ABF FREIGHT SYSTEM, INC.
P.O. Box 10048
Fort Smith, AR 72917-0048
479-785-8700

abf.com

November 18, 2013

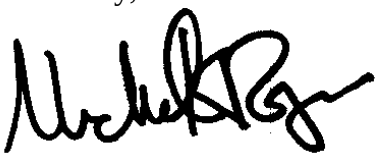
Mr. Mark Detterman, RG, CEG
Senior Hazardous Materials Specialist
Alameda County Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: **Perjury Statement-**
Soil Vapor Investigation Work Plan
ABF Freight System Facility (SLIC Case No. RO#0003033)
4575 Tidewater Avenue
Oakland, California

Dear Mr. Detterman:

I declare under penalty of perjury, that the information and/or recommendations contained in the attached document or report are true and correct to the best of my knowledge.

Sincerely,



Michael K. Rogers
Director, Real Estate
Arkansas Best Corporation

November 20, 2013
Project 154.006.001

Mr. Mark Detterman, RG, CEG
Senior Hazardous Materials Specialist
Alameda County Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: *Soil Vapor Investigation Work Plan*
ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California
RO#0003033

Dear Mr. Detterman:

This letter, prepared by Trinity Source Group, Inc. (Trinity) on behalf of ABF Freight System, Inc. (ABF), presents a *Soil Vapor Investigation Work Plan (Work Plan)* for the referenced site (Figures 1 and 2). This *Work Plan* was requested by Alameda County Environmental Health Department (ACEH) in a letter dated October 1, 2013. This *Work Plan* focuses on assessing the presence of tetrachloroethene (PCE) in sub-slab vapor, as requested by ACEH. The ACEH letter is included in Attachment A of this *Work Plan*.

BACKGROUND

The site encompasses approximately 1.4 acres situated between Tidewater Avenue and the water channel extending north from San Leandro Bay, separating the cities of Alameda and Oakland (Figures 1 and 2). Land-use in the area is industrial.

Currently the site is in use as a trucking terminal, with a maintenance building located near the western property boundary. One aboveground storage tank currently exists adjacent to the maintenance building, and is labeled with “Diesel Fuel”, “Not in Use”, and “Permanently Closed Jan. 1995”. An underground clarifier is in use near the maintenance building. The underground storage tanks (USTs) at the site were also located near the maintenance building.

Limited documentation of previous site environmental work is currently available. The available records are summarized in the November 4, 2011 *Work Plan for Soil and Groundwater Investigation*. Based on the 2011 *Work Plan* and subsequent March 6, 2012 *Work Plan* Addendum, Trinity performed soil, groundwater and sub-slab vapor sampling at the site. Results are presented in the February 22, 2013

Soil, Groundwater and Sub-Slab Vapor Investigation Report and the September 20, 2013 *Third Quarter 2013 Groundwater Monitoring Report*. Site conditions are summarized generally below.

Four USTs were formerly used at the site, as of 1986. Two 10,000-gallon diesel, one 800-gallon motor oil, and one 800-gallon waste oil USTs were present. One of the diesel USTs was reported to have previously contained gasoline. A leak in the product lines was discovered and repaired, and documented in an *Underground Storage Tank Unauthorized Release (Leak)/Contamination Site Report* dated June 30, 1986.

In 1986 and 1987, all of the tanks were removed, and two groundwater monitoring wells (MW-1 and MW-2) were installed.

Trinity conducted soil and grab-groundwater sampling at the site, and installed groundwater monitoring Wells MW-3 and MW-4 and sub-slab vapor Probes SVP-1 and SVP-2. Wells MW-1 through MW-4 were monitored two to three times during 2013. Soil, grab-groundwater, groundwater, and sub-slab vapor data are presented on the attached Tables 1 through 4, and Figures 3 through 6.

The chemicals detected were compared to Environmental Screening Levels[1] (ESLs), as a preliminary risk screening. ESLs are based on conservative risk-based numbers assembled by the California Regional Water Quality Control Board, San Francisco Bay Region, to evaluate detections of chemicals in soil, groundwater and soil gas. Detections less than ESLs generally do not warrant further evaluation. Detections greater than ESLs may warrant further evaluation based on site-specific conditions. For this site, the ESLs for "industrial/commercial land use" and "groundwater not used as a drinking water resource" were used. The analytical results were compared to the May 2013 ESLs.

Soils

Soils analytical data (Table 1 and Figure 3) indicated no exceedances of ESLs. In addition, no PCE or other halogenated volatile organic compounds (HVOCs) were detected.

The soil analytical data results indicate complete delineation of soils to non-detectable or low total petroleum hydrocarbons as diesel (TPHd) concentrations. TPH as gasoline (TPHg), benzene, and all other analytes from soil samples were non-detect except for a low detection of naphthalene, and very low concentrations of propyl benzene isomers and various polynuclear aromatic hydrocarbons (PAHs). The maximum concentrations detected during the two phases of investigation were from the former UST area (Boring B-4), as shown on Figure 3. No further soils assessment is recommended at this time.

[1] *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater* (November 2007), San Francisco Bay Regional Water Quality Control Board, California EPA, http://www.waterboards.ca.gov/sanfranciscobay/esl.htm, updated May 2013.

Groundwater

Grab-groundwater and groundwater monitoring data (Tables 2 and 3, and Figure 4) indicated concentrations of TPHd exceeding ESLs at various locations. In addition, TPHg, naphthalene, and 2-methyl-naphthalene exceeded ESLs in Well MW-1, and 2-methyl-naphthalene in Well MW-4 exceeded the ESL.

Analyses for full-scan VOCs were conducted on selected grab-groundwater samples in 2012, and samples from Wells MW-1 and MW-2 in 2011. No PCE or other HVOCs were detected in these water samples.

Groundwater has been measured at depths ranging from approximately 3.2 to 8.4 feet below ground surface at the site. The groundwater flow direction ranges from southeasterly to southwesterly, based on the existing well network (Figure 5). The results of the grab-groundwater sample from Boring B-12 and groundwater samples from Wells MW-3 and MW-4 generally delineate the groundwater plume upgradient to the north (MW-4), downgradient to the south (MW-3) and laterally to the east (B-12).

Sub-Slab Vapor

The two sub-slab vapor probes were sampled on two occasions. The most recent sub-slab vapor analytical data (Table 4 and Figure 6) indicated PCE at concentrations of 16 micrograms per meter cubed ($\mu g/m^3$) in Probe SVP-1 and 901 to 971 $\mu g/m^3$ in Probe SVP-2. Probe SVP-2 also had very low but detectable concentrations of several other HVOCs. The PCE concentration in Probe SVP-2 exceeded the attenuated ESL for indoor air.

Reviewing the data sets for these probes, Trinity concludes that the potential vapor intrusion threat is low, considering the building use as a truck maintenance facility. The building is well-ventilated, and the roll-up doors on opposite ends of the building generally remain open while the building is occupied. However, the source and extent of PCE are not known.

Regulatory Status

The October 1, 2013 letter from ACEH indicated that the site could be considered for low-threat closure under the California State Water Resources Control Board (SWRCB) Low-Threat Closure Policy with respect to petroleum hydrocarbons, except for the presence of PCE in sub-slab vapor. The source of the PCE is currently unknown, but may be petroleum-hydrocarbon related. ACEH requested additional investigation of the source and extent of PCE impacts in soil, groundwater and soil vapor, and preparation of a focused site conceptual model (SCM) applicable to the presence of PCE.

SITE CONCEPTUAL MODEL

The SCM focusing on the sub-slab vapor conditions at the subject site is outlined below and presented as Table 5. An initial SCM was presented in the November 4, 2011 *Soil and Groundwater Investigation Work Plan* for the site. The site assessment activities undertaken since that time have resolved data gaps regarding soils and groundwater, with the sub-slab vapor conditions remaining to be fully assessed.

Table 5 summarizes the elements of the SCM including the hydrogeologic setting, the source, and potential exposure pathways.

The primary data gap to be addressed in the SCM is the presence of PCE in the sub-slab vapor beneath the maintenance building. The source and extent of the PCE are unknown. Typical sources of PCE and related HVOCs at similar industrial sites include parts-washing facilities, waste oil USTs, and/or sewer lines. In addition, it is possible that the source is offsite.

Mr. Mike Rogers with ABF informed Trinity that ABF does not operate a parts-washing facility at the site, but has no information on the full site history. Because soil and groundwater data near the former waste oil UST indicates no HVOCs, it appears unlikely that the waste oil UST is the source; however, this will be further evaluated.

If a source of HVOCs is identified onsite through the assessment proposed below, additional soil and groundwater assessment may be warranted if the source is outside the areas already assessed.

RECOMMENDATIONS FOR GROUNDWATER MONITORING

The existing site monitoring wells (MW-1 through MW-4) have been monitored quarterly for two to three events in 2013. The analytical scope included TPHg and TPHd by EPA Method 8015, benzene, toluene, ethylbenzene, xylenes (BTEX compounds), methyl tert-butyl ether (MTBE) and naphthalene by EPA Method 8260, and PAHs by EPA Method 8270. In addition, Wells MW-1 and MW-2 were monitored in 2011 for these compounds and full-scan VOCs by EPA Method 8260. As presented above, the petroleum hydrocarbon plume is adequately delineated with these wells, and PAH concentrations are low to non-detectable.

Trinity recommends continuing groundwater monitoring in Wells MW-1 through MW-4 on a semiannual basis to further demonstrate plume stability. Trinity recommends analyzing TPHg, TPHd, BTEX compounds, and naphthalene for these additional monitoring events. If the soil gas assessment proposed below indicates the presence of PCE or other HVOCs in the vicinity of these wells, Trinity would recommend adding HVOCs to the analytical scope for future monitoring.

SCOPE OF WORK

The following scope of work is proposed to determine the source and extent of PCE in soil vapor. Trinity proposes to delineate PCE in soil vapor utilizing passive soil gas sampling. The passive soil gas results are expected to show relative HVOC concentrations across the area investigated. Table 6 summarizes the data gaps identified in the SCM, with the proposed investigation and rationale for addressing these data gaps.

The passive soil gas survey utilizes specialized modules which are buried at shallow depths and left in-place for approximately 7 to 10 days to absorb HVOCs from the surrounding soil. The modules are then retrieved, and laboratory-analyzed for HVOCs. The laboratory results correlate generally with elevated HVOC concentrations in soil vapor, soil and/or groundwater at the sample locations. Therefore,

the passive soil-gas survey can be an efficient means of identifying and delineating significant areas of HVOC impacts, although the actual HVOC concentrations in soil vapor, soil and groundwater are not indicated by the soil-gas module. The passive soil gas technology and field procedures are described in the literature from Beacon Environmental Services, Inc. presented in Attachment B.

Trinity proposes installing nine modules at this site, in and around the existing building and former UST area. Proposed locations are shown on Figure 7. The module locations will include the Probe SVP-2 area, along the sanitary sewer, in and near the former UST area, and near the western site boundary north and south of the maintenance building. Table 6 presents the rationale for each proposed location.

In addition, Trinity will conduct a site inspection in the maintenance building to look for evidence for parts washing facilities that may have existed prior to ABF's activities. Such evidence may include old sinks or basins, concrete patches where equipment may have been bolted to the floor, or other irregularities in the concrete floor.

The following tasks will be completed:

Prefield

Prefield tasks will include obtaining any necessary permits, preparing a site-specific health and safety plan, and notifying inspectors as needed. In addition, Trinity staff will mark the proposed module locations and notify Underground Service Alert for utility clearance.

Installing and Retrieving Passive Soil Gas Modules

The full description of the soil gas module installation and retrieval procedure is presented in Attachment B. In general, Trinity will install the Beacon passive soil gas modules at the proposed locations, to a depth of approximately 12 inches. A hand-held drill will be used to advance the hole. After installation, the hole will be plugged temporarily with a ball of aluminum foil and a thin layer of cement grout. The modules will be left undisturbed for 7 to 10 days. Modules will be installed at nine locations, with one duplicate.

Trinity will retrieve the modules by breaking the cement seal, removing the foil, and placing each module into a labeled sample vial. The borehole will be backfilled with cement grout.

Laboratory Analysis

Trinity will ship the soil gas modules to Beacon for laboratory analysis. The analysis will include HVOCs by EPA Method 8260C. Beacon will provide the analytical results, along with color isopleth maps showing analytical results for selected HVOCs in map view.

Reporting

The results of the passive soil gas survey will be summarized in a data packet for ACEH review. The data packet will include conclusions regarding potential HVOC sources and the extent of impacts, as well as recommendations for additional soil and/or groundwater assessment as appropriate.

If additional assessment is warranted, the additional work will be completed after ACEH approval. One comprehensive report of the additional soil gas, soil and groundwater assessment will be prepared.

The comprehensive report will include the methods, findings, and results of the work proposed herein will be presented in a report, which will include a site map, chain-of custody documentation, and certified analytical reports, along with conclusions and recommendations based on the data collected. The site data and report will be uploaded to GeoTracker.

SCHEDULE

Trinity will initiate the proposed scope of work after ACEH approval of this *Work Plan.* Upon approval to proceed and under normal circumstances, the investigation will take approximately 8 to 10 weeks to complete. The data packet will be submitted within 8 to 12 weeks after receipt of the Beacon report. The final comprehensive report will be submitted within 8 to 12 weeks after receipt of all analytical data.

Should you have any questions regarding this letter, please call Trinity at (831) 426-5600.

Sincerely,

TRINITY SOURCE GROUP, INC.

Information, conclusions, and recommendations made by Trinity in this document regarding this site have been prepared under the supervision of and reviewed by the licensed professional whose signature appears below.

Debra J. Moser, PG, CEG, CHG
Senior Geologist

Attachments:

Table 1:	Soil Analytical Data
Table 2:	Grab-Groundwater Analytical Data
Table 3:	Groundwater Analytical Data
Table 4:	Sub-Slab Vapor Analytical Data
Table 5:	Site Conceptual Model for Soil Vapor Conditions
Table 6:	Data Gaps and Proposed Investigation
Figure 1:	Site Location Map

Figure 2: Soil Boring, Sub-Slab Vapor Probe and Monitoring Well Location Map
Figure 3: Soil Analytical Data Map
Figure 4: Shallow Groundwater Analytical Data Summary Map, Various Dates
Figure 5: Groundwater Elevation Contour Map, August 1, 2013
Figure 6: Sub-Slab Vapor Analytical Data Map
Figure 7: Proposed Passive Soil Gas Survey Map

Attachment A: ACEH Letter Dated October 1, 2013
Attachment B: Beacon Environmental Services, Inc. Passive Soil Gas Survey Technology Description and Field Procedures

DISTRIBUTION

A copy of this report has been forwarded to:

Mr. Mike Rogers (via email to mkrogers@arkbest.com)

Leroy Griffin (via email to lgriffin@oaklandnet.com)

