METROVATION

July 7, 2012

Mr. Jerry Wickham
Senior Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Re: Terradev Jefferson LLC Property
645 Fourth Street, Oakland, CA 94607
Fuel Leak Case No. RO0003001
Blue Rock Project No. ASE-1

Dear Mr. Wickham,

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.

Sincerely,

Sara May
Director of Operations
Metrovation, LLC, managing agent for
Terradev Jefferson, LLC

Attachment:

Blue Rock Environmental, Inc.'s
Sub-Slab Soil Vapor Sampling Report dated July 7, 2012

OAKLAND IRONWORKS BUILDING
580 SECOND STREET, SUITE 260, OAKLAND CA 94607 TELEPHONE (510) 839-4000 FAX (510) 465-4472

BLUE ROCK ENVIRONMENTAL, INC.

Mr. Jerry Wickham
Senior Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

July 7, 2012

Re: Sub-Slab Soil Vapor Sampling Report
Terradev Jefferson LLC Property
645 4th Street, Oakland, CA 94607
Fuel Leak Case No. RO0003001
Blue Rock Project No. ASE-1

Dear Mr. Wickham,

This report, prepared by Blue Rock Environmental, Inc. (Blue Rock) on behalf of Terradev Jefferson, LLC, presents the results of sub-slab vapor sampling at the referenced site which was conditionally approved by the Alameda County Health Care Services Agency – Environmental Health Services (ACHCSA) in a letter dated May 16, 2012.

Background

Site Description and UST History

The site is located southeast of the intersection of 4th Street and Martin Luther King Jr. Way in Oakland, California (Figure 1). The site consists of a single story commercial building, bounded closely on the sides and back by other commercial buildings. One single-walled steel underground storage tank (UST) was discovered beneath the sidewalk immediately adjacent to the front of the building during renovation in 2006. The UST is located on the upgradient edge of a developed city block.

In their *Tank Closure Report* dated September 21, 2006, Golden Gate Tank Removal, Inc. (GGT) reported that the UST contained gasoline with an approximate holding capacity of 1,000-gallons, measuring approximately 10 feet in length and 4 feet in diameter. The bottom of the UST was estimated to be located 7.5 to 8 feet below ground surface (ft bgs). The fill port was reported to be located at the west end of the tank (Figure 2).

GGT abandoned the UST in place by triple washing followed by filling to capacity with concrete slurry because of structural considerations due to the proximity of the UST to the building foundation. Abandonment was performed with the permission and under the oversight of the City of Oakland Fire Prevention Bureau.

Two soil samples were collected from below the UST at a depth of 9 ft bgs during abandonment activities. Both samples contained elevated concentrations of total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and xylenes (BTEX); however, TPH as diesel (TPHd) and the five fuel oxygenates MTBE, TBA, ETBE, DIPE, and TAME were not detected (Table 2). No groundwater was encountered during abandonment activities, though the soil samples collected beneath the tank were reported as "wet".

Summary of Investigation Activities

Subsurface investigation began in 2009. A total of two soil borings have been drilled (B-1 and B-2) and three extraction wells have been installed (DPE-1 through DPE-3) at the site. A summary of well construction details is included in Table 1, and summaries of soil and groundwater sample analytical data are included in Tables 2 and 3, respectively.

In 2009, Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo & Moore) completed a limited subsurface investigation, the findings of which were presented in their *Limited Phase II Environmental Site Assessment* dated July 24, 2009. Two borings (B-1 and B-2) were advanced on each side of the UST by direct push drilling methods to a depth of 20 ft bgs. No soil samples were submitted for laboratory analysis; however, soil samples were screened in the field with a photo-ionization detector (PID) meter. In B-1, PID readings increased with depth to a maximum of 1,422 parts per million (ppm) at 9 ft bgs, and attenuated below that depth. Temporary wells were built in each boring, in which groundwater stabilized at a depth of approximately 9.6 ft bgs and was sampled. Concentrations of TPHd, TPHg, BTEX, and MTBE were present in groundwater samples collected from both borings (Table 3), although TPHg levels were an order of magnitude greater than TPHd levels suggesting the former is the primary hydrocarbon range of interest at the site.

In 2010, Blue Rock supervised the installation of three extraction wells (DPE-1 through DPE-3). Wells DPE-1 and DPE-2 were installed on either side of the UST proximal to former borings B-1 or B-2, respectively. Well DPE-3 was installed on the north side of the UST. All eight soil samples collected from these locations contained varying concentrations of gasoline range hydrocarbons, and diesel range hydrocarbons to a lesser degree. The maximum TPHg concentration (160,000 mg/kg) in soil was detected in the sample from DPE-2 at 11 ft bgs. Water samples collected from the wells contained elevated concentrations of dissolved-phase gasoline hydrocarbons. The maximum TPHg concentration (120,000 µg/L) in groundwater was detected in the sample from DPE-1.

During the January 2011 groundwater monitoring event, light non-aqueous phase liquid (LNAPL) petroleum was observed in DPE-3 at a thickness of 0.13-ft.

Site Conceptual Model

The site conceptual model for the project was initially developed by Amicus in their September 13, 2009 correspondence. The following section presents a summary of the current site conceptual model, which will be modified as new information regarding site conditions is acquired.

The subject site is located in a commercial/industrial neighborhood along the San Francisco Bay-Margin. The site is underlain by sediments characterized as silty and clayey sand with some layers of sandy clay and sand to a depth of 20 ft bgs (the maximum depth previously explored) and groundwater is present in unconfined conditions at a depth of approximately 9 ft bgs. Groundwater flows generally to the southeast, towards the estuary, based on information from nearby sites.

Gasoline range hydrocarbons are present in soil and groundwater proximal to the abandoned UST. Interestingly, the contaminant signature also includes MTBE, a gasoline additive not used abundantly in California until the early/mid 1990s (MTBE became a mandated addition to California gasoline following passage of the Clean Air Act Amendments in 1990). Although it is uncertain when the subject UST was removed from service, it is expected that it was not in service during MTBE's lifespan as a gasoline additive.

The abandoned UST is located beneath the sidewalk along 4th Street, at the upgradient edge of a city block. The location of densely packed, low ceiling (occupied) buildings prohibits implementation of a traditional environmental investigation (i.e. an array of downgradient borings and wells). The nearest location for the construction of downgradient monitoring wells is the street or sidewalk along 3rd Street, on the other side of the city block. Review of the results of UST studies at nearby sites (Allen property at 345 Martin Luther King Jr. Way and Markus Hardware at 632-638 Second Street) suggest that a 3rd Street location for downgradient monitoring wells for would simply be too far from the expected downgradient edge of the plume to serve any practical purpose. Yet, the results of corrective action at nearby sites can be used to predict aspects of the subject case.

