Mr. Reza Sheikhai
1208 Lincoln Avenue
Alameda, California

Ms. Karel Detterman
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502

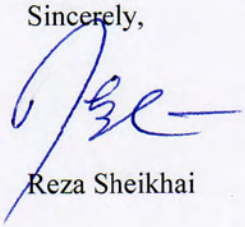
Re: Elegant Cleaners
1208 Lincoln Avenue
Alameda, California
ACEH LOP No. RO0003163

Dear Ms. Detterman:

I, Mr. Reza Sheikhai, have retained Pangea Environmental Services, Inc. (Pangea) as the environmental consultant for the project referenced above. Pangea is submitting the attached report on my behalf.

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

Sincerely,



Reza Sheikhai

April 5, 2016

Ms. Karel Detterman
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502

Re: **Data Gap Investigation Work Plan and Site Conceptual Model**
Elegant Cleaners
1208 Lincoln Avenue
Alameda, California
ACEH LOP No. RO0003163

Dear Ms. Detterman:

On behalf of Mr. Reza Sheikhai, Pangea Environmental Services, Inc. (Pangea) has prepared this *Data Gap Investigation Work Plan and Site Conceptual Model* (Workplan) for the subject site. This Workplan was prepared in response to agency correspondence of May 29, 2015 and February 18, 2016. This report addresses comments within your May 29, 2015 letter and proposes further characterize the extent of VOCs in groundwater and vapor. The proposed pilot testing will expedite mitigation of potential vapor intrusion concerns and pursuit of eventual case closure. Our preliminary conceptual site model and technical justification for the work scope is also provided herein.

If you have any questions or comments, please call me at (510) 435-8664.

Sincerely,
Pangea Environmental Services, Inc.

Bob Clark-Riddell, P.E.
Principal Engineer

Attachment: *Data Gap Investigation Work Plan and Site Conceptual Model*

cc: Reza Sheikhai (electronic)
Geotracker (electronic)

DATA GAP INVESTIGATION WORK PLAN AND SITE CONCEPTUAL MODEL

Elegant Cleaners
1208 Lincoln Avenue
Alameda, California

April 5, 2016

Prepared for:

Mr. Reza Sheikhai
1208 Lincoln Avenue
Alameda, California

Prepared by:

Pangea Environmental Services, Inc.
1710 Franklin Street, Suite 200
Oakland, California 94612

Written by:

Elizabeth Avery
Project Geologist

Bob Clark-Riddell, P.E.
Principal Engineer

INTRODUCTION

On behalf of Mr. Reza Sheikhai, Pangea Environmental Services, Inc. (Pangea) has prepared this *Data Gap Investigation Work Plan and Site Conceptual Model* (Workplan) for the subject site. This Workplan was prepared in response to agency correspondence of May 29, 2015 and February 18, 2016. This report addresses comments within your May 29, 2015 letter and proposes further characterize the extent of VOCs in groundwater and vapor. The proposed pilot testing will expedite mitigation of potential vapor intrusion concerns and pursuit of eventual case closure. Our preliminary conceptual site model and technical justification for the work scope is also provided herein.

SITE BACKGROUND

The site background is described below.

Site and Site Vicinity Description

The subject property is located at 1208 Lincoln Avenue, Alameda, in the partly commercial and residential area of the city of Alameda, California (Figure 1). The property is a 5,500 square foot (ft^2) irregularly shaped parcel that is developed with two-story 2,500 ft^2 commercial building currently occupied by a dry cleaning business (Figure 2). The northern portion of the building's first floor features a main entrance door leading into a reception area. The southern portion features a large dry cleaning machine, storage, and various pressers and dryers. The northern 75% of the building has raised wooden flooring. A boiler room extends from the southeastern corner onto the adjacent property. The second floor is used as storage. There is an unpaved parking area at the southern end of the property. The property is accessible from the north along Lincoln Avenue and southwest along Bay Street.

The property was developed with the current site building in the late 1800s or early 1900s. The building was originally developed as a meat market and was occupied by a store until the mid-1900s. In the 1970s it was occupied by a general store, and in 1980 it was occupied by a pet store. The current occupant, Elegant Cleaners, began occupying the building in 1986. The dry cleaners upgraded to an eco-friendly dry cleaning machine in 2005, which replaced the previous machine that used tetrachloroethene (PCE).

Prior Site Investigation

VOC data from prior site investigation is included in Appendix A. Appendix A presents VOC data for soil, groundwater, subslab gas, soil gas and indoor air. The extent of PCE in soil gas and groundwater is summarized on Figures 3 and 4, respectively.

In 2006, a Phase II Subsurface Investigation report was prepared by Eras Environmental Inc (ERAS). ERAS advanced three hand auger borings (B-1 through B-3) to about 5 feet depth in the southern portion of the building around the location of the dry cleaning machine. Soil samples collected from the borings were analyzed for TPH-diesel, TPH-kerosene, and HVOC (including

PCE). The test results indicated non-detectable concentrations for all contaminants tested, including PCE.

In August 2014, Encon Solutions, Inc. (Encon) advanced six borings for the purpose of a soil gas survey. Soil gas samples were collected at depths of 5 to 12 feet bgs. The results indicated the presence of PCE at a maximum concentration of 22,480 micrograms per cubic meter ($\mu g/m^3$) in the gravel lot south of the building (at SV-5-8.0 feet), and 13,540 $\mu g/m^3$ inside the building (at SV-4-5.0 feet). Soil sampling was not performed. The PCE concentrations in soil gas exceeded the California Human Health Screening Level (CHHSL) for PCE for commercial land use as well as Environmental Screening Level (ESL) established by the San Francisco Bay Regional Water Quality Control Board. Groundwater was not encountered at a maximum refusal depth of 12 feet below grade surface (bgs).

In October 2014, Encon conducted indoor air sampling at two indoor and two outdoor ambient locations (approximately 9-hour sample collection). Indoor air samples IA-1 and IA-2 were located on the southwest stairs near the existing hydrocarbon/former solvent based dry cleaning machines and in the northern portion of the tenant space near the public counter, respectively. Ambient air samples BG-1 and BG-2 were located at the extreme southeast portion of the gravel parking lot and at the southern entrance to the tenant space near the HVAC system intake, respectively. All VOC concentrations in indoor air were below commercial ESLs, except for benzene and carbon tetrachloride (which were similar to the ambient air concentrations). The only VOC present in indoor air significantly higher than ambient air concentrations was PCE (1.0 $\mu g/m^3$) detected on the southwest stairs near the dry cleaning machine.

In November 2014, five soil vapor probes (VW-1 through VW-5), one subslab gas probe (SS-1), and three monitoring wells (MW-1 through MW-3) were installed by Environmental Control Associates, Inc. (ECA) of Santa Cruz, California. This work was described in the *Phase III Environmental Site Assessment* dated January 14, 2015 by ENCON. PCE was detected at a maximum concentration in groundwater of 29 µg/L (MW-1). A PCE concentration of 7,000 $\mu g/m^3$ was found in subslab probe SS-1.

Site Geology and Hydrogeology

Based on prior site investigation, site soil predominantly consists of fill material overlying alluvial deposits. Soil beneath the fill material has been classified primarily as silts and silt sands. The maximum explored depth is 20 ft bgs.

Groundwater has been first encountered at depths of approximately 10 to 15 feet bgs. Based on limited site groundwater monitoring data (November 25, 2014), the depth to static groundwater is approximately 8 to 10 ft bgs. The static groundwater elevation was approximately 16.5 ft above mean sea level (NAVD 88 datum). On November 25, 2014, groundwater flow direction was estimated in the north-northwest direction at a gradient of 0.003 ft/ft. Shallow groundwater near the site has been reported as being relatively flat and may be influenced by dewatering or pumping at nearby properties. Buildings and paving inhibits infiltration of rainfall across most of the northern portion of the site, while unpaved areas south of the site allow rain infiltration.

ACEH TECHNICAL COMMENTS

In their May 29, 2015 letter, Alameda County Environmental Health (ACEH) requested that a work plan that addresses technical comments listed in the letter. Our responses to the ACEH technical comments are provided below.

A. Description of Immediate Land Use

Buildings adjacent to the property are two churches, an unpaved parking lot, and a residential garage. Other nearby land use is shown on Figure 2.

B. Map and Bar Scale

Figure 2 is a site map drawn to scale with a scale bar.

C. Soil Sample Collection

Soil samples will be collected during installation of proposed soil vapor wells and soil vapor extraction (SVE) wells. Select samples will be collected and analyzed from less than 5 ft depth and with the 5 to 10 ft interval bgs.

D. Eco-Friendly Dry Cleaning

Elegant Cleaners now uses ExxonMobil DF-2000 cleaning solution containing aliphatic hydrocarbons. Aliphatic hydrocarbons can be evaluated primarily by diesel-range organic analysis (e.g. TPH as diesel) and secondarily by gasoline-range organics analysis (e.g., TPH as gasoline). Pangea will evaluate select soil, soil vapor, and groundwater for TPH as diesel and gasoline.

E. Heating, Ventilation, and Air Conditioning (HVAC)

Pangea will research if the HVAC system was operational during the 9-hour indoor air sampling on October 30, 2014. Building doors were open during the indoor air sampling event, so it is unlikely that an HVAC system was operational. The exhaust fan at the rear of the facility may have been operational.

F. California Human Health Screening Levels (CHHSLs)

As CHHSLs are no longer used, Pangea will screen samples using Environmental Screening Levels (ESLs) established by the San Francisco Bay Regional Water Quality Control Board (SFRWQCB).

G. Former Dry Cleaning Machine Location

The former dry cleaning machine location is shown on Figure 2. The machine was located in the southwestern corner of the building.

H. Onsite PCE Uses

Pangea will research available records and information regarding former PCE use at the site. The current and former dry cleaning machine locations are shown on Figure 2. Pangea understands storage of PCE-laden materials may have occurred at near outdoor location SV-5 located in an unpaved area.

DATA GAPS EVALUATION

The May 29, 2015 ACEH letter requested that this workplan discuss data gaps pertaining to (a) groundwater plume delineation, (b) PCE source area identification, and (c) PCE vapor cloud definition. This section discusses these data gaps and introduces Pangea's proposed site assessment work to address these data gaps. Additional discussion of these data gaps is presented below in the conceptual site model section of this report.

A. Groundwater Plume Delineation

The PCE impact in groundwater has been initially characterized by three groundwater monitoring wells in and behind the subject site. The highest PCE impact (29 ug/L) has been found in monitoring well MW-1, with lower PCE concentrations found in nearby wells MW-2 and MW-3. From the only monitoring data collected to date (November 25, 2014), groundwater elevation data from the three onsite wells suggests a local groundwater flow direction of north-northwest. The PCE distribution in groundwater from this data is shown on Figure 4.

