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By Alameda County Environmental Health 8:26 am, Jun 20, 2017

June 13, 2017

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

Subject: **RO0000289**
DATA GAP ANALYSIS AND WORK PLAN TO ADDRESS DATA GAPS
OWENS-BROCKWAY GLASS CONTAINER FACILITY.
3600 ALAMEDA AVENUE, OAKLAND, CALIFORNIA.

Dear Ms. Soo:

Owens-Brockway Glass Container Corporation is pleased to submit the attached Data Gaps Analysis and Work Plan to Address the Data Gaps for the above site.

I declare under penalty of perjury that the information and/or recommendations contained in the attached report and work plan 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.
Regional EHS Manager

CKG Environmental, Inc.

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

June 13, 2017

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
DATA GAP ANALYSIS AND WORK PLAN TO ADDRESS DATA GAPS, OWENS-BROCKWAY GLASS CONTAINER FACILITY, OAKLAND, CALIFORNIA.

Dear Ms. Soo:

CKG Environmental, Inc. (CKG) is pleased to provide this data gap analysis and work plan to address the identified data gaps at the closed Owens-Brockway Glass Container, Inc. facility at 3600 Alameda Avenue in Oakland California (Plate 1). The need for a data gap analysis follows the submittal of the *Report of Soil Vapor Investigation, Owens-Brockway Glass Container Facility*, dated March 31, 2017 and our meeting with the Alameda County Department of Environmental Health (ACDEH) on March 30, 2017. The soil vapor investigation showed elevated concentrations of methane, petroleum hydrocarbons quantified as gasoline and some chlorinated solvents at the facility.

COMPILATION OF DATA COLLECTED TO DATE

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 August and September 2009 CKG completed an investigation to address data gaps that were identified while preparing the *Site Conceptual Model, Owens-Brockway Glass Container Facility*, dated April 3, 2009. At that time identified data gaps included collecting data and analyzing it by the 8015 Method because previous data was analyzed by methods that were not compatible with more modern screening levels; and collecting data to refine the understanding of the distribution of petroleum hydrocarbons in the subsurface. A total of 41 soil borings with 72 soil samples were collected. Data showed the distribution of petroleum hydrocarbons outside the buildings and showed that halogenated volatile organic constituents were not present in the soil or groundwater in the samples analyzed.

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.

From December 2016 through January 2017 CKG Installed soil vapor probes and collected soil vapor samples as presented in the March 31, 2017 report. Soil vapor samples were compared to Tier 1 Environmental Screening Levels (ESL) established by the RWQCB dated February 2016 for residential uses. Total petroleum hydrocarbons as gasoline (TPHg) exceeded the ESL at locations that generally coincide with known petroleum hydrocarbon impacts in soil with the exception of one location. TPHg was elevated at SV31 at a depth of 5 feet. Subsurface soil samples in the vicinity of SV31 do not show elevated gasoline at a shallow depth however, the borings are widely spaced.

Solvents were detected in four locations at the site. Two of them are associated with off-site sources. One is associated with one of the yeoman tanks and has subsurface soil data nearby to help define its extent. The fourth location is near the oil/water separator. No soil data is available near the oil water separator. CKG Environmental has prepared a *Work Plan to Complete a Limited Soil and Groundwater Assessment Oil/Water Separator, Owens-Brockway Glass Container Facility, 3600 Alameda Avenue, Oakland, California*, dated February 27, 2017 which was approved by ACDEH on March 16, 2017. The findings of that investigation will be presented as an Appendix/addendum to the soil vapor report

Methane was detected at very high concentrations mainly associated with the petroleum hydrocarbon impacted areas, although SV5, SV9 and SV31 are not located near strongly impacted soil based on a cursory review of existing data. The methane concentrations are high enough that they must be addressed during site remediation and/or redevelopment.

Plate 2 is a compilation that shows the locations of all the 2009 and 2015 soil borings, the groundwater monitoring wells, and the soil vapor sampling points. This plate can serve as an index to al sample locations.

Plates 3 through 5 illustrate the distribution of TPH in soils at three different depths. Plate 3 illustrates TPH distribution in soil from grade (which is 11 feet above mean seal level) and five feet above grade. It should be noted that this soil was not present when the asphalt refinery was operating. This soil was brought in to raise the grade when the glass plant was constructed in 1936. CKG suspects that when the plant basement was excavated the soil from the basement was used as fill. This would explain the streaky nature of petroleum hydrocarbon impacts observed in the fill to the north and northwest of the basement and the absence of petroleum hydrocarbons with increasing distance from the basement.

Plates 4 and 5 represent the distribution of petroleum hydrocarbons from grade to 5 feet

below grade and from 5-10 feet below grade respectively.

Plate 6 presents two three-dimensional visualization of the TPH distribution in the subsurface. The image on the left is looking north-northeast from the corner of Fruitvale Avenue and Alameda Avenue. The image on the right is looking north-northwest from Alameda Avenue at the entrance to the property. through the basement toward the west. The three layers show the progressive increase in petroleum hydrocarbons with depth. Plan views of each layer also are included in Appendix A for reference.

Plate 7 shows the distribution of TPH in the groundwater as of the first quarter 2017.

Plates 8 through 10 provide summaries of soil vapor data (TPHg, methane and volatile organics respectively) with the distribution of TPH in the subsurface shaded so that it is possible to correlate soil vapor and soil observations.

DATA GAP ANALYSIS AND PROPOSED SCOPE OF WORK TO ADDRESS THE DATA GAPS

Based on the soil vapor data and a review of soil data from previous investigations CKG has identified data gaps as follows.

1) Volatile Organic Constituents at the Skim Pond

As discussed above, volatile organic constituents (VOCs) were detected in soil vapor in the vicinity of the skim pond. A limited soil and groundwater assessment will be completed per the February 27, work plan. The additional approved soil and groundwater sample locations are shown on Plate 11.

2) Potential for Methane Infiltration in Excavated Areas

Soil vapor sampling demonstrated that methane exists in the areas with hydrocarbon impacts. There are two excavations within highly impacted areas but soil vapor data was not collected from those two areas. As a result, the potential reduction in methane that may result by excavating impacted material is not known. Two soil vapor probes have been installed within former excavation areas to address that question as presented in the February 27, work plan. The additional approved soil vapor sample locations are shown on Plate 11.

3) Dry Cleaning Solvent Detected at the Northeast Corner of the Property

VOCs including tetrachloroethene (PCE) and carbon tetrachloride were detected in the soil vapor sample collected at SV-44. SV-44 was installed at the far northeast corner of the property because historic data shows that a former drycleaner was operated offsite to the northeast. PCE is a commonly used dry cleaning solvent so it is suspected that the offsite former drycleaner is the source of the PCE but this must be confirmed. CKG proposes the following scope of work to address this data gap:

- Install three soil vapor probes off-site in the vicinity of the former drycleaner.
- Install probes to a depth of 5 feet.

- Sample all four soil vapor probes and analyze for VOCs by USEPA Method TO-15 and Helium using ASTM D1946 as a leak detection agent.

Proposed soil vapor locations are shown on Plate 11. Soil vapor probe installation and sampling will be conducted per the protocol contained in Appendix B and as specified in greater detail in CKGs *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,* dated October 13, 2016. Probes installed offsite will be covered with traffic rated locking well boxes. Soil vapor probes will be maintained as needed for future sampling until ACDEH agrees that they can be closed.

4) Chloroform Detected at the Northwest Corner of the Site

Elevated Chloroform was detected at SV-45. It is not clear what the potential source of the chloroform may be. A review of historical information shows that a former metal plating operation was located off site on the west side of Fruitvale Avenue. An industrial "soap" and "cleaning solvent" manufacturer is present at that location now. It is not clear if either of these operations could have been the source of chloroform. CKG proposes the following scope of work to address this data gap:

- Install three soil vapor probes off-site in the vicinity of the former plating shop.
- Install probes will to a depth of 5 feet.
- Sample all four soil vapor probes and analyze for VOCs by USEPA Method TO-15 and Helium using ASTM D1946 as a leak detection agent.

Proposed soil vapor locations are shown on Plate 11. Soil vapor probe installation and sampling will be conducted per the protocol contained in Appendix B and as specified in greater detail in CKGs *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, dated October 13, 2016.* Probes installed offsite will be covered with traffic rated locking well boxes. Soil vapor probes will be maintained as needed for future sampling until ACDEH agrees that they can be closed.

5) High TPHg and Methane at SV-31.

