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January 25, 2011

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

Re: **Revised Workplan**
P&D 23rd Avenue Associates
1125 Miller Avenue, Oakland, CA
Clearwater Project No. CB018H
ACEH Fuel Case Leak No. RO0000294

Dear Mr. Wickham,

As the legally authorized representative of the above-referenced project location I have reviewed the attached report prepared by my consultant of record, Clearwater Group, Inc. I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document are true and correct to the best of my knowledge.

Sincerely,

John Protopappas

CLEARWATER GROUP
Environmental Services

REVISED
WORKPLAN

P&D 23rd Avenue Associates LLC
(Formerly 23rd Avenue Partners)
1125 Miller Avenue
Oakland, California

Prepared by

CLEARWATER GROUP

For

Mr. John Protopappas
P&D 23rd Avenue Associates LLC
(Formerly 23rd Avenue Partners)
Global ID # T0600177455

January 24, 2011

229 Tewksbury Avenue ◆ Point Richmond, California 94801 ◆ Telephone: 510-307-9943 ◆ Fax: 510-232-2823

CLEARWATER GROUP
Environmental Services

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Attachment B Clearwater Group Standard Operating Procedures:
- Direct-Push Drilling Investigation Procedures – Single Rod Macro-Core® Sampler
- Typical Sub-Slab Soil Vapor Diagrams and Photographs
- TO-17 Sorbent Tubes SOP
- SUMMA Canister SOP (TO-14/-15)
- GILAIR-5 Active Air Pump
- Soil Vapor Sampling Procedures Where Total Petroleum Hydrocarbons as Diesel Is a Constituent of Concern
- Soil Sampling Procedures

1 INTRODUCTION

Clearwater Group (Clearwater) is submitting this *Revised Workplan (Workplan)* for the property located at 1125 Miller Avenue, Oakland, California (*Site*) (**Figure 1**). This *Workplan* is in response to a January 19, 2011, letter from Alameda County Environmental Health Services (ACEH) (**Attachment A**) prepared in response to Clearwater's *Workplan* dated December 17, 2010, its *Historic Uses Report* dated December 1, 2010, and the Agency meeting on January 19, 2011.

2 PURPOSE

ACEH staff requested a meeting with Clearwater and the property owner in order to review the site history, the past work at the site, and the appropriate options for future work at the site. ACEH, in its letter dated January 19, 2011, requested a revised Workplan to address several discussion points. The discussion points can be reduced to the following action items:

1) Confirm that the three historic grab groundwater samples, taken on and proximal to the site, represent the Total Petroleum Hydrocarbons as diesel (TPH-d) in groundwater downgradient from the release points at the site. *Site* levels of TPH-d have been documented between 600–800 parts per billion (ppb).

2) Close the data gaps in Total Petroleum Hydrocarbons as gasoline (TPH-g) concentrations in soil vapor under the concrete slab in the residential areas of the building at the *Site* (locating of proposed vapor sampling port SS-7 within the residence, upgradient from soil vapor location SS-3, in which elevated levels of TPH-g have been detected in soil vapor). Verify that the TPH-g soil vapor finding in SS-3 does not represent a significant presence of that constituent under the southern portion of the building.

3) Establish whether the usage of solvents during the 1980s inside the structure was associated with any release to the subsurface; collect soil vapor samples to rule out the presence of halogenated hydrocarbons in the soil vapor under the slab; While sampling the soil vapor at the entire network, analyze all soil vapor points for TPH-diesel, TPH-gasoline, Benzene, Toluene, Ethyl benzene, Xylenes (BTEX), and halogenated hydrocarbons.

4) Repair or replace SS-5, the soil vapor point that was irreparably damaged prior to the last sampling event.

5) Remove the piping (dispenser supply pipe, return pipe, and two vent pipes) from the western edge/western corner of the building, with the primary objective to close out the piping as a potential future conduit to the former tank pit/subsurface, and with a secondary objective to remove confirmed soil impacted with diesel from underneath the

dispenser; with completion of confirmation sampling after all soils excavation with the objective to remove this possible hydrocarbon source in the soil.

3 PROPOSED SCOPE OF WORK

To address each of these discussion points, the scope of proposed work for this workplan includes the following updated tasks:

- Perform soil boring investigation permitting, field preparation, Health & Safety Plan (HSP), and utility locating and clearance;
- Drill three vertical soil borings using a probe rig to obtain continuous soil cores and grab groundwater samples: (1) to verify the levels of TPH-g and TPH-d in a downgradient position in Calcot Place, location S12; (2) to verify the back fill in the tank pit, and to verify the levels of TPH-d and TPH-g at location S13; and (3) to rule out a source of TPH-g near SS-3, at location S14;
- Install one soil vapor point, SS-7, in the residential part of the ground floor. Repair SS-5 vapor point.
- Analyze the soil vapor from the 7 soil vapor points with method TO-15.
- Jackhammer and sawcut the pavement around the vent pipes and from the dispenser pipe hole; excavate the overburden soil from over the piping; remove the piping; remove any discolored soil adjacent to this piping.
- Collect soil samples at excavation wall and trench bottom surfaces following removal of soil with visual discoloration or photoionization detector (PID) readings.
- Dispose of concrete debris as non-hazardous waste.
- Store discolored soil or soil with PID reading on site in a (covered) debris bin, sampled and profiled preparatory to waste being disposed of at an appropriate landfill. (If possible, pipe removal/excavation work will precede soil boring work so that the soil bin can receive the soil cuttings and drums will not be needed.)
- Prepare the subsequent investigation report and produce the workplans for future activities moving toward the goal of site closure.

4 PERMITTING/FIELD PREPARATION

All work will be pre-approved by ACEH staff prior to initiation.

4.1 Permitting

Permits for the soil borings will be obtained from Alameda County Public Works Agency (ACPWA) before field activities are initiated. Clearwater will obtain excavation and encroachment permits from the City of Oakland Building Department and Department of Public Works to install the three soil borings.

4.2 Health and Safety Plan

A site-specific Health and Safety Plan (HSP) will be generated to cover the activities proposed in this phase of work. Traffic control will also be discussed in the HSP. The

HSP will be signed by the Clearwater project manager and the Clearwater Health & Safety Officer before it is released to the field staff. All field staff will review and sign the HSP before the field activities begin.

4.3 Ground Penetrating Radar Survey

Clearwater will perform an extensive Ground Penetrating Radar (GPR) and diagnostics survey on the site as well as pre-screen each boring location. Work will be coordinated to accommodate PG&E staff.

4.4 Utility Locating

Clearwater staff will notify USA North for utility location mark-outs before any field work is performed. Clearwater will provide at least three weeks to ensure that all utilities have marked out their lines. Clearwater will meet on-site with the PG&E representative to establish all lines in and around the *Site*, because of known industrial infrastructure (incinerator gas line). A private contractor, using ground penetrating radar, will locate utilities that enter the *Site*, follow lines from identified points of power usage or drain elements and more precisely locate underground services at every soil boring location.

5 SOIL BORINGS

Using direct push technology (DPT), Clearwater will sample three locations, S12 through S14, at the *Site* (**Figure 2**). Sampling will be performed in accordance with Clearwater's Standard Operating Procedures (**Attachment B**). One soil boring, S12, is proposed at the location shown in **Figure 2**. This location was chosen as a location down gradient from the former tank pit.

In the former tank pit, one soil boring is proposed to document backfill soil and to collect a grab groundwater sample to verify previous sampling values of TPH-d by method EPA 8015, and collect samples for TPH-g, BTEX, and solvents (8260B) analysis (**Figure 2**).

The final soil boring, S14, will be west of, but near the location of, vapor sampling port SS-3. At location SS-3, high TPH-g vapor concentrations were discovered during both sub-slab vapor sampling events.

5.1 Soil Sample Collection

Attempts will be made to collect continuous soil core samples within the vadose zone, the smear zone, and the saturated soils, for lithologic and hydrogeologic characterization. If discrete impacts are observed, samples will be collected from these locations and screened using PID, visual, and/or olfactory screening. For those soil samples that do not have obvious visual indicators of contamination, acetate liners will be scored every six vertical inches so that olfactory and PID observations can made for screening.

At least one soil sample will be collected from each soil boring for laboratory analysis. If no impacts are observed, one soil sample will be collected for laboratory analysis at

the interval immediately above the estimated groundwater level. Where impacts are observed through the clear, disposable acetate liner, the liner will be cut above and below the impacted soil and the liner capped, sealed, and sent to a laboratory for analysis.

