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REVISED DATA GAP WORK PLAN

580 Market Place Shopping Center
3735-4065 East Castro Valley Boulevard
Castro Valley, California
ACEHD Case No. RO0003097

Submitted to:
Ms. Karel Detterman
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Prepared on Behalf of:
Mr. Charles Gurney
Weingarten Realty Investors
2600 Citadel Plaza Drive, Suite 300
Houston, Texas 77008

Submitted by:
Cardno ATC
701 University Drive, Suite 200
Sacramento, California 95825

Cardno ATC Project No. 075.75354.0002

November 6, 2013

Gabe Stivala
Cardno ATC
701 University Drive Suite 701
Sacramento, CA 95825

Subject: **Revised Data Gap Work Plan**
Alameda County LOP No. RO 3047
Cardno ATC Project No. 75.75354.0002

Dear Mr. Stivala:

I have reviewed and approved the subject report. Please submit it to the regulatory agencies listed in the distribution section of the report. Should any of the agencies require it, I am prepared to declare, under penalty of perjury, that to the best of my knowledge, the information contained in the report is true and correct.

Sincerely,

Charles Gurney

Weingarten Realty Investors

2600 Citadel Plaza Drive, Suite 300

Houston, Texas 77008

Date: 11/7/13

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November 6, 2013

Ms. Karel Detterman
Alameda County
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject: **Revised Data Gap Work Plan**
580 Market Place Shopping Center
3735-4065 East Castro Valley Boulevard
Castro Valley, California
ACEHD Case No. RO0003097
Project No. 75.75354.0002

Dear Ms. Detterman:

On behalf of Weingarten Realty Investors (Weingarten), Cardno ATC (Cardno) is submitting this Revised Data Gap Work Plan to address comments received from the Alameda County Environmental Health Services (ACEH) on Cardno's previously submitted *Data Gap Work Plan,* dated November 30, 2012. On August 28, 2013, comments and recommendations on the original work plan were relayed to Weingarten and Cardno in a conference call with the ACEH and summarized in an email from the ACEH on the same date.

A summary of the ACEH comments and recommendations and Cardno's comments are as follows:

1. *Prepare an indoor air sampling scope for the current dry cleaning business including Indoor air sampling may be required in adjacent spaces if results of the soil vapor investigation indicate a potential for vapor intrusion into those tenant spaces*.

   Cardno Comment: Cardno has included a scope of work for the indoor air sampling of the dry cleaning facility and adjacent units in the revised work plan scope presented below.

2. *Vertical soil gas profiling in the drycleaner should be performed to help identify source locations; include a contingency plan with the rationale for step-out locations if soil vapor results indicate hot spots.*

   Cardno Comment: In a telephone conversation on September 5, 2013, the ACEH agreed with Cardno's recommendation to use a membrane interface probe (MIP) in place of vertical soil vapor profiling to further define the vertical and horizontal extent of impacts. Therefore, the revised work plan includes a scope for a MIP assessment, but not for vertical soil gas profiling.

3. *Include installation of permanent soil vapor probes inside the dry cleaning space to facilitate collection of seasonal data.*

Cardno Comment: Cardno has included a scope for the installation of permanent vapor probes in the revised work plan.

4. *Include soil gas sampling SOPs.*

   Cardno Comment: Rather than including separate SOPs, Cardno had incorporated descriptions of procedures in the text of the revised work plan.

5. *Include information on known utilities beneath the slab and foundation specifications (slab thickness, plumbing penetrations, condition of cracks, etc.)*.

   Cardno Comment: Cardno has incorporated known utility locations into figures included in this report. Cardno has no new information regarding slab thickness or potential presence of cracks in the building slab/foundation. Cardno will gather this information during implementation of the proposed scope of work.

6. *Initiate the public notification process using a mark-up of the RO2857 Fact Sheet e-mailed to Cardno. E-mail a draft fact sheet to ACEH for review. Upon receipt of the approved fact sheet, distribute it to all the tenants in the shopping center and forward to the ACEH the list of recipients and certification that the fact sheet was distributed.*

   Cardno Comment: A fact sheet has been prepared and will be submitted to the ACEH as a separate document; it has not been included in the revised work plan.

7. *Revise the "Groundwater Assessment Scope of Work" to delineate vertical impacts in the vadose and saturated zones (PCE is a DNAPL) and collection of depth discreet groundwater samples. The work plan states that a hollow stem auger (HSA) will be used, however, please consider a backup plan in the event that the HSA rig meets refusal due to bedrock so that the impact to groundwater data gap will be fulfilled.*

   Cardno Comment: In a telephone conversation on September 5, 2013, the ACEH agreed with Cardno's recommendation to delay the development of a scope for groundwater assessment until after soil vapor and soil assessment is complete. The number and location of wells will be dependent upon the lateral and vertical extent of soil vapor and soil impacts. Therefore, no monitoring well installation scope is proposed in the revised work plan.

8. *Prior to drilling activities, well permits should be obtained from the Alameda County Department of Public Works (ACDPW). Additionally, when conducting the sensitive receptor study, please also contact the ACDPW in addition to the California Department of Water Resources (DWR) because information from these two sources is sufficiently different to warrant inclusion of both in the study.*

   Cardno Comment: Cardno will include a review ACDPW well permitting documentation in addition to a review of DWR information. This is noted in the Sensitive Receptor Survey scope in the revised work plan.

9. *Synthesize all known site data, including, but not limited to, locations of former dry cleaning equipment, utilities, soil borings, and soil gas probes on figures to be included with the Addendum. Present tables summarizing all past and present soil and soil gas*

analytical data including sample depths. This data has been presented throughout the revised work plan.

Cardno Comment: Cardno has incorporated pertinent historical data into the revised work plan.

The following sections comprise the Revised Data Gap Work Plan and are intended to supersede the scope outlined in the original Data Gap Work Plan.

SITE BACKGROUND AND PREVIOUS ASSESSMENTS

The site is located north of Interstate 580, southeast of East Castro Valley Boulevard, and west of Chaparral Lane in the City of Castro Valley, Alameda County, California, as shown on **Figure 1**. A site plan illustrating the layout of the shopping center and locations of previous soil borings and vapor sampling are shown on **Figure 2**.

The property and surrounding area was used as agricultural land with rural residential developments prior to 1990. The property was developed as a 10.21 acre retail shopping center in 1990. Current land use is commercial within the 580 Market Place Shopping Center surrounded by residential developments. Dryclean 580 has operated at 3937 East Castro Valley Boulevard since 1990 within the 580 Market Place Shopping Center. In the past, dry cleaning was performed at the site using perchloroethene (PCE). Dry cleaning is still performed at the site however, TCE is no longer used. Current dry cleaning is performed using a hydrocarbon-based (non-halogenated) solvent.

1994 CET Phase I ESA

In February 1994, Certified Engineering and Testing Co. (CET) conducted a Phase I Environmental Site Assessment of the subject property. CET's assessment found no significant onsite or offsite environmental concerns that they believed would affect the subject property.

1996 SEG Phase I Environmental Assessment Update

In October 1996, Smith-Emery GeoServices. Inc. (SEG) performed a Phase I Environmental Site Assessment Update of the 580 Castro Valley Marketplace. SEG concluded that the subject property was unlikely to have been impacted by onsite activities or by activities on properties in the immediate vicinity. SEG concluded that a Phase II Environmental Site Assessment was not warranted.

