

APR 10 2001

TRANSMITTAL

TO: Ms. Eva Chu
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

DATE: April 2, 2001
PROJECT NUMBER: 224803T6
SUBJECT: Former Tosco 76 Service
Station 0843, 1629 Webster Street
Alameda, California

FROM: Paul Blank
TITLE: Assistant Project Manager


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COPIES	DATED	DESCRIPTION
1	April 2, 2001	Underground Utility Survey and Work Plan for Supplemental Evaluation of Soil and Groundwater

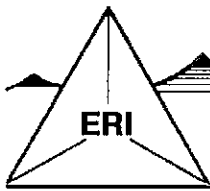
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REMARKS: At the request of Tosco Marketing Company (Tosco), Environmental Resolutions, Inc. (ERI) is submitting a copy of the above-referenced document. Please call with any questions or comments.


Paul D. Blank, Assistant Project Manager

cc: Mr. Dave DeWitt, Tosco Marketing Company
Ms. Jolanta Uchman, California Regional Water Quality Control Board - San Francisco Bay Region
ERI Project File 224803T6



ENVIRONMENTAL RESOLUTIONS, INC.

April 2, 2001
ERI 224803.W03

Mr. Dave DeWitt
Tosco Marketing Company
2000 Crow Canyon Place, Suite 400
San Ramon, California 94583

Subject: Underground Utility Survey and Work Plan for Supplemental Evaluation of Soil and Groundwater, Former Tosco 76 Service Station 0843, 1629 Webster Street, Alameda, California.

Mr. DeWitt:

At the request of Tosco Marketing Company (Tosco), Environmental Resolutions, Inc. (ERI) performed an underground utility survey for the subject site. The purpose of the survey was to identify and locate underground utility lines and vaults that may provide potential preferential pathways for groundwater flow. The results of the survey were used to design a supplemental evaluation of soil and groundwater and are presented in this document. This document also includes a work plan for supplemental evaluation of soil and groundwater. Tosco requested that ERI prepare this Work Plan to evaluate whether underground utility trenches in the vicinity of the site may potentially provide preferential pathways for groundwater flow and off-site migration of dissolved petroleum hydrocarbons.

The scope of work for the investigation includes:

- Obtaining a drilling permit from the Alameda County Public Works Agency (the County);
- Obtaining an encroachment permit from the City of Alameda Public Works Department (the City);
- Obtaining an encroachment permit from the California Department of Transportation (Caltrans);
- Coordinating the proposed field work in conjunction with quarterly groundwater monitoring and sampling of existing groundwater monitoring wells;
- Advancing seven off-site soil borings (GP1 through GP7);
- Collecting soil samples from the borings for field screening and potential laboratory analyses;
- Collecting reconnaissance groundwater samples from borings GP1 through GP7;
- Abandoning the borings;
- Submitting the reconnaissance groundwater samples and, if applicable, select soil samples for laboratory analysis of gasoline constituents;
- Interpreting the data; and,
- Preparing a report documenting the procedures and results of the investigation.

BACKGROUND

The site is located on the southwestern corner of Webster Street and Pacific Avenue in Alameda, California, as shown on the Site Vicinity Map (Plate 1). The locations of former underground storage tanks (USTs), former dispenser islands, existing groundwater monitoring wells and other selected site features are shown on the Generalized Site Plan (Plate 2). Properties in the vicinity of the site are occupied by residential and commercial developments.

Previous work performed at the site has included:

- Removal of two 10,000-gallon, single-walled steel gasoline USTs, one 550-gallon, single-walled steel used-oil UST, product lines, and dispensers; and installation of a conductor casing within the former UST cavity backfill (ERI, September 15, 1998);
- Installation of four on-site groundwater monitoring wells MW1 through MW4 (ERI, April 29, 1999);
- Installation of two off-site groundwater monitoring wells MW5 and MW6 (ERI, March 7, 2000; and quarterly groundwater monitoring and sampling.

Based on laboratory analysis results of soil samples collected during previous environmental investigations, residual hydrocarbons in soil appear to be delineated at the site. Laboratory analyses of groundwater samples collected during quarterly groundwater monitoring and sampling continue to detect dissolved hydrocarbons beneath and in the vicinity of the site. Cumulative groundwater monitoring and sampling data are provided in Attachment A.

UNDERGROUND UTILITY SURVEY

Procedures

ERI obtained maps of underground gas, electric, water, sanitary sewer, and storm sewer lines from Pacific Gas & Electric Company (PG&E), Alameda Power & Telecom (AP&T), East Bay Municipal Utility District (EBMUD), and the City for the intersection of Pacific Avenue and Webster Street in Alameda, California. ERI also obtained available information regarding utility line depth, trend, and trench backfill type from PG&E, AP&T, EBMUD, and the City. Using this information, ERI evaluated the potential connection between underground utility trenches, groundwater flow, and migration of dissolved petroleum hydrocarbons in the vicinity of the site.