All soil samples will be analyzed for Total Petroleum Hydrocarbons as diesel (TPH-d) by EPA Method 8015; Total Petroleum Hydrocarbons as gasoline (TPH-g); BTEX; and halogenated hydrocarbons by method EPA 8260B.

5.2 Grab Groundwater Sample Collection

Groundwater samples will be collected from temporary well casings placed in the soil borehole. After soil samples have been collected, a one-inch diameter temporary PVC (polyvinyl chloride) well screen will be placed into the well with the 5-foot screen interval placed across the groundwater-bearing zone, anticipated at approximately 17 ft to 20 ft below ground surface.

If possible, the groundwater samples will be collected using EPA-recommended low-flow sampling methods—maintaining a flow rate of less than 500 mL/min and a drawdown of less than 0.3 feet. Low-flow methods are recommended for these soil borings so that interference from suspended sorbed-phase impacts in samples collected from these temporary and non-reproducible sampling points do not alter laboratory findings. The soil borings will be purged using a peristaltic pump with new ¼-inch outside diameter (OD) low-density polyethylene (LDPE) tubing at every well. Water quality parameters will be collected using a YSI 5600 multi-parameter meter and flow-through cell. The temporary well will be purged until three of the six field water-quality parameters (pH, temperature, conductivity, Oxidation Reduction Potential [ORP], Dissolved Oxygen [DO], and turbidity) have stabilized for three consecutive readings. Because these are not developed monitoring wells, ORP, DO, and turbidity, which can be highly influenced by sediment present in groundwater, will not need to be stable in order to collect samples. **Table A**, includes water quality parameters and stabilization criteria.

Table A. Field Parameters

Water Quality Parameter	Stabilization Criteria
pH	± 0.1 standard units
Temperature	± 3 percent
Conductivity	± 3 percent
ORP	± 10 millivolts (mV) – Not necessary to achieve stabilization
DO	± 10 percent – Not necessary to achieve stabilization
Turbidity	< 10 NTUs – Not necessary to achieve stabilization

Note NTU = Nephelometric Turbidity Units

The groundwater samples will be collected by disconnecting or bypassing the flow-through cell and transferring the groundwater directly from the Teflon® tubing to the appropriate lab containers.

If the well is purged dry during low-flow sampling, a groundwater sample will be collected using a check valve and clean tubing as soon as the water level sufficiently recovers to a level at which a sample can be collected.

All groundwater samples will be analyzed for Total Petroleum Hydrocarbons as diesel (TPH-d) by EPA Method 8015; Total Petroleum Hydrocarbons as gasoline (TPH-g); benzene, toluene, ethylbenzene, xylenes (BTEX); and halogenated hydrocarbons by method EPA 8260B.

All remaining void space from these soil borings will then be tremmie grouted to the surface using neat cement and the surface finished to match the surrounding material. All groundwater data, including field parameters, purging methods, and analytical data, will be recorded and presented in a letter report.

5.3 Disposal of Investigation-Derived Waste

Efforts will be made to minimize the quantity of soil and groundwater discarded. Soil cuttings will be placed in labeled 55-gallon steel drums and temporarily stored on-site, pending receipt of the characterization of the sample results for soil disposal. The drummed soil will be disposed of at a permitted landfill, after receipt of the sample results. Investigation-derived groundwater waste will be taken to a licensed disposal location and properly disposed of.

6 SUB-SLAB VAPOR PROBE INSTALLATIONS AND SAMPLING

Clearwater will use the existing six sub-slab vapor sample locations (SS-1 through SS-6 and the new sub-slab vapor point SS-7) to sample the sub-slab vapor for halogenated hydrocarbons. Sample location SS-5 will be repaired, and a new sample location, SS-7, will be installed (**Figure 2**). The residential-use area where SS-7 is located on the ground floor is an unfinished concrete slab. All seven points will be resampled for all previous constituents of concern.

6.1 Procedures for Installing Raised Sub-Slab Vapor Probes

A raised sub-slab vapor probe will be installed at location SS-7. It will be located under the stairway, to the west of the door to the vestibule. An above-grade shut-off valve will be used to seal off the tubing. The raised probe head of this proposed sub-slab sampling location will be protected from foot traffic and placed such that it is not a hindrance. A drill and concrete rotary bit (or minimal hammer, if necessary) will be used to advance an outer pilot boring to partially penetrate the slab (7/8 inch in diameter; the slab is

presumed to measure 6 inches in depth). Cuttings and dust from the hole will be vacuumed. Then a smaller-diameter inner hole that is approximately 1/16th of an inch greater in diameter than the outer diameter of the stainless steel tubing will be drilled. Because ¼-inch stainless steel tubing will be used, the inner hole will be 5/16th inch in diameter. The hole will be vacuumed periodically until final penetration is achieved; then drilling will be continued approximately 3 inches into the sub-slab soil to create an open cavity to prevent obstructions during soil vapor sampling.

The design of the raised sub-slab vapor probe is shown in **Attachment B**. Stainless steel chromatography-grade tubing will be used with the lower end suspended in the inner hole (not protruding through the bottom of the slab) and the upper end connected immediately above the slab via a ferrule compression fitting to a vapor-tight shut-off valve in the "off" position and an affixed upper brass, or stainless steel end cap. Non-shrinking cement will be mixed in accordance with the manufacturer's instructions for flowable cement grout to ensure a tight seal. The resultant slurry will be injected or pushed into place surrounding the fitting within the outer hole to become flush with the slab surface. When the seal is complete, a traffic cone may be placed over the location with the protruding probe head to prevent accidental damage during the week when the sub-slab environment is allowed to reach equilibrium.

Sample point SS-5 will be removed, and the borehole will be re-drilled and vacuumed to remove debris. The point will be re-set with fresh cement.

6.2 Vapor Sampling Procedures

The tubing emanating from the stainless steel sub-slab sampling point will be affixed to a sample shut-off valve in the "off" position during the time needed to reach equilibrium (1 week). A 167 milliliters-per-minute flow regulator (inclusive of particulate filter) will then be fitted to the shut-off valve and the other end of the regulator will be filled to a "T" fitting. One end of the "T" will be connected to the sampling SUMMA canister. The other end of the "T" will be affixed to a vacuum gauge and a 1-liter SUMMA canister utilized for purging. A sketch of the setup is presented in **Attachment B**.

Before purging and sampling are initiated, a 10-minute minimum vacuum tightness test will be performed on the manifold and connections by opening and closing the 1-liter purge canister valve and applying and monitoring a vacuum on the vacuum gauge. The sample shut-off valve on the downhole side of the sampling manifold will remain in the closed position. After the gauge vacuum has been maintained for 10 minutes without any noticeable decrease in vacuum tightness, and the time to reach equilibrium has elapsed (at least one week since the boring was sealed for sub-slab sample locations), purging may begin. For sub-slab sample locations, the downhole shut-off valve will be opened, and one liter of vapor will be purged using the purging SUMMA canister. Purge volumes of vapor will be removed and verified by the calculated pressure drop in the 1-liter SUMMA canister used for purging. Isopropyl alcohol will be used as a leak detection compound

during sampling by applying two to five drops of it to cotton gauze and placing the gauze near the borehole. Sampling will begin by opening the SUMMA canister valve. Immediately upon opening the sampling valve, a shroud will be placed over it to enclose the atmosphere of the borehole and the entire sampling train, including all connections. The shroud will be loosely sealed to the surface with a soft gasket (a photograph of the shroud is presented in **Attachment B**).

Sampling for the TO-15 analysis (Attachment B) will continue until the vacuum gauge indicates approximately 5 inches of mercury (Hg) remaining (approximately 5 minutes for a 1-liter canister equipped with a 167-milliliter-per-minute flow regulator). A flow controller will be used in the sample train to control the flow of soil gas into the SUMMA canisters for sample collection. Limiting the purging and sampling rate to between 100 and 200 milliliters per minute limits stripping and aids in preventing ambient air from diluting the soil gas samples. During sampling, a data-logging PID will be used to monitor the atmosphere inside the shroud through a bulk-head fitting. The logged data (at a minimum of 30-second intervals) will be corrected to parts-per-million-by-volume isopropyl alcohol concentrations and used to evaluate the integrity of the sampling train.

One confirmation sample of the shroud atmosphere (approximately 20% of the total number of samples collected) will be collected in a Tedlar bag (through the sampling port of the PID) during sample collection to confirm the correction factor of the PID to isopropyl alcohol; it will be analyzed for isopropyl alcohol by method TO-15. All field data, including equilibrium time, purge volume calculations, and leak check measurements, will be recorded and presented in the report.

