FOCUSED SOIL GAS AND SUB-SLAB VAPOR INVESTIGATION

OHSU Richard Jones Hall

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PORTLAND, OR 97239
(ECSI ID 6594)

Prepared for:

Oregon Health and Science University
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This

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Report for:

Oregon Health and Science University

3222 SW Research Drive
Portland, Oregon 97239

and its assignees

Issued October 13, 2025 *by:*

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Table of Contents

List of Tables, Figures and Appendices

Tables

IN TEXT (*labeled by Section – Number)*

AFTER TEXT (*following 'Tables' tab)*

Figures

Appendices

List of Acronyms and Abbreviations

AST	above-ground storage tank
bgs	below ground surface
Client	Oregon Health & Science University (OHSU)
COI	constituent of interest
DRO	diesel-range organics
ENW	EVREN Northwest, Inc.
EX	Central Employment zoning
EPA	U.S. Environmental Protection Agency
FSDS	Field Sampling Data Sheets
F&BI	Friedman & Bruya, Inc.
IC	Institutional Campus zoning overlay
MRL	method reporting limit
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
OHSU	Oregon Health & Science University
PCS	petroleum-contaminated soil
PID	photoionization detector
ppmv	parts per million by volume
RBCs	risk-based concentrations
RBDM	ODEQ's *Risk-Based Decision Making for the Remediation of Contaminated Sites* guidance document
RJH	Richard Jones Hall
RM	River Mile
SLRBCs	screening-level risk-based concentrations
USGS	U.S. Geological Survey
VI	vapor intrusion
VOCs	volatile organic constituents

1.0 Introduction

At the request of Oregon Health and Science University (OHSU; Client), EVREN Northwest, Inc. (ENW) conducted a Focused Soil Gas and Sub-Slab Vapor Investigation as part of ongoing investigation activities following a release of diesel fuel in January 2024 from an above-ground storage tank (AST) associated with an emergency diesel generator on the southwest side of OHSU's Richard Jones Hall (RJH).

This report describes the Soil Gas Investigation scope of work findings, conclusions, and recommendations.

2.0 Background

Sometime prior to January 18, 2024, service was performed on a 2,000+ gallon rectangular double-wall AST associated with an emergency generator on the southwest side of the RJH building. Following the service, a release of diesel fuel was discovered resulting from a loose or mis-threaded connection on piping associated with the AST. OHSU coordinated with Clean Harbors Environmental (Clean Harbors) of Clackamas, Oregon, to perform cleanup of diesel fuel within the concrete structure that houses/retains the AST. Of the estimated 400+ gallons released, approximately 200 gallons of diesel fuel were recovered from within the structure and transferred into four (4) 55-gallon drums for disposal. During this initial cleanup, observations suggested that diesel fuel had escaped through weep holes in the interior of the concrete AST retaining structure and reached and infiltrated surface soil around the base on the northwest side of the concrete structure. Evidence of diesel impacts, i.e., sheen, were observed in a drainage northwest of the RJH building. Clean Harbors deployed fuel-absorbent booms and pads within the concrete structure, storm water outfalls, and ephemeral drainage in response to the release. OHSU deployed air purifiers in those interior spaces of the RJH. ENW understands OHSU reported the release to the Oregon Emergency Response System, the National Response Center, and the Oregon Department of Environmental Quality (ODEQ). The site release was added to ODEQ's project database on April 1, 2024, and assigned Environmental Cleanup Site Information (ECSI) project ID 6594.

Following Clean Harbors' initial response actions, systematic soil sampling was conducted by ENW immediately downgradient of the release area. Reconnaissance soil and surface water samples were also collected by ENW farther downgradient in the drainage ravine to the northwest of RJH. The findings suggest that a preferential pathway (or pathways) for diesel-related petroleum hydrocarbons may exist via storm and/or sewer utilities present on the south and west sides of RJH.

ENW conducted systematic surface and subsurface soil sampling to assess the lateral and vertical extent of the petroleum impacted soil (PCS) plume downgradient of the release. Based on the findings, ENW oversaw the excavation and disposal of approximately 36 tons of PCS in the area immediately downgradient of the release in October 2024. A treatment chemical (Micro-Blaze®) was applied to the margins of the resulting excavation to promote further bio-attenuation of residual impacts. These activities were documented in the Initial Assessment and Interim Soil Removal Action Oversight Report[1].

[1] ENW, 2025. Initial Soil Assessment and Interim Soil Removal Action Oversight: Diesel Spill Cleanup, OHSU Richard Jones Hall, 3222 SW Research Drive, Portland, OR 97239, ECSI ID 6594). March 27, 2025.

Based on the findings, further evaluation of the vapor intrusion pathway was recommended.

3.0 Scope of Work

ENW completed the following Scope of Work, in accordance with the Oregon Department of Environmental Quality (ODEQ)-approved *Work Plan*[2], dated July 9, 2025:

- Advanced two (2) temporary soil gas probes east and west of the former PCS excavation and collected soil gas samples at target depths of 5- and 10-feet below ground surface (bgs) at each location, per ODEQ guidance.
- Installed two (2) semi-permanent sub-slab vapor pins within the site building and collected sub-slab vapor samples at each location.
- Submitted samples to an independent laboratory for analysis of contaminants of interest.
- Evaluated analytical results with respect to ODEQ's cleanup standards and guidance documents.
- Prepared this report documenting the work conducted and presenting recommendations.

4.0 Site Description

OHSU's RJH building is located on OHSU's Portland Campus on Marquam Hill in Portland, Oregon (see Figure 1). The RJH building is centrally located on the north end of the campus at 3222 SW Research Dr, Portland, Oregon. The campus contains health care (i.e., hospital and clinic) facilities as well as medical, biologic, and chemical research facilities.

The emergency generator and associated steel rectangular 2,000+ gallon double-wall diesel AST are on the southwest side of the RJH building. The emergency generator is housed in a concrete utility room beneath the road deck on the southwest side of the building (Figures 2 and 3). A block fan/radiator rests on a steel grate south of the generator. The auxiliary 2,000+ gallon diesel AST is located on a 16-foot square shaped, 1-foot-thick concrete pad located approximately 8 feet beneath the steel grate. The AST pad rests on a 20.5-foot-long by 19 feet wide concrete retaining structure positioned approximately 8 feet southwest of the RJH building's exterior wall and 9 feet below the steel grate and generator. Concrete walls rise approximately 9 feet above the retaining structure floor, and two weep holes at the base of the retaining structure floor allow precipitation collecting inside the structure to drain through the northwest wall to the ground below. It is thought that the diesel fuel released from the diesel AST through a loosely/crossed threaded joint dripped onto the raised concrete pad and drained through the weep holes on the northwest side of the retaining structure. A large concrete footing is located approximately 5 to 8 feet northwest of the AST retaining structure. The purpose of this footing is unknown, though it limited the extent of PCS removal action directly northwest of the AST retaining structure.

Topography. The U.S. Geological Survey (USGS) Portland topographic quadrangle indicates the subject property is located at elevations ranging from 495 to 550 feet above mean sea level (see Figures 1 and 2).

[2] ENW, *Work Plan, Additional Remedial Action and Soil Gas Investigation*, OHSU Richard Jones Hall. Dated: July 8, 2025.

The property slopes steeply downward to the northwest toward a side ravine of Marquam Gulch. An ephemeral creek flows northeastward in the gulch. Connor Trail cuts the northwest-facing slope of the ravine. The AST structure is located at approximately 545-feet elevation on the northwest facing slope of the ravine.

Geologic Setting. The site is located in the Portland Hills of northwestern Oregon. The Portland Hills are an uplifted and complexly faulted block between the Portland Basin to the east and the Tualatin Basin to the west. The fault block consists primarily of Columbia River Basalt Group lavas mantled with a thin to locally thick loessal cover (Portland Hills Silt). The faults bounding the block trend generally northwesterly and consist of both normal and thrust faults. The faults are believed to have been active in late Miocene time to Pliocene time. The faulted block also is characterized by anticlinal folding with the fold axis oriented on a northwestern trend. The subject site is located on the east limb of the fold in a fault zone area where Ortley member of the Grand Ronde Basalt Formation is thrusted over the Sentinel Bluffs member.[3]

The loessal deposits that mantle the hillside may have resulted from periods of predominantly easterly winds blowing through the Columbia Gorge in response to higher barometric pressure east of the Cascade Range. The loessal deposits of this unit are characterized as interbedded fine sand and silt.

Previous site work by ENW revealed the presence of approximately 3 feet of soft, wet, brown, dark brown, and dark gray fine sand and silt underlain by basalt bedrock.

Surface Water. The Willamette River is the principal drainage and located approximately 1-mile east of the subject site. The Willamette River follows a northerly flow path approximately 14 miles to its confluence with the Columbia River at River Mile (RM) 101. An ephemeral drainage northwest of RJH flows northeastward toward Marquam Gulch where it drains to a storm water collector known as Sheridan Trunk. Constructed at the turn of the 19th century, Sheridan Trunk follows the natural drainage path of Marquam Creek to its point of discharge in the Willamette River just north of RM 14.