Results

The underground utility survey revealed buried gas, electric, water, sanitary sewer, and storm sewer lines in the vicinity of the site. The locations, typical depths, and typical backfill materials of the utilities are shown on Plate 2. The depth to groundwater in monitoring wells at the site has fluctuated between approximately 4 and 8 feet below ground surface (bgs) since March 1999. ~~Based on the groundwater depths and the depth of the utility lines, the trench backfill for the buried sanitary sewer, storm sewer and water lines may constitute potential preferential pathways for groundwater flow and migration of dissolved petroleum hydrocarbons during periods when the water table beneath the site is sufficiently high.~~

PROPOSED WORK

The purpose of this investigation is to evaluate whether the underground utility trenches in the vicinity of the site may potentially provide preferential pathways for groundwater flow and off-site migration of dissolved petroleum hydrocarbons. In addition, ERI will evaluate the extent of residual gasoline hydrocarbons in soil. The specific tasks are summarized below. ERI will perform field work in general accordance with this Work Plan, and in accordance with ERI's Field Protocol (Attachment B) and a site-specific Health and Safety Plan. ERI will perform the following tasks:

- Prepare permit application(s) and obtain drilling permit(s) from the County to advance eight off-site soil borings.
- Prepare permit application(s) and obtain encroachment permit(s) from the City to perform work in the City's Webster Street and Pacific Avenue rights-of-way.
- Prepare a permit application and obtain an encroachment permit from Caltrans to perform work in the Caltrans Webster Street right-of-way.
- Coordinate with Tosco and Gettler-Ryan, Inc. (GRI), and schedule the proposed field work in conjunction with quarterly groundwater monitoring and sampling of the existing groundwater monitoring wells at the site.
- Obtain the services of a licensed well driller and observe the driller advance off-site borings GP1 through GP7 utilizing direct-push technology. The borings will be advanced to approximately 2 feet below first-encountered groundwater. ERI anticipates groundwater to be encountered at approximately 4 to 8 feet bgs. The proposed boring locations and the utilities identified as potential preferential groundwater pathways are shown on Plate 3. The boring locations were selected based on cumulative groundwater monitoring and sampling data and the results of the underground utility survey to evaluate groundwater conditions in the downgradient direction of groundwater flow from the site (northeast) and the potential connection between underground utility trenches, groundwater flow, and migration of dissolved petroleum hydrocarbons.
- Collect soil samples from the borings for field screening for volatile organic compounds (VOCs) with a photoionization detector (PID), and potential laboratory analyses to evaluate the extent of residual gasoline hydrocarbons in vadose soil.
- Collect reconnaissance groundwater samples from borings GP1 through GP7 using a GeoProbe®, Hydropunch® or similar discrete groundwater sampling device for laboratory analyses to evaluate the potential connection between groundwater conditions and underground utility trenches in the vicinity of the site.
- Abandon the borings by grouting to ground surface with a neat cement.
- Submit the reconnaissance groundwater samples and select soil samples (if required based on field observations) collected from borings GP1 through GP7, to a California state-certified analytical laboratory for analysis of total petroleum hydrocarbons as gasoline (TPH_g) using Environmental

Protection Agency (EPA) Method 8015M, and benzene, toluene, ethylbenzene, total xylenes (BTEX), and methyl tertiary butyl ether (MTBE) using EPA Method 8020. Samples with detected concentrations of MTBE using EPA Method 8020 will also be analyzed for MTBE using EPA Method 8260. *and other ether oxygenates*

- Interpret field and laboratory data.
- Prepare a report documenting the procedures and results of the investigation.

Excess soil and rinsate water generated during direct-push sampling activities will be placed in storage drums, properly labeled, and temporarily stored on-site pending characterization and disposal by Tosco.

SCHEDULE OF OPERATIONS

ERI is prepared to implement this proposed work upon regulatory approval of this Work Plan and obtaining the appropriate encroachment and well installation permits.

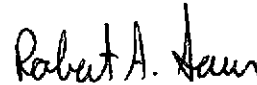
ERI recommends copies of this Work Plan be forwarded to:

Ms. Eva Chu
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Ms. Jolanta Uchman
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

Please call Mr. Paul Blank, ERI's project manager for the site, at (415) 382-5988, with any questions regarding this Work Plan.

Sincerely,
Environmental Resolutions, Inc.



Robert A. Saur
Staff Geologist



John B. Bobbitt
R.G. 4313

Attachments: References

- Plate 1: Site Vicinity Map
- Plate 2: Generalized Site Plan
- Plate 3: Proposed Boring Locations and Potential Preferential Groundwater Pathways

- Attachment A: Cumulative Groundwater Monitoring and Sampling Data (GRI, October 10, 2000).
- Attachment B: Field Protocol

REFERENCES

Environmental Resolutions, Inc. September 15, 1998. Underground Storage Tank, Associated Piping, and Dispenser Removal at Former Tosco 76 Service Station 0843, 1629 Webster Street, Alameda, California. ERI 224832.R01

Environmental Resolutions, Inc. April 28, 1999. Evaluation of Soil and Groundwater at Former Tosco 76 Service Station 0843, 1629 Webster Street, Alameda, California. ERI 224803.R01

Environmental Resolutions, Inc. March 7, 2000. Supplemental Evaluation of Groundwater at Former Tosco 76 Service Station 0843, 1629 Webster Street, Alameda, California. ERI 224803.R02

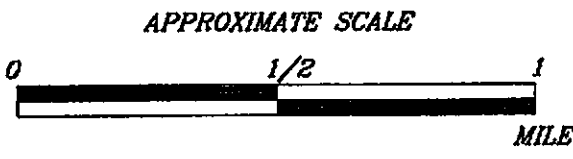
Gettler-Ryan, Inc. October 10, 2000. Third Quarter 2000 Groundwater Monitoring and Sampling Report, Former Tosco 76 Service Station 0843, 1629 Webster Street, Alameda, California. G-R Job #180203.

