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Additional Phase II Environmental Site Assessment

Lacey Urban Center

7131-7269 Martin Way East
Olympia, WA 98516

Prepared for

Mrs. Keum Woo

Prepared by

Envitechnology, Inc.
16541 Redmond Way #358C
Redmond, WA 98052

November 30, 2018

Project No. 02180712-1

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November 30, 2018

Project number 02180712-1

To: Mrs. Keum Woo
6730 Troon Lane SE
Olympia, WA 98499

Subject: Additional Phase II Environmental Site Assessment
Lacey Urban Center
7131-7269 Martin Way East, Olympia, WA 98516

Envitechnology is pleased to submit two copies of our report describing the finding of the Subsurface Investigation performed at the above property.

The purpose of this assessment is to evaluate the Recognized Environmental Conditions (RECs) for the purpose of providing sufficient information regarding the nature and extent of contamination to assist in making informed business decisions about the property; and where applicable, providing the level of knowledge necessary to satisfy the innocent purchaser defense under CERCLA.

This assessment was prepared in general accordance with the American Society of Testing and Materials (ASTM) Standard Practices for Environmental Site Assessments: Phase II ESA Process (ASTM Designation: E1903-11, 2011).

If you have any questions or require further clarification of the report findings, please contact the undersigned at your convenience. Thank you for the opportunity to be of service to you.

Yours very truly,

Jake S. Lee, Ph.D.
President
Envitech

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ICC Certified Washington State Site Assessor (5264460-U7)
ICC Certified UST Decommissioning (5264460-U2)

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1. EXECUTIVE SUMMARY

The Subject Property is a shopping center known as Lacey Urban Center. It is located on the south side of Martin Way East and the west side of Ranger Drive Southeast. The Subject Property is located within a mixed commercial and residential area of Thurston County.

Occupancy of the multi-tenant shopping center has primarily been for retail, office and service tenants. Occupants have included bank, barber shop, post office, donut shop, drapery shop, hair salon, drug store, restaurants, shoe repair, floral and gift shops, nail shops, bakery, dentist and chiropractic center. The Subject Property was occupied by a dry cleaning business from circa 1965 through approximately 1997. The dry cleaning business formerly occupied the southwestern corner of the multi-tenant building (7205 Martin Way East). Additionally the onsite building was formerly served by numerous onsite septic system, with the septic tank serving the dry cleaning building located adjacent south of the building and the drain field located adjacent west of the building.

A total of nine (9) soil borings were advanced into native soils on July 20, 2018. Three (3) soil borings (B1 through B3) were advanced in the former dry cleaning facility. Three (3) soil borings (B4 through B6) were advanced in the vicinity of the former septic tank and drain field. Additional three (3) borings (B4' through B6') were advanced near the outside borings for soil gas sampling. The inside soil borings were extended to 5 feet bgs. The outside soil borings were extended to 20 feet bgs. Additional outside soil borings for soil gas sampling were extended to 5 feet bgs. Groundwater was not encountered during the soil borings. A total of twelve (12) soil samples were collected; two (2) soil samples per each inside boring collected at 2 and 5 feet and two (2) soil samples per each outside boring collected at 5 and 20 feet. A total of six (6) soil gas samples were collected at a depth of 5 feet bgs.

Additional twelve (12) soil borings were advanced on August 20 and 21, 2018. Five (5) soil borings (B7 through B11) were advanced on the interior of the building and seven (7) borings (B12 through B18) were advanced on the exterior of the building. A total of twenty-four (24) soil samples were collected at depths ranging from 5 to 29 feet bgs. One (1) groundwater sample was collected at a depth of 26 feet bgs in borehole B14. Four (4) soil gas samples were collected at a depth of 5 feet bgs.

The surface cover at the Site consists of asphalt or concrete. Native soils beneath fill or other surface cover materials include dark brown, coarse-grained, dry, medium dense, gravelly sandy loam to a depth of 5 feet bgs. Light brown, coarse-grained, dry, medium dese, silty loam was encountered at depths ranging from 5 to 15 feet bgs. It was underlain by gravelly sandy loam to a depth of 29 feet bgs. The geophysical survey did not indicate the presence of former septic tank and drain field in the area surveyed. The survey could locate utility lines, electrical lines and any buried objectives.

Analytical results for the soil samples indicates that PCE was detected in the soil samples collected at boreholes at concentrations ranging from 0.02 to 0.25 mg/kg. PCE was detected in the soil samples, B1-5, B3-2, B3-5, B5-5, B9-5 and B12-5 at concentrations above the Method A soil cleanup level for PCE at 0.05 mg/kg. The highest PCE concentration observed in the interior samples was B3-5 at a concentration of 0.24 mg/kg. The highest PCE concentration observed in the exterior samples was B5-5 at a concentration of 0.25 mg/kg. MC was detected in the soil sample B6-20 at a concentration of 0.11 mg/kg, which is above the Method A soil cleanup level for MC at 0.02 mg/kg. However, additional test conducted on B16 located close to B6 could not detect methylene chloride at concentrations above the laboratory detection limits at samples collected at depths of 10 and 29 feet bgs. Methylene chloride is commonly used in the analytical laboratory for extractions and known as common laboratory contaminant. This result may be due to cross contamination of MC during the laboratory analysis. Other PCE degradation daughter products, TCE, DCE and VC were not detected at concentrations above the laboratory reporting limits. The PCE iso-concentration contours suggest that most of the contaminant mass is from the south portion of the Site, across the southern wall.

Analytical results for the sub-slab soil gas samples indicates that PCE was detected in each of the sub-slab samples (SG1-5 through SG11-5). PCE was detected in the soil gas samples, SG3-5, SG4-5, SG5-5, SG6-5, SG7-5, SG8-5 and SG11-5 at concentrations ranging from 350 to 1,800 $\mu g/m^3$, which is above the established Method B sub-slab soil gas screening level for PCE at 321 $\mu g/m^3$. TCE was detected in some of the sub-slab samples at concentrations ranging from 3.3 to 7.3 $\mu g/m^3$, which is below the established Method B sub-slab soil gas screening level for TCE at 12.3 $\mu g/m^3$. Other PCE degradation daughter products, DCE and VC were below the established cleanup levels. The PCE iso-concentration contours suggest that PCE vapor is widespread over the building interior, septic drainfield area and south side of the building.

Analytical results for the groundwater sample indicates that PCE and its degradation daughter products were not detected at concentrations above the laboratory limits in the groundwater sample (W4) collected at a depth of 26 feet bgs.

The concentrations of PCE were above the MTCA cleanup levels for soil and soil vapor. The goal of cleanup action is to 1) abate the potential for vapor intrusion of PCE into the overlying building, and 2) reduce the mass of PCE within the vadose zone. Envitechnology recommends a cleanup action by the mitigation of the risk of vapor intrusion and remediation of the PCE-contaminated soil.

2. INTRODUCTION

Mrs. Keum Woo engaged Envitechnology, Inc. (Envitechnology) to conduct an additional Phase II Environmental Site Assessment (ESA) on the property, Lacey Urban Center, located at 7131-7269 Martin Way East, Olympia, WA 98516, subsequently referred to in this report as "the Subject Property".

The purpose of the Additional Phase II ESA was to collect and evaluate environmental data at the Site to verify the lateral and vertical extent and magnitude of contamination and to determine potential impacts to human health and the environment resulting from on-site exposure and/or off-site migration of site contaminants.

This assessment was prepared in general accordance with the American Society of Testing and Materials (ASTM) Standard Practices for Environmental Site Assessments: Phase II ESA Process (ASTM Designation: E1903-11, 2011).

The recognized on-site environmental concerns assessed as part of this Phase II ESA were the former presence of dry cleaning facility at the Subject Property. This assessments performed to evaluate the recognized environmental conditions were: twelve (12) soil borings were advanced, twenty-four (24) soil samples, four (4) soil gas samples, and one (1) groundwater sample were collected and analyzed for chlorinated solvents.

3. BACKGROUND

3.1. SITE DESCRIPTION AND FEATURES

The Subject Property is a shopping center known as Lacey Urban Center. It is located on the south side of Martin Way East and the west side of Ranger Drive Southeast. The Subject Property is located within a mixed commercial and residential area of Thurston County.

Occupancy of the multi-tenant shopping center has primarily been for retail, office and service tenants. Occupants have included bank, barber shop, post office, donut shop, drapery shop, hair salon, drug store, restaurants, shoe repair, floral and gift shops, nail shops, bakery, dentist and chiropractic center.

The general layout of the subject site and immediate vicinity is shown in Figure 2. Site Vicinity Map. The property layout is presented in Figure 3. Site Plan.

The address of the Subject Property is 7131-7269 Martin Way East, Olympia, WA 98516. (Figure 1. Site Location Map).

The legal description of the Subject Property is:

Parcel # 78801200000

TANGLEWILDE #6-A COMM AREA A LESS STATE H&W LESS 1.17A

3.2. PHYSICAL SETTING

The objective of reviewing physical setting is to provide information about the impact of potential environmental contaminant migration.

Current USGS 7.5 Minute Topographic Map (7.50-minute Quads – Lacey) reviewed to determine the topography of the Subject Property.

The surface elevation at the site is approximately 197 feet above mean sea level. The Subject Property and general area are identified as a commercial and residential setting. Information on groundwater flow and soil type was examined to determine the east with which contaminants from the surrounding properties can reach the Subject Property. The parcel is fairly level. Based upon the USGS map and surface topography, groundwater is inferred to flow generally to the south-southwest. However, topography is not always a reliable basis for predicting the groundwater flow direction. Local gradient under the Subject Property may be influenced by naturally by zones of higher or lower permeability, or artificially by nearby pumping or recharge, and may deviate in any particular location

for the overall regional trend. Significant body of water includes Lake Lois located approximately one mile to the southwest of the Subject Property.

The subject property is situated at the southern end of the Puget Sound Lowlands physiographic province of the State of Washington. During the Quaternary, the Puget Lowland was covered a number of times by continental ice sheets. The most recent glaciation (Fraser) reached its peak about 14,000 years ago. The uppermost geologic formation underlying the soils at the subject property parcel is Pleistocene continental glacial drift, mostly Vashon Shade recessional outwash. The unit consists mostly of recessional and proglacial stratified, moderately to well-rounded, poorly to moderately sorted outwash sand and gravel of northern or mixed northern and Cascade source.

Based on information obtained from the USDA Natural Resources Conservation Service Web Soil Survey online database, the subject property is mapped as Spanaway gravelly sandy loam. The Spanaway series consists of deep and moderately deep, moderately well and well drained soils with moderately coarse textures that formed on outwash plains and terraces from volcanic ash over gravelly outwash of Pleistocene age. Slopes range from 0 to 3 percent.

3.3. SITE HISTORY AND LAND USE

A Phase I Environmental Site Assessment was recently conducted on the Subject Property dated July 3, 2018. According to the study, the Subject Property was occupied by a dry cleaning business from circa 1965 through approximately 1997. The dry cleaning business formerly occupied the southwestern corner of the multi-tenant building. Additionally, the onsite building was formerly served by numerous onsite septic system, with the septic tank serving the dry cleaning building located adjacent south of the building and the leach field located adjacent west of the building.

Dry cleaning operations typically use chlorinated solvents, particularly tetrachloroethylene (also known as perchloroethylene [PCE]), during the dry cleaning process. These solvents, even when properly stored and disposed of, can be released in small, frequent releases through floor drains, cracked concrete, and sewer systems. Chlorinated solvents are highly mobile chemicals that can easily accumulate in the soil and migrate to the groundwater beneath a facility. Based on the duration of onsite dry cleaning operations (at least 15 years), the use of septic systems at the subject property prior to 1994, the lack of previous subsurface investigations, and the nature of dry cleaning chemicals, the former presence of the dry cleaning business is considered a recognized environmental condition. The study recommended a limited subsurface investigation.