For the nearby residence at the corner of 9th Street and Pacific Avenue, site groundwater flow has ranged from approximately north to northwest. Based on groundwater monitoring results at the former Texaco Service Station at 1127 Lincoln Avenue, groundwater flowed in the approximate northwestern to north-northeastern direction. These flow directions are consistent with groundwater flow estimated from well gauging at our site. Based on an estimated north-northwest groundwater flow direction, Pangea proposes to conduct grab groundwater sampling at locations spaced every 25 ft along a transect just north and northwest of the subject site. The tentative grab sampling locations with respect to the prior estimated groundwater flow direction are shown on Figure 7. These tentative locations may be adjusted if planned gauging of existing wells suggests a different groundwater flow direction.

B. PCE Source Area(s) Identification

Available soil gas and groundwater data suggest a primary PCE source area is near the current and/or former dry cleaning machines (MW-1, SV-2, SV-3, and SV-4), and a secondary PCE source area is outside the building and across the paved alley and driveway where the gravel parking lot is located (SV-5). Pangea understands storage of PCE-laden materials may have occurred at this outdoors location. As stated above, Pangea will seek additional historic records and information about PCE use areas and practices at the site. Pangea also proposes a conduit study to evaluate potential pathways for PCE migration, and sampling of soil, subslab gas and soil gas sampling to further investigate other PCE sources at the site. Finally, proposed soil vapor extraction near both PCE source areas will help evaluate PCE mass in these areas. The current and former dry cleaning machine location is shown on Figure 2. The concrete pavement behind the cleaners ending near SV-5 is also shown on Figure 2.

C. PCE Vapor Cloud Definition

The preliminary conceptual site model shown on Figure 5 illustrates the primary areas of concern with respect to the PCE vapor cloud at the site. To further define the lateral limits of the PCE vapor plume, Pangea proposes subslab gas sampling on adjacent commercial properties, soil gas sampling (and soil sampling) near the former PCE-using dry cleaning machine, and soil gas sampling adjacent to the closest residence as shown on Figure 7. The proposed conduit study will also evaluate potential pathways for PCE migration, and the proposed SVE pilot test will help mitigate potential vapor intrusion concerns.

GEOTRACKER COMPLIANCE

As required by paragraph 5 of the May 29, 2015 letter, Pangea will assist the client with claiming the site on the Geotracker database.

CONCEPTUAL SITE MODEL

To facilitate preparation of a more robust investigation work plan, Pangea prepared a preliminary conceptual site model (CSM) for subsurface volatile organic compounds (VOCs). Prior site investigation has revealed the presence of VOCs, including tetrachloroethylene (PCE), in soil, soil gas and groundwater at the site. To evaluate potential risks to human health and the environment associated with the presence of VOCs at the site, Pangea developed a preliminary CSM and compared data with applicable environmental screening levels (ESLs). Through a comparison of site data to applicable criteria, the CSM was used to assess the adequacy of the site characterization and identify potential data gaps for making decisions regarding future corrective action. Based on historic data and our site inspection, Pangea offers the following preliminary CSM and summary of subsurface conditions. Potential data gaps for site assessment are described below, which expands on the above data gap discussion requested by ACEH.

The CSM developed for the site represents the assemblage of the existing site data and the general physical conditions that influence contaminant transport. The CSM presents the primary and secondary sources of VOCs and their release mechanisms. The CSM has been developed based on: known historical operations at the site; investigation results; properties of the chemicals present, e.g., suspected chemical release mechanisms; transport mechanisms; and potential exposure scenarios. As depicted on the CSM, the data indicate that the distribution of VOCs in soil, soil gas and groundwater is attributed to releases from historical operations at Elegant Cleaners.

A conceptual site model based on PCE distribution in soil, soil gas, and groundwater is shown on Figure 5. A CSM chart with potential exposure pathways in shows on Figure 6.

Contaminant Source/Release Information

Dry cleaning operations at the site reportedly started in 1986. The dry cleaners upgraded to an eco-friendly dry cleaning machine in 2005, which replaced the previous machine that used tetrachloroethene (PCE). Available soil gas and groundwater data suggest a primary PCE source area is near the current and/or former dry cleaning machines (MW-1, SV-2, SV-3, and SV-4), and

a secondary PCE source area is outside the building and across the paved alley and driveway where the gravel parking lot is located (SV-5). Pangea understands storage of PCE-laden materials may have occurred at this outdoors location.

Chemicals of Concern (COC)

The primary chemical of concern (COC) at the site is tetrachloroethylene (PCE) and the secondary COC is trichloroethylene (TCE), a breakdown product of PCE. Other breakdown products of PCE such as cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride may become future COCs, but have not been detected in sampled media to date. To date, only PCE has been detected in site soil vapor, and only PCE and TCE were detected in groundwater. PCE concentrations soil vapor and groundwater have exceeded RWQCB Environmental Screening Levels (ESLs).

VOC Distribution

Site investigation work has shown the presence of COCs in site soil gas and groundwater. For each media Pangea compares analytical data to ESLs for *residential and commercial* land use established by the RWQCB. Boring and well locations are shown on Figure 2. Existing groundwater monitoring well MW-1 is screened from approximately 7 to 15 feet bgs, and wells MW-2 and MW-3 are screened from 10 to 20 feet bgs. Historic analytical data is included in Appendix A. A conceptual site model based on the known PCE distribution in soil gas and groundwater is shown on Figure 5.

Soil: Soil samples were collected from borings B-1 through B-3 at approximately 3.25 feet bgs on October 3, 2006. Soil samples were also collected at 5 ft bgs, 10 ft bgs, and 15 ft bgs during installation of monitoring well MW-1 and 5 ft bgs and 10 ft bgs during installation of monitoring wells MW-2 and MW-3 on November 11, 2014. All VOC concentrations in soil samples were below detection limits.

Subslab Gas: Subslab gas probe SS-1 located immediately east of the current dry cleaning machine had a PCE concentration of 7,000 µg/m^3. This concentration exceeds the ESL and the RSL (Regional Screening Level established by CalEPA/DTSC).

Soil Gas: Soil gas has been sampled at several locations via former sampling locations and existing soil vapor monitoring wells. The highest reported PCE impact in soil gas was 13,540 µg/m^3 at SV-4, adjacent the former and current dry cleaning equipment. The inferred extent of PCE with respect to the residential ESL (210 ug/m^3) and the commercial ESLs (2,100 ug/m^3) is shown on Figures 3 and 5. As shown on Figures 3 and 5, the PCE soil gas impact exceeding the commercial ESLs may be present beneath the subject site and the two adjacent *commercial* parcels. As also shown on Figures 3 and 5, the PCE soil gas impact exceeding the *residential* ESLs may be present beneath the adjacent garage and residence at 1544 Bay Street (and the garage at 1542 Bay Street).

Groundwater: Groundwater quality has been assessed by monitoring of wells MW-1 through MW-3 on November 25, 2014. The highest reported PCE impact in groundwater was 29 ug/L at well MW-1. The only other PCE impact exceeding the commercial ESL (5 ug/L) was 8.8 ug/L at well MW-2. As shown on Figure 4 and Figure 5, the PCE groundwater impact exceeding the final

groundwater ESL (5 ug/L) is present in the southern section of the site and the northwest corner of the unpaved parking lot.

Groundwater Plume Delineation and Stability: With only one groundwater monitoring event completed to date (November 25, 2014), add groundwater monitoring and grab groundwater sampling is merited to further evaluate plume delineation and stability. Given the cessation of PCE use in 2005 and the relatively limited PCE impact in groundwater, the groundwater plume may be fairly stable and limited in extent. The presence of TCE in well MW-1 suggests some biological degradation of the PCE plume is occurring.

Indoor Air: From the October 2014 sampling, all VOC concentrations in indoor air were below commercial ESLs, except for benzene and carbon tetrachloride (which were similar to the ambient air concentrations). The only VOC present in indoor air significantly higher than ambient air concentrations was PCE (1.0 $\mu g/m^3$) detected on the southwest stairs near the dry cleaning machine. Building doors were open during the 9-hour indoor air sampling event.

Preferential Pathway Evaluation / Conduit Study

To improve the CSM, Pangea proposes completion of a preferential pathway evaluation and conduit study. Pangea anticipates that underground conduits run from the rear of the site toward Lincoln Avenue, where main service conduits are likely located.

Water Well and Surface Water Survey and Basement Survey

The closest surface water is Encinal Basin, located approximately 1,640 feet northeast of the site. Additionally, Littlejohn Park is located approximately 825 feet northeast of the site. Following assessment of the groundwater and vapor plume, Pangea proposes to perform a water well survey and basement survey as merited.

Potential Exposure Pathways

Exposure pathways for VOCs in soil, soil gas and groundwater at the site have been evaluated to assess the potential impacts to human health and the environment. A conceptual site model based on PCE distribution in soil, soil gas, and groundwater is shown on Figure 5. A CSM chart with potential exposure pathways in shows on Figure 6.This evaluation revealed that the *only* potentially complete exposure pathway for VOCs within site and adjacent buildings is inhalation of VOCs by existing commercial occupants and one nearby residence (1544 Bay Street). Direct exposure and ingestion of soil is *not* identified as a currently complete exposure pathway for future construction workers, since no VOCs have been detected in soil. Direct exposure to VOCs in groundwater via ingestion is *not* identified as a potentially complete exposure pathway as the site and vicinity is served by municipal water supply, and no water wells are anticipated downgradient near the site.

Data Gaps and Next Steps

Based on this conceptual site model, the recommended next steps for corrective action are to address the following key investigation data gaps:

- Mapping underground conduits at the site and adjacent buildings using a private underground line locator. Mapping sanitary and storm drain conduits within Lincoln Avenue.
- Conducting a survey of adjacent buildings for subgrade structures and foundation condition and penetrations.
- Investigation of *subslab* gas to evaluate potential vapor intrusion concerns within site and adjacent commercial units.
- Investigation of *soil gas* to evaluate potential vapor intrusion concern at the adjacent residence at 1544 Bay Street.
- Investigation of *soil gas* and *soil* near the former PCE-using dry cleaning machine.
- Downgradient characterization of VOC extent in *groundwater*.

Pangea's proposed site assessment work to address these data gaps in the conceptual site model are presented below. Given the permeable nature of site soil (sand) and the shallow nature of the PCE impact (primarily a vapor cloud issue), Pangea also proposes pilot testing of soil vapor extraction (SVE). SVE is an appropriate technique for mitigating vapor intrusion concerns and removing PCE source material in the site subsurface.