Precipitation falling on the subject property runs off impervious surfaces as storm water, while a portion infiltrates directly into pervious areas in the drainage northwest or RJH.

Ground Water. ENW accessed the Oregon Water Resources Department GRID database to determine ground-water conditions in the vicinity of the subject site. This database did not indicate that any wells are present on the subject site, though one water well (MULT 2775) was identified at OHSU's Marquam Campus 0.20-mile southeast of RJH. The static water level reported for this 556-ft-deep well completed in the Columbia River Basalt aquifer was 186-ft below top of casing. The U.S. Geological Survey's estimated depth to ground-water in this area of Portland between 300- to 400-ft above mean sea level[4], which correlates with a depth to ground water ranging from 150- to 250-ft bgs consistent with MULT 2775. ENW estimates that ground water flow in the basalt aquifer is eastward toward the Willamette River, consistent with topography.

[3] Beeson, M.H., Tolan, T.L., and Madin, I.P. 1989. Geologic map of the Lake Oswego quadrangle, Clackamas, Multnomah, and Washington Counties, Oregon: Oregon Department of Geology and Mineral Industries [ODOGAMI], General Map Series GMS-59.

[4] Snyder, D.T., 2008. *Estimated Depth to Ground Water and Configuration of the Water Table in the Portland, Oregon Area*: U.S. Geological Survey Scientific Investigations Report 2008-5059, Estimated Water Table Elevation – Plate 2.

City of Portland derives its drinking water from the Portland Water Bureau, which is sourced from the Bull Run Watershed and Columbia South Shore Well Field.

Land Use and Zoning. According to the City of Portland Comprehensive Plan, the subject property is in an area zoned Central Employment (EX) with design (d) and Institutional Campus (IC) overlays. EX allows mixed-uses and is intended for areas in the center of the City that have predominantly industrial type development. The intent of the zone is to allow industrial and commercial uses which need a central location. Residential uses are allowed but are not intended to predominate or set development standards for other uses in the area. The development standards are intended to allow new development that is similar in character to existing development. The design (d-overlay) ensures new development is designed for people and supports the City's growth in centers and corridors by requiring design review for certain projects. The IC overlay identifies large campuses that serve a wider area than their immediate neighborhood, such as medical centers, colleges, and universities, while encouraging supporting uses and enhancing the surrounding area.

5.0 Methods and Procedures

Onsite investigation activities were performed on September 10 and 15, 2025, and are documented in a photographic log included as Appendix A.

5.1 Preparation Activities

Once approval of the Work Plan[2] was received from ODEQ, ENW performed or coordinated the following activities.

Plan Preparation. An in-house Sampling and Analysis Plan was prepared for the project.

One Call Notification. ENW notified "One Call" locates and coordinated private utility locates prior to the installation of temporary soil gas probes and sub-slab vapor pins. Private locates were conducted by Recon Locates, LLC and On Target GPR to clear target sample locations.

Planning. ENW scheduled and coordinated with OHSU to perform sampling activities.

5.2 Soil Gas and Sub-Slab Vapor Sampling Methodology

5.2.1 Methods

ENW assessed the vapor intrusion pathway at the subject site by advancing temporary soil gas probes on September 10, 2025 and installing semi-permanent sub-slab vapor pins on September 15, 2025. The objective was to determine if a vapor encroachment condition may exist due to the proximity of the site building to the former diesel release area. Field sampling activities were conducted in general accordance with the methods and procedures presented in ODEQ-approved *Work Plan*.[2] Sample locations are presented on Figure 2.

Soil Gas Probe Installation. Soil gas probes SG01 and SG02 were advanced using an electric percussive hammer (jack hammer) or manual slide hammer to target depths of 5- and 10-feet bgs, as per ODEQ guidance. Upon reaching target depth, soil gas tooling was retracted four (4) inches to allow the expendable drive tip to be pushed out, and a section of dedicated ¼-inch Teflon® sample tubing was

connected with a threaded fitting onto the probe tip through the hollow probe rods to allow for fixed gas measurements, purging, and collection of soil gas samples. The Teflon® sample tubing was attached so that the inner soil gas pathway from probe tip to the surface was continuously sealed (a Teflon® sampling tube attached to a screw adapter fitted with an O-ring and connected to the probe tip). Hydrated bentonite was used to seal around the soil gas probe at the ground surface to prevent ambient air intrusion.

Sub-Slab Vapor Pin Installation. Sub-slab vapor samples SUB01 and SUB02 were collected from semi-permanent stainless-steel Vapor Pin® inserts installed through the floor slab of the lowest level of the RJH building near the release location. A masonry hole saw was used to drill a 5/8-inch hole through the concrete slab at each sample location, into which a semi-permanent Vapor Pin® with new silicon seal was installed. A section of Teflon® tubing secured to the Vapor Pin® provided a sealed vapor pathway to the sampling manifold.

Purging. Following an equilibration period of at least 30 minutes, a photoionization detector (PID) and LandTec GEM 5000 landfill gas meter were connected to the tubing at each sample location to perform initial screening of gas levels (further discussed in the next section) and ensure that stagnant or ambient air was removed from the sampling system and the sample collected was representative of subsurface conditions.

Sample Collection. Following purging, tubing at all soil gas and sub-slab vapor locations was connected to a flow regulator and finally to a low-flow vacuum pump. The pump was activated, and the flow rate was adjusted to 100 millimeters per minute using the flow regulator. A sample cartridge was inserted into the sampling train in between the down-hole tubing and the flow regulator. The sample cartridge consisted of a stainless-steel sorbent tube packed with activated carbon composed of Carbopack C (a weak sorbent), Carbopack B (a medium sorbent) and Carbosieve SIII (a strong sorbent).

Prior to commencement of sampling, new paper towels saturated with isopropyl alcohol were placed around the top of the soil gas probe tooling or Vapor Pin® and around sample train connections to test the sampling points for leakage. Based on initial screening, all samples were collected for 20 minutes (2000 milliliters of air). Sample data was recorded on Field Sampling Data Sheets (FSDS; included as Attachment B). After sampling, each soil gas and sub-slab vapor sample cartridge was capped, appropriately labeled, and immediately placed on ice pending delivery to the laboratory under chain-of-custody protocols.

Following sample collection, soil gas tooling was removed from the ground and boreholes were backfilled with bentonite chips. All sampling equipment was decontaminated before and after sampling by undergoing a wash sequence of Alconox® solution, tap water, and then deionized water final rinse. Clean Nitrile gloves were used during sample collection.

Sub-slab vapor pins were capped and remain in-place to utilize for future sample collection.

5.2.2 Fixed Soil Gas Measurements

As described in ODEQ's vapor intrusion (VI) guidance, vapors from petroleum sources have been found to attenuate quickly in the presence of oxygen. In particular, petroleum hydrocarbons and related volatile organic carbons (VOCs) in soil gas are more likely than other VOCs to attenuate before reaching an occupied building when oxygen-rich soils separate the VOC source from the occupied building. This is because sufficient oxygen and moisture in the soil can enhance natural aerobic biodegradation by micro-

organisms in the soil. ODEQ's VI guidance considers oxygen readings above 2 percent as a threshold above which active aerobic biodegradation can occur.

ENW used field instruments to screen soil gas and sub-slab vapor for VOCs, oxygen, carbon dioxide, and carbon monoxide. Such readings were used in conjunction with sample results to assess the vapor intrusion pathway. Initial screening results of the samples are presented in Table 5-1, below.

Table 5-1. Soil Gas & Sub-Slab Vapor Screening Results

Sample ID		SG01-5	SG01-10	SG02-5	SG02-10	SUB01	SUB02
Date Sampled		9/10/2025	9/10/2025	9/10/2025	9/10/2025	9/15/2025	9/15/2025
Depth Sampled (ft)		5	10	5	10	--	--
Sampled by		ENW	ENW	ENW	ENW	ENW	ENW
Location		Adjacent to PCS removal area - east		Adjacent to PCS removal area - west		RJH building; north of PCS removal area	RJH building; adjacent to crawlspace north of PCS removal area
Parameter of interest	Note:	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv
PID (Total Volatiles)	1	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Monoxide (CO)	2	0	0	0	1	0	0
		% Vol.	% Vol.	% Vol.	% Vol.	% Vol.	% Vol.
Methane (CH_4)		---	---	0.0	---	0.1	0.1
Carbon Dioxide (CO_2)		0.1	0.1	0.5	0.4	0.3	0.1
Oxygen (O_2)		20.7	20.7	20.4	20.4	20.0	20.0

1 = Photoionization detector
2 = LandTec Gas Meter
ppmv = parts per million, volume
% Vol. = percent by volume

Field screening for organic vapors using a PID calibrated to isobutylene standard gas [(100 parts per million by volume (ppmv)] did not suggest elevated VOC concentrations in any soil gas or sub-slab vapor sample location.

