Sampling and Analysis Plan

1400 – 1408 Bethel Street NE
Olympia, Washington

Prepared for:

City of Olympia
PO Box 1967
Olympia, Washington 98507

Prepared using the City of Olympia's United Stated Brownfield Assessment Grant Funds, Cooperative Agreement # BF01J66201

Prepared by:

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Sampling and Analysis Plan Approval

The Sampling and Analysis Plan for 1400 – 1408 Bethel Street NE has been approved by the following Project Team members:

Name and Role	Signature and Date
Susan Morales USEPA Project Manager	
Donald M. Brown USEPA Brownfields QA Reviewer	
Mike Reid City of Olympia Grantee Project Manager	Mike Reid 5/14/2021
Joel Hecker, LG PIONEER Project Manager	Jel W. Hecker 5/13/2021
Angela Noyan PIONEER QA Manager	For Angela Noyan 5/14/2021

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List of Acronyms

Acronym	Explanation
AEG	Associated Environmental Group LLC
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
City	City of Olympia
EAG	Ecology Assessment Group LLC
Ecology	Washington Department of Ecology
EPH	Extractable Petroleum Hydrocarbons
ESA	Environmental Site Assessment
mg/kg	Milligrams per Kilogram
MTCA	Model Toxics Control Act
NAPL	Non-Aqueous Phase Liquid
NTU	Nephelometric Turbidity Units
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
PIONEER	PIONEER Technologies Corporation
Property	1400-1408 Bethel Drive NE, Olympia, Washington
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan
QC	Quality Control
RL	Target Reporting Limit
SAP	Sampling and Analysis Plan
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbon
TPH-G	TPH in the gasoline range
TPH-D	TPH in the diesel range
TPH-HO	TPH in the heavy oil range
USEPA	United States Environmental Protection Agency
ug/L	Micrograms per Liter
UST	Underground Storage Tank
VOC	Volatile Organic Compound
VPH	Volatile Petroleum Hydrocarbons
WAC	Washington Administrative Code

SECTION 1: INTRODUCTION

PIONEER Technologies Corporation's (PIONEER's) project team prepared this Sampling and Analysis Plan (SAP) as a requirement of the United States Environmental Protection Agency (USEPA) brownfields grant program prior to using assessment grant funds for environmental assessment. The City of Olympia (City) intends to use its hazardous substances and petroleum assessment grant (BF01J66201) funds to conduct an environmental site assessment (ESA) of the property located at 1400 and 1408 Bethel Street NE, in Olympia, Thurston County, Washington (the Property). The general location of the Property is shown on Figure 1. The Property was determined to be eligible for the use of grant funds by the Washington Department of Ecology (Ecology) on May 10, 2021 and by the USEPA on May 12, 2021. The Quality Assurance Project Plan (QAPP) was submitted to USEPA and was approved on March 16, 2020, with subsequent addendums.

The objective of the proposed ESA is to evaluate the Property's current environmental conditions for the purpose of supporting environmental due diligence and liability management for a future prospective purchase and subsequent redevelopment of the Property. Descriptions of the Property history and current environmental conditions, strategies and procedures for soil and groundwater sampling, chemical analyses of collected soil and groundwater samples, data evaluation and reporting, and the estimated project schedule are presented in the following sections.

SECTION 2: BACKGROUND INFORMATION

Summaries of the Property history, current Property conditions, and a summary of environmental concerns identified during a review of the Property's history are presented in the following subsections. The planned subsurface assessment to further evaluate the environmental concerns is also summarized in this section.

2.1 Property History

The northern parcel of the Property (1408 Bethel Street NE) was developed with a convenience store identified as Briggs Grocery (1958 - mid-1970s), Don's E-Z Stop (mid-1970s - 2018), and Convenience Corner (2018 – current).

The southern parcel of the Property (1400 Bethel Street NE) was developed with a grocery store prior to 1934 (White Newton Grocery). By 1946, a service station (Horner's Service and Grocery) was in operation. The service station changed ownership multiple times and was identified as Bob's Richfield Service Station (1958), Jim's Signal Service Station (1963), Steve's Enco Service Station (1968), and Humphrey's Exxon Service Station (1973).[1] By 1978, the southern parcel was identified as Henderson's Twenty-Four Hour Towing & Repair and by 1987, the service station and auto building was vacant. Six underground storage tanks (USTs) were present to the southwest of the building at that time (see Figure 1) and at least one hoist was present within the building based on Thurston County Auditor records. Additionally, according to the Thurston County Auditor, the existing service station building and associated canopy was constructed in 1957.

Prior to their first identified use, both parcels were likely used for residential and/or agricultural use based on surrounding land uses.

2.2 Previous Environmental Investigations

In 1990, Ecology Assessment Group LLC (EAG) removed the six USTs associated with the former service station (see Figure 1). The USTs included four gasoline USTs, one fuel oil UST, and one waste oil UST (that historically contained gasoline). EAG collected composite soil samples from directly beneath each UST at the time of removal (see Table 1).[2] Soil samples were analyzed for total petroleum hydrocarbons (TPH) and a subset of volatile organic compounds (VOCs) consisting of benzene, toluene, ethylbenzene, and xylenes (BTEX). EAG reported that the 'heaviest' contamination was reported under UST 1 and that UST 3 was corroded and had a hole in the bottom (see Figure 2). Visual indications of contamination were only reported in the fill areas (likely associated with overflows) and the bottom of UST 1. As a result of the TPH contamination, additional excavation occurred. Samples were taken during over-excavation work, but sample locations and specific analytical data are unavailable. Reportedly, the soil

[1] City directories are presented in five year intervals, so specific ownership between the dates mentioned is unknown.