The Allen property, located across Martin Luther King Jr. Way (formerly Grove Street), provides a useful example. Contamination originating from a 10,000-gallon UST at that property extended approximately 75 feet downgradient. According to Allen property reports, a 10,000-gallon UST was used at that property to fuel fleet vehicles prior to its in-place abandonment. Available reports do not describe the installation date, throughput, or contents of the tank; however, the analytes detected in proximal groundwater suggest the tank may have held gasoline. It is notable that the UST at the subject site is much smaller than the Allen UST, and not obviously associated with a business employing a fleet of delivery trucks (implying a possibly lower throughput). Consequently, a conservative approximation of Terradev migratory extent may be the extent of migration of the Allen release (i.e. approximately 75 feet downgradient of the UST). This approximation is clearly far from the 3rd Street edge of the developed block, which is approximately 235 feet downgradient of the UST. Groundwater beneath this area of Oakland is not presently used for beneficial purposes (consumption or

irrigation). Additionally, it is reasonable to assume that the shallowest water-bearing zone in the vicinity of the subject site will plausibly not be used for beneficial consumption for the indeterminate future, if ever (in terms of City habitation). The residual hydrocarbons in groundwater do not, therefore, pose a threat to human health via consumption. Residual hydrocarbons in soil and groundwater may represent an exposure risk to construction or utility workers, and serve as a source for vapor intrusion of adjacent buildings.

Blue Rock understands that an upgradient property at the corner of 5th Street and Martin Luther King Jr. Way was formerly used as a gas station, the tanks for which were removed many years ago under Alameda County oversight. Additional data is not currently available to evaluate if the downgradient extent of any impact from that property has encroached onto the subject site.

Recommended Source Area Remediation

Amicus evaluated investigative and remedial options available at the site in the September 13, 2009 correspondence. It was noted that corrective actions would be necessarily constrained by the location of the abandoned UST relative to existing development - i.e. assessment proximally downgradient is prohibited, inadequate space to build a traditional fixed in-situ remediation system, and remedial excavation would undermine the existing building. Yet the persistence of elevated concentrations of gasoline range hydrocarbons in the subsurface merit remedial action. As a result, the use of mobile high-vacuum extraction (HVDPE) equipment was recommended as an aggressive approach to reduce the remaining gasoline mass in the vicinity of the UST for which details were proposed in the *Removal Action Workplan* dated February 3, 2010, which was conditionally approved by the ACHCSA in a letter dated February 19, 2010. The plan called for the installation of three wells proximal to the former UST to serve as both extraction and source area monitoring points to be sampled before and after a five-day HVDPE event.

High-Vacuum Dual-Phase Extraction Event (September-October 2010)

A five-day mobile HVDPE remedial event was performed at the site from September 28 to October 3, 2010. The event was completed using a truck-mounted unit consisting of a 25-horsepower oil sealed liquid-ring pump capable of producing 29 "Hg vacuum, and a thermal oxidizer capable of treating an air flow of approximately 450 ACFM. Wells DPE-1, DPE-2, and DPE-3 were used as extraction wells. A stinger hose was lowered into each well through a vacuum tight cap and placed approximately one foot off the bottom of each well. Depth to water at the beginning of the event was approximately 9.5 ft bgs in all three wells. At the beginning of the event, influent TPHg levels at individual wells ranged from 1,700 ppmv to 3,530 ppmv; however, they dropped to less 1,000 ppmv by the end of the event.

The total average hydrocarbon mass recovered was **174 lbs** (based on 122 lbs calculated from field PID data and 225 lbs calculated from lab data), which equates to an average extraction rate of nearly 35 lbs/day. A total of approximately 7,950 gallons of water were produced by the HVDPE remedial event, which were transported to the Seaport Environmental facility in Redwood City, California for disposal. The average water production rate was ~1.1 gpm.

Sub-Slab Soil Vapor Sampling

Purpose and Scope

The site activities described below were designed to comply with the scope of work requested in the ACHCSA letter dated March 22, 2012 and conditionally approved in their May 16, 2012 letter to evaluate potential vapor intrusion risk associated with the closed UST.

Sub-Slab Soil Vapor Point Installation

On June 16, 2012, Blue Rock installed three sub-slab soil vapor points at the site: VP-1, VP-2, and VP-3 (Figure 2). As noted in the workplan, probe installation and sampling activities were restricted to a weekend schedule, so as not to disrupt tenant operations. Soil vapor probe VP-1 is located in the office space viewed during the March 14, 2012 site meeting, approximately 6 feet south of the UST. Soil vapor probe VP-2 is located approximately 23 feet south-southwest of the closed UST, inside an individual office. The ACHCSA requested the location of VP-3 to be inside the same building space as VP-1 and VP-2, and within 30 feet of the UST, an area that consists of small individual offices. During the day of probe installation, the desired location of for VP-3 was inside an individual office that was locked and inaccessible. Moving the probe location further north to the next accessible location would have resulted in VP-1 and VP-3 being separated by less than 10 feet. Therefore, soil vapor probe VP-3 was installed in an accessible area as close as possible to originally planned location and is located approximately 38 feet south-southeast of the closed UST.

Drilling and Soil Vapor Probe Installation

A 1-5/8-inch diameter hole was drilled through the concrete slab in each location. Slab thickness was found to range between approximately 4 to 6 inches. The vapor probes consist of ¼-inch diameter stainless steel tubing with a 3-inch long stainless steel screened interval at the bottom. Total probe depths were approximately 9 inches below surface. A rubber plug was placed on tubing near the top of the probe screen to hold the sealing cement grout above the probe inlet. A thick mixture of cement grout was then placed in the remaining annular space to seal the probe. The surface of each probe is protected by a flush-mounted, tamper-resistant stainless steel top cap. Each probe was allowed to equilibrate for at least 30 minutes prior to purging and sampling.

Soil Vapor Point Sampling Equipment

The sample train for soil vapor sampling consists of tubing, connectors, valves, and vacuum source (Figure 3). All gauges and canisters were connected by laboratory-supplied stainless steel tubing and dedicated flexible Teflon or nylon tubing. The sample train was assembled using dedicated ¼-inch (outer diameter) tubing for all vapor sampling at this site. Swagelok® connectors were used for all connections between tubing and other sampling components. A flow regulator of 100 – 200 mL/min was placed in-line between the manifold and the downhole side Swagelok® valve. Sampling equipment was inspected to ensure tight fittings between all components. A shroud was placed over the wellhead and the entire sampling train.

Leak Testing and Tracer Gas

The sampling manifold was leak tested by inducing a vacuum on the manifold. In preparation for manifold leak testing, the downhole side Swagelok® valve remained closed, as did the valves going to the purge and sample ends of the sample train. To commence leak testing, an electric air pump was connected to the purge valve end of the sample train. The purge valve was opened and the air pump turned on to induce a vacuum of approximately 30" Hg on the assembly, and the purge valve was closed again. The vacuum on the manifold assembly was monitored for at least 15 minutes. The manifold was considered to have passed the leak test if vacuum was maintained for at least 15 minutes with <0.2" Hg vacuum loss. After ensuring that all connections between the purge and sample valves, flow controller, and sample manifold were tight, soil vapor purging and sampling activities were performed.

