



# AEI Consultants

Environmental & Engineering Services

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By Alameda County Environmental Health 9:58 am, May 24, 2016

May 23, 2016

## Work Plan for Additional Soil Vapor and Sewer Gas Investigation

**Property Identification:**

Lucasey Manufacturing Site  
2744 East Eleventh Street  
Oakland, California

Toxics Case No. RO# 3183

AEI Project No.345989

**Prepared for:**

Risa Investments, LLC

**Prepared by:**

AEI Consultants  
2550 Camino Diablo  
Walnut Creek, California 94567  
(925) 746-6000

Environmental &  
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May 20, 2016

Ms. Dilan Roe  
Alameda County Environmental Health  
1131 Harbor Parkway  
Alameda, California 94502

Subject: Transmittal, Work Plan for Additional Soil Vapor and Sewer Gas Investigation  
Lucasey Manufacturing Site  
2744 East Eleventh Street, Oakland, California  
Toxics Case No. RO0003183

Dear Miss Roe:

Please find enclosed the *Work Plan for Additional Soil Vapor and Sewer Gas Investigation* presented the proposed additional investigation activities at 2744 East Eleventh Street in Oakland, California. A draft copy of the work plan was provided for your review on April 8, 2016 prior to performing the investigation.

On behalf of Risa Investments, LLC, I declare under penalty of perjury, that the information and/or recommendations contained in the attached report for the above-referenced site are true and correct to the best of my knowledge.

If you have any questions or need additional information, please do not hesitate to contact Mr. Trent Weise of AEI Consultants at (408) 559-7600.

Sincerely,

Risa Investments, LLC

A handwritten signature in black ink that reads "Dan D." with a stylized flourish at the end.

Daniel Dunigan  
Development Manager

Enclosures



May 23, 2016

Ms. Dilan Roe  
Alameda County Department of Environmental Health  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California 94502

**Subject: Work Plan for Additional Soil Vapor Investigation  
and Sewer Gas Investigation**

Lucasey Manufacturing Site  
2744 East Eleventh Street, Oakland, California

Dear Ms. Roe:

On behalf of Risa Investments, LLC, AEI Consultants (AEI) appreciates the opportunity to submit this work plan for additional subsurface investigation at the Lucasey Manufacturing Site located at 2744 East Eleventh Street in Oakland, California ("the Site"). The Site is currently in the planning stages of redevelopment for residential use of the existing buildings. This work plan was developed based on the recommendations of the Alameda County Department of Environmental Health (ACDEH) during the April 1, 2016 meeting between AEI, ACDEH, and Riaz Development (RIAZ), the potential purchaser of the Site.

The purposes of this additional soil vapor and sewer gas investigations are to

- a) Provide additional soil vapor data to assess the temporal variability of soil vapor data from the March 2016 sampling event and other historical soil vapor sampling events;
- b) Provide additional soil vapor data to extend the delineation of the tetrachloroethene (PCE) and benzene soil vapor plumes beyond the footprint of the on-site structure;
- c) Investigate the hypothesis that the on-site sewer lines are a primary source of the on-site soil vapor contamination.

Data collected as part of this investigation is intended to supplement historical data to determine if the proposed Risk Management Plan and the potential data driven separation of work and live spaces as appropriate for the protection of human health.

**BACKGROUND**

The Site comprises approximately 2.32 acres and is located in an urban mixed use area of Oakland, California, consisting of commercial, residential, and industrial uses. The Site is currently developed with a 104,008 square-foot building built between 1920 and 1922 that is currently



## Work Plan for Additional Soil Vapor and Sewer Gas Investigation

Lucasey Manufacturing Site  
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used for manufacturing, warehousing, and office space and a four-story tower. The Site vicinity is shown on Figure 1.

The Site is underlain by generally discontinuous layers of fine-grained deposits comprised of gravely-silt, silty-sands and clay. Two water-yielding horizons have been identified at the Site. First encountered water is observed in an upper unconfined to semi-confined zone present to a depth of approximately 21 feet below ground surface (bgs). A deeper confined zone is present from 24 feet bgs to an unknown depth, which is comprised of clayey-sands.