[2] The samples collected from directly beneath the USTs (and shown on Table 1) were later over-excavated and are no longer in place.

beneath UST 1 was excavated to 17.5 feet below ground surface (bgs) and the TPH concentration at the excavation floor was 330 milligrams per kilogram (mg/kg). The soil beneath UST 4 was excavated to 19.5 feet bgs and the TPH concentration at the excavation floor was 173 mg/kg. The soil beneath the fuel oil UST (UST 6) was also excavated and a soil sample was collected from the excavation floor; the TPH concentration from the floor of the fuel oil UST excavation was 2.0 mg/kg. In total, approximately 163 cubic yards of contaminated soil were removed from the UST excavations and stockpiled on-site. Clean overburden material was stockpiled separately. EAG reported that constraints such as low-hanging electric lines, sidewalks, nearby streets, and the type of excavator limited the excavation from extending further vertically or laterally (EAG 1990 and 1991a).

Dewatering was required to advance the excavation deeper than 15 feet bgs. Approximately 5,000 gallons of water was pumped out of the excavation and disposed of off-site. Two groundwater samples were collected from the open excavation and analyzed for BTEX. Elevated concentrations of benzene (79 micrograms per liter [ug/L]), toluene (1,200 ug/L), ethylbenzene (2,100 ug/L), and xylenes (5,100 ug/L) were reported in the first sample. The second sample collected one week later still contained elevated, but lower, concentrations of BTEX: benzene (10 ug/L, toluene (320 ug/L), ethylbenzene (less than 1.0 ug/L), and xylenes (4,500 ug/L) (EAG 1991a).

EAG remediated the contaminated soil stockpile using vapor extraction methodologies and heat (i.e. blowing heated air through pipes within the stockpile). Analytical data was unavailable, but multiple samples were reportedly collected from the stockpile after treatment. The portions of the stockpile containing the highest TPH concentrations pre-remediation reportedly contained less than 1.0 mg/kg of TPH post-remediation. Clean gravel was placed in the open excavation from the floor until above the groundwater level (14 feet bgs), followed by clean stockpiled overburden material. The remediated soil was used to fill the excavation to grade. It is unclear if any soil was hauled off-site for disposal. After compaction, the excavation was paved with asphalt (EAG 1991b).

In 2012, Associated Environmental Group, LLC (AEG) completed a limited Phase II ESA of the former service station parcel. AEG advanced four soil borings and collected soil samples around the former dispenser island and service station building (see Figure 2). AEG did not encounter groundwater to the maximum explored depth of their borings (17 feet bgs). Each soil sample was analyzed for VOCs and TPH in the gasoline range (TPH-G). AEG documented elevated photoionization detector (PID) readings and strong petroleum odors from four to 15 feet bgs at location B-1, southeast of the former UST locations (see Figure 2). TPH-G was detected in soil at B-1 at concentrations exceeding Model Toxics Control Act (MTCA) Method A/B screening levels for unrestricted land use (see Table 1). VOCs were also detected in soil at B-1 but did not exceed MTCA Method A/B screening levels. Boring locations B-2 and B-3 were located on the southern and northern ends of the former dispenser island, respectively, and location B-4 was located directly north of the service station building. Soil samples collected from B-2, B-3, and B-4 did not exceed MTCA Method A/B screening levels (see Table 1); no elevated PID readings were recorded from these boring either (AEG 2012).

Ecology completed a Site Hazard Assessment in 2013. Ecology reported that previous investigations have confirmed the presence of TPH in subsurface soil at the Property and that although groundwater impacts have not been confirmed, the extent of contamination has not been fully delineated (Ecology 2013).

2.3 Current Conditions

As of the date of publication of this SAP, the Property consisted of a convenience store, a vacant former service station building, paved parking areas, and grass-covered land. The Property was located in a mixed-use commercial and residential area northeast of downtown Olympia. The current Property features are shown on Figure 1.

2.4 Environmental Conditions

The following environmental concerns associated with the Property were identified during a review of the Property history:

- The remaining soil and groundwater contamination associated with the former USTs.
- The potential for additional undiscovered and/or unreported contamination associated with former USTs.
- The potential for additional undiscovered and/or unreported contamination associated with former hoist(s) in the service station building.
- The lack of analytical data from the remediated soil.

2.5 Future Use of the Property

The anticipated future use of the Property will be used for mixed commercial and residential use.

2.6 Geologic Setting

The subsurface of the Property consists of alternating layers of silt and fine to coarse sand and gravel to depths of at least 17 feet bgs (AEG 2012). Groundwater has been observed at depths of approximately 14 feet bgs (EAG 1991a). However, during AEG's 2012 Phase II ESA, they did not encounter groundwater in the uppermost 17 feet of soil (AEG 2012).

The subsurface materials are consistent with the characteristics of glacial till. It is likely that groundwater slowly percolates through the till and although the AEG soil borings appeared dry at the time of drilling, with time, groundwater would have filled the open pore space. At this time, the direction of groundwater flow is unknown.

2.7 Susceptible Areas

According to the United States Fish and Wildlife National Wetland Inventory maps, the Property is not located in a wetland or flood designated area. According to the Ecology well search database, the closest water supply well is located on Lindell Road NE, approximately 6,000 feet to the east of the Property. Mission Creek Nature Park is located approximately 900 feet to the east of the Property. The closest school, Roosevelt Elementary School, is located on the south-adjoining site.

2.8 Conceptual Site Model

A simplified conceptual site model showing the possible pathways from sources through media and exposure scenarios to potential receptors is shown below.

Source of Concern	Primary Pathway	Secondary Pathway	Primary Receptors	Secondary Receptors	Primary Samples	Secondary Samples
Historic On-Site Operations	Direct Contact with Soil	Direct Contact with Groundwater	Future Occupants	Construction and Maintenance Workers	Soil Samples	Groundwater Samples

Note that no water supply wells are located within one mile of the Property and that the known contaminated portions of the Property are currently paved with asphalt or covered by concrete building pads. No occupants are currently present on the southern service station parcel.

