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TRANSMITTAL

DATE: June 4, 2012 REFERENCE NO.: 240897
PROJECT NAME: 4411 Foothill Boulevard, Oakland
TO: Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

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8:44 am, Jun 12, 2012
Alameda County
Environmental Health

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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)
Bill Phua (property owner), Foothill Blvd. LLC, P.O. Box 10664, Oakland, CA 94610

Completed by: Peter Schaefer Signed: 

Filing: Correspondence File



Jerry Wickham
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Re: Former Shell Service Station
4411 Foothill Boulevard
Oakland, California
SAP Code 135686
Incident No. 98995746
ACEH Case No. RO0000415

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 written over a horizontal line.

Denis L. Brown
Senior Program Manager



SUBSURFACE INVESTIGATION WORK PLAN

**FORMER SHELL SERVICE STATION
4411 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA**

**SAP CODE 135686
INCIDENT NO. 98995746
AGENCY NO. RO0000415**

**Prepared by:
Conestoga-Rovers
& Associates**

JUNE 4, 2012

REF. NO. 240897 (18)

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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 as discussed in Shell's and CRA's March 28, 2012 meeting with Alameda County Environmental Health (ACEH).

The site is a former Shell service station located on the southern corner of the intersection of Foothill Boulevard and High Street in Oakland, California (Figure 1). The former station layout included three first-generation underground storage tanks (USTs) (1958 to 1971), three second-generation USTs (1971 to 1984), three third-generation gasoline USTs (1984 to 2002), a waste oil UST (removed 1992), and four product dispensers (removed 2002) as shown on Figure 2. Land use in the vicinity of the site is a mix of commercial and residential, with gasoline service stations occupying the northern and western corners of the intersection. The subject property is currently developed as a strip mall with a variety of commercial and retail uses.

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

2.0 WORK TASKS

CRA proposes to reinstall two sub-slab soil vapor probes which were destroyed in September 2009 and install five new sub-slab soil vapor probes to assess soil vapor concentrations beneath the on-site buildings at the locations shown on Figure 2. Specific tasks are described below.

2.1 PERMIT

Alameda County Public Works Agency does not require a permit to install 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 reinstall two sub-slab soil vapor probes (SSV-1 and SSV-2) which were destroyed in September 2009 and install five new sub-slab soil vapor probes (SSV-3 through SSV-7) into the concrete slabs beneath the on-site buildings (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 floor slab. Cuttings will be removed using a towel moistened with distilled water or a portable vacuum cleaner.

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 floor material and approximately 3 inches into the sub-slab 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 sub-slab 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 sub-slab 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 floor. 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 2 weeks 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 SVP-1 through SVP-3 using a vacuum pump and Tedlar® bags. Prior to sampling, CRA will purge at least three tubing volumes of air from the probes using a vacuum pump. Then 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 percent of the source concentration (i.e., 10 percent 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, and tertiary-butyl

alcohol 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, boring logs, and analytical laboratory reports.

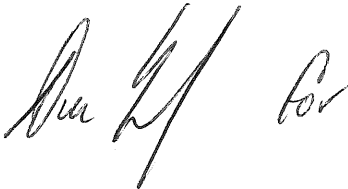
3.0 SCHEDULE

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

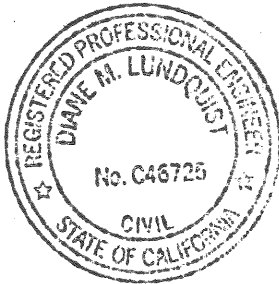
All of Which is Respectfully Submitted,
CONESTOGA-ROVERS & ASSOCIATES



