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By Alameda County Environmental Health 11:48 am, Oct 02, 2017

September 29, 2017

Alameda County Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Attention: Mr. Mark Detterman, PG, CEG, Senior Hazardous Materials Specialist

TRANSMITTAL LETTER
REVISED WORK PLAN FOR FOCUSED OFF-SITE SUBSURFACE VAPOR EVALUATION
6701, 6705, and 6707 SHELLMOUND STREET
EMERYVILLE, CALIFORNIA
Fuel Leak Case No. RO0000548
Geotracker Global ID T0600100894

Dear Mr. Detterman:

Submitted herewith for your review is the *Revised Work Plan for Focused Off-Site Subsurface Evaluation, 6701, 6705, and 6707 Shellmound Street, Emeryville, California* dated September 29, 2017, prepared by PES Environmental, Inc.

I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document or report submitted on my behalf to ACDEH's FTP server and the SWRCB's GeoTracker website.

Very truly yours,

ANTON EMERYVILLE, LLC

R. Green

Rachel Green
Senior Development Manager

PES Environmental, Inc.
Engineering & Environmental Services

September 29, 2017

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Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Attention: Mr. Mark Detterman, P.G., C.E.G.

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EMERYVILLE, CALIFORNIA
FUEL LEAK CASE NO. RO0000548
GEOTRACKER GLOBAL ID T0600100894

Dear Mr. Detterman:

On behalf of Anton Emeryville, LLC (Anton), PES Environmental, Inc. (PES) has prepared this Revised Work Plan for Focused Off-Site Subsurface Vapor Evaluation (Revised Work Plan) for work to be conducted at the off-site property located at 6601-6603 Shellmound Street, Emeryville, California (off-site property). The subject property is located at 6701, 6705, and 6707 Shellmound Street, Emeryville, California (site) and is currently listed as an open Spills, Leaks, Investigation and Cleanup (SLIC) case with Alameda County Department of Environmental Health (ACEH) as the lead environmental regulatory agency. The site location is shown on Plate 1. This Revised Work Plan was prepared based on discussions with ACEH on August 10 and September 19, 2017, with representatives of ACEH, Anton, PES, and Nady (owner of the subject property) in attendance, and email correspondence from ACEH on September 19 and 28, 2017.

PES is assisting Anton in working with ACEH to obtain SLIC case closure as part of the site redevelopment process. Numerous investigations have been conducted at the subject and off-site properties to assess conditions in soil, soil gas, and groundwater as part of pre-construction site characterization activities. A draft Corrective Action Plan (CAP) was prepared and submitted to ACEH in August 2017[1]. The draft CAP was noticed and made available for a 30-day public review and comment period which ended September 18, 2017. No comments were received by ACEH on the CAP.

[1] PES, 2017. *Draft Corrective Action Plan, 6701, 6705, and 6707 Shellmound Street, Emeryville, California, Fuel Leak Case No. RO0000548, Geotracker Global Id T0600100894.* August 14.

The scope of work presented in this Revised Work Plan includes an assessment of soil vapor conditions while an on-site soil vapor extraction (SVE) system was operational and non-operational, as well as an assessment of soil vapor and sub-slab vapor conditions beneath and adjacent to the off-site property building to assess post-soil excavations conditions. The SVE system has been operated as an interim remedial measure (IRM).

BACKGROUND INFORMATION

Current Site and Vicinity Characteristics

The present-day off-site building was constructed in 1959 with a slab-on-grade concrete flooring and has wood framing and pre-fabricated concrete walls. The exterior of the subject property consists of asphalt paved parking and driving areas on the south and west sides of the building. Historical information indicates the building was initially in use as a warehouse and wholesale distribution facility for sugar and liquor items. The original warehouse building was converted to office space during various renovations spanning the 1970s to 1990s. The site was occupied by Sybase in the early 1990s and Ex'pression College for Digital Arts has occupied the off-site building beginning in 1998.

Site Geology and Hydrogeology

Based on the results of investigations performed on the subject property and in the vicinity, the subject property is underlain by fill material overlying deposits of native silts and clays known locally as Old Bay Mud. The fill material ranges in thickness from approximately 10 to 19 feet and consists primarily of coarse-grained sands and gravels that contain varying amounts of fines, and fine-grained silts and clay. The fill material often contains debris (e.g., brick, concrete, metal, asphalt, glass, wood, fabric, and rubber). Fine-grained soils are present directly below the fill material, and generally consisted of dark-colored clays and occasional silts with organic material that represent Old Bay Mud deposits.

Saturated conditions, indicative of shallow groundwater, has been encountered at depths ranging from approximately 8 to 13.5 feet bgs. The predominant groundwater flow direction beneath the site is to the south-southwest toward the San Francisco Bay.

