



**CONESTOGA-ROVERS
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TRANSMITTAL

DATE: April 2, 2013 REFERENCE NO.: 240483
PROJECT NAME: 5755 Broadway, Oakland
TO: Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

RECEIVED

By Alameda County Environmental Health at 8:32 am, Apr 03, 2013

Please find enclosed: Draft Final
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QUANTITY	DESCRIPTION
1	Subsurface Investigation Work Plan

As Requested For Review and Comment
 For Your Use

COMMENTS:

If you have any questions regarding the contents of this document, please call Peter Schaefer at (510) 420-3319.

Copy to: Denis Brown, Shell Oil Products US (electronic copy)
Clint Mercer, SC Fuels (lessee), 1800 West Katella Avenue, Suite 400, Orange, CA 92867
Orkin, Inc. (property owner), PO Box 2128, Santa Fe Springs, CA 90670

Completed by: Peter Schaefer Signed: *Peter Schaefer*

Filing: Correspondence File



Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
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Denis L. Brown
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HSE – Environmental Services
20945 S. Wilmington Ave.
Carson, CA 90810-1039
Tel (707) 865 0251
Fax (707) 865 2542
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Re: Shell-branded Service Station
5755 Broadway
Oakland, California
SAP Code 135699
Incident No. 98995756
ACEH Case No. RO0000026

Dear Mr. Wickham:

The attached document is provided for your review and comment. Upon information and belief, I declare, under penalty of perjury, that the information contained in the attached document is true and correct.

If you have any questions or concerns, please call me at (707) 865-0251.

Sincerely,

A handwritten signature in black ink, appearing to read "Denis L. Brown", is located below the "Sincerely," text.

Denis L. Brown
Senior Program Manager



SUBSURFACE INVESTIGATION WORK PLAN

**SHELL-BRANDED SERVICE STATION
5755 BROADWAY
OAKLAND, CALIFORNIA**

**SAP CODE 135699
INCIDENT NO. 98995756
AGENCY NO. RO0000026**

APRIL 2, 2013

REF. NO. 240483 (14)

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**Prepared by:
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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) prepared this work plan on behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell) to assess potential for soil vapor intrusion at an adjacent residential property at 5606 Taft Avenue, Oakland as requested in Alameda County Environmental Health's (ACEH's) January 28, 2013 letter.

The subject site is a Shell-branded service station located on the northern corner of the Broadway and Taft Street intersection in a mixed residential and commercial area of Oakland, California (Figure 1). Current site features include three gasoline underground storage tanks, four dispenser islands, and a station building (Figure 2).

A summary of previous work performed at the site and other background information is presented in Appendix A.

2.0 WORK TASKS

CRA proposes to install two near sub-slab soil vapor probes to assess soil vapor concentrations in the concrete walkway directly adjacent to the apartment building at 5606 Taft Avenue, Oakland located southwest of the service station. The proposed locations are shown on Figure 2. Specific tasks are described below.

2.1 PERMIT

Alameda County Public Works Agency does not require a permit to install near sub-slab soil vapor probes.

2.2 HEALTH AND SAFETY PLAN (HASP)

CRA will prepare a HASP to protect site workers. The plan will be kept on site during field activities and will be reviewed and signed by each site worker.

2.3 UTILITY CLEARANCE

CRA will mark the proposed probe locations, and the locations will be cleared by Underground Service Alert and a private utility locating service prior to drilling.

2.4 SOIL VAPOR PROBE INSTALLATION

CRA proposes to install two near sub-slab soil vapor probes (VP-1 and VP-2) into the concrete walkway directly adjacent to the apartment building at 5606 Taft Avenue, Oakland located southwest of the service station (Figure 2).

Assuming the absence of subsurface obstructions, a rotary hammer drill will be used to drill a "shallow" (approximately 1-inch deep) outer borehole (approximately 7/8-inch diameter) that partially penetrates the walkway slab. Cuttings will be removed using a portable vacuum cleaner or a towel moistened with distilled water.

The rotary hammer drill will then be used to drill a smaller diameter inner borehole within the center of the outer borehole (approximately 3/8-inch diameter) through the walkway material and approximately 3 inches into the bedding material to create an open cavity. The outer borehole will be cleaned a second time with a moistened towel or a portable vacuum cleaner.