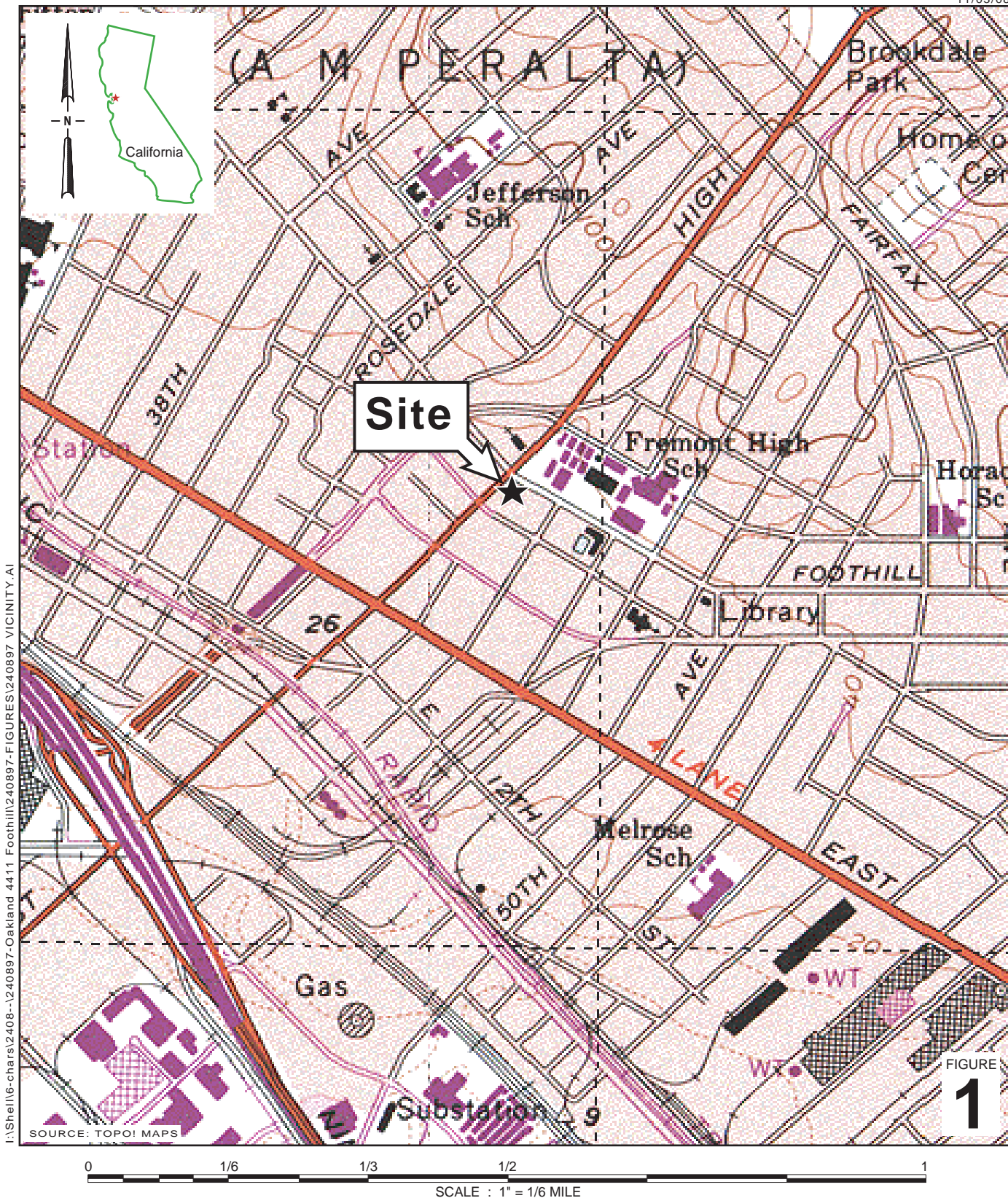
Peter Schaefer, CEG, CHG



Aubrey K. Cool, PG



FIGURES



Former Shell Service Station
 4411 Foothill Boulevard
 Oakland, California

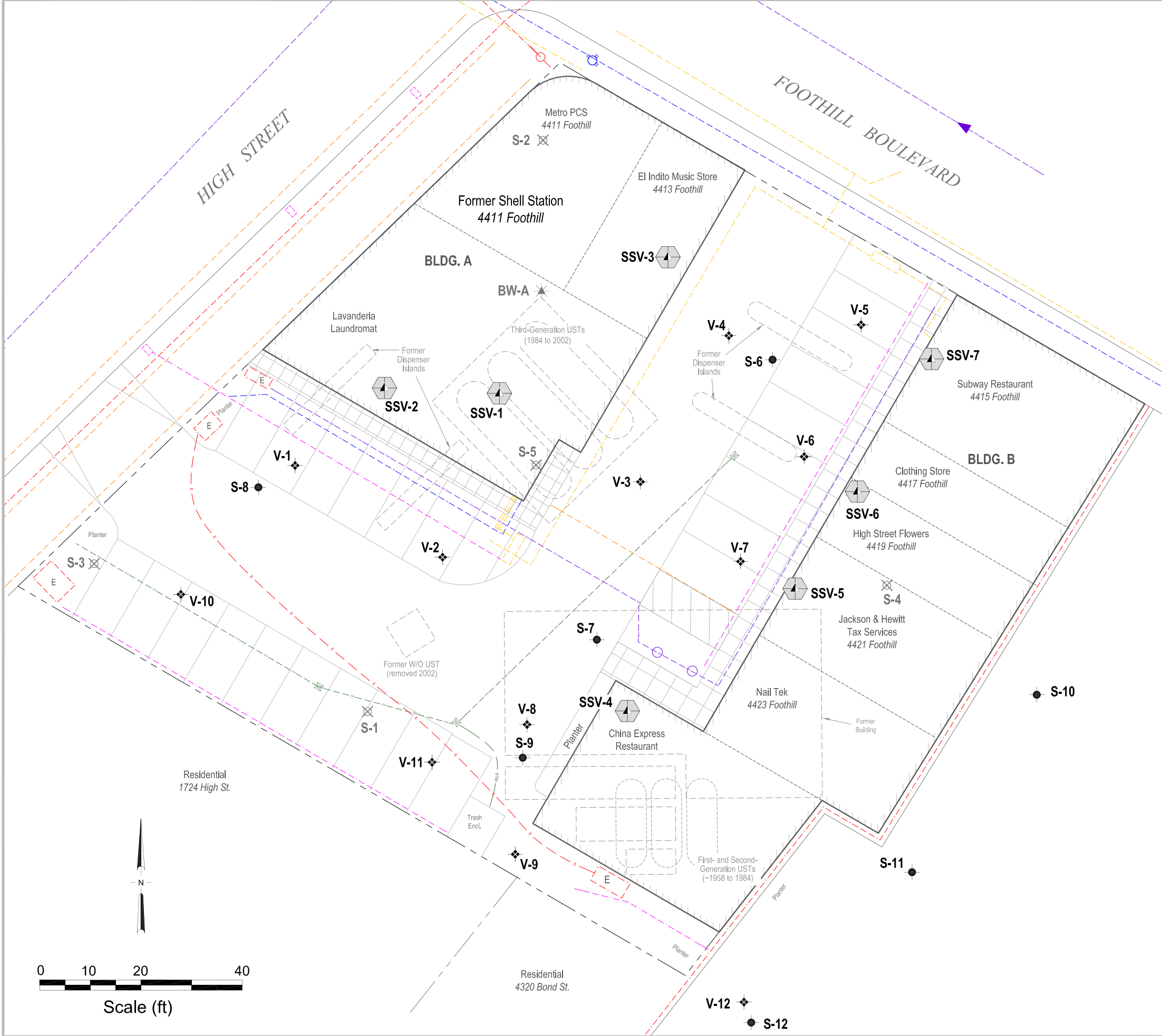


**CONESTOGA-ROVERS
 & ASSOCIATES**

Vicinity Map

EXPLANATION

- SSV-1 Proposed sub-slab soil vapor probe location
- S-6 Monitoring well location
- V-1 Soil vapor probe location
- S-1 Destroyed monitoring well location
- BW-A Destroyed tank backfill well location
- Electrical line (E)
- Telecommunications line (T)
- Gas line (GAS)
- Water line (W)
- Sanitary Sewer line (SAN)
- Storm drain line (STM)
- Unknown utility line
- Fire hydrant
- Catch basin
- Manhole
- Power pole
- Flow direction