During sample collection, helium (He) was used as a tracer gas to test for air leakage into the sampling system. The inner-shroud environment was enriched with helium supplied by a cylinder. The helium concentration inside the shroud was maintained at a minimum of 5% to 10%, so as to have detectable levels of tracer gas should leakage into the sampling train occur.

Vapor Point Purging, Sampling Activities, and Analysis

The laboratory (Analytical Sciences) supplied the flow controller and sample canisters. The initial and final vacuum, start and finish times, and helium tracer gas percentages inside the shroud were documented (see attached field sheets).

Prior to collecting a vapor sample, the vapor points were purged to ensure that the vapor samples were representative of actual shallow soil vapor concentrations. The dead-space volume for each vapor probe is approximately 0.02-liters (i.e. the total volume of casing, annular pore space, and sample train tubing). For the purpose of this sampling, approximately three dead-space volumes (or 0.06–liters) were purged using an electric air pump and known flow limits of the manifold regulators. Three dead-space volumes were purged from each point after approximately 20 seconds. After purging was completed, the sample train purge valve was closed in preparation for sample collection.

All samples were collected in clean, laboratory-supplied 1-liter Summa® canisters immediately after purging. Each sample canister had a starting vacuum of approximately 30 "Hg. To collect a sample, the valve on the sample Summa® canister was opened and the time and initial vacuum documented. As the canister was being filled, the vacuum gauge on the flow controller was observed to ensure that the vacuum in the canister was decreasing over time. When the vacuum on the sample canister decreased to approximately 5 "Hg, the valve was closed and sampling ended. Helium tracer gas concentrations were monitored inside the shroud during sample collection using a field meter. Helium concentrations in the shroud for this entire sampling event ranged from 12.3% to 27.1%.

The samples were labeled, documented on a chain-of-custody form, and transported to Analytical Sciences for analysis.

The soil vapor samples were analyzed by Analytical Sciences for concentrations of:

- TPHg, BTEX, and MTBE by modified EPA Method TO-15
- Naphthalene, 1,2-DCA, EDB by modified EPA Method TO-15
- Helium, Oxygen, Carbon Dioxide, and Methane by Modified ASTM D-1946

Vapor Point Air Sample Analytical Results

Low concentrations of TPHg and BTEX were generally detected in samples from all three vapor points, and low levels of MTBE were also detected in VP-1. Neither naphthalene, 1,2-DCA, nor EDB were detected in any of the samples (Table 4).

Helium was detected in two of the three samples: VP-1 and VP-3 at concentrations of 2.4% and 2.6%, respectively. The concentration of helium in the sample divided by the concentration of helium in the shroud provides a measure of the proportion of the sample attributable to leakage. In this case that equates to 10.8% for VP-1 (2.4% in the sample divided by the 22.8% average in the shroud), and 11% for VP-3 (2.6% in the sample divided by the 23.6% average in the shroud). Small leaks may be considered acceptable, as long as the magnitude of the leak is small compared to other unavoidable sources of bias and variability in sampling and analytical data. Laboratories, for example, typically assign a relative percent difference of +/- 25% for duplicate samples as acceptable. Therefore, the apparent leaks in the VP-1 and VP-3 samples on the order of approximately 10% are considered to be relatively insignificant. Sub-slab vapor sampling data are shown in Table 4, and copies of the laboratory report and chain-of-custody form are attached.

Potential Vapor Intrusion Risk Evaluation

The sub-slab vapor data were compared to Shallow Soil Gas ESLs from Table E of *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim 2007 (Revised 2008)* and CHHSLs published in *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties (CALEPA 2005)* for commercial / industrial land use scenarios. None of the constituents exceeded the screening levels, which preliminarily indicates no vapor intrusion risk is present. For the sake of being conservative, the concentrations in VP-1 and VP-3 were also adjusted upward to account for the proportion of the sample that was attributable to leak volume. The upwardly adjusted values were still well below the aforementioned screening levels. In accordance with the DTSC guidance, Blue Rock recommends completion of a second sub-slab soil vapor sampling event, in order to account for seasonal and temporal variability, before a final risk determination is made. The second event is tentatively scheduled for November 2012.

Certification

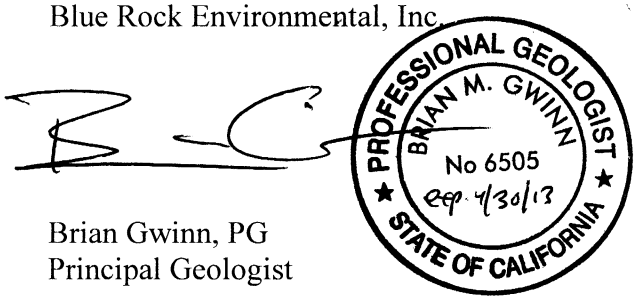
This report was prepared under the supervision of a California Professional Geologist at Blue Rock. All statements, conclusions, and recommendations are based upon published results from past consultants, field observations by Blue Rock, and analyses performed by a state-certified laboratory as they relate to the time, location, and depth of points sampled by Blue Rock. Interpretation of data, including spatial distribution and temporal trends, are based on commonly used geologic and scientific principles. It is possible that interpretations, conclusions, and recommendations presented in this report may change, as additional data become available and/or regulations change.

Information and interpretation presented herein are for the sole use of the client and regulating agency. The information and interpretation contained in this document should not be relied upon by a third party.

The service performed by Blue Rock has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

If you have any questions regarding this project, please contact us at (650) 522-9292.

Sincerely,
Blue Rock Environmental, Inc.



Brian Gwinn, PG
Principal Geologist

Project Status

- The 15-day mobile HVDPE event approved in the ACHCSA letter of May 16, 2012 is scheduled for July 9 through July 25.

- Blue Rock recommends performing the requested semi-annual groundwater monitoring event at least two weeks after the HVDPE to allow subsurface conditions to equilibrate. Thus, Blue Rock plans on performing this event on approximately August 8, 2012.

References

Amicus Strategic Environmental Consulting, 2009, letter regarding Terradev Jefferson, LLC Property, 645 Fourth Street, Oakland, September 13.

Blue Rock, 2010, *Removal Action Workplan*, 645 Fourth Street, Oakland, California, February 3.

Blue Rock, 2010, *Well Installation and Removal Action Report*, 645 Fourth Street, Oakland, California, October 29.

Blue Rock, 2011, *Groundwater Monitoring Report – First Quarter 2011*, 645 Fourth Street, Oakland, California, February 1.

Blue Rock, 2012, *Sub-Slab Soil Vapor Sampling Workplan and Project Schedule*, 645 Fourth Street, Oakland, California, April 23.

California EPA - DTSC. 2004. *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air.* December 15 (Revised February 7, 2005).

California EPA. 2005. *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties.* January.

California EPA - DTSC. 2010. *Advisory – Active Soil Gas Investigation.* March

Ninyo & Moore, 2009, *Limited Phase II Environmental Site Assessment*, 645 Fourth Street, Oakland, California, July 24.