Contamination attributable to the non-native fill materials originally used to create the land along the bay-shore area of Emeryville, including the site and immediate vicinity, includes detectable concentrations in soil and shallow groundwater resultant from the presence of volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and metals[2] in the non-native fill materials.

[2] PES, 2015. *Conceptual Site Model, 6701 – 6707 Shellmound Street, Emeryville, California, Fuel Leak Case No. RO0000548, GeoTracker Global ID T0600100894*. February 6.

PRIOR INVESTIGATIONS AND REMEDIAL MEASURES

Based in part on review of PES' April 8, 2016 *Pre-Construction Subsurface Investigation Report*, which documented the presence of elevated VOCs in soil vapor and soil adjacent to the shared property boundary between the subject property and the off-site property, ACEH requested delineation of the extent of VOC contamination potentially affecting soil, soil gas, and groundwater at the off-site property[3]. Investigations conducted to address ACEH's request, as well as on-site activities conducted to address on-site VOC contamination in soil vapor, are summarized below.

October 2016 Off-Site Subsurface Investigation

On behalf of Anton, PES conducted a subsurface investigation in October 2016 at the off-site property. The off-site investigation was conducted in accordance with PES' Work Plan for Off-Site Subsurface Investigation dated August 29, 2016 and conditionally approved in a letter from ACEH dated September 4, 2016. The primary objective of the off-site investigation included delineation of the extent of VOC contamination, primarily vinyl chloride, affecting soil, soil gas, and groundwater at the 6601-6603 Shellmound Street property.

The results of the off-site subsurface investigation were presented in a report entitled Off-Site Sub-Surface Investigation Report dated December 21, 2016[4]. Subsurface conditions with respect to the magnitude and horizontal and vertical extent of VOCs at the western portion of the off-site property were substantially characterized. With the exception of chlorinated VOCs (in particular, vinyl chloride), the laboratory analytical detections of VOCs and lithologic observations were generally consistent with the known presence of fill material in the site vicinity.

Vinyl chloride was not detected in any of the 11 sub-slab vapor samples, and oxygen was present at generally high levels in all sub-slab vapor samples. The sub-slab data indicated that due to the presence of high levels of oxygen in shallow soil beneath the building, vinyl chloride concentrations appeared to attenuate from relatively higher soil gas concentrations at 5 and 10 feet bgs, to less-than-detectable concentrations beneath the building. The absence of vinyl chloride in sub-slab vapor samples further support the presence of an active aerobic bioattenuation zone beneath the building[5].

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[3] Alameda County Environmental Health (ACEH), 2016. Conditional Interim Remedial Plan Approval and Work Plan Request; SCP Case RO000548 and Geotracker Global ID T0600100894, Mike Roberts Color Production, 6707 Bay Street, Emeryville, CA 94608. April 26.

[4] PES, 2016. Off-Site Subsurface Investigation Report, 6701, 6705, and 6707 Shellmound Street, Emeryville, California, Fuel Leak Case No. RO0000548, Geotracker Global ID T0600100894. December 21.

[5] Similar results (high oxygen, low VOCs) were also identified in prior sub-slab vapor samples collected between 2001 and 2014 in the southern portion of the building. (http://geotracker.waterboards.ca.gov/profile_report-.asp?global_id=T0600100470).

Additional investigation was recommended to laterally define concentrations of vinyl chloride-affected soil vapor (at 5 and 10 feet bgs) at the western and southern portion of the off-site building.

November 2016 – February 2017 On-Site Soil Vapor Extraction

After completion of the off-site investigation, implementation of an interim remedial measure (IRM) consisting of soil vapor extraction (SVE)[6] commenced November 8, 2016 under a Bay Area Air Quality Management District (BAAQMD) permit and ACEH approval. The utilization of a SVE system as an IRM was conducted to reduce on-site concentrations of VOCs in the subsurface prior to the initiation of the planned development activities and to reduce potential exposure to future site users. The SVE system consists of 19 SVE wells and 10 air inlet wells. Vapors extracted by the SVE system are routed through a BAAQMD-permitted vapor abatement system prior to discharge to atmosphere.

Vapor samples were periodically collected from select SVE wells during operation to assess concentration trends. Based on detected concentrations of vinyl chloride in vapor samples collected on February 9, 2017 that were below site-specific risk-based concentrations, the SVE system was shut down on February 28, 2017 to permit assessment of vapor rebound VOC concentrations. Vapor rebound sampling was conducted on June 1, 2017. The results of the rebound samples showed that select wells (within the near proximity of the source soil) exhibited vapor concentrations at levels above those detected in the February 9, 2017 samples; however, the magnitude and lateral extent of vinyl chloride in vapor was greatly reduced due to the beneficial effect of SVE. The results of the SVE rebound testing support that removal of soil containing residual VOCs at concentrations above the site target cleanup levels will be effective at further reducing concentrations of VOCs in soil vapor. This finding is supported by post-SVE soil sampling conducted on site[7]. The highest levels of vinyl chloride were detected in soil samples located in close proximity to the SVE wells that exhibited the highest rebound concentrations.