3.4. PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Envitechnology conducted a limited Phase II ESA on the Subject Property on July 20, 2018. A total of nine (9) soil borings were advanced into native soils. Three (3) soil borings (B1 through B3) were advanced in the former dry cleaning facility. Three (3) soil borings (B4 through B6) were advanced in the vicinity of the former septic tank and drain field. Additional three (3) borings (B4' through B6') were advanced near the outside borings for soil gas sampling. The inside soil borings were extended to 5 feet bgs. The outside soil borings were extended to 20 feet bgs. Additional outside soil borings for soil gas sampling were extended to 5 feet bgs. Groundwater was not encountered during the soil borings. A total of twelve (12) soil samples were collected; two (2) soil samples per each inside boring collected at 2 and 5 feet and two (2) soil samples per each outside boring collected at 5 and 20 feet. A total of six (6) soil gas samples were collected at a depth of 5 feet bgs.

Analytical results for the soil samples indicates that PCE was detected in the soil samples collected at boreholes B1 through B5 at concentrations ranging from 0.02 to 0.25 mg/kg. PCE was detected in the soil samples, B1-5, B3-2, B3-5, and B5-5 at concentrations above the Method A soil cleanup level for PCE at 0.05 mg/kg. MC was detected in the soil sample B6-20 at a concentration of 0.11 mg/kg, which is above the Method A soil cleanup level for MC at 0.02 mg/kg. Analytical results for the sub-slab soil gas samples indicates that PCE was detected in each of the sub-slab samples (SG1-5 through SG6-5). PCE was detected in SG3-5 through SG6-5 at concentrations ranging from 350 to 1,800 µg/m3, which is above the established Method B sub-slab soil gas screening level for PCE at 321 µg/m3. Analytical results for the soil and sub-slab soil gas samples indicates that releases have occurred in association with former dry cleaning operation. However, the extent of impacted subsurface conditions relative to this release was unknown. Envitechnology recommended an additional investigation in order to verify the lateral and vertical extent and magnitude of contamination.

3.5. ADJACENT PROPERTY AND LAND USE

An adjoining property is any real estate property whose border is contiguous or partially contiguous with the Subject Property, or that would be if the properties were not separated by a roadway, street, public thoroughfare, river or stream. The following identifies specific adjacent property tenants and/or use:

Direction	Site Use	Adjoining Street
East	Arco gas station	Ranger Dr SE
West	Tanglewilde Lumber and unimproved woodlands	Non-applicable
South	Residential	Non-applicable
North	Arco Gas Station	Martin Way E

4. WORK PERFORMED AND RATIONALE

4.1. SCOPE OF SERVICES

The scope of work for this assessment was in general accordance with the American Society of Testing and Materials (ASTM) Standard Practices for Environmental Site Assessments: Phase II ESA Process (ASTM Designation: E1903-11, 2011). The methodologies are described as representing good commercial and customary practice for conducting a Phase II ESA of a property for the purpose of evaluating Recognized Environmental Conditions.

The scope of work included the following tasks:

- Review of Existing Information
- Geophysical Survey
- Field Exploration – twelve (12) soil borings
- Sampling and Chemical Analyses
- Evaluation of Results
- Discussion of Finding and Conclusions

4.2. LIMITATIONS AND EXCEPTIONS OF ASSESSMENTS

This assessment was prepared in general accordance with the American Society of Testing and Materials (ASTM) Standard Practices for Environmental Site Assessments: Phase II ESA Process (ASTM Designation: E1903-11, 2011), and contains all of the limitations inherent in these methodologies. No other warranties, expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.

No ESA can eliminate all uncertainty. Furthermore, any sample, either surface or subsurface, taken for chemical analysis may or may not be representative of a larger population. Professional judgment and interpretation are inherent in the process and uncertainty is inevitable. Additional assessment may be able to reduce the uncertainty.

Even when Phase II ESA work is executed with an appropriate site-specific standard of care, certain conditions present especially difficult detection problems. Such conditions may include, but are not limited to, complex geological settings, the fate and transport characteristics of certain hazardous substances, the distribution of existing contamination, physical limitations imposed by the location of utilities and other man-made objects, and the limitations of assessment technologies.

Phase II ESA does not generally require an exhaustive assessment of environmental conditions on a property. There is a point at which the cost of information obtained and the time required to obtain it outweigh the usefulness of the information and, in fact, may be a material detriment to the orderly completion of transactions. If hazardous substance releases are confirmed on a parcel of property, the extent of further assessment is related to the degree of uncertainty that is acceptable to the user with respect to the real estate transaction.

Measurements and sampling data only represent the site conditions at the time of data collection. Therefore, the usability of data collected as part of this Phase II ESA may have a finite lifetime depending on the application and use being made of the data. An environmental professional should evaluate whether the generated data are appropriate for any subsequent use beyond the original purpose for which it was collected.

4.3. UTILITY LOCATION

Prior to conducting the next phase of the field investigation, Envitechnology requested Public Utility locating service to check proposed boring locations for the presence of underground utilities.

Envitechnology subcontracted with Mr. View Locating Services, Llc., Sumner, Washington to perform an additional site-specific utility clearance on the subject property prior to drilling. Underground utilities that were detected were spray painted on the surface of the subject property. All drilling locations were completed without encountering underground utilities or obstructions during the collection of soil samples on the Subject Property.

4.4. GEOPHYSICAL SURVEY

Because of the limited information regarding former site configuration and usage of septic system, geophysical survey was conducted at the Site. Envitechnology subcontracted with Mr. View Locating Services, Llc., Sumner, Washington to perform a geophysical survey. The geophysical survey employs the use of both electro-magnetic (EM) equipment and ground penetrating radar (GPR) to screen the Site for subsurface anomalies characteristics of USTs and other buried metallic objects.

A magnetometer is a measuring instrument used to measure the strength and the direction of magnetic field. Magnetometer is widely used for measuring the earth's magnetic fields and in geophysical surveys. The magnetic properties of naturally occurring materials such as magnetic ore bodies and basic igneous rocks allows them to be identified and mapped by magnetic surveys. Strong local magnetic fields or anomalies are also produced by buried steel objects. Magnetometer surveys find underground storage

tanks, drums, piles and reinforced concrete foundations by detecting the magnetic anomalies they produce.

Ground Penetrating Radar (GPR) is a geophysical method that uses radar pulses to image the subsurface which is the most common method used to locate underground storage tanks (USTs). The USTs can be made of metal or any other material that has different electrical or conductive properties than the surrounding subsurface oil and rocks. The GPR can determine the boundaries of current and/or former UST excavations.

4.5. HEALTH AND SAFETY

A Site Specific Health and Safety Plan was prepared prior to field activities. Envitechnology performed air monitoring for total VOCs during all field activities and also enforced the appropriate protective equipment including hard hats, safety glasses, hearing protection, steel-toed boots, and chemical resistant gloves. Air monitoring performed throughout the day indicated that the use of breathing protection equipment was not necessary.

4.6. EXPLORATION METHODS

A total of twelve (12) soil borings were advanced into native soils on August 20 and 21, 2018. Five (5) soil borings (B7 through B11) were advanced on the interior of the building, in the former dry cleaning facility in areas to the north of the boring B1, (B7), east of the boring B1 (B8), east of the boring B3 (B9 & B10) and west of the boring B3 (B11). Seven (7) borings (B12 through B18) were advanced on the exterior of the building, in the vicinity of the former septic tank in areas to the east of former septic tank (B12), south (B13 & B14), west (B15 & B18) and north (B16 & B17) of the former septic drain field. The location of these borings (labeled B7 through B18) are shown in Figure 3. Site Plan.

The method of inside borings was a manual drilling and limited access drilling performed by ESN Northwest, Olympia, WA. For a limited access drilling, a tractor-mounted (Kubota LA302) drive-point sampling device was utilized. A hydraulically-powered percussion/ direct push machine drives a tool string directly through the ground. Every four feet, the rods were removed and disposable Teflon sampling tubes were recovered. Now sections of Teflon sampling tubes were used for each sampling depth.

The method of outside borings was a direct push probe performed by ESN Northwest, Olympia, WA. Soil borings were performed by ESN Northwest, Olympia, WA. The direct push probe involves the use of truck-mounted hydraulic hammer to push a series of 1.5-inch diameter steel rods to the sampling depth. Every five feet, the rods were removed and disposable Teflon sampling tubes were recovered. New sections of Teflon sampling tubes were used for each sampling depth.

4.7. SUBSURFACE SOIL SAMPLING METHODS

The sampling was designed to prove for the collection of potentially contaminated environmental media, if they occur, at locations and depths where the highest concentrations are likely to occur.

The undisturbed soil samples were collected continuously using core samplers attached to drive rods. Each borehole was logged according to the United Soil Classification System as described in Figure A1 in Appendix A. Borehole logs are included in Appendix A as Figure A2 through A13.

A total of twenty-four (24) soil samples were collected at depths ranging from 5 to 29 feet bgs. Exact soil sample locations was selected based on the filed screening. Soil samples obtained from the core sampler was screened with visual and olfactory indications and photoionization detector (PID).

Soil samples at each location were collected in accordance with EPA method 5035A. (US EPA, 2002). Soil samples were recovered using a hand sampler to take about 5 grams of soil from each soil core. Samples were transferred from the samplers directly to sterilized glassware with Teflon-sealed lids furnished by the project laboratory. Samples were stored in an iced chest at the site and taken to the lab in this condition to minimize excessive dissipation of volatile fraction hydrocarbons. Each container was clearly labeled as to boring number, sample number, geologist, etc. EPA recommended 5035 sampling protocol for sample collection and management including maintenance of chain-of-custody documentation was observed at each stage of the project. Each sample was collected into a two-ounce jar for dry weight determination.

4.8. SOIL GAS SAMPLING METHODS

Four (4) soil gas samples were collected at a depth of 5 feet bgs. The location of the soil gas sampling points are shown in Figure 3. Site Plan.

Temporary soil gas sampling points were installed in each of the sub-slab and 5-foot deep borings. Construction of the temporary sampling points and soil gas sampling procedures were performed in general accordance with the guidelines presented in Ecology's Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action.

Upon installation, the temporary points were allowed to equilibrate for a minimum of 1 hour. Prior to sampling, a series of quality assurance/quality control (QA/QC) tests, including shut-in tests, leak tests, and line purging, were performed in sequential order at each location. Shut-in tests were conducted to check for leaks in the above-ground sampling system. Leak tests were performed using isopropyl alcohol to evaluate if leakage or ambient air was introduced into the soil vapor samples during collection. Line purging

(purge volume testing) was performed to ensure that stagnant air was removed from the sampling system (i.e., inert tubing, void spaces around the sand filter pack surrounding the soil vapor probe tip, and dry, granular bentonite in the annular space). During line purging, three (3) system volumes of air were purged from the probe.

Upon completion of the assembly testing at each location, soil gas samples were obtained with 1-liter Summa™ canisters fitted with laboratory-calibrated, flow controllers equipped with vacuum gauges and particulate filters. Each canister was individually checked, tested and certified by the laboratory for air tightness and proper vacuum prior to shipping. The Summa™ canisters were connected to inert tubing, which daylighted from the borings or sub-slab sampling points above the ground surface. The samples were obtained at flow rates between 100 and 200 milliliters per minute. Initial and final readings on the vacuum gauge were recorded at the beginning and end of sampling to confirm sample collection. Sampling was completed with a slight vacuum (of approximately -5 in-Hg) remaining in the canisters.

Upon sample retrieval, the Summa™ canisters were labeled with the appropriate project information, including the project name, project number, sample location and depth, date and time of sampling, sampler's name, canister identification number, and the initial and final canister vacuums. Chain-of-custody documentation was completed and accompanied the Summa™ canisters to the analytical laboratory.

4.9. FIELD SCREENING

Soil samples obtained from the core sampler were screened with visual and olfactory indications and/or photoionization detector (PID). Prior to use, the PID was calibrated against a 100 parts per million (ppm) isobutylene span gas in air mixture. The instrument was then zeroed against the ambient air near the work area. The PID is useful for qualitative field screening of volatile organic compounds (VOCs) and provides a basis for comparison between soil samples collected in the field. Soil samples were placed into sealable plastic bags and allowed to sit in a warm area for volatilization to occur. After approximately 5 minutes, VOCs were field measured by placing the tip of the PID into the head space above each sample in each bag. This is not a compound-specific analysis and is affected by, among other influences, climate (e.g., temperature and humidity), soil type and conditions, instrument calibration and operation, and type of VOCs present.

