ExxonMobil
Refining & Supply Company
Global Remediation
4096 Piedmont Avenue #194
Oakland, California 94611
510 547 8196
510 547.8706 FAX
jennifer.c.sedlachek@exxonmobil.com

Jennifer C. Sedlachek
Project Manager

ExxonMobil
Refining & Supply

October 27, 2006

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway
Alameda, California 94502

Subject: Fuel Leak Investigation Site No. RO0002635
Former Exxon RAS #7-4121, 10605 Foothill Boulevard, Oakland, California

Dear Mr. Chan:

Attached for your review and comment is a copy of the *Additional Risk Assessment and Well Installation Work Plan* dated October 2006 for the above-referenced site. The work plan, prepared by ETIC Engineering, Inc. of Pleasant Hill, California, is submitted based on the conclusions of the *Subsurface Investigation and Risk Assessment Report* prepared by ETIC Engineering, Inc. dated July 2006 and in response to correspondence from the Alameda County Health Care Services Agency dated September 25, 2006.

Upon information and belief, I declare, under penalty of perjury, that the information contained in the attached report is true and correct.

If you have any questions or comments, please contact me at 510.547.8196.

Sincerely,

Jennifer C. Sedlachek
Project Manager

Attachment: ETIC Additional Risk Assessment and Well Installation Work Plan dated October 2006

c: w/ attachment:
Mr. Ken Phares - MacArthur Boulevard Associates, Oakland, California
Mr. Peter McIntyre - AEI Consultants

c: w/o attachment:
Ms. Christa Marting - ETIC Engineering, Inc.

Additional Risk Assessment and Well Installation Work Plan

Former Exxon Retail Site 7-4121
10605 Foothill Boulevard
Oakland, California

Prepared for

ExxonMobil Oil Corporation
4096 Piedmont Avenue #194
Oakland, California 94611

Prepared by

ETIC Engineering, Inc.
2285 Morello Avenue
Pleasant Hill, California 94523
(925) 602-4710

K. Erik Appel, P.G. #8092
Project Manager

10/27/2006
Date

PROFESSIONAL GEOLOGIST
BRYAN CAMPBELL
No. 7724
Exp 2/09/08
STATE OF CALIFORNIA

Bryan Campbell, P.G. #7724
Senior Geologist

10/27/06
Date

October 2006

SITE CONTACTS

Site Name:	Former Exxon Retail Site 7-4121
Site Address:	10605 Foothill Boulevard Oakland, California
ExxonMobil Project Manager:	Jennifer C. Sedlachek ExxonMobil Refining and Supply Company 4096 Piedmont Avenue #194 Oakland, California 94611 (510) 547-8196
Consultant to ExxonMobil:	ETIC Engineering, Inc. 2285 Morello Avenue Pleasant Hill, California 94523 (925) 602-4710
ETIC Project Manager:	Erik Appel
Regulatory Oversight:	Barney Chan Alameda County Health Care Services Agency Environmental Health Services 1131 Harbor Bay Parkway Alameda, California 94502 (510) 567-6765

INTRODUCTION

At the request of ExxonMobil Oil Corporation (ExxonMobil), ETIC Engineering, Inc. (ETIC) has prepared this work plan for additional risk assessment and well installations for former Exxon Retail Site (RS) 7-4121, located at 10605 Foothill Boulevard, Oakland, California (Figures 1 through 3).

This work plan is submitted to address the conclusions of the Subsurface Investigation and Risk Assessment Report prepared by ETIC Engineering, Inc. dated July 2006 (ETIC 2006). Additional soil vapor sample collection is proposed based on the results of the human health risk assessment presented in the report. Samples will be collected from the soil vapor wells installed near the locations of borings V2, V4, V5, and V8 at approximately 5 feet below ground surface (bgs). Previous attempts to collect vapor samples using direct-push technology were unsuccessful at these locations. The results will be used to more accurately assess the potential risks to onsite and offsite occupants.

This work plan is also submitted in response to correspondence from the Alameda County Health Care Services Agency (ACHCSA) dated 25 September 2006. In the letter, the ACHCSA concurred with the collection of additional soil vapor samples. The ACHCSA also requested the onsite and offsite delineation of impacts which would include monitoring current groundwater conditions. In addition, the ACHCSA requested that onsite remediation alternatives be considered for the site and for the former underground storage tank (UST) excavation in particular. A copy of the correspondence is included in Appendix A.

This work plan outlines a proposed scope of work for the additional risk assessment which includes the collection of soil vapor samples following the installation of soil vapor wells. This work plan also outlines a proposed scope of work for the installation of groundwater monitoring wells to better define the onsite and offsite extent of hydrocarbon concentrations.

In addition, the preparation of a corrective action plan (CAP) is proposed. The CAP will include an evaluation of multiple remedial alternatives in order to address the site conditions and especially to address the hydrocarbon concentrations at the location of the former UST excavation.

SITE BACKGROUND

Former Exxon RS 7-4121 is currently a small landscaped area located at 10605 Foothill Boulevard, Oakland, California, on the south corner of the intersection of Foothill Boulevard and 106th Avenue (Figure 2). The site lies at an elevation of approximately 85 feet above mean sea level (msl). The property is currently owned by MacArthur Boulevard Associates and has a shopping center and a residential area nearby. According to internal Exxon Company, U.S.A. correspondence, the USTs were removed from the site between 20 October 1981 and 15 June 1982. Site physical features and soil boring locations are presented on Figure 2. An aerial photograph of the site and vicinity is presented on Figure 3.

According to the property owner, a commercial retail structure is currently proposed for the north corner of the site. The remainder of the site will consist of paved areas.

SITE GEOLOGY AND HYDROGEOLOGY

The geology and hydrogeology of the site have been evaluated using the boring logs from previous site investigations and information obtained from reports for nearby sites. The majority of the native soils encountered during investigations for the site generally consist of silty to sandy clay with some clayey silt from ground surface to between 17 and 19 feet bgs. The clay is underlain by a layer of silty to clayey sand approximately 4 feet thick, which is underlain by sand and gravelly sand to 25 feet bgs, the total depth explored. The site lies at an elevation of approximately 85 feet above msl.

Generally, depth to groundwater at the site is first encountered between approximately 18 and 20.5 feet bgs and stabilizes between approximately 11 and 15 feet bgs. Information obtained for nearby sites indicates groundwater flow directions to the southwest and south with hydraulic gradients between 0.005 and 0.17 foot/foot (ETIC 2006).

SUMMARY OF INVESTIGATION ACTIVITIES AND REMEDIAL MEASURES

In December 1998, AEI performed a geophysical survey using magnetometry and ground-penetrating radar to ascertain the presence of USTs at the site (AEI 2004). No underground anomalies indicative of remaining USTs were identified (AEI 2004). Also, an ACHCSA letter dated 22 March 2005 indicated that the UST system was removed from the site prior to December 1998.

Previous subsurface investigations have been conducted in March 2004 (AEI 2004), May 2005 (ETIC 2005), and May 2006 (ETIC 2006). During each investigation, soil and groundwater samples were collected. Additionally, during the investigation in May 2006, soil vapor samples were collected from direct-push borings as part of a risk assessment. An analysis of the results of the risk assessment indicated that additional soil vapor samples should be collected to complete the risk assessment.

Analytical results of soil, groundwater, and soil vapor sampling are presented in Figures 4 through 6, respectively. A full discussion of the site history is presented in the Subsurface Investigation and Risk Assessment Report dated July 2006 (ETIC 2006).

PROPOSED SCOPE OF WORK – WELL INSTALLATIONS

ETIC proposes to install groundwater monitoring wells to further investigate soil and groundwater conditions onsite and offsite and to determine a site-specific groundwater gradient and magnitude. Any applicable permits or access will be obtained prior to the performance of this work. The proposed well locations are shown in Figure 7.

ETIC proposes to conduct the following activities:

- Four soil borings (MW1-MW4) will be advanced at the proposed locations shown in Figure 7. The boring locations were chosen to investigate the lateral extent of concentrations of hydrocarbons in groundwater. The locations may need to be modified based on property access, utilities, vehicles, traffic requirements, or other obstacles that may be encountered.

The borings will be drilled with a truck-mounted rotary drill rig using hollow-stem, continuous-flight augers.