SV-31 is located within the plant building but nearby soil borings did not show elevated concentrations of petroleum hydrocarbons, thus the source of the methane and TPHg is unclear. It is possible that because of the wide spacing of the soil borings in the area petroleum hydrocarbon impacts were missed. CKG proposes the following scope of work to address this data gap:

- Install three Geoprobe borings to a depth of 20 feet below the concrete floor triangulating around SV-31 but no more than 10-15 feet away.
- Collect soil samples at five foot intervals, or at obvious visible petroleum hydrocarbon impacts.
- Soil samples will be analyzed for total petroleum hydrocarbons quantified as gasoline, diesel and motor oil by EPA Method 8015.
- SV-31 (both depths) will be resampled and the vapor analyzed for:
    - 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;
    - 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)

Proposed Geoprobe boring locations are shown on Plate 11. Geoprobe installation and sampling will be conducted per the protocol contained in Appendix C. Soil vapor sampling will be per the protocol included in Appendix B.

6) High TPHg and Methane at SV-9.

SV-9 is located just south of the plant building in the vicinity of a former lube oil underground storage tank. Soil borings to the east and west of SV-9 show elevated concentrations of petroleum hydrocarbons but the southern extent is unknown. CKG proposes the following scope of work to address this data gap:

- Install two Geoprobe borings to a depth of 15 feet below grade to the south of SV-9.
- Collect soil samples at five foot intervals or at obvious visible petroleum hydrocarbon impacts.
- Samples will be analyzed for total petroleum hydrocarbons quantified as gasoline, diesel and motor oil by EPA Method 8015.
- SV-9 will be resampled and the vapor analyzed for:
    - 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;
    - 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)

Proposed Geoprobe boring locations are shown on Plate 11. Geoprobe installation and sampling will be conducted per the protocol contained in Appendix C. Soil vapor sampling will be in accordance with the procedure in Appendix A.

7) High Methane at SV-5.

SV-5 is located on the south side of the batch house away from any known petroleum hydrocarbon impacted areas. The lack of TPHg in the soil vapor would suggest that the methane

may not be related to petroleum hydrocarbon impacts, thus the source of the methane is unknown. CKG proposes the following scope of work to address this data gap:

- Install three Geoprobe borings to a depth of 15 feet below grade around SV-5, but no more than 15 feet away.
- Collect soil samples at five foot intervals or at obvious visible petroleum hydrocarbon impacts. Also observe soil for organic material.
- Samples will be analyzed for total petroleum hydrocarbons quantified as gasoline, diesel and motor oil by EPA Method 8015.
- Resample SV-5 and analyze for
    - 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;
    - 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)

Proposed Geoprobe boring locations are shown on Plate 11. Geoprobe installation and sampling will be conducted per the protocol contained in Appendix C. Soil vapor sampling will be in accordance with the procedure in Appendix B.

8) Is there Seasonal Variation in Soil Vapor Data?

Soil vapor data was collected in January and February 2017 during a very wet rainy season following a prolonged drought. The potential for seasonal variation is unknown. CKG proposes the following scope of work to address this data gap:

- Resample all soil vapor probes (five foot and 10 foot) and perform the same analyses as were originally required in the October 2016 work plan as follows:.
    - 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;
    - 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)

This statement is not meant to duplicate sampling already proposed in data gap numbers 5, 6, and 7 identified above. Existing soil vapor probe locations are shown on Plates 2 and 8. Soil vapor sampling will be in accordance with the procedure in Appendix B.

PREFIELD ACTIVITIES

Prior to implementing the scope of work outlined above CKG will complete the following field preparation activities.:

- Submit and obtain an encroachment permit from the City of Oakland for offsite soil vapor probe locations.
- Submit and obtain a drilling permit from Alameda County Public Works Agency (ACPWA).
- 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.
- Mark the proposed soil boring vapor probe locations, and provide Underground Service Alert (USA) notification as required by California law.
- Subcontract a private utility locator to clear the proposed soil and temporary soil vapor probe locations.

POST FIELD ACTIVITIES

Disposal of Investigation Derived Waste

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.

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.

Reporting

CKG will prepare a report documenting the findings of the data gap investigation. This report will describe the completed field activities, provide construction logs of the soil borings and temporary soil vapor probes, include a map showing the soil boring and vapor probe

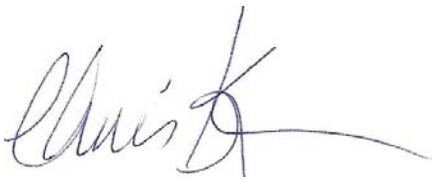
locations, tabulate data and provide the analytical laboratory reports. The soil and soil gas analytical results will be evaluated against the RWQCB's Environmental Screening Levels (ESLs) dated February 2016, for residential land use.

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.

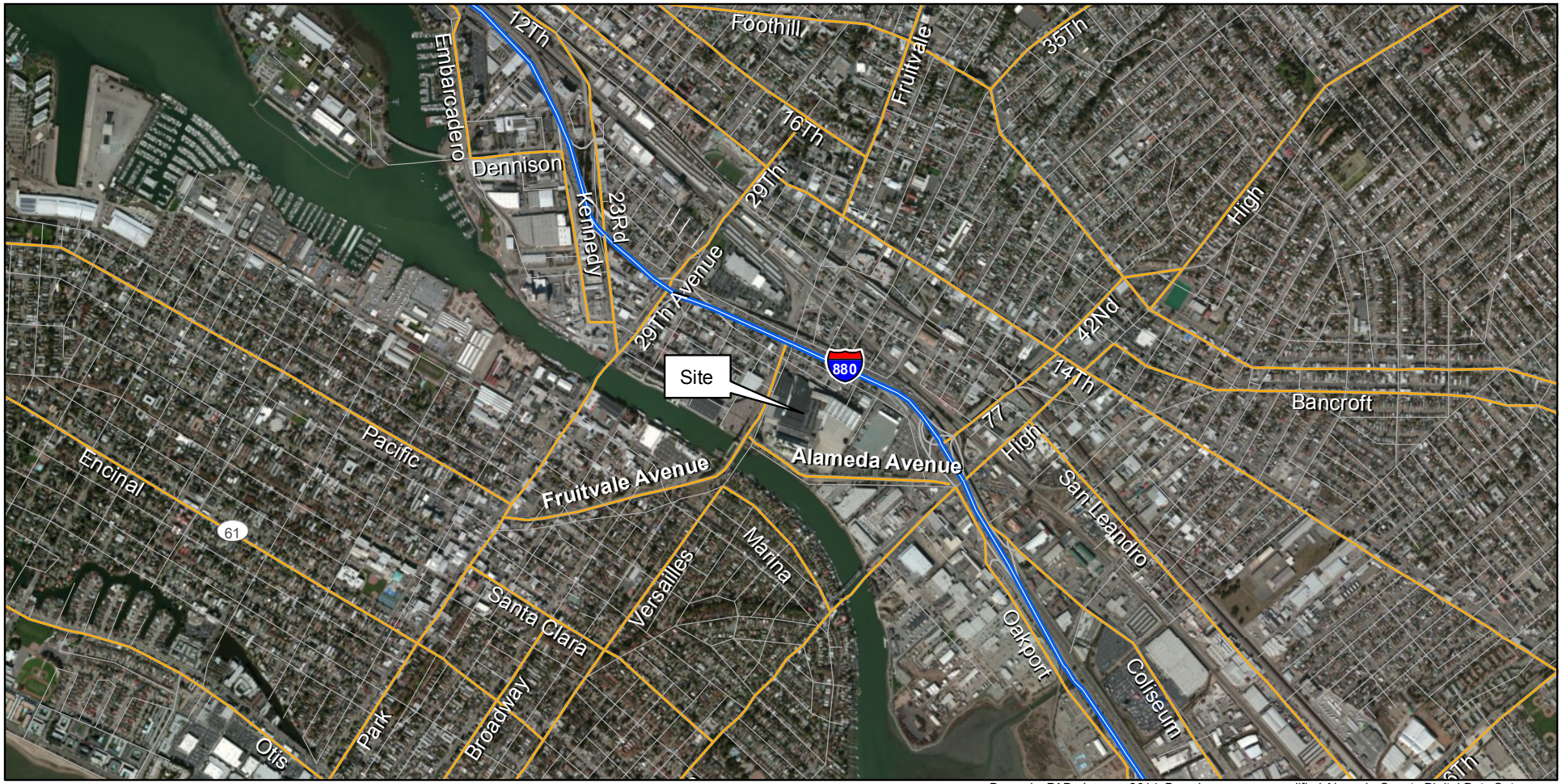
Sincerely,
CKG ENVIRONMENTAL, INC.