Golden Gate Tank Removal, Inc. 2006, *Tank Closure Report*, 645 Fourth Street, Oakland, California, September 21.

San Francisco Bay RWQCB. 2008. *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater - Interim Final November 2007 (Revised May 2008).* May.

Attachments:

Figure 1: Site Location Map
Figure 2: Site Plan
Figure 3: Soil Gas Sampling Apparatus

Table 1: Well Construction Data
Table 2: Soil Sample Analytical Data
Table 3: Groundwater Analytical Data
Table 4: Sub-Slab Vapor Sample Analytical Data

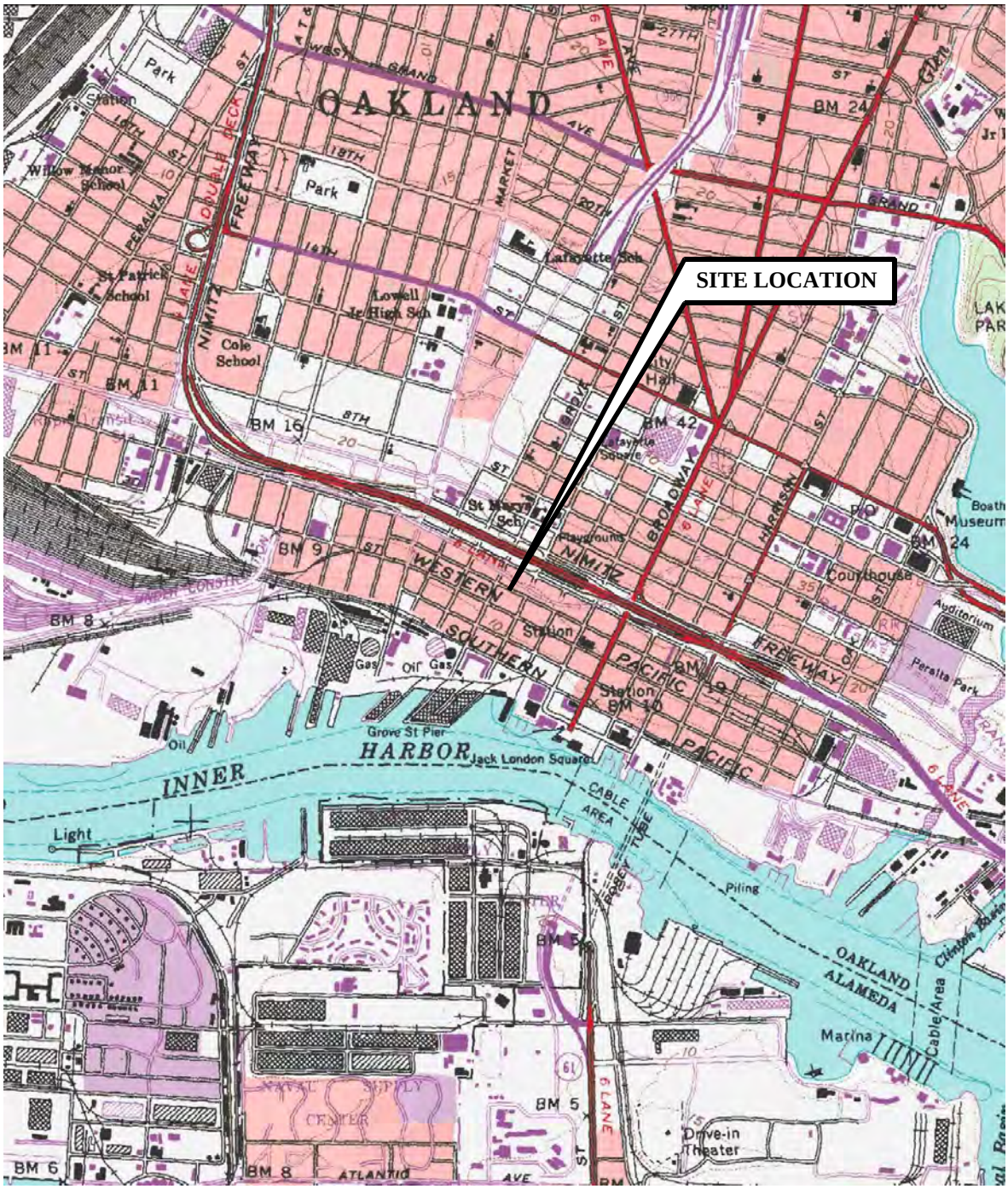
Field Data Sub-Slab Vapor Sampling Forms

Chain-of-Custody Forms and Laboratory Reports

Distribution:

Ms. Sara May, Metrovation
580 Second St. Suite 260, Oakland, CA 94607

Mr. Markus Niebanck, Amicus Strategic Environmental Consulting
580 Second St. Suite 260, Oakland, CA 94607



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APPROX. SCALE IN FEET

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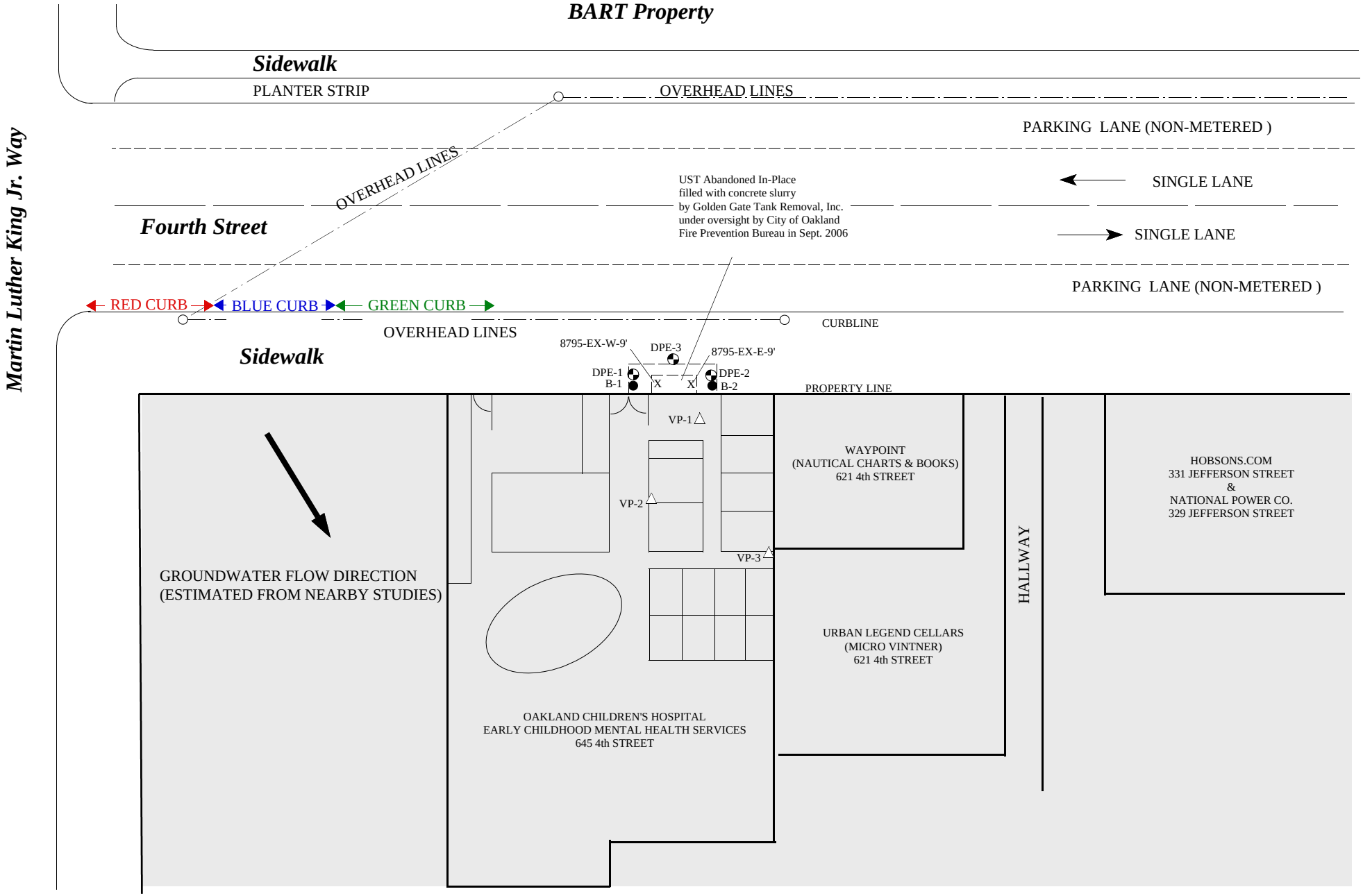
SOURCE: MyTopo.com