Based on the results of the SVE rebound testing, and to limit potential repropagation of vinyl chloride in vapor, PES recommended that the SVE system be intermittently operated (approximately one week per month)[8] until source soil excavation could be conducted. However, due to site security concerns, the SVE blower unit was removed from the site on August 7, 2017. As such, for future pre-demolition SVE operation events the SVE blower unit

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[6] PES, 2016. *Work Plan for Soil Vapor Extraction, 6701, 6705, and 6707 Shellmound Street, Emeryville, California, Fuel Leak Case No. RO0000548, GeoTracker Global ID T0600100894.* April 8.

[7] PES, 2017. *Focused Source Area Soil and Limited Soil Vapor Investigation Report, 6701, 6705, and 6707 Shellmound Street, Emeryville, California, Fuel Leak Case No. RO0000548, GeoTracker Global ID T0600100894.* August 11.

[8] PES, 2017. *Remedial Progress Report No. 8, June 1, 2017 through June 30, 2017, 6701, 6705, and 6707 Shellmound Street, Emeryville, California, Fuel Leak Case No. RO0000548, Geotracker Global Id T0600100894.* July 5.

will be re-mobilized to the site, the SVE system will be operated, and the SVE blower unit will be shut down and transported off-site at the end of the day.

May 2017 Supplemental Off-Site Subsurface Investigation

PES conducted supplemental off-site subsurface investigation activities on May 30 and 31, 2017 at the 6601-6603 Shellmound Street property. The primary objective of the supplemental off-site investigation activities included: (1) delineation of the lateral extent of vinyl chloride in soil gas above the commercial/industrial ESL at the off-site property through installation, sampling, and laboratory analysis of soil vapor samples; and (2) installation of permanent soil vapor monitoring probes to provide data suitable for assessing SVE influence in areas to the south of the SVE system through collection of periodic vacuum measurements (during SVE operation) and collection and analysis of soil vapor samples. The supplemental off-site investigation activities were conducted in accordance the scope, methods, and procedures presented in PES' *Draft Corrective Action Plan* dated January 30, 2017[9] and conditionally approved in a letter from ACEH dated February 2, 2017.

Eight (8) soil vapor monitoring probes were installed at four locations (PSGP1 through PSGP4), as shown on Plate 2. Shallow vapor monitoring probes were placed with screened intervals from at approximately 4.75 to 5.25 feet bgs (PSGP1-5.0 through PSGP4-5.0). A total of four (4) deeper vapor monitoring probes were installed at depths between 7 and 9 feet bgs. The deeper probes were installed shallower than the planned 10-foot bgs screened midpoint due to saturated soil conditions observed during continuous core drilling. PSGP1 was screened from 8.75 to 9.25 feet bgs; PSGP2 was screened from 7.75 to 8.25 feet bgs; and PSGP3 and PSGP4 were screened from 6.75 to 7.25 feet bgs.

Findings based on the supplemental off-site subsurface investigation indicated the western and southern lateral extent of vinyl chloride in shallow soil vapor (5 feet below ground surface [bgs]) was delineated[10]. While a deeper soil vapor sample (8 feet bgs) collected in the parking lot of the southern portion of the property (PSV13-8) had a detected vinyl chloride concentration above the commercial ESL (370 micrograms per cubic meter [$\mu g/m^3$]), the shallow soil vapor sample result (from 5 feet bgs) was below the ESL (PSV13-5; 160 $\mu g/m^3$). Based on the sample location within an exterior parking area, and the indication that shallower soil vapor was below the ESL, no further investigation was recommended.

PES further recommended collecting vacuum in the subsurface from each of the permanent vapor monitoring probes during SVE operation periods, and collecting vapor samples from the probes after cessation of the SVE system to be analyzed for vinyl chloride.

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[9] PES, 2017. *Corrective Action Plan for Soil Vapor Extraction, 6701, 6705, and 6707 Shellmound Street, Emeryville, California, Fuel Leak Case No. R00000548, Geotracker Global ID T0600100894.* January 30.

[10] PES, 2017. *Supplemental Off-Site Subsurface Investigation Report, 6701, 6705, and 6707 Shellmound Street, Emeryville, California, Fuel Leak Case No. RO0000548, Geotracker Global ID T0600100894.* July 6.