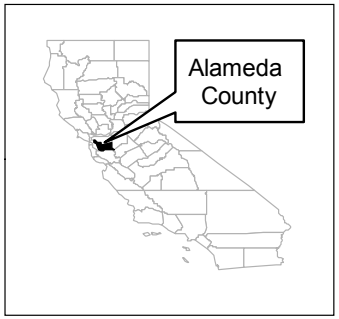
Christina J. Kennedy
Principal

Attachments
Plate 1 Site Location Map
Plate 2 Comprehensive Sample Location Map
Plate 3 Distribution of TPHd and TPHmo in Soil from Grade to 5 feet Above Grade.
Plate 4 Distribution of TPHd and TPHmo in Soil from Grade to 5 feet Below Grade.
Plate 5 Distribution of TPHd and TPHmo in Soil from 5 feet to 10 Feet Below Grade.
Plate 6 Three-Dimensional Visualization of Petroleum Hydrocarbon Impacts in the Subsurface
Plate 7 Distribution of TPHd and TPHmo in Groundwater, First Quarter 2017
Plate 8 Soil Vapor Probe Data Summary TPHg
Plate 9 Soil Vapor Probe Data Summary Methane
Plate 10 Soil Vapor Probe Data Summary VOCs
Plate 11 Proposed Data Gap Sample Location Plan

Appendices:
Appendix A: TPH Data Interpretation Layers for Plate 6
Appendix B: Soil Vapor Probe Installation and Sampling
Appendix C: Geoprobe Soil Sampling



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

- Monitoring Well
- SoilVaporProbe
- Boring
- Site Parcel Boundary

0 70 140

Scale in Feet

Base layers are unmodified ESRI Digital Data Sets.

CKG Environmental, Inc.

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

PLATE
2

EXPLANATION

- TPH >100 mg/kg
- TPH < 100 mg/kg
- TPH Not Detected
- Boring

0 50 100

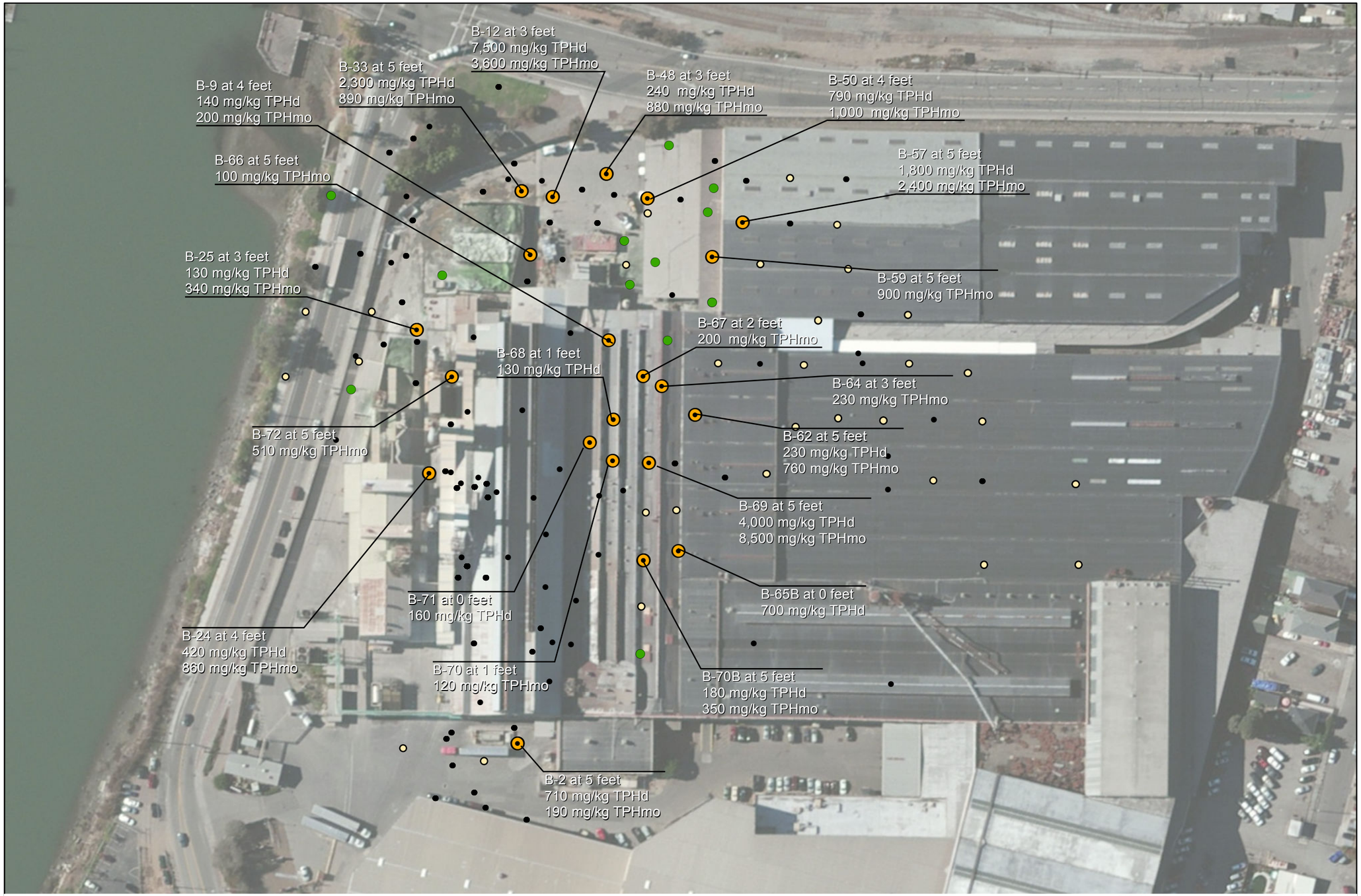
Scale in Feet

PAD. 2017. Base layers are unmodified ESRI Digital Data Sets.

CKG Environmental, Inc.

Distribution of TPHd and TPHmo in Soil from Grade to 5 Feet Above Grade
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland California

