Additional Investigation Work Plan
Oregon Lithoprint aka News Register Site
609 NE Third Street
McMinnville, Oregon

Prepared for:
Oregon Lithoprint, Inc.

November 9, 2021
2442-00

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Heather Gosack, R.G.
Associate Geologist

REGISTERED PROFESSIONAL ENGINEER
17,296
OREGON
JULY 19, 1994
MICHAEL W. STEVENS
EXPIRES JUNE 30 2022

Michael Stevens, P.E.
Principal Engineer

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1.0 Introduction

This *Additional Investigation Work Plan* (the Work Plan) presents the scope of work for collection and chemical analysis of soil, groundwater, ambient air, and soil vapor samples at the Oregon Lithoprint site located at 609 NE Third Street, McMinnville, Oregon (the Site; Figures 1 and 2). The Site includes the downtown area of the City of McMinnville (City) that has been impacted by historical releases of gasoline from former underground storage tanks (USTs) associated with the O'Dell Building at 609 NE Third Street (Former O'Dell Building Gasoline USTs). The Site also includes properties that have been investigated to characterize the extent and magnitude of the gasoline contamination, but which ultimately were determined not to have been impacted by the historical releases from the Former O'Dell Building Gasoline USTs. This Work Plan is based on the results of prior investigation work (described in the *Site Investigation Summary Report* [Apex, 2019b] and quarterly reports completed in 2019 and 2020) and was prepared in general accordance with the Oregon Department of Environmental Quality (DEQ) *Risk-Based Decision Making for the Remediation of Contaminated Sites* (DEQ, 2003) and at the request of DEQ.

1.1 Purpose

The purpose of this work plan is to augment prior data collection activities to address the following data gaps:

- Based on the results of soil and groundwater samples previously collected beneath the Site buildings, and sub-slab vapor samples collected within the Odd Fellows Building, DEQ has requested further evaluation of potential vapor intrusion risk to the Odd Fellows Building and the restaurant located immediately to the west.
- DEQ has requested additional groundwater monitoring data to assess further concentration trends at the Site and to assess the October 2019 groundwater concentration anomaly observed in monitoring well MW-5 to determine whether it was the result of a seasonal influence or whether it was not representative of Site conditions.

This Work Plan documents the methods that will be used to complete the proposed investigation activities.

1.2 Scope of Work

To accomplish the above objectives, the scope of work (SOW) described in this Plan includes the following tasks:

- One focused round of groundwater monitoring and sampling (gauging wells MW-1 through MW-6 and sampling wells MW-4 through MW-6);
- Installing one sub-slab vapor pin within the basement of the Odd Fellows Building and conducting one round of sub-slab vapor sampling from all four vapor pins within the Odd Fellows Building;

- Collecting additional grab soil and grab soil vapor samples at up to 10 borings installed via direct push drilling methods east and south of the Odd Fellows Building and to the south of the restaurant to the west of the Odd Fellows Building; and
- Collecting ambient air samples outside the Odd Fellows Building, within the Odd Fellows Building basement, and within the basement of the restaurant to the west of the Odd Fellows Building.

These activities are discussed in further detail within this Plan.

2.0 Background

This section presents a brief description of the Site, its history, and available physical and chemical data. Information included in this section was obtained from previously completed site investigations and related work within the vicinity of the Site.

2.1 Site Location and Description

The primary Site building (the O'Dell Building) is located on a 0.14-acre property at 609 NE Third Street. The building is 1.5 stories, approximately 6,000 square feet (SF), and contains no basement. The building was leased by the Yamhill Valley News Register (News Register), a division of Oregon Lithoprint, Inc. (Oregon Lithoprint), between 1981 and 2019. The O'Dell Building has housed offices and staff for the News Register; no printing has been conducted on-site. First Federal leased the O'Dell Building between 2019 and 2021. The current property owner is Oregon Lithoprint, Inc., and the building is currently leased to Alt Coworking, as of September 2021.

The parcels adjacent to and across the street from the O'Dell Building are used for commercial purposes as described below:

- North (604 NE Fourth Street): A parking lot for the O'Dell Building's tenants;
- East (611 NE Third Street): A two-story commercial building (the News Register building);
- South and Southeast (608 and 618 NE Third Street): A commercial building with apartments on the second floor;
- Southwest (546 NE Third Street): A commercial building;
- West (305 NE Ford Street): The Odd Fellows Building (also known as the Sidway Building and Third Street Flats Building) which contains a basement; and
- Northwest (375 NE Ford Street): a recently constructed four-story hotel (the Atticus Hotel).

All properties within the Site are zoned as commercial (C-3). Residential use is allowed by the zoning code but is considered unlikely based on the use and layout of the existing buildings.

Several below-grade utilities are present at the Site and include sanitary and storm sewer lines, historical wooden steam heat lines, electric, street-light, telecommunications, and natural gas lines. The stormwater lines are 3 to 4 feet below the ground surface (bgs), and the sanitary sewer lines are between 6.34 feet and 9.74 feet bgs. The wooden steam lines are associated with a former steam power plant located two blocks west of the Site and are at unknown locations and depths. Based on City staff observations at other locations, they are not likely deep below ground surface.

2.2 Site History

An in-depth site development history was provided in the *Site Investigation Summary Report* submitted to DEQ on June 28, 2019 (Apex, 2019b). A brief summary is provided in the sections below.

2.2.1 Historical Sampling Activities – 2001 through 2016

The Site has been impacted by historical releases of gasoline from former USTs associated with the O'Dell Building, as well as other sources. The Former O'Dell Building Gasoline USTs were located within the NE Ford Street right-of-way (ROW) west of the O'Dell Building. One of the USTs is believed to have been decommissioned in-place in 1971 following reports of a gasoline release. The other UST was used until 1985 when both Former O'Dell Building Gasoline USTs were removed following detection of another release. When the USTs were removed in 1985, free product was observed within the UST excavation. The impacted soil and free product were removed, and the DEQ indicated that no further actions were required in November 1985. However, the DEQ leaking UST (LUST) file for the Site remained open.

In 2001, the Oregon DEQ contacted Oregon Lithoprint, the then-tenant of the O'Dell Building, to investigate the status of the open LUST file. The DEQ required Oregon Lithoprint to undertake additional investigation activities to determine whether the historical impacts from the former USTs posed a risk to human health or the environment. Multiple site assessments were performed between 2001 and 2016.

Gasoline-related contamination in soil, soil vapor, air, and groundwater has been identified at the O'Dell Building, at the Odd Fellows Building, and in the ROW. Visibly-impacted soils were observed during previous investigations at depths of between 9 and 25 feet bgs. Solvent hydrocarbons were also detected in Site groundwater; however, these constituents were determined to be originating from upgradient, off-site sources. As a result of the numerous investigations conducted to date, the primary source of petroleum impacts has been determined to be the Former O'Dell Building Gasoline USTs. No preferential pathways for contamination have been identified at the Site to date, including the sanitary sewer lines south of the Site in Third Street. It has been concluded (based on the analytical data previously collected) that the contaminant plume is stable.

Soil samples were collected in multiple investigations between 2002 and 2016 across the Site. The primary contaminants of concern (COCs) in soil were determined to be gasoline-range total petroleum hydrocarbons (TPHg) and benzene. Detected TPHg concentrations have historically ranged from 11.1 milligrams per

kilogram (mg/kg) to 3,350 mg/kg. Detected benzene concentrations have ranged from 0.0342 mg/kg to 9.01 mg/kg.

Groundwater grab and groundwater well samples were collected in multiple investigations between 2002 and 2016 across the Site. The primary COCs in groundwater were determined to be TPHg, benzene, and dissolved lead. Detected TPHg concentrations have ranged from 108 micrograms per liter (µg/L) to 52,500 µg/L, and detected benzene concentrations have ranged from 0.5 µg/L to 14,600 µg/L.

Soil gas samples were collected at the Site in 2012 and 2013. Concentrations of TPHg in soil gas have ranged from non-detect to 800 micrograms per cubic meter (µg/m^3). Concentrations of benzene have ranged from non-detect to 2.7 µg/m^3.

Air samples were collected within exterior areas of the Site and within several Site buildings between 2003 and 2014. Detected concentrations of TPHg in ambient air have ranged between 74 µg/m^3 and 1,200 µg/m^3. Detected benzene concentrations have ranged between 0.56 µg/m^3 and 1.2 µg/m^3. The detected benzene concentrations in ambient air have been determined to be related to background urban air conditions in the vicinity of the Site.

A chemical oxidation treatment pilot study was conducted at the Site from September through November 2015. Post-remediation project injection results showed significant decreases in the TPHg and benzene concentrations.

2.2.2 Recent Sampling Activities – 2019 and 2020

Additional sampling activities were conducted in 2019 and 2020 to quantify potential petroleum impacts in soil and groundwater underlying the O'Dell Building and to assess the current conditions of impacts in groundwater across the Site (since the full set of groundwater monitoring wells had not been sampled since 2014). A detailed account of the recent sampling activities and results were provided in the following reports previously submitted to DEQ:

- *Summary Report – Soil and Groundwater Sampling*, April 5, 2019 (Apex, 2019a)
- *Site Investigation Summary Report,* June 28, 2019 (Apex, 2019b)
- *Additional Investigation Work Plan,* October 3, 2019 (Apex, 2019c)
- *October 2019 Site Investigation Summary Report,* December 4, 2019 (Apex, 2019d)
- *Summary Report – First Quarter 2020 Sampling Event,* March 11, 2020 (Apex, 2020a)
- *Summary Report – Second Quarter 2020 Sampling Event,* May 13, 2020 (Apex, 2020b)
- *Third Quarter 2020 Data Summary and Site Closure Assessment,* November 16, 2020 (Apex, 2020c)

The sampling results from February 2019 through July 2020 indicated significant permanent reductions in petroleum contamination in the soil and groundwater across the Site compared to the investigations completed prior to 2016. The collected sub-slab vapor and ambient air data also reflected limited potential for unacceptable risk exposures based on current Site uses. The extent of impacts above risk-based concentrations (RBCs) was observed to be limited to the NE Ford Street ROW between the O'Dell Building and the Odd Fellows Building, beneath the southwest corner of the Odd Fellows Building, and on the north side of Third Street near the intersection with NE Ford Street (between wells MW-2 and MW-4). Separate-phase hydrocarbons (free product) have not been observed at the Site since the decommissioning of the Former O'Dell Building Gasoline USTs in 1985.

Based on the current Site use, the primary potential risk exposure that was identified as being of potential concern is limited to construction worker exposure beneath the southwest corner of the O'Dell Building and in the vicinity of MW-4. This exposure would only present a potential risk if construction or excavation activities were undertaken without appropriate precautions. The potential for unacceptable risk to construction workers beneath the O'Dell Building is further limited by the fact that the building would need to be razed or excavation activities would need to be conducted within the existing building footprint for potential exposures to occur.

A secondary potential risk exposure of concern was identified as the limited potential for vapor intrusion impacts, with the October 2019 sub-slab vapor sample collected beneath the Odd Fellows Building (at SV-6) exceeding the occupational vapor intrusion RBC for benzene. However, each of the potential vapor intrusion exceedances are limited by the Site conditions and the historical soil gas and ambient air sampling that has shown that the indoor air concentrations are consistent with background conditions and not noticeably impacted by vapor intrusion (consistent with the fine-grained soil and depth below the ground surface).

As part of the Third Quarter 2020 Data Summary and Site Closure Assessment (Apex, 2020c), Apex prepared a Contaminated Media Management Plan (CMMP) to manage potential exposure risks at the Site. The CMMP defines procedures for appropriate management of soil and groundwater at the Site that may contain chemicals above certain screening levels, and it has been provided to the City of McMinnville for their review and approval. In addition, institutional controls for the O'Dell Building and Odd Fellows Building have been proposed and would include deed restrictions on groundwater use and attachment of the CMMP to each of the properties. Residential land use would also be restricted in the basement of the Odd Fellows Building until contaminant concentrations are below the Urban Residential RBC or until appropriate engineering controls are installed. The CMMP would also apply to management of any related contamination in the right-of-way.

Apex requested a No Further Action (NFA) determination for the Site subject to compliance with the prepared CMMP and land use restrictions that will be established. However, in subsequent communications with DEQ, including a call with DEQ on October 20, 2021, DEQ identified two remaining data gaps (listed above in

Section 1.1) and requested additional evaluation of soil vapor, soil, and groundwater near the Odd Fellows Building. The requested additional sampling activities are outlined within this Work Plan.

2.3 Physical Setting

This section summarizes Site topography, geology, and hydrogeology based on observations made during investigation activities.

2.3.1 Topography and Geology

The Site is located between 148 feet and 149.5 feet above mean sea level (MSL) and is relatively flat. The nearest surface water body is Cozine Creek, located approximately 1,400 feet south of the Site.

According to the Geologic Map of Oregon (United States Geological Survey [USGS], 1991), the Site is underlain by Quaternary Surficial Deposits that are comprised of unconsolidated alluvium and lacustrine sediments (including clay, silt, sand, and gravel). Subsurface materials encountered in previous investigations included silts and clayey silts. Localized gravel fill was historically observed within the Former O'Dell Building Gasoline USTs excavation area and utility trenches installed in the O'Dell Building.

2.3.2 Hydrogeology

Six groundwater monitoring wells (MW-1 through MW-6) are located in the ROW near the intersection of NE Ford Street and NE Third Street. Based on previously advanced soil borings and data from the monitoring wells, depth to groundwater at the Site generally ranges between 5.4 feet and 13.4 feet bgs. The groundwater flow direction is primarily to the south/southwest, towards Cozine Creek, which is approximately 1,400 feet south of the Site (see Figure 3). The hydraulic gradient at the Site is typically to the southwest-south at a range of between 0.011 feet/feet and 0.025 feet/feet, with an average gradient of 0.016 feet/feet.

3.0 Investigation Activities

The proposed SOW includes soil boring advancement for the collection of soil and soil vapor samples, groundwater monitoring well sampling, sub-slab vapor point installation and sampling, and ambient air sampling. The field and sampling procedures include collection of groundwater samples, soil boring installation via direct push drilling methods, soil sampling, installation of vapor pins, soil vapor sampling, ambient air sampling, groundwater sampling, sample management (i.e., containers, storage, and shipment), decontamination procedures, and handling of investigation-derived wastes (IDW). Detailed field and sampling procedures are described in the sampling and analysis plan (SAP) provided in Appendix A.

3.1 Preparatory Activities

Property Access. Apex will provide notification to the property owners prior to conducting field activities. We anticipate that permission will be granted for access to the Odd Fellows Building basement. Apex will also coordinate with the owner of the restaurant west of the Odd Fellows Building to access their basement for ambient air sampling.

Permitting. Apex will coordinate with the City of McMinnville to establish a right-of-way permit to complete the soil borings within the sidewalk adjacent to the Odd Fellows Building. As part of the permitting process, it is expected that Apex will prepare a traffic control plan. Apex will coordinate with the City to determine any requirements regarding installation of the soil borings or restoration activities (e.g. replacing sidewalk panels) following the work. Alternatively, if requested by the City and approved by DEQ, these borings may be completed within the parking lane adjacent to the sidewalks.

