RI Data Gaps Investigation Work Plan

Hardel Mutual Plywood Corporation
1210 West Bay Drive NW
Olympia, Washington

Prepared for:

West Bay Development Group LLC
8512 Canyon Road East
Suite 101
Puyallup, Washington 98371

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

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RI Data Gaps Investigation Work Plan Approval

The RI Data Gaps Investigation Work Plan for the Hardel Mutual Plywood Corporation site has been approved by the following Project Team members:

Name and Role	Signature and Date
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List of Acronyms

Acronym	Explanation
bgs	Below Ground Surface
CAP	Cleanup Action Plan
City	City of Olympia
COPCs	Constituents of Potential Concern
Ecology	Washington Department of Ecology
ESA	Environmental Site Assessment
Greylock	Greylock Consulting LLC
GWM	Groundwater Monitoring
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
POC	Point of Compliance
Property	Hardel Mutual Plywood Corporation property
Prospective Purchaser	West Bay Development Group LLC
QAPP	Quality Assurance Project Plan
QC	Quality Control
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
RL	Reporting Limit
SVP	Soil Vapor Probe
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
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
Work Plan	Data Gap Investigation Work Plan

SECTION 1: INTRODUCTION

PIONEER Technologies Corporation's (PIONEER's) project team prepared this Remedial Investigation (RI) Data Gaps Investigation Work Plan (Work Plan) 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 assessment grant (BF01J66201) funds on behalf of West Bay Development Group LLC (the purchaser) to conduct a RI data gaps investigation of the Hardel Mutual Plywood Corporation property, located at 1210 West Bay Drive NW, in Olympia, Thurston County, Washington (the Property), prior to redevelopment. The general location of the Property is shown on Figure 1. The Property was determined to be eligible for the use of hazardous substance funds on February 20, 2020. The Quality Assurance Project Plan (QAPP) was submitted to USEPA and was approved on March 16, 2020 (PIONEER 2020b). A QAPP Addendum was submitted and approved by the USEPA on January 26, 2021 (PIONEER 2021).

The objective of the proposed investigation is to fill current data gaps prior to completing an RI report and entering the Property into the Washington Department of Ecology's (Ecology's) Voluntary Cleanup Program. Descriptions of the Property history, previous investigations, and current physical and environmental conditions; strategies and procedures for soil, groundwater, and soil vapor sampling; chemical analyses of collected soil, groundwater, and soil vapor 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, previous investigations, current physical conditions, current environmental conditions, future use of the Property, geologic setting, susceptible areas, and a simplified conceptual site model (CSM) are presented in the following subsections. PIONEER's planned investigation is also summarized.

2.1 Property History

Logging and lumber related businesses began operating on the Property prior to 1924. Between 1924 and 1951, the Property was occupied by the Henry McCleary Timber Company, Olympia Harbor Lumber Company, Olympia Towing, and West Side Log Dump. From 1951 through 1996 the Property was occupied by Hardel Mutual Plywood Corporation as a plywood manufacturing facility. Hardel Mutual Plywood Corporation ended operations after a fire in 1996 severely damaged buildings on the Property. All buildings were subsequently demolished.

2.2 Previous Investigations

A series of investigations beginning in 2004 confirmed the presence of contamination, including (1) total petroleum hydrocarbons (TPH) in the diesel range (TPH-D) and heavy oil range (TPH-HO) in soil and groundwater, (2) non-aqueous phase liquid (NAPL) on the western portion of the Property, (3) polynuclear aromatic hydrocarbons (PAHs) in soil (northern portion of the Property) and in groundwater (southern portion of the Property), and (4) dioxins/furans and phthalates in off-shore sediment (Stemen Environmental 2004). In 2007, the Washington Department of Ecology (Ecology) issued an Agreed Order for completion of a Remedial Investigation/Feasibility Study (RI/FS) and interim action (e.g., cleanup) on the Property (Ecology 2007). The RI was completed in 2007 and the FS was completed in 2009 in compliance with Ecology's Agreed Order (Greylock Consulting LLC [Greylock] 2007, 2009a). The interim action consisted of NAPL removal and excavation and off-Property disposal of TPH- and PAH-impacted soils at concentrations exceeding Model Toxics Control Act (MTCA) Cleanup Levels for Unrestricted Land Use (Greylock 2009b). In 2010, approximately 23,331 tons of TPH- and PAH-impacted soil and debris was removed from three areas on the Property (Greylock 2010).