4.10. CHEMICAL ANALYTICAL METHODS

The chemical testing was designed to detect the contaminants suspected to be present in the samples collected. The testing plan included tests which provide quality assurance (QA) and techniques that provide quality control (QC) over the chemical analysis. A completed chain of custody record accompanied each sample shipment to the analytical

laboratory. Chain of custody records provide written documentation regarding sample collection and handling, identify the persons involved in the chain of sample possession, and a written record of requested analytical parameters.

The soil and groundwater samples were analyzed for the presence of chlorinated solvents – PCE (tetrachloroethene), and its degradation daughter products, TCE (trichloroethene), cis-DCE (dichloroethene), trans-DCE, and VC (vinyl chloride).

The sub-slab soil gas samples were analyzed in accordance with EPA method TO-15. The soil samples were analyzed in accordance with EPA method 8260.

The location, depth and type of samples collected are summarized in Table 1.

4.11. Decontamination and Hole Closure

Boreholes were filled with bentonite granules, 2 feet of concrete mix, and patched with asphalt or concrete. Disposable sampling equipment were disposed of at each sample interval. Non-disposable sampling equipment were decontaminated by scrubbing in a solution of Alconox and potable water, followed by rinses with potable water between test holes. Soil cuttings, decontamination water, and purge water were stored in labeled drums in a secure location until they can be profiled and appropriately disposed of.

5. PRESENTATION AND EVALUATION OF RESULTS

5.1. SUBSURFACE CONDITIONS

A general characterization of the on-site soil units encountered during our exploration is presented in this section. The Boring Logs in Appendix A present details of the soil encountered at each exploration location.

The soil borings were extended up to 20 feet below ground surface (ft bgs). The surface cover at the Site consists of asphalt or concrete. Native soils beneath fill or other surface cover materials include dark brown, coarse-grained, dry, medium dense, gravelly sandy loam to a depth of 5 feet bgs. Light brown, coarse-grained, dry, medium dese, silty loam was encountered at depths ranging from 5 to 15 feet bgs. It was underlain by gravelly sandy loam to a depth of 20 feet bgs.

Groundwater was encountered at a depth of 26 feet bgs during the soil boring at B14.

All soil samples were screened for volatile organic compounds (VOCs) with a MiniRae 3000 Photoionization Detector (PID). The PID reading and physical soil conditions did not indicate the presence of chlorinated solvents.

5.2. GEOPHYSICAL SURVEY

The geophysical survey did not indicate the presence of former septic tank and drain field in the area surveyed. The survey could locate utility lines, electrical lines and any buried objectives.

5.3. SOIL ANALYTICAL RESULTS

The soil analytical results along with the Washington State Department of Ecology (WSDOE) cleanup levels are summarized in Table 2. Laboratory documents are located in Appendix C. Laboratory Report.

Analytical result showed variable concentrations of VOCs in the soil samples analyzed during this investigation. Of these detected VOCs, only PCE and MC (methylene chloride) were found at concentrations exceeding their established Ecology soil cleanup levels. A summary of detected VOCs is provided as follows:

- PCE was detected in the soil samples collected at boreholes at concentrations ranging from 0.02 to 0.25 mg/kg. PCE was detected in the soil samples, B1-5, B3-2, B3-5, B5-5, B9-5 and B12-5 at concentrations above the Method A soil cleanup level for PCE at 0.05 mg/kg. The highest PCE concentration observed in the interior

samples was B3-5 at a concentration of 0.24 mg/kg. The highest PCE concentration observed in the exterior samples was B5-5 at a concentration of 0.25 mg/kg.

- MC was detected in the soil sample B6-20 at a concentration of 0.11 mg/kg, which is above the Method A soil cleanup level for MC at 0.02 mg/kg. However, additional test conducted on B16 located close to B6 could not detect methylene chloride at concentrations above the laboratory detection limits at samples collected at depths of 10 and 29 feet bgs. Methylene chloride is commonly used in the analytical laboratory for extractions and known as common laboratory contaminant. This result may be due to cross contamination of MC during the laboratory analysis.

- Other PCE degradation daughter products, TCE, DCE and VC were not detected at concentrations above the laboratory reporting limits.

- The PCE iso-concentration contours (Figure 4) suggest that most of the contaminant mass is from the south portion of the Site, across the southern wall.

5.4. SOIL GAS ANALYTICAL RESULTS

The soil gas analytical results along with the Washington State Department of Ecology (WSDOE) cleanup levels are summarized in Table 3. Laboratory documents are located in Appendix C. Laboratory Report.

Analytical result showed variable concentrations of VOCs in the sub-slab soil samples analyzed during this investigation. Of these detected VOCs, only PCE was found at concentrations exceeding its established Ecology soil gas screening level. A summary of detected VOCs is provided as follows:

- PCE was detected in each of the sub-slab samples (SG1-5 through SG11-5). PCE was detected in the soil gas samples, SG3-5, SG4-5, SG5-5, SG6-5, SG7-5, SG8-5 and SG11-5 at concentrations ranging from 350 to 1,800 $\mu g/m^3$, which is above the established Method B sub-slab soil gas screening level for PCE at 321 $\mu g/m^3$.

- TCE was detected in some of the sub-slab samples at concentrations ranging from 3.3 to 7.3 $\mu g/m^3$, which is below the established Method B sub-slab soil gas screening level for TCE at 12.3 $\mu g/m^3$.

- Other PCE degradation daughter products, DCE and VC were below the established cleanup levels.

- The PCE iso-concentration contours (Figure 5) suggest that PCE vapor is widespread over the building interior, septic drainfield area and south side of the building.

5.5. GROUNDWATER ANALYTICAL RESULTS

The groundwater analytical results along with the Washington State Department of Ecology (WSDOE) cleanup levels are summarized in Table 4. Laboratory documents are located in Appendix C. Laboratory Report. A summary of the groundwater analytical result is provided as follows:

- Groundwater was encountered at a depth of 26 feet bgs during the soil boring at B14.
- PCE and its degradation daughter products were not detected at concentrations above the laboratory limits in the groundwater sample (W4) collected at a depth of 26 feet bgs.

6. INTERPRETATION AND CONCLUSION

6.1. RECOGNIZED ENVIRONMENTAL CONDITIONS

The recognized on-site environmental concerns assessed as part of this Phase II ESA were the former presence of dry cleaning facility at the Subject Property. This assessments performed to evaluate the recognized environmental conditions were: twelve (12) soil borings were advanced, twenty-four (24) soil samples, four (4) soil gas samples, and one (1) groundwater sample were collected and analyzed for chlorinated solvents.

The results of these assessments indicates that releases have occurred in association with former dry cleaning operation. The findings and conclusions presented in this report apply only to the recognized environmental conditions assessed.

6.2. CONCEPTUAL SITE MODEL

The conceptual site model takes into consideration the potential distribution of contaminants with respect to the properties, behaviors and fate and transport characteristics of the contaminant in a setting such as that being assessed. The sampling plan was designed to provide for the collection of potentially contaminated environmental media, if they occur, at locations and depths where the higher concentrations are likely to occur.

The source of COCs (Chemicals of Concern) is the operations of the property as a dry cleaner. These solvents, even when properly stored and disposed of, can be released in small, frequent releases through floor drains, cracked concrete, and sewer systems. Chlorinated solvents are highly mobile chemicals that can easily accumulate in the soil and migrate to the groundwater beneath a facility. Based on the duration of onsite dry cleaning operations (at least 15 years), the use of septic systems at the subject property prior to 1994, the lack of previous subsurface investigations, and the nature of dry cleaning chemicals, the former presence of the dry cleaning business is considered a recognized environmental condition.

Possible fate and transport mechanisms are the following: infiltration of rain water and surface runoff; percolation of rain water and surface runoff through the soil; leaching of soil impacts into groundwater; groundwater recharging to surface water; movement of shallow groundwater along underground utility corridors and septic system; and flow of soil vapors.

Possible exposure pathways and the related potential receptors associated with soil impacted by COCs include the following:

- Incidental ingestion and/or dermal contact with surface soils by construction/utility workers, on-site employees, customers and visitors, and ecological receptors;

- Incidental ingestion and/or dermal contact with soils above 20 feet bgs by construction/utility workers, on-site employees, customers and visitors, and ecological receptors;

- Ingestion of groundwater by construction/utility workers, on-site employees, customers and visitors, and ecological receptors;

- Dermal contact with groundwater by construction/utility workers, on-site employees, customers and visitors, and ecological receptors; and

- Inhalation of vapors by construction/utility workers, on-site employees, customers and visitors, and ecological receptors.

6.3. AFFECTED MEDIA

Based on the results of this assessment, impacted soil and soil gas above applicable or relevant and appropriate requirements ("ARARs") was identified.

The data gathered during this assessment is sufficient to determine whether products were released or disposed at the property. With respect to the recognized environmental conditions assessed, chlorinated VOCs have been released or disposed on the property.

6.4. PROPOSED CLEANUP LEVELS

MTCA (Model Toxics Control Act) requires that cleanup actions meet cleanup standards. These standards are comprised of both cleanup levels and points of compliance. A cleanup level is the concentration of hazardous substance in soil, water, air, or sediment that is determined to be protective of human health and the environment under specified exposure conditions. A point of compliance (POC) defines the point or points on a site where cleanup levels must be met. MTCA provides three options for establishing cleanup levels, as described below:

- Method A: Applicable Laws and Tables. Method A is designed for cleanups that are relatively straightforward or involve only a few hazardous substances. This method consists of tabularized cleanup levels for the most common hazardous substances found in soil and groundwater, including those constituents identified at this site

- Method B: Universal Method. MTCA B cleanup levels are established using applicable state and federal laws and the risk equations and other requirements specified for each medium. Method B is divided into two tiers – standard and modified. Standard Method B uses generic default assumptions to calculate cleanup levels. Modified Method B provides for the use of chemical-specific or site-specific information to change selected default assumptions. For both standard and modified Method B, the human health risk level for individual carcinogens must not exceed one-in-a-million. If more than one type of hazardous substance is present, the total risk level at the site may not exceed 1 in 100,000. Levels for non-carcinogens cannot exceed a hazard quotient of 1. In addition to accounting for human health impacts, the Method B cleanup levels must account for potential terrestrial or aquatic ecological impacts, if present at the site.

- Method C: Conditional Method. Method C is similar to Method B in that it is divided into two tiers – standard and modified. The main differences are: (1) cleanup levels are based on less stringent exposure assumptions and (2) the lifetime cancer risk is set at 1 in 100,000 for both individual substances and for the total cancer risk caused by all substances at a site.

The MTCA cleanup levels proposed for the Site are MTCA Method A cleanup levels for soil and MTCA Method B cleanup levels for soil gas. These cleanup levels are appropriate for the Site because it was a typical dry cleaning facility without a complex mix of COCs.

6.5. OTHER CONCERNS

There were no other concerns identified during this Phase II ESA.

6.6. CONCLUSIONS

Analytical results for the soil and sub-slab soil gas samples indicates that releases have occurred in association with former dry cleaning operation.

7. RECOMMENDATIONS

Based on the results of this assessment the following is recommended:

1. Mitigate the risk of vapor intrusion into occupied spaces within the site building.
2. Cleanup the PCE-contaminated soil by direct excavation or soil vapor extraction (SVE) technology.
3. To achieve lawful compliance with Chapter 173-340-300 (site discovery and reporting), Envitechnology recommends that copies of this report along with any future reports regarding the environmental conditions thus far encountered be forwarded to the Washington State Department of Ecology.