PLATE
3



EXPLANATION

- TPH >100 mg/kg
- TPH < 100 mg/kg
- TPH Not Detected
- Boring

0 50 100

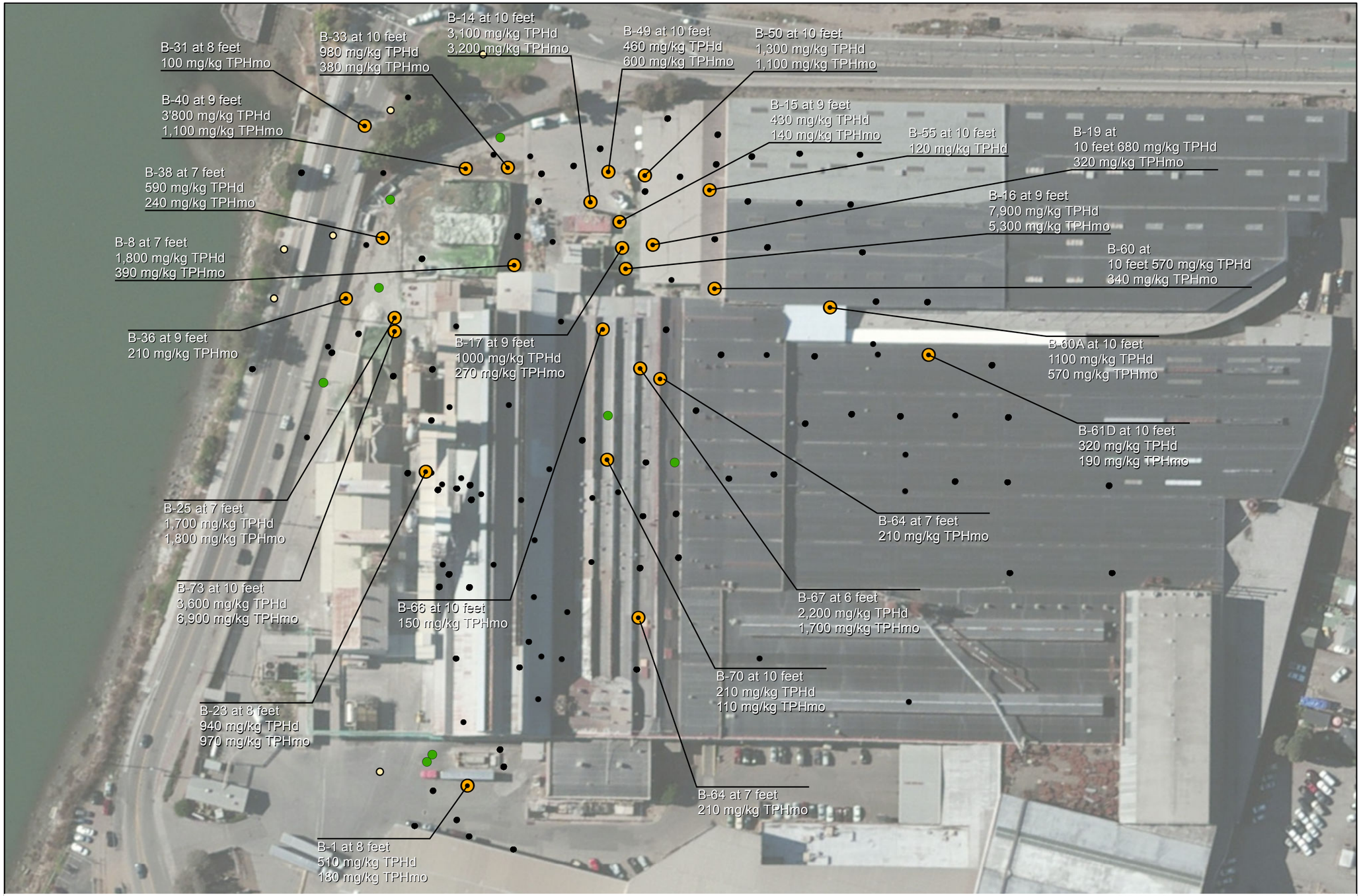
Scale in Feet

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

CKG Environmental, Inc.

Distribution of TPHd and TPHmo in Soil from Grade to 5 Feet Below Grade
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland California

PLATE
4



EXPLANATION

- TPH >100 mg/kg
- TPH < 100 mg/kg
- TPH Not Detected
- Boring

0 50 100

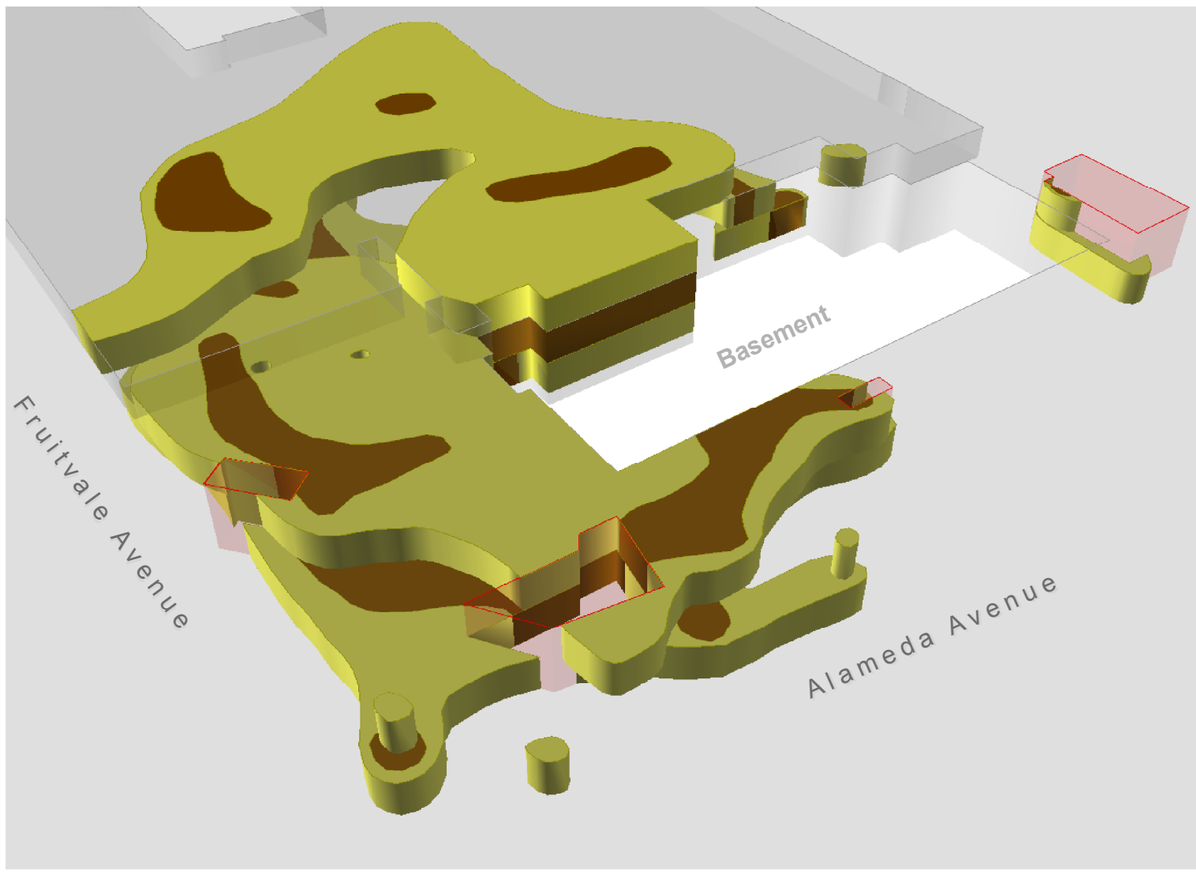
Scale in Feet

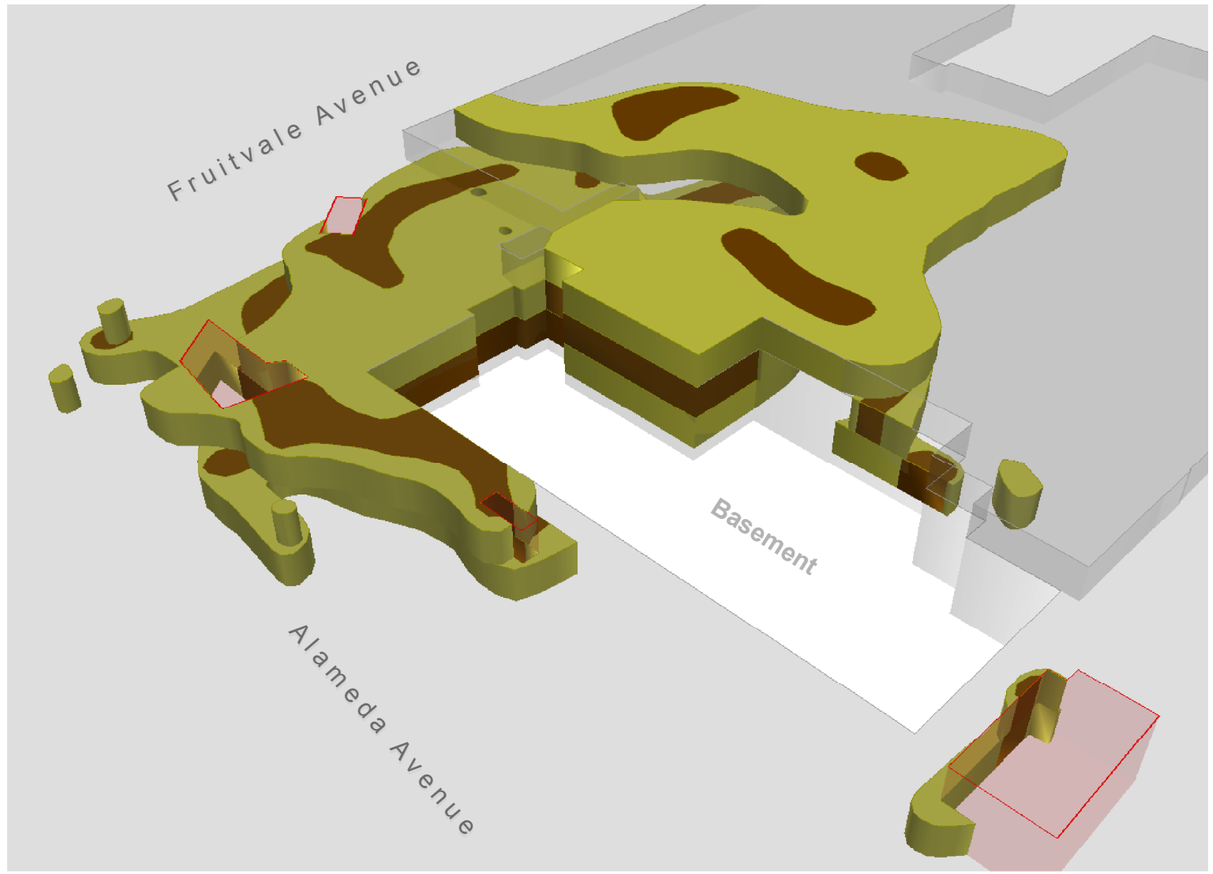
PAD. 2015. Base layers are unmodified ESRI Digital Data Sets.