Sampling for the TO-17 analysis (Attachment B) will be performed after collection of the SUMMA canister sample for TO-15 analysis. The Teflon tubing emanating from the closed vapor-tight valve of the sub-slab probe will be disconnected from the flow controller of the TO-15 setup and connected to a "setup" or sorbent calibration tube and then to a vertical rotometer and a low-flow sampling pump (a GILAIR-5 Active Air Pump™ or equivalent) using Tygon tubing **(Figure 3)**. The Swagelok valve will then be opened and the flow of the pump measured and adjusted as necessary (**Attachment B**). To achieve the shallow soil vapor Environmental Screening Level (ESL) for naphthalene of 72 micrograms per cubic meter ($\mu g/m^3$), a minimum sample-size volume of 70 milliliters (mL) is necessary. To achieve the soil vapor ESL for TPH-d (middle distillates) of 10,000 $\mu g/m^3$, a minimum sample-size volume of 100 mL is necessary. Therefore, a sample size of approximately 200 mL is proposed to be pumped through the sorbent sampling tube; the duration will be calculated on the basis of the rate of airflow through the sample train. The valve will then be closed, and the "setup" tube will be replaced with the sampling sorbent tube. The sampling pump will be started immediately after opening the vapor-tight valve and the start time recorded. After the desired duration has passed to achieve the 200 mL sample volume, the pump will be stopped and the valve

closed. The sorbent tube will then be capped and labeled and placed on ice for transport to the laboratory, accompanied by the completed chain-of-custody document.

A schematic of the sorbent tube setup is included as **Figure 4**. The SOPs for the GILAIR active air pump and the "Soil Vapor Sampling Procedures Where TPH-d is a Constituent of Concern" are included in **Attachment B**.

7 PIPE REMOVAL/SOURCE SOIL REMOVAL

In order to access the pipes, pavement will be sawcut around the two vent pipes; a jackhammer will be used to remove the concrete from the west edge of the dispenser hole, with a sawcut parallel with the pipes straight, 'west' to the tank pit. With the concrete removed, the overburden soil will be shoveled off the piping; the piping will be removed; any discolored soil above, adjacent, or below this piping will be removed. Additional saw cutting to access discolored soil will be done as needed. Work will be secured with trench plates at the finish of any workday. Field notes and photographs will document the work.

Soil from excavated soil and excavated side walls will be monitored with a PID to establish readings and guide additional digging or confirm whether or when digging should cease.

Following removal of soil with visual discoloration or PID readings, soil samples will be taken at excavation wall and trench bottom surfaces. They will be analyzed for TPH-g and TPH-d.

The concrete debris will be disposed of as non-hazardous waste.

Discolored soil or soil with a PID reading will be stored on site in a (covered) debris bin, sampled, and profiled preparatory to waste being disposed of at an appropriate landfill.

All sampled excavations, once approved by ACEH, will be back filled with clean fill and covered with an equivalent concrete pad as adjacent surfaces, and connected with rebar to ensure a future secure surface.

8 REPORT PREPARATION

The report will include soil boring samples analytical results, grab groundwater analytical results, boring logs, groundwater sampling depths, soil cutting disposal manifests, soil vapor installation documentation, soil vapor sample results, excavation/disposal and sampling documentation and lab data, as well as site photographs. The report will also include figures presenting soil boring and soil vapor data, groundwater data excavation data, and analysis and discussion of detected site impacts. Finally Clearwater's recommendations will indicate any additional risk assessment, remediation techniques,

sampling or investigation that will be required for the next phase of work, to move the site toward closure.

9 SCHEDULE

For a timeline for the tasks in this Revised Workplan to be accomplished, please see the table, below.

Task	Description	Estimated Start Date	Estimated End Date	Duration (days)
1	Workplan Addendum approval by Local Oversight Agency	1/25/11	2/8/11	15
2	ACPWA permit application, City of Oakland encroachment and excavation permit, Engage concrete cutter, bin, , USA notification. Meeting with GPR company and PG&E.	2/22/11	3/18/11	26
3	Install soil vapor points (2) Conduct soil vapor, soil and groundwater investigation after screening by ground penetrating radar – re-plot locations as necessary. Pipe removal.	3/21/11	4/1/11	11
4	Analytical Results Received and Report Preparation.	4/04/11	7/02/11	90

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GROUP
Environmental Services

10 REPORT LIMITATION

All work performed under this contract was directed by a licensed professional. The work was performed in accordance with generally accepted practices at the time the work was performed and completed in accordance with generally acceptable standards. It should be noted that during the course of normal business practices, Clearwater may purchase or use equipment, services, or products in which Clearwater has a professional or financial interest.

This report was prepared under the supervision of a State of California Professional Geologist, Engineer, or other licensed professional. Statements, conclusions, and recommendations made in this report are based on information provided to Clearwater, observations of existing site conditions, our general knowledge of the site, limited testing of selected soil and groundwater samples, and interpretations of a limited set of data. Clearwater cannot be held responsible for the accuracy of the analytical work performed by others.

Information and interpretation presented herein are for the use of the client. Third parties should rely upon the information and interpretation contained in this document at their own risk. No other warranties, certifications, or representations, either expressed or implied, are made about the information supplied in this report. The service performed by Clearwater has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the area of the site.

Sincerely,
Clearwater Group

Prepared by:

Erik Lervaag
Project Manager

Reviewed by:

James A. Jacobs, PG #4815, CHG #88
Chief Hydrogeologist

PROFESSIONAL GEOLOGIST
JAMES ALAN JACOBS
NO. 88
CERTIFIED HYDROGEOLOGIST
STATE OF CALIFORNIA

Olivia Jacobs

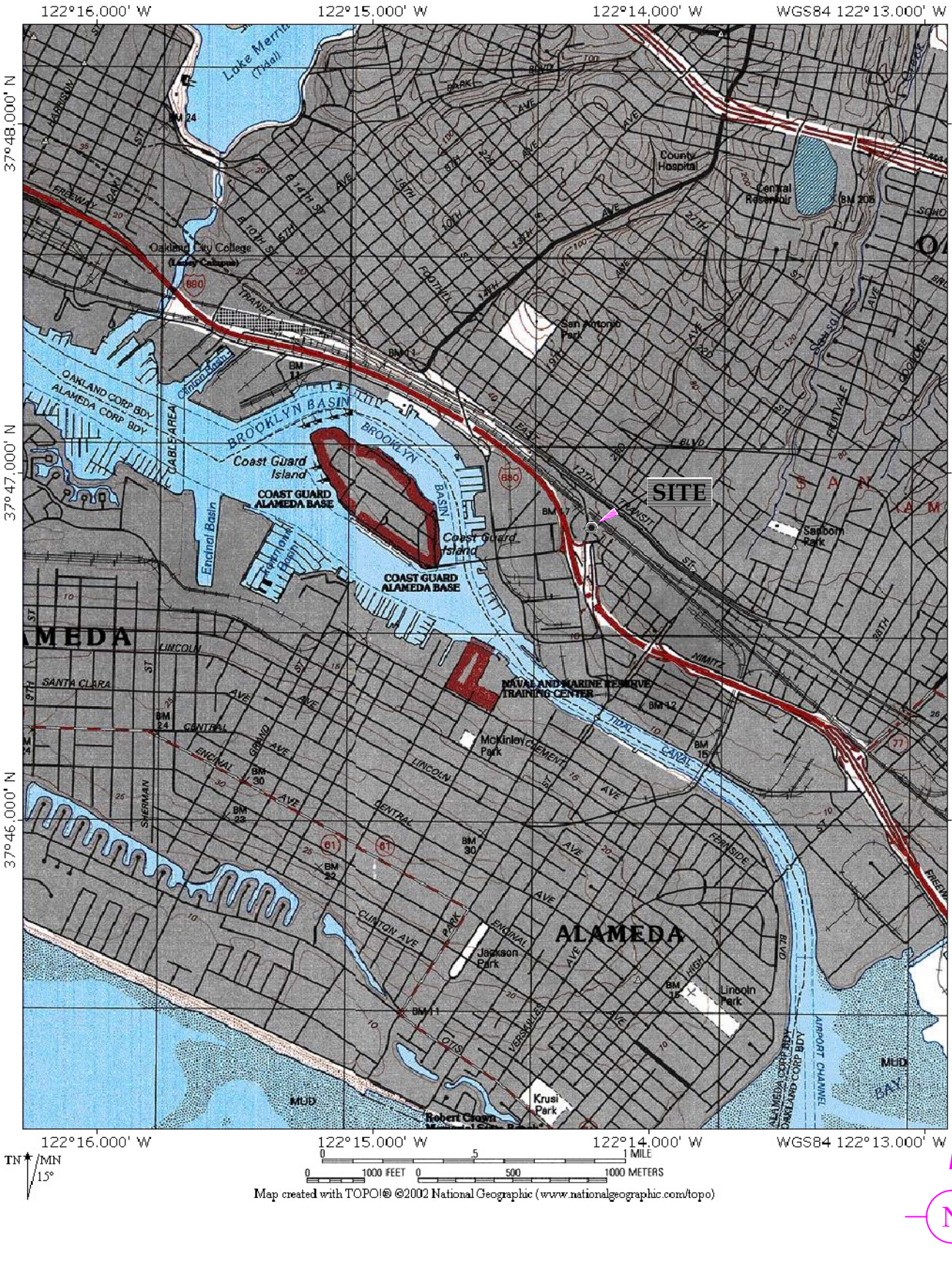
Olivia Jacobs, REA I #3219
Chief Executive Officer