PROPOSED SCOPE OF WORK

Our proposed scope of work is designed to assess data gaps identified in the ACEH letter dated May 29, 201 and to expedite mitigation of the subsurface vapor cloud. The proposed scope of work involves the following investigation:

- Task 1 – Monitoring well gauging and sampling to help guide groundwater plume delineation locations;
- Task 2 – Underground utility survey to evaluate potential migration pathways for PCE vapor cloud;
- Task 3 – Subslab gas and soil gas sampling;
- Task 4 – SVE well installation and soil sampling;
- Task 5 – Groundwater plume delineation;
- Task 6 – SVE pilot testing;
- Task 7 – Investigation-derived waste management; and
- Task 8 – Technical report preparation.

Results of the investigation and SVE pilot testing will be used to recommend next steps.

Task 1 – Monitoring Well Gauging and Sampling

To further evaluate the groundwater flow direction and groundwater conditions, Pangea will gauge and sample site monitoring wells MW-1 through MW-3 prior to proposed site assessment. The tentative grab groundwater sampling locations may be adjusted based on monitoring data.

Task 2 – Underground Utility and Slab Penetration Survey

To evaluate the potential for contaminant migration via preferential pathways and slab penetration, Pangea proposes locating subsurface utilities and slab penetrations beneath the site and nearby vicinity using and underground line location subcontractor. Pangea will compare utility location and depth to the know groundwater and vapor plumes. Pangea will also request construction diagrams and blueprints from the site owner and the City of Alameda Engineering Department. Depths for sewer lines will be based on elevations supplied by the City of Alameda.

Task 3 – Subslab Gas and Soil Gas Sampling

To evaluate the PCE vapor plume, Pangea proposes installing one soil vapor well in the alley southwest of the site, one soil vapor well near the former site dry cleaning machine, and two subslab gas probes in the each of the two adjacent commercial buildings. The proposed sampling locations are shown on Figure 7. Pangea will also resample subslab probe SS-1 and soil gas probes VW-2, VW-3 and VW-4.

The *subslab* gas probe installation procedure involves using a rotohammer to drill a 1 ½-inch diameter, 2-inch deep hole in the concrete slab of the building, drilling a 5/8-inch diameter hole through the remaining concrete, installing a Cox-Colvin Vapor Pin™ (sealed on top with a rubber cap) and attaching a protective steel or plastic cap over the top of the probe to protect it. The probes will be allowed to equilibrate for at least 2 hours, prior to sampling.

The semi-permanent *soil gas* probes will be constructed with a stainless steel geoprobe implant connected to new ¼-inch diameter Teflon tubing and capped with a Swagelok® type fitting. The implant will be placed in a 0.5 to 1 ft thick sand pack with 0.5 to 1 ft of dry granular bentonite above, followed by hydrated bentonite and a concrete surface seal. The probe will be installed using a hand auger and the proposed probe sampling interval will be approximately 5.0 to 5.5 ft bgs. The probe will be allowed to equilibrate for at least 48 hours, prior to sampling.

Subslab and soil gas sampling will be conducted in general accordance with *October 2011 Cal/EPA Advisory – Active Soil Gas Investigations* and *April 2012 Cal/EPA Advisory – Active Soil Gas Investigations*. For this initial screening and cost control, the vapor samples will be collected using 1-liter Tedlar bags for analysis by EPA Method 8010. To assess potential impact from DF2000 (aliphatic hydrocarbons), select samples will also be analyzed for TPHg by EPA Method 8015. Subsequent sampling with Summa canisters can be conducted after vapor cloud mitigation by proposed SVE testing/PCE removal. Samples will be submitted to a state-certified laboratory for analysis. Gas samples will also be analyzed for isopropyl alcohol (leak check compound).

Task 4 – SVE Well Installation and Soil Sampling

To facilitate soil vapor extraction (SVE) testing and interim remediation/mass removal, Pangea will install two SVE wells into unsaturated soil. Proposed well locations are shown on Figure 7. The SVE wells will allow testing and VOC removal where notable PCE concentrations have been detected in soil gas and groundwater.

The wells will be screened from approximately 5 to 8 ft bgs (near MW-1 where groundwater historically present about 8 ft depth) and from approximately 5 to 9 ft bgs (near MW-2 where groundwater historically present about 10 ft depth). The wells will be installed using a hollow-stem auger drilling rig or hand techniques. The wells will be constructed of 2-inch diameter, Schedule 40 polyvinyl chloride (PVC) casing, 0.02-inch factory-slotted PVC screen and #3 sand, with a bentonite seal and grout to the surface. The wells will be completed flush with the surrounding surface in a traffic-rated well vault. Additional well installation procedures are presented in our SOPs in Appendix B.

During installation of the two SVE wells (and the two soil gas/vapor monitoring wells), Pangea will collect soil samples from less than 5 ft depth and with the 5 to 10 ft interval bgs. Soil samples will be collected using EPA Method 5035 to minimize potential VOC volatilization. Soil samples will be submitted to a state-certified laboratory for analysis by EPA Method 8015 and 8260. Additional soil and assessment procedures are presented in our Standard Operating Procedures (SOPs) in Appendix B.

Task 5 – Groundwater Plume Delineation

To characterized the downgradient extent of VOC impact, Pangea proposes four grab groundwater sampling locations along Lincoln Avenue north and northwest of the . The proposed boring locations for this grab groundwater sampling are shown on Figure 7.

Pre-Field Activities

Prior to initiating field activities, Pangea will conduct the following tasks:

- Obtain soil boring permits from Alameda County Environmental Health Department and City of Alameda;
- Pre-mark the boring locations with white paint and notify Underground Service Alert (USA) of the drilling and sampling activities at least 48 hours before work begins;
- Prepare a site-specific health and safety plan to educate personnel and minimize exposure to potential hazards related to site activities; and
- Coordinate with drilling and laboratory contractors and with involved parties.

Boring Installation

Four soil borings will be advanced along Lincoln Avenue into first-encountered groundwater anticipated approximately 10 to 15 ft bgs. All borings will first be hand augered to five feet to avoid damaging subsurface utilities. The direct-push sampling rig will be equipped with a hydraulic hammer and steel drive rods to advance the borings to the proposed total depth. With hydraulic-push drilling, continuous soil collection is conducted using acetate liners. Soil samples will be collected for screening for field indications of VOCs (visual and olfactory observations) and for classification according to the Unified Soil Classification System (USCS). Soil sampling, if performed, will be obtained using Encore-type methods (EPA Method 5035) or by cutting 6-inch subsections, trimming the excess soil from the ends, and capping the ends with Teflon® tape and plastic caps.

Grab groundwater samples will be collected from each sampling point using a temporary PVC casing and a disposable bailer, tubing with check valve, or a peristaltic pump. Completed borings will be tremmie-grouted from the bottom of the hole to the surface.

All site investigation activities will be performed under the supervision of a California Registered Civil Professional Engineer (P.E.). Additional soil and assessment procedures are presented in our Standard Operating Procedures (SOPs) in Appendix B.

Sample Analysis

Grab groundwater samples collected during this investigation will be analyzed for the following VOCs by EPA Method 8260 and aliphatic hydrocarbons by EPA Method 8015 with TPHg and TPHd-range quantification.

Task 6 – SVE Pilot Testing / Interim Remediation

Following SVE well installation, Pangea will use temporary aboveground piping to conduct a five-day SVE test / interim remediation event. The goals of the test/removal event are to evaluate the ability of SVE to remove VOCs from the site subsurface and to provide mass removal for interim remediation. Given the relatively limited VOC impact, a five-day extraction event may significantly reduce the VOC mass in the subsurface.

The testing will evaluate VOC concentrations in soil vapor, determine VOC mass removal rates, measure applied vacuum rates required to induce air flow, and will evaluate the radius of vacuum influence. Site subslab probes, soil vapor wells, SVE wells, and groundwater monitoring wells will be used to evaluate vacuum influence during SVE operation.

SVE testing will be conducted primarily on the two proposed shallow SVE wells. Additioanl testing will be conducted on well MW-1 if the well screen starting at 7 ft bgs is exposed for SVE (groundwater was measured approximately 8 ft bgs in November 2014). The vapor extraction testing will consist of brief constant vacuum test on shallow soil vapor extraction wells. Each well will be tested individually for approximately 15 to 30 minutes. Depending on observed applied vacuum, Pangea may conduct step testing by increasing the vacuum to evaluate performance at different applied vacuums. During these tests, Pangea will measure vapor extraction flow rate, contaminant concentration, applied vacuum and the vacuum influence in

other site wells. A photo-ionization detector (PID) will be used to field measure VOC concentrations from the test wells. Magnehelic pressure gauges will be used to measure the vacuum applied and induced in observation wells and probes. Select vapor samples will be collected near the beginning or end of each test for correlation with PID readings and mass removal rate estimation. Near the end of testing of each well, vacuum influence measurements will be collected.

After initial testing, Pangea may adjust flow from individual wells to optimize VOC mass removal rates. Individual well testing is primarily planned for the first or second day of testing/removal. Subsequent extraction will be conducted to provide mass removal. Soil vapor samples will be collected in one-liter Tedlar bags and submitted to a state certified laboratory for analysis of VOCs by EPA Method 8010 or 8260. Pangea will notify the Bay Area Air Quality Management District (BAAQMD) prior to performing the SVE testing.

Soil vapors will be extracted from the wells using a 5 horsepower regenerative blower capable of applying vacuum of approximately 6 inches of mercury and a flow rate of approximately 150 cubic feet per minute. If MIP data suggests primary VOC impact is present in fine-grained material under the hard pan, a positive-displacement or liquid-ring vacuum pump may be used for to apply a higher vacuum during testing/removal. The vapor control system will include two 200-lb carbon canisters plumbed in series consistent with BAAQMD requirements. A PID will be used to monitor the influent, midpoint and effluent of the carbon treatment system.

SVE testing and post-SVE sampling of subslab and soil vapor wells will help determine if additional SVE or other contingency measures are appropriate. If additional SVE is merited, the test data will help determine if additional SVE wells are merited, help select appropriately-sized equipment for further vapor extraction and treatment, and provide data for obtaining an air discharge permit from the BAAQMD.

Task 7 – Investigation-Derived Waste Management

Soil cuttings and other investigation-derived waste will be stored onsite in appropriate containers pending laboratory analytical results. Upon receipt of the analytical reports, the waste will be transported to an appropriate disposal/recycling facility.

Task 8 – Report Preparation

Upon completion of field activities, Pangea will prepare a site assessment report documenting procedures and results of the completed assessment and SVE testing. The report will also provide recommendations for future action.