Petroleum hydrocarbons were released to the subsurface at the Site presumably from a fuel oil tank formerly located in what is now a parking lot located in the southern corner of the Site. Residual petroleum hydrocarbons in Site media include:

- The presence of petroleum hydrocarbons in soil vapor were assessed across the Site and documented in an August 18, 2008 *Results of Gore-Sorber™ Soil Vapor Survey and Recovery Well Installation* report. However, Gore-Sorber™ sampling does not provide sufficient information to assess the potential for vapor intrusion at the Site.
- Soil vapor samples collected on-site in June 2009 yielded benzene at a maximum concentration of 22 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) in the soil vapor sample collected from ASV-7. Elevated concentrations of benzene and ethylbenzene were detected in soil vapor samples collected from off-site locations ASV-3 and ASV-4 at maximum concentrations of 740 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and 2,600  $\mu\text{g}/\text{m}^3$ , respectively. Naphthalene was not detected in soil vapor samples collected and analyzed at or above laboratory method detection limits.

The fuel release case (RO0002902) was granted closure by ACDEH in a letter dated July 31, 2014. The case was granted closure under Scenario 4 of the Low-Threat Underground Storage Tank Closure Policy (LTCP). The Site Management Requirements of the Case Closure Summary includes that "[b]ased on the depth and type of petroleum hydrocarbons, the potential for exposure is low and the contamination does not appear to present a risk unless exposed by excavation. Therefore, case closure is granted for the current commercial land use." The conclusion section of the Case Closure Summary notes that "...re-evaluation of this case is required if any excavation takes place below a depth of 8 feet bgs."

To address potential risks posed by residual petroleum hydrocarbons in soil vapor, soil, and groundwater at the Site to future construction workers, commercial workers, and residents, AEI prepared a Risk Management Plan (RMP). The RMP recommended installing a vapor intrusion mitigation system within the building to protect indoor air from the concern of vapor intrusion. In discussions with the ACEH upon their review of the RMP, the ACEH requested additional subsurface investigation to assess soil vapor beneath the building in the vicinity of the known area where residual petroleum hydrocarbons are present beneath the Site. In accordance with the Work Plan dated October 30, 2015, AEI advanced and installed temporary soil vapor probes at a depth of five feet below ground surface (bgs) and sub-slab vapor probes at eight (8) locations (ASV-16, ASV-17, ASV-19, ASV-20, ASV-21, ASV-22, ASV-23, and ASV-24) in the vicinity of the known area where residual petroleum hydrocarbons are present beneath the Site. This initial scope

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Lucasey Manufacturing Site  
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of work was completed in November, 2015. Soil vapor and sub-slab vapor samples from this November 2015 investigation identified benzene and perchloroethene (PCE) as chemicals of potential concern (COPC) with both these compounds present in sub-slab and soil gas samples in excess of the conservative risk screening level for the protection of indoor air. Based on the results of the November 2015 investigation, AEI expanded the scope of the investigation to include an additional seventeen (17) temporary soil vapor probes installed at five feet bgs in a gridded pattern throughout the interior of the on-site manufacturing building (ASV-25 through ASV-41). The expanded scope and proposed sample locations were provided to the ACEH in an electronic mail message dated December 6, 2015 and approved prior to execution. The results of both the November and December phases of the soil vapor investigation are reported in the *Report on Soil Vapor Investigations* dated January 19, 2016. Briefly, the results of this report can be summarized as follows:

- Benzene was detected in 24 of the 25 slab soil vapor samples collected and analyzed, and observed at a maximum concentration of 46.9 µg/m<sup>3</sup>.
- PCE was detected in 23 of the 25 five-foot bgs soil vapor samples collected and analyzed, and observed at a maximum concentration of 1,100 µg/m<sup>3</sup>.

these two investigations characterized the lateral extent of volatile organic compounds (VOCs) including petroleum hydrocarbons and PCE, beneath the existing building at the Site. Benzene and PCE concentrations in soil vapor were observed at concentrations slightly above conservative risk screening levels for the protection of indoor air under a residential use scenario.

