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July 18, 2023

Mr. Sam Meng
Washington State Department of Ecology
Toxics Cleanup Program Headquarters
300 Desmond Drive SE
Lacey, Washington 98503

Subject: Remedial Investigation Phase V Characterization of Operable Unit 3 Report July 2023 Revision
Superlon Plastics Site, 2116 Taylor Way, Tacoma, Washington
Agreed Order No. DE 5940

Dear Mr. Meng:

On behalf of The Chemours Company FC, LLC, Pacific Environmental & Redevelopment Corporation and PIONEER Technologies Corporation are submitting this July 2023 Revision of the Remedial Investigation Phase V Characterization of Operable Unit 3 Report for the Superlon Plastics Site. The revisions are based on the Ecology's comments dated May 15, 2023. The following versions of the revised report are being submitted: one electronic PDF of the complete, clean version of the revised report and one electronic PDF showing revisions in track changes which includes a response to comments table. The response to comments table restates the comment and identifies the revisions in the revised report where each comment has been addressed. In addition, the track changes version includes links in the response to comments table that brings the reader to the revised section, the revised section then has a link that brings the reader back the response to comments table. This cover letter has been attached to both versions of the revised report.

Please do not hesitate to contact me at (206) 890-4849 or Jeff King, at (425) 238-2212, if you have any questions or comments about this report.

Respectfully,

Nathan Starr, L.G. (WA, CA)
Senior Geologist

cc: Sebastian Bahr, Chemours (electronic copy only)
Jeff King, Pacific Environmental & Redevelopment Corporation (electronic copy only)

Remedial Investigation Phase V Characterization of Operable Unit 3 Report Superlon Plastics Site

Prepared for:

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and

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July 18, 2023

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Acronyms and Abbreviations

Acronym/Abbreviation	**Description**
bgs	Below Ground Surface
CAP	Cleanup Action Plan
Chemours	The Chemours Company FC, LLC
CLs	Cleanup Levels
COC	Constituent of Concern
COPC	Constituent of Potential Concern
Ecology	Washington State Department of Ecology
Eh	Activity of Electrons
ERM	Environmental Resources Management
FS	Feasibility Study
GWM	Groundwater Monitoring
HPT	Hydraulic Profiling Tool
IA	Interim Action
lbs	Pounds
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MW	Groundwater Monitoring Well
MTCA	Model Toxics Control Act
OSP	On-Property Soils and Perched Water
OU	Operable Unit
PERC	Pacific Environmental and Redevelopment Corporation
PCL	Preliminary Cleanup Level
PIONEER	PIONEER Technologies Corporation
POC	Point of Compliance
Property	Superlon Plastics Property
RAOs	Remedial Action Objectives
Redox	Reduction-Oxidation
RELs	Remediation Levels
RI	Remedial Investigation
SAP/QAPP	Sampling and Analytical Plan / Quality Assurance Project Plan
SCL	Sediment Cleanup Level
SCO	Sediment Cleanup Objective
SCSL	Sediment Cleanup Screening Level
SEP	Sequential Extraction Procedure
Site	Superlon Plastics Site
SPLP	Synthetic Precipitation Leaching Procedure
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency

V	Volt
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
White Birch	White Birch Group, LLC
Work Plan	RI Phase V Work Plan
XRF	X-ray Fluorescence

Executive Summary

The primary purpose of this report is to present the results of Phase V of the Superlon Plastics Site Remedial Investigation (RI). All field work was conducted on the Superlon Plastics Property (Property) located at 2116 Taylor Way, Tacoma, Washington. The work was performed to obtain a better understanding of constituent concentrations in soil and perched water in Operable Unit (OU) 3 and in groundwater along the Property's perimeter, which will be used to guide future phases of the RI.

Key conclusions from evaluations presented in this report include:

- OU 3 arsenic groundwater concentrations in the Perched Aquifer are significantly less than Shallow Aquifer arsenic groundwater concentrations. This indicates that the Perched Aquifer at OU 3 is not a significant source contributing to the Shallow Aquifer arsenic plume.
- OU 3 arsenic soil concentrations in the Perched Aquifer were lower than those in the Upper Aquitard, which indicates that the majority of the arsenic mass at OU 3 is located in the Upper Aquitard. This is congruent with historical information indicating that the tidal flats within OU 3 were filled with hydrated lime between 1966 and 1972, long after lead arsenate and calcium arsenate insecticide activities ended in 1951 (i.e., the fill that created the Perched Aquifer within OU 3 was brought on to the Property after the releases of lead arsenate and calcium arsenate had occurred).
- Precipitation or co-precipitation of arsenic with highly stable minerals in the Upper Aquitard of OU 3 and low arsenic groundwater concentrations in the Perched Aquifer were observed. This combination of factors indicates that arsenic in soil at OU 3 is not leaching into groundwater to the extent predicted by leachability analysis and is not causing arsenic groundwater concentrations to exceed the groundwater REL.
- Prior to the remediation of OUs 1, 2 and 4, there was approximately 213,000 pounds (lbs) of arsenic in soil in OUs 1, 2 and 4 and approximately 7,700 lbs of arsenic in OU 3. Only 4% of the total accessible arsenic mass in OUs 1, 2, 3 and 4 was located in OU 3 (i.e., when remediation of OUs 1, 2, and 4 is complete, 96% of the arsenic mass will be remediated).[1]
- Arsenic groundwater concentrations in the Perched Aquifer exceeded the Preliminary Cleanup Level (PCL) of 0.008 milligrams per liter (mg/L) along all sides of the Property boundary where water was present.
- Arsenic groundwater concentrations in the Shallow Aquifer ranged from 0.11 to 65 mg/L. The distribution appears to indicate (1) dominant plume migration to the southwest, south, and southeast, (2) minor plume migration to the west and northwest, and (3) a possible off-Property source to the southeast.
- Arsenic groundwater concentrations in the Intermediate Aquifer plume are delineated to the PCL of 0.008 mg/L along the southwest, northwest, and northeast sides of the Property boundary. The Intermediate Aquifer plume is not delineated to the southeast.
- Arsenic groundwater concentrations in the Perched Aquifer at OU 3 do not exceed the Perched Water Remediation Level (REL). Therefore, groundwater in the Perched Aquifer at OU 3 does not require treatment as part of the ongoing Corrective Action Plan (CAP) for On-Property Soils and Perched Water (OSP) Interim Action (IA).

Recommendations in this report include:

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[1] Accessible arsenic is arsenic in soil above 15 feet bgs that is outside of the building, loading dock and railroad buffers.

- Conduct off-Property investigation(s) to delineate the groundwater plume in the Perched, Shallow, and Intermediate Aquifers.
- The arsenic soil REL of 114 milligrams per kilogram (mg/kg) for OU 3 was selected based on leachability analysis (PERC 2014c). However, data from this investigation indicates that arsenic in soil at OU 3 is not leaching into groundwater to the extent predicted by leachability analysis and is not causing arsenic groundwater concentrations to exceed the groundwater REL. Therefore, it is recommended that the CAP-OSP arsenic soil REL for OU 3 be based on the soil direct contact pathway cleanup level of 588 mg/kg.

1. Introduction

The primary purpose of this report is to present the results of Phase V of the Superlon Plastics Site Remedial Investigation (RI). All field work was conducted on the Superlon Plastics Property (Property) located at 2116 Taylor Way, Tacoma, Washington (see Figure 1). The work was necessary to obtain a better understanding of constituent concentrations in soil and perched water in Operable Unit (OU) 3 and in groundwater along the Property's perimeter, which will be used to guide future phases of the RI.

This report has been prepared on behalf of the White Birch Group, LLC (White Birch) and the Chemours Company FC, LLC (Chemours). These companies are hereafter referred to as the "Companies". The Companies or their authorized agent completed the work described in this report in accordance with Model Toxics Control Act (MTCA), Chapter 173-340 of the Washington Administrative Code (WAC) under Agreed Order No. DE 5940.

The Agreed Order requires that the Companies submit a Work Plan to the Washington State Department of Ecology (Ecology) for review and approval whenever work is to be completed at the Superlon Plastics Site (Site) in accordance with WAC 173-340-350(7). This work was conducted following the RI Phase V Work Plan (Work Plan), which was approved by Ecology on March 21, 2022 (Pacific Environmental and Redevelopment Corporation [PERC]/ PIONEER Technologies Corporation [PIONEER] 2022c).

1.1. Site Location and Description

The Site is located in a highly industrial area of the Tacoma Tidal Flats between the Blair and Hylebos Waterways (see Figure 1). Definition of the Site boundaries (per MTCA) and an evaluation of data from other off-Property media will be presented in a future RI/Feasibility Study (FS) and Cleanup Action Plan (CAP) for the Site. This approach, which has been approved by Ecology, was adopted in order to continue progress toward a final remedy for on-Property media while continuing to investigate off-Property issues and to define the Site boundary (Ecology 2013a).

The Property is bordered to the northeast by Taylor Way, to the north by a curved rail road right-of-way owned by the City of Tacoma Public Works, to the northwest by Lincoln Avenue and a warehouse operation, and to the southeast by property leased and operated by Gardner-Fields Products, a roofing and waterproofing products manufacturing business (see Figure 2). To the southwest of the Property is a ditch located on the northeast side of a paved trucking yard owned by the Port of Tacoma (see Figure 2).

2. Background

A summary of key Site background information is presented in this section.

2.1. Site Setting

2.1.1. Climate

The marine-influenced climate at the Site is typical of Western Washington and is relatively mild. The average annual precipitation for Tacoma is approximately 40 inches, with most of the precipitation falling between October and April (Western Regional Climate Center 2019).

2.1.2. Topography and Drainage

The Site is relatively flat, with the exception of a pond located on the eastern central portion of the Property and a drainage ditch located on Port of Tacoma property southwest of the Property (see Figure 2).[2] With the exception of the pond and ditch, topographic elevations generally range between 8 feet and 11 feet above mean sea level (msl). The surface water elevation of the pond fluctuates around 7 feet msl and the elevation of the ditch varies between 2.5 and 4 feet msl (ESM Consulting Engineers LLC 2021). Stormwater on the Property flows via sheet flow to the pond where it infiltrates.

2.1.3. Geology

The underlying regional geology is dominated by Quaternary ice age glacial deposits. In general, regional glacial deposits include sand and gravel aquifers associated with glacial outwash and low permeability glacial till deposits containing clay and silt (Washington Division of Geology and Earth Resources 2015).

The Site is located within the tideflats of the Puyallup River delta. In general, the pre-development tideflats consisted of alternating layers of fluvial lower permeability silt/clay and sandy deposits primarily derived from Mount Rainer lahar deposits. In the early 1900s, hydraulic fill from Commencement Bay and its tributaries (e.g., Hylebos and Blair Waterways) was used to raise the Property and surrounding areas above the tideflats. Review of aerial photographs indicates that additional fill was brought onto the Property between 1966 and 1975. This material extends from the land surface to 8 to 10 feet below ground surface (bgs) across the Property and includes fine sands and silts, large wood pilings, construction debris, industrial wastewater treatment sludge (from chlor-alkali manufacturing), manufacturing by-products imported from off-Property sources, and hydrated lime. The known extent of industrial wastewater treatment sludge was removed from the Property during the remedial actions discussed in Section 2.2.

Based on interpretations from the Site's soil boring logs and groundwater monitoring well (MW) logs, the relevant lithologic units at the Site, from shallowest to deepest, include the following:

- Fill: The fill unit consists of primarily hydraulic fill (fine sands and silts) with large wood pilings, construction debris, industrial wastewater treatment sludge (removed), manufacturing by-products imported from off-Property sources, and hydrated lime.
- Upper Silt: The upper silt unit is interpreted to be the historic tideflat surface and consists primarily of clayey silt to fine sandy silt.

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[2] The ditch drains to the northwest along the northeast side of the Port of Tacoma property and then drains to the southwest within the City of Tacoma's right-of-way along the northwest side of the Port of Tacoma property.

- Shallow Sand: The shallow sand unit consists primarily of a native fine to medium sand with shell fragments and silt interbeds, primarily derived from Mount Rainer lahar deposits.
- Lower Silt: The lower silt unit consists primarily of clayey silt to fine sandy silt.
- Lower Sand: The lower sand unit primarily consists of a fine to medium sand with silt interbeds.

2.1.4. Hydrogeology

Based on interpretations from the Site's soil boring logs and MW logs, the relevant hydrostratigraphic units at the Site correspond to specific lithologic units and include the following, from shallowest to deepest:

- Perched Aquifer: The Perched Aquifer is the saturated portion of the fill unit. The thickness of the Perched Aquifer is approximately eight to ten feet. Groundwater within the Perched Aquifer is typically encountered at depths of less than six feet bgs in most portions of the Property, and currently daylights in the pond during the winter months (see Figure 2).
- Upper Aquitard: The Upper Aquitard is the upper silt unit (i.e., the historic tideflat surface). The thickness of the Upper Aquitard is approximately five to ten feet. Thin and/or leaky portions of the upper silt have been identified in the central portion of the Property.
- Shallow Aquifer: The Shallow Aquifer is the shallow sand unit. The thickness of the Shallow Aquifer is approximately seven to 22 feet.
- Intermediate Aquitard: The Intermediate Aquitard is the lower silt unit. The thickness of the Intermediate Aquitard is approximately ten to 20 feet.
- Intermediate Aquifer: The Intermediate Aquifer is the lower sand unit. The Intermediate Aquifer appears to be at least 20 feet thick.

The groundwater gradients in the aquifers are tidally influenced and will be evaluated during future phases of the RI process.

2.1.5. Property Land Use

The Property is currently owned by the White Birch and operated by Superlon Plastics Company, Incorporated, an extruded plastic pipe manufacturer. The northwestern half of the Property is developed with two industrial buildings (Buildings C and D) and asphalt paved lots (see Figure 2). The ongoing Interim Actions (IAs) occupy the southeastern and western sections of the Property (see Section 2.2 for details on the IAs). Following the completion of the IAs, the Property will be backfilled to match the grade of the northwestern half of the Property and paved with asphalt.

2.1.6. Overview of Ownership History

Historically the Property has had numerous owners and uses since its initial development. A history of Property ownership is listed below (PERC/PIONEER 2011).

- In 1925, Latimer-Goodwin purchased an approximately five-acre parcel from Buffelen Lumber & Manufacturing Company. Latimer-Goodwin developed it for the manufacture of lead arsenate pesticides.
- In 1944, Grasselli, a subsidiary of DuPont, purchased Latimer-Goodwin's land parcel and the pesticide manufacturing facilities located there. Grasselli manufactured lead arsenate and calcium arsenate insecticides until 1946, and performed product mixing and agricultural chemical warehousing operations until 1949.
- In 1951, DuPont sold the Property to V.C. Monahan, who operated the Cabin Creek Lumber Company.

- In 1968, V.C. Monahan in turn sold the Property to Justus Company, Inc., who operated a wood treatment facility there.
- In 1972, Frank B. Lynott, of Justus Cedar Homes and Lindal Cedar Homes sold the Property to Mr. Ragnar M. Nars, to be used for Superlon Plastics Company, Incorporated.
- In 1992, the Property was subdivided evenly into thirds, all of which were re-consolidated and granted through a series of quit claim deeds to White Birch. White Birch continues to own the Property and Superlon Plastics Company continues to occupy the northwestern half of the Property.

2.2. Overview of Remedial Actions

Numerous investigation, evaluation, and cleanup activities have been performed at the Site since 2010. The remedial actions are summarized in the following subsections.

2.2.1. Remedial Investigation Phase I

The following actions were completed as described in the Phase I RI Work Plan (PERC 2010):

- Collected soil samples;
- Collected sediment samples and a surface water sample from the ditch;
- Reviewed and compiled existing data about the Property and surrounding properties;
- Evaluated the nature and extent of on-Property fill material;
- Evaluated the potential impacts from on-Property surface water and storm water to the ditch;
- Preliminarily assessed the potential impacts from vapor intrusion;
- Used data collected during soil and groundwater sampling to evaluate the potential of utility corridors as preference pathways to contaminant migration; and
- Determined additional information that would be needed to conduct an FS.

2.2.2. Remedial Investigation Phase II

The following actions were completed as described in the Phase II RI Work Plan (PERC/PIONEER 2011):

- Compiled all known data about the Property and surrounding properties;
- Assessed the potential impacts from vapor intrusion as new data was developed;
- Expanded the evaluation of the potential impacts from off-Property surface water and storm water to the ditch; and
- Performed an underground storage tank investigation and collected additional sediment samples from the ditch as well as additional soil samples (as identified in the Phase II RI Work Plan). No soil samples were collected on the Gardner-Fields property. Gardner-Fields was not responsive to access requests and access to the Gardner-Fields property was not obtained. This represented the only exception to the scope of work listed in the Phase II RI Work Plan.

2.2.3. Remedial Investigation Phase III

The objective of the Phase III RI was to expand upon the knowledge learned during Phases I and II of the RI, thoroughly characterize existing conditions in groundwater throughout the Superlon Property, and complete soil characterization at the Property. The following actions were completed, as described in the Phase III RI Work Plan (PERC 2012a):

- Installed additional MWs in the Shallow and Intermediate Aquifers (the current and former MWs are presented on Figure 3);
- Collected surface water samples from under former Building A and in the former Building B footprint (Figure 4);
- Re-evaluated Constituents of Potential Concern (COPCs) and developed a focused list of Constituents of Concern (COCs) for the Site; and
- Developed a conceptual Site exposure model that depicted the understanding of actual and potential exposure pathways of the Site COCs that existed at that time.

2.2.4. Interim Action Phase I

The Phase I Interim Action (IA) included (PERC 2012b):

- Removing surficial vegetation;
- Installing a coffer dam between former Buildings A and B to facilitate surface water management;
- Removing and disposing of a four-inch layer of surface soil across all exposed areas of the Property;
- Contouring the ground surface to direct surface water toward the pond in the footprint of former Building B (Building B has since been removed and the pond is shown on Figure 2, southeast of Building C);
- Placing a compacted gravel layer over the work area to prevent contact with contaminated soils;
- Characterizing Building B materials to determine the proper disposal option after demolition;
- Demolishing Building B and disposing of the resulting debris; and,
- Securing the Building B footprint by placing a layer of quarry spalls over the area.

2.2.5. Interim Action Phase II

Phase II IA included the following steps and actions:

- Sludge excavation and disposal, which included (PERC 2012c):
    - Excavating wastewater treatment sludge;
    - Characterizing excavated materials to determine the proper disposal option; and
    - Disposing of the excavated waste water treatment sludge.
- Building D soil removal and disposal, which included (PERC 2014a):
    - Excavating soil exceeding excavation goals underneath the footprint of Building D, prior to construction of the building;
    - Characterizing excavated materials to determine the proper disposal option; and
    - Disposing of the excavated soils.
- Former Building B soil removal and disposal, which included (documentation to be provided in the forthcoming Cleanup Action Plan Report for On-Property Soils and Perched Water):
    - Excavating soils exceeding excavation goals within the footprint of former Building B;

  - Characterizing excavated materials to determine the proper disposal option; and
  - Dewatering and disposing of the excavated soils.

2.2.6. Remedial Investigation Report for On-Property Soils and Surface Water

The RI for On-Property Soils and Perched Water (OSP) characterized the nature and extent of contamination in the context of past activities on the Property, including the presentation and evaluation of analytical data, fill characteristics, and other pieces of information that had been collected on the Property through the completion of Phases I, II, and III of the RI (PERC 2013). Specifically, the RI-OSP found that:

- Arsenic and lead are present in soil throughout the Property at concentrations exceeding the MTCA Method C industrial land use direct contact screening levels.
- Arsenic, cadmium, lead, pentachlorophenol, and vinyl chloride in soil may be contributing to the presence of these constituents in the Perched Aquifer.
- Total petroleum hydrocarbons (TPH) gasoline fraction, diesel fraction, and heavy oil fraction soil concentrations are greater than the industrial land use direct contact screening levels in a few isolated locations. In all cases, these occurrences are co-mingled with arsenic and/or lead exceedances.
- Volatile organic compounds (VOCs; in particular, trichloroethylene (TCE) and vinyl chloride) were associated with the wastewater treatment sludge formerly located in the western corner of the Property. An IA removed the VOC-containing wastewater treatment sludge, with the exception of a thin lens of the material at the excavation limits along the southern Property boundaries in two directions - toward the Gardner-Fields property and toward the off-Property drainage ditch.
- Arsenic, cadmium, lead, mercury, TPH heavy oil fraction, pentachlorophenol, 1,2-cis-dichloroethylene, and TCE have been detected in perched water above drinking water screening levels.
- In addition, the RI-OSP identified six soil OU areas (OU 1 through OU 6) based on their fill types. These six areas have distinct characteristics and have been grouped based on their need for different remedial technologies. This report includes additional evaluation of OU 3, which is defined by the limits of a hydrated lime layer that is present in the fill unit in the northern corner of the Property.

2.2.7. Feasibility Study for On-Property Soils and Perched Water

The FS-OSP presents the technical approach to remediate soils and perched water on the Property only (PERC 2014c). The FS-OSP determined the remedial action objectives (RAOs), Cleanup Levels (CLs), and Remediation Levels (RELs) which set the qualitative and quantitative remediation goals for the remediation of soils and perched water on the Property.

The FS-OSP identified one exposure pathway by which industrial workers could indirectly contact constituents in on-Property perched water. This involves the migration of constituents from the Perched Aquifer to the Shallow Aquifer, with the Shallow Aquifer used as part of a future process cooling water system. Under this scenario, exposure of industrial workers could occur as a part of maintenance activities on the cooling water system. Based on this pathway, the non-potable groundwater CLs for arsenic, cadmium, and lead were calculated to be 0.67, 1.05 and 1.65 milligrams per liter (mg/L), respectively. However, this pathway is not complete, as use of a groundwater-fed cooling water system does not occur at the Property.

The FS-OSP identified the following two potentially complete exposure pathways for soil: (1) the soil-to-perched water pathway where constituents in soil leach or migrate into perched water; and, (2) direct contact with soils by a future utility worker.

CLs for the soil-to-perched water pathway were developed for arsenic and lead for each of the six OUs depending on the leachability of the material in each OU. The CLs for arsenic and lead in OU 3 were calculated at 114 and 2,121 micrograms per kilogram (mg/kg; see the FS-OSP for CLs for the other OUs).

CLs for the direct contact soil pathway were developed for arsenic and lead for the Property as a whole. The CLs for arsenic and lead were calculated at 588 and 1,000 mg/kg.

The FS-OSP determined that the CLs are the RELs for arsenic and did not specifically calculate RELs for lead, since arsenic and lead are typically co-located, and remediation of arsenic soils will also remediate lead below the industrial CL of 1,000 mg/kg.

The FS-OSP preferred remedial alternative selected for on-Property soils and perched water consists of:

- Installing a slurry or grout wall around the Property perimeter;
- Treating perched water to the perched water REL;
- Excavating and disposing of soil greater than direct contact RELs in OUs 4 and 6;
- Excavating and stabilizing soils greater than soil-to-perched water RELs in OUs 1, 2, and 3;
- Covering the Property; and
- Applying a deed restriction to ensure ongoing industrial land use.

After completion of the six cleanup actions, on- and off-Property groundwater will be monitored to determine the progress of natural attenuation.

2.2.8. Feasibility Study for On-Property Soils and Perched Water Addendum 1

The FS-OSP Addendum 1 presents a revised remedial alternative that was determined during the remedial design process to implement the FS-OSP selected alternative (PERC 2014c; PERC/PIONEER 2017b). The revised alternative removed installing a slurry or grout wall around the Property perimeter.[3] Ecology agreed to the revised remedial alternative on August 24, 2017, which consists of:

- Treating perched water to the perched water REL;
- Excavating and disposing of soil greater than direct contact RELs in OUs 4 and 6;
- Excavating and stabilizing soils greater than soil-to-perched water RELs in OUs 1, 2, and 3;
- Covering the Property; and
- Applying a deed restriction to ensure ongoing industrial land use

After completion of the five cleanup actions, on- and off-Property groundwater will be monitored to determine the progress of natural attenuation.

2.2.9. Cleanup Action Plan for On-Property Soils and Perched Water

The CAP-OSP summarizes the technical approach of the preferred remedial alternative that was selected in the FS-OSP (see Section 2.2.7; PERC/PIONEER 2015b). The CAP-OSP includes installing a slurry or grout

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[3] Perched water will be treated in-situ with an additive rather than with the installation of a slurry/grout wall and a pump-and-treat system.

wall around the Property perimeter as selected in the FS-OSP. However, subsequent to Ecology's approval of the CAP-OSP, the FS-OSP Addendum 1 was approved by Ecology which removed installing a slurry or grout wall around the Property perimeter from the selected remedy. As such, a slurry or grout wall will not be installed around the Property perimeter as part of the CAP-OSP. Remediation of soils and perched water on the Property as described in the CAP-OSP are ongoing, under an interim action approach approved by Ecology in 2017 (PERC/PIONEER 2018a). Following remediation of soils and perched water, the Property will be covered with a cap and a deed restriction will be placed on the Property to ensure industrial land use.

2.2.10. Remedial Investigation Phase IV Characterization of Drainage Ditch Sediment

Phase IV RI consisted of characterization of the sediment and surface water in the drainage ditch (see Figure 2; PERC/PIONEER 2017a). The RI Phase IV included a sampling event on September 7th and 8th, 2016 to characterize the nature and extent of arsenic and lead as well as TPH in ditch sediment and surface water that remains after remediation of an asphalt tar oil spill (Ecology 2015b). Gardner-Fields Products spilled asphaltic tar oil on their property, and approximately 70,000 gallons were released into the ditch on February 8th, 2015 (Ecology 2015b). Environmental Resources Management (ERM), on behalf of Gardner-Fields Products, conducted remediation in the ditch (including sediment removal) to address the spill. Post-remediation sediment samples were collected and the results indicated that elevated arsenic (up to 330 mg/kg) and lead (up to 350 mg/kg) concentrations remained in the ditch (ERM 2015).

The Phase IV RI used the following sediment screening levels for this evaluation:

- Washington State sediment background concentrations; and
- MTCA Lower Tier Freshwater Sediment Cleanup Objectives (SCOs), Freshwater Sediment Cleanup Levels (SCLs), and Upper Tier Freshwater Sediment Cleanup Screening Levels (SCSLs), as promulgated by Ecology in the Sediment Cleanup User's Manual II (Ecology 2015a).

Based on data collected during the September 2016 sampling event the Phase IV RI determined that the SCSL exceedances for all constituents were primarily located in surface sediment (i.e., 0 to 0.5 feet bgs). The majority of concentrations collected from 0.5 to 8 feet bgs were non-detect or were detected below background concentrations. Residual contamination above SCLSs/SQOs from the asphalt tar oil spill remained in surface sediment in the ditch.

2.2.11. Interim Action Phase III Ditch Remediation

Based on the findings from Phase IV RI, Phase III IA was initiated to remediate the drainage ditch. As documented in the Public Review Draft Phase III Interim Action Work Plan – Ditch Remediation and Supplemental Phase III Interim Action Work Plan – Ditch Remediation (PERC/PIONEER 2021c, 2022c), Phase III IA addresses the arsenic and lead concentrations that are present in the ditch adjacent to the Superlon Property that are potentially associated with the Superlon Site.

The objectives of the Phase III IA are to excavate the:

- Top one foot of the sediment in the ditch in areas where arsenic concentrations exceed the Freshwater SCOs and Freshwater SCSLs promulgated by Ecology in the Sediment Management Standards (Ecology 2013b);
- Eastern berm of the ditch where arsenic and lead concentrations exceed the MTCA industrial cleanup standards for the Port of Tacoma property; and

- Remaining berm soil between the Superlon/Port of Tacoma property line and the western limits of the excavations previously conducted on the Superlon Property to remediate arsenic and lead concentrations exceeding Site-specific RELs.

IA Phase III was implemented between 2020 and 2022 and will be documented in a forthcoming technical memorandum.

2.2.12. Groundwater Monitoring

Groundwater monitoring (GWM) has been conducted at the Site since 2011. GWM was conducted quarterly from the third quarter of 2011 until the fourth quarter of 2015, when the sampling frequency was reduced to one event per year (Ecology 2015c). The results of the 2015-2022 GWM events were documented in the 2015, 2016, 2017, 2018, 2019, 2020, 2021, and 2022 GWM Reports (PERC/PIONEER 2015a, 2016, 2017c, 2018, 2019, 2021b, 2021c, and 2023). The results from the most recent 2022 GWM event indicate that arsenic concentrations in the Shallow Aquifer appear to be slowly increasing with a significant decrease in MW-9S,[4] while arsenic and lead concentrations in the Intermediate Aquifer and lead concentrations in the Shallow Aquifer are stable with the exception of lead in MW-4S, which may be increasing (PERC/PIONEER 2023).

The GWM well network historically consisted of 26 Shallow and Intermediate Aquifer co-located MWs installed at 12 locations on and off of the Property. As of 2022, 10 MWs remain in place, while the other 16 have been decommissioned to allow for the remediation of soils during OSP IA (see Figure 3). A brief history of MW locations is presented below:

- Seven Shallow Aquifer MWs (MW-1S – MW-7S) were installed during Phase I RI activities in 2011, in accordance with the Phase I RI Work Plan (PERC 2010).
- One Shallow Aquifer MW (MW-8S) and eight Intermediate Aquifer MWs (MW-1I – MW-8I) were installed during Phase III RI activities in 2012, in accordance with the Phase III RI Work Plan (PERC 2012a).
- Four Shallow Aquifer MWs (MW-9S – MW-12S) and four Intermediate Aquifer MWs (MW-9I – MW-12I) were installed during Phase IV RI activities in 2014, in accordance with the Phase IV RI Work Plan (PERC 2014b).
- Sixteen MWs were located in areas that the CAP-OSP IA planned to excavate and as such the MWs were decommissioned in 2017 (MW-1I, MW-1S, MW-3I, MW-3S, MW-5I, MW-5S, MW-6I, MW-6S, MW-7I, MW-7S, MW-8I, MW-8S, MW-11I, MW-11S, MW-12I, and MW-12S; PERC/PIONEER 2018b).
- One Shallow Aquifer MW (MW-13S) and one Intermediate Aquifer MW (MW-13I) were installed in November 2019 (PERC/PIONEER 2021b).[5]

All MWs will continue to be sampled annually. Following delineation of the plume using hydropunches, new MWs will be installed and added to the GWM program.[6]

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[4] These fluctuations are presumably due to the ongoing soil and perched groundwater IA (see Section 2.2.8)

[5] MW-13S and MW-13I were installed in the proximate location of MW-3S and MW-3I, which were abandoned in 2017 to allow for soil remediation.

[6] Hydropunches use a stainless steel screen that is shielded as it is pushed to the desired sample depth, and is then exposed at a discrete depth from which a groundwater sample is collected.

2.3. Primer on Geochemical Attenuation of Arsenic

Since arsenic does not degrade in the environment and geochemistry plays a critical role in attenuating arsenic, this section presents a brief primer on geochemical attenuation to provide context for the investigation findings presented in Section 4. The natural attenuation of arsenic in groundwater in general, and the natural attenuation that is presumably occurring within portions of the arsenic plume, is dependent on three geochemical attenuation mechanisms and several geochemical conditions (Argonne National Laboratory 2003; Savannah River National Laboratory 2011; United States Environmental Protection Agency [USEPA] 2007a, 2007b, 2015).[7] The three geochemical attenuation mechanisms (in decreasing order of long-term stability) are (1) precipitation or co-precipitation with recalcitrant and highly stable minerals, (2) co-precipitation with metal oxides (e.g., iron oxides), and (3) sorption. The occurrence of these three mechanisms, which involve partitioning of dissolved arsenic from the aqueous phase to the solid phase (i.e., soil or sediment), is being evaluated at the Site by analyzing soil using a sequential extraction procedure (SEP).[8] A brief description of each mechanism, along with the geochemical conditions typically associated with the mechanism, is presented in the three following paragraphs.

Arsenic that has precipitated or co-precipitated with highly stable minerals is not environmentally available for transport back to the dissolved phase because the arsenic has been incorporated into the mineral and the mineral will remain intact under a wide range of geochemical conditions (including current and anticipated future geochemical conditions at the Site). Arsenic-containing minerals incorporate arsenic directly as the mineral precipitates. Arsenic can also be incorporated indirectly with non-arsenic minerals as an impurity during mineralization (e.g., enargite (Cu3AsS4), cobaltite (CoAsS), and gersdoeffite (NiAsS), scorodite (FeAsO4)). A preliminary evaluation of the geochemical conditions documented during the sampling of the Site's Shallow and Intermediate Aquifer MWs indicates that a variety of highly stable minerals would be expected to precipitate and incorporate arsenic directly or indirectly during precipitation (PERC/PIONEER 2021c).[9] More importantly, the presence of arsenic within highly stable minerals at OU 3 was verified with the sequential extraction results (see Section 4).

Co-precipitation of arsenic with metal oxides (e.g., iron oxides) is not as favorable in terms of long-term attenuation stability as precipitation/co-precipitation with highly stable minerals because metal oxides can be reduced and dissolved by bacteria as part of their respiration process. However, co-precipitation of arsenic with metal oxides can provide stable attenuation of arsenic as long as oxygen is present. When oxygen is present, bacteria use oxygen instead of metal oxides in respiration, leaving the metal oxides intact. Precipitation of metal oxides, and incorporation of arsenic indirectly in the metal oxide mineral as a co-precipitate, occurs in locations where reduction-oxidation (redox) conditions transition from reducing (e.g., Eh less than 0 V) to oxidizing (e.g., Eh greater than 0 V). Thus, as long as redox conditions remain oxidizing (and favorable for metal oxides), arsenic that has co-precipitated with metal oxides will remain in the solid phase. The presence of arsenic within metal oxide minerals at OU 3 was verified with the sequential extraction results (see Section 4).

Although sorption of arsenic on the solid phase is an important geochemical attenuation mechanism, sorption is considered the least stable of the three geochemical attenuation mechanisms because arsenic can desorb from the solid phase and mobilize back to the aqueous phase if one or more geochemical

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[7] The information in this section is based on these references and personal correspondence between Dr. Rebecca Neumann (University of Washington) and Troy Bussey (PIONEER) from November 2016 through June 2019.

[8] A description of SEP is presented in the Brooks Applied Labs report in Appendix C.

[9] The 2011 through 2022 activity of electrons (Eh) values in the Shallow and Intermediate MWs ranged from -0.13 to 0.47 volts (V). The 2011 through 2022 pH results ranged from 6.0 to 9.0, with the exception of three outliers equal to or exceeding 12.0 and one at 4.4.

conditions change. In particular, sorption of the key arsenic species (arsenate and arsenite) can be affected by changes to pH and/or redox conditions. The ability of arsenic to sorb to the solid phase is better when pH is in a neutral range (e.g., pH between 6 and 8) compared to a basic pH (e.g., pH greater than 9).[10,11] Furthermore, the ability of arsenic to sorb to the solid phase decreases proportionally as the pH becomes increasingly basic (elevated).[12] The ability of arsenic to sorb to the solid phase is better in oxidizing conditions (e.g., Eh greater than 0 V) than reducing conditions (e.g., Eh less than 0 V). Oxidizing conditions are better for arsenic sorption primarily because iron oxide minerals are typically present in oxidizing conditions, and iron oxide minerals provide solid-phase sorption surfaces for arsenic.[13] These sorption surfaces can consist of existing iron oxide minerals that have already precipitated or fresh iron oxide minerals that form where redox conditions transition from reducing to oxidizing. Locations in which Eh exceeds 0 V and iron oxide concentrations exceed 1,000 mg/kg are considered favorable for arsenic sorption (Savannah River National Laboratory 2011). Beyond pH and redox conditions, secondary geochemical conditions that can affect sorption include ionic strength and the presence/absence of competitive anions. The ability of arsenic to sorb to the solid phase generally increases as the ionic strength of the aqueous phase increases because sorption surfaces are more positively charged at higher ionic strengths, which facilitates increased sorption of negatively charged arsenic oxyanions.[14] If excessive concentrations of competitive anions—such as ortho-phosphate and silicate—are present, the ability of arsenic to sorb to the solid phase can decrease because ortho-phosphate and silicate can compete with arsenic oxyanions for sorption surfaces.

In summary, ideal conditions for arsenic attenuation (in general order of importance) include:

- The presence of arsenic within highly stable minerals;
- Oxidizing conditions (e.g., Eh greater than 0 V);
- pH in a neutral range (e.g., pH between 6 and 8);[15]
- Iron oxide concentrations greater than 1,000 mg/kg;
- Elevated ionic strength (e.g., elevated conductivity values); and
- Lower concentrations of competitive anions such as ortho-phosphate and silicate.

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[10] At a neutral pH, the surface charge of metal oxides (which sorb arsenic in the aquifers) is positive, aqueous arsenate exists as negatively charged oxyanions, and aqueous arsenite exists as a neutrally charged species. Because the charges on the sorption surface and arsenic species are aligned to attract each other, the electrostatic attractions that facilitate sorption are more compatible in a neutral pH range. By contrast, the sorption surface and arsenic species are less attracted to each other at a basic (elevated) pH because the metal oxide surface and both arsenic species are negatively charged.

[11] Arsenate sorption increases and arsenite sorption decreases as pH becomes more acidic (e.g., decreases from pH 6 to pH 1).

[12] As pH becomes more basic (e.g., increases from pH 9 to pH 11), the sorption surface becomes more negatively charged, which further reduces the attraction of negatively charged arsenic species to the sorption surface.

[13] Manganese and aluminum oxides can also provide sorption surfaces for arsenic.

[14] Conductivity and total dissolved solids are indicators of the ionic strength of the aqueous phase.

[15] Alternatively, ideal attenuation conditions could include an acidic pH if arsenate is the predominant species.

3. Summary of Phase V Remedial Investigation Activities

This section summarizes the field and laboratory investigation activities that were conducted in 2022 to determine the following:

- The hydraulic connection between the Perched and Shallow Aquifers.
- The distribution of arsenic and lead in vadose zone soil, Perched Aquifer soil, and groundwater at OU 3.
- The prevalence of arsenic within highly stable minerals and iron oxide concentrations within the Upper Aquitard.
- The distribution of dissolved arsenic and lead in groundwater along the Property boundary.

Investigation activities were conducted in accordance with the approved Work Plan (see Table 1, Figure 4 and Appendix A), Sampling and Analytical Plan/Quality Assurance Project Plan (SAP/QAPP; PERC/PIONEER 2022a), WAC 173-340-820, and applicable components of Ecology guidance (Ecology 1995).

3.1. Deviations from the Work Plan

Deviations from the Work Plan and SAP/QAPP included the following:

- Off-Property boring HPT-GW-08 was not completed due to restricted access. The boring will be completed during the off-Property phase of the RI.
- HPT-03 and TW-MW-12P/S were located approximately 25 feet northeast of their planned location (see Figure 4).
- Groundwater samples were not collected from the Perched Aquifer at HPT-GW-04 and HPT-GW-05 due to insufficient water.
- An additional soil sample was collected from OU3-SB1 at 16.5 feet bgs.

The deviations did not compromise the investigation objectives or the use of the data obtained during the investigation.

3.2. Field and Laboratory Activities

A summary of field and laboratory activities is presented in the following subsections by purpose. Appendix B includes soil boring logs, the hydraulic profiling tool (HPT) report and logs, and the survey report of soil boring and HPT locations. A summary of the groundwater and soil sample depth intervals is presented on Table 2.

3.2.1. Connection between the Perched and Shallow Aquifers

In summary, field activities performed to determine the connection between the Perched and Shallow Aquifers consisted of:

- Advancing a HPT to approximately 20 feet bgs using direct push technology at three locations to determine the vertical intervals of the Perched and Shallow Aquifers and the Upper Aquitard (HPT-01, HPT-02 and HPT-03; see Figure 4).
- Adjacent to each of the three HPT locations, hydropunches were installed using direct push technology into the Perched and Shallow Aquifers. The hydropunches were left in place concurrently for at least 24 hours in the Perched and Shallow Aquifers to determine the piezometric head for both aquifers (TW-MW-5P/S, TW-MW-6P/S, TW-MW-12P/S; see Figure 4).

A groundwater sample was also collected and analyzed for dissolved arsenic and lead from the Perched and Shallow Aquifers at each HPT location.[16]

3.2.2. Distribution of Arsenic in the Vadose Zone, Perched Aquifer and Upper Aquitard Soils

In summary, field activities performed to determine the distribution of arsenic and lead in the vadose zone and Perched Aquifer at OU 3 consisted of:

- Advancing seven direct push continuously cored soil borings to 10 feet bgs at OU 3 (OU3-SB1 through OU3-SB7; see Figure 4).[17]
- Collecting soil samples from each soil boring at approximately 3 to 4, 6 to 7, and 9 to 10 feet bgs.[18, 19] Each soil sample was analyzed on-Site for arsenic and lead via X-ray fluorescence (XRF). Eight of the soil samples were subsequently analyzed for (1) the Resource Conservation and Recovery Act 8 metals and (2) arsenic and lead using the appropriate leachability procedure.[20] To determine if arsenic is prevalent within highly stable minerals and if iron oxide concentrations are prevalent in the phreatic zone, the seven samples collected at 9 feet bgs were also analyzed for arsenic and iron using the SEP.[21, 22] Soil samples for SEP analysis were collected by splitting the 9 to 10 feet bgs soil into two six-inch sections. The upper six-inch section was homogenized and analyzed for the non-SEP analysis. The bottom six-inch section was used for SEP analysis and was homogenized and collected under anoxic conditions to prevent arsenic from changing states due to oxidation.[23]
- Collecting Perched Aquifer groundwater samples for dissolved arsenic and lead analysis at the seven direct push soil boring locations.[24]

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[16] After each hydropunch location was allowed to equilibrate with the aquifer for at least 24 hours, the water level in the hydropunch was measured and recorded and a groundwater sample was collected.

[17] OU3-SB1 was located adjacent to HPT-02 and was advanced to 20 feet bgs to calibrate the HPT.

[18] Upper two intervals (3 to 4 and 6 to 7 ft bgs) are located within the Perched Aquifer. The third interval (9 to 10 ft bgs) was adjusted to sample the upper portion of the Upper Aquitard.

[19] An additional twelve-inch soil sample was collected from OU3-SB1 at 16.5 feet bgs, which was analyzed using the methods and analysis described for the 9 feet bgs samples described in Section 3.2.2.

[20] The leachability procedure was determined based on the pH of the soil. Per WAC 173-340-747(7), if the pH value was less than six, Toxicity Characteristic Leaching Procedure (TCLP) was used; if the pH value was greater than six, Synthetic Precipitation Leaching Procedure (SPLP) was used.

[21] The phreatic zone, saturated zone, or zone of saturation, is the part of an aquifer, below the water table, in which relatively all pores and fractures are saturated with water.

[22] SEP analysis was in accordance with Brooks Analytical Laboratories of Bothell, WA standard procedures using a modified version of the Wenzel et al 2001 methodology (BAL-5913). Analysis includes a five-step selective sequential extraction method (i.e., (1) NH4H2PO4, (2) NH2OH*HCl, (3)NH4+-oxalate, (4) HNO3/H2O2, and (5) HCl/HF/HNO3), for correlation between metals (aluminum, arsenic, iron, manganese, and silicon) and different substrate properties. Other analyses include total recoverable arsenic.

[23] Anoxic sampling conditions were maintained by homogenizing and containerizing the soil samples within a leakproof box without a lid (e.g., cooler) that had dry ice sublimating nitrogen and displacing oxygen from the box. An oxygen meter (e.g, RAE Systems QRAE) was used to ensure the cooler remained anoxic (i.e., oxygen less than 5%). The soil samples were delivered to the lab in a cooler with dry ice.

[24] Perched Aquifer groundwater samples at boring locations OU3-SB1 and OU3-SB3 were collected from co-located hydropunch locations TW-MW-5P and TW-MW-6P, respectively.

3.2.3. Distribution of Dissolved Arsenic and Lead along the Property Boundary

In summary, field activities performed to determine the distribution of dissolved arsenic and lead along the Property boundary consisted of:

- Advancing an HPT to 50 feet bgs using direct push technology at seven locations to determine the vertical intervals of the Perched, Shallow, and Intermediate Aquifers (HPT-GW-01 through HPT-GW-07; see Figure 4). [25]
- After determining the vertical intervals of the aquifer using the HPT results, groundwater samples were collected from hydropunches installed in the Perched, Shallow, and Intermediate Aquifers for analysis of dissolved arsenic and lead at the seven locations.

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[25] This evaluation was not designed to determine the lower extent of the Intermediate Aquifer, which is deeper than 50 feet bgs.

4. Investigation Results

This section summarizes the investigation results of the RI Phase V.

4.1. Data Validation

All laboratory analyses were validated by an independent data validator, James McAteer of QA/QC Solutions, LLC. Overall, the data generated by the laboratories were considered of good quality and the laboratories' quality assurance/quality control procedures were generally acceptable. In general, nearly all RI Phase V sampling analytical data were determined to be acceptable for use without qualification. Some data validation qualifiers were added to supplement data qualifiers assigned by the laboratories. All data assigned qualifiers were determined to be usable. Appendix C includes the laboratory validation report, summary tables of analytical data (Tables C-1 through C-4), and analytical laboratory reports.

4.2. Site Lithology

A summary of the interpreted lithology from the soil boring logs and HPT logs is presented on Table 2, the gauged groundwater levels are presented on Table 3, and the arsenic concentrations in groundwater and soil are presented on Tables 4 and 5. Cross-sections across the Property were generated using investigation soil boring logs, HPT logs, and groundwater monitoring well logs (see Appendix D, Figures D-1 through D-6). Shallow (surface grade to 20 feet below msl) and deep (surface grade to 40 feet below msl) figures of each cross-section were generated. The shallow cross-sections are labeled in lower case (e.g., a-a') and the corresponding deep cross-sections are labeled in upper case (e.g., A-A'). The shallow cross-sections include arsenic concentrations in soil and groundwater and hydraulic head values for the Perched and Shallow Aquifers. The deep cross-sections include arsenic groundwater concentrations and hydraulic head values for the Perched, Shallow, and Deep Aquifers. The lithologic layers are discussed in Sections 2.1.3 and 2.1.4.

4.3. Connection between the Perched and Shallow Aquifers in OU 3

The hydraulic head values measured in the Shallow Aquifer generally extend upward into the Upper Aquitard or Perched Aquifer, indicating that the Shallow Aquifer is at least partially confined (see Figures D-1 through D-6). Hydraulic head values measured in the Perched Aquifer within OU 3 were higher than the co-located Shallow Aquifer hydraulic head values (TW-MW-5P/S and TW-MW-6P/S; see Figure D-1 and Table 3). This demonstrates that there is a downward gradient between the Perched and Shallow Aquifers in OU 3.

Perched Aquifer arsenic concentrations in OU 3 ranged from 0.0059 to 0.19 mg/L (see Table 4 and Figures 5 and D-1 through D-4). Perched Aquifer arsenic concentrations outside of OU 3 ranged from 0.080 to 6.3 mg/L. Shallow Aquifer arsenic concentrations across the Property ranged from 0.11 to 65 mg/L. Perched Aquifer arsenic concentrations were significantly less than Shallow Aquifer arsenic concentrations at all locations in OU 3 with co-located Perched and Shallow Aquifer groundwater samples (see Table 4 and Figure 5).[26]

The combination of (1) a downward gradient between the Perched and Shallow Aquifers and (2) Perched Aquifer concentrations being significantly less than Shallow Aquifer concentrations indicates that groundwater from the Perched Aquifer is not adversely affecting the Shallow Aquifer at OU 3 (i.e., the slow downward migration of groundwater from the Perched Aquifer into the Shallow Aquifer is bringing groundwater with lower concentrations into the Shallow Aquifer). In summary, the sampling results

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[26] At the boundary of OU2 and OU 3—the edge of the source area—the Perched Aquifer arsenic concentrations are greater than Shallow Aquifer arsenic concentrations (i.e., TW-MW-12P/S [HPT-03]).

indicate that arsenic in the Perched Aquifer at OU 3 is not a contributing source of significance to the Shallow Aquifer arsenic plume.

4.4. Distribution of Arsenic in the Vadose Zone, Perched Aquifer and Upper Aquitard Soils

Arsenic soil concentrations in the Perched Aquifer and Upper Aquitard at OU 3 ranged from non-detect to 214 mg/kg, and from 10 to 15,499 mg/kg, respectively (see Table 5 and Figure 8).[27] Arsenic soil concentrations in the Perched Aquifer were lower at all locations than those in the Upper Aquitard, which indicates that a large majority of arsenic mass within OU 3 is located in the Upper Aquitard (see Figures D-1 and D-3). This is congruent with historical information indicating that the tidal flats (i.e., Perched Aquifer) within OU 3 were filled with hydrated lime between 1966 and 1972, long after lead arsenate and calcium arsenate insecticide activities ended in 1951 (i.e., the fill that created the Perched Aquifer within OU 3 was brought onto the Property after the releases of lead arsenate and calcium arsenate had occurred; see Appendix E for aerial photographs documenting fill being brought into OU 3).

4.5. Accessible Arsenic Mass in OU 3 Soils

The determination that the Perched Aquifer and Upper Aquitard in OU 3 contain relatively low arsenic concentrations led to an evaluation of the accessible arsenic mass in OU 3 relative to OUs 1, 2, and 4.[28, 29] Accessible arsenic mass was calculated for OU 3 and OUs 1, 2, and 4 using Thiessen polygons with the following methodology (see Appendix F for the detailed calculations and how Thiessen polygons are developed):

- Thiessen polygons were developed for the two areas defined by OU 3 and OUs 1, 2, and 4 using the RI soil boring locations and accessible areas;
- Inaccessible areas excluded include the building footprints with a 10-feet buffer and a 5-feet buffer around the building loading dock; and
- Arsenic concentrations were assigned to all polygons at corresponding depth intervals based on the soil sample results collected from 0 to 15 feet bgs from the soil boring associated with each polygon.[30]

Currently, CAP-OSP remediation of OUs 1, 2, and 4 is 90% complete (with the pond area being the only area remaining to remediate), and remediation of OU 3 has not begun. The mass calculation determined that:

- Prior to remediation of OUs 1, 2, and 4, there were approximately 213,000 pounds (lbs) of arsenic in soil at OUs 1, 2 and 4;
- Approximately 7,700 lbs of arsenic is present in OU 3;
- Only 4% of the accessible arsenic mass in OUs 1, 2, 3, and 4 was located in OU 3; and
- When remediation of OUs 1, 2, and 4 is complete, 96% of the accessible arsenic mass will be remediated.

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[27] Figure 8 presents lab and XRF results. If a lab result and XRF result were available for the same depth, the lab result was used on the figure.

[28] Accessible arsenic is arsenic in soil above 15 feet bgs that is outside of the building, loading dock and railroad buffers.

[29] Arsenic mass in OUs 5 and 6 was not included in the evaluation due to the separate source and non-soluble nature of the source (vitrified beads/shot; PERC 2013)

[30] In accordance with WAC 173-340-740(6)(d), the standard point of compliance (POC) depth for soil is 15 feet bgs for human direct contact.

4.6. Sequential Extraction Procedure Results of OU 3 Soils

Sequential extraction procedure results from the one Shallow Aquifer and six Upper Aquitard soil samples analyzed indicates the following (see Table 6):

- More than half of the arsenic in the Upper Aquitard has precipitated or co-precipitated with highly stable minerals and is unable to leach into groundwater and will remain intact under a wide range of geochemical conditions (including current and anticipated future geochemical conditions at the Site (see Figure 9 and Section 2.3 for details). [31]
- Iron oxide concentrations are greater than 1,000 mg/kg and average 3,700 mg/kg in the six Upper Aquitard samples (see Table 6, co-precipitated iron).

Precipitation or co-precipitation of arsenic with highly stable minerals in OU 3 combined with the low arsenic groundwater concentrations in the Perched Aquifer (see Figure 8) indicate that arsenic in soil within OU 3 is not leaching into groundwater. Although this conflicts with SPLP results indicating that the arsenic is leachable (see Table C-3 in Appendix C), the conflict is likely due to the synthetic nature of the leaching analysis not representing real world phreatic zone chemistry conditions at OU 3 (i.e., if the leaching analysis represented the phreatic zone chemistry, higher concentrations of dissolved arsenic would be present in the Perched Aquifer within OU 3).[32]

4.7. Arsenic and Lead Groundwater Plume

This section presents a method for delineation of the arsenic and lead groundwater plume, and the dissolved arsenic concentrations in the Perched, Shallow, and Intermediate Aquifers.

4.7.1. Method of Plume Delineation

Delineation of the plume will be determined by indicator constituent concentrations and not groundwater gradient as the primary groundwater gradient pattern may have shifted over the last 70 years as the area was developed (i.e., the release occurred between 1925 and 1951 [PERC/PIONEER 2011] and historic groundwater gradient patterns may have been different than the current groundwater gradient patterns).

The FS-OSP documented that arsenic and lead are co-located at the Site with arsenic being the primary risk driver (PERC 2014c). As such, dissolved arsenic will be used as the indicator constituent to define the extent of the plume. The extent of plume delineation will be defined by the POC, which is the groundwater cleanup level. The Puget Sound background arsenic concentration is 0.008 mg/L and is the proposed preliminary cleanup level (PCL) and potential POC for the Perched and Intermediate Aquifers (Ecology 2022).[33] The cleanup level for the Shallow Aquifer will be selected following determination of the arsenic background concentration in the Shallow Aquifer.[34] Cleanup standards will be proposed for each cleanup alternative evaluated in the Site FS Report, and the final cleanup standards for the selected remedy will be established in the Site Cleanup Action Plan.

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[31] Changing geochemical conditions due to a fluctuating groundwater table would not be sufficient to leach arsenic from highly stable minerals.

[32] The leaching procedures are performed in conditions with a pH of 5 or less to mimic acid rain or biologic degradation. However, due to the presence of hydrated lime within OU 3, the actual pH is significantly higher, with an average pH of 11.66 (see Table C-3).

[33] The lowest sampled Perched and Intermediate Aquifer concentrations are below 0.008 mg/L (see Table 4).

[34] The lowest detected Shallow Aquifer arsenic concentration at the Site is 0.11 mg/L (see Table 4) and the local arsenic background concentration in the Shallow Aquifer has not been determined.

4.7.2. Perched Aquifer Plume Delineation

Perched Aquifer arsenic concentrations are presented on Table 5 and Figure 5. Arsenic concentrations in the Perched Aquifer range from 0.0059 to 6.3 mg/L. Lower concentrations are generally located within OU 3, and the highest concentrations were located in OUs 1, 2, and 4. Arsenic concentrations exceeded the PCL of 0.008 mg/L along all sides of the Property boundary where water is present in the Perched Aquifer.[35] Off-Property investigation would be needed to delineate the plume in the Perched Aquifer.

4.7.3. Shallow Aquifer Plume Delineation

Shallow Aquifer arsenic concentrations are presented on Table 5 and Figure 6. Arsenic concentrations in the Shallow Aquifer range from 0.11 to 65 mg/L. The distribution appears to indicate (1) dominant plume migration to the southwest, south, and southeast, (2) minor plume migration to the west and northwest, and (3) a possible off-Site source to the southeast. Off-Property investigation is required to delineate the plume in the Shallow Aquifer.

4.7.4. Intermediate Aquifer Plume Delineation

Intermediate Aquifer arsenic concentrations are presented on Table 5 and Figure 7. Arsenic concentrations in the Intermediate Aquifer range from less than 0.005 to 0.16 mg/L. The Intermediate Aquifer plume is delineated to the PCL of 0.008 mg/L along the southwest, northwest, and northeast sides of the Property boundary. The Intermediate Aquifer plume is not delineated to the southeast. Off-Property investigation would be needed to delineate the Intermediate Aquifer plume to the southeast.

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[35] Groundwater samples were not collected from the Perched Aquifer at HPT-GW-04 and HPT-GW-05 due to insufficient water.

5. OU 3 CAP-OSP Remedy Evaluation

This section evaluates the CAP-OSP IA remedy for OU 3 using the results of this investigation. The CAP-OSP IA remedy is summarized as follows (PERC 2014c, PERC/PIONEER 2017b, PERC/PIONEER 2018a):

- Treating perched water to the perched water REL;
- Excavating and disposing of soil greater than direct contact RELs in OUs 4 and 6;
- Excavating and stabilizing soils greater than soil-to-perched water RELs in OUs 1, 2, and 3 (i.e., 242, 91, and 114 mg/kg, respectively);
- Covering the Property; and
- Applying a deed restriction to ensure on-going industrial land use

Remediation of soils and perched water on the Property are ongoing and are being performed in accordance with an Ecology-approved approach (PERC/PIONEER 2018a). Remediation of OU 6 is complete, remediation of OUs 1, 2, and 4 is 90% complete (with only the pond area remaining), and remediation of OU 3 has not started. Following remediation of the OSP, the Property will be covered with a cap and a deed restriction will be placed on the Property to ensure industrial land use.

5.1. OSP Perched Aquifer Groundwater Remediation Level

The FS-OSP identified one exposure pathway by which industrial workers could indirectly contact constituents in on-Property perched water. This involves the migration of constituents from the Perched Aquifer to the Shallow Aquifer, with the Shallow Aquifer used as part of a future process cooling water system. Under this scenario, exposure to industrial workers could occur as a part of maintenance activities on the cooling water system. Based on this pathway, the non-potable groundwater RELs for arsenic and lead were calculated to be 0.67 and 1.65 mg/L, respectively.

None of the groundwater samples collected from the Perched Aquifer within OU 3 exceeded the RELs for arsenic or lead (see Table C-2 in Appendix C). In addition, this pathway is not complete, as use of a groundwater-fed cooling water system does not occur at the Property. In summary, groundwater in the Perched Aquifer within OU 3 does not exceed the Perched Water RELs and does not need be treated as part of CAP-OSP IA.

5.2. OSP Soil Remediation Level

The FS-OSP identified the following two potentially complete exposure pathways for soil: (1) direct contact with soils by a future utility worker; and (2) the soil-to-perched water pathway where constituents in soil leach or migrate into perched water that could be contacted by workers performing maintenance activities on a future groundwater-fed cooling water system.

CLs for the direct contact soil pathway were developed for arsenic and lead for the Property as a whole. The CLs for arsenic and lead were calculated to be 588 and 1,000 mg/kg, respectively.

The CLs for the soil-to-perched water pathway were developed for arsenic for each of the six OUs depending on the leachability of the material in each OU. The CLs were calculated by comparing the leachability results to the perched water RELs to determine a corresponding soil concentration that would be protective of groundwater for each OU. The total soil concentration was compared to the leachability result and a leachate concentration equivalent to the perched water REL was calculated (see the following equation).

$$Soil\text{-}\ to\text{-}Perched\ Water\ \mathrm{REL}\ \left(\frac{\mathrm{mg}}{\mathrm{kg}}\right) = \frac{\left(\dfrac{Perched\ Water\ REL\ \frac{mg}{l}}{Dilution\ Factor}\right)}{SPLP\ or\ TCLP\ Result\ \frac{mg}{l}} \times Total\ Soil\ Concentration\ \frac{mg}{kg}$$

The CAP-OSP arsenic soil REL for each OU is the lower of the two soil exposure pathway CLs.[36] The soil-to-perched water pathway calculated from leachability analysis was selected for OU 3 with an REL of 114 mg/kg. However, data from this investigation indicates that arsenic in soil within OU 3 is not leaching into groundwater to the extent predicted by leachability analysis and is not causing arsenic groundwater concentrations to exceed the groundwater REL (see Section 4.6 for details). This conflict is likely due to the synthetic nature of the leaching analysis not representing real world phreatic zone chemistry conditions at OU 3 (i.e., if the leaching analysis represented the phreatic zone chemistry, higher concentrations of dissolved arsenic would be present in the Perched Aquifer within OU 3). It is recommended that the CAP-OSP arsenic soil REL for OU 3 be based on the direct contact soil pathway CL of 588 mg/kg. Figure 10 presents all of the soil sample locations at OU 3 with arsenic concentrations exceeding 588 mg/kg along with the associated Remedial Action Units at OU 3 to be remediated as part of the CAP-OSP IA.

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[36] An REL was not specifically calculated for lead, since arsenic and lead are typically co-located, and the remediation of arsenic concentrations in soil will address lead concentration to below the lead CL of 1,000 mg/kg (PERC 2014c).

6. Conclusions

Key conclusions from the investigation and evaluation activities documented in this Report are:

- OU 3 arsenic groundwater concentrations in the Perched Aquifer are significantly less than Shallow Aquifer arsenic groundwater concentrations. This indicates that the Perched Aquifer at OU 3 is not a significant source contributing to the Shallow Aquifer arsenic plume.
- OU 3 arsenic soil concentrations in the Perched Aquifer were lower than those in the Upper Aquitard, which indicates that the majority of the arsenic mass at OU 3 is located in the Upper Aquitard. This is congruent with historical information indicating that the tidal flats within OU 3 were filled with hydrated lime between 1966 and 1972, long after lead arsenate and calcium arsenate insecticide activities ended in 1951 (i.e., the fill that created the Perched Aquifer within OU 3 was brought on to the Property after the releases of lead arsenate and calcium arsenate had occurred).
- Precipitation or co-precipitation of arsenic with highly stable minerals in the Upper Aquitard of OU 3 and low arsenic groundwater concentrations in the Perched Aquifer were observed. This combination of factors indicates that arsenic in soil at OU 3 is not leaching into groundwater to the extent predicted by leachability analysis and is not causing arsenic groundwater concentrations to exceed the groundwater REL.
- Prior to the remediation of OUs 1, 2, and 4, there was approximately 213,000 lbs of arsenic in soil in OUs 1, 2, and 4, and approximately 7,700 lbs of arsenic in OU 3. Only 4% of the total accessible arsenic mass in OUs 1, 2, 3, and 4 was located in OU 3 (i.e., when remediation of OUs 1, 2, and 4 is complete, 96% of the arsenic mass will be remediated).
- Arsenic groundwater concentrations in the Perched Aquifer exceeded the PCL of 0.008 mg/L along all sides of the Property boundary where water was present.
- Arsenic groundwater concentrations in the Shallow Aquifer ranged from 0.11 to 65 mg/L. The distribution appears to indicate (1) dominant plume migration to the southwest, south, and southeast, (2) minor plume migration to the west and northwest, and (3) a possible off-Site source to the southeast.
- Arsenic groundwater concentrations in the Intermediate Aquifer plume are delineated to the PCL of 0.008 mg/L along the southwest, northwest, and northeast sides of the Property boundary. The Intermediate Aquifer plume is not delineated to the southeast.
- Arsenic groundwater concentrations in the Perched Aquifer at OU 3 do not exceed the Perched Water REL. Therefore, groundwater in the Perched Aquifer at OU 3 does not require treatment as part of the ongoing CAP-OSP IA.

7. Recommendations

Recommendations from the investigation and evaluation activities documented in this Report are:

- Conduct off-Property investigation(s) to delineate the groundwater plume in the Perched, Shallow, and Intermediate Aquifers.
- The arsenic soil REL of 114 mg/kg for OU 3 was selected based on leachability analysis (PERC 2014c). However, data from this investigation indicates that arsenic in soil at OU 3 is not leaching into groundwater. Therefore, it is recommended that the CAP-OSP arsenic soil REL for OU 3 be based on the soil direct contact pathway cleanup level of 588 mg/kg.

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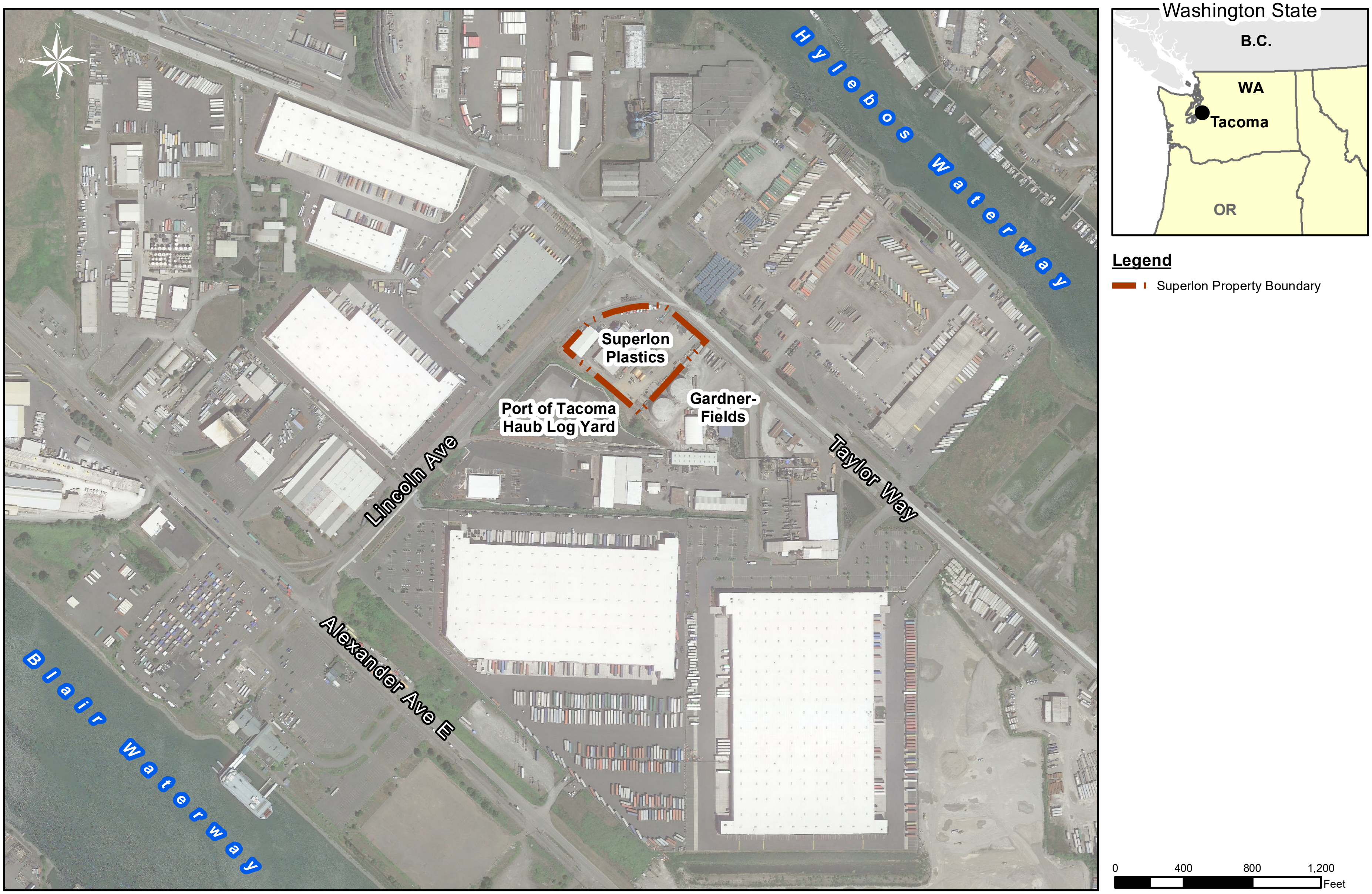

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Property Location
Remedial Investigation Phase V
Superlon Plastics Property, Tacoma, Washington

Figure 1

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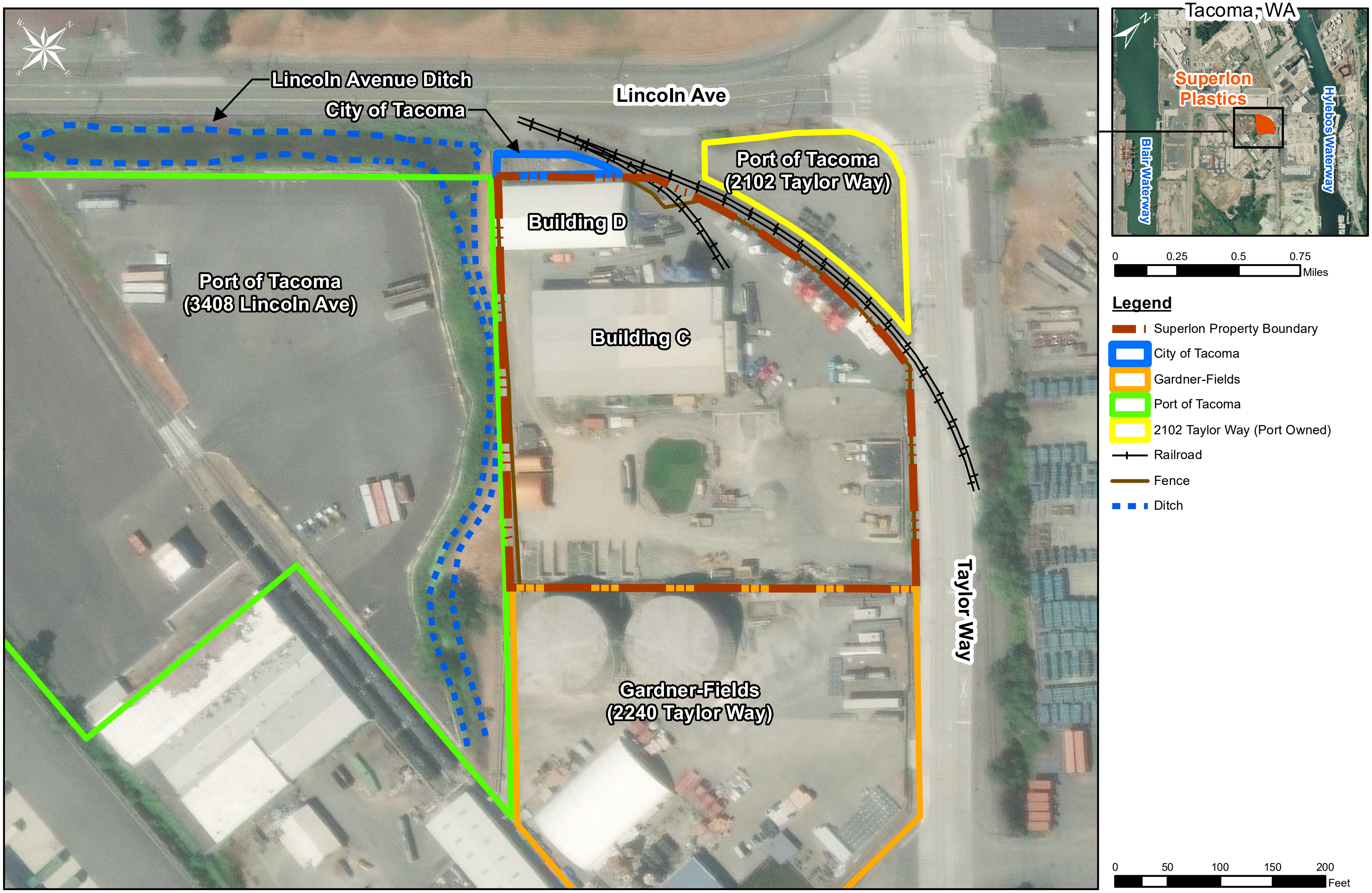

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Property Features
Remedial Investigation Phase V
Superlon Plastics Property, Tacoma, Washington

Figure 2

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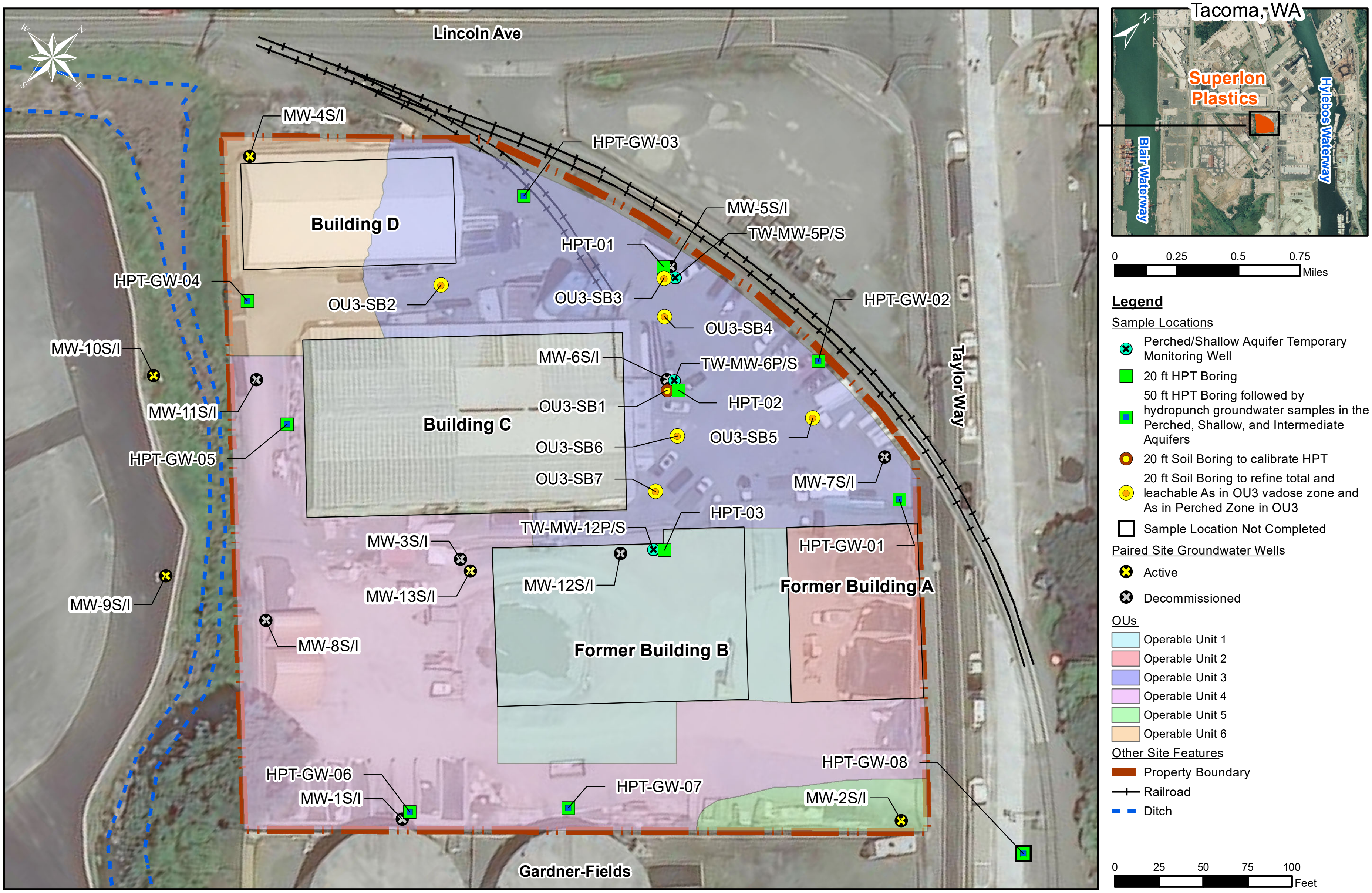
Monitoring Well Locations
Remedial Investigation Phase V
Superlon Plastics Site, Tacoma, Washington

Figure 3

Document Path: G:\Projects\Superlon\Maps\2023\March\RI Phase V\Figure 3_Locations of MWs.mxd; Author: MK; Date Saved: 3/28/2023

Document Path: G:\Projects\Superlon\Maps\2022\RI Phase V WP\September\Figure 4_Proposed Sample Locations.mxd; Author: MK; Date Saved: 10/5/2022



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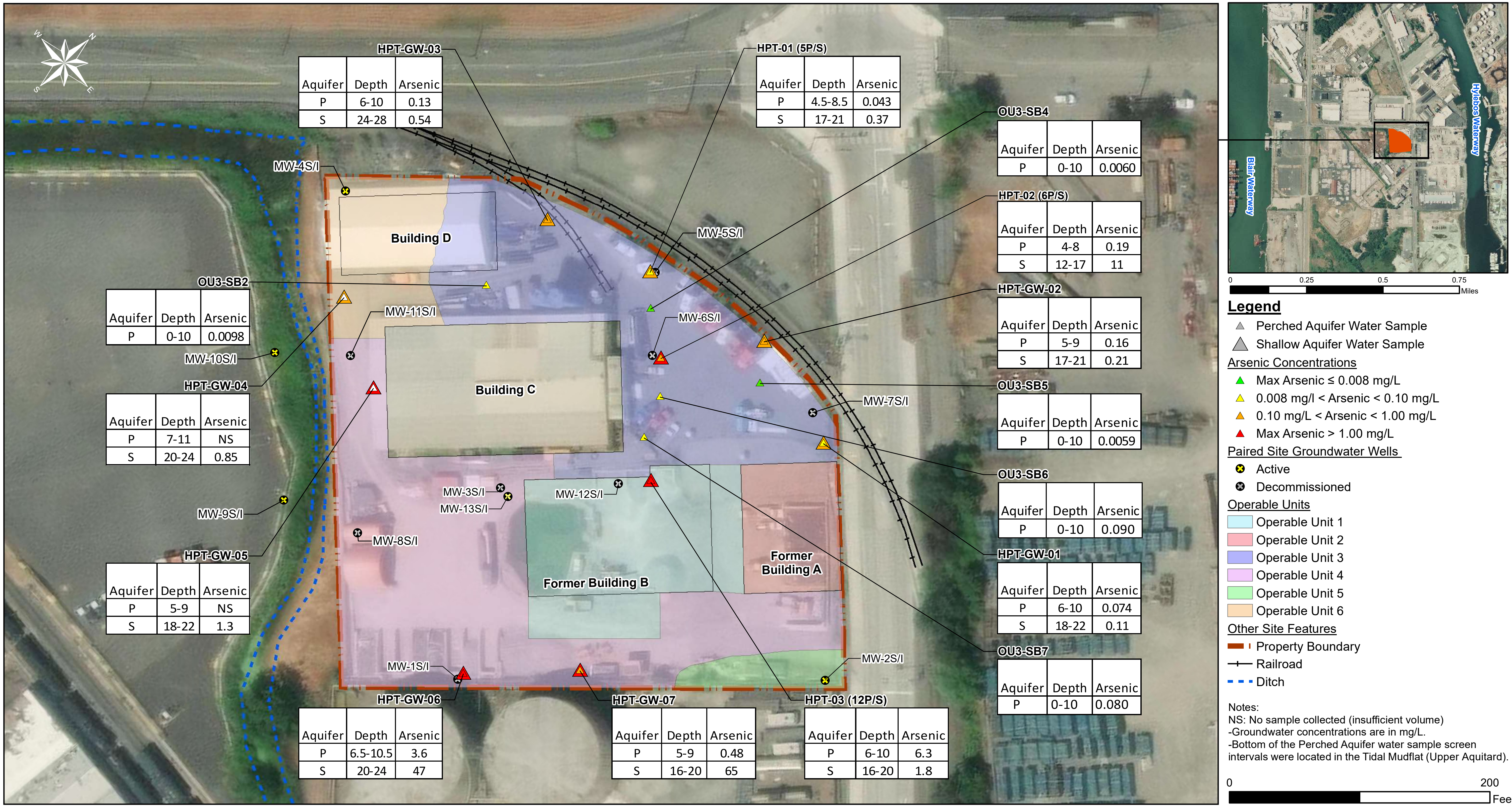
Sample Locations
Remedial Investigation Phase V
Superlon Plastics Property, Tacoma, Washington

Figure 4



HPT-GW-03

Aquifer	Depth	Arsenic
P	6-10	0.13
S	24-28	0.54

HPT-01 (5P/S)

Aquifer	Depth	Arsenic
P	4.5-8.5	0.043
S	17-21	0.37

OU3-SB4

Aquifer	Depth	Arsenic
P	0-10	0.0060

HPT-02 (6P/S)

Aquifer	Depth	Arsenic
P	4-8	0.19
S	12-17	11

HPT-GW-02

Aquifer	Depth	Arsenic
P	5-9	0.16
S	17-21	0.21

OU3-SB5

Aquifer	Depth	Arsenic
P	0-10	0.0059

OU3-SB6

Aquifer	Depth	Arsenic
P	0-10	0.090

HPT-GW-01

Aquifer	Depth	Arsenic
P	6-10	0.074
S	18-22	0.11

OU3-SB7

Aquifer	Depth	Arsenic
P	0-10	0.080

OU3-SB2

Aquifer	Depth	Arsenic
P	0-10	0.0098

HPT-GW-04

Aquifer	Depth	Arsenic
P	7-11	NS
S	20-24	0.85

HPT-GW-05

Aquifer	Depth	Arsenic
P	5-9	NS
S	18-22	1.3

HPT-GW-06

Aquifer	Depth	Arsenic
P	6.5-10.5	3.6
S	20-24	47

HPT-GW-07

Aquifer	Depth	Arsenic
P	5-9	0.48
S	16-20	65

HPT-03 (12P/S)

Aquifer	Depth	Arsenic
P	6-10	6.3
S	16-20	1.8

Legend

- ▲ Perched Aquifer Water Sample
- ▲ Shallow Aquifer Water Sample

Arsenic Concentrations
- ▲ Max Arsenic ≤ 0.008 mg/L
- ▲ 0.008 mg/l < Arsenic < 0.10 mg/L
- ▲ 0.10 mg/L < Arsenic < 1.00 mg/L
- ▲ Max Arsenic > 1.00 mg/L

Paired Site Groundwater Wells
- ⊗ Active
- ⊗ Decommissioned

Operable Units
- 🟦 Operable Unit 1
- 🟥 Operable Unit 2
- 🟦 Operable Unit 3
- 🟪 Operable Unit 4
- 🟩 Operable Unit 5
- 🟧 Operable Unit 6

Other Site Features
- ▬ Property Boundary
- ┼ Railroad
- - - Ditch

Notes:
NS: No sample collected (insufficient volume)
-Groundwater concentrations are in mg/L.
-Bottom of the Perched Aquifer water sample screen intervals were located in the Tidal Mudflat (Upper Aquitard).