Stainless steel tubing will be cut to a length that allows the probe to float within the slab thickness to avoid obstruction of the probe with bedding material. The tubing will be approximately 1/4-inch diameter. Where necessary, the compression fittings will be stainless steel (approximately 1/4-inch outside diameter and 1/8-inch National Pipe Thread) Swagelok® female thread connectors. The probes will be constructed prior to drilling to minimize exposure time, or venting, of the bedding material through the open borehole.

Each sub-slab soil vapor probe will be placed in the borehole so that the top of the probe is flush with the top of the walkway. The top of the probe will have a recessed stainless steel plug. A quick-drying, Portland cement slurry will be injected or pushed into the annular space between the probe and the outer borehole. The cement will be allowed to dry for at least 24 hours prior to sampling.

CRA will perform this work under the supervision of a professional geologist or engineer.

2.5 SOIL VAPOR PROBE SAMPLING

At least 24 hours following probe installation, CRA will collect soil vapor samples from each sampling point. Sampling is affected by rain. CRA's standard procedure is to allow 2 days or more after a heavy rain event prior to collecting soil vapor samples.

CRA will sample soil vapor probes VP-1 and VP-2 using a vacuum pump and Tedlar® bags. CRA will attach a sealed "lung sampler" containing a 1-liter Tedlar® bag to the probe and attach the vacuum pump to the box. The vacuum pump will lower the pressure in the "lung sampler" and draw air from the probe into the Tedlar® bag. To avoid breakage, CRA will fill the bags no more than two-thirds full. Each sample will be labeled, entered onto a chain-of-custody, and placed into a protective box at room temperature for transport to a State of California-certified laboratory for analysis within 72 hours.

2.6 LEAK TESTING

To check the system for leaks, CRA will cover the soil gas probe surface casing and sampling equipment with a containment unit (or shroud). Prior to soil gas probe purging, CRA will introduce helium into the containment unit to obtain a minimum 50 percent (%) helium content level. CRA will confirm the helium content within the containment unit using a helium meter and will record the helium meter readings in our field notes. Helium will continue to be introduced to the containment unit during soil gas probe purging and sampling.

All samples will be analyzed in a laboratory for helium. In the event that the soil vapor samples contain a helium content of greater than 10% of the source concentration (i.e., 10% of the helium content measured within the containment unit), the soil gas sample will be considered invalid.

2.7 CHEMICAL ANALYSES

Vapor samples will be analyzed for total petroleum hydrocarbons as gasoline, benzene, toluene, ethylbenzene, total xylenes, methyl tertiary-butyl ether, tertiary-butyl alcohol, and naphthalene by EPA Method 8260B; for oxygen plus argon, carbon dioxide, and methane by ASTM D Method 1946; and for helium by ASTM D Method 1946 (M).

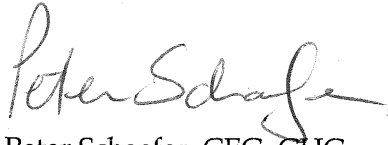
2.8 REPORT PREPARATION

Following receipt of the analytical results from the laboratory, CRA will prepare a written report, which will include field procedures, tabulated analytical data, and analytical laboratory reports.

3.0 SCHEDULE

CRA will implement the soil vapor probe installations upon receiving ACEH's written approval of this work plan.

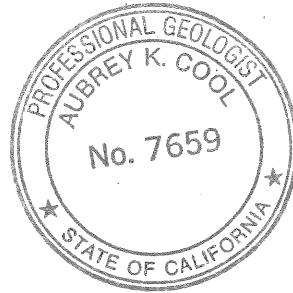
All of Which is Respectfully Submitted,
CONESTOGA-ROVERS & ASSOCIATES