August 2017 Corrective Action Plan

On behalf of Anton, PES submitted a Draft Corrective Action Plan (CAP) dated August 14, 2017 to ACEH for review and public comment.

The Draft CAP presents proposed site soil and soil vapor target cleanup levels (TCLs). Proposed actions described in the CAP included:

- Periodic operation of the SVE to further reduce VOC vapor concentrations in the southwest portion of the site to within TCLs and to limit potential repropagation of vinyl chloride in vapor until on-site impacted soil removal could be completed;

- Supplemental soil vapor and soil investigation at on-site locations to establish and evaluate the lateral extent of select VOCs (benzene, 1,1,2,2-PCA, and vinyl chloride) in soil vapor (at 5 and 10 feet bgs) at concentrations above applicable TCLs;

- Supplemental investigation of VOC-impacted soils in the southwestern portion of the site[6];

- Excavation and off-site disposal of soil with contaminant concentrations above respective site TCLs. Collection of soil and soil vapor verification samples to evaluate for reduction of VOCs in soil vapor concentrations. As noted above, based on the results of the SVE rebound testing (which strongly correlate with the results of post SVE soil sampling), removal of site soil containing residual VOCs at concentrations greater than site TCLs will be effective towards immediate, and long term, reductions in concentrations of VOCs in soil vapor at associated on-site and off-site; and

- While not included in the draft CAP, to promote further aerobic degradation of VOC residuals, Oxygen Release Compound (ORC®) will be proposed as an amendment to be added to the bottom of excavations prior to backfilling (considered a non-significant change to the CAP).

SCOPE OF WORK

The objective of the proposed focused off-site subsurface vapor evaluation is to present a plan to further assess VOC vapor conditions beneath the 6601-6603 Shellmound Street property that provides a basis for demonstrating that off-site vapor conditions are suitable for no further action (NFA) after completion of interim remedial SVE operation and the planned on-site impacted soil removal[11]. The primary components of the proposed off-site vapor evaluation include:

[11] Residual vinyl chloride vapor in vadose zone soil (i.e., vapor present within interstitial soil pore spaces) outside excavation areas is expected to attenuate over time after completion of completion of SVE and source soil removal actions.

- Collecting two rounds of vapor samples and vacuum readings from the permanent soil vapor monitoring probes installed at the 6601-6603 Shellmound Street building (during the May 2017 supplemental off-site investigation) to permit assessment of whether vinyl chloride concentrations are beneficially affected during SVE operation in areas to the south of the on-site SVE system during SVE operation. The first round of vapor samples will be collected during non-operation of the on-site SVE system, and the second round will be collected during operation of the SVE system. The vapor samples will be collected prior to on-site soil excavation. The samples will be analyzed for vinyl chloride (the primary vapor-phase VOC), oxygen (vinyl chloride has a great tendency to degrade in the presence of oxygen [12]), and carbon dioxide (a biodegradation activity parameter);

- To further demonstrate the absence of potential vapor intrusion concerns from vinyl chloride, after on-site soil excavation has been completed five (5) permanent sub-slab vapor probes (SSV1 through SSV5) will be installed (i.e., co-located with previous soil vapor sample locations), and three rounds of post-excavation vapor samples will be collected from the new sub-slab vapor probes, as well as the four (4) existing permanent soil vapor monitoring probes (PSGP1 through PSGP4). The vapor samples will be analyzed for vinyl chloride, oxygen, and carbon dioxide. Following the structured sampling plan for the soil vapor/sub-slab probes over approximately six months will provide a suitable data set for evaluation of vinyl chloride concentrations in soil vapor beneath the off-site building, as well as confirming that sub-slab vapor conditions do not present any unacceptable health risk to the commercial users of the building;

- Installation, sample collection, and analysis of soil vapor from three temporary soil vapor probes located along the shared property boundary to assess post-excavation vinyl chloride, oxygen, and carbon dioxide concentrations in soil vapor;

- Installation, sample collection, and analysis of soil vapor from one temporary soil vapor probe located near the previous southern-most off-site soil vapor sample location (PSV13) to assess post-soil excavation vinyl chloride, oxygen, and carbon dioxide concentrations; and

- Installation, sample collection, and analysis of soil vapor from one temporary soil vapor probe located south of the previous southern-most off-site soil vapor sample location (PSV13) to attempt to delineate the lateral extent of vinyl chloride impact to soil vapor on the off-site property.

[12] In Situ Remediation of Chlorinated Solvent Plumes. Springer Science & Business Media. 2010. Chlorinated Solvent Source Zone Remediation. Springer Science & Business Media. 2014.

A detailed scope of work and tentative schedule is presented below. A site plan showing the proposed vapor sampling locations at the off-site property building are shown on Plate 2. Consistent with prior scopes of work, based on the presence of sensitive building areas (e.g., recording studios and classroom spaces with custom acoustic flooring systems), all sampling activities will be conducted in common areas (e.g., building hallways) and accessible exterior locations.