11 DISTRIBUTION

Mr. John Protopappas
Madison Park Financial
Tribune Tower
409 Thirteenth St., 8th Floor
Oakland, CA 94612

Alameda County Environmental Health Services
(Sent via electronic upload to the Geotracker website)

FIGURES

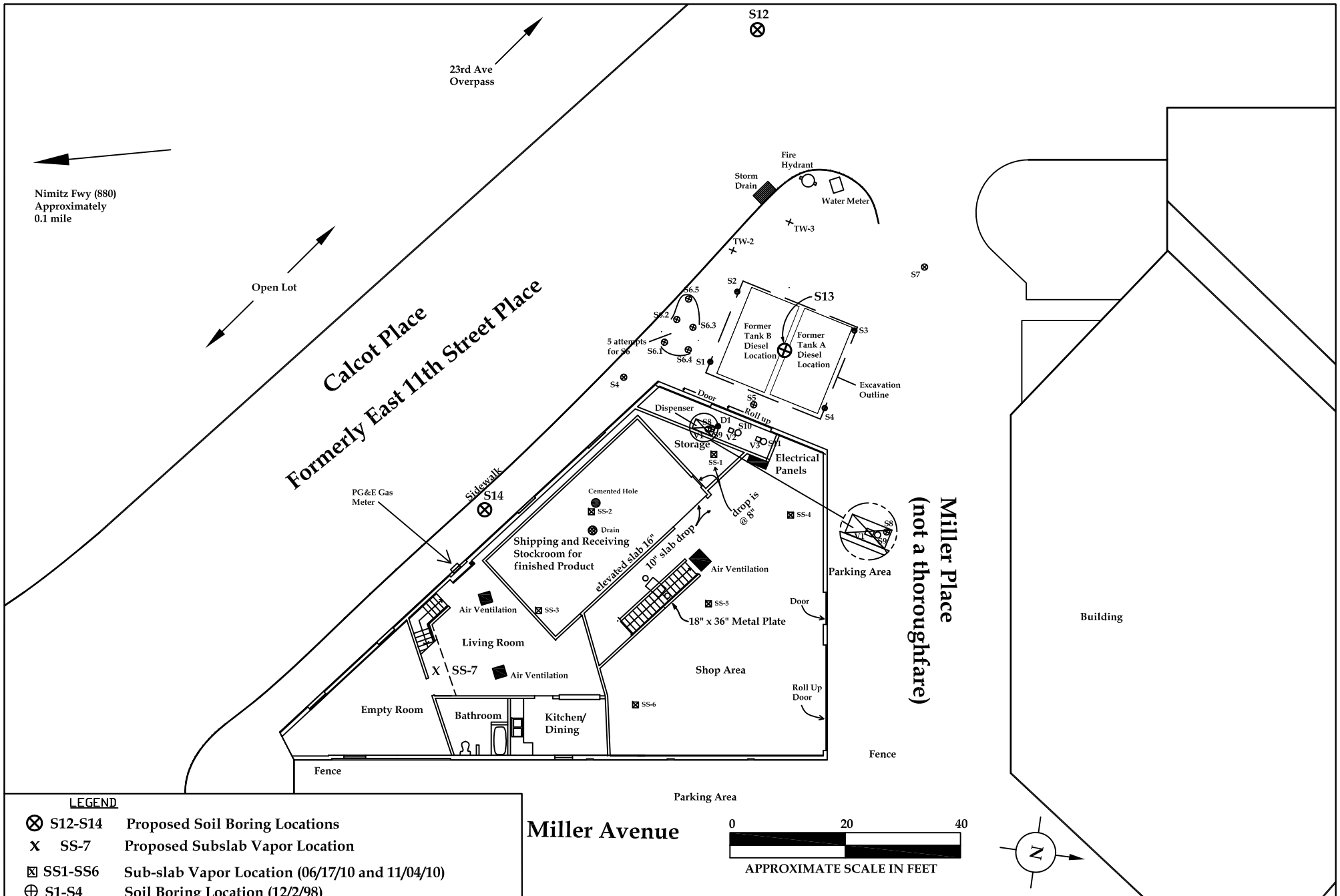


Site Vicinity Map

1125 Miller Avenue
Oakland, California

CLEARWATER GROUP

Project No.	Figure Date	Figure
CB018	9/05	1



LEGEND

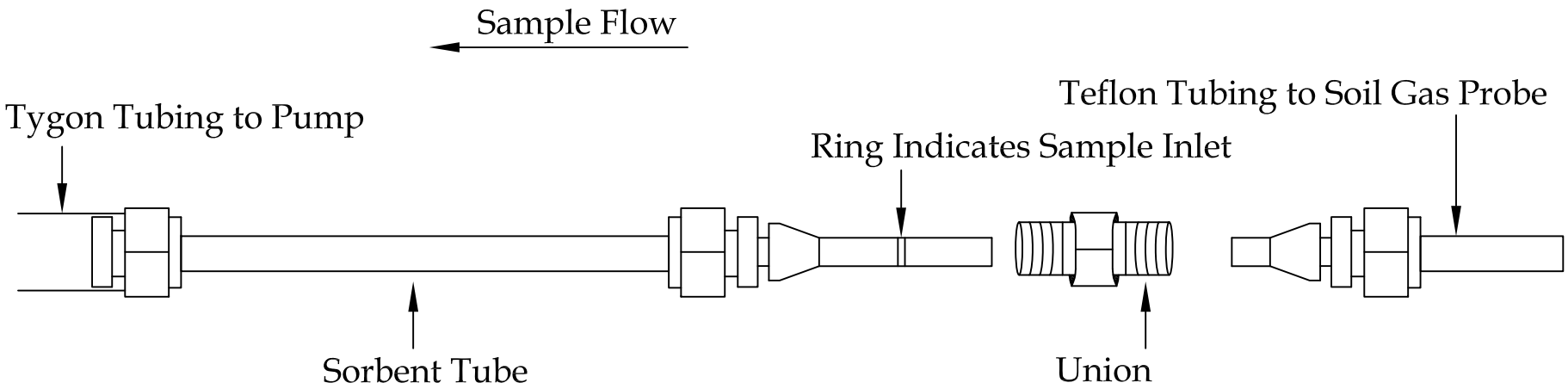
⊗ S12-S14	Proposed Soil Boring Locations
x SS-7	Proposed Subslab Vapor Location
⊠ SS1-SS6	Sub-slab Vapor Location (06/17/10 and 11/04/10)
⊕ S1-S4	Soil Boring Location (12/2/98)
⊕ S5-S8	Soil Boring Location (11/16/05)
● D1	Soil Boring Location (10/24/00)
+ TW-3	Temporary Well (10/24/00)
○ S9-S11	Soil Boring Location (11/15/06)
□ V1-V3	Soil Vapor Location (11/15/06)