ATTACHMENTS

Figure 1 – Site Location Map
Figure 2 – Site Map
Figure 3 – PCE Distribution in Soil Gas
Figure 4 – PCE Distribution in Groundwater
Figure 5 – Conceptual Site Model
Figure 6 – Conceptual Site Model Chart with Exposure Pathway Analysis
Figure 7 – Proposed Sampling Locations

Appendix A – Historic Site Assessment Information
Appendix B – Standard Operating Procedures

REFERENCES

Cal/EPA, 2011, Advisory-Active Soil Gas Investigation, California Environmental Protection Agency, Department of Toxic Substances Control, October.

Cal/EPA, 2012, Advisory-Active Soil Gas Investigation, California Environmental Protection Agency, Department of Toxic Substances Control, Los Angeles Regional Water Quality Control Board, San Francisco Regional Water Quality Control Board, April.

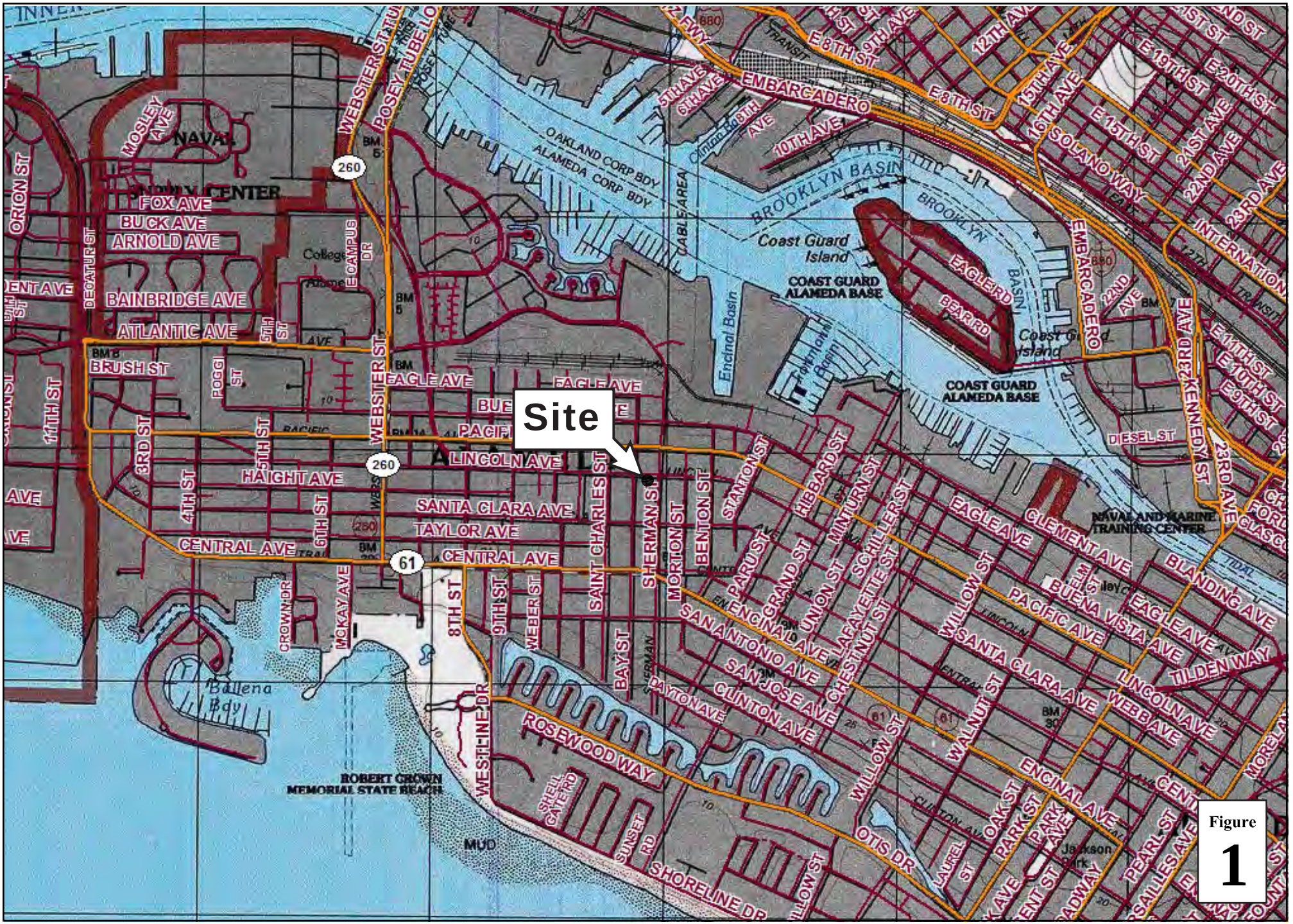
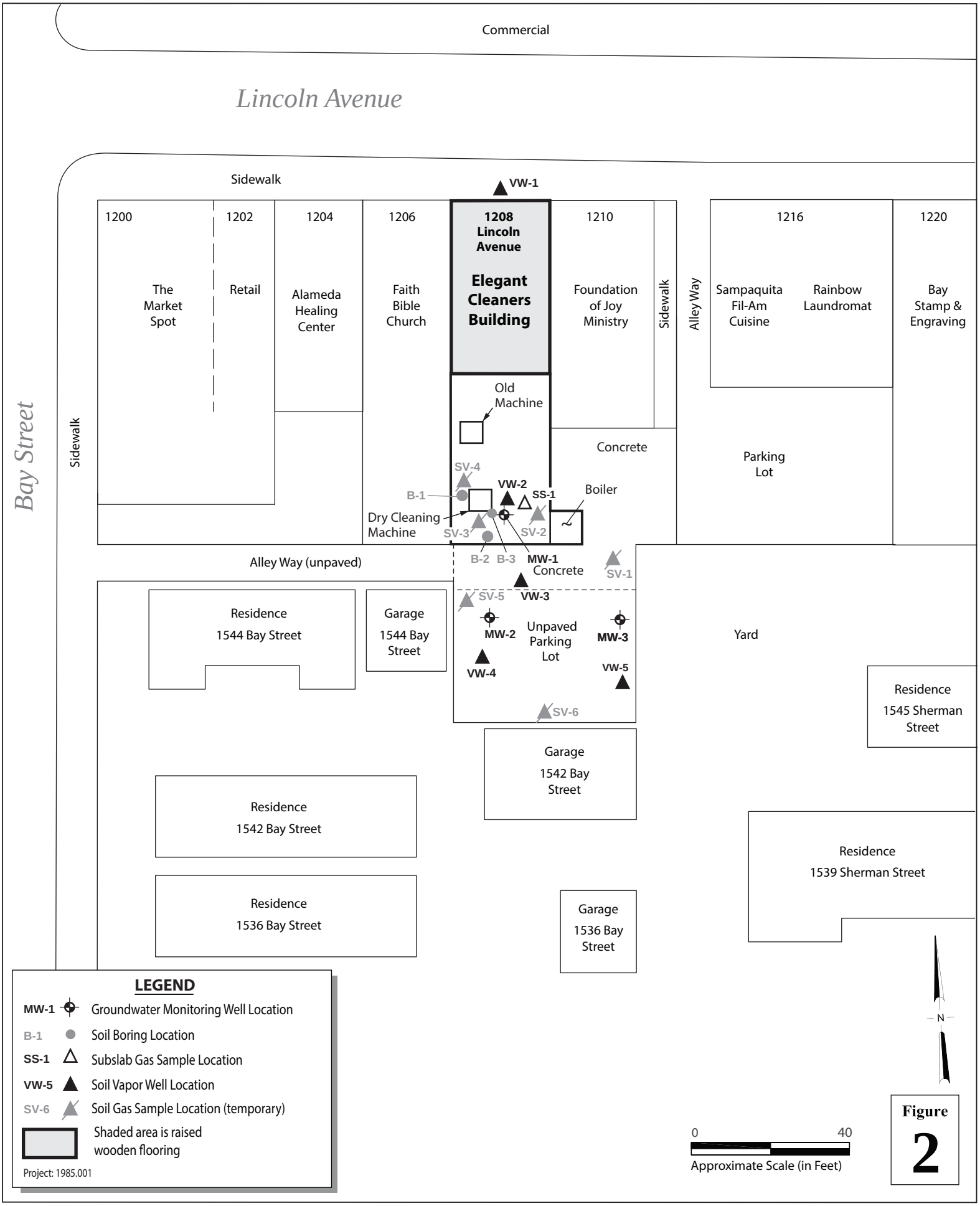