TABLES

Table 1
Soil Analytical Data

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

Sample ID#	Sample Date	Sample Depth (ft)	TPHg (mg/kg)	Diesel Range Organics* C10-C22 (mg/kg)	C22-C32 (mg/kg)	C32-C40 (mg/kg)	Total TPHd (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (Total) (mg/kg)	Naphthalene (mg/kg)	Other VOCs (mg/kg)	PAHs (mg/kg)
Soil Borings - May 2012														
B-1	5/22/2012	4	<0.60	**5.6**[d]	<4.8	<4.8	**5.6**	<0.0060	<0.030	<0.0060	<0.018	<0.030	ND	NA
B-1	5/22/2012	14	<0.93	**15**	**13**	<7.4	**28**	<0.0093	<0.046	<0.0093	<0.028	<0.046	ND	NA
B-2	5/21/2012	5	<0.60	**11**[c,d]	**5.1**[e]	<4.8	**16.1**	<0.0060	<0.030	<0.0060	<0.018	<0.030	ND	NA
B-2	5/21/2012	15	<1.0	**14**[d]	**14**[e]	<8.1	**28**	<0.010	<0.050	<0.010	<0.030	<0.050	ND	NA
B-3	5/22/2012	9	**6.0**	**71**	**14**	**2.2**[a]	**87.2**	<0.0059	<0.030	<0.0059	<0.018	<0.030	n-Propylbenzene = 0.0022[a]	NA
B-3	5/22/2012	15	<0.99	**4.2**[a]	<8.0	<8.0	**4.2**	<0.0099	**0.0034**[a]	<0.0099	<0.030	<0.050	ND	NA
B-3	5/22/2012	19	<0.84	**3.0**[a]	<6.7	<6.7	**3.0**	<0.0084	<0.042	<0.0084	<0.025	<0.042	ND	NA
B-4	5/21/2012	4	<0.62	**180**	**340**	**140**	**660**	<0.0062	<0.031	<0.0062	<0.018	<0.031	ND	NA
B-4	5/21/2012	12	<0.72	**23**[d]	**2.4**[a]	<5.8	**25.4**	<0.0072	<0.036	**0.017**	**0.0034**[a]	**0.0052**[a]	Isopropylbenzene = 0.0024[a]	NA
B-4	5/21/2012	15	<1.0	**16**[d]	**14**[e]	<8.0	**30**	<0.010	<0.050	<0.010	<0.030	**0.0076**[a]	n-Propylbenzene = 0.0034[a]	NA
B-4	5/21/2012	25	<0.60	**3.0**[a]	<4.8	<4.8	**3.0**	<0.0060	<0.030	<0.0060	<0.018	<0.030	ND	NA
B-5	5/21/2012	10	<0.94	**4.1**[a]	<7.5	**3.7**[a]	**7.8**	<0.0094	<0.047	<0.0094	<0.028	<0.047	ND	NA
B-6	5/21/2012	9	<3.6	<5.8[af]	<5.8[f]	<5.8[f]	<5.8	<0.0073	<0.036	<0.0073	<0.022	<0.036 (EPA Method 8270C) **0.0079** (EPA Method 8260B)	ND	Benzo(a)anthracene = 0.0022, Benzo (a) pyrene = 0.0012, Fluoranthene = 0.0030, Fluorene = 0.0013, Phenanthrene = 0.0033, Pyrene = 0.0032, 1-Methylnaphthalene = 0.0026, 2-Methylnaphthalene = 0.0035 "a" note on all of the above
B-6	5/21/2012	17	<4.6	**2.8**[f]	<7.4[f]	<7.4[f]	**2.8**	<0.0092	<0.046	<0.0092	<0.028	<0.046 (EPA Method 8270C) **0.0040** (EPA Method 8260B)	ND	Anthracene = 0.0017, Phenanthrene = 0.0044, Pyrene = 0.0020, 2-Methylnaphthalene = 0.0024 "a" note on all of the above

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Soil Analytical Data

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

Sample ID#	Sample Date	Sample Depth (ft)	TPHg (mg/kg)	Diesel Range Organics* C10-C22 (mg/kg)	C22-C32 (mg/kg)	C32-C40 (mg/kg)	Total TPHd (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (Total) (mg/kg)	Naphthalene (mg/kg)	Other VOCs (mg/kg)	PAHs (mg/kg)
B-7	5/21/2012	12	<0.66	**5.5**	<5.2	<5.2	**5.5**	<0.0066	<0.033	<0.0066	<0.020	<0.033	2-Butanone = 0.025[a], tert-Butyl alcohol = 0.094	NA
B-7	5/21/2012	15	<0.99	**10**[d]	<7.9	<7.9	**10**	<0.0099	<0.050	<0.0099	<0.030	<0.050		NA
B-8	5/21/2012	10	<0.85	**5.3**[a]	<6.8	<6.8	**5.3**	<0.0085	<0.042	<0.0085	<0.026	<0.042	ND	NA
B-8	5/21/2012	15	<0.96	**6.9**[a,d]	**4.0**[a]	<7.7	**10.9**	<0.0096	<0.048	<0.0096	<0.029	<0.048	ND	NA
B-9	5/22/2012	7	<0.74	**25**	**6.4**	<5.9	**31.4**	<0.0074	<0.037	<0.0074	<0.022	<0.037	2-Butanone = 0.034[a]	NA
B-9	5/22/2012	15	<0.98	**2.5**[a]	<7.8	<7.8	**2.5**	<0.0098	**0.0041**[a]	<0.0098	**0.010**[a]	<0.049	ND	NA
B-10	5/21/2012	4	<0.60	**11**[d]	**3.3**[a]	<4.8	**14.3**	<0.0060	<0.030	<0.0060	<0.018	<0.030	ND	NA
B-10	5/21/2012	15	<0.92	**4.8**[a]	<7.3	<7.3	**4.8**	<0.0092	<0.046	<0.0092	<0.027	<0.046	2-Butanone = 0.033[a]	NA
B-11	5/22/2012	8	<0.68	**3.3**[a]	<5.5	<5.5	**3.3**	<0.0068	<0.034	<0.0068	<0.020	<0.034	ND	NA
B-11	5/22/2012	15	<0.96	**5.4**[a]	<7.7	<7.7	**5.4**	<0.0096	<0.048	<0.0096	<0.29	<0.048	ND	NA
Soil Boring and Monitoring Well Installation - December 2012														
B-12	12/17/2012	3	**0.28**[a]	<23[f]	NA	NA	<23[f]	<0.0058	<0.029	<0.0058	<0.017	<0.029	ND**	NA
B-12	12/17/2012	6	<0.69	<1,100[f]	NA	NA	<1,100[f]	<0.0069	<0.034	<0.0069	<0.021	<0.034	ND**	NA
MW-3	12/17/2012	3	<0.59	<24[f]	NA	NA	<24[f]	<0.0059	<0.030	<0.0059	<0.018	<0.030	ND**	NA
MW-3	12/17/2012	7	<0.62	**8.1**	NA	NA	**8.1**	<0.0062	<0.031	<0.0062	<0.019	<0.031	ND**	NA
MW-4	12/17/2012	**3**	<0.58	**5.4**[a]	NA	NA	**5.4**[a]	<0.0058	<0.029	<0.0058	<0.018	<0.029	ND**	NA
MW-4	12/17/2012	**10**	**41**	**48**	NA	NA	**48**	<0.13	<0.65	<0.13	<0.39	**0.50**[a]	ND**	NA
SFRWQCB ESLs (mg/kg) Non Drinking Water Source Commercial Property Use - Shallow Soils														
500							500	1.2	9.3	4.7	11	4.8		
1,800							900	1.2	9.3	4.7	11	4.8		

Table 1
Soil Analytical Data

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

Sample ID#	Sample Date	Sample Depth (ft)	TPHg (mg/kg)	Diesel Range Organics* C10-C22 (mg/kg)	C22-C32 (mg/kg)	C32-C40 (mg/kg)	Total TPHd (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (Total) (mg/kg)	Naphthalene (mg/kg)	Other VOCs (mg/kg)	PAHs (mg/kg)

Notes:

* =	Silica gel cleanup was completed on diesel-range organics analysis
** =	Additional VOCs analyzed included MTBE, di-isopropyl ether, ethanol, ethyl tert-butyl ether, tert-butyl alcohol, tert-amyl methyl ether, 1,2-dibromoethane and 1,2-dichloroethane
MTBE =	Methyl Tertiary-Butyl Ether
TPH =	Total Petroleum Hydrocarbons
Elev. =	elevation
ft =	feet
< =	less than indicated detection level
mg/kg =	milligrams per kilogram
ND =	Not Detected
NA =	Not Analyzed
TPHg =	Total Petroleum Hydrocarbons - Gasoline
TPHd =	Total Petroleum Hydrocarbons - Diesel
VOC =	Volatile Organic Compound
PAH =	Poly-Aromatic Hydrocarbons
a =	The lab noted, estimated value below the lower calibration point. Confidence correlates with concentration.
b =	The lab noted, surrogate recovery limits have been exceeded; values are outside lower control limits.
c =	The lab noted, the sample matrix interfered with the ability to make any accurate dtermination; spike value is low.
d =	The lab noted, this sample has responded in the Diesel range, however it does not appear to be hydrocarbon product.
e =	The lab noted, this sample has responded in the Oil range, however it does not appear to be a hydrocarbon product.
f =	The lab noted, sample diluted due to matrix interferences that impaired the ability to make an accurate analytical determination. The detection limit is elevated in order to reflect the necessary dilution.
ESL =	Environmental Screening Level
SFBRWQCB =	San Francisco Bay Regional Water Quality Control Board, California EPA, http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml (May 2013)

Table 2
Grab-Groundwater Analytical Data

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

Sample ID#	Sample Date	TPHg (µg/L)	Diesel Range Organics* C10-C22 (µg/L)	C22-C32 (µg/L)	C32-C40 (µg/L)	Total TPHd (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (Total) (µg/L)	MTBE	Naphthalene (µg/L)	Other VOCs (µg/L)
B-2	5/21/2012	<100	**76**	<100	<100	**76**	<1.0	<5.0	<1.0	<3.0	<1.0	<5.0	ND
B-3	5/22/2012	**490**	**1,000**	**71**[a]	**60**[a]	**1,131**	**0.99**[a]	<5.0	<1.0	<3.0	<1.0	**13**	Acetone = 24 n-Butylbenzene = 3.7 sec-Butylbenzene = 1.3 tert-Butylbenzene = 5.4 Carbon disulfide = 0.36 n-Propylbenzene = 6.0
B-4	5/21/2012	**230**	**600**	<100	<100	**600**	**0.97**	**0.31**[a]	**0.51**	<3.0	<1.0	**7.6**	n-Butylbenzene = 0.48 sec-Butylbenzene = 0.35 tert-Butylbenzene = 1.1 n - Propylbenzene = 2.2 1,2,4-Trimethylbenzene = 0.61
B-6	5/21/2012	<100	**140**	<100	<100	**140**	<1.0	<5.0	<1.0	<3.0	<1.0	<5.0	ND
B-8	5/21/2012	**120**	**1400**	**100**	<100	**1,500**	<1.0	<5.0	<1.0	<3.0	**3.1**	**1.6**	Acetone = 29 sec-Butylbenzene = 0.73 tert-Butylbenzene = 0.82
B-9	5/22/2012	<100	**180**[b]	<100	<100	**180**	<1.0	<5.0	<1.0	<3.0	<1.0	<5.0	Acetone = 30
B-10	5/22/2012	**59**[a]	**2,300**[b]	**100**	<100	**2,400**	<1.0	<5.0	<1.0	<3.0	<1.0	<5.0	tert-Butylbenzene = 1.0 n-Propylbenzene = 0.42
B-11	5/22/2012	<100	**660**[b]	<100	<100	**660**	<1.0	<5.0	<1.0	<3.0	<1.0	<5.0	ND
B-12	12/17/2012	**44**[a]	**440**	NA	NA	**440**	<1.0	<5.0	**0.63**[a]	**1.9**[a]	<1.0	**11**	ND**
SFRWQCB ESLs (µg/L) Non Drinking Water Source Commercial Property Use													
		500				640	46	130	43	100	1,800	24	

Notes:

* = Silica gel cleanup was completed on diesel-range organics analysis
** = Additional VOCs analyzed included MTBE, di-isopropyl ether, ethanol, ethyl tert-butyl ether, tert-butyl alcohol, tert-amyl methyl ether, 1,2-dibromoethane and 1,2-dichloroethane
< = less than indicated reported detection limit
µg/L = micrograms per Liter (µg/L), also equivalent to parts per billion (ppb)
ND = Not Detected
NA = Not Analyzed
TPHg = Total Petroleum Hydrocarbons - Gasoline
TPHd = Total Petroleum Hydrocarbons - Diesel
MTBE = Methyl Tertiary-Butyl Ether
VOCs = Volatile Organic Compounds
a = Estimated value below the lowest calibration point. Confidence correlates with concetration
b = This sample has responded in the Diesel range, however it does not appear to be a hydrocarbon product
ESL = Environmental Screening Level
SFBRWQCB = San Francisco Bay Regional Water Quality Control Board, California EPA, http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml (May 2013)

Table 3
Groundwater Analytical Data
ABF Freight System, Inc.
4575 Tidewater Avenue
Oakland, California

					EPA Method												
					1664A	8015D/G	3511/8015				Volatile Organics: 8260B						
Sample ID	Sample Date	TOC Well Elevation (feet, MSL)	Depth to Groundwater (feet)	Groundwater Elevation (feet, MSL)	TPH Oil & Grease (µg/L)	TPHg (µg/L)	TPHd without silica gel cleanup (µg/L)	TPHmo without silica gel cleanup (µg/L)	TPHd with silica gel cleanup (µg/L)	TPHmo with silica gel cleanup (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Ethyl-benzene (µg/L)	Naph-thalene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	Other Detections
MW-1	9/15/1986[a]		NA		NA	4,520	NA	NA	NA	NA	NA	1,590	NA	NA	12	1,000	
	10/17/11	11.12	4.56	6.56	<1,300	660	6,680	110	4,520	33	8.4	11	0.93	56	1.1	3.3	A
	2/8/13	11.12	4.22	6.90	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	5/7/13	11.12	4.28	6.84	NS	690	NS	NS	3,000	NS	NS	19	0.60 b	NS	1.0 b	3.1	none
	8/1/13	**11.12**	**5.23**	**5.89**	**NS**	**540**	**NS**	**NS**	**4,700**	**NS**	**NS**	**9.6**	**0.49 b**	**NS**	**0.83 b**	**2.8 b**	**none**
MW-2	9/15/1986[a]		NA		NA	<50	NA	NA	NA	NA	NA	9	NA	NA	<1	<1	
	10/17/11	11.17	3.87	7.30	1,700	<40	730	64	600	69	11	<0.10	<0.11	1.0	<0.15	<0.50	none
	2/8/13	11.17	3.67	7.50	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	5/7/13	11.17	4.10	7.07	NS	<100	NS	NS	93 b	NS	NS	<1.0	<1.0	NS	<5.0	<3.0	none
	8/1/13	**11.17**	**4.83**	**6.34**	**NS**	**<100**	**NS**	**NS**	**440**	**NS**	**NS**	**<1.0**	**<1.0**	**NS**	**<5.0**	**<3.0**	**none**
MW-3	1/7/13	10.96	3.68	7.28	<10,000	43	NA	NA	300	NA	NA	<1.0	<1.0	NA	<5.0	<3.0	none
	2/8/13	10.96	3.98	6.98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	5/7/13	10.96	4.56	6.40	NS	<100	NS	NS	550	NS	NS	<1.0	<1.0	NS	<5.0	<3.0	none
	8/1/13	**10.96**	**5.24**	**5.72**	**NS**	**<100**	**NS**	**NS**	**700**	**NS**	**NS**	**<1.0**	**<1.0**	**NS**	**<5.0**	**<3.0**	**none**
MW-4	1/7/13	11.60	3.91	7.69	<10,000	<100	NA	NA	540	NA	NA	<1.0	<1.0	NA	<5.0	<3.0	MTBE = 2.1
	2/8/13	11.60	3.31	8.29	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	5/7/13	11.60	3.20	8.40	NS	31 b	NS	NS	2,400	NS	NS	2.5	<1.0	NS	<5.0	<3.0	MTBE= 1.2
	8/1/13	**11.60**	**4.53**	**7.07**	**NS**	**<100**	**NS**	**NS**	**1,500**	**NS**	**NS**	**1.9**	**<1.0**	**NS**	**<5.0**	**<3.0**	**MTBE= 1.2**
			ESL		640	500	640	640	640	640	1,500	46	43	24	130	100	
(Industrial Land Use, Non-Drinking Water Source, Aquatic Habitat Protection)																	