Between December 2010 and August 2011, four quarters of groundwater monitoring were completed on the Property to evaluate the effectiveness of the interim action cleanup. The results of the groundwater monitoring were compliant with MTCA Cleanup Levels for Unrestricted Land Use for TPH-D, TPH-HO, and PAHs (Greylock 2011). In 2012, Ecology issued the Final Cleanup Action Plan (CAP) (Ecology 2012a) and an Agreed Order Satisfaction letter (Ecology 2012b) stating that the Agreed Order had been satisfied. In the Final CAP, Ecology stated: "The interim action performed by Hardel completed all required cleanup of soil, groundwater and sediment at the Hardel Mutual Plywood Site."

Additionally, the Final CAP states: "Sediment containing phthalates and dioxins/furans are not associated with historic operations at this Site. Phthalates found in sediment [on] this Site are believed to have originated from residential neighborhoods to the West, having migrated by storm water, or

from historic operations at the adjacent parcel to the South. Dioxins/furans were found at concentrations ranging from 18 to 41 ng/kg in sediments at this Site. These dioxins/furans are believed to originate from an offsite source and are not known to have originated from historic operations on the uplands of this Site. There does not appear to be a direct linkage of dioxins/furans found in the intertidal sediment to the upland source area investigated in the remedial investigation of this Site. Dioxins/furans in sediments of Budd Inlet are believed to come from several upland sources including the former Cascade Pole facility."

The Agreed Order Satisfaction Letter reported that no additional remedial action was necessary at the Property unless new or different information become known (Ecology 2012b).

PIONEER conducted a Phase I Environmental Site Assessment (ESA), a Phase II ESA, and additional investigation activities in 2020 and 2021 for due diligence purposes. Recognized Environmental Concerns identified in the Phase I ESA included historical fill material throughout the Property and the south-adjoining Reliable Steel site (PIONEER 2020a). Phase II ESA sampling was conducted in June 2020 using the brownfield assessment grant funds (PIONEER 2020d). Several MTCA screening level (SL) exceedances in soil and groundwater and elevated methane concentrations in soil vapor were identified during the Phase II ESA. PIONEER conducted additional sampling in August 2020, November 2020, and January 2021 using leveraged funds. As part of the August 2020 sampling, soil and groundwater samples were analyzed for dioxins/furans and polychlorinated biphenyls (PCBs) even though Ecology had previously concluded that dioxins/furans and PCBs were not constituents of potential concern (COPCs) for the Property (PIONEER 2020c). The August 2020, November 2020, and January 2021 sampling applied the QAPP-approved sampling and analysis methods (PIONEER 2020b).

2.3 Current Physical Conditions

As of the date of publication of this Work Plan, the western upland portion of the Property consists of vacant concrete-, asphalt-, crushed concrete-, shrub-, and grass-covered land; the remainder of the Property consists of intertidal and subtidal areas of Budd inlet. Budd Inlet adjoins the Property to the east. The Property is located in a mixed-use commercial and residential area west of downtown Olympia. The current Property features are shown on Figure 2.

2.4 Current Environmental Conditions

A conservative screening of the June 2020 through January 2021 investigation results indicated that the Property is generally unimpacted (as expected based on the previous completion of remediation to the Ecology's satisfaction), with the exception of some minor MTCA soil and groundwater SL exceedances. The few minor soil SL exceedances are petroleum-related, do not pose a significant concern, and can be remedied relatively easily. The minor groundwater SL exceedances do not currently appear to pose a significant concern. However, additional investigation and evaluation activities are warranted to determine the path forward for addressing these groundwater SL exceedances (see Figure 2). There were no MTCA SL exceedances for dioxins/furans and PCBs in the 2020 soil and groundwater samples, which confirms the previous Ecology conclusion (in response to public comments) that dioxins/furans and PCBs are not a concern at this Property.

Additionally, methane in soil vapor was screened at two locations on the Property during the June 2020 Phase II ESA (see Figure 3). Peak results indicated that concentrations of methane (8.0% and 23% by volume) exceed the lower explosive limit of methane (5% by volume). Given the amount of wood debris in the subsurface, the relatively high methane concentrations, and the limited nature of the June 2020 methane investigation, conducting additional methane investigations activities that are tailored to the final redevelopment plan are prudent.