Subsequent to the *Report on Soil Vapor Investigation*, the ACEH requested a review of the available soil, groundwater, and soil-vapor analytical data to determine if the proposed soil vapor mitigation system was sufficient and appropriate to be protective of human health for the redevelopment of the Site for residential use. As a result of the review of the compiled data, the ACDEH requested that additional work be conducted to attempt to identify an on-site source of PCE soil vapor. In accordance with the work plan dated March 11, 2016, AEI conducted additional assessment activities which included the advancement and installation of twelve semi-permanent soil vapor probes to five and a half feet below ground surface and seven soil borings to groundwater for the collection of soil and groundwater samples. The semi-permanent soil vapor probes were installed in twinned locations of historical temporary soil vapor probes ASV-16 through ASV-29 excluding ASV-18, ASV-24, and ASV-26. Additionally, AEI conducted a survey of the on-site and historic sanitary sewer system to identify potential preferential pathways for soil vapor migration or potential migration pathways for contaminants. The results of this additional investigation are reported in the *Report on Additional Soil, Groundwater, and Soil Vapor Investigations* dated March 30, 2016. Briefly, the results of this report can be summarized as follows:

- Chemicals of potential concern (COPCs) were not identified above the method detection limit in any of the soil samples.
- COPCs were not present in groundwater in excess of historical groundwater concentrations or at levels which would be indicative of an on-site groundwater source of COPCs.

## **Work Plan for Additional Soil Vapor and Sewer Gas Investigation**

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- Although PCE was present in soil vapor samples above the Tier II residential environmental screening levels (ESLs), PCE in soil vapor was generally lower than in previous sampling events but overall consistent with the historical soil vapor PCE plume.
- Benzene was present above both historic soil vapor benzene levels and the Tier II benzene ESL. The distribution of benzene in soil vapor was inconsistent with historical benzene soil vapor data.

On April 1, 2016, AEI met with the ACEH to discuss the results of the March 30, 2016 *Report on Additional Soil, Groundwater, and Soil Vapor investigations* and their impact on the planned redevelopment of the Site for residential use. Based on this meeting, the ACEH agreed that a soil vapor mitigation system is appropriate for the protection of human health and the environment, however, requested that additional investigation be conducted to:

- a) Confirm data quality of historical soil vapor data;
- b) Delineate benzene and PCE soil vapor plumes beyond the footprint of the on-site building;
- c) Assess the hypothesis that on-site sewer lines are acting as migration pathways and primary sources of on-site benzene and/or PCE soil vapor contamination.

Additionally, the ACEH requested that AEI prepare a conceptual site model for sources, migration, and transport of benzene as well as a conceptual design for the proposed on-site vapor mitigation system.

### **SCOPE OF WORK**

This work plan is designed to address specific concerns and requests made by the ACEH related to additional subsurface investigation during the April 1, 2016 meeting between Riaz, ACEH, and AEI. AEI proposes the following scope of work:

#### **Preliminary Field Activities**

Prior to performing field activities, AEI will perform the following preliminary activities:

- Obtain soil boring permits from the Alameda County Water District.
- Update the existing site-specific Health and Safety Plan (HASP) for this scope of work.
- Notify the ACEH of the proposed field schedule.
- Notify Underground Service Alert of the proposed subsurface drilling activities.

#### **Installation of Additional Semi-Permanent Soil Vapor Probes.**

In order to extend to delineation of the on-site benzene and PCE soil vapor plumes beyond the footprint of the on-site building, AEI will install thirteen new semi-permanent soil vapor probes (ASV-43 through ASV-55) throughout the on-site parking lot and the perimeter of the existing on-site building in areas where the extent of the benzene or soil vapor plume extends beyond the footprint of the Lucasey Manufacturing building (Figure 2).

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- ASV-43 will be installed to the west of the ASV-17 in the vicinity of an on-site sewer lateral in the direction of the soil vapor PCE plume.
- ASV- 44 will be installed in the vicinity of the East Eleventh and Lisbon Avenue sewer access point.
- ASV-45 through ASV-53 will be installed throughout the parking lot of the Lucasey Manufacturing building to allow for the extrapolation of the soil vapor plume beyond the footprint of the existing structure in the direction of potential future development.
- ASV-54 and ASV-54 will be installed east of the Lucasey Manufacturing Building in the vicinity of an on-site sewer lateral and in the direction of the soil vapor PCE and benzene plumes.

Soil vapor probes will be installed in general accordance with the procedures outlined in the joint California Environmental Protection Agency, Department of Toxic Substances Control, Los Angeles Regional Water Quality Control Board, and the San Francisco Regional Water Quality Control Board July 2015 *Active Soil Gas Investigation Advisory* ("the Advisory").