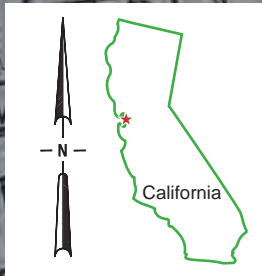
Peter Schaefer, CEG, CHG



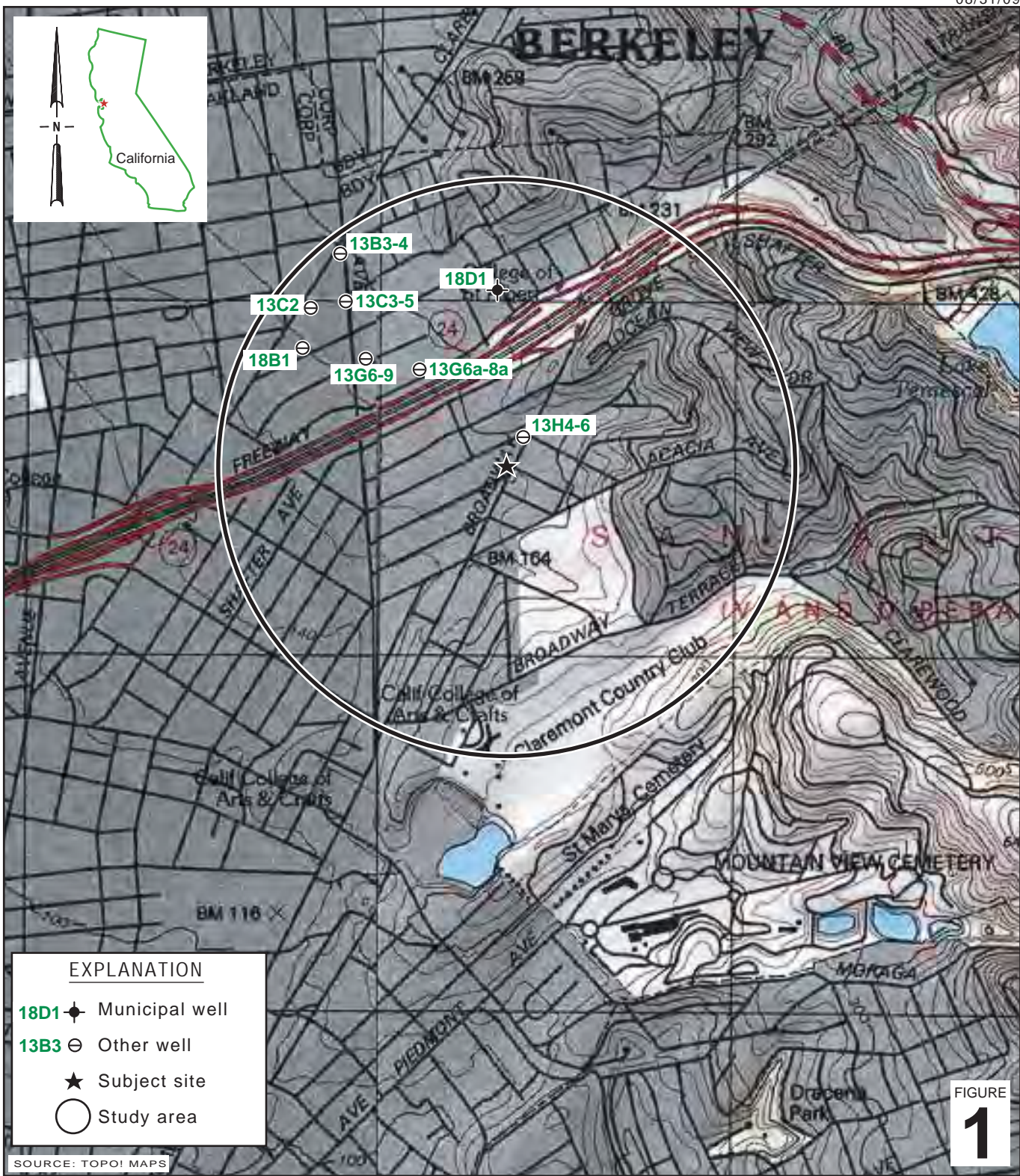
Aubrey K. Cool, PG



FIGURES



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EXPLANATION	
18D1	◆ Municipal well
13B3	⊖ Other well
	★ Subject site
	○ Study area