Figure 1

Elegant Cleaners
1208 Lincoln Avenue
Alameda, California

PANGEA

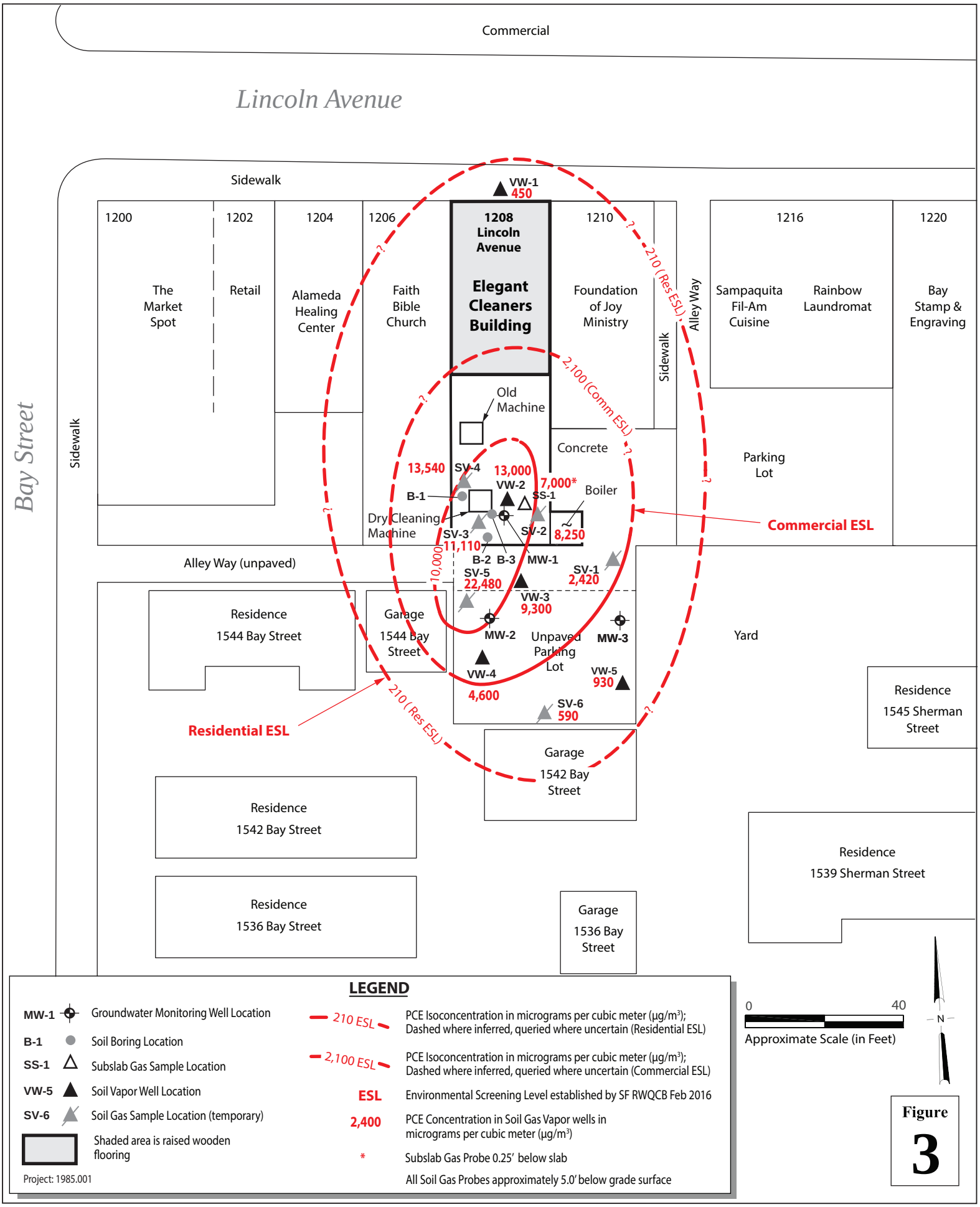
Vicinity Map



1208 Lincoln Avenue
Alameda, California

PANGEA

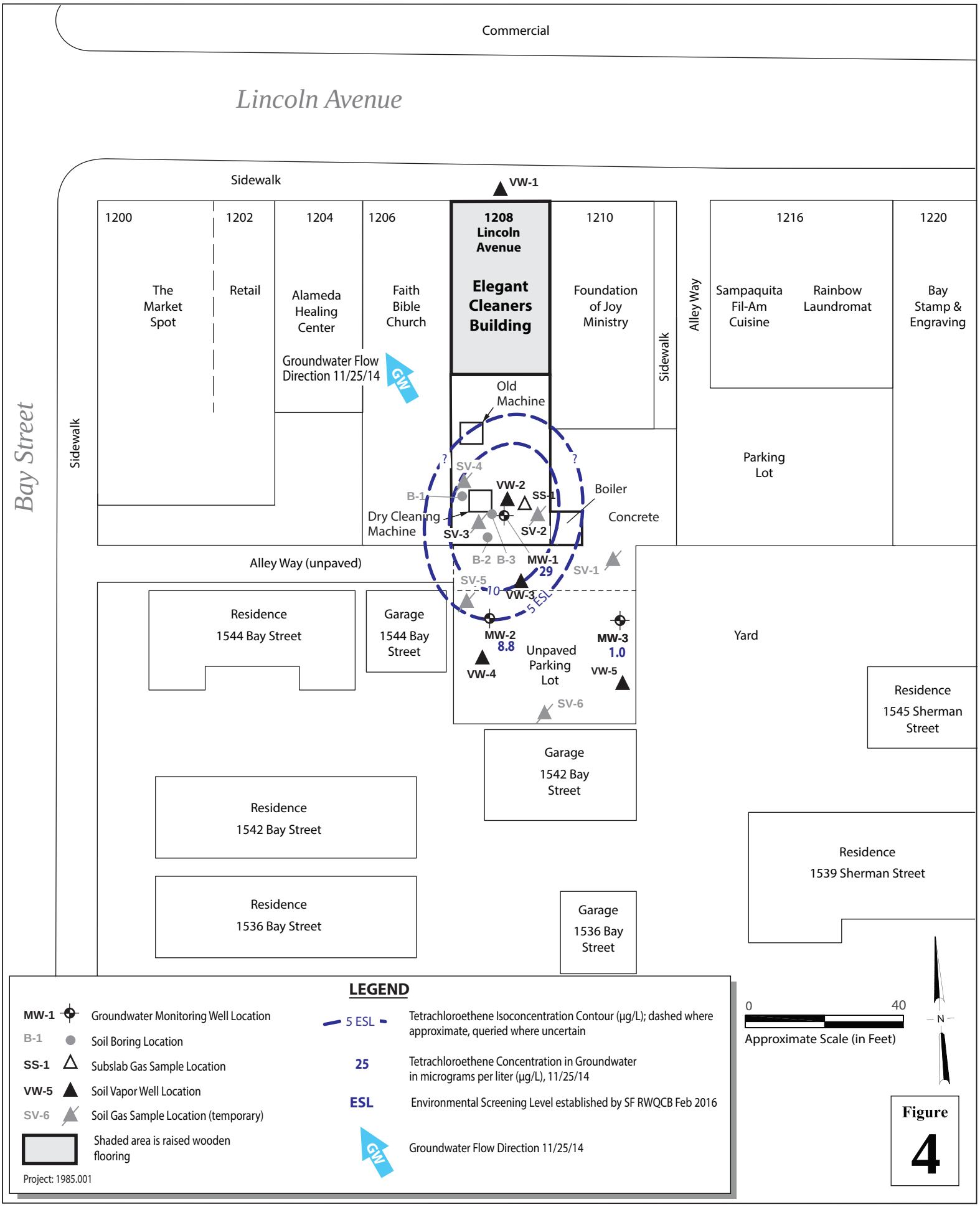
Site Map



1208 Lincoln Avenue
Alameda, California

PANGEA

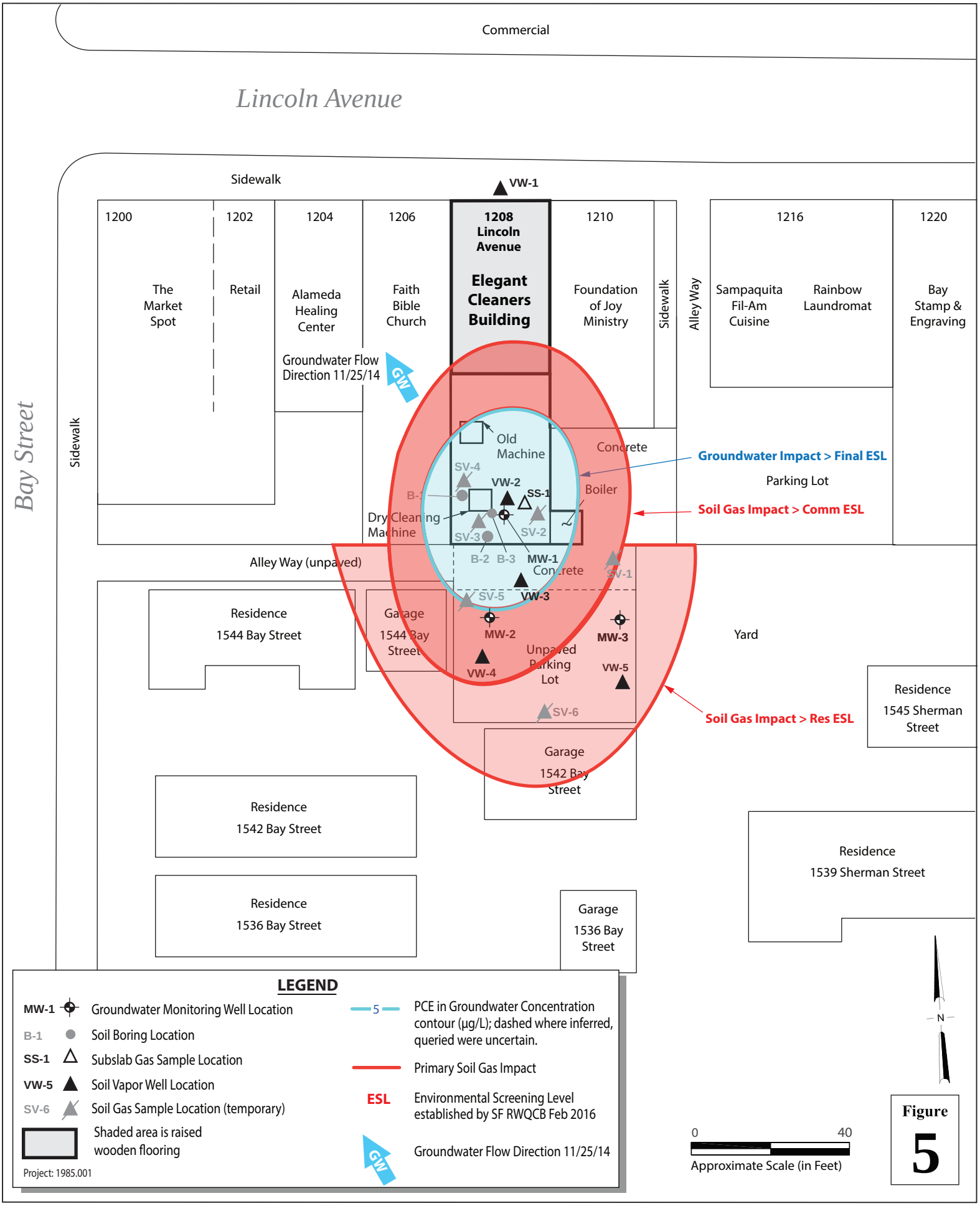
PCE Distribution in Soil Gas



1208 Lincoln Avenue
Alameda, California

PANGEA

PCE Distribution in Groundwater



1208 Lincoln Avenue
Alameda, California

PANGEA

Conceptual Site Model

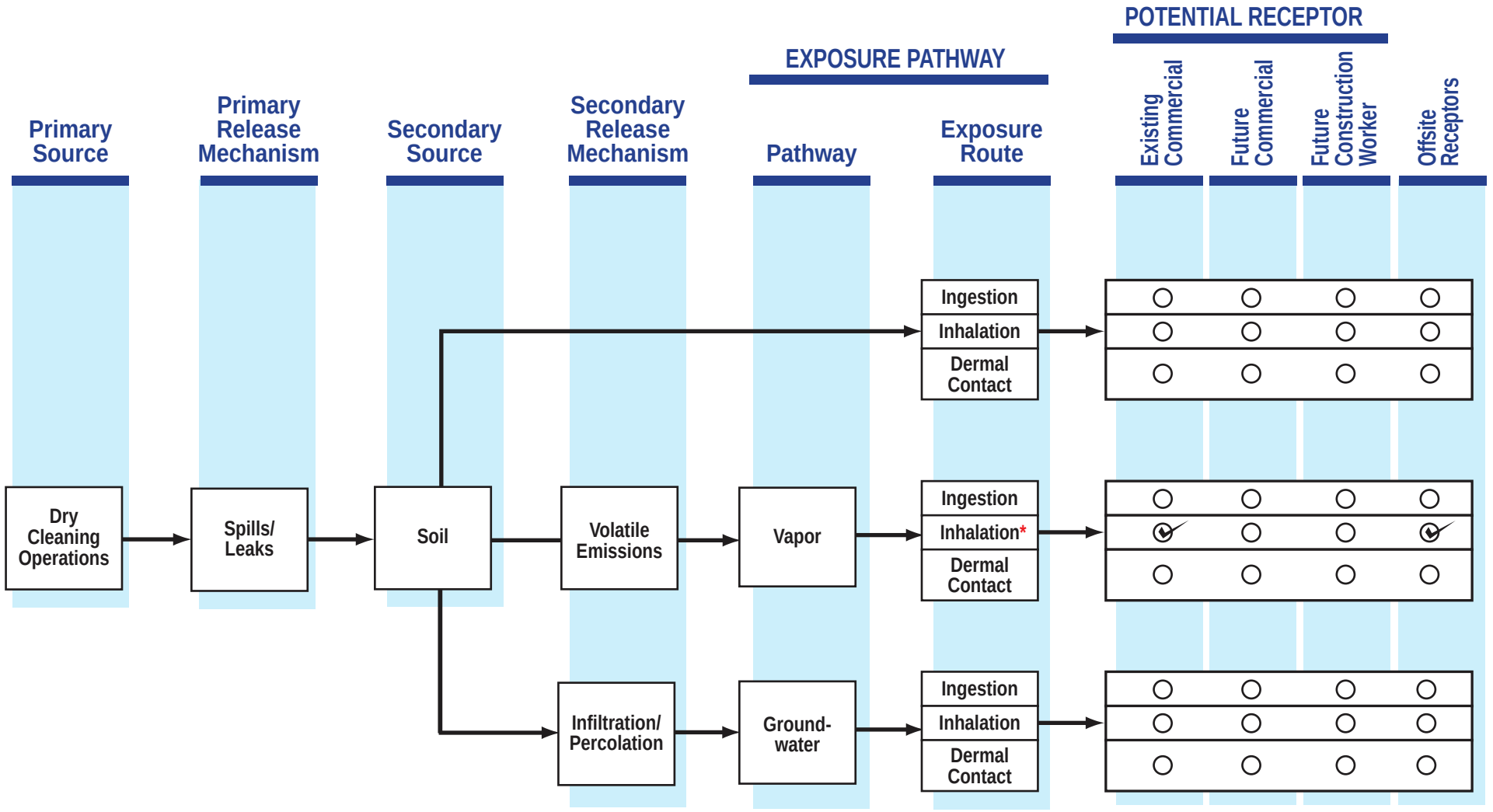
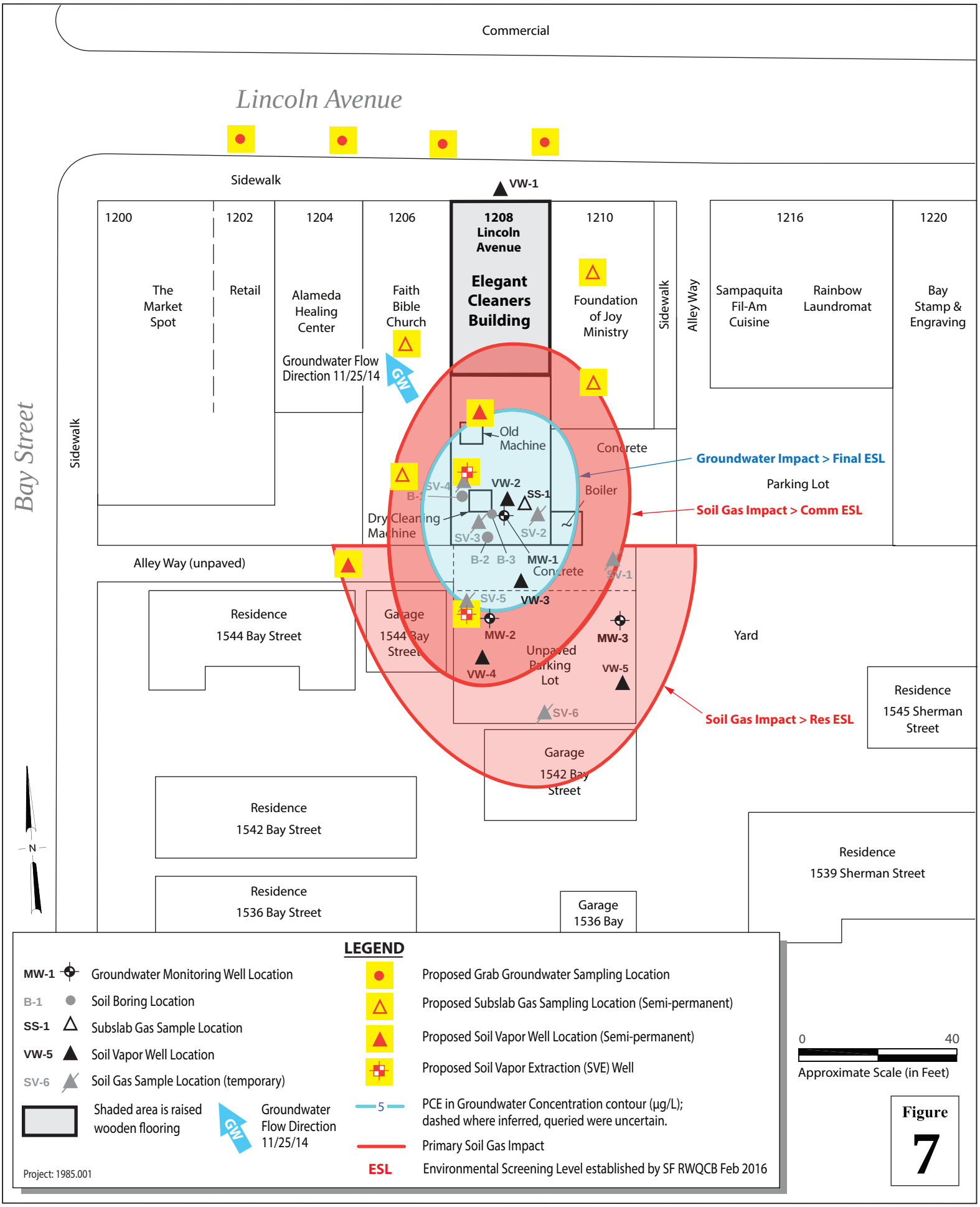


Figure 6

1208 Lincoln Avenue
Alameda, California

PANGEA

Conceptual Site Model Chart and Exposure Pathway Analysis



1208 Lincoln Avenue
Alameda, California

PANGEA

Proposed Sampling Locations

APPENDIX A

Historic Site Assessment Information

Table 1 - Summary of Indoor Air Sampling Collection and Analytical Results
Volatile Organic Compounds by EPA Test Method TO-15 Selective Ion Method
1208 Lincoln Avenue, Alameda, California

	Sample Date: October 20, 2014					
Sample Number:	BG-1	BG-2	IA-1	IA-2		
Start Time :	8:47	8:50	9:00	9:04		
End Time :	16:31	16:35	16:38	16:43		
Elapsed Time (minutes)	464	465	458	459		
Initial Vacuum (in Hg)	30"	30"	30"	30"		
Final Vacuum (in Hg)	5.5"	6.0"	3"	5.5"		
Sample Location	Southeast corner of parking lot	Under HVAC system above gas meter by back door	On southwest stairs behind dry cleaning machine	Northwest corner of store near sewing macine.	CHHSL for Commercial /Industrial Land Use	Dec-13 Bay Area ESL for Commercial /Industrial Land Use