SITE LOCATION MAP
Terradev Jefferson LLC Property
645 Fourth St.
Oakland, CA

BLUE ROCK
ENVIRONMENTAL, INC.

Project No.	Figure Date	Figure
ASE-1	10/10	1



EXPLANATION

- 8795-EX-W-9' X — TANK CLOSURE SOIL SAMPLE
- B-1 ● — SOIL BORING
- DPE-1 ⊕ — EXTRACTION WELL
- VP-3 △ — SUB-SLAB SOIL VAPOR POINT

0 30

APPROXIMATE
SCALE IN FEET

N

SITE PLAN

Terredev Jefferson LLC Property
645 Fourth St.
Oakland, CA

BLUE ROCK
ENVIRONMENTAL, INC.

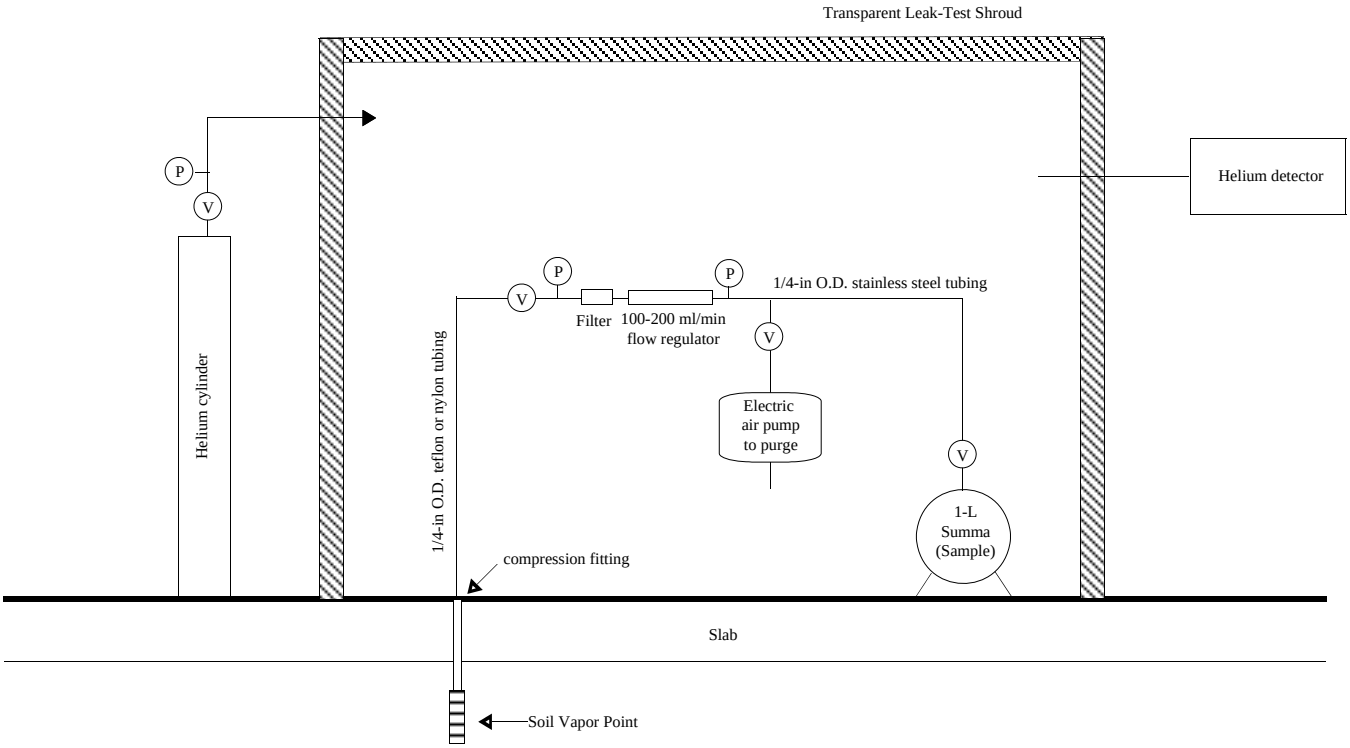
Project No.	Figure Date	Figure
ASE-1	6/12	2

EXPLANATION

P PRESSURE/VACUUM GAUGE

V VALVE

NOTE: ALL SAMPLE TRAIN TUBE CONNECTIONS AND VALVES ARE SWAGELOK



NOT TO SCALE

SOIL GAS SAMPLING APPARATUS
Terradev Jefferson LLC
645 4th St.
Oakland, California

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Figure Date	Figure
ASE-1	7/12	3

TABLE 1
Well Construction Data
Terradev Jefferson, LLC Property
645 Fourth Street
Oakland, CA

Extraction Wells

Well ID	Date Installed	Total Boring Depth (ft bgs)	Casing Diameter (inches)	Screen Depth (ft bgs)	Sandpack Depth (ft bgs)	Bentonite Depth (ft bgs)	Cement Grout Depth (ft bgs)
DPE-1	9/20/10	15	2	8 - 15	7 - 15	5 - 7	0 - 5
DPE-2	9/20/10	15	2	8 - 15	7 - 15	5 - 7	0 - 5
DPE-3	9/20/10	10	2	6 - 10	5 - 10	3 - 5	0 - 3

Vapor Probes

Well ID	Date Installed	Total Probe Depth (in bgs)	Tubing Diameter (inches)	Slab Thickness (in bgs)	Screen Depth (in bgs)	Rubber Plug (in bgs)	Cement Depth (in bgs)
VP-1	6/16/12	9	0.25	6.0	~ 6 - 9	~5.0 - 6.0	0 - 5
VP-2	6/16/12	9	0.25	4.5	~ 6 - 9	~3.5 - 4.5	0 - 3.5
VP-3	6/16/12	9	0.25	4.0	~ 6 - 9	~3.0 - 4.0	0 - 3

Notes:
ft bgs Feet below ground surface.
in bgs Inches below ground surface.