Underground Utility Location. Apex's Project Manager or designee will mobilize to the Site to mark out the proposed sampling locations with marking paint to enable identification of nearby underground utilities by Dig-Alert/Underground Service Alert (USA). Because Dig-Alert does not mark out underground utilities on private property and because the drilling activities will be performed inside the boundaries of the Site, a private underground utility locate event will be conducted to mark out underground utilities located within the proximity of each proposed sampling location prior to performing the subsurface work.

If any underground utilities are identified within 5 feet of a proposed sampling location, Apex will adjust the proposed sampling location before drilling commences. Apex will also adjust the proposed drilling location to provide for a safety buffer for buildings, heavy traffic areas, overhead utilities, and similar Site features so that sampling can be performed safely and with minimal disruption to existing businesses.

Site Health and Safety Plan. A Site-specific health and safety plan (HASP) has been prepared for the proposed activities (Appendix B). The HASP was prepared in general accordance with the Occupational Safety and Health Administration (OSHA) and the Oregon Administrative Rules (OAR). A copy of the HASP will be maintained on-Site during the field activities.

Prior to performing any on-Site work, Apex will prepare a Job Safety Analysis (JSA) and HASP guiding Site- and project-specific activities, risks, and safety protocols. All field staff and subcontractor personnel supporting the project will be required to review and agree to abide by the HASP. Safety topics will be refreshed daily with the field crew using a daily tailgate safety meeting, to be conducted by Apex's Site Supervisor or Site Safety Officer.

Due to the COVID-19 pandemic, additional safety measures will be implemented during the field activities to reduce or eliminate the spread of COVID-19, including the following:

- Personnel will commit to staying home and away from the job site if they are exhibiting symptoms of COVID-19 as described by the Centers for Disease Control and Prevention (CDC);
- If personnel on the job site begin to have symptoms, they will be asked to leave immediately;
- Personnel will follow social distancing protocols, with spacing greater than 6 feet;
- Common areas and areas of high "hand traffic" will be cleaned and disinfected regularly;
- Tools, pens, and paperwork will not be shared;
- Personnel will wash their hands regularly and thoroughly, and use hand sanitizer if soap and water are not available;
- Nitrile gloves will be used and changed once they contact a potentially contaminated surface; and,
- Personnel will wear cloth face coverings if a distance of 6 feet cannot be maintained or if they are unvaccinated.

3.2 Field Activities

Groundwater Levels. Groundwater levels will be measured in each of the six monitoring wells during the groundwater monitoring event at the Site. The wells will be opened for the water levels to equilibrate before the measurements are taken. The depth to groundwater, free product (if present), and/or sheen will be measured in each well to the nearest 0.01 foot using an electronic oil-water interface probe.

Soil Boring Installation and Grab Soil and Soil Vapor Collection. Apex will supervise the installation of up to 10 soil borings in (or adjacent to) the exterior sidewalk to the south and east of the Odd Fellows Building using direct push drilling methods to an approximate depth of 10 to 12 feet bgs (to the approximate depth of the adjacent basement), as shown on Figure 3. Soil cores will be extracted and soil lithology and conditions logged in general accordance with ASTM 2487/2488. Descriptions will include visual indications of impacts. Soil cores will be field screened for volatile organic compounds (VOCs) and separate-phase hydrocarbons (SPHs) using a photoionization detector (PID) and soil sheen tests. Soil samples will be collected at the intervals containing the highest field indication of impacts. One soil vapor sample will be collected from each boring for VOC analysis. Depending on conditions encountered, either a temporary vapor well will be set up at each boring or the post run tubing method will be used by the driller.

Soil samples will be transferred into laboratory-supplied containers, stored at 4 degrees Celsius (°C), and submitted to a state-certified laboratory under chain-of-custody protocol. Field observations and measurements made during groundwater monitoring will be recorded in field notes. Sampling will be consistent with methods described in the SAP (Appendix A).

A field log of lithology and soil conditions will be maintained for the borings. Drilling equipment will be decontaminated before and after each soil boring. The location of each boring will be recorded by measuring off fixed features outside the building.

Soil Vapor Pin Installation and Soil Vapor Sampling. One additional vapor pin location will be installed within the Odd Fellows Basement (SV-7, shown on Figure 3). The vapor pin will be installed into the concrete slab floor with roto-hammer equipment. Following installation, all four vapor pins within the Odd Fellows Building basement will be sampled for VOC analysis. Sampling will be consistent with the methods described in the SAP (Appendix A). Samples will be collected following a helium tracer leak test in laboratory-provided Summa canisters. Field observations and measurements made during the sampling events will be recorded in field notes and on the chain-of-custody.

Ambient Air Sampling. Two exterior ambient air samples, two interior ambient air samples within the Odd Fellows Building basement, and up to two interior ambient air samples within the restaurant basement (west of the Odd Fellows Building) will be collected. The specific number of samples collected in the restaurant basement will correspond to the number of discrete airspaces encountered (previous reporting has identified that the restaurant was originally developed as two spaces, allowing for the potential for the airspace in the basement not to be continuous).

Groundwater Monitoring Well Sample Collection. One groundwater monitoring event will be conducted. Monitoring wells MW-4, MW-5, and MW-6 will be sampled for VOC and TPHg analysis. Groundwater will be sampled using low-flow methods as described in the SAP (Appendix A). Prior to the collection of groundwater samples from monitoring wells, pH, conductivity, temperature, dissolved oxygen (DO), and oxidation reduction potential (ORP) will be measured using a flow cell connected to the discharge tubing of the sample pump. Turbidity of the water will be monitored visually, and color and clarity of the water will be recorded on the sampling data sheet. Purging will be considered complete when the water quality parameters have stabilized to within 10 percent and the water is visually clear for three consecutive three-minute intervals.

Samples will be transferred into laboratory-supplied containers, stored at 4 degrees Celsius (°C), and submitted to a state-certified laboratory under chain-of-custody protocol. Field observations and measurements made during groundwater monitoring will be recorded in field notes. Additional groundwater sampling procedures, sample handling, and quality assurance/quality control (QA/QC) procedures are detailed in the SAP (Appendix A).

Handling of Investigation-Derived Waste. IDW will consist of purge water, decontamination water, and soil cuttings. IDW will be placed in properly-labeled Oregon Department of Transportation (ODOT)-approved drums. The drums will be transferred to the designated storage area and stored pending receipt of chemical data. Based on the results of the chemical analysis, soil and water IDW will be profiled and disposed of at a

permitted waste facility. Sampling materials and personal protective equipment (PPE) will be disposed of as solid waste.

4.0 Analytical Program

Chemical analyses will be performed on the collected groundwater, soil, ambient air, and soil vapor samples. Samples will be submitted to the analytical laboratory using standard chain-of-custody procedures and analyzed on a standard turnaround time (14 business days).

The contaminants of interest for this project are TPHg and VOCs. Therefore, the collected soil and groundwater samples will be analyzed for VOCs by Method 8260B and for TPHg by Northwest Methods, and the soil vapor and ambient air samples will be analyzed for VOCs by Method TO-15. The SAP in Appendix A discusses the analytical program in detail.

QA/QC procedures will be used throughout this project. The SAP in Appendix A includes the QA plan for this project. This plan includes sampling and custody procedures, QA sampling analyses, detection limit goals, laboratory QC, and QA reporting.

5.0 Reporting

Following receipt of analytical results for each monitoring event, Apex will prepare a brief data summary report that presents the results of the investigation and a screening of chemical results. The data screening will include a comparison of the chemical data to Oregon RBCs.

Each investigation summary report will be prepared in general accordance with the following outline:

1. Introduction
    a. Purpose
    b. Scope of Work
    c. Limitations
2. Background
    a. Site Location and Description (includes Site maps)
    b. Site History
    c. Geology and Hydrogeology

3. Field Activities and Findings
    a. Investigation Preparatory Activities
    b. Methods and Procedures
4. Investigation Results
    a. Analyses Performed
    b. Groundwater Elevations
    c. Chemical Results
    d. Observed Trends
    e. Risk Screening
5. Conclusions
6. Appendices
    a. Backup Documentation (e.g., photographs)
    b. Field Methods and Sampling Procedures
    c. Analytical Laboratory Testing Program and Documentation (including a QA review)
    d. Lithologic Logs
    e. Groundwater Sampling Logs

A draft of the report will be submitted for review. Upon receipt of comments, a finalized version will be prepared for submittal to the DEQ.

6.0 References

Apex Companies, LLC (Apex), 2019a. *Summary Report – Soil and Groundwater Sampling*. April 5, 2019.

Apex, 2019b. *Site Investigation Summary Report*. June 28, 2019.

Apex, 2019c. *Revised Additional Investigation Work Plan*. October 3, 2019.

Apex, 2019d. *October 2019 Site Investigation Summary Report*. December 4, 2019.

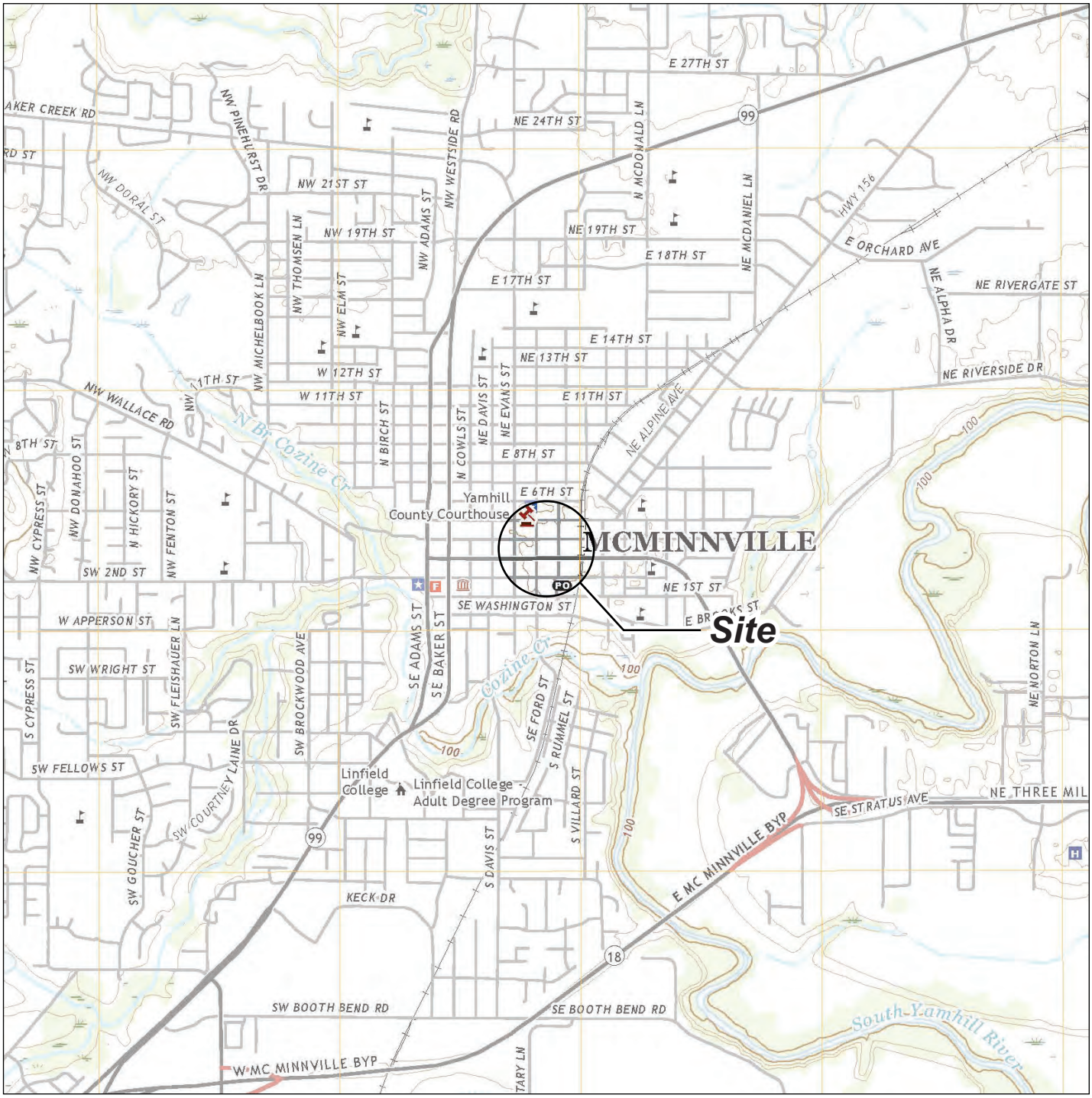
Apex, 2020a. *Summary Report – First Quarter 2020 Sampling Event*. March 11, 2020.

Apex, 2020b. *Second Quarter 2020 Sampling Event*. May 12, 2020.

Apex, 2020c. *Third Quarter 2020 Data Summary and Site Closure Assessment*. November 16, 2020.

Oregon Department of Environmental Quality (DEQ), 2003. *Risk-Based Decision Making for the Remediation of Contaminated Sites*. September 24, 2003.

United States Geological Survey (USGS), 1991. *Geologic Map of Oregon.* G.W. Walker and N.S. MacLeod, 1991.



Note: Base map prepared from USGS 7.5-minute quadrangle of McMinnville, OR, dated 2020 as provided by USGS.gov.