1996 SEG Environmental Soil Sampling

In October 1996, SEG completed three soil borings and collected soil samples to evaluate the presence of tetrachloroethylene (PCE) in the subsurface beneath Dryclean 580. One hand auger boring was completed near the dry-cleaning unit, and two borings were completed outside near the rear of the building. Samples were collected from depths ranging from 2 to 20 feet bgs. The results of analysis of the soil samples indicated the presence of PCE at 23 micrograms per kilogram (µg/kg) at a depth of 2 feet bgs near the dry-cleaning unit. PCE was not detected in a deeper sample collected from this boring. PCE was also detected at 23 µg/kg at a depth of 2.5 feet bgs near the rear of the building; however, PCE was not detected in three deeper samples collected from this boring at 10, 15 and 20 feet bgs. Low concentrations of 1,4-dichlorobenzene were detected in soil samples from two borings at concentrations up to 8 µg/kg. SEG concluded that no further action was required based on the data gathered.

1997 PES Phase I ESA and Phase II Subsurface Investigation

In 1997 PES Environmental, Inc. (PES) performed a Phase I ESA which concluded that significant chemical usage occurred at Dryclean 580, and that the facility used PCE as a dry-cleaning solvent and generated PCE wastes. Based on this, a Phase II ESA was performed including a soil vapor survey and the collection of one soil samplewas performed at Dryclean 580 to evaluate whether significant releases of dry-cleaning chemicals had occurred and affected subsurface conditions.

The soil vapor survey was conducted by Transglobal Environmental Geosciences, Inc. (TEG) under contract to PES as part of a Phase II Site Investigation in November 1997. Sixteen discrete soil vapor samples were collected from eleven locations (SG-1 through SG-11) at various depths using portable direct push equipment. These locations are shown on Figures 2 and 3.

One soil sample was collected outside the building using truck-mounted direct-push drilling equipment. Three soil vapor sampling locations were placed along the sanitary sewer line (SG-3, SG-5, and SG-11). The sampling points along the sanitary sewer line were placed adjacent to a sanitary sewer manhole (SG-3), adjacent to the location where the sewer line exits the building at the rear of Dryclean 580 (SG-5), and downslope of the floor drain inside the building (SG-11). One soil vapor sampling location (SG-10) was located adjacent to a plastic bucket used to collect waste water from the dry-cleaning machine. One soil vapor sampling location (SG-8) was placed directly in front of the dry-cleaning machine, adjacent to an area used for storage of spot removers. One soil vapor sampling location (SG-9) was placed directly behind the dry-cleaning machine and adjacent to the waste storage drums. Three soil vapor sampling locations were placed outside and directly behind the dry-cleaning facility (SG-4, SG-6, and SG-7). Two soil vapor sampling locations were placed within the landscaped slope present approximately 100 feet south of the dry-cleaning facility at areas where sandy deposits were observed on the ground surface during the site inspection (SG-1 and SG-2). Soil vapor samples were collected at depths ranging from 1 to 11.5 feet bgs.

At three locations (SG-3, SG-9, and SG-11) vapor could not be drawn for sampling at depths ranging from 1-foot bgs to 15 feet bgs. PES indicated that Inability to draw vapor in subsurface soils often corresponds to tight or fine-grained soil conditions. Soil vapor sampling location SG-3 was positioned adjacent to a junction in the sanitary sewer line approximately 100 feet south of Dryclean 580. The depth of the sewer pipe at the junction was measured to be 6.5 feet bgs. Because vapor could not be withdrawn from soils at depths ranging from 6 feet bgs to 15 feet bgs at SG-3, a soil matrix sample (SB1-7.0) was collected at a depth of 7 feet bgs, directly downgradient of the sanitary sewer junction. The soil sample was collected using truck mounted pneumatic drilling equipment to assess whether potential leaks from the sanitary sewer junction have impacted subsurface soils.

A 5/8-inch diameter core was drilled through the asphalt at outdoor sampling locations, and through the concrete at the indoor locations. Soil vapor samples were collected by installing a 5/8-inch diameter, hollow, stainless-steel, soil vapor probe to the required sampling depth. A continuous length of inert 1/8-inch diameter polypropylene nylaflow tubing runs down the center of the probe to the sampling port beneath the tip. The probe was driven to the required depth using a hand-held electric rotary hammer.

Soil vapor was withdrawn from the nylaflow tubing for purging and sampling using a 20-cubic centimeter (cc) syringe which was connected to the nylaflow tubing via an on/off valve. Eight

volumes of the tubing were flushed from the probe to evacuate the nylaflow tubing using the syringe. The next 20 cc of vapor were withdrawn and injected into a sealed Volatile Organic Analysis (VOA) container. The VOA container was immediately transferred to TEG's mobile laboratory for chemical analysis. This sampling technique allows a discrete soil vapor sample to be collected from the subsurface adjacent to the probe tip.

The soil vapor sample was analyzed within 15 minutes of collection using gas chromatography. Records were made on field data sheets of the sampling location, sampling depth, time of sample collection, time of sample analysis, probe evacuation volume, sample injection volume, and the concentration of soil vapor analyses. Following completion of the soil vapor survey, the boreholes were filled with a bentonite grout and the surface was patched with either cement or asphalt depending upon the existing surface conditions.

The sixteen soil vapor samples were collected by a TEG chemist and analyzed onsite using TEG's mobile laboratory. The one soil sample was collected using a brass tube sealed with teflon-lined plastic end caps, labeled, and delivered under chain of custody protocol to TEG's Rancho Cordova facility for analysis. The soil vapor and soil samples were analyzed for VOCs using EPA Test Method 8010.

During the soil vapor survey, a total of 16 soil vapor samples were collected from 11 soil vapor sampling locations (SG-1 through SG-11) at the site. Trichloroethene (TCE) was detected at concentrations ranging from 1,400 to 6,800 micrograms per cubic meter (µg/m³). Tetrachloroethylene (PCE) was detected at concentrations ranging from 1,700 to 119,700 µg/m³. A soil sample collected at a depth of 7 feet below ground surface (bgs) from SB-1, located adjacent to an identified sewer line, and did not contain detectable concentrations of TCE or PCE.

The highest concentration of PCE detected was 119,700 µg/m³ in a sample collected at 7.5 feet bgs at the exterior, rear of the building adjacent to the sanitary sewer. However, PCE was detected at 4,000 µg/m³ in a soil vapor sample collected at the same depth approximately 15 feet, laterally, from this location, indicating a potentially localized area of elevated concentrations of PCE. TCE was detected in four samples at concentrations up to 6,800 µg/m³.

The concentrations of PCE detected in soil vapor were highest at the locations along the sanitary sewer line inside and directly behind the dry-cleaning facility (SG-5 and SG-11). At location SG-5 the drill rods were observed to be wet upon withdrawing them from the borehole. Based on the proximity of SG-5 to a change in direction of the sanitary sewer line, it is possible that the moisture present on the drill rods is the result of a leak in the sanitary sewer line near SG-5. The concentration of PCE in soil vapor decreased from 119,700 µg/m³ at 7.5 feet bgs to below the laboratory reporting limit of 1,000 µg/m³ at 11.5 feet bgs at location SG-5. At location SG-11, where PCE was detected at 105,900 µg/m³ at 2.0 feet bgs along the sanitary sewer line inside the building, no vapor was able to be drawn for sampling from 2 feet bgs to 8 feet bgs. Concentrations of PCE in soil vapor approximately 5 feet south of SG-11, at SG-4, were detected at 5,700 µg/m³ at 2.5 feet bgs and decreased to 4,000 µg/m³ at 7.5 feet bgs.

No groundwater was encountered at the subject property to the depth of 20 feet bgs. The low levels of VOCs present in the subsurface do not appear to present a significant environmental concern.

2012 Cardno ATC Limited Subsurface Assessment
A limited subsurface assessment was conducted by Cardno ATC (formerly ATC Associates, Inc.) at the site in March 2012. These borings were drilled outside the rear of Dryclean 580. The purposed of the borings was to determine whether impacts to soil and groundwater were present in relation to the apparent chlorinated hydrocarbon release from Dryclean 580. Four soil borings (ATC-1 through ATC-4) were advanced to depths ranging from 24.5 to 31 feet below grade where refusal was encountered. Soil samples were collected continuously and field screened for the presence of VOCs. VOCs were detected in soil samples collected from ATC-1, ATC-2, and ATC-3. Groundwater was not encountered in any of the soil borings advanced.