2.9 Planned Site Assessment

The assessment activities described in this SAP are designed to evaluate the environmental conditions of the Property to support the following:

- Evaluate if contamination associated with the identified environmental concerns remains on the Property.
- If contamination is present, evaluate whether current environmental conditions warrant further investigation and/or remediation.

These Property assessment goals will be achieved through the following:

- Conducting limited subsurface activities to assess potential environmental impacts from historical use of the Property, as identified during the review of the Property history.
- If contamination is discovered, determine if regulated constituents are present at concentrations greater than MTCA Method A/B screening levels for unrestricted land use.
- Generate sufficient data to determine if the future residential use could require remediation of soil and groundwater to meet risk-based and regulatory goals.

This Phase II ESA can include spatial and temporal boundaries. The spatial limit for this investigation consists of the Property boundary and surrounding right-of-ways. Temporal limits are the seasons covered by the investigation and can account for variations based on seasonal weather changes. For the objectives of this Phase II ESA, temporal variation will not be assessed.

SECTION 3: SAMPLING PLAN

The sampling plan for the assessment activities is presented in this section. The sampling plan includes the following: 1) a summary of the planned soil and groundwater sampling locations, 2) rationales for those locations, and 3) descriptions of procedures and methods for field sampling. A summary of the soil and groundwater samples to be collected for this assessment is presented in Table 2 while sampling locations are shown on Figure 2. The work is planned in two phases, with the first phase advancing soil borings with temporary monitoring well screens in the potential source areas and the second phase installing permanent monitoring wells around the perimeter of the Property. Monitoring wells will be installed based on the results of the first phase of the project and locations may vary slightly from those shown on Figure 2.

3.1 Summary of Sampling Locations

During the first phase of the investigation, PIONEER will advance 8 soil borings, including 5 with temporary monitoring wells, and will collect soil and groundwater samples at the locations shown on Figure 2. During the second phase of the investigation, PIONEER will install up to seven monitoring wells and will collect soil and groundwater samples at the locations shown on Figure 2. The locations and number of sampling locations may change based on field conditions and the results of the first phase of the investigation. Soil samples will be collected from each boring for visual classification, field screening, and potential laboratory analyses. PIONEER selected the sample locations to evaluate the environmental concerns associated with the Property and potential due care concerns related to the current and future planned uses of the Property. Specific sampling objectives and their respective sampling locations are discussed in the following paragraphs.

Soil borings SB-101 through SB-105 will be advanced in and around the previously excavated area to characterize remediated backfill and soil beyond the vertical and horizontal extents of the excavation (see Figure 2). Each of the five borings will be advanced to a depth of 25 feet bgs. SB-103 through SB-105 will be converted to temporary monitoring wells. The temporary monitoring wells will assess potential groundwater impact from historical UST releases. Soil boring SB-105 will also further characterize and confirm the impacts identified by AEG in 2012 at their soil boring B-1 (see Figure 2).

Soil borings SB-106 and SB-107 will be advanced in the former service station building to characterize subsurface soil (see Figure 2). Each of the two borings will be advanced to a depth of 20 feet bgs or 5 feet below the first encountered groundwater, whichever is shallower. SB-106 will be converted to temporary monitoring well to assess potential groundwater impact from historical service station operations.

Soil boring SB-108 will be advanced adjacent to the former fuel oil UST to characterize subsurface soil (see Figure 2). The boring will be advanced to a depth of 25 feet bgs or 5 feet below the first encountered groundwater, whichever is shallower, and will be converted to temporary monitoring well to assess potential groundwater impact from the former USTs and/or historical auto repair operations.

Soil borings MW-1 through MW-7 will be installed along the perimeter of the southern parcel to assess potential migration of groundwater impact from historical on-site releases. Groundwater flow direction on the Property is unknown at this time. Each of the seven borings will be advanced to a depth of 25 feet or six to eight feet beyond the depth of first groundwater encountered, whichever is shallower, and will be converted to permanent monitoring wells. Soil samples will only be retained from the soil borings if field evidence of contamination is present.

3.2 Premobilization Coordination

Prior to beginning field work, the following will occur:

- Subcontracting with drillers and laboratories
- Completing required Health and Safety procedures for PIONEER and subcontractors
- Completing Public Utility Locate (i.e., 811)
- Obtain access agreement with Property owner
- Obtain sampling equipment and supplies

3.3 Sampling Procedures and Methods

Soil and groundwater sampling, quality control (QC) sampling, and waste management procedures and methods are summarized in this subsection. Sampling activities will be conducted in accordance with the QAPP and QAPP Addendums for the City, approved by USEPA, with subsequent updates as necessary (PIONEER 2020 and 2021).

3.3.1 Soil and Temporary Monitoring Well Sampling

PIONEER’s field representative will collect soil and groundwater samples during sampling activities according to the methods described in SOP 1, Soil and Groundwater Sampling Using Direct-Push Methods, included in the QAPP. Details of sampling activities are described as follows:

- PIONEER's field representative will collect continuous soil samples from each boring, visually characterize them in the field, and note physical indicators of environmental contamination.
- PIONEER's field representative will field-screen the soil samples using a portable PID to identify the potential presence of VOCs.
- PIONEER's field representative will collect soil samples for chemical analyses in accordance with the sampling design presented in Table 2.
- PIONEER's field representative will use the following criteria to determine soil sample intervals for chemical analyses in soil borings. Where the PID results identify the potential presence of VOCs in a given boring, the interval with the highest reading will be selected for analyses. When there are no detectable PID results in a given boring, the following procedure and criteria will be used to determine the sample interval, in order of presentation:
    - If an interval has a specific odor that other intervals do not have, that interval will be selected for analysis.
    - If an interval has discoloration that does not appear to be the color of native soil, while other intervals appear to be the color of native soil, that interval will be selected for analysis.

