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RECEIVED
By Alameda County Environmental Health 2:36 pm, Oct 13, 2016

October 13, 2016

Ms. Kit Soo
Alameda County Health Care Services
Environmental Health Services
1131 Harbor Bay Parkway
Alameda, CA 94502-6577

Subject: **RO0000289**
REVISED WORK PLAN TO COMPLETE A SOIL VAPOR INVESTIGATION
OWENS-BROCKWAY GLASS CONTAINER FACILITY.
3600 ALAMEDA AVENUE, OAKLAND, CALIFORNIA.

Dear Ms. Soo:

Owens-Brockway Glass Container Corporation is pleased to submit the attached Revised Work Plan to Complete a Soil Vapor Investigation for the above site. Revisions were made per comments received from you in an email dated October 7, 2016.

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

If you need further information, feel free to call me at (567) 336-8682.

Sincerely,

Mark Tussing.
Manager, Environmental Affairs

CKG Environmental, Inc.

P.O. Box 246 St. Helena, CA 94574
Phone (707) 967-8080 Fax: (707) 967-8080
ckennedy@geologist.com

October 13, 2016

Ms. Kit Soo
County of Alameda Health Care Services Agency
Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: RO0289
REVISED WORK PLAN TO COMPLETE A SOIL VAPOR INVESTIGATION, OWENS-BROCKWAY GLASS CONTAINER FACILITY, OAKLAND, CALIFORNIA.

Dear Ms. Soo:

CKG Environmental, Inc. (CKG) is pleased to provide this revised work plan to complete a soil vapor investigation at the closed Owens-Brockway Glass Container, Inc. facility at 3600 Alameda Avenue in Oakland California. The soil vapor investigation was discussed in a meeting with the Alameda County Department of Environmental Health (ACDEH) on Thursday August 18. In that meeting ACDEH and Owens-Brockway discussed the merits of using soil gas data to inform potential soil remediation for petroleum hydrocarbons at the site. In addition, ACDEH suggested that Owens-Brockway assess the potential for chlorinated solvent releases from sumps, drains, or sewer lines, and to assess the potential that petroleum hydrocarbons or solvents might be migrating onsite from upgradient sources.

BACKGROUND AND OBJECTIVE

Owens-Brockway has been working with ACDEH since approximately 1986 when petroleum hydrocarbons were discovered in soil and groundwater at the site after removing underground fuel storage tanks. At the time the site was placed into the ACDEH Local Oversight Program (LOP). Subsequent investigations showed that petroleum hydrocarbons were widespread in the southwest corner of the property and remediation efforts were not successful at removing separate phase petroleum hydrocarbons in the subsurface. In May 2015 CKG obtained historic Sanborn Fire Insurance maps to support a future property transaction. The 1912 Sanborn map showed that an asphalt refinery had been operated in the southwest corner of what is now the property. Additional research shows that the refinery operated from approximately 1902 until 1916.

In December 2015 CKG conducted a subsurface investigation to assess the extent of petroleum hydrocarbon impacts associated with the former asphalt refinery. This work was provided to ACDEH in CKG's *Subsurface Investigation Report Former Fuel Storage and Historical Asphalt Refinery Operational Areas*, dated February 29, 2016. The general conclusion of the report was that although some petroleum hydrocarbons may have been released from the former underground storage tanks, those releases are likely minor compared to the overall mass of petroleum hydrocarbons released by the former asphalt refinery operation. As such the bulk of the releases of petroleum hydrocarbons are not associated with underground fuel storage tanks.

At the August 18, 2016 meeting with ACDEH Owens-Brockway was informed that the site had been moved out of the LOP, into the Spills, Leaks Investigation and Cleanup (SLIC) program. This occurred approximately one week before the meeting. This change is significant because it allows Owens-Brockway to use health risk based information to establish a remediation plan. ACDEH suggested that soil vapor data could be used for this purpose. The following work plan presents a scope of work to complete the soil vapor investigation.

SCOPE OF WORK

CKG has reviewed site plans showing sewer structures including piping runs, drains, and sumps. In addition, CKG has completed a site walk to confirm the location of sewer structures and locate other structures that may not have appeared on plans. The subsurface structures located during these activities are shown on Plate 2.

Task 1 Soil Vapor Sampling

CKG will subcontract with Ninyo & Moore to complete the soil vapor investigation. The soil vapor investigation will include the following activities

Task 1.1 Prefield Activities

- CKG will prepare a site-specific health and safety plan specifying concerns associated with soil vapor investigation, and identifying the location and route to the nearest emergency medical facility.