The proposed investigation activities will address RI data gaps associated with the groundwater SL exceedances and elevated methane in soil vapor.

2.5 Future Use of the Property

The anticipated future use of the Property will be mixed commercial and multi-family residential use. Construction is tentatively planned to begin in 2023.

2.6 Geologic Setting

The Property resides along Budd Inlet in Thurston County. Budd Inlet lies in the southern Puget lowlands which were subjected to multiple glaciations during the Pleistocene. Surface soils at the Property have been mapped as alluvium consisting of fine-grained flood plan deposits, marine alluvium, and artificial fill. Coastal bluffs to the west of the Property are comprised of glaciofluvial sands and gravels (Greylock 2007).

The subsurface of the Property consists of fill, marine sands, silt, and varying amounts of wood from 0 to 25 feet below ground surface (bgs). In some areas poorly sorted gravel is present. Shallow groundwater at the Property has been observed at depths ranging from 0.4 to 12 feet bgs (Ecology 2012a, PIONEER 2020d). Although tidally influenced, the direction of groundwater flow at the Property is primarily towards Budd Inlet to the east (Ecology 2012a). At the northern portion of the Property, the direction of groundwater flow is reportedly toward the east-northeast (Greylock 2011). Groundwater flow direction will be confirmed as part of the RI data gaps investigation using a network of monitoring wells (MWs) and piezometers.

2.7 Susceptible Areas

Based on United States Fish and Wildlife National Wetland Inventory maps, the inter- and subtidal portion of the Property are designated as estuarine and marine wetland and estuarine and marine deep water. A small fringe along the northern and eastern boundary of the upland portion is designated as freshwater emergent wetland. West Bay Park is located approximately 1,100 feet to the south of the Property. The closest schools, Jefferson Middle School and Garfield Elementary School, are located approximately 1,300 feet to the west and southwest of the Property, respectively.

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 and Fill Material	Direct Contact with Soil	Direct Contact with Groundwater	Future Residents/ Workers	Construction and Maintenance Workers	Soil Samples	Groundwater Samples
Migration from Off-Site Sources	Direct Contact with Groundwater	None	Construction and Maintenance Workers	None	Groundwater Samples	None
Historic On-Site Operations and Fill Material and Migration from Off-Site Sources	Soil Migration to Groundwater to Surface Water	Groundwater Migration to Surface Water	Aquatic Receptors	Fish Consumption	Soil Samples	Groundwater Samples

2.9 Planned Site Assessment

The investigation described in this Work Plan is designed to evaluate the following RI data gaps:

- Determine if COPCs in groundwater are present at concentrations exceeding groundwater SLs at the downgradient upland boundary with Budd Inlet (i.e., potential point of compliance[POC] locations).
- Verify shallow groundwater flow direction throughout the Property towards Budd Inlet.
- Evaluate methane concentrations in the subsurface beneath planned structures.

These RI data gaps will be filled through the following:

- Installing one additional MW at a potential northern POC location.
- Collecting groundwater samples from the proposed and existing MWs (i.e., potential POC locations).
- Installing three piezometers and gauging the piezometers and MW network to determine the elevation of the potentiometric surface and groundwater flow direction.
- Installing 20 soil vapor probes (SVPs) in the proposed building footprints and sampling for methane.

The RI data gaps investigation includes spatial and temporal limitations. The spatial limits for this investigation consist of the Property boundary. The temporal limits are the seasons covered by the investigation, since investigation results could vary based on seasonal weather changes. Temporal variations will be assessed by collecting groundwater samples from each MW along the potential POC for four quarters. Several potential POC MWs have already been sampled for one or more quarters (see Table 1).

SECTION 3: SAMPLING PLAN

The sampling plan for the RI data gaps investigation is presented in this section. The sampling plan includes the following: 1) a summary of the planned soil, groundwater, and soil vapor sampling locations, 2) rationales for those locations, and 3) descriptions of procedures and methods for field sampling. A summary of the soil, groundwater, and soil vapor samples to be collected for this assessment is presented in Table 1 while soil and groundwater sampling locations are shown on Figure 2 and the SVP sampling locations are shown on Figure 3.[1]

3.1 Summary of Sampling Locations

PIONEER will advance 24 borings, including converting one to a new MW (MW107), three to piezometers (PZ101 through PZ103), and 20 to SVPs (SVP1 through SVP20), at the locations shown on Figures 2 and 3. PIONEER selected the sample locations to fill the remaining RI data gaps. The locations and number of sampling locations may change based on field conditions. Specific sampling objectives and their respective sampling locations are discussed in the following paragraphs.