Measured landfill gas readings suggested oxygen concentrations near ambient levels at all sample locations. Simiarly, carbon dioxide concentrations were within a normal range relative to atmospheric levels at all sample locations. Oxygen concentrations were significantly greater than 2 percent, which is the threshold value for active aerobic biodegradation of VOCs in the subsurface, suggesting active aerobic biodegradation is likely at all soil gas and sub-slab vapor locations.

5.3 Laboratory Analysis

All soil gas and sub-slab vapor samples were analyzed by Friedman and Bruya, Inc. (F&BI) of Seattle, Washington according to the analytical plan presented in Table 5-2. Laboratory analytical reports and chain of custody documents are included in Appendix B.

Table 5-2. Analytical Plan

Analytical Method	Constituents	Soil Gas
EPA Method TO-17	DRO and related VOCs: Benzene, toluene, ethylbenzene, total xylenes, naphthalene, and 2-propanol (for leak detection)	All soil gas and sub-slab vapor samples

EPA = U.S. Environmental Protection Agency
DRO = diesel-range organics
VOC = volatile organic compound

5.4 Cleanup Standards and Other Numeric Criteria

Oregon's environmental cleanup rules (Oregon Administrative Rules [OAR] 340-122) establish the standards and procedures for the protection of current and future public health, safety and welfare, and the environment in the event of a release or threat of a release of a hazardous substance. In the event of a release of a hazardous substance, remedial actions shall be implemented to achieve:

- Acceptable risk levels defined in OAR 340-122-0115, as demonstrated by a residual risk assessment; or
- Numeric cleanup standards developed as part of an approved generic remedy identified or developed by the Department under OAR 340-122-0047, if applicable; or
- For areas where hazardous substances occur naturally (e.g., metals, etc.), the background level of the hazardous substances, if higher than those levels specified above.

Acceptable risk levels may be evaluated through conducting a site-specific risk assessment that calculates exposure point concentrations for specific exposure pathway receptor-scenarios or use generic for hazardous substances under ODEQ's Risk-Based Decision Making (RBDM) guideline to streamline the risk assessment process (see below).

The assessment and remediation of hazardous substances in Oregon are conducted according to OAR 340, Division 122, *Hazardous Substance Remedial Action Rules*. The following cleanup standards may be applied in evaluating site assessment results.

ODEQ Risk-Based Concentrations. ODEQ has compiled default risk-based screening reference levels (RBDM guidance document) for common exposure-pathway receptor-scenarios that may be utilized in lieu of site-specific risk calculations (OAR 340-122-0115). In particular, the pre-calculated risk-based concentrations (RBCs) represents the concentration of a constituent of interest (COI) in the impacted medium (e.g., soil, ground water, or air) that potentially represents an unacceptable risk level.

The published RBCs represent a conservative default concentration of a COI in an impacted medium (e.g., soil, ground water, soil gas, or air). When COI concentrations on a site exceed the RBC, unacceptable human health impacts are possible.

- For carcinogens, the regulatory standard is represented by an excess cancer risk of one in one million ($1x10^{-6}$), and
- For non-carcinogens, this is represented by a Hazard Index of 1.

RBC exceedances typically trigger further investigation and potentially a human health risk assessment. Therefore, RBCs can be applied at sites as generic, conservative cleanup standards and are routinely used by ODEQ to determine if a site requires additional action. Site-specific parameters used in the equations to develop the RBCs are often adjusted to match actual conditions in developing site-specific cleanup levels.

RBCs are generally used to evaluate sampling analytical results as follows:

- ODEQ's lowest RBC for all pathways for residential receptors is used as an initial 'conservative' screening of a constituent. If a constituent's concentration exceeds its screening level risk-based concentration (SLRBC), it requires further evaluation. Otherwise, the constituent is considered unlikely to pose unacceptable risk to any human receptor.

- Because ODEQ Generic RBCs are based on several conservative assumptions (e.g., duration and type of exposure), exceeding an SLRBC does not necessarily indicate that additional investigation or remediation is required. Rather, the exceedance of a SLRBC may indicate that additional investigation and evaluation, including consideration of site-specific information (e.g., current, and future land uses), may be necessary to determine if remediation or other actions are necessary. In many cases, it is not possible to determine whether unacceptable risks to human health and the environment are present, and require further action, until a risk assessment, including evaluation of current and reasonably likely land and water uses, is complete.
- In general, ODEQ considers chemical concentrations less than SLRBCs to be protective of human health.

Should constituents be identified that also exceed their generic, but exposure pathway- and receptor-specific RBCs, then the appropriateness of additional site-specific methods allowed under the RBDM guidance document will be evaluated (e.g., the development of site-specific RBCs, sampling of soil gas and/or vapor, etc.).

6.0 Findings

6.1 Sample Locations

Four (4) soil gas and two (2) sub-slab vapor samples were collected during this investigation. Sample locations were selected based on the location of the diesel spill and the excavated PCS areas. A summary of sample locations is presented on Table 6-1, below. Figure 2 illustrates sample locations relative to site features.

Table 6-1. Summary of Sample Locations and Rationale

Borehole / Location ID	Date Sampled	Depth Sampled (feet)	Sampled By	Location
Soil Gas/ Sub-Slab Vapor				
SG01	9/10/2025	5 10	ENW	Adjacent to PCS removal area - east
SG02	9/10/2025	5 10	ENW	Adjacent to PCS removal area - west
SUB01	9/15/2025	SubSlab	ENW	RJH building; north of PCS removal area
SUB02	9/15/2025	SubSlab	ENW	RJH building; adjacent to crawlspace north of PCS removal area

6.2 Laboratory Analytical Results

Analytical results of soil gas and sub-slab vapor samples are presented in Table 1, behind the Tables tab following the text. In Table 1, analytical results are screened against SLRBCs for chronic and acute exposure.

6.2.1 Soil Gas Results

Petroleum Hydrocarbons. All soil gas and sub-slab vapor samples were analyzed for diesel-range organics (DRO) with the following pertinent results:

- DRO was detected in soil gas samples SG01 at the 5-foot depth interval and SG02 at the 10-foot depth interval at concentrations below its SLRBC.
- DRO was not detected any remaining soil gas or sub-slab vapor samples above the laboratory method report limit (MRL).

VOCs. All soil gas and sub-slab vapor samples were analyzed DRO-related VOCs, with the following pertinent results:

- Toluene was detected in all soil gas and sub-slab vapor samples at concentrations below its SLRBC.
- Naphthalene and total xylenes were detected in soil gas sample SG01 at the 5-foot depth interval and sub-slab vapor samples SUB01 and SUB02 at concentrations below their respective SLRBCs. These constituents were not detected in remaining samples above laboratory MRLs.
- Benzene was detected in sample SUB01 at a concentration below its SLRBC. Benzene was not detected in any other sample above the laboratory MRL.
- Ethylbenzene was not detected in any soil gas or sub-slab vapor sample above the laboratory MRL.

6.2.2 Quality Assurance/Quality Control Review

A review of the laboratory reports indicate samples were analyzed within appropriate quality assurance/quality control procedures and specified holding times (see Appendix C for laboratory data validation forms completed for this project).

Leak Detection. Isopropyl alcohol (or 2-propanol), used for leak detection purposes, was not detected in any of the soil gas or sub-slab vapor samples above ENW's conservative in-house screening level of 5000 $\mu g/m^3$, suggesting sampling integrity was preserved during sample collection.

7.0 Conclusions and Recommendations

This report has presented the findings of vapor intrusion assessment activities conducted at the subject site. This investigation assessed potential for vapor intrusion through collection of soil gas and sub-slab vapor samples, targeting the area surrounding the former PCS removal area and the north-adjacent RJH building. The findings of this investigation suggests no current unacceptable risk related to potential vapor intrusion at the RJH building related residual impacts of the January 2024 diesel AST release.

Based on the findings of this Focused Soil Gas and Sub-Slab Vapor Investigation, and following the schedule outlined in the ODEQ-approved Work Plan[2], ENW recommends the following:

- Soil gas and sub-slab vapor sampling findings should be confirmed with a second round of sample collection. The second sampling event is planned to occur in the winter of 2025-2026.

We recommend this report is kept as part of the permanent property records.

8.0 Limitations

The scope of this report is limited to observations made during on-site work; interviews with knowledgeable sources; and review of readily available published and unpublished reports and literature. As a result, these conclusions are based on information supplied by others as well as interpretations by qualified parties.

The focus of the work does not extend to the presence of the following conditions:

1. Naturally occurring toxic or hazardous substances in the subsurface soils, geology and water,
2. Toxicity of substances common in current habitable environments, such as stored chemicals, products, building materials and consumables,
3. Contaminants or contaminant concentrations that are not a concern now but may be under future regulatory standards,
4. Unpredictable events that may occur after ENW's site work, such as illegal dumping or accidental spillage.