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Arsenic Concentrations in the Perched and Shallow Aquifers
Remedial Investigation Phase V
Superlon Plastics Property, Tacoma, Washington

Figure 5

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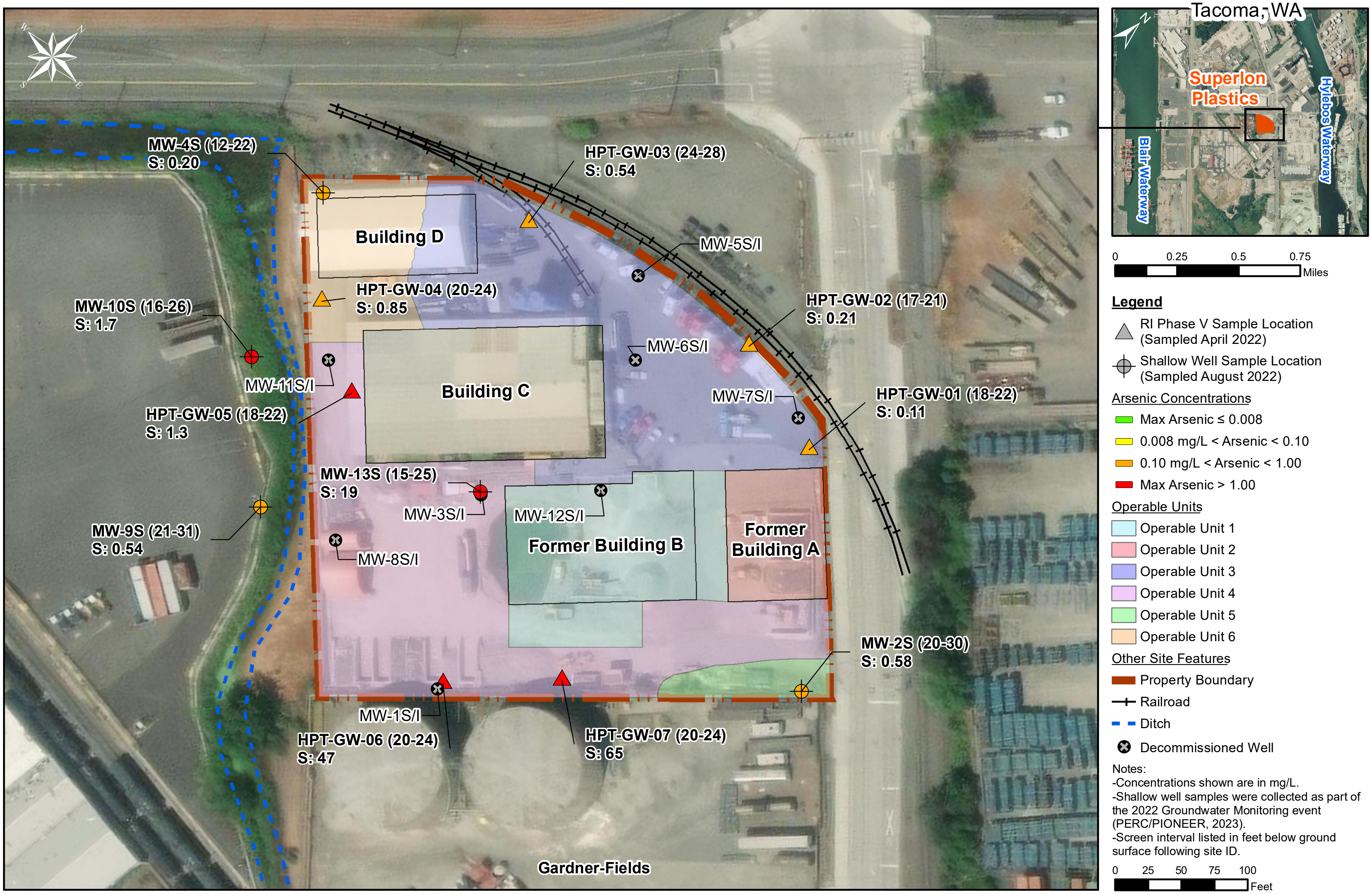

Notes:
-Concentrations shown are in mg/L.
-Shallow well samples were collected as part of the 2022 Groundwater Monitoring event (PERC/PIONEER, 2023).
-Screen interval listed in feet below ground surface following site ID.

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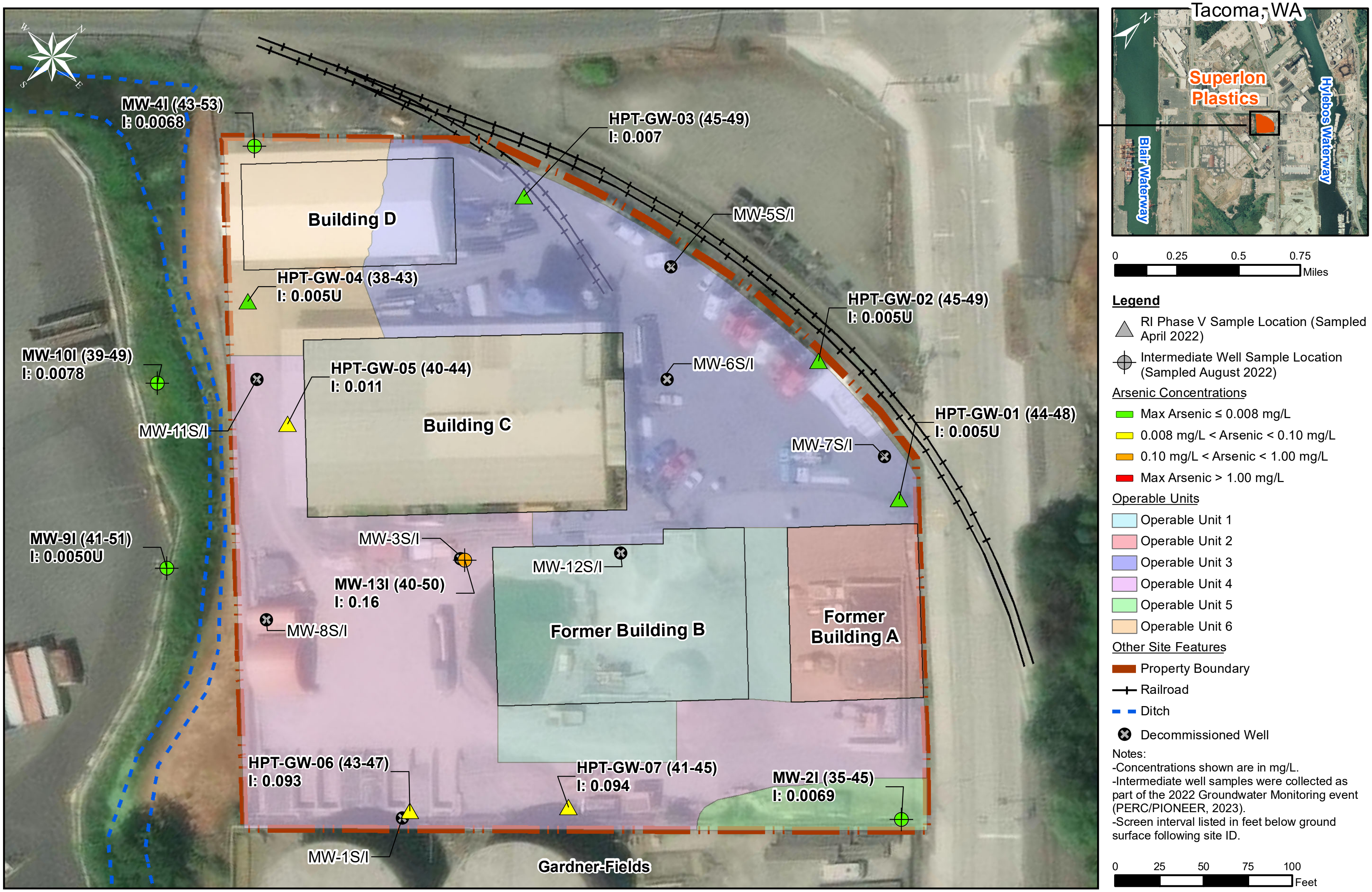
Arsenic Concentrations in the Shallow Aquifer
Remedial Investigation Phase V
Superlon Plastics Property, Tacoma, Washington

Figure 6

Document Path: G:\Projects\Superlon\Maps\2023\March\RI Phase V\Fig 6_Shallow Aq GW.mxd; Author: MK; Date Saved: 3/28/2023



Legend

RI Phase V Sample Location (Sampled April 2022)

Intermediate Well Sample Location (Sampled August 2022)

Arsenic Concentrations

🟩 Max Arsenic ≤ 0.008 mg/L

🟨 0.008 mg/L < Arsenic < 0.10 mg/L

🟧 0.10 mg/L < Arsenic < 1.00 mg/L

🟥 Max Arsenic > 1.00 mg/L

Operable Units

Operable Unit 1

Operable Unit 2

Operable Unit 3

Operable Unit 4

Operable Unit 5

Operable Unit 6

Other Site Features

Property Boundary

Railroad

Ditch

Decommissioned Well

Notes:
-Concentrations shown are in mg/L.
-Intermediate well samples were collected as part of the 2022 Groundwater Monitoring event (PERC/PIONEER, 2023).
-Screen interval listed in feet below ground surface following site ID.

Document Path: G:\Projects\Superlon\Maps\2023\March\RI Phase V\Fig 7_Intermediate Aq GW.mxd; Author: MK; Date Saved: 3/28/2023

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Arsenic Concentrations in the Intermediate Aquifer
Remedial Investigation Phase V
Superlon Plastics Property, Tacoma, Washington

Figure 7

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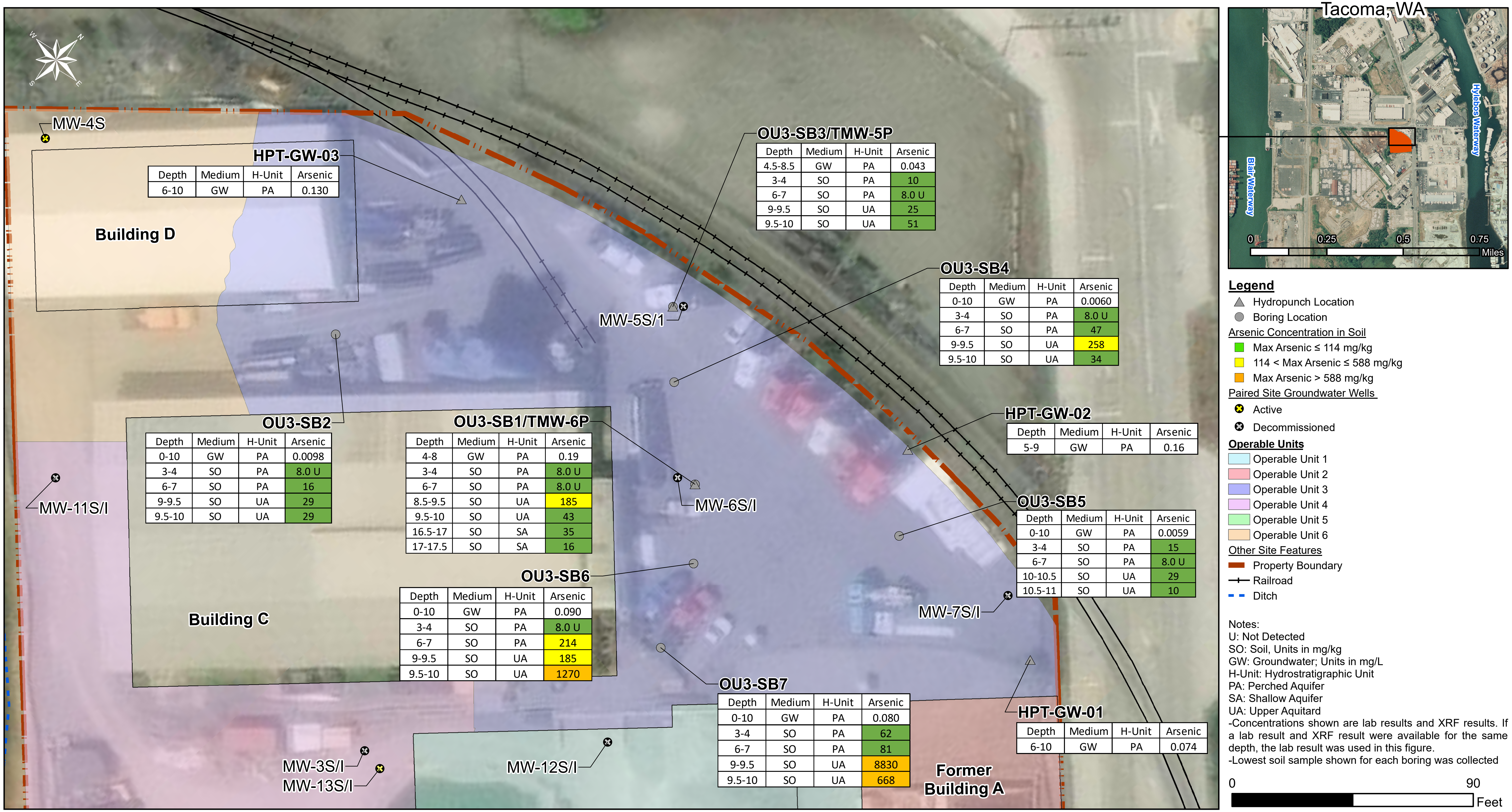

HPT-GW-03

Depth	Medium	H-Unit	Arsenic
6-10	GW	PA	0.130

OU3-SB3/TMW-5P

Depth	Medium	H-Unit	Arsenic
4.5-8.5	GW	PA	0.043
3-4	SO	PA	10
6-7	SO	PA	8.0 U
9-9.5	SO	UA	25
9.5-10	SO	UA	51

OU3-SB4

Depth	Medium	H-Unit	Arsenic
0-10	GW	PA	0.0060
3-4	SO	PA	8.0 U
6-7	SO	PA	47
9-9.5	SO	UA	258
9.5-10	SO	UA	34

HPT-GW-02

Depth	Medium	H-Unit	Arsenic
5-9	GW	PA	0.16

OU3-SB2

Depth	Medium	H-Unit	Arsenic
0-10	GW	PA	0.0098
3-4	SO	PA	8.0 U
6-7	SO	PA	16
9-9.5	SO	UA	29
9.5-10	SO	UA	29

OU3-SB1/TMW-6P

Depth	Medium	H-Unit	Arsenic
4-8	GW	PA	0.19
3-4	SO	PA	8.0 U
6-7	SO	PA	8.0 U
8.5-9.5	SO	UA	185
9.5-10	SO	UA	43
16.5-17	SO	SA	35
17-17.5	SO	SA	16

OU3-SB5

Depth	Medium	H-Unit	Arsenic
0-10	GW	PA	0.0059
3-4	SO	PA	15
6-7	SO	PA	8.0 U
10-10.5	SO	UA	29
10.5-11	SO	UA	10

OU3-SB6

Depth	Medium	H-Unit	Arsenic
0-10	GW	PA	0.090
3-4	SO	PA	8.0 U
6-7	SO	PA	214
9-9.5	SO	UA	185
9.5-10	SO	UA	1270

OU3-SB7

Depth	Medium	H-Unit	Arsenic
0-10	GW	PA	0.080
3-4	SO	PA	62
6-7	SO	PA	81
9-9.5	SO	UA	8830
9.5-10	SO	UA	668

HPT-GW-01

Depth	Medium	H-Unit	Arsenic
6-10	GW	PA	0.074

Legend

- △ Hydropunch Location
- ● Boring Location

Arsenic Concentration in Soil

- 🟩 Max Arsenic ≤ 114 mg/kg
- 🟨 114 < Max Arsenic ≤ 588 mg/kg
- 🟧 Max Arsenic > 588 mg/kg

Paired Site Groundwater Wells

- ⊗ Active
- ⊗ Decommissioned

Operable Units

- ▨ Operable Unit 1
- ▨ Operable Unit 2
- ▨ Operable Unit 3
- ▨ Operable Unit 4
- ▨ Operable Unit 5
- ▨ Operable Unit 6

Other Site Features

- ▬ Property Boundary
- ┼ Railroad
- ‒ ‒ Ditch

Notes:
U: Not Detected
SO: Soil, Units in mg/kg
GW: Groundwater; Units in mg/L
H-Unit: Hydrostratigraphic Unit
PA: Perched Aquifer
SA: Shallow Aquifer
UA: Upper Aquitard
-Concentrations shown are lab results and XRF results. If a lab result and XRF result were available for the same depth, the lab result was used in this figure.
-Lowest soil sample shown for each boring was collected

0 90 Feet

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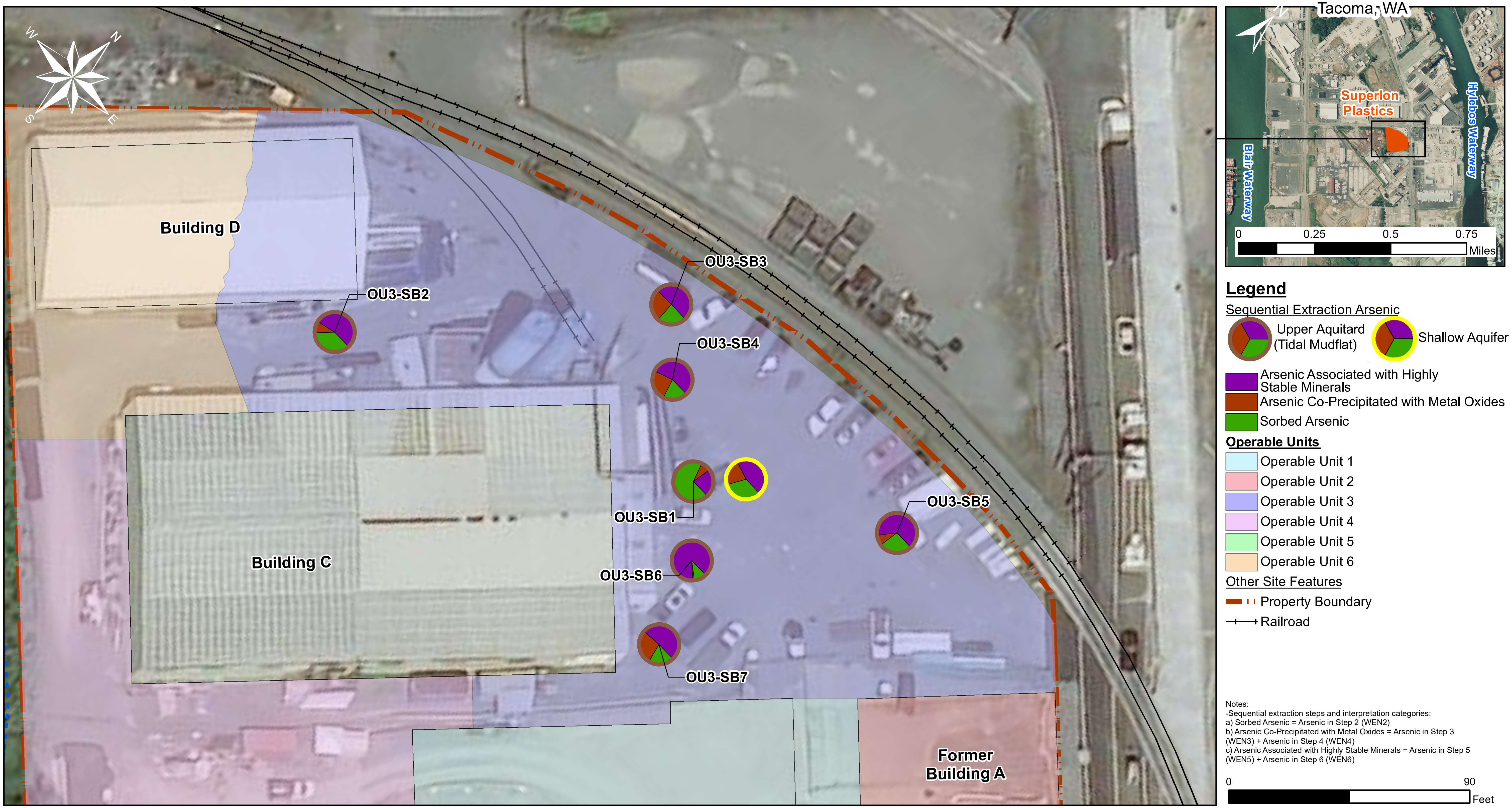
Operable Unit 3 Arsenic Soil Concentrations and Groundwater Concentrations in the Perched Aquifer Remedial Investigation Phase V Superlon Plastics Property, Tacoma, Washington

Figure 8



Notes:
-Sequential extraction steps and interpretation categories:
a) Sorbed Arsenic = Arsenic in Step 2 (WEN2)
b) Arsenic Co-Precipitated with Metal Oxides = Arsenic in Step 3 (WEN3) + Arsenic in Step 4 (WEN4)
c) Arsenic Associated with Highly Stable Minerals = Arsenic in Step 5 (WEN5) + Arsenic in Step 6 (WEN6)

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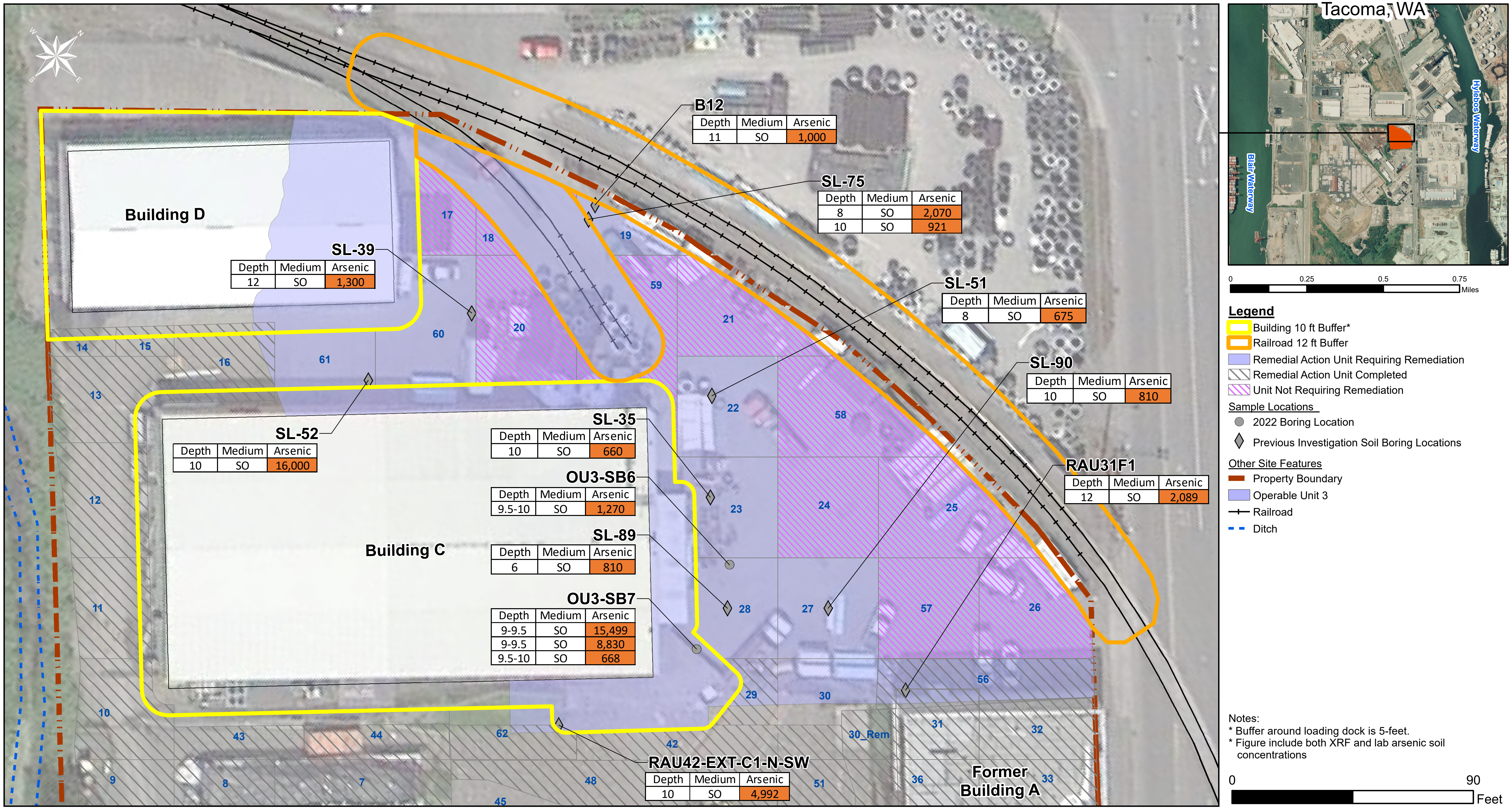
Summary of Sequential Extraction Arsenic Results for Soil in the Upper Aquitard and Shallow Aquifer
Remedial Investigation Phase V
Superlon Plastics Property, Tacoma, Washington

Figure 9

Document Path: G:\Projects\Superlon\Maps\2022\August\Fig 1_Soil As in Aquiclude and Aquifer.mxd; Author: MK; Date Saved: 8/8/2022



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Arsenic Soil Concentrations Exceeding 588 mg/kg in OU3
Remedial Investigation Phase V
Superlon Plastics Property, Tacoma, Washington

Figure 10

Document Path: \\sec\GIS\Projects\Superlon\Maps\2023\March\Fig 1_As Conc gt588 All Boring Intervals and Perched_wHistoricalBorings_11x17.mxd; Author: MK; Date Saved: 3/22/2023

Tables:

Table 1: Summary of Phase V Remedial Investigation Activities

Boring ID	Boring Location Note	Estimated Boring Depth (feet bgs)	Media	Potential Sample Interval (feet bgs)	Sample Purpose	Constituents					Completed	Deviations
						Arsenic and Lead GW[1]	Arsenic and Lead XRF Soil	RCRA 8 Metals Soil	STLC/TCLP Arsenic & Lead	SEP Analysis[2]		
HPT-01	HPT locations designed to determine the intervals of the Perched and Shallow Aquifers and the Tidal Mudflat Aquiclude.	20	N/A	N/A	HPT results determined groundwater sample intervals at TW-MW-5P/S	N/A	N/A	N/A	N/A	N/A	Yes	None
HPT-02		20	N/A	N/A	HPT results determined groundwater sample intervals at TW-MW-6P/S	N/A	N/A	N/A	N/A	N/A	Yes	None
HPT-03		20	N/A	N/A	HPT results determined groundwater sample intervals at TW-MW-7P/S	N/A	N/A	N/A	N/A	N/A	Yes	Located ~25 feet NE of planned location.
TW-MW-5P/S	At each location a hydropunch screen was installed for at least 24-hrs in the Perched and Shallow Aquifers to determine the piezometric head for both aquifers at each location. A groundwater sample was also collected from the Perched and Shallow Aquifers at each location.	9, 20	GW	9, 20	Determined how the Perched and Shallow Aquifers are connected.	2					Yes	None
TW-MW-6P/S		9, 20	GW	9, 20	Determined how the Perched and Shallow Aquifers are connected.	2					Yes	None
TW-MW-12P/S		9, 20	GW	9, 20	Determined how the Perched and Shallow Aquifers are connected.	2					Yes	Located ~25 feet NE of planned location.
OU3-SB1	Soil Boring locations designed to determine the distribution and concentrations of arsenic and lead in the vadose zone and Perched Aquifer in OU 3.	20	Soil[3]	3, 6, 9	Calibrated HPT results and determined arsenic and lead concentrations in OU 3.		3	1	1	1	Yes	Collected additional sample at 16.5
OU3-SB2		10	Soil & GW	3, 6, 9	Determined the distribution and concentrations of arsenic and lead in the vadose zone and Perched Aquifer in OU 3.	1	3	1	1	1	Yes	
OU3-SB3		10	Soil[4]	3, 6, 9			3	1	1	1	Yes	
OU3-SB4		10	Soil & GW	3, 6, 9		1	3	1	1	1	Yes	
OU3-SB5		10	Soil & GW	3, 6, 9		1	3	1	1	1	Yes	
OU3-SB6		10	Soil & GW	3, 6, 9		1	3	1	1	1	Yes	
OU3-SB7		10	Soil & GW	3, 6, 9		1	3	1	1	1	Yes	
HPT-GW-01	HPT locations designed to determine the intervals of the Perched, Shallow and Intermediate Aquifers. At each location a hydropunch groundwater sample was collected from the Perched, Shallow, and Intermediate Aquifers.	50	GW	9, 20, 50	Determined the distribution and concentrations of arsenic and lead in groundwater along the property boundary.	3					Yes	
HPT-GW-02		50	GW	9, 20, 50		3					Yes	
HPT-GW-03		50	GW	9, 20, 50		3					Yes	
HPT-GW-04		50	GW	9, 20, 50		3					Yes	Insufficient water to collect sample from Perched Aquifer
HPT-GW-05		50	GW	9, 20, 50		3					Yes	Insufficient water to collect sample from Perched Aquifer
HPT-GW-06		50	GW	9, 20, 50		3					Yes	
HPT-GW-07		50	GW	9, 20, 50		3					Yes	
HPT-GW-08		50	GW	9, 20, 50	Determined if the dissolved arsenic concentrations detected in MW-2S and MW-2I are migrating onto the Property from offsite.	3					No	Boring not completed

Notes:

bgs: below ground surface, RCRA 8 Metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver; GW: groundwater, QC: quality control.

[1] All groundwater samples for metals analyses were field filtered with a 0.45-micron filter.

[2] SEP analysis includes five-step selective sequential extraction method, based on Wenzel et al., for correlation between metals (aluminum [Al], arsenic [As], iron [Fe], manganese [Mn], and silicon [Si]) and different substrate properties. Other analyses include total recoverable arsenic.

[3] Co-located with groundwater sampling location (e.g., TW-MW-5P/S)

[4] Co-located with groundwater sampling location (e.g., TW-MW-6P/S)

Table 2: Summary of Interpreted Lithology and Sample Intervals

Boring ID	OU3-SB1[1]	HPT-02[1, 3]	OU3-SB2	OU3-SB3	OU3-SB4	OU3-SB5	OU3-SB6	OU3-SB7	HPT-01[4]	HPT-03[5]	HPT-GW-01	HPT-GW-02	HPT-GW-03	HPT-GW-04	HPT-GW-05	HPT-GW-06	HPT-GW-07
Boring Type	Soil Boring	HPT	Soil Boring	Soil Boring	Soil Boring	Soil Boring	Soil Boring	Soil Boring	HPT	HPT	HPT	HPT	HPT	HPT	HPT	HPT	HPT
Boring Depth (ft bgs)	17.5	20	12.5	10.5	10	13	10	10	20	20	50	50	50	50	50	50	50
Interpreted Lithology (ft bgs)																	
Fill/ Perched Aquifer	0-4	0-8.5	0-4	0-3.5	0-5	0-3.5, 7.5-9.5	0-3.5	0-4.5	0-9	0-10[2]	0-10	0-8.5	0-9	0-11.5[2]	0-9.5[2]	0-10.5[2]	0-13.5[2]
Fill-Hydrated Lime[6]	4-8.5	--	4-8	3.5-9	5-9	3.5-7.5	3.5-8	4.5-8	--	--	--	--	--	--	--	--	
Upper Aquitard	8.5-14.5	8.5-14.5	8+	9+	9+	9.5+	8+	8+	9-14	10-16	10-17	8.5-15	9-24	11.5-21	9.5-19	10.5-22	
Shallow Aquifer	14.5+	14.5+	--	--	--	--	--	--	14+	16+	17-29	15-30	24-34	21-28	19-26	22-31	13.5-20
Intermediate Aquitard	--	--	--	--	--	--	--	--	--	--	29-43	31-45	34-45	28-39.5	26-40	31-43	20-42.5
Intermediate Aquifer	--	--	--	--	--	--	--	--	--	--	43+	45+	45+	39.5+	40-44	43+	42.5+
Groundwater Sample Intervals (ft bgs)																	
Fill/ Perched Aquifer	--	4-8	0-10	--	0-10	0-10	0-10	0-10	4.5-8.5	6-10	6-10	5-9	6-10	7-11[7]	5-9[7]	6.5-10.5	5-9
Upper Aquitard	--	--		--					--	--	--	--	--	--	--	--	--
Shallow Aquifer	--	12-17	--	--	--	--	--	--	17-21	16-20	18-22	17-21	24-28	20-24	18-22	20-24	16-20
Intermediate Aquitard	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Intermediate Aquifer	--	--	--	--	--	--	--	--	--	--	44-48	45-49	45-49	38-42	40-44	43-47	41-45
Soil Sample Intervals (ft bgs)																	
Fill/ Perched Aquifer[3]	3-4, 6-7	--	3-4, 6-7	3-4, 6-7	3-4, 6-7	3-4, 6-7	3-4, 6-7	3-4, 6-7	--	--	--	--	--	--	--	--	--
Upper Aquitard	8.5-9.5, 9.5-10.5	--	9-9.5, 9.5-10.5	9-9.5, 9.5-10.5	9-9.5, 9.5-10.5	10-10.5, 10.5-11	9-9.5, 9.5-10.5	9-9.5, 9.5-10.5	--	--	--	--	--	--	--	--	--
Shallow Aquifer	16.5-17, 17-17.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Intermediate Aquitard	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Intermediate Aquifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

bgs: below ground surface

[1] OU3-SB1 and HPT-02 were collocated to confirm HPT readings

[2] Backfill from CAP-OSP remediation (historic fill and sediments removed; see Section 2.2.9 for details)

[3] Collocated groundwater samples collected from TW-MW-6P/S

[4] Collocated groundwater samples collected from TW-MW-5P/S

[5] Collocated groundwater samples collected from TW-MW-12P/S

[6] Hydrated Lime layer not readily identifiable on HPT logs

[7] Insufficient water volume to collect groundwater samples

Table 3: Gauged Groundwater Levels

Boring ID	Gauged Groundwater Levels					
	Fill/ Perched Aquifer		Shallow Aquifer		Intermediate Aquifer	
	Depth to Water (ft bgs)	Groundwater Elevation (ft msl)	Depth to Water (ft bgs)	Groundwater Elevation (ft msl)	Depth to Water (ft bgs)	Groundwater Elevation (ft msl)
TW-MW-5P/S[1]	3.94	6.43	14.61	-4.24	--	--
TW-MW-6P/S[1]	3.98	6.68	5.90	4.76	--	--
TW-MW-12P/S[1]	5.73	3.67	4.04	5.36	--	--
OU3-SB2	4.00	5.75	--	--	--	--
OU3-SB4	4.83	6.03	--	--	--	--
OU3-SB5	4.50	5.76	--	--	--	--
OU3-SB6	4.18	6.05	--	--	--	--
OU3-SB7	3.00	6.45	--	--	--	--
HPT-GW-01	6.49	4.26	7.13	3.62	21.54	-10.79
HPT-GW-02	4.63	5.48	6.21	3.90	18.73	-8.62
HPT-GW-03	4.00	6.14	5.52	4.62	43.60	-33.46
HPT-GW-04	7.90	0.26[2]	6.31	1.85	7.11	1.05
HPT-GW-05	7.90	0.20[2]	4.45	3.65	29.42	-21.32
HPT-GW-06	7.21	2.68	6.27	3.62	26.11	-16.22
HPT-GW-07	4.03	5.42	5.77	3.68	26.07	-16.62

Notes:

bgs: below ground surface

msl: mean sea level based on NGVD29 datum[1] TW-MW hydropunches were left in place concurrently for 24 to 32-hours in the Perched and Shallow Aquifers prior to measuring depth to groundwater.[2] Insufficient water available to collect analytical samples indicating that the measured water level is not representative of groundwater level.

Table 4: Dissolved Arsenic Concentrations in Groundwater

Soil Boring	Sample ID	Sample Depth Top (feet bgs)	Sample Depth Bottom (feet bgs)	Hydrostratigraphic Unit	Arsenic	
					Concentration (mg/L)	Qualifier
OU3-SB2	GW-OU3-SB2-033122	0.0	10.0	Perched Aquifer	0.0098	
OU3-SB4	GW-OU3-SB4-033022	0.0	10.0	Perched Aquifer	0.0060	
OU3-SB5	GW-OU3-SB5-033122	0.0	10.0	Perched Aquifer	0.0059	
OU3-SB6	GW-OU3-SB6-033022	0.0	10.0	Perched Aquifer	0.090	
OU3-SB7	GW-OU3-SB7-033022	0.0	10.0	Perched Aquifer	0.080	
HPT-01	TW-MW-5P-032422	4.5	8.5	Perched Aquifer	0.043	
	TW-MW-5S-032422	17.0	21.0	Shallow Aquifer	0.37	
HPT-02	TW-MW-6P-032322	4.0	8.0	Perched Aquifer	0.19	
	TW-MW-6S-032322	12.0	17.0	Shallow Aquifer	11	
HPT-03	TW-MW-12P-032922	6.0	10.0	Perched Aquifer	6.3	
	TW-MW-12S-032922	16.0	20.0	Shallow Aquifer	1.8	
HPT-GW-01	HPT-GW-01-P-032822	6.0	10.0	Perched Aquifer	0.074	
	HPT-GW-01-S-032822	18.0	22.0	Shallow Aquifer	0.11	
	HPT-GW-01-I-032822	44.0	48.0	Intermediate Aquifer	0.0050	U
HPT-GW-02	HPT-GW-02-P-033022	5.0	9.0	Perched Aquifer	0.16	
	HPT-GW-02-S-033022	17.0	21.0	Shallow Aquifer	0.21	
	HPT-GW-02-I-033022	45.0	49.0	Intermediate Aquifer	0.0050	U
HPT-GW-03	HPT-GW-03-P-032822	6.0	10.0	Perched Aquifer	0.13	
	HPT-GW-03-S-032822	24.0	28.0	Shallow Aquifer	0.54	
	HPT-GW-03-I-032822	45.0	49.0	Intermediate Aquifer	0.0070	
HPT-GW-04	HPT-GW-04-S-032422	20.0	24.0	Shallow Aquifer	0.85	
	HPT-GW-04-I-032422	38.0	42.0	Intermediate Aquifer	0.0050	U
HPT-GW-05	HPT-GW-05-S-032422	18.0	22.0	Shallow Aquifer	1.3	
	HPT-GW-05-I-032422	40.0	44.0	Intermediate Aquifer	0.011	
HPT-GW-06	HPT-GW-06-P-032922	6.5	10.5	Perched Aquifer	3.6	
	HPT-GW-06-S-032922	20.0	24.0	Shallow Aquifer	47	
	HPT-GW-06-I-032922_DC	43.0	47.0	Intermediate Aquifer	0.093	J
HPT-GW-07	HPT-GW-07-P-032922	5.0	9.0	Perched Aquifer	0.48	
	HPT-GW-07-S-032922	16.0	20.0	Shallow Aquifer	65	
	HPT-GW-07-I-032922	41.0	45.0	Intermediate Aquifer	0.094	

Notes:

Lab:	Eurofins Seattle
U:	Constituent was not detected at the shown reporting limit
J:	Estimated concentration, value detected below the reporting limit
🟨	A yellow highlighted cell means the arsenic concentration is > than the Puget Sound background arsenic level of 0.008 mg/l
🟧	A orange highlighted cell means the arsenic concentration is > than 0.10 mg/L
🟥	A red highlighted cell means the arsenic concentration is > than 1.00 mg/L
	Average concentrations are listed for samples with duplicate samples

Table 5: Total Arsenic Concentrations in Soil

Soil Boring	Sample ID	Sample Depth Top (feet bgs)	Sample Depth Bottom (feet bgs)	Hydrostratigraphic Unit	Arsenic Concentration (mg/kg)	Qualifier	Field XRF or Lab?
OU3-SB1	SO_OU3-SB1-3-4	3.00	4.00	Perched Aquifer	8.0	U	Field XRF
	SO_OU3-SB1-6-7	6.00	7.00	Perched Aquifer	8.0	U	Field XRF
	OU3-SB1-8.5-9.5-033022_DC	8.50	9.50	Upper Aquitard	185		Lab[1]
	SO_OU3-SB1-8.5-9.5	8.50	9.50	Upper Aquitard	174		Field XRF
	SO_OU3-SB1-9.5-10-0322	9.50	10.00	Upper Aquitard	43		Lab[2]
	SO_OU3-SB1-16.5-17	16.50	17.00	Shallow Aquifer	35		Field XRF
	SO_OU3-SB1-17-17.5-0322	17.00	17.50	Shallow Aquifer	16		Lab[2]
OU3-SB2	SO_OU3-SB2-3-4	3.00	4.00	Perched Aquifer	8.0	U	Field XRF
	SO_OU3-SB2-6-7	6.00	7.00	Perched Aquifer	16		Field XRF
	OU3-SB2-9-9.5-033122	9.00	9.50	Upper Aquitard	29		Lab[1]
	SO_OU3-SB2-9-9.5	9.00	9.50	Upper Aquitard	32		Field XRF
	SO_OU3-SB2-9.5-10-0322	9.50	10.00	Upper Aquitard	29		Lab[2]
OU3-SB3	SO_OU3-SB3-3-4	3.00	4.00	Perched Aquifer	10		Field XRF
	SO_OU3-SB3-6-7	6.00	7.00	Perched Aquifer	8.0	U	Field XRF
	OU3-SB3-9-9.5-033122	9.00	9.50	Upper Aquitard	25		Lab[1]
	SO_OU3-SB3-9-9.5_DC	9.00	9.50	Upper Aquitard	52		Field XRF
	SO_OU3-SB3-9.5-10-0322	9.50	10.00	Upper Aquitard	51		Lab[2]
OU3-SB4	SO_OU3-SB4-3-4	3.00	4.00	Perched Aquifer	8.0	U	Field XRF
	SO_OU3-SB4-6-7	6.00	7.00	Perched Aquifer	47		Field XRF
	OU3-SB4-9-9.5-033022	9.00	9.50	Upper Aquitard	258		Lab[1]
	SO_OU3-SB4-9-9.5	9.00	9.50	Upper Aquitard	376		Field XRF
	SO_OU3-SB4-9.5-10-0322	9.50	10.00	Upper Aquitard	34		Lab[2]
OU3-SB5	SO_OU3-SB5-3-4	3.00	4.00	Perched Aquifer	15		Field XRF
	SO_OU3-SB5-6-7	6.00	7.00	Perched Aquifer	8.0	U	Field XRF
	OU3-SB5-10-10.5-033122	10.00	10.50	Upper Aquitard	29		Lab[1]
	SO_OU3-SB5-10-10.5	10.00	10.50	Upper Aquitard	21		Field XRF
	SO_OU3-SB5-10.5-11-0322	10.50	11.00	Upper Aquitard	10.0		Lab[2]
OU3-SB6	SO_OU3-SB6-3-4	3.00	4.00	Perched Aquifer	8.00	U	Field XRF
	OU3-SB6-6-7-033022	6.00	7.00	Perched Aquifer	214		Lab[1]
	SO_OU3-SB6-6-7	6.00	7.00	Perched Aquifer	169		Field XRF
	OU3-SB6-9-9.5-033022	9.00	9.50	Upper Aquitard	185		Lab[1]
	SO_OU3-SB6-9-9.5_DC	9.00	9.50	Upper Aquitard	230		Field XRF
	SO_OU3-SB6-9.5-10-0322	9.50	10.00	Upper Aquitard	1,270		Lab[2]
OU3-SB7	SO_OU3-SB7-3-4	3.00	4.00	Perched Aquifer	62		Field XRF
	SO_OU3-SB7-6-7	6.00	7.00	Perched Aquifer	81		Field XRF
	OU3-SB7-9-9.5-033022	9.00	9.50	Upper Aquitard	8,830		Lab[1]
	SO_OU3-SB7-9-9.5	9.00	9.50	Upper Aquitard	15,499		Field XRF
	SO_OU3-SB7-9.5-10-0322	9.50	10.00	Upper Aquitard	668		Lab[2]

Notes:

Lab[1]: Analytical Resources Inc.
Lab[2]: Brooks Applied Labs
U: Constituent was not detected at the shown reporting limit
🟨 A yellow highlighted cell indicates the constituent concentration is > than the Property Specific Risk Based Soil Direct Contact Screening Level of 588 mg/kg for arsenic
Average concentrations are listed for samples with duplicate samples

Table 6: Sequential Extraction Procedure Results

Sample ID	Sequential Extraction Step[1]	Interpreted Category	OU3-SB1-17-17.5-0322		OU3-SB1-9.5-10-0322		OU3-SB2-9.5-10-0322		OU3-SB3-9.5-10-0322		OU3-SB4-9.5-10-0322		OU3-SB5-10.5-11-0322		OU3-SB6-9.5-10-0322		OU3-SB7-9.5-10-0322		Upper Aquitard Average Percentages
Lithologic Layer			Shallow Aquifer		Upper Aquitard		Upper Aquitard		Upper Aquitard		Upper Aquitard		Upper Aquitard		Upper Aquitard		Upper Aquitard		
Analyte			Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Conc. (mg/kg)	Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Percentage	
Arsenic (WEN2)	1	Sorbed	5.31	34.4%	25.7	69.2%	12.1	36.6%	5.3	23.5%	19.42	19.8%	2.79	27.0%	62.5	10.2%	171.2	20.7%	30.2%
Arsenic (WEN3)	2	Co-Precipitated with Metal Oxides	2.49	16.1%	1.11	3.0%	1.39	4.2%	1.19	5.3%	8.78	8.9%	0.449	4.3%	2.22	0.4%	192	23.2%	8.2%
Arsenic (WEN4)	3		0.799	5.2%	1.87	5.0%	1.7	5.1%	4.74	21.0%	15.385	15.7%	0.413	4.0%	5.7	0.9%	38.5	4.6%	7.7%
Arsenic (WEN5)	4	Associated with Highly Stable Minerals	5.57	36.1%	6.65	17.9%	14.9	45.1%	8.81	39.1%	46.25	47.1%	5.1	49.4%	516	83.9%	403	48.6%	45.9%
Arsenic (WEN6)	5		1.27	8.2%	1.81	4.9%	2.95	8.9%	2.51	11.1%	8.305	8.5%	1.58	15.3%	28.6	4.7%	23.9	2.9%	8.1%
Iron (WEN2)	1	Sorbed	40	0.1%	135	0.5%	789	2.7%	117	0.4%	39.995	0.1%	324	1.2%	536	2.7%	50.76	0.2%	1.0%
Iron (WEN3)	2	Co-Precipitated with Metal Oxides	2100	5.7%	4650	16.6%	5890	20.2%	5510	17.0%	14550	31.3%	2570	9.1%	3180	15.8%	3560	15.3%	16.4%
Iron (WEN4)	3		1100	3.0%	1660	5.9%	2340	8.0%	2890	8.9%	2182.5	4.7%	2360	8.4%	2500	12.4%	2710	11.7%	7.9%
Iron (WEN5)	4	Associated with Highly Stable Minerals	6990	19.1%	6300	22.5%	7720	26.5%	7030	21.7%	16400	35.3%	11900	42.3%	4150	20.6%	6640	28.5%	27.1%
Iron (WEN6)	5		26300	72.0%	15200	54.4%	12400	42.6%	16900	52.1%	13260	28.6%	11000	39.1%	9750	48.5%	10300	44.3%	47.7%

Notes:

Sequential extraction steps and interpretation categories:

a) Sorbed = Step 2 (WEN2)

b) Co-Precipitated with Metal Oxides= Step 3 (WEN3)+ Step 4 (WEN4)

c) Associated with Highly Stable Minerals = Step 5 (WEN5)+ Step 6 (WEN6)

Percentage of each step calculated by dividing step result by sum of all steps.

[1]-BAL refers to the 5 steps described by Wenzel et al 2001 methodology as selective sequential extraction Steps 2 through 6. These steps are listed on this table as Steps 1 through 5 to match the five steps described by Wenzel et al 2001 methodology.

Appendices:

Appendix A: RI Phase V Work Plan

From:	Mercuri, Joyce (ECY) <jmer461@ECY.WA.GOV>
Sent:	Monday, March 21, 2022 10:36
To:	Nathan Starr
Cc:	JEFFREY KING; Brad Grimsted
Subject:	RE: Annual Groundwater report and a work plan to start GW characterization

Thank you, this work plan is hereby approved by Ecology.

I don't need a further Microsoft Word version of it. I'll upload to our documents system and place in my electronic Superlon files.

Please let me know how the field work goes, and if you discover anything unexpected.

Best,
Joyce Mercuri

***Joyce Mercuri**
Cleanup Project Manager
Toxics Cleanup Program
Southwest Region

Cell Phone: (360) 999-9590
(360) 407-6260 Office Phone
Joyce.Mercuri@ecy.wa.gov*

From: Nathan Starr <StarrN@uspioneer.com>
Sent: Friday, March 18, 2022 10:24 AM
To: Mercuri, Joyce (ECY) <jmer461@ECY.WA.GOV>
Cc: JEFFREY KING <jking@percnw.com>; Brad Grimsted <GrimstedB@uspioneer.com>
Subject: RE: Annual Groundwater report and a work plan to start GW characterization

Joyce,

Please find attached Revision 2 of the work plan as a final pdf with your comments incorporated. Please let me know if you would like the word file version of the text as well.

Please let me or Jeff know if you have any questions or additional comments.

Thank you,

Nathan

Nathan Starr, L.G. (CA, WA)
Senior Geologist/Scientist

PIONEER Technologies Corporation
5205 Corporate Ctr. Ct. SE, Ste. A
Olympia, WA 98503-5901
Phone: 206.890.4849
https://uspioneer.com/

From: Mercuri, Joyce (ECY) <jmer461@ECY.WA.GOV>
Sent: Thursday, March 17, 2022 16:31
To: Nathan Starr <StarrN@uspioneer.com>
Cc: JEFFREY KING <jking@percnw.com>; Brad Grimsted <GrimstedB@uspioneer.com>
Subject: RE: Annual Groundwater report and a work plan to start GW characterization

Nathan;
Thanks for turning this back around so quickly. I do have a few very small notes that can be found within by doing a word search for “3-17-22”. Most of these are simple typos but I did want to add something to section 2.2.8 to clarify that there’s an Ecology-approved interim action underway for soil removal at the site currently, and added a reference to the engineering design report that details the interim action. This work plan provides a good background/summary of the complicated history of this site, so I wanted to add that to complete the picture for future site managers who could use this as a way to understand the site background. I hope you won’t find making a few more editorial changes too troublesome. Let me know if you have any problems or questions with my suggested additions. The table and figure on the PDF file look good. The final can be submitted electronically and I’ll put on our electronic document storage system.

For the purposes of your field work next week – the approach as detailed in the plan is approved by Ecology, in anticipation of the final revised report.

Thanks
Joyce

Joyce Mercuri
Cleanup Project Manager
Toxics Cleanup Program
Southwest Region

Cell Phone: (360) 999-9590
(360) 407-6260 Office Phone
Joyce.Mercuri@ecy.wa.gov

From: Nathan Starr <StarrN@uspioneer.com>
Sent: Thursday, March 17, 2022 9:55 AM
To: Mercuri, Joyce (ECY) <jmer461@ECY.WA.GOV>
Cc: JEFFREY KING <jking@percnw.com>; Brad Grimsted <GrimstedB@uspioneer.com>
Subject: FW: Annual Groundwater report and a work plan to start GW characterization

Joyce,

Thank you for taking the time to meet with us yesterday to discuss your group's comments on the WP; I found it very helpful. Per our discussion a revised work plan is attached as a final pdf and a redlined word document with your original comments.

As we discussed the HPT borings will begin on Monday March 21st and groundwater and soil sampling may start as early as March 24th, but will likely not begin until March 28th.

Please let me or Jeff know if you have any questions or additional comments.

Thank you,

Nathan

Nathan Starr, L.G. (CA, WA)
Senior Geologist/Scientist

PIONEER Technologies Corporation
5205 Corporate Ctr. Ct. SE, Ste. A
Olympia, WA 98503-5901
Phone: 206.890.4849
https://uspioneer.com/

From: JEFFREY KING <jking@percnw.com>
Sent: Tuesday, March 15, 2022 06:03
To: Nathan Starr <StarrN@uspioneer.com>
Subject: Fwd: Annual Groundwater report and a work plan to start GW characterization

Fyi

Get Outlook for iOS

From: Mercuri, Joyce (ECY) <jmer461@ECY.WA.GOV>
Sent: Monday, March 14, 2022 5:57:38 PM
To: JEFFREY KING <jking@percnw.com>
Subject: RE: Annual Groundwater report and a work plan to start GW characterization

Hi, from our end the meeting would be with me and Andy Smith; and possibly Tom Middleton who provided me with some hydrogeological support with my questions about the plan.
I've attached the plan with our questions. Sorry, normally I would tidy this up and consolidate questions but I'm really slammed with other things and trying to fit this in too. Also, I have not forgotten about your responses to my ditch plan comments.

Reviewing the OU3 work plan made me remember the Lime Sludge study plan from 2019. Was that work ever done?

Thanks,
Joyce

Joyce Mercuri
Cleanup Project Manager
Toxics Cleanup Program
Southwest Region

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Joyce.Mercuri@ecy.wa.gov

From: JEFFREY KING <jking@percnw.com>
Sent: Monday, March 14, 2022 5:54 PM
To: Mercuri, Joyce (ECY) <jmer461@ECY.WA.GOV>
Subject: Re: Annual Groundwater report and a work plan to start GW characterization

Who is we?

No I have not gotten in contact with the City. That hole will have to wait.

From: Mercuri, Joyce (ECY) <jmer461@ECY.WA.GOV>
Sent: Monday, March 14, 2022 3:09:30 PM
To: JEFFREY KING <jking@percnw.com>
Subject: RE: Annual Groundwater report and a work plan to start GW characterization

Hi,
We are available on Wednesday from about 2:15 – 5 pm.

I will send you the document with some questions/comments that we can discuss at that time.
Also curious, have you gotten access ok from city of Tacoma to the boring location HTP-GW-08?
Let me know if Wednesday works. I'd prefer to do the call on Teams if you can use that effectively. I can use other meeting funcitons like zoom if it is set up externally.

Joyce

Joyce Mercuri
Cleanup Project Manager
Toxics Cleanup Program
Southwest Region

Cell Phone: (360) 999-9590
(360) 407-6260 Office Phone
Joyce.Mercuri@ecy.wa.gov

From: JEFFREY KING <jking@percnw.com>
Sent: Monday, March 14, 2022 2:55 PM
To: Mercuri, Joyce (ECY) <jmer461@ECY.WA.GOV>
Subject: RE: Annual Groundwater report and a work plan to start GW characterization

I can talk to you in general terms anytime, except tomorrow before 2:00, but since I did not write the work plan we will have to set up a call with the author to discuss it in detail. How about Wednesday?

Jeff

From: Mercuri, Joyce (ECY) <jmer461@ECY.WA.GOV>
Sent: Monday, March 14, 2022 2:25 PM
To: JEFFREY KING <jking@percnw.com>
Subject: RE: Annual Groundwater report and a work plan to start GW characterization

Hi Jeff;
We would like to chat with you about the work plan for OU3. Are you available this week?
Thanks,
Joyce

Joyce Mercuri
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Toxics Cleanup Program
Southwest Region

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From: JEFFREY KING <jking@percnw.com>
Sent: Monday, March 7, 2022 10:16 AM
To: Mercuri, Joyce (ECY) <jmer461@ECY.WA.GOV>
Cc: 'starrn@uspioneer.com' <starrn@uspioneer.com>; 'kking@perc-nw.com' <kking@perc-nw.com>
Subject: Annual Groundwater report and a work plan to start GW characterization

Joyce:

Attached you will find the 2021 Annual Groundwater report and a work plan to start GW characterization.

The most important one for you to review is the work plan. We have got a driller scheduled for the 21st and would like to keep that date it possible.

I'll call you to discuss.

Thanks
Jeff

Jeffrey D King, PG/LG
President/Geologist
Pacific Environmental & Redevelopment Corporation (PERC)

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Superlon Plastics Site:
Remedial Investigation Phase V
Work Plan for Characterization of Operational Unit 3 and Property Groundwater

The Superlon Plastics Site
2116 Taylor Way, Tacoma, WA

Washington State Department of Ecology Cleanup Site ID 2096

Prepared for:

The Chemours Company FC, LLC

and

The White Birch Group, LLC

By:

Pacific Environmental & Redevelopment Corporation
8424 E. Meadow Lake Drive
Snohomish, WA 98290

and

Pioneer Technologies Corporation
5205 Corporate Center Court, Suite A
Olympia, WA 98503

March 18, 2022

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1. Introduction

This Work Plan (WP) presents the technical approach for further characterization of soil and perched water within Operable Unit (OU) 3 and groundwater located on the Superlon Plastics Property (Property). The Property is located at 2116 Taylor Way, Tacoma, Washington (see Figure 1). Work to be completed will occur on the Property and on adjacent Taylor Way. This work is necessary to obtain a better understanding of constituent concentrations in soil and perched water in OU 3 and in groundwater along the Property's perimeter which will be used to guide future phases of the groundwater portion of the Remedial Investigation (RI).

This Work Plan has been prepared on behalf of the White Birch Group, LLC (White Birch) and the Chemours Company FC, LLC (Chemours). These companies are hereafter referred to as the "Companies". The Companies or their authorized agent will complete the work described in this Work Plan in accordance with Model Toxics Control Act (MTCA), Chapter 173-340 of the Washington Administrative Code (WAC) under Agreed Order No. DE 5940.

The Agreed Order requires that the Companies submit a Work Plan to Ecology for review and approval whenever work is to be completed at the Superlon Plastics Site (Site) in accordance with WAC 173-340-350(7).

1.1. Site Location and Description

The Site is located in a highly industrial area of the Tacoma Tidal Flats between the Blair and Hylebos Waterways (see Figure 1). Definition of the Site boundaries (per MTCA) and an evaluation of data from other off Property media will be presented in a future RI/Feasibility Study (FS) and Cleanup Action Plan (CAP) for the Site. This approach, which has been approved by Ecology, was adopted in order to continue progress toward a final remedy for on-Property media, while continuing to investigate off-Property issues and to define the Site boundary (Ecology 2013a).

The Property is bordered to the northeast by Taylor Way, to the north by a curved rail road right-of-way owned by the City of Tacoma Public Works, to the northwest by Lincoln Avenue and a warehouse operation, and to the southeast by property leased and operated by Gardner-Fields Products, a roofing and waterproofing products manufacturing business (see Figure 2). To the southwest of the Property is a ditch located on the northeast side of a paved trucking yard owned by the Port of Tacoma (see Figure 2).

2. Background

A summary of key Site background information is presented in this section.

2.1. Site Setting

2.1.1. Climate

The marine-influenced climate at the Site is typical of Western Washington and is relatively mild. The average annual precipitation for Tacoma is approximately 40 inches, with most of the precipitation falling between October and April (Western Regional Climate Center 2019).

2.1.2. Topography and Drainage

The Site is relatively flat, with exception of a pond located on the eastern central portion of the Property and a drainage ditch located on Port of Tacoma property southwest of the Property (see Figure 2).[1] With the exception of the pond and ditch, topographic elevations generally range between 8 feet and 11 feet above mean sea level (msl). The surface water elevation of the pond fluctuates around 7 feet msl and the elevation of the ditch varies between 2.5 and 4 feet msl (ESM 2021). Stormwater on the Property flows via sheet flow to the pond where it infiltrates.

2.1.3. Geology

The underlying regional geology is dominated by Quaternary ice age glacial deposits. In general, regional glacial deposits include sand and gravel aquifers associated with glacial outwash and low permeability glacial till deposits containing clay and silt (Washington Division of Geology and Earth Resources 2015).

The Site is located within the tideflats of the Puyallup River delta. In general, the pre-development tideflats consisted of alternating layers of fluvial lower permeability silt/clay and sandy deposits primarily derived from Mount Rainer lahar deposits. In the early 1900s hydraulic fill from Commencement Bay and its tributaries (e.g., Hylebos and Blair Waterways) was used to raise the Property and surrounding areas above the tideflats. Review of aerial photographs indicates that additional fill was brought onto the Property between 1966 and 1975. This material extends from the land surface to 8 to 10 feet below ground surface (bgs) across the Property and includes fine sands and silts, large wood pilings, construction debris, industrial wastewater treatment sludge (from chlor-alkali manufacturing), manufacturing by-products imported from off-Property sources, and hydrated lime. The known extent of industrial wastewater treatment sludge was removed from the Property during the remedial actions discussed in Section 2.2.

Based on interpretations from the Site's soil boring logs and groundwater monitoring well logs the relevant lithologic units at the Site, from shallowest to deepest, include the following:

- Fill: The fill unit consisting of primarily hydraulic fill (fine sands and silts) with large wood pilings, construction debris, industrial wastewater treatment sludge, manufacturing by-products imported from off-Property sources, and hydrated lime
- Upper Silt: The upper silt unit is interpreted to be the historic tideflat surface and consists primarily of clayey silt to fine sandy silt

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[1] The ditch drains to the northwest along the northeast side of the Port of Tacoma property and then drains to the southwest within the City of Tacoma's right-of-Way along the northwest side of the Port of Tacoma property.

- Shallow Sand: The shallow sand unit consists primarily of a native fine to medium sand with shell fragments and silt interbeds, primarily derived from Mount Rainer lahar deposits.
- Lower Silt: The lower silt unit consists primarily of clayey silt to fine sandy silt.
- Lower Sand: The lower sand unit primarily consists of a fine to medium sand with silt interbeds.

2.1.4. Hydrogeology

Based on interpretations from the Site's soil boring logs and groundwater monitoring well logs the relevant hydrostratigraphic units at the Site, correspond to specific lithologic units and include the following from shallowest to deepest:

- Perched Aquifer: The Perched Aquifer is the saturated portion of the fill unit. The thickness of the Perched Aquifer is approximately eight to ten feet. Groundwater within the Perched Aquifer is typically encountered at depths of less than six feet bgs in most portions of the Site, and currently daylights in the pond during the winter months.
- Aquiclude: The Aquiclude is the upper silt unit (i.e., the historic tideflat surface). The thickness of the Aquitard is approximately five to ten feet. Thin and/or leaky portions of the upper silt have been identified in the central portion of the Property.
- Shallow Aquifer: The Shallow Aquifer is the shallow sand unit. The thickness of the Shallow Aquifer is approximately ten to 22 feet.
- Aquitard: The Aquitard is the lower silt unit. The thickness of the Aquitard is approximately five to ten feet.
- Intermediate Aquifer: The Intermediate Aquifer is the lower sand unit. The Intermediate Aquifer appears to be at least 20 feet thick.

The groundwater gradient in the aquifers is tidally influenced and will be evaluated during future phases of the RI process.

2.1.5. Property Land Use

The Property is currently owned by the White Birch Group, LLC and operated by Superlon Plastics Company, Incorporated, an extruded plastic pipe manufacturer. The northwestern half of the Property is developed with two industrial buildings (Buildings C and D and asphalt paved lots; see Figure 2). The ongoing Interim Actions (IAs) occupy the southeastern and western sections of the Property (see Section 2.2 for details on the IAs). Following the completion of the IAs the Property will be backfilled to match the grade of the northwestern half of the Property and paved with asphalt.

2.1.6. Overview of Ownership History

Historically the Property has had numerous owners and uses since its initial development. A history of Property ownership is listed below (Pacific Environmental and Redevelopment Corporation [PERC]/ PIONEER Technologies Corporation [PIONEER] 2011).

- In 1925, Latimer-Goodwin purchased an approximately 5-acre parcel from Buffelen Lumber & Manufacturing Company. Latimer-Goodwin developed it for the manufacture of lead arsenate pesticides.
- In 1944, Grasselli, a subsidiary of DuPont, purchased Latimer-Goodwin's land parcel and the pesticide manufacturing facilities located there. Grasselli manufactured lead arsenate and calcium

arsenate insecticides until 1946, and performed product mixing and agricultural chemical warehousing operations until 1949.

- In 1951, DuPont sold the Property to V.C. Monahan, who operated the Cabin Creek Lumber Company.
- In 1968, V.C. Monahan in turn sold the Property to Justus Company, Inc., who operated a wood treatment facility there.
- In 1972, Frank B. Lynott, of Justus Cedar Homes and Lindal Cedar Homes sold the Property to Mr. Ragnar M. Nars, to be used for Superlon Plastics Company, Incorporated.
- In 1992, the Property was subdivided evenly into thirds, all of which were re-consolidated and granted through a series of quit claim deeds to White Birch Group, LLC. White Birch continues to own the Property and Superlon Plastics Company continues to occupy the northwestern half of the Property.

2.2. Overview of Remedial Actions

Numerous investigation, evaluation, and cleanup activities have been performed at the Site since 2010. The remedial actions are summarized in the following subsections.

2.2.1. Remedial Investigation Phase I

The following actions were completed as described in the Phase I RI Work Plan (PERC 2010):

- Collected soil samples
- Collected sediment samples and a surface water sample from the ditch (Figure 2).
- Reviewed and compiled existing data about the Property and surrounding properties;
- Evaluated the nature and extent of fill material on-property;
- Evaluated the potential impacts from on-property surface water and storm water to the ditch;
- Preliminarily assessed the potential impacts from vapor intrusion;
- Used data collected during soil and groundwater sampling to evaluate the potential of utility corridors as preference pathways to contaminant migration; and,
- Determined additional information that would be needed to conduct an FS.

2.2.2. Remedial Investigation Phase II

The following actions were completed as described in the Phase II RI Work Plan (PERC/ PIONEER 2011):

- Performed a UST investigation and collected additional sediment samples from the ditch as well as additional soil samples as identified in the Phase II RI work plan. No soil samples were collected on the Gardner-Fields property. Gardner-Fields was not responsive to access requests and access to the Gardner-Fields property was not obtained. This represented the only exception to the scope of work listed in the Phase II RI work plan;
- Compiled all known data about the Property and surrounding properties;
- Assessed the potential impacts from vapor intrusion as new data was developed; and

- Expanded the evaluation of the potential impacts from off-property surface water and storm water to the ditch.

2.2.3. Remedial Investigation Phase III

The objective of the Phase III RI was to expand upon the knowledge learned during the Phases I and II of the RI and to thoroughly characterize existing conditions in groundwater throughout the Superlon Property and to complete characterization of soil at the Property. The following actions were completed as described in the Phase III RI Work Plan (PERC 2012a):

- Installed additional groundwater monitoring wells in the Shallow and Intermediate Aquifers (the current and former groundwater monitoring wells [MWs] are presented on Figure 3).
- Collected surface water samples from under former Building A and in the former Building B footprint (Figure 4).
- Re-evaluated COPCs and develop a focused list of Constituents of Concern (COCs) for the Site; and
- Developed a conceptual site exposure model that depicted the understanding of actual and potential exposure pathways to the site COCs that existed at that time.

2.2.4. Interim Action Phase I

The Phase I IA included (PERC 2012b):

- Removing surficial vegetation;
- Installing a coffer dam between former Buildings A and B to facilitate surface water management;
- Removing and disposing of a four-inch layer of surface soil across all exposed areas of the Property;
- Contouring the ground surface to direct surface water toward the pond under former Building B (Building B has since been removed and the pond is shown on Figure 2 southeast of Building C);
- Placing a compacted gravel layer over the area to prevent contact with contaminated soils;
- Characterizing Building B materials to determine the proper disposal option after demolition;
- Demolishing Building B and disposing the resulting debris; and,
- Securing the Building B footprint by placing a layer of quarry spalls over this area.

2.2.5. Interim Action Phase II

Phase II IA included the following steps and actions:

- Sludge excavation and disposal which included (PERC 2012c):
    - Excavating wastewater treatment sludge;
    - Characterizing excavated materials to determine the proper disposal option; and,
    - Disposing the excavated waste water treatment sludge.
- Building D soil removal and disposal which included (PERC 2014a):
    - Excavating soil exceeding excavation goals underneath the footprint of Building D, prior to construction of the building;

    - Characterizing excavated materials to determine the proper disposal option; and,
    - Disposing the excavated soils.
- Former Building B soil removal and disposal which included (documentation to be provided in the forthcoming Cleanup Action Plan Report for On-Property Soils and Perched Water).
    - Excavating soils exceeding excavation goals within the footprint of former Building B;
    - Characterizing excavated materials to determine the proper disposal option; and,
    - Dewatering and disposing the excavated soils.

2.2.6. Remedial Investigation Report for On-Property Soils and Surface Water

The RI for On-Property Soils and Surface Water (OSP) characterized the nature and extent of contamination in the context of past activities on the Property including presentation and evaluation of the analytical data, fill characteristics, and other pieces of information that had been collected on the Property through the completion of Phases I, II and III of the RI (PERC 2013). Specifically, the RI-OSP found that:

- Arsenic and lead are present in soil throughout the Property at concentrations exceeding industrial land use direct contact screening levels.
- Arsenic, cadmium, lead, pentachlorophenol and vinyl chloride in soil may be contributing to the presence of these constituents in the surficial aquifer.
- Total petroleum hydrocarbon (TPH) gasoline fraction, diesel fraction, and heavy oil fraction soil concentrations are greater than the industrial land use direct contact screening levels in a few isolated locations. In all cases these occurrences are co-mingled with arsenic and/or lead exceedances.
- Volatile organic compounds (VOCs; in particular trichloroethylene (TCE) and vinyl chloride) were associated with the wastewater treatment sludge formerly located in the western corner of the Property. An IA removed the VOC-containing wastewater treatment sludge, with the exception of a thin lens of the material at the excavation limits along the southern property boundaries in two directions - toward the Gardner-Fields property and toward the off-Property drainage ditch.
- Arsenic, cadmium, lead, mercury, TPH heavy oil fraction, pentachlorophenol, 1,2-cis-dichloroethylene, and TCE have been detected in perched water above drinking water screening levels.
- In addition, the RI-OSS identified six soil OUs areas (OU 1 through OU6) based upon their fill types. These six areas have distinct characteristics, and have been grouped based on their need for different remedial technologies. This WP includes additional evaluation of OU 3, which is defined by the limits of a hydrated lime layer that is present in the fill unit in the northern corner of the Property.

2.2.7. Feasibility Study for On-Property Soils and Perched Water

The FS-OSP presents the technical approach to remediate soils and perched water on the Property only (PERC 2014c). The FS-OSP determined the remedial action objectives (RAOs), Cleanup Levels (CLs), and Remediation Levels (RELs) which set the qualitative and quantitative remediation goals for the remediation of soils and perched water on the Property.

The FS-OSP identified one exposure pathway by which industrial workers could indirectly contact constituents in on-Property perched water. This involves the migration of constituents from perched water to groundwater, with the underlying groundwater used as part of a future process cooling water system. Under this scenario, exposure of industrial workers could occur as a part of maintenance activities on the cooling water system. Based on this pathway, the non-potable groundwater CLs for arsenic, cadmium and lead were calculated to be 0.67, 1.05 and 1.65 mg/l, respectively. However, this pathway is not complete as use of a groundwater-fed process cooling water system does not occur at the Property.

The FS-OSP identified the following two potentially complete exposure pathways for soil: (1) the soil-to-perched water pathway where constituents in soil leach or migrate into perched water; and, (2) direct contact with soils by a future utility worker.

CLs for the soil-to-perched water pathway were developed for arsenic and lead for each of the six OUs depending on the leachability of the material in each OU. The CLs for arsenic and lead in OU 3 were calculated at 114 and 2,121 micrograms per kilogram (mg/kg; see the FS-OSP for CLs for the other OUs).

CLs for the direct soil pathway were developed for arsenic and lead for the Property as a whole. The CLs for arsenic and lead were calculated at 588 and 1,000 mg/kg.

The FS-OSP determined that the CLs are the RELs for arsenic and did not specifically calculate RELs for lead, since arsenic and lead are typically co-located, and remediation of arsenic soils will also remediate lead to below the industrial CL for lead of 1,000 mg/kg.

The FS-OSP selected preferred remedial alternative for on-Property soils and perched water consists of:

- Installing a Slurry or Grout Wall Around the Property Perimeter;
- Treating Perched Water to the Perched Water REL;
- Excavating and Disposing of Soil Greater Than Direct Contact RELs in OUs 4 and 6;
- Excavating and Stabilizing Soils Greater Than Soil-to Perched Water RELs in OUs 1, 2, and 3;
- Covering the Property; and,
- Applying a Deed Restriction to Ensure On-Going Industrial Land Use

After completion of the six cleanup actions, on- and off-Property groundwater will be monitored to determine the progress of natural attenuation.

2.2.8. Feasibility Study for On-Property Soils and Perched Water Addendum 1

The FS-OSP Addendum 1 presents a revised remedial alternative that was determined during the remedial design process to implement the FS-OSP selected alternative (PERC 2014c; PERC/PIONEER 2017b). The revised alternative removed installing a slurry or grout wall around the Property perimeter. Ecology agreed to the revised remedial alternative on August 24, 2017, which consists of:

- Treating Perched Water to the Perched Water REL;
- Excavating and Disposing of Soil Greater Than Direct Contact RELs in OUs 4 and 6;
- Excavating and Stabilizing Soils Greater Than Soil-to Perched Water RELs in OUs 1, 2, and 3;
- Covering the Property; and,
- Applying a Deed Restriction to Ensure On-Going Industrial Land Use

After completion of the five cleanup actions, on- and off-Property groundwater will be monitored to determine the progress of natural attenuation.

2.2.9. Cleanup Action Plan for On-Property Soils and Perched Water

The CAP-OSP summarizes the technical approach of the preferred remedial alternative that was selected in the FS-OSP (see Section 2.2.7; PERC/PIONEER 2015b). The CAP-OSP includes installing a slurry or grout wall around the Property perimeter as selected in the FS-OSP. However subsequent to Ecology's approval of the CAP-OSP the FS-OSP Addendum 1 was approved by Ecology which removed installing a slurry or grout wall around the Property perimeter from the selected remedy. As such a slurry or grout wall will not be installed around the Property perimeter as part of the CAP-OSP. Remediation of soils and perched water on the Property as described in the CAP-OSP are ongoing, under an interim action approach approved by Ecology in 2017 (PERC/PIONEER 2018a). Following remediation of soils and perched water the Property will be covered with a cap and a deed restriction will be placed on the Property to ensure industrial land use.

2.2.10. Remedial Investigation Phase IV Characterization of Drainage Ditch Sediment

Phase IV RI consisted of characterization of the sediment and surface water in the drainage ditch (see Figure 2; PERC/PIONEER 2017a). The RI Phase IV included a sampling event on September 7th and 8th, 2016 to characterize the nature and extent of arsenic and lead as well as TPH in ditch sediment and surface water that remain after remediation of an asphalt tar oil spill (Ecology 2015b). Gardner-Fields Products spilled asphaltic tar oil on their property and approximately 70,000 gallons was released into the ditch on February 8, 2015 (Ecology 2015b). ERM, on behalf of Gardner-Fields Products, conducted remediation in the ditch (including sediment removal) to address the spill. Post-remediation sediment samples were collected and the results indicated that elevated arsenic (up to 330 mg/kg) and lead (up to 350 mg/kg) concentrations remained in the ditch (ERM 2015).

The Phase IV RI used the following sediment screening levels for this evaluation:

- Washington State sediment background concentrations; and
- MTCA Lower Tier Freshwater Sediment Cleanup Objectives (SCOs), Freshwater Sediment Cleanup Levels (SCLs), and Upper Tier Freshwater Sediment Cleanup Screening Levels (SCSLs), as promulgated by Ecology in the Sediment Cleanup User's Manual II (Ecology 2015a).

Based on data collected during the September 2016 sampling event the Phase IV RI determined that the SCSL exceedances for all constituents were primarily located in surface sediment (i.e., 0-0.5 feet bgs). The majority of concentrations collected from 0.5 to 8 feet bgs were non-detect or were detected below background concentrations. Residual contamination above SCLSs/SQOs from the asphalt tar oil spill remained in surface sediment in the ditch.

2.2.11. Interim Action Phase III Ditch Remediation

Based on the findings from Phase IV RI, Phase III IA was initiated to remediate the drainage ditch. Phase III IA addresses the arsenic and lead concentrations that are present in the ditch adjacent to the Superlon property that are potentially associated with the Superlon site.

The objectives of Phase III IA are to excavate the:

- Top one foot of the sediment in the ditch in areas where arsenic concentrations exceed the Freshwater SCOs and Freshwater SCSLs promulgated by Ecology in the Sediment Management Standards (Ecology 2013b);

- Eastern berm of the ditch where arsenic and lead concentrations exceed the MTCA industrial cleanup standards for the Port of Tacoma property; and
- Remaining berm soil between the Superlon/Port of Tacoma property line and the western limits of the excavations previously conducted on the Superlon Property to remediate arsenic and lead concentrations exceeding site-specific RELs.

IA Phase III was initiated in 2020 and is expected to be completed by 2022.

2.2.12. Groundwater Monitoring

Groundwater monitoring (GWM) has been conducted at the site since 2011. GWM was conducted quarterly from the third quarter of 2011 until the fourth quarter of 2015, when the sampling frequency was reduced to one event per year (Ecology 2015c). The results of the 2015-2021 GWM events were documented in the 2015, 2016, 2017, 2018, 2019, 2020, and 2021 GWM Reports (PERC/PIONEER 2015a, 2016, 2017c, 2018, 2019, 2021a and 2021b). The results from the most recent GWM event indicate that arsenic concentrations in the Shallow Aquifer appear to be fluctuating with a significant decrease in MW-9S and a significant increase in MW-13S[2], while arsenic and lead concentrations in the Intermediate Aquifer and lead concentrations in the Shallow Aquifer are stable (PERC/PIONEER 2021b).