- Soil samples from the borings will be collected continuously to the total depth of the borings. Selected soil samples will be retained for laboratory analysis based on significant lithologic changes and/or photoionization detector measurements.

- The borings will be completed as 2-inch-diameter groundwater monitoring wells. The wells will be screened with 0.010-inch slotted screen from approximately 10 to 25 feet bgs in the first water-bearing zone. Generally, depth to groundwater at the site is first encountered between approximately 18 and 20.5 feet bgs and stabilizes between approximately 11 and 15 feet bgs. The actual depth of the screened intervals will be dependent upon conditions encountered in the field. A proposed well construction diagram is shown in Figure 8.

- The boring and well installations will be completed in accordance with the drilling and well installation and sampling protocols described in Appendix B, and in accordance with local regulations.

- The wells will be developed and groundwater samples collected as described in Appendix B.

- All soil and groundwater samples will be preserved, stored in an ice-filled cooler, and delivered under chain of custody to a laboratory certified by the California Department of Health Services.

- The elevation of the top of each well casing will be surveyed relative to an established datum. Survey protocols are included in Appendix B.

- The new wells will be monitored and sampled as part of a quarterly groundwater monitoring program for the site.

Selected soil samples will be analyzed for:

- Total Petroleum Hydrocarbons as gasoline (TPH-g) and Total Petroleum Hydrocarbons as diesel (TPH-d) by EPA Method 8015B.
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021B.
- MTBE, tertiary butyl alcohol (TBA), diisopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), 1,2-dibromoethane (EDB), and 1,2-dichloroethane (1,2-DCA) by EPA Method 8260B.

The groundwater samples will be analyzed for:

- TPH-g and TPH-d by EPA Method 8015B.
- BTEX by EPA Method 8021B.
- MTBE, TBA, DIPE, ETBE, TAME, EDB, and 1,2-DCA by EPA Method 8260B.

PROPOSED SCOPE OF WORK – RISK ASSESSMENT

Based on the results of the human health risk assessment presented in the Subsurface Investigation and Risk Assessment Report dated July 2006, collection of additional soil vapor samples is proposed. These vapor samples are in addition to those collected as part of the investigation in May 2006 (ETIC 2006). Samples will be collected from the soil vapor wells installed near the locations of borings V2, V4, V5, and V8 at approximately 5 feet bgs. Previous attempts to collect vapor samples using direct-push technology were unsuccessful at these locations.

The following work will be conducted and data collected to more accurately assess the potential risk to onsite and offsite occupants. The risk assessment will include an analysis of the potential direct and indirect exposure pathways and will include a comparison of concentrations of chemicals of concern to relevant environmental screening levels adopted by the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB 2005). Any applicable permits or access will be obtained prior to the performance of this work.

An advisory published by the Department of Toxic Substances Control and the California Regional Water Quality Control Board, Los Angeles Region (DTSC/LARWQCB) will be used as a guideline for the collection of the soil vapor samples proposed below (DTSC/LARWQCB 2003).

ETIC proposes to conduct the following activities:

- Soil vapor samples will be collected from a total of five locations (VW1 through VW5) (Figure 7) which will be advanced using a hand auger. The proposed boring locations were selected based on the historical hydrocarbon concentrations beneath the site, the assumed groundwater flow direction, and the location of proposed onsite structures and existing offsite structures. Drilling and sample collection methods are described in Appendix B.

- One soil sample will be collected from each location at approximately 5 to 5.5 feet bgs and one at approximately 5.5 to 6 feet bgs. The soil samples will be screened in the field with an organic vapor analyzer and logged. The samples will be submitted for laboratory analysis.

- The borings will be completed as vapor wells for collection of shallow soil vapor samples from 5 to 6 feet bgs. A proposed well construction design is shown in Figure 9.

- Soil vapor samples will be collected in a 1-liter Summa canister and will be analyzed by a state-certified laboratory. Sample collection methods are described in Appendix B.

- If a sample cannot be collected from the well due to "low-flow" or "no-flow" conditions, often caused by the presence of clayey soils, then concentrations in the previously described soil samples will be used in lieu of soil vapor samples for the purpose of the risk assessment per the DTSC/LARWQCB guidelines (DTSC/LARWQCB 2003).

The soil samples collected at approximately 5 to 5.5 feet bgs will be analyzed for:

- Moisture content by D2216.
- Porosity by ASTM D854.

The soil samples collected at approximately 5.5 to 6 feet bgs will be analyzed for:

- TPH-g and TPH-d by EPA Method 8015B.
- BTEX by EPA Method 8021B.
- MTBE, TBA, DIPE, ETBE, TAME, EDB, and 1,2-DCA by EPA Method 8260B.

The soil vapor samples will be analyzed for:

- TPH-g by EPA Method TO-3M.
- BTEX by EPA Method TO-15.
- MTBE, TBA, DIPE, ETBE, TAME, EDB, and 1,2-DCA by EPA Method TO-15.
- Oxygen, carbon dioxide, and methane by ASTM D1946.
- 1,1-Difluoroethane (as a tracer) by EPA Method TO-15.

SCHEDULE AND REPORTING

Completion of the field work for the risk assessment and well installations is contingent upon approval of this work plan by the ACHCSA and upon receipt of approved permits. The report for the investigations and the results of the evaluation will be submitted within 90 days after completion of the field work. ETIC will keep the ACHCSA informed of the status of the investigation. The CAP will be submitted following the submittal of the report for the investigations.

Additionally, in the event that the work scope must be altered significantly due to access issues and/or other unexpected issues, ETIC will notify ACHCSA personnel prior to implementing those changes to the work scope.

REFERENCES

AEI (AEI Consultants). 2004. Phase II Subsurface Investigation Report, Project No. 8311, 10605 Foothill Boulevard, Oakland, California. AEI, Walnut Creek, California. 7 April.

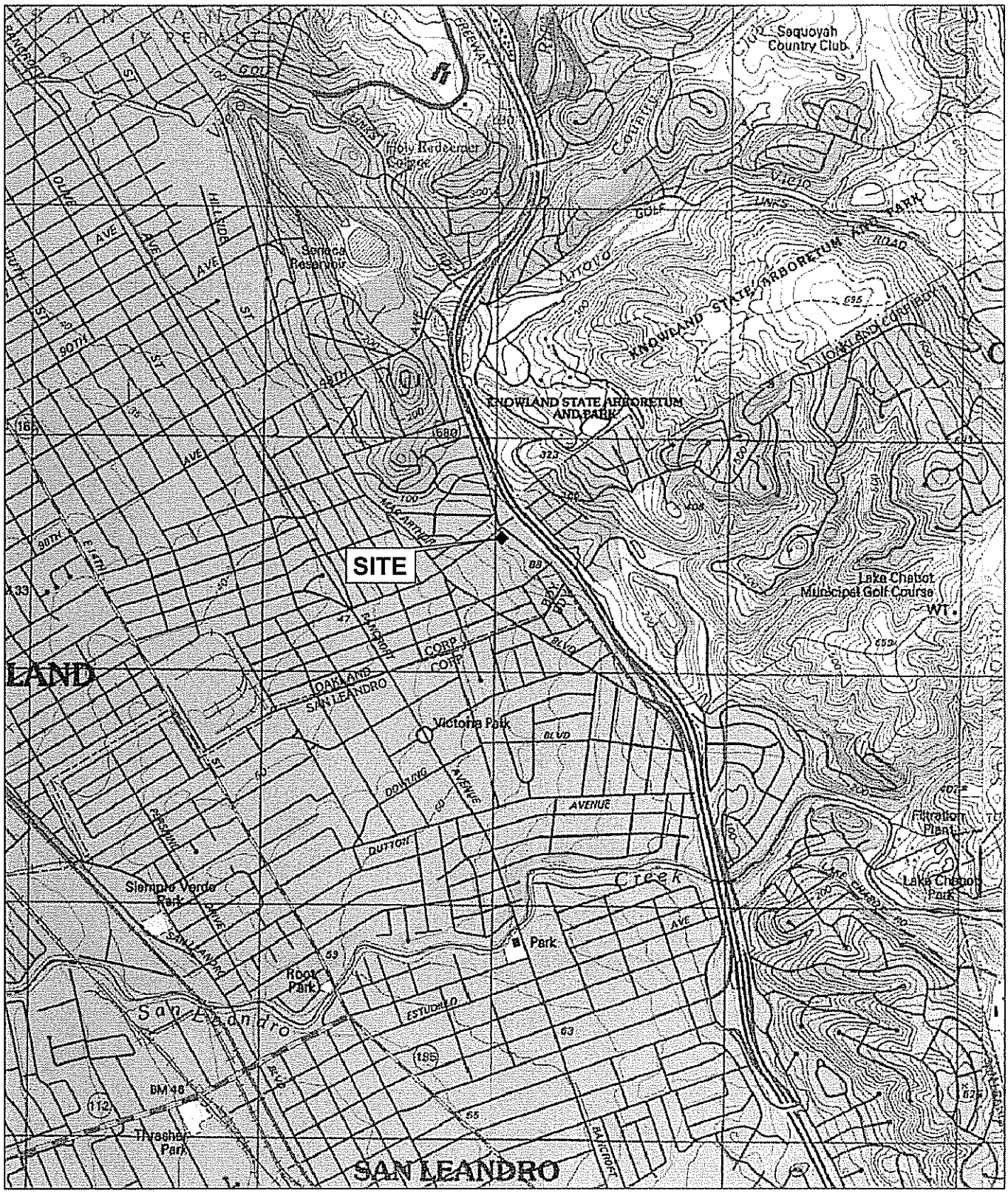
DTSC/LARWQCB (Department of Toxic Substances Control and California Regional Water Quality Control Board – Los Angeles Region). 2003. Advisory – Active Soil Gas Investigations. DTSC and LARWQCB, Glendale and Los Angeles, California. 28 January.