Soil samples will be collected from borings MW107 and PZ101 through PZ103 for visual classification, field screening, and potential laboratory analyses. Soil samples will be collected from one-third (6) of the 20 SVP locations in order to verify groundwater depths prior installing SVPs; the remaining 14 SVPs will be blind drilled.

Soil boring MW107 will be advanced along Property's northern upland border, downgradient of existing MW101. The boring will be advanced to a depth of 15 feet or six to eight feet beyond the depth of first groundwater encountered, whichever is shallower, and will be converted to a permanent monitoring well. Soil samples will be retained from MW107 only if evidence of contamination is present (see Section 3.3.1 for additional details).

Soil borings PZ101 through PZ103 will be advanced along the western portion of the Property. The borings will be advanced to a depth of 15 feet or six to eight feet beyond the depth of first groundwater encountered, whichever is shallower, and will be converted to piezometers. Soil samples will be retained from PZ101 through PZ103 only if evidence of contamination is present (see Section 3.3.1 for additional details).

Soil borings SVP1 through SVP20 will be a will be advanced to depths of six feet bgs. SVPs will be installed at sampling locations SVP1 through SVP20 to assess whether methane is a concern for future residential and commercial receptors. Subsurface methane may be present 1) in areas with significant quantities of fill material and wood debris, and 2) in areas with anoxic conditions in subsurface soil overlying shallow groundwater. These conditions suggest that it is possible that methane could be present in the subsurface at the Property. Soil samples will not be collected from these sample locations for laboratory analysis. Each of the 20 SVPs will be installed two feet above the first encountered

[1] SVP locations may change based on future building-specific plans.

groundwater or at a maximum depth of six feet bgs, whichever is shallower. If groundwater is encountered at a depth less than four feet bgs, the SVPs may not be installed.

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 sampling equipment and supplies

3.3 Sampling Procedures and Methods

Soil, groundwater, and SVP 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 Addendum for the City, approved by USEPA, with subsequent updates as necessary (PIONEER 2020b and 2021).

3.3.1 Soil and Groundwater Sampling

PIONEER's field representative will collect soil 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 cores from MW107 and PZ101 through PZ103, visually characterize them in the field, and note physical indicators of environmental contamination. Soil cores will also be collected from one-third (6) of the 20 SVP locations in order to verify groundwater depths prior installing SVPs; the remaining 14 SVPs will be blind drilled.
- PIONEER's field representative will field-screen the soil cores using a portable photoionization detector (PID) to identify the potential presence of volatile organic compounds (VOCs).
- PIONEER's field representative will collect soil samples for screening purposes from MW107 and PZ101 through PZ103. The following criteria will be used to determine if samples will be retained for laboratory analysis, and if so, which sampling interval will be retained. 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, no soil sample will be retained for analysis.

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

3.3.2 MW and Piezometer Installation and Development

A licensed Washington driller will install MW107 and the three piezometers (PZ101 through PZ103) 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 15 feet bgs. The MW and piezometers will consist of thread-coupled, flush-joint, one-inch diameter PVC casing (two-inch for the MW), 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 MW and piezometer 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 MW and piezometer construction details.

The newly installed MW107 will be developed. Piezometers will not be developed. Development will be conducted by over-pumping the MW with a surge block and check valve (i.e., foot pump) until the turbidity in the development water is less than 5 nephelometric turbidity units (NTU). If it is clearly not practical to continue development to reach the 5 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.

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 on-site MWs (MW101 through MW107) and three piezometers (PZ101 through PZ103). The vertical elevation will be surveyed to an accuracy of 0.01-foot with the North American Vertical Datum of 1988 (NAVD88). The horizontal accuracy will be approximately one foot.

3.3.4 Groundwater Sampling

PIONEER will conduct groundwater monitoring (GWM) events from five MWs along the potential POC (MW102, MW103, MW105, MW106, and MW107; see Figure 2). During each GWM event, the static water level and any measurable thickness of NAPL will be measured in all on-site MWs (i.e., MW101 through MW107) and piezometers (PZ101 through PZ103) 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 MW casing). The following low-flow purging standard operating procedures will be used to purge water from each MW prior to sampling. A peristaltic pump, equipped with dedicated polyethylene tubing, will be used to purge water from the MW. The tubing

intake will be positioned approximately two feet below the top of the MW 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 60 minutes of continuous purging. Groundwater samples will be collected immediately following purging without turning off the pumping system. If a MW is pumped dry before the sample can be collected, a groundwater sample will be collected as soon as groundwater in the MW recharges.