United States Geological Survey (USGS). 1980. 7.5-Minute Topographic Quadrangle Map, Oakland West, California.



FN 22480001

Source: U.S.G.S. 7.5 minute topographic quadrangle map Oakland West, California (Photorevised 1980)



PROJECT ERI 2248

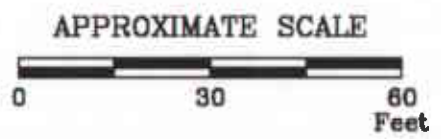
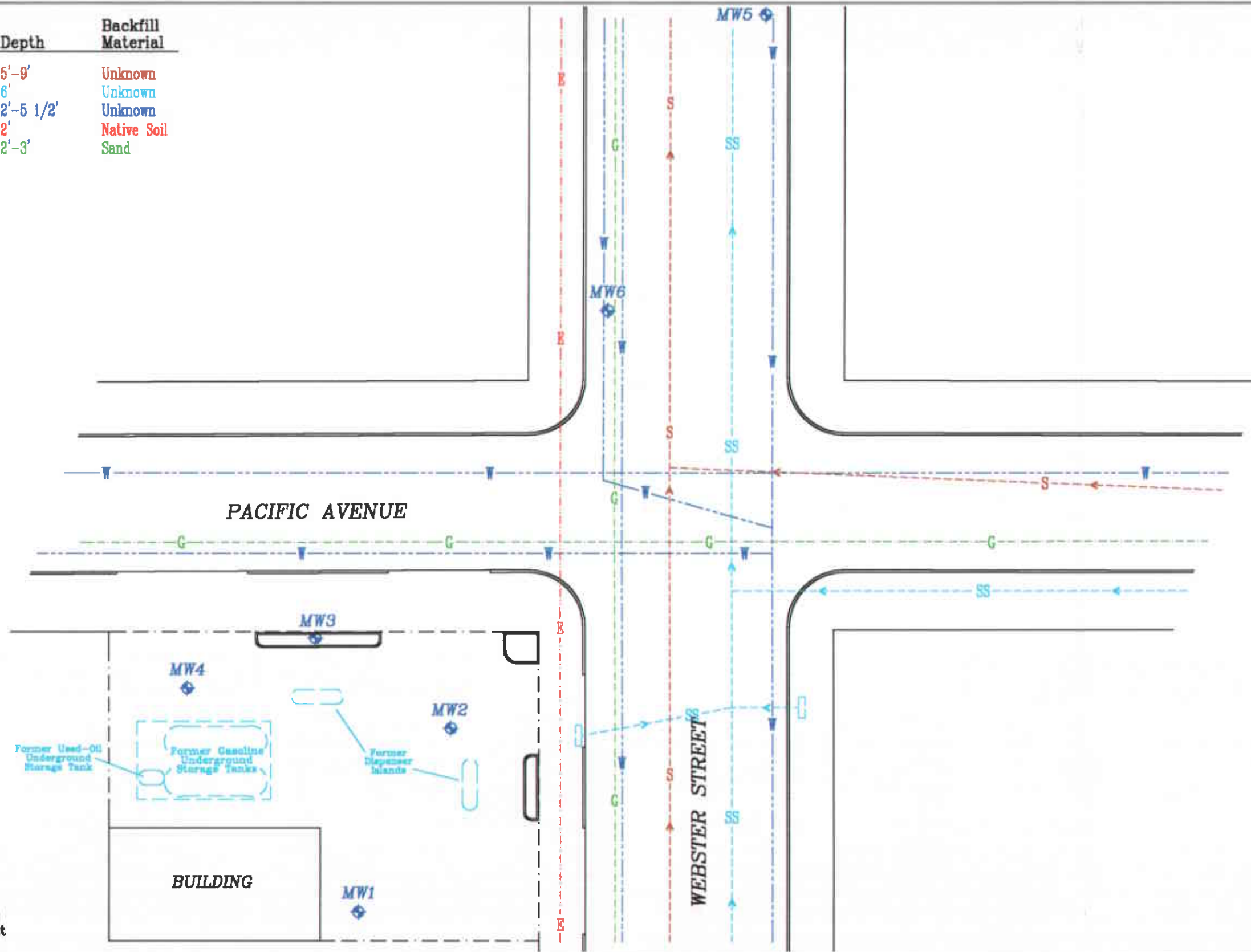
SITE VICINITY MAP

FORMER TOSCO 76 SERVICE STATION 0843
1629 Webster Street
Alameda, California

PLATE

1

Symbol	Utility	Depth	Backfill Material
---S---	Sanitary Sewer	5'-9'	Unknown
---SS---	Storm Sewer	6'	Unknown
---W---	Water	2'-5 1/2'	Unknown
---E---	Electricity	2'	Native Soil
---G---	Gas	2'-3'	Sand



Source: Modified from a map provided by Morrow Surveying

FN: 2248003A



GENERALIZED SITE PLAN

Former Tosco 76 Service Station 0843
1629 Webster Street
Alameda, California

EXPLANATION

MW6
Groundwater Monitoring Well

PROJECT NO.