### Collection of Additional Soil Vapor Samples.

Soil Vapor Samples will be collected from each of the semi-permanent soil vapor probes (ASV-16 through ASV-55 excluding ASV-18, ASV-24, and ASV-25) in general accordance with the *Advisory*. Each soil vapor probe will be allowed to equilibrate for a minimum of 48 hours after installation before sample collection. Prior to purging or sampling, a shut in test will be conducted to check for leaks in the sample train. The shut in test will be conducted by inducing a vacuum of 28 inches of mercury (in-Hg) into each closed and sealed sample train. The shut in test will be considered to have passed if the induced vacuum does not dissipate by more than 1 in-Hg over two hours. During purging and sampling, a leak check will be performed by encasing the soil vapor well and sample train in a shroud and inducing and maintaining a roughly 20% helium atmosphere. Once the shroud atmosphere is stabilized, soil vapor point will be purged for three well volumes. After purging but prior to sampling, a field helium meter will be used to screen the concentration of helium within the sample train. A sample will be considered to have passed if the helium concentration in the sample train does not exceed 5% of the concentration in the shroud. After purging and passing the leak test, soil vapor samples will be collected. Soil vapor samples collected as part of this investigation will be analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), and chlorinated ethenes via USEPA Method TO-15 and Helium *via* ASTM Method 1946-90D.

### Sewer Gas Assessment

In order to assess if on-site sanitary sewer lines are a primary source for soil vapor contamination at the site, AEI will collect sewer gas samples from on-site shallow sewer laterals and on-site deep sewer mains.

- AEI will collect a total of two grab samples (GSG-03 and GSG-04) from sewer laterals using methods similar to those described in the *Advisory*. Sample locations are depicted on Figure 3.
  - Samples will be collected using one liter summa canisters with flow controllers calibrated to approximately 150 milliliters per minute.

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- Sewer gas will be isolated from atmospheric gas by extending sample tubing into toilets beyond the J-trap.
- To ensure representative sewer gas samples, a total of 10 manifold volumes will be purged prior to sampling to ensure that any ambient atmosphere which is inadvertently introduced is removed to the extent feasible.
- Helium will be used as a leak check compound. The sample manifold and toilet bowl will be encased in a shroud to create a roughly 20% helium atmosphere. After purging, but prior to sampling, atmosphere within the sample train will be screened using a hand held helium detector to ensure that ambient atmosphere is not being introduced to the sample train.
- AEI will collect a total of two grab samples from the on-site sewer main. Samples will be collected by accessing the sewer main from manholes located within building 1 (GSG-01) and at the corner of East Eleventh Street and Lisbon Avenue (GSG-02). Samples will be collected using methods which are as close as practically possible the Advisory. Sample locations are depicted on Figure 3.
  - Samples will be collected using evacuated on liter summa canisters with a flow controller not to exceed 200 milliliters per minute.
  - Sample train influent will be located as close to the sewer main flow as feasible without introducing liquid into the sample train.
  - To ensure representative sewer gas samples, a total of 10 manifold volumes will be purged prior to sampling to ensure that any ambient atmosphere which is inadvertently introduced is removed to the extent feasible.
  - Helium will be used as a leak check compound. Due to the volume of the sewer main access, the manhole and sewer will not be considered as part of the sample train and will thus not be subjected to a helium atmosphere. The sample manifold will be encased in a shroud to create a roughly 20% helium atmosphere. After purging, but prior to sampling, atmosphere within the sample train will be screened using a hand held helium detector to ensure that ambient atmosphere is not being introduced to the sample train.
- AEI will collect a total of two passive sewer gas samples from the on-site sewer main using the Waterloo Membrane Sampler™, a passive membrane diffusion sampler (passive sampler). Samples will be collected by accessing the sewer main from manholes located within building 1 (PSG-01) and at the corner of East Eleventh Street and Lisbon Avenue (PSG-02).
  - Samples will be collected by suspending the passive sampler over the liquid flow of the sewer line and will remain suspended for a 24 hour period before being collected and containerized. The intent of the passive samplers is to capture sewer gas over a 24 hour period to account for temporal variations in benzene and PCE vapor concentration that may be associated with daily fluctuations in sewer flow that may not be captured by the grab samples.

**Work Plan for Additional Soil Vapor and Sewer Gas Investigation**

Lucasey Manufacturing Site  
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- Passive samplers will be installed immediately following the collection the respective grab samples from each location.