- CKG will mark the proposed temporary soil vapor probe locations, and provide Underground Service Alert (USA) notification as required by California law.

- CKG will subcontract a private utility locator to clear the proposed temporary soil vapor probe locations.

- CKG will submit and obtain a drilling permit from Alameda County Public Works Agency (ACPWA).

Task 1.2. Install Temporary Soil Vapor Probes

- CKG will oversee a California C-57 licensed driller to install temporary soil vapor probes at 45 locations as shown on Plate 2. For ease of reference Plate 2 distinguishes between those probes that are located outside of buildings and those that are located inside of buildings. The driller will install the temporary soil vapor probes in borings advanced by a combination of hand auger from 0 to 5 feet below grade and a direct push drill rig from 5 to 10 feet below grade. The following summarizes vapor probe installation rationale:

1) Two pairs of vapor probes will be installed at the northern (upgradient) property boundary to assess the potential that offsite sources of petroleum hydrocarbons or solvent vapors exist. One location is at the northeast corner where a former drycleaner was identified across the street in CKGs *Phase I Environmental Site Assessment, Owens-Brockway Glass Container Facility,* dated May 15, 2016. The other location is at the far northwest corner where the Phase I report identified a former plating operation across Fruitvale Avenue. At each location one probe will be installed to a depth of 5 feet below grade and the other installed to ten feet below grade.

2) Seven soil vapor probes will be installed to a depth of five feet below grade at locations thought to have the highest potential to provide conduits to the subsurface for solvents if they were ever used at the site. These locations include two Yeoman Tanks (sewer sumps that serve as collection points and are pumped up to sewer drains as needed), drains, sewer piping (corners) or other structures that might have been used to dispose of solvents at any time during the history of site operations (Plate 2). One probe is located at each of the two Yeoman Tanks. A corrugated cardboard box assembly area was formerly located on the second floor of the plant and had a printing area and an "Ink Well" associated with it. CKG and Owens-Brockway traced the drain lines from the Ink Well to the extent possible to the locations where they entered the main sewer at ground level and located two soil vapor probes there. Another soil vapor probe was located on the main sewer trunk line where a number of lines converge. One soil vapor probe was located at the southwest corner of the eastern warehouse where the sewer line drained from a former equipment maintenance area that was removed when the warehouse was constructed in the early 1980s. It should be noted that in the main plant area floor drains were directed to discharge directly to the basement where liquids were channeled to the two oil/water separator structures, then pumped up to the main oil water separator on the south side of the plant. The basement floor is within one foot or less of the groundwater table so it is not feasible to install soil vapor probes in the basement. For this reason, the seventh soil vapor probe was located adjacent to the main oil/water separator.

3) 36 pairs of probes will be installed in the petroleum hydrocarbon impacted area. At each location one probe will be installed to a depth of five feet below grade and the other installed to ten feet below grade. Eight of the probe pairs will be installed at locations where total petroleum hydrocarbons in the gasoline range were detected above 100 mg/kg in the upper ten feet of soil. The rest of the vapor probe pairs will be distributed on approximately 50 foot centers throughout the petroleum hydrocarbon impacted area as shown on Plate 2.

- Each vapor probe will include a 1-inch stainless steel vapor screen placed at five or ten feet below ground surface (bgs) as outlined above, and connected to ¼-inch Teflon tubing. The vapor probes will be constructed following standard methods in accordance with the California Department of Toxic Substances Control Advisory *Active Soil Gas Investigations* dated April 2012 and completed with temporary

surface finishes. Typical nested soil vapor probe construction is illustrated on Plate 3 and typical single soil vapor probe construction is illustrated on Plate 4. Soil vapor probes will be allowed to equilibrate a minimum of 48 hours after they are installed prior to being sampled. CKG will additionally prepare California Department of Water Resources (DWR) forms required for the installation of these soil vapor probes.