    - In the absence of all indicators listed above within a given boring, the depths listed in Table 2 will be selected for analysis.
- For borings along the perimeter of the southern parcel (MW-1 through MW-7), PIONEER's field representative will only collect a soil sample for analysis if field evidence of contamination is observed.
- PIONEER's field representative will install and sample temporary, one-inch diameter, polyvinyl chloride (PVC) well assemblies fitted with five-foot long, pre-packed well screens in the open boreholes of SB-103 through SB-106 and SB-108 after soil samples are collected.
- PIONEER's field representative will collect the groundwater samples for chemical analyses from the temporary wells using a peristaltic pump at low-flow sampling rates, or a bailer. The sampling procedures will be consistent with those outlined in the QAPP.

The sample containers will be logged on the chain of custody, packaged for transportation, and transported to the laboratory for analysis.

3.3.2 Permanent Monitoring Well Installation and Development

A licensed Washington driller will install MW-1 through MW-7 in accordance with Washington Administrative Code (WAC) 173-160 Part II using a direct-push, hollow-stem auger, or similar drill rig. The borings will be advanced approximately six to eight feet below where groundwater is first encountered, with a maximum expected depth of 25 feet bgs. The monitoring wells will consist of thread-coupled, flush-joint, two-inch diameter PVC casing, five to 10 feet of 10-slot PVC screen, and a sand filter pack extending at least one-foot above the top of the screen. The screens will be placed at or near the bottom of the borehole so the screened interval straddles the depth at which groundwater in that groundwater-bearing unit was encountered, while taking into account potential seasonal fluctuations. Each monitoring well will be sealed in accordance with WAC 173-160-450. In general, this sealing entails installing a bentonite plug above the top of the filter pack, filling the borehole annulus from the bentonite plug to near the land surface with bentonite or cement, and then installing a concrete surface seal. Flush-mount surface completions are planned. PIONEER field personnel will log borehole lithology and record monitoring well construction details.

Each monitoring well will be developed. Development will be conducted by over-pumping the monitoring well with a surge block and check valve (i.e., foot pump) or submersible pump until the turbidity in the development water is less than 10 nephelometric turbidity units (NTU). If it is clearly not practical to continue development to reach the 10 NTU goal, then a development goal of 50 NTU will be used instead. A calibrated field turbidity meter will be used to measure the turbidity. If the monitoring wells purge dry during development due to low hydraulic conductivity rates, each monitoring well be purged dry a minimum of five times.

3.3.3 Surveying

A licensed surveyor will determine the vertical and horizontal location of the reference point (notch or mark, or north side of the top of PVC casing if no notch or mark) for all seven monitoring wells. The vertical elevation will be surveyed to an accuracy of 0.01-foot with the North American Vertical Datum of 1988. The horizontal accuracy will be approximately one foot.

3.3.4 Groundwater Sampling

Prior to sampling the monitoring wells, PIONEER will measure the static water level and any measurable thickness of non-aqueous phase liquid (NAPL) in all on-site monitoring wells (i.e., MW-1 through MW-7) using an electronic interface probe. The depth-to-water and any NAPL thickness will be recorded to the nearest 0.01 foot from a consistent reference point (e.g., mark on the top of the monitoring well casing). The following low-flow purging standard operating procedures will be used to purge water from each monitoring well prior to sampling. A peristaltic pump, equipped with dedicated polyethylene tubing, will be used to purge water from the monitoring wells. The tubing intake will be positioned approximately two feet below the top of the monitoring well screen or two feet below the water level, whichever is lower. However, depending on the amount of drawdown during purging, the pump intake may need to be adjusted to a deeper interval. A variable-frequency drive controller on the pump will be used to limit the purging flow rate to less than one liter per minute. During purging, relative water levels will be monitored with an interface probe or electronic water level indicator, and water quality parameters (i.e., pH, specific conductivity, turbidity, dissolved oxygen, temperature, and oxidation/reduction potential) will be measured with a calibrated water quality meter to verify stabilization. In the event that water quality parameters do not stabilize, purging will be considered complete after 30 minutes of continuous purging. Groundwater samples will be collected immediately following purging without turning off the pumping system. If a monitoring well is pumped dry before the sample can be collected, a groundwater sample will be collected as soon as groundwater in the monitoring well recharges.

3.3.5 Quality Assurance and Quality Control

PIONEER's field representative will minimize the potential for cross-contamination by using new, disposable, nitrile sampling gloves for collection of each sample; using new polyethylene and/or silicone sample tubing for collection of each groundwater sample; using new terracore or T-handle samplers for the collection of each soil sample (if soil samples are collected); and calibrating field instruments in accordance with manufacturer’s instructions.

PIONEER's field representative will collect field QC samples as described in SOP 6, Field Quality Control Samples, included in the project QAPP and as summarized in Table 2. The sample handling and custody requirements, laboratory analytical methods, target reporting limits (RLs), and reporting protocols will be consistent with those outlined in the project QAPP.

3.3.6 Waste Management

PIONEER will manage investigation derived wastes as described in SOP 12, Investigative Derived Wastes, included in the project QAPP. The following types of investigation-derived waste will be generated during sampling activities and will be handled as follows:

- Cuttings from soil borings and monitoring wells will be placed in sealed and labeled drums.
- Development water, purge water, and decontamination water will be placed in sealed and labeled drums.
- Personal protective equipment (e.g., nitrile gloves) and other disposable sampling equipment will be disposed of as solid waste in the standard municipal solid waste stream.

