Pre-Remedial Design Investigation Data Report

South State Street MGP Site
Bellingham, Washington

for
Puget Sound Energy

June 28, 2023

GeoEngineers
Earth Science + Technology

Pre-Remedial Design Investigation Data Report

South State Street MGP Site
Bellingham, Washington

for
Puget Sound Energy

June 28, 2023

GeoEngineers

2101 4th Avenue, Suite 950
Seattle, Washington 98121
206.728.2674

Pre-Remedial Design Investigation Data Report

South State Street MGP Site Bellingham, Washington

File No. 0186-890-03

June 28, 2023

Prepared for:

Puget Sound Energy
PO Box 97034
Bellevue, Washington 98009-9734

Attention: Greg Andrina

Prepared by:

GeoEngineers, Inc.
2101 4th Avenue, Suite 950
Seattle, Washington 98121
206.728.2674

Neil Morton
Project Manager

Brian Tracy
Senior Environmental Engineer

Iain Wingard
Principal

KRA:BJT:NM:IW:leh

Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDICES

List of Acronyms

AO – Agreed Order

ARI – Analytical Resources, LLC

ASTM – ASTM International

bgs – below ground surface

bml – below mud line

BNSF – Burlington Northern/Santa Fe Railroad

CAP – Cleanup Action Plan

Cascade – Cascade Drilling, Inc.

CGS – Coastal Geologic Services, Inc.

City – City of Bellingham

cm - centimeters

COCs – contaminants of concern

cPAH – carcinogenic polycyclic aromatic hydrocarbon

CULs – cleanup levels

DEA – David Evans and Associates, Inc.

DNR – Washington State Department of Natural Resources

Ecology – Washington State Department of Ecology

EDR – Engineering Design Report

ENR – enhanced natural recovery

EPA – U.S. Environmental Protection Agency

FS – feasibility study

GEL – General Engineering Laboratories

GIS – geographic information system

GPS – global positioning system

Gravity – Gravity Environmental

Landau – Landau Associates, Inc.

LSI – Larry Steele Associates, Inc.

mg/L – milligrams per liter

MGP – Manufactured Gas Plant

µg/kg – micrograms per kilogram

µg/L – micrograms per liter

mL - milliliter

MLLW – mean lower low water

MNA – monitored natural attenuation

MNR – monitored natural recovery

MTC – Materials Testing & Consulting, Inc.

MTCA – Model Toxics Cleanup Program

NAVD88 – North American Vertical Datum of 1988

NOAA – National Oceanic and Atmospheric Administration

PID – photoionization detector

Pilot Project – Bellingham Bay Demonstration Pilot Project

PNNL – Pacific Northwest National Laboratories

ppm – parts per million

PRB – permeable reactive barrier

PRDI – Pre-Remedial Design Investigation

PSE – Puget Sound Energy

PSNERP – Puget Sound Nearshore Ecosystem Restoration Project

QAPP – Quality Assurance Project Plan

RCW – Revised Code of Washington

RI – remedial investigation

SAP – Sampling Analysis Plan

SMS – Sediment Management Standards

ST – seepage tests

SV – seepage velocities

SWAC – surface-area weighted average concentration

TEQ – toxic equivalent concentration

TOC – total organic carbon

TPH – total petroleum hydrocarbons

USACE – U.S. Army Corps of Engineers

USGS – United States Geological Survey

VOCs – volatile organic compounds

WAC – Washington Administrative Code

WAD – weak & dissociable

Work Plan – PRDI Work Plan

ZVI – zero-valent iron

1.0 INTRODUCTION

A Pre-Remedial Design Investigation (PRDI) was completed at the South State Street Manufactured Gas Plant Site (Site) in Bellingham, Washington to obtain additional data to support design of the remedial action for the Site. The Site is generally located at Boulevard Park, south[1] of the downtown business district (Figure 1). A Cleanup Action Plan (CAP) was completed that outlines the elements of the remedial action for the Site (Ecology 2020). The remedial action will be completed pursuant to requirements of the Washington State Model Toxics Control Act (MTCA) (Chapter 70A.305 of the Revised Code of Washington [RCW] and Chapter 173-340 of the Washington State Administrative Code [WAC]) and Sediment Management Standards (SMS) (Chapter 173-204 WAC). Remedial design and permitting activities will be conducted under Amendment #2 of Agreed Order (AO) No. DE 7655, (Ecology 2019) between the Washington State Department of Ecology (Ecology), Puget Sound Energy (PSE), and the City of Bellingham (City).