Proposed Soil Boring Locations

1125 Miller Avenue
Oakland, California

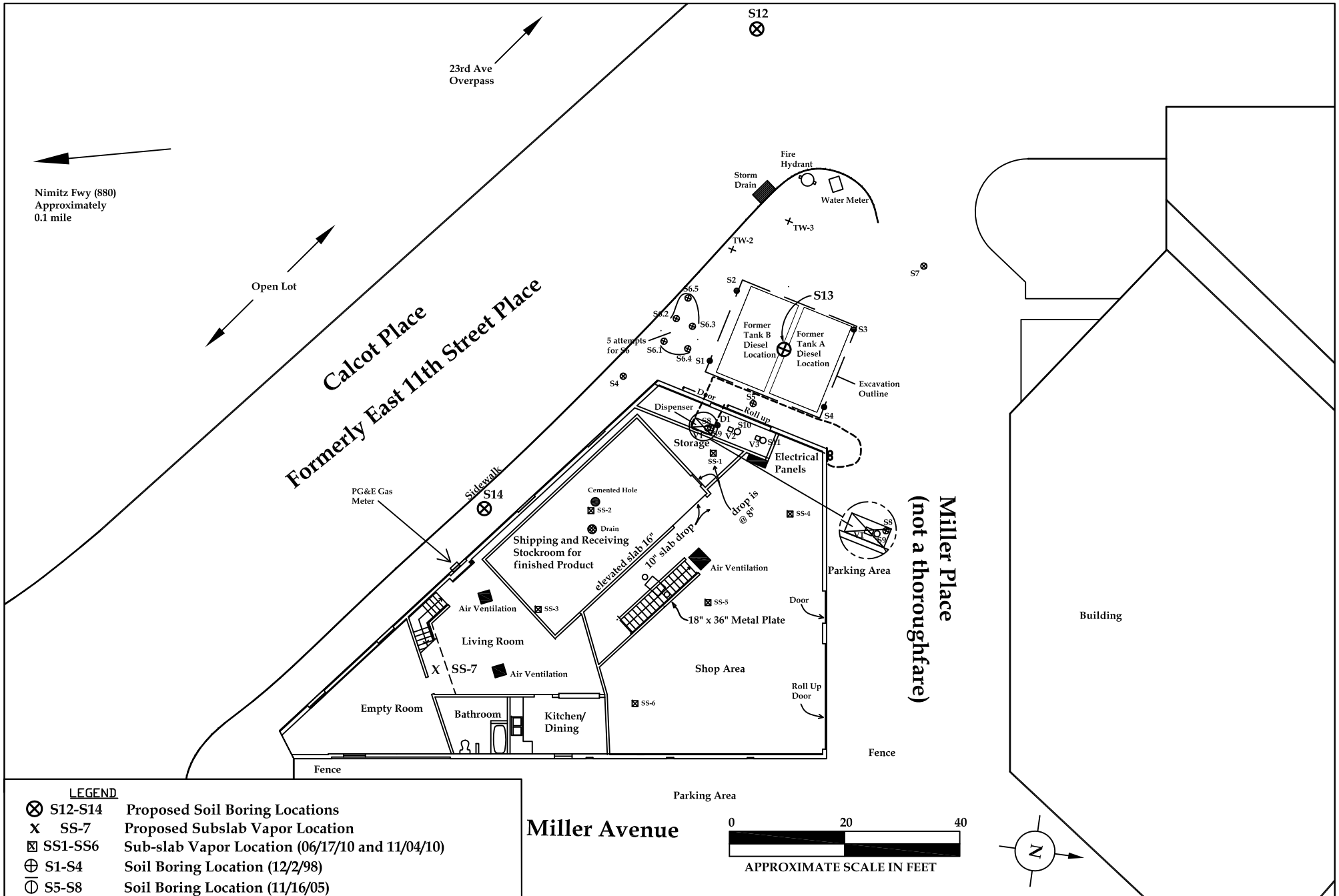
CLEARWATER GROUP

Project No.	Figure Date	Figure
CB018H	**1/11**	**2**



Not to Scale

	EPA Method TO-17 **Equipment Schematic** 1125 Miller Avenue Oakland, California	**CLEARWATER GROUP**		
		Project No. **CB018H**	Figure Date **1/11**	Figure **3**



LEGEND

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+ TW-3	Temporary Well (10/24/00)
○ S9-S11	Soil Boring Location (11/15/06)
□ V1-V3	Soil Vapor Location (11/15/06)
-------	Presumed Location of Trench Saw Cut For Pipe Excavation
∞	Vent Pipes

Proposed Pipe Removal

1125 Miller Avenue
Oakland, California

CLEARWATER GROUP

Project No.	Figure Date	Figure
CB018H	**1/11**	**4**

ATTACHMENTS

ATTACHMENT A

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Director

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

January 19, 2011

Mr. John Protopappas
P&D 23rd Avenue Associates LLC
P.O. Box 687
Oakland, CA 94604
(*Sent via E-mail to: John@MPFCorp.com*)

Subject: Work Plan for Fuel Leak Case No. RO0000294 and GeoTracker Global ID T0600177455, 23rd Avenue Partners, 1125 Miller Avenue, Oakland, CA 94601

Dear Mr. Protopappas:

Alameda County Environmental Health (ACEH) staff has reviewed the fuel leak case file for the above-referenced site including the most recently submitted document entitled, *"Historic Property Uses Report*," dated December 20, 2010, *"Results of Additional Sub-Slab Vapor Investigation Report*," dated December 10, 2010, and *"Site Characterization Workplan*," dated December 20, 2010 (Work Plan). The results from these reports and Work Plan were discussed during a meeting conducted on January 19, 2011 between Mr. John Protopappas of Madison Park Financial Corporation, James Jacobs of Clearwater Group, Erik Lervaag of Clearwater Group, Olivia Jacobs of Clearwater Group, and Jerry Wickham of ACEH.

Based on our review of the documents and the results of the meeting, we request that you prepare a Revised Work Plan that incorporates the revisions discussed during our January 19, 2011 meeting. These revisions are briefly summarized in the technical comments below.

TECHNICAL COMMENTS

1. **Soil Borings.** Three soil borings are to be advanced for collection of soil and groundwater samples at the locations discussed during our January 19, 2011 meeting; one near or within the former tank pit, one west of the tank pit, and one west of SS-3.

2. **Sub-slab Vapor Samples.** One additional sub-slab vapor probe is to be installed within the first-floor living space to assess whether a source in addition to the former diesel USTs may exist in this area. Vapor samples from the additional vapor probe and existing probes are to be analyzed for volatile organic compounds and total petroleum hydrocarbons as gasoline using EPA Method TO-15.

3. **Removal of Product Lines and Vent Lines.** In the Work Plan requested below, please include plans to remove the product lines from the former dispenser and vent lines. Please propose screening criteria for removing contaminated soil observed during the line removal and collecting confirmation soil samples.

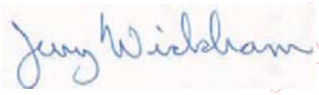
TECHNICAL REPORT REQUEST

Please submit technical reports to Alameda County Environmental Health (Attention: Jerry Wickham), according to the following schedule:

- **March 18, 2011** – Revised Work Plan

If you have any questions, please call me at (510) 567-6791 or send me an electronic mail message at jerry.wickham@acgov.org.

Sincerely,


Digitally signed by Jerry Wickham
DN: cn=Jerry Wickham, o=Alameda County Environmental Health, ou, email=jerry.wickham@acgov.org, c=US
Date: 2011.01.19 15:56:43 -08'00'

Jerry Wickham, California PG 3766, CEG 1177, and CHG 297
Senior Hazardous Materials Specialist

Attachment: Responsible Party(ies) Legal Requirements/Obligations

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Leroy Griffin, Oakland Fire Department, 250 Frank H. Ogawa Plaza, Ste. 3341, Oakland, CA 94612-2032 2032 (*Sent via E-mail to: lgriffin@oaklandnet.com*)

Erik Lervaag, Clearwater Group, 229 Tewksbury Avenue, Pt. Richmond, CA 94801 (*Sent via E-mail to: ELervaag@clearwatergroup.com*)

Olivia Jacobs, Clearwater Group, 229 Tewksbury Avenue, Pt. Richmond, CA 94801 (*Sent via E-mail to: OJacobs@clearwatergroup.com*)

James Jacobs, Clearwater Group, 229 Tewksbury Avenue, Pt. Richmond, CA 94801 (*Sent via E-mail to: augerpro@sbcglobal.net*)

Donna Drogos, ACEH (*Sent via E-mail to: donna.drogos@acgov.org*)
Jerry Wickham, ACEH (*Sent via E-mail to: jerry.wickham@acgov.org*)

GeoTracker, File

Attachment 1
Responsible Party(ies) Legal Requirements/Obligations

REPORT REQUESTS

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

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program FTP site are provided on the attached "Electronic Report Upload Instructions." Submission of reports to the Alameda County FTP site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) GeoTracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and other data to the GeoTracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is required in GeoTracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.swrcb.ca.gov/ust/electronic_submittal/report_rqmts.shtml.

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

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

Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC)	**REVISION DATE:** July 20, 2010
	ISSUE DATE: July 5, 2005
	PREVIOUS REVISIONS: October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010
SECTION: Miscellaneous Administrative Topics & Procedures	**SUBJECT:** Electronic Report Upload (ftp) Instructions

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

REQUIREMENTS

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

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

Submission Instructions

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

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

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

ATTACHMENT B

CLEARWATER GROUP
Direct-Push Drilling Investigation Procedures
Single Rod Macro-Core® Sampler

The direct-push method produces no drill cuttings and is capable of 150 to 200 feet of soil boring per day. Direct-push drilling can be used for soil sampling, grab groundwater sample collection, soil gas surveys, and installation of remediation system components, such as air sparge points.