CKG Environmental, Inc.

Distribution of TPHd and TPHmo in Soil from 5 Feet to 10 Feet Below Grade
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland California

PLATE
5





EXPLANATION

Excavations

Petroleum Hydrocarbon Concentration

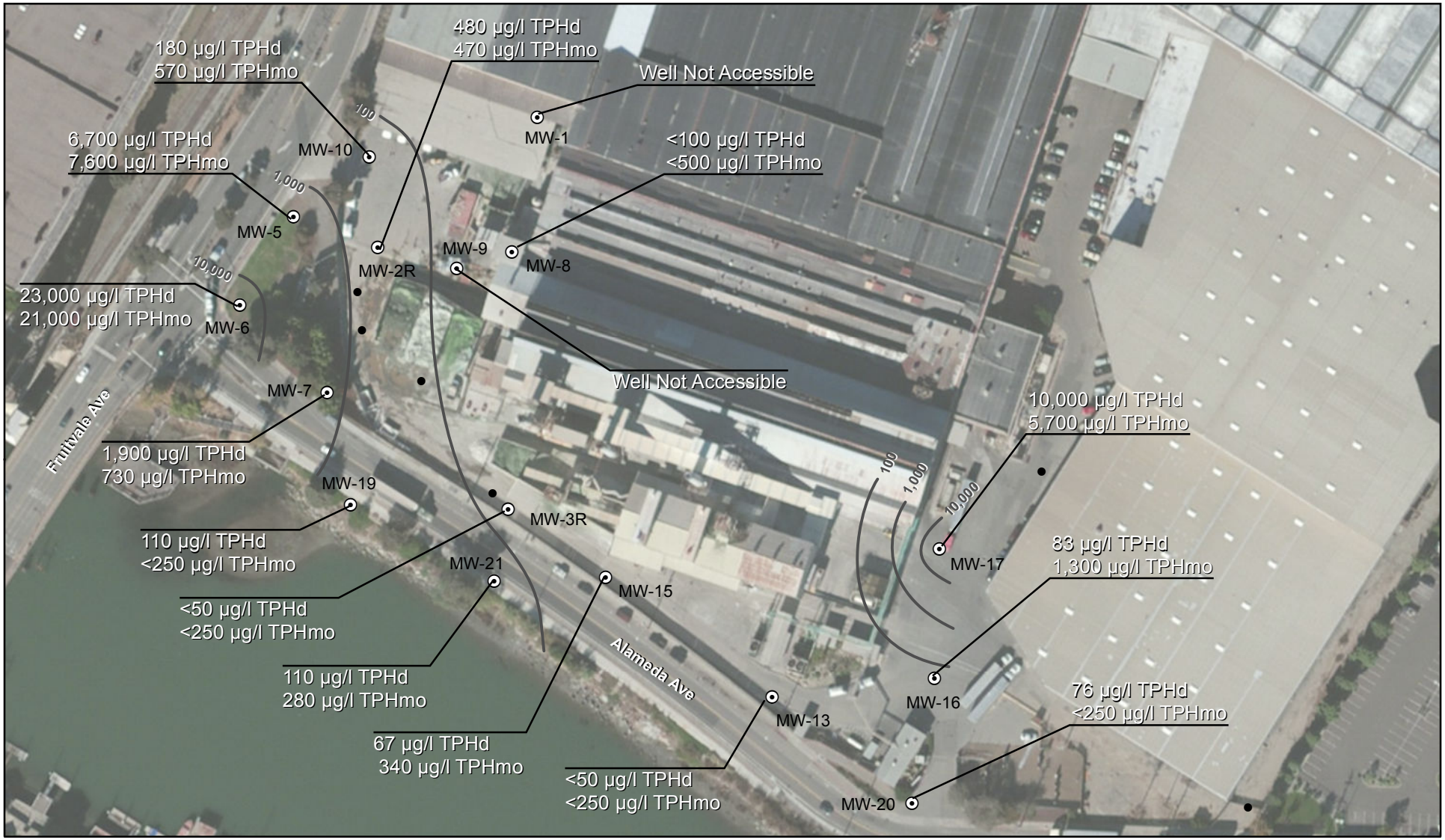
< 100 mg/kg

> 100 mg/kg

CKG Environmental, Inc.

Three-Dimensional Visualization of Petroleum Hydrocarbon Impacts in the Subsurface
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland California

PLATE
6



PAD June 2017. Base layer is aerial provided by ArcGIS Online.

EXPLANATION

- Monitoring Well
- Destroyed Well
- Line of Equal TPHd Concentration
- Dashed where approximate

0 70 140

Scale in Feet

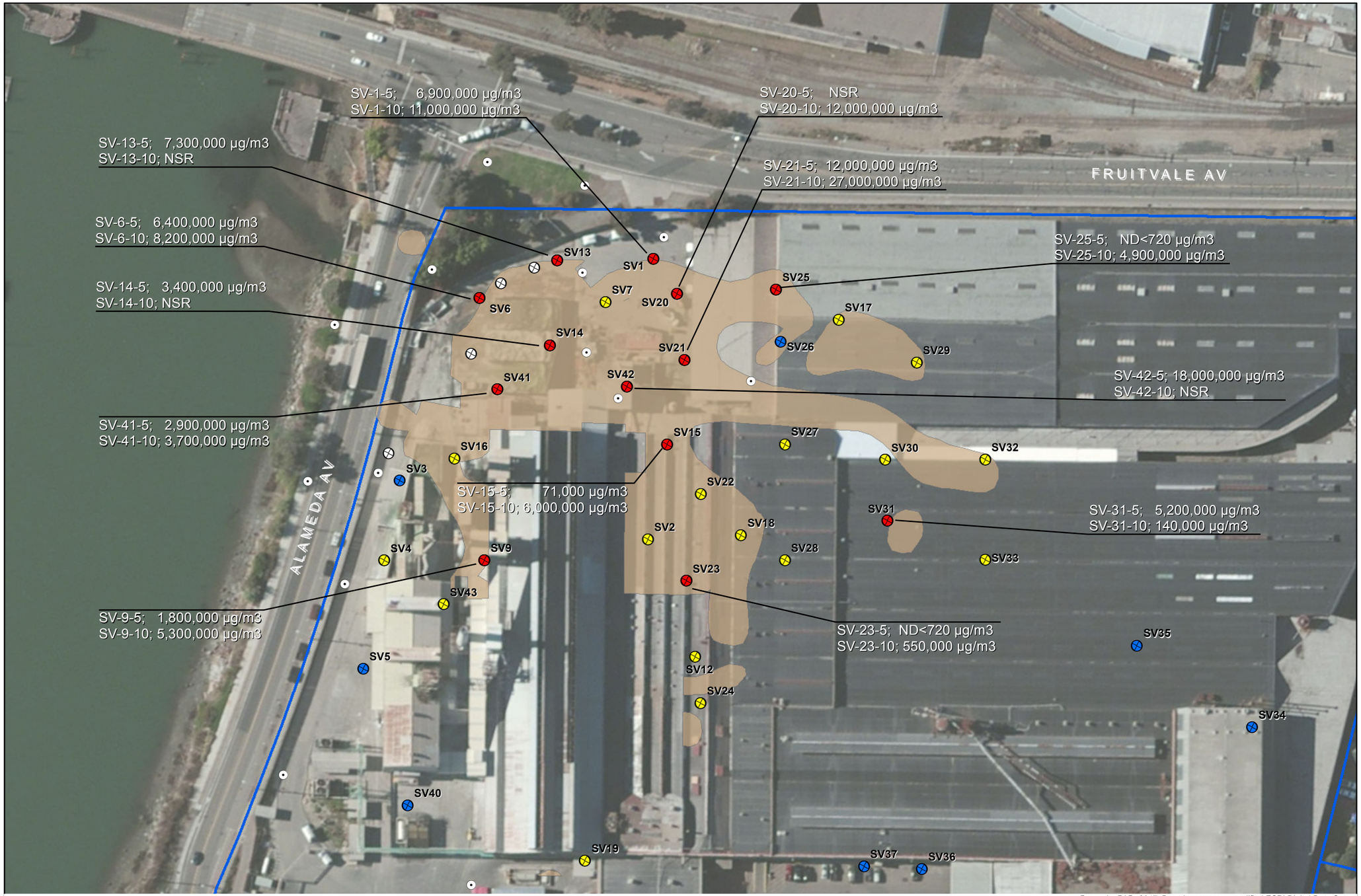
N

S

CKG Environmental, Inc.