2012 Cardno ATC Site Conceptual Model
A site conceptual model (SCM) was prepared at the request of the ACEH in a correspondence dated October 11, 2012. The SCM summarizes the site setting, environmental history, geologic and hydrogeologic characteristics, impacts to soil and groundwater, exposure pathways, remedial actions, and data gaps at the site. The SCM was developed to use as a guidance tool for future investigative or remedial activities.

Pertinent data from previous assessments has been included on **Figures 2 and 3**. Additionally, past data has been summarized in **Tables 1 and 2**.

SCOPE OF WORK

The objective of the proposed scope of work is to address the following environmental assessment data gaps:

1) Delineate the horizontal extent of sub-slab vapor beneath the dry cleaning facility and adjacent tenant units in an attempt to address potential vapor intrusion risks at the site as well as locate the contaminant source area and extent of vapor impacts.
2) Delineate the extent of soil vapor to the south of the building in an attempt to identify the source area.
3) Verify the vertical extent of impacts in the subsurface of the site.
4) Establish a means of monitoring seasonal variations in subsurface vapor impacts by installing semi-permanent vapor monitoring points.
5) Identify potential sensitive receptors in the vicinity of the site.

To achieve this objective, Cardno proposes assessment activities including the subsurface and sub-slab vapor sampling, soil assessment, and a sensitive receptor survey.

The proposed work in this work plan has been designed under the assumption that previously collected data is generally accurate. However, the proposed work will include the re-collection of data in some of the previously sampled areas to verify this assumption. Based on a cursory evaluation of the previously collected data, methods used by pervious consultants to collect and analyze subsurface media appear to have been appropriate. The only notable exception is for the PES soil vapor survey in which there was no indication that a minimum 2-hour equilibration period was allowed between vapor point installation and sample collection; the equilibration period is currently recommended by the California Department of Toxic Substances Control (DTSC) protocol.

Regarding the age of the data, although the data was collected a significant time ago (prior to 1998), the reported concentrations are not likely to have changed significantly due to the

recalcitrant nature of chlorinated hydrocarbons, such as PCE and TCE, unless additional contaminants were introduced following the collection of the data.

Details of the proposed activities are provided in the following sections.

Planning and Permits

Cardno will obtain the necessary Alameda County Department of Public Works (ACDPW) permits for the advancement of two soil borings and installation of one groundwater monitoring well. Cardno will schedule field personnel and equipment, notify Underground Services Alert to locate underground utilities as required, and perform other necessary field preparation and job start-up activities. Cardno will contract with a subsurface utility locator to determine the potential conflicts between subsurface utilities and proposed drilling locations. Additionally, the utility locator will attempt to trace and identify existing subsurface utility corridors that may represent potential preferential pathways for contaminant migration.

Soil Vapor Survey

Temporary Sub-Slab Vapor Probe Installation

Temporary Sub-slab vapor sampling probes will be installed and sampled at up to seven (7) locations (**Figure 3**) to determine vapor concentrations beneath the existing structure at the Dryclean 580 site and adjacent tenant units. Not all proposed locations will be sampled unless they are necessary to provide adequate horizontal delineation of impacts to sub-slab soil vapor. Conversdley, if "step-out" borings are necessary to laterally define the extent of significant impcacts, additional sub-slab smaplining points may be installed and samples. The assessment will be completed in two-steps by first sampling probes in known or suspected areas of impact, and then second by sampling additional locations in the directions in which there is a need for further lateral delineation. The work will be performed with a mobile laboratory on-site allowing decisions regarding step out borings to be made in real-time.

Soil vapor probe construction will be performed by a C57 licensed drilling company. Each bore hole will be advanced using a handheld drill to core through the floor slab. The temporary sub-slab vapor sampling probes will then be constructed of approximately two to three feet of ⅛-inch outside diameter Teflon or Nylaflow® tubing attached to a one-inch long filter screen emplaced approximately two inches beneath the concrete slab of the structure and above native soil. Dry granular bentonite will be used to fill the boring through the concrete slab and hydrated granular bentonite will be used at the surface to create a leak tight seal. A generalized schematic of a sub-slab vapor sampling point is included as **Figure 4**.

Temporary Soil Vapor (Soil Gas) Probe Installation (Outdoor locations)

Temporary soil vapor sampling probes will be installed and sampled at three (3) locations. The soil vapor probes will be installed outside the south side of the building and in the paved areas immediately adjacent to the rear of the dry cleaning facility and adjacent tenants. Proposed soil vapor probe sampling locations are illustrated on **Figure 3**. Additional locations may be proposed during the assessment if field data indicates additional lateral delineation is necessary.

Soil vapor probe construction will be performed by a C57 licensed drilling company. The soil vapor probes will be advanced to approximately five feet below ground surface (bgs) using

truck-mounted direct-push technology. Upon completion of each boring, a temporary vapor probe assembly will then be installed.

Each vapor probe will be constructed using 0.25-inch outer diameter (OD) Teflon or Nylaflow® tubing fitted with a stainless steel wire screen tip implant at the base of the vapor probe. The aboveground Teflon vapor probe tip will be fitted with a swaglok valve for future purging and vapor sample collection. The bottom of the boring around the screen tip and subsurface assembly will be backfilled with four to six inches of 2/12 Monterey sand and overlain with hydrated granular bentonite to seal the annular space above the sampling interval to prevent ambient air intrusion within the boring annulus. Each aboveground vapor probe assembly will be secured directly below the ground surface and covered with a steel plate. A generalized schematic of a soil vapor sampling probe is included as **Figure 5**.

Vapor Sample Collection

Sub-slab and soil vapor samples will be collected in accordance with the DTSC guidelines titled *Advisory- Active Soil Gas Investigations,* dated April 2012 and *Final - Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air,* dated October 2011. Prior to sampling, vapor sampling probes will be allowed to equilibrate for at least two hours following installation, a shut-in test will be conducted on each purge and sample assembly, a leak test will be conducted at each sampling location, and a purge volume test will be conducted on at least one sub-slab vapor sampling probe to determine the appropriate number of purge volumes to remove from each probe. The shut-in test will be conducted by applying a vacuum of approximately 100 inches of water to the purge and sample apparatus for a period of ten minutes. The shut-in test will be considered acceptable if no loss of vacuum is observed. To ensure leakage of ambient air is not diluting the soil vapor sample, a leak test utilizing the vapor leak check compound 1,1 difluoroethane (1,1-DFA) will be conducted at each location of potential ambient air intrusion including sample system connections, surface bentonite seals, and the top of the temporary soil vapor point. The leak check compound will be applied during purging and sampling activities at the soil vapor sampling point location. The flow rates will be monitored to ensure a sampling rate of 100 to 200 mL/min.

The stepped purge volume test will be conducted by removing one, three, and ten purge volumes (internal volume of tubing) from a selected sub-slab vapor sampling probe and collecting a sample after each step. Purging and sampling will be conducted at a rate of 100 to 200 milliliters per minute and will not exceed a vacuum of 100 inches of water within the purge and sample apparatus. The appropriate number of purge volumes will be selected based on the analytical data provided by the on-site mobile laboratory associated with respect to each stepped purge volume. If none of the analytes of interest are detected during the stepped purge test, a default of three purge volumes will be selected. Vapor samples associated with the stepped purge volume test will be collected in glass syringes for the mobile laboratory.