ETIC (ETIC Engineering, Inc.). 2005. Subsurface Investigation Report, Former Exxon Retail Site 7-4121, 10605 Foothill Boulevard, Oakland, California. ETIC, Pleasant Hill, California. July.

ETIC (ETIC Engineering, Inc.). 2006. Subsurface Investigation and Risk Assessment Report, Former Exxon Retail Site 7-4121, 10605 Foothill Boulevard, Oakland, California. ETIC, Pleasant Hill, California. July.

RWQCB (California Regional Water Quality Control Board – San Francisco Bay Region). 2005. Screening for Environmental Concerns At Sites With Contaminated Soil and Groundwater. RWQCB, Oakland, California. February.

Figures



SOURCE: USGS Topographic Map

0 2000

Scale (feet)

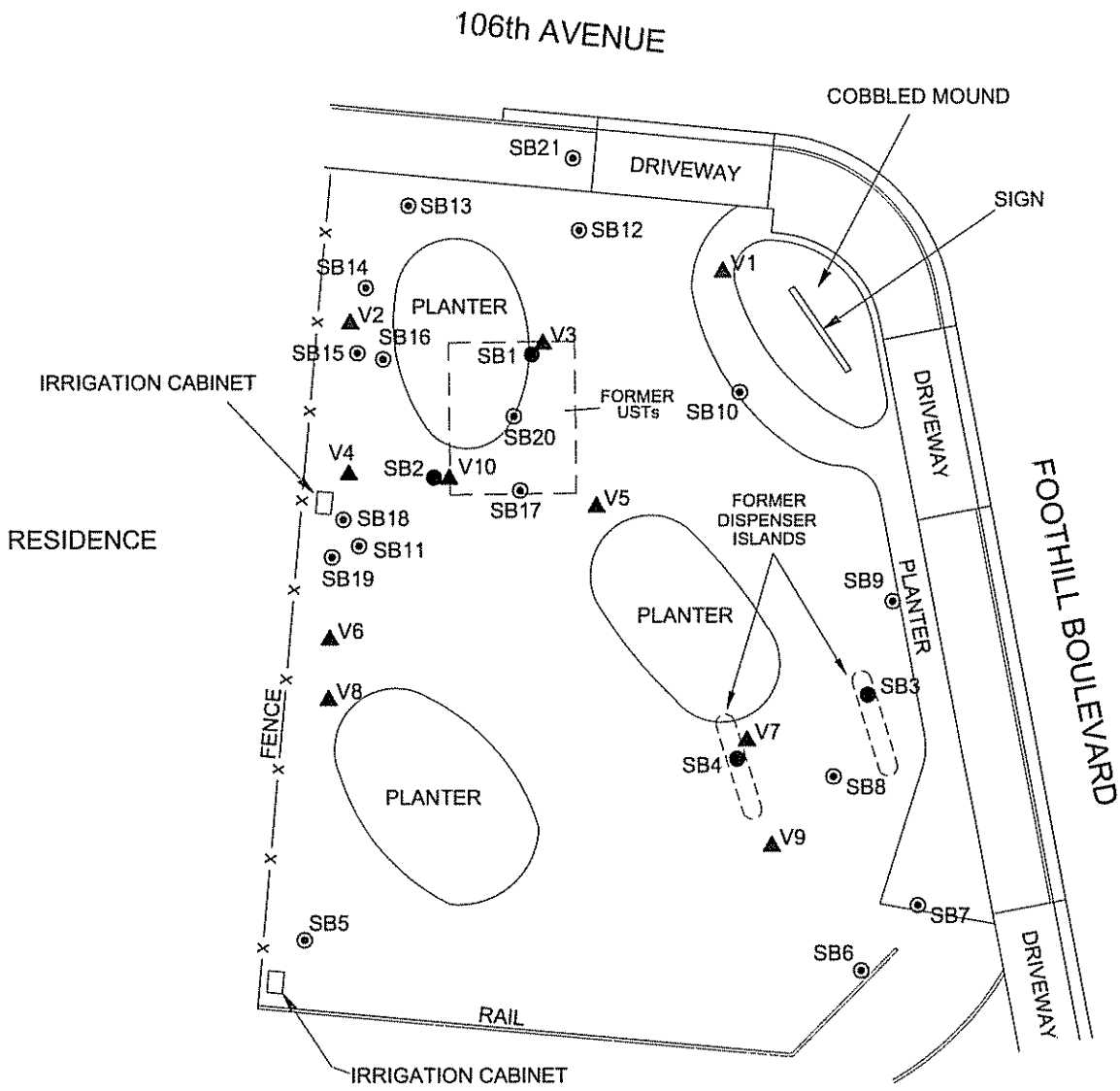
N

ETIC ENGINEERING

SITE LOCATION AND TOPOGRAPHIC MAP
FORMER EXXON RS 7-4121
10605 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

FIGURE: 1

FILENAME: TOPO0405.DWG 04/15/05



LEGEND

- ● Soil Boring (Installed by AEI 3/19/04)
- ⊙ Direct Push Soil Boring (Installed by ETIC)
- ▲ Soil Vapor Probe

Basemap Source: Morrow Surveying, 2006

N

0 30

Scale (feet)

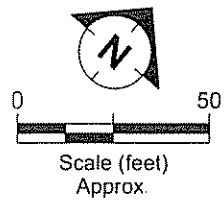
FILENAME: site0606.DWG 05/20/06

ETIC ENGINEERING

SITE PLAN
FORMER EXXON RS 7-4121
10605 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

FIGURE: **2**

Photo Source: Terraserver USA



ETIC ENGINEERING

AERIAL PHOTOGRAPH OF SITE AND VICINITY
FORMER EXXON RS 7-4121
10605 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

FIGURE: 3

FILENAME: SITE0705.DWG 07/13/05

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/02/06	5-5 5	<0 001	<0 1	14	<0 005
05/02/06	10-10 5	<0 001	<0 1	5.2	<0 005
05/02/06	15-15 5	<0 001	<0 1	4.2	<0 005
05/02/06	20-20 5	0 120	14	9.3	<0 005
05/02/06	24.5-25	<0.001	<0.1	<1.0	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/27/05	5-5 5	<0 001	<5 02	<9 92	<0 002
05/27/05	18 5-19	<0 001	<5 05	<9 92	<0 002
05/27/05	24.5-25	0.0011	<4.95	<9.92	<0.002

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
03/19/04	11	0.55	1.000	590	<0.25