The GWM well network historically consisted of 26 Shallow and Intermediate Aquifer co-located MWs installed at 12 locations on and off of the Property. As of 2021, 10 MWs remained in place, while the other 16 have been decommissioned (see Figure 3). A brief history of MW locations is presented below:

- Seven Shallow Aquifer MWs (MW-1S – MW-7S) were installed during Phase I RI activities in 2011, in accordance with the Phase I RI Work Plan (PERC 2010).
- One Shallow Aquifer MW (MW-8S) and eight Intermediate Aquifer MWs (MW-1I – MW-8I) were installed during Phase III RI activities in 2012, in accordance with the Phase III RI Work Plan (PERC 2012a).
- Four Shallow Aquifer MWs (MW-9S – MW-12S) and four Intermediate Aquifer MWs (MW9I – MW12I) were installed during Phase IV RI activities in 2014, in accordance with the Phase IV RI Work Plan (PERC 2014b).
- Sixteen MWs were decommissioned in 2017 (MW-1I, MW-1S, MW-3I, MW-3S, MW-5I, MW-5S, MW-6I, MW-6S, MW-7I, MW-7S, MW-8I, MW-8S, MW-11I, MW-11S, MW-12I, and MW-12S; PERC/PIONEER 2018b).
- One Shallow Aquifer MW (MW-13S) and one Intermediate Aquifer MW (MW-13I) were installed in November 2019 (PERC/PIONEER 2021a).[3]

2.3. Primer on Geochemical Attenuation of Arsenic

Since arsenic does not degrade in the environment and geochemistry plays a critical role in attenuating arsenic, this section presents a brief primer on geochemical attenuation to provide context for the proposed groundwater investigation presented in Section 3. The natural attenuation of arsenic in groundwater in general, and the natural attenuation that is presumably occurring within portions of the arsenic plume, is dependent on three geochemical attenuation mechanisms and several geochemical conditions (Argonne National Laboratory 2003; Savannah River National Laboratory 2011; USEPA 2007a,

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[2] These fluctuations are presumably due to the ongoing soil and perched groundwater interim action (see Section 2.2.8)

[3] MW-13S and MW-13I were installed in the proximate location of MW-3S and MW-3I which were abandoned in 2017 to allow for soil remediation.

2007b, 2015).[4] The three geochemical attenuation mechanisms (in decreasing order of long-term stability) are (1) precipitation or co-precipitation with recalcitrant and highly stable minerals, (2) co-precipitation with metal oxides (e.g., iron oxides), and (3) sorption. The occurrence of these three mechanisms, which involve partitioning of dissolved arsenic from the aqueous phase to the solid phase (i.e., soil or sediment), will be evaluated at the Site by analyzing soil using a sequential extraction procedure. A brief description of each mechanism, along with the geochemical conditions typically associated with the mechanism, is presented in the three following paragraphs.

Arsenic that has precipitated or co-precipitated with highly stable minerals is not environmentally available for transport back to the dissolved phase because the arsenic has been incorporated into the mineral and the mineral will remain intact under a wide range of geochemical conditions (including current and anticipated future geochemical conditions at the Site). Arsenic-containing minerals incorporate arsenic directly as the mineral precipitates. Arsenic can also be incorporated indirectly with non-arsenic minerals as an impurity during mineralization. A preliminary evaluation of the geochemical conditions documented during the sampling of the Site's Shallow and Intermediate Aquifer MWs indicate that a variety of highly stable minerals would be expected to precipitate and incorporate arsenic directly or indirectly during precipitation (PERC/PIONEER 2021b).[5] The presence of arsenic within highly stable minerals at the Site will be confirmed by the results of the sequential extraction procedure discussed in Section 3.

Co-precipitation of arsenic with metal oxides (e.g., iron oxides) is not as favorable in terms of long-term attenuation stability as precipitation/co-precipitation with highly stable minerals because metal oxides can be reduced and dissolved by bacteria as part of their respiration process. However, co-precipitation of arsenic with metal oxides can provide stable attenuation of arsenic as long as oxygen is present. When oxygen is present, bacteria use oxygen instead of metal oxides in respiration, leaving the metal oxides intact. Precipitation of metal oxides, and incorporation of arsenic indirectly in the metal oxide mineral as a co-precipitate, occurs in locations where reduction-oxidation (redox) conditions transition from reducing (e.g., Eh less than 0 V) to oxidizing (e.g., Eh greater than 0 V). Thus, as long as redox conditions remain oxidizing (and favorable for metal oxides), arsenic that has co-precipitated with metal oxides will remain in the solid phase. The presence of arsenic within metal oxide minerals will be confirmed by the results of the sequential extraction procedure discussed in Section 3.

Although sorption of arsenic on the solid phase is an important geochemical attenuation mechanism, sorption is considered the least stable of the three geochemical attenuation mechanisms because arsenic can desorb from the solid phase and mobilize back to the aqueous phase if one or more geochemical conditions change. In particular, sorption of the key arsenic species (arsenate and arsenite) can be affected by changes to pH and/or redox conditions. The ability of arsenic to sorb to the solid phase is better when pH is in a neutral range (e.g., pH between 6 and 8) compared to a basic pH (e.g., pH greater than 9).[6,7] Furthermore, the ability of arsenic to sorb to the solid phase decreases proportionally as the

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[4] The information in this section is based on these references and personal correspondence between Dr. Rebecca Neumann (University of Washington) and Troy Bussey (PIONEER) from November 2016 through June 2019.

[5] The 2011 through 2021 activity of electrons (Eh) values in the Shallow and Intermediate MWs ranged from -0.13 to 0.47 volts (V). The 2011 through 2021 pH results ranged from 6.0 to 9.0, with the exception of three outliers equal or exceeding 11.0.

[6] At a neutral pH, the surface charge of metal oxides (which sorb arsenic in the aquifers) is positive, aqueous arsenate exists as negatively charged oxyanions, and aqueous arsenite exists as a neutrally charged species. Because the charges on the sorption surface and arsenic species are aligned to attract each other, the electrostatic attractions that facilitate sorption are more compatible in a neutral pH range. By contrast, the sorption surface and arsenic species are less attracted to each other at a basic (elevated) pH because the metal oxide surface and both arsenic species are negatively charged.

[7] Arsenate sorption increases and arsenite sorption decreases as pH becomes more acidic (e.g., decreases from pH 6 to pH 1).

pH becomes increasingly basic (elevated).[8] The ability of arsenic to sorb to the solid phase is better in oxidizing conditions (e.g., Eh greater than 0 V) than reducing conditions (e.g., Eh less than 0 V). Oxidizing conditions are better for arsenic sorption primarily because iron oxide minerals are typically present in oxidizing conditions, and iron oxide minerals provide solid-phase sorption surfaces for arsenic.[9] These sorption surfaces can consist of existing iron oxide minerals that have already precipitated or fresh iron oxide minerals that form where redox conditions transition from reducing to oxidizing. Locations in which Eh exceeds 0 V and iron oxide concentrations exceed 1,000 mg/kg are considered favorable for arsenic sorption (Savannah River National Laboratory 2011). Beyond pH and redox conditions, secondary geochemical conditions that can affect sorption include ionic strength and the presence/absence of competitive anions. The ability of arsenic to sorb to the solid phase generally increases as the ionic strength of the aqueous phase increases because sorption surfaces are more positively charged at higher ionic strengths, which facilitates increased sorption of negatively charged arsenic oxyanions.[10] If excessive concentrations of competitive anions such as ortho-phosphate and silicate are present, the ability of arsenic to sorb to the solid phase can decrease because ortho-phosphate and silicate can compete with arsenic oxyanions for sorption surfaces.

In summary, ideal conditions for arsenic attenuation (in general order of importance) include:

- The presence of arsenic within highly stable minerals;
- Oxidizing conditions (e.g., Eh greater than 0 V);
- pH in a neutral range (e.g., pH between 6 and 8);[11]
- Iron oxide concentrations greater than 1,000 mg/kg;
- Elevated ionic strength (e.g., elevated conductivity values); and
- Lower concentrations of competitive anions such as ortho-phosphate and silicate.

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[8] As pH becomes more basic (e.g., increases from pH 9 to pH 11), the sorption surface becomes more negatively charged, which further reduces the attraction of negatively charged arsenic species to the sorption surface.

[9] Manganese and aluminum oxides can also provide sorption surfaces for arsenic.

[10] Conductivity and total dissolved solids are indicators of the ionic strength of the aqueous phase.

[11] Alternatively, ideal attenuation conditions could include an acidic pH if arsenate is the predominant species.

3. Phase V Remedial Investigation – Scope of Work

3.1. Purpose

The purpose of this section is to present the methodology for collecting and analyzing soil and groundwater samples pursuant to this Work Plan in accordance with WAC 173-340-820 and applicable components of Ecology guidance (Ecology 1995). Specific methods to be used to complete the field investigation are described in the Sampling and Analysis Plan / Quality Assurance Project Plan (SAP/QAPP; PERC/PIONEER 2022).

3.2. Sampling Design

This section presents the sampling design of Phase V to determine the following:

- The hydraulic connection between the Perched and Shallow Aquifers.
- The distribution of arsenic and lead in the vadose zone soil and Perched Aquifer soil and groundwater in OU 3.
- The prevalence of arsenic within highly stable minerals and iron oxide concentrations within the Perched Aquifer.
- The distribution of dissolved arsenic and lead in groundwater along the property boundary.

As part of Phase V, the Companies will collect and analyze groundwater and soil samples as summarized in Table 1 (see Figure 4 for sample locations). The SAP/QAPP summarizes the analytical methods, target reporting limits, and holding times for all media and analytes.

3.2.1. Connection between the Perched and Shallow Aquifers

Evaluation of the groundwater levels measured in the Shallow Aquifer indicate that the water level pressure in the Shallow Aquifer could extend above the Aquiclude and into the Perched Aquifer. If this occurs this could be the result of two scenarios:

(1) The Aquiclude is a continuous low permeability confining layer that is inhibiting the migration of groundwater from the Shallow Aquifer to the Perched Aquifer making the Shallow Aquifer a confined aquifer[12], or

(2) The Aquiclude is a leaky-discontinuous low permeability layer and the groundwater levels measured in the Shallow Aquifer extend up into the Perched Aquifer.

To determine if this scenario is possible the following analysis will be conducted:

- To determine the vertical intervals of the Perched and Shallow Aquifers and the Aquiclude, a hydraulic profiling tool (HPT) will be advanced to 20 feet bgs using direct push technology at three locations (HPT-01, HPT-02 and HPT-03; see Figure 4).
- Adjacent to each of the three HPT locations, hydropunches will be installed using direct push technology into the Perched and Shallow Aquifers. The hydropunches will be left in place concurrently for 24-hrs in the Perched and Shallow Aquifers to determine the piezometric head for both aquifers (TW-MW-5P/S, TW-MW-6P/S, TW-MW-12P/S; see Figure 4). A groundwater sample will also be collected and analyzed for dissolved arsenic and lead from the Perched and

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[12] A confined aquifer is an aquifer below the land surface that is saturated with water. Layers of low permeability sediments are both above and below the aquifer, causing it to be under pressure so that when the aquifer is penetrated by a well, the water will rise above the top of the aquifer.

Shallow Aquifers at each HPT location following the procedures and methods presented in Section 3.2.2.2 of the SAP/QAPP.[13]

3.2.2. Distribution of Arsenic in the Vadose Zone and Perched Aquifer Soils in OU 3

To more clearly determine the distribution of arsenic and lead in the vadose zone and Perched Aquifer in OU 3 the following analysis will be conducted:

- Seven direct push continuously cored soil borings will be advanced to 10 feet bgs in OU 3 (OU3-SB-1 through OU3-SB-7; see Figure 4).[14] The soil borings will be visually inspected and described in standard geologic terms in the field logbook as defined by the Unified Soil Classification System. The visual inspection will focus on the determination of soil types throughout the length of the core, and will note any waste or other non-native materials occurring within the core.
- Twelve-inch soil samples will be collected from each soil boring at approximately 3 to 4, 6 to 7 and 9 to 10 ft bgs. Each soil sample will be analyzed onsite for arsenic and lead via X-ray fluorescence (XRF). Up to eight of the soil samples will be subsequently analyzed for (1) the RCRA 8 metals and (2) arsenic and lead using the appropriate leachability procedure.[16] To determine if arsenic is prevalent within highly stable minerals and if iron oxide concentrations are prevalent in the phreatic zone, up to seven of the samples collected at 9 ft bgs will be analyzed for arsenic and iron using the sequential extraction procedure (SEP).[17] The SEP samples will be collected by splitting the 9 ft bgs soil samples into two six-inch sections. One six-inch section will be homogenized and analyzed for the non-SEP analysis. The other six-inch section will be used for SEP analysis and will be homogenized and collected under anoxic conditions to prevent arsenic from changing states due to oxidation.[18]
- If groundwater is encountered in any of the seven direct push soil borings, it will be sampled and analyzed for dissolved arsenic and lead following the procedures and methods presented in Section 3.2.2.2 of the SAP/QAPP.

3.2.3. Distribution of Dissolved Arsenic and Lead along the Property Boundary

The overall project schedule includes monitoring the on- and off-Property groundwater to determine the progress of natural attenuation following completion of the ongoing OSP clean-up actions (Ecology 2013a). The GWM network will be expanded in phases to delineate and monitor the groundwater plume, in order to determine the progress of natural attenuation. Prior to installing MWs in 2023 a better

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[13] Hydropunches use a stainless screen that is shielded as it is pushed to the desired sample depth, and is then exposed at a discrete depth. After each hydropunch location has been allowed to equilibrate with the aquifer for at least 24 hrs the water level in the hydropunch will be measured and recorded and a groundwater sample will be collected following the procedures and methods in the SAP/QAPP.

[14] OU3-SB-1 is located adjacent to HPT-02 and will be advanced to 20 ft bgs to calibrate the HPT.

[16] The leachability procedure will be determined based on the pH of the soil; If the pH value is less than six TCLP will be used, if the pH value is greater than six SPLP will be used per WAC 173-340-747(7).

[17] SEP analysis will be in accordance with Brooks Analytical Laboratories of Bothell, WA standard procedures using a modified version of the Wenzel et al 2001 methodology (BAL-5913). Analysis includes five-step selective sequential extraction method (i.e., (1) $NH_4H_2PO_4$, (2) $NH_2OH*HCl$, (3)NH_4+-oxalate, (4) HNO_3/H_2O_2, and (5) $HCl/HF/HNO_3$), for correlation between metals (aluminum [Al], arsenic [As], iron [Fe], manganese [Mn], and silicon [Si]) and different substrate properties. Other analyses include total recoverable arsenic.

[18] Anoxic sampling conditions will be maintained by homogenizing and containerizing the soil samples within a leak proof box without a lid (e.g., cooler) that has dry ice sublimating nitrogen and displacing oxygen from the box. An oxygen meter (e.g, RAE Systems QRAE) will be used to ensure the cooler remains anoxic (i.e., oxygen less than 5%). The soil samples will be delivered to the lab in a cooler with dry ice.

understanding of the Site's hydrostratigraphy and the migration of dissolved arsenic and lead across the Property boundary is needed to guide the location of future MWs. The following analysis will be completed to determine the vertical extent of the Perched, Shallow and Intermediate Aquifers and the dissolved arsenic and lead concentrations in the aquifers along the Property boundary:

- To determine the vertical intervals of the Perched, Shallow and Intermediate Aquifers along the property boundary an HPT will be advanced to 50 feet bgs using direct push technology at eight locations (HPT-GW-01 through HPT-GW-08 see Figure 4). [19, 20]
- Following the determination of the aquifers' vertical intervals using the HPT, groundwater samples will be collected from each of the aquifers at each of the eight locations. The groundwater samples will be collected from hydropunches installed in the Perched, Shallow, Intermediate Aquifers to collect groundwater samples for dissolved arsenic and lead following the procedures and methods presented in Section 3.2.2.2 of the SAP/QAPP.

3.3. Pre-Mobilization

Prior to the implementation of this Work Plan, a number of important pre-mobilization coordination tasks will need to be completed. Key pre-mobilization coordination tasks include:

- Coordinate the anticipated field schedule with Ecology.
- Coordinate the scope of work and field schedule with all on-site personnel.
- Coordinate with Chemours, PERC, PIONEER, and on-site contractors, regarding health and safety details specific to this project (e.g., field team organization and communication, potential hazards and associated controls, work zones, decontamination, personal protective equipment, air monitoring).
- Obtain necessary health and safety paperwork from team members (e.g., training records).
- Call the Washington Call Before You Dig phone number for all proposed excavation and drilling locations.
- If necessary, conduct a private utility locate for excavation and drilling locations.
- If necessary, core through asphalt/concrete to facilitate drilling activities.
- Ensure the licensed driller submits the necessary notices of intent and associated fees to the Ecology Water Resources Program for proposed drilling locations.
- Coordinate with the PERC Project Manager, the licensed driller, and XRF Field Screening staff to ensure that sample volume, sample preparation, and sample preservation requirements can be met for the XRF measurements and the laboratory analyses.
- Coordinate with the project laboratories on key elements of the SAP/QAPP (e.g., sample volume, sample preservation, analytical methods and analytes, field quality control samples, target reporting limits).
- Obtain sample containers from the project laboratories.

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[19] This evaluation in not designed to determine the lower extent of the Intermediate Aquifer, which is deeper than 50 feet bgs.

[20] HPT-GW-08 is located on the far side of the Taylor Way from the Property to determine if the dissolved arsenic concentrations detected in MW-2S and MW-2I are migrating onto the Property from offsite.

- Obtain the necessary equipment and supplies (e.g., water level meter, water quality multimeter, dry ice and oxygen meter for anoxic field preservation, soil pH field meter, 0.45-micron filters).
- Coordinate access with the City of Tacoma for boring location HPT-GW-08.

3.4. Decontamination

Between boring locations and following the completion of the second boring location the GeoProbe® rod, HPT and hydropunches will be decontaminated using the following three-step process:

1. Each length of pipe will be pressure washed.
2. The exterior and interior surfaces of each rod will be scrubbed using Alconox® soap.
3. The exterior and interior surfaces of each rod will be re-washed using a pressure washer.

Decontamination of personnel and equipment will follow the procedures identified in the Project Health and Safety Plan (PERC/Pioneer 2012).

3.5. Boring Completion and Surveying

Following sampling, each boring will be backfilled with bentonite chips or grout in accordance with Chapter 173-160 WAC.[21] Boring locations will be surveyed, establishing horizontal coordinates using a handheld GPS unit.

3.6. Reporting

Upon receipt of the qualified laboratory data a Technical Memorandum will be developed that will include:

- A description of the work completed, noting any exceptions to the methodology described in this work plan;
- Figures showing the sampling locations and the observed lithology in those locations;
- HPT and soil boring logs for boring locations;
- The findings of the laboratory analyses; and
- Interpretation of the investigation's findings.

The findings presented in the Technical Memorandum will be used to guide the location of future MWs and will be incorporated into the RI/FS following delineation of the groundwater plume.

3.7. Schedule

The preparatory and field work described in this work plan will be completed within the 1st and 2nd Quarters of 2022. The Technical Memorandum will be completed by the 4th quarter of 2022.

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[21] HPT borings will be backfilled with bentonite chips or grout immediately after extraction of the HPT probe from the boring.

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Figures:

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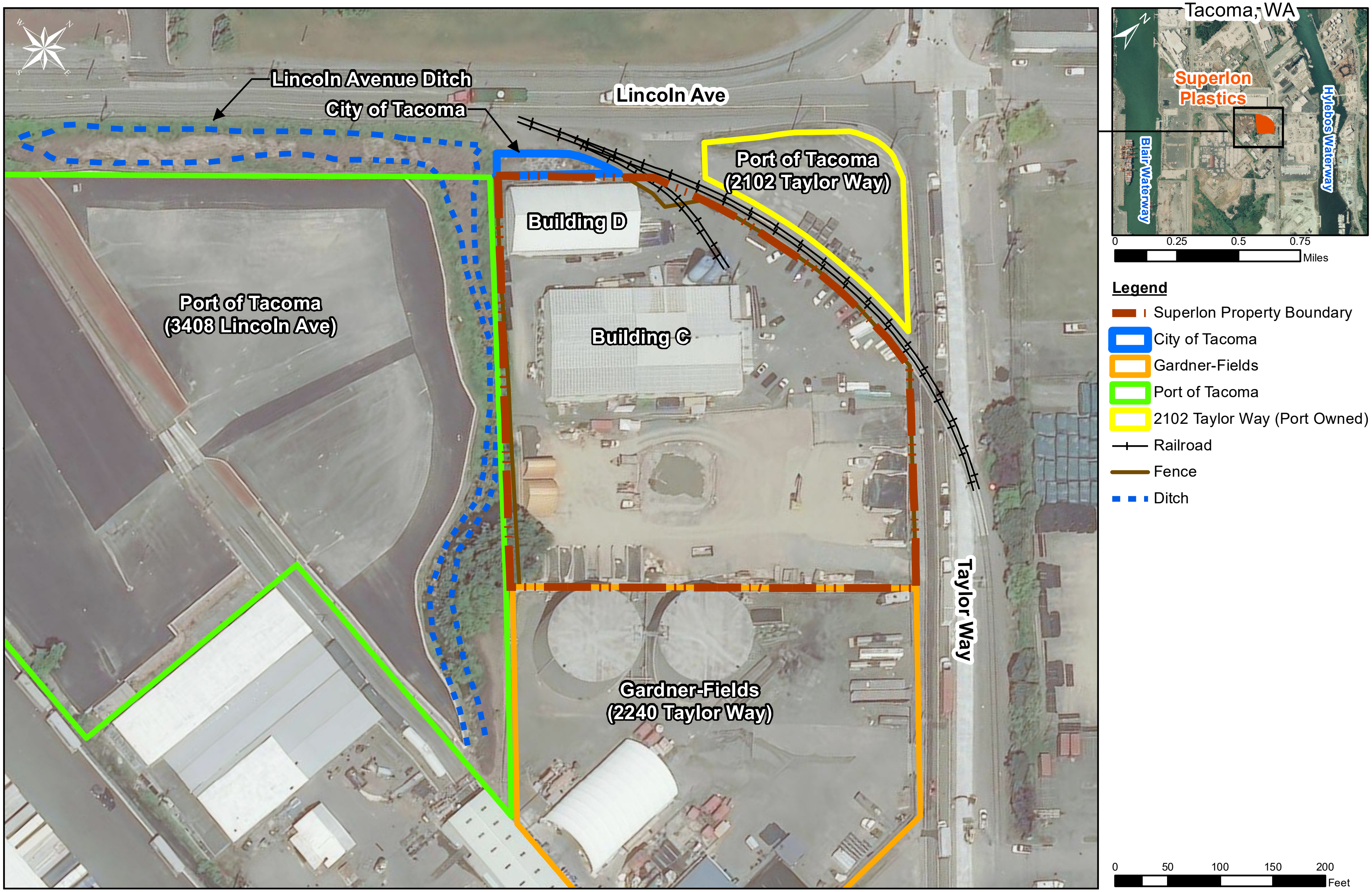
Superlon Property Location
Remedial Investigation Phase V Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 1

Document Path: G:\Projects\Superlon\Maps\2022\RI Phase V WP\Figure 1_Superlon Site Location.mxd; Author: SM; Date Saved: 2/3/2022



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Property Features
Remedial Investigation Phase V Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 2

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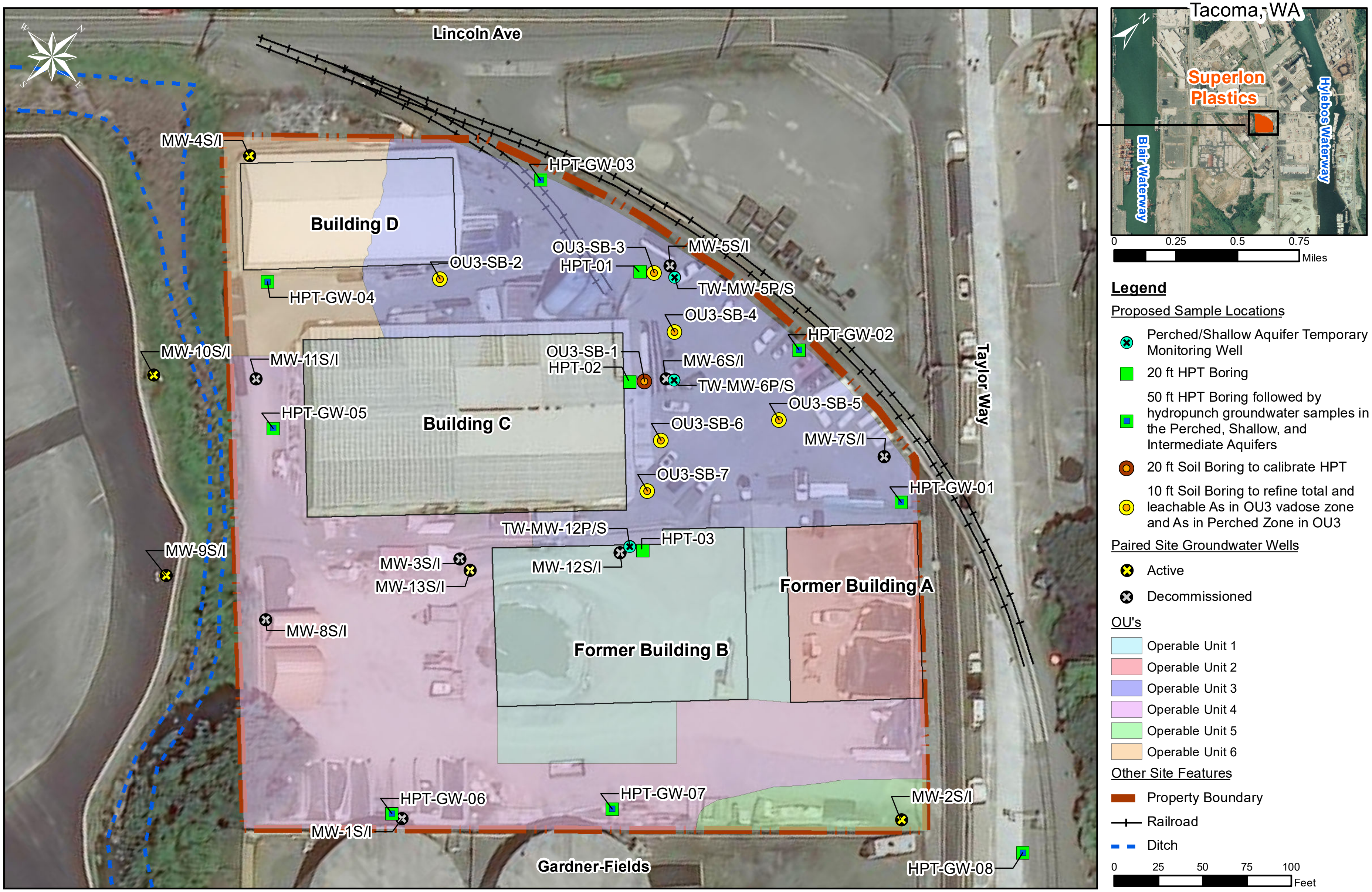
Monitoring Well Locations
Remedial Investigation Phase V Work Plan
Superlon Plastics Site, Tacoma, Washington

Figure 3



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Proposed Sample Locations
Remedial Investigation Phase V Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 4

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Tables:

Table 1: Sampling Design for SuperIon RI Phase V - OU 3 and Property Groundwater Investigation

Boring ID	Boring Location Note[1]	Estimated Boring Depth (in feet bgs)	Media	Potential Sample Interval (in feet bgs)	Sample Purpose	Constituents				
						Arsenic and Lead GW[2]	Arsenic and Lead XRF Soil	RCRA 8 Metals Soil	STLC/TCLP Arsenic & Lead	SEP Analysis[3]
HPT-01	HPT locations are designed to determine the intervals of the Perched and Shallow Aquifers and the Tidal Mudflat Aquiclude.	20	N/A	N/A	HPT results will guide groundwater sample intervals at TW-MW-5P/S	N/A	N/A	N/A	N/A	N/A
HPT-02		20	N/A	N/A	HPT results will guide groundwater sample intervals at TW-MW-6P/S	N/A	N/A	N/A	N/A	N/A
HPT-03		20	N/A	N/A	HPT results will guide groundwater sample intervals at TW-MW-7P/S	N/A	N/A	N/A	N/A	N/A
TW-MW-5P/S	At each location a hydropunch screen will be installed for 24-hrs in the Perched and Shallow Aquifers to determine the piezometric head for both aquifers at each location. A groundwater sample will also be collected from the Perched and Shallow Aquifers at each location.	9, 20	GW	9, 20	Determine how the Perched and Shallow Aquifers are connected.	2				
TW-MW-6P/S		9, 20	GW	9, 20	Determine how the Perched and Shallow Aquifers are connected.	2				
TW-MW-7P/S		9, 20	GW	9, 20	Determine how the Perched and Shallow Aquifers are connected.	2				
OU3-SB-01	Soil Boring locations are designed to determine the distribution and concentrations of arsenic and lead in the vadose zone and Perched Aquifer in OU 3.	20	Soil[4]	3, 6, 9	Calibrate HPT results and determine arsenic and lead concentrations in OU 3.		3	1	1	1
OU3-SB-02		10	Soil & GW	3, 6, 9	Determine the distribution and concentrations of arsenic and lead in the vadose zone and Perched Aquifer in OU 3.	1	3	1	1	1
OU3-SB-03		10	Soil[4]	3, 6, 9			3	1	1	1
OU3-SB-04		10	Soil & GW	3, 6, 9		1	3	1	1	1
OU3-SB-05		10	Soil & GW	3, 6, 9		1	3	1	1	1
OU3-SB-06		10	Soil & GW	3, 6, 9		1	3	1	1	1
OU3-SB-07		10	Soil & GW	3, 6, 9		1	3	1	1	1
HPT-GW-01	HPT locations are designed to determine the intervals of the Perched, Shallow and Intermidiate Aquifers. At each location a hydropunch groundwater sample will be collected from the Perched, Shallow, and Intermidiate Aquifers.	50	GW	9, 20, 50	Determine the distribution and concentrations of arsenic and lead in groundwater along the property boundary.	3				
HPT-GW-02		50	GW	9, 20, 50		3				
HPT-GW-03		50	GW	9, 20, 50		3				
HPT-GW-04		50	GW	9, 20, 50		3				
HPT-GW-05		50	GW	9, 20, 50		3				
HPT-GW-06		50	GW	9, 20, 50		3				
HPT-GW-07		50	GW	9, 20, 50		3				
HPT-GW-08		50	GW	9, 20, 50	Determine if the dissolved arsenic concentrations detected in MW-2S and MW-2I are migrating onto the Property from offsite.	3				
Field QC Samples			Soil & GW	N/A	Field Duplicates	2	2	1	1	1
			Soil & GW	N/A	Equipment Blanks	4	2	1		
					Total Samples per Analysis	41	25	9	8	8

Notes:

bgs: below ground surface, RCRA 8 Metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver; 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] All groundwater samples for metals analyses will be field filtered with a 0.45-micron filter and preserved with HNO3.

[3] SEP analysis includes five-step selective sequential extraction method, based on Wenzel et al., for correlation between metals (aluminum [Al], arsenic [As], iron [Fe], manganese [Mn], and silicon [Si]) and different substrate properties. Other analyses include total recoverable arsenic.

[4] Co-located with groundwater sampling location (e.g., TW-MW-5P/S)

Appendix B: Soil Boring and HPT Logs

Superlon - RI Phase V
Tacoma, WA

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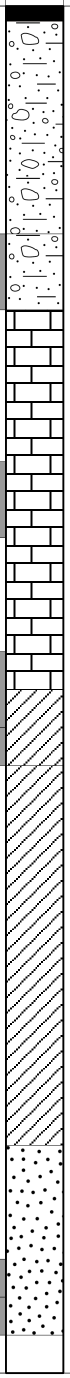
BORING LOCATION: OU3-SB1
DATE STARTED: 3/30/22
DRILLING CONTRACTOR: Cascade
DRILLING METHOD: Direct Push
DRILLING EQUIPMENT: Geoprobe
LOGGED BY: JH/NS

Log of Soil Boring No. OU3-SB1

DEPTH TO WATER (ft.): 5
TOTAL DEPTH (ft.): 17.5
SCREEN INTERVAL: --
BOREHOLE BACKFILL: Bentonite



DEPTH (feet)	SAMPLES Sample No.	Sample	Litho.	PID Reading	DESCRIPTION	BORING REMARKS	TEMPORARY WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0				PID Readings not Required	ASPHALT		No temporary well installed.
					FILL - Fine to Coarse SILTY SAND with gravel, dark gray to light gray, moist		
3	OU3-SB1-3-4-0322	▨			FILL - Fine SILTY SAND with hydrated lime, plastic, and trash, mottled tan, moist	Slight hydrocarbon odor at 3-4'	
4	OU3-SB1-6-7-0322 OU3-SB1-8.5-9.5-0322	▨ ▨			FILL - HYDRATED LIME with gravel, mottled tan, moist-to-wet		
9	OU3-SB1-9.5-10.5-0322	▨			ORGANIC CLAY with root fibers and peat, black, moist		
10					SILTY ORGANIC CLAY, trace root fibers, brown		
15	OU3-SB1-16.5-17-0322 OU3-SB1-17-17.5-0322	▨ ▨			Fine SAND with silt, dark brown, wet	Sand coarsens at depth from fine at 15' to fine-to-coarse at 17'	
18							

Superlon - RI Phase V

Tacoma, WA

BORING LOCATION: OU3-SB2

DATE STARTED: 3/31/22

DRILLING CONTRACTOR: Cascade

DRILLING METHOD: Direct Push

DRILLING EQUIPMENT: Geoprobe

LOGGED BY: JH/NS

PIONEER TECHNOLOGIES CORPORATION

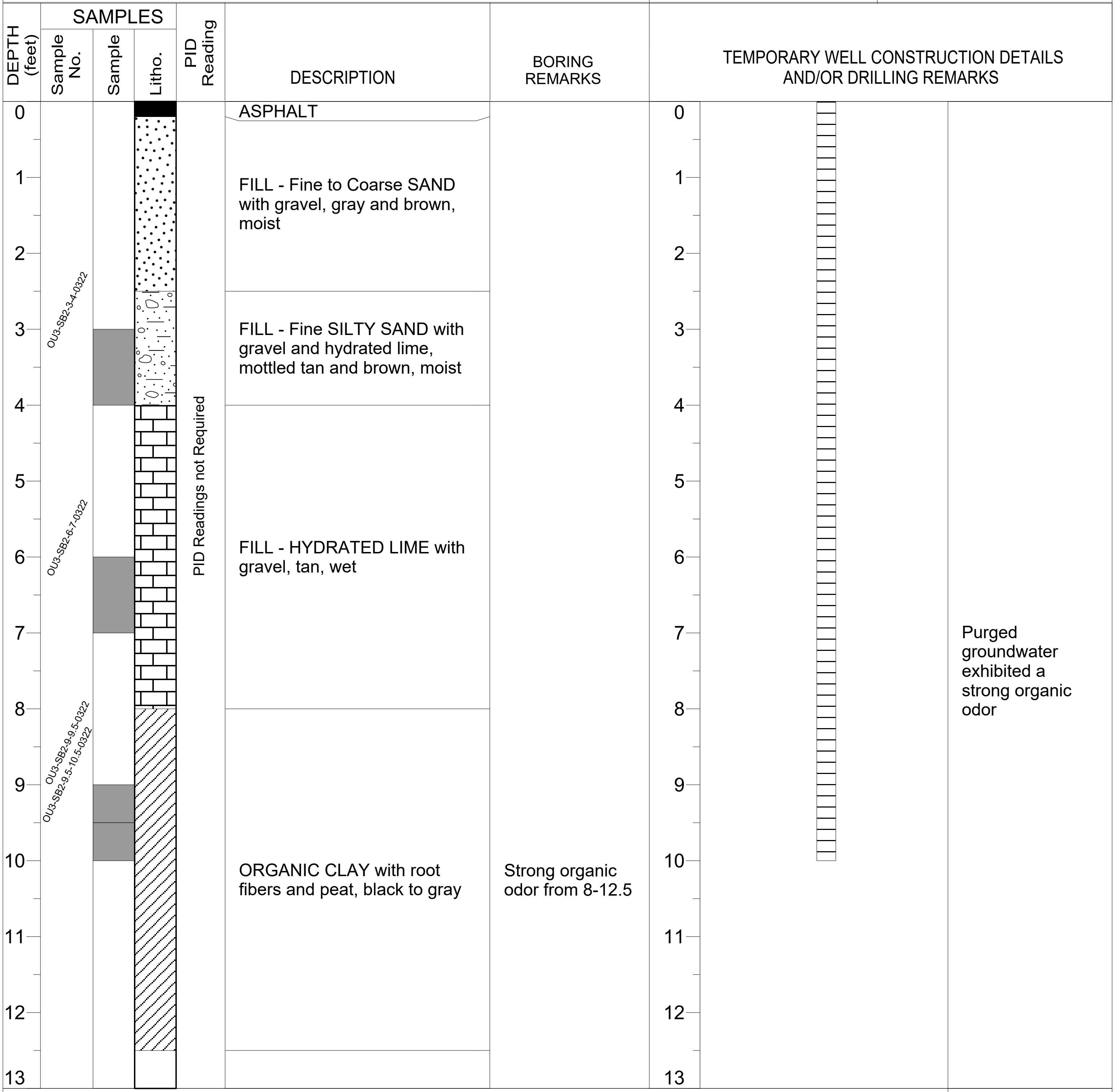
Log of Soil Boring No. OU3-SB2

DEPTH TO WATER (ft.): 4

TOTAL DEPTH (ft.): 12.5

SCREEN INTERVAL: 0-10

BOREHOLE BACKFILL: Bentonite



Sample No.	PID Reading	DESCRIPTION	BORING REMARKS	TEMPORARY WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
	PID Readings not Required	ASPHALT		
		FILL - Fine to Coarse SAND with gravel, gray and brown, moist		
OU3-SB2-3-4-0322		FILL - Fine SILTY SAND with gravel and hydrated lime, mottled tan and brown, moist		
OU3-SB2-6-7-0322		FILL - HYDRATED LIME with gravel, tan, wet		Purged groundwater exhibited a strong organic odor
OU3-SB2-9-9.5-0322 OU3-SB2-9.5-10.5-0322		ORGANIC CLAY with root fibers and peat, black to gray	Strong organic odor from 8-12.5	

Superlon - RI Phase V
Tacoma, WA

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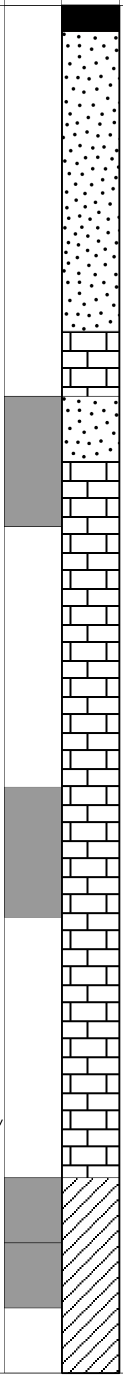
TECHNOLOGIES CORPORATION

Log of Soil Boring No. OU3-SB3

BORING LOCATION: OU3-SB3	DATE STARTED: 3/31/22	DEPTH TO WATER (ft.): 5	TOTAL DEPTH (ft.): 10.5
DRILLING CONTRACTOR: Cascade		SCREEN INTERVAL: --	BOREHOLE BACKFILL: Bentonite
DRILLING METHOD: Direct Push			
DRILLING EQUIPMENT: Geoprobe			
LOGGED BY: JH/NS			



DEPTH (feet)	SAMPLES Sample No.	Sample	Litho.	PID Reading	DESCRIPTION	BORING REMARKS
0				PID Readings not Required	ASPHALT	
1 2					FILL - Fine to Coarse SAND with gravel, gray, moist	
					FILL - HYDRATED LIME with gravel, tan and gray, moist	
3	OU3-SB3-3-4-0322				FILL - Fine to Coarse SAND with silt and gravel, brown, moist	
4 5 6 7 8	OU3-SB3-6-7-0322				FILL - HYDRATED LIME with gravel, tan, moist to wet	
9 10	OU3-SB3-9-9.5-0322 OU3-SB3-9.5-10.5-0322				ORGANIC CLAY with root fibers, black to gray	

TEMPORARY WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS

0 1 2 3 4 5 6 7 8 9 10

No temporary well installed.

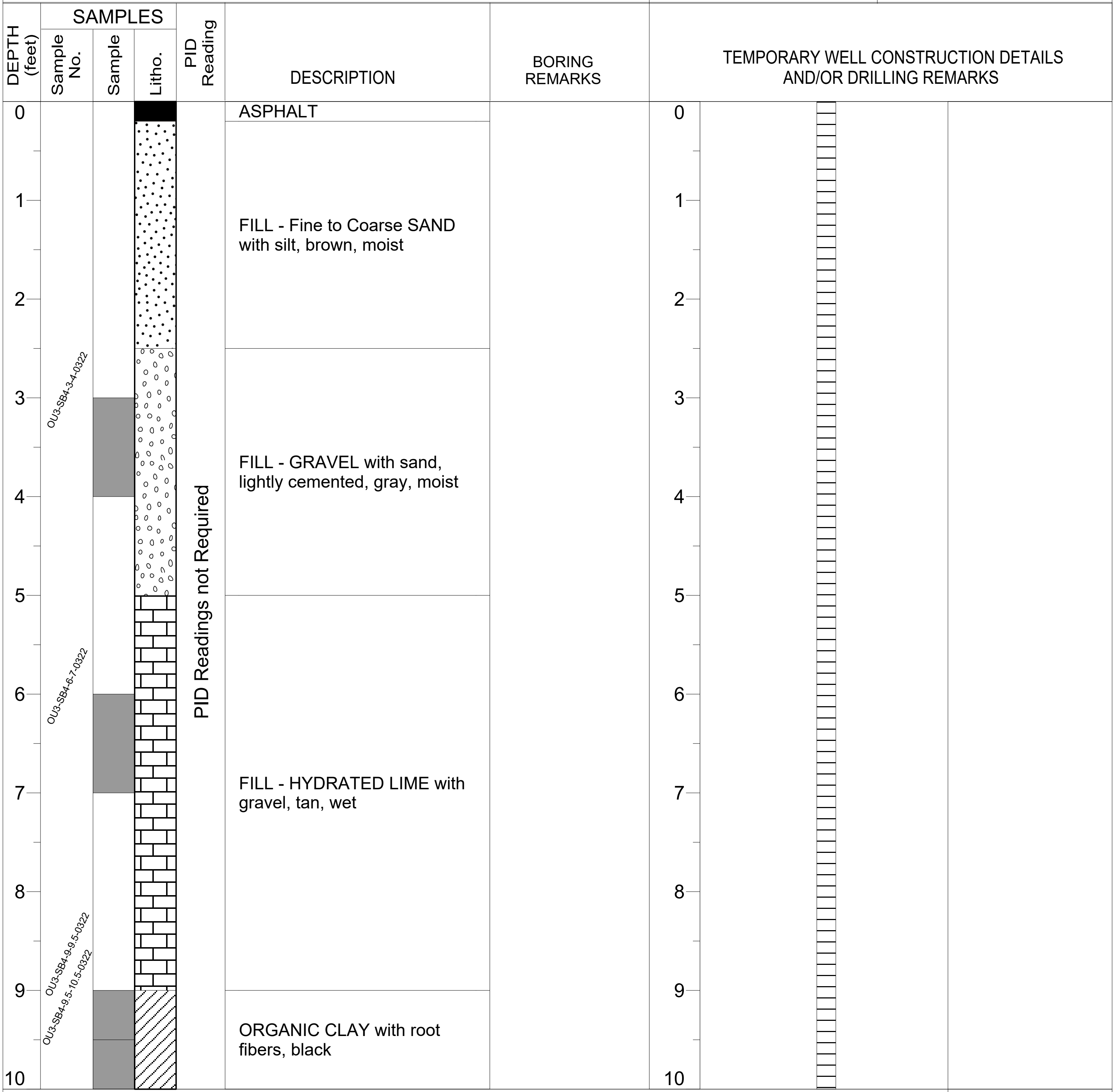
Superlon - RI Phase V

Tacoma, WA

PIONEER TECHNOLOGIES CORPORATION

Log of Soil Boring No. OU3-SB4

BORING LOCATION: OU3-SB4	DATE STARTED: 3/30/22
DRILLING CONTRACTOR: Cascade	
DRILLING METHOD: Direct Push	
DRILLING EQUIPMENT: Geoprobe	DEPTH TO WATER (ft.): 4.83
	TOTAL DEPTH (ft.): 10
LOGGED BY: JH/NS	SCREEN INTERVAL: 0-10
	BOREHOLE BACKFILL: Bentonite



ASPHALT

FILL - Fine to Coarse SAND with silt, brown, moist

FILL - GRAVEL with sand, lightly cemented, gray, moist

FILL - HYDRATED LIME with gravel, tan, wet

ORGANIC CLAY with root fibers, black

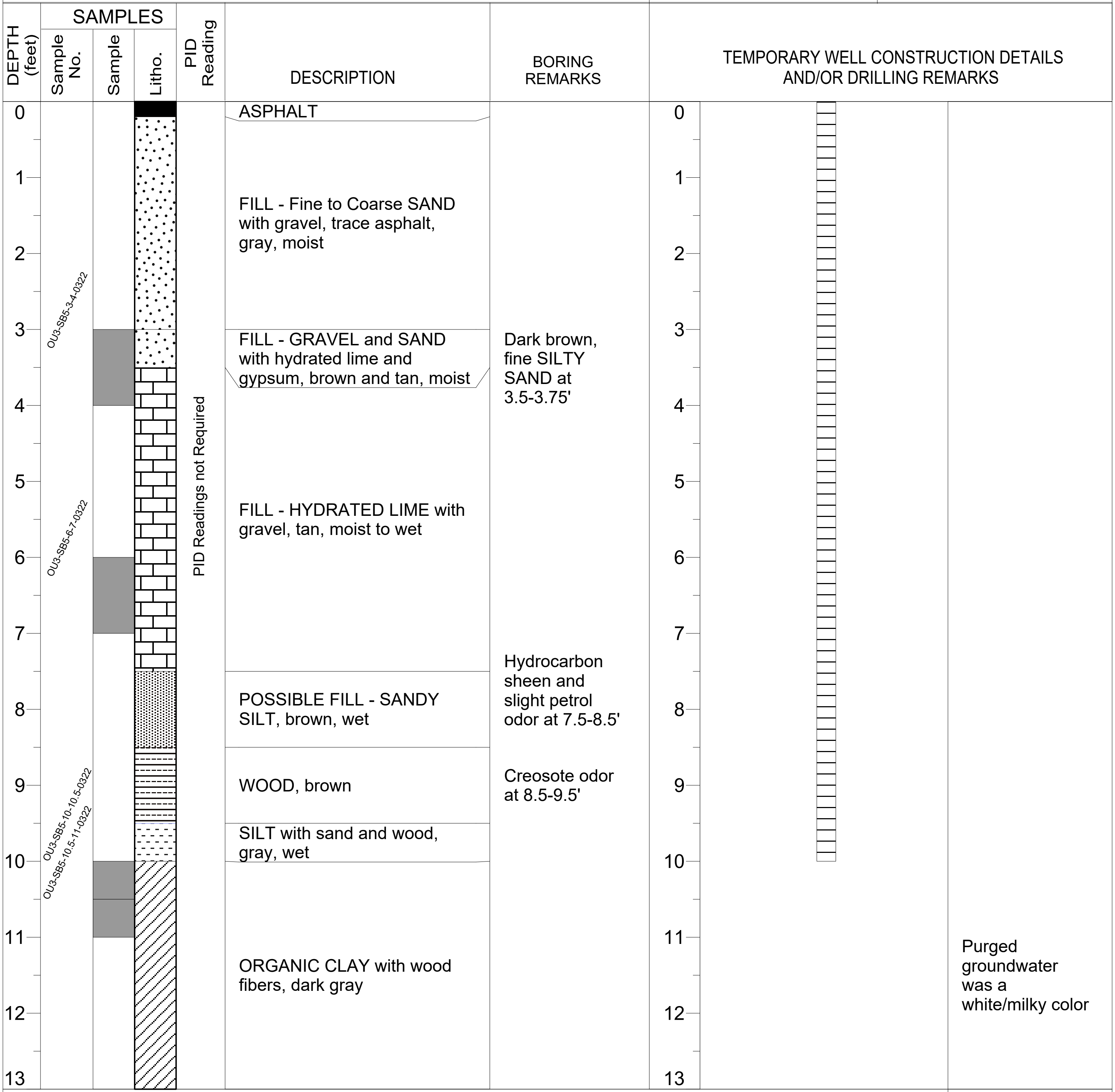
Superlon - RI Phase V

Tacoma, WA

PIONEER TECHNOLOGIES CORPORATION

Log of Soil Boring No. OU3-SB5

BORING LOCATION:	OU3-SB5
DATE STARTED:	3/31/22
DRILLING CONTRACTOR:	Cascade
DRILLING METHOD:	Direct Push
DRILLING EQUIPMENT:	Geoprobe
LOGGED BY:	JH/NS
DEPTH TO WATER (ft.):	4.5
TOTAL DEPTH (ft.):	13
SCREEN INTERVAL:	0-10
BOREHOLE BACKFILL:	Bentonite



DEPTH (feet)	Sample No.	PID Reading	DESCRIPTION	BORING REMARKS
0		PID Readings not Required	ASPHALT	
0.2-3	OU3-SB5-3-4-0322 (3-4)		FILL - Fine to Coarse SAND with gravel, trace asphalt, gray, moist	
3-3.75			FILL - GRAVEL and SAND with hydrated lime and gypsum, brown and tan, moist	Dark brown, fine SILTY SAND at 3.5-3.75'
3.75-7.5	OU3-SB5-6-7-0322 (6-7)		FILL - HYDRATED LIME with gravel, tan, moist to wet	
7.5-8.5			POSSIBLE FILL - SANDY SILT, brown, wet	Hydrocarbon sheen and slight petrol odor at 7.5-8.5'
8.5-9.5			WOOD, brown	Creosote odor at 8.5-9.5'
9.5-10			SILT with sand and wood, gray, wet	
10-13	OU3-SB5-10-10.5-0322 (10-10.5) OU3-SB5-10.5-11-0322 (10.5-11)		ORGANIC CLAY with wood fibers, dark gray	

Purged groundwater was a white/milky color

Superlon - RI Phase V

Tacoma, WA

BORING LOCATION: OU3-SB6

DATE STARTED: 3/30/22

DRILLING CONTRACTOR: Cascade

DRILLING METHOD: Direct Push

DRILLING EQUIPMENT: Geoprobe

LOGGED BY: JH/NS

PIONEER TECHNOLOGIES CORPORATION

Log of Soil Boring No. OU3-SB6

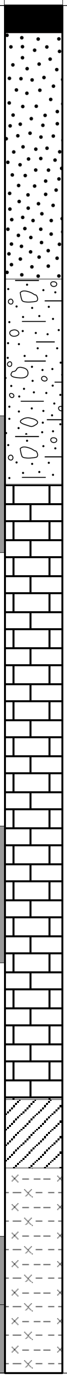
DEPTH TO WATER (ft.): 4.18

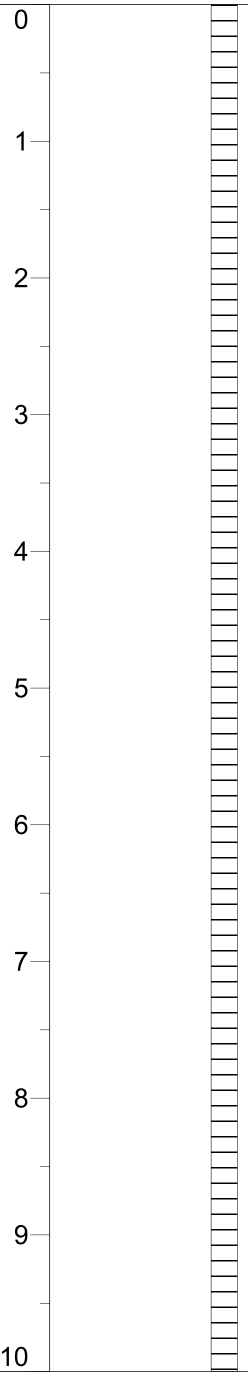
TOTAL DEPTH (ft.): 10

SCREEN INTERVAL: 0-10

BOREHOLE BACKFILL: Bentonite

DEPTH (feet)	SAMPLES			PID Reading	DESCRIPTION	BORING REMARKS	TEMPORARY WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
	Sample No.	Sample	Litho.				
0				PID Readings not Required	ASPHALT		
0.2–2					FILL - Fine to Coarse SAND with gravel, gray and brown, moist		
2–3.5	OU3-SB6-3-4-0322	▨ 3–4			FILL - Fine SILTY SAND with gypsum dust, tan, moist	Liquifies like silt when handled	
3.5–8	OU3-SB6-6-7-0322	▨ 6–7			FILL - HYDRATED LIME trace gravel, tan, wet		Purged groundwater was a white/milky color
8–8.6					ORGANIC CLAY with root fibers, trace subangular gravel, black		
8.6–10	OU3-SB6-9-9.5-0322 OU3-SB6-9.5-10.5-0322	▨ 9–9.5 ▨ 9.5–10			SILTY CLAY with organics, dark gray		





Superlon - RI Phase V

Tacoma, WA

BORING LOCATION: OU3-SB7

DATE STARTED: 3/30/22

DRILLING CONTRACTOR: Cascade

DRILLING METHOD: Direct Push

DRILLING EQUIPMENT: Geoprobe

LOGGED BY: JH/NS

PIONEER

TECHNOLOGIES CORPORATION

Log of Soil Boring No. OU3-SB7

DEPTH TO WATER (ft.): 3

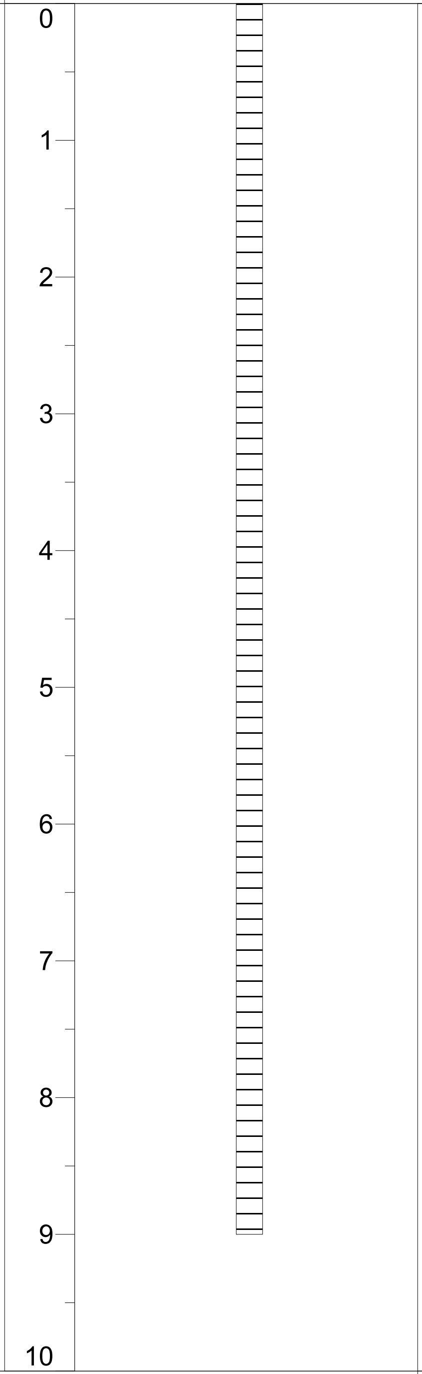
TOTAL DEPTH (ft.): 10

SCREEN INTERVAL: 0-9

BOREHOLE BACKFILL: Bentonite

DEPTH (feet)	SAMPLES			PID Reading	DESCRIPTION	BORING REMARKS
	Sample No.	Sample	Litho.			
0			■	PID Readings not Required	ASPHALT	
1			⁙		FILL - Fine to Coarse SAND with gravel and asphalt	
2			▨			
3	OU3-SB7-3-4-0322	▩	▨		FILL - CLAY with sand and hydrated lime/gypsum, light brown, moist to wet	
4			▨			
5			▦			
6	OU3-SB7-6-7-0322	▩	▦		FILL - HYDRATED LIME with gravel, tan, wet	
7			▦			
8			▨		ORGANIC CLAY with root fibers, black	
9	OU3-SB7-9-9.5-0322 OU3-SB7-9.5-10.5-0322	▩ ▩	┅		SILT with gravel, dark gray, wet	3" angular gravel at 9-9.2'
10						

TEMPORARY WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



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DRILLING | TECHNICAL SERVICES

04/14/2022

FINAL DATA REPORT

High Resolution Site Characterization

Hydraulic Profiling Tool (HPT)

Superlon Site
Tacoma, Washington
306221034

Prepared for:
PIONEER Technologies Corporation
Nathan Starr
5205 Corporate Ctr. Ct. SE, Ste. A
Olympia, WA 98503

TABLE OF CONTENTS

PROGRAM NARRATIVE

Cascade Technical Services (Cascade) is pleased to present this data report to Pioneer Technologies Corporation for the Hydraulic Profiling Tool (HPT) services provided between March 21st and March 23rd, 2022, at the Superlon Site in Tacoma, Washington.

Cascade advanced ten HPT borings at the site achieving depths up to approximately 38 feet below ground surface. For each location, Cascade generated a continuous log of the electrical conductivity (EC) and HPT data from ground surface to termination.

Field work, including the operation of the HPT and EC probe, was conducted by trained professionals and quality assurance/quality control (QA/QC) measurements associated with these data were found to be within the tolerances set forth in the standard operating procedures (SOPs) with no exceptions.

Additional information regarding the HPT and EC systems is provided in the reference material included in this report.

I certify that the data package is in compliance with the terms and conditions of the contract and meets Cascade's data quality standards, with no exceptions. Release of the data contained in this package has been authorized by the data manager or his/her designee, as verified by the following signature.

William B Carlson

Brad Carlson
Regional Manager, Site Characterization

QA/QC SUMMARY TABLE

Provided below is a summary of QA/QC information and any deviations from the SOPs that occurred during the field activities.

Location	Date	Time	Total Depth (ft bgs)	Response Test	Comments / Deviations
HPT01	March 22, 2022	15:40:30	20.00	Pass	None
HPT02	March 21, 2022	14:23:14	20.05	Pass	None
HPT03	March 23, 2022	11:53:40	20.20	Pass	None
HPTGW01	March 22, 2022	11:11:25	49.50	Pass	None
HPTGW02	March 22, 2022	08:57:26	49.50	Pass	None
HPTGW03	March 22, 2022	14:42:07	49.55	Pass	None
HPTGW04	March 21, 2022	11:12:13	50.00	Pass	None
HPTGW05	March 21, 2022	13:25:22	50.00	Pass	None
HPTGW06	March 23, 2022	09:01:14	49.50	Pass	None
HPTGW07	March 23, 2022	10:52:20	49.50	Pass	None

PROJECT DETAILS

This section provides information regarding the Cascade personnel present at the site during the field activities and the specific equipment used during field activities.

Cascade Personnel

The following personnel were present during field activities at the Site:

- Walter Moore, HRSC Specialist
- Brandon Pizzuti, DPT Rig Operator

Cascade Equipment

The following HRSC equipment was utilized during field activities at the Site:

- Geoprobe 78 Series direct push drill rig
- 1.75-inch O.D. MH6534 HPT probe
- Geoprobe K6300 HPT Controller
- Geoprobe FI 6000 Computer
- 150-foot HPT trunkline
- 1.75-inch O.D. drive rods

INTERPRETATION AND RECOMMENDATIONS

This section provides a summary of the data collected during this investigation program, Cascade's recommendations for updating the conceptual site model, and suggestions for next steps in the site management process, including remediation, if appropriate.

Data Interpretation

A detailed, written interpretation of the data collected during this field event was not included in the contracted scope of work, however, Cascade was in contact with the project team throughout the field mobilization and submitted daily HRSC logs.

Recommendations

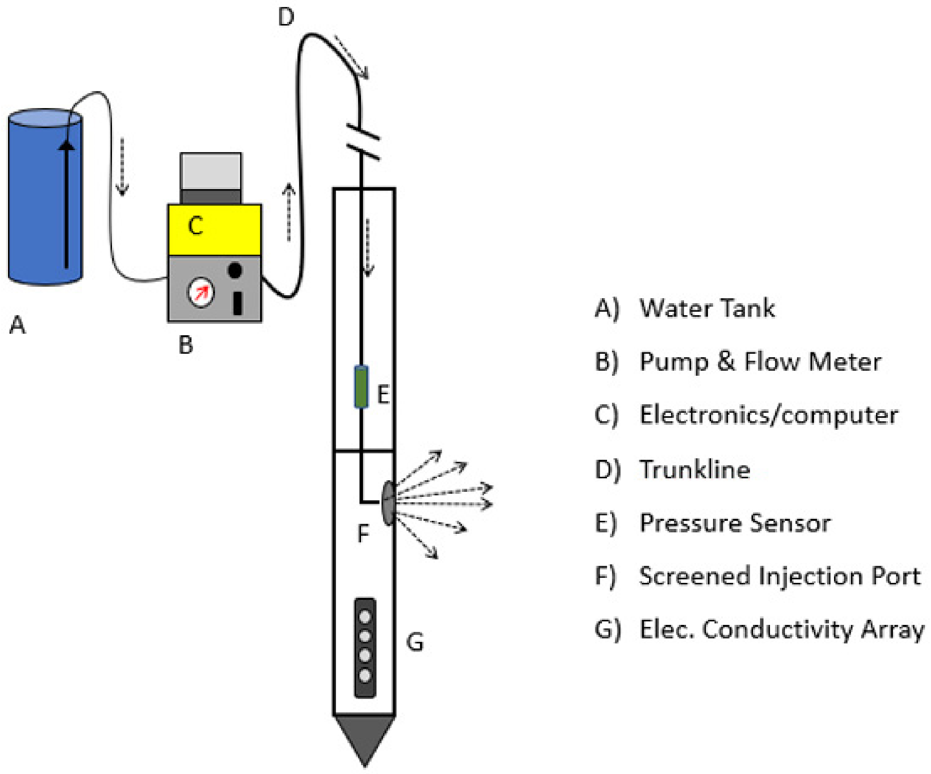
Additional recommendations were not included in this scope of work. Please contact the Cascade Project Manager if you would like to discuss further investigation or remediation alternatives. We would be excited to continue to learn about this site and assist you in meeting your site management goals.

REFERENCE MATERIAL

This section provides information useful in understanding and interpreting the data logs generated as part of this HRSC investigation.

HPT System Overview

The hydraulic profiling tool creates a log of the relative formation permeability versus depth in real time as the probe is advanced into the subsurface. It operates by injecting clean water at a constant flow rate from an aboveground reservoir through the direct push rods and out into the surrounding soil via an injection port on the side of the probe. Simultaneously, sensors record the flow rate, the back pressure required by the pump to maintain that flow rate, and the current depth of the probe. These measurements are collected by the onboard software and an estimated hydraulic conductivity (K) value is calculated and plotted alongside the other measurements in real time.



Generalized schematic of the HPT tool. Source: Geoprobe HPT Standard Operating Procedure

Reference Testing and Dissipation Tests

Reference testing is conducted to ensure that the HPT pressure transducer is working correctly and to evaluate the condition of the HPT injection screen. The HPT reference test also calculates atmospheric pressure which is required to obtain static water level readings and to determine the estimated K values for the log. The reference test utilizes an apparatus consisting of a tube with a valve located 6 inches above the HPT injection screen and the top of the tube located another 6 inches above the valve. When the tube is filled completely with water, the 12 inches of water will supply an additional 0.433 pounds per square inch (psi) of pressure on the injection screen (in addition to atmospheric pressure). When the valve is opened that additional pressure drops to 0.217 psi at the HPT injection screen. The accuracy of the pressure transducer can be assessed by comparing the pressure readings when the tube is filled and when the tube is filled only to the valve; this is done both with and without the pump running. A tolerance of plus or minus 10 percent is applied for a passing test.

Dissipation tests are conducted to determine the hydrostatic pressure of the water column above the transducer during logging. To conduct a dissipation test, advancement of the tooling is stopped, the HPT pump is stopped, and flow drops to zero. The pressure applied to the HPT pressure transducer by the injection of water into the formation begins to dissipate. This pressure should dissipate to a value equal to atmospheric pressure plus the hydrostatic pressure applied by water in the formation. In post-processing of the HPT log, the dissipation value and the atmospheric pressure determined during reference testing can be used to remove the influence of atmospheric and hydrostatic pressures from the values recorded by the transducer. These adjustments result in the corrected HPT pressure log which is a measure of the properties of the subsurface material.

HPT Data Interpretation

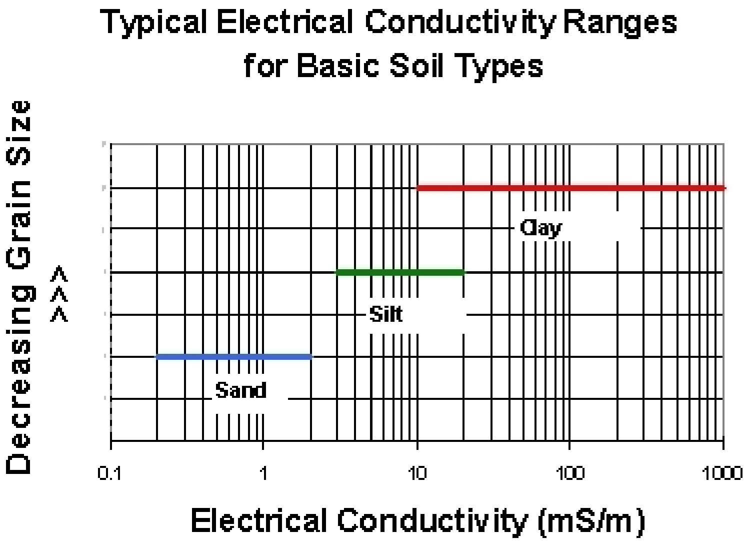
An HPT log typically includes several types of data, many of which are reduced by the software to generate the estimated K values. The dissipation testing results conducted by the operator during the advancement of the tool are used to adjust the HPT back pressure values to account for the hydrostatic pressure of the water column above the probe during advancement. This adjustment results in the corrected HPT pressure data set. Subsequently, the corrected HPT pressure and the HPT flow data sets are used to calculate the estimated K values.

The most useful measurement from the HPT is the estimated K log, which as noted above, is a measure of the relative permeability of the formation versus depth. Despite the fact that these data are presented in units typical of traditional hydraulic conductivity (feet per day), they are not traditional K values and should not be used in many of the applications where a traditional K value would be appropriate. The accuracy of the estimated K values is typically one to two orders of magnitude, which would clearly generate a significant amount of uncertainty if used for any seepage velocity or risk-based calculations. The estimated K values are, however, extremely useful for understanding what zones of the subsurface are exhibiting higher or lower relative permeability.

As a secondary data set from this tool, the HPT back pressure can be helpful in the design of injected remedies. The back pressure is a measure of the level of difficulty faced injecting the clean water from the HPT system into the formation; this is analogous to level of success an injection may achieve at the same depths.

EC Data Interpretation

In a general sense, the electrical conductivity of a soil varies with grain size. This correlation can be utilized to gather an understanding of the subsurface from the EC data. The EC measured in the subsurface can also vary based on changes in mineralogy, groundwater geochemistry, and contamination. It is important, then, to confirm the accuracy of the EC data for this use by collecting confirmatory soil borings from your site.



Relationship between electrical conductivity and grain size. Source: Geoprobe Electrical Conductivity System Standard Operating Procedure

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SITE PLAN

Hazards Checklists

PIONEER TECHNOLOGIES CORPORATION

Proposed Sample Locations
Remedial Investigation Phase V Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 1

Overhead Electrical shown as shaded red areas

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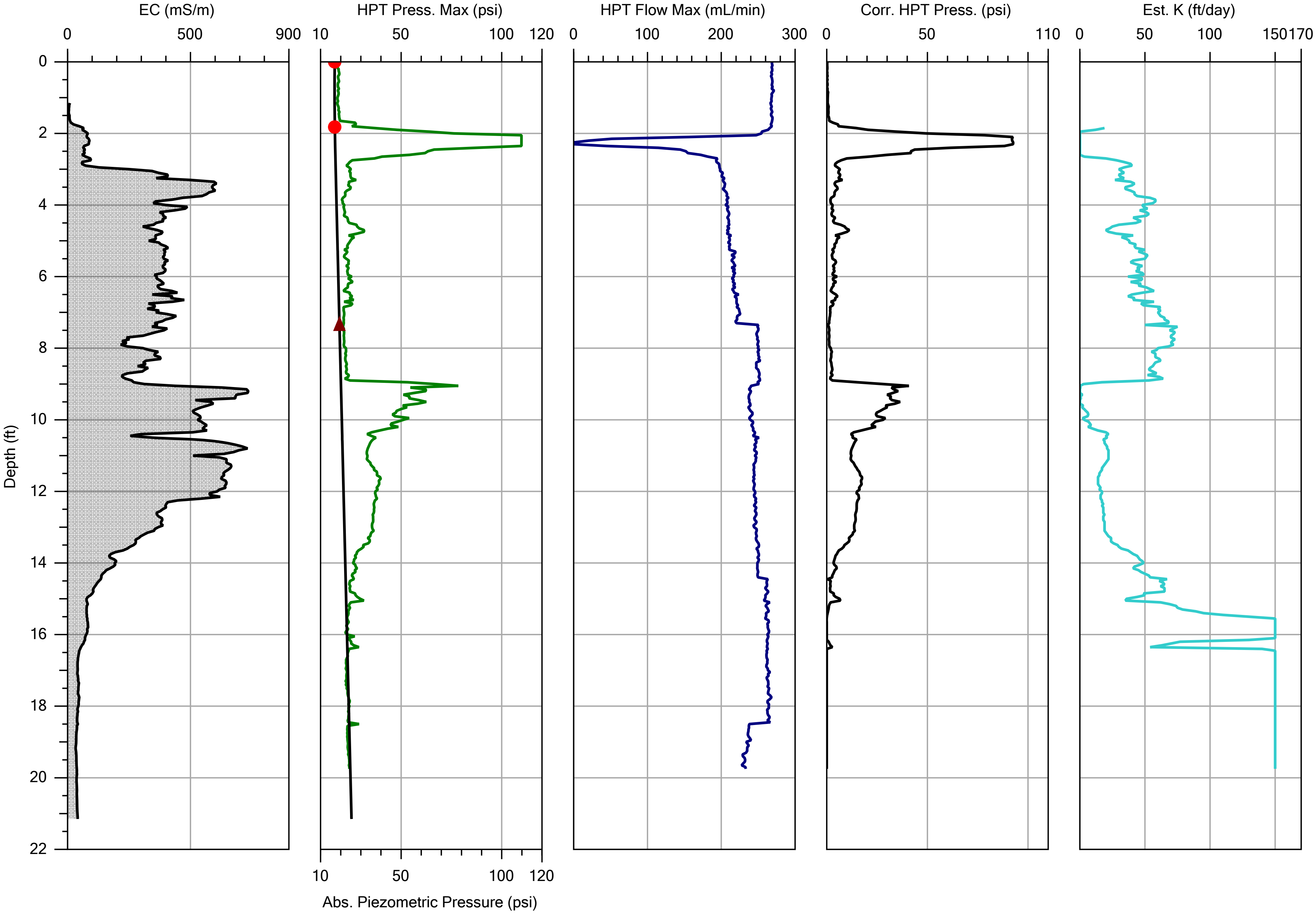
INVESTIGATION DATA PLOTS



CASCADE
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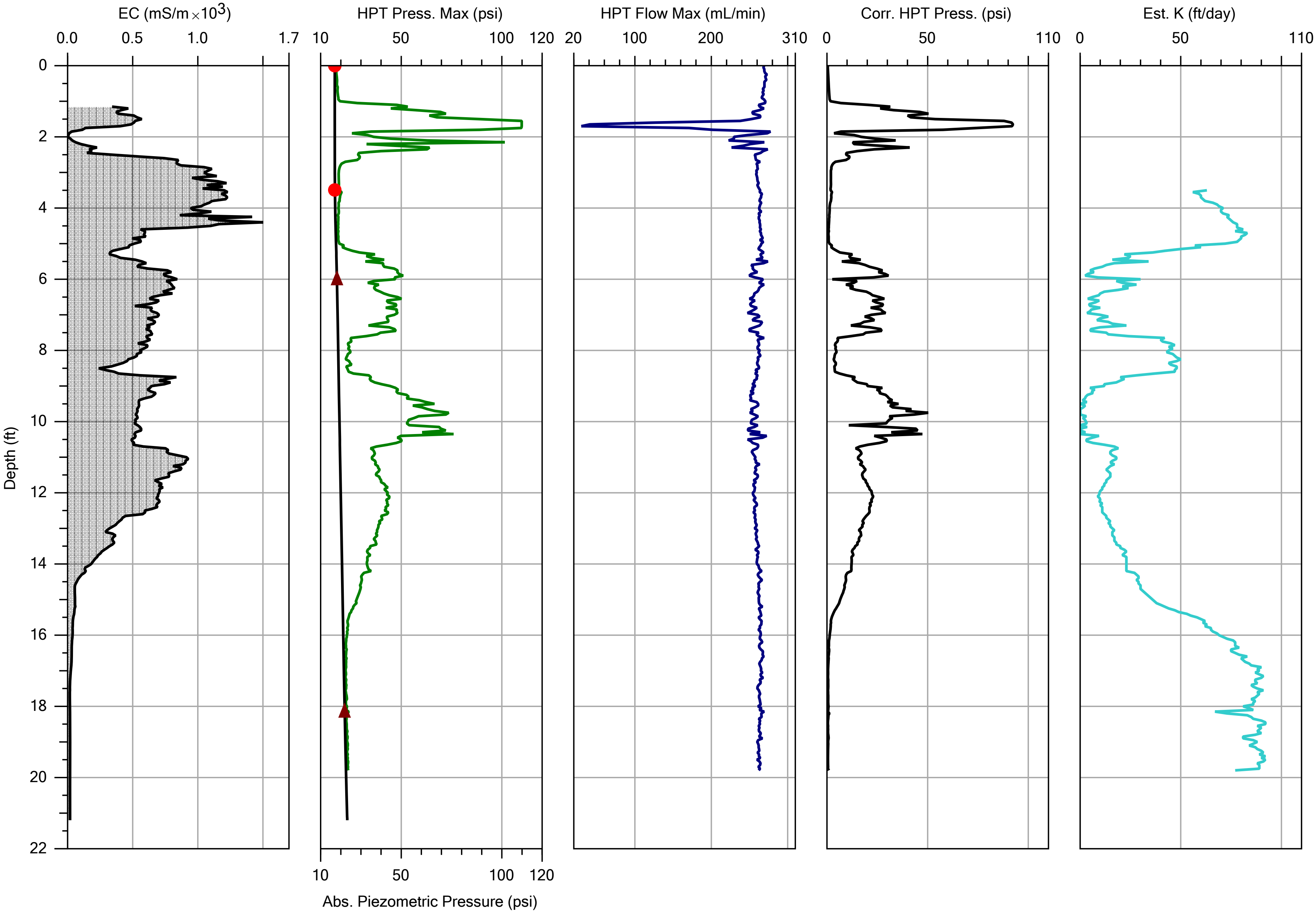
Project ID: 306-22-1034	Client: Pioneer Technologies	Location: Tacoma, WA



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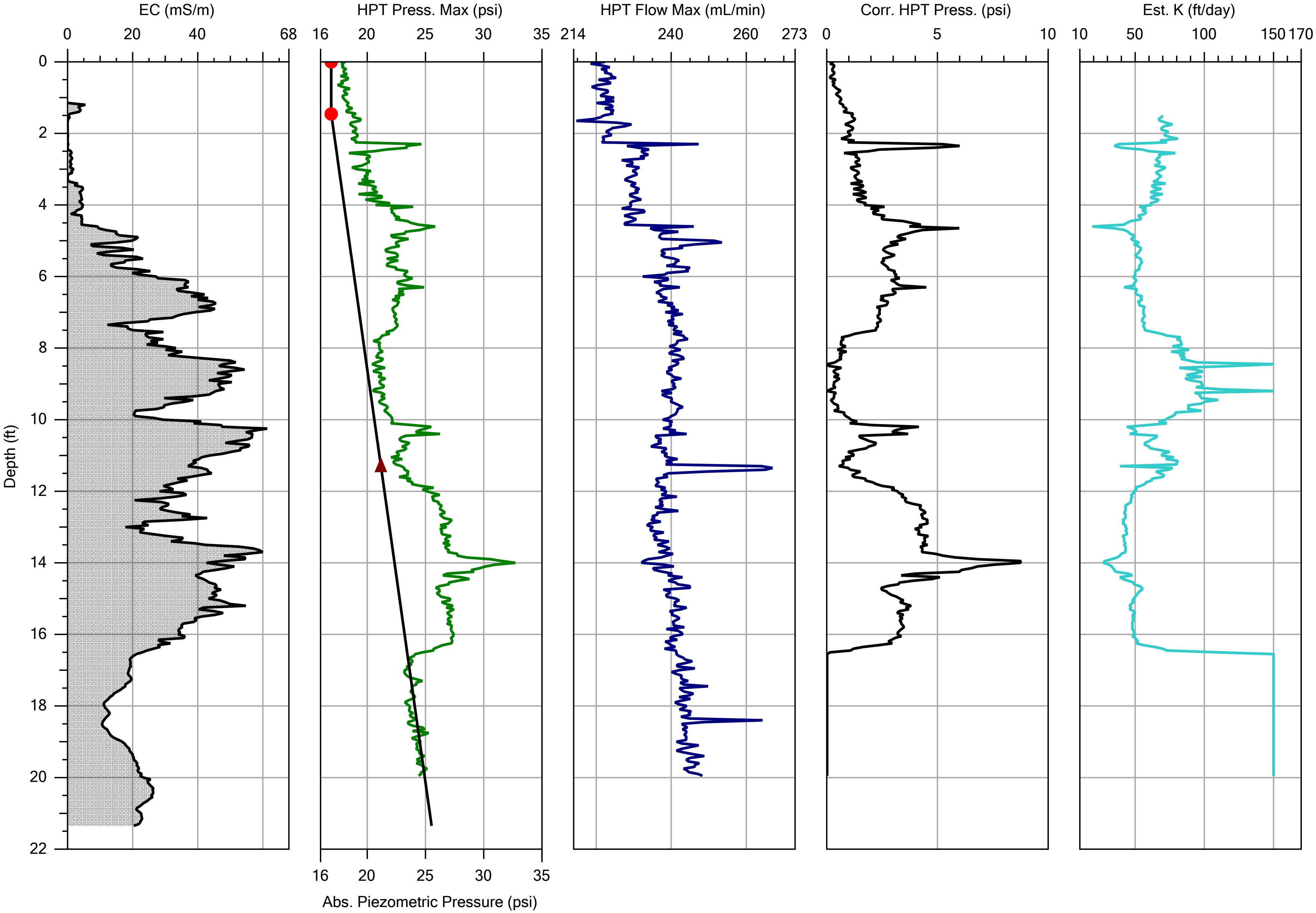