**Data Review and Reporting**

Upon receipt of the analytical results, AEI will compare the observed chemical concentrations, if present, to the most recent Environmental Screening Levels (ESLs) developed by the California Regional Water Quality Control Board, San Francisco Bay Region (February 2016) and using the procedures outlined in the *Final, Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance)*, October 2011, issued by the DTSC. AEI will prepare a report presenting the results of the investigation and our assessment of the data related to the protection of indoor air that will be submitted to the ACEH. The report will include a description of the sampling methodology, tables summarizing the sample results, and a figure presenting the sample locations.

**CLOSING**


AEI appreciates working with the ACEH to move this project forward and trust that this document meets with your approval. If you have any questions or comments, do not hesitate to contact Mr. Trent A. Weise, P.E. at (408) 559-7600 or [tweise@aeiconsultants.com](mailto:tweise@aeiconsultants.com).

Sincerely,

**AEI Consultants**




Trent A. Weise, P.E. (C64480)  
Vice President



Jonathan E. Sanders, E.I.T. (156699)  
Project Engineer

Copies:

Mr. Paul Dicarlo – Risa Investments, LLC

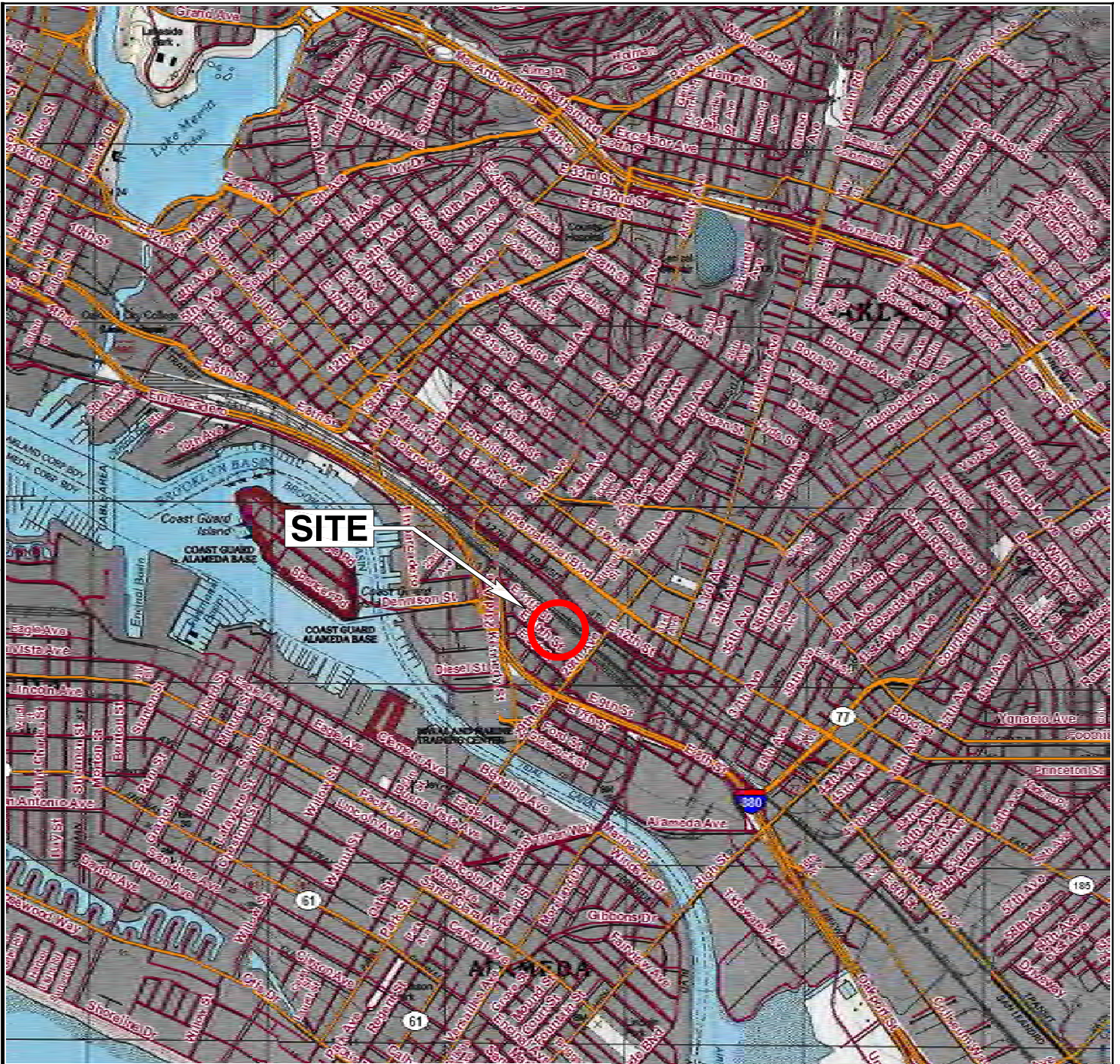
Enclosures

**REFERENCES**

The regulatory record for this Site can be found on the State of California GeoTracker Website at [http://geotracker.waterboards.ca.gov/profile\\_report.asp?global\\_id=T0600133151](http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600133151).