There is no practice that is thorough enough to absolutely identify the presence of all hazardous substances that may be present at a given site. ENW's investigation has been focused only on the potential for contamination that was specifically identified in the Scope of Work. Therefore, if contamination other than that specifically mentioned is present and not identified as part of a limited Scope of Work, ENW's environmental investigation shall not be construed as a guaranteed absence of such materials. ENW has endeavored to collect representative analytical samples for the locations and depths indicated in this report. However, no sampling program can thoroughly identify all variations in contaminant distribution.

We have performed our services for this project in accordance with our agreement and understanding with the client. This document and the information contained herein have been prepared solely for the use of the client.

ENW performed this study under a limited scope of services per our agreement. ENW assumes no responsibility for conditions that we did not specifically evaluate or conditions that were not generally recognized as environmentally unacceptable at the time this report was prepared.

Tables

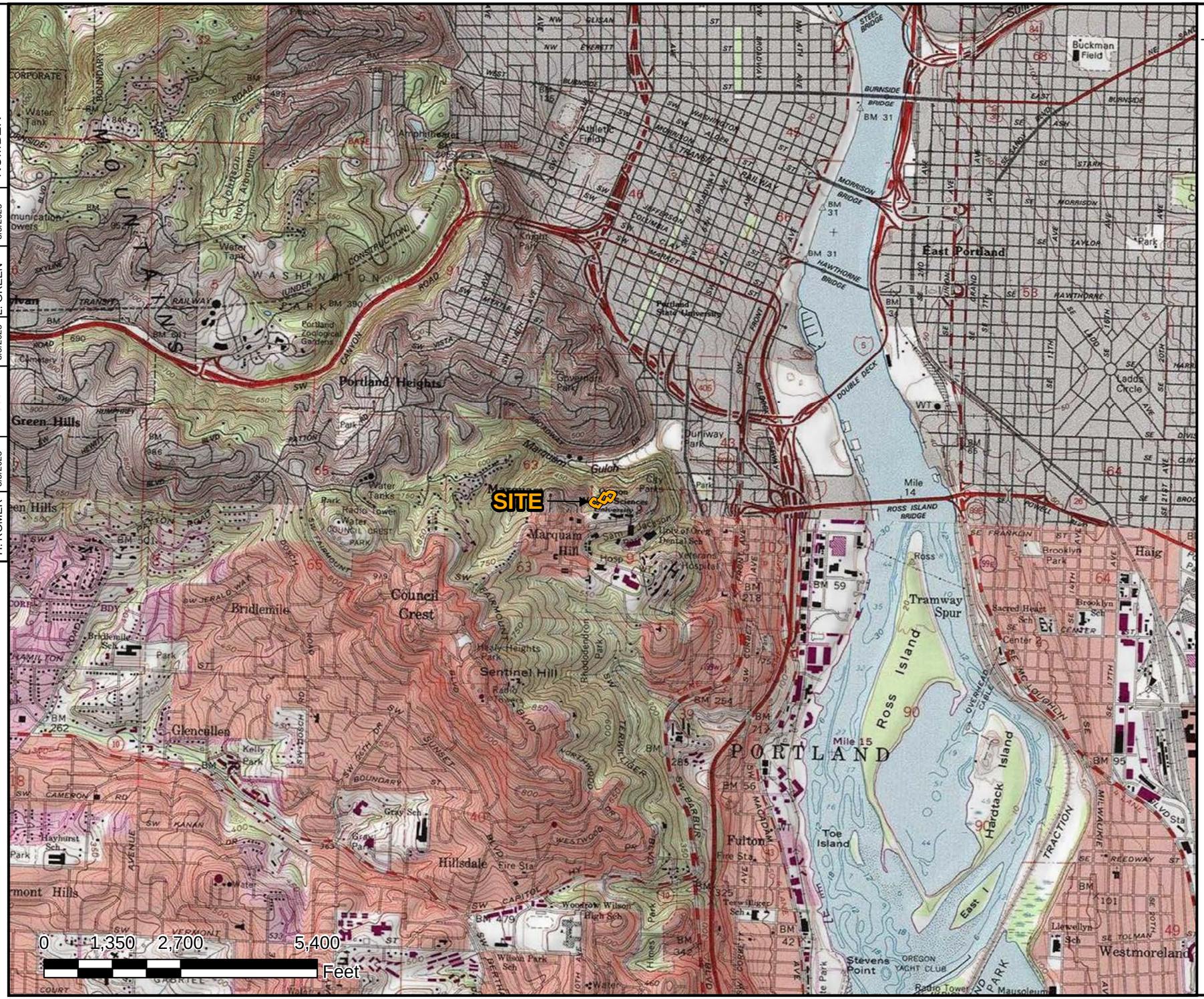
Table 1 - Summary of Analytical Data, Soil Gas and Sub-Slab Vapor

Sample ID		SG01-5-250910	SG01-10-250910	SG02-5-250910	SG02-10-250910	SUB01-250915	SUB02-250915	Maximum Soil-Gas Concentration	Screening-level RBCs (Soil Vapor, Chronic)[1]	Screening-level RBCs (Soil Vapor, Acute)[1]	Constituent of Concern (COC)
Date Sampled		9/10/25	9/10/25	9/10/25	9/10/25	9/15/25	9/15/25				
Depth Sampled (feet)		5	10	5	10	N/A	N/A				
Sampled By		ENW	ENW	ENW	ENW	ENW	ENW				
Location		Adjacent to PCS removal area - east		Adjacent to PCS removal area - west		RJH building; north of PCS removal area	RJH building; adjacent to crawlspace north of PCS removal area				TRUE OR Y FALSE OR N
Constituent of Interest	Note	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3			
Volatile Organic Constituents											
Benzene	c, v	<5 (ND)	<5 (ND)	<5 (ND)	<5 (ND)	11	<5 (ND)	11	12	970	N
Ethylbenzene	c, v	<2.5 (ND)	<2.5 (ND)	<2.5 (ND)	<2.5 (ND)	<5 (ND)	<2.5 (ND)	<5 (ND)	37	730000	N
Naphthalene	c, v	0.51	<0.5 (ND)	<0.5 (ND)	<0.5 (ND)	2.1	0.73	2.1	2.8	6700	N
Toluene	nc, v	11	6.3	3.5	2.6	23	10	23	170000	250000	N
Xylenes	nc, v	13.5	<2.5 (ND)	<2.5 (ND)	<2.5 (ND)	32	11.7	32	3500	290000	N
Total Petroleum Hydrocarbons											
Generic Diesel / Heating Oil (DRO)	nc, v	870 x	<800 (ND)	<800 (ND)	1300 x	<1600 (ND)	<800 (ND)	1300 x	3300	---	N
Leak Detection								**Maximum Soil-Gas Concentration**	**Leak Screening Level**		**Leak Suggested?**
2-Propanol		1200 ve	<120 (ND)	150 c	2400 ve	490	<120 (ND)	2400 ve	5000		N

Notes:
ND = not detected at or above laboratory method reporting limits.
— = not analyzed or not applicable.
< = not detected above method reporting limit shown.
ug/m^3 = micrograms per cubic meter of air .
c = carcinogenic
nc = noncarcinogenic
v = volatile
nv = nonvolatile
[1] Lowest Risk-Based Concentration regardless of receptor for soil gas/sub-slab vapor (screening level).
ve = the analyte response exceeded the valid instrument calibration range. The vaule reported is an estimate.
c = the presence of the analyte may be due to carryover from previous sample injections
x = the sample chromatographic pattern does not resemble the fuel standard used for c

Figures

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
H. ROMER 3/5/2025	E. BRUGGEMAN 3/5/2025	L. GREEN 3/5/2025	129-13004(V01)



LEGEND:

SUBJECT BUILDING

NOTES:

1. BASE MAP DEVELOPED BY THE USGS (PORTLAND, 1:24000, 2013)

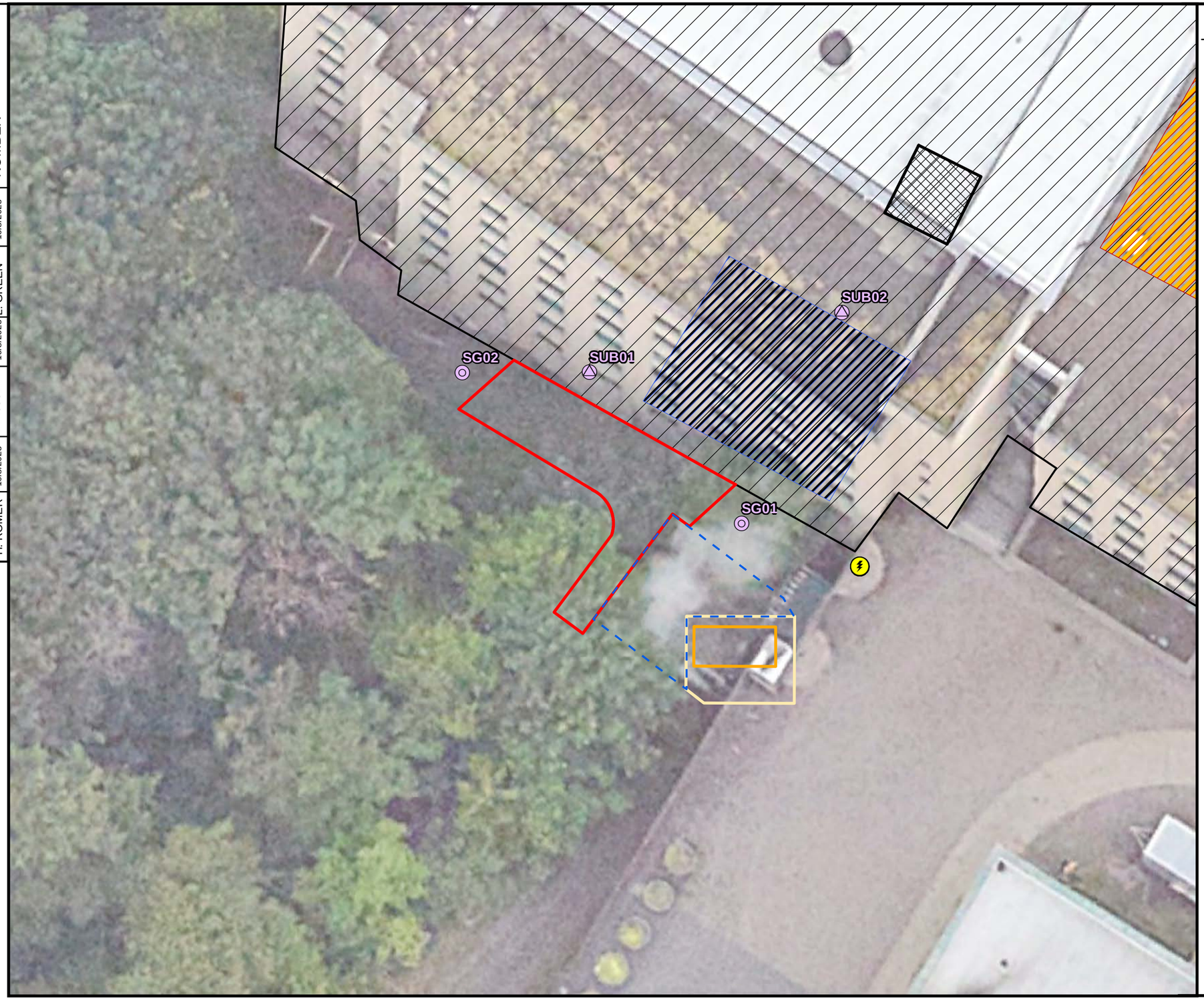
EVREN NORTHWEST INC.
environmental & natural resource consultants

FIGURE 1

SITE VICINITY MAP

RICHARD JONES HALL - OHSU
3222 SW REASEARCH DRIVE
PORTLAND, OREGON

DRAWING NUMBER	129-24001(V09)
APPROVED BY	L. GREEN 10/8/2025
CHECKED BY	E. BRUGGEMAN 10/8/2025
DRAWN BY	H. ROMER 10/8/2025



LEGEND:

- SUBJECT BUILDING
- 2024 FOCUSED SOIL REMOVAL AREA
- ABOVEGROUND STORAGE TANK PAD
- ABOVEGROUND STORAGE TANK
- GENERATOR
- SUBSLAB VAPOR SAMPLE
- ELEVATOR PIT
- LARGE CRAWLSPACE AREA
- INACCESSIBLE CRAWLSPACE AREA
- RETAINING STRUCTURE
- SOIL GAS SAMPLE

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2023 AND ENW FIELD NOTES.

2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.

3. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION

4. DRO = DIESEL RANGE ORGANICS

5. BGS = BELOW GROUND SURFACE

0 10 20 40 Feet

(APPROXIMATE 1" = 15 FEET WHEN PRINTED 11X17)

N

EVREN NORTHWEST INC.
environmental natural resource consultants

FIGURE 2

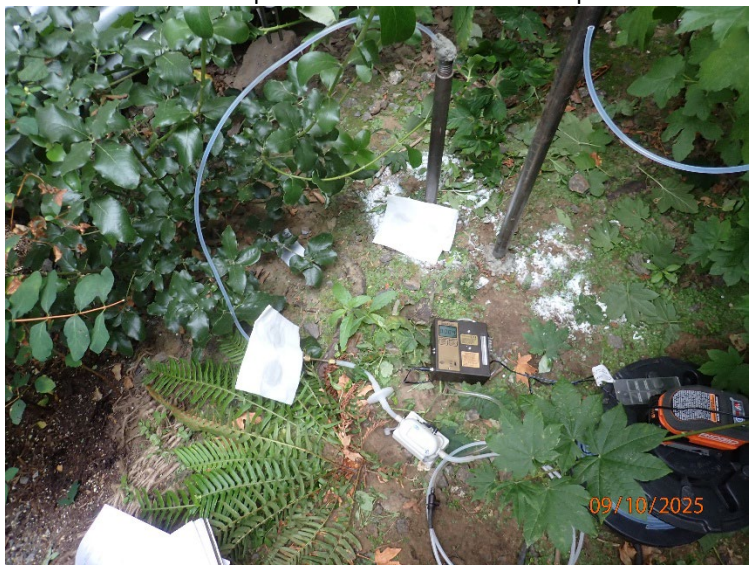
SITE PLAN AND SAMPLE LOCATION DIAGRAM

RICHARD JONES HALL - OHSU
3222 SW REASEARCH DRIVE
PORTLAND, OREGON

Appendix A

Site Photographs

At each soil gas sample location, temporary soil gas probes were installed to collect samples at both 5- and 10-foot depth intervals.



View of soil gas sample collection using EPA Method TO-17. Rags saturated with isopropyl alcohol were placed over sample train connections for leak detection.

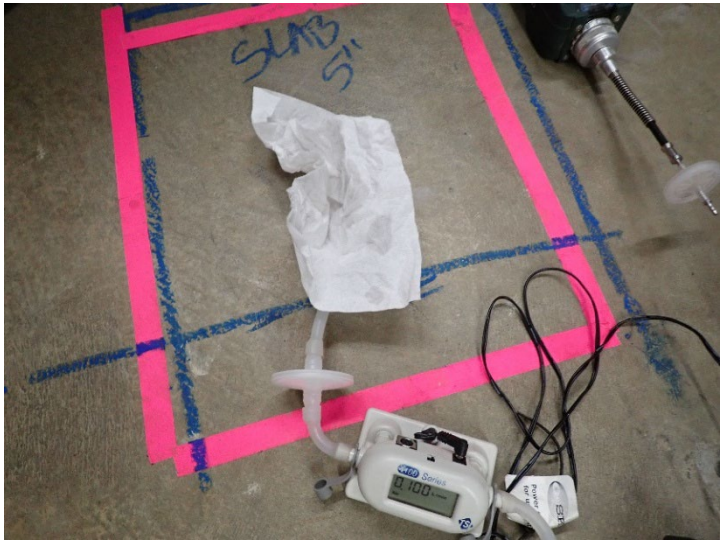
A photoionization detector (PID) was used to purge ambient air from the sample train and screen soil gas for volatile constituents.

During sample collection, a digital rotometer was utilized to monitor and maintain a steady sample rate.

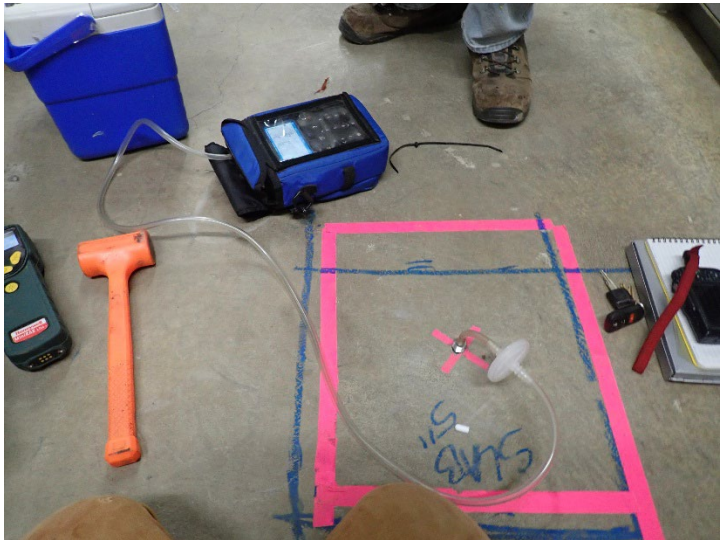
EVREN NORTHWEST INC environmental natural resource consultants	**OHSU – Richard Jones Hall** 3222 SW Research Drive Portland, OR 97239	**Site Photographs**	Project No. 129-13004-03 **Appendix A**

Ground-penetrating radar was used to help site sub-slab sample locations within the lowest level of the RJH building.