The goal is to have four consecutive quarters of COPC results in each potential POC MW that do not exceed groundwater SLs. Several MWs along the potential POC have already been sampled during previous quarters (see Table 1). Assuming COPCs in groundwater do not exceed SLs during future GWM events, MW102 will be sampled for only one more quarter, MW103 will be sampled for two more quarters, MW105 and MW106 will be sampled for three more quarters, and the newly installed MW107 will be sampled for four quarters. The estimated schedule for GWM is presented in Section 6.

3.3.5 Methane Soil Vapor Sampling

Methane will be evaluated at the Property using the guidance provided in ASTM E2993-16. Methane that is generated in the subsurface is typically positively pressurized which means that methane migration is predominantly driven by pressure driven flow, advection, and diffusion. This is different than typical vapor intrusion sites (e.g., dry cleaners) where movement of VOCs, such as tetrachloroethylene, is driven by advection and diffusion. Consequently, one of the lines of evidence used in screening potential methane sites is whether or not positive pressure (with respect to atmospheric pressure) is present in the subsurface. Positive pressure indicates that methane gas (or other gas) is potentially being generated in the subsurface.

In addition, the concentrations of typical concern for methane are in the percent (volume/volume) versus parts per billion range for some VOCs. Consequently, the methods used to evaluate sites for methane are not as sensitive nor do they have to be as precise as typical vapor intrusion sites.

After installation, at least three volumes of air will be purged from each SVP using a GEM2000 landfill gas monitor. The SVPs will be sealed with tape or rubber caps for at least four hours. After a minimum of four hours, PIONEER's field representative will use the GEM2000 to purge soil vapor for an additional 15 minutes, while documenting the concentrations of methane, oxygen, carbon dioxide, and differential pressure at each location. Atmospheric pressure will also be recorded. PIONEER will record the methane monitoring field data and conditions (e.g., personnel, weather, etc.) during the sampling event to assist with redevelopment planning.

3.3.6 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 and soil vapor sample; using new terracore 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 1. 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.

3.3.7 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 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 COPCs for the soil and groundwater samples were selected based on the project goals and the previously detected COPCs at the Property.[2] The specific constituents for each sampling location are presented in Table 1. The COPCs for the RI data gaps investigation will include select VOCs, TPH-gasoline (TPH-G), TPH-D, TPH-HO, PAHs, arsenic, and silver. The select VOCs will be the following petroleum-related VOCs pursuant to WAC 173-340-900 Table 830-1: benzene, toluene, ethylbenzene, xylenes, 1,2-dibromoethane, 1,2-dichloroethane, methyl-tert-butyl-ether, and naphthalene, as well as tetrachloroethylene and its degradation products trichloroethylene, cis-1,2-dichloroethylene, and vinyl chloride.[3] Laboratory analyses and field screening will be performed as described in the project QAPP and QAPP Addendum. 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 8260D
- TPH-G, TPH-D, and TPH-HO - Ecology Method NWTPH-Gx and Dx
- PAHs - USEPA Method 8270
- Metals – USEPA Methods 6020/7010

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, QAPP Addendum, 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.

[2] Soil vapor will be analyzed in the field for methane and other parameters. No soil vapor laboratory analyses are planned.
[3] Although listed in WAC 173-340-900 Table 830-1, the proposed samples will not be analyzed for n-hexane because n-hexane has not been detected in any previously analyzed soil or groundwater samples from the Property.

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 2020b). Following data review, PIONEER will incorporate the results from the RI data gap investigation into an RI report. The report will include details of the activities performed, procedures followed, chemical analyses results, and recommendations. The report 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.