## **FIGURES**



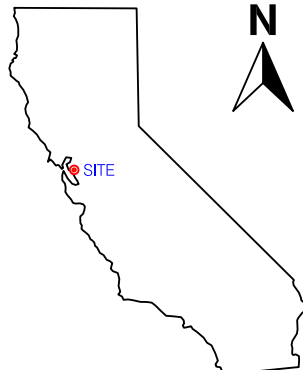


**LEGEND**



 Site Location

**REFERENCE LOCATION**



Map Source:  
 USGS 7.5 Minute  
 Topographic Quadrangle Map,  
 Oakland, East, CA - 1997

**AEI Consultants**  
 San Jose, California

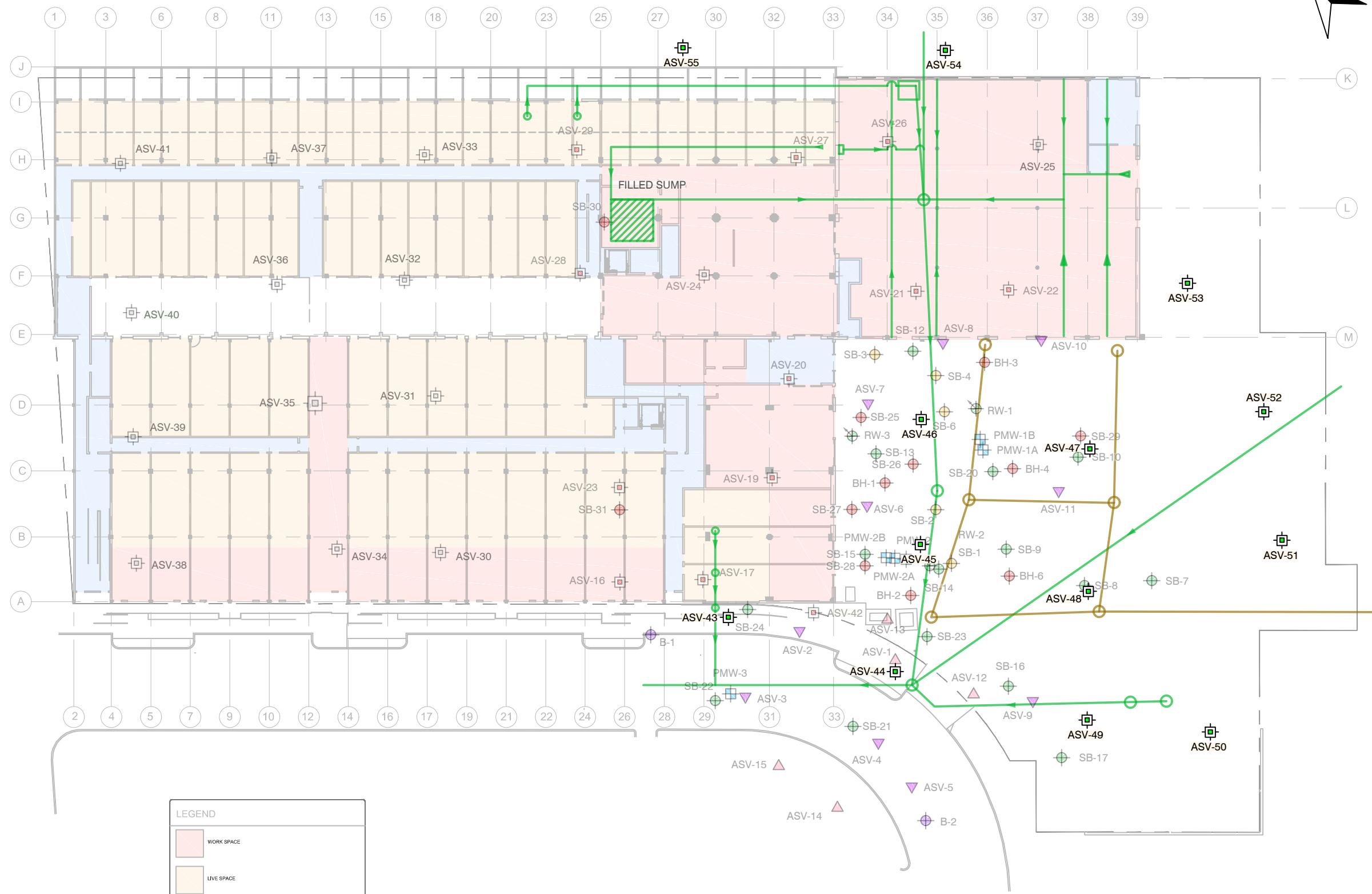
**SITE LOCATION MAP**

2744 East 11th Street  
 Oakland, California

**FIGURE 1**  
 Project No. 345989



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**LEGEND**

- WORK SPACE
- LIVE SPACE
- CIRCULATION, MISC. SPACE
- OPEN SPACE

**LEGEND**

- ASV-24 Proposed Soil Vapor Probes (AEI 4/11/16)
- ASV-24 Semi-Permenant Soil Vapor Probes (AEI 3/1/16)
- ASV-24 Temporary Soil Vapor Probes (AEI)
- ASV-18 Not Completed Soil Vapor Sample Location (AEI 11/2015)