Constituent Units:	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
Dichlordifluoromethane (12)	2.4	2.5	2.5	2.7	-----	-----
Chloromethane	1.1	1.1	1.4	1.2	-----	390
Vinyl Chloride	< 0.013	< 0.013	< 0.013	< 0.013	0.0524	0.16
Chloroethane	< 0.026	< 0.026	< 0.026	< 0.026	-----	-----
Trichlorofluoromethane (11)	3.0	3.0	3.4	3.0	-----	-----
1,1,2-Cl 1,2,2-F ethane (113)	0.51	0.50	0.50	0.55	-----	-----
1,1-Dichloroethene	<0.020	<0.020	<0.020	<0.020	-----	880
Methylene Chloride	0.83	0.73	0.74	0.73	-----	26
t-1,2-Dichloroethene	<0.040	<0.040	<0.040	<0.040	102	260
1,1-Dichloroethane	<0.040	<0.040	<0.040	<0.040	-----	7.7
c-1,2Dichloroethene	<0.040	<0.040	<0.040	<0.040	51.1	31
Chloroform	0.25	0.40	0.84	0.38	-----	2.3
1,1,1-Trichloroethane	<0.055	<0.055	<0.055	<0.055	3,210	22,000
Carbon Tetrachloride	**0.62**	**0.65**	**0.61**	**0.72**	0.0973	0.29
Benzene	**0.94**	**1**	**1.2**	**1.1**	0.141	0.42
1,2-Dichloroethane	0.087	0.082	0.079	0.092	0.195	7.7
Trichloroethene	<0.054	<0.054	0.061	<0.054	2.04	3.0
1,2-Dichloropropane	<0.092	<0.092	<0.092	<0.092	-----	1.2
Bromodichloromethane	<0.067	<0.067	<0.067	<0.067	-----	0.33
Toluene	3.7	4.2	4.7	4.0	438	1,300
t-1,3-Dichloroethane	<0.045	<0.045	<0.045	<0.045	-----	-----
1,1,2 -Trichloroethane	<0.055	<0.055	<0.055	<0.055	-----	1.6
Tetrachloroethene	0.12	0.20	**1.0**	0.35	0.693	2.1
1,2,-Dibromoethane	<0.15	<0.15	<0.15	<0.15	-----	17
Ethylbenzene	0.88	1.6	1.6	0.97	-----	4.9
p,&m-Xylene	3.2	6.1	6.0	3.5	1,020	440
0-Xylene	1.1	2.1	2.0	1.2	1,020	440
Styrene	0.23	0.31	0.45	0.38	-----	3900
1,1,2,2-Tetrachloroethane	<0.14	<0.14	<0.14	<0.14	-----	0.21