				Polynuclear Aromatic Hydrocarbons - EPA METHOD 8270C											
Sample ID	Sample Date		Depth to Groundwater (ft)	Acenaphthene (µg/L)	Acenaph-thylene (µg/L)	Benzo (a) anthracene (µg/L)	Anthracene (µg/L)	Fluoranthene (µg/L)	Fluorene (µg/L)	Naphthalene (µg/L)	1-Methyl naphthalene (µg/L)	2-Methyl naphthalene (µg/L)	Phenan-threne (µg/L)	Pyrene (µg/L)	Other Detections
MW-1	10/17/11		4.56	0.69	0.20	ND	0.056	0.049	1.5	31	13	13	0.29	0.041	none
	5/7/13		4.28	0.82	0.24	<0.050	0.065	<0.050	1.5	36	15	14	<0.25	0.029 b	none
	8/1/13		**5.23**	**1.1**	**0.28**	**<0.050**	**0.086**	**0.068**	**1.9**	**56**	**19**	**17**	**0.42**	**0.059**	**none**
MW-2	10/17/11		3.87	0.097	<0.011	ND	<0.013	<0.016	0.022	0.57	0.096	0.088	<0.018	0.021	none
	5/7/13		4.10	0.17	<0.050	<0.050	0.0089 b	<0.050	0.016 b	2.6	0.20 b	0.11 b	<0.050	<0.050	none
	8/1/13		**4.83**	**0.021 b**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.25**	**0.010 b**	**0.010 b**	**0.0091 b**	**0.014 b**	**none**
MW-3	1/7/13		3.68	0.18	<0.25	0.092	<0.25	<0.25	0.32	4.3	2.2	1.2	0.12	<0.25	none
	5/7/13		4.56	0.066	0.014 b	<0.050	0.025 b	<0.050	0.13	0.61	0.62	0.27	0.034 b	<0.050	none
	8/1/13		**5.24**	**0.073**	**0.015 b**	**<0.050**	**0.019 b**	**<0.050**	**0.12**	**0.91**	**0.65**	**0.28**	**0.031 b**	**<0.050**	**none**
MW-4	1/7/13		3.91	0.37	<0.25	0.095	<0.25	<0.25	0.26	1.2	2.1	0.76	0.098	<0.25	none
	5/7/13		3.20	6.5	0.066	<0.050	0.16	0.059	2.4	3.5	18	3.0	2.7	0.051	none
	8/1/13		**4.53**	**4.4**	**0.24**	**<0.050**	**0.10**	**0.050**	**3.0**	**5.8**	**12**	**3.3**	**1.7**	**0.042 b**	
			ESL	23	30	0.027	0.73	8.0	3.9	24	NLE	2.1	4.6	2.0	
(Industrial Land Use, Non-Drinking Water Source, Aquatic Habitat Protection)															

Table 3
Groundwater Analytical Data
ABF Freight System, Inc.
4575 Tidewater Avenue
Oakland, California

					EPA Method												
					1664A	8015D/G	3511/8015				Volatile Organics: 8260B						
Sample ID	Sample Date	TOC Well Elevation (feet, MSL)	Depth to Groundwater (feet)	Groundwater Elevation (feet, MSL)	TPH Oil & Grease (µg/L)	TPHg (µg/L)	TPHd without silica gel cleanup (µg/L)	TPHmo without silica gel cleanup (µg/L)	TPHd with silica gel cleanup (µg/L)	TPHmo with silica gel cleanup (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Ethyl-benzene (µg/L)	Naph-thalene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	Other Detections

Notes:

Note: Please reference lab report for all qualifers and notes.
Bold = Most current laboratory data
ID = Identification
TOC = top of casing
MSL = mean sea level
EPA = Environmental Protection Agency
TPHg = Total Petroleum Hydrocarbons, gasoline-range organics
TPHd = Total Petroleum Hydrocarbons, diesel-range organics (sum of C10-C22 and C22-C32 hydrocarbons)
TPHmo = Total Petroleum Hydrocarbons, motor-oil range organics (C32-C40 hydrocarbons)
MTBE = methyl tert-butyl ether
ESL = Environmental Screening Level (ESL) listed in *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater* (November 2007), San Francisco Bay Regional Water Quality Control Board, California EPA, http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml, updated May 2013
MW = Monitoring Well
µg/L micrograms per liter (equivalent to parts per billion)
< = not detected at above detection limit
MDL = Minimum detection limit
TPH = Total petroleum hydrocarbons
A = The following analytes were detected above MDL: n-Butylbenzene 2.6 µg/L, sec-Butylbenzene 1.9 µg/L, tert-Butylbenzene 14 µg/L, n-Hexane 7.9 µg/L, Isopropylbenzene 11 µg/L, n-Propylbenzene 21 µg/L, and 1,2,3-trimethylbenzene 1.2 µg/L
NLE = No level established
a = Data reported in Weston report dated February 25, 1987; analysis by EPA Methods 5020/8015/8020; Weston report listed "Motor Fuel" analysis which Trinity is reporting under TPHg
b = Estimated value below the lowest calibration point. Confidence correlates with concentration.
c = The sample matrix interfered with the ability to make any accurate determination; spike value is high

Table 4
Sub-Slab Vapor Analytical Data

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

Sample ID	Sample Date	Analytical Test Methods																
		ASTM D-1946				EPA TO-15											EPA TO-17	
		Carbon Dioxide (%)	Methane (%)	Oxygen (%)	Helium (%)	PCE (µg/m^3)	1,1,2-TCA (µg/m^3)	1,2,4 - TMB (µg/m3)	TPHg (µg/m^3)	Benzene (µg/m^3)	Toluene (µg/m^3)	Ethyl Benzene (µg/m^3)	Ethyl Acetate (µg/m^3)	Total Xylenes (µg/m^3)	Ethanol (µg/m^3)	Other VOCs (µg/m^3)	Naphthalene (µg/m^3)	TPHd (µg/m3)
SVP-1	6/20/2012	2.2	<0.0001	16	0.049	**60**	<11	<10	<1,800	<2.8	<7.7	<8.8	**20**	<27	**180**	ND	<2.0	
SVP-1	12/17/2012				8.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		<0.6	<125
SVP-1	1/17/2013	0.8	<0.0002	20	0.23	**16**	<11	<10	**1,300**	<6.5	<7.7	**9.6**	**33**	**77**	**290**	**Acetone, 340**	**2.0**	
SVP-2	6/20/2012	0.22	0.00018	18	<0.005	**530**	**38**	**13**	**1,900**	**2.9**	**11**	**20**	**19**	**160**	**100**	**Acetone, 230**	**3.4**	
SVP-2	12/17/2012				1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		<0.6	<125
SVP-2	1/17/2013				40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
SVP-2	2/5/2013	1.21	<0.0009	17.1	NA	**901**	<0.03	**0.02**	NA	**0.03**	**0.02**	<0.02	<0.02	**0.04**	NA	**Acetone, 20.4 1,1-DFE, 12.5 (leak check) Others as listed on Certified Analytical Report**		
SVP-2 (QC Sample)	2/5/2013	1.22	<0.001	17.3	NA	**971**	<0.03	**0.064**	**450***	**0.15**	**0.21**	<0.02	<0.02	**0**	**NA**	**Acetone, 67.1 1,1-DFE, 426 (leak check) Others as listed on Certified Analytical Report**		
	ESLs for Commercial Indoor Air	2.1	0.77	NA	100	0.42	1,300	4.9	NA	440	NA	NA	0.36	570				
	Attenuated Commercial Indoor Air[a]	42	15.4	NA	2,000	8.4	26,000	98	NA	8,800	NA	NA	7.2	11,400				

Notes:

ID = Identification
% = Percentage
µg/m^3 = micrograms per meter cubed
PCE = Tetracholoroethene
,2 - TCA = 1,1,2 - Trichloroethane
4 - TMB = 1,2,4 - Trimethylbenzene
TPHg = Total Petroleum Hydrcarbons as Gasoline
1,1-DFE = 1,1-Difluoroethane
ASTM = American Society for Testing Materials

Table 4
Sub-Slab Vapor Analytical Data

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

< =	Not detected at or above detection limit
ND =	Not detected
NA =	Not applicable
Bold =	data detected above laboratory detection limits
*	Duplicate sampled was analyzed for TPHg; result of 450 (µg/m^3) was attributed to single discrete peak (PCE).
ESLs =	Environmental Screening Levels (February 2013)
RWQCB =	San Francisco Bay Regional Water Quality Control Board, California EPA
	http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml (May 2013)
a=	Attenuation factor for existing commercial building sub-slab from the DTSC-CEPA Vapor Intrusion Guidance (2011) is 0.05

TABLE 5

SITE CONCEPTUAL MODEL FOR SOIL VAPOR CONDITIONS

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

SCM Element	SCM Sub-Element	Description	Data Gap	How to Address
Geology and Hydrogeology	Regional	Site is located in the Oakland Harbor area, within the South Bay Hydrologic Planning Area, Santa Clara Valley, East Bay Plain Groundwater Basin.	none	
	Site	Site is underlain by up to 10 feet of compacted fill materials, underlain by tidal marsh deposits and Bay mud. Nearest surface water is the channel extending northerly from San Leandro Bay, separating the island of Alameda and the city of Oakland.	none	
Hydraulic Flow System	Site	Shallow groundwater flow is generally to south and southeast, based on two groundwater monitoring events conducted in 2013. Depth to groundwater is 4 to 5 feet bgs based on 2013 monitoring.	none	
Release History	Site	Four USTs existed at the site; two 10,000-gallon diesel USTs, one 800-gallon motor oil UST, and one 800-gallon waste oil UST. In 1986, Azonic removed the two 800-gallon tanks, along with sludge beneath one of the tanks. Disposal records for two 10,000-gallon tanks show that both diesel tanks have been removed. Release was attributed to overfilling and incidental leaks. PCE source is unknown. In general, PCE sources at similar sites may include parts washing areas, waste oil tanks, and/or sewer lines. At this site, no parts washing areas are present currently; unknown whether historical	PCE source to sub-slab vapor	Conduct soil vapor plume delineation followed by soil sampling as appropriate Site inspection to identify evidence for historical parts washing facility.

TABLE 5
SITE CONCEPTUAL MODEL FOR SOIL VAPOR CONDITIONS

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

SCM Element	SCM Sub-Element	Description	Data Gap	How to Address
		use included parts washing.		
Plume	Site	Soils data indicate complete delineation to low or non-detectable TPHd. TPHg, benzene and other analytes including VOCs were non-detect except for low concentrations of naphthalene. Groundwater concentrations are generally less than ESLs for industrial land use, non-drinking water use, aquatic habitat protection. No HVOCs were detected in groundwater. Soil and groundwater data tables and maps are attached. PCE was detected at concentrations exceeding ESL in sub-slab vapor in one of two probes in the maintenance building. The source of PCE is not known.	PCE source and extent in soil/sub-slab vapor	Conduct soil vapor plume delineation
Site Structures and Operations	Site	Site is an active trucking terminal; release area is former fueling area adjacent to active truck maintenance building. Maintenance building is near western site boundary. No parts washing currently is performed.	None	
Other Nearby Releases	Off-site	Tidewater Business Park at 4703 Tidewater is listed in Geotracker as an active case with metals and oils detected; however, no data is posted to Geotracker. This site is approximately 500 feet from the project site. DiSalvo Trucking is listed in Geotracker as an active UST case with diesel impacts to groundwater. This site is	None – nearby sites have negligible impact on project site based on available data.	

TABLE 5

SITE CONCEPTUAL MODEL FOR SOIL VAPOR CONDITIONS

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

SCM Element	SCM Sub-Element	Description	Data Gap	How to Address
		located approximately 1,200 feet southeast of the project site.		
Land Uses and Exposure Scenarios		Industrial land use predominates at the site and vicinity. Soil and groundwater exposure pathways are not complete based on petroleum hydrocarbon conditions. Soil vapor exposures could occur if vapors accumulate in high concentrations beneath existing buildings and if buildings are not well-ventilated	Extent of PCE vapor plume	Conduct plume delineation using passive soil gas survey
Specific Data Gaps			Source and extent of PCE vapor plume	Conduct plume delineation using passive soil gas survey; follow up with soil sampling as appropriate

TABLE 6

DATA GAPS AND PROPOSED INVESTIGATION

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

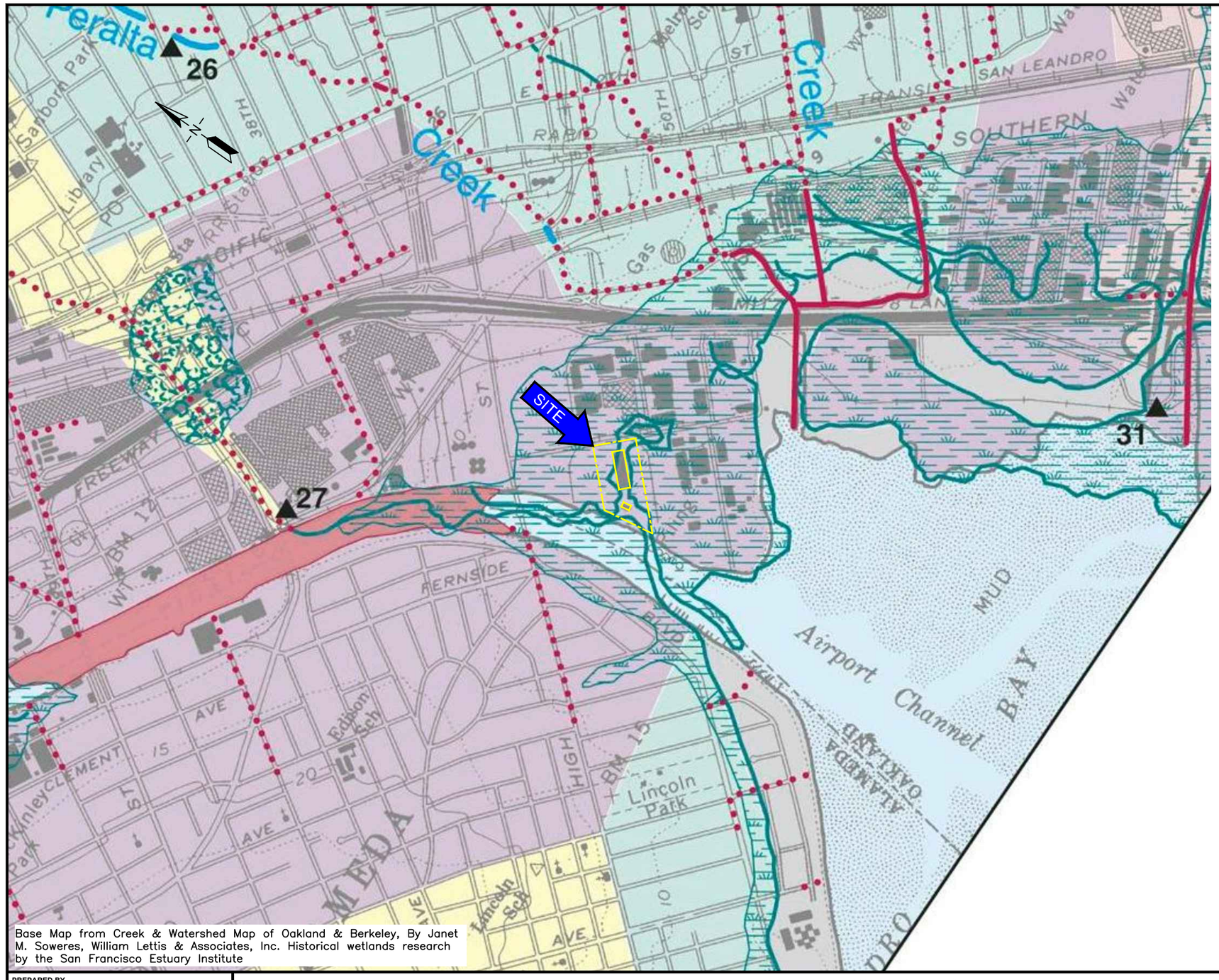
Data Gap	Proposed Investigation	Rationale	Analytical Scope
Source and Extent of PCE in Sub-Slab Vapor	Passive soil gas survey across maintenance building and former UST area. Nine probes are proposed at the locations shown on Figure 7 and described herein. Conduct site inspection for evidence for historical parts washing facilities. If any are found, add a passive soil gas module at that location.	Passive soil gas modules will be placed at the following locations to evaluate potential sources and delineate the extent of HVOC impacts: • Near SVP-2 (sub-slab probe with elevated PCE concentration) • Three modules at floor drains and along sanitary sewer line beneath maintenance building (potential sources) • Southwest corner of maintenance building to delineate extent of plume • Outside northwest corner of maintenance building to delineate extent of plume • In former waste oil UST location (potential source) • North of former waste oil UST along sanitary sewer (potential source and delineation) • North of former UST area, away from sewer line to delineate extent of plume	HVOCs by EPA Method 8260
Source and Extent of PCE in Sub-Slab Vapor; Evaluation of Sources Identified	After evaluating the passive soil gas results, soil sampling will be performed to confirm potential source areas and the extent of impacts. Prior to soil sampling, the passive soil gas sampling results and proposed soil boring locations will be forwarded to	Shallow soil samples will be collected in areas noted via the passive soil gas survey to have elevated HVOC concentrations. Additional samples will be collected to delineate these areas.	HVOCs by EPA Method 8260

TABLE 6
DATA GAPS AND PROPOSED INVESTIGATION

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

Data Gap	Proposed Investigation	Rationale	Analytical Scope
	ACEH for review and approval. Further groundwater assessment will be considered based on the locations of identified potential sources. If warranted, HVOC analysis may be added to the groundwater monitoring scope for Wells MW-1 through MW-4.		