Task 1.3. Sample and Analyze Temporary Soil Vapor Probes

- CKG will collect one round of soil vapor samples from each of the probe locations (for a total of 83samples) per the DTSC Advisory. As stated in Task 1.2, a minimum of 48 hours will be allowed to elapse between soil vapor probe installation and soil vapor sample collection. Sampling of soil vapor probes will not be conducted during, or within five days after a significant rain event (0.5 inch or greater). The sampling equipment and methods are discussed in detail below.
    - ***Sampling Equipment:*** Stainless steel sampling manifolds will be connected to the vapor probe tubing using Teflon tubing and Swagelok® fittings. The stainless steel manifold will consist of stainless steel tubing, a moisture filter, a flow controller, pressure gauges, valves, and Swagelok® fittings, and will be connected to two Summa® vacuum canisters (one for purging and one for sampling). Purging will be performed using a 6-liter Summa® vacuum canister and the samples will be collected in 1-liter Summa® vacuum canisters. The manifolds and Summa® canisters will be supplied by a state-certified laboratory. A different manifold will be used for each sample and manifolds will not be re-used at multiple sample locations. The flow controller will be pre-set by the laboratory to allow approximately 150 milliliters per minute (mL/min) of flow.
    - ***Manifold Shut-In Test:*** Before the manifold is connected to the soil vapor probe tubing, a Swagelok® cap will be fitted on the tubing connection side of the manifold and a shut-in test will be performed by opening the purge canister. At the onset of the shut-in test the initial vacuum and time will be recorded on a field data sheet. The shut-in test will continue for at least 1 minute. If the vacuum pressure remains constant for the duration of the shut-in test, the test will be considered successful, the manifold will be connected to the soil vapor probe using Teflon tubing, and purging and sampling will commence. If the vacuum pressure changes, the shut-in test will be discontinued, the manifold fittings will be double checked and tightened, and the shut-in test will be repeated until the vacuum pressure remains constant. Extra manifolds and Summa canisters will be available in case one of the laboratory supplied manifolds is faulty.
    - ***Leak Detection:*** Leak detection is important because leaks in the sampling system could cause the dilution of analytical samples with ambient air. The leak detection compound helium will be used to evaluate whether leaks are present in the sampling equipment. After a successful manifold shut-in test, the manifold will be connected to the soil vapor probe using Teflon tubing. With the exception of the Teflon tubing connections and soil vapor probe seals, all of the manifold

connections will have been successfully shut-in tested prior to sampling; therefore, only the tubing connections and vapor probe seals will be possible sources of leakage. Helium will be introduced to the soil vapor probe sampling shroud throughout the duration of purging and sample collection and the concentration of helium in the shroud will be monitored and recorded on field data sheets. Helium will be included in the list of analyzed compounds from the samples and the results will be included in the laboratory analytical report.

- ***Purge Volume:*** A combined tubing and manifold length of 8 feet and 13 feet was assumed for the purge volume calculation of the approximately 5 feet bgs and 10 feet bgs soil vapor probes, respectively. The purge volume was calculated to be approximately 478 mL which is equivalent to a drop in Summa® canister vacuum pressure of approximately 2.39 in. Hg for the approximately 5 feet bgs vapor monitoring probes. The purge volume was calculated to be approximately 505 mL which is equivalent to a drop in Summa® canister vacuum pressure of approximately 2.52 in. Hg for the approximately 10 feet bgs vapor monitoring probes. The purge volume calculations are included as Attachment 1 of this Work Plan.

- ***Purging:*** Prior to sample collection, purging of the appropriate volume will be performed in order to collect representative samples. The purge volume will be monitored by change in vacuum pressure, not time. The purging start time, initial purge canister vacuum, ending time, and final vacuum will be recorded on the field data sheets.

- ***Summa Canister Sample Collection:*** Subsequent to purging, the purge canister valve will be closed and the 1-liter Summa sample canister valve opened to begin sample collection. The sampling will be monitored by change in vacuum pressure, not time. The sampling start time, initial sample canister vacuum, end time, and final vacuum will be recorded on the field data sheets. Sample canister valves will be closed when the remaining vacuum is below 5 inches Hg. Sample canisters will not be allowed to reach 0 inch Hg, which would indicate that no vacuum remains in the canister.

- ***Sorbent Tube Sample Collection:*** Subsequent to Summa canister collection, a Tenax-TA sorbent tube will be placed in-line with a sample pump and a soil vapor sample will be collected in a dedicated sorbent tube from each of the soil vapor probes to be analyzed for TPHd and PAHs. Prior to sampling, a Gil-Air 5 air sampling pump will be set to a flow rate of approximately 180 milliliters per minute and calibrated using a Bios 510L flow sensor. The sorbent tube will be attached to the vapor probe tubing connector and the pump, and a volume of approximately 1-2 Liters of soil vapor will be extracted from the temporary soil vapor well through the sorbent tube. The sorbent tube serial number, the flow rate, before and after sampling, the time sampling began and ended will all be documented on field data sheets

- ***Quality Control:*** As discussed above, a manifold shut-in test will be performed and a leak detection compound (helium) will be used during sample collection and included in the analytical suite. Duplicate samples will be collected and analyzed for all the analytes requested of the analytical laboratory (see below). The DTSC Guidance states that a minimum of one duplicate per every 20 samples should be collected. On this basis CKG will collect 5 duplicate samples.