Vapor samples collected in glass syringes will be immediately transferred to a state-certified mobile laboratory located on-site and analyzed for the presence of VOCs by EPA Method 8260B, methane by EPA Method 8015M, and for oxygen and carbon dioxide by an appropriate EPA Method using a gas chromatograph (GC) and/or a thermal conductivity detector (TCD). At least one duplicate sample will be collected from a selected sub-slab vapor sampling probe that will be used for quality assurance and quality control (QA/QC) purposes. The purpose of the mobile laboratory is to field verify the presence of VOCs in vapor samples and to determine the integrity of each of the sub-slab vapor sampling probes.

Vapor samples collected in Summa canisters will be submitted under chain of custody documentation to a state-certified fixed base laboratory and analyzed for the presence of VOCs by EPA Method TO-15 or TO-17, methane by EPA Method 8015M, and for oxygen and carbon dioxide by an appropriate EPA Method using a gas chromatograph (GC) and/or a thermal conductivity detector (TCD). At least one duplicate sample will be collected from a selected sub-slab vapor sampling probe that will be used for QA/QC purposes.

Analytical results will be compared to the ESLs and CHHSLs.

Upon completion, the sub-slab vapor sampling probes will be destroyed by removing the tubing and patching the foundation borings with quick drying cement. Flooring will be restored to its original condition if necessary by repairing or replacing the original flooring material.

Semi-Permanent Vapor Sampling Probes

Based on the results of the vapor sampling, up to four (4) of semi-permanent vapor probes will be completed future vapor monitoring. The selected locations and depths for permanent vapor probes will be proposed to and agreed to by the ACEH based on draft vapor data to be presented during the implementation of the soil vapor assessment. Semi-permanent sub-slab vapor probes will be completed by installing a well box with grout to preserve the original temporary probe for future sampling. Proposed semi-permanent sub-slab vapor probe construction details are shown on **Figure 4.**

Because semi-permanent soil vapor sampling probes require grout seal, the semi-permanent vapor probe will be installed by drilling a new borehole adjacent to the original probe. The probe will be constructed of approximately ten feet of ⅛-inch outside diameter Teflon or Nylaflow® tubing attached to a one-inch long filter screen emplaced approximately six inches above the base of the annulus. A sand pack will be placed in the annulus of the well extending from the bottom of the well screen to approximately one foot above the top of the filter screen. Approximately three feet of bentonite will be placed on top of the sand pack and hydrated with potable water. The remaining annulus will be grouted to surface with cement grout. To protect the integrity of the probes, the probes will be completed at grade with flush-mounted traffic-rated vaults set in concrete. Proposed semi-permanent soil vapor probe construction details are shown on **Figure 5**.

Indoor Air Study

Cardno proposes to collect three (3) indoor (ambient) air samples and one outdoor vapor sample using time release certified clean summa canisters. The purpose of the indoor air analyses is be to evaluate the potential degradation of indoor air quality compared to both the outside air and the projections obtained from modeling soil vapor data and to identify any VOCs being emitted into the building.

One indoor air sample will be collected from the Dryclean 580 unit as well as from each of the immediately adjacent units, Verizon Wireless, and AT&T. The samples will be collected in the occupied areas of each unit at a height between three and five feet above the floor. The units are constant use, so a filter probe similar to those used for sub-slab or soil vapor sampling will be employed to keep incidental dust and airborne particles from entering the sample container. Each of the units will also be surveyed for consumer and household products such as cleaners, aerosol deodorants, and similar that may contain volatile compounds that could interfere with the analyses. If possible, these chemicals will be removed from the unit area as much as two

weeks in advance of sampling, and will be inventoried if they cannot be removed or if they have been used in the office area during the two weeks prior to sampling.

The samples will be collected using summa canisters over a period of six to eight hours. The outdoor sample will be collected approximately 100 feet away from the site structure in the prevailing up-wind direction concurrent with the indoor sample, at a location away from trees, automobiles, fuel tanks, and other sources of volatile organic compounds and elevated approximately six feet above the ground surface. The outdoor sample will provide a baseline for atmospheric concentrations of the identified analytes of concern.

The samples will be submitted under chain of custody documentation to a state-certified fixed base laboratory and analyzed for the presence of VOCs by EPA Method TO-15 or TO-17, methane by EPA Method 8015M, and for oxygen and carbon dioxide by an appropriate EPA Method using a GC and/or a TCD. At least one duplicate sample will be collected from a selected sub-slab vapor sampling probe that will be used for QA/QC purposes.

A tiered evaluation will be conducted using the laboratory analytical data. The soil vapor data will be compared to the values listed in Table E of the ESLs and Table 2 of the CHHSLs. If any of the analytes of interest exceed the ESLs and/or CHHSLs, these analytes will be evaluated utilizing the Tier 2 Modeling program. Cardno will use the Johnson and Ettinger Vapor Intrusion Model for Soil Vapor Emissions to Indoor Air Risk Assessment as appropriate for Residential Exposure Scenario for High Permeability (Sandy) Soils, version 1.0 (2005). Analytes of interest detected above laboratory method detection limits from vapor sampling will be inputted into the model to evaluate the Hazard Quotient for carcinogens and non-carcinogens. For the purpose of this indoor air risk assessment, Cardno will assume the building is slab on grade. Cardno will compare Hazard Quotient Ratios to conservative and action levels established by the SF Bay RWQCB and evaluate if additional sampling and/or modeling is necessary.

Soil Assessment

Membrane Interface Probe (MIP) Assessment

Cardno proposes to advance up to nine (9) membrane interface probe (MIP) borings at the site to more completely assess the lateral and vertical extent of impacts to soil (and groundwater, if present) at the site. The proposed MIP assessment has been designed using a step-wise approach that can be implemented in a real-time field environment. The MIP is a screening tool with semi-quantitative capabilities which acts as an interface between the contaminants in the subsurface and gas phase detectors at the surface. The most commonly used MIP detectors include photoionization detector (PIO), electron capture detector (ECO), and the flame ionization detector (FID). Each detector is designed for sensitivity to a group or type of contaminant. The ECO is used for chlorinated contaminant detection, and the PIO is best used for the detection of aromatic hydrocarbons (e.g., benzene and related compounds). This configuration enables collection of relative contaminant concentrations that can be used as a means to guide collection of traditional confirmation soil and groundwater samples for quantitative fixed-laboratory analysis at select locations.

The MIP tooling will also measure the electrical conductivity (or resistance, as resistance is the inverse of conductivity) of soil as the tool is advanced. Generally, electrical conductivity is inversely proportional to particle size. That is, clays usually have higher conductivity than sands.

Another rule of thumb is the smaller the particle size of the soil, the lower the permeability. Thus, electrical conductivity measurements yield important soil-stratigraphic information and identify potential permeable and non-permeable zones.

The proposed MIP locations identified on **Figure 3** will be advanced using either truck-mounted or limited-access direct-push drill rigs (based on accessibility). Each location identified will be assessed using MIP technology to determine the vertical distribution and magnitude of PCE impacts to subsurface soils and groundwater in those areas. The anticipated average depth that the MIP tool will be advanced is 25 feet. This is based on findings of earlier investigations and the depths of previous borings. Step-out MIP locations will be advanced based on the need for additional lateral assessment as determined by interpretation of data from the initial MIP locations; the number and actual location of step-outs will be based on MIP data. The goal for the step-out sample locations will be to adequately understand the lateral and vertical distribution of PCE in the vicinity of the source area.

Confirmation Soil Sampling

Confirmation soil will be advanced by a C57 Licensed driller using a direct-push rig to an average anticipated depth of 25 feet bgs. Samples will be collected at field-selected locations adjacent to MIP locations to allow for correlation of MIP data with laboratory data. If appropriate, selected control probes may also serve as confirmation sample locations to reduce project costs (i.e. previously advanced "ATC" borings). Specific locations and sample collection depths will be selected to meet the source assessment objectives; therefore, no attempt to predict sampling locations has been offered in this work plan. Soil samples will be collected in a 4-foot long by 1.5-inch outside diameter core sampler equipped with an acetate liner. Soil will be logged continuously for lithology and field screened at regular intervals using a photoionization detector (PID). Samples selected for laboratory analysis will be determined in the field based on observations made during review of the MIP results and/or based on observation made during the collection of the confirmation samples. All soil borings will be grouted to surface by emplacing concrete slurry in the bottom of each boring with a tremie pipe. A Cardno geologist will log the soil samples under the responsible charge of a California Professional Geologist.