REFERENCES AND SOURCE OF INFORMATION

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TABLES

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Table 1. Location, Depth and Type of Samples Collected

Sample ID	Sample type	Depth (ft)	Location	Compound of concern	Analysis method	Date collected
B1-2	Soil	2	B1	cVOCs	EPA 8260CL	7/20/18 10:00
B1-5	Soil	5	B1	cVOCs	EPA 8260CL	7/20/18 10:20
B2-2	Soil	2	B2	cVOCs	EPA 8260CL	7/20/18 11:00
B2-5	Soil	5	B2	cVOCs	EPA 8260CL	7/20/18 11:10
B3-2	Soil	2	B3	cVOCs	EPA 8260CL	7/20/18 11:50
B3-5	Soil	5	B3	cVOCs	EPA 8260CL	7/20/18 12:00
B4-5	Soil	5	B4	cVOCs	EPA 8260CL	7/20/18 13:20
B4-20	Soil	20	B4	cVOCs	EPA 8260CL	7/20/18 13:30
B5-5	Soil	5	B5	cVOCs	EPA 8260CL	7/20/18 12:50
B5-20	Soil	20	B5	cVOCs	EPA 8260CL	7/20/18 13:00
B6-5	Soil	5	B6	cVOCs	EPA 8260CL	7/20/18 14:15
B6-20	Soil	20	B6	cVOCs	EPA 8260CL	7/20/18 14:20
B7-5	Soil	5	B7	cVOCs	EPA 8260CL	8/20/18 10:00
B8-5	Soil	5	B8	cVOCs	EPA 8260CL	8/20/18 11:00
B9-5	Soil	5	B9	cVOCs	EPA 8260CL	8/21/18 11:35
B9-10	Soil	10	B9	cVOCs	EPA 8260CL	8/21/18 11:40
B9-15	Soil	15	B9	cVOCs	EPA 8260CL	8/21/18 11:45
B10-2	Soil	2	B10	cVOCs	EPA 8260CL	8/20/18 11:50
B10-5	Soil	5	B10	cVOCs	EPA 8260CL	8/20/18 11:55
B11-2	Soil	2	B11	cVOCs	EPA 8260CL	8/21/18 10:40
B11-5	Soil	5	B11	cVOCs	EPA 8260CL	8/21/18 10:50
B12-5	Soil	5	B12	cVOCs	EPA 8260CL	8/20/18 12:10
B12-15	Soil	15	B12	cVOCs	EPA 8260CL	8/20/18 12:20
B13-5	Soil	5	B13	cVOCs	EPA 8260CL	8/20/18 12:30
B13-15	Soil	15	B13	cVOCs	EPA 8260CL	8/20/18 12:40
B14-10	Soil	10	B14	cVOCs	EPA 8260CL	8/20/18 12:50
B14-15	Soil	15	B14	cVOCs	EPA 8260CL	8/20/18 12:55
B14-25	Soil	25	B14	cVOCs	EPA 8260CL	8/20/18 13:40
B15-5	Soil	5	B15	cVOCs	EPA 8260CL	8/20/18 13:50
B15-15	Soil	15	B15	cVOCs	EPA 8260CL	8/20/18 14:00
B16-10	Soil	10	B16	cVOCs	EPA 8260CL	8/20/18 15:10
B16-29	Soil	29	B16	cVOCs	EPA 8260CL	8/20/18 16:10
B17-5	Soil	5	B17	cVOCs	EPA 8260CL	8/20/18 14:40
B17-15	Soil	15	B17	cVOCs	EPA 8260CL	8/20/18 14:45
B18-5	Soil	5	B18	cVOCs	EPA 8260CL	8/20/18 14:00
SG1-5	Soil Gas	5	B'1	cVOCs	EPA TO-15	7/20/18 12:10
SG2-5	Soil Gas	5	B'2	cVOCs	EPA TO-15	7/20/18 12:20
SG3-5	Soil Gas	5	B'3	cVOCs	EPA TO-15	7/20/18 12:35
SG4-5	Soil Gas	5	B'4	cVOCs	EPA TO-15	7/20/18 14:44

Sample ID	Sample type	Depth (ft)	Location	Compound of concern	Analysis method	Date collected
SG5-5	Soil Gas	5	B'5	cVOCs	EPA TO-15	7/20/18 14:55
SG6-5	Soil Gas	5	B'6	cVOCs	EPA TO-15	7/20/18 15:05
SG7-5	Soil Gas	5	B7	cVOCs	EPA TO-15	8/21/18 10:19
SG8-5	Soil Gas	5	B8	cVOCs	EPA TO-15	8/21/18 10:07
SG10-5	Soil Gas	5	B10	cVOCs	EPA TO-15	8/21/18 10:27
SG11-5	Soil Gas	5	B11	cVOCs	EPA TO-15	8/21/18 11:33
W14	Water	26	B14	cVOCs	EPA 8260CL	8/20/18 13:30

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Table 2. Summary of Soil Analytical Results (mg/kg)

	PCE	TCE	c-DCE	t-DCE	VC	MC
B1-2	0.04	<0.02	<0.05	<0.05	<0.02	<0.05
B1-5	**0.06**	<0.02	<0.05	<0.05	<0.02	<0.05
B2-2	0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B2-5	0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B3-2	**0.19**	<0.02	<0.05	<0.05	<0.02	<0.05
B3-5	**0.24**	<0.02	<0.05	<0.05	<0.02	<0.05
B4-5	0.04	<0.02	<0.05	<0.05	<0.02	<0.05
B4-20	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B5-5	**0.25**	<0.02	<0.05	<0.05	<0.02	<0.05
B5-20	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B6-20	<0.02	<0.02	<0.05	<0.05	<0.02	**0.11**
B7-5	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B8-5	0.03	<0.02	<0.05	<0.05	<0.02	<0.05
B9-5	**0.07**	<0.02	<0.05	<0.05	<0.02	<0.05
B9-10	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B9-15	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B10-2	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B10-5	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B11-2	0.05	<0.02	<0.05	<0.05	<0.02	<0.05
B11-5	0.04	<0.02	<0.05	<0.05	<0.02	<0.05
B12-5	**0.19**	<0.02	<0.05	<0.05	<0.02	<0.05
B12-15	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B13-5	0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B13-15	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B14-10	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B14-15	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B14-25	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B15-5	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B15-15	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B16-10	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B16-29	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B17-5	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B17-15	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B18-5	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
B18-15	<0.02	<0.02	<0.05	<0.05	<0.02	<0.05
Std	0.05	0.03	160*	1,600*	0.67*	0.02

Notes
All values presented in milligram per kilogram (mg/kg)
Std = Method A soil cleanup levels for unrestricted land uses (Table 740-1)
* Method B Cleanup Level; Method A cleanup level not established
Numbers in **Bold Red** indicate concentrations above the MTCA cleanup levels.

PCE=Tetrachloroethene
TCE= Trichloroethene
c-DCE = cis-1,2-Dichloroethene
t-DCE = trans-1,2-Dichloroethene
VC = Vinyl Chloride
MC = Methylene Chloride

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Table 3. Summary of Groundwater Analytical Results (µg/L)

	PCE	TCE	c-DCE	t-DCE	VC
W14	<1.0	<1.0	<1.0	<1.0	<0.2
Std*	5	5	16**	160**	0.2

Notes

All values presented in microgram per liter (µg/L)
*Std = Method A Cleanup Level
PCE =Tetrachloroethene
TCE = Trichloroethene
c-DCE = cis-1,2-Dichloroethene
t-DCE = trans-1,2-Dichloroethene
VC = Vinyl Chloride
** Method B cleanup level; Method A cleanup level not established

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Table 4. Summary of Sub-Slab Vapor Analytical Results (µg/m³)

	PCE	TCE	c-DCE	t-DCE	VC
SG1-5	180	6.6	<4.0	<4.0	<2.6
SG2-5	140	3.8	<4.0	<4.0	<2.6
SG3-5	**1,800**	<2.7	<4.0	<4.0	<2.6
SG4-5	**430**	<2.7	<4.0	<4.0	<2.6
SG5-5	**610**	<2.7	<4.0	<4.0	<2.6
SG6-5	**350**	<2.7	<4.0	<4.0	<2.6
SG7-5	**450**	1.7	<2.0	<2.0	<1.3
SG8-5	**450**	3.3	<2.0	<2.0	<1.3
SG10-5	120	7.3	<1.3	<1.3	<0.84
SG11-5	**780**	3.5	<2.0	<2.0	6.2
Std*	321	12.3	NL	NL	9.33

Notes

All values presented in microgram per cubic meter (µg/m³)
*Std = Method B Sub-Slab Screening Level (cancer cleanup/screening level)
NL = Not listed; no cleanup/screening levels have been promulgated
Numbers in **Bold Red** indicate concentrations above the MTCA cleanup levels
PCE =Tetrachloroethene
TCE = Trichloroethene
c-DCE = cis-1,2-Dichloroethene
t-DCE = trans-1,2-Dichloroethene
VC = Vinyl Chloride