FIGURES



EXPLANATION

- Creeks
- Former creeks, buried or drained, and Bay shoreline, circa 1850
- Underground culverts and storm drains
- Engineered channels
- Willow groves, circa 1850
- Beach, circa 1850
- Tidal marsh, circa 1850
- now water
- now fill land
- Bay
- Bay, circa 1850, now fill land
- Artificial bodies of water
- Present watersheds

APPROX. SCALE IN FEET

0 1,000

Base Map from Creek & Watershed Map of Oakland & Berkeley, By Janet M. Soweres, William Lettis & Associates, Inc. Historical wetlands research by the San Francisco Estuary Institute

PREPARED BY
TRINITY source group, inc.
Environmental Consultants
500 Chestnut Street, Suite 225
Santa Cruz, California 95060
v: 831.426.5600
f: 831.426.5602

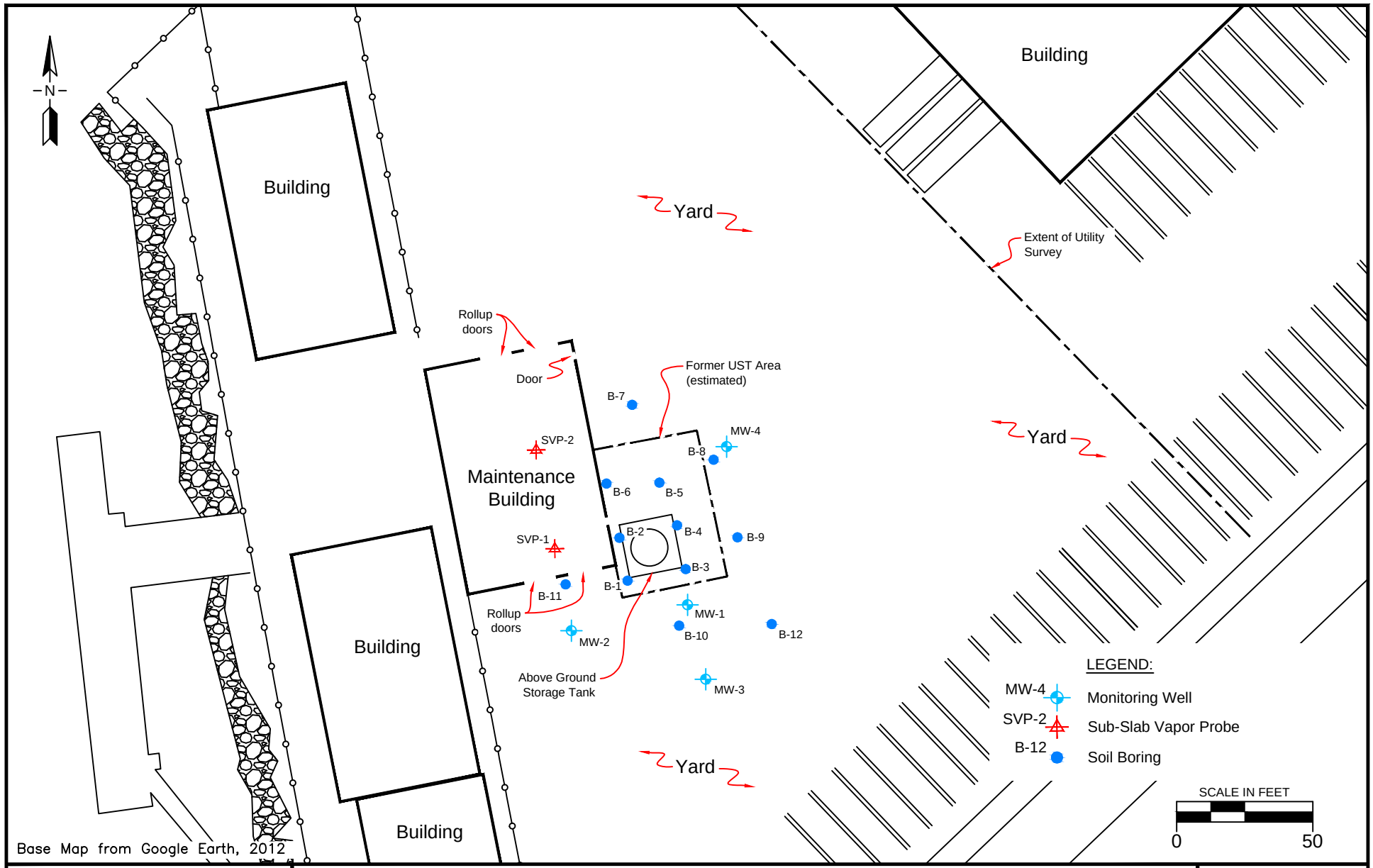
SITE LOCATION MAP

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT: 154.005.001

FIGURE: 1

REF. 154_001\154.004.001 fig1.dwg



PREPARED BY

TRINITY source group, inc.
Environmental Consultants
500 Chestnut Street, Suite 225
Santa Cruz, California 95060
v: 831.426.5600
f: 831.426.5602

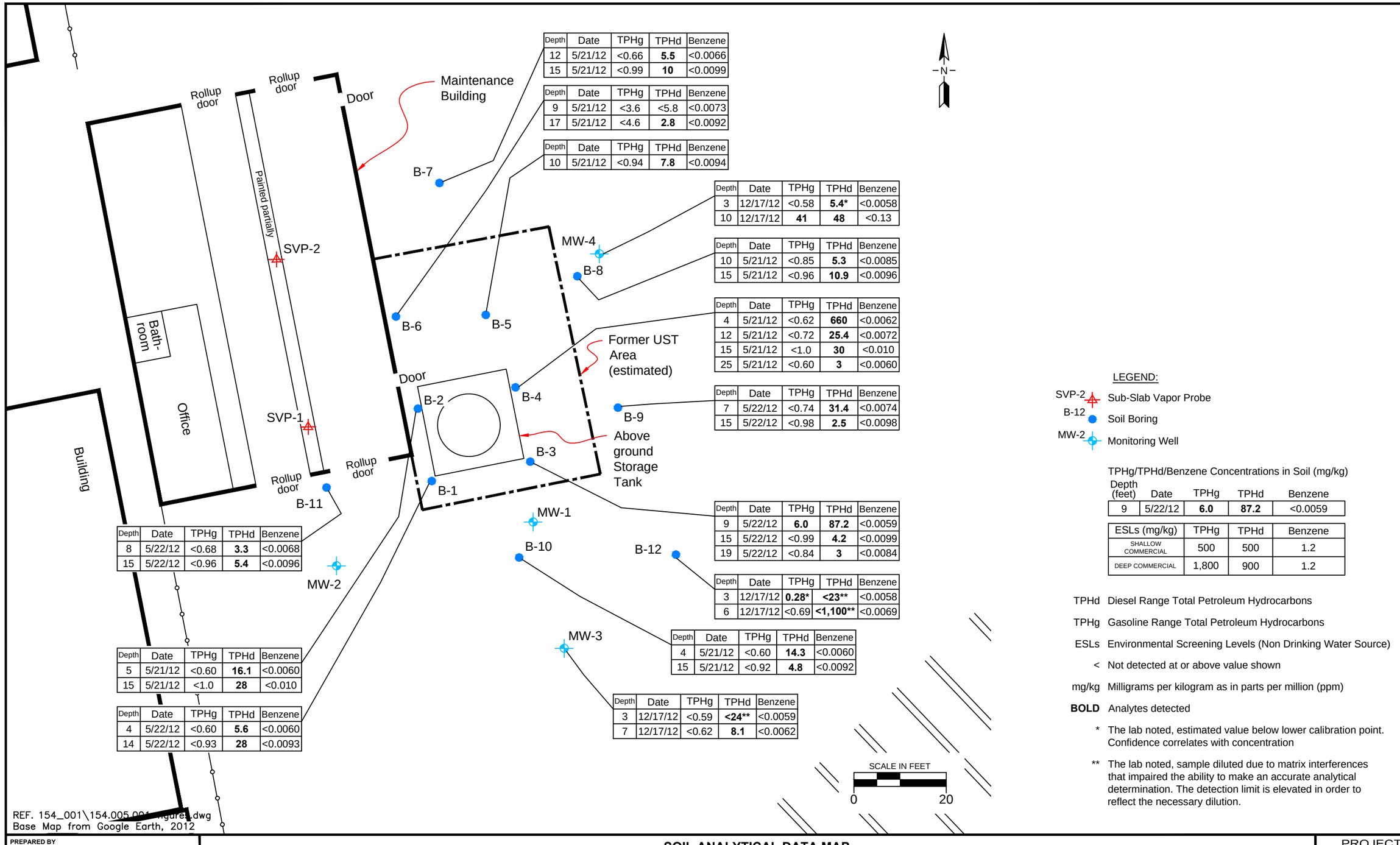
SOIL BORING, SUB-SLAB VAPOR PROBE AND MONITORING WELL LOCATION MAP

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT:
154.005.001

FIGURE:
2

REF. 154_001\154.005.001 figures.dwg



Depth	Date	TPHg	TPHd	Benzene
12	5/21/12	<0.66	**5.5**	<0.0066
15	5/21/12	<0.99	**10**	<0.0099

Depth	Date	TPHg	TPHd	Benzene
9	5/21/12	<3.6	<5.8	<0.0073
17	5/21/12	<4.6	**2.8**	<0.0092

Depth	Date	TPHg	TPHd	Benzene
10	5/21/12	<0.94	**7.8**	<0.0094

Depth	Date	TPHg	TPHd	Benzene
3	12/17/12	<0.58	**5.4***	<0.0058
10	12/17/12	**41**	**48**	<0.13

Depth	Date	TPHg	TPHd	Benzene
10	5/21/12	<0.85	**5.3**	<0.0085
15	5/21/12	<0.96	**10.9**	<0.0096

Depth	Date	TPHg	TPHd	Benzene
4	5/21/12	<0.62	**660**	<0.0062
12	5/21/12	<0.72	**25.4**	<0.0072
15	5/21/12	<1.0	**30**	<0.010
25	5/21/12	<0.60	**3**	<0.0060

Depth	Date	TPHg	TPHd	Benzene
7	5/22/12	<0.74	**31.4**	<0.0074
15	5/22/12	<0.98	**2.5**	<0.0098

Depth	Date	TPHg	TPHd	Benzene
8	5/22/12	<0.68	**3.3**	<0.0068
15	5/22/12	<0.96	**5.4**	<0.0096

Depth	Date	TPHg	TPHd	Benzene
5	5/21/12	<0.60	**16.1**	<0.0060
15	5/21/12	<1.0	**28**	<0.010

Depth	Date	TPHg	TPHd	Benzene
4	5/22/12	<0.60	**5.6**	<0.0060
14	5/22/12	<0.93	**28**	<0.0093

Depth	Date	TPHg	TPHd	Benzene
9	5/22/12	**6.0**	**87.2**	<0.0059
15	5/22/12	<0.99	**4.2**	<0.0099
19	5/22/12	<0.84	**3**	<0.0084

Depth	Date	TPHg	TPHd	Benzene
3	12/17/12	**0.28***	**<23****	<0.0058
6	12/17/12	<0.69	**<1,100****	<0.0069

Depth	Date	TPHg	TPHd	Benzene
4	5/21/12	<0.60	**14.3**	<0.0060
15	5/21/12	<0.92	**4.8**	<0.0092

Depth	Date	TPHg	TPHd	Benzene
3	12/17/12	<0.59	**<24****	<0.0059
7	12/17/12	<0.62	**8.1**	<0.0062

LEGEND:

SVP-2 Sub-Slab Vapor Probe

B-12 Soil Boring

MW-2 Monitoring Well

TPHg/TPHd/Benzene Concentrations in Soil (mg/kg)

Depth (feet)	Date	TPHg	TPHd	Benzene
9	5/22/12	**6.0**	**87.2**	<0.0059

ESLs (mg/kg)	TPHg	TPHd	Benzene
SHALLOW COMMERCIAL	500	500	1.2
DEEP COMMERCIAL	1,800	900	1.2

TPHd Diesel Range Total Petroleum Hydrocarbons

TPHg Gasoline Range Total Petroleum Hydrocarbons

ESLs Environmental Screening Levels (Non Drinking Water Source)

< Not detected at or above value shown

mg/kg Milligrams per kilogram as in parts per million (ppm)

BOLD Analytes detected

* The lab noted, estimated value below lower calibration point. Confidence correlates with concentration

** The lab noted, sample diluted due to matrix interferences that impaired the ability to make an accurate analytical determination. The detection limit is elevated in order to reflect the necessary dilution.

PREPARED BY

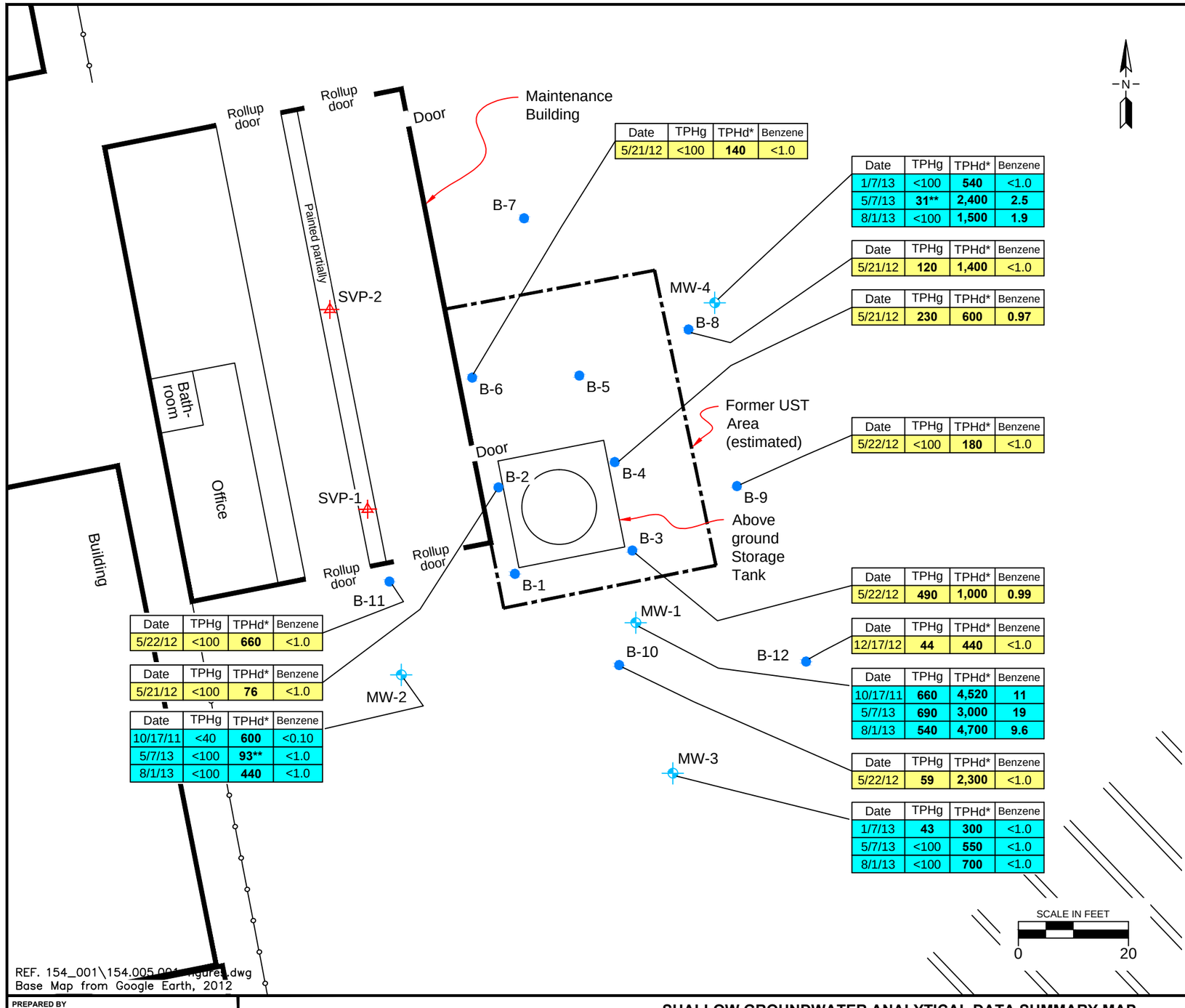
TRINITY source group, inc.
Environmental Consultants
500 Chestnut Street, Suite 225
Santa Cruz, California 95060
v: 831.426.5600
f: 831.426.5602