A pickup truck-mounted rig is used to drive the direct-push soil sampler. This method allows subsurface investigation work to be performed in areas inaccessible to conventional drill rigs such as beneath canopies, or below power lines. Direct-push equipment is ideal at sites with unconsolidated soil or overburden, and for sampling depths less than 30 feet. This method is not appropriate for boring into bedrock.

Permitting and Site Preparation

Prior to direct-push drilling, Clearwater Group will obtain all necessary permits and locate the underground utilities through Underground Service Alert and a thorough site inspection. The drilling equipment will be inspected daily and will be maintained in safe operating condition. The down-hole drilling equipment will be cleaned prior to arriving on-site. Working components of the drill rig near the borehole, as well as casing and sampling equipment, will be thoroughly decontaminated between each boring location by either steam cleaning or washing with an Alconox® solution. The drilling and sampling methods will be consistent with county, state, and federal regulations.

Soil Boring and Sampling

Single rod Macro-Core® direct-push drilling uses a 4-foot long by 1.5-inch diameter steel sample barrel with an inner, removable acetate liner. The sample barrel is open at the bottom. Soil samples are collected in four-foot sample intervals by driving the barrel into the soil, retracting the barrel, and removing the inner acetate liner, which has been filled with soil. The sample collection process is repeated for each four-foot depth interval. Following sample collection the boring is grouted according to regulatory agency requirements.

The four-foot long, clear, acetate liners are visually inspected and 6-inch sections of the liner, selected for laboratory analysis, are sawn from the liner and capped on both ends with tight-fitting plastic caps. The samples are labeled, recorded on a chain-of-custody document, stored on ice in a cooler, and transported to a state-certified analytical laboratory.

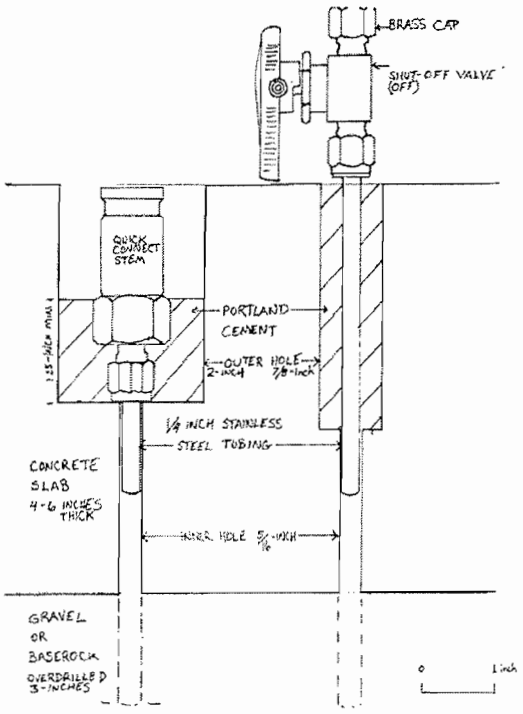
The remainder of the liner is split open and the soil examined in order to prepare lithologic descriptions according to the Unified Soil Classification System. A photo-ionization detector is used to scan the soil for organic vapors.

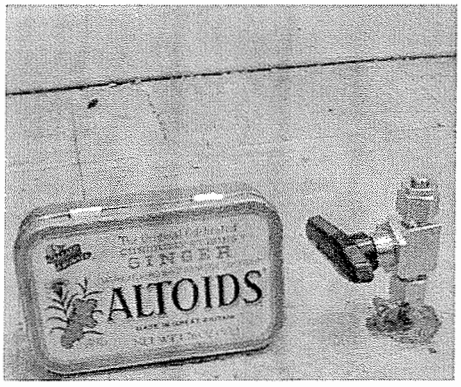
Head Space Method
To obtain a head space reading a portion of soil is placed in a plastic zip-lock bag. The bag is sealed and warmed for approximately 10 minutes to allow soil vapors to be released from the soil and diffused into the head space of the bag. The bag is then pierced with the probe of a calibrated photoionization detector and the detector reading is recorded on the soil boring log.

Grab Groundwater Sample Collection
Groundwater samples are collected by removing the sampler from the soil boring and lowering a disposable bailer into the boring. If enough water for sampling is not produced, or the boring is prone to caving, a 1-inch diameter PVC screen and casing can be installed in the boring to leave a temporary well for collecting groundwater samples, or depth to groundwater information. The groundwater samples are collected using small-diameter bailers.

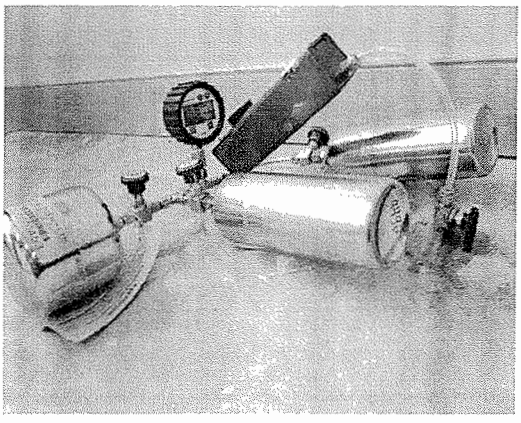
The samples are decanted into laboratory-supplied containers, labeled, recorded on a chain-of-custody document, stored on ice in a cooler, and transported to a certified analytical laboratory for analysis.

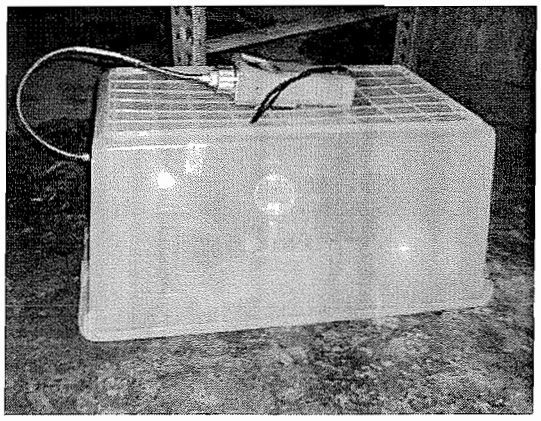
Typical Sub-Slab Soil Vapor Diagrams and Photographs





Sub-slab Vapor Probe Diagram (Flush mount and Raised Mount diagrams)





Typical sub-slab sampling manifold and encasement within Shroud with IPA atmosphere.

TO-17 Sorbent Tubes SOP

Sorbent & Tubes:

- BTEX: Carbopack™ B, Combination Tubes 1, 2, 3, or Chromosorb 106
- TPHd: same tube as BTEX

Tubes are ¼ inch (6 mm) O.D. of glass or stainless steel and can vary in length.

Air toxics - TO-17 Multi-bed Carbotrap 300 Tubes. These are generally stainless steel tubes packed with Carbopack C (a weak sorbent), Carbopack B (a medium sorbent) and Carbosieve SIII (a strong sorbent). This multibed tube can be used for a broad range of target compounds: Vinyl chloride to pyrene has been validated using these tubes.

Conditioning the Tube

- New tubes will need to be conditioned for approximately 30 minutes at 250 °C and 100 mL/min.
- Once conditioned, seal with brass, ¼" Swagelok®-type fittings and PTFE ferrules.
- Wrap the sealed tubes in uncoated Al foil and place the tubes in a clean, airtight, opaque container.
- Store in a refrigerator at 4 °C if not used within a day.
- On second and subsequent uses, the tubes will generally not require further conditioning as above. However, tubes with an immediate prior use indicating high levels of pollutant trace gases should be reconditioned prior to continued usage.

Sample Apparatus

- Sampling apparatus should accommodate at least two sampling tubes with independent control of sampling rate at a settable value in the range of 10 to 200 mL/min.
- Sampling rates:
    - 1 L for 1 hr is 16.7 mL/min
    - 4 L for 1 hr is 66.7 mL/min

Sample Collection

- At monitoring location, keep the tubes in storage container to equilibrate with ambient temperature
- Using clean gloves, remove sample tubes from container, remove caps, and attach to sampling lines of non-out gassing flexible tubing

- Set flow rate using mass flow monitor
- Set up sampling train (from front-to-back: in-line particulate filter (optional), an ozone scrubber (optional), a sampling tube, back-up tube (if any), and a flow controller/pump combination.
- Place the mass flow monitor in line after the tube. Turn the pump on and wait for one minute. Establish the approximate sampling flow rate using a dummy tube of identical construction and packing as the sampling tube to be used.
- Place the sampling tubes to be used on the sampling train and make final adjustments to the flow controller as quickly as possible to avoid significant errors in sample volume
- Adjust flow rate of one tube to sample at 16.7 mL/min and the second for 66.7 mL/min.
- Sample for 1 hour.
- Immediately remove the sampling tubes with clean gloves, recap tubes, rewrap tubes with uncoated Al foil, and place the tubes in a clean, opaque, airtight container and cool to <4 °C.