Notes:
ug/m3 indicates micrograms per cubic meter
"<" indicates less than the laboratory reporting limit shown.
"-----" indicates not tested and/or no established regulatory screening level.
CHHSL indicates California Human Health Screening Level, January 2005
Bold Compound Name indicates compound was also detected in subsurface soil vapor
Bold Value indicates result exceeds established Commercial/Industrial CHHSL and/or Bay Area ESL

Table 2 - Summary of Soil Vapor Sampling and Analytical Results
Elegant Cleaners
1208 Lincoln Avenue
Alameda, California

Field Representative: Cora Olson
Project Information: Elegant Cleaners
1208 Lincoln Avenue
Alameda, California

Contractor Information: TEG Norcal on 11/19/14

Probe Installation: ECA Drilling on 11/12/14

Sample Collection On-Site Laboratory Analysis. on 11/19/14

Equipment Information:
Field Instrument: PID - Not used

Tubing (type & diameter): 1/4-inch diameter nylaflow tubing

Purge Method: Volumetric Syringe
Purge Volume Test: 1, 3, and 10 Volumes
Purge rate: 200

Low/No Flow = >10inHg or qualitative if using syringe to purge

Sample ID		Probe Installation				Sampling Collection/Analysis							Results (ug/m3)			Comments
Sample Number	Depth (feet)	Date	Probe Installation (Time)	Seal Completion (Time)	Headspace PID (ppm)	Date	Purge Start Time	Purge Duration (minutes)	Flow Rate (ml/min)	Evacuation Volume (milliliters)	Sample Collection Time	Sample Injection Time	PCE			
VW-1	5.0	11/12/2014	13:00	13:35	NM	11/19/2014	10:52	4.8	200	950	10:57	11:00	450			3PV
VW-2	5.0	11/12/2014	12:15	12:40	NM	11/19/2014	9:43	1.6	200	317	9:45	9:47	12,000			1PV
VW-2	5.0	11/12/2014	12:15	12:40	NM	11/19/2014	10:01	4.8	200	950	10:06	10:09	13,000			3PV
VW-2	5.0	11/12/2014	12:15	12:40	NM	11/19/2014	10:17	15.8	200	3,167	10:33	10:35	12,000			10PV
VW-3	5.0	11/12/2014	14:00	14:30	NM	11/19/2014	11:15	4.8	200	950	11:20	11:22	9,300			3PV
VW-3	5.0	11/12/2014	14:00	14:30	NM	11/19/2014	11:15	4.8	200	950	11:20	11:38	10,000			Duplicate
VW-4	5.0	11/12/2014	14:50	15:30	NM	11/19/2014	11:56	4.8	200	950	12:01	12:04	4,600			3PV
VW-5	5.0	11/12/2014	15:45	16:15	NM	11/19/2014	12:18	4.8	200	950	12:23	12:25	930			3PV
SS-1	<0.5	11/12/2014	13:40	13:45	NM	11/19/2014	12:50	0.3	200	50	12:50	12:53	7,000			3PV

Table 3
Summary of Well Completion Details
Elegant Cleaners
1208 Lincoln Avenue
Alameda, California

Well Completion Details								
Well ID	Drill Date	Total Depth (feet, bgs)	Borehole Diameter (inches)	Casing Diameter (inches)	Total Depth of Casing (feet, bgs)	Screened Interval (feet, bgs)	Subsurface Zone	Slot Size (inches)
Groundwater Monitoring Wells:								
MW-1	11/12/2014	15.0	2"	3/4"	15	7-15	Groundwater	0.010"
MW-2	11/12/2014	20.0	8"	2"	20	10-20	Groundwater	0.010"
MW-3	11/12/2014	20.0	8"	2"	20	10-20	Groundwater	0.010"
Vapor Monitoring Wells:								
VW-2	11/12/2014	5.5	2"	1/4"	5.0	4.5-50	Vadose	SS inlet
VW-2	11/12/2014	5.5	2"	1/4"	5.0	4.5-5.0	Vadose	SS inlet
VW-3	11/12/2014	5.5	2"	1/4"	5.0	4.5-5.0	Vadose	SSinlet
VW-4	11/12/2014	5.5	2"	1/4"	5.0	4.5-5.0	Vadose	SS inlet
VW-5	11/12/2014	5.5	2"	1/4"	5.0	4.5-5.0	Vadose	SS inlet

Notes: ft,bgs indicates feet, below ground surface.

Table 4a - Summary of Current Soil Matrix Sample Analytical Results
Volatile Organic Compounds by EPA 8260B
1208 Lincoln Avenue, Alameda, California

Encon Solutions, Inc.

	Sample Date: November 11, 2014						
SampleName:	MW-1 @ 5'	MW-1 @ 10	MW-1 @ 15'	MW-2 @ 5'	MW-2 @ 10'	MW-3 @ 5'	MW-3 @ 10'
Sample Time	10:10	10:23	10:35	11:10	11:22	9:30	9:45
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Constituent							
1,1,1,2-Tetrachloroethane	<5	<5	<5	<5	<5	<5	<5
1,1,1-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethene	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
1,2,3-Trichlorobenzene	<5	<5	<5	<5	<5	<5	<5
1,2,3-Trichloropropane	<5	<5	<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	<5	<5	<5	<5	<5	<5	<5
1,2,4-Trimethylbenzene	<5	<5	<5	<5	<5	<5	<5
1,2-Dibromo-3-chloropropane	<10	<10	<10	<10	<10	<10	<10
1,2-Dibromoethane	<5	<5	<5	<5	<5	<5	<5
1,2-Dichlorobenzene	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5	<5	<5	<5
1,3,5-Trimethylbenzene	<5	<5	<5	<5	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5	<5	<5	<5	<5
1,3-Dichloropropane	<5	<5	<5	<5	<5	<5	<5
1,3,5-Trimethylbenzene	<5	<5	<5	<5	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5	<5	<5	<5	<5
1,3-Dichloropropane	<5	<5	<5	<5	<5	<5	<5
1,4-Dichlorobenzene	<5	<5	<5	<5	<5	<5	<5
2,2-Dichloropropane	<5	<5	<5	<5	<5	<5	<5
2-Chlorotoluene	<5	<5	<5	<5	<5	<5	<5
4-Chlorotoluene	<5	<5	<5	<5	<5	<5	<5
4-Isopropyltoluene	<5	<5	<5	<5	<5	<5	<5
Benzene	<5	<5	<5	<5	<5	<5	<5
Bromobenzene	<5	<5	<5	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5	<5	<5	<5
Bromomethane	<5	<5	<5	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5	<5	<5	<5
Chloroethane	<5	<5	<5	<5	<5	<5	<5
Chloroform	<5	<5	<5	<5	<5	<5	<5
Chloromethane	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethene	<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	<5	<5	<5	<5	<5	<5	<5
Dibromomethane	<5	<5	<5	<5	<5	<5	<5
Dichlorodifluoromethane	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5
Freon-113	<5	<5	<5	<5	<5	<5	<5
Hexachlorobutadiene	<5	<5	<5	<5	<5	<5	<5
Isopropylbenzene	<5	<5	<5	<5	<5	<5	<5
m,p-Xylene	<10	<10	<10	<10	<10	<10	<10
Methylene chloride	<5	<5	<5	<5	<5	<5	<5
MTBE	<5	<5	<5	<5	<5	<5	<5
n-Butylbenzene	<5	<5	<5	<5	<5	<5	<5
n-Propylbenzene	<5	<5	<5	<5	<5	<5	<5
Naphthalene	<5	<5	<5	<5	<5	<5	<5
o-Xylene	<5	<5	<5	<5	<5	<5	<5
sec-Butylbenzene	<5	<5	<5	<5	<5	<5	<5
Styrene	<5	<5	<5	<5	<5	<5	<5
tert-Butylbenzene	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethene	<5	<5	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	<5	<5	<5	<5	<5	<5	<5
Trichlorofluoromethane	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	<5	<5	<5	<5	<5	<5	<5

Notes: ug/Kg indicates micrograms per kilogram
"<" indicates less than the laboratory reporting limit shown.
"-----" indicates not tested and/or no established regulatory screening level.

Table 4b.
Summary of Historical Soil Analytical Data - ERAS Environmental, 2006
Total Petroleum Hydrocarbons (TPH) and Volatile Organic Compounds (VOCs)
Former Service Station
Elegant Cleaners, 1208 Lincoln Avenue
Alameda, California

Sample ID	Depth (ft,bgs)	Date Sampled	EPA 8015M TPH (mg\kg)		EPA 8260B (8010 list, ug\kg)									
			as kerosene	as diesel	PCE	TCE	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans-1,2-DCE	1,2-DCA	CCl4	VC	Other VOCs
B-1	3.25	10/3/06	----	----	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<9.6	<4.8 to <19
B-2	3.25	10/3/06	----	----	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<9.6	<4.8 to <19
B-3	3.25	10/3/06	<1	<1	----	----	----	----	----	----	----	----	----	----

Notes: "mg\kg" indicates milligrams per kilogram.
"ug\kg" indicates micrograms per kilogram
"---" indicates not tested.
"<" indicates constituent not detected at laboratory detection limit shown.
PCE indicates tetrachloroethylene
TCE indicates trichloroethylene
1,1-DCE indicates 1,1-dichloroethylene
1,1-DCA indicates 1,1-dichloroethane
cis-1,2-DCE indicates cis-1,2-dichloroethylene
trans-1,2-DCE indicates trans-1,2-dichloroethylene
CCl4 indicates carbon tetrachloride
VC indicates Vinyl chloride

Table 5a - Summary of November 2014 Soil Vapor Sampling Analytical Results
Volatile Organic Compounds by EPA 8260B
1208 Lincoln Avenue, Alameda, California