Distribution of TPHd and TPHmo in Groundwater, First Quarter 2017
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland California

PLATE
7



EXPLANATION

- TPHg in Soil Vapor Exceeds ESL
- TPHg detected in Soil Vapor
- TPHg not detected in Soil Vapor
- Destroyed Well
- Monitoring Well
- Extent of TPH > 100 mg/kg

TPHg ESL = 300,000 µg/m3

ESL - Environmental Screening Level
ND<X - Not detected above laboratory reporting limit
NSR - No sample recovered
µg/m3 - microgram per cubic meter

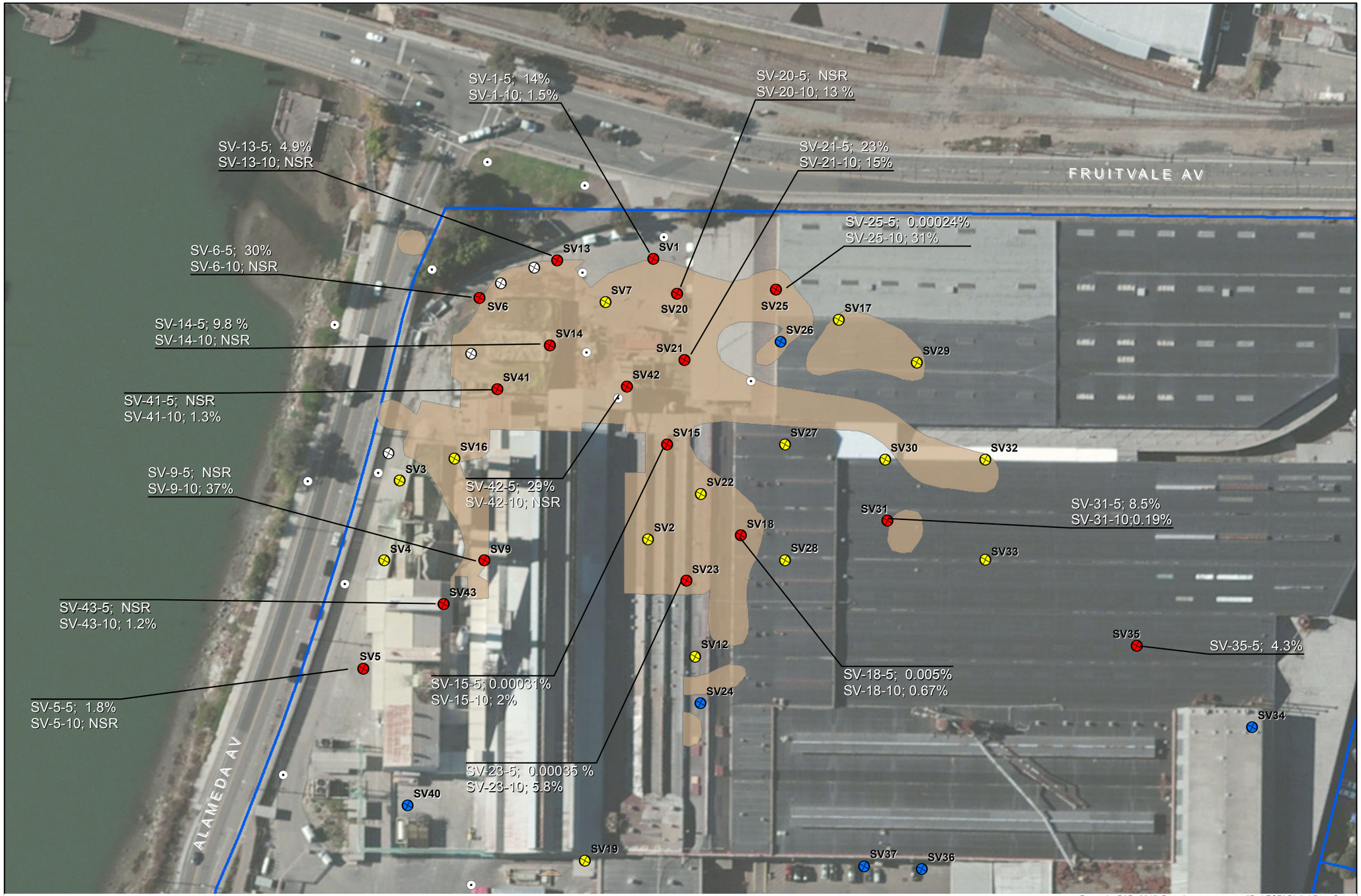
0 50 100
Scale in Feet

Drawn by PAD. 2017. Base layers are unmodified ESRI Digital Data Sets.

CKG Environmental, Inc.

Soil Vapor Probe Data Summary TPHg
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland California

PLATE
8



Drawn by PAD. 2017. Base layers are unmodified ESRI Digital Data Sets.

EXPLANATION

- Methane in Soil Vapor Exceeds 10% of LEL
- Methane Detected in Soil Vapor
- Methane not detected (or not analyzed) in Soil Vapor
- Destroyed Well
- Monitoring Well
- Extent of TPH > 100 mg/kg

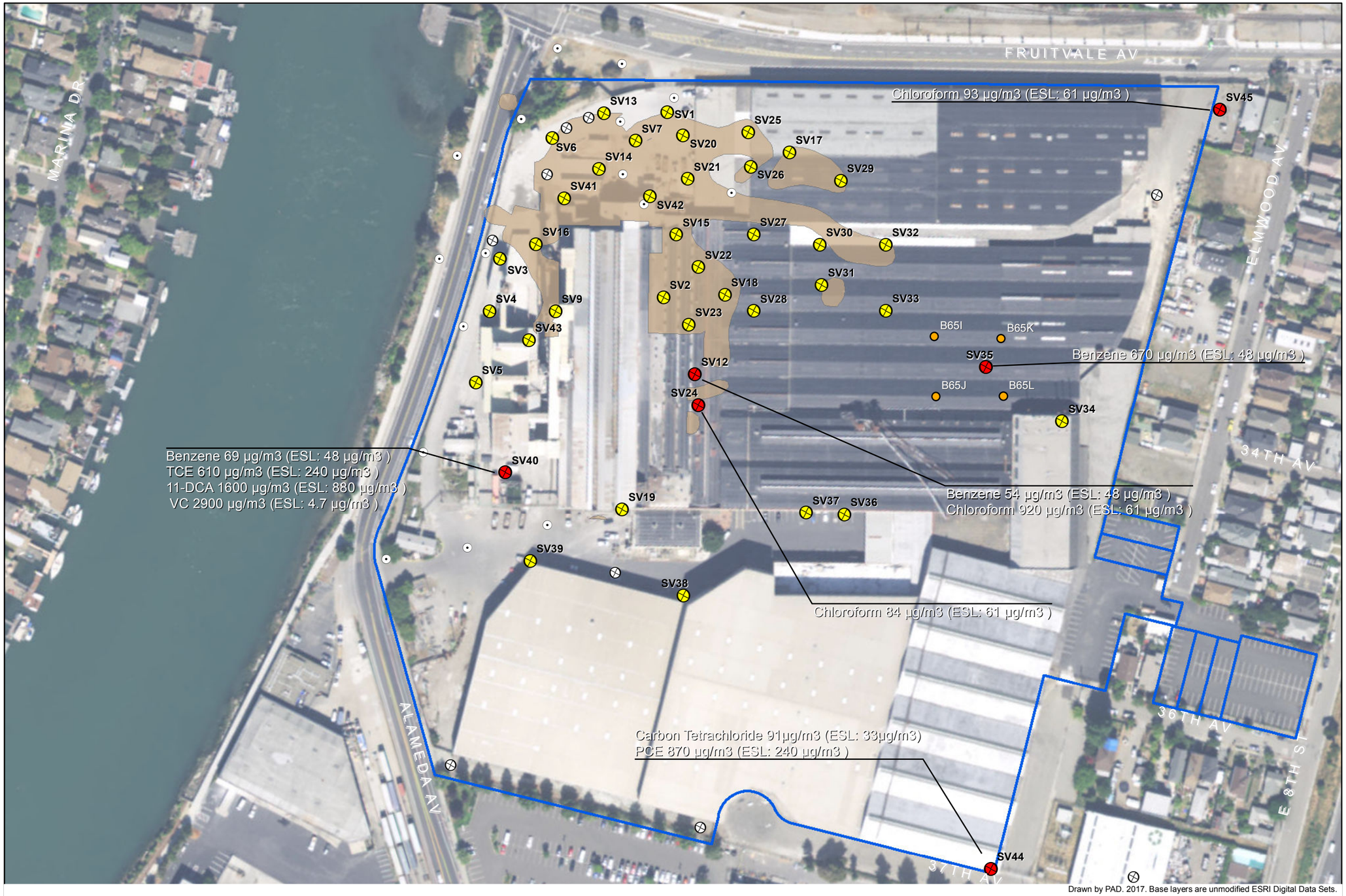
10% of LEL; 0.5% Methane by Volume
NSR; No Sample Recovered or Methane Not Analyzed

0 50 100
Scale in Feet

CKG Environmental, Inc.