- ***Sample Handling:*** Upon collection, each sample will be labeled with the sample identification, date and time of collection, sampler's initials, and analytical method requested. This information will also be recorded on a chain-of-custody supplied by the laboratory. Samples will be delivered to a state-certified analytical laboratory either the same day or no later than the day following sampling. Samples will be protected from exposure to direct sunlight or significant changes in temperature during storage and transportation to the laboratory.

- The samples will be transported under chain-of-custody documentation to a California-certified analytical laboratory to be analyzed for the following:

  - Total petroleum hydrocarbons as gasoline (TPHg) using United States Environmental Protection Agency (USEPA) Method TO-15 as well as diesel (TPHd) and polynuclear aromatic hydrocarbons (PAHs) using USEPA Method TO-17; (From the 38 nested sample locations including the two locations at the property boundary to assess petroleum hydrocarbons for a total of 76 samples).

  - VOCs using USEPA Method TO-15 (at the seven potential VOC locations and the two upgradient probe locations for a total of eleven samples)

  - Methane using American Society for Testing and Materials (ASTM) Method D1946-90. (One sample from each TPH assessment location, varying between the five foot and ten foot samples for a total of 36 methane samples)

  - Oxygen and carbon dioxide using ASTM D1946 (in all 83 samples to evaluate potential biodegradation and natural attenuation)

  - Helium using ASTM D1946 (in all 83 samples as a leak detection agent)

- CKG will arrange for the characterization and disposal of the investigation-derived waste (IDW) generated by the installation activities. This IDW will be stored on the Site in labeled 55-gallon drums or a roll-off bin pending proper offsite disposal.

Task 2 Temporary Soil Vapor Probe Abandonments

After data has been collected and ACDEH has agreed that no further data is needed, CKG will oversee a California C-57 licensed driller to properly abandon the temporary soil vapor

probes. These abandonments will be performed under an ACPWA permit, and will remove all vapor probe construction materials, with the open borehole sealed with neat cement. CKG will prepare and submit the required DWR forms documenting these abandonments. The IDW generated by these abandonments will be stored on the site in labeled 55-gallon drums or a roll off bin pending proper offsite disposal and will be disposed as described above.

Task 3 Reporting

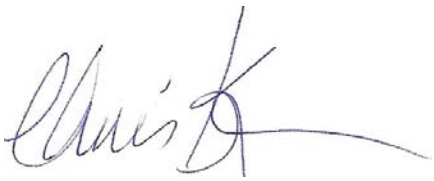
CKG will prepare a report documenting the soil gas investigation findings. This report will describe the completed field activities, provide construction logs of the temporary soil vapor probes, include a map showing the vapor probe locations, tabulate data and provide the analytical laboratory reports. The soil gas analytical results will be evaluated against the RWQCB's Environmental Screening Levels (ESLs) dated February 2016, for residential land use.

LIMITATIONS

CKG will perform the scope of work in a manner consistent with the standards of care and skill normally exercised by members of the profession practicing under similar conditions in the geographic vicinity and at the time the services will be performed. No warranty or guarantee expressed or implied is part of the services offered in this work plan.

CKG is pleased to prepare this work plan to complete a soil vapor investigation. If you need further information or would like more details regarding this work plan, please feel free to call me at (707) 967-8080.