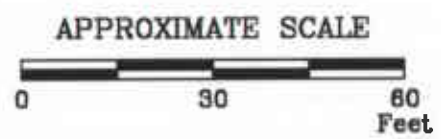
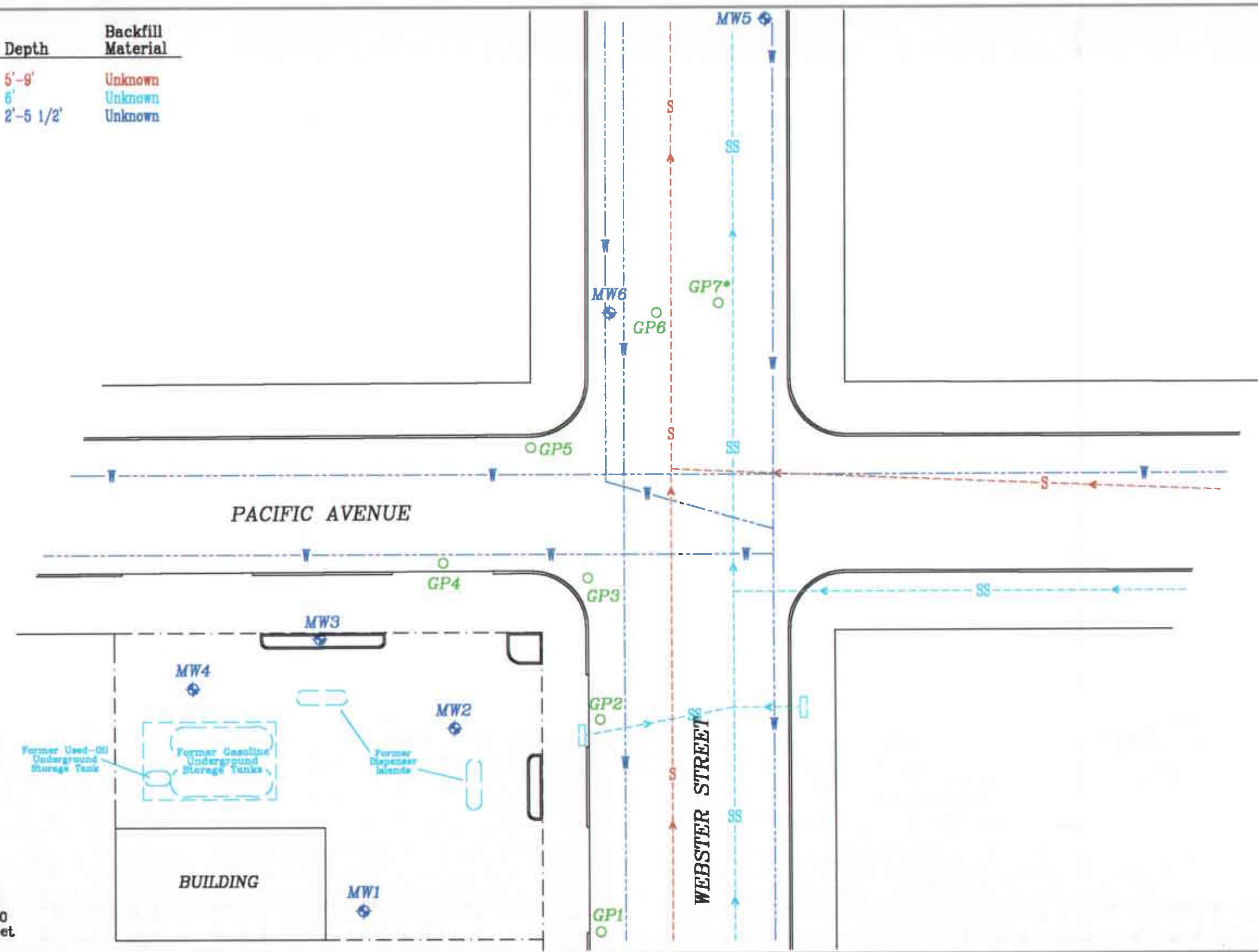
2248

PLATE

2

February 28, 2001

Symbol	Utility	Depth	Backfill Material
---S---	Sanitary Sewer	5'-9'	Unknown
---SS---	Storm Sewer	6'	Unknown
---W---	Water	2'-5 1/2'	Unknown



Source: Modified from a map provided by Morrow Surveying

FN: 2248003A



PROPOSED BORING LOCATIONS AND POTENTIAL PREFERENTIAL GROUNDWATER PATHWAYS

Former Tosco 76 Service Station 0843
1629 Webster Street
Alameda, California

EXPLANATION

- MW6** Groundwater Monitoring Well
- GP7** Proposed Direct-Push Soil Boring
- Drilling at this location will be performed on a contingency basis, based on field observations.