Collection of soil samples for laboratory analysis will be performed by cutting the desired sample interval from the acetate liner, and placing Teflon® sheeting and plastic end caps on the ends of the sample section. Each sample will be labeled, and placed in an ice-filled cooler for preservation. Samples will be submitted for laboratory analysis under chain-of-custody protocol to a California-certified analytical laboratory for analysis. Soil samples will be analyzed for volatile organic compounds via Environmental Protection Agency (EPA) Method 8260B for hydrocarbons.

Sensitive Receptor Study

Cardno will conduct a sensitive receptor study (SRS) within a 2,000-foot search radius from the site. The SRS will include review of California Department of Water Resources (DWR) and Alameda County Department of Public Works (ACDPW) well records to identify water supply wells located within the 2,000-foot search radius, field verification of identified wells and surface water bodies, and identification of underground utilities within 500 feet of the 580 Market Place Shopping Center. Additional receptors will include schools, hospitals, elderly care homes, and other public domains.

REPORT PREPARATION

Upon completion of field activities, Cardno will prepare a summary report that will include a description of field activities, laboratory analytical data in tabular form, boring logs, site plans, laboratory report sheets, a comparison of analytical data to the RWQCB, San Francisco Bay Region ESLs and/or CHHSLs, any additional modeling if necessary, and recommendations for additional work, if necessary, including the installation of monitoring wells. Additionally, Cardno will prepare and submit an updated Site Conceptual Model in the ACEH's preferred tabular format.

SCHEDULE

Once approval of this work plan has been received, Cardno will confirm a schedule for drilling and sampling activities. Cardno will notify the ACEH at least 48 hours prior to beginning any field activities. The summary report will be submitted to the ACEH approximately 60 days after the receiving analytical results.

CLOSING

If you have any questions or require additional information regarding this work plan, please contact Gabe Stivala at (925) 223-7123.

Respectfully submitted,
Cardno ATC

Sara Bostick
ıager

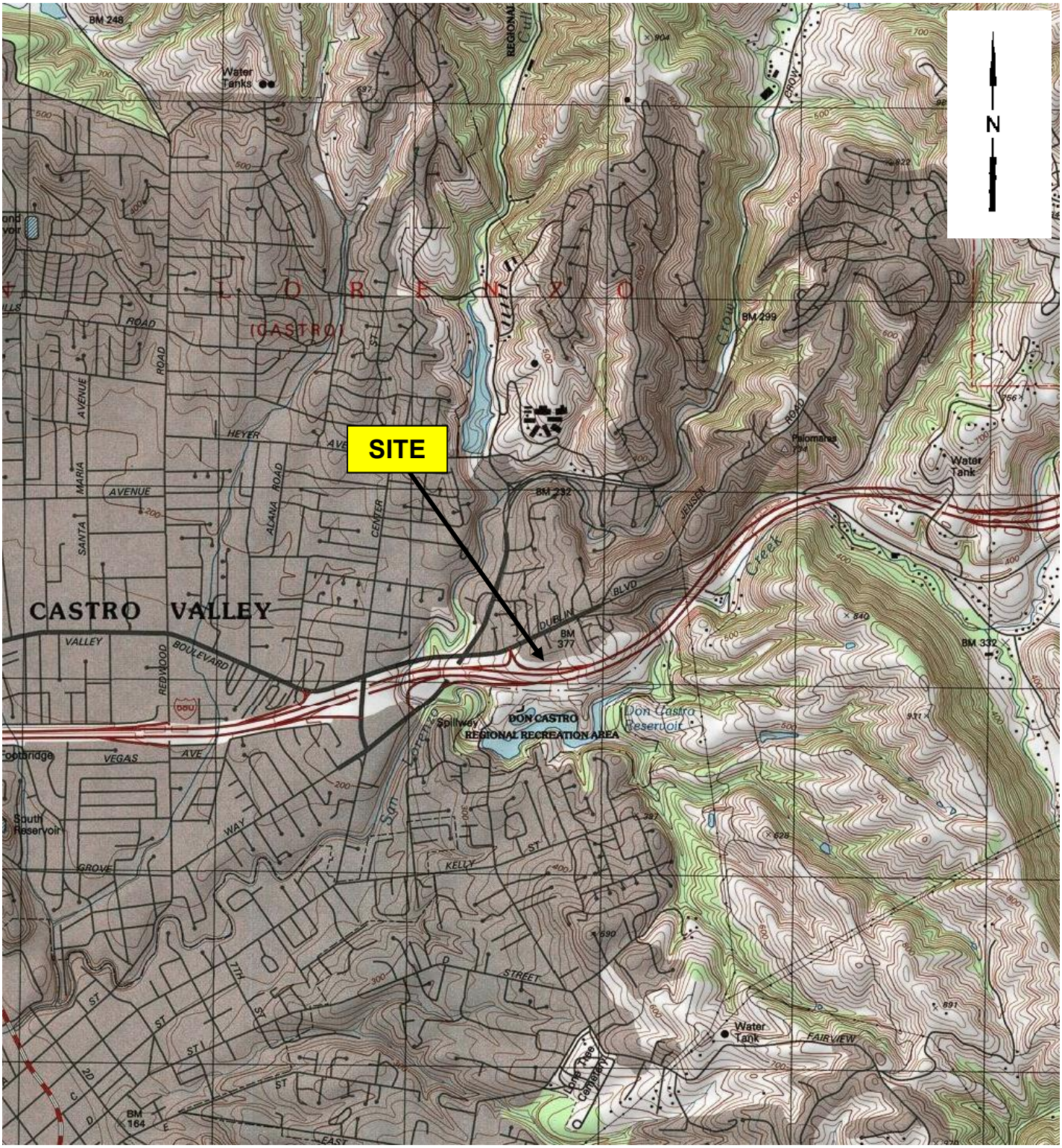
Senior Geologist

Attachments:

Figure 1 - Site Location Map
Figure 2 - Site Plan
Figure 3 - Proposed Sample Locations
Figure 4 - Sub-Slab Vapor Probe Schematic
Figure 5 - Soil Vapor Probe Schematic

Table 1 - Summary of Historical Soil Vapor Data
Table 2 - Summary of Historical Soil Data

cc: Mr. Chuck Gurney, Weingarten Realty Investors
Mr. Thomas J. Treacy, John Hancock Life Insurance Company USA



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP
CASTRO VALLEY QUADRANGLE, CALIFORNIA, DATED 1968, PHOTOREVISED 1987.