Field Planning Activities

Prior to initiating field activities at the off-site property, PES will update our site-specific Health and Safety Plan (HASP). The HASP will comply with applicable federal and California Occupational Safety and Health Administration (OSHA) guidelines.

Underground Service Alert will be contacted to schedule visits by public and private utility companies to locate their underground utilities. In addition, a private underground utility locating service will be contracted to conduct a subsurface electromagnetic survey to screen the proposed sampling locations for the presence of subsurface utilities. Access to the off-site property will be arranged by Anton.

Soil vapor sampling activities will be conducted in accordance with procedures outlined in the guidance document titled *Advisory – Active Soil Gas Investigations*[13] (ASGI).

Pre-Excavation Soil Vapor Sampling

Permanent Soil Vapor Monitoring Probe Sample Methodology

As noted above, to assess off-site soil vapor conditions as a result of operation of the on-site SVE system, two rounds of soil vapor samples have been collected and analyzed from the four off-site nested soil vapor monitoring probes (PSGP1 through PSGP4) prior to the planned on-site soil excavation. Based on the last planned operation event of the SVE system (September 15, 2017), the sampling was conducted on September 1 and 15, 2017.

One set of samples was collected when the SVE system was non-operational (samples were collected on September 1, 2017), and a second set of samples were collected during supplemental "pulse" operation of the SVE system on September 15, 2017. Vacuum measurements were also be collected during operation/non-operation of the SVE system. The vacuum measurements, and sampling and analysis of vapor collected from the probes while the on-site SVE system is non-operational and operational will provide: (1) an understanding of concentrations of vinyl chloride in soil vapor between periodic SVE operation; and (2) an assessment of whether the on-site SVE system is effective at reducing vinyl chloride concentrations in soil vapor near the soil vapor probes.

[13] DTSC, 2015. *Advisory - Active Soil Gas Investigations*. Jointly developed by the California Environmental Protection Agency Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board – Los Angeles Region (LARWQCB) and RWQCB - San Francisco Region (RWQCB). July.

Each probe was connected to a clean laboratory-provided vapor purging and sampling apparatus using new Teflon™ tubing, followed by a shut-in test on each sampling apparatus for a minimum one minute period. Following a successful shut-in test, the vapor monitoring probe was purged of a minimum of three volumes. Purging and collection of vapor samples was performed using a flow rate of 100 to 200 milliliters per minute (mL/min) and maintaining a vacuum of less than 100 in-H_2O to mitigate ambient air breakthrough into the samples. Sample train leak testing was performed using the tracer gas (helium) in combination with a shroud box equipped with a direct-read helium concentration meter. Each sample canister was filled until the vacuum gauges read approximately 5 inches mercury (in-Hg).

Sample Analysis

Following completion of soil vapor probe sampling, each SUMMA™ canister was transported under chain-of-custody protocol to a stationary State of California-certified analytical laboratory. The vapor samples were analyzed for vinyl chloride using U.S. Environmental Protection Agency (U.S. EPA) Method TO-15 and helium, oxygen, and carbon dioxide using ASTM International (ASTM) Method D1946. The laboratory analyses are currently in progress.

Post-Excavation Soil Vapor Evaluation

As noted above, and as shown on Plate 2, to confirm that soil vapor and sub-slab vapor conditions do not present an unacceptable health risk threat to the commercial users of the building, post-excavation confirmation soil vapor sampling (approximately 60 days after completion of soil excavation activities) and laboratory analysis for vinyl chloride, oxygen, and carbon dioxide will be conducted: (1) at three locations adjacent to the planned on-site source soil excavation areas; and (2) at the former sample location PSV13. Additionally, soil vapor samples will be collected from one temporary soil vapor probe located south of the previous southern-most off-site soil vapor sample location (PSV13) to attempt to delineate the lateral extent of vinyl chloride impact to soil vapor on the off-site property (Plate 2).

Additionally, and in accordance with ACEH's directive for assessment of environmental conditions beneath the off-site property building after on-site soil excavation is conducted, three sampling events will be conducted after: (1) SVE operation ceases; and (2) on-site soil excavation takes place. The vapor sampling events, consisting of sampling the permanent vapor probes (PSGP1 through PSGP4) and installation and sampling of five (5) new sub-slab vapor probes (SSV1 through SSV5), will be conducted on a bi-monthly basis. Based on the current preliminary schedule for completion of impacted soil excavation in late January 2018, it is anticipated that off-site sub-slab vapor monitoring events would be conducted in February, April, and June 2018.