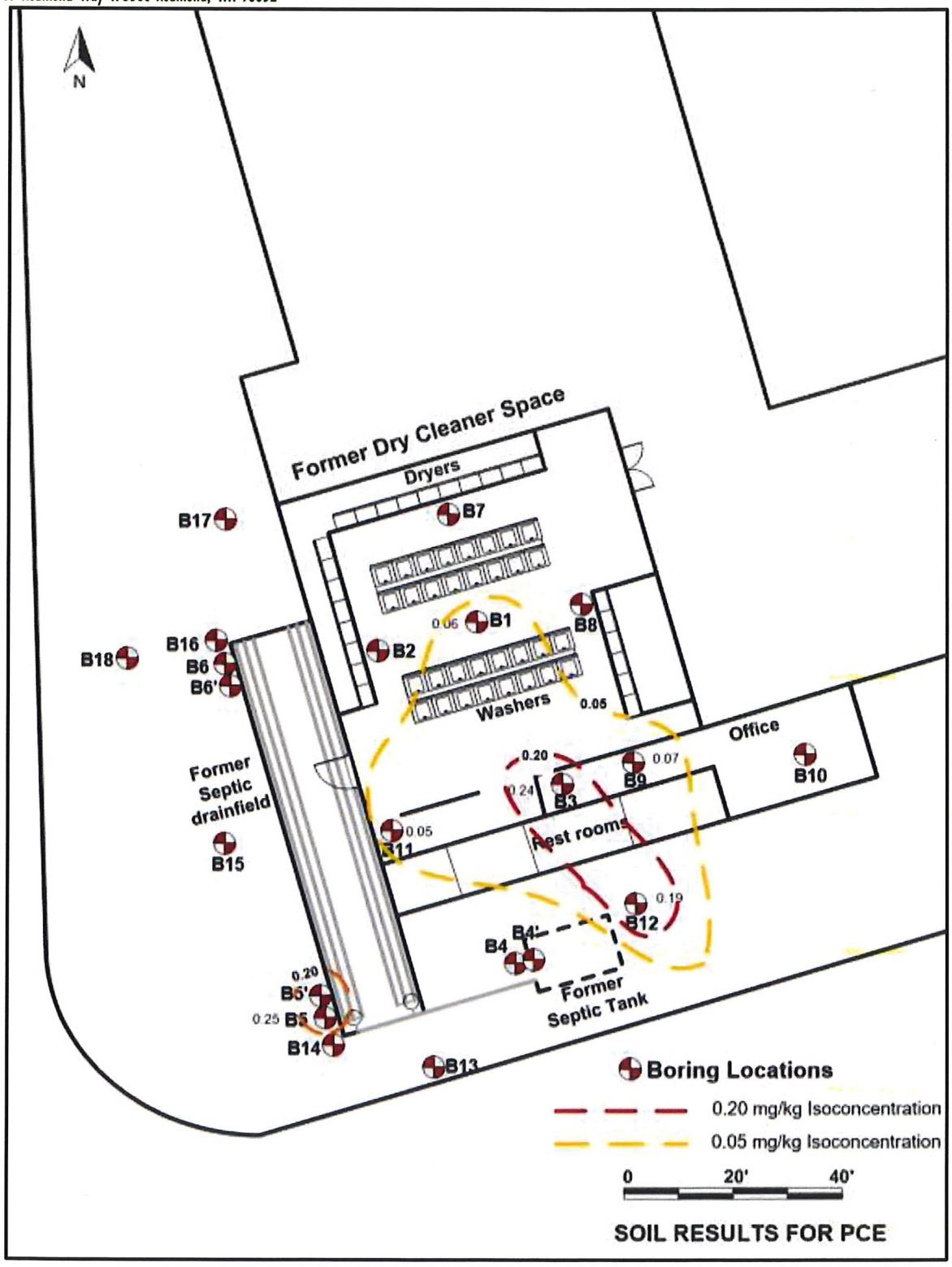


Figure 4. PCE Isoconcentrations in Soil

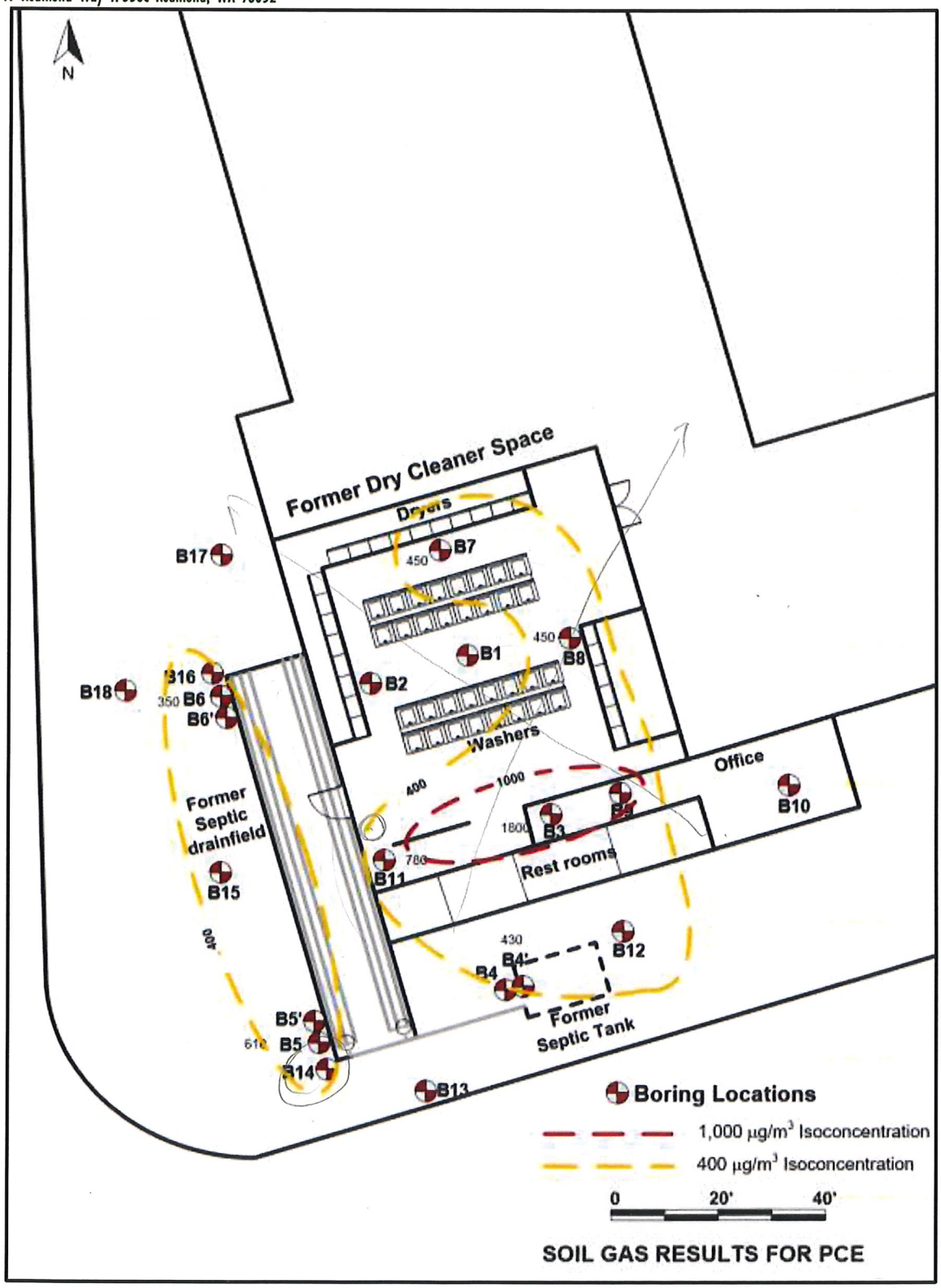
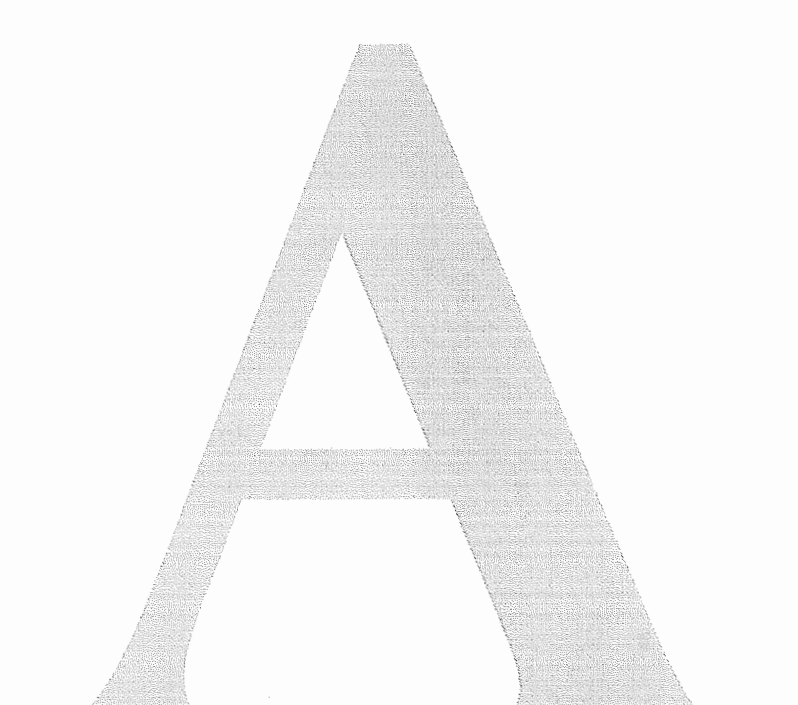


Figure 5. PCE Isoconcentrations in Soil Gas

APPENDICES

APPENDIX A. BORING LOGS



Unified Soil Classification System Chart

Major Divisions			Graph	USCS	Typical Description
Coarse Grained Soils More Than 50% Retained On No. 200 Sieve	Gravel More Than 50% of Coarse Fraction Retained On No. 4 Sieve	Clean Gravels		GW	Well-graded Gravels, Gravel-Sand Mixtures
				GP	Poorly-Graded Gravels, Gravel-Sand Mixtures
		Gravels With Fines		GM	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sand More Than 50% of Coarse Fraction Passing No. 4 Sieve	Clean Sands		SW	Well-graded Sands, Gravelly Sands
				SP	Poorly-Graded Sands, Gravelly Sands
		Sands With Fines		SM	Silty Sands, Sand-Silt Mixtures
				SC	Clayey Sands, Clay Mixtures
Fine Grained Soils More Than 50% Passing The No. 200 Sieve	Silts & Clays	Liquid Limit Less Than 50		ML	Inorganic Silts, rock Flour, Clayey Silts With Low Plasticity
				CL	Inorganic Clays of Low To Medium Plasticity
				OL	Organic Silts and Organic Silty Clays of Low Plasticity
	Silts & Clays	Liquid Limit Greater Than 50		MH	Inorganic Silts of Moderate Plasticity
				CH	Inorganic Clays of High Plasticity
				OH	Organic Clays And Silts of Medium to High Plasticity
Highly Organic Soils				PT	Peat, Humus, Soils with Predominantly Organic Content

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The Unified Soil Classification System (USCS)

07/20/2018 | **Figure A1**

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Log of Borehole – B7

Project : Lacey Urban Center	Approximate Elevation: 197 ft. above sea level
Loc: 7131 Martin Way E, Olympia, WA 98516	Drilling Method: Hand probe
Driller: ESN Northwest	Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED							Top concrete
								Dark brown
				SM			<1.0	Gravelly silty SAND (SM)
								Light brown, silty SAND (SM)
5					B7-5		<1.0	Soil sample (B7-5), Soil-gas sample (SG7-5)
								Boring termination at 5 feet bgs
10								
15								
20								

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Lacey Urban Center

8/20/2018 | **Figure A2**

Log of Borehole – B8

Project : Lacey Urban Center	Approximate Elevation: 197 ft. above sea level
Loc: 7131 Martin Way E, Olympia, WA 98516	Drilling Method: Hand probe
Driller: ESN Northwest	Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED			SM				Top concrete
								Light brown, gravelly silty SAND (SM)
							<1.0	No recovery between 2-4ft.
								Light brown, silty SAND (SM)
5					B8-5		<1.0	Soil sample (B8-5), Soil-gas sample (SG8-5)
								Boring termination at 5 feet bgs
10								
15								
20								

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Lacey Urban Center

8/20/2018 | **Figure A3**

Log of Borehole – B9

Project : Lacey Urban Center — Approximate Elevation: 197 ft. above sea level

Loc: 7131 Martin Way E, Olympia, WA 98516 — Drilling Method: Limited access

Driller: ESN Northwest — Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED							Top concrete
								Dark brown, gravelly silty SAND (SM)
								Dark brown, gravelly silty SAND (SM)
5					B9-5		<1.0	Soil sample (B9-5)
				SM				
10					B9-10		<1.0	Soil sample (B9-10)
15					B9-15		<1.0	Soil sample (B9-15)
								Boring termination at 15 feet bgs
20								

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Lacey Urban Center

8/21/2018 | **Figure A4**

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Log of Borehole – B10

Project : Lacey Urban Center	Approximate Elevation: 197 ft. above sea level
Loc: 7131 Martin Way E, Olympia, WA 98516	Drilling Method: Hand probe
Driller: ESN Northwest	Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED							Top concrete
					B10-2			Light brown gravelly silty SAND, Soil sample (B10-2)
				SM			<1.0	No recovery between 2-4ft.
								Light brown, silty SAND (SM)
5					B10-5		<1.0	Soil sample (B10-5), Soil-gas sample (SG10-5)
								Boring termination at 5 feet bgs
10								
15								
20								

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8/20/2018 | **Figure A5**

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Log of Borehole – B11

Project : Lacey Urban Center	Approximate Elevation: 197 ft. above sea level
Loc: 7131 Martin Way E, Olympia, WA 98516	Drilling Method: Limited access
Driller: ESN Northwest	Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED							Top concrete
					B11-2			Dark brown, gravelly sandy SILT (ML)
				ML			<1.0	Soil sample (B11-2)
								Dark brown, gravelly sandy SILT (ML)
5					B11-5		<1.0	Soil sample (B11-5), Soil gas sample (SG11-5)
								Boring termination at 5 feet bgs
10								
15								
20								

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Lacey Urban Center

8/21/2018 | **Figure A6**

Log of Borehole – B12

Project : Lacey Urban Center	Approximate Elevation: 197 ft. above sea level
Loc: 7131 Martin Way E, Olympia, WA 98516	Drilling Method: Geoprobe
Driller: ESN Northwest	Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED			SM				Top asphalt Dark brown, gravelly silty SAND (SM)
5					B12-5		<1.0	Soil sample (B12-5)
				ML				Light Brown, coarse-grained, Medium dense, gravelly sandy SILT (MT)
10							<1.0	
				SM				Grayish Gravelly silty SAND (SM)
15					B12-15		<1.0	Soil sample (B12-15) Boring termination at 15 feet bgs
20								

