Blows/6 inches or Pressure	Blows/12 inches	OVM (ppm)	Sample Interval	Graphic Log	SOIL DESCRIPTIONS GROUP NAME (GROUP SYMBOL) color, consistency/density, moisture condition, other descriptions (Local Name or Material Type)
0							ASPHALT 4 - INCHES THICK
5	A	12 12	20	0			CLAYEY SAND WITH GRAVEL (SC) Orange-brown, medium dense, moist, angular gravel, cobbles and chert
10	A	3 11	17	0			
15	A	5 11	18	0			
20	A	3 9	16	0			LEAN CLAY WITH SAND (CL) Mottled brown and green, soft, moist
25	A	4 11	18	0			SANDY CLAY (CL) Light brown, medium stiff, moist
30	A	4 10	18	0			LEAN CLAY (CL) Light brown, medium stiff, moist
35	A	9 13	21	0			Becomes stiff at 35 feet
40							Bottom of boring at 36.5 feet below ground surface.

WELL CONSTRUCTION



LOG OF BORING 1039-008.GPJ GEO-ENV.GDT 12/7/00

SCI Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

327 34th Street
Oakland, California

JOB NUMBER 1039.008

DATE 12/00

BORING MW-7