TABLE 2
Soil Sample Analytical Data
Terradev Jefferson, LLC Property
645 Fourth Street
Oakland, CA

Sample ID	Depth (ft bgs)	Sample Date	TPHd (mg/kg)	TPHg (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)	DIPE, ETBE, TAME (mg/kg)	1,2-DCA (mg/kg)	EDB (mg/kg)
UST Removal Samples													
8795-EX-W-9'	9	8/23/06	<120	**10,000**	**130**	**1,000**	**230**	**1,200**	<12	<100	all<12	---	---
8795-EX-E-9'	9	8/23/06	<25	**920**	**6.8**	**55**	**18**	**110**	<1.2	<10	all<1.2	---	---
Investigation Samples													
DPE-1-7.5	7.5	9/20/10	**810^**	**6,500**	**14**	**320**	**180**	**980**	<0.50	<2.5	---	<0.50	**0.50**
DPE-1-12	12	9/20/10	**260^**	**2,300**	**26**	**160**	**45**	**240**	**0.71**	<1.5	---	<0.30	<0.30
DPE-1-15	15	9/20/10	**92^**	**770**	**10**	**53**	**15**	**80**	**0.39**	<0.50	---	**0.11**	<0.090
DPE-2-6	6	9/20/10	**15**	**1.2**	<0.0050	**0.0054**	<0.0050	**0.021**	<0.0050	<0.0050	---	<0.0050	<0.0050
DPE-2-11	11	9/20/10	**1,200^**	**160,000**	**1,400**	**10,000**	**3,300**	**19,000**	<0.25	<1.5	---	<0.25	**1.8**
DPE-2-15	15	9/20/10	**66^**	**430**	**3.8**	**25**	**8.3**	**47**	<0.50	<2.5	---	<0.050	<0.50
DPE-3-7	7	9/20/10	**260^**	**860**	**2.1**	**37**	**19**	**100**	<0.10	<0.50	---	<0.10	<0.10
DPE-3-10	10	9/20/10	**800^**	**8,900**	**78**	**580**	**180**	**980**	<0.25	<1.5	---	<0.25	**0.82**

Notes:

ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
TPHd	total petroleum hydrocarbons as diesel by EPA Method 8015M or 8015B
TPHg	total petroleum hydrocarbons as gasoline by EPA Method 8260B
BTEX	benzene, toluene, ethylbenzene, and xylenes by EPA Method 8260B
MTBE, TBA, ETBE, DIPE, TAME	methyl tert-butyl ether, tert-butanol, ethyl tert-butyl ether, di-isopropyl ether, tert-amyl methyl ether by EPA Method 8260B,
1,2-DCA, EDB	1,2-dichloroethane, 1,2-dibromoethane by EPA Method 8260B.
µg/L	Micrograms per liter.
<###	Not detected at or above the indicated reporting limit.
^	Laboratory Flag: Hydrocarbons are lower-boiling than typical Diesel Fuel
---	Data not available, not monitored, or not sampled

TABLE 3
Groundwater Analytical Data
Terradev Jefferson, LLC Property
645 Fourth Street
Oakland, CA

Sample ID	Sample Date	TOC (ft MSL)	DTW (ft)	LNAPL (ft)	GWE (ft MSL)	TPHd (µg/L)	TPHg (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)
Grab Groundwater Samples															
B-1-GW*	7/10/09	--	~10 - 20	--	--	**5,300**	**78,000**	**15,000**	**13,000**	**1,700**	**10,500**	**570**	--	--	--
B-2-GW*	7/10/09	--	~10 - 20	--	--	**2,300**	**60,000**	**13,000**	**13,000**	**890**	**4,800**	**120**	--	--	--
Monitoring Well Data															
DPE-1	9/22/10	15.81	9.21	0.00	6.60	<4,000^	**120,000**	**25,000**	**18,000**	**3,300**	**17,000**	**320**	**320**	**620**	<40
Screen	9/28-10/3/10	15.81	--	--	--	5-day HVDPE Remedial Event									
~8' - 15'	10/18/10	15.81	9.26	sheen	6.55	<4,000^	**97,000**	**15,000**	**20,000**	**1,600**	**11,000**	**490**	**270**	**390**	<40
	1/20/11	15.81	8.56	sheen	7.25	<3,000^	**83,000**	**12,000**	**16,000**	**2,000**	**11,000**	**270**	<200	**220**	<40
DPE-2	9/22/10	16.01	9.44	0.00	6.57	<4,000^	**110,000**	**21,000**	**18,000**	**3,100**	**14,000**	**200**	**260**	**540**	**110**
Screen	9/28-10/3/10	16.01	--	--	--	5-day HVDPE Remedial Event									
~8' - 15'	10/18/10	16.01	9.48	sheen	6.53	<5,000^	**84,000**	**11,000**	**16,000**	**1,600**	**9,200**	**77**	<200	**220**	**77**
	1/20/11	16.01	8.77	sheen	7.24	<5,000^	**94,000**	**12,000**	**19,000**	**2,500**	**13,000**	**64**	<200	**220**	**88**
DPE-3	9/22/10	15.87	9.43	0.00	6.44	insufficient water column for sampling (i.e. <0.5-ft)									
Screen	9/28-10/3/10	15.87	--	--	--	5-day HVDPE Remedial Event									
~6' - 10'	10/18/10	15.87	9.35	0.00	6.52	insufficient water column for sampling (i.e. <0.5-ft)									
	1/20/11	15.87	8.51	**0.13**	7.36	no groundwater sample collected, LNAPL present.									