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8/20/2018 | **Figure A7**

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Log of Borehole – B13

Project : Lacey Urban Center	Approximate Elevation: 197 ft. above sea level
Loc: 7131 Martin Way E, Olympia, WA 98516	Drilling Method: Geoprobe
Driller: ESN Northwest	Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED			SM				Top asphalt Dark brown, gravelly silty SAND (SM)
5					B13-5		<1.0	Soil sample (B13-5)
				ML				Light Brown, coarse-grained, Medium dense, gravelly sandy SILT (MT)
10							<1.0	
				SM				Grayish, gravelly silty SAND (SM)
15					B13-15		<1.0	Soil sample (B13-15)
								Boring termination at 15 feet bgs
20								

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Lacey Urban Center

8/20/2018 | **Figure A8**

Log of Borehole – B14

Project : Lacey Urban Center — Approximate Elevation: 197 ft. above sea level

Loc: 7131 Martin Way E, Olympia, WA 98516 — Drilling Method: Geoprobe

Driller: ESN Northwest — Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED							Top asphalt
				SM				Dark brown, gravelly silty SAND (SM)
5							<1.0	
								Light Brown, coarse-grained
				ML				Medium dense, gravelly sandy SILT (MT)
10					B14-10		<1.0	Soil sample (B14-10)
								Grayish, gravelly silty SAND (SM)
15					B14-15		<1.0	Soil sample (B14-15)
				SM				
20							<1.0	
		▽			B14-25	W14	<1.0	Soil sample (B14-20), Water sample (W14) at 26 ft. Boring termination at 26 ft

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Lacey Urban Center

8/20/2018 | **Figure A9**

Log of Borehole – B15

Project : Lacey Urban Center	Approximate Elevation: 197 ft. above sea level
Loc: 7131 Martin Way E, Olympia, WA 98516	Drilling Method: Geoprobe
Driller: ESN Northwest	Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED							Top asphalt
								Dark brown, coarse-grained
								Medium dense, gravelly sandy SILT (MT)
5				ML	B15-5		<1.0	Soil sample (B15-5)
								Light Brown, coarse-grained
								Medium dense, gravelly sandy SILT (MT)
10							<1.0	
				SM				Grayish, gravelly silty SAND (SM)
15					B15-15		<1.0	Soil sample (B15-15)
								Boring termination at 15 feet bgs
20								

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8/20/2018 | **Figure A10**

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Log of Borehole – B16

Project : Lacey Urban Center — Approximate Elevation: 197 ft. above sea level

Loc: 7131 Martin Way E, Olympia, WA 98516 — Drilling Method: Geoprobe

Driller: ESN Northwest — Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED							Top asphalt
								Dark brown, coarse-grained
				ML				Medium dense, gravelly sandy SILT (ML)
5							<1.0	
10					B16-10		<1.0	Soil sample (B16-10)
								Grayish, Medium dense
								Gravelly silty SAND (SM)
15				SM			<1.0	
20							<1.0	
~								
29					B16-29		<1.0	Soil sample (B16-29), No water, boring stop at 29'

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8/20/2018 | **Figure A11**

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Log of Borehole – B17

Project : Lacey Urban Center — Approximate Elevation: 197 ft. above sea level

Loc: 7131 Martin Way E, Olympia, WA 98516 — Drilling Method: Geoprobe

Driller: ESN Northwest — Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED							Top asphalt
								Dark brown, coarse-grained
				ML				Medium dense, gravelly sandy SILT (ML)
5					B17-5		<1.0	Soil sample (B17-5)
								Grayish, Medium dense
								Gravelly silty SAND (SM)
10				SM			<1.0	
15					B17-15		<1.0	Soil sample (B17-15)
								Boring termination at 15 ft.
20								
~								
29								

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8/20/2018 | **Figure A12**

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Log of Borehole – B18

Project : Lacey Urban Center — Approximate Elevation: 197 ft. above sea level

Loc: 7131 Martin Way E, Olympia, WA 98516 — Drilling Method: Geoprobe

Driller: ESN Northwest — Logged by: Jake Lee

Depth (ft)	Well	Water Table	Symbol	USCS	Soil Sample	Water sample	PID Reading	Soil Description
	NO WELL CONSTRUCTED							Top asphalt
								Dark brown, coarse-grained
				ML				Medium dense, gravelly sandy SILT (ML)
5					B18-5		<1.0	Soil sample (B18-5)
								Grayish, Medium dense
								Gravelly silty SAND (SM)
10				SM			<1.0	
15					B18-15		<1.0	Soil sample (B18-15)
								Boring termination at 15 ft.
20								
25								

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Lacey Urban Center

8/20/2018 | **Figure A13**

APPENDIX B. SITE PHOTOGRAPHS

Photo 1. A front view of the Lacey Laundry looking south.

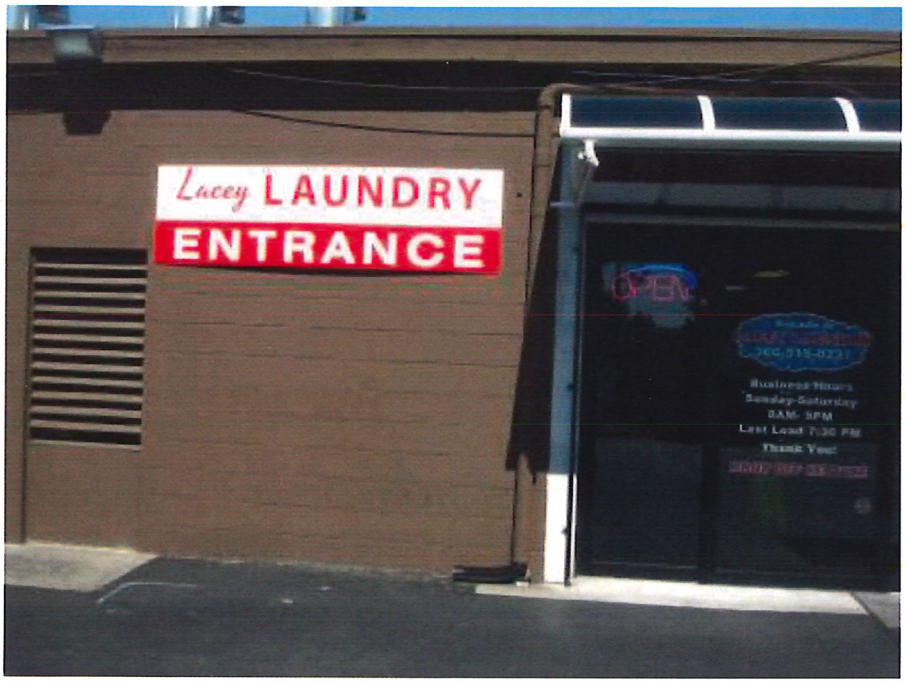

Photo 2. A rear view of the Lacey Laundry looking east.

Photo 3. An inside view of the Lacey Laundry looking east.

Photo 4. An inside view of the Lacey Laundry looking north.

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Photo 5. A view of the magnetometer survey.

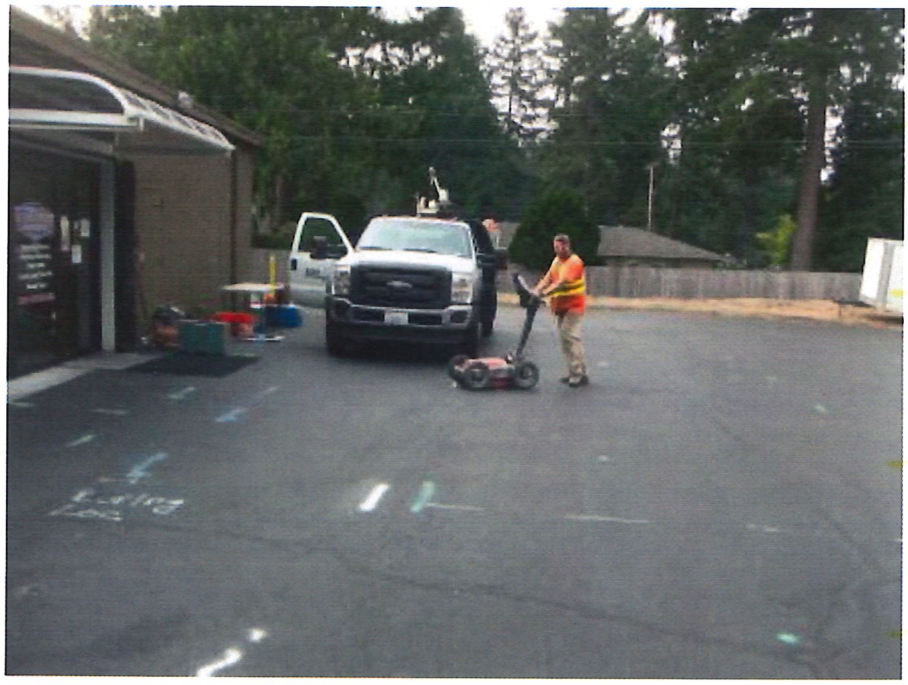

Photo 6. A view of the GPR survey.

Photo 7. A view of the soil boring – B7.

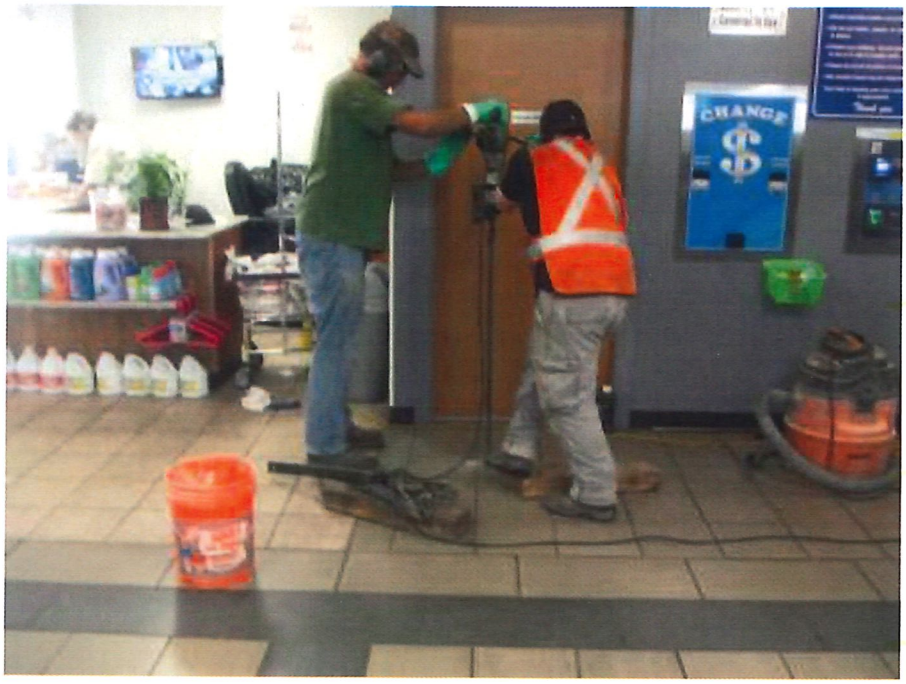

Photo 8. A view of the soil boring – B8.