I:\Shell\G-chars\24089-1240897-Oakland 4411 Foothill\240897-FIGURES\240897 SITE PLAN.DWG

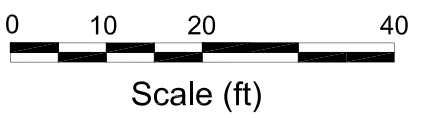


FIGURE 2



Former Shell Service Station
 4411 Foothill Boulevard
 Oakland, California

APPENDIX A

SITE HISTORY

SITE HISTORY

1958 Underground Storage Tank (UST) Piping Leak: On April 19, 1958, a gasoline shortage was discovered at the operating Shell-branded service station. It was determined that there was a piping leak into a concrete pump pit and then into the soil in the vicinity of the storage tanks. Separate phase hydrocarbons (SPHs) were found in an irrigation well located at 4320 Bond Street, adjacent to the Shell site. Shell Oil Products US (Shell) installed 22 8-inch diameter wells to depths of 15 feet below grade (fbg) along the property boundary and 1 well within the tank complex. Groundwater was pumped from the wells, and the extracted water was transported to a separator. Though the volume of the release is not known, Shell reported in a June 2, 1958 letter to Traveler's Insurance Company that they recovered 650 gallons of gasoline from the wells.

1971 UST Removal and Replacement: A Shell document dated July 15, 1971 notes plans to remove the then-existing 6,000-gallon USTs. An invoice dated September 17, 1971 indicates the delivery of one 10,000-gallon UST, one 8,000-gallon UST, and one 550-gallon underground waste oil tank.

1977 Dispenser Piping Leak: A Shell Oil Company *Oil Spill Report* dated October 19, 1977 documents the release of 2,000 gallons of gasoline from a leaking pipe that ran from the USTs to the dispenser located closest to High Street. The report noted that the damaged section of pipe was replaced and that leak detectors were installed on all systems.

1984 UST Removal and Replacement: A Shell purchase order dated October 1, 1984 indicates the removal of the then-existing USTs and installation of three 10,000-gallon fiberglass USTs.

1991 Waste Oil Tank Leak: On June 5, 1991, Shell submitted an Underground Storage Tank Unauthorized Release (Leak)/Site Contamination Report (Unauthorized Release Report) detailing a release from the 550-gallon waste oil tank at the site. The report stated that the release was caused by tank failure, that the volume of release was unknown, and that the contents of the tank had been removed.

1992 Waste Oil Tank Removal: In February 1992, Delta/Bay Builders, Inc. removed the 550-gallon waste oil tank. GeoStrategies Inc. (GeoStrategies) collected a soil sample from the bottom of the excavation at a depth of approximately 11 fbg. No total petroleum hydrocarbons as diesel (TPHd), total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, and total xylenes (BTEX), oil and grease, halogenated

volatile organic compounds, or cadmium were detected in the sample. The soil sample contained 79 milligrams per kilogram (mg/kg) chromium, 6.7 mg/kg lead, 180 mg/kg nickel, and 56 mg/kg zinc. Details of the waste oil tank removal and sampling activities are presented in GeoStrategies' March 26, 1992 report.