Soil Vapor Probe Data Summary Methane
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland California

PLATE
9



EXPLANATION

- VOCs in soil vapor exceed ESLs
- VOCs detected in soil vapor
- VOCs not reported in soil vapor
- Selected 2015 Soil Boring
- Destroyed Well
- Monitoring Well
- Extent of TPH > 100 mg/kg

DCA - Dichloroethane
ESL - Environmental Screening Level
PCE – Tetrachloroethylene (Perchloroethylene)
TCE - Trichloroethylene
µg/m3 - microgram per cubic meter
VC – Vinyl Chloride

0 75 150
Scale in Feet

Drawn by PAD. 2017. Base layers are unmodified ESRI Digital Data Sets.

CKG Environmental, Inc.

Soil Vapor Probe Data Summary VOCs
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland California

PLATE
10

EXPLANATION

Proposed Samples

- Vapor Probe; 2017 Data Gap Analysis
- Vapor Probe; February 27, 2017 Workplan
- Boring; 2017 Data Gap Analysis
- Boring; February 27, 2017 Workplan
- Monitoring Well
- SoilVaporProbe
- Boring
- Site Parcel Boundary

0 75 150

Scale in Feet

Base layers are unmodified ESRI Digital Data Sets.

CKG Environmental, Inc.

Proposed Data Gap Sample Location Map
Owens-Brockway Glass Container Facility
3600 Alameda Avenue, Oakland California

PLATE
11

APPENDIX A

Layer 1
Grade to 5 feet above grade
TPHd or TPHmo with some interpretation
based on field observations in boring logs

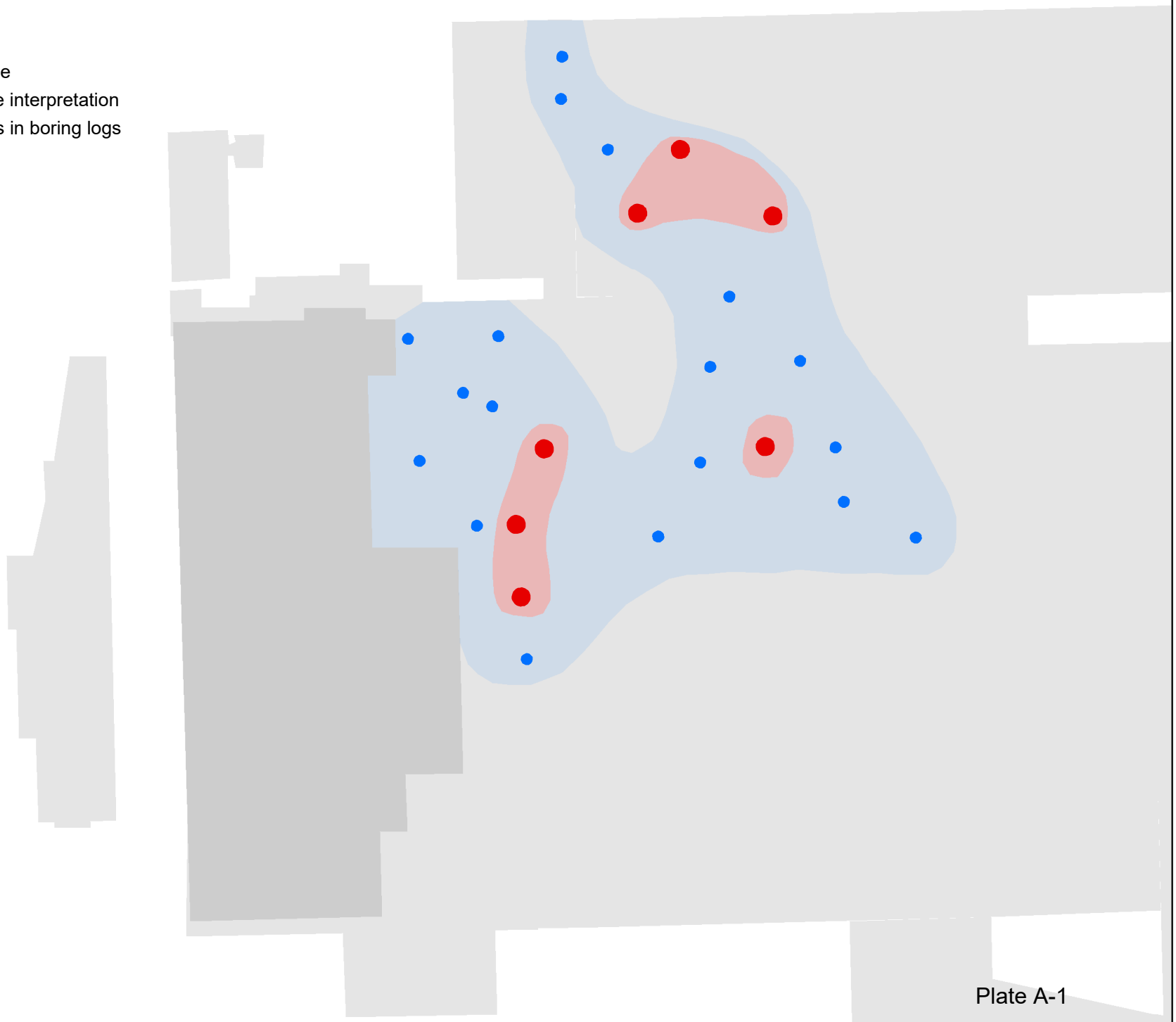
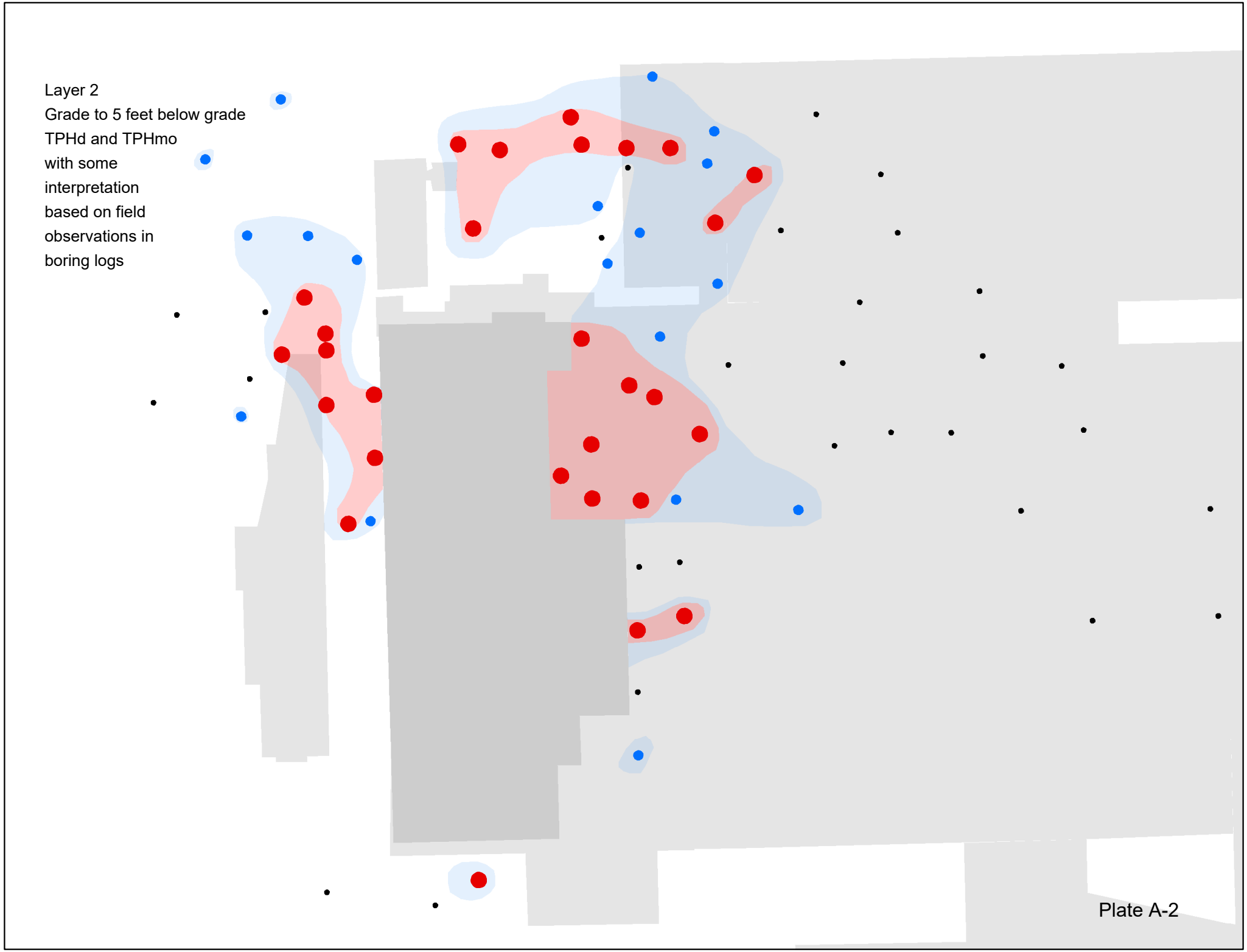