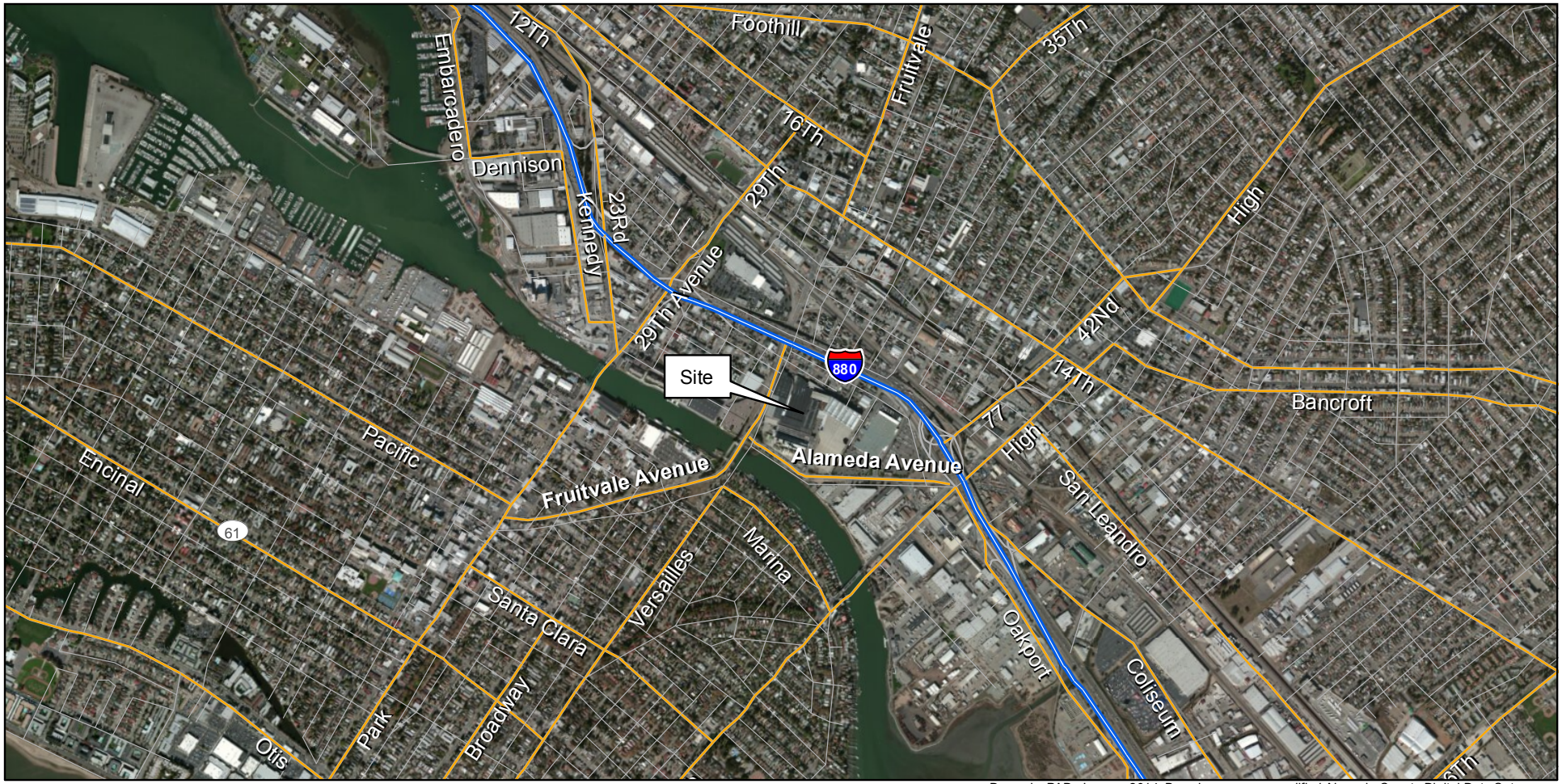
Sincerely,
CKG ENVIRONMENTAL, INC.



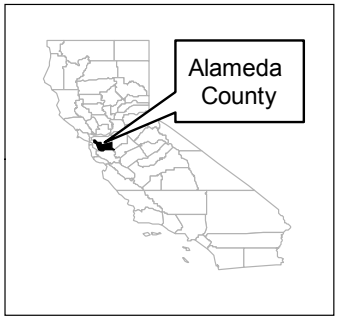
Christina J. Kennedy
Principal

Attachments Plate 1 Site Location Map
Plate 2 Proposed Soil Vapor Sample Locations
Plate 3 Nested Soil Vapor Probe Construction Schematic
Plate 4 Single Soil Vapor Probe Construction Schematic
Attachment 1: Purge Volume Calculation – 5-Foot-Deep Soil Gas Probe
Purge Volume Calculation – 10-Foot-Deep Soil Gas Probe

PLATES



Drawn by PAD. January 2014. Base layers are unmodified Alameda County Digital Data Sets.