N

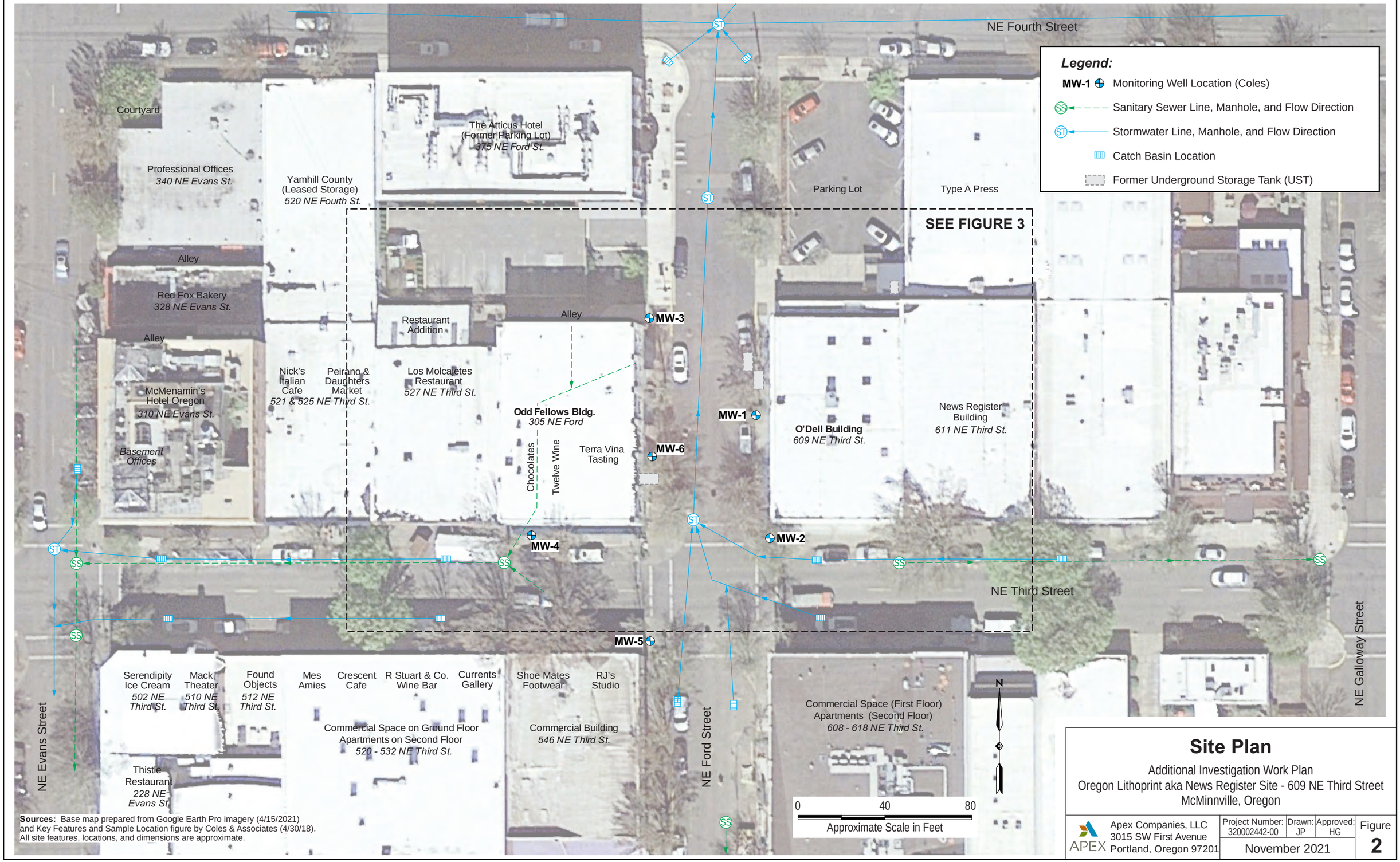
0 2,000 4,000

Approximate Scale in Feet

Site Location Map

Additional Investigation Work Plan
Oregon Lithoprint aka News Register Site - 609 NE Third Street
McMinnville, Oregon

APEX Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number: 320002442-00	Drawn: JP	Approved: HG	Figure 1
	November 2021			



Sources: Base map prepared from Google Earth Pro imagery (4/15/2021) and Key Features and Sample Location figure by Coles & Associates (4/30/18). All site features, locations, and dimensions are approximate.

Site Plan

Additional Investigation Work Plan
Oregon Lithoprint aka News Register Site - 609 NE Third Street
McMinnville, Oregon

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number: 320002442-00	Drawn: JP	Approved: HG	Figure **2**
	November 2021			

Sources: Base map prepared from Google Earth Pro imagery (4/15/2021) and Key Features and Sample Location figure by Coles & Associates (4/30/18). All site features, locations, and dimensions are approximate.

Proposed Sampling Locations

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Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number: 320002442-00	Drawn: JP	Approved: HG	Figure 3
	November 2021			

Appendix A

Sampling and Analysis Plan

1.0 Introduction

This appendix presents the field and sampling procedures and the analytical testing program that will be used to complete the field and analytical work for this project. Quality assurance and quality control (QA/QC) procedures are also discussed in this appendix.

2.0 Field and Sampling Procedures

The project scope of work (SOW) includes installation of up to ten soil borings with a direct push drill rig, one groundwater sampling event, soil sampling, installation of one vapor pin sampling point, and soil vapor sampling. Data from this investigation will be used to evaluate current Site conditions. The field and sampling procedures include the following:

- Preparatory activities;
- Soil logging and installation of up to ten soil borings in the exterior sidewalk to the south and east of the Odd Fellows Building via direct push drilling methods;
- Groundwater elevation measurements;
- Collection of monitoring well groundwater samples;
- Collection of soil samples;
- Installation of a sub-slab vapor pin within the Odd Fellows Building;
- Collection of soil vapor samples;
- Collection of ambient air samples;
- Sample management (i.e., containers, storage, and shipment);
- Decontamination procedures; and
- Handling of investigation-derived waste (IDW).

2.1 Preparatory Activities

Site Health and Safety Plan. A Site-specific health and safety plan (HASP) has been prepared for the proposed activities. The HASP was prepared in general accordance with the Occupational Safety and Health Act (OSHA) and the Oregon Administrative Rules (OAR). A copy of the HASP will be maintained at the Site during the field activities. Prior to performing any on-Site work, Apex will prepare a Job Safety Analysis (JSA) and HASP guiding Site- and project-specific activities, risks, and safety protocols. All field staff and subcontractor personnel supporting the project will be required to review and agree to abide by the HASP. Safety topics will be refreshed daily with the field crew using a daily tailgate safety meeting, to be conducted by Apex's Site Supervisor or Site Safety Officer.

Due to the COVID-19 pandemic, additional safety measures will be implemented during the field activities to reduce or eliminate the spread of COVID-19, including the following:

- Personnel will commit to staying home and away from the job site if they are exhibiting symptoms of COVID-19 as described by the Centers for Disease Control and Prevention (CDC);
- If personnel on the job site begin to have symptoms, they will be asked to leave immediately;
- Personnel will follow social distancing protocols, with spacing greater than 6 feet;
- Common areas and areas of high "hand traffic" will be cleaned and disinfected regularly;
- Tools, pens, and paperwork will not be shared;
- Personnel will wash their hands regularly and thoroughly, and use hand sanitizer if soap and water are not available;
- Nitrile gloves will be used and changed once they contact a potentially contaminated surface; and,
- Personnel will wear cloth face coverings if a distance of 6 feet cannot be maintained or if they are unvaccinated.

Permitting. Apex will coordinate with the City of McMinnville to establish a right-of-way permit to complete the soil borings within the sidewalk adjacent to the Odd Fellows Building. As part of the permitting process, it is expected that Apex will prepare a traffic control plan. Apex will coordinate with the City to determine any requirements regarding installation of the soil borings or restoration activities (e.g. replacing sidewalk panels) following the work. Alternatively, if requested by the City and approved by the Oregon Department of Environmental Quality (DEQ), these borings may be completed within the parking lane adjacent to the sidewalks.

Property Access. Apex will provide notification to the property owner prior to conducting field activities. It is our understanding that permission will be granted for access to the Odd Fellows Building basement. Apex will also coordinate with the owner of the restaurant west of the Odd Fellows Building to access their basement for ambient air sampling.

Underground Utility Location. Apex's Project Manager or designee will mobilize to the Site to mark out the proposed sampling locations with marking paint to enable the identification of nearby underground utilities by Dig-Alert/Underground Service Alert (USA). Because Dig-Alert does not mark out underground utilities on private property and because the drilling activities will be performed inside the boundaries of the Site, a private utility locator will conduct an underground utility locate to mark out underground utilities located within the proximity of each proposed sampling location prior to performing the subsurface work.

If any underground utilities are identified within five feet of the proposed sampling location, Apex will adjust the proposed sampling location before drilling commences. Apex will also adjust the proposed drilling

location to provide for a safety buffer for overhead utilities or other Site features so that sampling can be performed safely and with minimal disruption to existing businesses.

As an additional safety measure, all borings will be hand-cleared using a hand auger, air-knife, or post hole digger.

2.2 Collection of Soil Samples

Up to ten proposed explorations to the east and south of the Odd Fellows Building will be completed using direct push drilling techniques. Apex staff will complete the field screening at 2-foot intervals in accordance with Apex Standard Operating Procedure (SOP) 2.1, SOP 2.4, and SOP 2.7 (attached). Soil samples will be collected in accordance with SOP 2.1, 2.4, and 2.7. Soil samples will be collected from the soil interval containing the highest indication of contamination (i.e. elevated photoionization detector [PID] readings, staining, odor). Table A-1 lists the anticipated number of soil samples, container requirements, and proposed analytical methods. One duplicate soil sample will be collected (Table A-3). Additional soil samples may be collected if field screening indicates potential impacts. Each exploration will be abandoned by filling with granular bentonite and hydrating the bentonite with water following sample collection. The ground surface will be restored with concrete to match the surrounding concrete sidewalk panel. If required by the City, the sidewalk panels will be replaced following completion of the soil borings.

2.3 Groundwater Elevation Measurements

Water level measurements will be collected in general accordance with SOP 2.16 for water level measurement procedures (attached). Water level measurements will be collected from existing wells MW-1 through MW-6. Well covers and well caps will be opened, and the water level will be allowed to equilibrate under atmospheric conditions for at least five minutes before water level measurements are taken. Depth to water, depth to product, and/or presence of sheen will be recorded in the field notes. Noticeable odors, damage to wells, or other conditions will also be documented in the field notes.

2.4 Collection of Groundwater Samples

Apex will collect groundwater samples from existing wells MW-4 through MW-6 in accordance with the low-flow sampling techniques described in SOP 2.5, included in this attachment. Water level monitoring will be attempted during sampling and pumping drawdown restricted to less than 0.3 feet during groundwater monitoring events. Groundwater samples will be collected using dedicated tubing and a peristaltic pump. Existing Site monitoring wells typically include a 10-foot screen interval. During sample collection, the tubing will be placed in the middle of the saturated screened interval. Groundwater will be purged prior to sampling. During purging, groundwater field parameters (pH, oxidation-reduction potential [ORP], dissolved oxygen [DO], specific conductivity, and temperature) will be measured using a flow cell connected to the discharge tubing of the sample pump. Turbidity of the water will be monitored visually with color and clarity

being recorded on the sampling data sheet. Purging will be considered complete when the water quality parameters have stabilized to within ten percent and the water is visually clear for three consecutive three-minute intervals. Sample containers will be provided by the laboratory ready for sample collection. Table A-1 lists the anticipated number of groundwater samples, container requirements, and proposed analytical methods. One duplicate groundwater sample will be collected during the monitoring event (Table A-3).

2.5 Vapor Pin Installation

One sub-slab vapor pin will be installed within the Odd Fellows Building. The sub-slab soil vapor point will be installed using the vapor pin system (http://vaporpin.coxcolvin.com/) and roto-hammer equipment, in accordance with the Oregon DEQ Draft Vapor Intrusion Guidance Document (DEQ, 2010). The point will be a semi-permanent installation and can be removed by hand. Roto-hammer drilling is completed within a customized fitting connected to a vacuum to create a near dust-free condition. A protective casing will be placed around the point to prevent accidental damage.

2.6 Soil Vapor Sampling

One round of vapor monitoring will be conducted for the interior sub-slab vapor points within the Odd Fellows Building. The sampling will be conducted in accordance with Apex SOP 2.6 (attached). Sample collection and helium tracer leak detection will be completed in accordance with the Oregon DEQ Draft Vapor Intrusion Guidance Document (DEQ, 2010). Prior to sampling, a minimum of two volumes will be purged, followed by a leak check using helium. The initial vacuum gauge reading and sampling start time will be recorded on the chain-of-custody form. The sample will be collected using a Summa canister provided by the laboratory. Once a sufficient sample volume is collected, the elapsed sampling time and final pressure will be recorded on the chain-of-custody form.

2.7 Ambient Air Sampling

One round of ambient air sampling will be conducted outside the Odd Fellows Building, within the Odd Fellows Building basement, and within the adjacent restaurant basement. The sampling will be conducted in accordance with Apex SOP 2.8, included in this attachment. The initial vacuum gauge reading and sampling start time will be recorded on the chain-of-custody form. The samples will be collected using a Summa canister provided by the laboratory. Once a sufficient sample volume is collected, the elapsed sampling time and final pressure will be recorded on the chain-of-custody form.

2.8 Sample Management

Containers. Clean sample containers and Summa canisters will be provided by the analytical laboratory ready for sample collection (the container requirements are listed in Table A-1).

Labeling Requirements. A sample label will be affixed to each sample container before sample collection. Containers will be marked with the project name, sample I.D. (unique I.D. for each sample location), date and time stamp (military time) of collection, sampler's initials, and the type of analysis.

Sample Storage and Shipment. Water and soil samples will be stored in a cooler chilled with ice to four degrees Celsius (°C). The cooler lid will be sealed with chain-of-custody seals. If necessary, the samples will be sent via overnight courier to the analytical laboratory for chemical analysis. Otherwise, Apex will transport the containers to the laboratory. Chain-of-custody will be maintained and documented at all times.

2.9 Decontamination Procedures

Personnel Decontamination. Personnel decontamination procedures depend on the level of protection specified for a given activity. The HASP identifies the appropriate level of protection for the type of work and expected field conditions associated with this project. In general, clothing and other protective equipment can be removed from the investigation area. Field personnel will thoroughly wash their hands and faces at the end of each day and before taking any work breaks.

Sampling Equipment Decontamination. To prevent cross-contamination between sampling points, clean, dedicated sampling equipment (e.g., groundwater sampling tubing) will be used for each sampling point and will be discarded after use. Cleaning of non-disposable items (i.e., field meter and water level probe) will consist of washing in a detergent (Alconox®) solution, rinsing with tap water, and rinsing with de-ionized (DI) water. Decontamination water will be collected and handled in accordance with Section 2.7.

2.10 Handling of Investigation-Derived Waste

IDW will consist of purge water, soil cuttings, and decontamination water. IDW will be temporarily placed in five-gallon buckets and covered with a lid. Throughout the sampling event, the buckets will be emptied into Department of Transportation (DOT)-approved drums. Each drum will be labeled with the project name, general contents, and date.

The drummed IDW will be transported to a designated on-site IDW storage area pending pickup/disposal by the IDW subcontractor. The selected disposal option will be determined based on analytical results on groundwater and soil samples from the explorations. An arrangement with a waste disposal subcontractor will be made to dispose of the IDW after chemical analysis results have been received.

Disposable items, such as sample tubing, gloves, protective overalls (e.g., Tyvek®), paper towels, etc., will be placed in plastic bags after use and deposited in trash receptacles for disposal.

3.0 Analytical Testing Program

Analytical laboratory QA/QC procedures are discussed in Section 5 of this attachment.

Tables A-1 and A-2 provide the proposed analytical methods, detection limit goals, and anticipated number of groundwater, soil, and soil vapor samples. Samples will be collected and handled using methods described in Section 2 of this appendix. Specific container and storage requirements for samples will be discussed with the analytical laboratory prior to sample collection and will be in accordance with the container requirements presented in Table A-1.

Soil and groundwater samples will be analyzed for volatile organic compounds (VOCs) by Method 8260B and for gasoline-range total petroleum hydrocarbons (TPHg) by Northwest Methods. Soil vapor and ambient air samples will be analyzed for VOCs by Method TO-15.

4.0 Field Quality Assurance Program

Table A-3 provides a summary of anticipated field QA/QC samples.

Field Chain-of-Custody. A chain-of-custody form will be used to record possession of a sample and to document analyses requested. Each time the sample bottles or samples are transferred between individuals, both the sender and receiver will sign and date the chain-of-custody form. When a sample shipment is transported to the laboratory, a copy of the chain-of-custody form will be included in the transport container (e.g., ice chest).

Field Duplicate Samples. One soil, one soil vapor, and one groundwater field duplicate sample will be collected during the investigation activities. The duplicate samples will be analyzed for TPHg and VOCs consistent with the associated primary sample. Field duplicates will consist of two samples collected sequentially from one sample location to assess data variability. The field duplicates will be analyzed by the same analytical methods used for primary samples. Relative percent differences (RPDs) for field duplicates will be calculated to assess the data precision and accuracy and potential variability caused by sample handling.