All drummed investigation-derived waste will be characterized and then removed by a licensed waste transporter for off-Site treatment and/or disposal at a facility permitted to accept the waste.

SECTION 4: ANALYSIS PLAN

The target constituents for the soil and groundwater samples were selected based on the project goals, previously detected constituents, and the historical use of the Property. The specific constituents for each sampling location are presented in Table 2. The target constituents for the assessment will include VOCs, TPH-G, TPH in the diesel range (TPH-D), TPH in the heavy oil range (TPH-HO), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), lead, and total organic carbon (TOC). Samples may also be analyzed for volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH). Laboratory analyses and field screening will be performed as described in the project QAPP. Samples will be submitted to Libby Environmental in Olympia, Washington for shipment to a subcontracted laboratory, per the QAPP, or analyzed using the following referenced methods:

- VOCs - USEPA Method 8260B
- TPH-G, TPH-D, and TPH-HO - Ecology Method NWTPH-Gx and Dx
- PAHs - USEPA Method 8270LVI
- PCBs – USEPA Method 8082
- Lead – USEPA Method 7010
- TOC – USEPA Method 9060
- VPH – Ecology Method NWVPH
- EPH – Ecology Method NWEPH

Laboratory testing, analysis method target RLs, quality assurance/QC procedures, and reporting protocols used or performed by the laboratories will be consistent with those described in the project QAPP and the needs of the project. Laboratory analytical results will be compared to MTCA Method A/B Cleanup Levels for Unrestricted Land Use for initial screening purposes.

SECTION 5: DATA EVALUATION AND REPORTING

Data collected during this Property assessment will be evaluated as described in Section 4.0 – Data Verification/Validation and Usability of the project QAPP (PIONEER 2020). Following data review, PIONEER will prepare a Phase II ESA report summarizing the results. The report will include details of the activities performed, procedures followed, chemical analyses results, and recommendations. The reports will include a sampling location diagram, tabulated analytical results, soil boring logs, a copy of the laboratory analytical report for all samples collected, and a copy of the chain-of-custody records.

SECTION 6: ESTIMATED SCHEDULE

The environmental activities described in this Work Plan are to be implemented according to the schedule presented below.

- Advancement of SB-101 through SB-108: Early June 2021
- Evaluation of analytical results from SB-101 through SB-108: Late June 2021
- Installation and development of MW-1 through MW-7: July 2021
- Gauging and sampling event of MW-1 through MW-7: July 2021
- Final data evaluation and development of Phase II ESA Report: August and September 2021

This schedule assumes USEPA approval of the SAP within two weeks of submittal.

SECTION 7: REFERENCES

AEG. 2012. Limited Phase II ESA – Subsurface Investigation. Former Jack's Auto Repair. 1400 Bethel Street NE, Olympia, Washington. October.

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EAG. 1991a. Contamination Site Assessment Report (Addendum Report #1). Jack's Auto Repair. 1400 N. Bethel Street, Olympia, Washington. March.

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Ecology. 2013. Site Hazard Assessment Worksheet 1. Summary Score Sheet. Jack's Auto Repair. 1400 Bethel Street NE, Olympia, Washington. December.

PIONEER. 2020. Quality Assurance Project Plan for the City of Olympia's Brownfield Assessment Grant. March.

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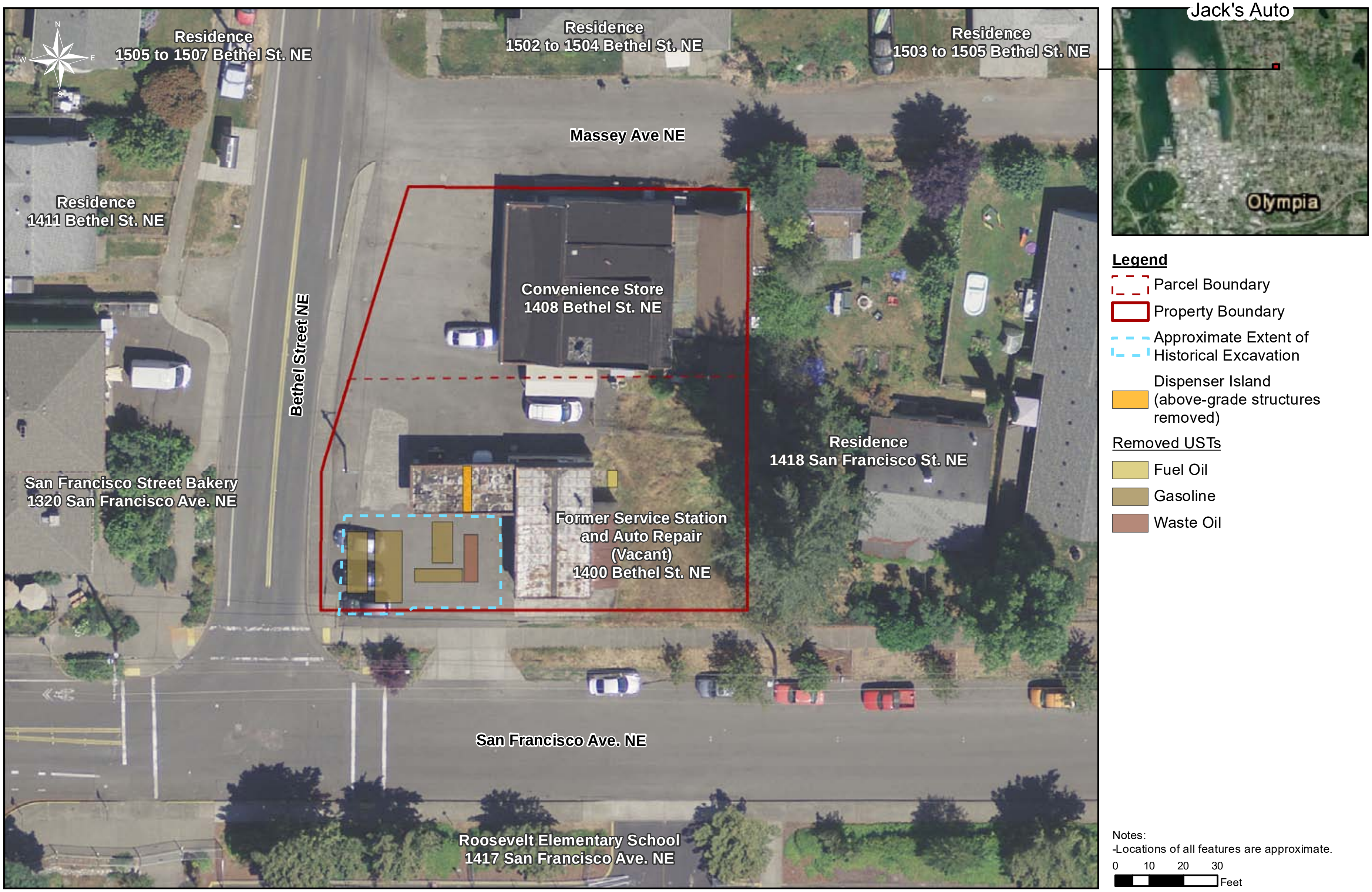
Figures