	Sample Date: November 25, 2014										
Sample Number :	VW-1	VW-2	VW-2	VW-2	VW-3	VW-3 (dup)	VW-4	VW-5	SS-1		
Sample Depth (feet) :	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.25		
Purge Volume :	3	1	3	10	3	3	3	3	3		
Sample Time :	10:57	9:45	10:06	10:33	11:20	11:20	12:01	12:23	12:50	CHHSLs	ESLs
Dilution Factor :	1	1	1	1	1	1	1	1	1	(commercial)	(commercial)
Units:	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
Constituent											
Tetrachloroethene	450	**12,000**	**13,000**	**12,000**	**9,300**	**10,000**	**4,600**	**930**	**7000**	603	2,100
Dichlorodifluoromethane	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	-----
Vinyl Chloride	<100	<100	<100	<100	<100	<100	<100	<100	<100	44.8	160
Trichlorofluoromethane	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	-----
1,1,-Dichloroethene	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	-----
1,1,2-Trichloror-trifluoroethane	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	-----
Methylene Chloride	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	26,000
trans-1,2-Dichloroethene	<100	<100	<100	<100	<100	<100	<100	<100	<100	88,700	260,000
1,1-Dichloroethane	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	7,700
cis-1,2-Dichloroethene	<100	<100	<100	<100	<100	<100	<100	<100	<100	44,400	31,000
Chloroform	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	2,300
1,2,4-Trimethylbenzene	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	-----
1,1,1-Trichloroethane	<100	<100	<100	<100	<100	<100	<100	<100	<100	2,790,000	22,000,000
Carbon tetrachloride	<100	<100	<100	<100	<100	<100	<100	<100	<100	84.6	290
1,2-Dichloroethane	<100	<100	<100	<100	<100	<100	<100	<100	<100	167	580
Benzene	<80	<80	<80	<80	<80	<80	<80	<80	<80	122	420
Trichloroethene	<100	<100	<100	<100	<100	<100	<100	<100	<100	1,770	3,000
Toluene	<200	<200	<200	<200	<200	<200	<200	<200	<200	378,000	1,300,000
1,1,2-Trichloroethane	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	1,600
Ethylbenzene	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	4,900
m,p-Xylene	<200	<200	<200	<200	<200	<200	<200	<200	<200	887,000	440,000
o-Xylene	<100	<100	<100	<100	<100	<100	<100	<100	<100	879,000	440,000
1,1,2,2-Tetrachloroethane	<100	<100	<100	<100	<100	<100	<100	<100	<100	-----	-----

Notes: ug/m3 indicates micrograms per cubic meter.
"<" indicates less than the laboratory reporting limit shown.
"-----" indicates not tested and/or no established regulatory screening level.
CHHSL indicates California Human Health Screening Level for soil gas at 5' depth, commerical/industrial setting.
ESL indicates the San Francisco Bay Area Environmental Screening Level for shallow soil gas, commercial/industrial setting.

Table 5b - Summary of August 2014 Soil Vapor Sampling Analytical Results
Volatile Organic Compounds by EPA Modified 8021B
1208 Lincoln Avenue, Alameda, California

	Sample Date: August 20, 2014								
Sample Number :	SV-1	SV-2	SV-3	SV-4	SV-5	SV-6	SV-6 Dup		
Sample Depth (feet) :	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Purge Volume :	3	1	3	10	3	3	3		
Sample Time :	10:57	9:45	10:06	10:33	11:20	11:20	12:01	CHHSLs	ESLs
Dilution Factor :	1	1	1	1	1	1	1	(commercial)	(commercial)
Units:	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
Constituent									
Tetrachloroethene	**2,420**	**8,250**	**11,110**	**13,540**	**22,480**	590	**630**	603	2,100
Dichlorodifluoromethane	<100	<100	<100	<100	<100	<100	<100	-----	-----
Vinyl Chloride	<10	<10	<10	<10	<10	<10	<10	44.8	160
Trichlorofluoromethane	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	-----	-----
1,1,-Dichloroethene	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	-----	-----
1,1,2-Trichloror-trifluoroethane	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	-----	-----
Methylene Chloride	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	-----	26,000
trans-1,2-Dichloroethene	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	88,700	260,000
1,1-Dichloroethane	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	-----	7,700
cis-1,2-Dichloroethene	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	44,400	31,000
Chloroform	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	-----	2,300
1,2,4-Trimethylbenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----
1,1,1-Trichloroethane	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	2,790,000	22,000,000
Carbon tetrachloride	<20	<20	<20	<20	<20	<20	<20	84.6	290
1,2-Dichloroethane	<40	<40	<40	<40	<40	<40	<40	167	580
Benzene	<30	<30	<30	<30	<30	<30	<30	122	420
Trichloroethene	<100	<100	<100	<100	<100	<100	<100	1,770	3,000
Toluene	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	378,000	1,300,000
1,1,2-Trichloroethane	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	-----	1,600
Ethylbenzene	<400	<400	<400	<400	<400	<400	<400	-----	4,900
m,p-Xylene	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	887,000	440,000
o-Xylene	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	879,000	440,000
1,1,2,2-Tetrachloroethane	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	-----	-----

Notes: ug/m3 indicates micrograms per cubic meter.
"<" indicates less than the laboratory reporting limit shown.
"-----" indicates not tested and/or no established regulatory screening level.
CHHSL indicates California Human Health Screening Level for soil gas at 5' depth, commerical/industrial setting.
ESL indicates the San Francisco Bay Area Environmental Screening Level for shallow soil gas, commercial/industrial setting.
BOLD indicates result exceeds regulatory screening level(s).

Table 6 - Groundwater Monitoring Data
Elegant Cleaners
1208 Lincoln Avenue
Alameda, California

Well ID	Date	Time	Top of Casing Elevation (ft., AMSL)	Depth to Groundwater (ft.,BTOC)	Groundwater Surface Elevation (ft., AMSL)	Comments
MW-1	11/25/14	8:06	24.21	7.82	16.39	Total Depth = 15.32 ft, BTOC
MW-2	11/25/14	8:10	26.28	9.82	16.46	Total Depth = 19.65 ft, BTOC
MW-3	11/25/14	8:14	26.51	10.00	16.51	Total Depth = 19.90 ft, BTOC

Notes: ft, AMSL indicates feet above mean sea level.
ft,BTOC indicates feet below top of casing.
Wells surveyed December 19, 2014 by Mid-Coast Engineers, Wastonville, California
Survey referenced to benchmark HT0882, a disk set in a concrete seawall 59 feet west of the center of 5th Street and north of the extended center of Atlantic Avenue in Alameda. Elevation = 9.13 feet, NAVD 88 datum

Table 7 - Summary of Groundwater Sample Analytical Results - Detected Constituents
Volatile Organic Compounds by EPA 8260B
1208 Lincoln Avenue, Alameda, California

	Sample Date: November 25, 2014				
SampleName:	MW-1	MW-2	MW-3		San Francisco Bay Area
Sample Time	9:10	8:35	8:55		ESLs
TOC Elevation, ft MSL	24.21	26.28	26.51	Maximum	(to evaluate
Depth to Water Ft TOC	7.82	9.82	10	Contaminant	vapor intrusion,
GW Elevation MSL	16.39	16.46	16.51	Level (MCL)	commerical)
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Constituent					
Tetrachloroethene	**29**	**8.8**	1.0	5	23
Trichloroethene	0.65	<0.50	<0.50	5	52

Notes: TOC ft MSL indicates the surveyed height of the top of casing from mean sea level
Depth to Water TOC indicated the depth to water from the top of the well casing
Groundwater Elevation MSL indicates the GW elevation from MSL (TOC FT MSL - Depth to Water TOC)
ug/L indicates micrograms per liter
ESLs indicate San Francisco Bay Area Environmental Screening Levels for evaluation of vapor intrusion, Commercial/Industrial property.
"<" indicates less than the laboratory reporting limit shown.
"-----" indicates not tested and/or no established regulatory screening level.
Bold indicates constituent detected at or above regulatory screening level.

APPENDIX B

Standard Operating Procedures

STANDARD FIELD PROCEDURES FOR SOIL BORINGS

This document describes Pangea Environmental Services' standard field methods for drilling and sampling soil borings. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water depth and quality, and to submit samples for chemical analysis.

Soil Classification/Logging

All soil samples are classified according to the Unified Soil Classification System by a trained geologist, scientist or engineer working under the supervision of a California Registered Engineer, California Registered Geologist (RG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e. sand, silt, clay or gravel)
- Approximate percentage of each grain size category,
- Color,
- Approximate water or product saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e. cementation, presence of marker horizons, mineralogy), and
- Estimated permeability.

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or hydraulic-push technologies. At least one and one half ft of the soil column is collected for every five ft of drilled depth. Additional soil samples are collected near the water table and at lithologic changes. With hollow-stem drilling, samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments beyond the bottom of the borehole. With hydraulic-push drilling, samples are typically collected using acetate liners. The vertical location of each soil sample is determined by measuring the distance from the middle of the soil sample tube to the end of the drive rod used to advance the split barrel sampler or the acetate tube. All sample depths use the ground surface immediately adjacent to the boring as a datum. The horizontal location of each boring is measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Storage, Handling and Transport

Sampling tubes or cut acetate liners chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

Soil samples collected during drilling will be analyzed in the field for ionizable organic compounds using a photo-ionization detector (PID) with a 10.2 eV lamp. The screening procedure will involve placing an undisturbed soil sample in a sealed container (either a zip-lock bag, glass jar, or a capped soil tube). The container will be set aside, preferably in the sun or warm location. After approximately fifteen minutes, the head space within the container will be tested for total organic vapor, measured in parts per million on a volume to volume basis (ppmv) by the PID. The PID instrument will be calibrated prior to boring using hexane or isobutylene. PID measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Water Sampling

Water samples collected from borings are either collected from the open borehole, from within screened PVC inserted into the borehole, or from a driven Hydropunch-type sampler. Groundwater is typically extracted using a bailer, check valve and/or a peristaltic pump. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory.

Pangea often performs electrical conductivity (EC) logging and/or continuous coring to identify potential water-bearing zones. Hydropunch-type sampling is then performed to provide discrete-depth grab groundwater sampling within potential water-bearing zones for vertical contaminant delineation. Hydropunch-type sampling typically involves driving a cylindrical sheath of hardened steel with an expendable drive point to the desired depth within undisturbed soil. The sheath is retracted to expose a stainless steel or PVC screen that is sealed inside the sheath with Neoprene O-rings to prevent infiltration of formation fluids until the desired depth is attained. The groundwater is extracted using tubing inserted down the center of the rods into the screened sampler.

Duplicates and Blanks

Blind duplicate water samples are collected usually collected only for monitoring well sampling programs, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks accompany samples collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory QA/QC blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite on top of and covered by plastic sheeting. At least four individual soil samples are collected from the stockpiles for later compositing at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Ground water removed during sampling and/or rinsate generated during decontamination procedures are stored onsite in sealed 55 gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Disposal of the water is based on the analytic results for the well samples. The water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.

STANDARD FIELD PROCEDURES FOR MONITORING WELLS

This document describes Pangea Environmental Services' standard field methods for drilling, installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Well Construction and Surveying

Groundwater monitoring wells are installed in soil borings to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 feet below and 5 feet above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three feet thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two feet thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I, II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security. The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. Wells may be surged prior to installation of the well seal to ensure that there are no voids in the sand pack. Development occurs 48 to 72 hours after seal installation to ensure that the Portland cement has set up correctly. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 72 hours after they are developed.

Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.