Field Blank Samples. One field blank sample will be collected during the groundwater monitoring event. The field blank sample will be analyzed for TPHg and VOCs consistent with the associated collected groundwater samples. The field blank will be collected by pouring laboratory-provided deionized water over a decontaminated sampling apparatus and filling the laboratory-provided sample jars. The sample will provide information about potential variability caused by sample handling and decontamination methods.

Trip Blank Samples. One trip blank sample will be analyzed during the groundwater monitoring event. The trip blank sample will be analyzed for TPHg and VOCs consistent with the associated collected groundwater samples. The trip blank will be provided by the laboratory and will stay in the sample shipment container. The sample will provide information about potential variability caused by sample shipment.

5.0 Quality Assurance Plan

The purpose of the Quality Assurance Plan (QAP) is to specify procedures and methods for office and field documentation, sample handling and custody, recordkeeping, equipment handling, and laboratory analyses that will be used during sampling and analysis.

5.1 Quality Assurance Objectives for Data Management

The general QA objectives for this project are to develop and implement procedures for obtaining and evaluating data of a specified quality. To collect such information, analytical data must have an appropriate degree of accuracy and reproducibility, samples collected must be representative of actual field conditions, and samples must be collected and analyzed using unbroken chain-of-custody procedures.

Specific QA objectives are as follows.

1. Establish sampling techniques that will produce analytical data representative of the media being measured.
2. Collect and analyze a sufficient number of field duplicate samples to establish sampling precision. Laboratory duplicates of the same sample will provide a measure of precision within the sample (sample homogeneity).
3. Analyze a sufficient number of analytical duplicate samples to assess the performance of the analytical laboratory.
4. Analyze a sufficient number of blank, standard, duplicate, spiked, and check samples within the laboratory to evaluate results against numerical QA goals established for precision and accuracy.

Precision, accuracy, representatives, completeness, and comparability parameters used to indicate data quality are defined below.

5.1.1 Precision

Precision is a measure of the reproducibility of data under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared to their average value. For duplicate measurements, precision can be expressed as the RPD. Analysis of field duplicate samples will

serve to measure the precision of sampling. Laboratory duplicate measurements will be carried out with at least a five percent frequency for each sample matrix.

5.1.2 Accuracy

Accuracy is the measure of error between the reported test results and the true sample concentration. True sample concentration is never known due to analytical limitations and error. Consequently, accuracy is inferred from the recovery data from spiked samples.

Because of difficulties with spiking samples in the field, the laboratory will spike samples. The laboratory will perform sufficient spike samples of a similar matrix (water or soil) to allow the computation of the accuracy.

Perfect accuracy is a 100 percent recovery.

5.1.3 Representativeness

Representativeness is a measure of how closely the results reflect the actual concentration of the chemical parameters in the medium sampled.

Sampling procedures, as well as sample-handling protocols for storage, preservation, and transportation, are designed to preserve the representativeness of the samples collected. Proper documentation will confirm that protocols are followed. This helps to assure the sample identification and integrity.

Laboratory method blanks will be run in accordance with established laboratory protocols.

5.1.4 Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is essentially that a sufficient amount of valid data be generated to allow for the evaluation of site cleanup.

5.1.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. The objective of this QAP is to assure that data developed during the sampling are comparable. Comparability of the data will be assured by using U.S. Environmental Protection Agency (EPA)-defined procedures which specify sample collection, handling, and analytical methods.

5.1.6 Documentation

Essentially, EPA Level III documentation will be generated during sampling/analysis. This level of documentation is generally considered legally defensible and consists of the following:

- Chain-of-custody;
- Holding times;
- Laboratory method blank data;
- Sample data;
- Shipping receipts;
- Laboratory notes;
- Raw data validation;
- Matrix/surrogate spike data; and
- Duplicate sample data.

5.2 Sampling Protocols

5.2.1 Methods

Sampling methods are presented in Section 2. These procedures are designed to ensure that:

- Samples collected are consistent with project objectives; and
- Samples are identified, handled, and transported in a manner that does not alter the representativeness of the data from the actual site conditions.

Quality assurance objectives for sample collection will be accomplished by a combination of the following items:

- **Standardized Procedures.** Standardized procedures will be followed and documented during each sampling event.
- **Laboratory QA.** Laboratory duplicate measurements will be carried out on at least five percent of laboratory samples. Analytical procedures will be evaluated using the protocols of the analytical laboratory. These protocols can be submitted upon request.
- **Chain-of-Custody.** Described in Section 5.3.

5.3 Sample and Document Custody Procedures

The various methods used to document field sample collection and laboratory operation are presented below.

5.3.1 Field Chain-of-Custody Procedures

Sample chain-of-custody refers to the process of tracking the possession of a sample from the time it is collected in the field through the laboratory analysis. A sample is considered to be under a person's custody if:

- It is in a person's physical possession;
- It is in view of the person after possession has been taken; or
- It is secured by that person so that no one can tamper with the sample or secured by that person in an area which is restricted to authorized personnel.

A chain-of-custody form is used to record possession of a sample and to document analyses requested. Each time the sample bottles or samples are transferred between individuals, both the sender and receiver will sign and date the chain of custody form. When a sample shipment is transported to the laboratory, a copy of the chain of custody form will be included in the transport container (i.e., ice chest).

The chain-of-custody forms are used to record the following information:

- Sample identification number;
- Sample collector's signature;
- Date and time of collection;
- Description of sample;
- Analyses requested;
- Shipper's name and address;
- Receiver's name and address; and
- Signatures of persons involved in chain-of-custody.

Procedures for the handling, documenting, and shipping of samples are described in Section 2.

5.3.2 Laboratory Operations

The analytical laboratory has a system in place for documenting the following laboratory information:

- Calibration procedures;

- Analytical procedures;
- Computational procedures;
- Quality control procedures;
- Bench data;
- Operating procedures or any changes to these procedures; and
- Laboratory notebook policy.

Laboratory chain-of-custody procedures provide the following:

- Identification of the responsible party (sample custodian) authorized to sign for incoming field samples and a log consisting of sequential lab-tracking numbers; and
- Specification of laboratory sample custody procedures for sample handling, storage, and internal distribution for analysis.

5.3.3 Corrections to Documentation

Original data are recorded in field notes and on chain-of-custody forms using indelible ink. Documents will be retained even if they are illegible or contain inaccuracies that require correction.

If an error is made on a document, the individual making the entry will correct the document by crossing a line through the error, entering the correct information, and initialing and dating the correction. Any subsequent error discovered on a document is corrected, initialed, and dated by the person who made the entry.

5.4 Equipment Calibration Procedures and Frequency

Instruments and equipment used during this project will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations. Operation, calibration, and maintenance will be performed by laboratory personnel fully trained in these procedures.

The instrumentation will be tuned once per week and calibrated with a minimum of five standards resulting in a linear calibration (r^2>0.985). A second source check standard will be analyzed with every batch and must be ±15% of the average response of the mid-point calibration standard. Sample concentrations should be within bracketing calibration standards. If not, samples must be diluted to be within the calibration range.

5.5 Analytical Procedures

Samples will be analyzed using EPA 8260C analytical protocols, EPA methodology, and Method NWTPH-Gx.

5.6 Data Reduction, Validation, and Reporting

Reports generated in the field and laboratory will be included with project reports. The Project Manager will assure the validation of the analytical data. The laboratory generating analytical data for this project will be required to submit results that are supported by sufficient backup and QA/QC data to enable the reviewer to determine the quality of the data. The validity of the laboratory data will be determined based on the objectives outlined in Section 5.1 and Section 5.8. Data validity will also be determined based upon the sampling procedures and documentation outlined in Sections 5.2 and 5.3. Upon completion of the review, the Project Manager will be responsible for assuring the development of a QA/QC report on the analytical data. Data will be stored and maintained according to the standard procedures of the laboratory. The method of data reduction will be described in the final report.

5.7 Performance Audits

Performance audits are an integral part of an analytical laboratory's standard operating procedures and are available upon request.

5.8 Data Measurement Assessment Procedures

The quality of the data will be assessed based on precision, accuracy, and completeness. Procedures to compute each are discussed below.

5.8.1 Precision

The RPD is used to assess the precision of the analytical method and is calculated using the following equation.

(1) $$RPD = \frac{X_s - X_d}{(X_s + X_d)/2} \times 100\%$$

where:

X_s = analytical result of the sample

X_d = analytical result of the duplicate sample

5.8.2 Accuracy

The accuracy of the data set is determined from the analysis of spiked samples. The accuracy is calculated using the following equation.

(2) $$A = \frac{(X_{ss} - X_s)}{T} \times 100\%$$

where:

A = accuracy
X_{ss} = analytical result obtained from the spiked sample
X_s = analytical result obtained from the sample
T = true value of the added spike

The overall accuracy is the arithmetic mean of the spiked samples.

5.8.3 Completeness

Completeness (percent complete, or PC) of the data is determined by the following equation.

(3) $$PC = \frac{\text{Number of samples with acceptable data}}{\text{Number of samples collected}} \times 100\%$$

5.9 Corrective Actions

If the quality control audit detects unacceptable conditions or data, the Project Manager will be responsible for developing and initiating corrective action. Corrective action may include the following:

- Reanalyzing the samples, if holding time criteria permit;
- Resampling and analyzing;
- Evaluating and amending sampling and analytical procedures; and
- Accepting data and acknowledging level of uncertainty or inaccuracy by flagging the data.

5.10 Quality Assurance Reports

A quality assurance review will be conducted that presents a QA/QC evaluation of the data collected during the sampling activities for inclusion in the final report. In addition to an opinion regarding the validity of the data, the QA/QC evaluation will address the following:

- Any adverse conditions or deviations from the SAP;
- Assessment of analytical data for precision, accuracy, and completeness;

- Significant QA problems and recommended solutions; and
- Corrective actions taken for any problems previously identified.

Table A-1 — Analytical Methods - Sample Container Requirements
Oregon Lithoprint
McMinnville, Oregon

Analysis	Anticipated Number of Samples	Method	Container	Preservative	Storage Temperature	Holding Time
Soil Samples						
TPH - Gasoline-Range	10	NWTPH-Gx	4-ounce	None	4°C	14 days
VOCs	10	EPA 5035/8260	1 x 40 mL VOA	Methanol	4°C	14 days
Water Samples						
TPH - Gasoline-Range	3	NWTPH-Gx	3 x 40 mL VOA	HCl	4°C	14 days
VOCs	3	EPA 8260	3 x 40 mL VOA	HCl	4°C	14 days
Vapor Samples						
VOCs	20	TO-15	1L Summa	none	none	30 days

Notes:
1. EPA = U.S. Environmental Protection Agency.
2. TPH = Total petroleum hydrocarbons.
4. VOCs = Volatile organic compounds.
5. °C = Degrees Celsius.
6. mL = Milliliter.
7. HCl = Hydrochloric acid.
8. Quality assurance / quality control samples are detailed on Table A-3.

Table A-2 — Analytical Methods, Anticipated Sample Number, and Detection Limit Goals
Oregon Lithoprint
McMinnville, Oregon

		Soil (mg/kg)		Soil Vapor and Ambient Air ($\mu g/m^3$)		Groundwater (µg/L)	
Analyte	**Method**	**Anticipated Number of Samples**	**Detection Limit Goal**	**Anticipated Number of Samples**	**Detection Limit Goal**	**Anticipated Number of Samples**	**Detection Limit Goal**
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range	NWTPH-Gx	11	0.8475	--	--	5	31.6
Volatile Organic Compounds (VOCs)							
Acetone	EPA 8260/TO-15	11	0.0365	20	0.27	5	11.3
Acrolein	EPA 8260	--	--	--	--	5	2.54
Acrylonitrile	EPA 8260	11	0.00361	--	--	5	0.671
Benzene	EPA 8260/TO-15	11	0.000467	20	0.294	5	0.0941
Bromobenzene	EPA 8260	11	0.0009	--	--	5	0.118
Bromodichloromethane	EPA 8260/TO-15	11	0.000725	20	0.584	5	0.136
Bromoform	EPA 8260/TO-15	11	0.00117	20	1.626	5	0.129
Bromomethane	EPA 8260/TO-15	11	0.00197	20	0.472	5	0.605
n-Butylbenzene	EPA 8260	11	0.00525	--	--	5	0.157
sec-Butylbenzene	EPA 8260	11	0.00288	--	--	5	0.125
tert-Butylbenzene	EPA 8260	11	0.00195	--	--	5	0.127
Carbon Tetrachloride	EPA 8260/TO-15	11	0.000898	20	0.736	5	0.128
Chlorobenzene	EPA 8260/TO-15	11	0.00021	20	0.556	5	0.116
Chlorodibromomethane	EPA 8260	11	0.000612	--	--	5	0.14
Chloroethane	EPA 8260/TO-15	11	0.0017	20	0.258	5	0.192
Chloroform	EPA 8260/TO-15	11	0.00103	20	0.558	5	0.111
Chloromethane	EPA 8260/TO-15	11	0.00435	20	0.224	5	0.96
2-Chlorotoluene	EPA 8260/TO-15	11	0.000865	20	0.624	5	0.106
4-Chlorotoluene	EPA 8260	11	0.00045	--	--	5	0.114
1,2-Dibromo-3-Chloropropane	EPA 8260/TO-15	11	0.0039	20	0.84	5	0.276
1,2-Dibromoethane	EPA 8260/TO-15	11	0.000648	20	0.284	5	0.126
Dibromomethane	EPA 8260	11	0.00075	--	--	5	0.122
1,2-Dichlorobenzene	EPA 8260/TO-15	11	0.000425	20	0.726	5	0.107
1,3-Dichlorobenzene	EPA 8260/TO-15	11	0.0006	20	0.718	5	0.11
1,4-Dichlorobenzene	EPA 8260/TO-15	11	0.0007	20	0.67	5	0.12
Dichlorodifluoromethane	EPA 8260	11	0.00161	--	--	5	0.374
1,1-Dichloroethane	EPA 8260/TO-15	11	0.000491	20	0.412	5	0.1
1,2-Dichloroethane	EPA 8260/TO-15	11	0.000649	20	0.498	5	0.0819
1,1-Dichloroethene	EPA 8260/TO-15	11	0.000606	20	0.388	5	0.188
cis-1,2-Dichloroethene	EPA 8260/TO-15	11	0.000734	20	0.308	5	0.126
trans-1,2-Dichloroethene	EPA 8260/TO-15	11	0.00104	20	0.368	5	0.149
1,2-Dichloropropane	EPA 8260/TO-15	11	0.00142	20	0.554	5	0.149
1,1-Dichloropropene	EPA 8260	11	0.000809	--	--	5	0.142
1,3-Dichloropropane	EPA 8260	11	0.000501	--	--	5	0.11
cis-1,3-Dichloropropene	EPA 8260/TO-15	11	0.000757	20	0.534	5	0.111
trans-1,3-Dichloropropene	EPA 8260/TO-15	11	0.00114	20	0.394	5	0.118
2,2-Dichloropropane	EPA 8260	11	0.00138	--	--	5	0.161
Di-Isopropyl Ether	EPA 8260	11	0.00041	--	--	5	0.105
Ethylbenzene	EPA 8260/TO-15	11	0.000737	20	0.438	5	0.137
Hexachloro-1,3-Butadiene	EPA 8260/TO-15	11	0.006	20	1.4	5	0.337
Isopropylbenzene	EPA 8260/TO-15	11	0.000425	20	0.554	5	0.105
p-Isopropyltoluene	EPA 8260	11	0.00255	--	--	5	0.12
2-Butanone (MEK)	EPA 8260/TO-15	11	0.0635	20	0.29	5	1.19
Methylene Chloride	EPA 8260/TO-15	11	0.00664	20	0.322	5	0.43
4-Methyl-2-Pentanone (MIBK)	EPA 8260/TO-15	11	0.00228	20	0.532	5	0.478
Methyl Tert-Butyl Ether	EPA 8260/TO-15	11	0.00035	20	0.364	5	0.101
Naphthalene	EPA 8260/TO-15	11	0.00488	20	1.612	5	1
n-Propylbenzene	EPA 8260	11	0.00095	--	--	5	0.0993
Styrene	EPA 8260/TO-15	11	0.000229	20	0.396	5	0.118
1,1,1,2-Tetrachloroethane	EPA 8260/TO-15	11	0.000948	20	0.792	5	0.147
1,1,2,2-Tetrachloroethane	EPA 8260	11	0.000695	--	--	5	0.133
1,1,2-Trichlorotrifluoroethane	EPA 8260	11	0.000754	--	--	5	0.18
Tetrachloroethene	EPA 8260/TO-15	11	0.000896	20	0.674	5	0.3
Toluene	EPA 8260/TO-15	11	0.0013	20	0.376	5	0.278
1,2,3-Trichlorobenzene	EPA 8260	11	0.00733	--	--	5	0.23
1,2,4-Trichlorobenzene	EPA 8260/TO-15	11	0.0044	20	2.2	5	0.481
1,1,1-Trichloroethane	EPA 8260/TO-15	11	0.000923	20	0.724	5	0.149
1,1,2-Trichloroethane	EPA 8260/TO-15	11	0.000597	20	0.312	5	0.158

Please see notes at end of table.