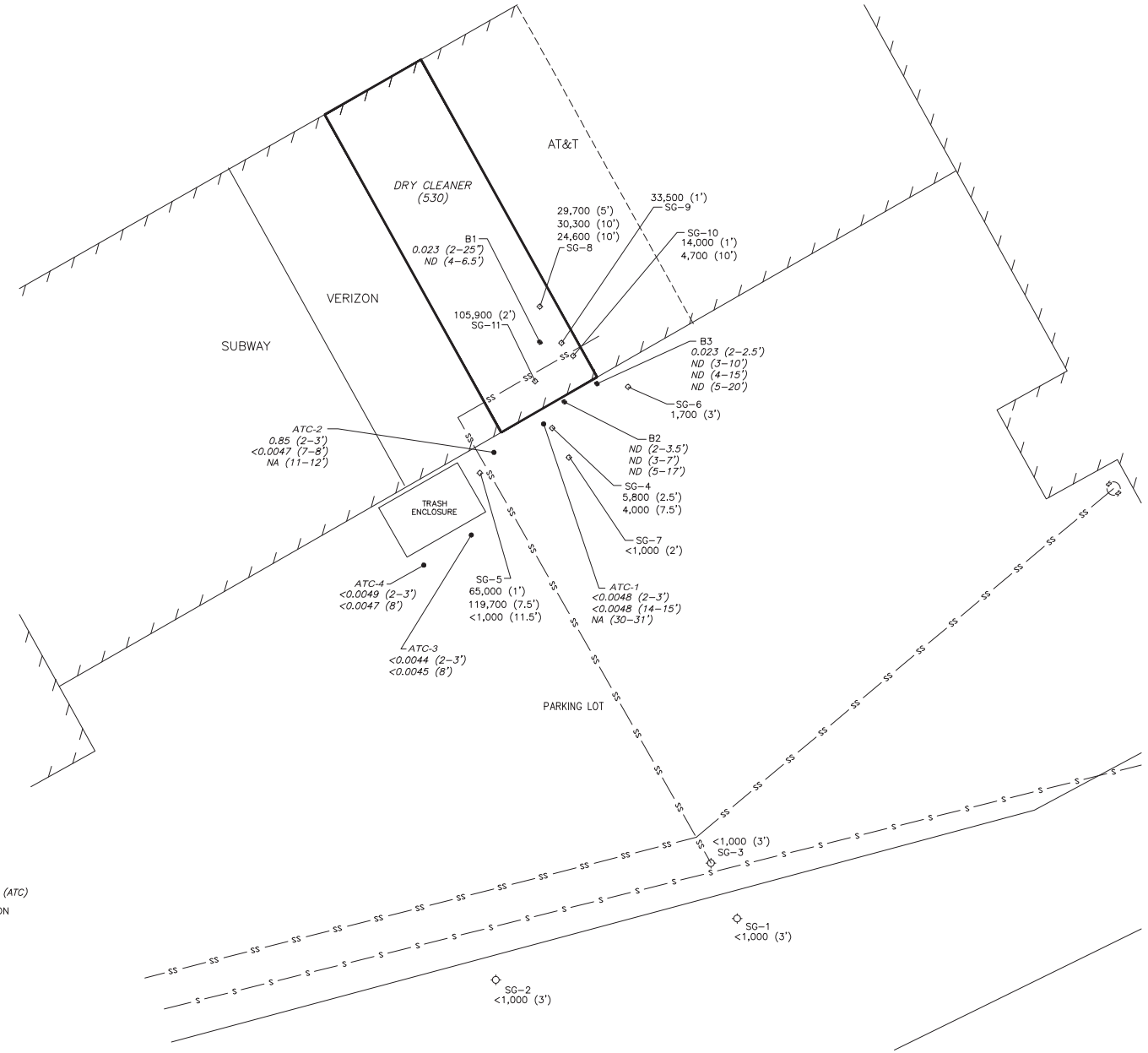
FIGURE 1

SITE LOCATION MAP

580 MARKET PLACE SHOPPING CENTER
3735-4065 EAST CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CALIFORNIA 94552

Cardno ATC
Shaping the Future
1117 Lone Palm Ave, Ste 201B
Modesto, CA 95351
(209) 579-2221

PROJECT NO: 075.75356.0002		
DESIGNED BY: JK	SCALE: 1:24,000	REVIEWED BY: JH
DRAWN BY: JK	DATE: 11/13	FILE: LOCATION



SITE PLAN

580 MARKET PLACE
3735 E. CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CA

PROJECT NUMBER: 75.75354.0002		DATE: 11/8/13	FIGURE 2
APPROVED BY: GS		DRAWN BY: BK	

Cardno ATC
701 University Avenue, Ste. #200
Sacramento, California 95825
Ph: (916) 923-1097 *** Fax: (916) 923-6251

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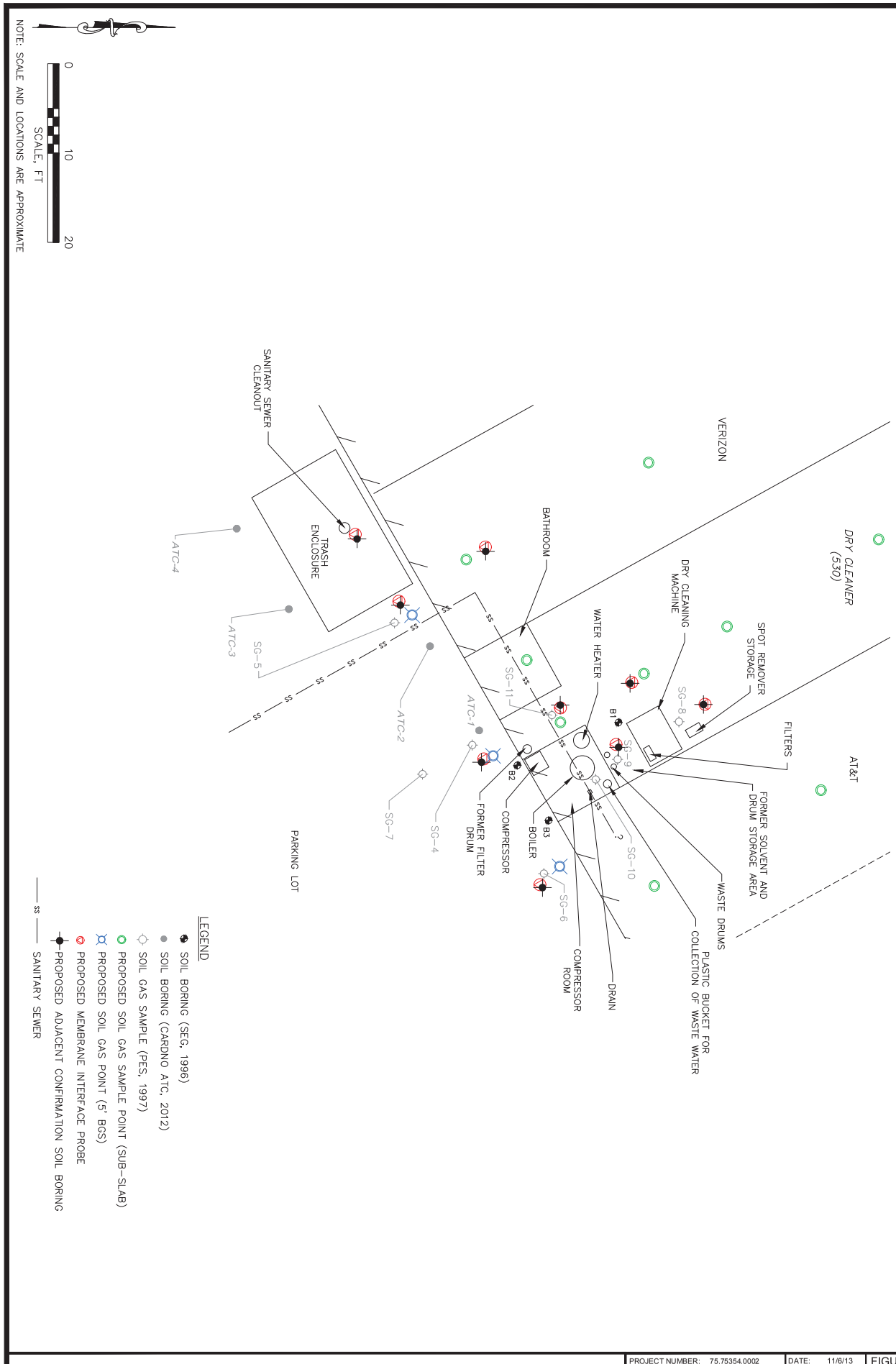