A PRDI Work Plan (Work Plan) was developed and approved by Ecology (GeoEngineers 2020) that describes the additional information collected to support the engineering analysis and design of the remedial action for the Site that includes the following:

- The extent of soil contamination in the upland requiring capping;
- Soil and groundwater conditions where enhanced, in-situ bioremediation is to be performed for treatment of groundwater;
- The extent of the nearshore intertidal capping and components of the cap needed to protect sediment and surface water;
- The extent of conventional and thin layer capping and area of application of enhanced natural recovery (ENR) and monitored natural recovery (MNR); and
- Accretion and erosion at the Site as a result of coastal marine processes.

The Work Plan also provides detailed descriptions of the field and laboratory testing procedures for completion of the PRDI in the Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP).

While completing the PRDI, four work plan addenda were prepared. Field and laboratory testing procedures for work associated with the addenda were completed in accordance with the SAP and QAPP. The four work plan addenda include the following:

- Work Plan Addendum 1 (GeoEngineers 2021a) – describes revised intertidal and subtidal sediment sample locations based on the new carcinogenic polycyclic aromatic hydrocarbon (cPAH) sediment cleanup level of 229 µg/kg toxic equivalent concentration (TEQ).
- Work Plan Addendum 2 (GeoEngineers 2021b) – describes the approach for additional intertidal porewater sampling in the vicinity of porewater sample location PRDI-2 to further evaluate the presence and extent of petroleum-related contamination.

[1] All directions are referenced relative to "project north." The relationship between project north and true north is shown on the figures.

- Work Plan Addendum 3 (GeoEngineers 2022a) – describes the completion of additional direct-push borings and the collection of additional groundwater and soil samples to further evaluate the extent of contamination upgradient of porewater sample location PRDI-2 and to support design of enhanced, in-situ bioremediation for the treatment of groundwater. This addendum also describes the relocation of direct-push borings GP-65 through GP-69 and monitoring well MW-61.
- Work Plan Addendum 4 (GeoEngineers 2022b) - describes the collection of additional intertidal and subtidal surface sediment samples to define the extent of cPAH contamination greater than the sediment cleanup level north of surface sediment locations PRDI-13 and PRDI-15.

The field investigations and deviations from the Work Plan and Work Plan Addenda are discussed in Sections 2 and 3.

1.1. General Site Description

The South State Street Manufactured Gas Plant (MGP) was formerly located on what is now Boulevard Park along the eastern shore of Bellingham Bay (Figure 1). The Site is divided into an Upland Unit and Marine Unit, separated by the mean high tide line (Figure 2). The Upland Unit encompasses the northern portion of Boulevard Park and is further divided into three areas: the upper park, the slope, and the lower park. The former MGP was in the upper park area. The Marine Unit includes aquatic lands of Bellingham Bay. The Upland Unit includes property owned by the City, Burlington Northern/Santa Fe Railroad (BNSF), and Washington State (managed by the Department of Natural Resources [DNR]) (Figure 3). The Marine Unit includes State- and BNSF-owned aquatic land and platted street ROW.

The Site has been used as a public park since approximately 1980. The area comprising the lower park was constructed by placing fill on tidelands formerly occupied by a historic sawmill. The area comprising the upper park was formerly occupied by the MGP facility. Fill in the lower park includes wood waste associated with former lumber mill and log-rafting operations, and materials from local demolition and construction projects. Pilings associated with the former lumber mill wharf likely remain beneath the lower park. The base of one of the former gas holders remains above-ground in the upper park.

1.2. Relationship to Adjacent MTCA Cleanup Sites

Twelve cleanup sites located in the general vicinity of the South State Street Site are part of the Bellingham Bay Demonstration Pilot Project (Pilot Project). The cleanup sites located closest to the South State Street Site are shown in Figure 4. The Pilot Project is a coordinated effort by federal, tribal, state, and local governments to clean up contamination around Bellingham Bay.