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/02/06	8-8 5	<0 001	<0 1	1 4	<0 005
05/02/06	13-13 5	<0 001	<0 1	<1 0	<0 005
05/02/06	18-18 5	<0 001	<0 1	1.7	0.0088
05/02/06	19 5-20	<0 001	<1	2 4	0.012
05/02/06	23-23 5	<0 001	<0 1	<1 0	<0 005
05/02/06	24.5-25	<0.001	<0.1	<1.0	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/27/05	5-5 5	<0 001	<4 97	<10	<0 002
05/27/05	16 5-17	<0 001	<5 05	<9 88	<0 002
05/27/05	25.5-26	<0.001	<4.98	<9.96	<0.002

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/02/06	5-5 5	<0 001	<0 1	3 2	<0 005
05/02/06	10-10 5	<0 001	<0 1	6.5	<0 005
05/02/06	15-15 5	<0 001	<0 1	2.1	<0 005
05/02/06	20-20 5	<0 001	1.300	2 8	<0 005
05/02/06	24.5-25	<0.001	<0.1	2.2	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/03/06	9.5-10	<0.001	<0.1	<1.0	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/02/06	5-5 5	<0 001	<0 1	3 1	<0 005
05/02/06	15-15 5	<0 001	<0 1	8.7	<0 005
05/02/06	20-20 5	<0 001	0 160	2.5	<0 005
05/02/06	24.5-25	<0.001	0.270	1.3	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/02/06	5 5-6	<0 001	<0 1	14	<0 005
05/02/06	10-10 5	0.58	76	98	<0 051
05/02/06	15-15 5	26	1,300	270	<0 12
05/02/06	19 5-20	20	2,700	250	<2 5
05/02/06	23.5-24	0.013	0.610	7.0	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
03/19/04	18	<0.05	65	37	<0.5

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/27/05	5-5 5	<0 001	<5 01	<9 92	<0 002
05/27/05	17 5-18	<0 001	<5 03	<10	<0 002
05/27/05	24.5-25	<0.001	<5.01	<10	<0.002

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/03/06	5-5 5	<0 001	<0 1	<1 0	<0 005
05/03/06	7.5-8	<0.001	<0.1	<1.0	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/03/06	5-5 5	<0 001	<0 1	<1.0	<0 005
05/03/06	7.5-8	<0.001	0.240	<1.0	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/03/06	5-5 5	<0 001	<0 1	<1 0	<0 005
05/03/06	10-10 5	<0 001	<0 1	<1 0	<0 005
05/03/06	15-15 5	<0 001	<0 1	<1 0	<0 005
05/03/06	19 5-20	<0 10	29	14	<0 005
05/03/06	24.5-25	<0.001	<0.1	<1.0	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/27/05	5-5 5	<0 001	<5 02	<9 80	<0 002
05/27/05	18-18 5	<0 001	<5	<10	<0 002
05/27/05	19 5-20	<0 001	<4 96	<10	<0 002
05/27/05	24.5-25	1.58	279	<9.88	<0.002

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/27/05	5-5 5	<0 001	<4 99	<10 2	<0 002
05/27/05	18 5-19	<0 001	<4 95	<10	<0 002
05/27/05	24.5-25	0.0082	<4.98	<10	<0.002

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
03/19/04	5	<0.005	<1.0	<1.0	<0.05

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/26/05	5-5 5	<0 001	<4 97	<9 92	<0 002
05/26/05	17 5-18	0.0010	<4 96	<9 92	<0 002
05/26/05	21 5-22	0.0307	11 2	<10	<0 002
05/26/05	24.5-25	0.0414	10.2	<10	<0.002

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/02/06	5-5 5	<0 001	<0 1	1 4	<0 005
05/02/06	10-10 5	<0 001	0 230	4 8	<0 005
05/02/06	15-15 5	<0 001	<0 1	1 2	<0 005
05/02/06	20-20 5	<0 10	19	5.8	<0 005
05/02/06	24.5-25	<0.001	<0.1	1.7	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/26/05	5-5 5	<0 001	<5 02	<10.2	<0 002
05/26/05	18-18 5	<0 001	<5	<10	<0 002
05/26/05	22 5-23	<0 001	<4 96	<10	<0 002
05/26/05	24.5-25	<0.001	<5.02	<10.2	<0.002

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/26/05	5-5 5	<0 001	<4 98	<10 1	<0 002
05/26/05	17 5-18	<0 001	<4 97	<9 92	<0 002
05/26/05	24.5-25	<0.001	<4.99	10.6	<0.002

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/02/06	5 5-6	<0 001	<0 1	18	<0 005
05/02/06	10-10 5	<0 01	38	260	<0 12
05/02/06	15-15 5	0.018	0 700	3.5	<0 005
05/02/06	19 5-20	3 2	320	18	<1 2
05/02/06	24.5-25	<0.001	<0.1	1.1	<0.005

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
03/19/04	5	<0.005	<1.0	2.1	<0.05

Date	Depth (feet)	Benzene	TPH-g	TPH-d	MTBE
05/26/05	5-5 5	<0 001	<5 03	10 2	<0 002
05/26/05	19 5-20	<0 001	<5 03	<10 1	<0 002
05/26/05	21 5-22	<0 001	<4 96	<10	<0 002
05/26/05	24.5-25	<0.001	<4.98	<10	<0.002

106th AVENUE
COBBLED MOUND
SIGN
DRIVEWAY
PLANTER
IRRIGATION CABINET
FORMER USTs
RESIDENCE
FENCE
FORMER DISPENSER ISLANDS
PLANTER
PLANTER
FOOTHILL BOULEVARD
DRIVEWAY
RAIL
IRRIGATION CABINET
SHOPPING CENTER DRIVEWAY
DRIVEWAY
SB1 SB2 SB3 SB4 SB5 SB6 SB7 SB8 SB9 SB10 SB11 SB12 SB13 SB14 SB15 SB16 SB17 SB18 SB19 SB20 SB21
V1 V2 V3 V4 V5 V6 V7 V8 V9 V10

LEGEND

- ● Soil Boring (Installed by AEI 3/19/04)
- ◉ Direct Push Soil Boring (Installed by ETIC)
- ▲ Soil Vapor Probe
- TPH-g Total Petroleum Hydrocarbons as gasoline
- TPH-d Total Petroleum Hydrocarbons as diesel
- MTBE Methyl Tertiary Butyl Ether

Notes:
Samples collected from SB-1 through SB21 were analyzed for TPH-g, TPH-d, BTEX, and MTBE
Samples collected from SB14 through SB21 were also analyzed for other Volatile Organic Compounds
Concentrations in milligrams per kilogram (mg/kg)

0 30
Scale (feet)

Basemap Source: Morrow Surveying, 2006

FILENAME: WP1005.DWG 10/24/06

ETIC ENGINEERING

SITE PLAN SHOWING SOIL ANALYTICAL RESULTS
FORMER EXXON RS 7-4121
10605 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

FIGURE: 4

5/2/06 Depth(ft. bgs): 20	
Benzene	1.89
Toluene	<0.500
Ethylbenzene	102
Total Xylenes	5.56
TPH-g	2,340
TPH-d	820
MTBE	<0.500
VOCs	ND

5/2/06 Depth(ft. bgs): 20	
Benzene	30.3
Toluene	0.820
Ethylbenzene	410
Total Xylenes	11.3
TPH-g	5,940
TPH-d	1,700
MTBE	<0.500
VOCs	ND

5/27/05 Depth(ft. bgs): 20	
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	0.6
Total Xylenes	<0.5
TPH-g	447
TPH-d	121
MTBE	14.2

5/2/06 Depth(ft. bgs): 22	
Benzene	<0.500
Toluene	<0.500
Ethylbenzene	<0.500
Total Xylenes	<0.500
TPH-g	1,390
TPH-d	440
MTBE	83.3
VOCs	ND

5/27/05 Depth(ft. bgs): 20	
Benzene	<0.5
Toluene	0.5
Ethylbenzene	1.0
Total Xylenes	<0.5
TPH-g	1,060
TPH-d	305
MTBE	4.30

3/19/04 Depth(ft. bgs): 13.3-16	
Benzene	250
Toluene	22
Ethylbenzene	310
Total Xylenes	71
TPH-g	3,200
TPH-d	4,200
MTBE	<17

5/27/05 Depth(ft. bgs): 20	
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
Total Xylenes	0.7
TPH-g	54.5
TPH-d	<50
MTBE	<0.5

5/2/06 Depth(ft. bgs): 20	
Benzene	18.4
Toluene	<0.500
Ethylbenzene	42.6
Total Xylenes	4.16
TPH-g	831
TPH-d	440
MTBE	<0.500
VOCs	ND