SUMMA Canister SOP (TO-14/-15)

Summa canisters range in volume from less than 1L to greater than 15L. 6L canisters are generally used for ambient air samples and for collecting samples over time. 1L canisters are normally used for taking high level (ca. > 100 ppbv) grab samples although exceptions to these guidelines are common.

Air Toxics Ltd., in support of its analytical services, maintains a large inventory of 250mL, 1L and 6L canisters, over 3000. All canisters are cleaned using proprietary techniques and certified using GC/MS TO-15 protocols.

Air Toxics has over 1000 flow controllers in inventory. They are used when collecting a sample over a period of time - up to 24 hours. For sampling intervals up to 8 hours we use an in-house design, which has proven to be very reliable and free of contamination.

Definition

- Pressurized Sampling – collection of an air sample in a canister with a (final) canister pressure above atmospheric pressure, using a sample pump
- Subatomic Sampling – collection of an air sample in an evacuated canister at a (final) canister pressure below atmospheric pressure, without the assistance of a sampling pump. The canister is filled as the internal canister pressure increases to ambient or near ambient pressure. An auxiliary vacuum pump may be used as part of the sampling system to flush the inlet tubing prior to or during sample collection.

Sampling System

- Subatmospheric pressure and pressurized canister sampling systems are commercially available.
    - Subatmospheric pressure sampling may be used to collect grab samples (duration of 10 to 30 seconds) or time-integrated samples (duration of 12-24 hours) taken through a flow-restrictive inlet (e.g., mass flow controller, critical orifice). In preparation for subatmospheric sample collection in a canister, the canister is evacuated to 0.05 mm Hg. When opened to the atomospheric containing the VOCs to be sampled, the differential pressure causes the sample to flow into the canister.
    - Pressurized sampling is used when longer-term integrated samples or higher volume samples are required. The sample is collected in a canister using a pump and flow control arrangement to achieve a typical 103-206 kPa (15-30 psig) final canister pressure. For example, a 6-liter evacuated canister can be filled at 10 mL/min for 24 hours to achieve a final pressure of about 144 kPa (21 psig).
- For automatic operation, the timer is wired to start and stop the pump at appropriate times for the desired sample period. The timer must also control the solenoid valve, to open the valve when starting the pump and close the valve when stopping the pump.
- The connecting lines between the sample inlet and the canister should be as short as possible to minimize their volume. The flow rate into the canister should remain relatively constant over the entire sampling period. If a critical orifice is used, some drop in the flow rate may occur near the end of the sample period as the canister pressure approaches the final calculated pressure.
- Prior to field use, each sampling system must pass a humid zero air ceritification and all plumbing should be checked carefully for leaks.

Sampling Procedure

- A sample collection system is assembled.
- The canister valve and vacuum/pressure gauge valve are opened and the pressure/vacuum is recorded.
- The vacuum/pressure gauge valve is closed and the maximum-minimum thermometer is reset to current temperature. Time of day and elapsed time meter readings are recorded on the canister sampling field data sheet.
- The electronic timer is set to begin and stop the sampling period at the appropriate times. Sampling commences and stops by the programmed timer.
- After the desired sampling period, the maximum, minimum, current interior temperature and current ambient temperature are recorded. The current reading from the flow controller is recorded.
- At the end of the sampling period, the vacuum/pressure gauge valve on the sampler is briefly opened and closed and the pressure/vacuum is recoded. Pressure should be close to desired pressure.
- The canister valve is closed. The sampling line is disconnected from the canister and the canister is removed from the system. The sampler is turned off.

Specs for SOP

Clean Air Engineering

800-553-5511; Chad; IL

2 (at least) Pumps – GILAIR-5 (spec sheet attached)
Cost - ≤3 days = $40
>3 days = $7/day
Shipping Cost - $60-$80 for next day delivery
Rental term begins on date of outbound shipment and continues until equipment is returned.
When ordering, verify ¼ inch I.D. connectors are included.*******

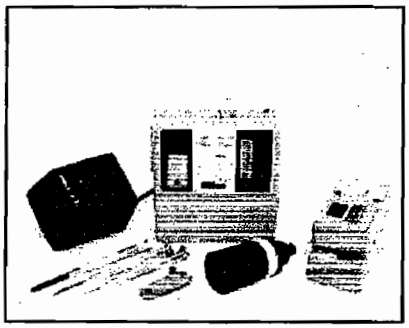
Air Toxics

916-985-1000; Taryn (x1035); CA

TO-17 Method: sorbent tubes
Two sorbent tubes (1L and 4L) needed per sampling point.
Tubes – TO-17 Multi-bed Carbotrap 300 Tubes
Cost - $225/sample
Shipping - $30/tube
Flow rate – 1L for 15 min is 66.7 mL/min
4L for 30 min is 133.3 mL/min
Tube O.D. ¼ inch (6 mm)
Hold time – 30 days
Standard TAT – 10 working days

TO-15 Method: SUMMA canister
One canister needed per sampling point
Suggested – 6L
Sample Time = 30 minutes
Flow rate = 200 mL/min
Teflon tubing used – ¼ inch diameter
No additional pump is needed for this system
Cost - $190/sample
Shipping - $50/canister
Hold time – 30 days (14 days recommended)
Standard TAT – 10 working days

GILAIR-5 Active Air Pump



The GILAIR-5 Sampler Includes (5 pack):

- (5) Pumps
- (5) Discharge bosses
- (1) Tool accessory kit
- (1) Gilian BMS charger (5 stations)
- (5) U-tubes, barbs, & clips w/ 3/8" tygon hose
- (1) Carrying case
- Manual

Specifications:

1. Approximate Shipping Weight: 25 lbs for a 5 pack. Each pump is 22.5 oz.
2. Shipping Dimensions: 19 ¼" x 10 5/8" x 17 5/8" for a 5 pack. Each pump is 4 1/16" x 3 5/16" x 2".
3. Battery pack system: rechargeable NiCad 6.0V, 1.4 AH, min. 8 hours operation, 14-18 hours charging time
4. Triple sampling modes: pressure/suction and constant high flow
5. Flow Rate: 750-5000 cc/min. With a constant low flow module: 5-500 cc/min. With a multi low flow module: 1-750 cc/min.
6. Pressure Range Table:

Flow (LPM)	Fault "H2O	8 hr Run "H2O
0.75	35	20
1	37	29
2	38	26
3	32	23
4	20	18
5	10	10

7. Flow control: ± 5% of set point
8. Controls: Power switch, flow control, and MODE/HOLD button
9. Indicators: Display (LCD), Battery (Green) LED, Fault (Red) LED
10. Display Ranges: 0-9999 (Timing), 0-9 (Error percentage)
11. Display Messages: LAST, CAL, SHUT/OFF, E, PC, P1-P6
12. Intrinsically Safe: UL- Class I, Div I, Groups A, B, C, D; T3C
    CE- EMC EMI/RFI, EN 55 022 Class B; IEC801-2, 3
    CENELEC- EEx ia IIC T4

Rental/Application Notes:

1. These pumps come equipped with a flow fault indicator light. After approximately 30 seconds of flow outside the +/- 5% set point the pump will be shut off.

Clean Air Engineering
500 W. Wood Street
Palatine, IL 60067
(800) 553-5511
(847) 934-8668
Fax: (847) 934-8260
www.cleanair.com

CleanAir
INSTRUMENT RENTAL

GILAIR-5 Active Air Pump

2. A bubble or piston style calibrator is recommended for calibrating these pumps. (See Bios DryCal or Gilian Gilibrator). Proper calibration entails drawing a sample through the entire sample train. This includes the pump, sample media, and tubing. Therefore, calibration should be done in the field and not at our facilities.
3. Currently, we rent the model GilAir-5 RC unit. It has a clock but is not programmable.
4. Filter media is available upon request (tared or non-tared). Other accessories such as tube holders and PM10 cyclones (part# 800051) are also available upon request.
5. When renting, equipment must be returned in its original packaging.