Portions of the Whatcom Waterway Site overlap with the Marine Unit of the South State Street Site (Figure 4). In the area of overlap, the Whatcom Waterway cleanup consists of monitored natural recovery (Whatcom Waterway Units 7 and 9 in Figure 4; Anchor QEA 2015). Unit 7 (Starr Rock) encompasses an area where sediment dredged from Whatcom Waterway and adjacent berthing areas was disposed during the late 1960s. Unit 9 is an area where mercury contamination, not associated with the South State Street MGP Site, exists.

1.3. Cleanup Action Summary

The components of the selected Site cleanup action presented in the CAP (Ecology 2020) are presented on Figures 5 and 6 and include the following:

- Upland permeable vegetated soil cap
- Groundwater enhanced, in-situ bioremediation and monitored natural attenuation (MNA)
- Removal of remnant gas holder
- Sediment capping
- Sediment natural recovery

The cleanup action is described in further detail in the Final CAP (Ecology 2020).

2.0 SITE SURVEYS

As part of the PRDI, topographic and bathymetric surveys were completed to update the Site survey to provide the basis for design for the Upland and Marine Units.

Larry Steele Associates, Inc. (LSI) completed a topographic survey of the Upland Unit and a portion of the intertidal area of the Marine Unit. Additionally, the survey documented the upland hand auger sampling locations, existing and new monitoring wells, and direct push soil boring locations. The land-based topographic survey was performed in accordance with WAC 332-130 and other Washington State requirements for land surveys. The final topographic survey stamped by the licensed surveyor is included in Appendix A.

David Evans and Associates, Inc. (DEA) completed a bathymetric survey of the Marine Unit. Survey data were collected using in-water multi-beam survey equipment deployed from a marine vessel. The survey indicated the presence of vegetation (eelgrass) on the sea floor within a band generally between -2 and -10 feet North American Vertical Datum of 1988 (NAVD88). DEA processed the bathymetric data to remove the height of the vegetation and provide the sea floor contours in the final survey. The multibeam survey was performed in accordance with the U.S. Army Corps of Engineers (USACE), Engineering and Design Hydrographic Surveying Engineer Manual (EM 1110-2-1003). The final bathymetric survey stamped by the licensed surveyor is included in Appendix A.

Upon completion of the upland survey, LSI combined the topographic and bathymetric surveys to provide an integrated, updated survey of the entire Site. The surveys were combined where the surveys overlapped in the intertidal area of the Site. Figure 7 provides the combined, updated survey which is used as the base map for figures presented in this report.

3.0 FIELD INVESTIGATION ACTIVITIES

This section describes the PRDI field investigation activities completed per the Work Plan and Work Plan addenda. Field investigation activities were completed between May 2021 and April 2022. The field investigations followed the sampling and analysis procedures detailed in the SAP and QAPP in Appendix A of the Work Plan, unless otherwise noted below.

Sections 3.1 through 3.7 describe the field investigation activities completed as part of the PRDI. Each section summarizes the purpose of the investigation and a description of the activities completed.

Boring logs, laboratory data reports, and data validation reports prepared as part of the PRDI are included in the following appendices:

- Appendix B: Soil logs
- Appendix C: Sediment logs
- Appendix D: Laboratory data reports
- Appendix E: Data validation reports

PRDI data (chemical analytical, grain size, and seepage velocity results) data are presented in Tables 1 through 11. Chemical analyses were performed by Analytical Resources, LLC (ARI) in Tukwila, Washington and Spectra Laboratories, LLC (Spectra) in Tacoma, Washington, both Ecology-accredited laboratories. Grain size analyses were performed by Materials Testing & Consulting, Inc. (MTC) in Burlington, Washington, an Ecology-accredited laboratory. Upland sample locations are shown in Figure 8. Marine sample locations are shown on Figures 9 and 9b. Intertidal seepage velocity measurement locations are shown in Figure 10.