3/19/04 Depth(ft. bgs): 14-22	
Benzene	17
Toluene	24
Ethylbenzene	68
Total Xylenes	21
TPH-g	7,000
TPH-d	26,000
MTBE	<17

5/2/06 Depth(ft. bgs): 20	
Benzene	3,240
Toluene	53.2
Ethylbenzene	3,670
Total Xylenes	4,170
TPH-g	41,800
TPH-d	4,300
MTBE	<0.500
VOCs	ND

5/27/05 Depth(ft. bgs): 20	
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
Total Xylenes	<0.5
TPH-g	<50
TPH-d	<50
MTBE	<0.5

5/3/06 Depth(ft. bgs): 20	
Benzene	<25.0
Toluene	<25.0
Ethylbenzene	159
Total Xylenes	<25.0
TPH-g	10,100
TPH-d	1,700
MTBE	<25.0
VOCs	ND

5/26/05 Depth(ft. bgs): 18	
Benzene	75.7
Toluene	0.5
Ethylbenzene	4.7
Total Xylenes	4.7
TPH-g	824
TPH-d	801
MTBE	<0.5

5/27/05 Depth(ft. bgs): 20	
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	1.9
Total Xylenes	0.5
TPH-g	2,250
TPH-d	701
MTBE	<0.5

5/26/05 Depth(ft. bgs): 19	
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
Total Xylenes	<0.5
TPH-g	<50
TPH-d	57
MTBE	<0.5

5/2/06 Depth(ft. bgs): 20	
Benzene	4.19
Toluene	<0.500
Ethylbenzene	5.78
Total Xylenes	6.29
TPH-g	3,100
TPH-d	720
MTBE	<0.500
VOCs	ND

5/26/05 Depth(ft. bgs): 20	
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
Total Xylenes	<0.5
TPH-g	<50
TPH-d	341
MTBE	<0.5

5/2/06 Depth(ft. bgs): 20	
Benzene	2,140
Toluene	1,400
Ethylbenzene	4,690
Total Xylenes	11,100
TPH-g	60,800
TPH-d	7,500
MTBE	<25.0
VOCs	ND

5/26/05 Depth(ft. bgs): 22	
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
Total Xylenes	<0.5
TPH-g	<50
TPH-d	<56
MTBE	<0.5

106th AVENUE
COBBLED MOUND
SIGN
DRIVEWAY
PLANTER
IRRIGATION CABINET
FORMER USTs
FORMER DISPENSER ISLANDS
RESIDENCE
FENCE
RAIL
IRRIGATION CABINET
SHOPPING CENTER DRIVEWAY
FOOTHILL BOULEVARD
SB1 SB2 SB3 SB4 SB5 SB6 SB7 SB8 SB9 SB10 SB11 SB12 SB13 SB14 SB15 SB16 SB17 SB18 SB19 SB20 SB21
V1 V2 V3 V4 V5 V6 V7 V8 V9 V10

0 30
Scale (feet)

LEGEND

- ● Soil Boring (Installed by AEI 3/19/04)
- ⊙ Direct Push Soil Boring (Installed by ETIC)
- ▲ Soil Vapor Probe
- TPH-g Total Petroleum Hydrocarbons as gasoline
- TPH-d Total Petroleum Hydrocarbons as diesel
- MTBE Methyl Tertiary Butyl Ether
- VOCs Volatile Organic Compounds (other than MTBE)
- ND Not Detected

Notes:
Concentrations in Micrograms per Liter (ug/L)

Basemap Source: Morrow Surveying, 2006

ETIC ENGINEERING

SITE PLAN SHOWING GROUNDWATER ANALYTICAL RESULTS
FORMER EXXON RS 7-4121
10605 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

FIGURE: 5

FILENAME: WP1005.DWG 10/24/06

Depth (feet bgs)	Date	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	TPH-g	MTBE
5.5	05/01/06	**120**	**160**	**140**	<100	<100	**110,000**	<100

Depth (feet bgs)	Date	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	TPH-g	MTBE
5.5	05/01/06	**200**	<100	<100	<100	<100	**790,000**	<100

Depth (feet bgs)	Date	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	TPH-g	MTBE
8.0	05/01/06	**1,100**	**130**	**340**	**180**	<100	**6,600,000**	<100
10.0	05/01/06	**1,900**	<100	<100	<100	<100	**17,000,000**	<100

Depth (feet bgs)	Date	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	TPH-g	MTBE
7.0	05/01/06	**170**	<100	**540**	**410**	<100	**880,000**	<100

Depth (feet bgs)	Date	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	TPH-g	MTBE
7.5	05/01/06	**84**	**140**	<100	**110**	<100	**2,200**	<100
7.5 dup	05/01/06	<80	**110**	<100	<100	<100	**2,400**	<100

Depth (feet bgs)	Date	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	TPH-g	MTBE
7.5	05/01/06	<80	<100	<100	<100	<100	**360,000**	<100

106th AVENUE
COBBLED MOUND
SIGN
DRIVEWAY
SB21
SB13
SB12
SB14
V1
V2
PLANTER
SB16
V3
SB15
SB1
IRRIGATION CABINET
FORMER USTs
SB10
SB20
V4
SB2
V10
SB17
V5
RESIDENCE
SB18
SB11
SB19
FORMER DISPENSER ISLANDS
SB9
PLANTER
V6
V8
SB3
V7
SB4
SB8
FENCE
PLANTER
V9
SB7
SB5
SB6
RAIL
IRRIGATION CABINET
SHOPPING CENTER DRIVEWAY
FOOTHILL BOULEVARD

LEGEND

- ● Soil Boring (Installed by AEI 3/19/04)
- ⊙ Direct Push Soil Boring (Installed by ETIC)
- ▲ Soil Vapor Probe
- TPH-g Total Petroleum Hydrocarbons as gasoline
- TPH-d Total Petroleum Hydrocarbons as diesel
- MTBE Methyl Tertiary Butyl Ether
- dup Duplicate

Notes:
Concentrations in Micrograms per cubic meter (ug/m3)

N
30
Scale (feet)