- Installation of MW107 and three piezometers: 2Q2021
- Development of MW107 and first quarterly gauging and sampling event of piezometers and MWs along the potential POC: 2Q2021
- Second quarterly gauging and sampling event of piezometers and MWs along the potential POC: 3Q2021
- Installation and sampling of SVPs: 3Q2021
- Enrollment into Ecology's Voluntary Cleanup Program: 3Q2021 (this may occur later)
- Third quarterly gauging and sampling event of piezometers and MWs along the potential POC: 4Q2021
- Fourth quarterly gauging and sampling event of piezometers and MWs along the potential POC: 1Q2022
- Final data evaluation and development of RI Report: 2Q2022

SECTION 7: REFERENCES

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Tables

Table 1: Proposed Sampling Design for RI Data Gaps Investigation

Sample ID	Sample Location Note[1]	Estimated Sample Interval (in feet bgs)	Media	Sample Purpose (and frequency)	Contingent Sample?	Constituents					
						Select VOCs[2]	TPH-G (w/o SGC)	TPH-D and HO (w/o SGC)[3]	PAHs	As and Ag[4]	Methane[5]
MW102	Potential northeastern POC well	3-13	GW	Evaluate groundwater concentrations at potential POC (1 quarter needed; 3 quarters completed).	No	1	1	1	1	1	
MW103	Potential eastern POC well	3-13	GW	Evaluate groundwater concentrations at potential POC (2 quarters needed; 2 quarters completed).	No	2	2	2	2	2	
MW105	Potential southeastern POC well	3-13	GW	Evaluate groundwater concentrations at potential POC (3 quarters needed; 1 quarter completed).	No	3	3	3	3	3	
MW106	Potential eastern POC well	3-13	GW	Evaluate groundwater concentrations at potential POC (3 quarters needed; 1 quarter completed).	No	3	3	3	3	3	
MW107	Potential northern POC well; approximately 50 feet northeast of MW101	3-13	GW	Evaluate groundwater concentrations at potential POC (4 quarters needed).	No	4	4	4	4	4	
		TBD	Soil	Characterize potential impact, if encountered (single event).	Yes	1	1	1	1		
PZ101	Northwest portion of upland area	TBD	Soil	Characterize potential impact, if encountered (single event).	Yes	1	1	1	1		
PZ102	West portion of upland area	TBD	Soil	Characterize potential impact, if encountered (single event).	Yes	1	1	1	1		
PZ103	Southwest portion of upland area	TBD	Soil	Characterize potential impact, if encountered (single event).	Yes	1	1	1	1		
SVP1 - SVP20	20 locations in footprints of proposed buildings	5-6	Vapor	Verify methane concentrations due to potential degradation of organic material in fill (single event).	No						20
Field QC Samples[6]			Soil	Field duplicate (collected only if other soil samples are collected)	Yes	1	1	1	1		
			GW	Field duplicate	No	4	4	4	4	4	
			GW	VOC trip blank	No	4					
					Sample Count	26	22	22	22	17	20

Table Notes:

bgs: below ground surface, GW: groundwater, PAHs: Polynuclear Aromatic Hydrocarbons, POC: point of compliance, QC: quality control, SGC: silica gel cleanup, TBD: sample interval would be determined based on encountered impact, TPH-D, G, and HO: total petroleum hydrocarbons in the gasoline, diesel, and heavy oil range, VOCs: volatile organic compounds.

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

[2] The select VOCs will be the following petroleum-related VOCs pursuant to WAC 173-340-900 Table 830-1: benzene, toluene, ethylbenzene, xylenes, 1,2-dibromoethane, 1,2-dichloroethane, methyl-tert-butyl-ether, and naphthalene, as well as tetrachloroethylene and its degradation products trichloroethylene, cis-1,2-dichloroethylene, and vinyl chloride. Sampling for n-hexane is not necessary because it has not been detected in any previously analyzed soil or groundwater samples at the Site.

[3] Silica gel cleanup and HCID are possible add on preparations/analyses if the sum of TPH-D and TPH-HO concentrations exceed 500 ug/L.

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

[5] Methane will be evaluated in the field using a GEM 2000 Landfill Gas Monitor. Oxygen, carbon dioxide, and differential pressure will also be recorded. Samples will not be submitted to the laboratory.

[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) per sampling event. No soil or aqueous equipment blanks are needed as each sample will be collected with clean dedicated equipment (i.e.. terracores for soil, tubing for GW).