PROJECT NO.

2248

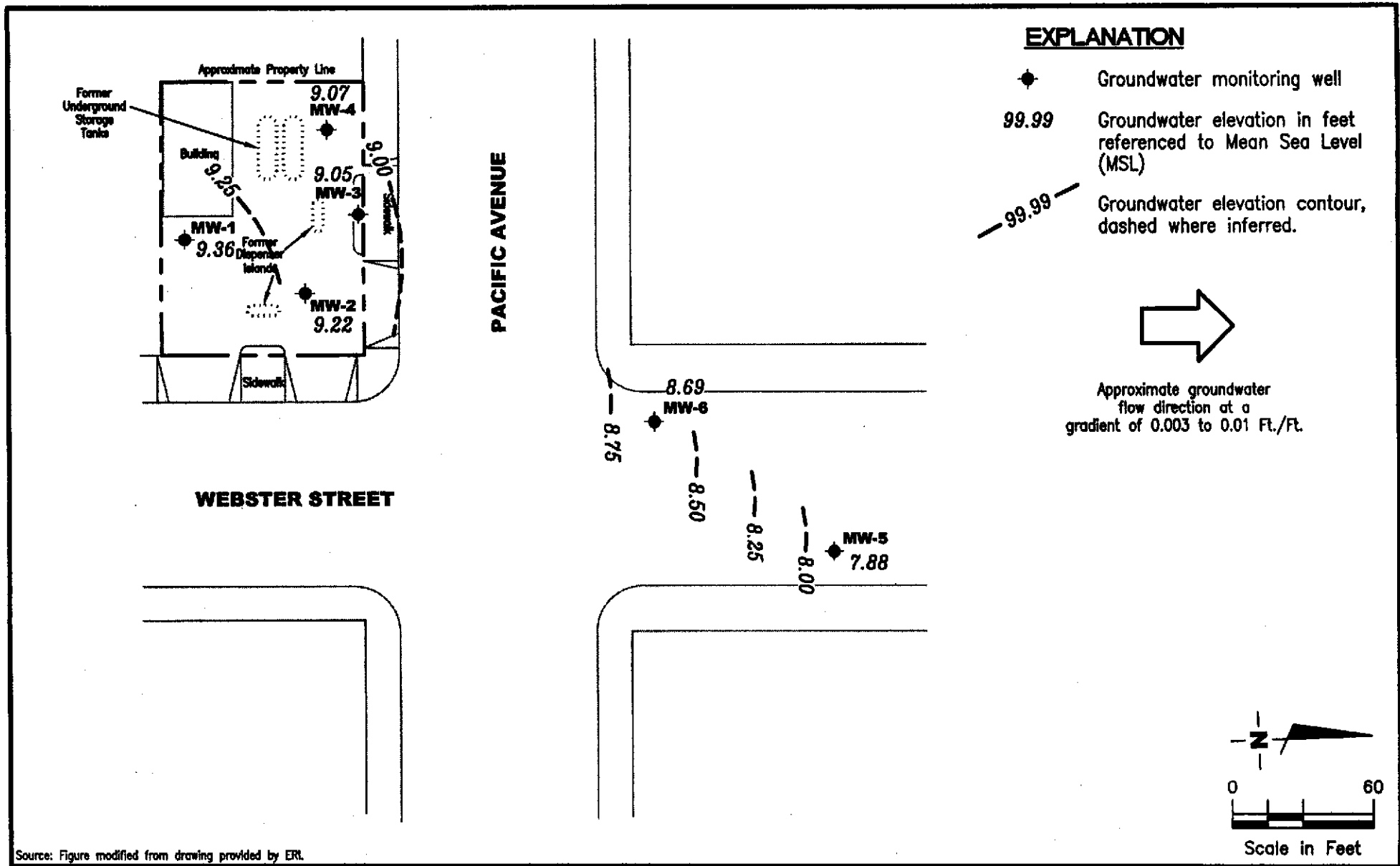
PLATE

3

February 28, 2001

ATTACHMENT A

**CUMULATIVE GROUNDWATER MONITORING AND SAMPLING
DATA (GRI, OCTOBER 10, 2000)**



Gettler - Ryan Inc.

6747 Sierra Ct., Suite J
Dublin, CA 94568 (925) 551-7555

POTENTIOMETRIC MAP
Former Tosco 76 Service Station #0843
1629 Webster Street
Alameda, California