1992 Subsurface Investigation: In November 1992, GeoStrategies installed one groundwater monitoring well (S-1) in the vicinity of the waste oil UST. Soil samples collected from the well boring contained up to 390 mg/kg total petroleum hydrocarbons as motor oil (TPHmo), 180 mg/kg TPHd, 110 mg/kg TPHg, 0.45 mg/kg benzene, 0.51 mg/kg toluene, 2.2 mg/kg ethylbenzene, and 8 mg/kg total xylenes. GeoStrategies' January 19, 1993 *Monitoring Well Installation Report* provides well installation details.

1993 Subsurface Investigation: In May 1993, Hydro Environmental Technologies, Inc. (HETI) installed two groundwater monitoring wells (S-2 and S-3). Soil samples collected from the well borings contained up to 36 mg/kg TPHd, 1,300 mg/kg TPHg, 0.019 mg/kg toluene, 35 mg/kg ethylbenzene, and 200 mg/kg total xylenes. No benzene was detected in soil samples from the well borings. Well installation details are presented in HETI's July 22, 1993 report.

1995 Subsurface Investigation: In June 1995, Pacific Environmental Group (PEG) drilled eight on-site soil borings and two off-site borings. Soil samples collected from the borings contained up to 380 mg/kg TPHd, 840 mg/kg TPHg, 0.13 mg/kg benzene, 6.0 mg/kg toluene, 20 mg/kg ethylbenzene, and 98 mg/kg total xylenes. Grab groundwater samples collected from borings GP-2 and GP-10 contained up to 820 micrograms per liter ($\mu\text{g/L}$) TPHmo, 850 $\mu\text{g/L}$ TPHd, 1,100 $\mu\text{g/L}$ TPHg, 34 $\mu\text{g/L}$ benzene, 41 $\mu\text{g/L}$ ethylbenzene, and 71 $\mu\text{g/L}$ total xylenes. No toluene was detected in the grab groundwater samples. PEG's September 12, 1995 *Site Investigation* report presents investigation details.

1998 Fuel System Upgrades: In November 1998, Paradiso Mechanical (Paradiso) upgraded the service station by adding secondary containment to the gasoline turbines and dispensers. Cambria Environmental Technology Inc. (Cambria) collected soil samples (D-1 through D-4) from beneath each of the dispensers. These soil samples contained up to 1,500 mg/kg TPHg, 9.2 mg/kg benzene, 4.3 mg/kg toluene, 15 mg/kg ethylbenzene, 61 mg/kg total xylenes, and 13 mg/kg methyl tertiary-butyl ether (MTBE). Details of dispenser upgrade and sampling activities are presented in Cambria's November 30, 1998 *Dispenser Soil Sampling Report*.

1999 - 2000 Oxygen Releasing Compound (ORC) Remediation: In September 1999, Cambria purged well BW-A with a vacuum truck and installed ORC socks in wells S-1, S-2, and BW-A. These activities are detailed in Cambria's October 15, 1999 *Second Quarter 1999 Monitoring Report*. According to field notes attached to Blaine Tech Services, Inc.'s (Blaine's) January 23, 2001 *Fourth Quarter 2000 Groundwater Monitoring* report, Blaine removed the ORC socks in December 2000.

1999 Site Conceptual Model (SCM) and Conduit Study: In December 1999, Cambria conducted a subsurface conduit study which identified several conduits that may provide limited preferential groundwater flow at times of shallow groundwater depth. Cambria also submitted additional data and analysis to complete the SCM for the site. Cambria's December 13, 1999 *Letter Response and Work Plan* presents the conduit study results and the additional portions of the SCM.

2000 Subsurface Investigation: In January 2000, Cambria installed one well (S-4) adjacent to the southeast corner of the station building and drilled one soil boring (SB-4) northwest of the station building. Soil samples contained up to 244 mg/kg TPHd, 786 mg/kg TPHg, 2.27 mg/kg benzene, 4.35 mg/kg toluene, 8.1 mg/kg ethylbenzene, 26.5 mg/kg total xylenes, and 0.893 mg/kg MTBE. Grab groundwater samples collected from boring SB-4 contained up to 180,000 µg/L TPHg, 31,000 µg/L benzene, 6,900 µg/L toluene, 5,900 µg/L ethylbenzene, 26,000 µg/L total xylenes, and 7,100 µg/L MTBE. Investigation details are contained in Cambria's November 17, 2000 *Site Investigation Report*.