SOURCE: TOPOI MAPS

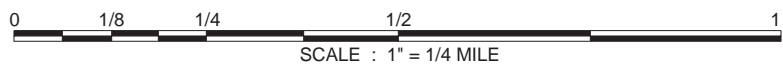


FIGURE 1












Shell-branded Service Station
 5755 Broadway
 Oakland, California

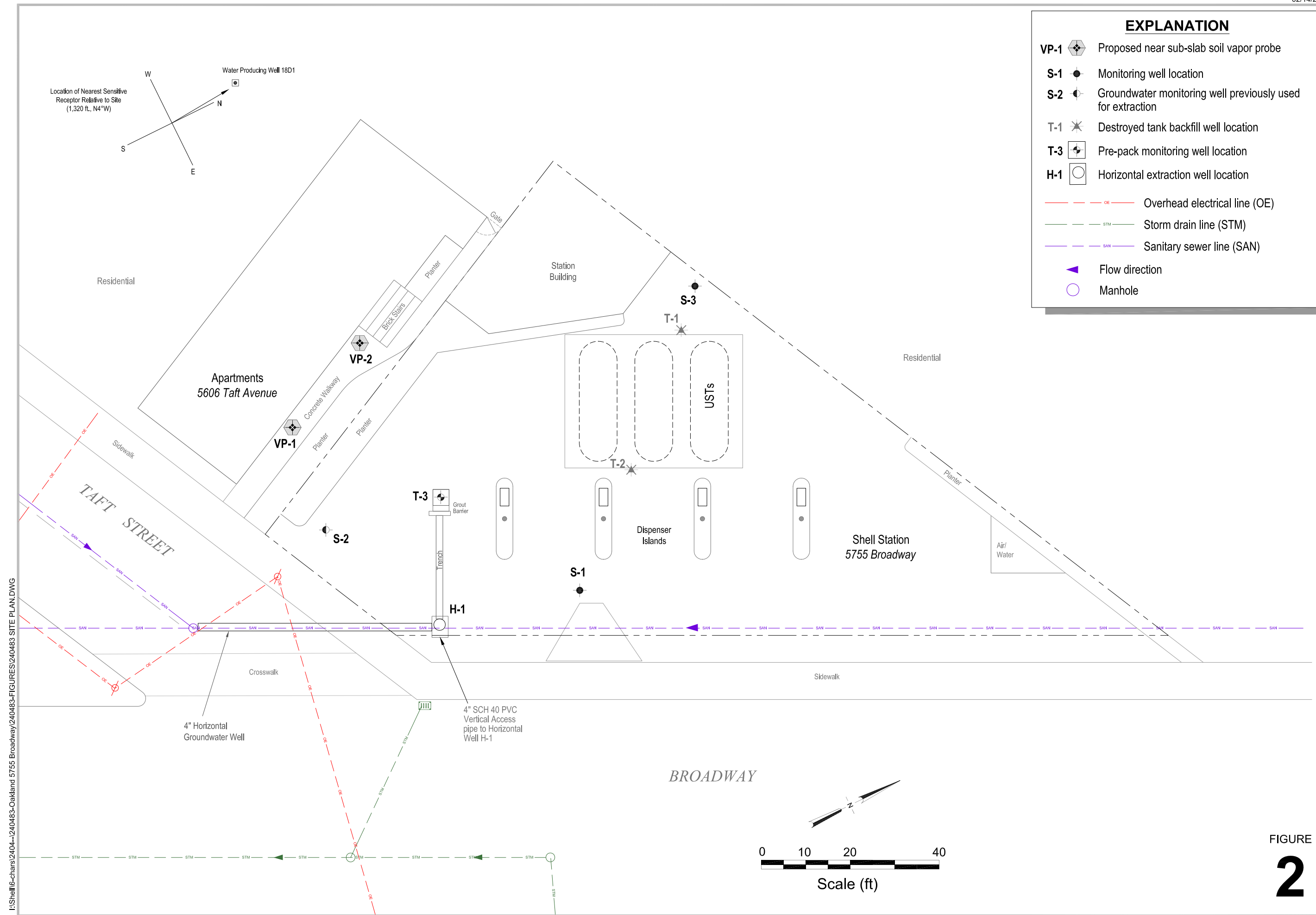


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Vicinity Map

EXPLANATION

- VP-1  Proposed near sub-slab soil vapor probe
- S-1  Monitoring well location
- S-2  Groundwater monitoring well previously used for extraction
- T-1  Destroyed tank backfill well location
- T-3  Pre-pack monitoring well location
- H-1  Horizontal extraction well location
-  Overhead electrical line (OE)
-  Storm drain line (STM)
-  Sanitary sewer line (SAN)
-  Flow direction
-  Manhole



I:\Shell\6-chars\2404-1\240483-Oakland 5755 Broadway\240483-FIGURES\240483 SITE PLAN.DWG



Shell-branded Service Station

5755 Broadway
Oakland, California

FIGURE
2

APPENDIX A

SITE HISTORY

SITE HISTORY

Site Background: Prior to 1972, the site was a Thrifty service station. Shell leased the parcel in 1972 and replaced the existing underground storage tanks (USTs) with three 10,000-gallon double-wall fiberglass gasoline USTs in late 1985.