FIGURE

1

PROJECT NUMBER
180203

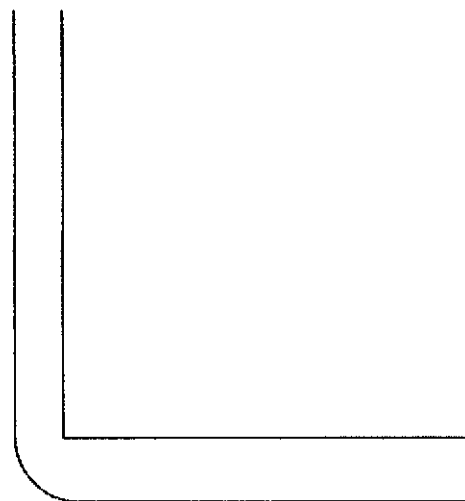
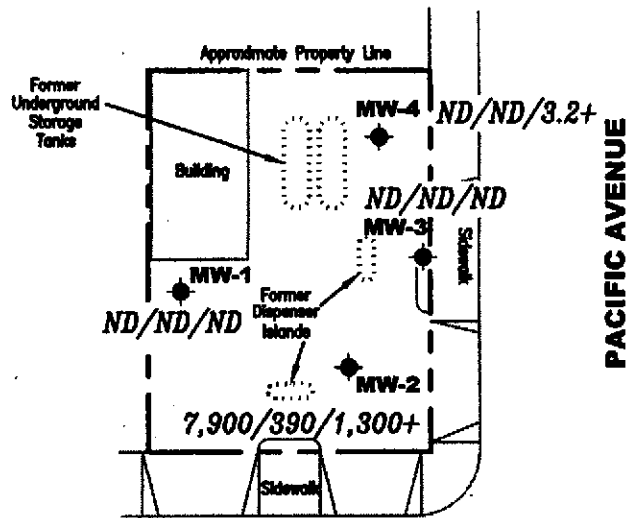
REVIEWED BY

DATE
August 29, 2000

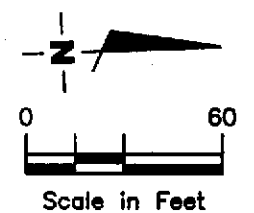
REVISED DATE

EXPLANATION

- ◆ Groundwater monitoring well
- A/B/C TPH(G) (Total Petroleum Hydrocarbons as Gasoline)/ Benzene/MTBE concentrations in ppb
- ND Not Detected
- + MTBE by EPA Method 8260



MW-5 ND/ND/ND



Source: Figure modified from drawing provided by ERI.



Gettler - Ryan Inc.

6747 Sierra Ct., Suite J
Dublin, CA 94568 (925) 551-7555

CONCENTRATION MAP
Former Tosco 76 Service Station #0843
1629 Webster Street
Alameda, California

FIGURE

2

PROJECT NUMBER
180203

REVIEWED BY

DATE
August 29, 2000

REVISED DATE

Table 1
Groundwater Monitoring Data and Analytical Results
Former Tosco 76 Service Station #0843
1629 Webster Street
Alameda, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (msl)	TPH(G) (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
MW-1									
16.18	03/05/99 ¹	--	--	86.6 ³	ND	2.04	ND	4.06	23.9 ²
	06/03/99	6.24	9.94	ND	ND	ND	ND	ND	ND/ND ²
	09/02/99	7.19	8.99	ND	ND	ND	ND	ND	ND/ND ²
	12/14/99	8.07	8.11	ND	ND	ND	ND	ND	ND
	03/14/00	5.47	10.71	ND	ND	ND	ND	ND	ND
	05/31/00	6.22	9.96	ND	ND	ND	ND	ND	ND
	08/29/00	6.82	9.36	ND	ND	ND	ND	ND	ND
MW-2									
15.57	03/05/99 ¹	--	--	34,400	2,070	7,710	2,340	8,240	8,460 ²
	06/03/99	5.96	9.61	51,200 ⁴	1,820	7,570	2,510	7,320	6,460/8,800 ²
	09/02/99	6.85	8.72	17,000 ⁵	1,000	3,100	1,400	3,700	4,000/3,720 ²
	12/14/99	7.65	7.92	83,000 ⁵	3,000	22,000	4,500	17,000	9,100/11,000 ²
	03/14/00	5.26	10.31	31,000 ⁵	1,600	4,600	2,300	7,300	5,700/8,700 ²
	05/31/00	5.60	9.97	9,970 ⁵	598	1,030	487	2,060	2,500/1,670 ²
	08/29/00	6.35	9.22	7,900 ⁵	390	1,500	280	1,900	1,800/1,300 ²
MW-3									
15.11	03/05/99 ¹	--	--	135 ³	ND	ND	ND	4.84	2.46 ²
	06/03/99	5.57	9.54	ND	ND	ND	ND	ND	5.23/12.7 ²
	09/02/99	6.50	8.61	ND	ND	ND	ND	ND	13/11.0 ²
	12/14/99	7.28	7.83	ND	ND	ND	ND	ND	ND
	03/14/00	4.87	10.24	ND	ND	ND	ND	ND	7.2/6.3 ²
	05/31/00	5.58	9.53	ND	ND	ND	ND	ND	ND
	08/29/00	6.06	9.05	ND	ND	ND	ND	ND	ND