2000 Sensitive Receptor Survey (SRS): In February 2000, Cambria conducted an SRS which identified 58 monitoring, test, or industrial wells located within a ½-mile radius of the site. No municipal, domestic, or irrigation wells were identified. The SRS is included in Cambria's November 17, 2000 *Site Investigation Report*.

2001 Mobile Dual-Phase Extraction (DPE): From April to September 2001, Cambria conducted monthly mobile DPE from wells BW-A and S-2. Mobile DPE removed approximately 18,588 gallons of groundwater containing approximately 1.05 pounds of TPHg and 0.39 pounds of MTBE. Mobile DPE results are summarized in Cambria's November 7, 2001 *Third Quarter 2001 Monitoring Report*.

2001 Preferential Pathway Analysis: In June 2001, Cambria conducted a preferential pathway analysis using a San Francisco Bay Regional Water Quality Control Board (RWQCB) dilution attenuation factor (DAF) analysis originally developed for a similar analysis at San Francisco International Airport in 1998. The analysis determined that

groundwater containing approximately 10 µg/L benzene and 218 µg/L MTBE could potentially reach San Francisco Bay (the nearest groundwater receptor). The DAF analysis is summarized in Cambria's June 26, 2001 First Quarter 2001 *Monitoring Report and Letter Response*.

2001 Corrective Action Plan (CAP): In November 2001, Cambria submitted a CAP in preparation for impending site demolition and fueling facility removal which recommended over-excavation following removal of the underground facilities, removing groundwater from the excavation, and placing ORC at the base of the excavation to enhance biological degradation of residual-impacted soil and groundwater. Cambria's November 12, 2001 CAP details these recommendations.

2002 UST Removal: In February 2002, Paradiso removed the gasoline USTs and hydraulic hoists, and over-excavated approximately 1,250 cubic yards of impacted soil around and beneath the USTs, product dispenser islands, and hydraulic hoists. Phillips Services Corporation extracted approximately 16,000 gallons of groundwater from the excavations. Cambria collected 54 soil samples and 2 grab groundwater samples from the excavation. Soil samples collected following the over-excavation contained up to 230 mg/kg hydraulic oil, 1,800 mg/kg TPHg, 9.6 mg/kg benzene, 42 mg/kg toluene, 100 mg/kg ethylbenzene, 590 mg/kg total xylenes, and 0.48 mg/kg MTBE. The grab groundwater sample collected following over-excavation contained 590 µg/L TPHg, 2.7 µg/L benzene, 2.3 µg/L toluene, 6.4 µg/L total xylenes, and 1,900 µg/L MTBE. No ethylbenzene, di-isopropyl ether (DIPE), ethyl tertiary-butyl ether (ETBE), tertiary-amyl methyl ether (TAME), tertiary butyl alcohol (TBA), or ethanol was detected in this sample. Following over-excavation, Paradiso placed 810 pounds of ORC powder on the bottom of the excavation. Details of the fuel facilities removal and corrective action are presented in Cambria's February 25, 2002 *Underground Storage Tank Closure Report*.

2002 Subsurface Investigation: In May 2002, Cambria installed one groundwater monitoring well (S-5). The well installation is described in Cambria's July 2, 2002 *Monitoring Well Installation Report*.

2005 SCM: In August 2005, Cambria submitted an SCM which recommended destroying all on-site wells and replacing them after site development was completed, defining the horizontal extent of soil and groundwater impacts southeast of well S-4 and south of the 1958 fuel release, and continued groundwater monitoring. Cambria's August 16, 2005 *Subsurface Investigation Work Plan and SCM* details these recommendations.