3.1. Surface Soil Sampling

The cleanup action includes placement of soil caps in the Upland Unit. The primary objective of the upland caps is to provide a 2-foot barrier of clean soil between the park users and contaminants in underlying soil exceeding direct contact cleanup and remediation levels. One of the goals of the PRDI is to refine the area to be capped in the upper park. This was accomplished by collecting additional surface soil samples in the upper park to supplement surface soil sampling that was previously performed as part of the remedial investigation (RI) for the Site.

In accordance with the Work Plan, 20 shallow hand auger borings (HA-15 through -34) were completed on August 31 and September 1, 2021. The shallow hand auger soil boring locations are shown in Figure 8 and the boring logs are presented in Appendix B. Soil samples were collected from depths of 0 to 1 foot below ground surface (bgs) and 1 to 2 feet bgs and submitted to ARI in Tukwila, Washington for analysis of cPAHs by U.S. Environmental Protection Agency (EPA) 8270E-SIM.

The chemical analytical results for surface soil samples are presented in Table 1 and are further discussed in Section 4.

3.2. Monitoring Well Installation and Development

In accordance with the Work Plan, four groundwater monitoring wells were installed in the lower park to more completely characterize the extent of groundwater contamination and to evaluate geochemical conditions indicative of natural attenuation. Monitoring wells MW-59 and MW-60 were installed along the western shoreline with well screens across the top of the water table to complement existing deeper wells and monitoring wells MW-61 and MW-62 were installed at the base of the slope to fill data gaps near the railroad tracks. The four new monitoring wells were developed, and existing monitoring wells installed as part of the RI were redeveloped prior to the completion of dry-season and wet-season site-wide groundwater monitoring events. The following sections provide additional detail for monitoring well installation and development completed as part of the PRDI.

3.2.1. Monitoring Well Installation

Monitoring wells MW-59, MW-60 and MW-62 were installed using a hollow-stem auger drill rig on August 30 and 31, 2021 by Cascade Drilling Inc. (Cascade), a Washington state licensed driller. As discussed in Work Plan Addendum 3, the location of MW-61 was modified from what was identified in the Work Plan because of its original location on BNSF property and proximity to the railroad tracks. The modified location is within an existing terraced landscape area and could not be installed with the hollow-stem auger drill rig. MW-61 was therefore, installed by Cascade Drilling using a direct push track rig and a pre-pack 2-inch diameter well on January 11, 2022.

The monitoring well locations are shown in Figure 8, and the boring logs and well construction logs are included in Appendix B. Soil cuttings generated from drilling activities were field screened and collected in accordance with the Work Plan.

At MW-59 and MW-60, soil samples were collected near the midpoint of the well screen at a depth of 9 to 10.5 feet bgs. At MW-61 and MW-62, soil samples were collected at the intervals with the highest field screening evidence of contamination (15 to 16 feet bgs and 13 to 14 feet bgs, respectively). The soil samples from MW-59 through MW-62 were submitted to ARI for analysis of the following:

- Gasoline-range hydrocarbons by NWTPH-G (MW-61 and MW-62);
- Diesel- and heavy oil- range petroleum hydrocarbons by NWTPH-Dx (MW-61 and MW-62);
- Benzene and naphthalene by EPA 8260D (MW-61 and MW-62);
- Total cyanide by EPA 9014 (MW-59, MW-60, and MW-62) and SM 4500 (MW-61; ARI subcontracted the total cyanide analysis for MW-61 to Spectra);
- Total iron and copper by EPA 6020B (MW-59 and MW-60); and
- Total organic carbon (TOC) by SW 9060A (MW-59 and MW-60).

The chemical analytical results for soil samples collected as a part of monitoring well installation are presented in Table 2 and are further discussed in Section 5.

Soil cuttings were stored in 55-gallon steel drums in a fenced and locked upland staging area.

3.2.2. Monitoring Well Development

New and existing monitoring wells were developed prior to completing site-wide groundwater monitoring. Existing monitoring wells were redeveloped during the PRDI because they had last been sampled between 2011 and 2016. Site reconnaissance to locate the existing monitoring wells was completed on April 27 and April 28, 2021 and the existing wells were redeveloped on May 5, 2021 with the following exceptions. Monitoring wells MW-07, MW-31, and MW-44 were not developed in May 2021 due to insufficient groundwater in the three wells. Monitoring wells MW-07, MW-31 and MW-44 were redeveloped on January 21, 2022, prior to the wet season site-wide groundwater monitoring event.