Notes:

Screen	Well screen depth interval.
TOC	Top of casing relative to feet above mean sea level (ft MSL) (ref NAVD88).
DTW	Depth to water (for borings DTW shows "depth to water" and "depth to bottom of boring")
LNAPL	Light non-aqueous phase liquid petroleum, "sheen" is an immeasurable thickness (i.e. <0.01-ft)
GWE	Groundwater Elevation (TOC-DTW) in ft MSL. (This does not account for LNAPL thickness, if present).
TPHd	Total petroleum hydrocarbons as diesel by EPA Method 8015M, *8015B.
TPHg	Total petroleum hydrocarbons as gasoline by EPA Method 8260B, * 8015B.
BTEX	Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8260B, * 8021B.
	Note: total xylenes equal the sum of sepearate isomers reported for the 7/09 samples.
MTBE	Methyl tert-butyl ether by EPA Method 8260B, * 8021B.
TBA	Tert-butanol by EPA Method 8260B.
1,2-DCA, EDB	1,2-dichloroethane, 1,2-dibromoethane by EPA Method 8260B.
µg/L	Micrograms per liter.
<###	Not detected at or above the indicated reporting limit.
^	Method detection limit increased due to ineterference from gasoline range hydrocarbons
---	Data not available, not monitored, or not sampled

Table 4
SUB-SLAB VAPOR SAMPLE ANALYTICAL DATA
Terradev Jefferson LLC Property
645 Fourth St.
Oakland, CA

		air volume		Consituent Concentrations									Soil Gas Concentrations			Tracer Gas		Sample Can Vacuum	
Sample I.D.	Sample Date	dead space vols. purged	sample container	TPHg ($\mu g/m^3$)	B ($\mu g/m^3$)	T ($\mu g/m^3$)	E ($\mu g/m^3$)	X ($\mu g/m^3$)	MTBE ($\mu g/m^3$)	Naphthalene ($\mu g/m^3$)	1,2-DCA ($\mu g/m^3$)	EDB ($\mu g/m^3$)	O_2 (%)	CO_2 (%)	CH_4 (%)	In Sample He (%)	In Shroud He - Avg (%)	End of Sampling ("Hg)	Arrival at Lab ("Hg)
VP-1	6/16/12	3.0	1-L	1,300	38	120	21	138	7.3	<0.09	<0.14	<0.05	15	0.096	<0.008	2.4	22.2	~8	~6
Data corrected for 10.8% of leak volume in sample				1,457	43	135	24	155	8.2	<0.10	<0.16	<0.06	---	---	---	---	---	---	---
VP-2	6/16/12	3.0	1-L	1,200	66	25	2.6	8.2	<6.3	<0.09	<0.14	<0.05	11	1.3	<0.009	<0.003	13.8	~8	~7
VP-3	6/16/12	3.0	1-L	960	16	19	2.9	20	<5.8	<0.08	<0.13	<0.05	16	0.029	<0.008	2.6	23.6	~5	~5
Data corrected for 11.0% of leak volume in sample				1,079	18	21	3.3	22	<6.5	<0.09	<0.15	<0.06	---	---	---	---	---	---	---

ESLs Comm/Indus Soil Gas	*29,000*	*280*	*180,000*	*3,300*	*58,000*	*31,000*	*240*	*310*	*14*
CHHSLs Comm /Indus Soil Gas	*NA*	*122*	*378,000*	*NA*	*879,000*	*13,400*	*106*	*167*	*NA*

Notes:

TPHg	Total Petroluem Hydrocarbons as gasoline by EPA Method TO-3(M) GC/FID
BTEX, MTBE	Benzene, Toluene, Ethylbenzene, and Total Xylenes, Methyl tert-Butyl Ether by EPA Method TO-15(M) GC/MS
Naphthalene	Naphthalene by EPA Method TO-15(M) GC/MS
1,2-DCA, EDB	1,2-dichloroethane, 1,2-dibromoethane by EPA Method TO-15(M) GC/MS
O_2, CO_2, CH_4, He	Oxygen, Carbon Dioxide, Methane, and Helium by modified ASTM D-1946
mg/m^3	Milligrams per cubic meter (equivalent to ug/L)
<#.##	Compound not detected at or above the reported laboratory detection limit
ESLs	Environmental Screening Levels for Soil Vapor in Commercial/Industrial or Residential setting (SFBRWQCB 2008).
CHHSLs	California Human Health Screening Levels for Soil Vapor in Commercial/Industrial or Residential setting (CalEPA/OEHHA2005)
Tracer Gas in Shroud	Concentration range of tracer gas in shroud recorded during sample collection. Average = (Max - Min) / 2

If helium was detected in the sample, the percentage measured in the sample divided by the average percentage in the shroud represents the proportion of the sample attributable to leakage.
The data were adjusted to account for that proportion by the following: Corrected value ($\mu g/m^3$) = Analyte ($\mu g/m^3$) * [100% / (100% - leak%)]

Date: 6/16/12
Technician: LT/SR
Job No.: ASE-1

WELL ID: ~~VP-1~~ VP-1		Manifold ID#: NA	
Purge Suma ID#: ~~15~~ Purge w/Pump	Volume:		Start Presure: 30+"Hg
Sample Suma ID#: 1015	Volume: 1L		Start Presure: 30+"Hg
Shut-in Test Start Time/Pressure: 1244 / 30"Hg		Shut-in Test End Time/Pressure: 1302 / 30"Hg	

	Time (24 Hr)	Pre-Regulator Presure (-"H_2O)	Post-Regulator Presure (-"Hg)	He Tracer (%)
1402 start sample	1402	NA	30+	25.4
	1403		28	24.8
	1404		27	23.9
	1405		23	22.9
	1406		20	21.6
	1407		17	20.8
	1408		14	20.2
	1409		12	19.7
	1410		10	19.4
end sample	1411		8	18.9

Notes:

Date: 6/16/12
Technician: LT/SR
Job No.: ASE-1

WELL ID: VP-2		Manifold ID#: NA	
Purge Suma ID#: Purge w/ Pump	Volume:		Start Presure: 30" Hg
Sample Suma ID#: 302	Volume: 1 L		Start Presure: 30" Hg
Shut-in Test Start Time/Pressure: 1249 / 30" Hg		Shut-in Test End Time/Pressure: 1305 / 30" Hg	

	Time (24 Hr)	Pre-Regulator Presure (-"H_2O)	Post-Regulator Presure (-"Hg)	He Tracer (%)
1350 start sample	1350	NA	30	15.3
	1351		29	14.8
	1352		27	14.4
	1353		22	13.8
	1354		20	13.2
	1355		18	13.1
	1356		15	13.1
	1357		12	12.8
	1358		10	12.6
	1359		9	12.4
~~1359~~ 1359 end sample	1359		8	12.3

Notes:

Date: 6/16/12
Technician: LT/SR
Job No.: ASE-1

WELL ID: ~~VP-3~~ VP-3		Manifold ID#: NA	
Purge Suma ID#: Purge w/Pump	Volume:		Start Presure: 30" Hg
Sample Suma ID#: 1005	Volume: 1L		Start Presure: 30" Hg
Shut-in Test Start Time/Pressure: 1242 / 30" Hg		Shut-in Test End Time/Pressure: 1300 / 30" Hg	

	Time (24 Hr)	Pre-Regulator Presure (-"H_2O)	Post-Regulator Presure (-"Hg)	He Tracer (%)
1338 start time	1338	NA ~~30~~	30	27.1
	1339	~~27~~	27	25.8
	1340	~~24~~	24	25.1
	1341		21	24.3
	1342		17	23.3
	1343		15	22.8
	1344		13	22.4
	1345		9	21.7
	1346		7	21.2
	1347		6	20.9
1348 end sample	1348		5	20.1

Notes:

Analytical Sciences

July 03, 2012

Brian Gwinn
Blue Rock Environmental
1169 Chess Drive, Ste. C
Foster City, CA 94404