PROPOSED DATA GAP ASSESSMENT LOCATIONS

580 MARKET PLACE
3735 E. CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CA

PROJECT NUMBER: 75.75354.0002		DATE: 11/6/13	FIGURE 3
APPROVED BY: GS		DRAWN BY: BK	

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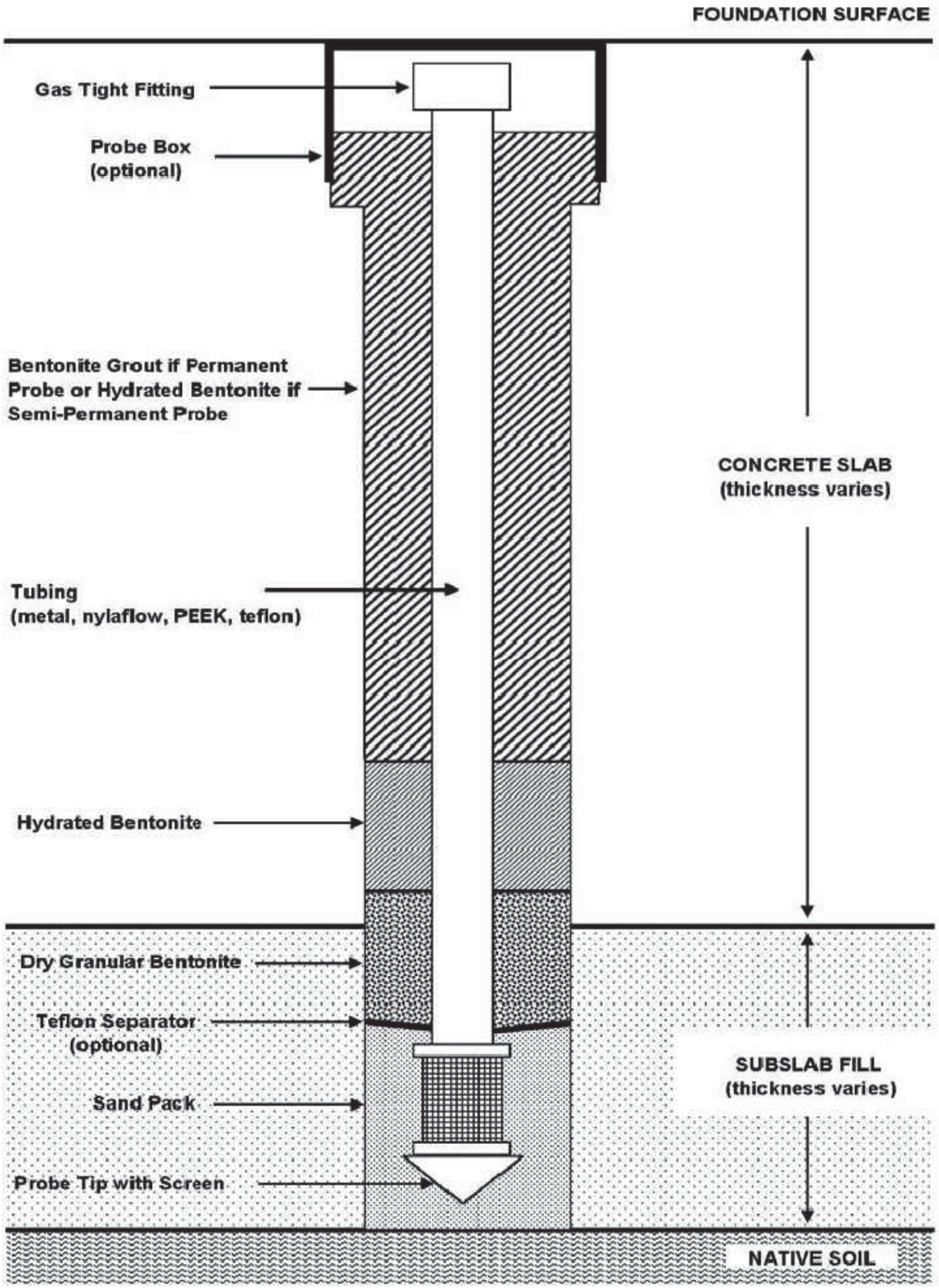

NOT TO SCALE

SUB-SLAB VAPOR PROBE

580 MARKET PLACE
3735 - 4065 E. CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CA

PROJECT NUMBER: 75.75354.0002		DATE: 9/23/13	FIGURE
APPROVED BY: GS		DRAWN BY: BK	4

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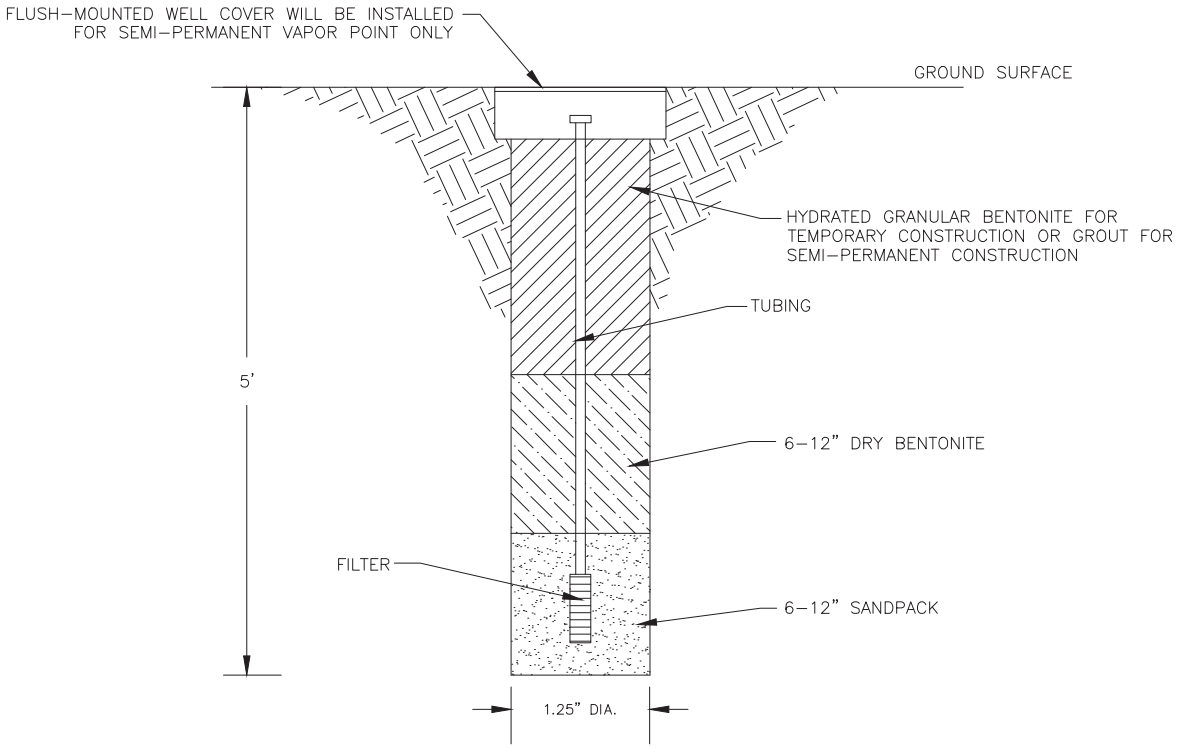

SINGLE SOIL VAPOR PROBE

NOT TO SCALE

TEMPORARY AND SEMI-PERMANENT SOIL VAPOR PROBE CONSTRUCTION DIAGRAM

580 MARKET PLACE
3735 - 4065 E. CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CA

PROJECT NUMBER: 75.75354.0002		DATE: 9/23/13	FIGURE
APPROVED BY: GS		DRAWN BY: BK	5

Cardno ATC
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TABLE 1
SUMMARY OF SOIL VAPOR ANALYTICAL RESULTS
580 Market Place Shopping Center
3735-4065 East Castro Valley Boulevard, Castro Valley, California