View of vapor pin installed at location SUB01 within the RJH building.



View of sub-slab sample collection using method TO-17. Rags saturated with isopropyl alcohol were placed over sample train connections for leak detection.



A landfill gas meter was utilized to measure concentrations of oxygen and other gases.

EVREN NORTHWEST INC. environmental natural resource consultants	**OHSU – Richard Jones Hall** 3222 SW Research Drive Portland, OR 97239	**Site Photographs**	Project No. 129-13004-03 **Appendix A**

Appendix B

Field Sampling Data Sheets

FIELD SAMPLING DATA SHEET

EVREN NORTHWEST

PO Box 14488
Portland, Oregon, 97293
503-452-5561 enw@evren-nw.com

PROJECT NAME/NUMBER: 129 - 13004 - 03 **SAMPLE LOCATION / ID:** SG01 - 5

SITE ADDRESS: **SAMPLE DATE:** 09/10/25

WIND FROM:	(N)	NE	E	SE	S	SW	W	NW	(LIGHT)	MEDIUM	HEAVY
WEATHER:	SUNNY	(CLOUDY)	RAIN	OTHER:							

Temp., C	Humidity (%)
63°F	84

SCREENING

PID max 0.3

Purge Time (start) 940				Purge Time (finish) 945		
Date	Time	Depth (ft)	PID (ppm)	O_2 (ppm)	CO (ppm)	CO_2 (ppm)
09/10/25	1015	5	0.0	20.9	1	0.1
	1016	5	0.0	20.8	0	0.1
	1017	5	0.0	20.7	0	0.1
	1018	5	0.0	20.7	1	0.1
↓	1019	5	0.0	20.7	0	0.1

VOLUME CALCULATION

Flow Rate (mL/min)	Sample Time (min)	Total Volume (L)
100 mL/mn	20	2L

SAMPLING DATA

Sample ID	Tube ID	Sample Depth	Sample Time (start)	Sample Time (finish)
SG01-5-250910	435263	5	9:51	10:10

	CONTAINER TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
		PESTICIDE/PCSs (TO-4) ALDEHYDES/KEYTONES (TO-5) PESTICIDES/PCBs (TO-10) ALDEHYDES/KEYTONES (TO-11)
		TPH as Diesel (TO-17)
		SPECIFIC CHEMICAL ANALYSIS [ ]

NOTES:

SAMPLER: Jordan Morris (PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET

EVREN NORTHWEST

PO Box 14488
Portland, Oregon, 97293
503-452-5561 enw@evren-nw.com

PROJECT NAME/NUMBER: 129-17004-03 **SAMPLE LOCATION / ID:** SG01-10

SITE ADDRESS: **SAMPLE DATE:** 09-10-25

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY	CLOUDY	RAIN	OTHER:							

Temp., C	Humidity (%)
63°F	84

SCREENING

Purge Time (start) 8:50 Purge Time (finish) 8:55

PID drift -0.2

Date	Time	Depth (ft)	PID (ppm)	O_2 (ppm)	CO (ppm)	CO_2 (ppm)
09-10-25	8:52	10	0.0	20.8	0	0.1
	8:53		0.0	20.7	0	0.1
	8:54		0.0	20.7	0	0.1
	8:55		0.0	20.7	0	0.1
	8:56		0.0	20.7	0	0.1

VOLUME CALCULATION

Flow Rate (mL/min)	Sample Time (min)	Total Volume (L)
100	20	2

SAMPLING DATA

Sample ID	Tube ID	Sample Depth	Sample Time (start)	Sample Time (finish)
SG01-10-250910	855692	10	8:59	9:19

	CONTAINER TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
		PESTICIDE/PCSs (TO-4) ALDEHYDES/KEYTONES (TO-5) PESTICIDES/PCBs (TO-10) ALDEHYDES/KEYTONES (TO-11)
		TPH as Diesel (TO-17)
		SPECIFIC CHEMICAL ANALYSIS [ ]

NOTES: Open 8:15. Lower ready fill all the way to 10.

SAMPLER: Darden Crowns (PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET

EVREN NORTHWEST

PO Box 14488
Portland, Oregon, 97293
503-452-5561 enw@evren-nw.com

PROJECT NAME/NUMBER: 179-3004-03 **SAMPLE LOCATION / ID:** SG02-5

SITE ADDRESS: **SAMPLE DATE:** 09-10-25

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		CLOUDY		RAIN		OTHER:				

Temp., C	Humidity (%)

SCREENING

Meter PID = 0.4

Purge Time (start) 10:49 Purge Time (finish) 10:59

Date	Time	Depth (ft)	PID (ppm)	O_2 (ppm)	CO (ppm)	CO_2 (ppm)
09-10-25	11:41	5	1.2			
	11:42		1.1			
	11:43		0.7			
	11:44		0.2			
	11:45		0.0	20.4	0	0.5

VOLUME CALCULATION

Flow Rate (mL/min)	Sample Time (min)	Total Volume (L)
100	20	2

CH4	H2S	Bal
0.0	0	79.1

SAMPLING DATA

Sample ID	Tube ID	Sample Depth	Sample Time (start)	Sample Time (finish)
SG02-5-250910	703502	5	11:09	11:39

	CONTAINER TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
		PESTICIDE/PCSs (TO-4) ALDEHYDES/KEYTONES (TO-5) PESTICIDES/PCBs (TO-10) ALDEHYDES/KEYTONES (TO-11)
		TPH as Diesel (TO-17)
		SPECIFIC CHEMICAL ANALYSIS [ ]

NOTES:

SAMPLER: Jordan Mortis (PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET

EVREN NORTHWEST

PO Box 14488
Portland, Oregon, 97293
503-452-5561 enw@evren-nw.com

PROJECT NAME/NUMBER: 129-1709-03 **SAMPLE LOCATION / ID:** SG02-10

SITE ADDRESS: **SAMPLE DATE:** 09.10.28

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		CLOUDY		RAIN		OTHER:				

Temp., C	Humidity (%)

SCREENING

Purge Time (start) 8:20 Purge Time (finish) 8:28

Date	Time	Depth (ft)	PID (ppm)	O_2 (ppm)	CO (ppm)	CO_2 (ppm)
09.10.28	11:00	10	0.0 *	20.7	0	0.4
	11:01		0.0	20.4	0	0.4
	11:02		0.2	20.4	1	0.4
	11:03		0.2			
	11:03		0.0			

PID drift = 0.0

* PID spiked to 200 - I dunno it it got a sniff of IPA while I was off the tube or what.

VOLUME CALCULATION

Flow Rate (mL/min)	Sample Time (min)	Total Volume (L)
100	20	2

SAMPLING DATA

Sample ID	Tube ID	Sample Depth	Sample Time (start)	Sample Time (finish)
SG02-10-250910	322149	10	10:37	10:57

	CONTAINER TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
		PESTICIDE/PCSs (TO-4) ALDEHYDES/KEYTONES (TO-5) PESTICIDES/PCBs (TO-10) ALDEHYDES/KEYTONES (TO-11)
		TPH as Diesel (TO-17)
		SPECIFIC CHEMICAL ANALYSIS [ ]

NOTES:

SAMPLER: Jordan Ramis

(PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET

EVREN NORTHWEST

PO Box 14488
Portland, Oregon, 97293
503-452-5561 enw@evren-nw.com

PROJECT NAME/NUMBER: 129-B004-05 **SAMPLE LOCATION / ID:** SUB01

SITE ADDRESS: **SAMPLE DATE:** 09-15-25

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		CLOUDY		RAIN		OTHER:				

Temp., C	Humidity (%)

SCREENING

Max PID = 0.0

Purge Time (start) 8:52 Purge Time (finish) 8:56

Date	Time	Depth (ft)	PID (ppm)	O_2 (ppm)	CO (ppm)	CO_2 (ppm)
09-15-25	9:24	SUB	0.0			
	9:25		0.0			
	9:26		0.0			
	9:27		0.0			
	9:28		0.0	20.0	0	0.3

CH4	H2S	Benz	Time
0.1	0	79.7	9:31

VOLUME CALCULATION

Flow Rate (mL/min)	Sample Time (min)	Total Volume (L)
100	20	2

SAMPLING DATA

Sample ID	Tube ID	Sample Depth	Sample Time (start)	Sample Time (finish)
SUB01-250915	453005	SUB	9:03	9:23

	CONTAINER TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
		PESTICIDE/PCBs (TO-4) ALDEHYDES/KEYTONES (TO-5) PESTICIDES/PCBs (TO-10) ALDEHYDES/KEYTONES (TO-11)
		TPH as Diesel (TO-17)
		SPECIFIC CHEMICAL ANALYSIS [ ]

NOTES: TO-17 run for Dx, BTEX+N, IPA.