SOIL ANALYTICAL DATA MAP

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT: 154.005.001

FIGURE: 3



Date	TPHg	TPHd*	Benzene
5/21/12	<100	**140**	<1.0

Date	TPHg	TPHd*	Benzene
1/7/13	<100	**540**	<1.0
5/7/13	**31****	**2,400**	**2.5**
8/1/13	<100	**1,500**	**1.9**

Date	TPHg	TPHd*	Benzene
5/21/12	**120**	**1,400**	<1.0

Date	TPHg	TPHd*	Benzene
5/21/12	**230**	**600**	**0.97**

Date	TPHg	TPHd*	Benzene
5/22/12	<100	**180**	<1.0

Date	TPHg	TPHd*	Benzene
5/22/12	<100	**660**	<1.0

Date	TPHg	TPHd*	Benzene
5/21/12	<100	**76**	<1.0

Date	TPHg	TPHd*	Benzene
10/17/11	<40	**600**	<0.10
5/7/13	<100	**93****	<1.0
8/1/13	<100	**440**	<1.0

Date	TPHg	TPHd*	Benzene
5/22/12	**490**	**1,000**	**0.99**

Date	TPHg	TPHd*	Benzene
12/17/12	**44**	**440**	<1.0

Date	TPHg	TPHd*	Benzene
10/17/11	**660**	**4,520**	**11**
5/7/13	**690**	**3,000**	**19**
8/1/13	**540**	**4,700**	**9.6**

Date	TPHg	TPHd*	Benzene
5/22/12	**59**	**2,300**	<1.0

Date	TPHg	TPHd*	Benzene
1/7/13	**43**	**300**	<1.0
5/7/13	<100	**550**	<1.0
8/1/13	<100	**700**	<1.0

LEGEND:

SVP-2 Sub-Slab Vapor Probe

B-12 Soil Boring

MW-2 Monitoring Well

TPHg/TPHd/Benzene Concentrations in Groundwater (µg/L)

Date	TPHg	TPHd*	Benzene
5/22/12	**59**	**2,300**	<1.0

ESLs (µg/L)	TPHg	TPHd	Benzene
COMMERCIAL	500	640	46

TPHd Diesel Range Total Petroleum Hydrocarbons

TPHg Gasoline Range Total Petroleum Hydrocarbons

ESLs Environmental Screening Levels (Non Drinking Water Source)

< Not detected at or above value shown

µg/L Micrograms per liter as in parts per billion (ppb)

BOLD Analytes detected

* Silica gel cleanup was completed on diesel-range organics analysis

** Estimated value below the lowest calibration point. Confidence correlates with concentration.

Grab Groundwater Sample

Well Groundwater Sample

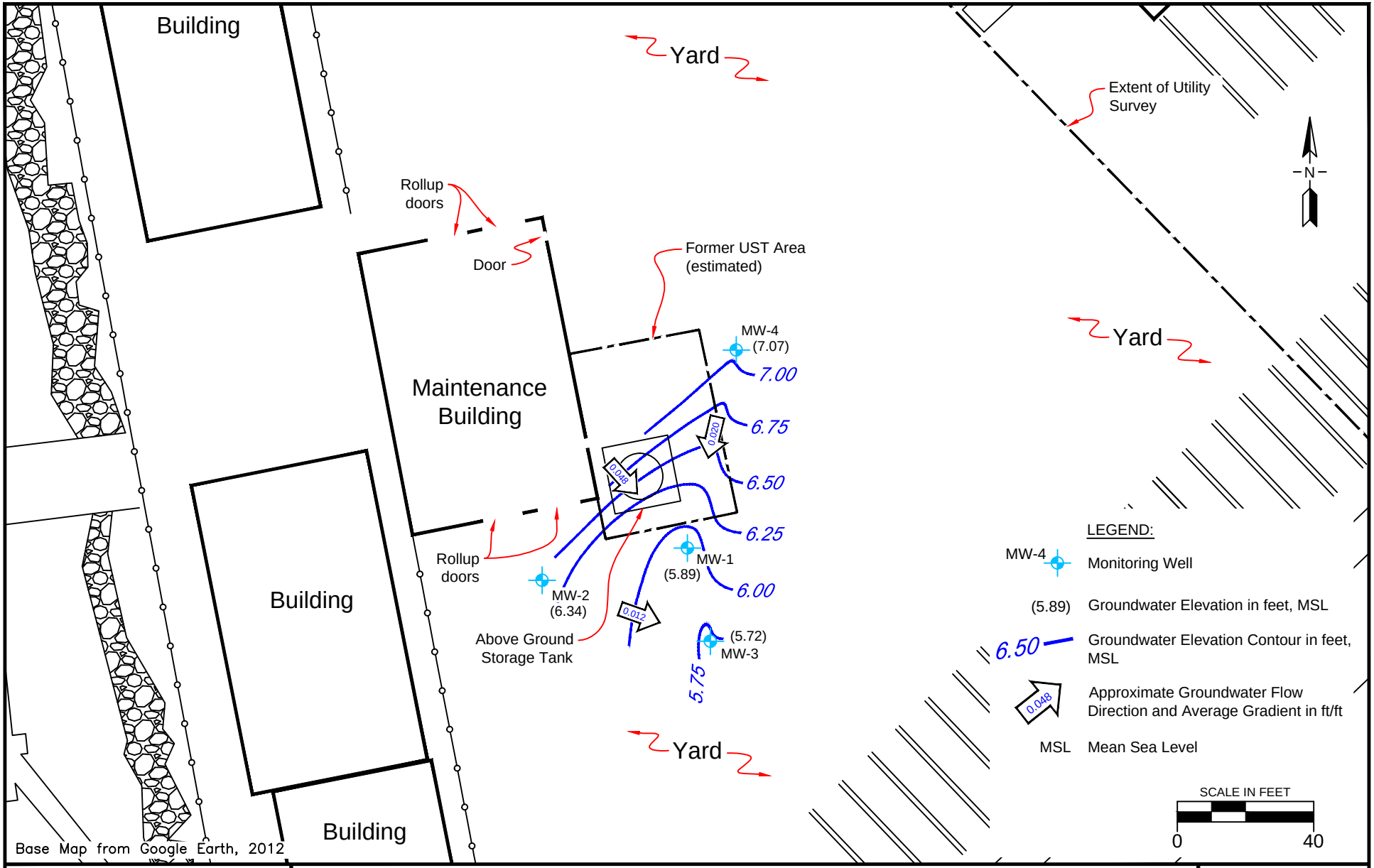
REF. 154_001\154.005.001 figure1.dwg
Base Map from Google Earth, 2012

PREPARED BY
TRINITY source group, inc.
Environmental Consultants
500 Chestnut Street, Suite 225
Santa Cruz, California 95060
v: 831.426.5600
f: 831.426.5602

SHALLOW GROUNDWATER ANALYTICAL DATA SUMMARY MAP, VARIOUS DATES
ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT: 154.005.001

FIGURE: 4



PREPARED BY

TRINITY source group, inc.
Environmental Consultants

500 Chestnut Street, Suite 225
Santa Cruz, California 95060
v: 831.426.5600
f: 831.426.5602

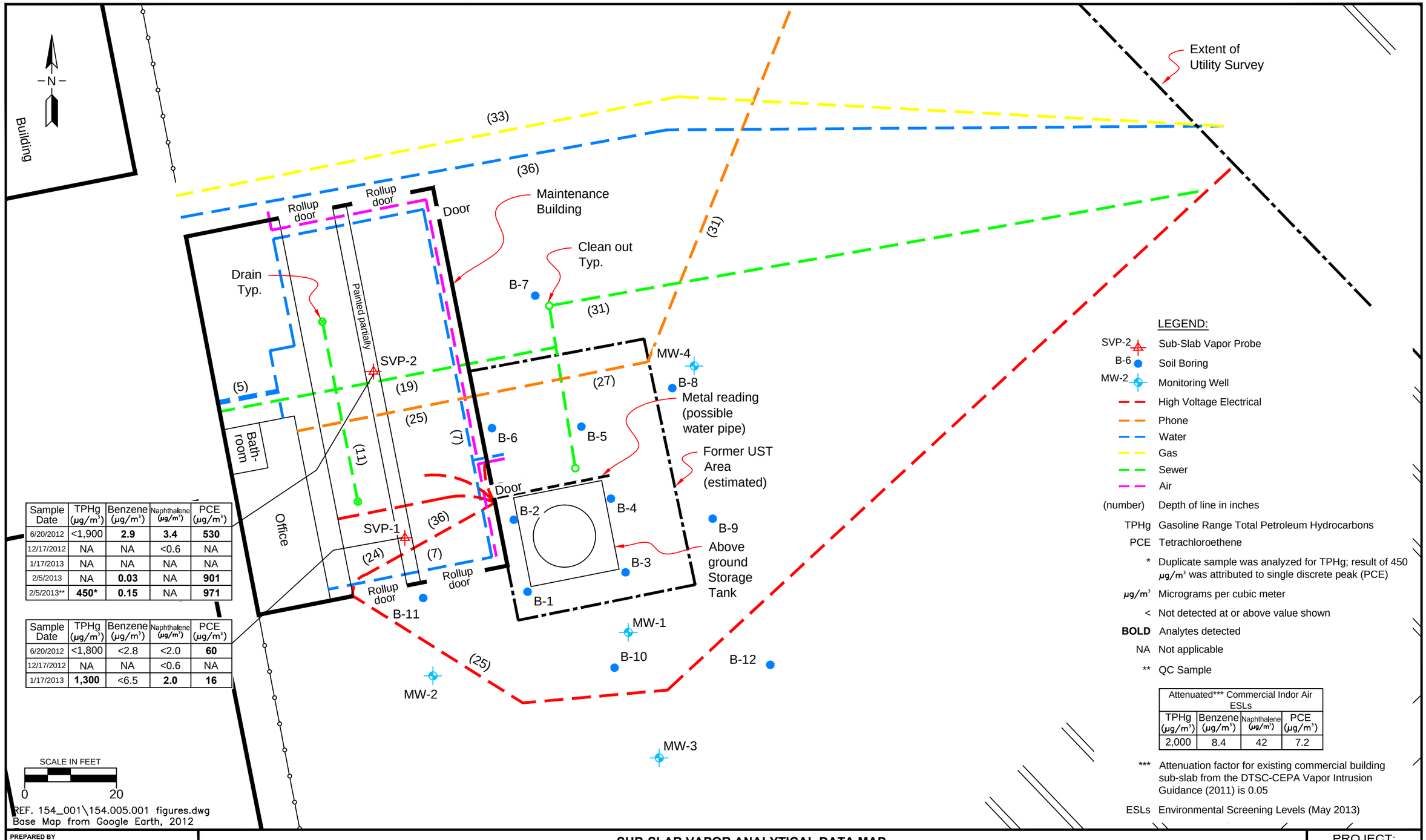
GROUNDWATER ELEVATION CONTOUR MAP, AUGUST 1, 2013

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT: 154.005.001

FIGURE: 5

REF. 154_001\154.005.001 figures.dwg



Sample Date	TPHg (µg/m³)	Benzene (µg/m³)	Naphthalene (µg/m³)	PCE (µg/m³)
6/20/2012	<1,900	**2.9**	**3.4**	**530**
12/17/2012	NA	NA	<0.6	NA
1/17/2013	NA	NA	NA	NA
2/5/2013	NA	**0.03**	NA	**901**
2/5/2013**	**450***	**0.15**	NA	**971**

Sample Date	TPHg (µg/m³)	Benzene (µg/m³)	Naphthalene (µg/m³)	PCE (µg/m³)
6/20/2012	<1,800	<2.8	<2.0	**60**
12/17/2012	NA	NA	<0.6	NA
1/17/2013	**1,300**	<6.5	**2.0**	**16**

LEGEND:

- SVP-2 — Sub-Slab Vapor Probe
- B-6 — Soil Boring
- MW-2 — Monitoring Well
- High Voltage Electrical
- Phone
- Water
- Gas
- Sewer
- Air
- (number) — Depth of line in inches
- TPHg — Gasoline Range Total Petroleum Hydrocarbons
- PCE — Tetrachloroethene
- * — Duplicate sample was analyzed for TPHg; result of 450 µg/m³ was attributed to single discrete peak (PCE)
- µg/m³ — Micrograms per cubic meter
- < — Not detected at or above value shown
- **BOLD** — Analytes detected
- NA — Not applicable
- ** — QC Sample

Attenuated*** Commercial Indor Air ESLs			
TPHg (µg/m³)	Benzene (µg/m³)	Naphthalene (µg/m³)	PCE (µg/m³)
2,000	8.4	42	7.2

- *** — Attenuation factor for existing commercial building sub-slab from the DTSC-CEPA Vapor Intrusion Guidance (2011) is 0.05
- ESLs — Environmental Screening Levels (May 2013)

PREPARED BY

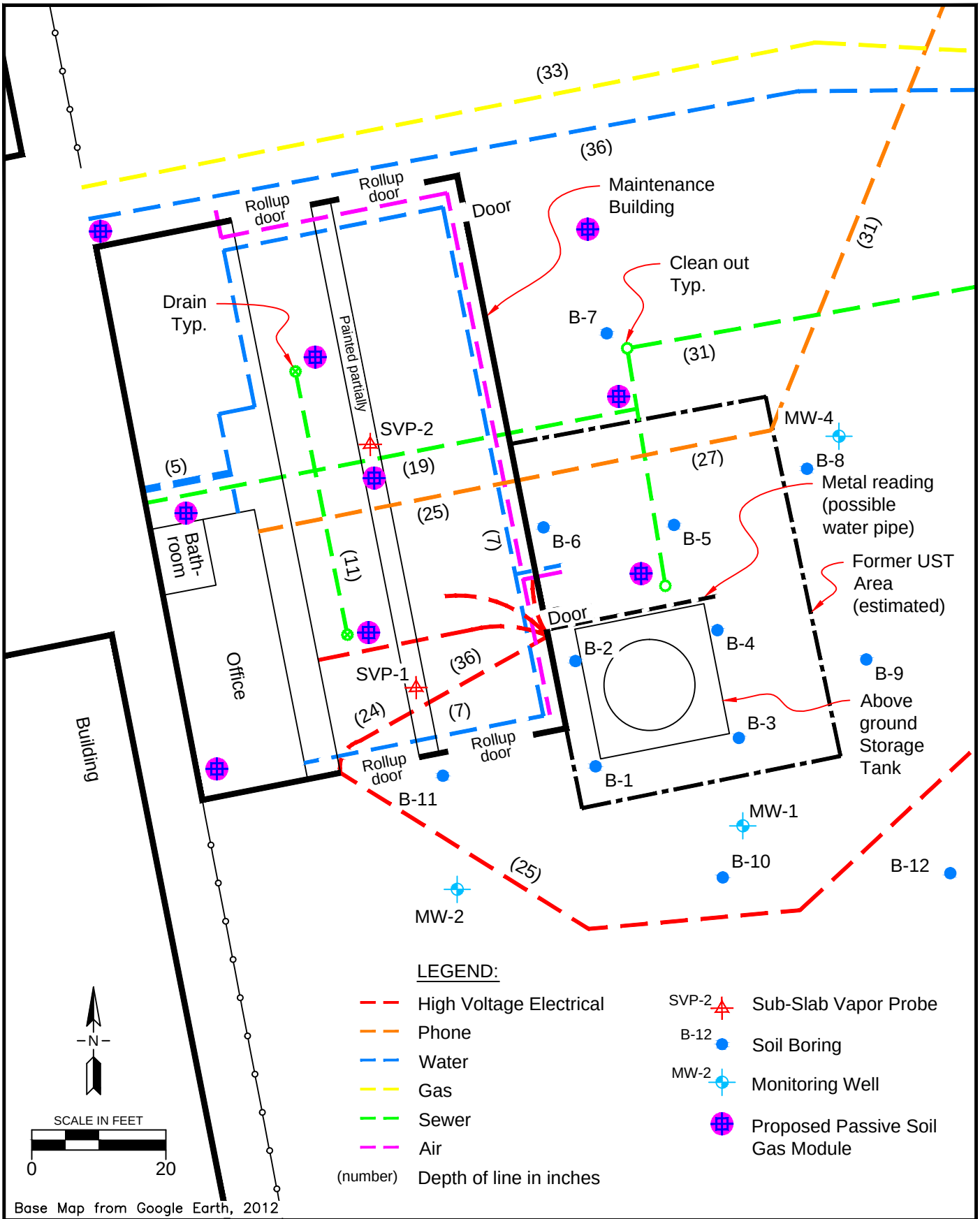
TRINITY source group, inc.
Environmental Consultants
500 Chestnut Street, Suite 225
Santa Cruz, California 95060
v: 831.426.5600
f: 831.426.5602

SUB-SLAB VAPOR ANALYTICAL DATA MAP

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT: 154.005.001

FIGURE: 6



REF. 154_001\154.005.001 figures.dwg

PREPARED BY

TRINITY source group, inc.
Environmental Consultants
500 Chestnut Street, Suite 225
Santa Cruz, California 95060
v: 831.426.5600
f: 831.426.5602

PROPOSED PASSIVE SOIL GAS SURVEY LOCATION MAP

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT: 154.005.001

FIGURE: 7

ATTACHMENT A

ACEH Letter Dated October 1, 2013

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

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

October 1, 2013

Arkansas Bandag Corporation
PO Box 10048
Fort Smith AR 72917

Mr. Chris Brown
ABF Freight Systems, Inc.
PO Box 10048
Fort Smith AR 72917
(sent via electronic mail to cbrown@abf.com)

Subject: Request for Data Gap Investigation Work Plan; Fuel Leak Case No. RO0003033 and GeoTracker Global ID T0600100018, ABF Freight Systems, 4575 Tidewater Avenue, Oakland, CA 94601

Dear Mr. Brown:

Alameda County Environmental Health (ACEH) staff has reviewed the case file for the above-referenced site, including the *Soil, Groundwater, and Sub-Slab Vapor Investigation,* dated February 18, 2013, and the *Third Quarter 2013 Groundwater Monitoring Report,* dated September 20, 2013. The reports were prepared by the Trinity Source Group, Inc (Trinity). Thank you for the reports.