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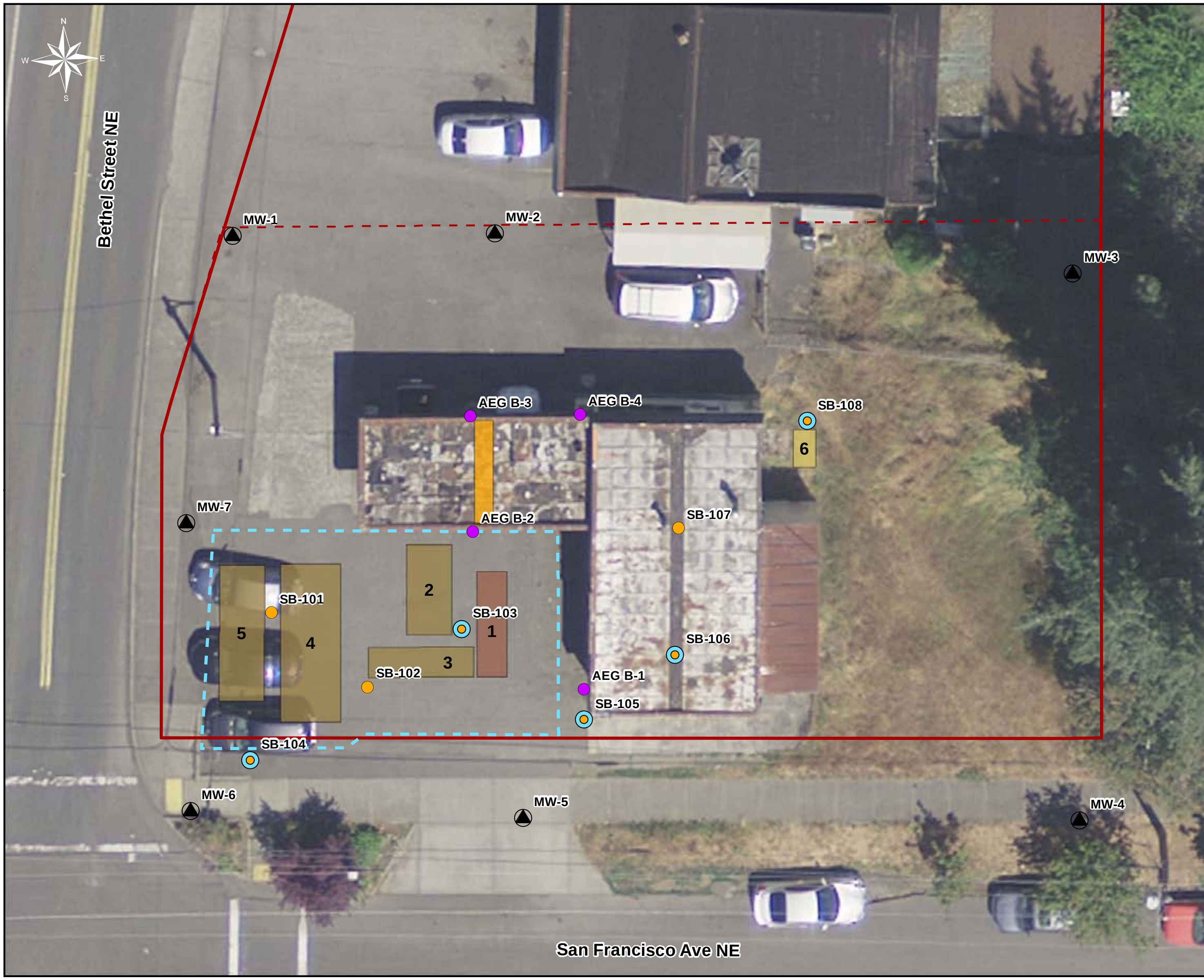
Current and Historical Property Features
1400 – 1408 Bethel Street NE
Olympia, Washington

Figure 1



Legend

Historical Borings (AEG 2012)

Proposed Samples

- Soil Boring
- Soil Boring with Temporary Well
- Monitoring Well

Other Property Features

- Approximate Extent of Historical Excavation
- Dispenser Island (above-grade structures removed)
- Parcel Boundary
- Property Boundary

Removed USTs

- Fuel Oil
- Gasoline
- Waste Oil

Notes:
-Location of all features are approximate.