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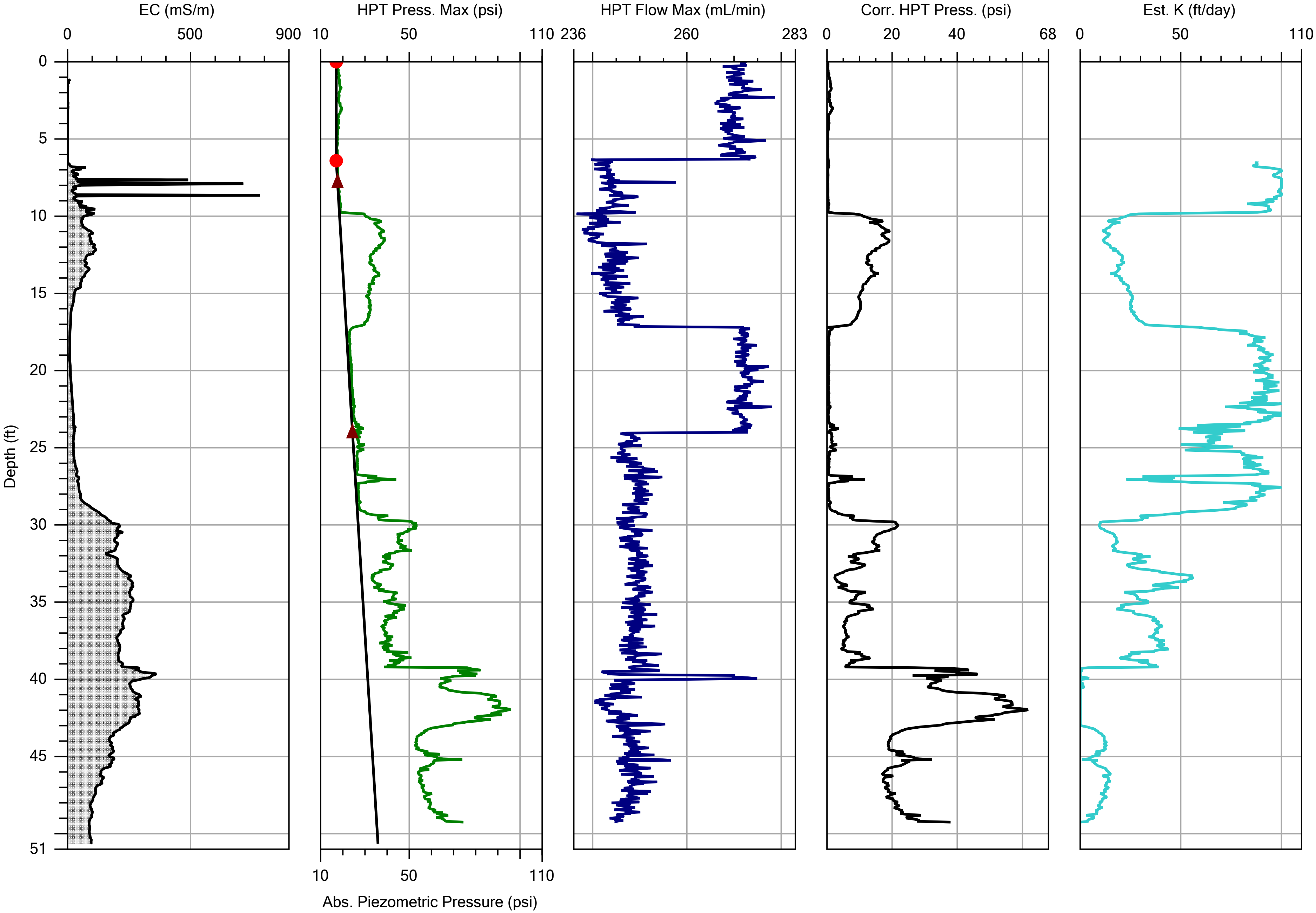

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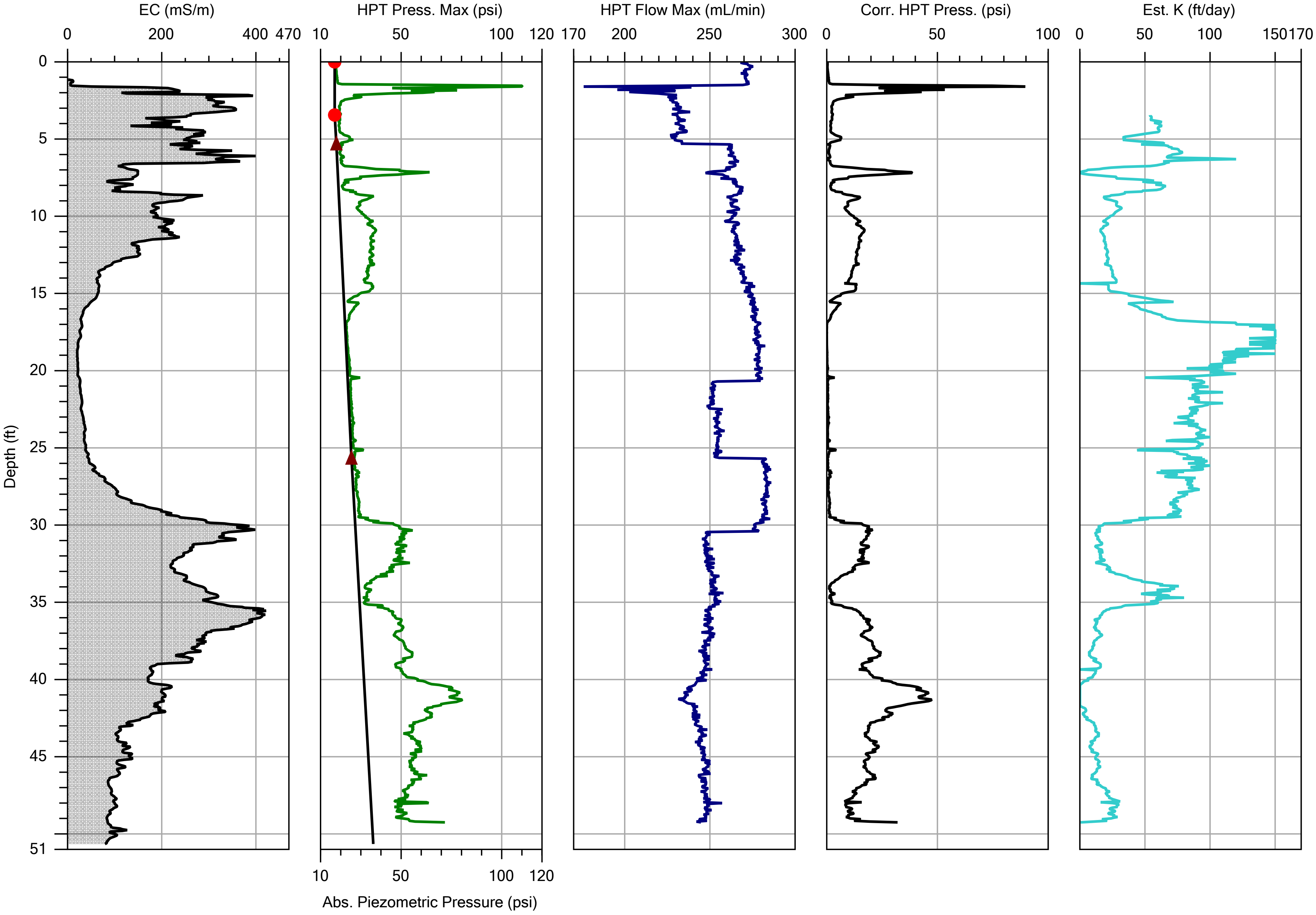

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Company: Cascade

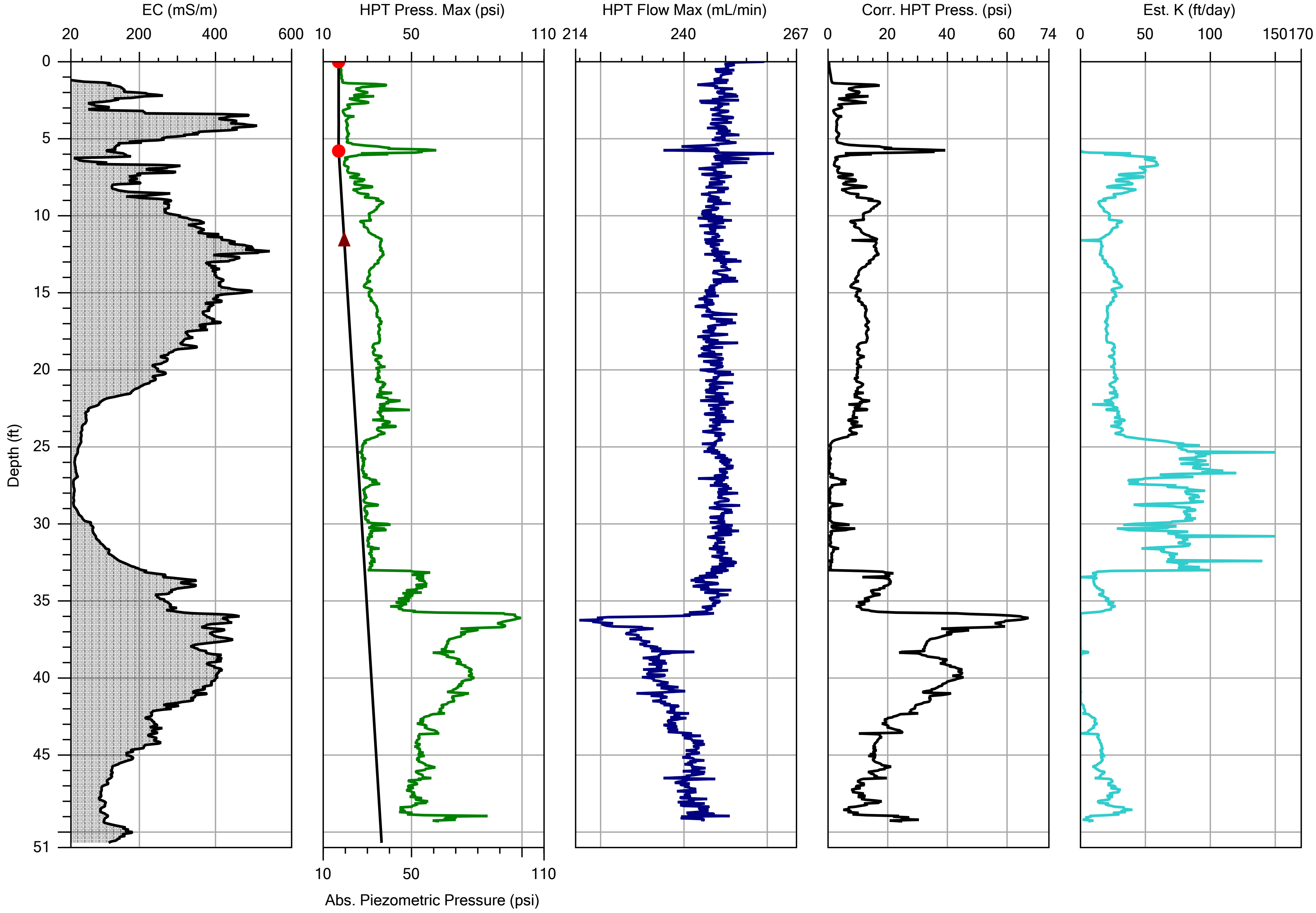
Operator: Walter Moore

Date: 03/22/22

Project ID: 306-22-1034

Client: Pioneer Technologies

Location: Tacoma, WA



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DRILLING | TECHNICAL SERVICES

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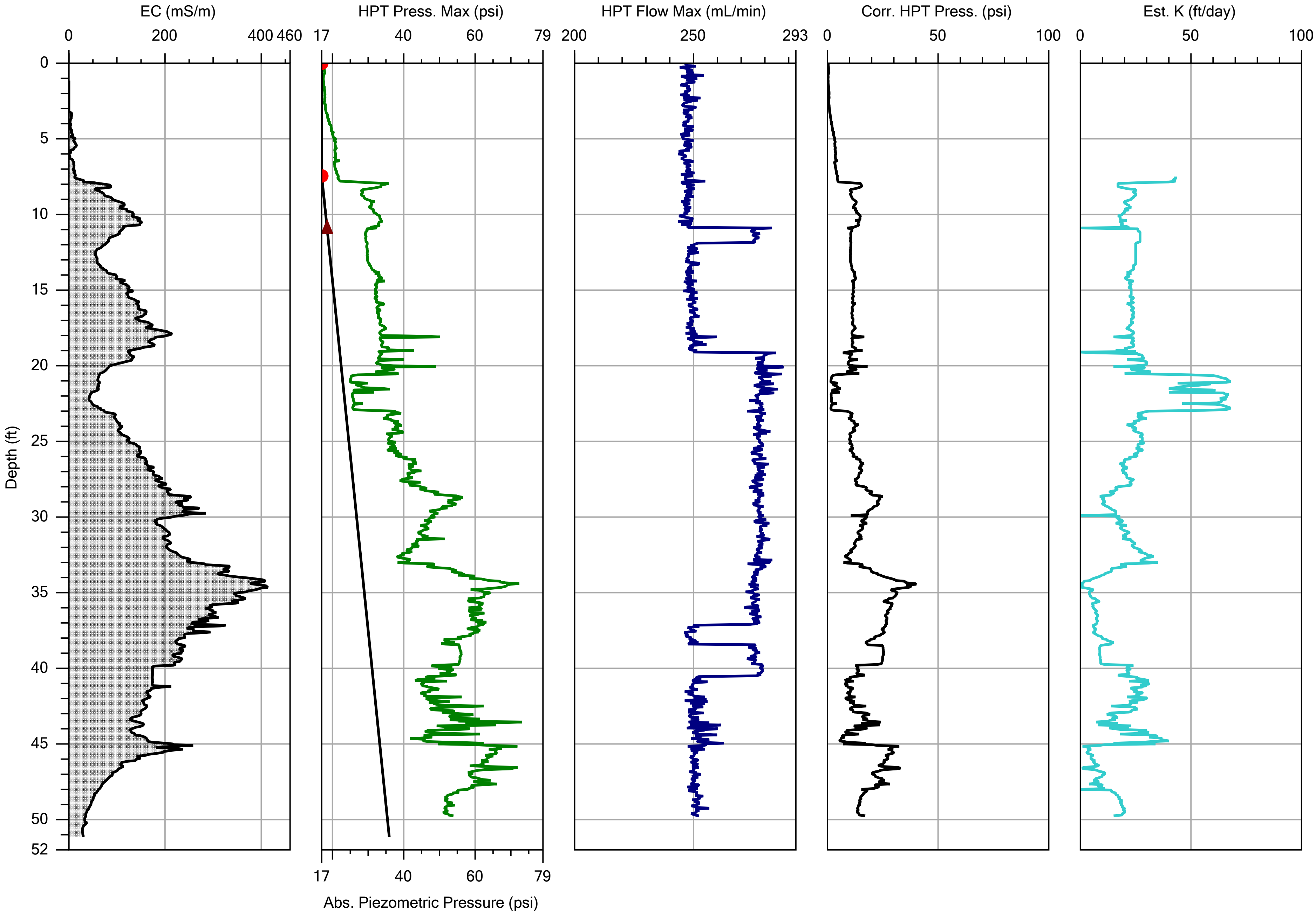

CASCADE
DRILLING | TECHNICAL SERVICES

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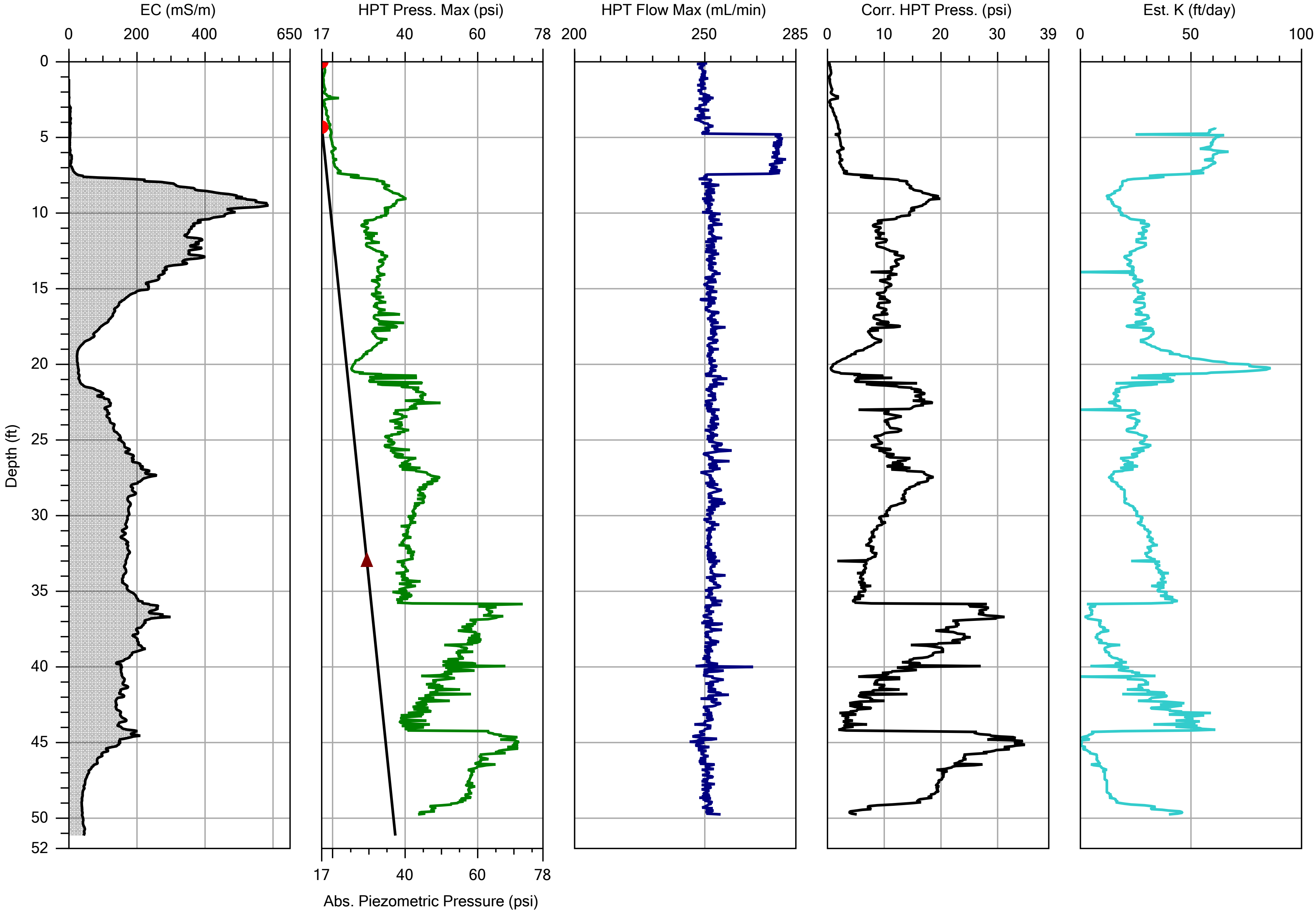

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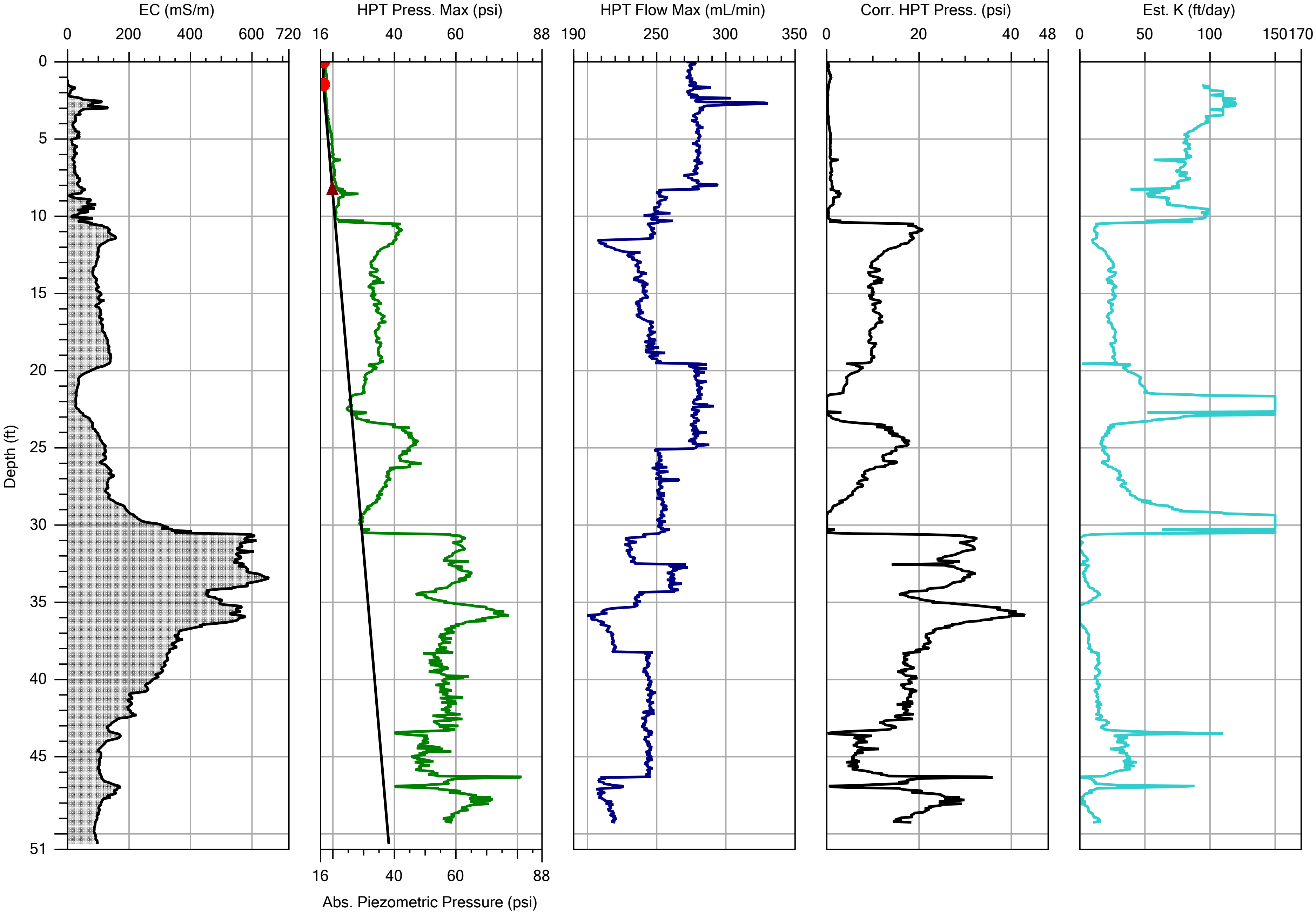

CASCADE
DRILLING | TECHNICAL SERVICES

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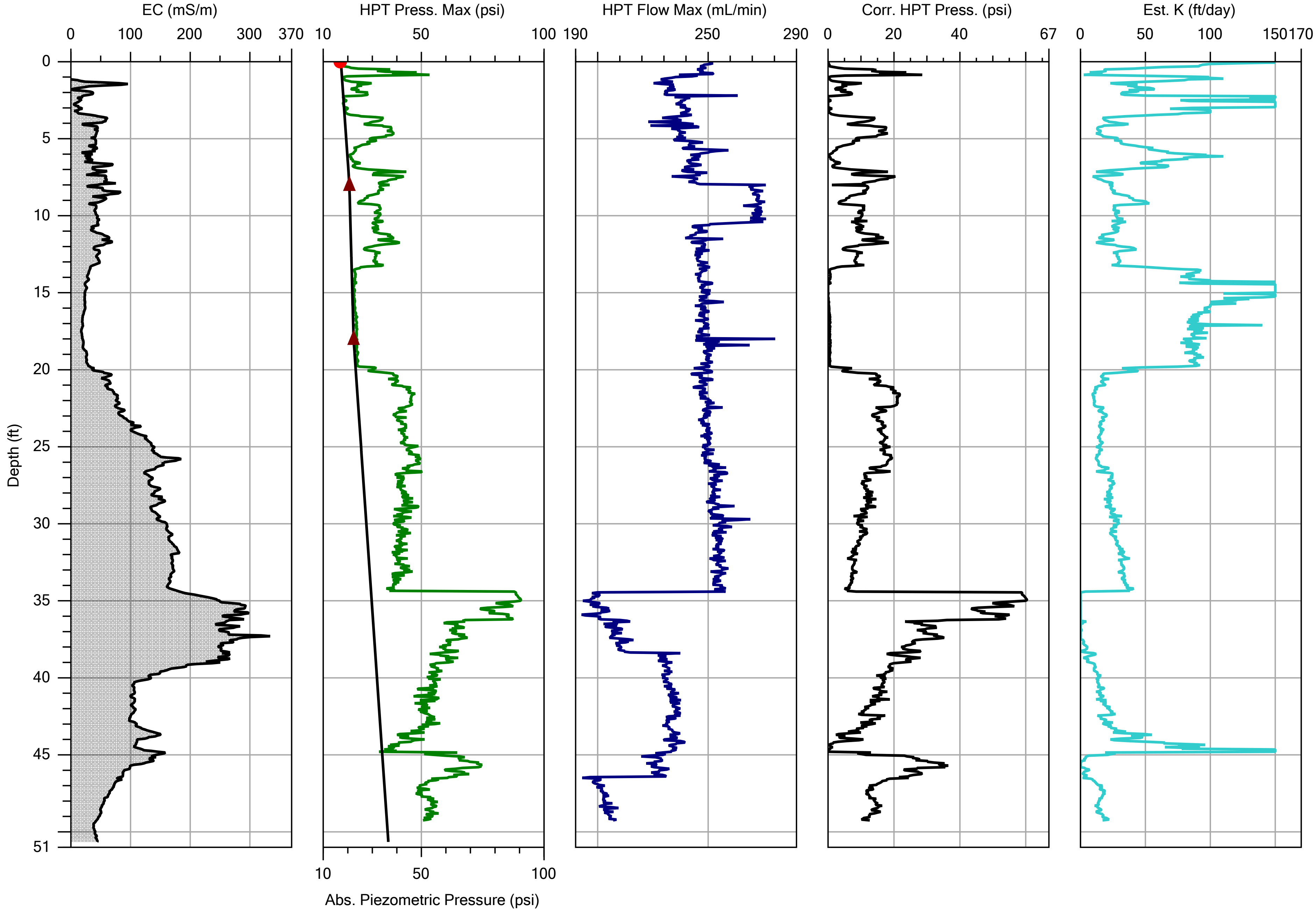

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DRILLING | TECHNICAL SERVICES

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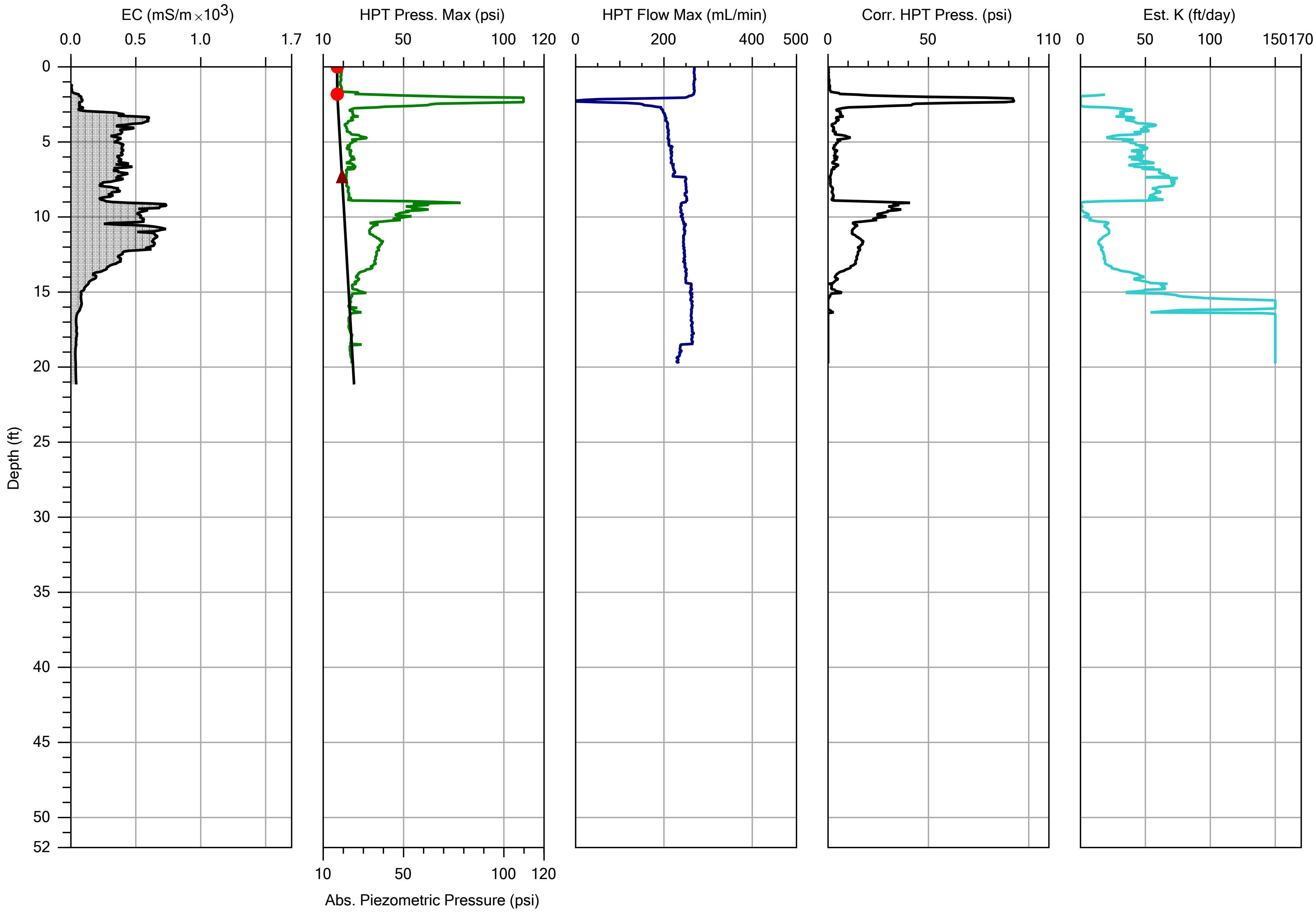
INVESTIGATION DATA PLOTS

COMMON SCALE



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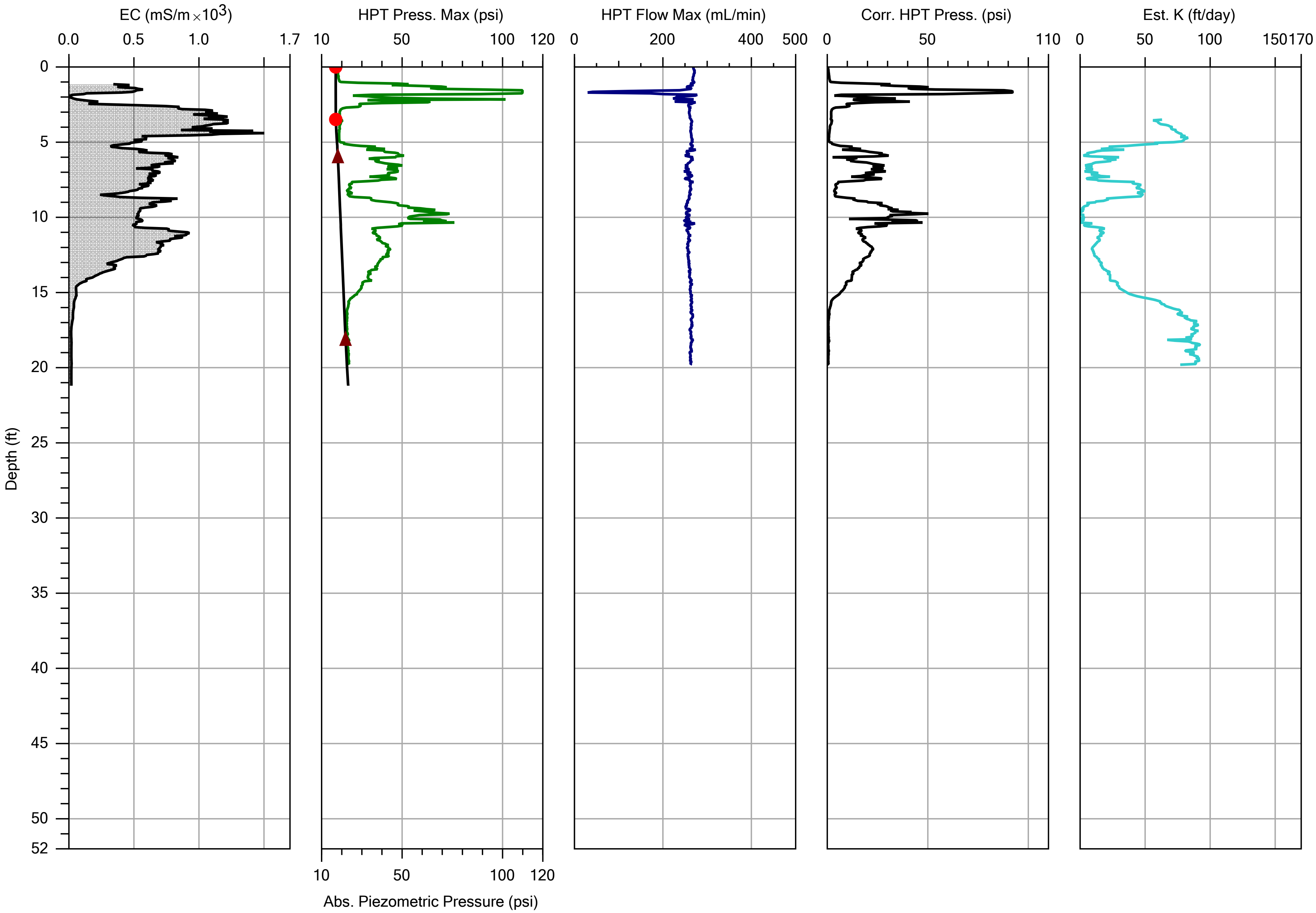

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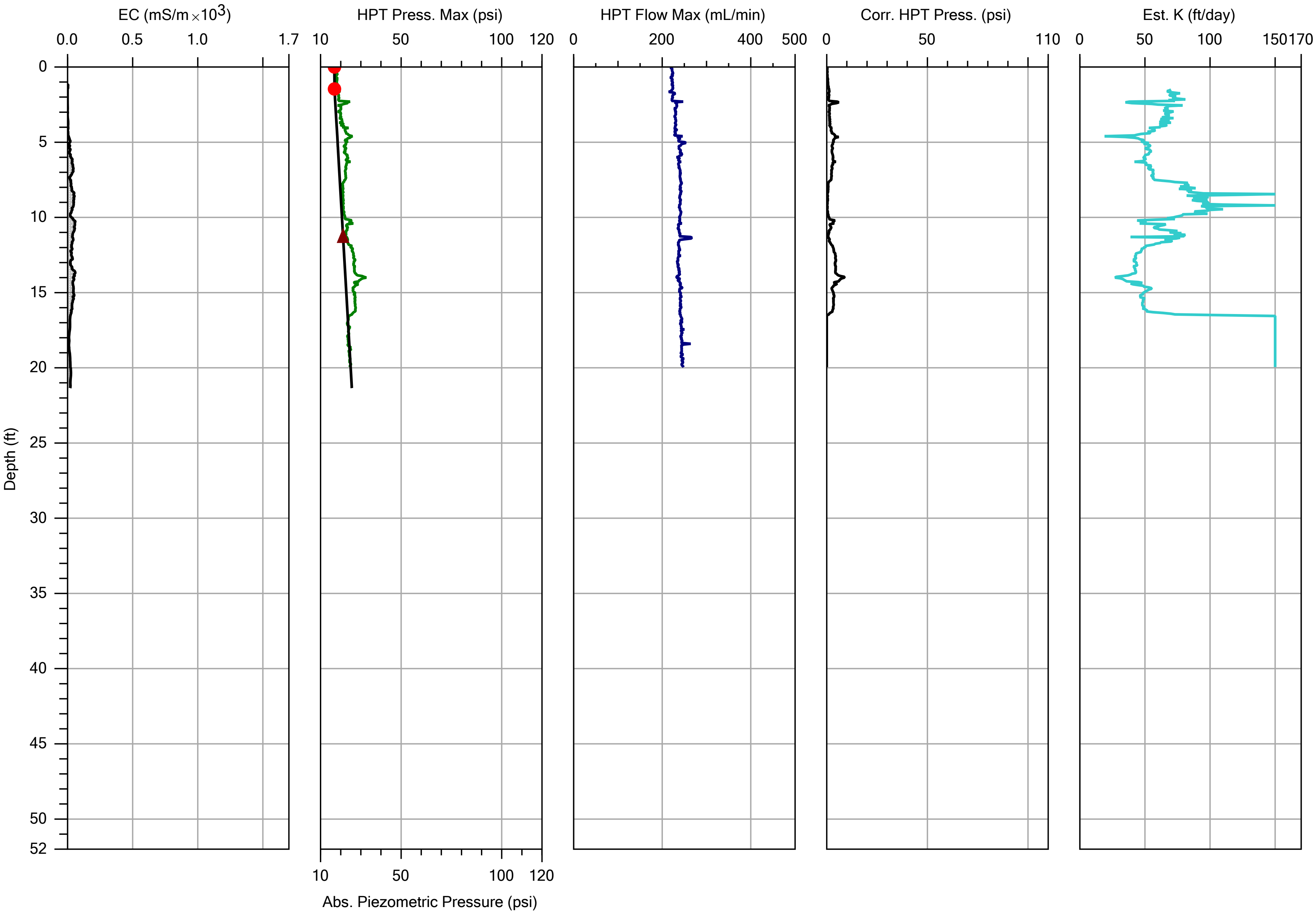

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DRILLING | TECHNICAL SERVICES

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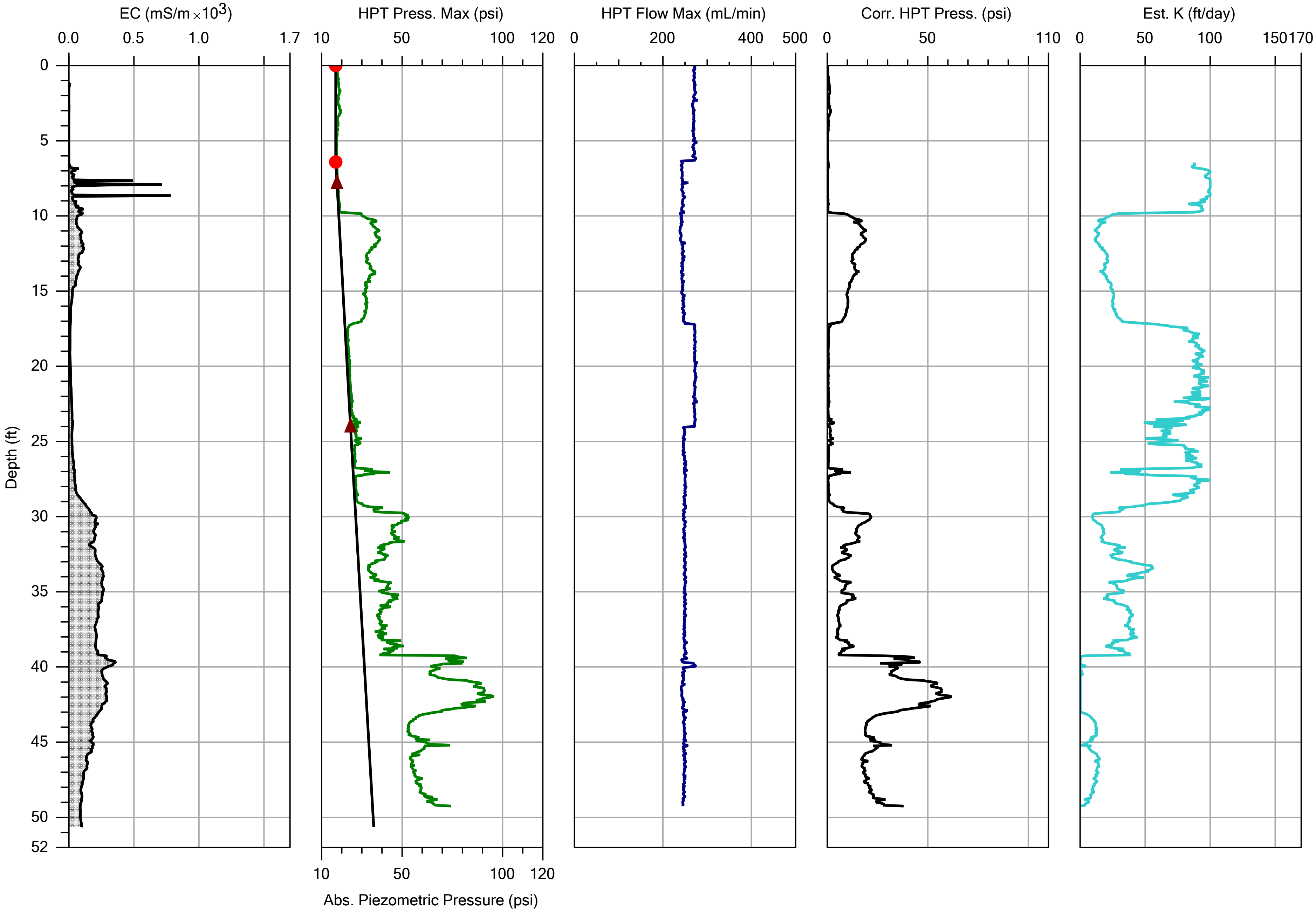

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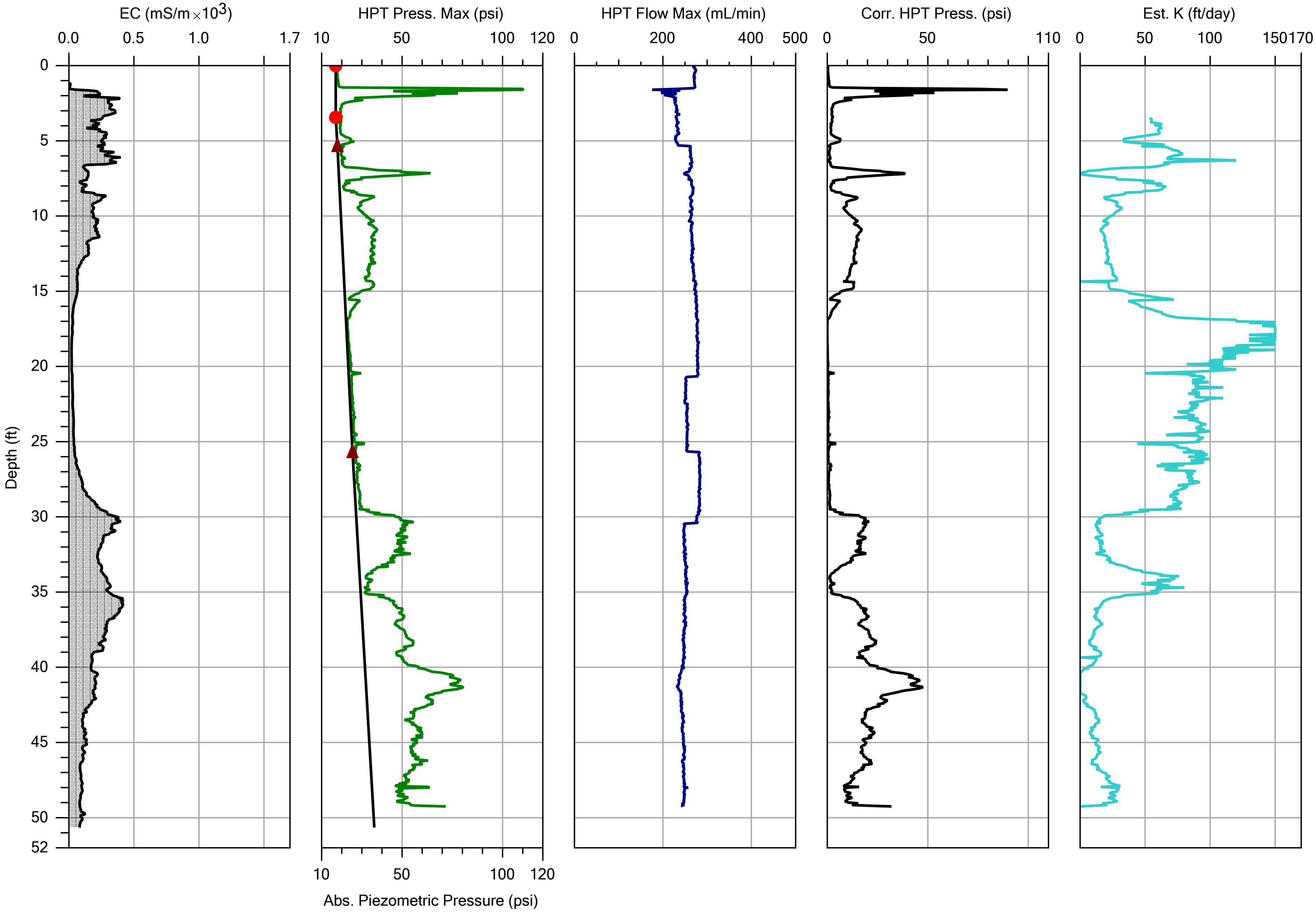

CASCADE
DRILLING | TECHNICAL SERVICES

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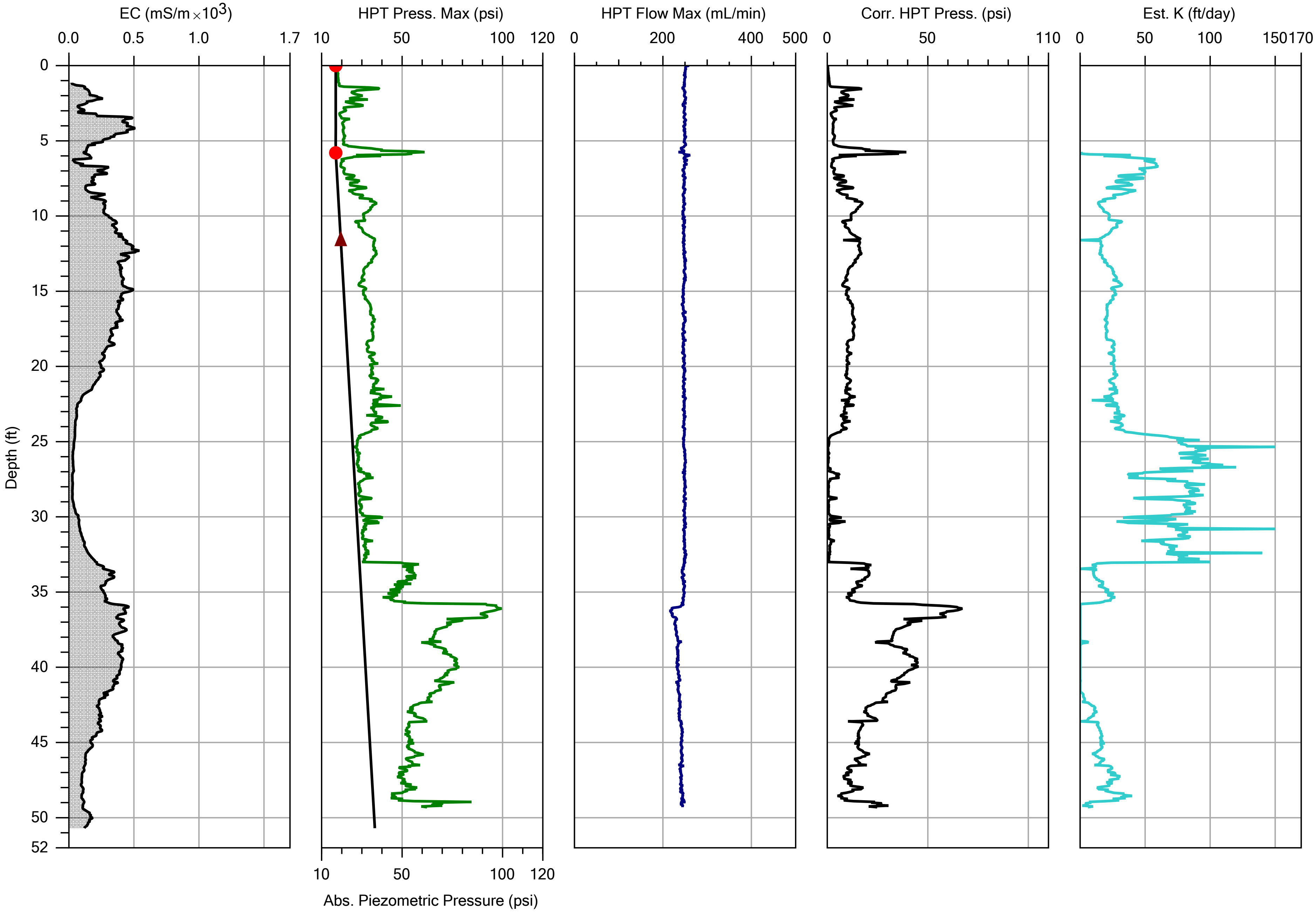

CASCADE
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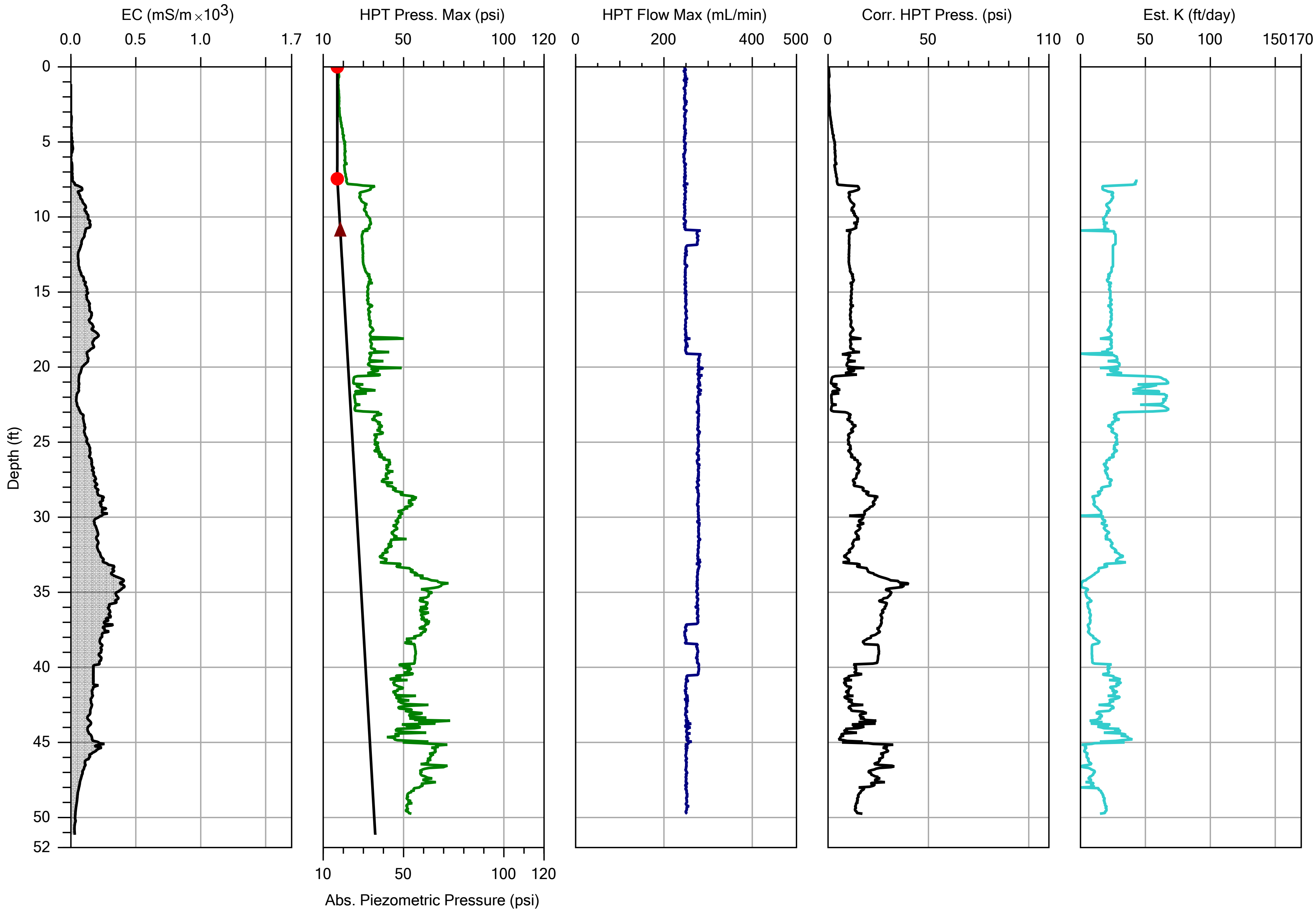

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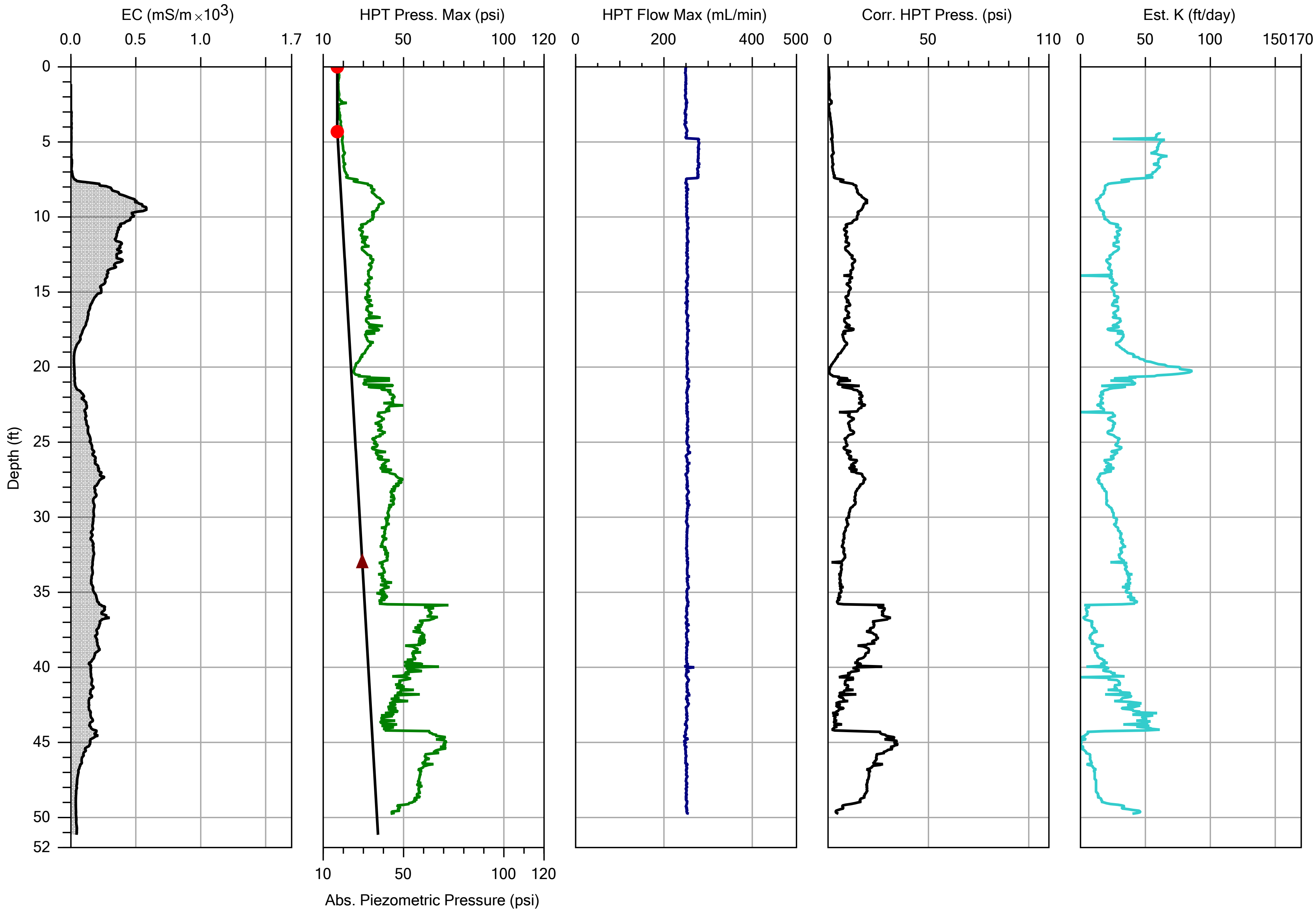
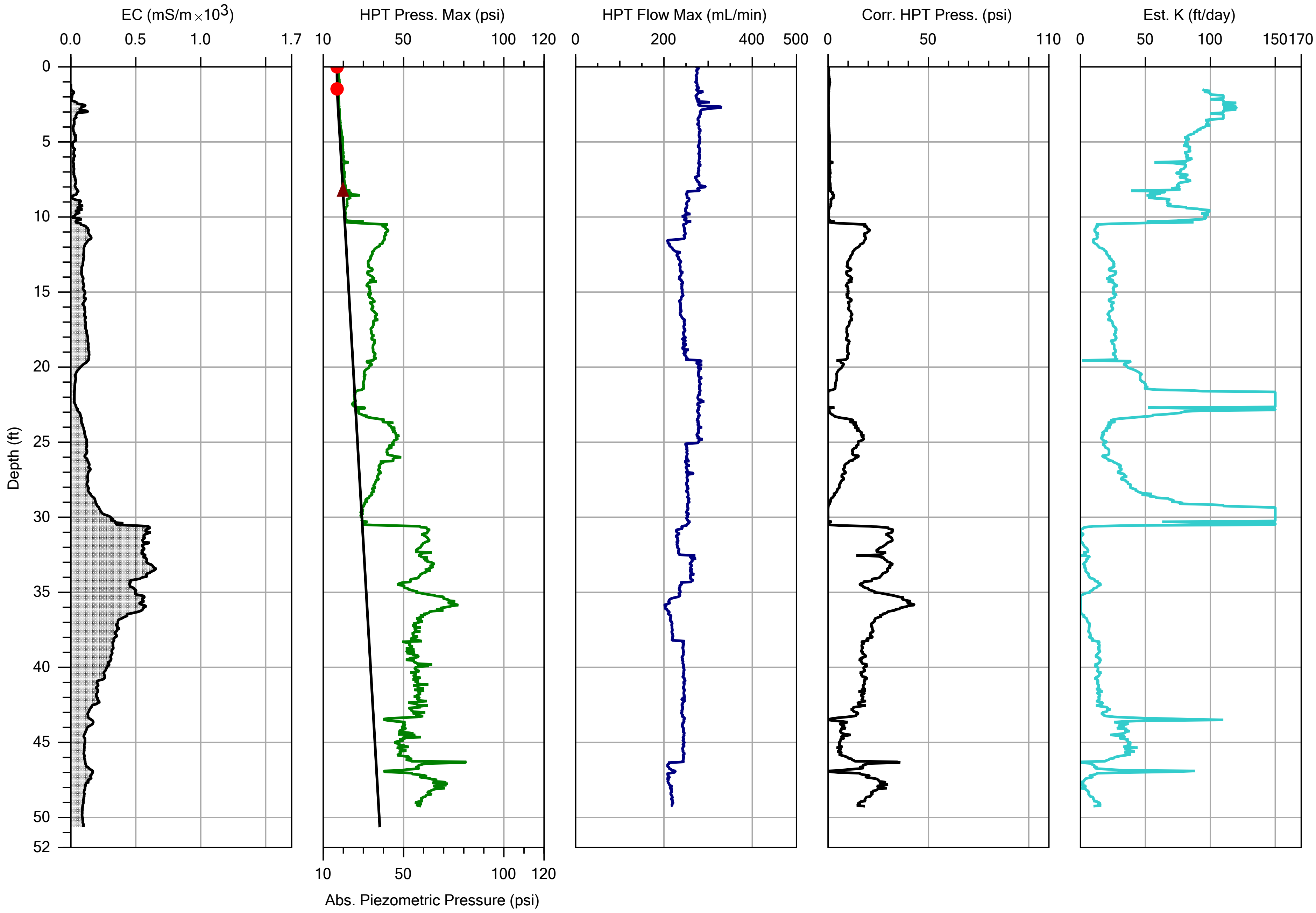
Project ID: 306-22-1034	Client: Pioneer Technologies	Location: Tacoma, WA

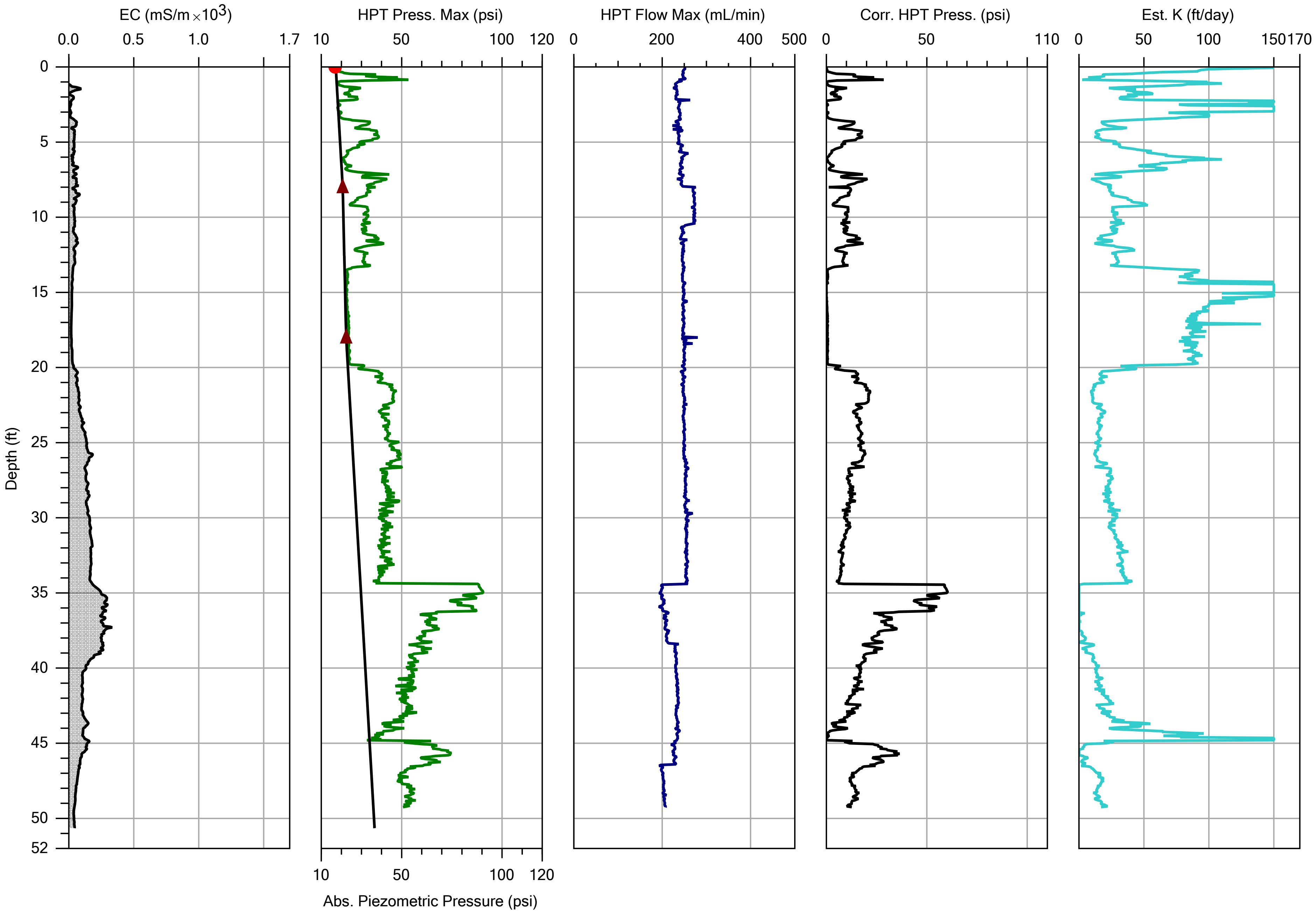


Company: Cascade	Operator: Walter Moore	File: HPTGW05.MHP
		Date: 03/21/22
Project ID: 306-22-1034	Client: Pioneer Technologies	Location: Tacoma, WA



CASCADE
DRILLING | TECHNICAL SERVICES

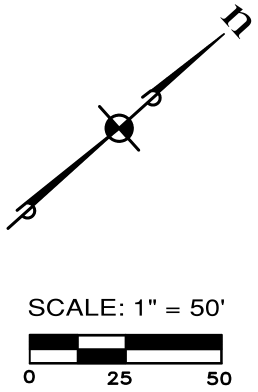
		File: HPTGW06.MHP
Company: Cascade	Operator: Walter Moore	Date: 03/23/22
Project ID: 306-22-1034	Client: Pioneer Technologies	Location: Tacoma, WA



CASCADE
DRILLING | TECHNICAL SERVICES

		File: HPTGW07.MHP
Company: Cascade	Operator: Walter Moore	Date: 03/23/22
Project ID: 306-22-1034	Client: Pioneer Technologies	Location: Tacoma, WA

Surveyor Report



REMEDIAL INVESTIGATION
PHASE V WORK PLAN
SUPERLON PLASTICS PROPERTY,
TACOMA, WASHINGTON

ESM OBTAINED FILED LOCATIONS
3/31/2022

PACIFIC ENVIRONMENT & RE-DEVELPOMENT

SUPERLON PLASTICS

SAMPLE LOCATIONS

DRAWING: SR–05

ESM
CONSULTING ENGINEERS LLC
33400 8th Ave S, Suite 205
Federal Way, WA 98003
FEDERAL WAY (253) 838–6113
EVERETT (425) 297–9900
www.esmcivil.com

Civil Engineering | Land Surveying | Land Planning
Public Works | Project Management | Landscape Architecture

JOB NO. 1624–001–009
DATE: 4/5/2022
DRAWN: RFG
SHEET 1 OF 2

File: \\Esm8\engr\ESM–JOBS\1624\001\009\exhibits\SR–05.dwg
Plotted: 4/5/2022 11:00 AM Plotted By: Raeline Garcia

BORE HOLE LOCATIONS

ESM POINT NO.	NORTHING	EASTING	LATITUDE	LOGITUDE	ELEVATION	DESCRIPTION
7436	712099.95	1172857.33	47°16'14.53"	122°23'00.67"	10.75	HPT-GW-01
7437	712121.20	1172769.32	47°16'14.72"	122°23'01.96"	10.11	HPT-GW-02
7438	712003.74	1172758.64	47°16'13.55"	122°23'02.07"	9.25	OU3-SB-7
7439	712034.26	1172744.52	47°16'13.85"	122°23'02.29"	10.23	OU3-SB-6
7440	712055.12	1172723.65	47°16'14.05"	122°23'02.60"	10.66	OU3-SB-1
7441	712075.83	1172690.82	47°16'14.25"	122°23'03.08"	10.86	OU3-SB-4
7442	712065.80	1172586.82	47°16'14.13"	122°23'04.58"	10.14	HPT-GW-03
7443	711997.17	1172590.60	47°16'13.45"	122°23'04.50"	9.75	OU3-SB-2
7444	711911.94	1172521.43	47°16'12.59"	122°23'05.48"	8.16	HPT-GW-04
7445	711880.01	1172587.13	47°16'12.29"	122°23'04.51"	8.10	HPT-GW-05
7447	712094.97	1172670.25	47°16'14.43"	122°23'03.38"	10.37	OU3-SB-3
7448	712096.65	1172790.16	47°16'14.48"	122°23'01.65"	10.26	OU3-SB-5
7449	711778.10	1172792.99	47°16'11.34"	122°23'01.49"	9.89	HPT-GW-06
7450	711844.38	1172853.46	47°16'12.00"	122°23'00.64"	9.45	HPT-GW-07
7451	711991.58	1172798.94	47°16'13.44"	122°23'01.48"	9.40	HPT-03
7452	711993.75	1172753.97	47°16'13.45"	122°23'02.13"	13.75	SW CORNER UNIT-28
7453	712107.79	1172863.54	47°16'14.61"	122°23'00.59"	10.71	SE CORNER UNIT-26

NOTE: COORDINATES SHOWN ARE REFERENCED TO THE WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, NAD 83(91)

HORIZONTAL & VERTICAL DATUM

WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, NAD 83/91. PROJECT IS REFERENCED VIA GPS TO CONTROL POINTS 120, 180 AND 182 AS DEPICTED ON THAT MAP TITLED "BLAIR-HYLEBOS PENINSULA SURVEY CONTROL MAP" BY HUITT-ZOLLARS FOR THE PORT OF TACOMA, DATED DEC 3, 2007 ELEVATIONS BASED ON POINT 180 AS NOTED ON CONTROL MAP NOTED ABOVE. ELEVATION OF POINT 180 = 17.43 (MLLW).

NOTE: ELEVATIONS SHOWN ARE MSL, (NGVD29), CITY OF TACOMA DATUM. DATUM CONVERSION FROM MLLW TO MSL; SUBTRACT 6.32 FEET FROM MLLW TO OBTAIN MSL (NGVD29) CITY OF TACOMA ELEVATIONS. SEE TACOMA PUBLIC WORKS VERTICAL DATUM CONVERSION SHEET PREPARED BY TACOMA PUBLIC WORKS. REVISED FEBRUARY 2004.

File: \\Esm8\engr\ESM-JOBS\1624\001\009\exhibits\SR-05.dwg
Plotted: 4/5/2022 11:00 AM
Plotted By: Raeline Garcia

PACIFIC ENVIRONMENT & RE-DEVELPOMENT

SUPERLON PLASTICS

SAMPLE LOCATIONS

DRAWING: SR-05

ESM CONSULTING ENGINEERS LLC
33400 8th Ave S, Suite 205
Federal Way, WA 98003

FEDERAL WAY (253) 838-6113
EVERETT (425) 297-9900

www.esmcivil.com

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JOB NO. 1624-001-009
DATE: 4/5/2022
DRAWN: RFG
SHEET 2 OF 2

Appendix C: Investigation Results Tables and Analytical Laboratory Reports

Table C-1: Total Metal Soil Concentrations

						Arsenic		Lead		Barium		Cadmium		Chromium, Total		Mercury		Selenium		Silver	
Soil Boring	**Sample ID**	**Sample Depth Top (feet bgs)**	**Sample Depth Bottom (feet bgs)**	**Hydrostratigraphic Unit**	**Field XRF or Lab?**	**Conc. (mg/kg)**	**Qual.**	**Conc. (mg/kg)**	**Qual.**	**Conc. (mg/kg)**	**Qual.**	**Conc. (mg/kg)**	**Qual.**	**Conc. (mg/kg)**	**Qual.**	**Conc. (mg/kg)**	**Qual.**	**Conc. (mg/kg)**	**Qual.**	**Conc. (mg/kg)**	**Qual.**
OU3-SB1	SO_OU3-SB1-3-4	3.00	4.00	Perched Aquifer	Field XRF	8	U	50		--		--		--		--		--		--	
	SO_OU3-SB1-6-7	6.00	7.00	Perched Aquifer	Field XRF	8	U	27		--		--		--		--		--		--	
	SO_OU3-SB1-8.5-9.5	8.50	9.50	Upper Aquitard	Field XRF	174		85		--		--		--		--		--		--	
	OU3-SB1-8.5-9.5-033022_DC	8.50	9.50	Upper Aquitard	Lab[1]	185		61		48		0.72	U	0.11		0		18	U	1	U
	SO_OU3-SB1-16.5-17	16.50	17.00	Shallow Aquifer	Field XRF	35		19		--		--		--		--		--		--	
OU3-SB2	SO_OU3-SB2-3-4	3.00	4.00	Perched Aquifer	Field XRF	8	U	48		--		--		--		--		--		--	
	SO_OU3-SB2-6-7	6.00	7.00	Perched Aquifer	Field XRF	16		65		--		--		--		--		--		--	
	SO_OU3-SB2-9-9.5	9.00	9.50	Upper Aquitard	Field XRF	32		21		--		--		--		--		--		--	
	OU3-SB2-9-9.5-033122	9.00	9.50	Upper Aquitard	Lab[1]	29		2.5	J	29		0.31	U	18		0.0329	J	3.29	J	0.462	U
OU3-SB3	SO_OU3-SB3-3-4	3.00	4.00	Perched Aquifer	Field XRF	10		41		--		--		--		--		--		--	
	SO_OU3-SB3-6-7	6.00	7.00	Perched Aquifer	Field XRF	8	U	77		--		--		--		--		--		--	
	SO_OU3-SB3-9-9.5_DC	9.00	9.50	Upper Aquitard	Field XRF	52		117		--		--		--		--		--		--	
	OU3-SB3-9-9.5-033122	9.00	9.50	Upper Aquitard	Lab[1]	25		60		58		0.47		19		0.16		4.64	J	0.537	U
OU3-SB4	SO_OU3-SB4-3-4	3.00	4.00	Perched Aquifer	Field XRF	8	U	66		--		--		--		--		--		--	
	SO_OU3-SB4-6-7	6.00	7.00	Perched Aquifer	Field XRF	47		37		--		--		--		--		--		--	
	SO_OU3-SB4-9-9.5	9.00	9.50	Upper Aquitard	Field XRF	376		78		--		--		--		--		--		--	
	OU3-SB4-9-9.5-033022	9.00	9.50	Upper Aquitard	Lab[1]	258		59		54		0.31	J	20		0.213		19.6	U	1.18	U
OU3-SB5	SO_OU3-SB5-3-4	3.00	4.00	Perched Aquifer	Field XRF	15		25		--		--		--		--		--		--	
	SO_OU3-SB5-6-7	6.00	7.00	Perched Aquifer	Field XRF	8	U	25		--		--		--		--		--		--	
	SO_OU3-SB5-10-10.5	10.00	10.50	Upper Aquitard	Field XRF	21		22		--		--		--		--		--		--	
	OU3-SB5-10-10.5-033122	10.00	10.50	Upper Aquitard	Lab[1]	29		4.8		25		0.35	U	17		0.0445		5.37	J	0.519	U
OU3-SB6	SO_OU3-SB6-3-4	3.00	4.00	Perched Aquifer	Field XRF	8	U	26		--		--		--		--		--		--	
	SO_OU3-SB6-6-7	6.00	7.00	Perched Aquifer	Field XRF	169		24		--		--		--		--		--		--	
	OU3-SB6-6-7-033022	6.00	7.00	Perched Aquifer	Lab[1]	214		4.7	J	36		3.6	U	34		0.0118	J	90.5	U	5.43	U
	SO_OU3-SB6-9-9.5_DC	9.00	9.50	Upper Aquitard	Field XRF	230		391		--		--		--		--		--		--	
	OU3-SB6-9-9.5-033022	9.00	9.50	Upper Aquitard	Lab[1]	185		341		90		0.86		20		0.207		61	J	0.505	U
OU3-SB7	SO_OU3-SB7-3-4	3.00	4.00	Perched Aquifer	Field XRF	62		63		--		--		--		--		--		--	
	SO_OU3-SB7-6-7	6.00	7.00	Perched Aquifer	Field XRF	81		49		--		--		--		--		--		--	
	SO_OU3-SB7-9-9.5	9.00	9.50	Upper Aquitard	Field XRF	15,499		66,481		--		--		--		--		--		--	
	OU3-SB7-9-9.5-033022	9.00	9.50	Upper Aquitard	Lab[1]	8,830		53,400		57		13		19		0.469		5.91	J	3.3	

Notes:

Lab[1]:	Analytical Resources Inc.
Conc.:	Concentration
Qual.:	Qualifier
U:	Constituent was not detected at the shown reporting limit
J:	Estimated Concentration, value detected below the reporting limit
🟨	A yellow highlighted cell means the constituent concentration is > than the Property Specific Risk Based Soil Direct Contact Screening Level of 588 mg/kg for arsenic and 1,000 for lead

Barium, Cadmium, Chromium, Mercury, Selenium, and Silver have not been identified as Site COPCs or COCs and cleanup criteria have not been determined for these constituents.