ACEH has also reviewed the case file with respect to the recently enacted Low-Threat Closure Policy and it may be possible to close the petroleum portion of the case under the Policy; however, the recent work has also identified potential petroleum related health threats associated with the former waste oil underground storage tank (chlorinated volatile organic compounds or VOCs) at the site that warrant additional data gathering in order to determine the extent of the potential problem. Specifically, recent sub-slab vapor sampling of the maintenance building detected elevated concentrations of tetrachlorethene (PCE) that exceed the attenuated (using the default DTSC attenuation factor of 0.05) commercial indoor air Environmental Screening Levels (ESLs) promulgated by the San Francisco Regional Water Quality Control Board (RWQCB). Your consultant, Trinity, has stated that because the building is used for maintenance, and the roll-up doors on opposite sides of the building are generally open, that the potential vapor intrusion threat is considered low. However, because the source is unknown and uncharacterized, the extent of the contamination is unknown, potential downgradient offsite receptors exist (adjacent buildings towards estuary), and the Oakland – Alameda Inner Harbor / estuary is at an approximate distance of 150 feet of the vapor detection, it appears that an additional investigation is warranted.

Therefore, based on the review of the case file, ACEH requests that you address the following technical comments and send us the documents requested below.

TECHNICAL COMMENTS

1. **Data Gap Investigation Work Plan and Focused Site Conceptual Model –** In order to define the extent of any soil, vapor, and groundwater contamination (lateral, downgradient, and vertical) associated with the detection of PCE in soil vapor at the site, ACEH requests the submittal of a Data Gap Investigation Work Plan by your consultant to undertake the work by the date identified below.

   Please support the scope of work in the Data Gap Investigation Work Plan that includes a focused Site Conceptual Model (SCM) and Data Quality Objectives (DQOs) that relate the data collection to the objective. In order to expedite review, ACEH requests the focused SCM be presented in a tabular format that highlights the major SCM elements and associated data gaps, which need to be

addressed to progress the site to case closure. Please see Attachment A "Site Conceptual Model Requisite Elements". Please sequence activities in the proposed data gap investigation scope of work to enable efficient data collection in the fewest mobilizations possible.

TECHNICAL REPORT REQUEST

Please upload technical reports to the ACEH ftp site (Attention: Mark Detterman), and to the State Water Resources Control Board's Geotracker website, in accordance with the specified file naming convention below, according to the following schedule:

- **November 22, 2013** – Soil, Groundwater, and Vapor Work Plan
  File to be named: RO3033_WP_SCM_R_yyyy-mm-dd

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

Online case files are available for review at the following website: http://www.acgov.org/aceh/index.htm. If your email address does not appear on the cover page of this notification, ACEH is requesting you provide your email address so that we can correspond with you quickly and efficiently regarding your case.

If you have any questions, please call me at (510) 567-6876 or send me an electronic mail message at mark.detterman@acgov.org.

Sincerely,

Digitally signed by Mark Detterman
DN: cn=Mark Detterman, o, ou, email=mark.detterman@acgov.org, c=US
Date: 2013.10.01 11:03:31 -07'00'

Mark E. Detterman, PG, CEG
Senior Hazardous Materials Specialist

Enclosures: Attachment 1 – Responsible Party (ies) Legal Requirements / Obligations
Electronic Report Upload (ftp) Instructions

Attachment A – Site Conceptual Model Requisite Elements

cc: David Reinsma, Trinity Source Group, Inc, 500 Chestnut Street, Suite 225, Santa Cruz, CA 95060 (sent via electronic mail to dar@tsgcorp.net)

Debra Moser, Trinity Source Group, Inc, 500 Chestnut Street, Suite 225, Santa Cruz, CA 95060 (sent via electronic mail to djm@tsgcorp.net)

Dilan Roe (sent via electronic mail to dilan.roe@acgov.org)
Mark Detterman (sent via electronic mail to mark.detterman@acgov.org)
Electronic File, GeoTracker

Attachment 1

Responsible Party(ies) Legal Requirements/Obligations

REPORT/DATA REQUESTS

These reports/data are being requested pursuant to Division 7 of the California Water Code (Water Quality), Chapter 6.7 of Division 20 of the California Health and Safety Code (Underground Storage of Hazardous Substances), and Chapter 16 of Division 3 of Title 23 of the California Code of Regulations (Underground Storage Tank Regulations).

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (Local Oversight Program [LOP] for unauthorized releases from petroleum Underground Storage Tanks [USTs], and Site Cleanup Program [SCP] for unauthorized releases of non-petroleum hazardous substances) require submission of reports in electronic format pursuant to Chapter 3 of Division 7, Sections 13195 and 13197.5 of the California Water Code, and Chapter 30, Articles 1 and 2, Sections 3890 to 3895 of Division 3 of Title 23 of the California Code of Regulations (23 CCR). Instructions for submission of electronic documents to the ACEH FTP site are provided on the attached "Electronic Report Upload Instructions."

Submission of reports to the ACEH FTP site is in addition to requirements for electronic submittal of information (ESI) to the State Water Resources Control Board's (SWRCB) Geotracker website. In April 2001, the SWRCB adopted 23 CCR, Division 3, Chapter 16, Article 12, Sections 2729 and 2729.1 (Electronic Submission of Laboratory Data for UST Reports). Article 12 required electronic submittal of analytical laboratory data submitted in a report to a regulatory agency (effective September 1, 2001), and surveyed locations (latitude, longitude and elevation) of groundwater monitoring wells (effective January 1, 2002) in Electronic Deliverable Format (EDF) to Geotracker. Article 12 was subsequently repealed in 2004 and replaced with Article 30 (Electronic Submittal of Information) which expanded the ESI requirements to include electronic submittal of any report or data required by a regulatory agency from a cleanup site. The expanded ESI submittal requirements for petroleum UST sites subject to the requirements of 23 CCR, Division, 3, Chapter 16, Article 11, became effective December 16, 2004. All other electronic submittals required pursuant to Chapter 30 became effective January 1, 2005. Please visit the SWRCB website for more information on these requirements: (http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/).

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, 7835, 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, late 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.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

Alameda County Environmental Cleanup Oversight Programs (LOP and SCP)	**REVISION DATE:** July 25, 2012
	ISSUE DATE: July 5, 2005
	PREVIOUS REVISIONS: October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010
SECTION: Miscellaneous Administrative Topics & Procedures	**SUBJECT:** Electronic Report Upload (ftp) Instructions

The Alameda County Environmental Cleanup Oversight Programs (petroleum UST and SCP) require submission of all reports in electronic form to the county's FTP site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

REQUIREMENTS

- **Please do not submit reports as attachments to electronic mail.**
- Entire report including cover letter must be submitted to the ftp site as **a single Portable Document Format (PDF) with no password protection**.
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- **Signature pages and perjury statements must be included and have either original or electronic signature.**
- **Do not password protect the document**. Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted**.
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:

  RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Submission Instructions

1) Obtain User Name and Password
   a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
      i) Send an e-mail to deh.loptoxic@acgov.org
   b) In the subject line of your request, be sure to include **"ftp PASSWORD REQUEST"** and in the body of your request, include the **Contact Information, Site Addresses**, and the **Case Numbers (RO# available in Geotracker) you will be posting for**.

2) Upload Files to the ftp Site
   a) Using Internet Explorer (IE4+), go to ftp://alcoftp1.acgov.org
      (i) Note: Netscape, Safari, and Firefox browsers will not open the FTP site as they are NOT being supported at this time.
   b) Click on Page located on the Command bar on upper right side of window, and then scroll down to Open FTP Site in Windows Explorer.
   c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
   d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
   e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.

3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
   a) Send email to deh.loptoxic@acgov.org notify us that you have placed a report on our ftp site.
   b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
   c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO#, use the street address instead.
   d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

ATTACHMENT A

Site Conceptual Model Requisite Elements

ATTACHMENT A

Site Conceptual Model

The site conceptual model (SCM) is an essential decision-making and communication tool for all interested parties during the site characterization, remediation planning and implementation, and closure process. A SCM is a set of working hypotheses pertaining to all aspects of the contaminant release, including site geology, hydrogeology, release history, residual and dissolved contamination, attenuation mechanisms, pathways to nearby receptors, and likely magnitude of potential impacts to receptors.

The SCM is initially used to characterize the site and identify data gaps. As the investigation proceeds and the data gaps are filled, the working hypotheses are modified, and the overall SCM is refined and strengthened until it is said to be "validated". At this point, the focus of the SCM shifts from site characterization towards remedial technology evaluation and selection, and later remedy optimization, and forms the foundation for developing the most cost-effective corrective action plan to protect existing and potential receptors.

For ease of review, Alameda County Environmental Health (ACEH) requests utilization of tabular formats to (1) highlight the major SCM elements and their associated data gaps which need to be addressed to progress the site to case closure (see Table 1 of attached example), and (2) highlight the identified data gaps and proposed investigation activities (see Table 2 of the attached example). ACEH requests that the tables presenting the SCM elements, data gaps, and proposed investigation activities be updated as appropriate at each stage of the project and submitted with work plans, feasibility studies, corrective action plans, and requests for closures to support proposed work, conclusions, and/or recommendations.

The SCM should incorporate, but is not limited to, the topics listed below. Please support the SCM with the use of large-scaled maps and graphics, tables, and conceptual diagrams to illustrate key points. Please include an extended site map(s) utilizing an aerial photographic base map with sufficient resolution to show the facility, delineation of streets and property boundaries within the adjacent neighborhood, downgradient irrigation wells, and proposed locations of transects, monitoring wells, and soil vapor probes.

a. Regional and local (on-site and off-site) geology and hydrogeology. Include a discussion of the surface geology (e.g., soil types, soil parameters, outcrops, faulting), subsurface geology (e.g., stratigraphy, continuity, and connectivity), and hydrogeology (e.g., water-bearing zones, hydrologic parameters, impermeable strata). Please include a structural contour map (top of unit) and isopach map for the aquitard that is presumed to separate your release from the deeper aquifer(s), cross sections, soil boring and monitoring well logs and locations, and copies of regional geologic maps.

b. Analysis of the hydraulic flow system in the vicinity of the site. Include rose diagrams for depicting groundwater gradients. The rose diagram shall be plotted on groundwater elevation contour maps and updated in all future reports submitted for your site. Please address changes due to seasonal precipitation and groundwater pumping, and evaluate the potential interconnection between shallow and deep aquifers. Please include an analysis of vertical hydraulic gradients, and effects of pumping rates on hydraulic head from nearby water supply wells, if appropriate. Include hydraulic head in the different water bearing zones and hydrographs of all monitoring wells.

c. Release history, including potential source(s) of releases, potential contaminants of concern (COC) associated with each potential release, confirmed source locations, confirmed release locations, and existing delineation of release areas. Address primary leak source(s) (e.g., a tank, sump, pipeline, etc.) and secondary sources (e.g., high-

concentration contaminants in low-permeability lithologic soil units that sustain groundwater or vapor plumes). Include local and regional plan view maps that illustrate the location of sources (former facilities, piping, tanks, etc.).

d. Plume (soil gas and groundwater) development and dynamics including aging of source(s), phase distribution (NAPL, dissolved, vapor, residual), diving plumes, attenuation mechanisms, migration routes, preferential pathways (geologic and anthropogenic), magnitude of chemicals of concern and spatial and temporal changes in concentrations, and contaminant fate and transport. Please include three-dimensional plume maps for groundwater and two-dimensional soil vapor plume plan view maps to provide an accurate depiction of the contaminant distribution of each COC.

e. Summary tables of chemical concentrations in different media (i.e., soil, groundwater, and soil vapor). Please include applicable environmental screening levels on all tables. Include graphs of contaminant concentrations versus time.

f. Current and historic facility structures (e.g., buildings, drain systems, sewer systems, underground utilities, etc.) and physical features including topographical features (e.g., hills, gradients, surface vegetation, or pavement) and surface water features (e.g. routes of drainage ditches, links to water bodies). Please include current and historic site maps.

g. Current and historic site operations/processes (e.g., parts cleaning, chemical storage areas, manufacturing, etc.).

h. Other contaminant release sites in the vicinity of the site. Hydrogeologic and contaminant data from those sites may prove helpful in testing certain hypotheses for the SCM. Include a summary of work and technical findings from nearby release sites, including the two adjacent closed LUFT sites, (i.e., Montgomery Ward site and the Quest Laboratory site).

i. Land uses and exposure scenarios on the facility and adjacent properties. Include beneficial resources (e.g., groundwater classification, wetlands, natural resources, etc.), resource use locations (e.g., water supply wells, surface water intakes), subpopulation types and locations (e.g., schools, hospitals, day care centers, etc.), exposure scenarios (e.g. residential, industrial, recreational, farming), and exposure pathways, and potential threat to sensitive receptors. Include an analysis of the contaminant volatilization from the subsurface to indoor/outdoor air exposure route (i.e., vapor pathway). Please include copies of Sanborn maps and aerial photographs, as appropriate.

j. Identification and listing of specific data gaps that require further investigation during subsequent phases of work. Proposed activities to investigate and fill data gaps identified.