Clean Air Engineering
500 W. Wood Street
Palatine, IL 60067
(800) 553-5511
(847) 934-8668
Fax: (847) 934-8260
www.cleanair.com

CleanAir
INSTRUMENT RENTAL

CLEARWATER GROUP

Soil Vapor Sampling Procedures Where Total Petroleum Hydrocarbons as Diesel is a Constituent of Concern

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To confirm the presence of shallow soil contamination where total petroleum hydrocarbons as diesel (TPH-d) are suspected, a soil vapor sampling event may be conducted using Direct Push Technology with a Macro-Core® Soil Sampler or similar drilling equipment. The soil vapor sample would be collected and analyzed using EPA Method TO-17 for concentrations of TPH-d. Air Toxics, LTD. of Folsom, California has developed a protocol for the analysis of TPH-d using EPA Method TO-17 which provides a laboratory reporting limit of 100 nanograms. Air Toxics is continuing their efforts to develop laboratory methods that would increase the variation of constituents that can be analyzed using this method. Currently there are a number of soil vapor sampling methods that may be employed for the analysis of benzene, toluene, ethyl benzene, xylenes (BTEX), total petroleum hydrocarbons as gasoline (TPH-g), or methyl tertiary butyl ether (MTBE), however these methods provide poor recovery levels for the analysis of TPH-d. It is recommended that the project laboratory such as Air Toxics be contacted prior to the soil vapor sampling event to ensure that the TO-17 sample method is sufficient for the entire list of analytes required for the project site.

<u>TO-17 Multi-Bed Carbotrap 300 Tubes Discussion</u>

TO-17 Multi-bed Carbotrap 300 tubes are generally constructed of stainless steel and are packed with more than one absorbent in order of increasing absorbent strength. The Multi-bed Carbotrap 300 tubes are packed with hydrophobic absorbents such as: Carbopack C (a weak absorbent), Carbopack B (a medium absorbent) and Carbosieve SIII (a strong absorbent). According to the *Compendium Method TO-17, Determination of Volatiles Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes* higher weight molecular compounds are retained in the front, least retentive, absorbent; while the more volatile compounds are retained further into the packing on the stronger absorbent. The

higher molecular weight compounds never encounter the stronger absorbents thereby improving the efficiency of analysis.

The TO-17 Multi-bed Carbotrap 300 tubes come pre-conditioned and ready for vapor sample collection. According to Air-Toxics, because the composition of the vapor sample is often unknown, it is best to collect a series of samples using 2 or 3 different sample volumes, often referred to as distributive volume sampling. The EPA requires the use of distributed volume pairs for monitoring to ensure high quality data. The TO-17 method recommends that the distributive volume sampling be completed using 1-liter and 4-liter total sample volumes.

TO-17 Multi-Bed Carbotrap 300 Tubes Field Application

Soil vapor samples may be collected at various depths using the direct soil gas sampling system provided by Geoprobe Systems®. The direct soil gas sampling system allows the driller (a C-57 licensed drilling contractor) to drive probe rods to the desired depth, connect the gas sampling cap to the top of the drive rode, pull up on the drive rod to expose the soil vapor screen located below ground. A sample pump capable of flow rates ranging from 10 to 200 milliliters per minute (mL/min) such as the Gilair-5 Active Air Pump™ is then connected to the nipple on the gas sampling cap. The Gilair-5 Active Air Pump™ can be rented from Clean Air Engineering, Palatine, Illinois.

The Geoprobe® gas sampling caps are designed to receive 0.25-inch inner diameter tubing which will then be connected to the Gilair-5 Active Air Pump™ (or equivalent equipment) using a 0.25-inch inner diameter connector. Clean Air Engineering recommends using tygon tubing. Tubing is then connected from the air pump to the TO-17 Multi-bed Carbotrap 300 tube which has an outer diameter of 0.25-inch and comes pre-conditioned for field sampling. Prior to connecting the TO-17 Multi-bed Carbotrap 300 tube to the sample pump, the line will be purged with source soil vapor allowing ample time to set the sample flow rate on the sample pump using an air flow calibrator. To satisfy the distributive volume sampling requirement, at least 2 vapor samples such as a 1-liter and a 4-liter are collected at each

sampling point. To collect a 1-liter volume sample the sample pump flow rate will be set at 66.7 mL/min for approximately 15 minutes. The 4-liter volume sample requires that a flow rate of 133.3 mL/min for approximately 30 minutes. With sampling equipment set up and sample time taken into consideration, it is expected that each TO-17 Multi-bed Carbotrap 300 tube sample location will take at least 1-hour to complete.

Each sample volume will be labeled according to the soil vapor boring location, corresponding sample depth and sample volume collected. For example, a 1 liter sample volume collected at 2 feet bgs in soil vapor boring location V-1 would be labeled as V-1-2-1. The samples are then be recorded on a chain of custody form supplied by Air-Toxics, placed in their respective shipping sleeves and placed on ice for transport to the project laboratory. The samples have a hold time of up to 30 days however transport to the project laboratory will occur no later than 72 hours from the date of collection. At the project laboratory the samples will be analyzed under the standard 10 day turn around time using EPA Method TO-17 for concentrations of TPH-d and BTEX.

Confirmation Soil Vapor Sampling Using SUMA Canisters

Confirmation soil vapor sampling may be required by some oversight agencies. To satisfy this requirement, soil vapor samples are collected using SUMMA canisters at the soil vapor sample depths corresponding with TO-17 soil vapor sampling locations. The confirmation samples will be collected after the vapor samples have been collected using the TO-17 Multi-bed Carbotrap 300 tubes.

To accomplish the confirmation sampling using SUMMA canisters, it is recommended that a 6-liter sub-atmospheric pressure canister be used. The 6-liter canister will be assembled in series using Teflon tubing attached to the Geoprobe® gas sampling cap which is connected to an air flow controller capable of regulating air flow to 200 mL/min. The SUMMA canister is then connected to the air flow regulator. Since the sub-atmospheric pressure canister is an evacuated canister (final canister pressure is below atmospheric pressure), the soil vapor

sample can be collected without the use of a sample pump. The recommended sample duration is approximately 30 minutes. After 30 minutes the sample valve will be closed, the canister will be labeled and documented on a chain-of-custody form and transported to the project laboratory for analysis of BTEX and TPH-d using EPA Method TO-15. The sample hold-time is up to 30 days however Air-Toxics recommends that the samples be analyzed within 14 days of collection.

Standard Operating Procedure for Drilling, Soil Sampling, and Analysis

Prior to conducting field activities, a soil boring permit for drilling will be obtained from the appropriate permitting agency. The site specific Health and Safety Plan will be updated as needed. All field personnel on-site will review and sign the site specific Health and Safety plan, prepared in accordance with OSHA 1910.120, at the start of the field day.

CLEARWATER GROUP

Soil Sampling Procedures

Soil samples are typically collected in six-inch long, two-inch diameter brass or acetate tubes. If copper or zinc contamination is the subject of the investigation, acetate or stainless steel liners are used instead of brass. Soil sample locations are typically selected by field screening a portion of the soil for organic vapors using a calibrated organic vapor meter.

Once the sampling location has been determined, a small thickness of superficial soil is removed prior to collection, to prevent cross contamination. If the location being sampled has been exposed to the air for more than a few minutes, hand-tools will be used to dig at least 12 inches into the soil in order to collect as fresh a sample as possible. The sample is collected by pushing the tube into the soil by hand, or a rubber mallet may be used if the tube can not be driven by hand. If it is not possible to drive the tube into the soil, loose soil may be scraped from the freshly exposed surface and placed in the tube by hand.

Soil samples may also be collected using a hand auger and a slide hammer-driven sampler. The hand auger is advanced the desired depth into the soil, then withdrawn and replaced with the slide hammer sampler. The slide hammer sampler contains a 6-inch long by 2-inch diameter brass sample liner (or two 3-inch long liners) inserted inside the threaded core barrel, which is attached to the slide hammer by an extension rod. The core barrel is driven into the soil by the slide hammer, then withdrawn, unscrewed, and the sample liner removed.

Soil samples selected for laboratory analysis are immediately sealed on both ends with Teflon® lined plastic end caps, labeled, documented on a chain-of-custody form, and placed in a chilled cooler for transport to a state-certified laboratory.

To prevent cross-contamination of the samples, Clearwater personnel adhere to the following procedures in the field:

- A new, clean pair of latex or nitrile gloves are donned prior to collecting each sample.
- All hand-digging and sampling equipment is thoroughly decontaminated between each sample, by scrubbing equipment in a wash of Alconox® solution, followed by a double rinse in potable water. If required the second rinse will consist of distilled water.