Average concentrations are listed for samples with duplicate samples

Barium, Cadmium, Chromium, Total, Mercury, Selenium, Silver

Table C-2: Dissolved Arsenic and Lead Groundwater Concentrations

Soil Boring	Sample ID	Sample Depth Top (feet bgs)	Sample Depth Bottom (feet bgs)	Hydrostratigraphic Unit	Arsenic		Lead	
					Concentration (mg/L)	Qualifier	Concentration (mg/L)	Qualifier
OU3-SB2	GW-OU3-SB2-033122	0.0	10.0	Perched Aquifer	0.0098		0.0034	
OU3-SB4	GW-OU3-SB4-033022	0.0	10.0	Perched Aquifer	0.0060		0.0020	U
OU3-SB5	GW-OU3-SB5-033122	0.0	10.0	Perched Aquifer	0.0059		0.0078	
OU3-SB6	GW-OU3-SB6-033022	0.0	10.0	Perched Aquifer	0.090		0.0020	U
OU3-SB7	GW-OU3-SB7-033022	0.0	10.0	Perched Aquifer	0.080		0.65	
HPT-01	TW-MW-5P-032422	4.5	8.5	Perched Aquifer	0.043		0.0020	U
	TW-MW-5S-032422	17.0	21.0	Shallow Aquifer	0.37		0.098	
HPT-02	TW-MW-6P-032322	4.0	8.0	Perched Aquifer	0.19		0.0057	
	TW-MW-6S-032322	17.0	21.0	Shallow Aquifer	11		0.41	
HPT-03	TW-MW-12P-032922	6.0	10.0	Perched Aquifer	6.3		0.0020	U
	TW-MW-12S-032922	16.0	20.0	Shallow Aquifer	1.8		0.0020	U
HPT-GW-01	HPT-GW-01-P-032822	6.0	10.0	Perched Aquifer	0.074		0.0020	U
	HPT-GW-01-S-032822	18.0	22.0	Shallow Aquifer	0.11		0.0020	U
	HPT-GW-01-I-032822	44.0	48.0	Intermediate Aquifer	0.0050	U	0.0020	U
HPT-GW-02	HPT-GW-02-P-033022	5.0	9.0	Perched Aquifer	0.16		0.0020	U
	HPT-GW-02-S-033022	17.0	21.0	Shallow Aquifer	0.21		0.0020	U
	HPT-GW-02-I-033022	45.0	49.0	Intermediate Aquifer	0.0050	U	0.0020	U
HPT-GW-03	HPT-GW-03-P-032822	6.0	10.0	Perched Aquifer	0.13		0.0020	U
	HPT-GW-03-S-032822	24.0	28.0	Shallow Aquifer	0.54		0.0093	
	HPT-GW-03-I-032822	45.0	49.0	Intermediate Aquifer	0.0070		0.0020	U
HPT-GW-04	HPT-GW-04-S-032422	20.0	24.0	Shallow Aquifer	0.85		0.10	
	HPT-GW-04-I-032422	38.0	42.0	Intermediate Aquifer	0.0050	U	0.0020	U
HPT-GW-05	HPT-GW-05-S-032422	18.0	22.0	Shallow Aquifer	1.3		0.0020	U
	HPT-GW-05-I-032422	40.0	44.0	Intermediate Aquifer	0.011		0.0020	U
HPT-GW-06	HPT-GW-06-P-032922	6.5	10.5	Perched Aquifer	3.6		0.0020	U
	HPT-GW-06-S-032922	20.0	24.0	Shallow Aquifer	47		0.0020	U
	HPT-GW-06-I-032922_DC	43.0	47.0	Intermediate Aquifer	0.093	J	0.0020	U
HPT-GW-07	HPT-GW-07-P-032922	5.0	9.0	Perched Aquifer	0.48		0.0020	U
	HPT-GW-07-S-032922	16.0	20.0	Shallow Aquifer	65		0.0020	U
	HPT-GW-07-I-032922	41.0	45.0	Intermediate Aquifer	0.094		0.0020	U

Notes:

U:	Constituent was not detected at the shown reporting limit
J:	Estimated Concentration, value detected below the reporting limit
🟨	A yellow highlighted cell means the arsenic concentration is > than the Puget Sound background Arsenic Level of 0.008 mg/l
🟧	A orange highlighted cell means the arsenic concentration is > than 0.10 mg/L
🟥	A red highlighted cell means the arsenic concentration is > than 1.00 mg/L
	Average concentrations are listed for samples with duplicate samples

Table C-3: Synthetic Leachable Arsenic Concentrations

Soil Boring	Sample ID	Sample Depth Top (feet bgs)	Sample Depth Bottom (feet bgs)	Hydrostratigraphic Unit	pH (units)	Arsenic Concentration (mg/L)	Qualifier	SPLP or TCLP
OU3-SB1	OU3-SB1-8.5-9.5-033022_DC	8.50	9.50	Upper Aquitard	12.37	0.93		SPLP
OU3-SB2	OU3-SB2-9-9.5-033122	9.00	9.50	Upper Aquitard	9.64	0.28		SPLP
OU3-SB3	OU3-SB3-9-9.5-033122	9.00	9.50	Upper Aquitard	11.70	0.43		SPLP
OU3-SB4	OU3-SB4-9-9.5-033022	9.00	9.50	Upper Aquitard	11.80	1.7		SPLP
OU3-SB5	OU3-SB5-10-10.5-033122	10.00	10.50	Upper Aquitard	12.10	0.20	J	SPLP
OU3-SB6	OU3-SB6-6-7-033022	6.00	7.00	Perched Aquifer	12.50	0.027	J	SPLP
OU3-SB6	OU3-SB6-9-9.5-033022	9.00	9.50	Upper Aquitard	12.30	2.8		SPLP
OU3-SB7	OU3-SB7-9-9.5-033022	9.00	9.50	Upper Aquitard	10.90	7.5		SPLP

Notes:

J: Estimated Concentration, value detected below the reporting limit
SPLP: Synthetic Precipitation Leaching Procedure
TCLP: Toxicity Characteristic Leaching Procedure
Average concentrations are listed for samples with duplicate samples

Table C-4: Sequential Extraction Procedure Results

Sample ID	Sequential Extraction Step[1]	Interpreted Category	OU3-SB1-17-17.5-0322		OU3-SB1-9.5-10-0322		OU3-SB2-9.5-10-0322		OU3-SB3-9.5-10-0322		OU3-SB4-9.5-10-0322		OU3-SB5-10.5-11-0322		OU3-SB6-9.5-10-0322		OU3-SB7-9.5-10-0322		Upper Aquitard Average Percentages
Lithologic Layer			Shallow Aquifer		Upper Aquitard		Upper Aquitard		Upper Aquitard		Upper Aquitard		Upper Aquitard		Upper Aquitard		Upper Aquitard		
Analyte			Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Conc. (mg/kg)	Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Percentage	Conc. (mg/kg)	Percentage	
Aluminum (WEN2)	1	Sorbed	6.87	0.0%	0.558	0.0%	160	0.2%	1.59	0.0%	1.865	0.0%	133	0.2%	96.2	0.1%	41.62	0.0%	0.1%
Aluminum WEN3)	2	Co-Precipitated with Metal Oxides	153	0.2%	475	0.6%	546	0.7%	1800	2.0%	77.305	0.1%	1030	1.4%	544	0.8%	3150	3.7%	1.2%
Aluminum (WEN4)	3		231	0.3%	604	0.8%	513	0.7%	1160	1.3%	1072	1.4%	1200	1.6%	679	1.1%	1390	1.6%	1.1%
Aluminum (WEN5)	4	Associated with Highly Stable Minerals	4210	5.9%	9480	12.2%	9760	13.1%	10800	11.9%	13440	17.5%	10700	14.5%	7830	12.2%	13200	15.3%	12.8%
Aluminum (WEN6)	5		67300	93.6%	66900	86.4%	63600	85.3%	77200	84.9%	62410	81.1%	60600	82.3%	55100	85.8%	68400	79.4%	84.8%
Arsenic (WEN2)	1	Sorbed	5.31	34.4%	25.7	69.2%	12.1	36.6%	5.3	23.5%	19.42	19.8%	2.79	27.0%	62.5	10.2%	171.2	20.7%	30.2%
Arsenic (WEN3)	2	Co-Precipitated with Metal Oxides	2.49	16.1%	1.11	3.0%	1.39	4.2%	1.19	5.3%	8.78	8.9%	0.449	4.3%	2.22	0.4%	192	23.2%	8.2%
Arsenic (WEN4)	3		0.799	5.2%	1.87	5.0%	1.7	5.1%	4.74	21.0%	15.385	15.7%	0.413	4.0%	5.7	0.9%	38.5	4.6%	7.7%
Arsenic (WEN5)	4	Associated with Highly Stable Minerals	5.57	36.1%	6.65	17.9%	14.9	45.1%	8.81	39.1%	46.25	47.1%	5.1	49.4%	516	83.9%	403	48.6%	45.9%
Arsenic (WEN6)	5		1.27	8.2%	1.81	4.9%	2.95	8.9%	2.51	11.1%	8.305	8.5%	1.58	15.3%	28.6	4.7%	23.9	2.9%	8.1%
Iron (WEN2)	1	Sorbed	40	0.1%	135	0.5%	789	2.7%	117	0.4%	39.995	0.1%	324	1.2%	536	2.7%	50.76	0.2%	1.0%
Iron (WEN3)	2	Co-Precipitated with Metal Oxides	2100	5.7%	4650	16.6%	5890	20.2%	5510	17.0%	14550	31.3%	2570	9.1%	3180	15.8%	3560	15.3%	16.4%
Iron (WEN4)	3		1100	3.0%	1660	5.9%	2340	8.0%	2890	8.9%	2182.5	4.7%	2360	8.4%	2500	12.4%	2710	11.7%	7.9%
Iron (WEN5)	4	Associated with Highly Stable Minerals	6990	19.1%	6300	22.5%	7720	26.5%	7030	21.7%	16400	35.3%	11900	42.3%	4150	20.6%	6640	28.5%	27.1%
Iron (WEN6)	5		26300	72.0%	15200	54.4%	12400	42.6%	16900	52.1%	13260	28.6%	11000	39.1%	9750	48.5%	10300	44.3%	47.7%
Manganese (WEN2)	1	Sorbed	1.15	0.2%	0.608	0.2%	2.51	0.7%	3.76	0.8%	2.946	0.7%	7.02	2.1%	2.62	1.1%	4.3165	1.4%	0.9%
Manganese (WEN3)	2	Co-Precipitated with Metal Oxides	8.44	1.3%	6.37	1.6%	11.8	3.5%	17.7	3.9%	48.185	11.1%	14.4	4.4%	3.35	1.4%	27.3	8.8%	4.5%
Manganese (WEN4)	3		3.32	0.5%	6.36	1.6%	7.63	2.2%	11.7	2.6%	8.615	2.0%	12.9	3.9%	10.5	4.5%	14.7	4.8%	2.8%
Manganese (WEN5)	4	Associated with Highly Stable Minerals	66.7	10.6%	59.5	14.8%	58.2	17.2%	72.5	16.1%	123.15	28.4%	87.7	26.7%	33.8	14.5%	65.8	21.3%	18.7%
Manganese (WEN6)	5		547	87.3%	329	81.9%	259	76.4%	346	76.6%	250.8	57.8%	207	62.9%	183	78.4%	197	63.7%	73.1%
Silicon (WEN2)	1	Sorbed	25.2	0.0%	928	0.4%	1120	0.4%	1370	0.5%	2645.5	1.1%	727	0.3%	1070	0.5%	945.75	0.4%	0.5%
Silicon (WEN3)	2	Co-Precipitated with Metal Oxides	58.7	0.0%	276	0.1%	236	0.1%	584	0.2%	1079.5	0.5%	249	0.1%	180	0.1%	748	0.3%	0.2%
Silicon (WEN4)	3		123	0.1%	341	0.1%	406	0.2%	656	0.2%	560.9	0.2%	648	0.3%	554	0.3%	576	0.2%	0.2%
Silicon (WEN5)	4	Associated with Highly Stable Minerals	54.2	0.0%	57.2	0.0%	76.9	0.0%	70.8	0.0%	121.58	0.1%	101	0.0%	66.3	0.0%	103	0.0%	0.0%
Silicon (WEN6)	5		228000	99.9%	239000	99.3%	249000	99.3%	264000	99.0%	234750	98.2%	238000	99.3%	218000	99.1%	264000	99.1%	99.1%

Notes:

Sequential extraction steps and interpretation categories:

a) Sorbed = Step 2 (WEN2)

b) Co-Precipitated with Metal Oxides= Step 3 (WEN3)+ Step 4 (WEN4)

c) Associated with Highly Stable Minerals = Step 5 (WEN5)+ Step 6 (WEN6)

Percentage of each step calculated by dividing step result by sum of all steps.

[1]-BAL refers to the 5 steps described by Wenzel et al 2001 methodology as selective sequential extraction Steps 2 through 6. These steps are listed on this table as Steps 1 through 5 to match the five steps described by Wenzel et al 2001 methodology.

QA/QC SOLUTIONS, LLC

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October 6, 2022

Jeff King, L.G.
Pacific Environmental and Redevelopment (PERC-NW)
8424 East Meadow Lake Drive
Snohomish, WA 98290

Subject: Superlon Plastics Site RI Phase V Sampling Event Data Validation Summary:
Task Order No.: 22-01
QA/QC Solutions, LLC Project No.: 121621.1

Sent via e-mail to jking@perc-nw.com on October 6, 2022

Dear Jeff:

This letter documents the results of the data validation review for the analysis of various metals, totals solids, and pH completed on groundwater and soil samples associated with Superlon Plastic Site RI Phase V sampling event.

The available data reported were validated to verify applicable laboratory quality assurance and quality control (QA/QC) procedures were reported, documented and of sufficient quality to support its intended purpose(s). A summary of the overall assessment of data quality, the data set, a summary of the analytical methods used to complete the chemical analyses, a summary of the data validation procedures used, and a summary of the reasons why data were qualified (including other items noted during data validation) is presented below.

Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC procedures that were used by the laboratories during the analysis of the samples were acceptable. Some sample results required qualification during data validation because method-specific QA/QC criteria were not met; results maybe qualified for more than one reason. During data validation the following actions were taken:

- A total of 44 results reported as detected required qualification as estimated and were assigned a *J* data validation qualifier.
- One reported as undetected (*U*) required qualification as estimated and was assigned a *UJ* data validation qualifier.

Note: No results required rejection

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements were qualified as estimated (*J or UJ*) by the laboratory or during data validation. These qualified data are usable and represent data of good quality and reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data).

Data Set

The data set consisted of groundwater samples and soil samples that were collected between March 24, 2022 and March 31, 2022. Analyses were completed for selected metals, total solids, and pH and were completed Analytical Resources, LLC located in Tukwila, Washington, Eurofins Seattle located in Tacoma, Washington, and Brooks Applied Labs located in Seattle, Washington. A summary of the samples collected and analyses completed is presented in Tables 1A, 1B, and 1C.

QA/QC Solutions, LLC received the laboratory data summaries and electronic data deliverables (EDDs) from Pioneer Technologies, Inc. on April 20, 2022, April 28, 2022, and August 1, 2022.

Analytical Methods

A summary of the samples collected and analyses completed is presented in Tables 1A, 1B, and 1C and are specified in each of the laboratories data packages.

Analysis of dissolved arsenic and lead was completed by filtration through 0.45-µm filter. Data users should note that filtration through 0.45-µm filter is an "operational" definition and is not indicative of a "truly dissolved" water fraction.

Data Validation Procedures

Data validation procedures included evaluating a summary of the sample results and applicable quality control results that were reported by the laboratory. This level of validation is also referred to as a Stage 2A (U.S. EPA 2009) or also as an abbreviated data review. The analytical data were validated generally following the applicable guidance and requirements specified in:

- Method-specific and laboratory-established quality control requirements, as applicable.
- *Guidance on Environmental Data Verification and Validation* (U.S. EPA 2002).
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).
- *National Functional Guidelines for Inorganic Data Superfund Data Review. Final*. OLEM 9240.1-66 EPA 542-R-20-006 November 2020. U.S. Environmental Protection Agency (EPA), Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, DC. (U.S. EPA 2020).

The laboratory data deliverables that were validated included the following:

- Case narrative discussing analytical problems (if any) and procedures.
- Chain-of-custody (COC) documentation to verify completeness of the data set.
- Laboratory summary result forms to verify analytical holding times were met.
- Results for the method blanks and equipment rinsate blank (Sample EB-033022) to determine whether an analyte that was reported as detected in any sample was the result of possible contamination introduced at the laboratory or during field sampling.

- Results for laboratory control sample (LCS) (i.e., blank spike) and duplicate LCS recoveries to assess analytical accuracy. Results for a matrix spike (MS) and matrix spike duplicate (MSD) were nor reported.
- Results for applicable laboratory duplicate LCS and/or MS/MSDs analyses to assess analytical precision.
- Results for field duplicate samples to provide additional information in support of the quality assurance review. The soil field duplicate sample are OU3-SB1-8.5-9.5-0322 and OU3-SB1-8.5-9.5-0322-01. The aqueous field duplicate samples are HPT-GW-06-I and HPT-GW-06-I-01)
- Laboratory summaries of analytical results.

Verification and validation of 100-percent of all applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets were not completed during the data validation review. There may be analytical problems that could only be identified by reviewing every instrument printouts and associated analytical quality control results. Verification of all possible factors that could result in the degradation of data quality was not completed nor should be inferred at this time. The laboratory case narrative did not indicate any significant problems with data that were not reviewed during data validation. The adequacy of the sampling procedures was not completed during the data validation.

Performance based control limits established by the laboratory, applicable control limits specified in the analytical methods, and best professional judgement were used to evaluate data quality and to determine if specific data required qualification. Data qualifiers were assigned during data validation following guidance specified by U.S. EPA (2002 and 2020) to the EDD when applicable QC measurement criteria were not met, and qualification of the data was warranted.

Reasons for Data Qualification

The reasons for qualification of sample results are summarized in Tables 2A, 2B, and 2C (Summary of Qualified Data by laboratory).

General Comments

- Data users should refer to the laboratory data packages for complete information pertinent to the analyses completed.
- Some sample results were reported from a dilution analysis that was required. In these instances, all other sample results were reported from the undiluted analysis.
- Sample results required qualification for one of the following three reasons:
    - the result was less than the reporting limit (RL)
    - the relative percent difference (RPD) between sample and associated field duplicate sample could not be calculated. Concentration of affected element in the sample was >5x the RL, but field duplicate reported as not detected
    - the RPD between the concentration of an element in a sample and associated laboratory sample duplicate analysis of above the applicable control limit

This concludes the data validation review. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at jjmcateer@msn.com.

Cordially,

James J. Mc Ateer, Jr., BS, MRSC
Managing Member

cc: Brad Grimsted, Pioneer Technologies Corporation via email at grimstedb@uspioneer.com
Nathan Starr, Pioneer Technologies Corporation via email at starrn@uspioneer.com

Attachment

References

U.S. EPA 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA/240/R-02/004. November 2002. U.S. Environmental Protection Agency, Office of Environmental Information, Washington DC.

U.S. EPA 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. January 13, 2009.U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA 2020. National Functional Guidelines for Inorganic Data Superfund Data Review. Final. OLEM 9240.1-66 EPA 542-R-20-006. November 2020. Office of Superfund Remediation and Technology Innovation (OSRTI), U.S. Environmental Protection Agency.

U.S. EPA 2022. SW-846 on-line. Test methods for evaluating solid wastes, physical/chemical methods. https://www.epa.gov/hw-sw846/sw-846-compendium (last updated on June 15, 2022). U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC.

Wenzel, Walter *et al*. 2001. Arsenic Fractionation in Soils Using an Improved Sequential Extraction Procedure. Analytica Chimica Acta 436 (2001) 309-323.

Table 1A. Summary of Samples Collected and Analyses Completed by ARI

Sample Number	Laboratory ID	Date Collected	As, Ba, Cd, Cr, Pb, Se, and Ag by SW-846 6010D	Mercury by SW-846 7471A	Arsenic and Lead by 6010D and digetion using SPN of EPA 1312 Elutriate	pH by SW-846 9045D	Total Solids by SM 250 G-97
OU3-SB1-8.5-9.5-0322	22D0050-03	03/30/2022	✓	✓	✓	✓	✓
OU3-SB1-8.5-9.5-0322-01	22D0050-04	03/30/2022	✓	✓	✓	✓	✓
OU3-SB2-9-9.5-0322	22D0050-08	03/31/2022	✓	✓	✓	✓	✓
OU3-SB3-9-9.5-0322	22D0050-11	03/31/2022	✓	✓	✓	✓	✓
OU3-SB4-9-9.5-0322	22D0050-14	03/30/2022	✓	✓	✓	✓	✓
OU3-SB5-10-10.5-0322	22D0050-17	03/31/2022	✓	✓	✓	✓	✓
OU3-SB6-6-7-0322	22D0050-19	03/30/2022	✓	✓	✓	✓	✓
OU3-SB6-9-9.5-0322	22D0050-20	03/30/2022	✓	✓	✓	✓	✓
OU3-SB7-9-9.5-0322	22D0050-23	03/30/2022	✓	✓	✓	✓	✓
	Total Number of Samples:		9	9	9	9	9

Notes

SPN - sulphuric, perchloric, and nitric acids

Table 1B. Summary of Samples Collected and Analyses Completed by Eurofins

Sample Number	Laboratory ID	Date Collected	Dissolved Arsenic and Lead by SW-846 6020B
EB-033022	580-112086-32	03/30/22	✓
GW-OU3-SB2-0322	580-112086-31	03/31/22	✓
GW-OU3-SB4-0322	580-112086-28	03/30/22	✓
GW-OU3-SB5-0322	580-112086-9	03/31/22	✓
GW-OU3-SB6-0322	580-112086-29	03/30/22	✓
GW-OU3-SB7-0322	580-112086-30	03/30/22	✓
HPT-GW-01-I	580-112086-15	03/28/22	✓
HPT-GW-01-P	580-112086-13	03/28/22	✓
HPT-GW-01-S	580-112086-14	03/28/22	✓
HPT-GW-02-I	580-112086-27	03/30/22	✓
HPT-GW-02-P	580-112086-25	03/30/22	✓
HPT-GW-02-S	580-112086-26	03/30/22	✓
HPT-GW-03-I	580-112086-12	03/28/22	✓
HPT-GW-03-P	580-112086-10	03/28/22	✓
HPT-GW-03-S	580-112086-11	03/28/22	✓
HPT-GW-04-I	580-112086-4	03/24/22	✓
HPT-GW-04-S	580-112086-3	03/24/22	✓
HPT-GW-05-I	580-112086-6	03/24/22	✓
HPT-GW-05-S	580-112086-5	03/24/22	✓
HPT-GW-06-I	580-112086-18	03/29/22	✓
HPT-GW-06-I-01	580-112086-19	03/29/22	✓
HPT-GW-06-P	580-112086-16	03/29/22	✓
HPT-GW-06-S	580-112086-17	03/29/22	✓
HPT-GW-07-I	580-112086-22	03/29/22	✓
HPT-GW-07-P	580-112086-20	03/29/22	✓
HPT-GW-07-S	580-112086-21	03/29/22	✓
TW-MW-12P	580-112086-23	03/29/22	✓
TW-MW-12S	580-112086-24	03/29/22	✓
TW-MW-5P	580-112086-7	03/24/22	✓
TW-MW-5S	580-112086-8	03/24/22	✓
TW-MW-6P	580-112086-1	03/23/22	✓
TW-MW-6S	580-112086-2	03/23/22	✓
	Total Number of Samples:		32

Table 1B. Summary of Samples Collected and Analyses Completed by BAL

Sample Number	Laboratory ID	Date Collected	Total Solids	WEN2 (Al, As, Fe, Mn, Si)	WEN3 (Al, As, Fe, Mn, Si)	WEN4 (Al, As, Fe, Mn, Si)	WEN5 (Al, As, Fe, Mn, Si)	WEN6 (Al, As, Fe, Mn, Si)
OU3-SB1-9.5-10-0322	2204012-01	03/30/2022	✓	✓	✓	✓	✓	✓
OU3-SB1-17-17.5-0322	2204012-02	03/30/2022	✓	✓	✓	✓	✓	✓
OU3-SB2-9.5-10-0322	2204012-03	03/31/2022	✓	✓	✓	✓	✓	✓
OU3-SB3-9.5-10-0322	2204012-04	03/31/2022	✓	✓	✓	✓	✓	✓
OU3-SB4-9.5-10-0322	2204012-05	03/30/2022	✓	✓	✓	✓	✓	✓
OU3-SB5-10.5-11-0322	2204012-06	03/31/2022	✓	✓	✓	✓	✓	✓
OU3-SB6-9.5-10-0322	2204012-07	03/30/2022	✓	✓	✓	✓	✓	✓
OU3-SB7-9.5-10-0322	2204012-08	03/30/2022	✓	✓	✓	✓	✓	✓
	Total Number of Samples:		8	8	8	8	8	8

Notes

WEN - sequential extraction procedure developed by Wenzel, et. al. (Analyica Chemica ACTA, 2001)

Table 2A. Summary of Qualified ARI Data

Sample ID	Laboratory ID	Chemical	Concentration	Units	DL	RL	Lab Qualifier	Final Data Validation Qualifier	Reason for Qualification
Soil Samples									
OU3-SB1-8.5-9.5-0322	22D0050-03	Lead	56.8	mg/kg, dry wt.	0.935	7.79	D	J	The RPD of laboratory sample duplicate analysis of 23.4 was above the control limit of 20
OU3-SB2-9-9.5-0322	22D0050-08	Lead	2.54	mg/kg, dry wt.	0.369	3.08	J	J	Concentration >DL, <RL
		Selenium	3.29	mg/kg, dry wt.	1.97	7.69	J	J	Concentration >DL, <RL
		Mercury	0.0329	mg/kg, dry wt.	0.00715	0.0341	J	J	Concentration >DL, <RL
OU3-SB3-9-9.5-0322	22D0050-11	Selenium	4.64	mg/kg, dry wt.	2.29	8.94	J	J	Concentration >DL, <RL
OU3-SB4-9-9.5-0322	22D0050-14	Cadmium	0.313	mg/kg, dry wt.	0.274	0.784	J, D	J	Concentration >DL, <RL
OU3-SB5-10-10.5-0322	22D0050-17	Selenium	5.37	mg/kg, dry wt.	2.21	8.65	J	J	Concentration >DL, <RL
OU3-SB6-6-7-0322	22D0050-19	Lead	4.67	mg/kg, dry wt.	4.35	36.2	J, D	J	Concentration >DL, <RL
		Mercury	0.0118	mg/kg, dry wt.	0.0095	0.0452	J	J	Concentration >DL, <RL
OU3-SB6-9-9.5-0322	22D0050-20	Selenium	6.10	mg/kg, dry wt.	2.15	8.41	J	J	Concentration >DL, <RL
OU3-SB7-9-9.5-0322	22D0050-23	Selenium	5.91	mg/kg, dry wt.	5.27	8.23	J, D	J	Concentration >DL, <RL
Aqueous Samples									
OU3-SB1-8.5-9.5-0322	22D0050-03	Lead	0.0218	mg/L	0.0065	0.0218	J, D	J	Concentration >DL, <RL
OU3-SB1-8.5-9.5-0322-01	22D0050-04	Lead	0.0229	mg/L	0.0065	0.1	J, D	J	Concentration >DL, <RL
OU3-SB5-10-10.5-0322	22D0050-17	Arsenic	0.196	mg/L	0.014	0.25	J, D	J	Concentration >DL, <RL
OU3-SB6-6-7-0322	22D0050-19	Arsenic	0.0272	mg/L	0.014	0.25	J, D	J	Concentration >DL, <RL

Total results qualified "J" = 15

Data Validation Assigned Data Qualifiers and Definitions

D = dilution

DL = detection limit

J = estimated

RL = reporting limit

RPD = relative percent difference

Table 2B. Summary of Qualified Eurofins Data

Sample ID	Laboratory ID	Chemical	Concentration	Units	MDL	RL	Lab Qualifier	Final Data Validation Qualifier	Reason for Qualification
HPT-GW-06-I	580-112086-18	Arsenic, Inorganic	0.093	mg/L	0.0010	0.0050		J	The RPD between sample and field duplicate cannot be calculated. The sample result was >5x RL, but the field duplicate reported as not detected
HPT-GW-06-I-01	580-112086-19	Arsenic, Inorganic	0.005	mg/L	0.0010	0.0050	U	UJ	The RPD between sample and field duplicate cannot be calculated. The sample result was >5x RL, but the field duplicate reported as not detected

Total results qualified "J" =	1
Total results qualified "UJ" =	1

Data Validation Assigned Data Qualifiers and Definitions

J = estimated

MDL = method detection limit

RPD = relative percent difference

RL = reporting limit

UJ = result restated as undetected at value shown

Table 2C. Summary of Qualified BAL Data

Sample ID	Laboratory ID	Chemical	Concentration	Units	MDL	MRL	Lab Qualifier	Validation Qualifier	Reason for Qualification
OU3-SB1-9.5-10-0322	2204012-01	Si(WEN5)	57.2	mg/kg, dry wt.	52.8	106	J	J	Concentration >MDL, <MRL
OU3-SB1-17-17.5-0322	2204012-02	Si(WEN5)	54.2	mg/kg, dry wt.	45.7	91.4	J	J	Concentration >MDL, <MRL
OU3-SB2-9.5-10-0322	2204012-03	Si(WEN5)	76.9	mg/kg, dry wt.	55.0	110	J	J	Concentration >MDL, <MRL
OU3-SB3-9.5-10-0322	2204012-04	Si(WEN5)	70.8	mg/kg, dry wt.	59.7	119	J	J	Concentration >MDL, <MRL
OU3-SB4-9.5-10-0322	2204012-05	Al(WEN2)	2.25	mg/kg, dry wt.	0.222	0.444	M	J	The RPD of laboratory sample duplicate analysis above control limit of 20
		Al(WEN4)	897	mg/kg, dry wt.	0.335	0.670	M	J	The RPD of laboratory sample duplicate analysis above control limit of 20
		Al(WEN5)	15700	mg/kg, dry wt.	0.822	1.64	M	J	The RPD of laboratory sample duplicate analysis above control limit of 20
OU3-SB4-9.5-10-0322	2204012-05	As(WEN3)	3.55	mg/kg, dry wt.	0.003	0.030	M	J	The RPD of laboratory sample duplicate analysis above control limit of 35
		As(WEN4)	4.56	mg/kg, dry wt.	0.006	0.030	M	J	The RPD of laboratory sample duplicate analysis above control limit of 35
		As(WEN5)	10.9	mg/kg, dry wt.	0.006	0.061	M	J	The RPD of laboratory sample duplicate analysis above control limit of 35
OU3-SB4-9.5-10-0322	2204012-05	Fe(WEN4)	1650	mg/kg, dry wt.	1.43	2.86	M	J	The RPD of laboratory sample duplicate analysis above control limit of 20
	2204012-05RE1	Fe(WEN3)	12300	mg/kg, dry wt.	3.29	6.58	M	J	The RPD of laboratory sample duplicate analysis above control limit of 20
	2204012-05RE1	Fe(WEN5)	10800	mg/kg, dry wt.	3.90	7.79	M	J	The RPD of laboratory sample duplicate analysis above control limit of 20
OU3-SB4-9.5-10-0322	2204012-05	Mn(WEN2)	2.40	mg/kg, dry wt.	0.009	0.030	M	J	The RPD of laboratory sample duplicate analysis above control limit of 20
		Mn(WEN4)	6.40	mg/kg, dry wt.	0.143	0.286	M	J	The RPD of laboratory sample duplicate analysis above control limit of 20
OU3-SB5-10.5-11-0322	2204012-06	Si(WEN5)	101	mg/kg, dry wt.	59.0	118	J	J	Concentration >MDL, <MRL
OU3-SB6-9.5-10-0322	2204012-07	Si(WEN5)	66.3	mg/kg, dry wt.	51.8	104	J	J	Concentration >MDL, <MRL
OU3-SB7-9.5-10-0322	2204012-08	Si(WEN5)	103	mg/kg, dry wt.	55.0	110	J	J	Concentration >MDL, <MRL

Total results qualified "J" = 18

Data Validation Assigned Data Qualifiers and Definitions

J = estimated

MDL = method detection limit

MRL = method reporting limit

RPD = relative percent difference

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ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-112086-1
Client Project/Site: Superlon Plastics

For:
Pioneer Technologies Corp
5205 Corporate Center Ct SE
Suite A
Olympia, Washington 98503

Attn: Nathan Starr

M. Elaine Walker

Authorized for release by:
4/18/2022 1:23:09 PM

Elaine Walker, Project Manager II
(253)248-4972
M.Elaine.Walker@et.eurofinsus.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Case Narrative

Job ID: 580-112086-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-112086-1

Receipt

Thirty-two samples were received on 4/1/2022 5:45 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.6º C.

Receipt Exceptions

The reference method requires samples to be preserved to a pH of <2. The following samples were received with insufficient preservation at a pH of >2: TW-MW-6P (580-112086-1), HPT-GW-04-S (580-112086-3), HPT-GW-04-I (580-112086-4), HPT-GW-05-I (580-112086-6), TW-MW-5P (580-112086-7), GW-OU3-SB5-0322 (580-112086-9), HPT-GW-03-P (580-112086-10), HPT-GW-03-P (580-112086-10[DU]), HPT-GW-03-I (580-112086-12), HPT-GW-01-I (580-112086-15), GW-OU3-SB4-0322 (580-112086-28), GW-OU3-SB6-0322 (580-112086-29), GW-OU3-SB7-0322 (580-112086-30) and GW-OU3-SB2-0322 (580-112086-31). The samples were preserved to the appropriate pH in the laboratory on 4/1/22 at 1825. Reagent: 3095393

The sample times on the container label for the following samples did not match the information listed on the Chain-of-Custody (COC): TW-MW-6P (580-112086-1), TW-MW-6S (580-112086-2), HPT-GW-03-P (580-112086-10), HPT-GW-03-P (580-112086-10[DU]), HPT-GW-03-S (580-112086-11) and HPT-GW-02-S (580-112086-26).
-1) The container label lists 1500, while the COC lists 1515.
-2) The container label lists 1515, while the COC lists 1500.
-10) The container label lists 0930, while the COC lists 0920.
-11) The container label lists 0920, while the COC lists 0930.
-26) The container label lists 0825, while the COC lists 0828.
All sample times were logged per the COC pending client verification.

An additional sample container was received for the following sample.GW-OU3-SB4-0322 (580-112086-28) This additional container has 'dup' written on the lid however the client did not specify this sample to run as a duplicate.

Per email from the client on April 1, 2022, duplicate analyses were added to samples HPT-GW-03-P (580-223086-10) and HPT-GW-02-I (580-112086-27)

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client Sample ID: TW-MW-6P

Lab Sample ID: 580-112086-1

Date Collected: 03/23/22 15:15

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.19**		0.0050		mg/L		04/08/22 19:19	04/11/22 14:30	5
Lead	**0.0057**		0.0020		mg/L		04/08/22 19:19	04/11/22 14:30	5

Client Sample Results

Client Sample ID: TW-MW-6S

Lab Sample ID: 580-112086-2

Date Collected: 03/23/22 15:00

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**11**		0.0050		mg/L		04/08/22 19:19	04/11/22 14:26	5
Lead	**0.41**		0.0020		mg/L		04/08/22 19:19	04/11/22 14:26	5

Client Sample Results

Client Sample ID: HPT-GW-04-S

Lab Sample ID: 580-112086-3

Date Collected: 03/24/22 09:35

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.85**		0.0050		mg/L		04/08/22 19:19	04/11/22 14:22	5
Lead	**0.10**		0.0020		mg/L		04/08/22 19:19	04/11/22 14:22	5

Client Sample Results

Client Sample ID: HPT-GW-04-I
Lab Sample ID: 580-112086-4
Date Collected: 03/24/22 09:38
Matrix: Water
Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0050		mg/L		04/08/22 19:19	04/11/22 14:18	5
Lead	ND		0.0020		mg/L		04/08/22 19:19	04/11/22 14:18	5

Client Sample ID: HPT-GW-05-S

Lab Sample ID: 580-112086-5

Date Collected: 03/24/22 12:35

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.3**		0.0050		mg/L		04/08/22 19:19	04/11/22 14:14	5
Lead	ND		0.0020		mg/L		04/08/22 19:19	04/11/22 14:14	5

Client Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: HPT-GW-05-I
Date Collected: 03/24/22 12:45
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-6
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.011**		0.0050		mg/L		04/08/22 19:19	04/11/22 14:38	5
Lead	ND		0.0020		mg/L		04/08/22 19:19	04/11/22 14:38	5

Client Sample Results

Client Sample ID: TW-MW-5P
Lab Sample ID: 580-112086-7
Date Collected: 03/24/22 14:30
Matrix: Water
Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.043**		0.0050		mg/L		04/08/22 19:19	04/11/22 14:34	5
Lead	ND		0.0020		mg/L		04/08/22 19:19	04/11/22 14:34	5

Client Sample Results

Client Sample ID: TW-MW-5S

Lab Sample ID: 580-112086-8

Date Collected: 03/24/22 14:40

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.37**		0.0050		mg/L		04/11/22 16:18	04/13/22 21:47	5
Lead	**0.098**		0.0020		mg/L		04/11/22 16:18	04/13/22 21:47	5

Client Sample Results

Client Sample ID: GW-OU3-SB5-0322

Lab Sample ID: 580-112086-9

Date Collected: 03/31/22 10:00

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0059**		0.0050		mg/L		04/11/22 16:18	04/13/22 21:39	5
Lead	**0.0078**		0.0020		mg/L		04/11/22 16:18	04/13/22 21:39	5

Client Sample ID: HPT-GW-03-P

Lab Sample ID: 580-112086-10

Date Collected: 03/28/22 09:20

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.13**		0.0050		mg/L		04/08/22 19:19	04/11/22 13:32	5
Lead	ND		0.0020		mg/L		04/08/22 19:19	04/11/22 13:32	5

Client Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: HPT-GW-03-S
Date Collected: 03/28/22 09:30
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-11
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.54**		0.0050		mg/L		04/11/22 16:18	04/13/22 21:43	5
Lead	**0.0093**		0.0020		mg/L		04/11/22 16:18	04/13/22 21:43	5

Client Sample ID: HPT-GW-03-I
Date Collected: 03/28/22 09:10
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-12
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0070**		0.0050		mg/L		04/11/22 16:18	04/13/22 21:27	5
Lead	ND		0.0020		mg/L		04/11/22 16:18	04/13/22 21:27	5

Client Sample ID: HPT-GW-01-P
Date Collected: 03/28/22 11:30
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-13
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.074**		0.0050		mg/L		04/11/22 16:18	04/13/22 21:35	5
Lead	ND		0.0020		mg/L		04/11/22 16:18	04/13/22 21:35	5

Client Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: HPT-GW-01-S

Date Collected: 03/28/22 12:00
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-14

Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.11**		0.0050		mg/L		04/11/22 16:18	04/13/22 21:31	5
Lead	ND		0.0020		mg/L		04/11/22 16:18	04/13/22 21:31	5

Client Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: HPT-GW-01-I
Date Collected: 03/28/22 12:15
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-15
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0050		mg/L		04/11/22 16:20	04/13/22 18:44	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 18:44	5

Client Sample ID: HPT-GW-06-P
Date Collected: 03/29/22 08:20
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-16
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**3.6**		0.0050		mg/L		04/11/22 16:20	04/13/22 18:47	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 18:47	5

Client Sample ID: HPT-GW-06-S
Date Collected: 03/29/22 08:25
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-17
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**47**		0.0050		mg/L		04/11/22 16:20	04/13/22 18:51	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 18:51	5

Client Sample ID: HPT-GW-06-I
Lab Sample ID: 580-112086-18
Date Collected: 03/29/22 08:30
Matrix: Water
Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.093**		0.0050		mg/L		04/11/22 16:20	04/13/22 18:55	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 18:55	5

Client Sample ID: HPT-GW-06-I-01
Date Collected: 03/29/22 08:30
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-19
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0050		mg/L		04/11/22 16:20	04/13/22 18:59	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 18:59	5

Client Sample ID: HPT-GW-07-P

Date Collected: 03/29/22 10:40

Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-20

Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.48**		0.0050		mg/L		04/11/22 16:20	04/13/22 19:03	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 19:03	5

Client Sample ID: HPT-GW-07-S
Lab Sample ID: 580-112086-21
Date Collected: 03/29/22 10:45
Matrix: Water
Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**65**		5.0		mg/L		04/11/22 16:20	04/14/22 12:34	5000
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 19:07	5

Client Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: HPT-GW-07-I
Date Collected: 03/29/22 10:50
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-22
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.094**		0.0050		mg/L		04/11/22 16:20	04/13/22 19:11	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 19:11	5

Client Sample ID: TW-MW-12P

Lab Sample ID: 580-112086-23

Date Collected: 03/29/22 15:00

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**6.3**		0.0050		mg/L		04/11/22 16:20	04/13/22 19:15	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 19:15	5

Client Sample ID: TW-MW-12S

Lab Sample ID: 580-112086-24

Date Collected: 03/29/22 14:55

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.8**		0.0050		mg/L		04/11/22 16:20	04/13/22 19:19	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 19:19	5

Client Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: HPT-GW-02-P

Lab Sample ID: 580-112086-25

Date Collected: 03/30/22 08:22

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.16**		0.0050		mg/L		04/11/22 16:20	04/13/22 19:42	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 19:42	5

Client Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: HPT-GW-02-S

Lab Sample ID: 580-112086-26

Date Collected: 03/30/22 08:28

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.21**		0.0050		mg/L		04/11/22 16:20	04/13/22 19:46	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 19:46	5

Client Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: HPT-GW-02-I
Date Collected: 03/30/22 08:30
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-27
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0050		mg/L		04/11/22 16:20	04/13/22 18:01	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 18:01	5

Client Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: GW-OU3-SB4-0322
Date Collected: 03/30/22 16:00
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-28
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0060**		0.0050		mg/L		04/11/22 16:20	04/13/22 19:50	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 19:50	5

Client Sample Results

Client Sample ID: GW-OU3-SB6-0322

Lab Sample ID: 580-112086-29

Date Collected: 03/30/22 13:05

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.090**		0.0050		mg/L		04/11/22 16:20	04/13/22 19:57	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 19:57	5

Client Sample Results

Client Sample ID: GW-OU3-SB7-0322

Lab Sample ID: 580-112086-30

Date Collected: 03/30/22 11:45

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.080**		0.0050		mg/L		04/11/22 16:20	04/13/22 20:05	5
Lead	**0.65**		0.0020		mg/L		04/11/22 16:20	04/13/22 20:05	5

Client Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: GW-OU3-SB2-0322
Date Collected: 03/31/22 08:30
Date Received: 04/01/22 17:45

Lab Sample ID: 580-112086-31
Matrix: Water

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0098**		0.0050		mg/L		04/11/22 16:20	04/13/22 20:09	5
Lead	**0.0034**		0.0020		mg/L		04/11/22 16:20	04/13/22 20:09	5

Client Sample Results

Client Sample ID: EB-033022

Lab Sample ID: 580-112086-32

Date Collected: 03/30/22 13:00

Matrix: Water

Date Received: 04/01/22 17:45

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0050		mg/L		04/11/22 16:20	04/13/22 20:13	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 20:13	5

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Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-386944/24-A
Matrix: Water
Analysis Batch: 387276

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 386944

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0050		mg/L		04/08/22 19:19	04/11/22 13:28	5
Lead	ND		0.0020		mg/L		04/08/22 19:19	04/11/22 13:28	5

Lab Sample ID: LCS 580-386944/25-A
Matrix: Water
Analysis Batch: 387276

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 386944

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	0.982		mg/L		98	80 - 120
Lead	1.00	0.993		mg/L		99	80 - 120

Lab Sample ID: LCSD 580-386944/26-A
Matrix: Water
Analysis Batch: 387276

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 386944

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1.00	0.975		mg/L		97	80 - 120	1	20
Lead	1.00	0.988		mg/L		99	80 - 120	1	20

Lab Sample ID: MB 580-387104/14-A
Matrix: Water
Analysis Batch: 387447

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 387104

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		04/11/22 16:18	04/13/22 20:36	1
Lead	ND		0.00040		mg/L		04/11/22 16:18	04/13/22 20:36	1

Lab Sample ID: LCS 580-387104/15-A
Matrix: Water
Analysis Batch: 387447

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 387104

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	1.08		mg/L		108	80 - 120
Lead	1.00	1.11		mg/L		111	80 - 120

Lab Sample ID: LCSD 580-387104/16-A
Matrix: Water
Analysis Batch: 387447

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 387104

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1.00	1.09		mg/L		109	80 - 120	1	20
Lead	1.00	1.11		mg/L		111	80 - 120	1	20

Lab Sample ID: MB 580-387105/24-A
Matrix: Water
Analysis Batch: 387423

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 387105

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0050		mg/L		04/11/22 16:20	04/13/22 17:57	5
Lead	ND		0.0020		mg/L		04/11/22 16:20	04/13/22 17:57	5

QC Sample Results

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: LCS 580-387105/25-A
Matrix: Water
Analysis Batch: 387423

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 387105

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Arsenic			1.00	1.10		mg/L		110	80 - 120		
Lead			1.00	1.10		mg/L		110	80 - 120		

Lab Sample ID: LCSD 580-387105/26-A
Matrix: Water
Analysis Batch: 387423

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 387105

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic			1.00	1.08		mg/L		108	80 - 120	2	20
Lead			1.00	1.09		mg/L		109	80 - 120	0	20

Lab Sample ID: 580-112086-10 MS
Matrix: Water
Analysis Batch: 387276

Client Sample ID: HPT-GW-03-P
Prep Type: Dissolved
Prep Batch: 386944

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Arsenic	0.13		1.00	1.16		mg/L		103	80 - 120		
Lead	ND		1.00	1.02		mg/L		102	80 - 120		

Lab Sample ID: 580-112086-10 MSD
Matrix: Water
Analysis Batch: 387276

Client Sample ID: HPT-GW-03-P
Prep Type: Dissolved
Prep Batch: 386944

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	0.13		1.00	1.17		mg/L		105	80 - 120	1	20
Lead	ND		1.00	1.02		mg/L		102	80 - 120	0	20

Lab Sample ID: 580-112086-10 DU
Matrix: Water
Analysis Batch: 387276

Client Sample ID: HPT-GW-03-P
Prep Type: Dissolved
Prep Batch: 386944

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Arsenic	0.13			0.129		mg/L				1	20
Lead	ND			ND		mg/L				NC	20

Lab Sample ID: 580-112086-27 MS
Matrix: Water
Analysis Batch: 387423

Client Sample ID: HPT-GW-02-I
Prep Type: Dissolved
Prep Batch: 387105

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Arsenic	ND		1.00	1.02		mg/L		101	80 - 120		
Lead	ND		1.00	0.993		mg/L		99	80 - 120		

Lab Sample ID: 580-112086-27 MSD
Matrix: Water
Analysis Batch: 387423

Client Sample ID: HPT-GW-02-I
Prep Type: Dissolved
Prep Batch: 387105

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	ND		1.00	1.01		mg/L		101	80 - 120	1	20
Lead	ND		1.00	0.998		mg/L		100	80 - 120	0	20

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: 580-112086-27 DU
Matrix: Water
Analysis Batch: 387423

Client Sample ID: HPT-GW-02-I
Prep Type: Dissolved
Prep Batch: 387105

	Sample	Sample		DU	DU						RPD
Analyte	**Result**	**Qualifier**		**Result**	**Qualifier**	**Unit**	**D**			**RPD**	**Limit**
Arsenic	ND			ND		mg/L				NC	20
Lead	ND			ND		mg/L				NC	20

Lab Sample ID: 580-112086-28 DU
Matrix: Water
Analysis Batch: 387423

Client Sample ID: GW-OU3-SB4-0322
Prep Type: Dissolved
Prep Batch: 387105

	Sample	Sample		DU	DU						RPD
Analyte	**Result**	**Qualifier**		**Result**	**Qualifier**	**Unit**	**D**			**RPD**	**Limit**
Arsenic	0.0060			0.00523		mg/L				13	20
Lead	ND			ND		mg/L				NC	20

Lab Sample ID: 580-112086-29 DU
Matrix: Water
Analysis Batch: 387423

Client Sample ID: GW-OU3-SB6-0322
Prep Type: Dissolved
Prep Batch: 387105

	Sample	Sample		DU	DU						RPD
Analyte	**Result**	**Qualifier**		**Result**	**Qualifier**	**Unit**	**D**			**RPD**	**Limit**
Arsenic	0.090			0.0935		mg/L				4	20
Lead	ND			ND		mg/L				NC	20

Lab Chronicle

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: TW-MW-6P

Lab Sample ID: 580-112086-1

Date Collected: 03/23/22 15:15
Date Received: 04/01/22 17:45

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			386944	04/08/22 19:19	TMH	FGS SEA
Dissolved	Analysis	6020B		5	387276	04/11/22 14:30	FCW	FGS SEA

Client Sample ID: TW-MW-6S

Lab Sample ID: 580-112086-2

Date Collected: 03/23/22 15:00
Date Received: 04/01/22 17:45

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			386944	04/08/22 19:19	TMH	FGS SEA
Dissolved	Analysis	6020B		5	387276	04/11/22 14:26	FCW	FGS SEA

Client Sample ID: HPT-GW-04-S

Lab Sample ID: 580-112086-3

Date Collected: 03/24/22 09:35
Date Received: 04/01/22 17:45

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			386944	04/08/22 19:19	TMH	FGS SEA
Dissolved	Analysis	6020B		5	387276	04/11/22 14:22	FCW	FGS SEA

Client Sample ID: HPT-GW-04-I

Lab Sample ID: 580-112086-4

Date Collected: 03/24/22 09:38
Date Received: 04/01/22 17:45

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			386944	04/08/22 19:19	TMH	FGS SEA
Dissolved	Analysis	6020B		5	387276	04/11/22 14:18	FCW	FGS SEA

Client Sample ID: HPT-GW-05-S

Lab Sample ID: 580-112086-5

Date Collected: 03/24/22 12:35
Date Received: 04/01/22 17:45

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			386944	04/08/22 19:19	TMH	FGS SEA
Dissolved	Analysis	6020B		5	387276	04/11/22 14:14	FCW	FGS SEA

Client Sample ID: HPT-GW-05-I

Lab Sample ID: 580-112086-6

Date Collected: 03/24/22 12:45
Date Received: 04/01/22 17:45

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			386944	04/08/22 19:19	TMH	FGS SEA
Dissolved	Analysis	6020B		5	387276	04/11/22 14:38	FCW	FGS SEA

Lab Chronicle

Client Sample ID: TW-MW-5P

Lab Sample ID: 580-112086-7
Date Collected: 03/24/22 14:30
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			386944	04/08/22 19:19	TMH	FGS SEA
Dissolved	Analysis	6020B		5	387276	04/11/22 14:34	FCW	FGS SEA

Client Sample ID: TW-MW-5S

Lab Sample ID: 580-112086-8
Date Collected: 03/24/22 14:40
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387104	04/11/22 16:18	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387447	04/13/22 21:47	FCW	FGS SEA

Client Sample ID: GW-OU3-SB5-0322

Lab Sample ID: 580-112086-9
Date Collected: 03/31/22 10:00
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387104	04/11/22 16:18	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387447	04/13/22 21:39	FCW	FGS SEA

Client Sample ID: HPT-GW-03-P

Lab Sample ID: 580-112086-10
Date Collected: 03/28/22 09:20
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			386944	04/08/22 19:19	TMH	FGS SEA
Dissolved	Analysis	6020B		5	387276	04/11/22 13:32	FCW	FGS SEA

Client Sample ID: HPT-GW-03-S

Lab Sample ID: 580-112086-11
Date Collected: 03/28/22 09:30
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387104	04/11/22 16:18	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387447	04/13/22 21:43	FCW	FGS SEA

Client Sample ID: HPT-GW-03-I

Lab Sample ID: 580-112086-12
Date Collected: 03/28/22 09:10
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387104	04/11/22 16:18	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387447	04/13/22 21:27	FCW	FGS SEA

Lab Chronicle

Client Sample ID: HPT-GW-01-P
Lab Sample ID: 580-112086-13

Date Collected: 03/28/22 11:30
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387104	04/11/22 16:18	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387447	04/13/22 21:35	FCW	FGS SEA

Client Sample ID: HPT-GW-01-S
Lab Sample ID: 580-112086-14

Date Collected: 03/28/22 12:00
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387104	04/11/22 16:18	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387447	04/13/22 21:31	FCW	FGS SEA

Client Sample ID: HPT-GW-01-I
Lab Sample ID: 580-112086-15

Date Collected: 03/28/22 12:15
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 18:44	FCW	FGS SEA

Client Sample ID: HPT-GW-06-P
Lab Sample ID: 580-112086-16

Date Collected: 03/29/22 08:20
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 18:47	FCW	FGS SEA

Client Sample ID: HPT-GW-06-S
Lab Sample ID: 580-112086-17

Date Collected: 03/29/22 08:25
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 18:51	FCW	FGS SEA

Client Sample ID: HPT-GW-06-I
Lab Sample ID: 580-112086-18

Date Collected: 03/29/22 08:30
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 18:55	FCW	FGS SEA

Lab Chronicle

Client Sample ID: HPT-GW-06-I-01

Lab Sample ID: 580-112086-19
Date Collected: 03/29/22 08:30
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 18:59	FCW	FGS SEA

Client Sample ID: HPT-GW-07-P

Lab Sample ID: 580-112086-20
Date Collected: 03/29/22 10:40
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 19:03	FCW	FGS SEA

Client Sample ID: HPT-GW-07-S

Lab Sample ID: 580-112086-21
Date Collected: 03/29/22 10:45
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 19:07	FCW	FGS SEA
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5000	387559	04/14/22 12:34	FCW	FGS SEA

Client Sample ID: HPT-GW-07-I

Lab Sample ID: 580-112086-22
Date Collected: 03/29/22 10:50
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 19:11	FCW	FGS SEA

Client Sample ID: TW-MW-12P

Lab Sample ID: 580-112086-23
Date Collected: 03/29/22 15:00
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 19:15	FCW	FGS SEA

Client Sample ID: TW-MW-12S

Lab Sample ID: 580-112086-24
Date Collected: 03/29/22 14:55
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 19:19	FCW	FGS SEA

Client Sample ID: HPT-GW-02-P

Lab Sample ID: 580-112086-25

Date Collected: 03/30/22 08:22

Matrix: Water

Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 19:42	FCW	FGS SEA

Client Sample ID: HPT-GW-02-S

Lab Sample ID: 580-112086-26

Date Collected: 03/30/22 08:28

Matrix: Water

Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 19:46	FCW	FGS SEA

Client Sample ID: HPT-GW-02-I

Lab Sample ID: 580-112086-27

Date Collected: 03/30/22 08:30

Matrix: Water

Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 18:01	FCW	FGS SEA

Client Sample ID: GW-OU3-SB4-0322

Lab Sample ID: 580-112086-28

Date Collected: 03/30/22 16:00

Matrix: Water

Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 19:50	FCW	FGS SEA

Client Sample ID: GW-OU3-SB6-0322

Lab Sample ID: 580-112086-29

Date Collected: 03/30/22 13:05

Matrix: Water

Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 19:57	FCW	FGS SEA

Client Sample ID: GW-OU3-SB7-0322

Lab Sample ID: 580-112086-30

Date Collected: 03/30/22 11:45

Matrix: Water

Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 20:05	FCW	FGS SEA

Lab Chronicle

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Client Sample ID: GW-OU3-SB2-0322

Lab Sample ID: 580-112086-31
Date Collected: 03/31/22 08:30
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 20:09	FCW	FGS SEA

Client Sample ID: EB-033022

Lab Sample ID: 580-112086-32
Date Collected: 03/30/22 13:00
Matrix: Water
Date Received: 04/01/22 17:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			387105	04/11/22 16:20	ABP	FGS SEA
Dissolved	Analysis	6020B		5	387423	04/13/22 20:13	FCW	FGS SEA

Laboratory References:

FGS SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

1 2 3 4 5 6 7 8 9 10 11

Accreditation/Certification Summary

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Washington	State	C788	07-13-22

Sample Summary

Client: Pioneer Technologies Corp
Project/Site: Superlon Plastics

Job ID: 580-112086-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-112086-1	TW-MW-6P	Water	03/23/22 15:15	04/01/22 17:45
580-112086-2	TW-MW-6S	Water	03/23/22 15:00	04/01/22 17:45
580-112086-3	HPT-GW-04-S	Water	03/24/22 09:35	04/01/22 17:45
580-112086-4	HPT-GW-04-I	Water	03/24/22 09:38	04/01/22 17:45
580-112086-5	HPT-GW-05-S	Water	03/24/22 12:35	04/01/22 17:45
580-112086-6	HPT-GW-05-I	Water	03/24/22 12:45	04/01/22 17:45
580-112086-7	TW-MW-5P	Water	03/24/22 14:30	04/01/22 17:45
580-112086-8	TW-MW-5S	Water	03/24/22 14:40	04/01/22 17:45
580-112086-9	GW-OU3-SB5-0322	Water	03/31/22 10:00	04/01/22 17:45
580-112086-10	HPT-GW-03-P	Water	03/28/22 09:20	04/01/22 17:45
580-112086-11	HPT-GW-03-S	Water	03/28/22 09:30	04/01/22 17:45
580-112086-12	HPT-GW-03-I	Water	03/28/22 09:10	04/01/22 17:45
580-112086-13	HPT-GW-01-P	Water	03/28/22 11:30	04/01/22 17:45
580-112086-14	HPT-GW-01-S	Water	03/28/22 12:00	04/01/22 17:45
580-112086-15	HPT-GW-01-I	Water	03/28/22 12:15	04/01/22 17:45
580-112086-16	HPT-GW-06-P	Water	03/29/22 08:20	04/01/22 17:45
580-112086-17	HPT-GW-06-S	Water	03/29/22 08:25	04/01/22 17:45
580-112086-18	HPT-GW-06-I	Water	03/29/22 08:30	04/01/22 17:45
580-112086-19	HPT-GW-06-I-01	Water	03/29/22 08:30	04/01/22 17:45
580-112086-20	HPT-GW-07-P	Water	03/29/22 10:40	04/01/22 17:45
580-112086-21	HPT-GW-07-S	Water	03/29/22 10:45	04/01/22 17:45
580-112086-22	HPT-GW-07-I	Water	03/29/22 10:50	04/01/22 17:45
580-112086-23	TW-MW-12P	Water	03/29/22 15:00	04/01/22 17:45
580-112086-24	TW-MW-12S	Water	03/29/22 14:55	04/01/22 17:45
580-112086-25	HPT-GW-02-P	Water	03/30/22 08:22	04/01/22 17:45
580-112086-26	HPT-GW-02-S	Water	03/30/22 08:28	04/01/22 17:45
580-112086-27	HPT-GW-02-I	Water	03/30/22 08:30	04/01/22 17:45
580-112086-28	GW-OU3-SB4-0322	Water	03/30/22 16:00	04/01/22 17:45
580-112086-29	GW-OU3-SB6-0322	Water	03/30/22 13:05	04/01/22 17:45
580-112086-30	GW-OU3-SB7-0322	Water	03/30/22 11:45	04/01/22 17:45
580-112086-31	GW-OU3-SB2-0322	Water	03/31/22 08:30	04/01/22 17:45
580-112086-32	EB-033022	Water	03/30/22 13:00	04/01/22 17:45

580-112086 Chain of Custody

Chain of Custody Record

eurofins | Environment Testing America

Client Information
Client Contact: Naman Stair
Company: Pioneer Technologies corporation
Address: 5265 Corporate ctr. Ct. SE Ste A
City: Olympia
State, Zip: WA, 98503
Phone:
Email: Starrn@usPioneer.com
Project Name: Superion Plastics
Site:

Sampler: MK
Phone: 503-758-7363
PWSID:
Due Date Requested:
TAT Requested (days):
Compliance Project: Δ Yes Δ No
PO #: Purchase Order not required
WO #:
Project #:
SSOW#:

Lab PM: Elaine Walker
E-Mail: m.elaine.walker@eurofinset.co
Carrier Tracking No(s):
State of Origin:
COC No:
Page: Page 1 of ~~1~~ 3
Job #:

Analysis Requested

Preservation Codes:

- A - HCL
- B - NaOH
- C - Zn Acetate
- D - Nitric Acid
- E - NaHSO4
- F - MeOH
- G - Amchlor
- H - Ascorbic Acid
- I - Ice
- J - DI Water
- K - EDTA
- L - EDA
- M - Hexane
- N - None
- O - AsNaO2
- P - Na2O4S
- Q - Na2SO3
- R - Na2S2O3
- S - H2SO4
- T - TSP Dodecahydrate
- U - Acetone
- V - MCAA
- W - pH 4-5
- Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)		Dissolved As & Pb	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	S	X	
TW-MW-6P	03/23/22	15:15	G	W	4		X		
TW-MW-6S	↓	15:00							
~~HPT-GW-04-P~~	~~03/24/22~~								
HPT-GW-04-S	03/24/22	09:35							
HPT-GW-04-I		09:38							
~~HPT-GW-05-P~~									
HPT-GW-05-S		12:35							
HPT-GW-05-I		12:45							
TW-MW-5P		14:30							
TW-MW-5S	↓	14:40							
GW-003-885-0322	03/31/22	10:00	↓	↓	↓		↓		

Therm. ID: IR8 Cor: 1.6 ° Unc: 1.8 °
Cooler Dsc: LB
Packing: Bwb
Cust. Seal: Yes ___ No ___
Blue Ice, [✓ Wet,] Dry, None
FedEx:
UPS:
Lab Cour:
Other: CD

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For ______ Months*

Deliverable Requested: I, II, III, IV, Other (specify)
Special Instructions/QC Requirements:

Empty Kit Relinquished by: Date: Time: Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Melisa Kegant	04/01/22 10:00	PTC		4/1/22 0947	EEHS

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

Eurofins FGS, Seattle
5755 8th Street East
Tacoma, WA 98424

Chain of Custody Record

eurofins | Environment Testing America

Client Information

Client Contact: Nathan Starr
Company: Pioneer Technologies Corporation
Address:
City:
State, Zip:
Phone:
Email:
Project Name:
Site:

Sampler: MK / JH
Phone: 503-758-7363
PWSID:
Due Date Requested:
TAT Requested (days):
Compliance Project: ∆ Yes ∆ No
PO #: Purchase Order not required
WO #:
Project #:
SSOW#:

Lab PM: Elaine Walker
E-Mail:
Carrier Tracking No(s):
State of Origin:
COC No:
Page: Page ~~1 of 1~~ 2/3
Job #:

Analysis Requested

Preservation Codes:

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA

M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)		Dissolved As + Pb	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	S	X	
HPT-GW-03-P	03/28/22	09:20	G	W	Y		X		
HPT-GW-03-S		09:30							
HPT-GW-03-I		09:10							
HPT-GW-01-P		11:30							
HPT-GW-01-S		12:00							
HPT-GW-01-I	↓	12:15							Additional line:
HPT-GW-06-P	03/29/22	08:20							please run EB-033022
HPT-GW-06-S		08:25							for Dissolved As & Pb
HPT-GW-06-I		08:30							Date: 03/30/22 Time: 1300
HPT-GW-06-I-01		08:30							
HPT-GW-07-P	↓	10:40	↓	↓	↓		↓		

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Melisa Keyanb	Date/Time: 04/01/22 10:00	Company PTC	Received by:	Date/Time: 4/1/22 0947	Company EFGS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

Eurofins FGS, Seattle
5755 8th Street East
Tacoma, WA 98424

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: MK / JH	Lab PM: Elaine Walker	Carrier Tracking No(s):	COC No:
Client Contact: Nathan Starr	Phone: 503-758-7363	E-Mail:	State of Origin:	Page: Page ~~1 of 1~~ 3/3
Company: Pioneer Technologies Corporation	PWSID:			Job #:

Address:
City:
State, Zip:
Phone:
Email:
Project Name:
Site:

Due Date Requested:
TAT Requested (days):
Compliance Project: Δ Yes Δ No
PO #: Purchase Order not required
WO #:
Project #:
SSOW#:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Dissolved As & Pb	Total Number of containers	Special Instructions/Note:
			Preservation Code:			S		
HPT-GW-07-S	03/29/22	10:45	G	W	Y	X		
HPT-GW-07-I		10:50						
TW-MW-12P		15:00						
TW-MW-12S	↓	14:55						
HPT-GW-02-P	03/30/22	08:27						
HPT-GW-02-S		08:28						
HPT-GW-02-I		08:30						
GW-OU3-SB4-0322		16:00						
GW-OU3-SB6-0322		13:05						
GW-OU3-SB7-0322	↓	11:45						
GW-OU3-SB2-0322	03/31/22	08:30	↓	↓	↓	↓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Melissa Kegans	Date/Time: 04/01/22 10:00	Company: PTC	Received by:	Date/Time: 4/1/22 1947	Company: EFGS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

580-112086 Chain of Custody

Chain of Custody Record

eurofins | Environment Testing America

Client Information	
Client Contact:	Nathan Starr
Company:	Pioneer Technologies corporation
PWSID:	
Address:	5205 Corporate ctr. Ct. SE Ste A
City:	Olympia
State, Zip:	WA, 98503
Phone:	
Email:	Starrn@uspioneer.com
Project Name:	Superion Plastics
Site:	
Sampler:	MK
Phone:	503-758-7363
Lab PM:	Elaine Walker
E-Mail:	m.elaine.walker@eurofinset.com
Carrier Tracking No(s):	
State of Origin:	
COC No:	
Page:	Page 1 of ~~1~~ 3
Job #:	
Due Date Requested:	
TAT Requested (days):	
Compliance Project:	Δ Yes Δ No
PO #:	Purchase Order not required
WO #:	
Project #:	
SSOW#:	

Analysis Requested

Preservation Codes:

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)		Dissolved As & Pb	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	S	X	
TW-MW-6P	03/23/22	15:15	G	W	Y		X		
TW-MW-6S	↓	15:00							
~~HPT-GW-04-P~~	~~03/24/22~~								
HPT-GW-04-S	03/24/22	09:35							
HPT-GW-04-I		09:38							
~~HPT-GW-05-P~~									
HPT-GW-05-S		12:35							
HPT-GW-05-I		12:45							
TW-MW-5P		14:30							
TW-MW-5S	↓	14:40							
GW-OU3-8B5-0322	03/31/22	10:00	↓	↓	↓		↓		

Therm. ID: IR8 Cor: 1.6 ° Unc: 1.8 °
Cooler Dsc: LB
Packing: Bwb
Cust. Seal: Yes ___ [✓ No]
Blue Ice, [✓ Wet], Dry, None
FedEx:
UPS:
Lab Cour:
Other: CD

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Melisa Regan	Date/Time: 04/01/22 10:00	Company PTC	Received by:	Date/Time: 4/1/22 0947	Company EETUS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

Eurofins FGS, Seattle
5755 8th Street East
Tacoma, WA 98424

Chain of Custody Record

eurofins | Environment Testing America

Client Information

Client Contact: Nathan Starr

Company: Pioneer Technologies Corporation

Address:

City:

State, Zip:

Phone:

Email:

Project Name:

Site:

Sampler: MK / JH

Phone: 503-758-7363

Lab PM: Elaine Walker

E-Mail:

Carrier Tracking No(s):

State of Origin:

COC No:

Page: Page ~~1 of 1~~ 2/3

Job #:

PWSID:

Due Date Requested:

TAT Requested (days):

Compliance Project: Δ Yes Δ No

PO #: Purchase Order not required

WO #:

Project #:

SSOW#:

Analysis Requested

Preservation Codes:

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)		Dissolved As & Pb	Total Number of Containers	Special Instructions/Note:
			Preservation Code:				S		
HPT-GW-03-P	03/28/22	09:20	G	W	Y		X		
HPT-GW-03-S		09:30							
HPT-GW-03-I		09:10							
HPT-GW-01-P		11:30							
HPT-GW-01-S		12:00							
HPT-GW-01-I	↓	12:15							Addiional line:
HPT-GW-06-P	03/29/22	08:20							please run EB-033022
HPT-GW-06-S		08:25							for Dissolved As & Pb
HPT-GW-06-I		08:30							Date: 03/30/22 Time: 1300
HPT-GW-06-I-01		08:30							
HPT-GW-07-P	↓	10:40	↓	↓	↓		↓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Melisa Keyamb	04/01/22 10:00	PTC		4/1/22 0947	EFGS

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Eurofins FGS, Seattle
5755 8th Street East
Tacoma, WA 98424

Chain of Custody Record

eurofins | Environment Testing America

Client Information

Client Contact: Nathan Starr
Company: Pioneer Technologies Corporation
PWSID:
Address:
City:
State, Zip:
Phone:
Email:
Project Name:
Site:

Sampler: MK / JH
Phone: 503-758-7363
Due Date Requested:
TAT Requested (days):
Compliance Project: Δ Yes Δ No
PO #: Purchase Order not required
WO #:
Project #:
SSOW#:

Lab PM: Elaine Walker
E-Mail:
Carrier Tracking No(s):
State of Origin:
COC No:
Page: Page ~~1 of 1~~ 3/3
Job #:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)		Dissolved As & Pb	Total Number of containers	Special Instructions/Note:
			Preservation Code:				S		
HPT-GW-07-S	03/29/22	10 45	G	W	Y		X		
HPT-GW-07-I		10:50							
TW-MW-12P		15:00							
TW-MW-12S		14:55							
HPT-GW-02-P	03/30/22	08:27							
HPT-GW-02-S		08:28							
HPT-GW-02-I		08:30							
GW-OU3-SB4-0322		16:00							
GW-OU3-SB6-0322		13:05							
GW-OU3-SB7-0322		11:45							
GW-OU3-SB2-0322	03/31/22	08:30							

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Deliverable Requested: I, II, III, IV, Other (specify)

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Special Instructions/QC Requirements:

Empty Kit Relinquished by:
Date:
Time:
Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Melissa Kegans	04/01/22 10:00	PTC		4/1/22 0947	EFGS

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Pioneer Technologies Corp

Job Number: 580-112086-1

Login Number: 112086
List Number: 1
Creator: Greene, Ashton R

List Source: Eurofins Seattle

Question	**Answer**	**Comment**
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

BROOKS APPLIED LABS
13751 Lake City Way NE, Ste 108, Seattle, WA 98125 • USA • T:206-632-6206 • info@brooksapplied.com

July 29, 2022

Pioneer Technologies Corporation
ATTN: Nathan Starr
5205 Corporate Center Ct. SE, Suite A
Lacey, WA 98503
StarrN@uspioneer.com

RE: Project PTC-OA2101 Client Project: Superlon Site

Dear Nathan Starr,

On April 1, 2022, Brooks Applied Labs (BAL) received eight (8) soil samples. The samples were logged-in for the analyses of total solids, total arsenic (As) analysis, and a five-step selective sequential extraction (SSE) method, based on *Wenzel et al*. for aluminum (Al), arsenic (As), iron (Fe), manganese (Mn), and silicon (Si).

All samples were stored and prepped anoxically in an oxygen free glove box. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

<u>Total Solids Analysis</u>

A known mass of each soil sample was placed into a pre-weighed pan, then the combined mass of the sample and pan was recorded. All samples were placed into a convection oven maintained at a temperature of 103°C-105°C. After drying for a minimum of 12 hours, all samples were briefly cooled and reweighed. The total solids percentage of each sample was calculated by dividing the weight of the dried sample by the weight of the original sample.

<u>Batch B220822</u>

All data was reported without qualification, and all associated quality control sample results met the acceptance criteria.

The method blanks (BLK) B220882-BLK1 and B220882-BLK2 had concentrations outside the acceptance limit. All sample results were greater than 10x the concentration of the BLKs and no further action was required.

<u>Arsenic (EPA 6020B MOD) Quantitation by ICP-QQQ-MS</u>

Total recoverable arsenic, manganese, and iron quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). Prior to analysis a known mass of each sample was digested with aliquots of concentrated HNO_3, HCl, and H_2O_2 in a hot block apparatus, in accordance with a modified EPA Method 3050B.

<u>Batch B220912</u>

All data was reported without qualification, and all associated quality control sample results met the acceptance criteria.

The total metals results were *not* method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values and MRL values are determined by MDL studies. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

Arsenic (Five Step SSE (Wenzel et al.)) Quantitation by ICP-QQQ-MS

Metals quantitation [As] was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). Prior to the analyses, a sequential extraction method, based on *Wenzel et al.,* was employed. The applied extraction solutions are designed to target the different substrate components. The following table provides details on the various fractions in the Five Step SSE (*Wenzel et al*.).

Five Step SSE (*Wenzel et al.*)

SSE Extraction Step	Analyte Code	Extraction Liquid Identity	Volume Extraction Liquid (mL)	Target Fraction/Substrate Description
2	xx(WEN2)	0.05 M $(NH_4)H_2PO_4$	25	Specifically-sorbed metals
3	xx(WEN3)	0.2M ammonium oxalate buffer (pH=3.25)	25	Amorphous metal oxyhydroxides
4	xx(WEN4)	0.2M ammonium oxalate buffer + 0.1M Ascorbic Acid	25	Crystalline metal oxyhydroxides
5	xx(WEN5)	concentrated HNO_3, H_2O_2, and HCl	50	Residual, Total Recoverable
6	xx(WEN6)	concentrated HNO_3, HCl, and HF	50	Residual, Total digest

Approximately 1g of each soil sample was transferred to a 50mL polypropylene vial and 25mL of 0.05 M $(NH_4)_2SO_4$ was added to each vial. Each vial was capped and shaken on an inverting shaker for 4 hours at room temperature at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled “WEN2,” a total of 20mL of reagent water was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

All sample vials were wrapped in aluminum foil to prevent photo-oxidation and exactly 25mL of 0.2M ammonium oxalate buffer (pH=3.25) was added to each vial. Each vial was capped and shaken on an inverting shaker for 4 hours at room temperature at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled “WEN3,” a total of 12.5mL of ammonium oxalate buffer was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

Exactly 25mL of 0.2M ammonium oxalate buffer with 0.1M ascorbic acid was added to each vial. The vials were then placed in a hotblock digestion apparatus at 96°C for 30 minutes.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled “WEN4,” a total of 12.5mL of 0.2M ammonium oxalate buffer with 0.1M ascorbic acid was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

The residual solid pellets remaining in the vials were then digested via with aliquots of concentrated HNO_3, HCl, and H_2O_2 (in accordance with a modified EPA Method 3050B). The resulting digests were labeled “WEN5”.

The residual solid pellets remaining in the vials were then digested in a closed vessel (bomb) with concentrated nitric, hydrochloric, and hydrofluoric acids, in accordance with a modified EPA Method 3052. The resulting digests were labeled “WEN6”.

All samples were stored and prepped anoxically in an oxygen free glove box. Degassed reagent water was used to prepare extraction solutions for each step, except for step 5 (i.e. residual metals fractions). For each fraction requiring an inverting rotator, the tumbling step took place in an anoxic environment (glovebox).

Total recoverable metals quantitation on individual fractions was performed was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, brooksapplied.com.

Four Standard reference material standards (SRM) were prepared with the samples and taken through all the SSE steps and analysis. Please note that no certified reference materials for the SSE Procedure are commercially available. The SRMs analyzed at each step of the extraction produced recoveries outside of the typical solid matrix control limits for these analytes. As no control limits have been officially established for the recoveries of SRMs for the SSE Procedure, the recoveries were not indicative of poor data quality. The sum of each analyte fractions should be compared against the certified total analyte value to demonstrate the efficiency of the SSE Procedure at recovering all available forms of Al, As, Fe, Mn, and Si.

It is important to note that the 5-step procedure is not designed to provide total numbers for As in the sample as much as it is designed to show how extractable the As is from the sample. As such, it is not uncommon for the total numbers to not perfectly match the sum of the species. All sum of species for the samples met duplicate criteria with the As results (RPD < 35%), with the following exceptions 2204012-01, 2204012-04, and 2204012-07. The RPDs were elevated for samples respectively 65%, 78%, and 69%. In all 3 of these cases, the sum of species was less than the total As results.

Batch B220847 (WEN2 analyses)
The duplicate (DUP) B220847-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for Al above the acceptance limit (41%). The Al result for sample 2204012-05 was qualified **M** for duplicate imprecision.

The duplicate (DUP) B220847-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for Mn above the acceptance limit (37%). The Mn result for sample 2204012-05 was qualified **M** for duplicate imprecision.

The post spike (PS) B220847-PS1 performed on sample 2204012-05 had a recovery outside the acceptance limit for As and Si. In instances where a post spike (PS) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. No sample results were qualified on the basis of the PS recoveries.

B220885 (WEN2 analyses)
Sample 2204012-08 was prepped in batch B220885 as the initial mass was not recorded when prepping the original batch B220847. After this step, the samples from batches B220847 and B220885 were combined together for the remaining steps of the procedure (WEN3 through WEN6).

Batch B220848 (WEN3 analyses)
The duplicate (DUP) B220848-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for As above the acceptance limit (119%). The As result for sample 2204012-05 was qualified **M** for duplicate imprecision.

The duplicate (DUP) B220848-DUP2 performed on sample 2204012-05 had a relative percent difference (RPD) for Fe above the acceptance limit (119%). The Fe result for sample 2204012-05 was qualified **M** for duplicate imprecision.

Batch B220849 (WEN4 analyses)
The duplicate (DUP) B220849-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for Al above the acceptance limit (33%). The Al result for sample 2204012-05 was qualified **M** for duplicate imprecision.

The duplicate (DUP) B220849-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for As above the acceptance limit (141%). The As result for sample 2204012-05 was qualified **M** for duplicate imprecision.

The duplicate (DUP) B220849-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for Fe above the acceptance limit (49%). The Fe result for sample 2204012-05 was qualified **M** for duplicate imprecision.

The duplicate (DUP) B220849-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for Mn above the acceptance limit (51%). The Mn result for sample 2204012-05 was qualified **M** for duplicate imprecision.

Batch B220850 (WEN5 analyses)
Due to high CPS RPD, the Si results were not reported from the original analysis in sequence S220487. These samples were reanalyzed as batch B220963 in sequence S220507. All other analytes (Al, As, Fe, and Mn) were reported batch B220850 in sequence S220487.

The duplicate (DUP) B220850-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for Al above the acceptance limit (34%). The Al result for sample 2204012-05 was qualified **M** for duplicate imprecision.

The duplicate (DUP) B220849-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for As above the acceptance limit (153%). The As result for sample 2204012-05 was qualified **M** for duplicate imprecision.

The duplicate (DUP) B220849-DUP2 performed on sample 2204012-05 had a relative percent difference (RPD) for Fe above the acceptance limit (68%). The Fe result for sample 2204012-05 was qualified **M** for duplicate imprecision.

B220963 (WEN5 analyses)

The blank spike (BS) B220963-BS1 had a recovery for Si outside the acceptance limit. This low recovery is consistent with historical data for Si samples not prepped with HF. Data is reported with no qualifiers.

The duplicate (DUP) B220963-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for Si above the acceptance limit (80%). The Si result for sample 2204012-05 was qualified **M** for duplicate imprecision.

Batch B220851 (WEN6 analyses)

The duplicate (DUP) B220851-DUP1 performed on sample 2204012-05 had a relative percent difference (RPD) for As above the acceptance limit (134%). The As result for sample 2204012-05 was qualified **M** for duplicate imprecision.

The metals results (FiveStep SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where a post spike (PS) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were ≤ 25% of the native sample concentrations, the recoveries were not reported **(NR)**. No sample results were qualified on the basis of the PS recoveries.

All data was reported without further qualification and all other associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report. This report should be used in its entirety for interpretation of results.

Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Amy Goodall

Amy Goodall
Project Manager
Brooks Applied Labs
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Report Information

Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations /certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/> or review Tables 1 and 2 in our Accreditation Information. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

(Effective 3/23/2020)

E	An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H	Holding time and/or preservation requirements not met. Please see narrative for explanation.
J	Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1	Estimated value. A full explanation is presented in the narrative.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R	Rejected, unusable value. A full explanation is presented in the narrative.
U	Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X	Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

Accreditation Information

Table 1. Accredited method/matrix/analytes for TNI

Issued by: State of Florida Dept. of Health (The NELAC Institute 2016 Standard)

Issued on: July 1, 2021; Valid to: June 30, 2022

Certificate Number: E87982-37

Method	Matrix	TNI Accredited Analyte(s)
EPA 1638	Non-Potable Waters	Ag, Cd, Cu, Ni, Pb, Sb, Se, Tl, Zn
EPA 200.8	Non-Potable Waters	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
EPA 6020	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn
BAL-5000	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn, Hardness
	Solids/Chemicals	Ag, As, B, Be, Cd, Co, Cr, Cu, Pb, Mo, Ni, Sb, Se, Sn, Sr, Tl, V, Zn
	Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn
EPA 1640	Non-Potable Waters	Cd, Cu, Pb, Ni, Zn
EPA 1631E	Non-Potable Waters, Solids/Chemicals & Biological	Total Mercury
EPA 1630	Non-Potable Waters	Methyl Mercury
BAL-3200	Solids/Chemicals & Biological	Methyl Mercury
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
BAL-4201	Non-Potable Waters	Se(IV), Se(VI)
BAL-4300	Non-Potable Waters Solid/Chemicals	Cr(VI)
SM2340B	Non-Potable Waters	Hardness

Accreditation Information

Table 2. Accredited method/matrix/analytes for ISO (1), Non-Governmental TNI (2)

Issued by: ANAB

Issued on: September 21, 2021; Valid to: March 30, 2024

Method	Matrix	ISO and Non-Gov. TNI Accredited Analyte(s)
EPA 1638 Mod EPA 200.8 Mod EPA 6020 Mod BAL-5000	Non-Potable Waters	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, V, Zn Hg (Biological Only)
EPA 1640 Mod	Non-Potable Waters	Cd, Cu, Pb, Ni, Zn Ag, As, Cr, Co, Se, Tl, V (ISO Only)
EPA 1631E Mod BAL-3100	Non-Potable Waters, Solids/Chemicals & Biological/Food	Total Mercury
EPA 1630 Mod BAL-3200	Non-Potable Waters, Solids/Chemicals Biological	Methyl Mercury
EPA 1632A Mod BAL-3300	Non-Potable Waters	Inorganic Arsenic (ISO Only)
	Biological/Food Solids/Chemicals	Inorganic Arsenic (ISO Only)
AOAC 2015.01 Mod BAL-5000	Food	As, Cd, Hg, Pb
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
	Biological by BAL-4117	Inorganic Arsenic, DMAs, MMAs (ISO Only)
BAL-4101	Food by BAL-4117	Inorganic Arsenic, DMAs, MMAs (ISO Only)
BAL-4201	Non-Potable Waters	Se(IV), Se(VI), SeCN, SeMet
BAL-4300	Non-Potable Waters, Solid/Chemicals	Cr(VI)
SM 3500-Fe BAL-4500	Non-Potable Waters	Fe, Fe(II) (ISO Only)
SM2340B	Non-Potable Waters	Hardness
SM 2540G BAL-0501	Solids/Chemicals & Biological	% Dry Weight

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
OU3-SB1-9.5-10-0322	2204012-01	Soil	Sample	03/30/2022	04/01/2022
OU3-SB1-17-17.5-0322	2204012-02	Soil	Sample	03/30/2022	04/01/2022
OU3-SB2-9.5-10-0322	2204012-03	Soil	Sample	03/31/2022	04/01/2022
OU3-SB3-9.5-10-0322	2204012-04	Soil	Sample	03/31/2022	04/01/2022
OU3-SB4-9.5-10-0322	2204012-05	Soil	QC Sample	03/30/2022	04/01/2022
OU3-SB5-10.5-11-0322	2204012-06	Soil	Sample	03/31/2022	04/01/2022
OU3-SB6-9.5-10-0322	2204012-07	Soil	Sample	03/30/2022	04/01/2022
OU3-SB7-9.5-10-0322	2204012-08	Soil	Sample	03/30/2022	04/01/2022

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
%TS	Biota	SOP BAL-0501	04/13/2022	04/14/2022	B220822	N/A
Al(WEN2)	Soil/Sediment	In-House	04/14/2022	04/18/2022	B220847	S220457
Al(WEN2)	Soil/Sediment	In-House	04/19/2022	04/20/2022	B220885	S220457
Al(WEN3)	Soil/Sediment	In-House	04/14/2022	04/22/2022	B220848	S220457
Al(WEN4)	Soil/Sediment	In-House	04/14/2022	04/27/2022	B220849	S220487
Al(WEN5)	Soil/Sediment	In-House	04/28/2022	04/29/2022	B220850	S220487
Al(WEN6)	Soil/Sediment	In-House	05/06/2022	05/10/2022	B220851	S220526
As	Soil/Sediment	EPA 6020B Mod	04/26/2022	04/27/2022	B220912	S220481
As(WEN2)	Soil/Sediment	In-House	04/14/2022	04/18/2022	B220847	S220457
As(WEN2)	Soil/Sediment	In-House	04/19/2022	04/21/2022	B220885	S220457
As(WEN3)	Soil/Sediment	In-House	04/14/2022	04/22/2022	B220848	S220457
As(WEN4)	Soil/Sediment	In-House	04/14/2022	04/27/2022	B220849	S220487
As(WEN5)	Soil/Sediment	In-House	04/28/2022	04/29/2022	B220850	S220487
As(WEN6)	Soil/Sediment	In-House	05/06/2022	05/09/2022	B220851	S220524
Fe(WEN2)	Soil/Sediment	In-House	04/14/2022	04/18/2022	B220847	S220457
Fe(WEN2)	Soil/Sediment	In-House	04/19/2022	04/20/2022	B220885	S220457
Fe(WEN3)	Soil/Sediment	In-House	04/14/2022	04/22/2022	B220848	S220457
Fe(WEN4)	Soil/Sediment	In-House	04/14/2022	04/27/2022	B220849	S220487
Fe(WEN5)	Soil/Sediment	In-House	04/28/2022	04/29/2022	B220850	S220487
Fe(WEN6)	Soil/Sediment	In-House	05/06/2022	05/09/2022	B220851	S220524
Fe(WEN6)	Soil/Sediment	In-House	05/06/2022	05/10/2022	B220851	S220526
Mn(WEN2)	Soil/Sediment	In-House	04/14/2022	04/18/2022	B220847	S220457
Mn(WEN2)	Soil/Sediment	In-House	04/19/2022	04/20/2022	B220885	S220457
Mn(WEN3)	Soil/Sediment	In-House	04/14/2022	04/22/2022	B220848	S220457
Mn(WEN4)	Soil/Sediment	In-House	04/14/2022	04/27/2022	B220849	S220487
Mn(WEN5)	Soil/Sediment	In-House	04/28/2022	04/29/2022	B220850	S220487
Mn(WEN6)	Soil/Sediment	In-House	05/06/2022	05/09/2022	B220851	S220524
Mn(WEN6)	Soil/Sediment	In-House	05/06/2022	05/10/2022	B220851	S220526
Si(WEN2)	Soil/Sediment	In-House	04/14/2022	04/18/2022	B220847	S220457
Si(WEN2)	Soil/Sediment	In-House	04/19/2022	04/20/2022	B220885	S220457
Si(WEN3)	Soil/Sediment	In-House	04/14/2022	04/22/2022	B220848	S220457
Si(WEN4)	Soil/Sediment	In-House	04/14/2022	04/27/2022	B220849	S220487
Si(WEN5)	Soil/Sediment	In-House	04/28/2022	05/02/2022	B220963	S220507
Si(WEN6)	Soil/Sediment	In-House	05/06/2022	05/10/2022	B220851	S220526

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
OU3-SB1-9.5-10-0322										
2204012-01	%TS	Soil	NA	73.68		0.009	0.03	%	B220822	N/A
2204012-01	Al(WEN2)	Soil	dry	0.558		0.203	0.406	mg/kg	B220847	S220457
2204012-01	Al(WEN3)	Soil	dry	475		0.389	0.778	mg/kg	B220848	S220457
2204012-01	Al(WEN4)	Soil	dry	604		0.306	0.611	mg/kg	B220849	S220487
2204012-01	Al(WEN5)	Soil	dry	9480		0.750	1.50	mg/kg	B220850	S220487
2204012-01	Al(WEN6)	Soil	dry	66900		306	611	mg/kg	B220851	S220526
2204012-01	As	Soil	dry	42.8		0.055	0.129	mg/kg	B220912	S220481
2204012-01	As(WEN2)	Soil	dry	25.7		0.008	0.028	mg/kg	B220847	S220457
2204012-01	As(WEN3)	Soil	dry	1.11		0.003	0.028	mg/kg	B220848	S220457
2204012-01	As(WEN4)	Soil	dry	1.87		0.006	0.028	mg/kg	B220849	S220487
2204012-01	As(WEN5)	Soil	dry	6.65		0.006	0.056	mg/kg	B220850	S220487
2204012-01	As(WEN6)	Soil	dry	1.81		0.006	0.056	mg/kg	B220851	S220524
2204012-01	Fe(WEN2)	Soil	dry	135		0.361	0.723	mg/kg	B220847	S220457
2204012-01	Fe(WEN3)	Soil	dry	4650		0.750	1.50	mg/kg	B220848	S220457
2204012-01	Fe(WEN4)	Soil	dry	1660		1.31	2.61	mg/kg	B220849	S220487
2204012-01	Fe(WEN5)	Soil	dry	6300		0.889	1.78	mg/kg	B220850	S220487
2204012-01	Fe(WEN6)	Soil	dry	15200		5.56	11.1	mg/kg	B220851	S220524
2204012-01	Mn(WEN2)	Soil	dry	0.608		0.008	0.028	mg/kg	B220847	S220457
2204012-01	Mn(WEN3)	Soil	dry	6.37		0.147	0.295	mg/kg	B220848	S220457
2204012-01	Mn(WEN4)	Soil	dry	6.36		0.131	0.261	mg/kg	B220849	S220487
2204012-01	Mn(WEN5)	Soil	dry	59.5		0.028	0.056	mg/kg	B220850	S220487
2204012-01	Mn(WEN6)	Soil	dry	329		0.645	1.29	mg/kg	B220851	S220526
2204012-01	Si(WEN2)	Soil	dry	928		0.778	2.78	mg/kg	B220847	S220457
2204012-01	Si(WEN3)	Soil	dry	276		4.45	27.8	mg/kg	B220848	S220457
2204012-01	Si(WEN4)	Soil	dry	341		12.8	25.6	mg/kg	B220849	S220487
2204012-01	Si(WEN5)	Soil	dry	57.2	J	52.8	106	mg/kg	B220963	S220507
2204012-01	Si(WEN6)	Soil	dry	239000		22000	43900	mg/kg	B220851	S220526

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
OU3-SB1-17-17.5-0322										
2204012-02	%TS	Soil	NA	85.28		0.006	0.02	%	B220822	N/A
2204012-02	Al(WEN2)	Soil	dry	6.87		0.176	0.351	mg/kg	B220847	S220457
2204012-02	Al(WEN3)	Soil	dry	153		0.337	0.673	mg/kg	B220848	S220457
2204012-02	Al(WEN4)	Soil	dry	231		0.265	0.529	mg/kg	B220849	S220487
2204012-02	Al(WEN5)	Soil	dry	4210		0.649	1.30	mg/kg	B220850	S220487
2204012-02	Al(WEN6)	Soil	dry	67300		265	529	mg/kg	B220851	S220526
2204012-02	As	Soil	dry	16.1		0.051	0.120	mg/kg	B220912	S220481
2204012-02	As(WEN2)	Soil	dry	5.31		0.006	0.024	mg/kg	B220847	S220457
2204012-02	As(WEN3)	Soil	dry	2.49		0.002	0.024	mg/kg	B220848	S220457
2204012-02	As(WEN4)	Soil	dry	0.799		0.005	0.024	mg/kg	B220849	S220487
2204012-02	As(WEN5)	Soil	dry	5.57		0.005	0.048	mg/kg	B220850	S220487
2204012-02	As(WEN6)	Soil	dry	1.27		0.006	0.048	mg/kg	B220851	S220524
2204012-02	Fe(WEN2)	Soil	dry	40.0		0.313	0.625	mg/kg	B220847	S220457
2204012-02	Fe(WEN3)	Soil	dry	2100		0.649	1.30	mg/kg	B220848	S220457
2204012-02	Fe(WEN4)	Soil	dry	1100		1.13	2.26	mg/kg	B220849	S220487
2204012-02	Fe(WEN5)	Soil	dry	6990		0.770	1.54	mg/kg	B220850	S220487
2204012-02	Fe(WEN6)	Soil	dry	26300		19.2	38.5	mg/kg	B220851	S220526
2204012-02	Mn(WEN2)	Soil	dry	1.15		0.007	0.024	mg/kg	B220847	S220457
2204012-02	Mn(WEN3)	Soil	dry	8.44		0.127	0.255	mg/kg	B220848	S220457
2204012-02	Mn(WEN4)	Soil	dry	3.32		0.113	0.226	mg/kg	B220849	S220487
2204012-02	Mn(WEN5)	Soil	dry	66.7		0.024	0.048	mg/kg	B220850	S220487
2204012-02	Mn(WEN6)	Soil	dry	547		0.558	1.12	mg/kg	B220851	S220526
2204012-02	Si(WEN2)	Soil	dry	25.2		0.673	2.40	mg/kg	B220847	S220457
2204012-02	Si(WEN3)	Soil	dry	58.7		3.85	24.0	mg/kg	B220848	S220457
2204012-02	Si(WEN4)	Soil	dry	123		11.1	22.1	mg/kg	B220849	S220487
2204012-02	Si(WEN5)	Soil	dry	54.2	J	45.7	91.4	mg/kg	B220963	S220507
2204012-02	Si(WEN6)	Soil	dry	228000		19000	38000	mg/kg	B220851	S220526

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
OU3-SB2-9.5-10-0322										
2204012-03	%TS	Soil	NA	62.57		0.005	0.02	%	B220822	N/A
2204012-03	Al(WEN2)	Soil	dry	160		0.211	0.423	mg/kg	B220847	S220457
2204012-03	Al(WEN3)	Soil	dry	546		0.405	0.811	mg/kg	B220848	S220457
2204012-03	Al(WEN4)	Soil	dry	513		0.318	0.637	mg/kg	B220849	S220487
2204012-03	Al(WEN5)	Soil	dry	9760		0.782	1.56	mg/kg	B220850	S220487
2204012-03	Al(WEN6)	Soil	dry	63600		318	637	mg/kg	B220851	S220526
2204012-03	As	Soil	dry	28.6		0.070	0.164	mg/kg	B220912	S220481
2204012-03	As(WEN2)	Soil	dry	12.1		0.008	0.029	mg/kg	B220847	S220457
2204012-03	As(WEN3)	Soil	dry	1.39		0.003	0.029	mg/kg	B220848	S220457
2204012-03	As(WEN4)	Soil	dry	1.70		0.006	0.029	mg/kg	B220849	S220487
2204012-03	As(WEN5)	Soil	dry	14.9		0.006	0.058	mg/kg	B220850	S220487
2204012-03	As(WEN6)	Soil	dry	2.95		0.007	0.058	mg/kg	B220851	S220524
2204012-03	Fe(WEN2)	Soil	dry	789		0.376	0.753	mg/kg	B220847	S220457
2204012-03	Fe(WEN3)	Soil	dry	5890		0.782	1.56	mg/kg	B220848	S220457
2204012-03	Fe(WEN4)	Soil	dry	2340		1.36	2.72	mg/kg	B220849	S220487
2204012-03	Fe(WEN5)	Soil	dry	7720		0.926	1.85	mg/kg	B220850	S220487
2204012-03	Fe(WEN6)	Soil	dry	12400		5.79	11.6	mg/kg	B220851	S220524
2204012-03	Mn(WEN2)	Soil	dry	2.51		0.009	0.029	mg/kg	B220847	S220457
2204012-03	Mn(WEN3)	Soil	dry	11.8		0.153	0.307	mg/kg	B220848	S220457
2204012-03	Mn(WEN4)	Soil	dry	7.63		0.136	0.272	mg/kg	B220849	S220487
2204012-03	Mn(WEN5)	Soil	dry	58.2		0.029	0.058	mg/kg	B220850	S220487
2204012-03	Mn(WEN6)	Soil	dry	259		0.168	0.336	mg/kg	B220851	S220524
2204012-03	Si(WEN2)	Soil	dry	1120		0.811	2.90	mg/kg	B220847	S220457
2204012-03	Si(WEN3)	Soil	dry	236		4.63	29.0	mg/kg	B220848	S220457
2204012-03	Si(WEN4)	Soil	dry	406		13.3	26.6	mg/kg	B220849	S220487
2204012-03	Si(WEN5)	Soil	dry	76.9	J	55.0	110	mg/kg	B220963	S220507
2204012-03	Si(WEN6)	Soil	dry	249000		22900	45700	mg/kg	B220851	S220526

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
OU3-SB3-9.5-10-0322										
2204012-04	%TS	Soil	NA	55.29		0.006	0.02	%	B220822	N/A
2204012-04	Al(WEN2)	Soil	dry	1.59		0.229	0.458	mg/kg	B220847	S220457
2204012-04	Al(WEN3)	Soil	dry	1800		0.440	0.879	mg/kg	B220848	S220457
2204012-04	Al(WEN4)	Soil	dry	1160		0.345	0.691	mg/kg	B220849	S220487
2204012-04	Al(WEN5)	Soil	dry	10800		0.848	1.70	mg/kg	B220850	S220487
2204012-04	Al(WEN6)	Soil	dry	77200		345	691	mg/kg	B220851	S220526
2204012-04	As	Soil	dry	51.4		0.079	0.185	mg/kg	B220912	S220481
2204012-04	As(WEN2)	Soil	dry	5.30		0.008	0.031	mg/kg	B220847	S220457
2204012-04	As(WEN3)	Soil	dry	1.19		0.003	0.031	mg/kg	B220848	S220457
2204012-04	As(WEN4)	Soil	dry	4.74		0.007	0.031	mg/kg	B220849	S220487
2204012-04	As(WEN5)	Soil	dry	8.81		0.006	0.063	mg/kg	B220850	S220487
2204012-04	As(WEN6)	Soil	dry	2.51		0.007	0.063	mg/kg	B220851	S220524
2204012-04	Fe(WEN2)	Soil	dry	117		0.408	0.816	mg/kg	B220847	S220457
2204012-04	Fe(WEN3)	Soil	dry	5510		0.848	1.70	mg/kg	B220848	S220457
2204012-04	Fe(WEN4)	Soil	dry	2890		1.48	2.95	mg/kg	B220849	S220487
2204012-04	Fe(WEN5)	Soil	dry	7030		1.00	2.01	mg/kg	B220850	S220487
2204012-04	Fe(WEN6)	Soil	dry	16900		25.1	50.2	mg/kg	B220851	S220526
2204012-04	Mn(WEN2)	Soil	dry	3.76		0.009	0.031	mg/kg	B220847	S220457
2204012-04	Mn(WEN3)	Soil	dry	17.7		0.166	0.333	mg/kg	B220848	S220457
2204012-04	Mn(WEN4)	Soil	dry	11.7		0.148	0.295	mg/kg	B220849	S220487
2204012-04	Mn(WEN5)	Soil	dry	72.5		0.031	0.063	mg/kg	B220850	S220487
2204012-04	Mn(WEN6)	Soil	dry	346		0.182	0.364	mg/kg	B220851	S220524
2204012-04	Si(WEN2)	Soil	dry	1370		0.879	3.14	mg/kg	B220847	S220457
2204012-04	Si(WEN3)	Soil	dry	584		5.02	31.4	mg/kg	B220848	S220457
2204012-04	Si(WEN4)	Soil	dry	656		14.4	28.9	mg/kg	B220849	S220487
2204012-04	Si(WEN5)	Soil	dry	70.8	J	59.7	119	mg/kg	B220963	S220507
2204012-04	Si(WEN6)	Soil	dry	264000		24800	49600	mg/kg	B220851	S220526

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
OU3-SB4-9.5-10-0322										
2204012-05	%TS	Soil	NA	60.07		0.006	0.02	%	B220822	N/A
2204012-05	Al(WEN2)	Soil	dry	2.25	M	0.222	0.444	mg/kg	B220847	S220457
2204012-05	Al(WEN3)	Soil	dry	4440		0.426	0.852	mg/kg	B220848	S220457
2204012-05	Al(WEN4)	Soil	dry	897	M	0.335	0.670	mg/kg	B220849	S220487
2204012-05	Al(WEN5)	Soil	dry	15700	M	0.822	1.64	mg/kg	B220850	S220487
2204012-05	Al(WEN6)	Soil	dry	64800		335	670	mg/kg	B220851	S220526
2204012-05	As	Soil	dry	33.9		0.071	0.166	mg/kg	B220912	S220481
2204012-05	As(WEN2)	Soil	dry	18.4		0.008	0.030	mg/kg	B220847	S220457
2204012-05	As(WEN3)	Soil	dry	3.55	M	0.003	0.030	mg/kg	B220848	S220457
2204012-05	As(WEN4)	Soil	dry	4.56	M	0.006	0.030	mg/kg	B220849	S220487
2204012-05	As(WEN5)	Soil	dry	10.9	M	0.006	0.061	mg/kg	B220850	S220487
2204012-05	As(WEN6)	Soil	dry	2.72		0.007	0.061	mg/kg	B220851	S220524
2204012-05	Fe(WEN2)	Soil	dry	40.1		0.396	0.792	mg/kg	B220847	S220457
2204012-05	Fe(WEN3)	Soil	dry	12300	M	3.29	6.58	mg/kg	B220848	S220457
2204012-05	Fe(WEN4)	Soil	dry	1650	M	1.43	2.86	mg/kg	B220849	S220487
2204012-05	Fe(WEN5)	Soil	dry	10800	M	3.90	7.79	mg/kg	B220850	S220487
2204012-05	Fe(WEN6)	Soil	dry	12800		6.09	12.2	mg/kg	B220851	S220524
2204012-05	Mn(WEN2)	Soil	dry	2.40	M	0.009	0.030	mg/kg	B220847	S220457
2204012-05	Mn(WEN3)	Soil	dry	45.9		0.161	0.323	mg/kg	B220848	S220457
2204012-05	Mn(WEN4)	Soil	dry	6.40	M	0.143	0.286	mg/kg	B220849	S220487
2204012-05	Mn(WEN5)	Soil	dry	111		0.030	0.061	mg/kg	B220850	S220487
2204012-05	Mn(WEN6)	Soil	dry	254		0.177	0.353	mg/kg	B220851	S220524
2204012-05	Si(WEN2)	Soil	dry	2720		0.852	3.04	mg/kg	B220847	S220457
2204012-05	Si(WEN3)	Soil	dry	1010		4.87	30.4	mg/kg	B220848	S220457
2204012-05	Si(WEN4)	Soil	dry	507		14.0	28.0	mg/kg	B220849	S220487
2204012-05	Si(WEN5)	Soil	dry	170		57.8	116	mg/kg	B220963	S220507
2204012-05	Si(WEN6)	Soil	dry	242000		24000	48100	mg/kg	B220851	S220526

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
OU3-SB5-10.5-11-0322										
2204012-06	%TS	Soil	NA	56.22		0.006	0.02	%	B220822	N/A
2204012-06	Al(WEN2)	Soil	dry	133		0.227	0.453	mg/kg	B220847	S220457
2204012-06	Al(WEN3)	Soil	dry	1030		0.435	0.869	mg/kg	B220848	S220457
2204012-06	Al(WEN4)	Soil	dry	1200		0.342	0.683	mg/kg	B220849	S220487
2204012-06	Al(WEN5)	Soil	dry	10700		0.838	1.68	mg/kg	B220850	S220487
2204012-06	Al(WEN6)	Soil	dry	60600		342	683	mg/kg	B220851	S220526
2204012-06	As	Soil	dry	9.99		0.073	0.171	mg/kg	B220912	S220481
2204012-06	As(WEN2)	Soil	dry	2.79		0.008	0.031	mg/kg	B220847	S220457
2204012-06	As(WEN3)	Soil	dry	0.449		0.003	0.031	mg/kg	B220848	S220457
2204012-06	As(WEN4)	Soil	dry	0.413		0.007	0.031	mg/kg	B220849	S220487
2204012-06	As(WEN5)	Soil	dry	5.10		0.006	0.062	mg/kg	B220850	S220487
2204012-06	As(WEN6)	Soil	dry	1.58		0.007	0.062	mg/kg	B220851	S220524
2204012-06	Fe(WEN2)	Soil	dry	324		0.404	0.807	mg/kg	B220847	S220457
2204012-06	Fe(WEN3)	Soil	dry	2570		0.838	1.68	mg/kg	B220848	S220457
2204012-06	Fe(WEN4)	Soil	dry	2360		1.46	2.92	mg/kg	B220849	S220487
2204012-06	Fe(WEN5)	Soil	dry	11900		0.994	1.99	mg/kg	B220850	S220487
2204012-06	Fe(WEN6)	Soil	dry	11000		6.21	12.4	mg/kg	B220851	S220524
2204012-06	Mn(WEN2)	Soil	dry	7.02		0.009	0.031	mg/kg	B220847	S220457
2204012-06	Mn(WEN3)	Soil	dry	14.4		0.165	0.329	mg/kg	B220848	S220457
2204012-06	Mn(WEN4)	Soil	dry	12.9		0.146	0.292	mg/kg	B220849	S220487
2204012-06	Mn(WEN5)	Soil	dry	87.7		0.031	0.062	mg/kg	B220850	S220487
2204012-06	Mn(WEN6)	Soil	dry	207		0.180	0.360	mg/kg	B220851	S220524
2204012-06	Si(WEN2)	Soil	dry	727		0.869	3.11	mg/kg	B220847	S220457
2204012-06	Si(WEN3)	Soil	dry	249		4.97	31.1	mg/kg	B220848	S220457
2204012-06	Si(WEN4)	Soil	dry	648		14.3	28.6	mg/kg	B220849	S220487
2204012-06	Si(WEN5)	Soil	dry	101	J	59.0	118	mg/kg	B220963	S220507
2204012-06	Si(WEN6)	Soil	dry	238000		24500	49100	mg/kg	B220851	S220526

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
OU3-SB6-9.5-10-0322										
2204012-07	%TS	Soil	NA	59.18		0.005	0.02	%	B220822	N/A
2204012-07	Al(WEN2)	Soil	dry	96.2		0.199	0.398	mg/kg	B220847	S220457
2204012-07	Al(WEN3)	Soil	dry	544		0.382	0.764	mg/kg	B220848	S220457
2204012-07	Al(WEN4)	Soil	dry	679		0.300	0.600	mg/kg	B220849	S220487
2204012-07	Al(WEN5)	Soil	dry	7830		0.736	1.47	mg/kg	B220850	S220487
2204012-07	Al(WEN6)	Soil	dry	55100		300	600	mg/kg	B220851	S220526
2204012-07	As	Soil	dry	1270		0.303	0.707	mg/kg	B220912	S220481
2204012-07	As(WEN2)	Soil	dry	62.5		0.007	0.027	mg/kg	B220847	S220457
2204012-07	As(WEN3)	Soil	dry	2.22		0.003	0.027	mg/kg	B220848	S220457
2204012-07	As(WEN4)	Soil	dry	5.70		0.006	0.027	mg/kg	B220849	S220487
2204012-07	As(WEN5)	Soil	dry	516		0.022	0.218	mg/kg	B220850	S220487
2204012-07	As(WEN6)	Soil	dry	28.6		0.006	0.055	mg/kg	B220851	S220524
2204012-07	Fe(WEN2)	Soil	dry	536		0.355	0.709	mg/kg	B220847	S220457
2204012-07	Fe(WEN3)	Soil	dry	3180		0.736	1.47	mg/kg	B220848	S220457
2204012-07	Fe(WEN4)	Soil	dry	2500		1.28	2.56	mg/kg	B220849	S220487
2204012-07	Fe(WEN5)	Soil	dry	4150		0.873	1.75	mg/kg	B220850	S220487
2204012-07	Fe(WEN6)	Soil	dry	9750		5.45	10.9	mg/kg	B220851	S220524
2204012-07	Mn(WEN2)	Soil	dry	2.62		0.008	0.027	mg/kg	B220847	S220457
2204012-07	Mn(WEN3)	Soil	dry	3.35		0.145	0.289	mg/kg	B220848	S220457
2204012-07	Mn(WEN4)	Soil	dry	10.5		0.128	0.256	mg/kg	B220849	S220487
2204012-07	Mn(WEN5)	Soil	dry	33.8		0.027	0.055	mg/kg	B220850	S220487
2204012-07	Mn(WEN6)	Soil	dry	183		0.158	0.316	mg/kg	B220851	S220524
2204012-07	Si(WEN2)	Soil	dry	1070		0.764	2.73	mg/kg	B220847	S220457
2204012-07	Si(WEN3)	Soil	dry	180		4.36	27.3	mg/kg	B220848	S220457
2204012-07	Si(WEN4)	Soil	dry	554		12.5	25.1	mg/kg	B220849	S220487
2204012-07	Si(WEN5)	Soil	dry	66.3	J	51.8	104	mg/kg	B220963	S220507
2204012-07	Si(WEN6)	Soil	dry	218000		21500	43100	mg/kg	B220851	S220526

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
OU3-SB7-9.5-10-0322										
2204012-08	%TS	Soil	NA	58.70		0.006	0.02	%	B220822	N/A
2204012-08	Al(WEN2)	Soil	dry	41.0		0.434	0.869	mg/kg	B220885	S220457
2204012-08	Al(WEN3)	Soil	dry	3150		0.405	0.811	mg/kg	B220848	S220457
2204012-08	Al(WEN4)	Soil	dry	1390		0.318	0.637	mg/kg	B220849	S220487
2204012-08	Al(WEN5)	Soil	dry	13200		0.782	1.56	mg/kg	B220850	S220487
2204012-08	Al(WEN6)	Soil	dry	68400		318	637	mg/kg	B220851	S220526
2204012-08	As	Soil	dry	668		0.293	0.684	mg/kg	B220912	S220481
2204012-08	As(WEN2)	Soil	dry	173		0.014	0.116	mg/kg	B220885	S220457
2204012-08	As(WEN3)	Soil	dry	192		0.012	0.116	mg/kg	B220848	S220457
2204012-08	As(WEN4)	Soil	dry	38.5		0.006	0.029	mg/kg	B220849	S220487
2204012-08	As(WEN5)	Soil	dry	403		0.023	0.232	mg/kg	B220850	S220487
2204012-08	As(WEN6)	Soil	dry	23.9		0.007	0.058	mg/kg	B220851	S220524
2204012-08	Fe(WEN2)	Soil	dry	51.2		0.145	0.290	mg/kg	B220885	S220457
2204012-08	Fe(WEN3)	Soil	dry	3560		0.782	1.56	mg/kg	B220848	S220457
2204012-08	Fe(WEN4)	Soil	dry	2710		1.36	2.72	mg/kg	B220849	S220487
2204012-08	Fe(WEN5)	Soil	dry	6640		0.927	1.85	mg/kg	B220850	S220487
2204012-08	Fe(WEN6)	Soil	dry	10300		5.79	11.6	mg/kg	B220851	S220524
2204012-08	Mn(WEN2)	Soil	dry	4.27		0.012	0.029	mg/kg	B220885	S220457
2204012-08	Mn(WEN3)	Soil	dry	27.3		0.153	0.307	mg/kg	B220848	S220457
2204012-08	Mn(WEN4)	Soil	dry	14.7		0.136	0.272	mg/kg	B220849	S220487
2204012-08	Mn(WEN5)	Soil	dry	65.8		0.029	0.058	mg/kg	B220850	S220487
2204012-08	Mn(WEN6)	Soil	dry	197		0.168	0.336	mg/kg	B220851	S220524
2204012-08	Si(WEN2)	Soil	dry	945		1.42	2.90	mg/kg	B220885	S220457
2204012-08	Si(WEN3)	Soil	dry	748		4.63	29.0	mg/kg	B220848	S220457
2204012-08	Si(WEN4)	Soil	dry	576		13.3	26.6	mg/kg	B220849	S220487
2204012-08	Si(WEN5)	Soil	dry	103	J	55.0	110	mg/kg	B220963	S220507
2204012-08	Si(WEN6)	Soil	dry	264000		22900	45700	mg/kg	B220851	S220526

Accuracy & Precision Summary

Batch: B220822
Lab Matrix: Biota
Method: SOP BAL-0501

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220822-DUP1	**Duplicate, (2204012-05)**						
	%TS	60.07		60.19	%		0.2% 15

Accuracy & Precision Summary

Batch: B220847
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B220847-SRM1	**Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)**								
	Al(WEN2)		132800	2.505	mg/kg	*0.002%*	75-125		
	As(WEN2)		186.2	36.73	mg/kg	*20%*	75-125		
	Fe(WEN2)		104900	ND	mg/kg	NR	75-125	N/C	
	Mn(WEN2)		240.2	3.928	mg/kg	*2%*	75-125		
	Si(WEN2)		213000	182.7	mg/kg	*0.09%*	N/A		
B220847-SRM2	**Reference Material (2041047, NIST 2702 Inorganics in Marine Sediment)**								
	Al(WEN2)		84100	3.708	mg/kg	*0.004%*	75-125		
	As(WEN2)		45.30	2.600	mg/kg	*6%*	75-125		
	Fe(WEN2)		74000	3.376	mg/kg	*0.005%*	N/A		
B220847-SRM3	**Reference Material (2005027, CRM052-50G Loamy Clay)**								
	Al(WEN2)		12650	14.35	mg/kg	*0.1%*	75-125		
	As(WEN2)		202.0	33.00	mg/kg	*16%*	75-125		
	Fe(WEN2)		9977	1.232	mg/kg	*0.01%*	75-125		
	Mn(WEN2)		1127	27.23	mg/kg	*2%*	75-125		
B220847-SRM4	**Reference Material (2041047, NIST 2702 Inorganics in Marine Sediment)**								
	Mn(WEN2)		1757	136.0	mg/kg	*8%*	75-125		
B220847-DUP1	**Duplicate, (2204012-05)**								
	Al(WEN2)	2.248		1.480	mg/kg			*41%*	25
	As(WEN2)	18.45		20.44	mg/kg			10%	35
	Fe(WEN2)	40.12		39.89	mg/kg			0.6%	25
	Mn(WEN2)	2.397		3.492	mg/kg			*37%*	25
	Si(WEN2)	2717		2571	mg/kg			6%	25
B220847-PS1	**Post Spike, (2204012-05)**								
	Al(WEN2)	2.248	76.11	76.48	mg/kg	98%	75-125		
	As(WEN2)	18.45	7.611	29.22	mg/kg	*142%*	75-125		
	Fe(WEN2)	40.12	76.11	109.7	mg/kg	91%	75-125		
	Mn(WEN2)	2.397	7.611	9.581	mg/kg	94%	75-125		
	Si(WEN2)	2717	761.1	4090	mg/kg	*180%*	75-125		

Accuracy & Precision Summary

Batch: B220847
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits
B220847-PS2	**Post Spike, (2204012-05)**							
	Al(WEN2)	2.248	76.11	78.13	mg/kg	100%	75-125	
	As(WEN2)	18.45	7.611	25.01	mg/kg	86%	75-125	
	Fe(WEN2)	40.12	76.11	111.2	mg/kg	93%	75-125	
	Mn(WEN2)	2.397	7.611	9.702	mg/kg	96%	75-125	
	Si(WEN2)	2717	761.1	3379	mg/kg	87%	75-125	

Accuracy & Precision Summary

Batch: B220848
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits
B220848-SRM1	**Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)**							
	Al(WEN3)		132800	1838	mg/kg	*1%*	75-125	
	As(WEN3)		186.2	98.73	mg/kg	*53%*	75-125	
	Mn(WEN3)		240.2	30.07	mg/kg	*13%*	75-125	
	Si(WEN3)		213000	1308	mg/kg	*0.6%*	N/A	
B220848-SRM2	**Reference Material (2041047, NIST 2702 Inorganics in Marine Sediment)**							
	Al(WEN3)		84100	586.4	mg/kg	*0.7%*	75-125	
	As(WEN3)		45.30	4.635	mg/kg	*10%*	75-125	
B220848-SRM3	**Reference Material (2005027, CRM052-50G Loamy Clay)**							
	Al(WEN3)		12650	1183	mg/kg	*9%*	75-125	
	Fe(WEN3)		9977	762.4	mg/kg	*8%*	75-125	
	Mn(WEN3)		1127	39.37	mg/kg	*3%*	75-125	
B220848-SRM4	**Reference Material (2005027, CRM052-50G Loamy Clay)**							
	Al(WEN3)		12650	1132	mg/kg	*9%*	75-125	
	Fe(WEN3)		9977	750.2	mg/kg	*8%*	75-125	
	Mn(WEN3)		1127	41.16	mg/kg	*4%*	75-125	
B220848-SRM5	**Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)**							
	Fe(WEN3)		104900	20310	mg/kg	*19%*	75-125	
B220848-SRM6	**Reference Material (2041047, NIST 2702 Inorganics in Marine Sediment)**							
	Fe(WEN3)		74000	5519	mg/kg	7%	N/A	
	Mn(WEN3)		1757	166.9	mg/kg	*10%*	75-125	
B220848-SRM7	**Reference Material (2005027, CRM052-50G Loamy Clay)**							
	As(WEN3)		202.0	129.6	mg/kg	*64%*	75-125	
B220848-SRM8	**Reference Material (2005027, CRM052-50G Loamy Clay)**							
	As(WEN3)		202.0	126.4	mg/kg	*63%*	75-125	

Accuracy & Precision Summary

Batch: B220848
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220848-DUP1	**Duplicate, (2204012-05)**						
	Al(WEN3)	4440		4394	mg/kg		1% 25
	As(WEN3)	3.554		14.01	mg/kg		*119%* 35
	Mn(WEN3)	45.94		50.47	mg/kg		9% 25
	Si(WEN3)	1008		1149	mg/kg		13% 25
B220848-DUP2	**Duplicate, (2204012-05)**						
	Fe(WEN3)	12280		16800	mg/kg		*31%* 25
B220848-PS1	**Post Spike, (2204012-05)**						
	Al(WEN3)	4440	76.11	4470	mg/kg	NR 75-125	
	As(WEN3)	3.554	7.611	9.996	mg/kg	85% 75-125	
	Mn(WEN3)	45.94	7.611	52.36	mg/kg	NR 75-125	
	Si(WEN3)	1008	761.1	1671	mg/kg	87% 75-125	
B220848-PS2	**Post Spike, (2204012-05)**						
	Al(WEN3)	4440	76.11	4438	mg/kg	NR 75-125	
	As(WEN3)	3.554	7.611	10.04	mg/kg	85% 75-125	
	Mn(WEN3)	45.94	7.611	52.19	mg/kg	NR 75-125	
	Si(WEN3)	1008	761.1	1656	mg/kg	85% 75-125	
B220848-PS3	**Post Spike, (2204012-05)**						
	Fe(WEN3)	12280	304.4	12090	mg/kg	NR 75-125	
B220848-PS4	**Post Spike, (2204012-05)**						
	Fe(WEN3)	12280	304.4	12110	mg/kg	NR 75-125	

Accuracy & Precision Summary

Batch: B220849
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B220849-SRM1	**Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)**								
	Al(WEN4)		132800	1256	mg/kg	*0.9%*	75-125		
	As(WEN4)		186.2	4.986	mg/kg	*3%*	75-125		
	Fe(WEN4)		104900	3917	mg/kg	*4%*	75-125		
	Si(WEN4)		213000	443.7	mg/kg	*0.2%*	N/A		
B220849-SRM2	**Reference Material (2041047, NIST 2702 Inorganics in Marine Sediment)**								
	Al(WEN4)		84100	1570	mg/kg	*2%*	75-125		
	As(WEN4)		45.30	11.20	mg/kg	*25%*	75-125		
B220849-SRM3	**Reference Material (2005027, CRM052-50G Loamy Clay)**								
	Al(WEN4)		12650	299.2	mg/kg	*2%*	75-125		
	As(WEN4)		202.0	5.923	mg/kg	*3%*	75-125		
B220849-SRM4	**Reference Material (2005027, CRM052-50G Loamy Clay)**								
	Al(WEN4)		12650	296.5	mg/kg	*2%*	75-125		
	As(WEN4)		202.0	5.420	mg/kg	*3%*	75-125		
B220849-SRM5	**Reference Material (2041047, NIST 2702 Inorganics in Marine Sediment)**								
	Fe(WEN4)		74000	13700	mg/kg	19%	N/A		
	Mn(WEN4)		1757	259.2	mg/kg	*15%*	75-125		
B220849-SRM6	**Reference Material (2005027, CRM052-50G Loamy Clay)**								
	Fe(WEN4)		9977	6964	mg/kg	*70%*	75-125		
	Mn(WEN4)		1127	532.7	mg/kg	*47%*	75-125		
B220849-SRM7	**Reference Material (2005027, CRM052-50G Loamy Clay)**								
	Fe(WEN4)		9977	7336	mg/kg	*74%*	75-125		
	Mn(WEN4)		1127	587.3	mg/kg	*52%*	75-125		
B220849-DUP1	**Duplicate, (2204012-05)**								
	Al(WEN4)	896.8		1247	mg/kg			*33%*	25
	As(WEN4)	4.561		26.21	mg/kg			*141%*	35
	Fe(WEN4)	1654		2715	mg/kg			*49%*	25
	Mn(WEN4)	6.398		10.83	mg/kg			*51%*	25
	Si(WEN4)	507.4		614.8	mg/kg			19%	25

Accuracy & Precision Summary

Batch: B220849
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits
B220849-PS1	**Post Spike, (2204012-05)**							
	Al(WEN4)	896.8	76.11	913.9	mg/kg	NR	75-125	
	As(WEN4)	4.561	7.611	11.14	mg/kg	86%	75-125	
	Fe(WEN4)	1654	76.11	1642	mg/kg	NR	75-125	
	Mn(WEN4)	6.398	7.611	13.72	mg/kg	96%	75-125	
	Si(WEN4)	507.4	761.1	1193	mg/kg	90%	75-125	
B220849-PS2	**Post Spike, (2204012-05)**							
	Al(WEN4)	896.8	76.11	929.1	mg/kg	NR	75-125	
	As(WEN4)	4.561	7.611	11.40	mg/kg	90%	75-125	
	Fe(WEN4)	1654	76.11	1660	mg/kg	NR	75-125	
	Mn(WEN4)	6.398	7.611	13.02	mg/kg	87%	75-125	
	Si(WEN4)	507.4	761.1	1201	mg/kg	91%	75-125	

Accuracy & Precision Summary

Batch: B220850
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits
B220850-BS1	**Blank Spike, (2218063)**							
	Al(WEN5)		250.0	199.3	mg/kg	80%	75-125	
	As(WEN5)		25.00	21.64	mg/kg	87%	75-125	
	Fe(WEN5)		250.0	204.3	mg/kg	82%	75-125	
	Mn(WEN5)		25.00	23.09	mg/kg	92%	75-125	
B220850-SRM1	**Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)**							
	Al(WEN5)		132800	8328	mg/kg	*6%*	75-125	
	As(WEN5)		186.2	6.954	mg/kg	*4%*	75-125	
B220850-SRM2	**Reference Material (2041047, NIST 2702 Inorganics in Marine Sediment)**							
	As(WEN5)		45.30	12.55	mg/kg	*28%*	75-125	
B220850-SRM3	**Reference Material (2005027, CRM052-50G Loamy Clay)**							
	Al(WEN5)		12650	6320	mg/kg	*50%*	75-125	
	As(WEN5)		202.0	2.572	mg/kg	*1%*	75-125	
	Fe(WEN5)		9977	1368	mg/kg	*14%*	75-125	
B220850-SRM4	**Reference Material (2005027, CRM052-50G Loamy Clay)**							
	Al(WEN5)		12650	6115	mg/kg	*48%*	75-125	
	As(WEN5)		202.0	2.545	mg/kg	*1%*	75-125	
	Fe(WEN5)		9977	1356	mg/kg	*14%*	75-125	
B220850-SRM5	**Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)**							
	Fe(WEN5)		104900	19290	mg/kg	*18%*	75-125	
B220850-SRM6	**Reference Material (2041047, NIST 2702 Inorganics in Marine Sediment)**							
	Al(WEN5)		84100	14130	mg/kg	*17%*	75-125	
	Fe(WEN5)		74000	29110	mg/kg	39%	N/A	
	Mn(WEN5)		1757	575.3	mg/kg	*33%*	75-125	
B220850-SRM7	**Reference Material (2005027, CRM052-50G Loamy Clay)**							
	Mn(WEN5)		1127	486.7	mg/kg	*43%*	75-125	
B220850-SRM8	**Reference Material (2005027, CRM052-50G Loamy Clay)**							
	Mn(WEN5)		1127	510.7	mg/kg	*45%*	75-125	

Accuracy & Precision Summary

Batch: B220850
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220850-DUP1	**Duplicate, (2204012-05)**						
	Al(WEN5)	15750		11180	mg/kg		*34%* 25
	As(WEN5)	10.94		81.60	mg/kg		*153%* 35
	Mn(WEN5)	111.4		135.3	mg/kg		19% 25
B220850-DUP2	**Duplicate, (2204012-05)**						
	Fe(WEN5)	10830		22000	mg/kg		*68%* 25
B220850-PS1	**Post Spike, (2204012-05)**						
	Al(WEN5)	15750	152.2	15770	mg/kg	NR 75-125	
	As(WEN5)	10.94	15.22	24.23	mg/kg	87% 75-125	
	Mn(WEN5)	111.4	15.22	126.6	mg/kg	NR 75-125	
B220850-PS2	**Post Spike, (2204012-05)**						
	Al(WEN5)	15750	152.2	15600	mg/kg	NR 75-125	
	As(WEN5)	10.94	15.22	24.49	mg/kg	89% 75-125	
	Mn(WEN5)	111.4	15.22	124.9	mg/kg	NR 75-125	
B220850-PS3	**Post Spike, (2204012-05)**						
	Fe(WEN5)	10830	608.9	11210	mg/kg	NR 75-125	
B220850-PS4	**Post Spike, (2204012-05)**						
	Fe(WEN5)	10830	608.9	11410	mg/kg	NR 75-125	

Accuracy & Precision Summary

Batch: B220851
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220851-BS1	**Blank Spike, (2219029)**						
	Al(WEN6)		500.0	419.2	mg/kg	84% 75-125	
	As(WEN6)		50.00	44.13	mg/kg	88% 75-125	
	Fe(WEN6)		500.0	440.0	mg/kg	88% 75-125	
	Mn(WEN6)		50.00	45.87	mg/kg	92% 75-125	
	Si(WEN6)		2500	2143	mg/kg	86% 75-125	
B220851-SRM1	**Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)**						
	As(WEN6)		186.2	4.194	mg/kg	*2%* 75-125	
	Mn(WEN6)		240.2	148.9	mg/kg	*62%* 75-125	
B220851-SRM2	**Reference Material (2041047, NIST 2702 Inorganics in Marine Sediment)**						
	As(WEN6)		45.30	3.467	mg/kg	*8%* 75-125	
	Fe(WEN6)		74000	8365	mg/kg	*11%* 75-125	
	Mn(WEN6)		1757	76.26	mg/kg	*4%* 75-125	
B220851-SRM3	**Reference Material (2005027, CRM052-50G Loamy Clay)**						
	As(WEN6)		202.0	2.127	mg/kg	*1%* 75-125	
	Fe(WEN6)		9977	3103	mg/kg	*31%* 75-125	
	Mn(WEN6)		1127	15.81	mg/kg	*1%* 75-125	
B220851-SRM4	**Reference Material (2005027, CRM052-50G Loamy Clay)**						
	As(WEN6)		202.0	2.136	mg/kg	*1%* 75-125	
	Fe(WEN6)		9977	3248	mg/kg	*33%* 75-125	
	Mn(WEN6)		1127	14.15	mg/kg	*1%* 75-125	
B220851-SRM6	**Reference Material (2041047, NIST 2702 Inorganics in Marine Sediment)**						
	Al(WEN6)		84100	54180	mg/kg	*64%* 75-125	
B220851-SRM9	**Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)**						
	Al(WEN6)		132800	87100	mg/kg	*66%* 75-125	
	Fe(WEN6)		104900	44550	mg/kg	*42%* 75-125	
	Si(WEN6)		213000	163100	mg/kg	77% N/A	

Accuracy & Precision Summary

Batch: B220851
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220851-DUP1	**Duplicate, (2204012-05)**						
	As(WEN6)	2.721		13.89	mg/kg		*134%* 35
	Fe(WEN6)	12810		13720	mg/kg		7% 25
	Mn(WEN6)	254.0		247.6	mg/kg		3% 25
B220851-DUP2	**Duplicate, (2204012-05)**						
	Al(WEN6)	64830		60020	mg/kg		8% 25
	Si(WEN6)	242100		227500	mg/kg		6% 25
B220851-PS1	**Post Spike, (2204012-05)**						
	As(WEN6)	2.721	15.22	21.34	mg/kg	122% 75-125	
	Fe(WEN6)	12810	152.2	14330	mg/kg	NR 75-125	
	Mn(WEN6)	254.0	15.22	301.4	mg/kg	NR 75-125	
B220851-PS2	**Post Spike, (2204012-05)**						
	As(WEN6)	2.721	15.22	20.31	mg/kg	116% 75-125	
	Fe(WEN6)	12810	152.2	13780	mg/kg	NR 75-125	
	Mn(WEN6)	254.0	15.22	282.1	mg/kg	NR 75-125	
B220851-PS3	**Post Spike, (2204012-05)**						
	Al(WEN6)	64830	15220	73860	mg/kg	NR 75-125	
	Si(WEN6)	242100	152200	382400	mg/kg	92% 75-125	
B220851-PS4	**Post Spike, (2204012-05)**						
	Al(WEN6)	64830	15220	73380	mg/kg	NR 75-125	
	Si(WEN6)	242100	152200	360800	mg/kg	78% 75-125	

Accuracy & Precision Summary

Batch: B220885
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B220885-SRM1	**Reference Material (2005027, CRM052-50G Loamy Clay)**								
	Al(WEN2)		12650	14.34	mg/kg	*0.1%*	75-125		
	As(WEN2)		202.0	28.94	mg/kg	*14%*	75-125		
	Fe(WEN2)		9977	1.131	mg/kg	*0.01%*	75-125		
	Mn(WEN2)		1127	23.20	mg/kg	*2%*	75-125		
B220885-DUP1	**Duplicate, (2204012-08)**								
	Al(WEN2)	41.02		42.24	mg/kg			3%	25
	Fe(WEN2)	51.25		50.32	mg/kg			2%	25
	Mn(WEN2)	4.274		4.363	mg/kg			2%	25
	Si(WEN2)	945.1		946.5	mg/kg			0.1%	25
B220885-DUP2	**Duplicate, (2204012-08)**								
	As(WEN2)	172.8		169.4	mg/kg			2%	35
B220885-PS1	**Post Spike, (2204012-08)**								
	Al(WEN2)	41.02	289.5	288.0	mg/kg	85%	75-125		
	Fe(WEN2)	51.25	289.5	316.3	mg/kg	92%	75-125		
	Mn(WEN2)	4.274	28.95	29.26	mg/kg	86%	75-125		
	Si(WEN2)	945.1	2895	3187	mg/kg	77%	75-125		
B220885-PS2	**Post Spike, (2204012-08)**								
	Al(WEN2)	41.02	289.5	285.7	mg/kg	85%	75-125		
	Fe(WEN2)	51.25	289.5	313.5	mg/kg	91%	75-125		
	Mn(WEN2)	4.274	28.95	28.94	mg/kg	85%	75-125		
	Si(WEN2)	945.1	2895	3201	mg/kg	78%	75-125		
B220885-PS3	**Post Spike, (2204012-08)**								
	As(WEN2)	172.8	28.95	189.4	mg/kg	NR	75-125		
B220885-PS4	**Post Spike, (2204012-08)**								
	As(WEN2)	172.8	28.95	189.0	mg/kg	NR	75-125		

Accuracy & Precision Summary

Batch: B220912
Lab Matrix: Soil/Sediment
Method: EPA 6020B Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220912-BS1	**Blank Spike, (2116054)**						
	As		50.00	49.34	mg/kg	99% 75-125	
B220912-SRM1	**Reference Material (2005027, CRM052-50G Loamy Clay)**						
	As		202.0	211.9	mg/kg	105% 75-125	
B220912-DUP1	**Duplicate, (2204012-05)**						
	As	33.92		38.59	mg/kg		13% 30
B220912-MS1	**Matrix Spike, (2204012-05)**						
	As	33.92	79.34	121.7	mg/kg	111% 70-130	
B220912-MSD1	**Matrix Spike Duplicate, (2204012-05)**						
	As	33.92	80.70	112.8	mg/kg	98% 70-130	12% 30

Accuracy & Precision Summary

Batch: B220963
Lab Matrix: Soil/Sediment
Method: In-House

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B220963-BS1	**Blank Spike, (2218063)**						
	Si(WEN5)		2500	1592	mg/kg	*64%* 75-125	
B220963-SRM1	**Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)**						
	Si(WEN5)		213000	79.18	mg/kg	*0.04%* N/A	
B220963-DUP1	**Duplicate, (2204012-05)**						
	Si(WEN5)	170.2		73.16	mg/kg		*80%* 25
B220963-PS1	**Post Spike, (2204012-05)**						
	Si(WEN5)	170.2	1522	1450	mg/kg	84% 75-125	
B220963-PS2	**Post Spike, (2204012-05)**						
	Si(WEN5)	170.2	1522	1476	mg/kg	86% 75-125	

Method Blanks & Reporting Limits

Batch: B220822
Matrix: Biota
Method: SOP BAL-0501
Analyte: %TS

Sample	Result	Units
B220822-BLK1	-0.14	%
B220822-BLK2	-0.20	%
Average:	*-0.17*	
Limit:	0.10	

MDL: 0.03
MRL: 0.10

Method Blanks & Reporting Limits

Batch: B220847
Matrix: Soil/Sediment
Method: In-House
Analyte: Al(WEN2)

Sample	Result	Units
B220847-BLK1	0.133	mg/kg
B220847-BLK2	0.100	mg/kg
B220847-BLK3	0.112	mg/kg
B220847-BLK4	0.143	mg/kg

Average: 0.122
Limit: 0.365

MDL: 0.182
MRL: 0.365

Analyte: As(WEN2)

Sample	Result	Units
B220847-BLK1	0.006	mg/kg
B220847-BLK2	0.005	mg/kg
B220847-BLK3	0.005	mg/kg
B220847-BLK4	0.005	mg/kg

Average: 0.005
Limit: 0.025

MDL: 0.007
MRL: 0.025

Analyte: Fe(WEN2)

Sample	Result	Units
B220847-BLK1	0.242	mg/kg
B220847-BLK2	0.163	mg/kg
B220847-BLK3	0.165	mg/kg
B220847-BLK4	0.129	mg/kg

Average: 0.175
Limit: 0.650

MDL: 0.325
MRL: 0.650

Method Blanks & Reporting Limits

Analyte: Mn(WEN2)

Sample	Result	Units
B220847-BLK1	0.006	mg/kg
B220847-BLK2	0.005	mg/kg
B220847-BLK3	0.004	mg/kg
B220847-BLK4	0.005	mg/kg

Average: 0.005
Limit: 0.025

MDL: 0.008
MRL: 0.025

Analyte: Si(WEN2)

Sample	Result	Units
B220847-BLK1	-0.343	mg/kg
B220847-BLK2	-0.501	mg/kg
B220847-BLK3	-0.494	mg/kg
B220847-BLK4	-0.478	mg/kg

Average: -0.454
Limit: 2.500

Standard Deviation: 0.075
Limit: 0.700

MDL: 0.700
MRL: 2.50

Method Blanks & Reporting Limits

Batch: B220848
Matrix: Soil/Sediment
Method: In-House
Analyte: Al(WEN3)

Sample	Result	Units
B220848-BLK1	0.184	mg/kg
B220848-BLK2	0.140	mg/kg
B220848-BLK3	0.186	mg/kg
B220848-BLK4	0.204	mg/kg
B220848-BLK5	0.271	mg/kg

Average: 0.197
Limit: 0.700

MDL: 0.350
MRL: 0.700

Analyte: As(WEN3)

Sample	Result	Units
B220848-BLK1	0.001	mg/kg
B220848-BLK2	0.0008	mg/kg
B220848-BLK3	0.001	mg/kg
B220848-BLK4	-0.0001	mg/kg
B220848-BLK5	0.0006	mg/kg

Average: 0.001
Limit: 0.025

MDL: 0.002
MRL: 0.025

Analyte: Fe(WEN3)

Sample	Result	Units
B220848-BLK1	0.545	mg/kg
B220848-BLK2	0.618	mg/kg
B220848-BLK3	0.543	mg/kg
B220848-BLK4	0.547	mg/kg
B220848-BLK5	0.510	mg/kg

Average: 0.553
Limit: 1.350

MDL: 0.675
MRL: 1.35

Method Blanks & Reporting Limits

Analyte: Mn(WEN3)

Sample	Result	Units
B220848-BLK1	0.124	mg/kg
B220848-BLK2	0.125	mg/kg
B220848-BLK3	0.121	mg/kg
B220848-BLK4	0.122	mg/kg
B220848-BLK5	0.116	mg/kg

Average: 0.122
Limit: 0.265

MDL: 0.132
MRL: 0.265

Analyte: Si(WEN3)

Sample	Result	Units
B220848-BLK1	-1.22	mg/kg
B220848-BLK2	-0.439	mg/kg
B220848-BLK3	-0.473	mg/kg
B220848-BLK4	1.74	mg/kg
B220848-BLK5	-1.06	mg/kg

Average: -0.290
Limit: 25.000

Standard Deviation: 1.189
Limit: 4.000

MDL: 4.00
MRL: 25.0

Method Blanks & Reporting Limits

Batch: B220849
Matrix: Soil/Sediment
Method: In-House
Analyte: Al(WEN4)

Sample	Result	Units
B220849-BLK1	0.129	mg/kg
B220849-BLK2	0.077	mg/kg
B220849-BLK3	0.149	mg/kg
B220849-BLK4	0.188	mg/kg
B220849-BLK5	0.162	mg/kg

Average: 0.141
Limit: 0.550

MDL: 0.275
MRL: 0.550

Analyte: As(WEN4)

Sample	Result	Units
B220849-BLK1	0.003	mg/kg
B220849-BLK2	0.003	mg/kg
B220849-BLK3	0.002	mg/kg
B220849-BLK4	0.003	mg/kg
B220849-BLK5	0.004	mg/kg

Average: 0.003
Limit: 0.025

MDL: 0.005
MRL: 0.025

Analyte: Fe(WEN4)

Sample	Result	Units
B220849-BLK1	1.07	mg/kg
B220849-BLK2	0.969	mg/kg
B220849-BLK3	0.995	mg/kg
B220849-BLK4	0.930	mg/kg
B220849-BLK5	0.912	mg/kg

Average: 0.974
Limit: 2.350

MDL: 1.18
MRL: 2.35

Method Blanks & Reporting Limits

Analyte: Mn(WEN4)

Sample	Result	Units
B220849-BLK1	0.111	mg/kg
B220849-BLK2	0.114	mg/kg
B220849-BLK3	0.112	mg/kg
B220849-BLK4	0.110	mg/kg
B220849-BLK5	0.113	mg/kg

Average: 0.112
Limit: 0.235

MDL: 0.118
MRL: 0.235

Analyte: Si(WEN4)

Sample	Result	Units
B220849-BLK1	-7.83	mg/kg
B220849-BLK2	-7.50	mg/kg
B220849-BLK3	-6.88	mg/kg
B220849-BLK4	-9.76	mg/kg
B220849-BLK5	-7.00	mg/kg

Average: -7.793
Limit: 23.000

Standard Deviation: 1.162
Limit: 11.500

MDL: 11.5
MRL: 23.0

Method Blanks & Reporting Limits

Batch: B220850
Matrix: Soil/Sediment
Method: In-House
Analyte: Al(WEN5)

Sample	Result	Units
B220850-BLK1	0.172	mg/kg
B220850-BLK2	0.129	mg/kg
B220850-BLK3	0.080	mg/kg
B220850-BLK4	0.054	mg/kg
B220850-BLK5	0.464	mg/kg

Average: 0.180
Limit: 1.350

MDL: 0.675
MRL: 1.35

Analyte: As(WEN5)

Sample	Result	Units
B220850-BLK1	0.0007	mg/kg
B220850-BLK2	0.002	mg/kg
B220850-BLK3	0.0005	mg/kg
B220850-BLK4	0.00008	mg/kg
B220850-BLK5	0.0009	mg/kg

Average: 0.001
Limit: 0.050

MDL: 0.005
MRL: 0.050

Analyte: Fe(WEN5)

Sample	Result	Units
B220850-BLK1	0.243	mg/kg
B220850-BLK2	0.109	mg/kg
B220850-BLK3	0.098	mg/kg
B220850-BLK4	0.112	mg/kg
B220850-BLK5	0.545	mg/kg

Average: 0.221
Limit: 1.600

MDL: 0.800
MRL: 1.60

Method Blanks & Reporting Limits

Analyte: Mn(WEN5)

Sample	Result	Units
B220850-BLK1	-0.003	mg/kg
B220850-BLK2	0.003	mg/kg
B220850-BLK3	-0.008	mg/kg
B220850-BLK4	-0.013	mg/kg
B220850-BLK5	0.003	mg/kg

Average: -0.004
Limit: 0.050

MDL: 0.025
MRL: 0.050

Method Blanks & Reporting Limits

Batch: B220851
Matrix: Soil/Sediment
Method: In-House
Analyte: Al(WEN6)

Sample	Result	Units
B220851-BLK1	1.04	mg/kg
B220851-BLK2	2.03	mg/kg
B220851-BLK3	1.04	mg/kg
B220851-BLK4	1.16	mg/kg
B220851-BLK5	1.67	mg/kg

Average: 1.389
Limit: 5.500

MDL: 2.75
MRL: 5.50

Analyte: As(WEN6)

Sample	Result	Units
B220851-BLK1	0.001	mg/kg
B220851-BLK2	0.00007	mg/kg
B220851-BLK3	0.003	mg/kg
B220851-BLK4	0.003	mg/kg
B220851-BLK5	0.0006	mg/kg

Average: 0.002
Limit: 0.050

MDL: 0.006
MRL: 0.050

Analyte: Fe(WEN6)

Sample	Result	Units
B220851-BLK1	0.543	mg/kg
B220851-BLK2	1.22	mg/kg
B220851-BLK3	1.09	mg/kg
B220851-BLK4	3.42	mg/kg
B220851-BLK5	0.362	mg/kg

Average: 1.325
Limit: 10.000

MDL: 5.00
MRL: 10.0

Method Blanks & Reporting Limits

Analyte: Mn(WEN6)

Sample	Result	Units
B220851-BLK1	0.005	mg/kg
B220851-BLK2	0.092	mg/kg
B220851-BLK3	0.008	mg/kg
B220851-BLK4	0.051	mg/kg
B220851-BLK5	0.027	mg/kg

Average: 0.037
Limit: 0.290

MDL: 0.145
MRL: 0.290

Analyte: Si(WEN6)

Sample	Result	Units
B220851-BLK1	136	mg/kg
B220851-BLK2	146	mg/kg
B220851-BLK3	121	mg/kg
B220851-BLK4	93.9	mg/kg
B220851-BLK5	85.0	mg/kg

Average: 116.456
Limit: 395.000

Standard Deviation: 26.445
Limit: 197.500

MDL: 198
MRL: 395

Method Blanks & Reporting Limits

Batch: B220885
Matrix: Soil/Sediment
Method: In-House
Analyte: Al(WEN2)

Sample	Result	Units
B220885-BLK1	0.374	mg/kg

Average: 0.374 **MDL:** 0.375
Limit: 0.750 **MRL:** 0.750

Analyte: As(WEN2)

Sample	Result	Units
B220885-BLK1	0.003	mg/kg

Average: 0.003 **MDL:** 0.003
Limit: 0.025 **MRL:** 0.025

Analyte: Fe(WEN2)

Sample	Result	Units
B220885-BLK1	0.123	mg/kg

Average: 0.123 **MDL:** 0.125
Limit: 0.250 **MRL:** 0.250

Analyte: Mn(WEN2)

Sample	Result	Units
B220885-BLK1	0.010	mg/kg

Average: 0.010 **MDL:** 0.010
Limit: 0.025 **MRL:** 0.025

Analyte: Si(WEN2)

Sample	Result	Units
B220885-BLK1	-1.22	mg/kg

Average: -1.224 **Standard Deviation:** 0.000 **MDL:** 1.22
Limit: 2.500 **Limit:** 1.225 **MRL:** 2.50

Method Blanks & Reporting Limits

Batch: B220912
Matrix: Soil/Sediment
Method: EPA 6020B Mod
Analyte: As

Sample	Result	Units
B220912-BLK1	0.0002	mg/kg
B220912-BLK2	0.001	mg/kg
B220912-BLK3	0.00004	mg/kg
B220912-BLK4	0.001	mg/kg

Average: 0.001
Limit: 0.105

MDL: 0.045
MRL: 0.105

Method Blanks & Reporting Limits

Batch: B220963
Matrix: Soil/Sediment
Method: In-House
Analyte: Si(WEN5)

Sample	Result	Units
B220963-BLK1	-32.3	mg/kg
B220963-BLK2	-38.4	mg/kg
B220963-BLK3	-39.1	mg/kg
B220963-BLK4	-38.3	mg/kg
B220963-BLK5	-31.0	mg/kg

Average: -35.802
Limit: 95.000

Standard Deviation: 3.835
Limit: 47.500

MDL: 47.5
MRL: 95.0

Sample Containers

Lab ID: 2204012-01
Sample: OU3-SB1-9.5-10-0322
Report Matrix: Soil
Sample Type: Sample
Collected: 03/30/2022
Received: 04/01/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Jar HDPE	N/A	N/A	None	N/A	N/A	Cooler - 2204012
B	XTRA_VOL	N/A	N/A	None	N/A	N/A	Cooler - 2204012

Comments: Original Container

Lab ID: 2204012-02
Sample: OU3-SB1-17-17.5-0322
Report Matrix: Soil
Sample Type: Sample
Collected: 03/30/2022
Received: 04/01/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Jar HDPE	N/A	N/A	None	N/A	N/A	Cooler - 2204012
B	XTRA_VOL	N/A	N/A	None	N/A	N/A	Cooler - 2204012

Comments: Original Container

Lab ID: 2204012-03
Sample: OU3-SB2-9.5-10-0322
Report Matrix: Soil
Sample Type: Sample
Collected: 03/31/2022
Received: 04/01/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Jar HDPE	N/A	N/A	None	N/A	N/A	Cooler - 2204012
B	XTRA_VOL	N/A	N/A	None	N/A	N/A	Cooler - 2204012

Comments: Original Container

Lab ID: 2204012-04
Sample: OU3-SB3-9.5-10-0322
Report Matrix: Soil
Sample Type: Sample
Collected: 03/31/2022
Received: 04/01/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Jar HDPE	N/A	N/A	None	N/A	N/A	Cooler - 2204012
B	XTRA_VOL	N/A	N/A	None	N/A	N/A	Cooler - 2204012

Comments: Original Container

Sample Containers

Lab ID: 2204012-05 **Report Matrix:** Soil **Collected:** 03/30/2022
Sample: OU3-SB4-9.5-10-0322 **Sample Type:** QC Sample **Received:** 04/01/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Jar HDPE	N/A	N/A	None	N/A	N/A	Cooler - 2204012
B	XTRA_VOL	N/A	N/A	None	N/A	N/A	Cooler - 2204012

Comments: Original Container

Lab ID: 2204012-06 **Report Matrix:** Soil **Collected:** 03/31/2022
Sample: OU3-SB5-10.5-11-0322 **Sample Type:** Sample **Received:** 04/01/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Jar HDPE	N/A	N/A	None	N/A	N/A	Cooler - 2204012
B	XTRA_VOL	N/A	N/A	None	N/A	N/A	Cooler - 2204012

Comments: Original Container

Lab ID: 2204012-07 **Report Matrix:** Soil **Collected:** 03/30/2022
Sample: OU3-SB6-9.5-10-0322 **Sample Type:** Sample **Received:** 04/01/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Jar HDPE	N/A	N/A	None	N/A	N/A	Cooler - 2204012
B	XTRA_VOL	N/A	N/A	None	N/A	N/A	Cooler - 2204012

Comments: Original Container

Lab ID: 2204012-08 **Report Matrix:** Soil **Collected:** 03/30/2022
Sample: OU3-SB7-9.5-10-0322 **Sample Type:** Sample **Received:** 04/01/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Jar HDPE	N/A	N/A	None	N/A	N/A	Cooler - 2204012
B	XTRA_VOL	N/A	N/A	None	N/A	N/A	Cooler - 2204012

Comments: Original Container

Shipping Containers

Cooler - 2204012

Received: April 1, 2022 11:58
Tracking No: N/A via Courier
Coolant Type: Dry Ice
Temperature: -19.0 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR#33

Custody seals present? Yes
Custody seals intact? No
COC present? Yes

BROOKS APPLIED LABS

Chain -of-Custody Form

Ship samples to:
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

BAL Report 2204012

For BAL use only
Received by: Speratz Lyde *Date:* 4/1/22
Work Order ID: *Time:* 11:58
Project ID:

Client: Pioneer Technologies
Contact: Nathan Starr
Client Project ID: Superlon
Samples Collected By: JH/NS/MK
PO Number: PTC-0A2101
Phone: 360-570-1700
Email: Starrn@uspioneer.com
Mailing Address: 5205 Corporate Center Ct. Lacey WA
Email Receipt Confirmation? [✓ Yes]/No
BAL PM: ~~Jeffrey Leadbeater~~ Amy Goodall

Requested TAT (business days)
☒ 20 (standard)
☐ 15*
☐ 10*
☐ 5*
☐ Other ____

*Surcharges may apply to expedited TATs

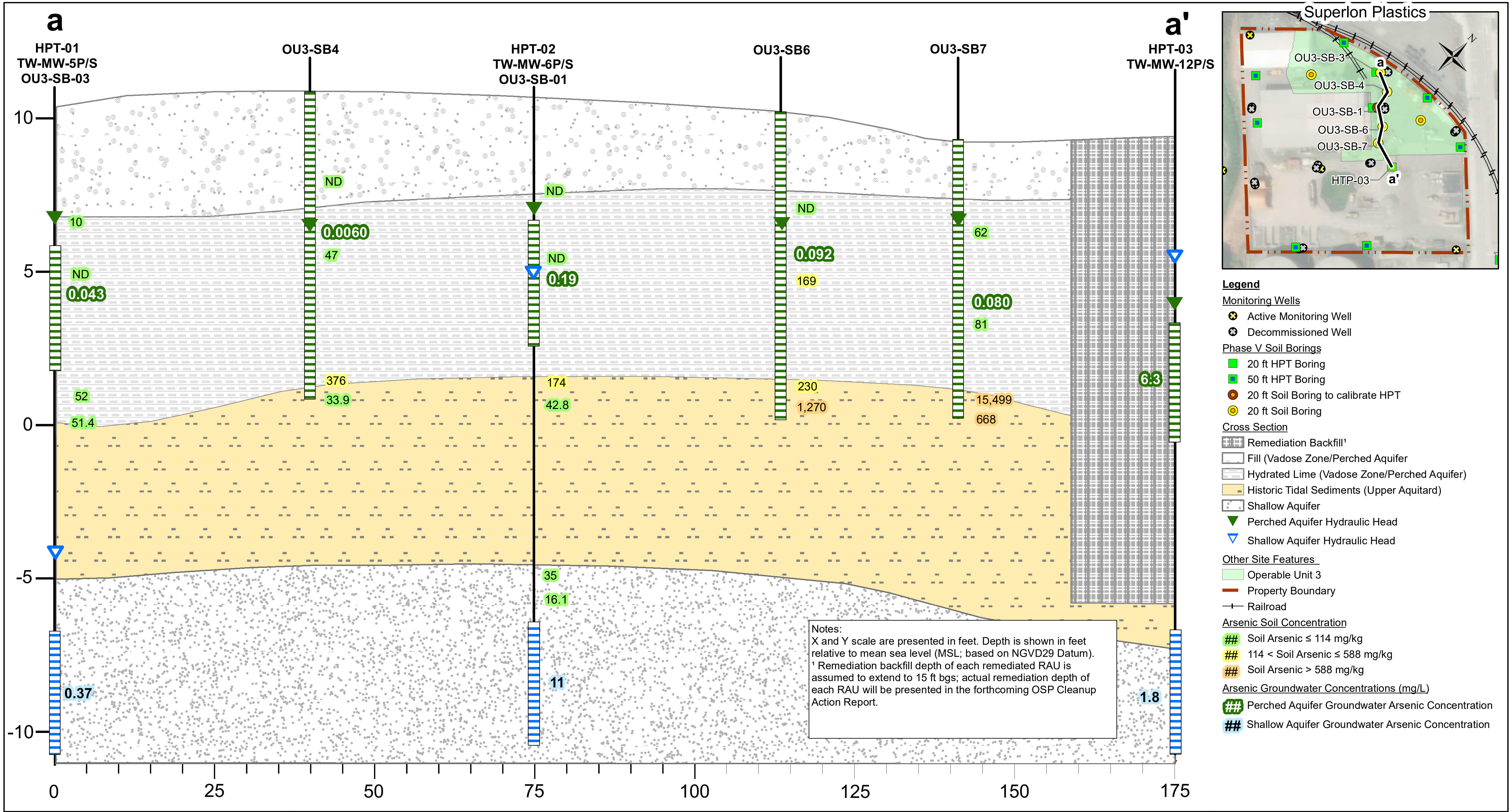
		Collection		Client Sample Info				BAL Analyses Required								Comments
	Sample ID	Date	Time	Matrix Type	Number of Containers	Field Filtered? (Yes/No)	Preservation Type HCl /HNO₃/Other	Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify)	As Species (specify) InOrg, III, V, MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) * SEP	Other (specify)	Specify Here * see project bid for details
1	OU3-SB1-9.5-10-0322	3/30/22	1435	Soil	1	—	—							X		
2	OU3-SB1-17-17.5-0322	3/30/22	1450	↓	↓	↓	↓							↓		
3	OU3-SB2-9.5-10-0322	3/31/22	0800	↓	↓	↓	↓							↓		
4	OU3-SB3-9.5-10-0322	3/31/22	0916	↓	↓	↓	↓							↓		
5	OU3-SB4-9.5-10-0322	3/30/22	1600	↓	↓	↓	↓							↓		
6	OU3-SB5-10.5-11-0322	3/31/22	1000	↓	↓	↓	↓							↓		
7	OU3-SB6-9.5-10-0322	3/30/22	1130	↓	↓	↓	↓							↓		
8	OU3-SB7-9.5-10-0322	3/30/22	1100	↓	↓	↓	↓							↓		
9																Note: cooler is
10																anoxic w/
	Trip Blank															dry ice

Relinquished By:	Date: 4/1/22	Time: 11:55	Relinquished By:	Date:	Time:
Received By: Sperotz Lyde	Date: 4/1/22	Time: 11:58	Total Number of Packages:		

Page____of____ List Hazardous Contaminants: __________

samples@brooksapplied.com | brooksapplied.com

Appendix D: Cross-Sections



Legend

Monitoring Wells

- ⊗ Active Monitoring Well
- ⊗ Decommissioned Well

Phase V Soil Borings

- 🟩 20 ft HPT Boring
- 🟩 50 ft HPT Boring
- ◎ 20 ft Soil Boring to calibrate HPT
- ◎ 20 ft Soil Boring

Cross Section

- ▦ Remediation Backfill¹
- ☐ Fill (Vadose Zone/Perched Aquifer
- ▤ Hydrated Lime (Vadose Zone/Perched Aquifer)
- 🟨 Historic Tidal Sediments (Upper Aquitard)
- ☐ Shallow Aquifer
- ▼ Perched Aquifer Hydraulic Head
- ▽ Shallow Aquifer Hydraulic Head

Other Site Features

- 🟩 Operable Unit 3
- — Property Boundary
- ┼ Railroad

Arsenic Soil Concentration

- ## Soil Arsenic ≤ 114 mg/kg
- ## 114 < Soil Arsenic ≤ 588 mg/kg
- ## Soil Arsenic > 588 mg/kg

Arsenic Groundwater Concentrations (mg/L)

- ## Perched Aquifer Groundwater Arsenic Concentration
- ## Shallow Aquifer Groundwater Arsenic Concentration

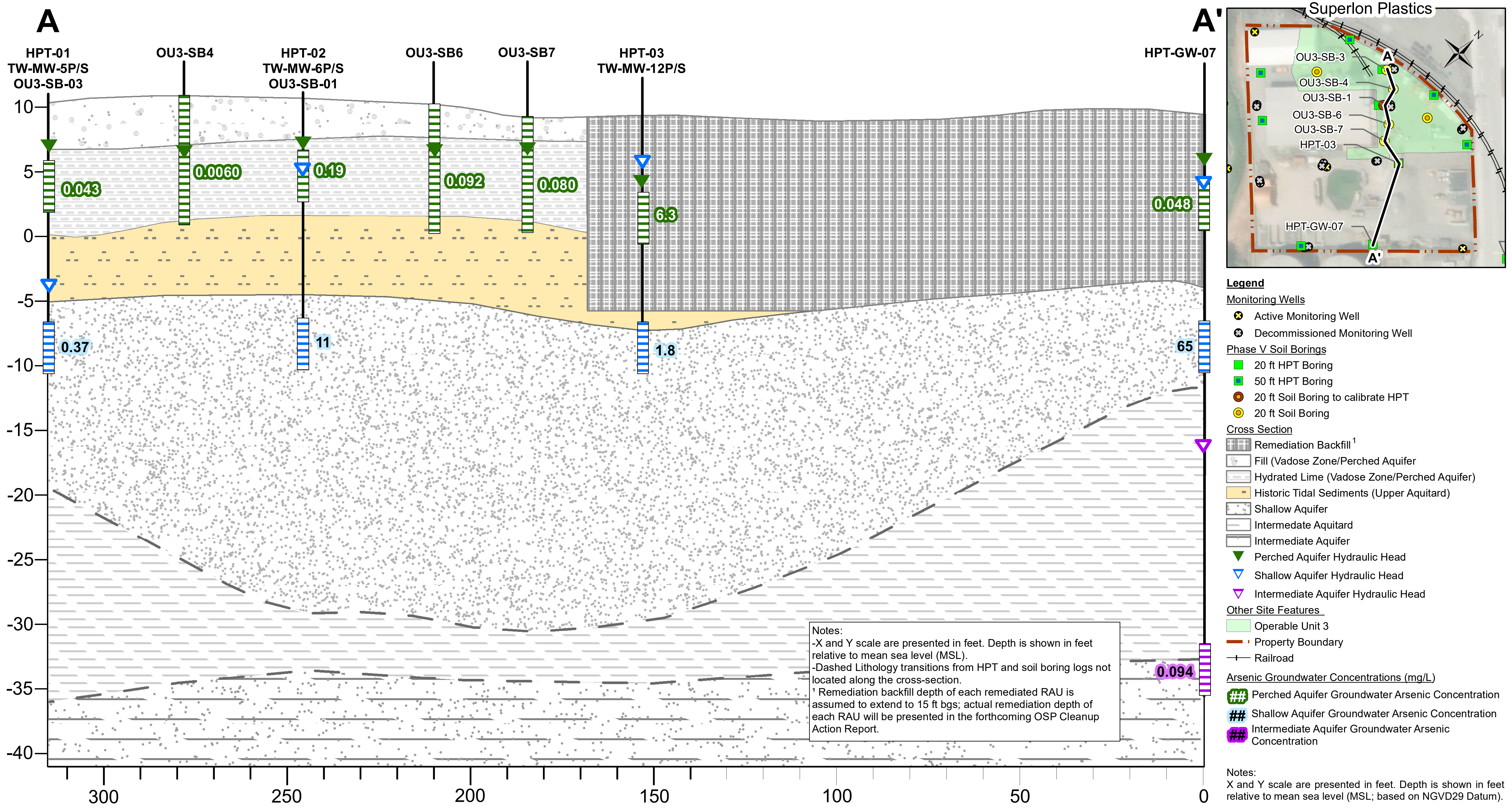
Notes:
X and Y scale are presented in feet. Depth is shown in feet relative to mean sea level (MSL; based on NGVD29 Datum).
¹ Remediation backfill depth of each remediated RAU is assumed to extend to 15 ft bgs; actual remediation depth of each RAU will be presented in the forthcoming OSP Cleanup Action Report.

PIONEER
TECHNOLOGIES CORPORATION

OU3 Cross Section a-a'
Superlon Plastics Property
Tacoma, Washington

Figure D-1

Document Path: G:\Projects\Superlon\Maps\2023\March\Cross Sections\Figure D-1_RI Phase V_OU3 X Sec_a.mxd; Author: AR; Date Saved: 6/5/2023



Notes:
-X and Y scale are presented in feet. Depth is shown in feet relative to mean sea level (MSL).
-Dashed Lithology transitions from HPT and soil boring logs not located along the cross-section.
[1] Remediation backfill depth of each remediated RAU is assumed to extend to 15 ft bgs; actual remediation depth of each RAU will be presented in the forthcoming OSP Cleanup Action Report.

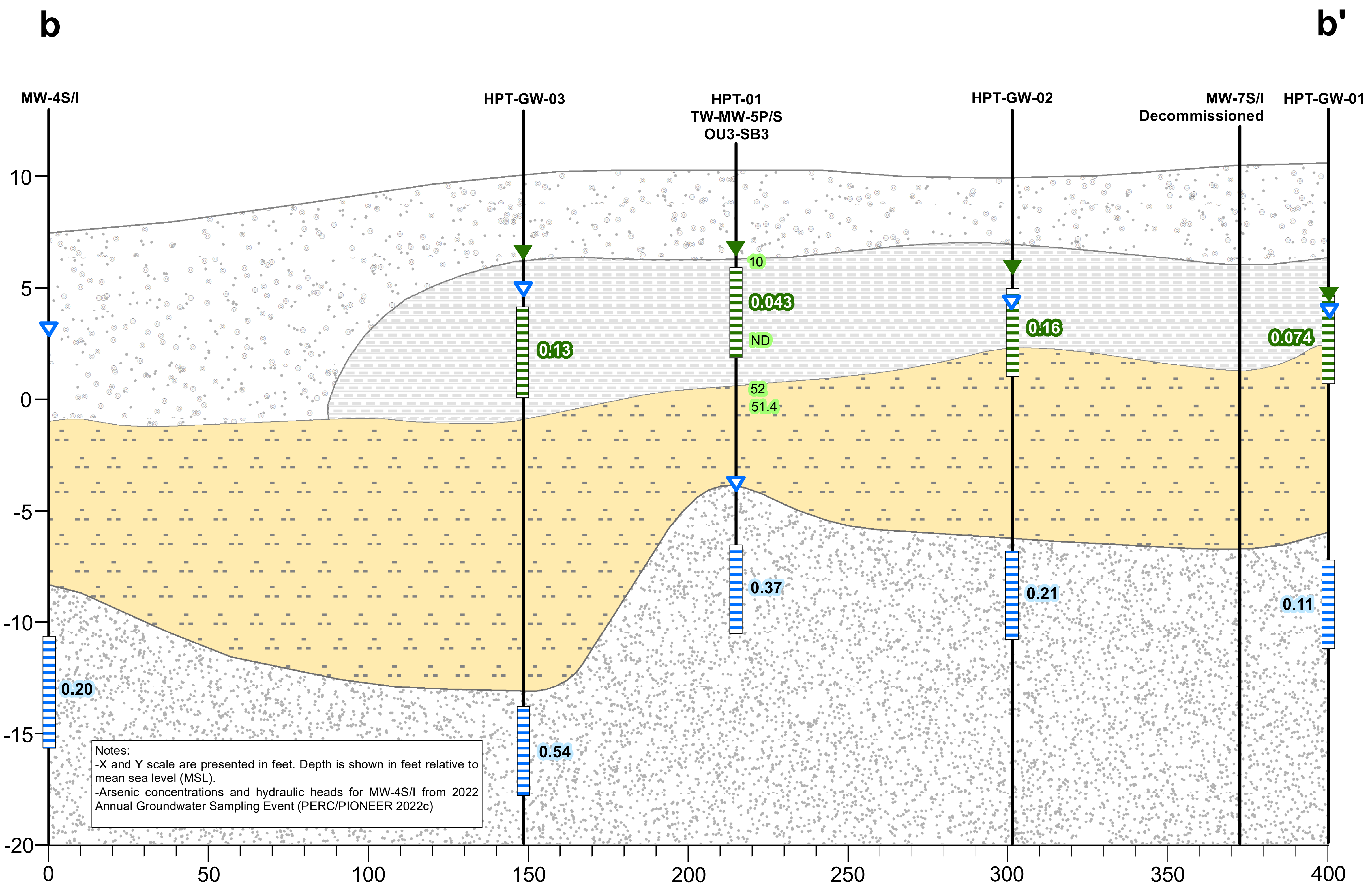
Notes:
X and Y scale are presented in feet. Depth is shown in feet relative to mean sea level (MSL; based on NGVD29 Datum).