TABLE 1

INITIAL SITE CONCEPTUAL MODEL

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Geology and Hydrogeology	Regional	The site is in the northwest portion of the Livermore Valley, which consists of a structural trough within the Diablo Range and contains the Livermore Valley Groundwater Basin (referred to as "the Basin") (DWR, 2006). Several faults traverse the Basin, which act as barriers to groundwater flow, as evidenced by large differences in water levels between the upgradient and downgradient sides of these faults (DWR, 2006). The Basin is divided into 12 groundwater basins, which are defined by faults and non-water-bearing geologic units (DWR, 1974). The hydrogeology of the Basin consists of a thick sequence of fresh-water-bearing continental deposits from alluvial fans, outwash plains, and lacustrine environments to up to approximately 5,000 feet bgs (DWR, 2006). Three defined fresh-water bearing geologic units exist within the Basin: Holocene Valley Fill (up to approximately 400 feet bgs in the central portion of the Basin), the Plio-Pleistocene Livermore Formation (generally between approximately 400 and 4,000 feet bgs in the central portion of the Basin), and the Pliocene Tassajara Formation (generally between approximately 250 and 5,000 or more feet bgs) (DWR, 1974). The Valley Fill units in the western portion of the Basin are capped by up to 40 feet of clay (DWR, 2006).	None	NA
	Site	***Geology:*** Borings advanced at the site indicate that subsurface materials consist primarily of finer-grained deposits (clay, sandy clay, silt and sandy silt) with interbedded sand lenses to 20 feet below ground surface (bgs), the approximate depth to which these borings were advanced. The documented lithology for one on-site boring that was logged to approximately 45 feet bgs indicates that beyond approximately 20 feet bgs, fine-grained soils are present to approximately 45 feet bgs. A cone penetrometer technology test indicated the presence of sandier lenses from approximately 45 to 58 feet bgs and even coarser materials (interbedded with finer-grained materials) from approximately 58 feet to 75 feet bgs, the total depth drilled. The lithology documented at the site is similar to that reported at other nearby sites, specifically the Montgomery Ward site (7575 Dublin Boulevard), the Quest laboratory site (6511 Golden Gate Drive), the Shell-branded Service Station site (11989 Dublin Boulevard), and the Chevron site (7007 San Ramon Road). ***Hydrogeology:*** Shallow groundwater has been encountered at depths of approximately 9 to 15 feet bgs. The hydraulic gradient and groundwater flow direction have not been specifically evaluated at the site.	As noted, most borings at the site have been advanced to approximately 20 feet bgs, and one boring has been advanced and logged to 45 feet bgs; CPT data was collected to 75 feet bgs at one location. Lithologic data will be obtained from additional borings that will be advanced on site to further the understanding of the subsurface, especially with respect to deeper lithology. The on-site shallow groundwater horizontal gradient has not been confirmed. Additionally, it is not known if there may be a vertical component to the hydraulic gradient.	Two direct push borings and four multi-port wells will be advanced to depth (up to approximately 75 feet bgs) and soil lithology will be logged. See items 4 and 5 on Table 2. Shallow and deeper groundwater monitoring wells will be installed to provide information on lateral and vertical gradients. See Items 2 and 5 on Table 2.
Surface Water Bodies		The closest surface water bodies are culverted creeks. Martin Canyon Creek flows from a gully west of the site, enters a culvert north of the site, and then bends to the south, passing approximately 1,000 feet east of the site before flowing into the Alamo Canal. Dublin Creek flows from a gully west of the site, enters a culvert approximately 750 feet south of the site, and then joins Martin Canyon Creek approximately 750 feet southeast of the site.	None	NA
Nearby Wells		The State Water Resources Control Board's GeoTracker GAMA website includes information regarding the approximate locations of water supply wells in California. In the vicinity of the site, the closest water supply wells presented on this website are depicted approximately 2 miles southeast of the site; the locations shown are approximate (within 1 mile of actual location for California Department of Public Health supply wells and 0.5 mile for other supply wells). No water-producing wells were identified within 1/4 mile of the site in the well survey conducted for the Quest Laboratory site (6511 Golden Gate Drive; documented in 2009); information documented in a 2005 report for the Chevron site at 7007 San Ramon Road indicates that a water-producing well may exist within 1/2 mile of the site.	A formal well survey is needed to identify water-producing, monitoring, cathodic protection, and dewatering wells.	Obtain data regarding nearby, permitted wells from the California Department of Water Resources and Zone 7 Water Agency (Item 11 on Table 2).

TABLE 2

DATA GAPS AND PROPOSED INVESTIGATION

Item	Data Gap	Proposed Investigation	Rationale	Analysis
5	Evaluate the possible presence of impacts to deeper groundwater. Evaluate deeper groundwater concentration trends over time. Obtain data regarding the vertical groundwater gradient. Obtain more lithological data below 20 feet bgs.	Install four continuous multichannel tubing (CMT) groundwater monitoring wells (aka multi-port wells) to approximately 65 feet bgs in the northern parking lot with ports at three depths (monitoring well locations may be adjusted pending results of shallow grab groundwater samples; we will discuss any potential changes with ACEH before proceeding). Groundwater monitoring frequency to be determined. Soil samples will be collected only if there are field indications of impacts. Soil lithology will be logged. However, information regarding the moisture content of soil may not be reliable using sonic drilling technology (two borings will be logged using direct push technology; see Item 4, above).	One well is proposed at the western (upgradient) property boundary to confirm that there are no deeper groundwater impacts from upgradient. Two wells are proposed near the center of the northern parking lot to evaluate potential impacts in an area where deeper impacts, if any, would most likely to be found. One well is proposed at the eastern (downgradient) property boundary to confirm that there are no impacts extending off-site. Port depths will be chosen based on the locations of saturated soils (as logged in direct push borings; see Item 4, above), but are expected at approximately 15, 45, and 60 feet bgs.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance.
6	Evaluate possible off-site migration of impacted soil vapor in the downgradient direction (east). Evaluate concentration trends over time.	Install 4 temporary nested soil vapor probes at approximately 4 and 8 feet bgs along the eastern property boundary. Based on the results of the sampling, two sets of nested probes will be converted to vapor monitoring wells to allow for evaluation of VOC concentration trends over time.	Available data indicate that PCE and TCE are present in soil vapor in the eastern portion of the northern parking lot. Samples are proposed on approximately 50-foot intervals along the eastern property boundary to provide a transect of concentrations through the vapor plume. The depths of 4 and 8 feet bgs are chosen to provide data closest to the source (i.e., groundwater) while avoiding saturated soil, and also provide shallower data to help evaluate potential attenuation within the soil column. Two sets of nested vapor probes will be converted into vapor monitoring wells (by installing well boxes at ground surface); the locations of the permanent wells will be chosen based on the results of samples from the temporary probes.	*Soil vapor*: VOCs by EPA Method TO-15.
7	Evaluate potential for off-site migration of impacted groundwater in the downgradient direction (east).	Advance two borings to approximately 20 feet bgs in the parking lot of the property east of the Crown site for collection of grab groundwater samples.	Two borings are proposed off-site, on the property east of the Crown site, just east of the building in the expected area of highest potential VOC concentrations.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance.
8	Evaluate VOC concentrations just north of the highest concentration area.	Advance two borings to approximately 20 feet bgs north of Building A for collection of soil and grab groundwater samples. Soil samples will be collected at two depths in the vadose zone. Soil samples will be collected based on field indications of impacts (PID readings, odor, staining) or, in the absence of field indications of impacts, at 5 and 10 feet bgs.	The highest concentrations of PCE in groundwater were detected at boring NM-B-32, just north of Building A. The nearest available data to the north are approximately 75 feet away. One of the borings will be advanced approximately 20 feet north of NM-B-32 to provide data close to the highest concentration area. A second boring will be advanced approximately halfway between the first boring and former boring NM-B-33 to provide additional spatial data for contouring purposes. These borings will be part of a transect in the highest concentration area.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance. *Soil:* VOCs by EPA Method 8260 (soil samples to be collected using field preservation in accordance with EPA Method 5035).
9	Evaluate VOC concentrations in soil vapor in the south parcel of the site.	Install four temporary soil vapor probes at approximately 5 feet bgs around boring SV-25, where PCE was detected in soil vapor at a low concentration.	PCE was detected in soil vapor sample SV-25 in the southern parcel, although was not detected in groundwater in that area. Three probes will be installed approximately 30 feet from of boring SV-25 to attempt to delineate the extent of impacts. A fourth probe is proposed west of the original sample, close to the property boundary and the location of mapped utility lines, which may be a potential conduit, to evaluate potential impacts from the west.	*Soil vapor*: VOCs by EPA Method TO-15.
10	Obtain additional information regarding subsurface structures and utilities to further evaluate migration pathways and sources.	Ground penetrating radar (GPR) and other utility locating methodologies will be used, as appropriate, to further evaluate the presence of unknown utilities and structures at the site.	Utilities have been identified at the site that include an on-site sewer lateral and drain line, and shallow water, electric, and gas lines. Given the current understanding of the distribution of PCE in groundwater at the site, it is possible that other subsurface utilities, and specifically sewer laterals, exist that may act as a source or migration pathway for distribution of VOCs in the subsurface.	NA

TABLE 6

DATA GAPS AND PROPOSED INVESTIGATION

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

Data Gap	Proposed Investigation	Rationale	Analytical Scope
Source and Extent of PCE in Sub-Slab Vapor	Passive soil gas survey across maintenance building and former UST area. Nine probes are proposed at the locations shown on Figure 7 and described herein. Conduct site inspection for evidence for historical parts washing facilities. If any are found, add a passive soil gas module at that location.	Passive soil gas modules will be placed at the following locations to evaluate potential sources and delineate the extent of HVOC impacts: • Near SVP-2 (sub-slab probe with elevated PCE concentration) • Three modules at floor drains and along sanitary sewer line beneath maintenance building (potential sources) • Southwest corner of maintenance building to delineate extent of plume • Outside northwest corner of maintenance building to delineate extent of plume • In former waste oil UST location (potential source) • North of former waste oil UST along sanitary sewer (potential source and delineation) • North of former UST area, away from sewer line to delineate extent of plume	HVOCs by EPA Method 8260
Source and Extent of PCE in Sub-Slab Vapor; Evaluation of Sources Identified	After evaluating the passive soil gas results, soil sampling will be performed to confirm potential source areas and the extent of impacts. Prior to soil sampling, the passive soil gas sampling results and proposed soil boring locations will be forwarded to	Shallow soil samples will be collected in areas noted via the passive soil gas survey to have elevated HVOC concentrations. Additional samples will be collected to delineate these areas.	HVOCs by EPA Method 8260

TABLE 6
DATA GAPS AND PROPOSED INVESTIGATION

ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

Data Gap	Proposed Investigation	Rationale	Analytical Scope
	ACEH for review and approval. Further groundwater assessment will be considered based on the locations of identified potential sources. If warranted, HVOC analysis may be added to the groundwater monitoring scope for Wells MW-1 through MW-4.		

ATTACHMENT B

Beacon Environmental Services, Inc.
Passive Soil Gas Survey
Technology Description and Field Procedures

PASSIVE SOIL GAS TESTING:

STANDARD FOR SITE CHARACTERIZATION

Beacon Environmental Services, Inc.
2203A Commerce Road
Suite 1
Forest Hill, MD 21050 USA

Beacon is the recognized leader in passive soil gas sampling

DoD ELAP and ISO 17025 Accredited Laboratory
NEFAP Accredited Field Sampling Organization
Accreditation No. 72690

PASSIVE SOIL GAS TESTING:
STANDARD FOR SITE CHARACTERIZATION

Background and Introduction

Passive soil gas surveys utilize adsorbent samplers that are emplaced subsurface to adsorb volatile and semivolatile organic compounds (VOCs and SVOCs) in soil gas without forcing the flow rate of gas, yielding a more representative sample than active soil gas methods. Samplers are typically placed in a grid pattern to simultaneously sample trace levels of compounds in soil gas that originate from contamination in soil or groundwater. By sampling all locations at the same time, the temporal variations in soil-gas concentrations that are known to occur daily and even hourly are normalized. In addition, the spatial variability of contamination is better defined with a passive soil gas survey because the lower sampling and analytical costs of the method allow for more locations to be sampled than normally would be with a fixed budget. Passive soil gas methods have been demonstrated to be more sensitive and reproducible than active soil gas methods and are able to target a broad range of organic compounds from vinyl chloride to polynuclear aromatic hydrocarbons (PAHs) and other SVOCs.

The analytical results for a passive soil gas method are not presented as a concentration, but in units of mass for comparison between sample locations to identify source areas, to delineate the lateral extent of contamination, including migration pathways, and to monitor remediation programs. The soil gas concentration reported with an active soil gas method that uses a high flow pump may not represent the actual concentration in soil gas because of the forced movement of soil gas. However, valid soil-gas concentrations can be measured following Method TO-17 using packed adsorbent tubes and a low-flow pump or Method TO-15 using Summa canisters.

Passive soil gas (PSG) results are based on a higher level of QA/QC than can be achieved with other field screening methods. Measurements are based on a five-point initial calibration with the lowest point on the calibration curve at or below the practical quantitation limit of each compound. Internal standards and surrogates are included with each analysis – per EPA Method 8260C – to provide proof of performance that the system was operating properly for each sample and to provide consistent reference points for each analysis, which enables an accurate comparison of measured quantities. Trip blanks are analyzed with each batch of samples and because two sets of hydrophobic adsorbent cartridges are provided in each Sampler, duplicate or confirmatory analyses can be performed for any of the sample locations. A representative list of compounds that can be targeted with passive soil gas surveys is provided in **Table 1**.

Biography of Author

Harry O'Neill is the President of Beacon Environmental Services and has managed soil gas investigations for more than 20 years working on military and commercial projects throughout the United States, as well as internationally. Mr. O'Neill has been on the forefront of the acceptance of passive soil gas sampling technologies at the national and international level and has overseen the implementation of over a thousand soil gas surveys. He is also the lead author of the recent *ASTM Standard D7758: Standard Practice for Passive Soil Gas Sampling in the Vadose Zone for Source Identification, Spatial Variability Assessment, Monitoring, and Vapor Intrusion Evaluations*.

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Table 1
Passive Soil-Gas Survey
Representative List of Target Compounds

TPH C_5-C_9	p & m-Xylene
TPH C_{10}-C_{15}	Bromoform
Vinyl Chloride	1,1,2,2-Tetrachloroethane
1,1-Dichloroethene	o-Xylene
trans-1,2-Dichloroethene	1,2,3-Trichloropropane
Methyl-t-butyl ether (MTBE)	Isopropylbenzene
1,1-Dichloroethane	1,3,5-Trimethylbenzene
cis-1,2-Dichloroethene	1,2,4-Trimethylbenzene
Chloroform	1,3-Dichlorobenzene
2,2-Dichloropropane	1,4-Dichlorobenzene
1,2-Dichloroethane	1,2-Dichlorobenzene
1,1,1-Trichloroethane	n-Butylbenzene
1,1-Dichloropropene	1,2,4-Trichlorobenzene
Carbon Tetrachloride	Naphthalene
Benzene	Hexachlorobutadiene
1,2-Dichloropropane	Trichlorobenzenes
Trichloroethene	2-Methylnaphthalene
1,1,2-Trichloroethane	Tetrachlorobenzenes
Toluene	Acenaphthylene
1,3-Dichloropropane	Acenaphthene
1,2-Dibromoethane (EDB)	Pentachlorobenzene
Tetrachloroethene	Heptadecane
1,1,1,2-Tetrachloroethane	Hexachlorobenzene
Chlorobenzene	Phenanthrene
Ethylbenzene	Anthracene

Note: Additional compounds may be targeted to meet project specific requirements. The reporting quantitation level (RQL) for each compound is 25 nanograms (ng) and the RQL for TPH is 5,000 ng; however, the demonstrated limit of quantitation (LOQ) for each compound is 10 ng.

The following document is broken into two separate parts:

1. General Overview of Passive Soil Gas Investigation for Site Characterization
2. Step-by-Step Passive Soil Gas Sampler Installation and Retrieval

For the complete site characterization, Beacon Environmental recommends a passive soil gas survey be performed followed by a limited and focused soil and/or groundwater sampling program to measure the concentrations of identified compounds. The primary purpose of this document is to describe the methods and procedures used to perform a passive soil gas investigation.

Part 1: General Overview of Passive Soil Gas Investigation for Site Characterization

1.0 Survey Design

The survey design varies depending on the amount of historical and other site information that is available prior to initiating the passive soil gas (PSG) survey. Typically an unbiased grid is established across the site with additional biased sample locations to target specific features. The spacing between sample locations is dependent upon the expected depth of the chemicals of concern (CoC), the soil types, and the size of the area to be investigated. Generally, a grid with 25-foot spacing between sample locations is used to identify source areas, but the actual spacing will be dependent additionally on the size of the area of investigation and the project budget. Wider grids and transects are used to track groundwater contamination. Global positioning system (GPS) equipment can be used to collect the sample location coordinate data.