Dear Brian,

Enclosed you will find Analytical Sciences' final report 2061807 for your Terradev Jefferson LLC project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: July 03, 2012

Laboratory Report

Brian Gwinn
Blue Rock Environmental
1169 Chess Drive, Ste. C
Foster City, CA 94404

Project Name: **Terradev Jefferson LLC** **ASEI**

Lab Project: **2061807**

This 7 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
2061807-01	**VP-1**	Gasoline	1300	(1a)	16
		1,2-Dichloroethane (EDC)	ND		0.14
		Benzene	38		0.11
		Toluene	120		6.3
		1,2-Dibromoethane (EDB)	ND		0.05
		Ethylbenzene	21		1.5
		m,p-Xylene	100		7.3
		Naphthalene	ND		0.09
		Methyl tert-Butyl Ether (MTBE)	7.3		6.0

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	37.7	97	70-130
4-Bromofluorobenzene	38.4	99	70-130

Date Sampled:	06/16/12	Date Analyzed:	06/22/12	QC Batch: B010809
Date Received:	06/18/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
2061807-02	**VP-2**	Gasoline	1200	(1b)	17
		1,2-Dichloroethane (EDC)	ND		0.14
		Benzene	66		0.11
		Toluene	25		6.6
		1,2-Dibromoethane (EDB)	ND		0.05
		Ethylbenzene	2.6		1.5
		m,p-Xylene	8.2		7.6
		Naphthalene	ND		0.09
		Methyl tert-Butyl Ether (MTBE)	ND		6.3

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	38.8	100	70-130
4-Bromofluorobenzene	41.5	107	70-130

Date Sampled:	06/16/12	Date Analyzed:	06/22/12	QC Batch: B010809
Date Received:	06/18/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
2061807-03	**VP-3**	Gasoline	960	(1c)	16
		1,2-Dichloroethane (EDC)	ND		0.13
		Benzene	16		0.10
		Toluene	19		6.0
		1,2-Dibromoethane (EDB)	ND		0.05
		Ethylbenzene	2.9		1.4
		m,p-Xylene	20		6.9
		Naphthalene	ND		0.08
		Methyl tert-Butyl Ether (MTBE)	ND		5.8

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	38.4	99	70-130
4-Bromofluorobenzene	40.1	103	70-130

Date Sampled:	06/16/12	Date Analyzed:	06/22/12	QC Batch: B010809
Date Received:	06/18/12	Method:	EPA TO-15	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2061807-01	**VP-1**	Oxygen (O2)	15	0.008
		Carbon Dioxide (CO2)	0.096	0.008
		Methane	ND	0.008
		Helium	2.4	0.003

Date Sampled:	06/16/12	Date Analyzed:	07/02/12	QC Batch: B010887
Date Received:	06/18/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2061807-02	**VP-2**	Oxygen (O2)	11	0.009
		Carbon Dioxide (CO2)	1.3	0.009
		Methane	ND	0.009
		Helium	ND	0.003

Date Sampled:	06/16/12	Date Analyzed:	07/02/12	QC Batch: B010887
Date Received:	06/18/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2061807-03	**VP-3**	Oxygen (O2)	16	0.008
		Carbon Dioxide (CO2)	0.029	0.008
		Methane	ND	0.008
		Helium	2.6	0.003

Date Sampled:	06/16/12	Date Analyzed:	07/02/12	QC Batch: B010887
Date Received:	06/18/12	Method:	ASTM 1946 D	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B010809 - Air prep GC/MS										
Blank (B010809-BLK1)				Prepared: 06/07/12 Analyzed: 06/21/12						
Gasoline	ND	9.8	µg/m³							
1,2-Dichloroethane (EDC)	ND	0.32	µg/m³							
Benzene	ND	0.26	µg/m³							
Toluene	ND	3.8	µg/m³							
1,2-Dibromoethane (EDB)	ND	0.03	µg/m³							
Ethylbenzene	ND	0.87	µg/m³							
m,p-Xylene	ND	4.3	µg/m³							
Naphthalene	ND	0.21	µg/m³							
Methyl tert-Butyl Ether (MTBE)	ND	3.6	µg/m³							
Surrogate: Dibromofluoromethane	*20.5*		*µg/m³*	*19.5*		*105*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*18.3*		*µg/m³*	*19.4*		*94*	*70-130*			

Fixed Gases (%)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B010887 - Air prep GC										
Blank (B010887-BLK1)				Prepared & Analyzed: 07/02/12						
Oxygen (O2)	ND	0.005	%							
Carbon Dioxide (CO2)	ND	0.005	%							
Methane	ND	0.005	%							
Helium	ND	0.002	%							

Notes and Definitions

(1a)	Summa Canister received with a vacuum of 6 inches of Mercury.
(1b)	Summa Canister received with a vacuum of 7 inches of Mercury.
(1c)	Summa Canister received with a vacuum of 5 inches of Mercury.
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 2061807
CLIENT'S PROJECT NAME: Terrader Jefferson LLC
CLIENT'S PROJECT NUMBER: ASE1

CLIENT INFORMATION

COMPANY NAME: Blue Rock Env
ADDRESS: 1169 Chess Drive, ste C
Foster City Ca. 94404
CONTACT: Brian Gwinn
PHONE#: (650) 522-9292
FAX #: (650) 522-9259
email : brian@blueRockenv.com

BILLING INFORMATION

CONTACT:
COMPANY NAME: Blue Rock
ADDRESS: ← SAME
PHONE#:
FAX #:

TURNAROUND TIME (check one)

MOBILE LAB
SAME DAY
24 HOURS
48 HOURS
72 HOURS
5 DAYS
NORMAL ✓

GEOTRACKER EDF: X Y ___N
GLOBAL ID: T10000001072

COOLER TEMPERATURE
°C

COC

PAGE 1 OF 1

ITEM	CLIENT SAMPLE I..D.	Summa Canister Serial #	Regulator Serial #	Sample Start Time	Sample End Time	Date Sampled	Matrix	ANALYSIS: EPA TO-15 BTEX / MTBE	EPA TO-3 TPH Gasoline	EPA TO-15 Naphthalene, 1,2-DCA, EDB	ASTM 1946 He, O2, CO2, CH4		COMMENTS	LAB SAMPLE #
1	VP-1	1015			1411	6/16/12	soil gas	X	X	X	X		2061807 -	01
2	VP-2	302			1359	6/16/12	soil gas	X	X	X	X		↓ -	02
3	VP-3	1005			1348	6/16/12	soil gas	X	X	X	X		↓ -	03
4														
5														
6														
7														
8														
9														
10														

SIGNATURES

SAMPLED BY: Scott Robertson

RELINQUISHED BY: Scott Robertson — SIGNATURE
6/18/12 — DATE
1255 — TIME

RECEIVED BY LABORATORY: [signature] — SIGNATURE
6/18/12 — DATE
1255 — TIME

110 Liberty Street
Petaluma, CA 94952