PIONEER
TECHNOLOGIES CORPORATION

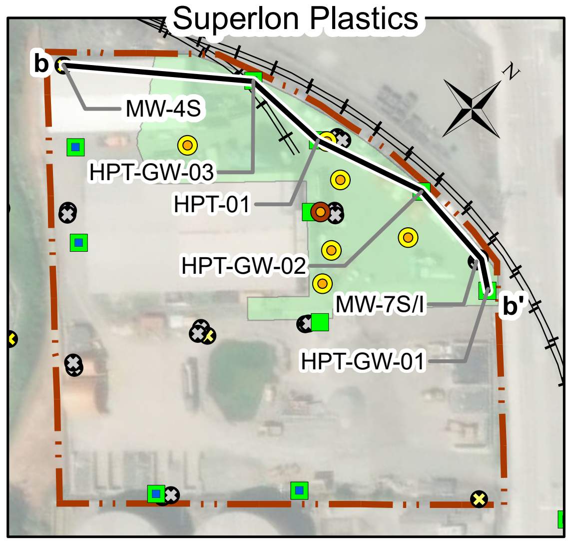
OU3 Cross Section A-A'
Superlon Plastics Property
Tacoma, Washington

Figure D-2

Document Path: G:\Projects\Superlon\Maps\2023\March\Cross Sections\Figure D-2_RI Phase V_OU3 X Sec_A.mxd; Author: AR; Date Saved: 6/5/2023



Notes:
-X and Y scale are presented in feet. Depth is shown in feet relative to mean sea level (MSL).
-Arsenic concentrations and hydraulic heads for MW-4S/I from 2022 Annual Groundwater Sampling Event (PERC/PIONEER 2022c)



Legend

Monitoring Wells
- ⊗ Active Monitoring Well
- ⊗ Decommissioned Monitoring Well

Phase V Soil Borings
- 🟩 20 ft HPT Boring
- 🟩 50 ft HPT Boring
- ◉ 20 ft Soil Boring to calibrate HPT
- ◉ 20 ft Soil Boring

Cross Section
- ☐ Fill (Vadose Zone/Perched Aquifer
- ▤ Hydrated Lime (Vadose Zone/Perched Aquifer)
- 🟨 Historic Tidal Sediments (Upper Aquitard)
- ▨ Shallow Aquifer
- ▼ Perched Aquifer Hydraulic Head
- ▽ Shallow Aquifer Hydraulic Head

Other Site Features
- 🟩 Operable Unit 3
- ━ Property Boundary
- ┼ Railroad

Arsenic Soil Concentration
- ## Soil Arsenic ≤ 114 mg/kg
- ## 114 < Soil Arsenic ≤ 588 mg/kg
- ## Soil Arsenic > 588 mg/kg

Arsenic Groundwater Concentrations (mg/L)
- ## Perched Aquifer Groundwater Arsenic Concentration
- ## Shallow Aquifer Groundwater Arsenic Concentration

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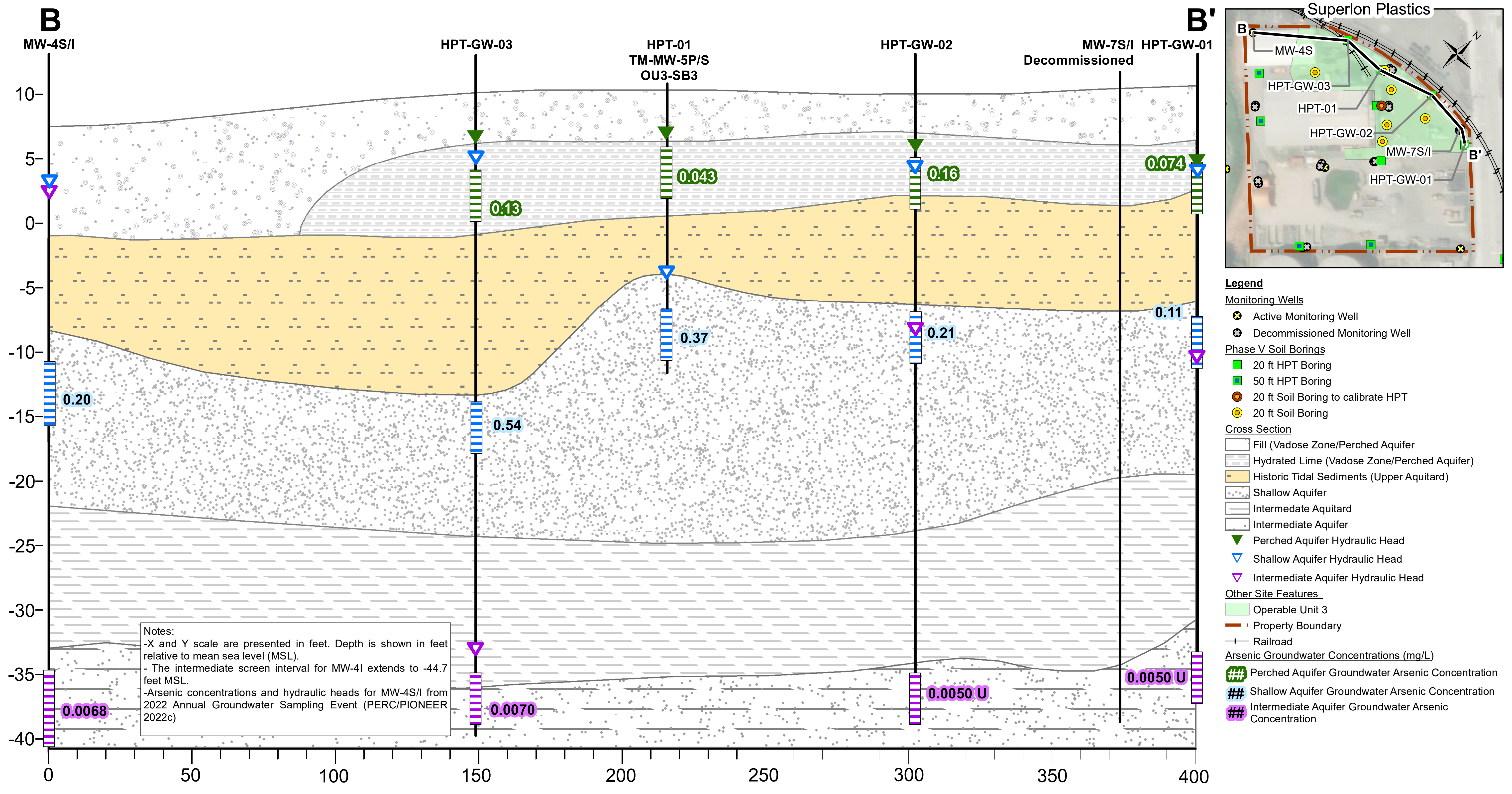
OU3 Cross Section b-b'
Superlon Plastics Property
Tacoma, Washington

Figure D-3

Document Path: G:\Projects\Superlon\Maps\2023\March\Cross Sections\Figure D-3_RI Phase V_OU3 X Sec_b.mxd; Author: AR; Date Saved: 3/23/2023



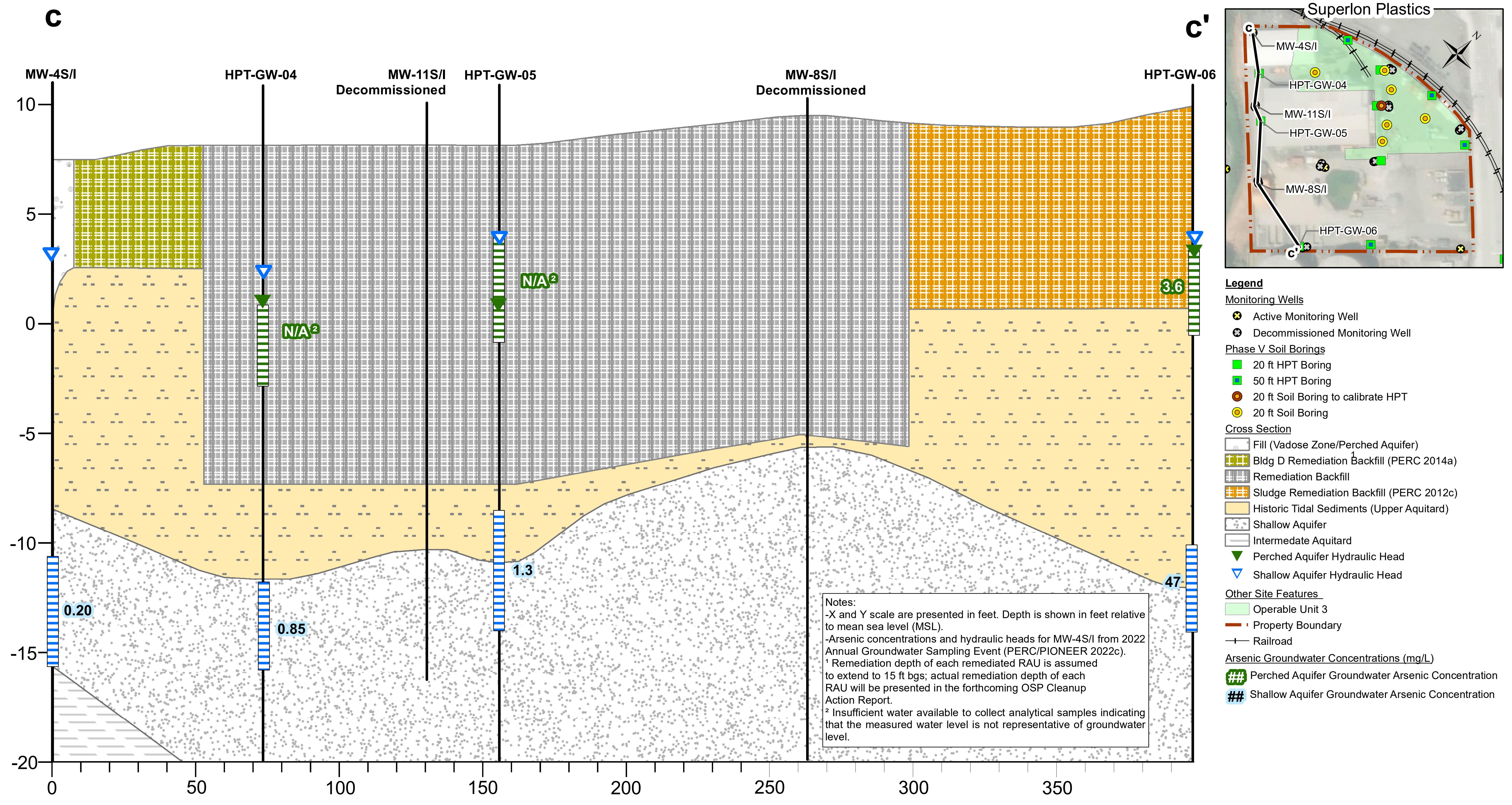
Notes:
-X and Y scale are presented in feet. Depth is shown in feet relative to mean sea level (MSL).
- The intermediate screen interval for MW-4I extends to -44.7 feet MSL.
-Arsenic concentrations and hydraulic heads for MW-4S/I from 2022 Annual Groundwater Sampling Event (PERC/PIONEER 2022c)

PIONEER
TECHNOLOGIES CORPORATION

OU3 Cross Section B-B'
Superlon Plastics Property
Tacoma, Washington

Figure D-4

Document Path: G:\Projects\Superlon\Maps\2023\March\Cross Sections\Figure D-4_RI Phase V_OU3 X Sec_B.mxd; Author: AR; Date Saved: 3/23/2023



Notes:
-X and Y scale are presented in feet. Depth is shown in feet relative to mean sea level (MSL).
-Arsenic concentrations and hydraulic heads for MW-4S/I from 2022 Annual Groundwater Sampling Event (PERC/PIONEER 2022c).
[1] Remediation depth of each remediated RAU is assumed to extend to 15 ft bgs; actual remediation depth of each RAU will be presented in the forthcoming OSP Cleanup Action Report.
[2] Insufficient water available to collect analytical samples indicating that the measured water level is not representative of groundwater level.

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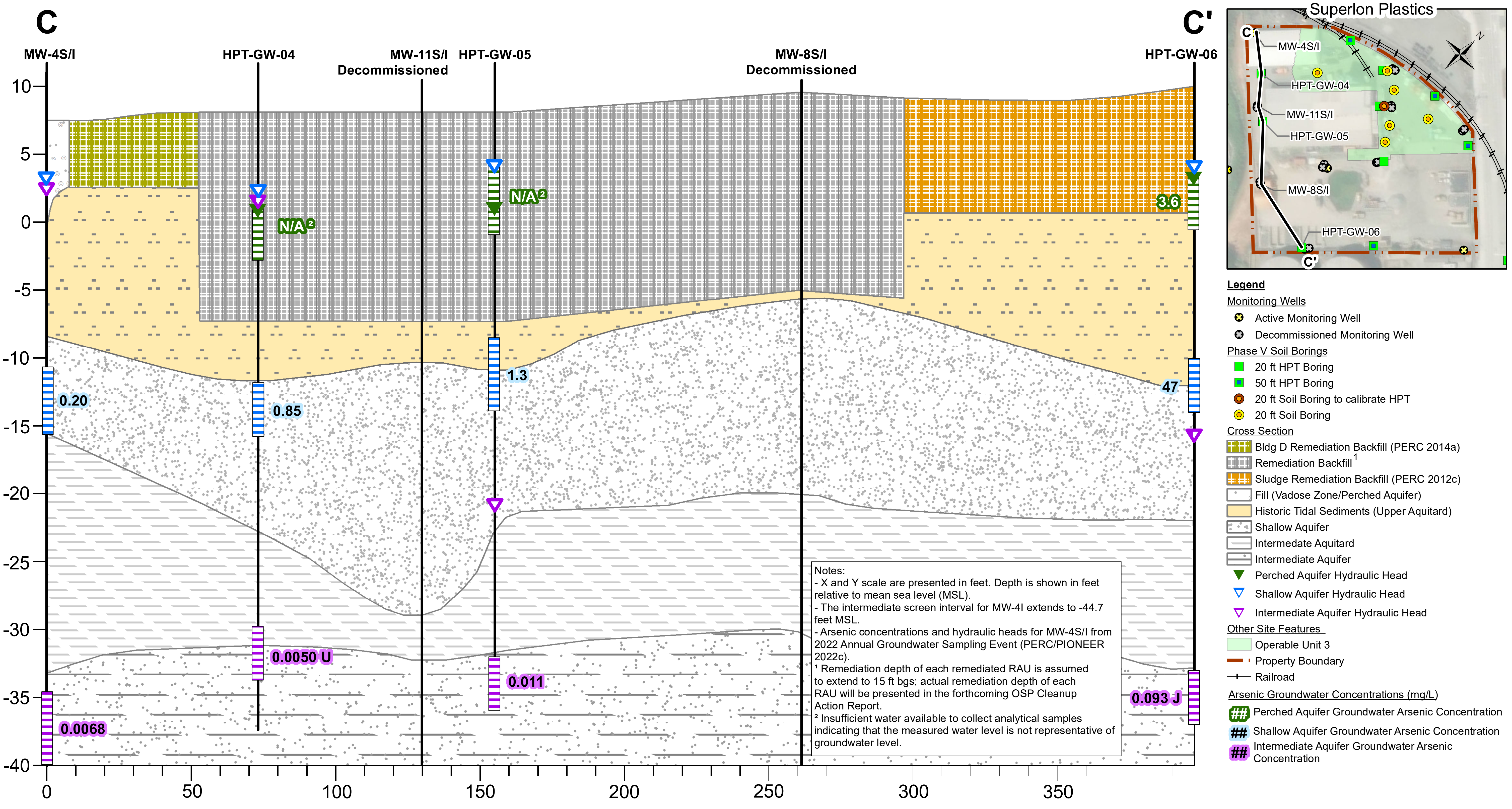
OU3 Cross Section c-c'
Superlon Plastics Property
Tacoma, Washington

Figure D-5

Document Path: G:\Projects\Superlon\Maps\2023\March\Cross Sections\Figure D-5_RI Phase V_OU3 X Sec_c.mxd; Author: AR; Date Saved: 3/23/2023



Notes:
- X and Y scale are presented in feet. Depth is shown in feet relative to mean sea level (MSL).
- The intermediate screen interval for MW-4I extends to -44.7 feet MSL.
- Arsenic concentrations and hydraulic heads for MW-4S/I from 2022 Annual Groundwater Sampling Event (PERC/PIONEER 2022c).

[1] Remediation depth of each remediated RAU is assumed to extend to 15 ft bgs; actual remediation depth of each RAU will be presented in the forthcoming OSP Cleanup Action Report.

[2] Insufficient water available to collect analytical samples indicating that the measured water level is not representative of groundwater level.

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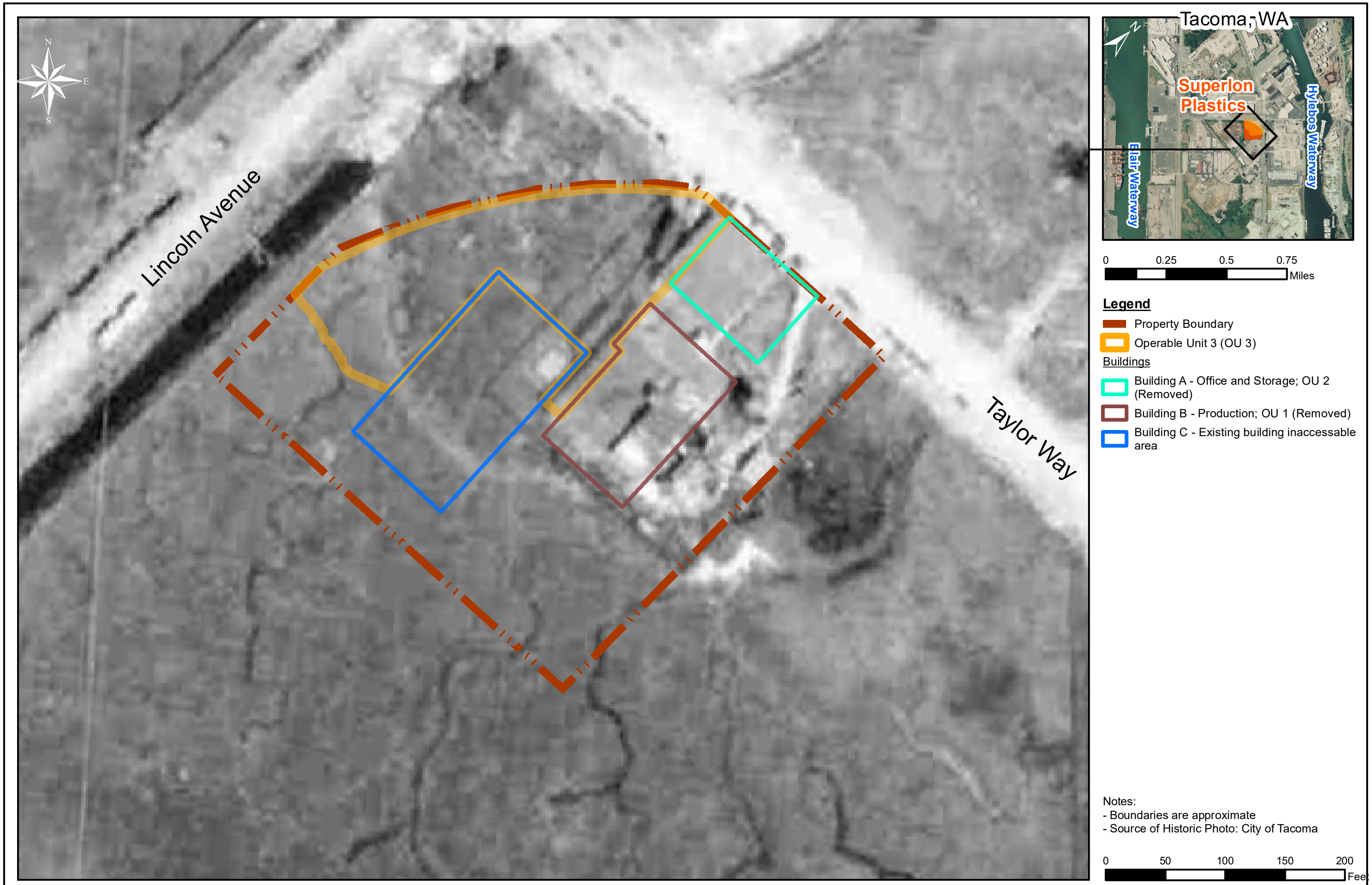
OU3 Cross Section C-C'
Superlon Plastics Property
Tacoma, Washington

Figure D-6

Document Path: G:\Projects\Superlon\Maps\2023\March\Cross Sections\Figure D-6_RI Phase V_OU3 X Sec_C.mxd; Author: AR; Date Saved: 3/23/2023

Appendix E: Historical Aerial Photographs



Notes:
- Boundaries are approximate
- Source of Historic Photo: City of Tacoma

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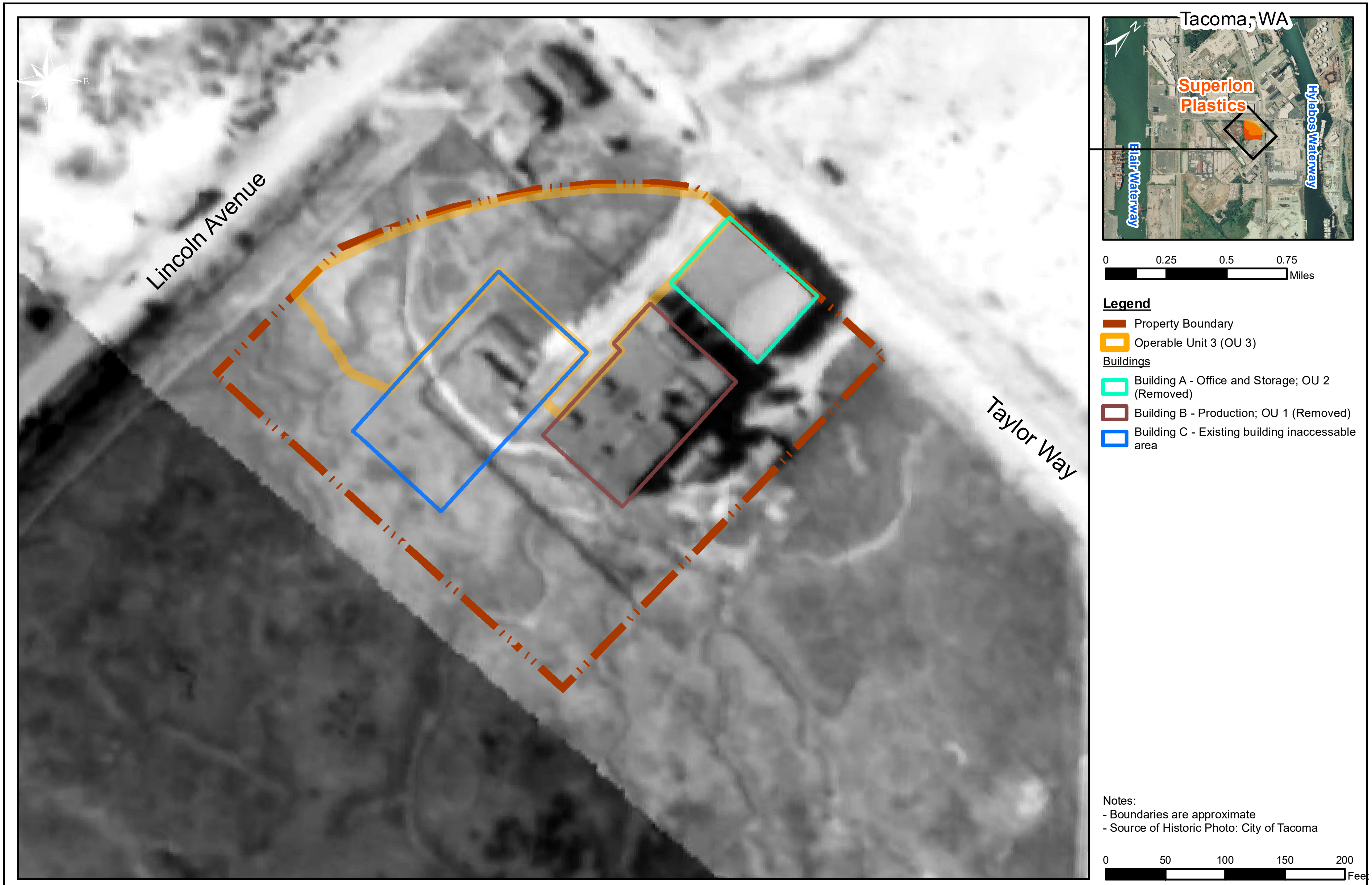
Superlon Site 1931
RI Phase V OU 3 Technical Memorandum
Superlon Plastics Property, Tacoma, Washington

Figure E-1

Document Path: G:\Projects\Superlon\Maps\2023\March\Fig E-1_1931.mxd; Author: MK; Date Saved: 3/17/2023



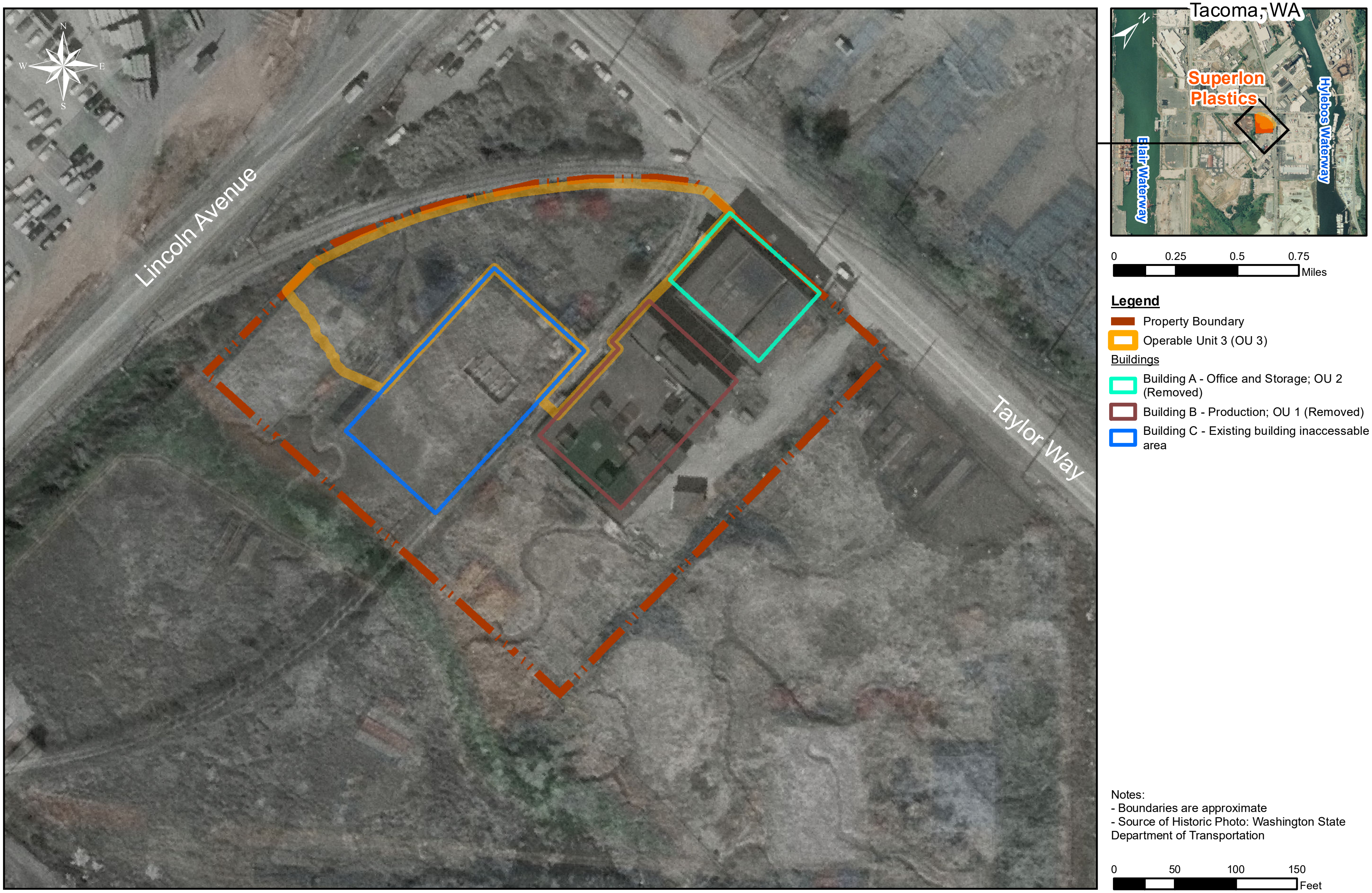
Notes:
- Boundaries are approximate
- Source of Historic Photo: City of Tacoma

PIONEER
TECHNOLOGIES CORPORATION

Superlon Site 1940
RI Phase V OU 3 Technical Memorandum
Superlon Plastics Property, Tacoma, Washington

Figure E-2

Document Path: G:\Projects\Superlon\Maps\2023\March\Fig E-2_1940.mxd; Author: MK; Date Saved: 3/17/2023



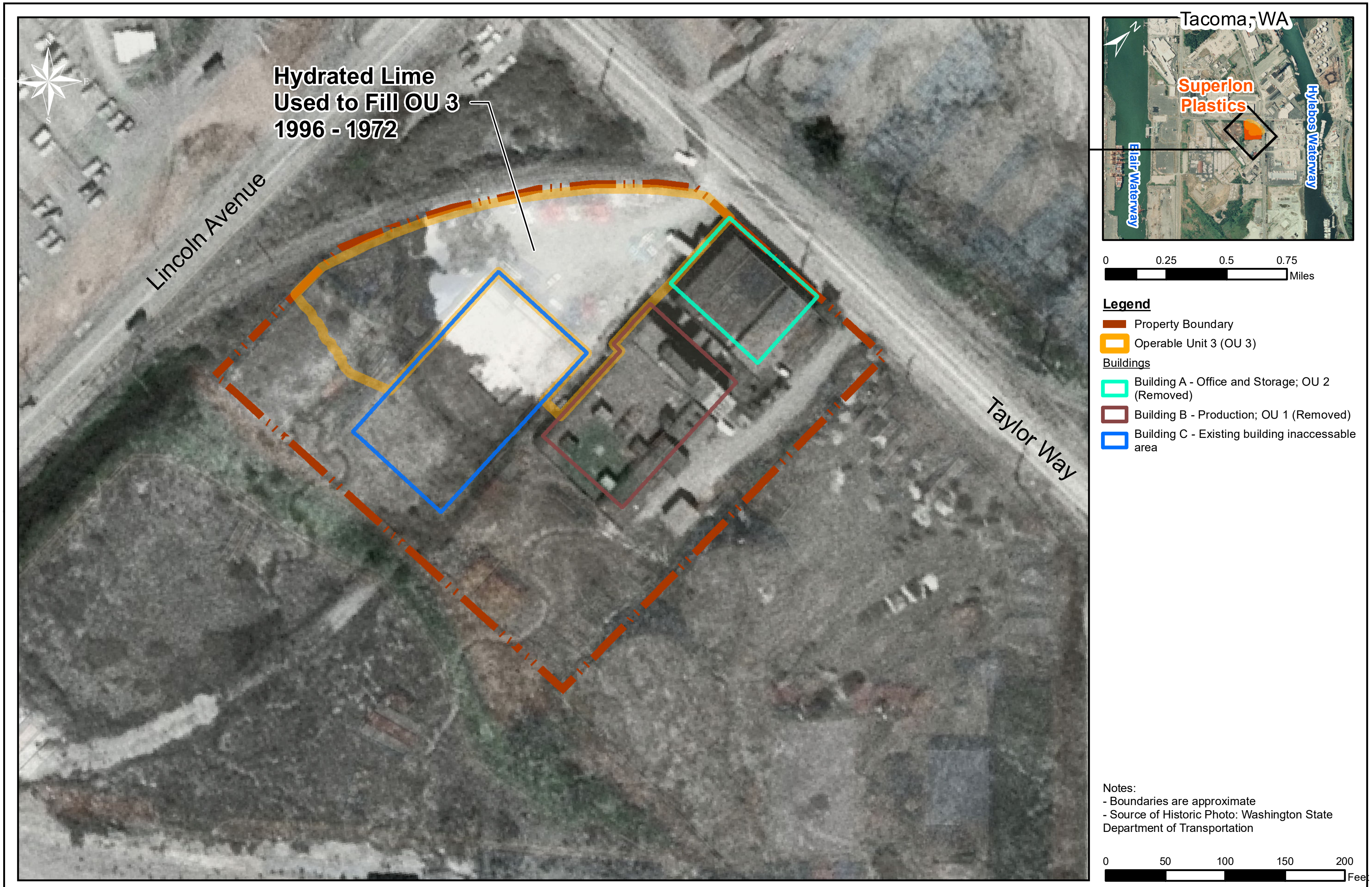
Notes:
- Boundaries are approximate
- Source of Historic Photo: Washington State Department of Transportation

PIONEER
TECHNOLOGIES CORPORATION

Superlon Site 1961
RI Phase V OU 3 Technical Memorandum
Superlon Plastics Property, Tacoma, Washington

Figure E-3

Document Path: G:\Projects\Superlon\Maps\2023\March\Fig E-3_1961.mxd; Author: MK; Date Saved: 3/20/2023



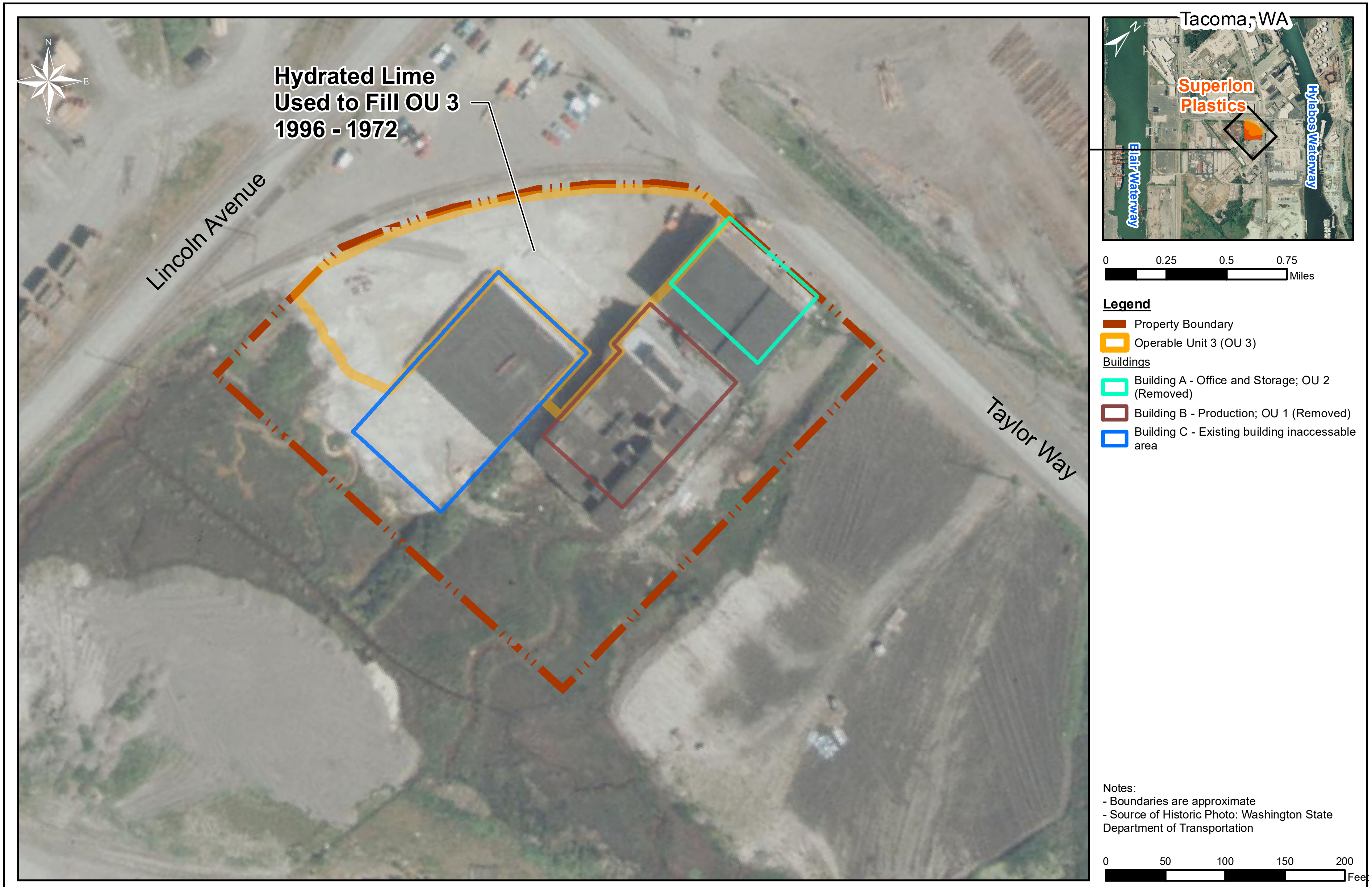
Notes:
- Boundaries are approximate
- Source of Historic Photo: Washington State Department of Transportation

PIONEER
TECHNOLOGIES CORPORATION

Superlon Site 1966
RI Phase V OU 3 Technical Memorandum
Superlon Plastics Property, Tacoma, Washington

Figure E-3

Document Path: G:\Projects\Superlon\Maps\2023\March\Fig E-3_1966.mxd; Author: MK; Date Saved: 3/17/2023



Notes:
- Boundaries are approximate
- Source of Historic Photo: Washington State Department of Transportation

PIONEER
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Superlon Site 1972
RI Phase V OU 3 Technical Memorandum
Superlon Plastics Property, Tacoma, Washington

Figure E-4

Document Path: G:\Projects\Superlon\Maps\2023\March\Fig E-4_1972.mxd; Author: MK; Date Saved: 3/17/2023

Appendix F: Arsenic Mass Calculation M**emorandum**

Memo

PIONEER TECHNOLOGIES CORPORATION

5205 Corporate Ctr. Ct. SE, Ste. A
Olympia, WA 98503-5901
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www.uspioneer.com

To: File

From: Avery Rosenbalm, M.S.

Reviewed By: Nathan Starr, P.G. #2760

Date: October 11, 2022

Subject: Arsenic Mass Calculations in the Superlon Property Soil

Arsenic mass calculations were conducted for the Superlon Plastics Property (Property) located at 2116 Taylor Way, Tacoma, Washington to determine the pre-remediation arsenic mass in soil from the ground surface to 15 feet (ft) below the ground surface (bgs) in the two areas defined by Operable Units (OUs) 1, 2, 4 and OU 3. Remediation of soils and perched water on the Property as described in the Cleanup Action Plan for On-Property Soils and Perched Water (CAP-OSP) are ongoing under an interim action approach approved by Ecology in 2017 (Pacific Environmental & Redevelopment Corporation [PERC]/PIONEER Technologies Corporation [PIONEER] 2015, 2018).

There are six OUs defined at the Property. Arsenic in OUs 5 and 6 was primarily associated with vitrified glass beds that were part of the fill that was placed on the Property and is not associated with releases from production of arsenic based pesticides in OU 2 (PERC 2013). As of the date of this memo, CAP-OSP remediation of OU 1, 2, and 4 is 90% complete with the pond area being the only area remaining to remediate, and remediation of OU 3 has not begun. The mass calculation described below determined that prior to remediation of OUs 1, 2 and 4 there was approximately 213,000 pounds (lbs) of arsenic in soil in the OUs 1, 2 and 4 area and that approximately 7,700 lbs of arsenic is present in OU 3.

Areas Removed from Analysis

See Figure 1 for a representation of all areas removed from analysis (included under the "Areas Not To Be Remediated Under CAP-OSP" header). Arsenic mass was not calculated for OUs 5 and 6. Additionally, as the Property has ongoing, active business operations, the building footprints (plus 10-foot buffers around the buildings) were excluded from the analysis. Similarly, the loading dock (plus a 5-foot buffer around the loading dock) was removed. In addition, RAUs that were previously remediated under a separate Interim Action in the south corner of the Property were excluded (PERC 2012).

Method of Calculation

The two areas defined by the limits of OU 3 and OUs 1, 2 and 4 were divided into polygons based on the locations of the remedial investigation (RI) soil borings using the Thiessen method (see Figure 1). The Thiessen method is based on the assumption that the measured arsenic concentration at any boring can be applied halfway to the next boring in any direction, which means that at any point the calculated arsenic concentration is equal to the observed arsenic concentration at the closest soil boring sample location. The Thiessen polygons are formed by the perpendicular bisectors of the lines joining nearby soil borings. Each soil boring location within the area analyzed was assigned a polygon. The Thiessen polygons were generated using the Voronoi Map tool included in the Geostatistical license for ArcMap.

The area of each soil boring-based Thiessen polygon was calculated using the "Calculate Geometry" function in the ArcMap attributes table based on the NAD 83 Washington South State Plane coordinate system. The ArcMap attribute table for each polygon includes 1) the name of the soil boring associated with it[1], and 2) the area of the polygon.

By referencing the polygon attribute table to the soil boring table, a Thiessen polygon area is associated with each boring location. Multiplying the area of a polygon by the thickness calculated from a sample's depth interval provides the soil volume represented by each soil sample. To then determine the mass of arsenic associated with each soil sample volume, the following calculation was made:

1) The soil volume was converted from cubic feet to cubic yards.
2) The cubic yards associated with each soil sample volume was converted to weight by assuming each cubic yard weighted 1.5 short (US) Tons or 1,361 kilograms (kg).
3) The weight in kilograms associated with each soil sample was then multiplied by the associated arsenic soil concentration in milligrams per kilogram (mg/kg), which provided the calculated mass (weight) of arsenic associated with each soil sample.

These masses were then summed for the two areas to provide comparisons of total mass of soil and arsenic between OUs 1, 2, and 4 and OU 3[2]. Table 1 includes the following for each soil sample used in the calculation: Sample ID, Soil Boring ID (Site ID), associated OU, arsenic concentration, depth interval (and if applicable adjusted depth interval), polygon area, volume of soil, soil and arsenic weight. Table 1 also includes the total area, soil volume, soil and arsenic weight for the two areas.

Example Calculation

In this scenario, three borings were used to calculate volumes from the ground surface to five ft bgs. The three borings were divided into two mock OUs - Alpha and Beta. The three borings, A and B (OU Alpha) and C (OU Beta) were sampled at interval depths in ft bgs from 1-2, and 3-4. Table A below summarizes the sample depths and concentrations for each boring. Since the sample intervals do not extend from the ground surface to five ft bgs, the sample intervals were adjusted up to zero ft bgs and down to five ft bgs, and the interval from two to three ft bgs is split evenly between the two samples. The interval thickness is the difference between the top and bottom of the sample interval.

---

[1] If the soil boring associated with the Thiessen polygon is not identified in the Thiessen attribute table, a spatial join can be conducted to correlate the soil boring to the Thiessen polygon.

[2] A small portion of what was considered to be OU 3 has already been remediated (area immediately northwest of SL-22 and SL-23); therefore, this section was included as part of the OUs 1, 2, and 4 area. Note that the hydrated lime fill layer that defines the extent of OU 3 was not located in this area.

Table A: Example Scenario Arsenic Soil Boring Samples

Boring ID	Sample Interval (ft bgs)	Arsenic Concentration (mg/kg)	Adjusted Sample Interval (ft bgs)	Thickness (ft)
A	1-2	563	0-2.5	2.5
A	3-4	252	2.5-5	2.5
B	1-2	671	0-2.5	2.5
B	3-4	293	2.5-5	2.5
C	1-2	314	0-2.5	2.5
C	3-4	98	2.5-5	2.5

Then, in ArcMap, Thiessen polygons for each soil boring were formulated and the area of the polygon was generated. This area was used to finish the arsenic calculations, as seen in Table B, below.

Table B: Example Scenario Arsenic Mass Calculations

Boring ID	Sample Interval (ft bgs)	Arsenic Concentration (mg/kg)	Adjusted Sample Interval (ft bgs)	Thickness (ft)	Thiessen Polygon Area (square ft)	Volume (cubic ft)	Volume (cubic yards)	Weight of Soil (tons)	Weight of Arsenic (tons)
Sample Info	Sample Info	Sample Info	Sample Info (adjusted)	Calculated	Generated in ArcMap	Calculated	Calculated	Calculated	Calculated
A	1-2	563	0-2.5	2.5	1,000	2,500	926	1,389	0.78
A	3-4	252	2.5-5	2.5	1,000	2,500	926	1,389	0.35
B	1-2	671	0-2.5	2.5	1,250	3,125	1,157	1,736	1.2
B	3-4	293	2.5-5	2.5	1,250	3,125	1,157	1,736	0.51
C	1-2	314	0-2.5	2.5	875	2,187.5	810	1,215	0.38
C	3-4	98	2.5-5	2.5	875	2,187.5	810	1,215	0.12

Where:

Thickness = (Adjusted) Sample Bottom – (Adjusted) Sample Top

Volume (cubic ft) = Thickness * Thiessen Polygon Area

Volume (cubic yards) = Volume (cubic ft) * 0.37037

Weight of Soil in Short (US) Tons = Volume (cubic yards) * 1.5

Weight (Mass) of Soil in Kilograms = Weight (Mass) of Soil in Short (US) Tons * 907

Weight (Mass) of Arsenic in Milligrams = Arsenic Concentration (mg/kg) * Weight of Soil (kg)

Weight (Mass) of Arsenic in Short (US) Tons = Weight of Arsenic (mg) / 907,200,000

Values were then summed to compare OU Alpha and OU Beta.

Table C: Example Scenario OU Comparisons

OU	Total Soil Weight (tons)	Arsenic Weight (tons)	Percent of Total Soil Weight (Mass)	Percent of Total Arsenic Weight (Mass)
Alpha (Borings A & B)	6,250	2.84	72%	85%
Beta (Boring C)	2,430	0.5	28%	15%

References

PERC. 2012. Sludge Excavation and Disposal Report for the Superlon Plastics Site, Tacoma, Washington. March.

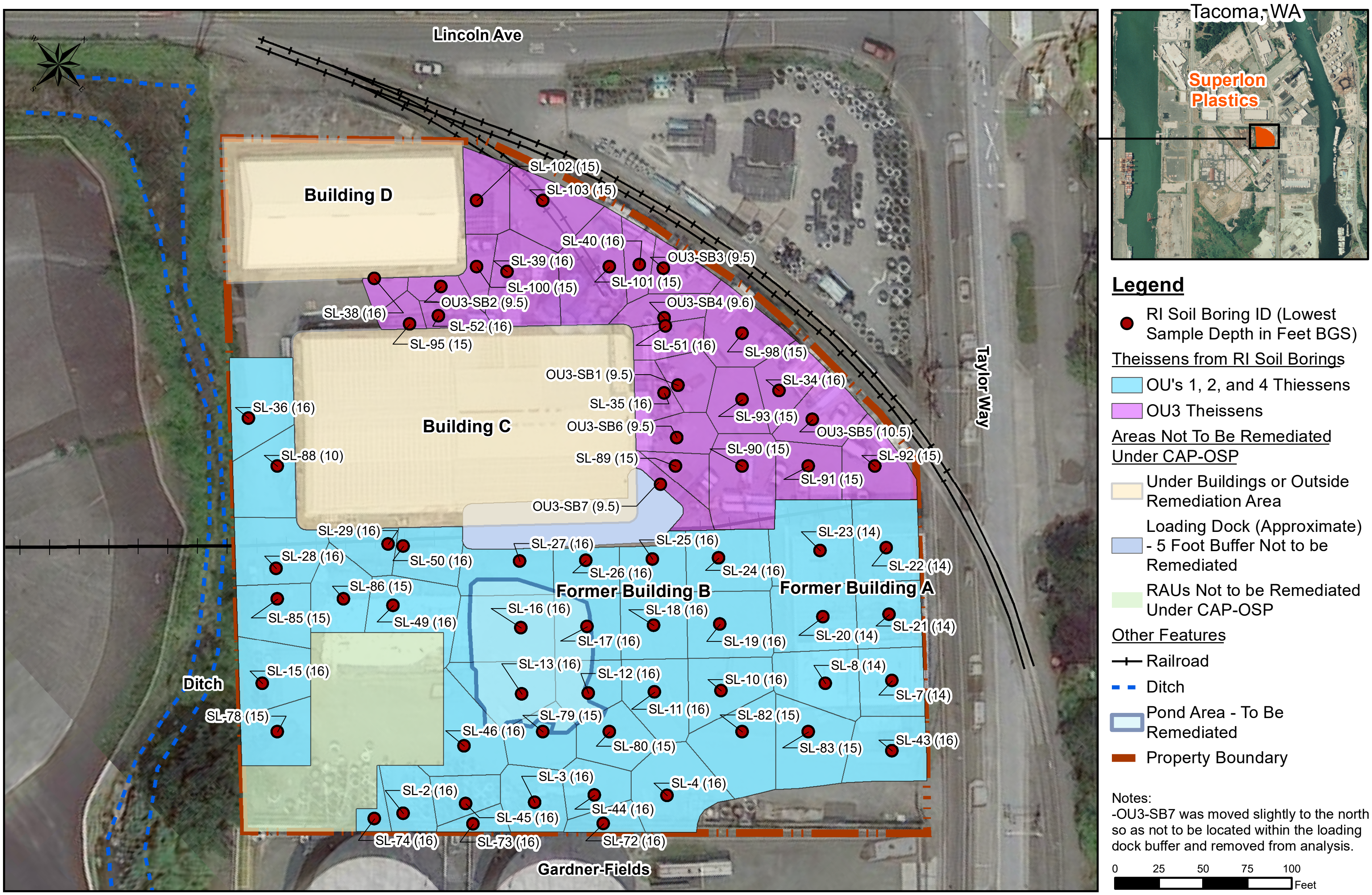
PERC. 2013. Remedial Investigation Report for On-Property Soils and Surface Water at the Superlon Plastics Property, Tacoma, Washington. August.

PERC/PIONEER. 2015. Cleanup Action Plan for On-Property Soils and Perched Water for the Superlon Plastics Property. Tacoma, Washington. July 30.

PERC/PIONEER. 2018. Remedial Design Report for the Superlon Plastics Site. March (updated).

Enclosures

Figure 1	RI Soil Boring Thiessens Used for Arsenic Mass Calculations
Table 1	RI Soil Boring Sample Results and Attributes



Legend

● RI Soil Boring ID (Lowest Sample Depth in Feet BGS)

Theissens from RI Soil Borings

- ▭ OU's 1, 2, and 4 Theissens
- ▭ OU3 Theissens

Areas Not To Be Remediated Under CAP-OSP

- ▭ Under Buildings or Outside Remediation Area
- ▭ Loading Dock (Approximate) - 5 Foot Buffer Not to be Remediated
- ▭ RAUs Not to be Remediated Under CAP-OSP

Other Features

- ┼ Railroad
- - - Ditch
- ▭ Pond Area - To Be Remediated
- ▬ Property Boundary

Notes:
-OU3-SB7 was moved slightly to the north so as not to be located within the loading dock buffer and removed from analysis.

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RI Soil Boring Thiessens Used for Arsenic Mass Calculations
Arsenic Mass Calculations in the Superlon Site Soil Memo
Superlon Plastics Site, Tacoma, Washington

Figure 1

Table 1: RI Soil Boring Sample Results and Attributes

Sample ID	Site ID	Operable Unit	Date	X Coordinate^1	Y Coordinate^1	Arsenic Concentration (mg/kg)		Sample Top (ft bgs)	Sample Bottom (ft bgs)	Adjusted Sample Top^2 (ft bgs)	Adjusted Sample Bottom^2 (ft bgs)	Total Height (ft)	Thiessen Polygon Area (ft^2)	Volume (ft^3)	Volume (yd^3)	Soil Weight (US tons)	Soil Weight (kg)	Arsenic Weight (mg)	Arsenic Weight (US tons)
						Result	Qualifier												
Operable Units 1, 2, and 4 Soil Borings																			
SUP_SL_10 6-8_051011	SL-10	Operable Unit 1	5/10/2011	1172864.836	711953.2531	1,330		6	8	0	8	8	1,473	11,781	436	655	593,653	789,558,593	0.87
SUP_SL_10 8-10_051011	SL-10	Operable Unit 1	5/10/2011	1172864.836	711953.2531	22		8	10	--	--	2	1,473	2,945	109	164	148,413	3,294,775	0.0036
SUP_SL_10 10-12_051011	SL-10	Operable Unit 1	5/10/2011	1172864.836	711953.2531	5.3		10	12	--	--	2	1,473	2,945	109	164	148,413	786,590	0.00087
SUP_SL_10 12-14_051011	SL-10	Operable Unit 1	5/10/2011	1172864.836	711953.2531	2.8		12	14	--	--	2	1,473	2,945	109	164	148,413	415,557	0.00046
SUP_SL_10 14-16_051011	SL-10	Operable Unit 1	5/10/2011	1172864.836	711953.2531	21		14	16	14	15	1	1,473	1,473	55	82	74,207	1,528,657	0.0017
SUP_SL_11 4-5_051011	SL-11	Operable Unit 1	5/10/2011	1172839.343	711925.7514	38,100		4	5	0	5	5	1,520	7,602	282	422	383,053	14,594,335,715	16
SUP_SL_11 5-6_051011	SL-11	Operable Unit 1	5/10/2011	1172839.343	711925.7514	1,720		5	6	--	--	1	1,520	1,520	56	84	76,611	131,770,380	0.15
SUP_SL_11 6-8_051011_DC	SL-11	Operable Unit 1	5/10/2011	1172839.343	711925.7514	1,110		6	8	--	--	2	1,520	3,041	113	169	153,221	170,075,723	0.19
SUP_SL_11 8-10_051011	SL-11	Operable Unit 1	5/10/2011	1172839.343	711925.7514	342		8	10	--	--	2	1,520	3,041	113	169	153,221	52,401,709	0.058
SUP_SL_11 10-12_051011	SL-11	Operable Unit 1	5/10/2011	1172839.343	711925.7514	388		10	12	--	--	2	1,520	3,041	113	169	153,221	59,449,892	0.066
SUP_SL_11 12-14_051011	SL-11	Operable Unit 1	5/10/2011	1172839.343	711925.7514	76		12	14	--	--	2	1,520	3,041	113	169	153,221	11,583,536	0.013
SUP_SL_11 14-16_051011	SL-11	Operable Unit 1	5/10/2011	1172839.343	711925.7514	81		14	16	14	15	1	1,520	1,520	56	84	76,611	6,174,821	0.0068
SUP_SL_12 3-4_051011	SL-12	Operable Unit 1	5/10/2011	1172813.85	711898.2496	4,300		3	4	0	4	4	1,114	4,458	165	248	224,617	965,854,466	1.1
SUP_SL_12 4-5_051011	SL-12	Operable Unit 1	5/10/2011	1172813.85	711898.2496	1,410		4	5	--	--	1	1,114	1,114	41	62	56,154	79,177,604	0.087
SUP_SL_12 5-6_051011	SL-12	Operable Unit 1	5/10/2011	1172813.85	711898.2496	7,750	J	5	6	--	--	1	1,114	1,114	41	62	56,154	435,196,053	0.48
SUP_SL_12 6-8_051011	SL-12	Operable Unit 1	5/10/2011	1172813.85	711898.2496	1,220		6	8	--	--	2	1,114	2,229	83	124	112,309	137,016,564	0.15
SUP_SL_12 8-10_051011	SL-12	Operable Unit 1	5/10/2011	1172813.85	711898.2496	380		8	10	--	--	2	1,114	2,229	83	124	112,309	42,677,290	0.047
SUP_SL_12 10-12_051011	SL-12	Operable Unit 1	5/10/2011	1172813.85	711898.2496	300		10	12	--	--	2	1,114	2,229	83	124	112,309	33,692,598	0.037
SUP_SL_12 12-14_051011	SL-12	Operable Unit 1	5/10/2011	1172813.85	711898.2496	115		12	14	--	--	2	1,114	2,229	83	124	112,309	12,915,496	0.014
SUP_SL_12 14-16_051011	SL-12	Operable Unit 1	5/10/2011	1172813.85	711898.2496	34		14	16	14	15	1	1,114	1,114	41	62	56,154	1,920,478	0.0021
SUP_SL_13 3-4_051011	SL-13	Operable Unit 1	5/10/2011	1172788.357	711870.7478	2,520		3	4	0	4	4	1,576	6,305	234	350	317,688	800,572,545	0.88
SUP_SL_13 4-5_051011	SL-13	Operable Unit 1	5/10/2011	1172788.357	711870.7478	2,200		4	5	--	--	1	1,576	1,576	58	88	79,422	174,728,135	0.19
SUP_SL_13 5-6_051011	SL-13	Operable Unit 1	5/10/2011	1172788.357	711870.7478	922		5	6	--	--	1	1,576	1,576	58	88	79,422	73,226,973	0.081
SUP_SL_13 6-8_051011	SL-13	Operable Unit 1	5/10/2011	1172788.357	711870.7478	579		6	8	--	--	2	1,576	3,152	117	175	158,844	91,970,536	0.10
SUP_SL_13 8-10_051011	SL-13	Operable Unit 1	5/10/2011	1172788.357	711870.7478	812		8	10	--	--	2	1,576	3,152	117	175	158,844	128,981,132	0.14
SUP_SL_13 10-12_051011	SL-13	Operable Unit 1	5/10/2011	1172788.357	711870.7478	647		10	12	--	--	2	1,576	3,152	117	175	158,844	102,771,912	0.11
SUP_SL_13 12-14_051011	SL-13	Operable Unit 1	5/10/2011	1172788.357	711870.7478	203		12	14	--	--	2	1,576	3,152	117	175	158,844	32,245,283	0.036
SUP_SL_13 14-16_051011	SL-13	Operable Unit 1	5/10/2011	1172788.357	711870.7478	87		14	16	14	15	1	1,576	1,576	58	88	79,422	6,933,530	0.0076
SUP_SL_15 2-4_08/11/10_SO	SL-15	Operable Unit 4	8/11/2010	1172682.561	711769.2176	890	^	0	4	--	--	4	1,466	5,862	217	326	295,400	262,905,579	0.29
SUP_SL_15 4-6_08/11/10_SO	SL-15	Operable Unit 4	8/11/2010	1172682.561	711769.2176	350	^	4	6	--	--	2	1,466	2,931	109	163	147,700	51,694,917	0.057
SUP_SL_15 6-8_08/11/10_SO	SL-15	Operable Unit 4	8/11/2010	1172682.561	711769.2176	330	^	6	8	--	--	2	1,466	2,931	109	163	147,700	48,740,922	0.054
SUP_SL_15 8-10_08/11/10_SO	SL-15	Operable Unit 4	8/11/2010	1172682.561	711769.2176	170	^	8	10	--	--	2	1,466	2,931	109	163	147,700	25,108,960	0.028
SUP_SL_15 10-12_08/11/10_SO	SL-15	Operable Unit 4	8/11/2010	1172682.561	711769.2176	340	^	10	12	--	--	2	1,466	2,931	109	163	147,700	50,217,920	0.055
SUP_SL_15 12-14_08/11/10_SO	SL-15	Operable Unit 4	8/11/2010	1172682.561	711769.2176	2.1	J ^	12	14	--	--	2	1,466	2,931	109	163	147,700	310,170	0.00034
SUP_SL_15 14-16_08/11/10_SO	SL-15	Operable Unit 4	8/11/2010	1172682.561	711769.2176	3.6	^	14	16	14	15	1	1,466	1,466	54	81	73,850	265,860	0.00029
SUP_SL_16 3-4_051011	SL-16	Operable Unit 1	5/10/2011	1172760.855	711896.2409	8,510		3	4	0	4	4	2,102	8,408	311	467	423,655	3,605,306,137	4.0
SUP_SL_16 4-5_051011	SL-16	Operable Unit 1	5/10/2011	1172760.855	711896.2409	565		4	5	--	--	1	2,102	2,102	78	117	105,914	59,841,303	0.066
SUP_SL_16 5-6_051011	SL-16	Operable Unit 1	5/10/2011	1172760.855	711896.2409	383		5	6	--	--	1	2,102	2,102	78	117	105,914	40,564,990	0.045
SUP_SL_16 6-8_051011	SL-16	Operable Unit 1	5/10/2011	1172760.855	711896.2409	39		6	8	--	--	2	2,102	4,204	156	234	211,828	8,176,546	0.0090
SUP_SL_16 8-10_051011	SL-16	Operable Unit 1	5/10/2011	1172760.855	711896.2409	38		8	10	--	--	2	2,102	4,204	156	234	211,828	7,943,536	0.0088
SUP_SL_16 10-12_051011	SL-16	Operable Unit 1	5/10/2011	1172760.855	711896.2409	124		10	12	--	--	2	2,102	4,204	156	234	211,828	26,266,625	0.029
SUP_SL_16 12-14_051011	SL-16	Operable Unit 1	5/10/2011	1172760.855	711896.2409	34	J	12	14	--	--	2	2,102	4,204	156	234	211,828	7,286,870	0.0080
SUP_SL_16 14-16_051011	SL-16	Operable Unit 1	5/10/2011	1172760.855	711896.2409	48		14	16	14	15	1	2,102	2,102	78	117	105,914	5,105,046	0.0056
SUP_SL_17 3-4_080211	SL-17	Operable Unit 1	8/2/2011	1172786.348	711923.7427	4,200		3	4	0	4	4	1,406	5,625	208	312	283,437	1,190,436,310	1.3
SUP_SL_17 8-10_051011	SL-17	Operable Unit 1	5/10/2011	1172786.348	711923.7427	923		8	10	--	--	2	1,406	2,813	104	156	141,719	130,806,275	0.14
SUP_SL_17 10-12_080211	SL-17	Operable Unit 1	8/2/2011	1172786.348	711923.7427	549		10	12	--	--	2	1,406	2,813	104	156	141,719	77,803,516	0.086
SUP_SL_17 12-14_080211	SL-17	Operable Unit 1	8/2/2011	1172786.348	711923.7427	27		12	14	--	--	2	1,406	2,813	104	156	141,719	3,868,918	0.0043
SUP_SL_17 14-16_080211	SL-17	Operable Unit 1	8/2/2011	1172786.348	711923.7427	71		14	16	14	15	1	1,406	1,406	52	78	70,859	5,031,011	0.0055
SUP_SL_18 3-4_051111	SL-18	Operable Unit 1	5/11/2011	1172811.841	711951.2445	38,100	J	3	4	0	4	4	1,406	5,625	208	312	283,437	10,798,957,951	12
SUP_SL_18 4-5_051111	SL-18	Operable Unit 1	5/11/2011	1172811.841	711951.2445	25,000		4	5	--	--	1	1,406	1,406	52	78	70,859	1,771,482,604	2.0

Table 1: RI Soil Boring Sample Results and Attributes

Sample ID	Site ID	Operable Unit	Date	X Coordinate[1]	Y Coordinate[1]	Arsenic Concentration (mg/kg)		Sample Top (ft bgs)	Sample Bottom (ft bgs)	Adjusted Sample Top[2] (ft bgs)	Adjusted Sample Bottom[2] (ft bgs)	Total Height (ft)	Thiessen Polygon Area (ft^2)	Volume (ft^3)	Volume (yd^3)	Soil Weight (US tons)	Soil Weight (kg)	Arsenic Weight (mg)	Arsenic Weight (US tons)
						Result	Qualifier												
SUP_SL_18 5-6_051111	SL-18	Operable Unit 1	5/11/2011	1172811.841	711951.2445	28,300		5	6	--	--	1	1,406	1,406	52	78	70,859	2,005,318,307	2.2
SUP_SL_18 6-8_051111	SL-18	Operable Unit 1	5/11/2011	1172811.841	711951.2445	22,300		6	8	--	--	2	1,406	2,813	104	156	141,719	3,160,324,965	3.5
SUP_SL_18 8-10_051111	SL-18	Operable Unit 1	5/11/2011	1172811.841	711951.2445	8,320		8	10	--	--	2	1,406	2,813	104	156	141,719	1,179,098,821	1.3
SUP_SL_18 10-12_051111	SL-18	Operable Unit 1	5/11/2011	1172811.841	711951.2445	2,080		10	12	--	--	2	1,406	2,813	104	156	141,719	294,774,705	0.32
SUP_SL_18 12-14_051111	SL-18	Operable Unit 1	5/11/2011	1172811.841	711951.2445	224		12	14	--	--	2	1,406	2,813	104	156	141,719	31,744,968	0.035
SUP_SL_18 14-16_051111	SL-18	Operable Unit 1	5/11/2011	1172811.841	711951.2445	137		14	16	14	15	1	1,406	1,406	52	78	70,859	9,707,725	0.011
SUP_SL_19 5-6_051111	SL-19	Operable Unit 1	5/11/2011	1172837.334	711978.7463	1,890		5	6	0	6	6	1,796	10,775	399	599	542,930	1,026,137,052	1.1
SUP_SL_19 6-8_051111	SL-19	Operable Unit 1	5/11/2011	1172837.334	711978.7463	664		6	8	--	--	2	1,796	3,592	133	200	180,977	120,168,431	0.13
SUP_SL_19 8-10_051111	SL-19	Operable Unit 1	5/11/2011	1172837.334	711978.7463	390		8	10	--	--	2	1,796	3,592	133	200	180,977	70,580,855	0.078
SUP_SL_19 10-12_051111	SL-19	Operable Unit 1	5/11/2011	1172837.334	711978.7463	5.3	J	10	12	--	--	2	1,796	3,592	133	200	180,977	959,176	0.0011
SUP_SL_19 12-14_051111	SL-19	Operable Unit 1	5/11/2011	1172837.334	711978.7463	9.3	J	12	14	--	--	2	1,796	3,592	133	200	180,977	1,683,082	0.0019
SUP_SL_19 14-16_051111	SL-19	Operable Unit 1	5/11/2011	1172837.334	711978.7463	45		14	16	14	15	1	1,796	1,796	67	100	90,488	4,090,070	0.0045
SUP_SL_2 1-2_08/11/10_SO	SL-2	Operable Unit 4	8/11/2010	1172790.385	711775.6981	46		3	4	0	4	4	982	3,928	145	218	197,904	9,103,583	0.010
SUP_SL_2 2-4_08/11/10_SO	SL-2	Operable Unit 4	8/11/2010	1172790.385	711775.6981	380		4	6	--	--	2	982	1,964	73	109	98,952	37,601,756	0.041
SUP_SL_2 4-6_08/11/10_SO	SL-2	Operable Unit 4	8/11/2010	1172790.385	711775.6981	280		6	8	--	--	2	982	1,964	73	109	98,952	27,706,557	0.031
SUP_SL_2 6-8_08/11/10_SO	SL-2	Operable Unit 4	8/11/2010	1172790.385	711775.6981	920		8	10	--	--	2	982	1,964	73	109	98,952	91,035,830	0.10
SUP_SL_2 8-10_08/11/10_SO	SL-2	Operable Unit 4	8/11/2010	1172790.385	711775.6981	500		8	10	--	--	2	982	1,964	73	109	98,952	49,475,994	0.055
SUP_SL_2 10-12_08/11/10_SO	SL-2	Operable Unit 4	8/11/2010	1172790.385	711775.6981	110		10	12	--	--	2	982	1,964	73	109	98,952	10,884,719	0.012
SUP_SL_2 12-14_08/11/10_SO	SL-2	Operable Unit 4	8/11/2010	1172790.385	711775.6981	2.8		12	14	--	--	2	982	1,964	73	109	98,952	277,066	0.00031
SUP_SL_2 14-16_08/11/10_SO	SL-2	Operable Unit 4	8/11/2010	1172790.385	711775.6981	1.5	J	14	16	14	15	1	982	982	36	55	49,476	74,214	0.000082
SUP_SL_20 0-1_08/02/10_SO	SL-20	Operable Unit 2	8/2/2010	1172874.679	712023.5035	30		6	7	0	7	7	1,795	12,563	465	698	633,048	18,991,427	0.021
SUP_SL_20 1-2_08/02/10_SO	SL-20	Operable Unit 2	8/2/2010	1172874.679	712023.5035	1,100		7	8	--	--	1	1,795	1,795	66	100	90,435	99,478,905	0.11
SUP_SL_20 8-10_081211	SL-20	Operable Unit 2	8/12/2011	1172874.679	712023.5035	59		8	10	--	--	2	1,795	3,590	133	199	180,871	10,653,286	0.012
SUP_SL_20 10-12_081211	SL-20	Operable Unit 2	8/12/2011	1172874.679	712023.5035	25		10	12	--	--	2	1,795	3,590	133	199	180,871	4,539,855	0.0050
SUP_SL_20 12-14_081211	SL-20	Operable Unit 2	8/12/2011	1172874.679	712023.5035	3.1		12	14	12	15	3	1,795	5,384	199	299	271,306	841,049	0.00093
SUP_SL_21 0-1_08/02/10_SO	SL-21	Operable Unit 2	8/2/2010	1172899.511	712051.6041	610		6	7	0	7	7	1,375	9,626	357	535	485,060	295,886,349	0.33
SUP_SL_21 1-2_08/02/10_SO	SL-21	Operable Unit 2	8/2/2010	1172899.511	712051.6041	3,100		7	8	--	--	1	1,375	1,375	51	76	69,294	214,812,103	0.24
SUP_SL_21 8-10_081511	SL-21	Operable Unit 2	8/15/2011	1172899.511	712051.6041	77		8	10	--	--	2	1,375	2,750	102	153	138,588	10,699,029	0.012
SUP_SL_21 10-12_081511	SL-21	Operable Unit 2	8/15/2011	1172899.511	712051.6041	12	J	10	12	--	--	2	1,375	2,750	102	153	138,588	1,607,626	0.0018
SUP_SL_21 12-14_081511	SL-21	Operable Unit 2	8/15/2011	1172899.511	712051.6041	4.0		12	14	12	15	3	1,375	4,126	153	229	207,883	831,531	0.00092
SUP_SL_22 0-1_08/02/10_SO	SL-22	Operable Unit 2	8/2/2010	1172871.41	712076.4356	830		6	7	0	7	7	1,705	11,932	442	663	601,253	499,040,178	0.55
SUP_SL_22 1-2_08/02/10_SO	SL-22	Operable Unit 2	8/2/2010	1172871.41	712076.4356	240		7	8	--	--	1	1,705	1,705	63	95	85,893	20,614,396	0.023
SUP_SL_22 8-10_081211	SL-22	Operable Unit 2	8/12/2011	1172871.41	712076.4356	44		8	10	--	--	2	1,705	3,409	126	189	171,787	7,489,897	0.0083
SUP_SL_22 10-12_081211	SL-22	Operable Unit 2	8/12/2011	1172871.41	712076.4356	26		10	12	--	--	2	1,705	3,409	126	189	171,787	4,535,167	0.0050
SUP_SL_22 12-14_081211	SL-22	Operable Unit 2	8/12/2011	1172871.41	712076.4356	2.5		12	14	12	15	3	1,705	5,114	189	284	257,680	644,200	0.00071
SUP_SL_23 0-1_08/02/10_SO	SL-23	Operable Unit 2	8/2/2010	1172846.579	712048.335	1,900		6	7	--	--	1	2,207	2,207	82	123	111,221	211,320,409	0.23
SUP_SL_23 1-2_08/02/10_SO	SL-23	Operable Unit 2	8/2/2010	1172846.579	712048.335	1,900		7	8	--	--	1	2,207	2,207	82	123	111,221	211,320,409	0.23
SUP_SL_23 8-10_081211	SL-23	Operable Unit 2	8/12/2011	1172846.579	712048.335	491		8	10	--	--	2	2,207	4,415	164	245	222,443	109,219,285	0.12
SUP_SL_23 10-12_081211	SL-23	Operable Unit 2	8/12/2011	1172846.579	712048.335	107		10	12	--	--	2	2,207	4,415	164	245	222,443	23,801,351	0.026
SUP_SL_23 12-14_081211	SL-23	Operable Unit 2	8/12/2011	1172846.579	712048.335	15		12	14	12	15	3	2,207	6,622	245	368	333,664	4,971,591	0.0055
SUP_SL_24_3-4_080211	SL-24	Operable Unit 1	8/2/2011	1172809.832	712004.2395	2,550		3	4	0	4	4	1,652	6,609	245	367	333,032	849,231,414	0.94
SUP_SL_24_4-5_080211	SL-24	Operable Unit 1	8/2/2011	1172809.832	712004.2395	1,130		4	5	--	--	1	1,652	1,652	61	92	83,258	94,081,519	0.10
SUP_SL_24 5-6_051111	SL-24	Operable Unit 1	5/11/2011	1172809.832	712004.2395	69		5	6	--	--	1	1,652	1,652	61	92	83,258	5,778,104	0.0064
SUP_SL_24 6-8_051111_DC	SL-24	Operable Unit 1	5/11/2011	1172809.832	712004.2395	161		6	8	--	--	2	1,652	3,305	122	184	166,516	26,725,812	0.029
SUP_SL_24 8-10_051111	SL-24	Operable Unit 1	5/11/2011	1172809.832	712004.2395	379		8	10	--	--	2	1,652	3,305	122	184	166,516	63,109,550	0.070
SUP_SL_24 10-12_051111	SL-24	Operable Unit 1	5/11/2011	1172809.832	712004.2395	803		10	12	--	--	2	1,652	3,305	122	184	166,516	133,712,319	0.15
SUP_SL_24 12-14_051111	SL-24	Operable Unit 1	5/11/2011	1172809.832	712004.2395	38		12	14	--	--	2	1,652	3,305	122	184	166,516	6,327,607	0.0070
SUP_SL_24 14-16_051111	SL-24	Operable Unit 1	5/11/2011	1172809.832	712004.2395	13		14	16	14	15	1	1,652	1,652	61	92	83,258	1,074,028	0.0012
SUP_SL_25 4-5_051111	SL-25	Operable Unit 1	5/11/2011	1172784.339	711976.7377	2,860		4	5	0	5	5	1,086	5,430	201	302	273,616	782,542,995	0.86
SUP_SL_25 5-6_051111	SL-25	Operable Unit 1	5/11/2011	1172784.339	711976.7377	5,220		5	6	--	--	1	1,086	1,086	40	60	54,723	285,655,555	0.31
SUP_SL_25 6-8_051111	SL-25	Operable Unit 1	5/11/2011	1172784.339	711976.7377	3,630		6	8	--	--	2	1,086	2,172	80	121	109,447	397,291,059	0.44