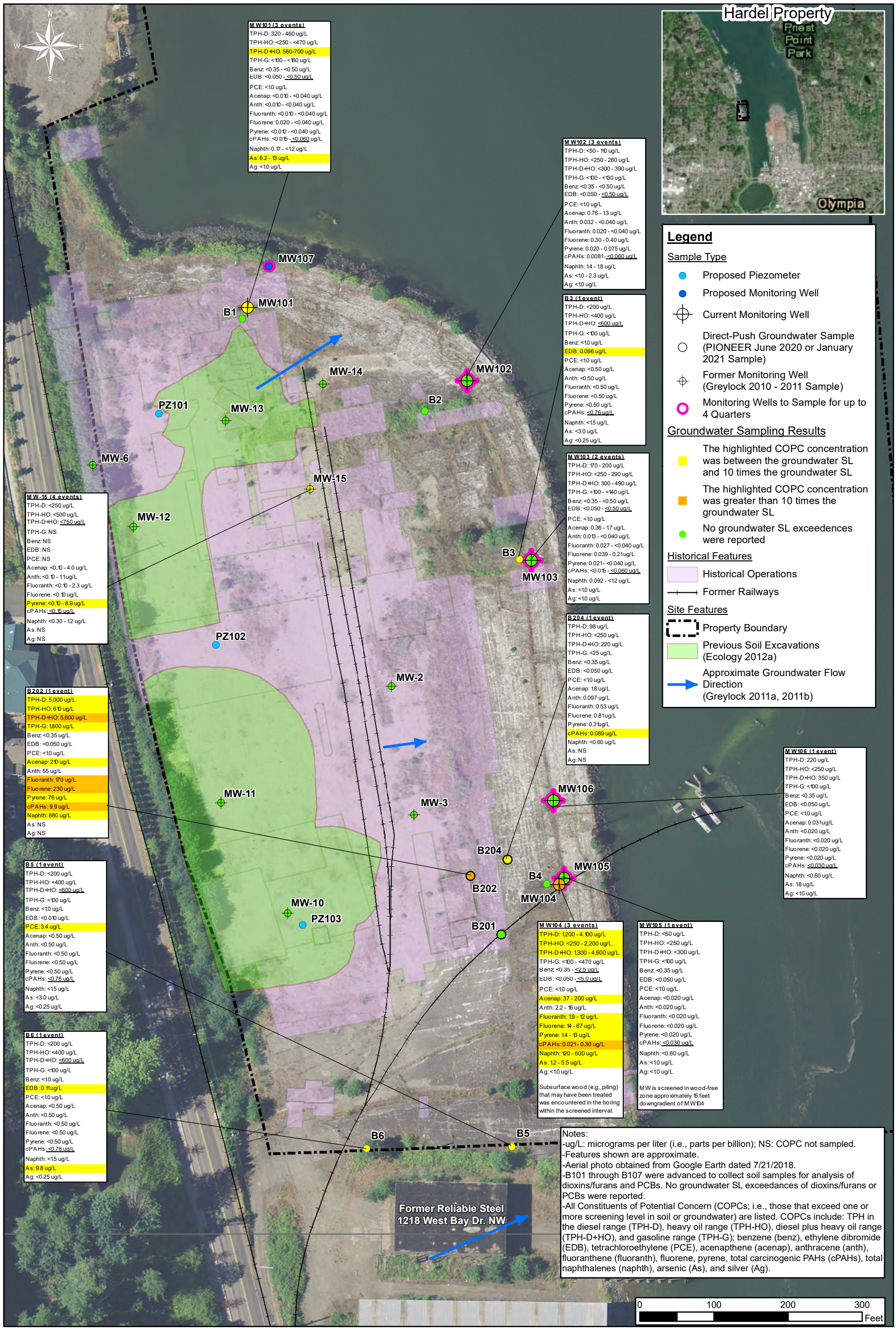
Figures

PIONEER TECHNOLOGIES CORPORATION

Property Location Map
Hardel Mutual Plywood Corporation
RI Data Gaps Investigation Work Plan
1210 West Bay Drive NW
Olympia, WA

Figure 1

Document Path: G:\Projects\City of Olympia\GIS\Maps\2021\Hardel\Data Gaps Investigation Work Plan\Fig 1_Property Location.mxd; Author: MK; Date Saved: 3/15/2021