1985 Subsurface Investigation: In June 1985, EMCON Associates (EMCON) drilled one soil boring (S-A) and installed one groundwater monitoring well (S-1). Soil samples from soil boring S-A contained up to 3 milligrams per kilogram (mg/kg) total petroleum hydrocarbons as gasoline (TPHg). No soil analytical data were obtained from S-1. EMCON's August 1, 1985 letter presents investigation details.

1989 Subsurface Investigation: In September 1989, Harding Lawson Associates (HLA) installed two groundwater monitoring wells (S-2 and S-3). Soil samples collected from the well borings contained up to 92 mg/kg TPHg and 0.12 mg/kg benzene. HLA's January 12, 1990 *Quarterly Technical Report- Fourth Quarter of 1989* provides soil and groundwater analytical data.

1992 Product Release and Tank Backfill Well Purging: In December, 1992, Gettler-Ryan, Inc. (G-R) of Hayward, California replaced a defective pipe fitting reported to have released approximately 200 gallons of unleaded gasoline. Mixed water and separate phase hydrocarbons (SPHs) were purged from the tank backfill wells (T-1 and T-2) on a daily basis from December 24, 1992 through January 7, 1993. Purging was suspended when SPHs originally observed in the wells were reduced to a sheen. According to Shell records, approximately 40,000 gallons of water mixed with SPHs were purged from the tank backfill wells.

1993 Soil Sampling and Sanitary Sewer Upgrade: Concurrent with purging SPHs from the tank backfill wells, G-R excavated three trenches up to 14 feet deep at the site's southeast corner to identify hydrocarbon-impacted areas near sewer piping. Soil samples collected from the trench excavations contained up to 1,300 mg/kg TPHg and 1.1 mg/kg benzene.

The on-site sanitary sewer piping and portions of the off-site sewer piping were replaced with piping resistant to hydrocarbon penetration. Additionally, G-R installed a horizontal groundwater extraction (GWE) well within the excavated sewer trench below a section of sewer piping and constructed a grout barrier in the sewer trench to prevent further off-site migration of residual hydrocarbons. During sewer upgrade activities, approximately 126 cubic yards of soil were transported by U.S. Services of Oakland, California to Browning Ferris Landfill in Livermore, California for disposal.

Weiss Associates' June 18, 1993 *Soil Sampling and Sanitary Sewer Upgrade* report presents details of the soil investigation, sewer replacement, grout barrier installation, and horizontal well installation.

1998 Dispenser Upgrade: In March, 1998, Paradiso Mechanical of San Leandro, California upgraded the station's dispensers and UST turbine pumps. Soil samples, collected below each dispenser, showed field indications of hydrocarbons, including odor and soil discoloration. The soil samples contained up to 1.8 mg/kg TPHg, 3.4 mg/kg benzene, and 25 mg/kg methyl tertiary-butyl ether (MTBE). Cambria Environmental Technology, Inc.'s (Cambria's) April 9, 1998 *Dispenser Sampling Report* presents details of the dispenser upgrade activities.

2002 Soil Borings: In August 2002, Cambria drilled 11 soil borings (B-1 through B-11) to further define the extent of petroleum hydrocarbons on and off site. Soil samples from the on-site borings (B-5 through B-11) contained up to 260 mg/kg TPHg, 0.096 mg/kg benzene, and 0.9 mg/kg MTBE. Grab groundwater samples collected from the on-site borings contained up to 66,000 micrograms per liter ($\mu\text{g/L}$) TPHg, 1,800 $\mu\text{g/L}$ benzene, and 9,100 $\mu\text{g/L}$ MTBE. No TPHg, benzene, toluene, ethylbenzene, and total xylenes (BTEX), or MTBE was detected in soil or groundwater samples collected from the off-site borings (B-1 through B-4), with the exception 3,500 $\mu\text{g/L}$ MTBE in the grab groundwater sample collected from boring B-1. Investigation results are presented in Miller Brooks' October 21, 2002 *Subsurface Investigation Report*.