Plate A-1


Layer 2
Grade to 5 feet below grade
TPHd and TPHmo
with some
interpretation
based on field
observations in
boring logs
Plate A-2

Layer 3
5-10 feet below grade.
TPHd and TPHmo with some interpretation based on field observations in boring logs.

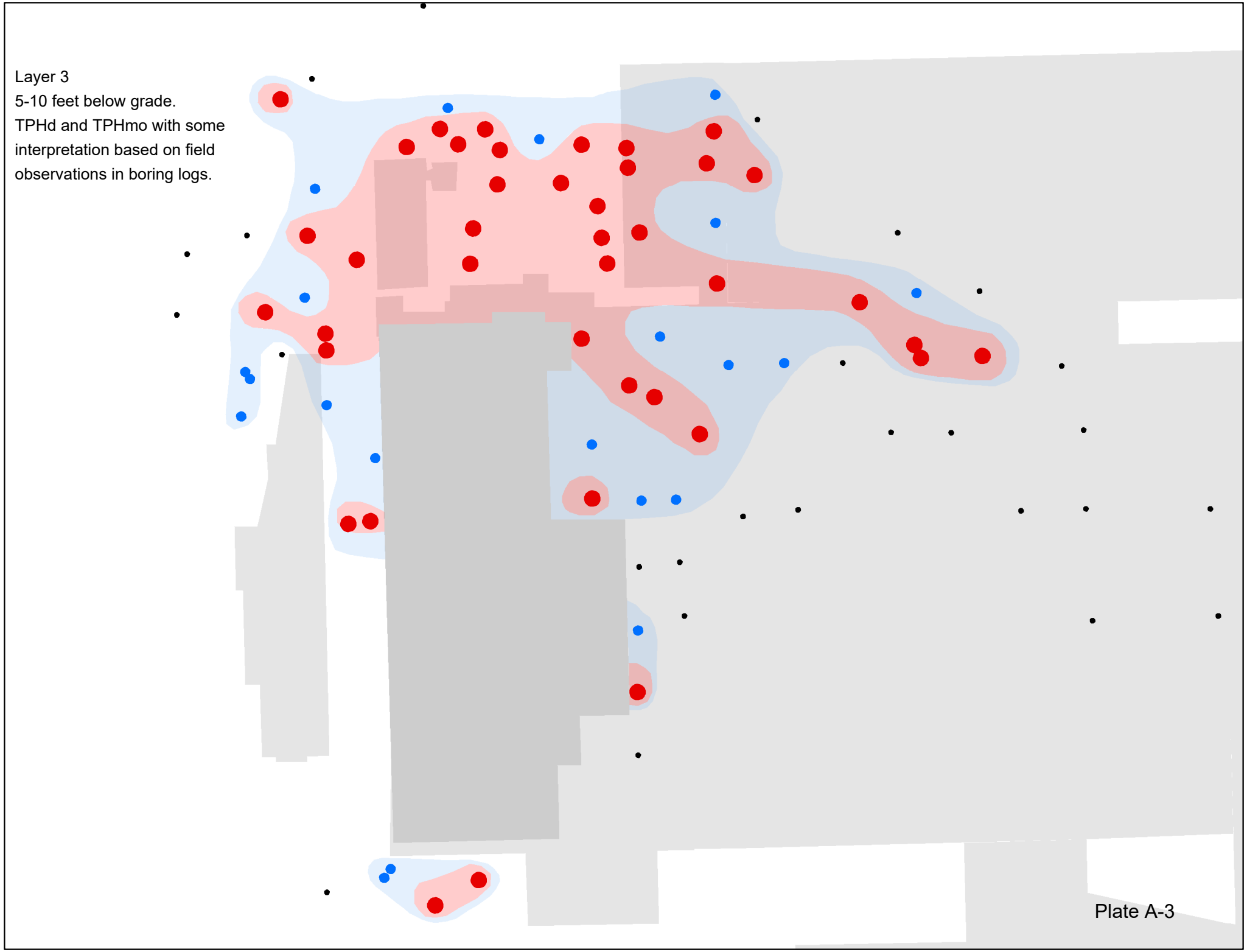


Plate A-3

APPENDIX B

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APPENDIX B
SOIL VAPOR PROBE INSTALLATION AND SAMPLING

Task B-1. Install Temporary Soil Vapor Probes

- CKG will oversee a California C-57 licensed driller to install temporary soil vapor probes. 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:

- Each vapor probe will include a 1-inch stainless steel vapor screen placed at five 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 B-2 Sample and Analyze Temporary Soil Vapor Probes

- CKG will collect one round of soil vapor samples from each of the probe locations per the DTSC Advisory. 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 stated analyses.

APPENDIX C

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APPENDIX C
GEOPROBE SOIL SAMPLING

C-1 FIELD PREPARATION

Before performing work in the field, environmental staff review the scope of work, prepare a health and safety plan, coordinate the work to be done with their supervisor, assemble the necessary sample containers, and check, calibrate and clean equipment to be used in the field. When underground utilities may exist at a site where subsurface soil samples are being collected, USA Underground is contacted with the boring locations and the scheduled date of drilling, or a utility locating firm is employed to check the boring locations. Proper traffic control measures are carried out during roadwork.

C-2 SUBSURFACE SAMPLING

C-2.1 Geoprobe™ Sampling

Subsurface soil samples will be collected from soil borings. Soil borings will be advanced using a truck or track-mounted Geoprobe™ sampler. The Geoprobe™ sampler uses a direct push technology to advance a 1-½ inch sampler into the ground. The 4 foot long sampler is lined with clear acetate tubing to allow for continuous logging. A geologist registered with the State of California will log samples.

C-2.2 Equipment Decontamination

To reduce the potential for cross-contamination, samplers and associated equipment will be cleaned with a trisodium phosphate wash and rinsed with distilled water prior to collecting each soil sample.

C-2.3 Soil Sample Collection

The geologist will collect samples for quantitative analysis by cutting a six-inch long length of tubing at selected depths. The ends of the tube will be covered with Teflon and sealed with tight-fitting plastic caps.

After the samples are collected they will be individually labeled. The label will include CKG Environmental's name, job number, the date and time the sample was collected, the employee's name and a unique sample identifier.

C-2.4 Groundwater Sample Collection

The driller will install a Hydropunch™ sampler at the bottom of each boring so that a groundwater sample can be collected. The Hydropunch™ sampler consists of a 1-½ inch diameter PVC screen with a stainless steel tip on the end. The sampler is pushed approximately two feet beyond the bottom of the hole and water is allowed to fill it. Groundwater will be recovered using a small bailer and placed in laboratory prepared jars.

C-2.5 Sample Handling

After labeling, the sample is immediately stored in an iced cooler for transport to the analytical laboratory. A laboratory chain-of-custody form is attached to the cooler. The chain-of-custody form includes CKG Environmental's name, address and telephone number, the name of the individual who performed the sampling, the sample numbers, the date and time the samples were collected, the number of containers each sample occupies, and the analyses for which the samples are being submitted, if any. Each person who handles the samples, including all CKG employees and the receiving employee of the analytical laboratory when the samples are delivered, signs the chain-of-custody form.

C-2.7 Soil Boring Closure and Soil Cutting Disposal

Soil borings are closed immediately after the collection and logging of soil samples. Closure is accomplished by grouting the boring with a cement/bentonite slurry or as otherwise required. Drill cuttings will be properly disposed by Owens-Brockway as part of their ongoing waste stream.