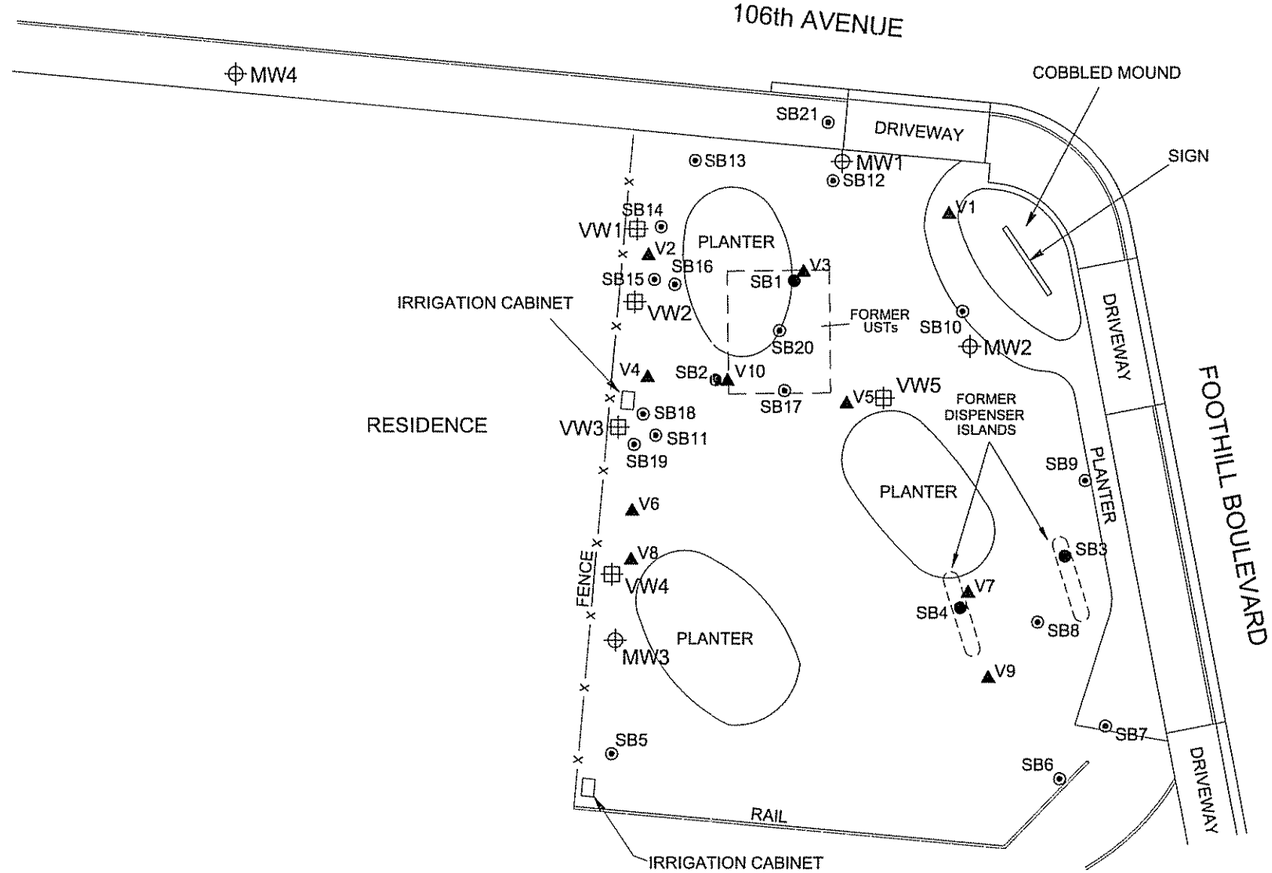
Basemap Source: Morrow Surveying. 2006

ETIC ENGINEERING

SITE PLAN SHOWING SOIL VAPOR ANALYTICAL RESULTS
FORMER EXXON RS 7-4121
10605 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

FIGURE: **6**

FILENAME: WP1006.DWG 10/24/06



LEGEND

- Soil Boring (Installed by AEI 3/19/04)
- Direct Push Soil Boring (Installed by ETIC)
- Soil Vapor Probe
- Proposed Groundwater Monitoring Well
- Proposed Soil Vapor Monitoring Well

30
Scale (feet)

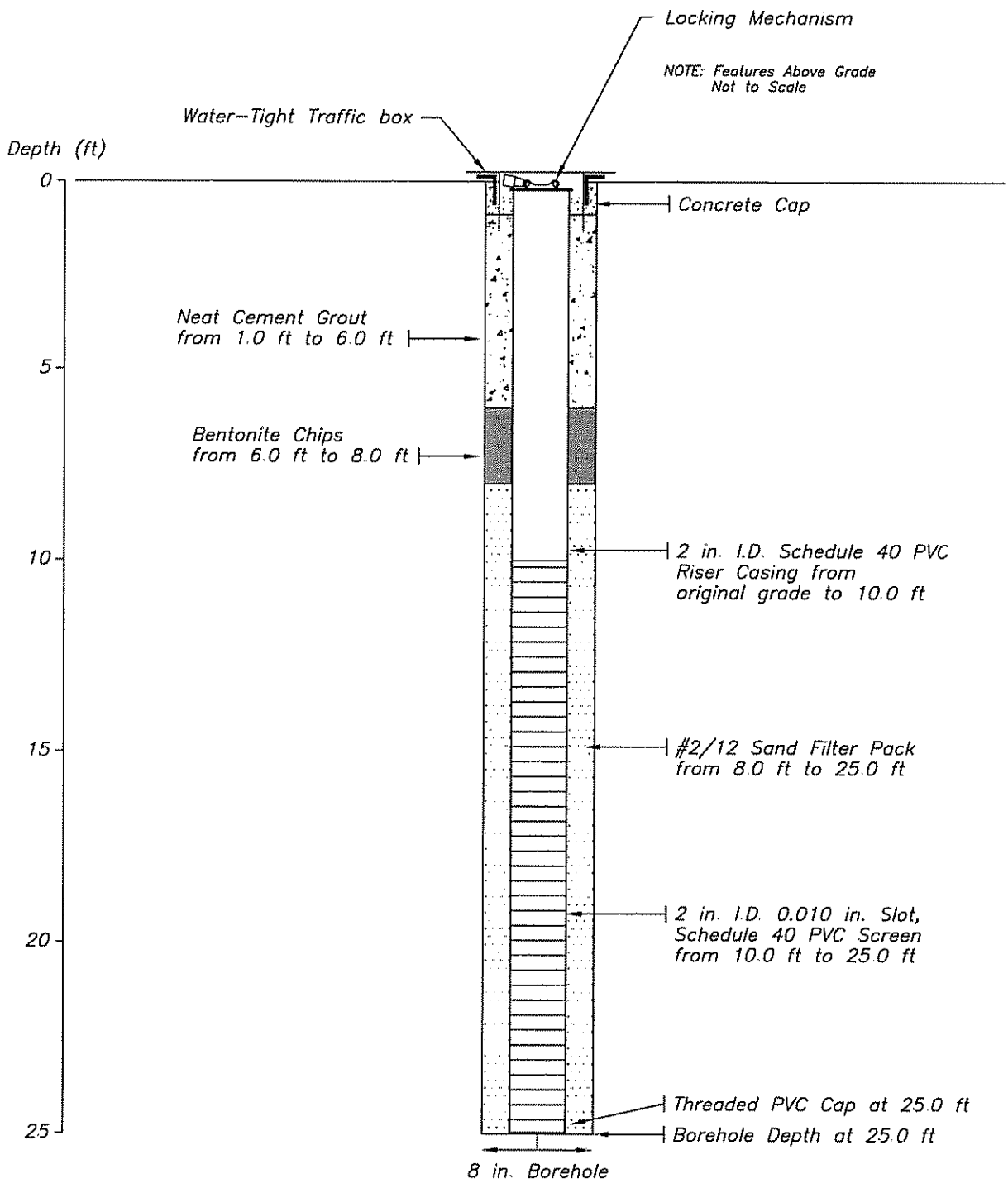
Basemap Source: Morrow Surveying. 2006

FILENAME: WP1066.DWG 10/24/06

ETIC ENGINEERING

SITE PLAN SHOWING PROPOSED GROUNDWATER AND SOIL VAPOR MONITORING WELLS
FORMER EXXON RS 7-4121
10605 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