0 10 20 30 Feet

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Previous and Proposed Sampling Locations
1400 – 1408 Bethel Street NE
Olympia, Washington

Figure 2

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Tables

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Table 1: Summary of Historical Soil Analytical Results

Constituent	UST 1 (Fuel Oil)	UST 2 (Waste Oil)	UST 3 (Gasoline)	UST 4 (Gasoline)	UST 5 (Gasoline)	UST 6 (Gasoline)	B-1	B-2	B-3	B-4	Soil Direct Contact Screening Level for an Unrestricted Land Use Scenario (mg/kg)	Soil Direct Contact Screening Level for a Commercial/Industrial Land Use Scenario (mg/kg)	Soil-to-Groundwater Screening Level (mg/kg)
	Sample Location, Depth Interval (Feet bgs), and Sample Date										Soil Screening Levels[1]		
	8	10	8	11	9	5	4-15	1-4	4-6	3-9			
	9/26/1990	9/26/1990	9/26/1990	9/26/1990	9/26/1990	9/26/1990	8/9/2012	8/9/2012	8/9/2012	8/9/2012			
Total Petroleum Hydrocarbons (mg/kg)													
Total Petroleum Hydrocarbons (non-specific)	**1,763**	**117**	**84**	**192**	**152**	**362**	-- --	--	--	--	No Value	No Value	No Value
Diesel Range Organics (TPH-D)	--	--	--	--	--	--	--	--	--	--	3,000	39,000	2,000
Gasoline (TPH-G)	-- --	--	--	--	--	--	**1,100**	**20**	10 U	**11**	4,700	150,000	30
Heavy Fuel Oil (TPH-HO)	-- --	--	--	--	--	--	-- --	--	--	--	3,000	39,000	2,000
VOCs (mg/kg)													
Benzene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	0.02 U	0.02 U	0.02 U	0.02 U	18	2,400	0.027
Toluene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	0.05 U	0.05 U	0.05 U	0.05 U	6,400	280,000	4.5
Ethylbenzene	**0.013**	0.01 U	0.01 U	0.01 U	0.01 U	--	**1.4**	0.05 U	0.05 U	0.05 U	8,000	350,000	5.9
Xylenes	**0.20**	0.01 U	0.01 U	0.01 U	0.01 U	--	**3.0**	0.15 U	0.15 U	0.15 U	16,000	700,000	14
1,2,4-Trimethylbenzene	-- --	--	--	--	--	--	**9.1**	0.05 U	0.05 U	0.05 U	800	35,000	No Value
1,3,5-Trimethylbenzene	-- --	--	--	--	--	--	**3.6**	0.05 U	0.05 U	0.05 U	800	35,000	No Value
Cumene	-- --	--	--	--	--	--	**0.34**	0.05 U	0.05 U	0.05 U	8,000	350,000	No Value
Naphthalene	-- --	--	--	--	--	--	**2.1**	0.10 U	0.10 U	0.10 U	1,600	70,000	4.5
n-Propylbenzene	-- --	--	--	--	--	--	**1.7**	0.10 U	0.10 U	0.10 U	8,000	350,000	No Value
p-Isopropyltoluene	-- --	--	--	--	--	--	**0.54**	0.05 U	0.05 U	0.05 U	No Value	No Value	No Value
Remaining VOCs	-- --	--	--	--	--	--	<RL	<RL	<RL	<RL	Varies	Varies	Varies

Notes:

UST samples 1 through 6 were composite samples collected from directly beneath the USTs during removal. The sampled material was removed and is no longer in place.

-- --: constituent not analyzed, <RL: constituent not detected at the reporting limt, feet bgs: feet below ground surface, mg/kg: milligrams per kilogram, No Value: a screening level cannot be calculated because no values exist in CLARC (Ecology 2020), U: constituent not detected at shown reporting limit

Bold compounds were detected at the shown concentration.

Highlighted concentrations exceed than the soil-to-groundwater screening level.

[1] Screening Levels were calculated in accordance with WAC 173-340-740, WAC 173-340-745, and WAC 173-340-747.