- RW-3 Product Recovery Well (Clearwater)
- PMW-3 Product Monitoring Well (ERM)
- SB-24 Soil Boring (Clearwater)
- SB-6 Soil Boring (Terra Firma)
- SB-14 Soil Boring (AEI)
- B-2 Soil Boring (ERM 2010)
- ASV-11 Soil Vapor Sample Location (ERM, 2009)
- ASV-15 Soil Vapor Sample Location (ERM, 2010)
- Proposed Sewer Gas Grab Sample Location
- Proposed Sewer Gas Passive Sample Location
- Sanitary Sewer and Manhole Locations (Arrow Indicates Flow Direction)
- Storm Drain and Cleanout Locations

**KEY PLAN**

SCALE: N.T.S.

0 40 80  
APPROXIMATE SCALE  
IN FEET

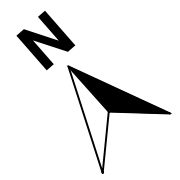
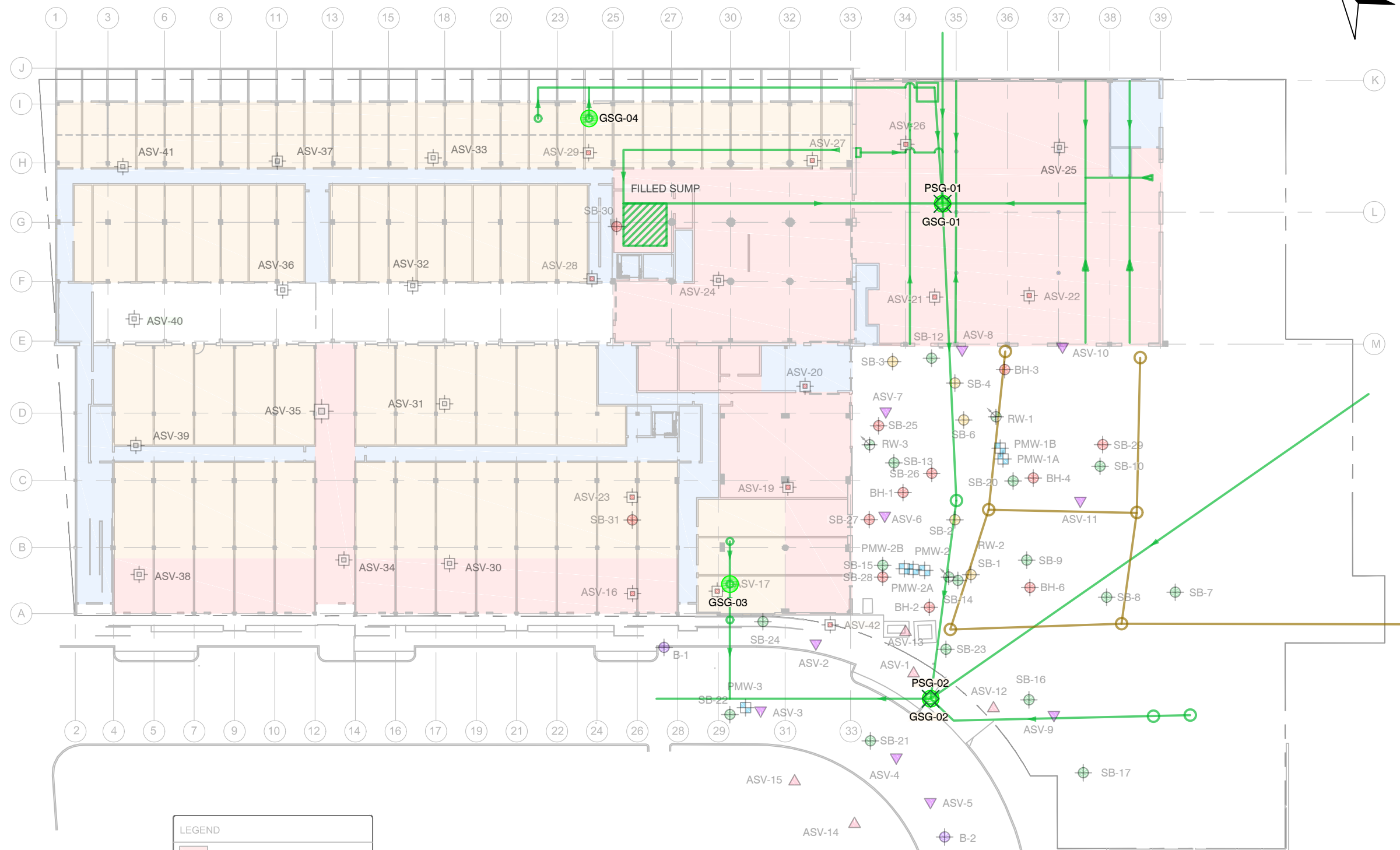
**AEI Consultants**  
2500 Camino Diablo  
Walnut Creek, California