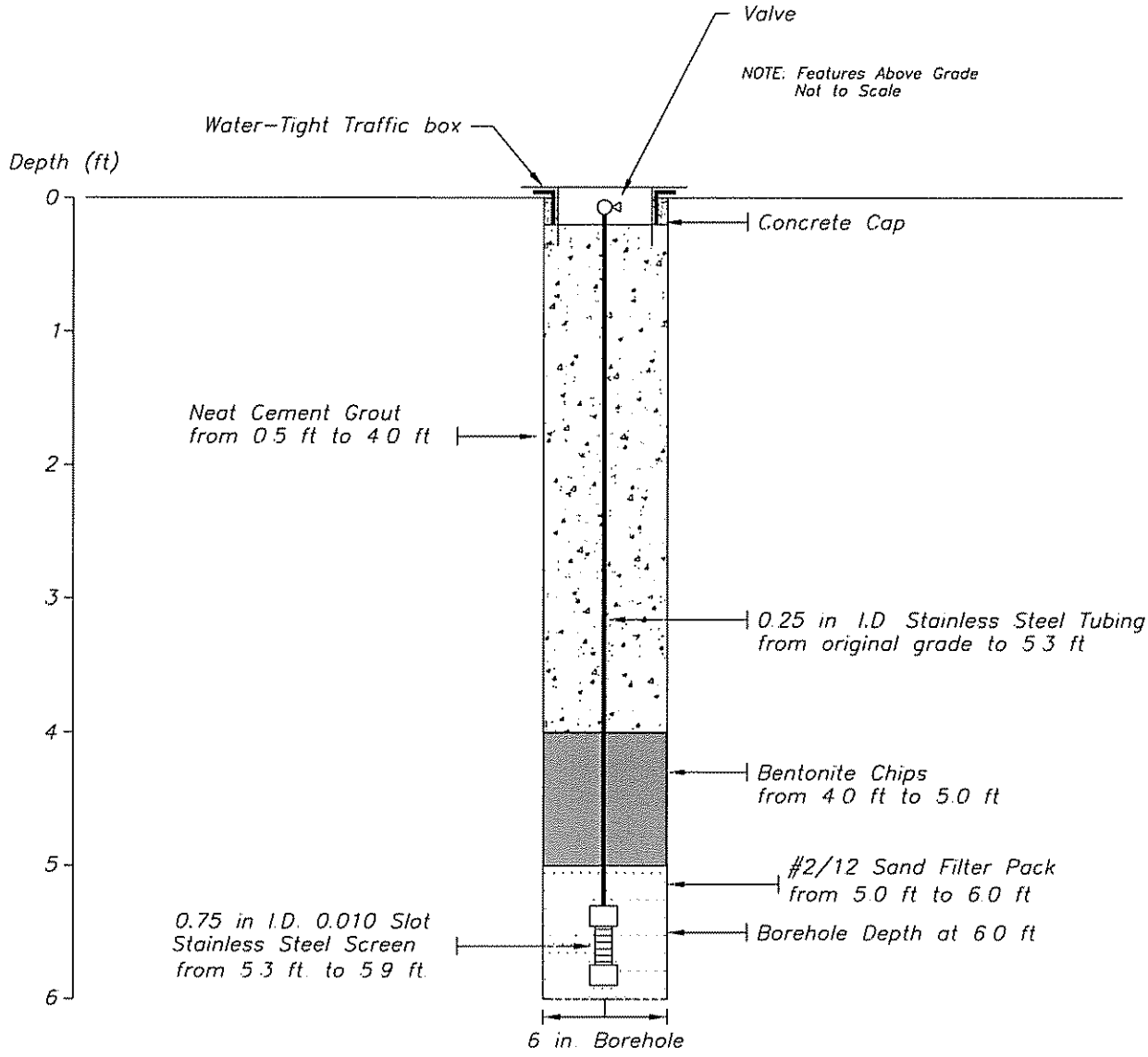
FIGURE: 7



ETIC ENGINEERING

WELL COMPLETION DIAGRAM FOR
PROPOSED 2" GROUNDWATER MONITORING WELLS
FORMER EXXON RETAIL SITE 7-4121
10605 FOOTHILL BOULEVARD, OAKLAND, CALIFORNIA

FIGURE: 8



ETIC ENGINEERING

WELL COMPLETION DIAGRAM FOR
PROPOSED SOIL VAPOR MONITORING WELLS
FORMER EXXON RETAIL SITE 7-4121
10605 FOOTHILL BOULEVARD, OAKLAND, CALIFORNIA

FIGURE: **9**

Appendix A

Regulatory Correspondence

7-4121

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

September 25, 2006

Ms. Jennifer Sadlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611

Mr. Ken Phares
MacArthur Blvd. Associates
10700 MacArthur Blvd.
Oakland, CA 94605

Dear Ms. Sadlachek and Mr. Phares:

Subject: Fuel Leak Case RO0002635, Exxon #7-4121, 10605 Foothill Blvd., Oakland, CA 94605

Alameda County Environmental Health staff has received and reviewed the July 2006, Subsurface Investigation and Risk Assessment Report, prepared by ETIC Engineering. This report provides the results of soil, groundwater and soil vapor sampling collected at the site and also provides results of a conduit/receptor survey, well search and human health risk assessment. We have the following technical comments and request you submit the technical report requested below.

TECHNICAL COMMENTS

1. Well Search- Based upon the results of the well survey presented it appears that only one of the five wells identified would be down-gradient of this site. Because this well is approximately 1640 feet from the site, our office concurs that it is not likely being impacted by the release from this site.

2. Conduit/Receptor Survey- Based upon the information on the anticipated depth to electric and gas lines, storm and sanitary sewer lines and water lines and the general depth to groundwater at this site, these utilities would not be expected to be encountered by the fuel release.

3. Contaminant Source Characterization- Soil contamination appears to be limited to the immediate vicinity of the former UST pit and vary in depths from 10-20' bgs. Groundwater contamination appears more widespread. It is found within and down-gradient of the former tank pit and also near the former dispenser islands. The recent groundwater samples detected up to 60,600 ppb TPHg, 26,000 ppb TPHd, and 3240, 1400, 4690, 11,100 ppb, BTEX, respectively and represent a continual source of groundwater contamination. These results indicate an undefined plume, which has likely migrated off-site beneath adjacent properties. MTBE was reported in only the samples along the 106th Ave. property boundary indicating either an off-site source impacting the site or plume migration from the site. Given the absence of MTBE in soil and groundwater samples on-site, the site is not likely a source of this contaminant. Off-site plume delineation appears necessary before the site closure can be considered. In addition, on site well installation will be required to monitor current groundwater concentrations and measure the affect of on-site remediation. We believe that

on-site remediation alternatives should be considered to reduce the residual groundwater petroleum source, regardless of current or future soil vapor results. Please provide a work plan as requested below.

4. Soil Vapor Sampling- Results from soil vapor samples in the vicinity and down-gradient of the former UST pit indicate elevated TPHg in gas samples collected from 5.5-10' bgs. The risk assessment performed using these soil vapor results indicates a carcinogenic health risk of 1.8-3E-6 for commercial and residential exposure, respectively and a non-carcinogenic hazard index of 53 and 38 for residential and commercial exposure, respectively. Additional soil vapor sampling is recommended since vapor sampling occurred at varying depths and at some locations samples were not able to be collected. We are not against taking additional soil vapor samples, however, as stated, we recommend remedial alternatives be considered for the former UST pit, at a minimum, in addition to additional sampling.

TECHNICAL REPORT REQUEST

Please submit the following technical reports to our office according to the following schedule:

- October 30, 2006- Work plan for well installation, plume delineation, and feasibility study of remedial alternatives.

This report is being requested pursuant to California Health and Safety Code Section 25296.10. Title 23, CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) now request submission of reports in electronic form. The electronic copy is intended to replace the need for a paper copy and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Submission of reports to the Alameda County FTP site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) Geotracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and other data to the Geotracker database over the Internet. Beginning July 1, 2005, electronic submittal of a complete copy of all reports is required in Geotracker (in PDF format). Please visit the State Water Resources Control Board, (http://www.swrcb.ca.gov/ust/cleanup/electronic_reporting) for more information on these requirements.

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following:

"I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

If you have any questions, please contact me at (510) 567-6765.

Sincerely,

Barney M. Chan
Hazardous Materials Specialist

C: files, D. Drogos
√Ms. Sherris Prall, ETIC Engineering, 2285 Morello Ave., Pleasant Hill, CA 94523

9_25_06 10605 Foothill Blvd

Appendix B

Field Protocols

PROTOCOLS FOR WELL DRILLING, COMPLETION, AND DEVELOPMENT

SUBSURFACE CLEARANCE SURVEY PROCEDURES

Prior to drilling, the proposed locations of borings will be marked with white paint. Underground Service Alert (USA) will be contacted prior to subsurface activities and a "ticket" will be issued for this investigation. USA members will mark underground utilities in the delineated areas using standard color code identifiers.

Once USA has marked the site, all proposed borehole locations will be investigated by subsurface clearance surveys to identify possible buried hazards (pipelines, drums, tanks). Subsurface clearance surveys use several geophysical methods to locate shallow buried man-made objects. The geophysical methods include electromagnetic induction (EMI) profiling, ground penetrating radar (GPR), and/or magnetic surveying. The choice of methods depends on the target object and potential interference from surrounding features.

Prior to drilling, all boreholes will be cleared of underground utilities to a depth of at least 4 feet below ground surface (bgs) in "non-critical zones" and to 8 feet bgs in "critical zones." Critical zones are defined as locations that are within 10 feet from the furthest edge of any underground storage tank (UST), within 10 feet of the product dispenser islands, the entire area between the UST field and the product dispenser islands, and within 10 feet of any suspected underground line. An 8- to 12-inch-diameter circle will be cut in the surface cover at each boring location. A hole, greater than the diameter of the drilling tool being used, will then be cleared at each boring location, using a hand auger or vacuum excavation system. The vacuum system consists of an air or water lance, used to disturb native soil by injecting water into the soil, and a vacuum, used to remove the soil.

DRILLING

Boreholes are drilled with a truck-mounted rotary drill, using hollow-stem, continuous-flight augers. The diameter of the augers is selected to provide an annular space between the boring wall and the well casing of no less than 2 inches.