2005 Well Destructions: In anticipation of redevelopment of the site, Cambria properly destroyed five wells (S-1 through S-5) in July 2005. The well destructions are described in Cambria's August 19, 2005 *Well Destruction Report*.

2005 Subsurface Investigation and Over-Excavation: In August 2005, Cambria drilled two soil borings (TB-1 and TB-3) to investigate the extent of petroleum-hydrocarbon-impacted soil and groundwater from the 1958 piping leak. Soil samples from the borings contained up to 1,600 mg/kg TPHg, 2.2 mg/kg benzene, 11 mg/kg ethylbenzene, 48 mg/kg total xylenes, 0.0062 mg/kg MTBE, 0.021 mg/kg TBA, and 291 mg/kg lead. No toluene, DIPE, ETBE, TAME, 1,2-dichloroethane (1,2-DCA), or ethylene dibromide (EDB) was detected in the soil samples from the borings. Grab groundwater samples from the borings contained up to 180,000 µg/L TPHg, 22,000 µg/L benzene, 9,700 µg/L toluene, 5,200 µg/L ethylbenzene, 25,000 µg/L total xylenes, 890 µg/L MTBE, 1,600 µg/L DIPE, and 13.4 µg/L lead. No TBA, ETBE, TAME, 1,2-DCA, or EDB was detected in the samples. Because the former UST area was located within the proposed footprint of a new building to be constructed at the site, K.E. Curtis Construction excavated soil to the extent feasible in order to remove hydrocarbon-impacted soil beneath the building prior to site redevelopment. The excavation was completed to dimensions of 20 feet long by 25 feet wide by 20 feet deep. Following excavation, Cambria collected one confirmation soil sample from each sidewall and two soil samples from the excavation base. The excavation soil samples contained up to 0.050 mg/kg benzene, 0.0083 mg/kg ethylbenzene, 0.040 mg/kg xylenes, 0.029 mg/kg TBA, and 0.023 mg/kg DIPE. No TPHg, toluene, MTBE, ETBE, or TAME was detected in the excavation samples. No water was observed in the bottom of the excavation. The activities are described in their entirety in Cambria's November 16, 2005 *Subsurface Investigation and Over-Excavation Report*.

2006 Subsurface Investigation: In May 2006, Cambria drilled five soil borings (SB-5 through SB-8, and SB-12) to assess the vertical extent of soil and groundwater impacts. Soil samples collected from the borings contained up to 110 mg/kg TPHd, 3,000 mg/kg TPHg, 3.7 mg/kg benzene, 60 mg/kg toluene, 47 mg/kg ethylbenzene, 270 mg/kg total xylenes, and 0.46 mg/kg MTBE. Grab groundwater samples contained up to 2,400 µg/L TPHd, 5,900 µg/L TPHg, 3,300 µg/L benzene, 470 µg/L toluene, 260 µg/L ethylbenzene, 420 µg/L total xylenes, 880 µg/L MTBE, and 630 µg/L TBA. The vertical extent of petroleum constituents in groundwater at the site was defined by the groundwater results from boring SB-12, located down gradient of the first- and second-generation USTs. The results from the grab groundwater sample from 31 to 35 fbg in this boring indicated that the petroleum constituent concentrations attenuate by one to two orders

of magnitude with depth. The activities are described in Cambria's July 25, 2006 *Subsurface Investigation Report and Monitoring Well Installation Work Plan*.

2007 Subsurface Investigation: In February 2007, Cambria installed four replacement wells (S-6 through S-9). Soil samples collected from the well borings contained up to 62 mg/kg TPHd, 230 mg/kg TPHg, 2.6 mg/kg benzene, 2.5 mg/kg toluene, 7.1 mg/kg ethylbenzene, 24 mg/kg total xylenes, 0.28 mg/kg MTBE, 1.6 mg/kg TBA, and 12 mg/kg lead. No 1,2-DCA or EDB was detected in the soil samples. The well reinstallation activities are described in Conestoga-Rovers & Associates' (CRA's) April 19, 2007 *Site Investigation and First Quarter 2007 Groundwater Monitoring Report*.