Sampling the sub-slab vapor probes over the six-month period is expected to provide confirmation of the previously-observed absence of vinyl chloride in sub-slab vapor beneath the off-site building. The results of the deeper soil vapor probes will be used to assess vinyl chloride concentrations in soil gas between 5 and 10 feet beneath the building.

Results from the sampling and analysis of soil vapor and sub-slab vapor from the previous PSV13 sample location and a location south of previous PSV13 (located in the parking lot, south of the building at 6601-6603 Shellmound Street) will also be evaluated.

Sub-Slab Vapor Probe Installation Methodology

As shown on Plate 2, five sub-slab soil vapor ports will be installed at the location of previous sub-slab vapor samples (SSV1 through SSV5) collected in October 2016. The sub-slab sample ports will be installed no closer than three feet to the previous locations to minimize the potential for communication with ambient air in the event the integrity of the concrete floor slab is compromised at the previous sampling locations. Additionally, a sub-slab vapor probe will be installed adjacent to previous sample location PSV13 to assess vapor conditions immediately beneath the exterior parking lot. Each sub-slab sampling port will be installed by coring a 1 ½-inch diameter hole 1 ¾ inches into the concrete floor slab and drilling a 5/8-inch diameter hole through the remaining concrete slab and into the underlying fill material using a hand-operated rotary hammer drill. A sub-slab implant, consisting of a 3-inch long purpose-made brass barb fitting and self-sealing silicone sleeve (Vapor Pin™, manufactured by Cox-Colvin & Associates of Plain City, Ohio, or Sub Slab Gas Vapor Probe Installation Kit manufactured by AMS, Inc.), will be advanced into the drill hole. Each implant barb will be fitted with a flush-mounted vapor- and water-tight cap and covered with a flush-mount stainless-steel cover.

Because only interior concrete derived from the installation procedures is generated, investigation-derived waste (IDW) will not be generated nor require management during the proposed sub-slab vapor probe installation activities.

Sub-Slab Vapor Probe Sampling Methodology

Each implant will be connected to a clean laboratory-provided vapor purging and sampling apparatus using new Teflon™ tubing, followed by a shut-in test on each sampling apparatus for a minimum one minute period. Following a successful shut-in test, the sample tubing and sub-slab implant will be purged of a minimum of three volumes. Purging and collection of sub-slab vapor samples will be performed using a flow rate of 100 to 200 milliliters per minute (mL/min) and maintaining a vacuum of less than 100 in-H_2O to mitigate ambient air breakthrough into the samples.

Following completion of the shut-in leak test and purging, sample train leak testing will be performed using helium gas as a tracer in combination with a shroud box. A leak test will be performed each time a sub-slab vapor sample is collected to evaluate whether a good seal has been established in the sampling train, ground surface, and probe interface. The tracer shroud box will consist of a polycarbonate box equipped with a sampling port. The bottom of the shroud box will be positioned over the sample port with the sample collection tubing passing through the bottom. Once in position, the sample train will be connected to the SUMMA™ canisters, and the shroud box will be placed over entire sample train. The shroud box will be equipped with an access port to allow charging of the box with the tracer. Prior to opening the SUMMA™ canister, the shroud box will be charged by spraying the tracer gas into the shroud box using a regulator. The shroud box will be allowed to remain in place for the duration of sampling.

Temporary Soil Gas Probe Installation and Sampling

The proposed additional off-site soil vapor sample locations are shown on Plate 2. Methods and procedures for installation of soil vapor probes and sample collection are presented below.

Soil gas samples will be collected by installing a 1-inch diameter, hollow, stainless-steel, soil gas probe to the required sampling depth (5 feet bgs or 10 feet bgs [conditions permitting]). If wet soil is observed at depths above 10 feet bgs, the deeper soil gas probe installation depth will be adjusted to sample soil gas within the vadose zone (above the capillary fringe). The probes will be installed at the required depth using a track- or truck-mounted direct-push rig. Upon reaching the target depth of 10.25 feet bgs at each location, a new ceramic soil vapor probe will be placed at approximately 10 feet bgs within a #2/12 sand pack extending 3 inches above and below the sampling interval, and attached to new ¼-inch diameter Teflon™ tubing extending to ground surface. One-foot of dry granular bentonite will be placed on top of the sand pack to preclude the infiltration of hydrated bentonite grout into the sand pack. The borehole annular space between approximately 8.75 and 5.25 feet bgs will be filled with hydrated bentonite.