All augers are pressure-washed or steam-cleaned before drilling begins and before each new borehole is drilled. All drill cuttings are either placed on and covered with plastic sheeting or contained in sealed 55-gallon drums. All fluids generated during cleaning of drilling equipment are contained in sealed 55-gallon drums. All waste generated during drilling activities is stored onsite until appropriate disposal is arranged. The drums are labeled with the site description (including owner's name) and date. The drill cuttings are disposed of at a proper facility based on results of soil sample analysis.

During drilling, an ETIC geologist generates a soil boring log for each borehole. The boring logs contain detailed geological information, including descriptions of the soils classified according to the Unified Soil Classification System (USCS), blow counts for soil sampling intervals, organic vapor analyzer (OVA) readings, relative moisture content of the soils, and initial and static water levels.

SOIL SAMPLING

Soil samples are collected using a 2-inch-diameter by 18- or 24-inch-long modified California split-spoon sampler containing three or four 6-inch-long brass or stainless steel liners. The sampler and liners are scrubbed in potable water and Alconox or equivalent detergent and rinsed with potable water after use at each sampling interval.

At each sample depth, the sampler is driven 18 or 24 inches ahead of the augers into undisturbed soil. When the sampler is retrieved, either the lowermost or the middle sample liner is removed and the ends of the tube are covered with aluminum foil or Teflon tape and sealed with plastic caps. The soil-filled liner is labeled with the borehole number, sample depth, site location, date, and time. The samples are placed in zip-lock bags and stored in a cooler containing ice.

Soil from one of the liners is removed and placed in a sealed plastic bag. The soil is scanned with an OVA equipped with a flame ionization detector (FID) or photoionization detector (PID), and the readings are noted on the soil boring logs. The soil from the remaining liner(s) is examined and classified according to the Unified Soil Classification System.

Soil samples are delivered, under chain of custody, to a laboratory certified by the California Department of Health Services (DHS) for analyses.

WELL INSTALLATION

The boreholes are completed as groundwater monitoring wells, vapor extraction wells, groundwater extraction wells, or air sparging wells. The wells are typically constructed by installing Schedule 40 polyvinyl chloride (PVC) flush-threaded casing through the inner opening of the auger. The screened interval consists of slotted casing of the appropriate slot size and length placed at depths depending on soil conditions encountered during drilling and the depth to groundwater. A threaded end plug or a slip cap secured with a stainless steel screw is placed on the bottom of the well.

A filter pack of clean sand of appropriate size is placed in the annular space around the well screen to approximately 1 to 3 feet above the top of the screen. The sand is placed through the inner opening of the augers as they are slowly removed. A transitional seal is completed above the sand pack by adding 1 to 2 feet of bentonite pellets and hydrating them with water. A surface seal is then created by placing neat cement grout containing less than 5 percent bentonite from the top of the bentonite seal to just below the ground surface.

The well is finished at the surface with a slightly raised, traffic-rated, watertight steel traffic box set in concrete. The traffic box is secured with bolts and the casing is further secured with a locking well cap.

WELL DEVELOPMENT

The wells are developed no less than 72 hours after completion or prior to establishing the bentonite seal during the drilling activities. Development typically consists of surging the screened interval of the well with a flapper valve surge block of the same diameter as the well for approximately 10 minutes. The well is then purged with a vacuum truck and a dedicated PVC stinger or disposable

tubing, an inertial pump, a submersible electric pump, a centrifugal pump, an air-lift pump, or a PVC bailer until at least 3 casing volumes are removed and the water is free of silt and apparent turbidity.

A record of the purging methods and volumes of water purged is maintained. All purge water is contained on the site in properly labeled 55-gallon drums. Purged water is transported to an appropriate treatment facility.

WELL SURVEY

The elevation of the top of the well casing is surveyed by a state licensed land surveyor. A small notch is cut in the top of the well casing to mark the survey point and establish the point used for all future water level measurements. A loop originating and ending at the datum is closed to ±0.01 feet according to standard methods.

PROTOCOLS FOR INSTALLATION AND SAMPLING OF SOIL VAPOR WELLS

SUBSURFACE CLEARANCE SURVEY PROCEDURES

Prior to drilling, the proposed locations of borings will be marked with white paint. Underground Service Alert (USA) will be contacted prior to subsurface activities and a "ticket" will be issued for this investigation. USA members will mark underground utilities in the delineated areas using standard color code identifiers.

Once USA has marked the site, all proposed borehole locations will be investigated by subsurface clearance surveys to identify possible buried hazards (pipelines, drums, tanks). Subsurface clearance surveys use several geophysical methods to locate shallow buried man-made objects. The geophysical methods include electromagnetic induction (EMI) profiling, ground penetrating radar (GPR), and/or magnetic surveying. The choice of methods depends on the target object and potential interference from surrounding features.

Prior to drilling, all boreholes will be cleared of underground utilities to a depth of at least 4 feet below ground surface (bgs) in "non-critical zones" and to 8 feet bgs in "critical zones". Critical zones are defined as locations that are within 10 feet from the furthest edge of any underground storage tank (UST), within 10 feet of the product dispenser islands, the entire area between the UST field and the product dispenser islands, and within 10 feet of any suspected underground line. An 8- to 12-inch-diameter circle will be cut in the surface cover at each boring location. A hole, greater than the diameter of the drilling tool being used, will then be cleared at each boring location, using a hand auger.

SOIL SAMPLING

Shallow soil samples are collected using a 6-inch sample barrel connected to a slide hammer and containing a 6-inch stainless steel sample sleeve. After driving the hammer 6 inches, the rods and sample barrel are withdrawn from the borehole and the sample sleeve is removed.

Soil from the hand auger is removed and placed in a sealed plastic bag. The soil is scanned with an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID) or photoionization detector (PID), and the readings are noted on the soil boring logs. The remaining soil from the hand auger is examined and classified according to the Unified Soil Classification System (USCS).

Soil samples are delivered, under chain of custody, to a laboratory certified by the California Department of Health Services (DHS) for analyses.

SOIL VAPOR WELL INSTALLATION PROCEDURES

The vapor wells are constructed with 0.25-inch-diameter stainless steel tubing connected to 0.75-inch-diameter 0.010-inch machine-slotted Schedule 40 stainless steel casing. All connections are sealed with Swagelok® type fittings. A filter pack of #2/12 sand is placed at the screened interval and above and below the slotted PVC casing for each well. The wells are then sealed with hydrated

bentonite chips or granules, followed by neat cement grout to just below ground surface. The tubing is sealed at the surface with a Swagelok® valve.

The wells are finished at the surface with a slightly raised, watertight steel traffic-rated box set in concrete. The lid on the traffic-rated box is bolted to the rim of the well box.

SOIL VAPOR SAMPLING PROCEDURES

To allow for subsurface conditions to equilibrate, the wells are not disturbed for a period of at least 48 hours.

A vacuum tightness test is performed on each well. The test consists of the application of vacuum and monitoring of vacuum tightness using vacuum gauges and/or flow meter for 5 to 10 minutes.

A purge test will be conducted for one well. The selected well should be the one with the highest expected concentrations. The test consists of the collection of vapor samples using Tedlar bags after purging the well of one (1), three (3), and seven (7) purge volumes by drawing vapor using a syringe connected to a valve on the tubing or a vacuum pump. The purge volume is estimated based on the internal volume of the tubing used and the annular space around the slotted screen. The samples are collected through a particulate filter and flow controller which regulates the flow of soil gas to no more than 200 milliliters per minute. The results of the purge test are used to dictate the purge volume to be used during the sampling of subsequent wells.

The vapor samples are collected in 1-liter stainless steel Summa canisters. The samples are collected through a particulate filter and flow controller which regulates the flow of soil gas to no more than 200 milliliters per minute. To ensure air-tight connections between the tubing, sampling port, valves, and other connections, a tracer compound is applied to joints as a tracer. A leak will be evident if the tracer is detected in the analysis of the soil vapor samples.

The 1-liter Summa canisters are labeled and packaged for delivery to a state-certified laboratory for chemical analysis. The initial pressure and the final pressure readings taken from the gauges on the Summa canisters are recorded. A small vacuum of about 5 inches of mercury is left inside the sample canister and is recorded on the chain-of-custody. Upon receipt, the laboratory will check the pressure in the sample canister and compare it to the pressure recorded on the chain-of-custody for quality control purposes.