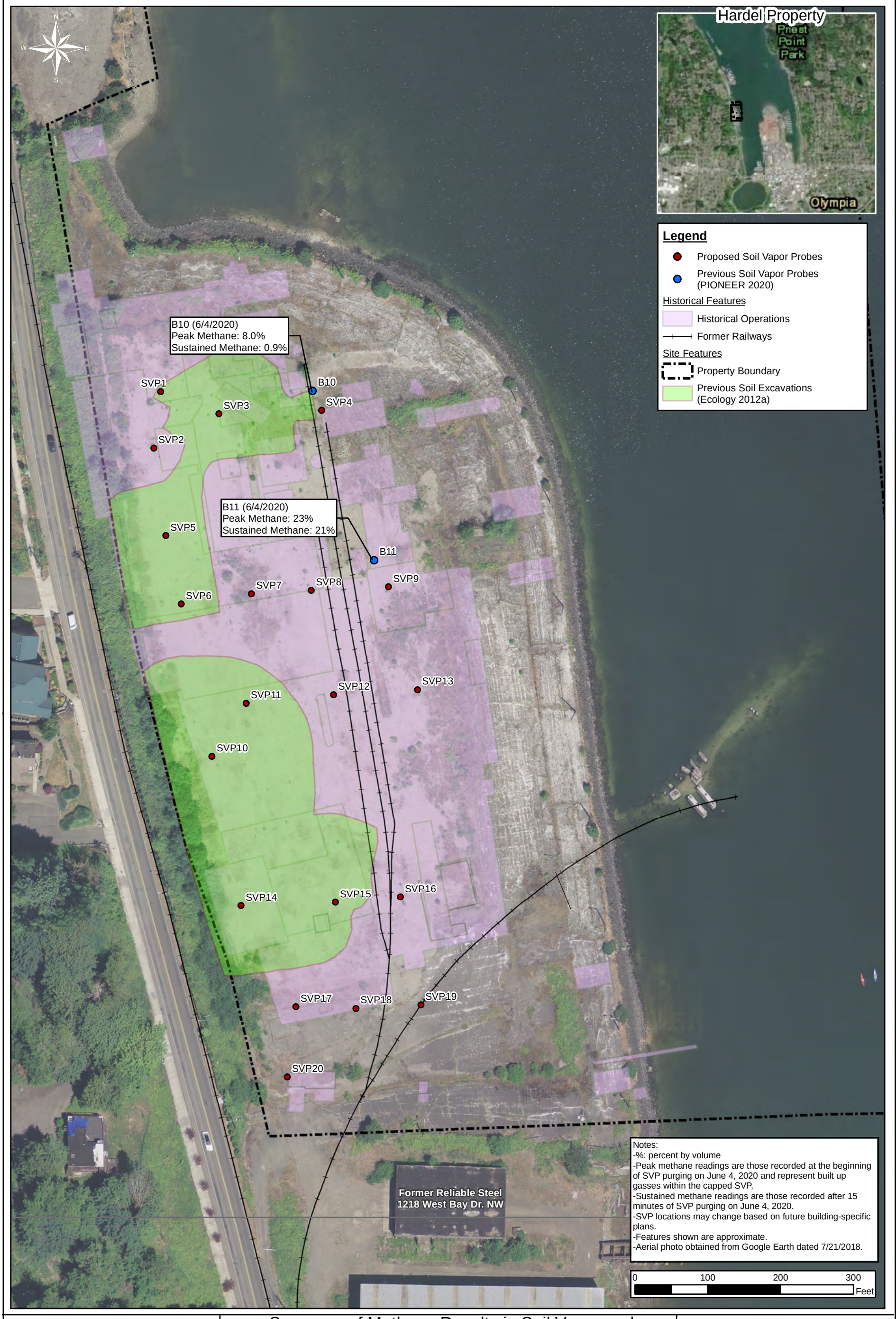


PIONEER TECHNOLOGIES CORPORATION

Summary of Groundwater Results and Proposed Sampling Locations
Hardel Mutual Plywood Corporation
RI Data Gaps Investigation Work Plan
1210 West Bay Drive NW
Olympia, WA

Figure 2

Document Path: G:\Projects\City of Olympia\GIS\Maps\2021\Harde\Data Gaps Investigation Work Plan\Fig 2_GW Results and Proposed Samp Locs.mxd; Author: VN; Date Saved: 3/15/2021



PIONEER TECHNOLOGIES CORPORATION

Summary of Methane Results in Soil Vapor and Proposed Sampling Locations
Hardel Mutual Plywood Corporation
RI Data Gaps Investigation Work Plan
1210 West Bay Drive NW
Olympia, WA

Figure 3

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