Beacon Environmental provides a BESURE Sample Collection Kit™ with detailed instructions to allow samples to be collected by an environmental field technician. Following collection in the field, the samplers are returned to Beacon Environmental's laboratory for analysis using thermal desorption-gas chromatography/mass spectrometry (TD-GC/MS) instrumentation following EPA Method 8260C. A comprehensive survey report is provided by Beacon Environmental that includes results in tabular form as well as on color isopleth maps showing the distribution of compounds identified in the investigation (see **Figure 1** below).

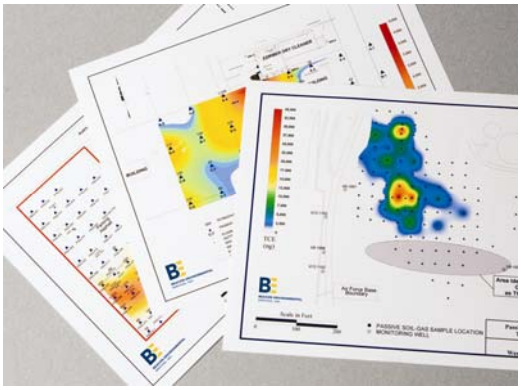

Figure 1 – Example Color Isopleth Maps

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2.0 Soil-Gas Sampling Procedures

To perform the soil-gas investigation, Beacon Environmental provides a BESURE Sample Collection Kit™ with all the materials necessary to collect the requested number of soil-gas samples. To collect soil-gas samples, an approximately one-inch diameter hole is advanced to the appropriate depth to meet the objectives of the survey (e.g., one to three feet). The PSG Sampler (which contains two sets of ***hydrophobic adsorbent*** cartridges) is installed in the hole and covered with an aluminum foil plug and soil to seal the sampler in the ground. The adsorbent cartridges used by Beacon Environmental are hydrophobic, which allows the samplers to be effective even in water-saturated conditions. Extensive empirical evidence, which is supported by a government study, has proven that hydrophobic adsorbents work perfectly well in high moisture conditions and should not be encased by a hydrophobic membrane.

For locations covered by asphalt or concrete surfacing, an approximately 1 ½-inch diameter hole is drilled through the surfacing to the underlying soils. A ½" to 1" diameter drill bit can then be used to advance the hole to a three foot depth to increase the sensitivity of the method. The upper 12 inches of the hole is sleeved with a sanitized metal pipe provided in the Kit. After the Sampler is installed inside the metal pipe, the hole is patched with an aluminum foil plug and a thin concrete patch to effectively protect the sampler.

The samplers are exposed to subsurface gas for approximately three to 14 days, with the exact length of time appropriate to meet the objectives of the survey. The sampler is shipped to the site with a length of wire wrapped around the vial and twisted around the shoulder of the vial to expedite retrieval from the ground. Following the exposure period, the Samplers are retrieved and shipped to Beacon Environmental's laboratory for analysis. It is not necessary to use ice or preservatives during shipment; however, the samplers are sealed and shipped under established chain-of-custody procedures. Trip blanks, which remain with the other samples during preparation, shipment, and storage, are included at a typical rate of five percent of the total number of field samples. **Figure 2** shows a PSG Sampler as it looks when received in the BESURE Kit™.

Figure 2 - PSG Sampler

A two-person team can install approximately 50 to 100 samplers per day depending on the number of sample locations that are covered with asphalt, concrete, or gravel surfacing. For retrieval of the Samplers, one person can retrieve approximately 50 samplers per day and patch the holes through the surfacing. If no impervious surfacing is present, one person can retrieve more than 100 samplers per day. **Figure 3** shows installation through asphalt and grass surfaces, respectively.

Figure 3 — Installation of Samplers with Beacon Environmental's BESURE Kit™

The amount of days required to complete the installation and retrieval procedures is dependent upon the number of personnel deployed for the execution of the fieldwork, weather conditions, and health and safety considerations.

3.0 Analytical Procedures

A chain-of-custody accompanies the field samples at all times from the time the samples are collected until final analysis. BESURE Kits™ are shipped with tug-tight custody seals to ensure that samplers are not tampered with during transport (see **Figure 4**). Once samples are received at the laboratory, the sample custodian receives the samples and logs the samples into the laboratory's Sample Receipt Log.

Figure 4 – BESURE Sample Collection Kit™

Beacon Environmental's laboratory is maintained in a safe and secure manner at all times. The facility is locked when not occupied and is monitored for fire and unauthorized access. Beacon Environmental personnel escort all visitors at all times while inside the facility. Neither soil nor water analyses are performed at Beacon Environmental, so no solvents are stored or used that

can create background contamination problems as experienced by wet labs. This ensures that a clean laboratory environment is maintained for trace analyses.

Soil gas samples are analyzed by Beacon Environmental using gas chromatography/mass spectrometry (GC/MS) instrumentation, following EPA Method 8260C procedures. Samples are routinely analyzed for a list of approximately 40 compounds, which can additionally include total petroleum hydrocarbons (TPH). The laboratory performs an ***initial five-point calibration***. In addition, a BFB tune is performed daily and a method blank is run following the daily calibration. ***Internal standards and surrogates*** are included with each sample analysis. The laboratory's reported quantitation level (RQL) for each of the targeted compounds is 25 nanograms (ng); however, the limit of quantitation (LOQ) is 10 ng and the limit of detection (LOD) is 5 ng. MDL studies are performed, as well. As an option, TICs can be reported for each sample, with the results based on the closest internal standard to the TIC.

Beacon Environmental is known for providing the highest level of accuracy and quality assurance and quality control (QA/QC) procedures for the analysis of soil gas samples in the industry. The table below summarizes these analytical procedures.

Description	**Included**
Analysis by thermal desorption-gas chromatography/mass spectrometry (TD-GC/MS) following EPA Method 8260C	√
Analytical results based on 5-point initial calibration	√
MDLs are based on a seven replicate study with contiguous analyses	√
Limit of Detection (LOD) and Limit of Quantitation (LOQ) studies performed quarterly	√
Internal standards and surrogates included with each run	√
BFB tunes (5 to 50 nanograms through GC, per method)	√
Continuing calibration checks	√

Analyses of the samples are performed at Beacon Environmental's laboratory using state-of-the-art instruments that are listed below. The Markes thermal desorption instruments outperform other older thermal desorption equipment, which cannot target as broad a range of compounds with as much sensitivity or accuracy.

- Agilent Gas Chromatograph/Mass Spectrometer,
- Markes Unity thermal desorber,
- Markes UltrA autosampler, and
- Markes Mass Flow Controller Module.

4.0 Reporting

Following analysis and a thorough data review, a comprehensive survey report is provided that contains:

project objectives,
the investigation plan,
the QA/QC program and findings,
laboratory data,
color isopleth maps showing the distribution of detected compounds,
field procedures,
laboratory procedures,
Field Deployment Reports, and
Chain-of-Custody documentation.

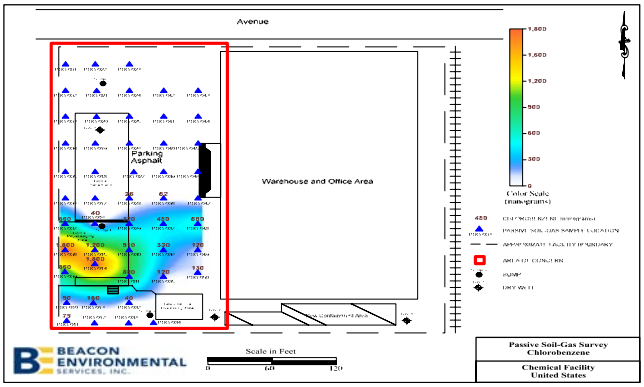

Figure 5 – Example Color Isopleth Map

Beacon Environmental requests a CAD drawing of the site is provided with coordinate data for each location to facilitate creation of color isopleth maps. BEACON can provide the color isopleth maps as layers for use with CAD software or provide data files of the contours for use with GIS software. Beacon Environmental provides post survey support to assist in interpreting the data, when requested.

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Part 2: PSG Sampler Step-by-Step Installation and Retrieval Procedures

PSG Sampler Installation

1. At each survey point, clear vegetation as necessary and, using a hammer drill and drill bit (or comparable equipment), create a 1"- to 1½"-diameter hole approximately 12 inches deep, but can be as shallow as 6 inches. When appropriate, use a ½" to 1" diameter drill bit to extend the hole to a three foot depth. Note: In areas of very organic topsoil or landscaped areas (*i.e.*, mulched areas, gardens, etc.) it is important to get beneath the organic soil layer to the underlying soil below. For locations covered with asphalt or concrete, an approximately 1½"-diameter hole is drilled through the surfacing to the underlying soils and the hole is sleeved with a 12" long metal pipe provided in the BeSure Sample Collection Kit. The pipe is then pushed or tapped ½" to 1" into the base of the hole using a hammer and tapping dowel also provided in the Kit.

2. After the hole is created, remove a BeSure PSG Sampler (a rugged, borosilicate glass vial containing two sets of hydrophobic adsorbent cartridges) and unwind the retrieval wire wrapped around it. Holding the capped end of the vial in one hand, pull the wire tight (to straighten it) with the other hand. Remove the solid cap on the Sampler Vial and replace it with a Sampling Cap (a one-hole cap with a screen meshing insert). Store the solid cap in the Cap Storage Container. And seal to prevent cross contamination

3. Lower the Sampler with the screened-capped-end pointing down into the hole. If the hole was created to a greater depth it is only necessary to suspend the sampler in the upper portion of the hole because compounds in soil gas that enter the hole will migrate up to the sampler. With the retrieval wire extending from the hole, plug the top of the hole with aluminum foil and use a hammer to collapse the soils above the foil plug. Coil the wire and lay it flat on the ground surface. For those locations through concrete or asphalt, lower the Sampler into the metal pipe and bend the end of the wire over the top of the pipe so that the coil of wire hangs over the top and outside the pipe. Next, plug the top of the hole with a wad of aluminum foil and a thin concrete patch (approximately ¼" thick) to effectively seal the Sampler in the ground. **Figure 6** depicts sampler installation options.

4. Close the Kit, and on the Field Deployment Report record: (a) sample-point number; (b) date and time of emplacement; and (c) other relevant information (*e.g.*, soil type, vegetation, proximity to potential source areas). Be sure to mark the sample location and take detailed notes (*i.e.*, compass bearings and distances from fixed reference points or GPS coordinates).

5. Move to next location.

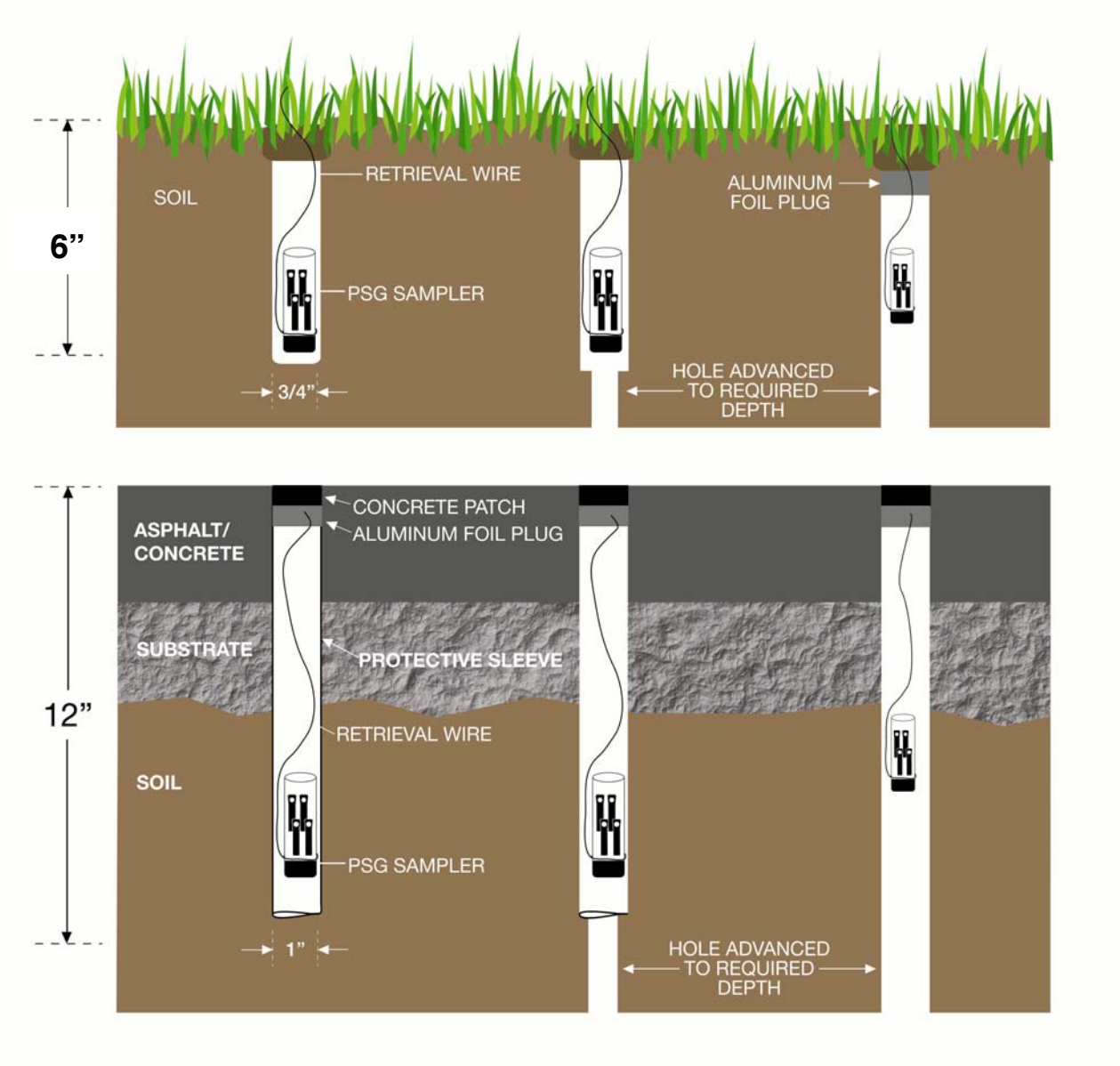

Figure 6 – Sampler Installation Options

PSG Sampler Retrieval

1. At each sample location open the BeSure Sample Collection Kit and place it and the wire cutters within easy reach. Remove a square of gauze cloth and place it and a clean towel on the open Kit. Remove a solid cap from the Cap Storage Container and place it on the Kit, also.

2. Expose the Sampler by pulling on the wire when in soils or using a small chisel and hammer to chip the thin concrete patch away when in asphalt/concrete. Retrieve the Sampler from its hole by pulling on the retrieval wire. Holding the Sampler upright, clean the sides of the vial with the clean towel (especially close to the Sampling Cap). Remove the Sampling Cap, cut the wire from the vial with the wire cutters, and clean the vial threads completely with the gauze cloth.

3. Firmly screw the solid cap on the Sampler Vial and with a ballpoint pen record the sample number, corresponding to the sample location, on the cap's label.

4. On the Field Deployment Report, record: (a) date and time of retrieval (to nearest minute); and (b) any other relevant information.

5. Return the sampling cap to the Sampling Cap container. Place the sealed and labeled Sampler Vial in a 3" x 4" re-sealable Sampler Bag. Then place the individually bagged and labeled sampler into the larger bag labeled "Return Shipment Bag." Each sampler is to be individually bagged and placed in a Return Shipment Bag, with up to 40 PSG Samplers and at least one trip blank per Return Shipment Bag.

6. On the Field Deployment Report, record: (a) date and time of retrieval; and (b) any other relevant information. After all samples have been retrieved, verify that the caps on each Sampler are sealed tightly and that the seals on the Sampler Bags are closed. Verify that all Samplers are stored in the Return Shipment Bag, which contains an adsorbent pack. Seal the Return Shipment Bag and place it in the upper tray of the Kit, and place the provided tools and materials in the lower compartment of the Kit.

7. Complete the chain-of-custody for shipment of Samplers. Seal the BESURE Sample Collection Kit with the provided tug tight custody seal, provided in the Kit, which has a unique identification number that is documented on the chain-of-custody. Place the Kit and paperwork in a cardboard box and ship via overnight delivery to Beacon Environmental Services for analysis of the samples.

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2203A Commerce Road, Suite 1, Forest Hill, MD 21050 USA ph: 1-410-838-8780 www.beacon-usa.com