Table 2: Proposed Sampling Design

Mobilization Event	Boring ID	Boring Location Note[1]	Estimated Boring Depth (in feet bgs)	Media	Potential Sample Interval (in feet bgs)	Sample Purpose	Contingent Sample?	Constituents: VOCs	MTCA Short-List VOCs[2]	TPH-G (w/o SGC)[3]	(w/o SGC)[3]	PAHs	PCBs	Lead[4]	TOC[5]
Phase 1	SB101	Western portion of former UST area	25	Soil	0-10	Characterize remediated backfill material returned to excavation in 1990	No		1	1	1			1	2
					20-22	Characterize potential impacts beyond previously excavated extent	No		1	1	1			1	
	SB102	South-central portion of former UST area	25	Soil	0-10	Characterize remediated backfill material returned to excavation in 1990	No		1	1	1			1	
					18-20	Characterize potential impacts beyond previously excavated extent	No		1	1	1			1	
	SB103	Eastern portion of former UST area, near highest reported TPH concentrations and evidence of UST release (UST 1)	25	Soil	0-10	Characterize remediated backfill material returned to excavation in 1990	No	1		1	1	1	1	1	
					14-16	Characterize potential impacts beyond previously excavated extent	No	1		1	1	1	1	1	
				GW	15-25	Characterize potential groundwater impacts from historical soil releases from USTs or on-site automotive repair operations	No	1		1	1	1	1	1	
	SB104	South of excavation	25	Soil	6-10	Characterize potential impacts in soil beyond previously excavated extent at base of former USTs	No		1	1	1			1	
					14-16	Characterize potential impacts in soil (field evidence of impact or smear zone) south of previously excavated extent	No		1	1	1			1	
				GW	15-25	Characterize potential groundwater impacts from historical soil releases from USTs or on-site automotive repair operations	No		1	1	1			1	
	SB105	Near AEG B-1, near highest known TPH impact	25	Soil	6-10	Confirm impacts from former USTs and auto repair operations	No	1		1	1	1	1	1	
					14-16	Characterize deeper soil impacts (field evidence of impact or smear zone) from former auto repair operations	No	1		1	1	1	1	1	
				GW	15-25	Characterize potential groundwater impacts from historical soil releases from former automotive repair operations	No	1		1	1	1	1	1	
	SB106	Interior of former auto repair building	20	Soil	0-2	Characterize near surface impacts from former auto repair operations	No	1		1	1	1	1	1	
					14-16	Characterize deeper soil impacts (field evidence of impact or smear zone) from former auto repair operations	No	1		1	1	1	1	1	
				GW	15-20	Characterize potential groundwater impacts from historical soil releases from former automotive repair operations	No	1		1	1	1	1	1	
	SB107	Interior of former auto repair building	20	Soil	0-2	Characterize near surface impacts from former auto repair operations.	No	1		1	1	1	1	1	
					14-16	Characterize deeper soil impacts (field evidence of impact or smear zone) from former auto repair operations	No	1		1	1	1	1	1	
	SB108	Former fuel oil UST location	25	Soil	6-8	Characterize potential remaining impact in soil from fuel oil UST	No	1		1	1	1	1	1	
				GW	15-25	Characterize potential groundwater impacts from historical soil releases from USTs or on-site automotive repair operations	No	1		1	1	1	1	1	
Phase 2	MW1	Northwest corner of parcel	25	Soil	TBD	Characterize potential soil impact from former on-site operations, if field evidence of impact is present.	Yes	1		1	1	1	1	1	
				GW	15-25	Characterize potential migration of impacted groundwater from former on-site operations to Property boundary.	No	1		1	1	1	1	1	
	MW2	North of former dispenser island	25	Soil	TBD	Characterize potential soil impact from former on-site operations, if field evidence of impact is present.	Yes	1		1	1	1	1	1	
				GW	15-25	Characterize potential migration of impacted groundwater from former on-site operations to Property boundary.	No	1		1	1	1	1	1	
	MW3	Northeast corner of parcel	25	Soil	TBD	Characterize potential soil impact from former on-site operations, if field evidence of impact is present.	Yes	1		1	1	1	1	1	
				GW	15-25	Characterize potential migration of impacted groundwater from former on-site operations to Property boundary.	No	1		1	1	1	1	1	
	MW4	Southeast corner of parcel	25	Soil	TBD	Characterize potential soil impact from former on-site operations, if field evidence of impact is present.	Yes	1		1	1	1	1	1	
				GW	15-25	Characterize potential migration of impacted groundwater from former on-site operations to Property boundary.	No	1		1	1	1	1	1	
	MW5	Southern ege of parcel	25	Soil	TBD	Characterize potential soil impact from former on-site operations, if field evidence of impact is present.	Yes	1		1	1	1	1	1	
				GW	15-25	Characterize potential migration of impacted groundwater from former on-site operations to Property boundary.	No	1		1	1	1	1	1	
	MW6	Southwestern corner of parcel	25	Soil	TBD	Characterize potential soil impact from former on-site operations, if field evidence of impact is present.	Yes	1		1	1	1	1	1	
				GW	15-25	Characterize potential migration of impacted groundwater from former on-site operations to Property boundary.	No	1		1	1	1	1	1	
	MW7	Western edge of parcel	25	Soil	TBD	Characterize potential soil impact from former on-site operations, if field evidence of impact is present.	Yes	1		1	1	1	1	1	
				GW	15-25	Characterize potential migration of impacted groundwater from former on-site operations to Property boundary.	No	1		1	1	1	1	1	
Field QC Samples[5]				Soil	Soil	Field duplicate	No	1		1	1	1	1	1	
				GW	GW	Field duplicate	No	1		1	1	1	1	1	
				GW	GW	VOC trip blank	No	2							
							Sample Count	31	7	36	36	29	29	36	2

Table Notes:

bgs: below ground surface, VOCs: volatile organic compounds, TPH-D, G, and HO: total petroleum hydrocarbons in the gasoline, diesel, and heavy oil range, SGC: silica gel cleanup, PAHs: Polynuclear Aromatic Hydrocarbons, PCBs: polychlorinated biphenyls, TBD: sample interval to be determined, TOC: total organic carbon, GW: groundwater, QC: quality control.

[1] Boring locations will be adjusted as necessary in the field based on overhead power lines, underground utilities, etc.

[2] MTCA short-list VOCs are those listed in Table 830-1 and include benzene, toluene, ethylbenzene, xylenes, 1,2-dibromoethane, 1,2-dichloroethane, methyl-tert-butyl ether, and naphthalene, which are commonly associated with gasoline releases.

[3] Volatile Petroleum Hydrocarbons (VPH) and Extractable Petroleum Hydrocarbons (EPH) will also be collected for each sample to potentially run on the most contaminated samples (if TPH contamination is encountered). This may be used to develop site-specific Method B TPH Cleanup Levels for Unrestricted land Use.

[4] All groundwater samples for metals analyses will be field filtered with a 0.45-micron filter.

[6] All soil samples will be held for possible TOC analyses. Two lithologically representative samples that do not have detections of organic compounds will be analyzed for TOC.

[6] Frequency expectations for field QC samples will be one sample per 20 samples per matrix (except VOC trip blanks will be one sample per cooler). No soil or aqueous equipment blank is needed as each sample will be collected with clean dedicated equipment (e.g. cleaned dedicated tubing and disposable t-handles).

Analysis of TPH-D/HO, PAHs, and PCBs will be contingent at these locations based on results from source area borings (SB-101 through SB-107)