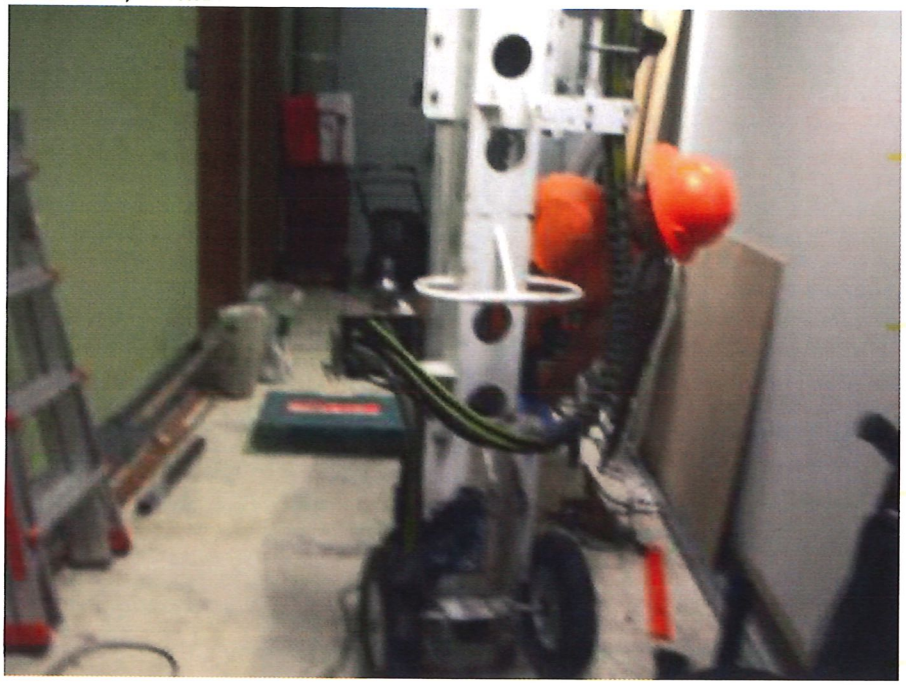

Photo 9. A view of the soil boring – B9.

Photo 10. A view of the soil boring – B10.

Photo 11. A view of the soil boring – B11.

Photo 12. A view of the soil boring – B12

Photo 13. A view of the soil boring – B13.

Photo 14. A view of the soil boring – B14.

Photo 15. A view of the soil boring – B15.

Photo 16. A view of the soil boring – B16.

Photo 17. A view of the soil boring – B17.

Photo 18. A view of the soil boring – B18

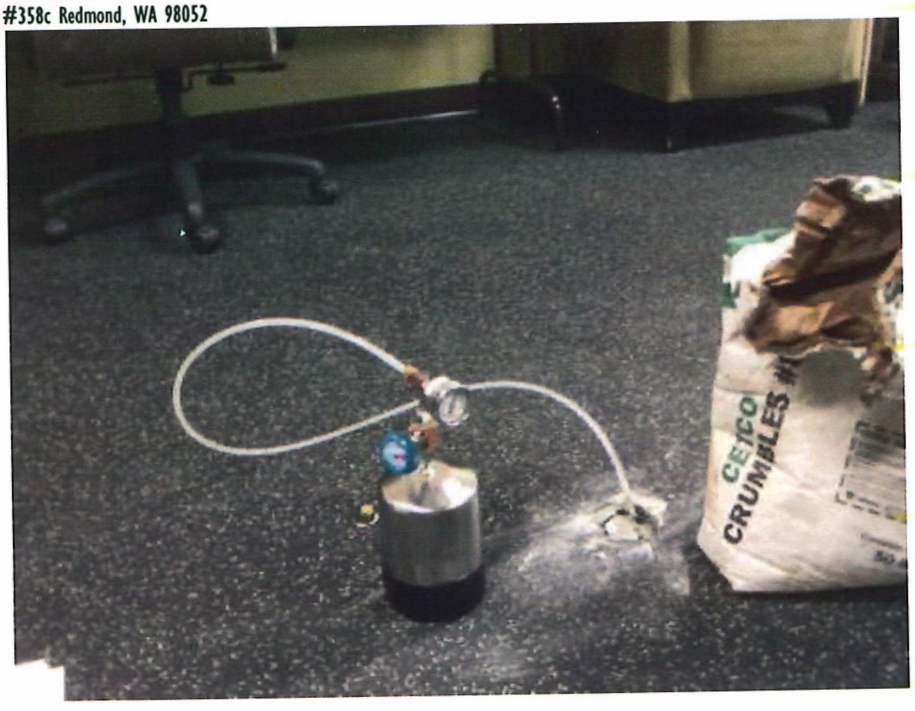

Photo 19. A view of the indoor soil gas sampling.

Photo 20. A view of the groundwater sampling.

APPENDIX C. LABORATORY REPORT

C

ESN NORTHWEST
Environmental
Services Network

September 7, 2018

Jake Lee
EnviTech, LLC
18025 NE 130th Ct.
Redmond, WA 98052

Dear Mr. Lee:

Please find enclosed the analytical data report for the Lacey Urban Center Project located in Lacey, Washington. Probe services were conducted on August 20 & 21, 2018. Soil and water samples were analyzed for Chlorinated VOC's by Method 8260 and soil vapor for VOC's by Method TO-15 on August 22 – 29, 2018.

The results of the analyses are summarized in the attached tables. All soil values are reported on a dry weight basis. Applicable detection limits and QA/QC data are included. An invoice for this analytical work is also enclosed.

ESN Northwest appreciates the opportunity to have provided analytical services for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Michael A Korosec

Michael A. Korosec
President

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Web Site: *www.esnnw.com* E-Mail: *info@esnnw.com*

ESN NORTHWEST CHEMISTRY LABORATORY

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PROJECT LACEY URBAN CENTER
PROJECT #02180712-1
Olympia, Washington

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Analysis of Chlorinated Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	MB	LCS	B7-5	B8-5	B10-2	B10-5	B12-5
Date extracted		08/22/18	08/22/18	08/20/18	08/20/18	08/20/18	08/20/18	08/20/18
Date analyzed	(mg/Kg)	08/22/18	08/22/18	08/22/18	08/22/18	08/22/18	08/22/18	08/22/18
% Moisture				3%	16%	5%	5%	25%
Dichlorodifluoromethane	0.05	nd		nd	nd	nd	nd	nd
Chloromethane	0.05	nd		nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	93%	nd	nd	nd	nd	nd
Chloroethane	0.05	nd		nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd		nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	77%	nd	nd	nd	nd	nd
Methylene chloride	0.05	nd		nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd		nd	nd	nd	nd	nd
1,1-Dichloroethane	0.05	nd		nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd		nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd		nd	nd	nd	nd	nd
Chloroform	0.05	nd	82%	nd	nd	nd	nd	nd
Bromochloromethane	0.05	nd		nd	nd	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd		nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd		nd	nd	nd	nd	nd
1,1-Dichloropropene	0.05	nd		nd	nd	nd	nd	nd
Carbon tetrachloride	0.05	nd		nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	98%	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.05	nd	98%	nd	nd	nd	nd	nd
Bromodichloromethane	0.05	nd		nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd		nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd		nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd		nd	nd	nd	nd	nd
1,3-Dichloropropane	0.05	nd		nd	nd	nd	nd	nd
Dibromochloromethane	0.05	nd		nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	102%	nd	**0.03**	nd	nd	**0.19**
Chlorobenzene	0.05	nd	94%	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd		nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd		nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd		nd	nd	nd	nd	nd
2-Chlorotoluene	0.05	nd		nd	nd	nd	nd	nd
4-Chlorotoluene	0.05	nd		nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd		nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd		nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd		nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd		nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd		nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd		nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd		nd	nd	nd	nd	nd
Surrogate recoveries								
Dibromofluoromethane		99%	93%	98%	97%	105%	99%	101%
Toluene-d8		108%	101%	106%	103%	108%	104%	105%
4-Bromofluorobenzene		102%	100%	105%	101%	100%	102%	105%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

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PROJECT #02180712-1
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lab@esnnw.com

Analysis of Chlorinated Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	B12-15	B13-5	B13-15	B14-10	B14-15	B14-25	B15-5	B15-15
Date extracted		08/20/18	08/20/18	08/20/18	08/20/18	08/20/18	08/20/18	08/20/18	08/20/18
Date analyzed	(mg/Kg)	08/22/18	08/22/18	08/22/18	08/22/18	08/22/18	08/22/18	08/22/18	08/23/18
% Moisture		5%	9%	4%	24%	4%	9%	26%	4%
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Chloromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd	nd	nd	nd	nd	nd
Chloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Methylene chloride	0.05	nd	nd	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Chloroform	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Bromochloromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Bromodichloromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Dibromochloromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	**0.02**	nd	nd	nd	nd	nd	nd
Chlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Surrogate recoveries									
Dibromofluoromethane		102%	99%	93%	100%	96%	99%	103%	98%
Toluene-d8		107%	104%	102%	104%	105%	104%	105%	102%
4-Bromofluorobenzene		100%	98%	103%	105%	105%	103%	101%	104%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

Envitech
PROJECT LACEY URBAN CENTER
PROJECT #02180712-1
Olympia, Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analysis of Chlorinated Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	B16-10	B16-29	B17-5	B17-15	B18-5	B18-15	B11-2	B11-5
Date extracted		08/20/18	08/20/18	08/20/18	08/20/18	08/20/18	08/20/18	08/20/18	08/20/18
Date analyzed	(mg/Kg)	08/23/18	08/23/18	08/23/18	08/23/18	08/23/18	08/23/18	08/23/18	08/23/18
% Moisture		4%	1%	16%	4%	5%	8%	12%	17%
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Chloromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd	nd	nd	nd	nd	nd
Chloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Methylene chloride	0.05	nd	nd	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Chloroform	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Bromochloromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Bromodichloromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Dibromochloromethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd	nd	nd	nd	nd	**0.05**	**0.04**
Chlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd	nd
Surrogate recoveries									
Dibromofluoromethane		99%	100%	102%	96%	103%	105%	102%	101%
Toluene-d8		105%	107%	106%	105%	107%	108%	106%	106%
4-Bromofluorobenzene		98%	103%	102%	102%	102%	102%	98%	102%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

Envitech
PROJECT LACEY URBAN CENTER
PROJECT #02180712-1
Olympia, Washington

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lab@esnnw.com

Analysis of Chlorinated Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	B9-5	B9-10	B9-15
Date extracted		08/20/18	08/20/18	08/20/18
Date analyzed	(mg/Kg)	08/23/18	08/23/18	08/23/18
% Moisture		15%	6%	2%
Dichlorodifluoromethane	0.05	nd	nd	nd
Chloromethane	0.05	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd
Chloroethane	0.05	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd
Methylene chloride	0.05	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd	nd	nd
1,1-Dichloroethane	0.05	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd
Chloroform	0.05	nd	nd	nd
Bromochloromethane	0.05	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd	nd	nd
1,1-Dichloropropene	0.05	nd	nd	nd
Carbon tetrachloride	0.05	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd
1,2-Dichloropropane	0.05	nd	nd	nd
Bromodichloromethane	0.05	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd	nd	nd
1,3-Dichloropropane	0.05	nd	nd	nd
Dibromochloromethane	0.05	nd	nd	nd
Tetrachloroethene (PCE)	0.02	**0.07**	nd	nd
Chlorobenzene	0.05	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd	nd	nd
2-Chlorotoluene	0.05	nd	nd	nd
4-Chlorotoluene	0.05	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd	nd	nd
Surrogate recoveries				
Dibromofluoromethane		96%	98%	96%
Toluene-d8		105%	105%	104%
4-Bromofluorobenzene		105%	101%	101%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

Envitech
PROJECT LACEY URBAN CENTER
PROJECT #02180712-1
Olympia, Washington

ESN Northwest
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Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analysis of Chlorinated Volatile Organic Compounds in Water by Method 8260C/5030C