Sample ID	Date	Sample Depth (feet)	Constituents of Concern reported in ug/m³					Location
			Vinyl Chloride	trans-1,2 DCE	cis-1,2 DCE	TCE	PCE	
SG-1	11/11/97	3.0	<1,000	<1,000	<1,000	<1,000	<1,000	Landscaped slope 100 Ft south of Dryclean 580
SG-2	11/11/97	3.0	<1,000	<1,000	<1,000	<1,000	<1,000	Landscaped slope 100 Ft south of Dryclean 580
SG-3	11/11/97	3.0	<1,000	<1,000	<1,000	<1,000	<1,000	Sanitary sewer corridor
SG-4	11/11/97	2.5	<1,000	<1,000	<1,000	<1,000	**5,800**	Outside, south of Dryclean 580
SG-4	11/11/97	7.5	<1,000	<1,000	<1,000	<1,000	**4,000**	Outside, south of Dryclean 580
SG-5	11/11/97	1.0	<1,000	<1,000	<1,000	<1,000	**65,000**	Sanitary sewer corridor
SG-5	11/11/97	7.5	<1,000	<1,000	<1,000	**6,800**	**119,700**	Sanitary sewer corridor
SG-5	11/11/97	11.5	<1,000	<1,000	<1,000	<1,000	<1,000	Sanitary sewer corridor
SG-6	11/11/97	3.0	<1,000	<1,000	<1,000	<1,000	**1,700**	Outside, south of Dryclean 580
SG-7	11/11/97	2.0	<1,000	<1,000	<1,000	<1,000	<1,000	Outside, south of Dryclean 580
SG-8	11/12/97	5.0	<1,000	<1,000	<1,000	2,100	**29,700**	Front of dry cleaning machine, area of storage of spot removers
SG-8	11/12/97	10.0	<1,000	<1,000	<1,000	1,400	**30,300**	Front of dry cleaning machine, area of storage of spot removers
SG-8	11/12/97	10.0	<1,000	<1,000	<1,000	1,100	**24,600**	Front of dry cleaning machine area of storage of spot removers
SG-9	11/12/97	1.0	<1,000	<1,000	<1,000	<1,000	**33,500**	Behind drycleaning machine, adjacent to former location of waste storage drums
SG-10	11/12/97	1.0	<1,000	<1,000	<1,000	<1,000	**14,000**	Adjacent to a plastic bucket used to collect waste water from the dry-cleaning machine
SG-10	11/12/97	10.0	<1,000	<1,000	<1,000	<1,000	**4,700**	Adjacent to a plastic bucket used to collect waste water from the dry-cleaning machine
SG-11	11/12/97	2.0	<1,000	<1,000	<1,000	1,400	**105,900**	Sanitary sewer corridor
CHHSL (1)			*8/7/1902*	*240,000*	*120,000*	*4,400*	*1,600*	

Notes:

ug/m³ denotes micrograms per cubic meter

All analytes were analyzed by a mobile laboratory utilizing EPA Method 8010

All soil vapor data collected by Transglobal Environmental Geosciences, Inc. (TEG) under contract to PES Environmental,Inc. (PES) as part of a Phase II Site Investigation in November 1997

(1) *California Human Health Screening Levels (CHHSLs)* , Soil-Screening Numbers - Updated 09/23/10,
Table 2. Soil-Gas-Screening Numbers for Volatile Chemicals below Buildings Constructed with Engineered Fill below Sub-slab Gravel, Commercial.Insudtrial Values

Bold values exceed CHHSLs
All data reported by PES Environmental,Inc. (PES)

Table 2

Summary of Soil Analytical Data

580 Market Place Shopping Center
3735-4065 East Castro Valley Boulevard
Castro Valley, California 94552

Sample ID	Depth (feet bgs)	Sample Date	PCE (mg/kg)	TCE (mg/kg)	Acetone (mg/kg)	Location	Consultant
			EPA Method 8260B				
B1-2-25"	2	10/1996*	---	0.023	---	south side of dry cleaning machine; "solvent work area"	SEG
B1-4-6.5'	6.5	10/1996*	---	ND	---	south side of dry cleaning machine; "solvent work area"	SEG
B2-2-3.5'	3.5	10/1996*	---	ND	---	outside (south side) near rear of Dryclean 580	SEG
B2-3-7'	7	10/1996*	---	ND	---	outside (south side) near rear of Dryclean 580	SEG
B2-5-17'	17	10/1996*	---	ND	---	outside (south side) near rear of Dryclean 580	SEG
B3-2-2.5'	2.5	10/1996*	---	0.023	---	outside (south side) near rear of Dryclean 580	SEG
B3-3-10'	10	10/1996*	---	ND	---	outside (south side) near rear of Dryclean 580	SEG
B3-4-15'	15	10/1996*	---	ND	---	outside (south side) near rear of Dryclean 580	SEG
B3-5-20'	20	10/1996*	---	ND	---	outside (south side) near rear of Dryclean 580	SEG
SB1-7.0	7	11/12/1997	<0.005	<0.005	<0.005	Sanitary sewer corridor near southern edge of property	PES
ATC-1 (2')	2-3	3/1/2012	<0.0048	<0.0048	<0.048	outside (south side) near rear of Dryclean 580	Cardno ATC
ATC-1 (15')	14-15	3/1/2012	<0.0048	<0.0048	0.062	outside (south side) near rear of Dryclean 580	Cardno ATC
ATC-1 (31')	30-31	3/1/2012	---	---	---	outside (south side) near rear of Dryclean 580	Cardno ATC
ATC-2 (2')	2-3	3/1/2012	**0.85**	0.047	<0.22	outside (south side) near rear of Dryclean 580	Cardno ATC
ATC-2 (7.5')	7-8	3/1/2012	<0.0047	<0.0047	0.071	outside (south side) near rear of Dryclean 580	Cardno ATC
ATC-2 (12')	11-12	3/1/2012	---	---	---	outside (south side) near rear of Dryclean 580	Cardno ATC
ATC-3 (2')	2-3	3/1/2012	<0.0044	<0.0044	<0.044	outside (south side) near rear of dumpster storage	Cardno ATC
ATC-3 (8')	7-8	3/1/2012	<0.0045	<0.0045	<0.045	outside (south side) near rear of dumpster storage	Cardno ATC
ATC-4 (2')	2-3	3/1/2012	<0.0049	<0.0049	<0.049	outside (south side) near rear of dumpster storage	Cardno ATC
ATC-4 (8')	7-8	3/1/2012	<0.0047	<0.0047	0.079	outside (south side) near rear of dumpster storage	Cardno ATC
ESL Shallow (<9.8 feet)			*0.7*	*0.46*	*0.5*		
ESL Deep (>9.8 feet)			*0.7*	*0.46*	*0.5*		

NOTES:

EPA	Environmental Protection Agency
PCE	Tetrachloroethene
TCE	Trichloroethene
bgs	Below ground surface.
mg/kg	Milligrams per kilogram.
---	No Data / Not Analyzed
<0.0048	Constituent not detected above specific minimum laboratory reporting limit.
*	Exact date not available for SEG data
ESL Shallow ^	Environmental screening level (Table A - Commercial Land Use)/SWRCB Region 2 ESL Tables Interim Final - November 2007 (Revised May 2008)
ESL Deep ^^	Environmental screening level (Table C - Commercial Land Use)/SWRCB Region 2 ESL Tables Interim Final - November 2007 (Revised May 2008)
BOLD	Reported value exceeds ESL.
ND	Not detected above method detection limit; no reporting limit available to Cardno ATC

SEG - Smith-Emery GeoServices. Inc
PES - PES Environmental,Inc. (PES)
Cardno ATC - Cardno ATC, formerly ATC Associates