**Proposed Additional Soil Vapor Probe Locations**

2744 East 11th Street  
Oakland, California

**FIGURE 02**  
Project No. 345989

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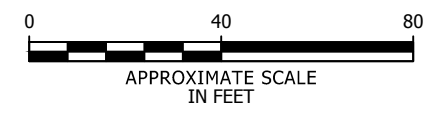
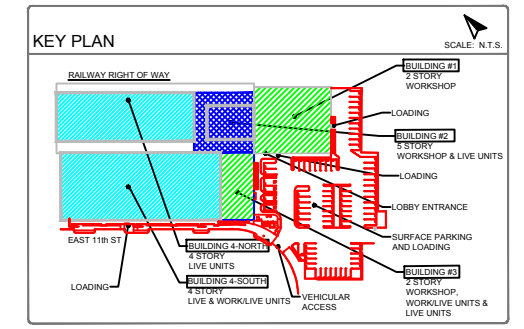


**LEGEND**

- ASV-24 Proposed Soil Vapor Probes (AEI 4/11/16)
- ASV-24 Semi-Permenant Soil Vapor Probes (AEI 3/1/16)
- ASV-24 Temporary Soil Vapor Probes (AEI)
- ASV-18 Not Completed Soil Vapor Sample Location (AEI 11/2015)
- RW-3 Product Recovery Well (Clearwater)
- PMW-3 Product Monitoring Well (ERM)
- SB-24 Soil Boring (Clearwater)
- SB-6 Soil Boring (Terra Firma)
- SB-14 Soil Boring (AEI)
- B-2 Soil Boring (ERM 2010)
- ASV-11 Soil Vapor Sample Location (ERM, 2009)
- ASV-15 Soil Vapor Sample Location (ERM, 2010)
- Proposed Sewer Gas Grab Sample Location
- Proposed Sewer Gas Passive Sample Location
- Sanitary Sewer and Manhole Locations (Arrow Indicates Flow Direction)
- Storm Drain and Cleanout Locations

**LEGEND**

- WORK SPACE
- LIVE SPACE
- CIRCULATION, MISC. SPACE
- OPEN SPACE



**AEI Consultants**  
 2500 Camino Diablo  
 Walnut Creek, California

**Proposed Sewer Gas Sample Locations**

2744 East 11th Street  
 Oakland, California

**FIGURE 03**  
 Project No. 345989