Table A-2 — Analytical Methods, Anticipated Sample Number, and Detection Limit Goals
Oregon Lithoprint
McMinnville, Oregon

		Soil (mg/kg)		Soil Vapor and Ambient Air (µg/m^3)		Groundwater (µg/L)	
Analyte	**Method**	**Anticipated Number of Samples**	**Detection Limit Goal**	**Anticipated Number of Samples**	**Detection Limit Goal**	**Anticipated Number of Samples**	**Detection Limit Goal**
VOCs continued							
Trichloroethene	EPA 8260/TO-15	11	0.000584	20	0.584	5	0.19
Trichlorofluoromethane	EPA 8260	11	0.000827	--	--	5	0.16
1,2,3-Trichloropropane	EPA 8260	11	0.00162	--	--	5	0.237
1,2,4-Trimethylbenzene	EPA 8260/TO-15	11	0.00158	20	0.474	5	0.322
1,2,3-Trimethylbenzene	EPA 8260	11	0.00158	--	--	5	0.104
1,3,5-Trimethylbenzene	EPA 8260/TO-15	11	0.002	20	0.62	5	0.104
Vinyl Chloride	EPA 8260/TO-15	11	0.00116	20	0.234	5	0.234
Xylenes, Total	EPA 8260	11	0.00088	--	--	5	0.174
Allyl Chloride	TO-15	--	--	20	0.342	--	--
Benzyl Chloride	TO-15	--	--	20	0.622	--	--
1,3-Butadiene	TO-15	--	--	20	0.25	--	--
Cyclohexane	TO-15	--	--	20	0.368	--	--
1,4-Dioxane	TO-15	--	--	20	0.4	--	--
Ethanol	TO-15	--	--	20	0.314	--	--
4-Ethyltoluene	TO-15	--	--	20	0.654	--	--
Trichlorofluoromethane	TO-15	--	--	20	0.756	--	--
Dichlorodifluoromethane	TO-15	--	--	20	0.594	--	--
1,1,2-Trichlorotrifluoroethane	TO-15	--	--	20	1.054	--	--
1,2-Dichlorotetrafluoroethane	TO-15	--	--	20	0.64	--	--
Heptane	TO-15	--	--	20	0.512	--	--
n-Hexane	TO-15	--	--	20	0.322	--	--
Methyl Butyl Ketone	TO-15	--	--	20	0.558	--	--
Methyl Methacrylate	TO-15	--	--	20	0.634	--	--
2-Propanol	TO-15	--	--	20	0.434	--	--
Propene	TO-15	--	--	20	0.32	--	--
Tetrahydrofuran	TO-15	--	--	20	0.3	--	--
2,2,4-Trimethylpentane	TO-15	--	--	20	0.426	--	--
m&p-Xylene	TO-15	--	--	20	0.82	--	--
o-Xylene	TO-15	--	--	20	0.548	--	--
Vinyl Bromide	TO-15	--	--	20	0.636	--	--
Vinyl Acetate	TO-15	--	--	20	0.45	--	--

Notes:
3. mg/kg = Milligrams per kilogram.
4. µg/L = Micrograms per liter.
5. µg/m^3 = Micrograms per cubic meter.
6. EPA = U.S. Environmental Protection Agency.
7. -- = Not available or not applicable.

Table A-3 — Quality Assurance Samples
Oregon Lithoprint
McMinnville, Oregon

QA Sample Matrix	QA Sample Type	Analyses Requested	Anticipated Number of Samples
Soil	Field Duplicate	TPHg/VOCs (1 x 40ml VOA; 1 x 4-ounce)	1
Soil Vapor	Field Duplicate	TPHg/VOCs (1L Summa)	1
Groundwater	Field Duplicate	TPHg/VOCs (6 x 40ml VOA)	1
Water	Trip Blank	TPHg/VOCs (6 x 40ml VOA)	1
Water	Field Blank	TPHg/VOCs (6 x 40ml VOA)	1

Notes:

1. VOCs = Volatile organic compounds by EPA Method 8260.
2. TPHg = Gasoline-range petroleum hydrocarbons by Northwest Method NWTPH-Gx.
3. QA = Quality assurance.

Apex Standard Operating Procedures

SOP 2.1 – Standard Field Screening Procedures
SOP 2.4 – Push-Probe Exploration Procedures
SOP 2.5 – Low Flow Groundwater Sampling Procedures
SOP 2.6 – Soil Vapor Sampling Procedures
SOP 2.7 – EPA Method 5035A Soil Sampling Procedures
SOP 2.8 – Ambient Vapor Sampling Procedures
SOP 2.16 – Water Level Measurement Procedures

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) provides instructions for standard field screening. Field screening results are used to aid in the selection of soil samples for chemical analysis. This procedure is applicable during Apex Companies, LLC (Apex) soil sampling operations.

Standard field screening techniques include the use of a photoionization detector (PID) to assess for volatile organic compounds (VOCs), for the presence of separate-phase petroleum hydrocarbons using a sheen test. These methods will not detect all potential contaminants, so selection of screening techniques shall be based on an understanding of the site history. The PID is not compound or concentration-specific, but it can provide a qualitative indication of the presence of VOCs. PID measurements are affected by other field parameters such as temperature and soil moisture. Other field screening methods, such as screening for dense non-aqueous phase liquid (DNAPL) using dye or UV light, are not considered "standard" and will be detailed in the site-specific sampling and analysis plan (SAP).

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- PID with calibration gas (record daily calibration/calibration check in field notes);
- Plastic resealable bags (for PID measurement); and
- Glass jars or stainless steel bowls (for sheen testing).

3. METHODOLOGY

Each soil sample will be field screened for VOCs using a PID and for the presence of separate-phase petroleum hydrocarbons using a sheen test. If the presence of DNAPL is suspected, then screening using dye and UV light may also to be completed. For information regarding screening using dye or UV light, refer to the site specific sampling and analysis plan.

PID lamps come in multiple sizes, typically 9.8, 10.6, and 11.7 electron volts (eV). The eV rating for the lamp must be greater than the ionization potential (in eV) of a compound in order for the PID to detect the compound. For petroleum hydrocarbons, a lamp of at least 9.8 eV should be used. For typical chlorinated alkenes (dichloroethene, trichloroethene, tetrachloroethene, or vinyl chloride.), a lamp of at least 10.6 eV should be used. The compatibility of the lamp size with the site constituents should be verified prior to the field event and will be detailed in the site-specific SAP.

PID Calibration Procedure: The PID used on-site should be calibrated daily or more frequently if needed. Calibration of the PID should be documented in field notes. Calibrations procedures should be conducted according to the manufacturer's instructions. .

<u>PID Screening Procedure:</u>

- Place a representative portion (approximately one ounce) of freshly exposed, uncompacted soil into a clean resealable plastic bag.
- Seal the bag and break up the soil to expose vapors from the soil matrix.
- Allow the bag to sit to reach ambient temperature. Note: Ambient temperature and weather conditions/humidity should be recorded in field notes. Changes in ambient temperature and weather during the field work should also be recorded, as temperature and humidity can affect PID readings.
- Carefully insert the intake port of the PID into the plastic bag.
- Record the PID measurement in the field notes or boring logs.

<u>Sheen Test Procedure:</u>

- Following the PID screen, place approximately one ounce of freshly exposed, uncompacted soil into a clean glass jar or stainless steel bowl.

- Add enough water to cover the sample.
- Observe the water surface for signs of discoloration/sheen and characterize

No Sheen (NS)	No visible sheen on the water surface
Biogenic Film (BF)	Dull, platy/blocky or foamy film.
Slight Sheen (SS)	Light sheen with irregular spread, not rapid. May have small spots of color/iridescence. Majority of water surface not covered by sheen.
Moderate Sheen (MS)	Medium to heavy coverage, some color/iridescence, spread is irregular to flowing. Sheen covering a large portion of water surface.
Heavy Sheen (HS)	Heavy sheen coverage with color/iridescence, spread is rapid, entire water surface covered with sheen. Separate-phase hydrocarbons may be evident during sheen test.

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes the methods for observing and sampling from push-probes (i.e., GeoProbe™). Subsurface soil cores may be obtained using this system for purposes of determining subsurface soil conditions and for obtaining soil samples for physical and/or chemical evaluation. Grab groundwater samples may be collected using temporary well screens. Soil vapor samples may be obtained using temporary well points. Shallow (less than 50 feet), small-diameter (2-inch max) pre-packed wells may also be installed using push-probe equipment. This procedure is applicable during all Apex Companies, LLC (Apex) push-probe activities.

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Traffic cones, measuring tape, spatula, and buckets/drums
- Sampling equipment (water level probe, pumps, tubing) and laboratory-supplied sample containers
- Field documentation materials
- Decontamination materials
- Personal protective equipment (as required by project Health and Safety Plan)

3. METHODOLOGY

Coring Procedure (Conducted by Drilling Subcontractor):

The sampling procedure includes driving a 2-inch outside-diameter, 5-foot-long, push-probe soil sampler to the desired depth using a combination of hydraulic pressure and mechanical hammer blows. When the sampling depth is reached, the pin attaching the sampler's tip is released (if a tip is used), which allows the tip to slide inside the sampler (Macro-Core Sampler with removable plastic liner). The sampler is driven the length of the sampler to collect a soil core, which is then withdrawn from the exploration. When the sampler is retrieved from the borehole the drive head/cutting shoe is detached and the liner is removed. Soil cores are collected continuously to the full depth of the exploration unless otherwise specified in a project-specific sampling and analysis plan (SAP). Verify that the subcontractor decontaminates the sampling device (per SOP 1.2) prior to its initial use and following collection of each soil sample.

Logging and Soil Sample Collection:

Remove the soil core from the sampler for field screening, description, and placement into sample jars. Soil samples will be collected for field screening and possible chemical analysis on two foot intervals unless otherwise specified in a project-specific SAP. The sampling interval will be determined in the field based on recovery, soil variability, and evidence of contamination. Complete field screening as specified in SOP-2.1. Soil samples should be collected using different procedures for volatile on non-volatile analyses, as follows.

- **Volatile Analyses.** Sampling for volatile organics analysis (VOA) is different than other routine physical or chemical testing because of the potential loss of volatiles during sampling. To limit volatile loss, the soil sample must be obtained as quickly and as directly as possible. If a VOA sample is to collected as part of a multiple analyte sample, the VOA sample portion will be obtained first. The VOA sample should be obtained from a discrete portion of the entire collected sample and should not be composited or homogenized. Sample bottles should be filled to capacity, with no headspace. Specific procedures for collecting VOA samples using the EPA Method 5035 are discussed in SOP 2.7.
- **Other Analyses.** Soil samples for non-volatile analyses will be thoroughly homogenized in a stainless steel bowl prior to bottling. Sample homogenizing is accomplished by manually mixing the entire soil

sample in the stainless steel bowl with a clean sampling tool until a uniform mixture is achieved. The sample jar should be filled completely.

Any extra soil generated during probing activities will be placed in Department of Transportation (DOT) approved drums.

Grab Groundwater Sample Collection:

Collect grab groundwater samples using a sampling attachment with a 4 to 5-foot-long temporary screen (specify to drillers whether to use decontaminated stainless steel or disposable PVC. Also, specify whether a filter pack is necessary based on field observations). Obtain samples using a peristaltic pump unless otherwise specified in the SAP with new tubing for each boring. Record field parameters (e.g., temperature, conductivity, and pH) prior to sampling.

Backfilling the Excavation (Conducted by Drilling Subcontractor):

After sampling activities are completed, abandon each exploration in accordance with Oregon Water Resources Department (OWRD) regulations and procedures. The abandonment procedure typically consists of filling the exploration with granular bentonite and hydrating the bentonite with water. Match the surface completion to the surrounding materials.

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes the methods for collection of groundwater samples from monitoring wells applying low flow protocols. Low flow sampling is a method of collecting samples that does not require the removal of large volumes of water and therefore does not overly agitate the water, suspend particles, or potentially aspirate VOCs. Typical flow rates for low flow sampling range from 0.1 L/min to 0.5 L/min depending on site characteristics. The groundwater monitoring activities will consist of measuring water levels, purging and sampling groundwater, and measuring groundwater field parameters. This procedure is applicable during Apex Companies low flow groundwater sampling activities.

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Traffic cones, tools, keys, and buckets/drums
- Water quality meter with calibration solutions (record daily calibration/calibration check in field notes)
- Sampling equipment (water level probe, pumps, tubing) and laboratory-supplied sample containers
- Field documentation materials
- Decontamination materials
- Personal protective equipment (as required by project Health and Safety Plan)

3. METHODOLOGY

Water Levels:

Water levels in the wells will be measured and recorded for the purpose of determining groundwater elevations and gradient. The wells will be opened and the water level allowed to equilibrate before the measurements are taken. Measurements of the depth to water will be made to the nearest 0.01 foot using an electronic probe.

Purging:

Purge using low-flow sampling equipment (e.g., peristaltic pump or bladder pump) at a low-flow rate to limit water table drawdown. Unless specified otherwise in the project-specific sampling and analysis plan (SAP) the sample tubing/pump will be lowered to the middle of the saturated screened interval. To assess the effectiveness of purging, groundwater field parameters (pH, electrical conductivity, and temperature) will be measured using a flow cell connected to the discharge tubing of the sample pump. Purging will be considered complete when the water quality parameters (i.e., pH, temperature, and specific conductance) stabilize within 10 percent for three consecutive 3-minute intervals. Consult the project-specific SAP for additional parameters and stabilization criteria. Purge water will be placed in Department of Transportation (DOT) approved drums.