SAMPLER: Jordan Ivens
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET

EVREN NORTHWEST

PO Box 14488
Portland, Oregon, 97293
503-452-5561 enw@evren-nw.com

PROJECT NAME/NUMBER: 129-13004-03 **SAMPLE LOCATION / ID:** SUB02

SITE ADDRESS: **SAMPLE DATE:** 09-15-25

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		CLOUDY		RAIN		OTHER:				

Temp., C	Humidity (%)

SCREENING

Purge Time (start) 9:11 Purge Time (finish) 9:15

Date	Time	Depth (ft)	PID (ppm)	O_2 (ppm)	CO (ppm)	CO_2 (ppm)
09-15-25	9:58	SUB	0.1			
↓	9:59	↑	0.0			
	10:00		0.0			
	10:01		0.0			
↓	10:02	↓	0.0	20.0	0	0.1

VOLUME CALCULATION

Flow Rate (mL/min)	Sample Time (min)	Total Volume (L)
100	20	2

CH_4	H_2S	Bal	Time
0.1	0	79.8	10:04

SAMPLING DATA

Sample ID	Tube ID	Sample Depth	Sample Time (start)	Sample Time (finish)
SUB02-250915	853856	SUB	9:36	9:56

CONTAINER TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	~~PESTICIDE/PCSs (TO-4)~~ ALDEHYDES/KEYTONES (TO-5) PESTICIDES/PCBs (TO-10) ALDEHYDES/KEYTONES (TO-11)
	TPH as Diesel (TO-17)
	SPECIFIC CHEMICAL ANALYSIS [ ]

NOTES: TO-17 run for BTEX+N, DX, IDA.

SAMPLER: Jordan Nava (PRINTED NAME) (SIGNATURE)

Appendix C

Laboratory Analytical Results

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Elizabeth Webber-Bruya
Ann Webber-Bruya
Michael Erdahl
Vineta Mills
Eric Young

5500 4th Ave South
Seattle, WA 98108-2419
(206) 285-8282
office@friedmanandbruya.com
www.friedmanandbruya.com

September 17, 2025

Lynn Green, Project Manager
Evren Northwest, Inc.
PO Box 14488
Portland, OR 97293

Dear Mr Green:

Included are the results from the testing of material submitted on September 11, 2025 from the 129-13004-03, F&BI 509174 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 have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Paul Trone, Evan Bruggeman
ENW0917R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on September 11, 2025 by Friedman & Bruya, Inc. from the Evren Northwest 129-13004-03, F&BI 509174 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Evren Northwest
509174 -01	SG01-10-250910
509174 -02	SG01-5-250910
509174 -03	SG02-10-250910
509174 -04	SG02-5-250910

The 2-propanol concentration in samples SG01-5-250910 and SG02-10-250910 exceeded the calibration range of the instrument. The data were flagged accordingly. In addition, the 2-propanol carried over into the analysis of sample SG02-5-250910. The data was flagged accordingly.

All other quality control requirements were acceptable.

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	SG01-10-250910	Client:	Evren Northwest
Date Received:	09/11/25	Project:	129-13004-03, F&BI 509174
Date Collected:	09/10/25	Lab ID:	509174-01 1/0.50
Date Analyzed:	09/11/25	Data File:	091112.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	MD

Compounds:	Concentration ug/m3
2-Propanol	<120
Benzene	<5
Toluene	6.3
Ethylbenzene	<2.5
m,p-Xylene	<5
o-Xylene	<2.5
Naphthalene	<0.5
Diesel Fuel Range	<800

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	SG01-5-250910	Client:	Evren Northwest
Date Received:	09/11/25	Project:	129-13004-03, F&BI 509174
Date Collected:	09/10/25	Lab ID:	509174-02 1/0.50
Date Analyzed:	09/11/25	Data File:	091113.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	MD

Compounds:	Concentration ug/m3
2-Propanol	1,200 ve
Benzene	<5
Toluene	11
Ethylbenzene	<2.5
m,p-Xylene	9.8
o-Xylene	3.7
Naphthalene	0.51
Diesel Fuel Range	870 x

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	SG02-10-250910	Client:	Evren Northwest
Date Received:	09/11/25	Project:	129-13004-03, F&BI 509174
Date Collected:	09/10/25	Lab ID:	509174-03 1/0.50
Date Analyzed:	09/11/25	Data File:	091114.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	MD

Compounds:	Concentration ug/m3
2-Propanol	2,400 ve
Benzene	<5
Toluene	2.6
Ethylbenzene	<2.5
m,p-Xylene	<5
o-Xylene	<2.5
Naphthalene	<0.5
Diesel Fuel Range	1,300 x

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	SG02-5-250910	Client:	Evren Northwest
Date Received:	09/11/25	Project:	129-13004-03, F&BI 509174
Date Collected:	09/10/25	Lab ID:	509174-04 1/0.50
Date Analyzed:	09/11/25	Data File:	091115.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	MD

Compounds:	Concentration ug/m3
2-Propanol	150 c
Benzene	<5
Toluene	3.5
Ethylbenzene	<2.5
m,p-Xylene	<5
o-Xylene	<2.5
Naphthalene	<0.5
Diesel Fuel Range	<800

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	Method Blank	Client:	Evren Northwest
Date Received:	Not Applicable	Project:	129-13004-03, F&BI 509174
Date Collected:	Not Applicable	Lab ID:	05-2268 mb
Date Analyzed:	09/11/25	Data File:	091106.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	MD

Compounds:	Concentration ug/m3
2-Propanol	<250
Benzene	<10
Toluene	<5
Ethylbenzene	<5
m,p-Xylene	<10
o-Xylene	<5
Naphthalene	<1
Diesel Fuel Range	<1,600

Date of Report: 09/17/25
Date Received: 09/11/25
Project: 129-13004-03, F&BI 509174

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-17

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
2-Propanol	ng/tube	250	97	70-130
Benzene	ng/tube	50	91	70-130
Toluene	ng/tube	50	97	70-130
Ethylbenzene	ng/tube	50	97	70-130
m,p-Xylene	ng/tube	100	99	70-130
o-Xylene	ng/tube	50	98	70-130
Naphthalene	ng/tube	50	105	70-130
Diesel Fuel Range	ng/tube	2,500	88	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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 analyte 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 due to sample matrix effects.

j - The analyte concentration is reported between the method detection limit and the lowest calibration point. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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.

509174

SAMPLE CHAIN OF CUSTODY

09-11-25

N1

Page # 1 of 1

Report To Lynn Green

Company Evren Northwest

Address Po Box 14488

City, State, ZIP Portland OR 97293

Phone 503 452 5561 Email lynng@evren-nw.com

SAMPLERS (*signature*)

PROJECT NAME: 129-13004-03

PO #

REMARKS

INVOICE TO

TURNAROUND TIME
Standard Turnaround (3 day requested)
RUSH
Rush charges authorized by: per LG)

SAMPLE DISPOSAL
Dispose after 30 days
Archive Samples
Other

Sample Name	Lab ID	Tube ID	Collection Information: Sample Date	Pre-Flow Rate	Post-Flow Rate	Start Time	End Time	Volume Sampled	TO-17 Analytes Requested: Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	TPH-DRO	2-Propanol		Notes
SG01-10-250910	01	855962	09/10/25	100 mL/min	100 mL/min	8:59	9:19	2L	X	X	X	X	X	X	X		
SG01-5-250910	02	435265	09/10/25	100 mL/min	100 mL/min	9:51	10:11	2L	X	X	X	X	X	X	X		
SG02-10-250910	03	322149	09/10/25	100 mL/min	100 mL/min	10:37	10:57	2L	X	X	X	X	X	X	X		
SG02-5-250910	04	783502	09/10/25	100 mL/min	100 mL/min	11:09	11:39	2L	X	X	X	X	X	X	X		

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Jordan Morris	Evren Nw	09-10-25	18:00
Received by:	Nhan Phan	FEBT	9-11-25	1015
Relinquished by:				
Received by:		Samples received at 3 °C		

Friedman & Bruya, Inc.
5500 4th Avenue South
Seattle, WA 98108
Ph. (206) 285-8282
Fax (206) 283-5044

SAMPLE CONDITION UPON RECEIPT CHECKLIST

PROJECT # 5091 CLIENT Evren INITIALS/ DATE: (NP) 9-11-25

If custody seals are present on cooler, are they intact? ☑ NA ☐ YES ☐ NO

Cooler/Sample temperature 3 °C
Thermometer ID: Fluke 96312917

Were samples received on ice/cold packs? ☑ YES ☐ NO

How did samples arrive?
☐ Over the Counter ☐ Picked up by F&BI ☒ FedEx/UPS/(GSO)