2000-2001 Interim Remediation Activities: From April to October 2000, mobile GWE using a vacuum truck was conducted periodically at the site. A single dual-phase vacuum extraction (DVE) event was performed at the site on February 7, 2001, and monthly mobile DVE was conducted at the site from May to November 2001. GWE and DVE extracted approximately 20,038 gallons of groundwater from wells S-2, H-1, and T-2 containing an estimated 6.2 pounds of TPHg, 0.1 pounds of benzene, and 0.45 pounds of MTBE. Cambria suspended monthly DVE from wells S-2 and H-1 due to the low influent volume of groundwater from S-2 and the low influent MTBE concentrations from H-1.

2003-2006 Temporary GWE System: From October 2003 to May 2006, Cambria operated a temporary GWE system from well S-2. The temporary GWE system removed approximately 32,043 gallons of water containing an estimated 0.88 pounds of TPHg, 0.046 pounds of benzene, and 0.62 pounds of MTBE.

2004-2005 Fuel System Upgrade Activities: In November 2004, Fillner Construction, Inc. (Fillner) of Rocklin, California upgraded the fuel system. On November 19, 2004, a

water line was apparently damaged during the construction activities. On November 20, 2004, station personnel observed that water leaking from the broken line had entered the tank backfill and caused the uncovered tanks to float in the tank excavation. Cambria and Shell personnel responded at the site and secured the tanks. Piping had been previously disconnected from the tanks. Cambria observed a small amount of fuel dripping from one of the tank sumps. Shell estimates that less than 0.1 gallon of fuel was lost. Fillner used a bucket to contain the fuel until the sump was repaired. Absorbent cloths were used to remove fuel from within the tank backfill.

In December 2004, Fillner removed three 10,000-gallon, double-walled fiberglass gasoline USTs. In January 2005, Cambria collected four soil samples from the UST excavation (TP-1 through TP-4) which contained up to 32 mg/kg TPHg and 0.08 mg/kg MTBE. No benzene was detected in the samples. Later in January 2005, Fillner uncovered visibly hydrocarbon-impacted fill material in the northeast corner of the tank excavation. In February 2005, Cambria collected four additional samples (TP-5 through TP-8) from this area. No TPHg, BTEX, or MTBE was detected in these samples. A grab groundwater sample collected from the UST excavation contained 640 µg/L TPHg, 11 µg/L benzene, and 38 µg/L MTBE.

In February 2005, Cambria collected soil samples from beneath the former dispensers (DS-1, through DS-4) and former piping (P-1, P-2 and P-3) from native soil at depths between 1 and 2 feet below grade (fbg). These samples contained up to 1,100 mg/kg TPHg, and 0.84 mg/kg MTBE. No benzene was detected in the samples. Based on these results, Fillner over-excavated the dispenser and piping areas. Cambria collected seven confirmation samples at 4 to 6 fbg in the same locations where the initial samples were collected. The deeper samples contained up to 1,000 mg/kg TPHg, 0.66 mg/kg benzene, and 1.9 mg/kg MTBE.

In February 2005, Cambria also conducted a geophysical survey in the area northeast of the UST excavation to identify any other potential underground sources using ground-penetrating radar. The survey identified four geophysical anomalies, two of which had features consistent with buried USTs or drums.

From January to June 2005, Manley and Sons Trucking, Inc. transported approximately 1,522.48 tons of soil and pea gravel to Allied Waste Industries' Forward Landfill in Manteca, California for disposal. In addition, approximately 291,077 gallons of groundwater were removed from the tank excavation containing an estimated 1.1 pounds of TPHg, 0.1 pounds of benzene, and 0.85 pounds of MTBE.

Cambria's August 9, 2005 *Fuel System Upgrade Soil Sampling, Soil Excavation, and Geophysical Survey Report* provides details of these activities.

2005 Subsurface Investigation: In November 2005, Cambria drilled three hand-auger soil borings (SB-12 through SB-14). Bedrock was encountered at depths ranging from 5.5 to 8 fbg. Soil samples contained up to 68 mg/kg total petroleum hydrocarbons as diesel (TPHd) and 180 mg/kg TPHg. No benzene or MTBE was detected in the soil samples. Cambria's February 13, 2006 *Site Investigation Report* details investigation results.

Groundwater Monitoring Program: Groundwater monitoring and sampling began in July 1985. Depth to first-encountered groundwater typically ranges between 0.5 to 4.9 fbg. The groundwater gradient is generally to the south.