Table 1
Groundwater Monitoring Data and Analytical Results
Former Tosco 76 Service Station #0843
1629 Webster Street
Alameda, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (msl)	TPH(G) (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
MW-4									
15.17	03/05/99 ¹	--	--	ND	ND	ND	ND	2.44	25.2 ²
	06/03/99	5.45	9.72	ND	ND	ND	ND	ND	ND/3.96 ²
	09/02/99	6.48	8.69	ND	ND	ND	ND	ND	23/27.0 ²
	12/14/99	7.27	7.90	ND	ND	ND	ND	ND	200/270 ²
	03/14/00	4.67	10.50	ND	ND	ND	ND	ND	46/49 ²
	05/31/00	5.48	9.69	ND	ND	ND	ND	ND	ND
	08/29/00	6.10	9.07	ND	ND	ND	ND	ND	6.1/3.2 ²
MW-5									
13.34	12/14/99	6.45	6.89	ND	ND	ND	ND	ND	3.5/3.8 ²
	03/14/00	4.46	8.88	ND	ND	ND	ND	ND	ND
	05/31/00	5.18	8.16	ND	ND	ND	ND	ND	ND
	08/29/00	5.46	7.88	ND	ND	ND	ND	ND	ND
MW-6									
14.08	12/14/99	6.64	7.44	ND	ND	ND	ND	ND	11,000/18,000 ²
	03/14/00	4.72	9.36	ND ⁷	ND ⁷	ND ⁷	ND ⁷	ND ⁷	19,000/21,000 ^{2,6}
	05/31/00	5.28	8.80	ND ⁷	ND ⁷	ND ⁷	ND ⁷	ND ⁷	13,200
	08/29/00	5.39	8.69	ND	ND	ND	ND	ND	270/400 ²

Table 1
Groundwater Monitoring Data and Analytical Results
 Former Tosco 76 Service Station #0843
 1629 Webster Street
 Alameda, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (msl)	TPH(G) (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
Trip Blank									
TB-LB	03/05/99 ¹	--	--	ND	ND	ND	ND	ND	ND ²
	06/03/99	--	--	ND	ND	ND	ND	ND	ND
	09/02/99	--	--	ND	ND	ND	ND	ND	ND
	12/14/99	--	--	ND	ND	ND	ND	ND	ND
	03/14/00	--	--	ND	ND	ND	ND	ND	ND
	05/31/00	--	--	ND	ND	ND	ND	ND	ND
	08/29/00	--	--	ND	ND	ND	ND	ND	ND

Table 1
Groundwater Monitoring Data and Analytical Results
Former Tosco 76 Service Station #0843
1629 Webster Street
Alameda, California

EXPLANATIONS:

Groundwater monitoring data and laboratory analytical results prior to June 3, 1999, were compiled from reports prepared by ERI, Inc.

TOC = Top of Casing

DTW = Depth to Water

(ft.) = Feet

GWE = Groundwater Elevation

msl = Mean sea level

TPH(G) = Total Petroleum Hydrocarbons as Gasoline

B = Benzene

T = Toluene

E = Ethylbenzene

X = Xylenes

MTBE = Methyl tertiary butyl ether

ppb = Parts per billion

ND = Not Detected

-- = Not Measured/Not Analyzed

* TOC elevations are based on USC&GS Benchmark WEB PAC - 1947 - R 1951; (Elevation = 14.054 feet).

¹ Benzene, toluene, ethylbenzene and total xylenes by EPA Method 8260A.

² MTBE by EPA Method 8260.

³ Laboratory report indicates weathered gasoline C6-C12.

⁴ Laboratory report indicates chromatogram pattern C6-C12.

⁵ Laboratory report indicates gasoline C6-C12.

⁶ Laboratory report indicates sample was analyzed 03/28/00 but required reanalysis at a dilution. The dilution was analyzed outside of the EPA recommended holding time.

⁷ Detection limit raised. Refer to analytical reports.

Table 2
Groundwater Analytical Results - Oxygenate Compounds
Former Tosco 76 Service Station #0843
1629 Webster Street
Alameda, California

WELL ID	DATE	ETHANOL (ppb)	TBA (ppb)	MTBE (ppb)	DIPE (ppb)	ETBE (ppb)	TAME (ppb)	1,2-DCA (ppb)	EDB (ppb)
MW-1	09/02/99	ND	ND	ND	ND	ND	ND	--	--
MW-2	09/02/99	ND ¹	ND ¹	3,720	ND ¹	ND ¹	ND ¹	--	--
	12/14/99	ND ¹	ND ¹	11,000	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
	03/14/00	ND ¹	1,300	8,700	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
	05/31/00	ND ¹	ND ¹	1,670	ND ¹	ND ¹	ND ¹	ND ¹	ND ¹
	08/29/00	ND	250	1,300	ND	ND	ND	ND	ND
MW-3	09/02/99	ND	ND	11.0	ND	ND	ND	--	--
	03/14/00	--	--	6.3	--	--	--	--	--
MW-4	09/02/99	ND	ND	27.0	ND	ND	ND	--	--
	12/14/99	--	--	270	--	--	--	--	--
	03/14/00	--	--	49	--	--	--	--	--
	08/29/00	--	--	3.2	--	--	--	--	--
MW-5	12/14/99	--	--	3.8	--	--	--	--	--
MW-6	12/14/99	--	--	18,000	--	--	--	--	--
	03/14/00	--	--	21,000 ²	--	--	--	--	--
	08/29/00	--	--	400	--	--	--	--	--

Table 2
Groundwater Analytical Results - Oxygenate Compounds
Former Tosco 76 Service Station #0843
1629 Webster Street
Alameda, California

EXPLANATIONS:

TBA = Tertiary butyl alcohol
MTBE = Methyl tertiary butyl ether
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
1,2-DCA = 1,2-Dichloroethane
EDB = 1,2-Dibromoethane
ppb = Parts per billion
-- = Not Analyzed
ND = Not Detected

ANALYTICAL METHOD:

EPA Method 8260 for Oxygenate Compounds

¹ Detection limit raised. Refer to analytical reports.