Sample Collection:

After the purging of each well is complete, collect groundwater samples for chemical analyses using the same pump used for the well purging.

Low Yield Sampling Procedure:

If drawdown of the water table is unavoidable and a well pumps dry during purging, discontinue measurement of water quality parameters. Collect groundwater samples once the water level recovers to 90 percent of the pre-purge water column. Contact project manager in the event of slow recharge conditions. Always collect samples for VOC analysis as soon after recharge as possible.

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes the methods for collecting soil vapor samples. Samples for soil gas are collected with temporary or permanent purpose-specific sampling equipment installed to the desired depth in vadose soil. The samples are generally obtained using these procedures for the purpose of determining concentrations of chemicals by laboratory analysis. This procedure is applicable to all Apex Companies (Apex) soil vapor sampling activities.

This SOP was developed using the following resources:

- American Petroleum Institute (API), Collecting and Interpreting Soil Gas Samples for the Vadose Zone, Publication Number 4741, November 2005
- USEPA, OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Pathway from Groundwater and Soils, EPA530-D-02-004, November 2002
- Commonwealth of Massachusetts, Indoor Air Sampling and Evaluation Guide, WSC Policy #02-430, Office of Research and Standards, Department of Environmental Protection, April, 2002

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Traffic cones, measuring tape, Teflon tape, wrenches, and buckets/drums
- Sampling equipment (vapor sampling assembly with gauges and valves) and laboratory-supplied sample containers and flow controllers (20-minute for grab samples, as specified for time-weighted samples)
- Leak detection equipment (helium tank, two-stage regulator, and gas flow control valve, and helium leak detector)
- Purge pump
- Field documentation materials
- Decontamination materials
- Personal protective equipment (as required by project Health and Safety Plan)

3. METHODOLOGY

For soil gas sampling, follow steps (a) through (e).

(a) Sample Point Installation Procedure

Permanent or temporary vapor points will be installed to the depth specified in the work plan. Installation of the sample point may be completed with a hand or drilling subcontractor. Vapor point construction details, including screen, annular material, and seal specifications, are project specific and will be provided in the project work plan. Prior to sampling temporary sampling points need to equilibrate for at least 30 minutes Permanent points should equilibrate for at least 48 hours.

(b) Assembly and Attachment of Sampling Equipment:

The sampling valve assembly is attached to the sample container (e.g., Summa canister) and flow controller. All valves are kept closed. The valve assembly is connected to the vapor monitoring point using flexible tubing (sealed with compression fittings at both ends).

(c) Leak Detection:

Prepare the Helium pressurization assembly (Helium tank [40 cu.ft], two stage regulator, tubing, gas flow meter, and flow control valve). Ensure that the assembly fittings are tight and perform preliminary leak detection on this assembly with the flow control valve closed.

The Teflon tubing extending from the two stage regulator is attached to the leak detection leg of the sampling assembly using a Swage-Lok fitting (See Figure). Secure all fittings, and make sure both the Summa canister and the vapor point are closed/off. Turn on the Helium gas and use the regulator to set the pressure to approximately 10 pounds per square inch (psi). Open the gas flow control valve on the helium pressurization assembly, and open the corresponding valve on the leak detection leg of the sampling assembly. Helium gas should now be flowing through the sampling train.

Using the Helium Leak Detector (Laco Technologies Model LHHLD-2002 or similar) test each fitting on the sampling train, all Teflon lines, and the connections to the Summa canister, sampling regulator, and to the vapor point. To test these points, activate the Helium Leak Detector, which will take about one minute to calibrate, and hold slightly above each fitting for a minimum of 10 seconds per fitting. The Helium Leak Detector must be able to detect any Helium concentration that is a minimum of 25 ppm. If helium is detected, tighten the fittings and repeat testing. Allowing a few moments to zero the leak detector and allow the residual Helium to clear from the area.

Once all fittings and connections have passed the leak detection testing, the secondary valve to the leak detection leg should be shut off, closing off the Helium gas to the system. The Helium pressurization assembly should then be disconnected and a purge pump should be attached to the leak detection leg of the sampling train. Ensuring that the vapor point valve is open, use the purge pump to void the residual vapor from the sampling assembly and vapor point. Once the purge has been completed, close off the leak detection leg valve. The vapor point can now be sampled according to section (d) below.

If sorbent tubes are used for Method TO-17, a sampling shroud may be needed. Confirm with laboratory the appropriate leak detection methods.

(d) Sample Collection:

The valve on the sample container is opened (verifying that the control valve on the sampling assembly is closed), so that the initial container pressure can be measured and recorded. The control valve can then be slowly opened to allow collection of the sample. Return to the sampler prior to the programmed sample duration so that some vacuum remains in the container (a vacuum of between 1 and 5 inches of Hg). The sample container valve is then closed, the sampling assembly is disconnected, and the sampling container is processed for shipment to the analytical laboratory. Disconnect the sampling apparatus from the vapor point, reopen the bypass “T” and operate the vacuum pump for a period of five minutes to purge sample air from the assembly.

(e) Data Recording:

Record the following:

- In a field log notebook or sampling event form, record project name, sample date, sampling location, canister serial number, initial vacuum reading, final pressure reading, and sampling time.
- Current weather conditions (temperature, barometric pressure, humidity, sunny/cloudy, wind).
- Date and amount of most recent prior rainfall.

- Maintain records of all field procedures, including any leak testing, purging, and sampling for each sampling location.

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes the methods used for obtaining soil samples for chemical analysis for volatile organic compounds (VOCs) by EPA Method 5035A. Samples collected using the 5035A protocols are not exposed to the atmosphere after sampling thereby reducing the potential for loss of VOCs during sample transport, handling, and analysis. This procedure assumes the use of the PowerStop Handle sampler with disposable EasyDraw Syringes or Terra Core Samplers. This procedure is applicable during Apex Companies, LLC (Apex) soil sampling activities where the 5035A protocols are employed.

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Sampling equipment (PowerStop Handle, disposable EasyDraw Syringes, Terra Core Samplers)
- Laboratory-supplied sample containers (pre-weighed 40ml VOA vials including labels, preservative, stir bars, etc. [number and type as specified by the lab], two ounce jars)
    - Vials used from ACA stock must be weighed to confirm loss of reagents is less than 0.02 grams. Record vial tare weight in field notes. Discard vials with dates over 6 months old.
- Field documentation materials
- Decontamination materials
- Personal protective equipment (as required by Health and Safety Plan)

3. METHODOLOGY

The project-specific sampling and analysis plan (SAP) will define the specific requirements for 5035A methodology required for a particular site or by a regulatory agency.

Analytical Requirements

- VOCs must be analyzed within 14 days of collection.
- Field preserved samples (e.g., sodium bisulfate or methanol) must be maintained at 4° C.
- Sample collected without preservative (e.g., reagent water) must frozen or analyzed within 48 hours.

Collection of Samples

- When using the PowerStop Handle, clip the syringe into the handle in one of the three 5 gram positions. Use the heavy position for dense clay, the light position for dry sandy soil, and the medium position for all others.
- Using the handle, push the sampler into the soil to collect the sample. Continue pushing until the soil column has forced the plunger in the syringe to the stopping point or filled the sampler.
- Wipe all debris from the outside of the sampler. The soil plug should be flush with the mouth of the sampler. Remove any excess soil that extends beyond the mouth of the sampler.
- Extrude the 5 gram sample into vial and cap vial immediately. Hold vial at an angle when extruding to minimize splashing. Gently swirl vial for 10 seconds to break up soil particles (do not shake).
- When capping the vial, be sure to remove any soil or debris from the threads of the vial.
- Repeat process for each additional vial.
- Fill a two ounce container (to capacity) for percent total solids determination.

Additional Considerations

- Methanol contamination can occur from adjacent activities (e.g., exhaust from running equipment or vehicles, hot tar roofing, facility operations, etc). Collection and analysis of methanol field blank (e.g., additional methanol vial left open during period of sampling) is recommended.
- Acidification of carbonaceous soils with sodium bisulfate can cause effervescence and loss of VOCs.
- Certain volatile compounds such as 2-chloroethylvinyl ether may be lost by acidification.
- Acidification of certain soils with sodium bisulfate may cause the formation of acetone through oxidation of soil waxes and humic material (e.g., organic materials such as roots).

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes the methods for collecting ambient air vapor samples. Samples from ambient air are collected with laboratory-supplied canisters with flow control valves. The samples are generally obtained using these procedures for the purpose of determining concentrations of chemicals by laboratory analysis. This procedure is applicable to Apex Companies, LLC (Apex) ambient air vapor sampling activities.

This SOP was developed using the following resources:

- American Petroleum Institute (API), Collecting and Interpreting Soil Gas Samples for the Vadose Zone, Publication Number 4741, November 2005
- USEPA, OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Pathway from Groundwater and Soils, EPA530-D-02-004, November 2002
- Commonwealth of Massachusetts, Indoor Air Sampling and Evaluation Guide, WSC Policy #02-430, Office of Research and Standards, Department of Environmental Protection, April, 2002

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Laboratory-supplied sample containers and flow controllers (as specified in the work plan for time-weighted samples)
- Barricades and straps for outdoor sample placement
- Field documentation materials

3. METHODOLOGY

For ambient vapor sampling, follow steps (a) through (d).

(a) Eliminate or Identify Confounding Sources:

Prior to sampling, potential sources of target or interfering compounds should be identified and removed if possible. The specific methods for this task are site specific and should be developed in the work plan using the resources listed above in Section 1.

(b) Place Sample Canister:

Place the sample canister at the location identified by the work plan. In general, the canister should be placed in the lowest occupied level at a height of 2 to 5 feet above the floor or ground. Canisters should be protected from disturbance during the sampling period.

(c) Sample Collection:

Record the initial container pressure (initial vacuum should be approximately 30 inches of Hg). Slowly open the control valve to allow collection of the sample. Return to the sampler prior to the programmed sample duration so that some vacuum remains in the container (the target finishing vacuum is between 0.5 and 1 inches of water). Close the sample container valve and process the sampling container for shipment to the analytical laboratory.

(d) Data Recording:

Record the following:

- In a field log notebook or sampling event form, record project name, sample date, sampling location, canister serial number, initial vacuum reading, final pressure reading, and sampling time.
- Current weather conditions (temperature, barometric pressure, humidity, sunny/cloudy, wind).
- Maintain records of all field procedures, including any leak testing, purging, and sampling for each sampling location.

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes procedures for the collection of groundwater level measurements and separate phase hydrocarbon (SPH) measurements. Measurements may be collected as an independent event or in conjunction with groundwater sampling or SPH removal. This SOP is applicable for Apex Companies, LLC (Apex) sites and projects.

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Water level or oil/water interface probe (as appropriate);
- Field documentation materials;
- Decontamination materials;
- Bailers or tape/paste (to confirm unusual SPH detections) and
- Personal protective equipment (PPE; as required by project Health and Safety Plan).

3. METHODOLOGY

Preparation. Obtain and review table of well construction details and historical groundwater and SPH levels/thicknesses. Bring tables into the field for ready reference.

Field Procedure. Water level and SPH measurements should be collected upon arrival at the site. Appropriate PPE (as required by the project-specific Health and Safety Plan) should be worn during measurement activities. During groundwater sampling events, measurements should be collected (1) prior to, during, and after purging and sampling. Water level measurements during low-flow sampling are conducted to ensure that drawdown is not occurring during purging/sampling. Low-flow sampling methods are described in SOP 2.5. The following procedures should be followed when collecting groundwater level and SPH measurements from wells:

No SPH in monitoring well

1. The electronic probe should be tested to ensure proper instrument response. If response is inadequate, replace batteries or repair probe as needed.
2. Well covers and caps will be opened and the water level allowed to equilibrate under atmospheric conditions. Observe for indications that water levels may not be at equilibrium such as:
    a. Escaping air upon loosening of well cap; or
    b. Water level above the top of the well screen.

   For either of these conditions, equilibrium should be verified by repeating water level measurements over five-minute intervals until successive equal measurements are obtained. Otherwise allow water levels to equilibrate for a minimum of five minutes before measurements are taken. Unless otherwise indicated in the work scope of site-specific sampling plan, water level measurements should be taken from the least contaminated wells first to avoid cross-contamination.
3. Locate the reference point on the well riser pipe.
4. Slowly lower the probe until the probe signal indicates that water has been contacted.
5. Record the depth-to-water (DTW) probe reading at the reference point. Measurements should be collected to the nearest 0.01 foot.
6. Withdraw the probe and repeat steps 5 and 6. Measurements should agree within a precision of 0.01 feet. Repeat if needed until a precision of 0.01 feet is obtained.
7. If the work scope or site specific sampling plan requires that the depth-to-bottom (DTB) of monitoring wells is measured, then the probe should be lowered to the bottom of the well and the DTB reading at the reference point should be measured to the nearest 0.01 foot.
8. Remove probe and decontaminate the tape using alcohol wipes then wash the tape and probe in a detergent (Alconox®) solution, rinse with tap water, and a final deionized water rinse. DO NOT USE ALCOHOL WIPES ON THE PROBE TIP. Describe in field notes unusual characteristics of SPH that may bias thickness readings (e.g. unusually viscous product).

SPH in monitoring well

1. Repeat above steps 1 through 5.
2. Slowly lower the oil/water interface probe until the signal indicates that SPH has been contacted (generally a steady tone and signal light).
3. Record the depth-to-product (DTP) probe reading at the reference point. Measurements should be collected to the nearest 0.01 foot.
4. Continue lowering the probe until the signal indicates that water has been contacted (generally an intermittent tone and signal light).
5. Record the DTW probe reading at the reference point. Measurements should be collected to the nearest 0.01 foot.
6. Withdraw the probe and repeat steps 5 and 6. Measurements should agree within a precision of 0.01 feet. Repeat if needed until a precision of 0.01 feet is obtained.
7. Remove probe and initially decontaminate the tape using alcohol wipes then wash/scrub the tape and probe in a detergent (Alconox®) solution, rinse with tap water, and a final deionized water rinse. DO NOT USE ALCOHOL WIPES ON THE PROBE TIP. Describe in field notes unusual characteristics of SPH that may bias thickness readings (e.g. unusually viscous product).
8. If unusual SPH thicknesses are detected (e.g. SPH is detected in well with no prior history of SPH or thicknesses are greater than prior detections), verify presence/thickness using alternative technique (e.g. bailer, tape and water/petroleum colorimetric paste).

Appendix B

Health and Safety Plan

This Level 2 HASP is intended to provide health and safety guidelines for project field work meeting the following criteria:

- **"Buddy System" in use (or communication plan implemented for "lone worker"**
- **Some likelihood of chemical and/or physical hazard exposure**
- **No supplied-air respirator use**

The Project Manager should review this Health and Safety Plan with all Apex project personnel. A copy of the HASP must be kept in the field with the project team as well as maintained in project files.