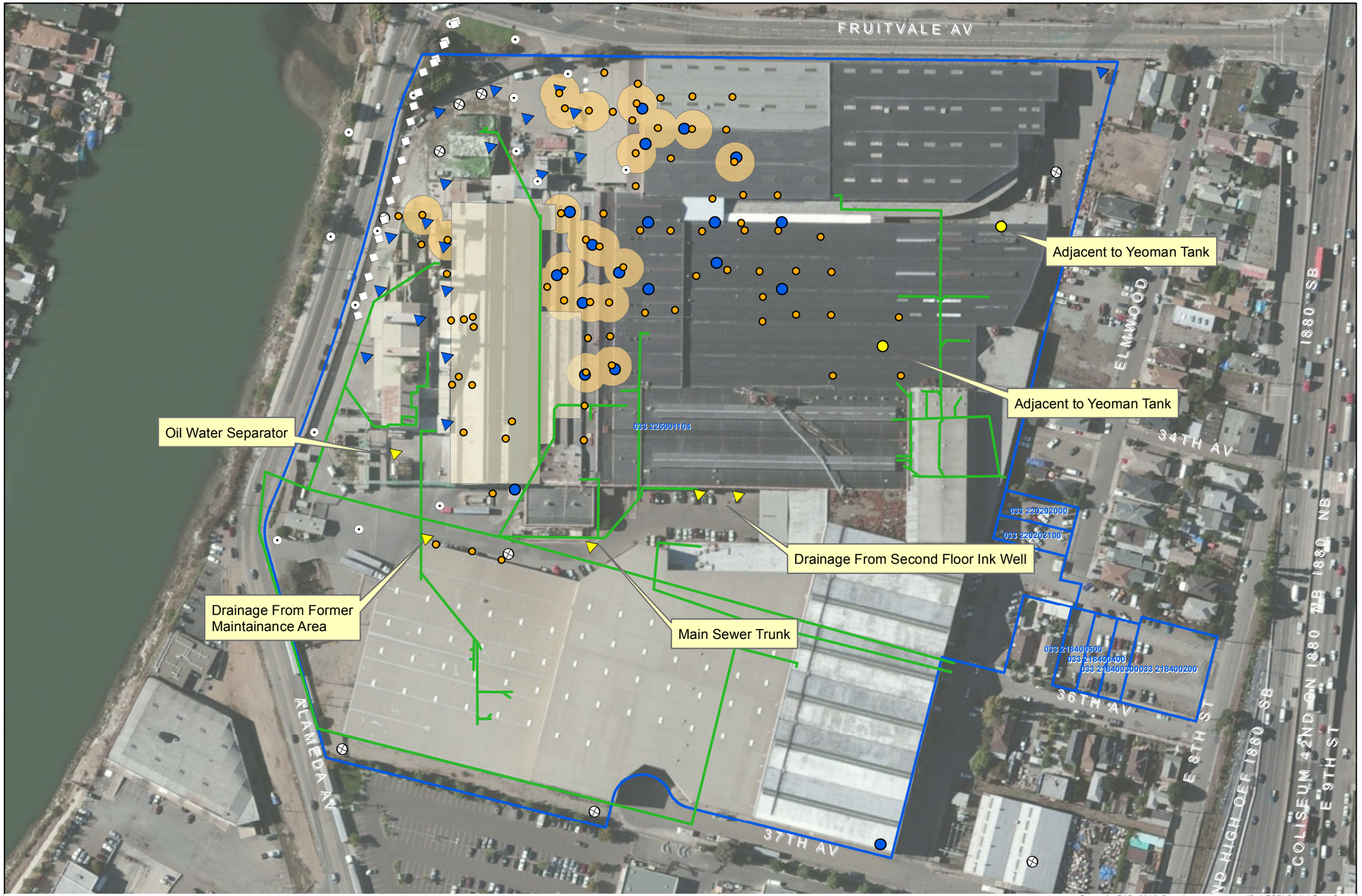
0 1,000 2,000

Scale in Feet

CKG Environmental, Inc.

Site Location Map
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland, California

PLATE
1



EXPLANATION

- Injection Well
- Destroyed Well
- Monitoring Well
- 2015 Soil Boring

Proposed Soil Vapor Probe

- Pair (5' & 10'), Outside
- Pair (5' & 10'), Inside
- 5', Outside
- 5', Inside
- Sanitary Sewer
- Basement
- Soil Potentialy Containing TPH in Upper 10-feet