Table 1: RI Soil Boring Sample Results and Attributes

Sample ID	Site ID	Operable Unit	Date	X Coordinate[1]	Y Coordinate[1]	Arsenic Concentration (mg/kg)		Sample Top (ft bgs)	Sample Bottom (ft bgs)	Adjusted Sample Top[2] (ft bgs)	Adjusted Sample Bottom[2] (ft bgs)	Total Height (ft)	Thiessen Polygon Area (ft^2)	Volume (ft^3)	Volume (yd^3)	Soil Weight (US tons)	Soil Weight (kg)	Arsenic Weight (mg)	Arsenic Weight (US tons)
						Result	Qualifier												
SUP_SL_25 8-10_051111	SL-25	Operable Unit 1	5/11/2011	1172784.339	711976.7377	977		8	10	--	--	2	1,086	2,172	80	121	109,447	106,929,302	0.12
SUP_SL_25 10-12_051111	SL-25	Operable Unit 1	5/11/2011	1172784.339	711976.7377	430		10	12	--	--	2	1,086	2,172	80	121	109,447	47,062,026	0.052
SUP_SL_25 12-14_051111	SL-25	Operable Unit 1	5/11/2011	1172784.339	711976.7377	203		12	14	--	--	2	1,086	2,172	80	121	109,447	22,217,654	0.024
SUP_SL_25 14-16_051111	SL-25	Operable Unit 1	5/11/2011	1172784.339	711976.7377	124		14	16	14	15	1	1,086	1,086	40	60	54,723	6,785,688	0.0075
SUP_SL_26 5-9_051011	SL-26	Operable Unit 1	5/10/2011	1172758.846	711949.2359	36,000		5	9	0	9	9	979	8,813	326	490	444,095	15,987,415,425	18
SUP_SL_26 9-10_051011	SL-26	Operable Unit 1	5/10/2011	1172758.846	711949.2359	406		9	10	--	--	1	979	979	36	54	49,344	20,033,613	0.022
SUP_SL_26 10-12_080211	SL-26	Operable Unit 1	8/2/2011	1172758.846	711949.2359	2,020		10	12	--	--	2	979	1,959	73	109	98,688	199,349,254	0.22
SUP_SL_26 12-14_080211	SL-26	Operable Unit 1	8/2/2011	1172758.846	711949.2359	375		12	14	--	--	2	979	1,959	73	109	98,688	37,007,906	0.041
SUP_SL_26 14-16_080211	SL-26	Operable Unit 1	8/2/2011	1172758.846	711949.2359	323		14	16	14	15	1	979	979	36	54	49,344	15,938,072	0.018
SUP_SL_27 3-4_051011	SL-27	Operable Unit 1	5/10/2011	1172733.353	711921.7341	13,200		3	4	0	4	4	1,390	5,560	206	309	280,176	3,698,323,872	4.1
SUP_SL_27 4-5_051011	SL-27	Operable Unit 1	5/10/2011	1172733.353	711921.7341	1,900		4	5	--	--	1	1,390	1,390	51	77	70,044	133,083,624	0.15
SUP_SL_27 5-6_051011	SL-27	Operable Unit 1	5/10/2011	1172733.353	711921.7341	38		5	6	--	--	1	1,390	1,390	51	77	70,044	2,682,686	0.0030
SUP_SL_27 6-8_051011	SL-27	Operable Unit 1	5/10/2011	1172733.353	711921.7341	26		6	8	--	--	2	1,390	2,780	103	154	140,088	3,656,297	0.0040
SUP_SL_27 8-10_051011	SL-27	Operable Unit 1	5/10/2011	1172733.353	711921.7341	14		8	10	--	--	2	1,390	2,780	103	154	140,088	2,017,268	0.0022
SUP_SL_27 10-12_051011	SL-27	Operable Unit 1	5/10/2011	1172733.353	711921.7341	159		10	12	--	--	2	1,390	2,780	103	154	140,088	22,273,996	0.025
SUP_SL_27 12-14_051011	SL-27	Operable Unit 1	5/10/2011	1172733.353	711921.7341	31		12	14	--	--	2	1,390	2,780	103	154	140,088	4,300,702	0.0047
SUP_SL_27 14-16_051011	SL-27	Operable Unit 1	5/10/2011	1172733.353	711921.7341	12		14	16	14	15	1	1,390	1,390	51	77	70,044	861,541	0.00095
SUP_SL_28 1-2_08/12/10_SO	SL-28	Operable Unit 4	8/12/2010	1172641.08	711819.7642	140		1	2	0	2	2	1,744	3,488	129	194	175,732	24,602,491	0.027
SUP_SL_28 2-4_08/12/10_SO	SL-28	Operable Unit 4	8/12/2010	1172641.08	711819.7642	330		2	4	--	--	2	1,744	3,488	129	194	175,732	57,991,587	0.064
SUP_SL_28 4-6_08/12/10_SO	SL-28	Operable Unit 4	8/12/2010	1172641.08	711819.7642	38		4	6	--	--	2	1,744	3,488	129	194	175,732	6,677,819	0.0074
SUP_SL_28 6-8_08/12/10_SO	SL-28	Operable Unit 4	8/12/2010	1172641.08	711819.7642	33		6	8	--	--	2	1,744	3,488	129	194	175,732	5,799,159	0.0064
SUP_SL_28 8-10_08/12/10_SO	SL-28	Operable Unit 4	8/12/2010	1172641.08	711819.7642	26		8	10	--	--	2	1,744	3,488	129	194	175,732	4,569,034	0.0050
SUP_SL_28 10-12_08/12/10_SO	SL-28	Operable Unit 4	8/12/2010	1172641.08	711819.7642	24		10	12	--	--	2	1,744	3,488	129	194	175,732	4,217,570	0.0046
SUP_SL_28 12-14_08/12/10_SO	SL-28	Operable Unit 4	8/12/2010	1172641.08	711819.7642	6.0		12	14	--	--	2	1,744	3,488	129	194	175,732	1,054,392	0.0012
SUP_SL_28 14-16_08/12/10_SO	SL-28	Operable Unit 4	8/12/2010	1172641.08	711819.7642	4.3		14	16	14	15	1	1,744	1,744	65	97	87,866	377,824	0.00042
SUP_SL_29_2-4_11/15/10_SO	SL-29	Operable Unit 4	11/15/2010	1172674.9	711875.0066	31		2	4	0	4	4	768	3,072	114	171	154,818	4,799,367	0.0053
SUP_SL_29_4-6_11/15/10_SO	SL-29	Operable Unit 4	11/15/2010	1172674.9	711875.0066	8.2		4	6	0	6	6	768	4,609	171	256	232,227	1,904,265	0.0021
SUP_SL_29_6-8_11/15/10_SO	SL-29	Operable Unit 4	11/15/2010	1172674.9	711875.0066	3,100		6	8	--	--	2	768	1,536	57	85	77,409	239,968,358	0.26
SUP_SL_29_8-10_11/15/10_SO	SL-29	Operable Unit 4	11/15/2010	1172674.9	711875.0066	1,500		8	10	--	--	2	768	1,536	57	85	77,409	116,113,722	0.13
SUP_SL_29_10-12_11/15/10_SO	SL-29	Operable Unit 4	11/15/2010	1172674.9	711875.0066	560		10	12	--	--	2	768	1,536	57	85	77,409	43,349,123	0.048
SUP_SL_29_12-14_11/15/10_SO	SL-29	Operable Unit 4	11/15/2010	1172674.9	711875.0066	110		12	14	--	--	2	768	1,536	57	85	77,409	8,515,006	0.0094
SUP_SL_29_14-16_11/15/10_SO	SL-29	Operable Unit 4	11/15/2010	1172674.9	711875.0066	69		14	16	14	15	1	768	768	28	43	38,705	2,670,616	0.0029
SUP_SL_3 4-6_08/11/10_SO	SL-3	Operable Unit 4	8/11/2010	1172837.414	711833.6044	13	^	4	6	0	6	6	1,272	7,634	283	424	384,643	5,000,362	0.0055
SUP_SL_3 6-8_08/11/10_SO	SL-3	Operable Unit 4	8/11/2010	1172837.414	711833.6044	160	^	6	8	--	--	2	1,272	2,545	94	141	128,214	20,514,304	0.023
SUP_SL_3 1-2_08/11/10_SO	SL-3	Operable Unit 4	8/11/2010	1172837.414	711833.6044	120	^	6	8	--	--	2	1,272	2,545	94	141	128,214	15,385,728	0.017
SUP_SL_3 8-10_08/11/10_SO	SL-3	Operable Unit 4	8/11/2010	1172837.414	711833.6044	750	^	8	10	--	--	2	1,272	2,545	94	141	128,214	96,160,800	0.11
SUP_SL_3 2-4_08/11/10_SO	SL-3	Operable Unit 4	8/11/2010	1172837.414	711833.6044	8.9	^	8	10	--	--	2	1,272	2,545	94	141	128,214	1,141,108	0.0013
SUP_SL_3 10-12_08/11/10_SO	SL-3	Operable Unit 4	8/11/2010	1172837.414	711833.6044	640	^	10	12	--	--	2	1,272	2,545	94	141	128,214	82,057,216	0.090
SUP_SL_3 12-14_08/11/10_SO	SL-3	Operable Unit 4	8/11/2010	1172837.414	711833.6044	440	^	12	14	--	--	2	1,272	2,545	94	141	128,214	56,414,336	0.062
SUP_SL_3 14-16_08/11/10_SO	SL-3	Operable Unit 4	8/11/2010	1172837.414	711833.6044	190	^	14	16	14	15	1	1,272	1,272	47	71	64,107	12,180,368	0.013
SUP_SL_36 1-2_08/12/10_SO	SL-36	Operable Unit 4	8/12/2010	1172569.111	711867.345	560		1	2	0	2	2	1,703	3,406	126	189	171,634	96,115,299	0.11
SUP_SL_36 2-4_08/12/10_SO	SL-36	Operable Unit 4	8/12/2010	1172569.111	711867.345	37		2	4	0	4	4	1,703	6,812	252	378	343,269	12,700,950	0.014
SUP_SL_36 4-6_08/12/10_SO	SL-36	Operable Unit 4	8/12/2010	1172569.111	711867.345	68		4	6	--	--	2	1,703	3,406	126	189	171,634	11,671,143	0.013
SUP_SL_36 6-8_08/12/10_SO	SL-36	Operable Unit 4	8/12/2010	1172569.111	711867.345	100		6	8	--	--	2	1,703	3,406	126	189	171,634	17,163,446	0.019
SUP_SL_36 8-10_08/12/10_SO	SL-36	Operable Unit 4	8/12/2010	1172569.111	711867.345	110		8	10	--	--	2	1,703	3,406	126	189	171,634	18,879,791	0.021
SUP_SL_36 10-12_08/12/10_SO	SL-36	Operable Unit 4	8/12/2010	1172569.111	711867.345	19		10	12	--	--	2	1,703	3,406	126	189	171,634	3,261,055	0.0036
SUP_SL_36 12-14_08/12/10_SO	SL-36	Operable Unit 4	8/12/2010	1172569.111	711867.345	61		12	14	--	--	2	1,703	3,406	126	189	171,634	10,469,702	0.012
SUP_SL_36 14-16_08/12/10_SO	SL-36	Operable Unit 4	8/12/2010	1172569.111	711867.345	6.8		14	16	14	15	1	1,703	1,703	63	95	85,817	583,557	0.00064
SUP_SL_4 2-4_08/11/10_SO	SL-4	Operable Unit 4	8/11/2010	1172886.478	711890.3296	480	^	2	4	0	4	4	1,996	7,982	296	443	402,228	193,069,390	0.21
SUP_SL_4 4-6_08/11/10_SO	SL-4	Operable Unit 4	8/11/2010	1172886.478	711890.3296	100	^	4	6	--	--	2	1,996	3,991	148	222	201,114	20,111,395	0.022
SUP_SL_4 6-8_08/11/10_SO	SL-4	Operable Unit 4	8/11/2010	1172886.478	711890.3296	3,700	^	6	8	--	--	2	1,996	3,991	148	222	201,114	744,121,607	0.82

Table 1: RI Soil Boring Sample Results and Attributes

Sample ID	Site ID	Operable Unit	Date	X Coordinate^1	Y Coordinate^1	Arsenic Concentration (mg/kg)		Sample Top (ft bgs)	Sample Bottom (ft bgs)	Adjusted Sample Top^2 (ft bgs)	Adjusted Sample Bottom^2 (ft bgs)	Total Height (ft)	Thiessen Polygon Area (ft^2)	Volume (ft^3)	Volume (yd^3)	Soil Weight (US tons)	Soil Weight (kg)	Arsenic Weight (mg)	Arsenic Weight (US tons)
						Result	Qualifier												
SUP_SL_4 8-10_08/11/10_SO	SL-4	Operable Unit 4	8/11/2010	1172886.478	711890.3296	1,000	^	8	10	--	--	2	1,996	3,991	148	222	201,114	201,113,948	0.22
SUP_SL_4 10-12_08/11/10_SO	SL-4	Operable Unit 4	8/11/2010	1172886.478	711890.3296	1,100	^	10	12	--	--	2	1,996	3,991	148	222	201,114	221,225,343	0.24
SUP_SL_4 12-14_08/11/10_SO	SL-4	Operable Unit 4	8/11/2010	1172886.478	711890.3296	32	^	12	14	--	--	2	1,996	3,991	148	222	201,114	6,435,646	0.0071
SUP_SL_4 14-16_08/11/10_SO	SL-4	Operable Unit 4	8/11/2010	1172886.478	711890.3296	29	^	14	16	14	15	1	1,996	1,996	74	111	100,557	2,916,152	0.0032
SUP_SL_43 1-2_080111	SL-43	Operable Unit 4	8/1/2011	1172956.342	711999.2765	333		1	2	0	2	2	1,591	3,181	118	177	160,299	53,379,563	0.059
SUP_SL_43 2-4_080111	SL-43	Operable Unit 4	8/1/2011	1172956.342	711999.2765	23		2	4	--	--	2	1,591	3,181	118	177	160,299	3,734,966	0.0041
SUP_SL_43 4-6_080111	SL-43	Operable Unit 4	8/1/2011	1172956.342	711999.2765	12		4	6	--	--	2	1,591	3,181	118	177	160,299	1,859,468	0.0020
SUP_SL_43 6-8_080111	SL-43	Operable Unit 4	8/1/2011	1172956.342	711999.2765	31		6	8	--	--	2	1,591	3,181	118	177	160,299	4,937,209	0.0054
SUP_SL_43 8-10_080111	SL-43	Operable Unit 4	8/1/2011	1172956.342	711999.2765	14		8	10	--	--	2	1,591	3,181	118	177	160,299	2,228,156	0.0025
SUP_SL_43 10-12_080111	SL-43	Operable Unit 4	8/1/2011	1172956.342	711999.2765	4.1	J	10	12	--	--	2	1,591	3,181	118	177	160,299	657,226	0.00072
SUP_SL_43 12-14_080111	SL-43	Operable Unit 4	8/1/2011	1172956.342	711999.2765	18		12	14	--	--	2	1,591	3,181	118	177	160,299	2,885,382	0.0032
SUP_SL_43 14-16_080111	SL-43	Operable Unit 4	8/1/2011	1172956.342	711999.2765	1.3	J	14	16	14	15	1	1,591	1,591	59	88	80,149	104,194	0.00011
SUP_SL_44 1-2_080111	SL-44	Operable Unit 4	8/1/2011	1172857.747	711860.7779	24	J	1	2	0	2	2	984	1,967	73	109	99,118	2,339,189	0.0026
SUP_SL_44 2-4_080111	SL-44	Operable Unit 4	8/1/2011	1172857.747	711860.7779	608		2	4	--	--	2	984	1,967	73	109	99,118	60,263,848	0.066
SUP_SL_44 4-6_080111	SL-44	Operable Unit 4	8/1/2011	1172857.747	711860.7779	57		4	6	--	--	2	984	1,967	73	109	99,118	5,669,559	0.0062
SUP_SL_44 6-8_080111	SL-44	Operable Unit 4	8/1/2011	1172857.747	711860.7779	6,970		6	8	--	--	2	984	1,967	73	109	99,118	690,853,652	0.76
SUP_SL_44 8-10_080111	SL-44	Operable Unit 4	8/1/2011	1172857.747	711860.7779	1,900		8	10	--	--	2	984	1,967	73	109	99,118	188,324,525	0.21
SUP_SL_44 10-12_080111	SL-44	Operable Unit 4	8/1/2011	1172857.747	711860.7779	1,460		10	12	--	--	2	984	1,967	73	109	99,118	144,712,530	0.16
SUP_SL_44 12-14_080111	SL-44	Operable Unit 4	8/1/2011	1172857.747	711860.7779	555		12	14	--	--	2	984	1,967	73	109	99,118	55,010,585	0.061
SUP_SL_44 14-16_080111	SL-44	Operable Unit 4	8/1/2011	1172857.747	711860.7779	104		14	16	14	15	1	984	984	36	55	49,559	5,154,145	0.0057
SUP_SL_45 1-2_080111	SL-45	Operable Unit 4	8/1/2011	1172810.88	711805.0941	21		1	2	0	2	2	855	1,711	63	95	86,193	1,827,299	0.0020
SUP_SL_45 2-4_080111	SL-45	Operable Unit 4	8/1/2011	1172810.88	711805.0941	68		2	4	--	--	2	855	1,711	63	95	86,193	5,826,669	0.0064
SUP_SL_45 4-6_080111	SL-45	Operable Unit 4	8/1/2011	1172810.88	711805.0941	4,080		4	6	--	--	2	855	1,711	63	95	86,193	351,668,799	0.39
SUP_SL_45 6-8_080111	SL-45	Operable Unit 4	8/1/2011	1172810.88	711805.0941	2,640		6	8	--	--	2	855	1,711	63	95	86,193	227,550,399	0.25
SUP_SL_45 8-10_080111	SL-45	Operable Unit 4	8/1/2011	1172810.88	711805.0941	1,010	B	8	10	--	--	2	855	1,711	63	95	86,193	87,055,266	0.096
SUP_SL_45 10-12_080111	SL-45	Operable Unit 4	8/1/2011	1172810.88	711805.0941	245	B	10	12	--	--	2	855	1,711	63	95	86,193	21,117,367	0.023
SUP_SL_45 12-14_080111	SL-45	Operable Unit 4	8/1/2011	1172810.88	711805.0941	8.6	B	12	14	--	--	2	855	1,711	63	95	86,193	741,263	0.00082
SUP_SL_45 14-16_080111	SL-45	Operable Unit 4	8/1/2011	1172810.88	711805.0941	68	B	14	16	14	15	1	855	855	32	48	43,097	2,917,644	0.0032
SUP_SL_46 1-2_080111	SL-46	Operable Unit 4	8/1/2011	1172786.788	711826.9132	209	B	1	2	0	2	2	1,547	3,094	115	172	155,914	32,586,058	0.036
SUP_SL_46 2-4_080111	SL-46	Operable Unit 4	8/1/2011	1172786.788	711826.9132	58	B	2	4	--	--	2	1,547	3,094	115	172	155,914	9,058,612	0.010
SUP_SL_46 4-6_080111	SL-46	Operable Unit 4	8/1/2011	1172786.788	711826.9132	607	B	4	6	--	--	2	1,547	3,094	115	172	155,914	94,639,890	0.10
SUP_SL_46 6-8_080111	SL-46	Operable Unit 4	8/1/2011	1172786.788	711826.9132	23,700	B	6	8	--	--	2	1,547	3,094	115	172	155,914	3,695,165,399	4.1
SUP_SL_46 8-10_080111_DC	SL-46	Operable Unit 4	8/1/2011	1172786.788	711826.9132	9,020	B	8	10	--	--	2	1,547	3,094	115	172	155,914	1,406,345,650	1.6
SUP_SL_46 10-12_080111	SL-46	Operable Unit 4	8/1/2011	1172786.788	711826.9132	1,390	B	10	12	--	--	2	1,547	3,094	115	172	155,914	216,720,671	0.24
SUP_SL_46 12-14_080111	SL-46	Operable Unit 4	8/1/2011	1172786.788	711826.9132	726	B	12	14	--	--	2	1,547	3,094	115	172	155,914	113,193,674	0.12
SUP_SL_46 14-16_080111	SL-46	Operable Unit 4	8/1/2011	1172786.788	711826.9132	170	B	14	16	14	15	1	1,547	1,547	57	86	77,957	13,252,703	0.015
SUP_SL_49 1-2_080211	SL-49	Operable Unit 4	8/2/2011	1172701.786	711852.9162	22		1	2	0	2	2	1,601	3,202	119	178	161,332	3,533,170	0.0039
SUP_SL_49 2-4_080211	SL-49	Operable Unit 4	8/2/2011	1172701.786	711852.9162	912		2	4	--	--	2	1,601	3,202	119	178	161,332	147,134,747	0.16
SUP_SL_49 4-6_080211	SL-49	Operable Unit 4	8/2/2011	1172701.786	711852.9162	896		4	6	--	--	2	1,601	3,202	119	178	161,332	144,553,436	0.16
SUP_SL_49 6-8_080211	SL-49	Operable Unit 4	8/2/2011	1172701.786	711852.9162	838		6	8	--	--	2	1,601	3,202	119	178	161,332	135,196,182	0.15
SUP_SL_49 8-10_080411	SL-49	Operable Unit 4	8/4/2011	1172701.786	711852.9162	256		8	10	--	--	2	1,601	3,202	119	178	161,332	41,300,982	0.046
SUP_SL_49 10-12_080411	SL-49	Operable Unit 4	8/4/2011	1172701.786	711852.9162	19		10	12	--	--	2	1,601	3,202	119	178	161,332	3,113,707	0.0034
SUP_SL_49 12-14_080211	SL-49	Operable Unit 4	8/2/2011	1172701.786	711852.9162	84		12	14	--	--	2	1,601	3,202	119	178	161,332	13,584,151	0.015
SUP_SL_49 14-16_080211	SL-49	Operable Unit 4	8/2/2011	1172701.786	711852.9162	104		14	16	14	15	1	1,601	1,601	59	89	80,666	8,389,262	0.0092
SUP_SL_50 1-2_080211	SL-50	Operable Unit 4	8/2/2011	1172681.638	711880.2212	146		1	2	0	2	2	1,137	2,274	84	126	114,605	16,732,386	0.018
SUP_SL_50 2-4_080211	SL-50	Operable Unit 4	8/2/2011	1172681.638	711880.2212	30	J	2	4	--	--	2	1,137	2,274	84	126	114,605	3,392,319	0.0037
SUP_SL_50 8-10_080411	SL-50	Operable Unit 4	8/4/2011	1172681.638	711880.2212	342		8	10	--	--	2	1,137	2,274	84	126	114,605	39,195,041	0.043
SUP_SL_50 10-12_080411	SL-50	Operable Unit 4	8/4/2011	1172681.638	711880.2212	37		10	12	--	--	2	1,137	2,274	84	126	114,605	4,274,781	0.0047
SUP_SL_50 12-14_080211_DC	SL-50	Operable Unit 4	8/2/2011	1172681.638	711880.2212	51		12	14	--	--	2	1,137	2,274	84	126	114,605	5,799,032	0.0064
SUP_SL_50 14-16_080211	SL-50	Operable Unit 4	8/2/2011	1172681.638	711880.2212	50		14	16	14	15	1	1,137	1,137	42	63	57,303	2,842,213	0.0031
SUP_SL_7 0-1_08/02/10_SO	SL-7	Operable Unit 2	8/2/2010	1172927.611	712026.7726	680		6	7	0	7	7	1,408	9,855	365	548	496,587	337,678,846	0.37

Table 1: RI Soil Boring Sample Results and Attributes

Sample ID	Site ID	Operable Unit	Date	X Coordinate[1]	Y Coordinate[1]	Arsenic Concentration (mg/kg)		Sample Top (ft bgs)	Sample Bottom (ft bgs)	Adjusted Sample Top[2] (ft bgs)	Adjusted Sample Bottom[2] (ft bgs)	Total Height (ft)	Thiessen Polygon Area (ft^2)	Volume (ft^3)	Volume (yd^3)	Soil Weight (US tons)	Soil Weight (kg)	Arsenic Weight (mg)	Arsenic Weight (US tons)
						Result	Qualifier												
SUP_SL_7 1-2_08/02/10_SO	SL-7	Operable Unit 2	8/2/2010	1172927.611	712026.7726	1,200		7	8	--	--	1	1,408	1,408	52	78	70,941	85,129,121	0.094
SUP_SL_7 8-10_081711	SL-7	Operable Unit 2	8/17/2011	1172927.611	712026.7726	512	J	8	10	--	--	2	1,408	2,816	104	156	141,882	72,643,516	0.080
SUP_SL_7 10-12_081711	SL-7	Operable Unit 2	8/17/2011	1172927.611	712026.7726	17	J	10	12	--	--	2	1,408	2,816	104	156	141,882	2,341,051	0.0026
SUP_SL_7 12-14_081711	SL-7	Operable Unit 2	8/17/2011	1172927.611	712026.7726	12	J	12	14	12	15	3	1,408	4,224	156	235	212,823	2,532,591	0.0028
SUP_SL_72_4-6_082412	SL-72	Operable Unit 4	8/24/2012	1172872.775	711853.349	22		4	6	0	6	6	540	3,243	120	180	163,399	3,545,750	0.0039
SUP_SL_72_6-8_082412	SL-72	Operable Unit 4	8/24/2012	1172872.775	711853.349	2,810		6	8	--	--	2	540	1,081	40	60	54,466	153,050,029	0.17
SUP_SL_72_8-10_082412	SL-72	Operable Unit 4	8/24/2012	1172872.775	711853.349	8,170		8	10	--	--	2	540	1,081	40	60	54,466	444,988,875	0.49
SUP_SL_72_10-12_082412	SL-72	Operable Unit 4	8/24/2012	1172872.775	711853.349	2,000		10	12	--	--	2	540	1,081	40	60	54,466	108,932,405	0.12
SUP_SL_72_12-14_082412	SL-72	Operable Unit 4	8/24/2012	1172872.775	711853.349	2,030		12	14	--	--	2	540	1,081	40	60	54,466	110,566,391	0.12
SUP_SL_72_14-16_082412	SL-72	Operable Unit 4	8/24/2012	1172872.775	711853.349	980		14	16	14	15	1	540	540	20	30	27,233	26,688,439	0.029
SUP_SL_73_2-4_082412	SL-73	Operable Unit 4	8/24/2012	1172822.209	711800.087	505		2	4	0	4	4	393	1,570	58	87	79,132	39,961,885	0.044
SUP_SL_73_6-8_082412	SL-73	Operable Unit 4	8/24/2012	1172822.209	711800.087	73		6	8	--	--	2	393	785	29	44	39,566	2,872,508	0.0032
SUP_SL_73_8-10_082412	SL-73	Operable Unit 4	8/24/2012	1172822.209	711800.087	660		8	10	--	--	2	393	785	29	44	39,566	26,113,707	0.029
SUP_SL_73_10-12_082412	SL-73	Operable Unit 4	8/24/2012	1172822.209	711800.087	626		10	12	--	--	2	393	785	29	44	39,566	24,768,456	0.027
SUP_SL_73_12-14_082412	SL-73	Operable Unit 4	8/24/2012	1172822.209	711800.087	300		12	14	--	--	2	393	785	29	44	39,566	11,869,867	0.013
SUP_SL_73_14-16_082412_DC	SL-73	Operable Unit 4	8/24/2012	1172822.209	711800.087	135		14	16	14	15	1	393	393	15	22	19,783	2,670,720	0.0029
SUP_SL_74_2-4_082412	SL-74	Operable Unit 4	8/24/2012	1172781.325	711761.822	1,150		2	4	0	4	4	325	1,298	48	72	65,407	75,217,505	0.083
SUP_SL_74_4-6_082412	SL-74	Operable Unit 4	8/24/2012	1172781.325	711761.822	804		4	6	--	--	2	325	649	24	36	32,703	26,293,424	0.029
SUP_SL_74_6-8_082412	SL-74	Operable Unit 4	8/24/2012	1172781.325	711761.822	523		6	8	--	--	2	325	649	24	36	32,703	17,103,807	0.019
SUP_SL_74_8-10_082412	SL-74	Operable Unit 4	8/24/2012	1172781.325	711761.822	4,440		8	10	--	--	2	325	649	24	36	32,703	145,202,489	0.16
SUP_SL_74_10-12_082412	SL-74	Operable Unit 4	8/24/2012	1172781.325	711761.822	4.2	J	10	12	--	--	2	325	649	24	36	32,703	137,354	0.00015
SUP_SL_74_12-14_082412	SL-74	Operable Unit 4	8/24/2012	1172781.325	711761.822	280		12	14	--	--	2	325	649	24	36	32,703	9,156,914	0.010
SUP_SL_74_14-16_082412	SL-74	Operable Unit 4	8/24/2012	1172781.325	711761.822	3.7	J	14	16	14	15	1	325	325	12	18	16,352	60,501	0.000067
SO-SL-78-052516-2-4	SL-78	Operable Unit 4	5/25/2016	1172707.985	711756.3831	108		2	4	0	4	4	1,314	5,255	195	292	264,779	28,596,158	0.032
SO-SL-78-052516-4-6	SL-78	Operable Unit 4	5/25/2016	1172707.985	711756.3831	103		4	6	--	--	2	1,314	2,627	97	146	132,390	13,636,131	0.015
SO-SL-78-052516-6-8	SL-78	Operable Unit 4	5/25/2016	1172707.985	711756.3831	65		6	8	--	--	2	1,314	2,627	97	146	132,390	8,605,325	0.0095
SO-SL-78-052516-8-10	SL-78	Operable Unit 4	5/25/2016	1172707.985	711756.3831	1,900	F2	8	10	--	--	2	1,314	2,627	97	146	132,390	251,540,276	0.28
SO-SL-78-052516-10-12	SL-78	Operable Unit 4	5/25/2016	1172707.985	711756.3831	469		10	12	--	--	2	1,314	2,627	97	146	132,390	62,090,731	0.068
SO-SL-78-052516-12-14	SL-78	Operable Unit 4	5/25/2016	1172707.985	711756.3831	3.4	U	12	14	--	--	2	1,314	2,627	97	146	132,390	450,125	0.00050
SO-SL-78-052516-14-15	SL-78	Operable Unit 4	5/25/2016	1172707.985	711756.3831	3.5	U	14	15	--	--	1	1,314	1,314	49	73	66,195	231,682	0.00026
SO-SL-79-052516-1-2	SL-79	Operable Unit 1	5/25/2016	1172811.9	711864.5576	204		1	2	0	2	2	1,183	2,365	88	131	119,192	24,315,122	0.027
SO-SL-79-052516-2-4_DC	SL-79	Operable Unit 1	5/25/2016	1172811.9	711864.5576	1,706		2	4	--	--	2	1,183	2,365	88	131	119,192	203,341,167	0.22
SO-SL-79-052516-4-6	SL-79	Operable Unit 1	5/25/2016	1172811.9	711864.5576	15,254		4	6	--	--	2	1,183	2,365	88	131	119,192	1,818,151,323	2.0
SO-SL-79-052516-6-8	SL-79	Operable Unit 1	5/25/2016	1172811.9	711864.5576	25,139		6	8	--	--	2	1,183	2,365	88	131	119,192	2,996,362,010	3.3
SO-SL-79-052516-8-10	SL-79	Operable Unit 1	5/25/2016	1172811.9	711864.5576	8,500		8	10	--	--	2	1,183	2,365	88	131	119,192	1,013,130,080	1.1
SO-SL-79-052516-10-12	SL-79	Operable Unit 1	5/25/2016	1172811.9	711864.5576	3,100		10	12	--	--	2	1,183	2,365	88	131	119,192	369,494,500	0.41
SO-SL-79-052516-12-14	SL-79	Operable Unit 1	5/25/2016	1172811.9	711864.5576	1,400		12	14	--	--	2	1,183	2,365	88	131	119,192	166,868,484	0.18
SO-SL-79-052516-14-15	SL-79	Operable Unit 1	5/25/2016	1172811.9	711864.5576	740		14	15	--	--	1	1,183	1,183	44	66	59,596	44,100,956	0.049
SUP_SL_8 0-1_08/02/10_SO	SL-8	Operable Unit 2	8/2/2010	1172902.78	711998.6719	1,400		6	7	0	7	7	1,554	10,876	403	604	548,052	767,273,061	0.85
SUP_SL_8 1-2_08/02/10_SO_DC	SL-8	Operable Unit 2	8/2/2010	1172902.78	711998.6719	2,450		7	8	--	--	1	1,554	1,554	58	86	78,293	191,818,265	0.21
SUP_SL_8 8-10_081511_DC	SL-8	Operable Unit 2	8/15/2011	1172902.78	711998.6719	182		8	10	--	--	2	1,554	3,108	115	173	156,586	28,420,421	0.031
SUP_SL_8 10-12_081511	SL-8	Operable Unit 2	8/15/2011	1172902.78	711998.6719	39		10	12	--	--	2	1,554	3,108	115	173	156,586	6,044,233	0.0067
SUP_SL_8 12-14_081511	SL-8	Operable Unit 2	8/15/2011	1172902.78	711998.6719	18		12	14	12	15	3	1,554	4,661	173	259	234,880	4,110,391	0.0045
SO-SL-80-052516-2-4	SL-80	Operable Unit 1	5/25/2016	1172837.879	711891.6013	167		2	4	0	4	4	1,199	4,795	178	266	241,639	40,353,657	0.044
SO-SL-80-052516-4-6	SL-80	Operable Unit 1	5/25/2016	1172837.879	711891.6013	9,400		4	6	--	--	2	1,199	2,398	89	133	120,819	1,135,701,736	1.3
SO-SL-80-052516-6-8	SL-80	Operable Unit 1	5/25/2016	1172837.879	711891.6013	13,598		6	8	--	--	2	1,199	2,398	89	133	120,819	1,642,901,299	1.8
SO-SL-80-052516-8-10	SL-80	Operable Unit 1	5/25/2016	1172837.879	711891.6013	14,119		8	10	--	--	2	1,199	2,398	89	133	120,819	1,705,848,171	1.9
SO-SL-80-052516-10-12	SL-80	Operable Unit 1	5/25/2016	1172837.879	711891.6013	6,200		10	12	--	--	2	1,199	2,398	89	133	120,819	749,079,868	0.83
SO-SL-80-052516-12-14_DC	SL-80	Operable Unit 1	5/25/2016	1172837.879	711891.6013	319		12	14	--	--	2	1,199	2,398	89	133	120,819	38,480,958	0.042
SO-SL-80-052516-14-15	SL-80	Operable Unit 1	5/25/2016	1172837.879	711891.6013	65		14	15	--	--	1	1,199	1,199	44	67	60,410	3,926,628	0.0043
SO-SL-82-052416-1-2	SL-82	Operable Unit 4	5/24/2016	1172889.836	711945.6885	19		1	2	0	2	2	1,965	3,931	146	218	198,062	3,763,186	0.0041

Table 1: RI Soil Boring Sample Results and Attributes

Sample ID	Site ID	Operable Unit	Date	X Coordinate[1]	Y Coordinate[1]	Arsenic Concentration (mg/kg)		Sample Top (ft bgs)	Sample Bottom (ft bgs)	Adjusted Sample Top[2] (ft bgs)	Adjusted Sample Bottom[2] (ft bgs)	Total Height (ft)	Thiessen Polygon Area (ft^2)	Volume (ft^3)	Volume (yd^3)	Soil Weight (US tons)	Soil Weight (kg)	Arsenic Weight (mg)	Arsenic Weight (US tons)
						Result	Qualifier												
SO-SL-82-052416-2-4	SL-82	Operable Unit 4	5/24/2016	1172889.836	711945.6885	392		2	4	--	--	2	1,965	3,931	146	218	198,062	77,640,461	0.086
SO-SL-82-052416-4-6	SL-82	Operable Unit 4	5/24/2016	1172889.836	711945.6885	200		4	6	--	--	2	1,965	3,931	146	218	198,062	39,612,480	0.044
SO-SL-82-052416-6-8	SL-82	Operable Unit 4	5/24/2016	1172889.836	711945.6885	1,283		6	8	--	--	2	1,965	3,931	146	218	198,062	254,114,059	0.28
SO-SL-82-052416-8-10	SL-82	Operable Unit 4	5/24/2016	1172889.836	711945.6885	28		8	10	--	--	2	1,965	3,931	146	218	198,062	5,545,747	0.0061
SO-SL-82-052416-10-12	SL-82	Operable Unit 4	5/24/2016	1172889.836	711945.6885	29		10	12	--	--	2	1,965	3,931	146	218	198,062	5,743,810	0.0063
SO-SL-82-052416-12-14	SL-82	Operable Unit 4	5/24/2016	1172889.836	711945.6885	4.4		12	14	--	--	2	1,965	3,931	146	218	198,062	871,475	0.00096
SO-SL-82-052416-14-15	SL-82	Operable Unit 4	5/24/2016	1172889.836	711945.6885	3.1	U	14	15	--	--	1	1,965	1,965	73	109	99,031	306,997	0.00034
SO-SL-83-052516-1-2	SL-83	Operable Unit 4	5/25/2016	1172915.815	711972.7322	220		1	2	0	2	2	1,860	3,720	138	207	187,453	41,239,556	0.045
SO-SL-83-052516-2-4	SL-83	Operable Unit 4	5/25/2016	1172915.815	711972.7322	89		2	4	--	--	2	1,860	3,720	138	207	187,453	16,683,275	0.018
SO-SL-83-052516-4-6	SL-83	Operable Unit 4	5/25/2016	1172915.815	711972.7322	45		4	6	--	--	2	1,860	3,720	138	207	187,453	8,435,364	0.0093
SO-SL-83-052516-6-8	SL-83	Operable Unit 4	5/25/2016	1172915.815	711972.7322	75		6	8	--	--	2	1,860	3,720	138	207	187,453	14,058,939	0.015
SO-SL-83-052516-8-10	SL-83	Operable Unit 4	5/25/2016	1172915.815	711972.7322	93		8	10	--	--	2	1,860	3,720	138	207	187,453	17,433,085	0.019
SO-SL-83-052516-10-12	SL-83	Operable Unit 4	5/25/2016	1172915.815	711972.7322	236		10	12	--	--	2	1,860	3,720	138	207	187,453	44,238,796	0.049
SO-SL-83-052516-12-14	SL-83	Operable Unit 4	5/25/2016	1172915.815	711972.7322	4.8		12	14	--	--	2	1,860	3,720	138	207	187,453	899,772	0.00099
SO-SL-83-052516-14-15	SL-83	Operable Unit 4	5/25/2016	1172915.815	711972.7322	2.5	U	14	15	--	--	1	1,860	1,860	69	103	93,726	234,316	0.00026
SO-SL-85-052516-2-4	SL-85	Operable Unit 4	5/25/2016	1172653.898	711808.3404	97		2	4	0	4	4	1,364	5,455	202	303	274,849	26,660,347	0.029
SO-SL-85-052516-4-6	SL-85	Operable Unit 4	5/25/2016	1172653.898	711808.3404	1,300		4	6	--	--	2	1,364	2,727	101	152	137,424	178,651,813	0.20
SO-SL-85-052516-6-8	SL-85	Operable Unit 4	5/25/2016	1172653.898	711808.3404	148		6	8	--	--	2	1,364	2,727	101	152	137,424	20,338,822	0.022
SO-SL-85-052516-8-10	SL-85	Operable Unit 4	5/25/2016	1172653.898	711808.3404	110		8	10	--	--	2	1,364	2,727	101	152	137,424	15,116,692	0.017
SO-SL-85-052516-10-12_DC	SL-85	Operable Unit 4	5/25/2016	1172653.898	711808.3404	155		10	12	--	--	2	1,364	2,727	101	152	137,424	21,300,793	0.023
SO-SL-85-052516-12-14	SL-85	Operable Unit 4	5/25/2016	1172653.898	711808.3404	6.2		12	14	--	--	2	1,364	2,727	101	152	137,424	852,032	0.00094
SO-SL-85-052516-14-15	SL-85	Operable Unit 4	5/25/2016	1172653.898	711808.3404	3.2	U	14	15	--	--	1	1,364	1,364	51	76	68,712	219,879	0.00024
SO-SL-86-052516-2-4	SL-86	Operable Unit 4	5/25/2016	1172679.877	711835.3841	187		2	4	0	4	4	1,348	5,392	200	300	271,672	50,802,745	0.056
SO-SL-86-052516-4-6	SL-86	Operable Unit 4	5/25/2016	1172679.877	711835.3841	251		4	6	--	--	2	1,348	2,696	100	150	135,836	34,094,890	0.038
SO-SL-86-052516-6-8	SL-86	Operable Unit 4	5/25/2016	1172679.877	711835.3841	103		6	8	--	--	2	1,348	2,696	100	150	135,836	13,991,130	0.015
SO-SL-86-052516-8-10	SL-86	Operable Unit 4	5/25/2016	1172679.877	711835.3841	55		8	10	--	--	2	1,348	2,696	100	150	135,836	7,470,992	0.0082
SO-SL-86-052516-10-12	SL-86	Operable Unit 4	5/25/2016	1172679.877	711835.3841	49		10	12	--	--	2	1,348	2,696	100	150	135,836	6,655,975	0.0073
SO-SL-86-052516-12-14_DC	SL-86	Operable Unit 4	5/25/2016	1172679.877	711835.3841	3.5	U	12	14	--	--	2	1,348	2,696	100	150	135,836	475,427	0.00052
SO-SL-86-052516-14-15	SL-86	Operable Unit 4	5/25/2016	1172679.877	711835.3841	14		14	15	--	--	1	1,348	1,348	50	75	67,918	950,854	0.0010
SO-SL-88-052516-2-4	SL-88	Operable Unit 4	5/25/2016	1172599.811	711860.2978	710		2	4	0	4	4	1,493	5,972	221	332	300,932	213,661,877	0.24
SO-SL-88-052516-4-6	SL-88	Operable Unit 4	5/25/2016	1172599.811	711860.2978	457		4	6	--	--	2	1,493	2,986	111	166	150,466	68,763,013	0.076
SO-SL-88-052516-6-8	SL-88	Operable Unit 4	5/25/2016	1172599.811	711860.2978	110		6	8	--	--	2	1,493	2,986	111	166	150,466	16,551,272	0.018
SO-SL-88-052516-8-10	SL-88	Operable Unit 4	5/25/2016	1172599.811	711860.2978	64		8	10	8	15	7	1,493	10,451	387	581	526,631	33,704,409	0.037
Totals for Operable Units 1, 2, and 4													**397,589**	**861,921**	**31,923**	**47,884**	**43,431,186**	**96,684,502,443**	**107**
Operable Unit 3 Soil Borings																			
OU3 SB1 3-4 (XRF)	OU3 SB1	Operable Unit 3	3/30/2022	1172723.65	712055.12	10.0		3	4	0	5	5	790	3,951	146	219	199,080	1,990,803	0.0022
OU3 SB1 6-7 (XRF)	OU3 SB1	Operable Unit 3	3/30/2022	1172723.65	712055.12	10.0		6	7	5	7.75	2.75	790	2,173	80	121	109,494	1,094,941	0.0012
OU3 SB1 8.5-9.5 (XRF)	OU3 SB1	Operable Unit 3	3/30/2022	1172723.65	712055.12	174		8.5	9.5	7.75	9.5	1.75	790	1,383	51	77	69,678	12,136,820	0.013
OU3-SB1-9.5-10-0322	OU3 SB1	Operable Unit 3	3/30/2022	1172723.65	712055.12	43		9.5	10	9.5	15	5.5	790	4,346	161	241	218,988	9,372,698	0.010
OU3 SB2 3-4 (XRF)	OU3 SB2	Operable Unit 3	3/31/2022	1172590.6	711997.17	10.0		3	4	0	5	5	452	2,259	84	126	113,835	1,138,347	0.0013
OU3 SB2 6-7 (XRF)	OU3 SB2	Operable Unit 3	3/31/2022	1172590.6	711997.17	16		6	7	5	8	3	452	1,355	50	75	68,301	1,126,500	0.0012
OU3 SB2 9-9.5 (XRF)	OU3 SB2	Operable Unit 3	3/31/2022	1172590.6	711997.17	32		9	9.5	8	9.5	1.5	452	678	25	38	34,150	1,080,242	0.0012
OU3-SB2-9-9.5-033122	OU3 SB2	Operable Unit 3	3/31/2022	1172590.6	711997.17	29		9.5	10	9.5	15	5.5	452	2,485	92	138	125,218	3,581,239	0.0039
OU3 SB3 3-4 (XRF)	OU3 SB3	Operable Unit 3	3/31/2022	1172670.25	712094.97	10		3	4	0	5	5	796	3,982	147	221	200,660	2,098,126	0.0023
OU3 SB3 6-7 (XRF)	OU3 SB3	Operable Unit 3	3/31/2022	1172670.25	712094.97	10.0		6	7	5	8	3	796	2,389	88	133	120,396	1,203,961	0.0013
OU3 SB3 9-9.5 (XRF)	OU3 SB3	Operable Unit 3	3/31/2022	1172670.25	712094.97	52		9	9.5	8	9.5	1.5	796	1,195	44	66	60,198	3,130,299	0.0035
OU3-SB3-9.5-10-0322	OU3 SB3	Operable Unit 3	3/31/2022	1172670.25	712094.97	51		9.5	10	9.5	15	5.5	796	4,380	162	243	220,726	11,345,327	0.013
OU3 SB4 3-4 (XRF)	OU3 SB4	Operable Unit 3	3/30/2022	1172690.82	712075.83	10.0		3	4	0	5	5	766	3,828	142	213	192,868	1,928,676	0.0021
OU3 SB4 6-7 (XRF)	OU3 SB4	Operable Unit 3	3/30/2022	1172690.82	712075.83	47		6	7	5	8	3	766	2,297	85	128	115,721	5,471,071	0.0060
OU3 SB4 9-9.5 (XRF)	OU3 SB4	Operable Unit 3	3/30/2022	1172690.82	712075.83	376		9	9.5	8	9.5	1.5	766	1,148	43	64	57,860	21,744,177	0.024
OU3-SB4-9.5-10-0322	OU3 SB4	Operable Unit 3	3/30/2022	1172690.82	712075.83	36		9.5	10	9.5	15	5.5	766	4,210	156	234	212,154	7,689,533	0.0085

Table 1: RI Soil Boring Sample Results and Attributes

Sample ID	Site ID	Operable Unit	Date	X Coordinate^{1}	Y Coordinate^{1}	Arsenic Concentration (mg/kg)		Sample Top (ft bgs)	Sample Bottom (ft bgs)	Adjusted Sample Top^{2} (ft bgs)	Adjusted Sample Bottom^{2} (ft bgs)	Total Height (ft)	Thiessen Polygon Area (ft^{2})	Volume (ft^{3})	Volume (yd^{3})	Soil Weight (US tons)	Soil Weight (kg)	Arsenic Weight (mg)	Arsenic Weight (US tons)
						Result	Qualifier												
OU3 SB5 3-4 (XRF)	OU3 SB5	Operable Unit 3	3/31/2022	1172790.16	712096.65	15		3	4	0	5	5	1,286	6,428	238	357	323,889	4,887,870	0.0054
OU3 SB5 6-7 (XRF)	OU3 SB5	Operable Unit 3	3/31/2022	1172790.16	712096.65	10.0		6	7	5	8	3	1,286	3,857	143	214	194,334	1,943,336	0.0021
OU3 SB5 9-9.5 (XRF)	OU3 SB5	Operable Unit 3	3/31/2022	1172790.16	712096.65	21		9	9.5	8	10	2	1,286	2,571	95	143	129,556	2,777,343	0.0031
OU3-SB5-10.5-11-0322	OU3 SB5	Operable Unit 3	3/31/2022	1172790.16	712096.65	10.0		10.5	11	10	15	5	1,286	6,428	238	357	323,889	3,235,655	0.0036
OU3 SB6 3-4 (XRF)	OU3 SB6	Operable Unit 3	3/30/2022	1172744.52	712034.26	10.0		3	4	0	5	5	880	4,401	163	244	221,744	2,217,436	0.0024
OU3 SB6 6-7 (XRF)	OU3 SB6	Operable Unit 3	3/30/2022	1172744.52	712034.26	169		6	7	5	8	3	880	2,640	98	147	133,046	22,442,138	0.025
OU3 SB6 9-9.5 (XRF)	OU3 SB6	Operable Unit 3	3/30/2022	1172744.52	712034.26	230		9	9.5	8	9.5	1.5	880	1,320	49	73	66,523	15,300,311	0.017
OU3-SB6-9.5-10-0322	OU3 SB6	Operable Unit 3	3/30/2022	1172744.52	712034.26	1,270		9.5	10	9.5	15	5.5	880	4,841	179	269	243,918	309,775,868	0.34
OU3 SB7 3-4 (XRF)	OU3 SB7	Operable Unit 3	3/30/2022	1172758.64$^{(3)}$	712003.74$^{(3)}$	62		3	4	0	5	5	574	2,871	106	159	144,658	9,009,032	0.0099
OU3 SB7 6-7 (XRF)	OU3 SB7	Operable Unit 3	3/30/2022	1172758.64$^{(3)}$	712003.74$^{(3)}$	81		6	7	5	8	3	574	1,722	64	96	86,795	7,065,986	0.0078
OU3 SB7 9-9.5 (XRF)	OU3 SB7	Operable Unit 3	3/30/2022	1172758.64$^{(3)}$	712003.74$^{(3)}$	15,499		9	9.5	8	9.5	1.5	574	861	32	48	43,397	672,622,817	0.74
OU3-SB7-9.5-10-0322	OU3 SB7	Operable Unit 3	3/30/2022	1172758.64$^{(3)}$	712003.74$^{(3)}$	668		9.5	10	9.5	15	5.5	574	3,158	117	175	159,123	106,294,358	0.12
SO-SL-100-052516-1-2	SL-100	Operable Unit 3	5/25/2016	1172596.616	712019.3647	6.2		1	2	0	2	2	604	1,209	45	67	60,899	377,572	0.00042
SO-SL-100-052516-2-4	SL-100	Operable Unit 3	5/25/2016	1172596.616	712019.3647	3.8		2	4	--	--	2	604	1,209	45	67	60,899	231,415	0.00026
SO-SL-100-052516-4-6	SL-100	Operable Unit 3	5/25/2016	1172596.616	712019.3647	4.2		4	6	--	--	2	604	1,209	45	67	60,899	255,774	0.00028
SO-SL-100-052516-6-8	SL-100	Operable Unit 3	5/25/2016	1172596.616	712019.3647	84		6	8	--	--	2	604	1,209	45	67	60,899	5,115,486	0.0056
SO-SL-100-052516-8-10	SL-100	Operable Unit 3	5/25/2016	1172596.616	712019.3647	18		8	10	--	--	2	604	1,209	45	67	60,899	1,096,176	0.0012
SO-SL-100-052516-10-12	SL-100	Operable Unit 3	5/25/2016	1172596.616	712019.3647	116		10	12	--	--	2	604	1,209	45	67	60,899	7,064,242	0.0078
SO-SL-100-052516-12-14	SL-100	Operable Unit 3	5/25/2016	1172596.616	712019.3647	35		12	14	--	--	2	604	1,209	45	67	60,899	2,131,452	0.0023
SO-SL-100-052516-14-15	SL-100	Operable Unit 3	5/25/2016	1172596.616	712019.3647	9.6		14	15	--	--	1	604	604	22	34	30,449	292,313	0.00032
SO-SL-101-052316-1-2	SL-101	Operable Unit 3	5/23/2016	1172648.573	712073.452	5.8		1	2	0	2	2	2,048	4,096	152	228	206,372	1,196,955	0.0013
SO-SL-101-052316-2-4	SL-101	Operable Unit 3	5/23/2016	1172648.573	712073.452	3.5	U	2	4	--	--	2	2,048	4,096	152	228	206,372	722,300	0.00080
SO-SL-101-052316-4-6	SL-101	Operable Unit 3	5/23/2016	1172648.573	712073.452	3.7	U	4	6	--	--	2	2,048	4,096	152	228	206,372	763,575	0.00084
SO-SL-101-052316-6-8	SL-101	Operable Unit 3	5/23/2016	1172648.573	712073.452	35		6	8	--	--	2	2,048	4,096	152	228	206,372	7,223,003	0.0080
SO-SL-101-052316-8-10	SL-101	Operable Unit 3	5/23/2016	1172648.573	712073.452	32		8	10	--	--	2	2,048	4,096	152	228	206,372	6,603,889	0.0073
SO-SL-101-052316-10-12	SL-101	Operable Unit 3	5/23/2016	1172648.573	712073.452	124		10	12	--	--	2	2,048	4,096	152	228	206,372	25,590,068	0.028
SO-SL-101-052316-12-14	SL-101	Operable Unit 3	5/23/2016	1172648.573	712073.452	48		12	14	--	--	2	2,048	4,096	152	228	206,372	9,905,833	0.011
SO-SL-101-052316-14-15	SL-101	Operable Unit 3	5/23/2016	1172648.573	712073.452	9.8		14	15	--	--	1	2,048	2,048	76	114	103,186	1,011,220	0.0011
SO-SL-102-052516-1-2	SL-102	Operable Unit 3	5/25/2016	1172569.572	712045.3434	2.7	U	1	2	0	2	2	1,134	2,267	84	126	114,250	308,474	0.00034
SO-SL-102-052516-2-4	SL-102	Operable Unit 3	5/25/2016	1172569.572	712045.3434	4.0		2	4	--	--	2	1,134	2,267	84	126	114,250	456,999	0.00050
SO-SL-102-052516-4-6	SL-102	Operable Unit 3	5/25/2016	1172569.572	712045.3434	74		4	6	--	--	2	1,134	2,267	84	126	114,250	8,454,473	0.0093
SO-SL-102-052516-6-8	SL-102	Operable Unit 3	5/25/2016	1172569.572	712045.3434	293		6	8	--	--	2	1,134	2,267	84	126	114,250	33,475,144	0.037
SO-SL-102-052516-8-10	SL-102	Operable Unit 3	5/25/2016	1172569.572	712045.3434	144		8	10	--	--	2	1,134	2,267	84	126	114,250	16,451,948	0.018
SO-SL-102-052516-10-12	SL-102	Operable Unit 3	5/25/2016	1172569.572	712045.3434	130		10	12	--	--	2	1,134	2,267	84	126	114,250	14,852,453	0.016
SO-SL-102-052516-12-14	SL-102	Operable Unit 3	5/25/2016	1172569.572	712045.3434	3.4		12	14	--	--	2	1,134	2,267	84	126	114,250	388,449	0.00043
SO-SL-102-052516-14-15	SL-102	Operable Unit 3	5/25/2016	1172569.572	712045.3434	3.5	U	14	15	--	--	1	1,134	1,134	42	63	57,125	199,937	0.00022
SO-SL-103-052516-1-2	SL-103	Operable Unit 3	5/23/2016	1172595.551	712072.3871	12		1	2	0	2	2	1,535	3,070	114	171	154,712	1,856,542	0.0020
SO-SL-103-052516-2-4	SL-103	Operable Unit 3	5/23/2016	1172595.551	712072.3871	3.9		2	4	--	--	2	1,535	3,070	114	171	154,712	603,376	0.00067
SO-SL-103-052516-4-6	SL-103	Operable Unit 3	5/23/2016	1172595.551	712072.3871	3.9	U	4	6	--	--	2	1,535	3,070	114	171	154,712	603,376	0.00067
SO-SL-103-052516-6-8	SL-103	Operable Unit 3	5/23/2016	1172595.551	712072.3871	200		6	8	--	--	2	1,535	3,070	114	171	154,712	30,942,375	0.034
SO-SL-103-052516-8-10	SL-103	Operable Unit 3	5/23/2016	1172595.551	712072.3871	41		8	10	--	--	2	1,535	3,070	114	171	154,712	6,343,187	0.0070
SO-SL-103-052516-10-12	SL-103	Operable Unit 3	5/23/2016	1172595.551	712072.3871	190		10	12	--	--	2	1,535	3,070	114	171	154,712	29,395,256	0.032
SO-SL-103-052516-12-14	SL-103	Operable Unit 3	5/23/2016	1172595.551	712072.3871	83		12	14	--	--	2	1,535	3,070	114	171	154,712	12,841,086	0.014
SO-SL-103-052516-14-15	SL-103	Operable Unit 3	5/23/2016	1172595.551	712072.3871	67		14	15	--	--	1	1,535	1,535	57	85	77,356	5,182,848	0.0057
SUP_SL_34_1-2_11/15/10_SO	SL-34	Operable Unit 3	11/15/2010	1172765.366	712094.246	1.6	J	1	2	0	2	2	1,124	2,248	83	125	113,274	181,239	0.00020
SUP_SL_34_2-4_11/15/10_SO	SL-34	Operable Unit 3	11/15/2010	1172765.366	712094.246	7.4		2	4	--	--	2	1,124	2,248	83	125	113,274	838,228	0.00092
SUP_SL_34_4-6_11/15/10_SO	SL-34	Operable Unit 3	11/15/2010	1172765.366	712094.246	4.7	U	4	6	--	--	2	1,124	2,248	83	125	113,274	532,388	0.00059
SUP_SL_34_6-8_11/15/10_SO	SL-34	Operable Unit 3	11/15/2010	1172765.366	712094.246	4.1	U	6	8	--	--	2	1,124	2,248	83	125	113,274	464,424	0.00051
SUP_SL_34_8-10_11/15/10_SO_DC	SL-34	Operable Unit 3	11/15/2010	1172765.366	712094.246	180		8	10	--	--	2	1,124	2,248	83	125	113,274	20,389,340	0.022
SUP_SL_34_10-12_11/15/10_SO	SL-34	Operable Unit 3	11/15/2010	1172765.366	712094.246	3.7		10	12	--	--	2	1,124	2,248	83	125	113,274	419,114	0.00046
SUP_SL_34_12-14_11/15/10_SO	SL-34	Operable Unit 3	11/15/2010	1172765.366	712094.246	1.9	J	12	14	--	--	2	1,124	2,248	83	125	113,274	215,221	0.00024

Table 1: RI Soil Boring Sample Results and Attributes

Sample ID	Site ID	Operable Unit	Date	X Coordinate[1]	Y Coordinate[1]	Arsenic Concentration (mg/kg)		Sample Top (ft bgs)	Sample Bottom (ft bgs)	Adjusted Sample Top[2] (ft bgs)	Adjusted Sample Bottom[2] (ft bgs)	Total Height (ft)	Thiessen Polygon Area (ft^2)	Volume (ft^3)	Volume (yd^3)	Soil Weight (US tons)	Soil Weight (kg)	Arsenic Weight (mg)	Arsenic Weight (US tons)
						Result	Qualifier												
SUP_SL_34_14-16_11/15/10_SO	SL-34	Operable Unit 3	11/15/2010	1172765.366	712094.246	2.3	J	14	16	14	15	1	1,124	1,124	42	62	56,637	130,265	0.00014
SUP_SL_35_0-1_11/15/10_SO	SL-35	Operable Unit 3	11/15/2010	1172721.485	712046.5426	3.6	U	0	1	--	--	1	690	690	26	38	34,788	125,238	0.00014
SUP_SL_35_1-2_11/15/10_SO	SL-35	Operable Unit 3	11/15/2010	1172721.485	712046.5426	3.4	U	1	2	--	--	1	690	690	26	38	34,788	118,280	0.00013
SUP_SL_35_2-4_11/15/10_SO	SL-35	Operable Unit 3	11/15/2010	1172721.485	712046.5426	3.1	U	2	4	--	--	2	690	1,381	51	77	69,577	215,688	0.00024
SUP_SL_35_4-6_11/15/10_SO	SL-35	Operable Unit 3	11/15/2010	1172721.485	712046.5426	92		4	6	--	--	2	690	1,381	51	77	69,577	6,401,057	0.0071
SUP_SL_35_6-8_11/15/10_SO	SL-35	Operable Unit 3	11/15/2010	1172721.485	712046.5426	180		6	8	--	--	2	690	1,381	51	77	69,577	12,523,807	0.014
SUP_SL_35_8-10_11/15/10_SO	SL-35	Operable Unit 3	11/15/2010	1172721.485	712046.5426	110		8	10	--	--	2	690	1,381	51	77	69,577	7,653,438	0.0084
SUP_SL_35_10-12_11/15/10_SO	SL-35	Operable Unit 3	11/15/2010	1172721.485	712046.5426	660		10	12	--	--	2	690	1,381	51	77	69,577	45,920,626	0.051
SUP_SL_35_12-14_11/15/10_SO	SL-35	Operable Unit 3	11/15/2010	1172721.485	712046.5426	140		12	14	--	--	2	690	1,381	51	77	69,577	9,740,739	0.011
SUP_SL_35_14-16_11/15/10_SO	SL-35	Operable Unit 3	11/15/2010	1172721.485	712046.5426	26		14	16	14	15	1	690	690	26	38	34,788	904,497	0.0010
SUP_SL_38 1-2_08/12/10_SO	SL-38	Operable Unit 3	8/12/2010	1172561.449	711973.134	5.8		1	2	0	2	2	337	673	25	37	33,930	196,793	0.00022
SUP_SL_38 2-4_08/12/10_SO	SL-38	Operable Unit 3	8/12/2010	1172561.449	711973.134	1.7	J	2	4	--	--	2	337	673	25	37	33,930	57,681	0.000064
SUP_SL_38 4-6_08/12/10_SO	SL-38	Operable Unit 3	8/12/2010	1172561.449	711973.134	1.9	J	4	6	--	--	2	337	673	25	37	33,930	64,467	0.000071
SUP_SL_38 6-8_08/12/10_SO	SL-38	Operable Unit 3	8/12/2010	1172561.449	711973.134	11		6	8	--	--	2	337	673	25	37	33,930	373,228	0.00041
SUP_SL_38 8-10_08/12/10_SO	SL-38	Operable Unit 3	8/12/2010	1172561.449	711973.134	4.0	J	8	10	--	--	2	337	673	25	37	33,930	135,719	0.00015
SUP_SL_38 10-12_08/12/10_SO	SL-38	Operable Unit 3	8/12/2010	1172561.449	711973.134	5.1		10	12	--	--	2	337	673	25	37	33,930	173,042	0.00019
SUP_SL_38 12-14_08/12/10_SO	SL-38	Operable Unit 3	8/12/2010	1172561.449	711973.134	5.9		12	14	--	--	2	337	673	25	37	33,930	200,186	0.00022
SUP_SL_38 14-16_08/12/10_SO	SL-38	Operable Unit 3	8/12/2010	1172561.449	711973.134	7.2		14	16	14	15	1	337	337	12	19	16,965	122,147	0.00013
SUP_SL_39_1-2_11/15/10_SO	SL-39	Operable Unit 3	11/15/2010	1172610.513	712029.8592	3.1	U	1	2	0	2	2	1,894	3,787	140	210	190,838	591,597	0.00065
SUP_SL_39_2-4_11/15/10_SO	SL-39	Operable Unit 3	11/15/2010	1172610.513	712029.8592	3.0	U	2	4	--	--	2	1,894	3,787	140	210	190,838	572,513	0.00063
SUP_SL_39_4-6_11/15/10_SO	SL-39	Operable Unit 3	11/15/2010	1172610.513	712029.8592	0.53	J	4	6	--	--	2	1,894	3,787	140	210	190,838	101,144	0.00011
SUP_SL_39_6-8_11/15/10_SO	SL-39	Operable Unit 3	11/15/2010	1172610.513	712029.8592	3.1	U	6	8	--	--	2	1,894	3,787	140	210	190,838	591,597	0.00065
SUP_SL_39_8-10_11/15/10_SO	SL-39	Operable Unit 3	11/15/2010	1172610.513	712029.8592	48		8	10	--	--	2	1,894	3,787	140	210	190,838	9,160,207	0.010
SUP_SL_39_10-12_11/15/10_SO	SL-39	Operable Unit 3	11/15/2010	1172610.513	712029.8592	510		10	12	--	--	2	1,894	3,787	140	210	190,838	97,327,201	0.11
SUP_SL_39_12-14_11/15/10_SO_DC	SL-39	Operable Unit 3	11/15/2010	1172610.513	712029.8592	1,300		12	14	--	--	2	1,894	3,787	140	210	190,838	248,088,942	0.27
SUP_SL_39_14-16_11/15/10_SO	SL-39	Operable Unit 3	11/15/2010	1172610.513	712029.8592	280		14	16	14	15	1	1,894	1,894	70	105	95,419	26,717,271	0.029
SUP_SL_40_0-1_11/15/10_SO	SL-40	Operable Unit 3	11/15/2010	1172659.577	712086.5845	220		0	1	--	--	1	644	644	24	36	32,471	7,143,580	0.0079
SUP_SL_40_1-2_11/15/10_SO	SL-40	Operable Unit 3	11/15/2010	1172659.577	712086.5845	17		1	2	--	--	1	644	644	24	36	32,471	552,004	0.00061
SUP_SL_40_2-4_11/15/10_SO	SL-40	Operable Unit 3	11/15/2010	1172659.577	712086.5845	3.4	U	2	4	--	--	2	644	1,289	48	72	64,942	220,802	0.00024
SUP_SL_40_4-6_11/15/10_SO	SL-40	Operable Unit 3	11/15/2010	1172659.577	712086.5845	27		4	6	--	--	2	644	1,289	48	72	64,942	1,753,424	0.0019
SUP_SL_40_6-8_11/15/10_SO	SL-40	Operable Unit 3	11/15/2010	1172659.577	712086.5845	140		6	8	--	--	2	644	1,289	48	72	64,942	9,091,829	0.010
SUP_SL_40_8-10_11/15/10_SO	SL-40	Operable Unit 3	11/15/2010	1172659.577	712086.5845	120		8	10	--	--	2	644	1,289	48	72	64,942	7,792,997	0.0086
SUP_SL_40_10-12_11/15/10_SO	SL-40	Operable Unit 3	11/15/2010	1172659.577	712086.5845	13		10	12	--	--	2	644	1,289	48	72	64,942	844,241	0.00093
SUP_SL_40_12-14_11/15/10_SO	SL-40	Operable Unit 3	11/15/2010	1172659.577	712086.5845	3.4		12	14	--	--	2	644	1,289	48	72	64,942	220,802	0.00024
SUP_SL_40_14-16_11/15/10_SO	SL-40	Operable Unit 3	11/15/2010	1172659.577	712086.5845	5.6		14	16	14	15	1	644	644	24	36	32,471	181,837	0.00020
SUP_SL_51 0-1_080311	SL-51	Operable Unit 3	8/3/2011	1172694.663	712073.0967	6.0	J	0	1	--	--	1	769	769	28	43	38,750	232,501	0.00026
SUP_SL_51 1-2_080311	SL-51	Operable Unit 3	8/3/2011	1172694.663	712073.0967	8.9	J	1	2	--	--	1	769	769	28	43	38,750	344,877	0.00038
SUP_SL_51 2-4_080311	SL-51	Operable Unit 3	8/3/2011	1172694.663	712073.0967	6.1	J	2	4	--	--	2	769	1,538	57	85	77,500	472,752	0.00052
SUP_SL_51 4-6_080311	SL-51	Operable Unit 3	8/3/2011	1172694.663	712073.0967	13	J	4	6	--	--	2	769	1,538	57	85	77,500	1,015,255	0.0011
SUP_SL_51 6-8_080311	SL-51	Operable Unit 3	8/3/2011	1172694.663	712073.0967	44	J	6	8	--	--	2	769	1,538	57	85	77,500	3,441,016	0.0038
SUP_SL_51 8-10_080311	SL-51	Operable Unit 3	8/3/2011	1172694.663	712073.0967	675		8	10	--	--	2	769	1,538	57	85	77,500	52,312,737	0.058
SUP_SL_51 10-12_080311	SL-51	Operable Unit 3	8/3/2011	1172694.663	712073.0967	271		10	12	--	--	2	769	1,538	57	85	77,500	21,002,595	0.023
SUP_SL_51 12-14_080311	SL-51	Operable Unit 3	8/3/2011	1172694.663	712073.0967	11	J	12	14	--	--	2	769	1,538	57	85	77,500	844,754	0.00093
SUP_SL_51 14-16_080311	SL-51	Operable Unit 3	8/3/2011	1172694.663	712073.0967	5.2		14	16	14	15	1	769	769	28	43	38,750	201,501	0.00022
SUP_SL_52 1-2_080411	SL-52	Operable Unit 3	8/4/2011	1172601.819	711984.7256	2.6		1	2	0	2	2	502	1,004	37	56	50,593	131,543	0.00014
SUP_SL_52 2-4_080411	SL-52	Operable Unit 3	8/4/2011	1172601.819	711984.7256	8.4	U	2	4	--	--	2	502	1,004	37	56	50,593	424,984	0.00047
SUP_SL_52 4-6_080411	SL-52	Operable Unit 3	8/4/2011	1172601.819	711984.7256	6.3		4	6	--	--	2	502	1,004	37	56	50,593	318,738	0.00035
SUP_SL_52 6-8_080411	SL-52	Operable Unit 3	8/4/2011	1172601.819	711984.7256	2.9		6	8	--	--	2	502	1,004	37	56	50,593	146,721	0.00016
SUP_SL_52 8-10_080411	SL-52	Operable Unit 3	8/4/2011	1172601.819	711984.7256	288		8	10	--	--	2	502	1,004	37	56	50,593	14,570,875	0.016
SUP_SL_52 10-12_080411	SL-52	Operable Unit 3	8/4/2011	1172601.819	711984.7256	16,000		10	12	--	--	2	502	1,004	37	56	50,593	809,493,063	0.89
SUP_SL_52 12-14_080411	SL-52	Operable Unit 3	8/4/2011	1172601.819	711984.7256	257		12	14	--	--	2	502	1,004	37	56	50,593	13,002,482	0.014

Table 1: RI Soil Boring Sample Results and Attributes

Sample ID	Site ID	Operable Unit	Date	X Coordinate^1	Y Coordinate^1	Arsenic Concentration (mg/kg)		Sample Top (ft bgs)	Sample Bottom (ft bgs)	Adjusted Sample Top^2 (ft bgs)	Adjusted Sample Bottom^2 (ft bgs)	Total Height (ft)	Thiessen Polygon Area (ft^2)	Volume (ft^3)	Volume (yd^3)	Soil Weight (US tons)	Soil Weight (kg)	Arsenic Weight (mg)	Arsenic Weight (US tons)
						Result	Qualifier												
SUP_SL_52 14-16_080411	SL-52	Operable Unit 3	8/4/2011	1172601.819	711984.7256	431		14	16	14	15	1	502	502	19	28	25,297	10,902,860	0.012
SO-SL-89-052316-1-2	SL-89	Operable Unit 3	5/23/2016	1172755.683	712022.5596	4.1		1	2	0	2	2	632	1,264	47	70	63,687	261,117	0.00029
SO-SL-89-052316-2-4_DC	SL-89	Operable Unit 3	5/23/2016	1172755.683	712022.5596	4.5		2	4	--	--	2	632	1,264	47	70	63,687	286,592	0.00032
SO-SL-89-052316-4-6	SL-89	Operable Unit 3	5/23/2016	1172755.683	712022.5596	3.7	U	4	6	--	--	2	632	1,264	47	70	63,687	235,642	0.00026
SO-SL-89-052316-6-8	SL-89	Operable Unit 3	5/23/2016	1172755.683	712022.5596	810		6	8	--	--	2	632	1,264	47	70	63,687	51,586,517	0.057
SO-SL-89-052316-8-10	SL-89	Operable Unit 3	5/23/2016	1172755.683	712022.5596	24		8	10	--	--	2	632	1,264	47	70	63,687	1,528,489	0.0017
SO-SL-89-052316-10-12	SL-89	Operable Unit 3	5/23/2016	1172755.683	712022.5596	31		10	12	--	--	2	632	1,264	47	70	63,687	1,974,299	0.0022
SO-SL-89-052316-12-14	SL-89	Operable Unit 3	5/23/2016	1172755.683	712022.5596	8.2		12	14	--	--	2	632	1,264	47	70	63,687	522,234	0.00058
SO-SL-89-052316-14-15	SL-89	Operable Unit 3	5/23/2016	1172755.683	712022.5596	25		14	15	--	--	1	632	632	23	35	31,844	796,088	0.00088
SO-SL-90-052316-1-2	SL-90	Operable Unit 3	5/23/2016	1172781.662	712049.6033	62		1	2	0	2	2	1,978	3,956	147	220	199,358	12,360,221	0.014
SO-SL-90-052316-2-4	SL-90	Operable Unit 3	5/23/2016	1172781.662	712049.6033	3.7	U	2	4	--	--	2	1,978	3,956	147	220	199,358	737,626	0.00081
SO-SL-90-052316-4-6	SL-90	Operable Unit 3	5/23/2016	1172781.662	712049.6033	110		4	6	--	--	2	1,978	3,956	147	220	199,358	21,929,424	0.024
SO-SL-90-052316-6-8	SL-90	Operable Unit 3	5/23/2016	1172781.662	712049.6033	510		6	8	--	--	2	1,978	3,956	147	220	199,358	101,672,784	0.11
SO-SL-90-052316-8-10	SL-90	Operable Unit 3	5/23/2016	1172781.662	712049.6033	570		8	10	--	--	2	1,978	3,956	147	220	199,358	113,634,288	0.13
SO-SL-90-052316-10-12	SL-90	Operable Unit 3	5/23/2016	1172781.662	712049.6033	810		10	12	--	--	2	1,978	3,956	147	220	199,358	161,480,305	0.18
SO-SL-90-052316-12-14	SL-90	Operable Unit 3	5/23/2016	1172781.662	712049.6033	19		12	14	--	--	2	1,978	3,956	147	220	199,358	3,787,810	0.0042
SO-SL-90-052316-14-15	SL-90	Operable Unit 3	5/23/2016	1172781.662	712049.6033	3.4	U	14	15	--	--	1	1,978	1,978	73	110	99,679	338,909	0.00037
SO-SL-91-052316-1-2	SL-91	Operable Unit 3	5/23/2016	1172807.64	712076.6469	5.2		1	2	0	2	2	1,203	2,407	89	134	121,276	630,634	0.00070
SO-SL-91-052316-2-4	SL-91	Operable Unit 3	5/23/2016	1172807.64	712076.6469	11		2	4	--	--	2	1,203	2,407	89	134	121,276	1,334,034	0.0015
SO-SL-91-052316-4-6	SL-91	Operable Unit 3	5/23/2016	1172807.64	712076.6469	3.8	U	4	6	--	--	2	1,203	2,407	89	134	121,276	460,848	0.00051
SO-SL-91-052316-6-8	SL-91	Operable Unit 3	5/23/2016	1172807.64	712076.6469	16		6	8	--	--	2	1,203	2,407	89	134	121,276	1,940,414	0.0021
SO-SL-91-052316-8-10	SL-91	Operable Unit 3	5/23/2016	1172807.64	712076.6469	28		8	10	--	--	2	1,203	2,407	89	134	121,276	3,395,724	0.0037
SO-SL-91-052316-10-12	SL-91	Operable Unit 3	5/23/2016	1172807.64	712076.6469	95		10	12	--	--	2	1,203	2,407	89	134	121,276	11,521,206	0.013
SO-SL-91-052316-12-14	SL-91	Operable Unit 3	5/23/2016	1172807.64	712076.6469	6.3		12	14	--	--	2	1,203	2,407	89	134	121,276	764,038	0.00084
SO-SL-91-052316-14-15	SL-91	Operable Unit 3	5/23/2016	1172807.64	712076.6469	3.2	U	14	15	--	--	1	1,203	1,203	45	67	60,638	194,041	0.00021
SO-SL-92-052316-1-2	SL-92	Operable Unit 3	5/23/2016	1172833.619	712103.6905	6.4		1	2	0	2	2	1,447	2,895	107	161	145,850	933,443	0.0010
SO-SL-92-052316-2-4	SL-92	Operable Unit 3	5/23/2016	1172833.619	712103.6905	7.4		2	4	--	--	2	1,447	2,895	107	161	145,850	1,079,294	0.0012
SO-SL-92-052316-4-6	SL-92	Operable Unit 3	5/23/2016	1172833.619	712103.6905	10.0		4	6	--	--	2	1,447	2,895	107	161	145,850	1,458,505	0.0016
SO-SL-92-052316-6-8	SL-92	Operable Unit 3	5/23/2016	1172833.619	712103.6905	9.0	U	6	8	--	--	2	1,447	2,895	107	161	145,850	1,312,654	0.0014
SO-SL-92-052316-8-10_DC	SL-92	Operable Unit 3	5/23/2016	1172833.619	712103.6905	126		8	10	--	--	2	1,447	2,895	107	161	145,850	18,377,162	0.020
SO-SL-92-052316-10-12	SL-92	Operable Unit 3	5/23/2016	1172833.619	712103.6905	4.9		10	12	--	--	2	1,447	2,895	107	161	145,850	714,667	0.00079
SO-SL-92-052316-12-14	SL-92	Operable Unit 3	5/23/2016	1172833.619	712103.6905	3.9	U	12	14	--	--	2	1,447	2,895	107	161	145,850	568,817	0.00063
SO-SL-92-052316-14-15	SL-92	Operable Unit 3	5/23/2016	1172833.619	712103.6905	3.5	U	14	15	--	--	1	1,447	1,447	54	80	72,925	255,238	0.00028
SO-SL-93-052316-1-2	SL-93	Operable Unit 3	5/23/2016	1172754.618	712075.5819	3.5		1	2	0	2	2	1,073	2,146	79	119	108,131	378,460	0.00042
SO-SL-93-052316-2-4	SL-93	Operable Unit 3	5/23/2016	1172754.618	712075.5819	4.2		2	4	--	--	2	1,073	2,146	79	119	108,131	454,152	0.00050
SO-SL-93-052316-4-6	SL-93	Operable Unit 3	5/23/2016	1172754.618	712075.5819	3.9	U	4	6	--	--	2	1,073	2,146	79	119	108,131	421,713	0.00046
SO-SL-93-052316-6-8	SL-93	Operable Unit 3	5/23/2016	1172754.618	712075.5819	8.8		6	8	--	--	2	1,073	2,146	79	119	108,131	951,557	0.0010
SO-SL-93-052316-8-10	SL-93	Operable Unit 3	5/23/2016	1172754.618	712075.5819	36		8	10	--	--	2	1,073	2,146	79	119	108,131	3,892,731	0.0043
SO-SL-93-052316-10-12	SL-93	Operable Unit 3	5/23/2016	1172754.618	712075.5819	180		10	12	--	--	2	1,073	2,146	79	119	108,131	19,463,656	0.021
SO-SL-93-052316-12-14	SL-93	Operable Unit 3	5/23/2016	1172754.618	712075.5819	34		12	14	--	--	2	1,073	2,146	79	119	108,131	3,676,468	0.0041
SO-SL-93-052316-14-15	SL-93	Operable Unit 3	5/23/2016	1172754.618	712075.5819	4.1		14	15	--	--	1	1,073	1,073	40	60	54,066	221,669	0.00024
SO-SL-95-052316-1-2	SL-95	Operable Unit 3	5/23/2016	1172593.635	711969.8107	20		1	2	0	2	2	418	836	31	46	42,106	842,124	0.00093
SO-SL-95-052316-2-4_DC	SL-95	Operable Unit 3	5/23/2016	1172593.635	711969.8107	4.2		2	4	--	--	2	418	836	31	46	42,106	176,846	0.00019
SO-SL-95-052316-4-6	SL-95	Operable Unit 3	5/23/2016	1172593.635	711969.8107	44		4	6	--	--	2	418	836	31	46	42,106	1,852,674	0.0020
SO-SL-95-052316-6-8	SL-95	Operable Unit 3	5/23/2016	1172593.635	711969.8107	20		6	8	--	--	2	418	836	31	46	42,106	842,124	0.00093
SO-SL-95-052316-8-10	SL-95	Operable Unit 3	5/23/2016	1172593.635	711969.8107	8.8		8	10	--	--	2	418	836	31	46	42,106	370,535	0.00041
SO-SL-95-052316-10-12	SL-95	Operable Unit 3	5/23/2016	1172593.635	711969.8107	8.6		10	12	--	--	2	418	836	31	46	42,106	362,114	0.00040
SO-SL-95-052316-12-14	SL-95	Operable Unit 3	5/23/2016	1172593.635	711969.8107	28		12	14	--	--	2	418	836	31	46	42,106	1,178,974	0.0013
SO-SL-95-052316-14-15	SL-95	Operable Unit 3	5/23/2016	1172593.635	711969.8107	200		14	15	--	--	1	418	418	15	23	21,053	4,210,622	0.0046
SO-SL-98-052316-1-2	SL-98	Operable Unit 3	5/23/2016	1172727.574	712101.5606	15		1	2	0	2	2	1,568	3,137	116	174	158,056	2,370,835	0.0026
SO-SL-98-052316-2-4	SL-98	Operable Unit 3	5/23/2016	1172727.574	712101.5606	3.7		2	4	--	--	2	1,568	3,137	116	174	158,056	584,806	0.00064

Table 1: RI Soil Boring Sample Results and Attributes

Sample ID	Site ID	Operable Unit	Date	X Coordinate[1]	Y Coordinate[1]	Arsenic Concentration (mg/kg)		Sample Top (ft bgs)	Sample Bottom (ft bgs)	Adjusted Sample Top[2] (ft bgs)	Adjusted Sample Bottom[2] (ft bgs)	Total Height (ft)	Thiessen Polygon Area (ft^2)	Volume (ft^3)	Volume (yd^3)	Soil Weight (US tons)	Soil Weight (kg)	Arsenic Weight (mg)	Arsenic Weight (US tons)
						Result	Qualifier												
SO-SL-98-052316-4-6	SL-98	Operable Unit 3	5/23/2016	1172727.574	712101.5606	4.1	U	4	6	--	--	2	1,568	3,137	116	174	158,056	648,028	0.00071
SO-SL-98-052316-6-8	SL-98	Operable Unit 3	5/23/2016	1172727.574	712101.5606	6.1		6	8	--	--	2	1,568	3,137	116	174	158,056	964,140	0.0011
SO-SL-98-052316-8-10	SL-98	Operable Unit 3	5/23/2016	1172727.574	712101.5606	33		8	10	--	--	2	1,568	3,137	116	174	158,056	5,215,837	0.0057
SO-SL-98-052316-10-12	SL-98	Operable Unit 3	5/23/2016	1172727.574	712101.5606	23		10	12	--	--	2	1,568	3,137	116	174	158,056	3,635,281	0.0040
SO-SL-98-052316-12-14	SL-98	Operable Unit 3	5/23/2016	1172727.574	712101.5606	15		12	14	--	--	2	1,568	3,137	116	174	158,056	2,370,835	0.0026
SO-SL-98-052316-14-15	SL-98	Operable Unit 3	5/23/2016	1172727.574	712101.5606	6.9		14	15	--	--	1	1,568	1,568	58	87	79,028	545,292	0.00060
Totals for Operable Unit 3													**181,088**	**377,173**	**13,969**	**20,954**	**19,005,328**	**3,497,254,740**	**3.9**

Notes:

bgs: Below ground surface

ft: Feet

kg: Kilogram

mg: Milligram

mg/kg: Milligrams per kilogram

OU: Operable Unit

yd: Yard

[1] Coordinates are provided in the North American Datum (NAD) 83 State Plane Washington South (US Feet).

[2] If the sample top and sample bottom of all samples for one boring did not cover the 0-15 ft bgs interval, the sample tops and sample bottoms were adjusted to cover the entire interval. Shallow samples were assumed to extend to 0 ft bgs (i.e., if the shallowest sample taken at a boring was from 2-4 ft bgs, it was assumed that samples represented the interval from 0-4 ft bgs), and intervals not covered were divided evenly between the two constraining sample intervals (i.e., if a sample was taken from 2-4 ft bgs and from 6-8 ft bgs, the first sample was adjusted to represent the 2-5 ft bgs interval, and the second sample was adjusted to represent the 5-8 ft bgs interval).

[3] OU 3 SB7 was shifted slightly north to be included in the mass calculations for OU 3, as its location is within the loading dock's five-foot buffer.