Administrative Information **This document is valid for a maximum time period of one year after initial completion and must be re-evaluated by the project team at that time.** **A minimum of two persons with appropriate training must be onsite or an appropriate communication plan must be implemented. A mix of Apex and other personnel can satisfy this requirement.**	Site Name and Location Oregon Lithoprint - 609 East Third Street, McMinnville, OR	
	Client Contact and Phone Gus Winkes, 206-315-4813	
	Project Name Oregon Lithoprint	
	Health & Safety Plan Date 11/2/2021	Revision Number and Date
	Field Work Start Date November 2021	Anticipated Field Work End Date December 2021
	Project Manager (*responsible for implementing the site health and safety program on this project*) Michael Stevens	Site Safety Officer (SSO) (*responsible for overall site health and safety performance on this project).* Heather Gosack

Project Background and Scope of Work

Include numbered list of tasks to be completed by Apex personnel during this project, and a separate list of tasks to be completed by any subcontractors at the site.

JSAs are to be prepared for each task listed. Subcontractors are responsible for preparing JSAs for their activities.

Apex Scope of Work:

Collection of groundwater samples, oversight of soil boring installation via direct push drilling methods, soil sampling, installation of vapor pins, soil vapor sampling, ambient air sampling, groundwater sampling, sample management (i.e., containers, storage, and shipment), decontamination procedures, and handling of investigation-derived wastes

Subcontractor Scope of Work: Soil boring installation via direct push drilling methods

Site/Project General Information

An asterisk (*) indicates that additional checklists or permits are required and must be completed and attached to this document.

A double asterisk (**) indicates that a Risk Review performed by a member of the Corporate Safety Committee must take place prior to beginning fieldwork on the project.

Site Type (check all applicable boxes)

☐ Active Facility	☐ Remote Facility	☒ Inactive Facility	☐ Residential
☐ Mine	☐ Railroad	☐ Industrial	☐ Secured
☒ Uncontrolled	☐ Other (specify)		

Main Site Hazards (check all applicable boxes)

☒ Slip/Trip/Fall	☒ Cold Stress	☒ Heat Stress	☒ Extreme Weather
☒ Biological	☒ Organic/Inorganic Chemicals	☒ High Noise	☒ Construction Traffic
☒ Vehicular Traffic	☐ Respirable Particles	☐ Excavations	☒ Buried/Overhead Utilities
☐ Non-Ionizing Radiation	☐ Security	☐ ASTs/USTs	☐ Manlift/Cherry Picker Use
☐ Work Over 6' High*	☒ Hand/Portable Power Tools	☐ Oxygen Deficiency	☐ Construction
☐ Blasting Agents	☐ Confined Spaces	☐ Welding or Hot Work	☐ Chemical Mixing**
☐ Lockout/Tagout	☐ Forklift Use	☐ Other (*specify*)	
☐ Scaffold Use	☐ Portable Ladders	☐ Other (*specify*)	

Chemical Products Apex will Use or Store Onsite

For each chemical product identified, an SDS must be attached to this HASP

☒ Alconox or Liquinox	☐ Calibration gas (Methane)	☐ Isopropyl Alcohol
☐ Hydrochloric acid (HCl)*	☒ Calibration gas (Isobutylene)	☐ Household bleach (NaOCl)*
☐ Nitric acid (HNO_3)*	☐ Calibration gas (Pentane)	☐ Sulfuric acid (H_2SO_4)*
☐ Sodium hydroxide (NaOH)*	☐ Calibration gas (4-gas mixture)	☐ Hexane
☐ Other (specify)	☐ Other (specify)	☒ Other (specify) Helium

***NOTE: Eyewash solution shall be readily available on ALL projects where corrosive materials are used or stored, including sample preservatives.**

Safe Work Practices

Place a checkmark by applicable SWPs and attach to this document

For hazards not covered by SWPs listed in this section, ensure the hazard is addressed in the JSA for that task. Otherwise, the JSA may reference the SWP for that hazard.

SWPs Applicable To This Project (check all applicable boxes)

☐ Hazard Communication	☒ Medical Services and First Aid	☐ Airborne Contaminants	☐ Heat Stress
☒ Cold Stress	☒ Natural Hazards	☒ Personal Protective Equipment	☐ Respiratory Protection
☐ Confined Space Entry	☒ Drum Handling	☐ Excavation	☐ Fall Protection and Prevention
☐ Forklift and Truck Operations	☒ Hand/Power Tool Use	☐ Heavy and Material Handling Equipment	☐ Ladder Safety
☐ Wet Utilities – Maintenance, Inspection, Repair	☐ **Other Task (specify)**	☐ **Other Task (specify)**	☐ **Other Task (specify)**
☐ **Other Task (specify)**	☐ **Other Task (specify)**	☐ **Other Task (specify)**	☐ **Other Task (specify)**

Levels of Protection Required for each Task

Signature of the SSO on page 1 of this document signifies certification of PPE Hazard Assessment

Task Description	Level			
	A	B	C	D
Groundwater monitoring, sub-slab vapor point installation and sampling, ambient air sampling, soil sampling, soil vapor sampling	☐	☐	☐	☒
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐

Personal Protective Equipment	Equipment	Req	Rec	NA	Equipment	Req	Rec	NA
Req=Required Rec=Recommended An asterisk (*) indicates that employees must be a participant in the respiratory program, including, annual training and fit testing.	Steel Toe Boots	☒	☐	☐	Tyvek Suit	☐	☐	☒
	Safety Glasses Shields	☒	☐	☐	Outer Disposable Boots	☐	☐	☒
	Hi Vis Vest (Specify Class 2/3)	☐	☐	☒	Indirect Vented Goggles	☐	☐	☒
	Hi Vis Shirt	☐	☒	☐	Poly-Coated Tyvek	☐	☐	☒
	Hard Hat	☐	☒	☐	Dust Mask*	☐	☐	☒
	Fire Resistant Clothing (FRC)	☐	☐	☒	Full-Face Respirator*	☐	☐	☒
	Hearing Protection	☒	☐	☐	Half-Face Respirator*	☐	☐	☒
	Work Gloves – Type: Leather	☒	☐	☐	Inner Chemical Gloves	☐	☐	☒
	Outer Chemical Gloves	☒	☐	☐	Other (specify)	☐	☐	☒
Training and Medical Surveillance	**Training**	**Req**	**Rec**	**NA**	**Medical Surveillance**	**Req**	**Rec**	**NA**
Req=Required Rec=Recommended	40 Hour HAZWOPER	☒	☐	☐	Medical Clearance (fit for duty)	☒	☐	☐
	Current 8 Hour HAZWOPER	☒	☐	☐	Respirator Clearance	☒	☐	☐
	8 Hour HAZWOPER Supervisor	☐	☐	☒	Blood Lead and ZPP	☐	☐	☒
	24Hour HAZWOPER	☐	☐	☒	Other (specify)	☐	☐	☐
	Current CPR and First Aid	☒	☐	☐	Other (specify)	☐	☐	☐
	10 Hour Construction	☐	☐	☒	Other (specify)	☐	☐	☐
	Other (specify)	☐	☐	☐	Other (specify)	☐	☐	☐
	Other (specify)	☐	☐	☐	Other (specify)	☐	☐	☐
	Other (specify)	☐	☐	☐	Other (specify)	☐	☐	☐
Safety Supplies	**Supplies**	**Req**	**Rec**	**NA**	**Supplies**	**Req**	**Rec**	**NA**
Req=Required Rec=Recommended	First Aid Kit	☒	☐	☐	Fire Extinguisher	☒	☐	☐
	Eyewash Solution	☒	☐	☐	Water/Sports Drink	☐	☒	☐
	Air Horn	☐	☒	☐	Oral Thermometer (heat monitoring)	☐	☒	☐
	Noise Meter (Dosimeter)	☐	☐	☒	Decontamination Supplies	☒	☐	☐

Work Zones **If exclusion zones are necessary because of chemical OR equipment hazards, describe the plan**	Exclusion Zone: Use cones or other high-vis markings to delineate work/sampling area so that the work is highly visible to traffic
	Contamination Reduction Zone:
	Support Zone:

Site Access/Control **How do we limit unauthorized entry to the site itself?**	Access Control Procedures: Monitoring wells are within public right-of-ways; use cones or other high-vis markings to delineate work area
DECON Procedures	Decontamination Procedures: Follow Level D PPE decontamination procedures with alconox/water rinse, tap rinse, DI rinse

Communication Plan **In the event work must be completed alone by an Apex employee or work is performed in a rural area with limited communication, this Communication Plan must be completed.**	The purpose of the communication plan is to provide a "What to Do" if the project manager/supervisor cannot contact field personnel. The field team and PM must coordinate a call in time daily. The check-in intervals will depend on the project setting and hazards. More importantly, if the field team does not check in, what is the requirement or actions of the PM.			
	Daily Check in Time	Responsible Person	Daily Check In Time	Responsible person
	5pm			
	Plan of Action (in the event of no communication): Project PM will contact field staff in the event of no communication. If no contact within 30 minutes, PM may elect to conduct site visit to determine safety of field personnel or contact client representative.			

Chemicals of Concern

In the section to the right, check any chemicals present onsite in any media (air, soil water).

In the table below, list chemicals suspected or confirmed to be onsite, and provide requested information.

- ☐ Friable Asbestos
- ☐ RCRA Metals
- ☐ Lead
- ☒ Benzene
- ☐ Trichloroethylene (TCE)
- ☐ Tetrachloroethylene (PCE)
- ☒ Other TPHg
- ☐ Other
- ☐ Other
- ☐ Vinyl chloride
- ☐ Inorganic Arsenic
- ☐ Cadmium
- ☐ Formaldehyde
- ☐ Fuel Oils
- ☐ Methylene chloride
- ☐ Other
- ☐ Other
- ☐ Other
- ☐ **No Apex exposure to these**
- ☒ Toluene
- ☒ Ethylbenzene
- ☒ Xylene
- ☐ Polyaromatic hydrocarbons (PAHs)
- ☐ Polychlorinated biphenyl (PCBs)
- ☐ Chromium (VI)
- ☐ Other
- ☐ Other
- ☐ Other

Materials Present or Suspected at Site	Highest Reported Concentration (specify units and sample medium)	Exposure Limit (specify ppm or mg/m³)	IDLH Level (specify ppm or mg/m³)	Primary Hazards of the Material (explosive, flammable, corrosive, toxic, volatile, radioactive, biohazard, oxidizer, or other)	Symptoms and Effects of Acute Exposure	Ionization Potential (eV)
TPHg	2,940 ug/L	PEL = 500 ppm REL = 350 ppm TLV = Skin Hazard ☒	1,100 ppm	Volatile	Fatigue, headache, nausea, dizziness. Exposure to high levels can lead to coma and death	
Benzene	23.8 ug/L	PEL = 1 ppm REL = 0.1 ppm TLV = Skin Hazard ☒	500 ppm	Volatile, flammable	Drowsiness, dizziness, rapid heart rate, headache, tremors, confusion, and unconsciousness. Exposure to very high levels can lead to death	
		PEL = REL = TLV = Skin Hazard ☐				
		PEL = REL = TLV = Skin Hazard ☐				

PEL = OSHA Permissible Exposure Limit
REL = NIOSH Recommended Exposure Limit
TLV = ACGIH Threshold Limit Value
IDLH = Immediately Dangerous to Life or Health

Monitoring Equipment: All monitoring equipment on site must be calibrated before and after each use and results recorded.				
Instrument (Check all required)	**Task**	**Instrument Reading**	**Action Guideline**	**Comments**
☐ Combustible gas indicator model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	0 to 10% LEL	Monitor; evacuate if confined space	
		10 to 25% LEL	Potential explosion hazard	
		>25% LEL	Explosion hazard; interrupt task; evacuate site	
☐ Oxygen meter model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	>23.5% Oxygen	Potential fire hazard; evacuate site	
		23.5 to 19.5% Oxygen	Oxygen level normal	
		<19.5% Oxygen	Oxygen deficiency; interrupt task; evacuate site	
☐ Radiation survey meter model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Normal background	Proceed	Annual exposure not to exceed 1,250 mrem per quarter Background reading must be taken in an area known to be free of radiation sources
		Two to three times background	Notify SSO	
		>Three times background	Radiological hazard; interrupt task; evacuate site	
☒ Photoionization detector model: ☐ 11.7 eV ☐ 10.6 eV ☒ 10.2 eV ☐ 9.8 eV ☐ _____ eV	☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Any response above background to 5 ppm above background	Level D is acceptable	Action levels must be determined based on the COCs and concentrations identified in the media sampled. If no COC conentrations are known, then use 5 ppm sustained within the breathing zone as your action level until the contaminants are identified.
		ppm above background	Level C (not anticipated)	
		ppm above background	Discontinue work	
☐ Flame ionization detector model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Any response above background to ppm above background	Level C is acceptable Level B is recommended	Action levels must be determined based on the COCs and concentrations identified in the media sampled. If no COC conentrations are known, then use 5 ppm sustained within the breathing zone as your action level until the contaminants are identified.
		ppm above background	Level B	
		above background	Level A	
☐ Detector tube models:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Specify:	Specify:	The action level for upgrading the level of protection is one-half of the contaminant's PEL. If the PEL is reached, evacuate the site and notify a safety specialist.
☐ Other (specify):	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Specify:	Specify:	

Emergency Response Planning	
In the pre-work briefing and Daily Tailgate Safety meetings, all onsite employees will be trained in the provisions of emergency response planning, site communication systems, and site evacuation routes. **Signal a site emergency or medical emergency with three blasts of a loud horn (car horn, fog horn, or similar device).** **To complete this section, attach a hospital route map to the HASP.**	**All work-related incidents must be reported. For all medical emergencies, call 911 or the local emergency number. For non-emergency incidents, you must:** • Give appropriate first aid care to the injured or ill individual and secure the scene. • Immediately call **WorkCare at (888) 449-7787** (available 24 hours/7 days per week) if the injured person is an Apex employee. • Notify the Project Manager and/or SSO after calling WorkCare. • Enter the safety incident into the Apex Incident Report and submit to incidents@apexcos.com within 24 hours. **In the event of an emergency that necessitates evacuation of the work task area or the site as a whole, the following procedures shall occur:** • The Apex site supervisor or Project Manager will contact all nearby personnel using the onsite communications system to advise of the emergency. • Personnel will proceed along site roads to a safe distance upwind from the hazard source to a pre-determined assembly area. • Call 911 • Personnel will remain in that area until the site supervisor or Project Manager or other authorized individual provides further instruction. **In the event of a severe spill or leak, site personnel will follow the procedures listed below:** • **STOP WORK** • Evacuate the affected area and relocate personnel to an upwind, pre-determined assembly area. • Inform the Apex site supervisor or Project Manager, an Apex office, and a site representative immediately. • Locate the source of the spill or leak, and stop the source if it is safe to do so until appropriately trained personnel are onsite to do so. Begin containment and recovery of spilled or leaked materials. • Notify appropriate local, state, and federal agencies after obtaining client consent to do so. **In the event of severe weather, site personnel will follow the procedures listed below:** • Site work shall not be conducted during severe weather, including high winds and lightning. • In the event of severe weather, stop work, lower any equipment (drill rigs), and evacuate the affected area. • Monitor internet or other sources for sever weather alerts before resuming work. • In the event of lightning, outdoor work must be halted for a minimum of **30 minutes** from the last lightening observation.