Is there a Chain-of-Custody* (COC)? ☑ YES ☐ NO **Initials/ Date:** (NP) 9/11
*or other representative documents, letters, and/or shipping memos

Number of days samples have been sitting prior to receipt at laboratory 1 days

Are the samples clearly identified? (explain "no" answer below) ☐ ~~YES~~ AP ☑ NO

Were all sample containers received intact (i.e. not broken, leaking etc.)? (explain "no" answer below) ☑ YES ☐ NO

Were appropriate sample containers used? ☑ YES ☐ NO ☐ Unknown

If custody seals are present on samples, are they intact? ☑ NA ☐ YES ☐ NO

Are samples requiring no headspace, headspace free? ☑ NA ☐ YES ☐ NO

Is the following information provided on the COC, and does it match the sample label?
(explain "no" answer below)

Sample ID's	☐ Yes	☑ No	☐ Not on COC/label
Date Sampled	☑ Yes	☐ No	☐ Not on COC/label
Time Sampled	☑ Yes	☐ No	☐ Not on COC/label
# of Containers	☑ Yes	☐ No	
Relinquished	☑ Yes	☐ No	
Requested analysis	☑ Yes	☐ On Hold	

Other comments (use a separate page if needed)
- Tube ID is not correct on tube 435263(-02)

Air Samples: Were any additional canisters/tubes received? ☐ NA ☑ YES ☐ NO

Number of unused TO15 canisters** _____ **Number of unused TO17 tubes** 07
**Fill out Green manifolds billing sheet

GLS.

800-322-5555
www.gls-us.com

Ship From:
EVREN
DAN SAJKO
40 SE 24TH AVE SUITE A
PORTLAND, OR 97214

Ship To:
FRIEDMAN & BRUYA, INC.
SAMPLE RECEIVING
5500 4TH AVENUE SOUTH
SEATTLE, WA, 98108

COD: $0.00
Weight: 0 lb(s)
Dimensions:
Reference:
Delivery Instructions:
Signature Type: STANDARD

Tracking #: 563424730

PDS

SEATTLE

S06437C

39575602

KNT WA980-7C0

Print Date : 08/28/25 06:01 AM

1 of 25

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Elizabeth Webber-Bruya
Ann Webber-Bruya
Michael Erdahl
Vineta Mills
Eric Young

5500 4th Ave South
Seattle, WA 98108-2419
(206) 285-8282
office@friedmanandbruya.com
www.friedmanandbruya.com

September 24, 2025

Lynn Green, Project Manager
Evren Northwest, Inc.
PO Box 14488
Portland, OR 97293

Dear Mr Green:

Included are the results from the testing of material submitted on September 16, 2025 from the 129-13004-03, F&BI 509257 project. There are 6 pages included in this report.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Paul Trone, Evan Bruggeman
ENW0924R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on September 16, 2025 by Friedman & Bruya, Inc. from the Evren Northwest 129-13004-03, F&BI 509257 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Evren Northwest
509257 -01	SUB01-250915
509257 -02	SUB02-250915

All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	SUB01-250915	Client:	Evren Northwest
Date Received:	09/16/25	Project:	129-13004-03, F&BI 509257
Date Collected:	09/15/25	Lab ID:	509257-01
Date Analyzed:	09/20/25	Data File:	091923.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	MD

Compounds:	Concentration ug/m3
2-Propanol	490
Benzene	11
Toluene	26
Ethylbenzene	<5
m,p-Xylene	23
o-Xylene	9
Naphthalene	2.1
Diesel Fuel Range	<1,600

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	SUB02-250915	Client:	Evren Northwest
Date Received:	09/16/25	Project:	129-13004-03, F&BI 509257
Date Collected:	09/15/25	Lab ID:	509257-02 1/0.50
Date Analyzed:	09/17/25	Data File:	091710.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	MD

Compounds:	Concentration ug/m3
2-Propanol	<120
Benzene	<5
Toluene	10
Ethylbenzene	<2.5
m,p-Xylene	8.7
o-Xylene	3.0
Naphthalene	0.73
Diesel Fuel Range	<800

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	Method Blank	Client:	Evren Northwest
Date Received:	Not Applicable	Project:	129-13004-03, F&BI 509257
Date Collected:	Not Applicable	Lab ID:	05-2348 mb
Date Analyzed:	09/17/25	Data File:	091706.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	MD

Compounds:	Concentration ug/m3
2-Propanol	<250
Benzene	<10
Toluene	<5
Ethylbenzene	<5
m,p-Xylene	<10
o-Xylene	<5
Naphthalene	<1
Diesel Fuel Range	<1,600

Date of Report: 09/24/25
Date Received: 09/16/25
Project: 129-13004-03, F&BI 509257

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-17

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
2-Propanol	ng/tube	250	94	70-130
Benzene	ng/tube	50	90	70-130
Toluene	ng/tube	50	94	70-130
Ethylbenzene	ng/tube	50	96	70-130
m,p-Xylene	ng/tube	100	99	70-130
o-Xylene	ng/tube	50	100	70-130
Naphthalene	ng/tube	50	107	70-130
Diesel Fuel Range	ng/tube	2,500	91	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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 analyte 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 due to sample matrix effects.

j - The analyte concentration is reported between the method detection limit and the lowest calibration point. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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.

509257

SAMPLE CHAIN OF CUSTODY

09/16/25 GT N1

Page # 1 of 1

Report To Lynn Green
Company Evren Northwest
Address P.O. Box 14488
City, State, ZIP Portland, OR 97293
Phone (503) 452-5561 Email lynng@evren-nw.com

SAMPLERS (*signature*)

PROJECT NAME: 129-13004-03

PO #

REMARKS

INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

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

Sample Name	Lab ID	Tube ID	Collection Information: Sample Date	Pre-Flow Rate	Post-Flow Rate	Start Time	End Time	Volume Sampled	TO-17 Analytes Requested: Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	TPH-DRO	2-Propanol		Notes
SUB01-250915	01	453005	09-15-25	100 mL/min	100 mL/min	9:03	9:23	2L	X	X	X	X	X	X	X		
SUB02-250915	02	453856	09-15-25	100 mL/min	100 mL/min	9:36	9:56	2L	X	X	X	X	X	X	X		
									Samples received at 3 °C								

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Jordan Morris	Evren Northwest	09-15-25	18:00
Received by:		Dhan Phan	FEBI	09/16/25	1020
Relinquished by:					
Received by:					

SAMPLE CONDITION UPON RECEIPT CHECKLIST

PROJECT # 509257 CLIENT Evren Northwest INITIALS/ DATE: (NP) 9/16/25

If custody seals are present on cooler, are they intact? ☑ NA ☐ YES ☐ NO

Cooler/Sample temperature 3 °C
Thermometer ID: Fluke 96312917

Were samples received on ice/cold packs? ☑ YES ☐ NO

How did samples arrive?
☐ Over the Counter ☐ Picked up by F&BI ☐ FedEx/UPS/GSO

Is there a Chain-of-Custody* (COC)? ☑ YES ☐ NO **Initials/ Date:** (NP) 9/16
*or other representative documents, letters, and/or shipping memos

Number of days samples have been sitting prior to receipt at laboratory 1 days

Are the samples clearly identified? (explain "no" answer below) ☑ YES ☐ NO

Were all sample containers received intact (i.e. not broken, leaking etc.)? (explain "no" answer below) ☑ YES ☐ NO

Were appropriate sample containers used? ☑ YES ☐ NO ☐ Unknown

If custody seals are present on samples, are they intact? ☑ NA ☐ YES ☐ NO

Are samples requiring no headspace, headspace free? ☑ NA ☐ YES ☐ NO

Is the following information provided on the COC, and does it match the sample label?
(explain "no" answer below)

Sample ID's	☑ Yes	☐ No	☐ Not on COC/label
Date Sampled	☑ Yes	☐ No	☐ Not on COC/label
Time Sampled	☑ Yes	☐ No	☐ Not on COC/label
# of Containers	☑ Yes	☐ No	
Relinquished	☑ Yes	☐ No	
Requested analysis	☑ Yes	☐ On Hold	

Other comments (use a separate page if needed)

Air Samples: Were any additional canisters/tubes received? ☑ NA ☐ YES ☐ NO

Number of unused TO15 canisters** _____ **Number of unused TO17 tubes** _____
**Fill out Green manifolds billing sheet

GLS.

800-322-5555
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PDS

Ship From
EVREN NW
DAN SAJKO
18 SE 24TH AVE
PORTLAND, OR 97214

Ship To
FRIEDMAN & BRUYA, INC
MICHAEL ERDAHL
5500 4TH AVE S
SEATTLE, WA 98108

COD: $0.00
Weight: 0 lb(s)
Reference:

Delivery Instructions:

Signature Type: NOT REQUIRED

Tracking #: 563423071

SEATTLE

S06437C

39562719

KNT WA980-7C0