A shallower soil vapor probe will be installed within the same borehole as the deeper probe at each location scheduled for soil gas sampling. The shallow probe tip will be placed at approximately 5 feet bgs within a #2/12 sand pack extending 3 inches above and below the sampling interval, and attached to new ¼-inch diameter Teflon™ tubing extending to ground surface. One-foot of dry granular bentonite will be placed on top of the sand pack. The borehole annular space from approximately 3.75 feet bgs to ground surface will be filled with hydrated bentonite. The upper end of the tubing for each probe will be capped with a vapor-tight fitting and marked at the surface to identify the probe location and depth. Each soil gas probe will be allowed to equilibrate for a minimum of 2 hours prior to purging and gas sampling.

Prior to purging and collecting soil gas samples, shut-in leak testing will be performed. The shut-in test will consist of assembling the above-ground sampling apparatus (e.g., valves, lines and fittings downstream from the top of the probe) and evacuating the lines to a measured vacuum of approximately 100 inches of water column (in-H2O), then shutting the vacuum in with closed valves on opposite ends of the sampling train. A vacuum gauge will be used to assess if there is any observable loss of vacuum (for at least one minute) prior to purging and the collection of soil gas samples. If observable vacuum loss is noted, the sample train will be re-assembled and the shut-in test will be repeated. This process will be repeated as necessary until a successful shut-in test has been performed.

The purge volumes of the sampling tubing and void within the bottom of the exposed portion of the soil gas probes will be calculated. A default of three probe volumes will be purged prior to the collection of the soil gas samples. The stagnant air will be purged with a six-liter SUMMA™ canister. A 1-liter SUMMA™ canister that is batch-certified clean by a California-certified analytical laboratory will be utilized to collect the soil gas sample.

Sample train leak testing will be performed equivalent to the methods described above (for sub-slab samples) using the tracer gas (helium) in combination with a shroud box equipped with a direct-read helium concentration meter. Each sample canister will be filled until the vacuum gauge reads approximately 5 inches' mercury (in-Hg).

Following collection of the soil gas sample at each location, the soil gas sampling probe will be removed from the borehole and decontaminated. A new soil gas sampling probe and new tubing will be used for the collection of each soil gas sample. Following completion of the soil gas sampling from each probe, the probes will be removed from the subsurface via over-drilling, and the boreholes will be grouted with a bentonite/cement slurry.

Soil Vapor and Sub-Slab Vapor Sample Analysis

Following completion of soil vapor and sub-slab vapor sampling, each SUMMA™ canister will be transported under chain-of-custody protocol to a stationary State of California-certified analytical laboratory. The sub-slab vapor samples will be analyzed for vinyl chloride using U.S. EPA Test Method TO-15 in selective ion-monitoring mode (SIM), and helium, oxygen, and carbon dioxide using ASTM Test Method D1946. The soil vapor samples will be analyzed for vinyl chloride U.S. EPA Test Method TO-15 and helium, oxygen, and carbon dioxide using ASTM Test Method D1946.

Reporting

The results of the two pre-excavation soil vapor monitoring probe sampling events conducted in September 2017 will be presented in Remedial Progress Reports submitted to ACEH. The results will be submitted electronically to the ACEH ftp site and State Water Resources Control Board's GeoTracker database, and associated data (e.g., laboratory analytical data) will be submitted to the GeoTracker website in electronic format.

The results of the first two bi-monthly sub-slab sampling events will be summarized in technical memoranda containing tables and plates and will be submitted to ACEH approximately 30 days after each sampling event. The methods and results of the sampling and analysis of the additional soil vapor probes will be reported along with the initial sub-slab sampling results.

Following the final (June 2018) sampling event, a summary report presenting the results of the three post-excavation sub-slab sampling events will be prepared. A description of the methods and procedures of the above-referenced scope of work will be presented along with the results of the sampling activities. The report will also provide tabulated data, illustrations showing select contaminant concentrations, and laboratory reports.

As described above, the proposed scope of work includes pre-soil excavation assessment of soil vapor conditions via sampling and analysis of soil vapor probes located on the off-site property. As noted above, this work has been conducted and the laboratory analytical results are pending. Additionally, post-soil excavation conditions will be evaluated through the periodic sampling and analysis of sub-slab vapor probes to confirm that concentrations of vinyl chloride in vapor remain below ESLs. If concentrations of vinyl chloride in the sub-slab vapor samples remain below relevant commercial/industrial ESLs, no further vapor evaluation will be recommended, and a request for NFA will be recommended.

The report will be submitted electronically to the ACEH ftp site and State Water Resources Control Board's GeoTracker database, and associated data (e.g., laboratory analytical data) will be submitted to the GeoTracker website in electronic format.

Please call Kyle Flory at (415) 899-1600 if you have any questions or comments regarding this document.

Very truly yours,

PES ENVIRONMENTAL, INC.