Emergency Contacts	Name	Location	Phone	Cell Phone
Hospital (attach map)	Willamette Valley Medical Center	2700 SE Stratus Ave, McMinnville, OR	503-472-6131	
Police			911	
Fire			911	
Project Manager	Michael Stevens	3015 SW First Ave, Portland, OR	503-924-4704 x 1919	503-312-2674
Field Manager (if not PM)				
Site Safety Officer (if not PM)	Heather Gosack	3015 SW First Ave, Portland, OR	503-924-4704 x 1913	503-961-0775
Division H&S Contact	Heather Gosack	3015 SW First Ave, Portland, OR	503-924-4704 x 1913	503-961-0775
Corporate H&S Contact	Keith Green	Rockville, MD	301-417-0200	571-217-3617
Incident Intervention	WorkCare	NA	888-449-7787	
Subcontractor Safety Contact				
Subcontractor Safety Contact				

Acknowledgement	***I have read, understood, and agree with the information set forth in this Health & Safety Plan, and will follow guidance in the plan and in the Apex Corporate Health and Safety Manual. I understand the training and medical monitoring requirements for conducting activities covered by this HASP and have met these requirements.*** ***Apex has prepared this plan solely for the purpose of protecting the health and safety of Apex employees. Subcontractors, visitors, and others at the site are required to follow provisions in this document at a minimum, but must refer to their organization's health and safety program for their protection.***		
Printed Name	Signature	Organization	Date

Approval Signatures

Signatures in this section indicate the signing employee will comply with and enforce this HASP, as well as procedures and guidelines established in the Apex Corporate H&S Manual. Signatures in this section also indicate that any subcontractors performing work under contract to Apex agree to comply with this HASP.

APEX

Vapor Pin Installation; Groundwater Sampling; Soil Sampling; Soil Vapor Sampling, Ambient Air Sampling
Job Safety Analysis (JSA)

Project Number:	**2442-00**	Project/Client Name:	**Oregon Lithoprint**
Project Manager:	**Heather Gosack**	Project Location:	**McMinnville, OR**

Specific Task:	**Vapor Pin Installation; Groundwater Sampling; Soil Sampling; Soil Vapor Sampling; Ambient Air Sampling**
Minimum Required PPE for Task:	☑ Hard Hat ☐ Hearing Protection ☐ Hi-Vis Shirt ☐ Coverall ☐ Face Shield ☐ Other (specify): ☑ Safety Toed Boots ☐ Long ☐ Fire Resistant ☑ Hi-Vis Vests Class 2 ☐ Hi-Vis Vests Class 3 ☑ Gloves Nitrile ☐ Respirator

Additional Task-Step Specific PPE: (as indicated below under controls)	**N/A**	**Equipment/Tools Required:**	**Vehicle, hand tools (wrenches, tubing cutter), peristaltic pump, interface probe, decontamination equipment, drill, saw.**
Training Required for this Task:	**HAZWOPER 40**	**Permits Required for this Task: (e.g. confined space, LOTO)**	**Ground Disturbance Permit - Apex**
Forms Associated with this Task:	**Well Gauging and Sampling Form, Daily Tailgate Form, Field Sheets.**		

JSA Developed/Reviewed By:			**Date and Revision Number:**	07/24/19 Rev 1
Employee Name/Job Title	Employee Name/Job Title	Employee Name/Job Title	H&S Team Leader to ensure all personnel performing this task have reviewed JSA and agree to follow it. Site specific changes to this JSA have been made as warranted based on this review. H&S Team Leader Signature/Date:	
Heather Gosack / Associate Geologist				

Task Steps	Potential Hazards and Consequences	Likelihood	Severity	Risk	Controls to Eliminated/Reduce Risks
1. Travelling to/from the Site	a. Traffic accident - Injury	3	3	**9**	Follow posted speed limits and traffic signs. Stay alert to to other vehicles, cyclists, pedestrians and be a defensive driver by maintaining a safe distance with other vehicles on the road.
	b. Improperly secured load - Accident or injury	2	3	**6**	Maintain good housekeeping to securely load vehicles and ensure that loose or light items that may shift during travel are secured. Use ratcheting straps, covers, etc to secure loads.
2. Loading and Unloading Equipment	a. Moving equipment - back or muscle strain	2	3	**6**	Ensure proper lifing techniques. Do not attempt to bodily move large equipment. Use the buddy lift to move heavy objects.
	b. Slip/trips/falls - Injury	2	3	**6**	Maintain good housekeeping. Inspect the area of tripping hazards. Sturdy work boot required
3. Calibration of equipment	a. Skin or eye contact with calibration chemicals	2	2	**4**	Wear disposable gloves and safety glasses, avoid direct contact with calibration solutions. Properly dispose of calibration solution waste.

APEX

Vapor Pin Installation; Groundwater Sampling; Soil Sampling; Soil Vapor Sampling, Ambient Air Sampling **Job Safety Analysis (JSA)**					
Project Number:	**2442-00**	Project/Client Name:	**Oregon Lithoprint**		
Project Manager:	**Heather Gosack**	Project Location:	**McMinnville, OR**		
Specific Task:	**Vapor Pin Installation; Groundwater Sampling; Soil Sampling; Soil Vapor Sampling; Ambient Air Sampling**				
4. Setup and installation of low-flow pump	a. Potential hand injuries during pump setup.	2	2	**4**	Wear gloves when preparing pump and equipment for sampling
	b. Traffic consideration - Injury	2	3	**6**	Some wells are located in public right-of-ways along a roadway. Maintain a well delineated work area using cones, field vehicle, or other barricades to avoid hazards from vehicular traffic.
	c. Slip/trips/falls - Injury	2	3	**6**	Maintain good housekeeping. Inspect the area of tripping hazards. Sturdy work boot required. Maintain 3-points of contact when using stairways.
	e. Lifting or moving equipment - Injury	2	3	**6**	Ensure proper lifing techniques. Do not attempt to bodily move large equipment. Use the buddy lift to move heavy objects. Make multiple trips when carrying equipment to wells.
5. Sample Collection	a. Contact with potentially contaminated groundwater - Exposure	2	2	**4**	Wear disposable goves and safety glasses when collecting samples to minimize contact with groundwater.
	b. Contact with acids from sample preservation.	2	2	**4**	Wear disposable gloves and safety glasses or goggles when handling acids. Quantites handled are generally very small, so large spills are unlikely. In the event of contact with acid, wash area thoroughly with fresh water.
	c. Slip/trips/falls - Injury	2	3	**6**	Maintain good housekeeping. Inspect the area of tripping hazards. Sturdy work boot required. Maintain 3-points of contact when using stairways.
	d. Sample mangement - Injury from damaged glassware	2	2	**4**	Inspect bottles before use. Wear gloves and use care when handling glass sampling containers to avoid hand lacerations.
	e. Moving equipment or full sample coolers - Back or muscle injury.	2	3	**6**	Ensure proper lifing techniques. Do not attempt to bodily move large equipment. Use the buddy lift to move heavy coolers.
	f. Cutting or Disconnecting sample tubing - Hand injury	2	3	**6**	Wear leather gloves (or similar) when using cutting tools to cut and/or disconnect tubing.

APEX

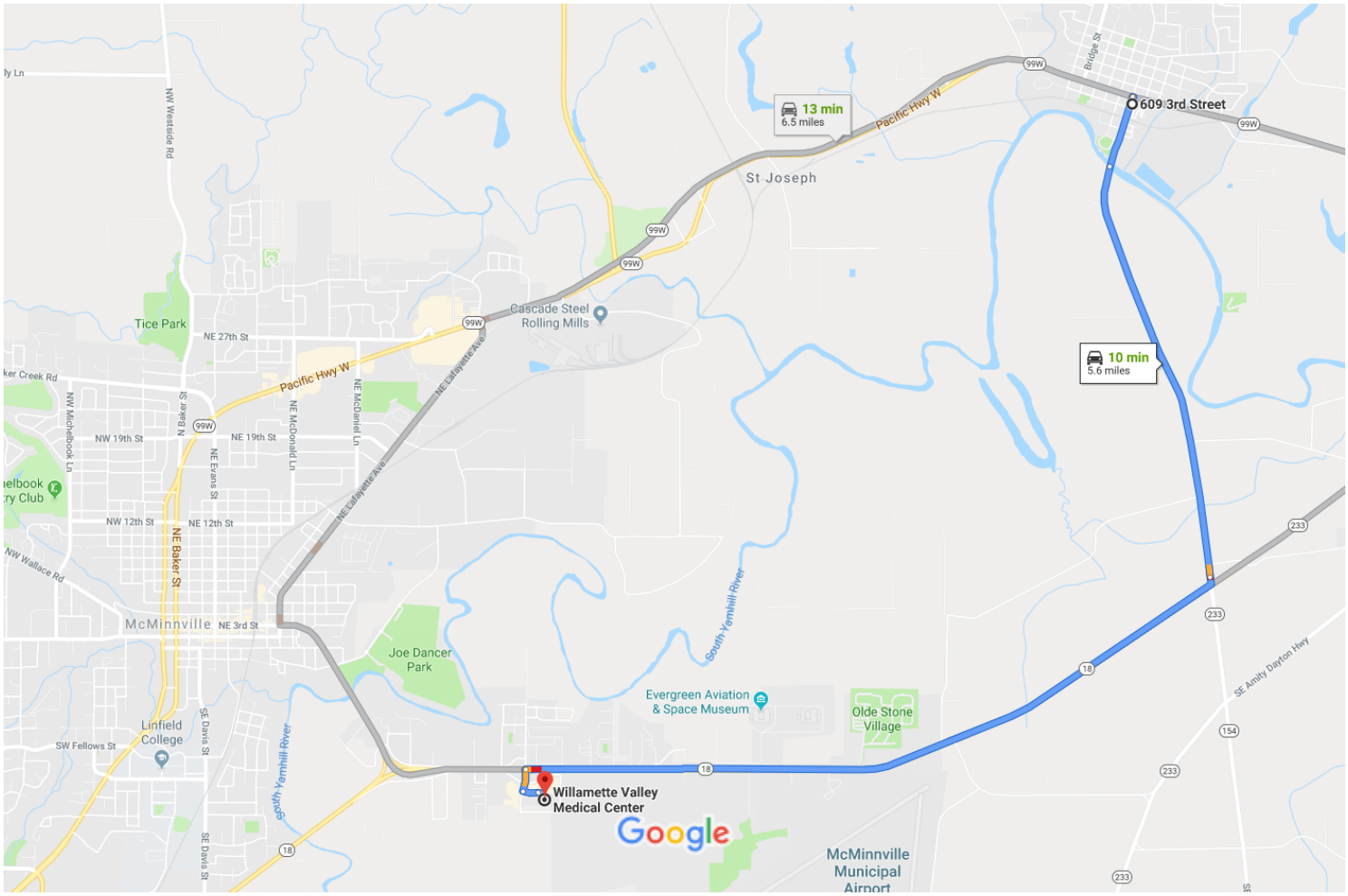
Vapor Pin Installation; Groundwater Sampling; Soil Sampling; Soil Vapor Sampling, Ambient Air Sampling **Job Safety Analysis (JSA)**					
Project Number:	**2442-00**	Project/Client Name:	**Oregon Lithoprint**		
Project Manager:	**Heather Gosack**	Project Location:	**McMinnville, OR**		
Specific Task:	**Vapor Pin Installation; Groundwater Sampling; Soil Sampling; Soil Vapor Sampling; Ambient Air Sampling**				
6. Management of Investigation Derived Waste	a. Slip/trips/falls - Injury	2	3	**6**	Maintain good housekeeping. Inspect the area of tripping hazards. Sturdy work boot required. Maintain 3-points of contact when using stairways.
	b. Potential hand injuries while opening/closing accumulation drum	2	3	**6**	Wear leather (or similar) work gloves and hand tools when opening and closing the lids to accumulatino storage drums to avoid pinching hand in the ring or cutting hand on the drum or lid..
	c. Spill - Environmental impact	2	2	**4**	Have absorbant pads and/or rags available in the event of a spill. Wear gloves when handling pads or potentially contaminated material.
7. Site wide Activities	a. Slip/trips/falls - Injury	2	3	**6**	Maintain good housekeeping. Inspect the area of tripping hazards. Sturdy work boot required. Maintain 3-points of contact when using stairways.
	b. Traffic considerations - Injury	2	3	**6**	Some wells are located in active traffic areas of an active gas station. Maintain a well delineated work area using cones, field vehicle, or other barricades to avoid hazards from vehicular traffic.
8. Site Setup and Mobilization	8a. Striking underground lines or objects with drill.	3	2	**6**	The one-call notification system should be called 2 days before commencing any drilling activities. Observe surrounding before starting to drill. Private Locate onsite before drilling to begin.
	8b. Vehicle traffic - striking/hitting workers	3	3	**9**	Setup traffic safety perimeter with traffic cones to delineate work area - use caution tape if available. Keep a watchful eye on traffic when moving outside of delineated work area. Wear high visiblity PPE.
9. Drilling Activities	9a. Physical injury from use of hand auger	3	3	**9**	Use proper procedures when hand augering. Inspect hand auger before use for any signs of damage. Use leather gloves and take breaks

APEX

Vapor Pin Installation; Groundwater Sampling; Soil Sampling; Soil Vapor Sampling, Ambient Air Sampling **Job Safety Analysis (JSA)**					
Project Number:	**2442-00**	Project/Client Name:	**Oregon Lithoprint**		
Project Manager:	**Heather Gosack**	Project Location:	**McMinnville, OR**		
Specific Task:	**Vapor Pin Installation; Groundwater Sampling; Soil Sampling; Soil Vapor Sampling; Ambient Air Sampling**				
	9b. Exposure to contaminated media	3	2	**6**	Monitor the air space of each drill location before, during, and after drilling with a photoionization detector for VOCs and follow the site-specific Health and Safety Plan
10. Installation of vapor pins	10a. Physical injury from use of rotohammer	3	3	**9**	Use proper procedures when using the drill. Inspect drill before use for any signs of malfunction or damage. Use leather gloves.
	10b. Striking underground lines or objects with drill.	3	3	**9**	Observe potential utility paths inside the buildings prior to drilling. Have a private contractor conduct a utility markout.
	10c. Tripping over equipment as it is taken apart and laying on ground before being loaded.	3	2	**6**	All personnel should be constantly watching for trip hazards such as uneven terrain, holes, ditches, stretched wires or ropes, or any other materials or pieces of equipment in their path
	10d. Hurting back trying to lift heavy objects.	3	3	**9**	Use proper lifting techniques to avoid back strain. Get help if the object is too heavy by yourself.

609 3rd St, Lafayette, OR 97127 to Willamette Valley Medical Center

Drive 5.6 miles, 10 min



609 3rd St

Lafayette, OR 97127

1. Head west on 3rd St/Pacific Hwy W toward N Madison St

23 ft

2. Turn left at the 1st cross street onto Madison St

0.3 mi

3. Continue onto SE Lafayette Hwy

1.9 mi

4. Turn right onto OR-18 W

3.2 mi

5. Turn left onto SE Norton Ln

0.1 mi

6. Turn left

361 ft

7. Continue straight

Destination will be on the right

95 ft

Willamette Valley Medical Center

2700 SE Stratus Ave, McMinnville, OR 97128

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.