Analytical Results

	RL	MB	LCS	LCSD	W14
Date analyzed	(ug/L)	08/24/18	08/24/18	08/24/18	08/24/18
Dichlorodifluoromethane	1.0	nd			nd
Chloromethane	1.0	nd			nd
Vinyl chloride	0.2	nd	104%	98%	nd
Chloroethane	1.0	nd			nd
Trichlorofluoromethane	1.0	nd			nd
1,1-Dichloroethene	1.0	nd	78%	79%	nd
Methylene chloride	1.0	nd			nd
trans-1,2-Dichloroethene	1.0	nd			nd
1,1-Dichloroethane	1.0	nd			nd
cis-1,2-Dichloroethene	1.0	nd			nd
2,2-Dichloropropane	1.0	nd			nd
Chloroform	1.0	nd	82%	84%	nd
Bromochloromethane	1.0	nd			nd
1,1,1-Trichloroethane	1.0	nd			nd
1,2-Dichloroethane (EDC)	1.0	nd			nd
1,1-Dichloropropene	1.0	nd			nd
Carbon tetrachloride	1.0	nd			nd
Trichloroethene (TCE)	1.0	nd	101%	102%	nd
1,2-Dichloropropane	1.0	nd			nd
Bromodichloromethane	1.0	nd			nd
cis-1,3-Dichloropropene	1.0	nd			nd
trans-1,3-Dichloropropene	1.0	nd			nd
1,1,2-Trichloroethane	1.0	nd			nd
1,3-Dichloropropane	1.0	nd			nd
Dibromochloromethane	1.0	nd			nd
Tetrachloroethene (PCE)	1.0	nd	109%	106%	nd
Chlorobenzene	1.0	nd	102%	100%	nd
1,1,1,2-Tetrachloroethane	1.0	nd			nd
1,1,2,2-Tetrachloroethane	1.0	nd			nd
1,2,3-Trichloropropane	1.0	nd			nd
2-Chlorotoluene	1.0	nd			nd
4-Chlorotoluene	1.0	nd			nd
1,3-Dichlorobenzene	1.0	nd			nd
1,4-Dichlorobenzene	1.0	nd			nd
1,2-Dichlorobenzene	1.0	nd			nd
1,2-Dibromo-3-Chloropropane	1.0	nd			nd
1,2,4-Trichlorobenzene	1.0	nd			nd
Hexachloro-1,3-butadiene	1.0	nd			nd
1,2,3-Trichlorobenzene	1.0	nd			nd
Surrogate recoveries					
Dibromofluoromethane		108%	89%	89%	103%
Toluene-d8		107%	93%	93%	106%
4-Bromofluorobenzene		105%	102%	100%	101%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NORTHWEST, INC. | Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: Envitech

ADDRESS: 16541 Redmond Way #358C Redmond, WA 98052

PHONE: 425-890-3517 FAX: 425-310-6600

CLIENT PROJECT #: 021807.12-1 PROJECT MANAGER: Jake Lee

DATE: 8/20/18 PAGE 1 OF 2

PROJECT NAME: Lacey Urban Center

LOCATION: 1205 Martin Way E. Olympia, WA

COLLECTOR: Jake Lee DATE OF COLLECTION: 8/20/18

Sample Number	Depth	Time	Sample Type	Container Type	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	NOTES	Total Number of Containers	Laboratory Note Number
1. B7-5	5	10:00	Soil		X														Chlorinated Solvents		
2. B8-5	5	11:00	↓		↓														RE TCE DCE VC		
3. B10-2	2	11:50																			
4. B10-5	5	11:55																			
5. B12-5	5	12:10																			
6. B12-15	15	12:20																			
7. B13-5	5	12:30																			
8. B13-15	15	12:40																			
9. B14-10	10	12:50																			
10. B14-15	15	12:55																			
11. B14-25	25	13:40																			
12. B15-5	5	13:50																			
13. B15-15	15	14:00																			
14. B16-10	10	15:10																			
15. B16-29	29	16:10																			
16. B17-5	5	14:40																			
17. B17-15	15	14:45																			
18. B18-5	5	13:50	↓		↓																

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
		Jennifer Arnold	8.21.18
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR 5 DAY

1210 Eastside Street SE, Suite 200
Olympia, Washington 98501
Phone: 360-459-4670
Fax: 360-459-3432
Website: www.esnnw.com
E-Mail: info@esnnw.com

ESN NORTHWEST, INC. | Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: Enviteh

ADDRESS: 16541 Redmond Way #358C, Redmond, WA 98052

PHONE: 425-890-3517 FAX: 425-310-6600

CLIENT PROJECT #: 021807121 PROJECT MANAGER: Jake Lee

DATE: 8/20/18 PAGE 2 OF 2

PROJECT NAME: Lacey Urban Center

LOCATION: 7205 Martin Way E, Olympia WA

COLLECTOR: Jake Lee DATE OF COLLECTION: 8/20/18

Sample Number	Depth	Time	Sample Type	Container Type	TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	NOTES	Total Number of Containers	Laboratory Note Number
1. B18-15	15	14:00	Soil						X													Chlorinated Solvents PCE, TCE, DCE, VC		
2. W14	26	13:30	Water						X															
3. B11-2	2	10:40	8/21	Soil					X															
4. B11-5	5	10:50	8/21						X															
5. B9-5	5	11:35	8/21						X															
6. B9-10	10	11:45	8/21						X															
7. B9-15	15	11:45	8/21						X															
8.																								
9.																								
10.																								
11.																								
12.																								
13.																								
14.																								
15.																								
16.																								
17.																								
18.																								

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
Jake Lee	8/21/18 11:55	Cole Pickering	8-21-18 11:55
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR (5 DAY)

1210 Eastside Street SE, Suite 200
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Phone: 360-459-4670
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E-Mail: info@esnnw.com

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 5, 2018

Jennifer Arnold, Project Manager
ESN NW
1210 Eastside St SE, Suite 200
Olympia, WA 98501

Dear Ms Arnold:

Included are the results from the testing of material submitted on August 22, 2018 from the Lacey Urban Center 021807T12-1, F&BI 808504 project. There are 8 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
ESN0905R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on August 22, 2018 by Friedman & Bruya, Inc. from the ESN NW Lacey Urban Center 021807T12-1, F&BI 808504 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	ESN NW
808504 -01	SG7-5
808504 -02	SG8-5
808504 -03	SG10-5
808504 -04	SG11-5

Trichloroethene was detected in the TO-15 method blank at a level within 10 times the concentration detected in sample SG7-5. The data were flagged accordingly.

All other quality control requirements were acceptable.

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SG7-5	Client:	ESN NW
Date Received:	08/22/18	Project:	Lacey Urban Center 021807T12-1
Date Collected:	08/21/18	Lab ID:	808504-01 1/5
Date Analyzed:	08/29/18	Data File:	082824.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	96	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<1.3	<0.5
Chloroethane	<1.3	<0.5
1,1-Dichloroethene	<2	<0.5
trans-1,2-Dichloroethene	<2	<0.5
1,1-Dichloroethane	<2	<0.5
cis-1,2-Dichloroethene	<2	<0.5
1,2-Dichloroethane (EDC)	<0.2	<0.05
1,1,1-Trichloroethane	<2.7	<0.5
Trichloroethene	1.7 fb	0.31 fb
1,1,2-Trichloroethane	<0.27	<0.05
Tetrachloroethene	450	66

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SG8-5	Client:	ESN NW
Date Received:	08/22/18	Project:	Lacey Urban Center 021807T12-1
Date Collected:	08/21/18	Lab ID:	808504-02 1/5
Date Analyzed:	08/29/18	Data File:	082825.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<1.3	<0.5
Chloroethane	<1.3	<0.5
1,1-Dichloroethene	<2	<0.5
trans-1,2-Dichloroethene	<2	<0.5
1,1-Dichloroethane	<2	<0.5
cis-1,2-Dichloroethene	<2	<0.5
1,2-Dichloroethane (EDC)	<0.2	<0.05
1,1,1-Trichloroethane	<2.7	<0.5
Trichloroethene	3.3	0.61
1,1,2-Trichloroethane	<0.27	<0.05
Tetrachloroethene	450	66

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SG10-5	Client:	ESN NW
Date Received:	08/22/18	Project:	Lacey Urban Center 021807T12-1
Date Collected:	08/21/18	Lab ID:	808504-03 1/3.3
Date Analyzed:	08/29/18	Data File:	082826.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	95	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.84	<0.33
Chloroethane	<0.87	<0.33
1,1-Dichloroethene	<1.3	<0.33
trans-1,2-Dichloroethene	<1.3	<0.33
1,1-Dichloroethane	<1.3	<0.33
cis-1,2-Dichloroethene	<1.3	<0.33
1,2-Dichloroethane (EDC)	<0.13	<0.033
1,1,1-Trichloroethane	<1.8	<0.33
Trichloroethene	7.3	1.4
1,1,2-Trichloroethane	<0.18	<0.033
Tetrachloroethene	120	18

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SG11-5	Client:	ESN NW
Date Received:	08/22/18	Project:	Lacey Urban Center 021807T12-1
Date Collected:	08/21/18	Lab ID:	808504-04 1/5
Date Analyzed:	08/29/18	Data File:	082827.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	91	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	6.2	2.4
Chloroethane	<1.3	<0.5
1,1-Dichloroethene	<2	<0.5
trans-1,2-Dichloroethene	<2	<0.5
1,1-Dichloroethane	<2	<0.5
cis-1,2-Dichloroethene	<2	<0.5
1,2-Dichloroethane (EDC)	<0.2	<0.05
1,1,1-Trichloroethane	<2.7	<0.5
Trichloroethene	3.5	0.64
1,1,2-Trichloroethane	<0.27	<0.05
Tetrachloroethene	780	120

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	ESN NW
Date Received:	Not Applicable	Project:	Lacey Urban Center 021807T12-1
Date Collected:	Not Applicable	Lab ID:	08-1920 mb
Date Analyzed:	08/28/18	Data File:	082807.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
Chloroethane	<0.26	<0.1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	<0.04	<0.01
1,1,1-Trichloroethane	<0.55	<0.1
Trichloroethene	<0.27	<0.05
1,1,2-Trichloroethane	<0.055	<0.01
Tetrachloroethene	<0.68	<0.1

Date of Report: 09/05/18
Date Received: 08/22/18
Project: Lacey Urban Center 021807T12-1, F&BI 808504

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	ppbv	5	99	70-130
Chloroethane	ppbv	5	98	70-130
1,1-Dichloroethene	ppbv	5	103	70-130
trans-1,2-Dichloroethene	ppbv	5	105	70-130
1,1-Dichloroethane	ppbv	5	106	70-130
cis-1,2-Dichloroethene	ppbv	5	104	70-130
1,2-Dichloroethane (EDC)	ppbv	5	111	70-130
1,1,1-Trichloroethane	ppbv	5	111	70-130
Trichloroethene	ppbv	5	99	70-130
1,1,2-Trichloroethane	ppbv	5	101	70-130
Tetrachloroethene	ppbv	5	99	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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SAMPLE CHAIN OF CUSTODY

ME 08/22/18

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(ESN Northwest
1210 Eastside Street SE, Suite 200
/ Olymp

ESN Northwest
1210 Eastside Street SE, Suite 200
Olympia, WA 98501

Phone 4

.technology.com

SAMPLERS (signature): Jake Ang Lee

PROJECT NAME: Lacey Urban Centers

PO #: 0218071 2-1

REPORTING LEVEL
☐ Indoor Air ☐ Deep Soil Gas
☒ Sub Slab/Soil Gas ☐ SVE/Grab

INVOICE TO: Envitech

Page # _____ of _____

TURNAROUND TIME
☒ Standard
☒ RUSH 7 Day 2d ET ME
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Archive Samples
☐ Other

ANALYSIS REQUESTED

Sample Name	Lab ID	Canister ID	Flow Contr. ID	Date Sampled	Field Initial Press. (Hg)	Field Initial Time	Field Final Press. (Hg)	Field Final Time	TO-15 Full Scan	TO-15 BTEXN	TO-15 cVOCs		Notes
SG7-5	01	225	3251	8/21/18	30	10:19	3	10:24			X		Chlorinated Solvents
SG8-5	02	01	2297	↓	30	10:07	3	10:15			X		PCE, TCE, DCE, VC
SG10-5	03	17	2301	↓	29	10:27	3	10:33			X		
SG11-5	04	07	3677	✓	30	11:33	3	11:38			X		
													Samples received at 23 °C
												°C	~~Samples received at~~ (NP)

Friedman & Bruya, Inc.
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Seattle, WA 98119-2029
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Fax (206) 283-5044

FORMS\COC\COCTO-15.DOC

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Jake Ang Lee	Jake Lee	Envitech	8/21/18	12:00
Received by:	Cole Pickering	Cole Pickering	ESN	8/21/18	12:00
Relinquished by:					
Received by:	[illegible]	Nhan Phan	FEBI	8/22/18	1245