Christopher J. Baldassari, P.G.
Senior Geologist

Kyle S. Flory, P.G.
Principal Geologist

Attachments: Plate 1 – Site Location
Plate 2 – Site Plan with Proposed Vapor Sample Locations

cc: Rachel Green – Anton Emeryville, LLC

PLATES

PES Environmental, Inc.
Engineering & Environmental Services

Site Location
Revised Focused Off-Site Subsurface Vapor Evaluation
6601-6603 Shellmound Street
Emeryville, California

PLATE
1

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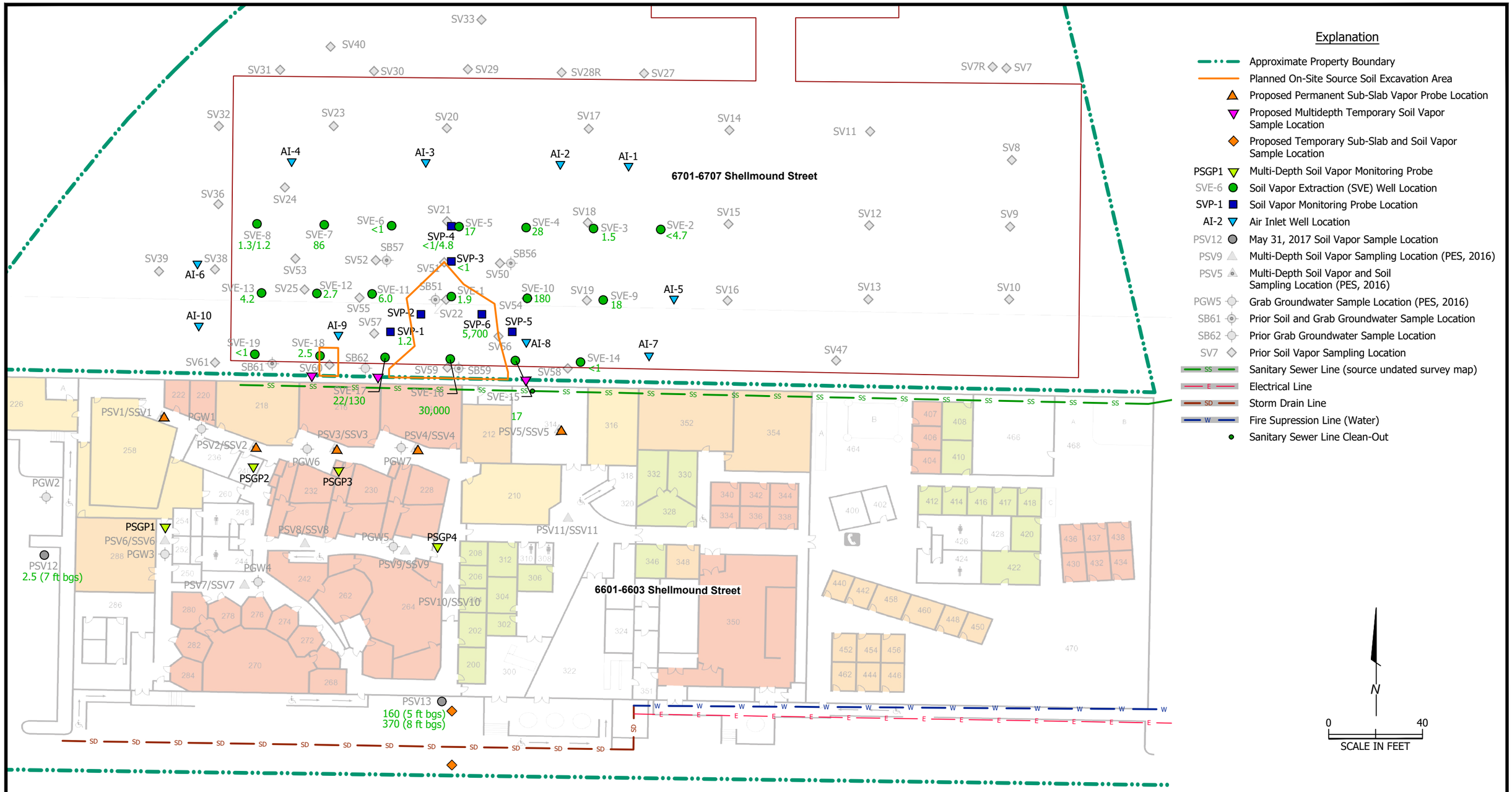

6601-6603 Shellmound Basemap: Ex'pression College Campus Map, North Wing, 2015
Utility Locations: EKI, Inc, 2012 Report of Site Investigation and 2012 Request for Site Closure, July 5, 2012

PES Environmental, Inc.
Engineering & Environmental Services

Site Plan with Proposed Vapor Sample Locations
Revised Focused Off-Site Subsurface Vapor Evaluation
6601-6603 Shellmound Street
Emeryville, California

PLATE
2

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