0 75 150

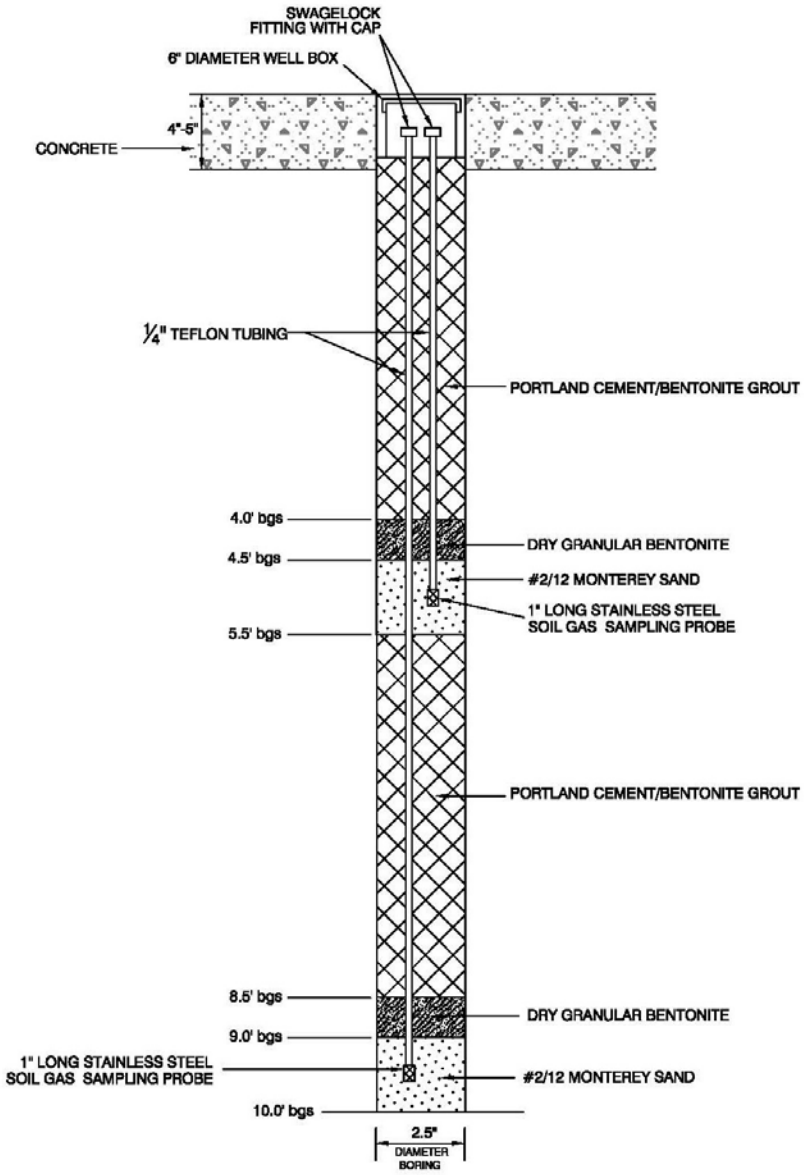
Scale in Feet

Drawn by PAD. 2015. Base layers are unmodified ESRI Digital Data Sets.

CKG Environmental, Inc.

Proposed Soil Vapor Probe Locations
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland California

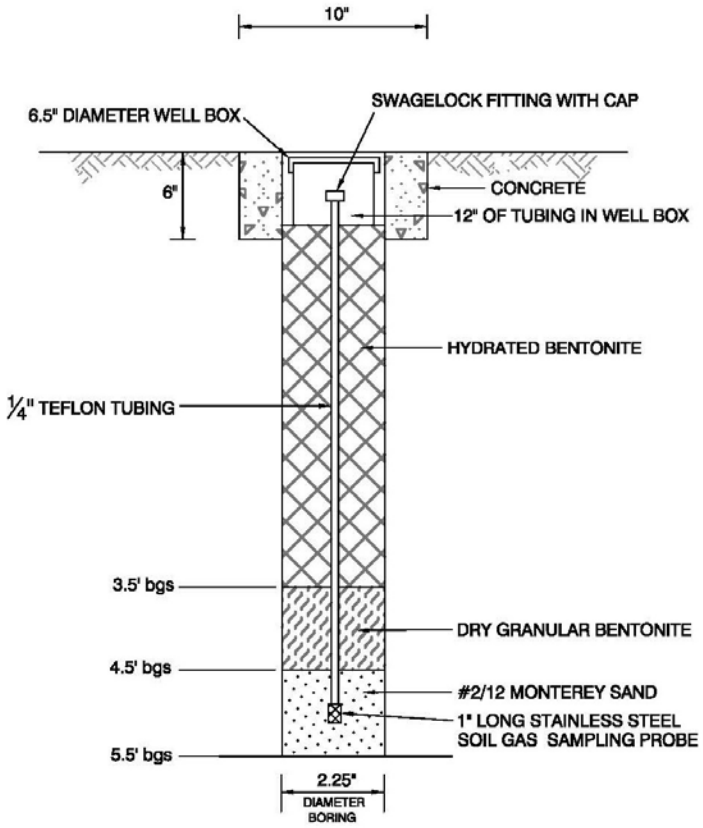
PLATE
2



NOT TO SCALE

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

CKG Environmental, Inc.		NESTED SOIL VAPOR PROBE SCHEMATIC **Owens-Brockway Glass Container, Inc** **Oakland, California**	PLATE 3
Project No: Date: 10/12/16			