2007 Soil Vapor Investigation: CRA installed nine on-site soil vapor probes (V-1 through V-7, V-10, and V-11) at depths of approximately 5 fbg. The probe installation details are presented in CRA's March 13, 2008 *Soil Vapor Probe Installation and Sampling Report*.

2008 Soil Vapor Monitoring: CRA conducted three rounds of soil vapor monitoring from the on-site soil vapor probes. TPHg, benzene, and ethylbenzene were detected at concentrations exceeding RWQCB environmental screening levels (ESLs) for soil gas with commercial land use¹. The monitoring results are presented in CRA's November 10, 2008 *Soil Vapor Probe Installation and Sampling Report*.

2009 Sub-Slab Soil Vapor Investigation: In March of 2009, CRA installed two sub-slab soil vapor probes (SSV-1 and SSV-2) into the subsurface beneath the on-site laundromat's building footprint to further assess soil vapor concentrations beneath the site. The sub-slab soil vapor probe sample collected from SSV-2 did not contain BTEX, and BTEX detections in SSV-1 were below ESLs. Details of this investigation are presented in CRA's June 22, 2009 *Sub-Slab Soil Vapor Probe Installation and Sampling Report*.

2009 Subsurface Investigation: In August and September 2009, CRA installed three off-site groundwater monitoring wells (S-10 through S-12) and one off-site soil vapor probe (V-12) and destroyed two on-site sub-slab soil vapor probes (SSV-1 and SSV-2). BTEX, fuel oxygenates, and lead scavengers were not detected in soil samples collected during this investigation. All TPHg detections in soil samples collected during this investigation were below RWQCB ESLs. Only one TPHd detection in soil exceeded ESLs (S-12-5.5'; 880 mg/kg). The laboratory noted that the TPHd reported does not

¹ Screening for Environmental Concerns at Sites With Contaminated Soil and Groundwater, California Regional Water Quality Control Board, Interim Final - November 2007 [Revised May 2008]

match the diesel standard chromatographic pattern. The soil vapor probe could not be sampled, because water was present in the probe's Teflon[®] tubing. CRA's January 5, 2010 *Subsurface Investigation Report* provides investigation details.

2010 Soil Vapor Monitoring: In July 2010, CRA conducted soil vapor monitoring from off-site soil vapor probe V-12. No TPHg, BTEX, MTBE, or TBA was detected in the soil vapor sample. The monitoring results are presented in CRA's August 16, 2010 *Soil Vapor Sampling Report*.

2011 Soil Vapor Monitoring: In May 2011, CRA conducted soil vapor monitoring from soil vapor probes V-1 through V-9 and V-11. Soil vapor probes V-10 and V-12 could not be sampled due to water in the sampling tubing. No toluene, ethylbenzene, total xylenes, MTBE, or TBA was detected at concentrations exceeding RWQCB ESLs for soil gas with commercial land use. Soil vapor probes V-2 through V-6 and V-8 contained TPHg at concentrations exceeding RWQCB ESLs. It should be noted that RWQCB ESL guidance advises that "TPH ESLs must be used in conjunction with ESLs for related chemicals (e.g. BTEX, polynuclear aromatic hydrocarbons, oxidizers, etc.)." In this case, BTEX, MTBE, and TBA would be the appropriate related chemicals. Soil vapor probes V-2 and V-3 contained benzene at concentrations exceeding RWQCB ESLs for commercial land use. The monitoring results are presented in CRA's August 3, 2011 *Soil Vapor Sampling Report*.

Groundwater Monitoring Program: Groundwater has been monitored at the site since December 1992. Groundwater depths have ranged from approximately 6 to 12 fbg. The calculated groundwater gradient typically trends southwesterly.