² Laboratory report indicates sample was analyzed 03/28/00 but required reanalysis at a dilution. The dilution was analyzed outside of the EPA recommended holding time.

ATTACHMENT B

FIELD PROTOCOL

FIELD PROTOCOL

Site Safety Plan

Field work is performed by ERI personnel in accordance with a site safety plan (SSP) developed for the site. The SSP describes the basic safety requirements for the subsurface investigation and the drilling of soil borings at the work site. The SSP is applicable to personnel and subcontractors of ERI. Personnel at the site are informed of the contents of the SSP before work begins. A copy of the SSP is kept at the work site and is available for reference by appropriate parties during the work. The ERI geologist acts as the Site Safety Officer.

Soil Borings and Soil Sampling

Prior to drilling of borings, ERI acquires the necessary permits from the appropriate agency(ies). ERI contacts Underground Service Alert (USA) before drilling to help locate public utility lines at the site. ERI observes the driller clear boring locations to a depth of approximately 4 feet before drilling to reduce the risk of damaging underground structures.

Soil borings are drilled with a B-57 (or similar) drill rig equipped with hollow-stem augers. Auger flights and sampling equipment are steam-cleaned before use to minimize the possibility of crosshole contamination. The rinsate is containerized and stored on site. ERI coordinates the appropriate disposal or recycling of the rinsate with Tosco.

Drilling is performed under the observation of a field geologist, and the earth materials in the borings are identified using visual and manual methods, and classified as drilling progresses using the Unified Soil Classification System. Soil borings are advanced until groundwater is encountered, until refusal, or until the maximum extent of the drill rig is reached.

During drilling, soil samples are collected at 5-foot intervals, obvious changes in lithology, and just above the groundwater surface. Samples are collected with a California-modified, split-spoon sampler equipped with laboratory-cleaned brass sleeves. Samples are collected by advancing the auger to a point just above the sampling depth and driving the sampler into the soil. The sampler is driven 18 inches with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows required to drive the sampler each successive 6-inch interval is counted and recorded to give an indication of soil consistency.

Soil samples are monitored with a photoionization device (PID), which measures hydrocarbon concentrations in the ambient air or headspace above the soil sample. Field instruments such as the PID are useful for indicating relative levels of hydrocarbon vapors, but do not detect concentrations of hydrocarbons with the same precision as laboratory analyses. Soil samples selected for possible chemical analysis are sealed promptly with Teflon® tape and plastic caps. The samples are labeled and placed in iced storage for transport to the laboratory. Chain of Custody records are initiated by the geologist in the field, updated throughout handling of the samples, and sent with the samples to the laboratory. Copies of these records are included in the final report.

Cuttings generated during drilling are placed on plastic sheeting, covered, and left at the site. ERI coordinates the appropriate disposal or recycling of the cuttings with Tosco.

Reconnaissance Groundwater Sampling

ERI observes the driller push the Hydropunch® (or similar temporary discrete groundwater sampling well point) approximately 2 to 3 feet below the groundwater surface using a Geoprobe® (or similar direct-push rig). The point is then opened exposing a well screen to the formation. ERI collects a discrete groundwater sample for laboratory analysis using a stainless steel bailer cleaned with a laboratory-grade detergent and deionized water. Groundwater is transferred slowly from the bailer to laboratory-cleaned, 1-liter amber bottles and 40-milliliter glass volatile organic analysis vials (VOAs) for analyses by the laboratory. The VOAs contain hydrochloric acid as a preservative. The sampler checks to see if headspace is present. If headspace is present, the sampler collects more samples until none is present. Chain of Custody records are initiated in the field by the sampler, updated throughout handling of the samples, and sent along with the samples to the laboratory. Copies of these records are included in our final report.

Quality Assurance/Quality Control

The sampling and analysis procedures employed by ERI for groundwater sampling follow regulatory guidance documents for quality assurance/quality control (QA/QC). Quality control is maintained by site-specific field protocols and quality control checks performed by the laboratory. Laboratory and field handling of samples may be monitored by including QC samples for analysis. QC samples may include any combination of the following. The number and types of QC samples are selected and analyzed on a project-specific basis.

Trip Blanks – Trip blanks are prepared with organic-free water by the laboratory, and accompany sampling equipment to the project site. They are not opened. Trip blanks travel with the groundwater samples (collected from the project site) to the laboratory and verify that concentrations of analyzed chemical constituents are not being introduced into the samples during transportation.

Bailer Blanks – Bailer blanks are prepared at the project site immediately prior to sample collection using a new disposable bailer or a cleaned stainless steel bailer, and organic-free water. Bailer blanks accompany the groundwater samples (collected from the project site) to the laboratory and verify that concentrations of analyzed chemical constituents are not being introduced into the samples by the sampling equipment and/or methods used in the field.