NOT TO SCALE

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

CKG Environmental, Inc.		SINGLE SOIL VAPOR PROBE SCHEMATIC **Owens-Brockway Glass Container, Inc** **Oakland, California**	PLATE 4
Project No: Date: 10/12/16			

ATTACHMENT 1

Purge Volume Calculation - 5 Foot Deep Soil Gas Probe

1. Determine the <u>tubing volume</u> in milliliters

$V_{TUBING}=\pi r^2 h$

r = inside radius of tubing*

ENTER INSIDE RADIUS OF TUBING*: 2.38125 MILLIMETERS

h = length of tubing + length of sampling manifold

ENTER LENGTH OF TUBING + SAMPLING MANIFOLD: 8 FEET

$V_{TUBING}=\pi r^2 h$

V_{TUBING}= 43.43746196 mL

2. Determine the <u>filter pack air void volume</u> in milliliters

$V_{filter\ pack}=\pi r^2 h$

r = radius of drill rod

DRILL ROD **DIAMETER*****: 2.5 INCHES

h = hight of filter pack

HEIGHT OF FILTER PACK (SAND AND DRY BENTONITE): 18 INCHES

$V_{filter\ pack}$ = 1447.915399 mL

Porosity of sand/bentonite = approximately 30 %

$V_{air\ voids\ in\ filter\ pack}$ = 0.3 x $V_{filter\ pack}$ = 434.3746196 mL

3. Determine the value of <u>*one* purge volume</u> by adding the tubing volume to the probe tip volume

$V_{PURGE} = V_{TUBING} + V_{PROBE\ TIP}$

V_{PURGE} = 477.8120815 mL

4. Convert from mL to in. Hg for a 6 liter Summa purge cannister

V_{PURGE} = 2.39 in. Hg for 6 Liter Summa

Notes and Conversions

*diameter of standard teflon vapor sampling tubing is 1/4" OD = 3/16" ID = 4.7625 mm ID

*inside radius of tubing for standard 1/4" OD tubing = **2.38125** mm

** diameter of standard geoprobe rod is 1.5 "

*** spreadsheet converts drill rod diameter in inches to drill rod radius in mm

1 in =	**25.4**	mm
1 ft =	**304.8**	mm
1 mm^3 =	**0.001**	mL

Purge Volume Calculation - 10 Foot Deep Soil Gas Probe

1. Determine the <u>tubing volume</u> in milliliters

$V_{TUBING}=\pi r^2 h$

r = inside radius of tubing*

ENTER INSIDE RADIUS OF TUBING*: 2.38125 MILLIMETERS

h = length of tubing + length of sampling manifold

ENTER LENGTH OF TUBING + SAMPLING MANIFOLD: 13 FEET

$V_{TUBING}=\pi r^2 h$

V_{TUBING}= 70.58587568 mL

2. Determine the <u>filter pack air void volume</u> in milliliters

$V_{filter\ pack} = \pi r^2 h$

r = radius of drill rod

DRILL ROD **DIAMETER*****: 2.5 INCHES

h = hight of filter pack

HEIGHT OF FILTER PACK (SAND AND DRY BENTONITE): 18 INCHES

$V_{filter\ pack}$ = 1447.915399 mL

Porosity of sand/bentonite = approximately 30 %

$V_{air\ voids\ in\ filter\ pack}$ = 0.3 x $V_{filter\ pack}$ = 434.3746196 mL

3. Determine the value of *<u>one</u>* <u>purge volume</u> by adding the tubing volume to the probe tip volume**

$V_{PURGE} = V_{TUBING} + V_{PROBE\ TIP}$

V_{PURGE} = 504.9604952 mL

4. Convert from mL to in. Hg for a 6 liter Summa purge cannister

V_{PURGE} = 2.52 in. Hg for 6 Liter Summa

Notes and Conversions

*diameter of standard teflon vapor sampling tubing is 1/4" OD = 3/16" ID = 4.7625 mm ID

*inside radius of tubing for standard 1/4" OD tubing = **2.38125** mm

** diameter of standard geoprobe rod is 1.5 "

*** spreadsheet converts drill rod diameter in inches to drill rod radius in mm

1 in =	**25.4**	mm
1 ft =	**304.8**	mm
1 mm^3 =	**0.001**	mL