New wells MW-59 through MW-62 were developed after well installation. Monitoring wells MW-59, MW-60, and MW-62 were developed on September 1, 2021. Monitoring well MW-61 was developed on January 12, 2022.

Purge water generated during monitoring well development was stored in 55-gallon steel drums in a fenced and locked upland staging area.

3.3. Site-Wide Groundwater Monitoring

Prior to the PRDI, the most recent groundwater monitoring event was completed at the Site in 2016. Two Site-wide groundwater monitoring events were completed as part of the PRDI to evaluate current conditions, and spatial and temporal contaminant concentration trends. The dry and wet season groundwater monitoring events were conducted in September 2021 and February/April 2022 in accordance with the Work Plan. Well locations are presented in Figure 8.

Dry season groundwater monitoring was completed September 20 through 23, 2021. Monitoring wells MW-07, MW-19, MW-31, and MW-44 were not sampled due to limited recharge rates and insufficient groundwater. During the dry season event, groundwater samples were collected from 16 wells and submitted to ARI for the chemical analyses detailed below.

Wet season groundwater sampling was completed February 7 through 10, 2022. Monitoring well MW-44 was not sampled during the wet season monitoring event due to limited recharge rates and insufficient groundwater. During the wet season event, groundwater samples were collected from 20 wells and submitted to ARI for the chemical analyses detailed below. During the analyses of the wet season groundwater samples, ARI did not complete the diesel- and heavy oil-range petroleum hydrocarbon analyses for monitoring wells MW-7, MW-19, MW-24, MW-28, MW-31, MW-38, MW-45. and MW-60. These monitoring wells were re-sampled on April 6 and 7, 2022 and groundwater samples were submitted to ARI for chemical analyses of diesel- and heavy oil-range petroleum hydrocarbons.

During each monitoring event samples were submitted for the following analyses:

- Gasoline-range hydrocarbons by NWTPH-G;
- Diesel- and heavy oil- range petroleum hydrocarbons by NWTPH-Dx;
- Benzene and naphthalene by EPA 8260D;
- Total and weak & dissociable (WAD) cyanide by EPA 9014 and SM 4500, respectively;
- Metals including dissolved[2] iron, lead and selenium and total iron by EPA 6020B;
- Nitrate and sulfate by EPA 353.2 and 375.2, respectively; and
- TOC by SM 5310B.

The chemical analytical results for samples collected as part of groundwater monitoring are presented in Table 3 and are further discussed in Section 5.

Purge water generated during dry and wet season sampling events was stored in 55-gallon steel drums in a fenced and locked upland staging area.

3.4. Direct-Push Borings

Direct-push borings were completed in the lower park to support use of enhanced, in-situ groundwater bioremediation. Specifically, the direct-push borings were completed to characterize the saturated

[2] Groundwater samples for dissolved metals were field filtered.

thickness of soil above bedrock and the lateral distribution of contaminants in groundwater. A direct-push track rig was mobilized to complete soil borings at locations GP-58 through GP-75. The drilling work was completed from January 11 through 14, 2022 by Cascade Drilling.

The direct-push borings were originally scheduled to be completed during the spring of 2021; however, due to delays in receiving the BNSF environmental access agreement, the work was delayed until January 2022. In addition, limitations for drilling near railroad tracks on BNSF property required deviations from the Work Plan scope to modify the proposed locations and the number of borings to be completed as detailed in Work Plan Addendum 3. The modifications included in Work Plan Addendum 3 are the following:

- Borings GP-65 through GP-69 were moved from the east side to the west side of the railroad tracks. The spacing between borings was increased slightly in Work Plan Addendum 3, which resulted in the borings GP-70 and GP-71 being relocated from south of boring GP-69 to north of boring GP-58.
- A second east-west transect (GP-74, GP-62, and GP-75) was added perpendicular to the northern transect to supplement the east-west transect included in the Work Plan (GP-59, GP-60, and GP-61). This original, northernmost transect, was modified during field activities with locations GP-59 and GP-61 moving north to encompass location GP-58, instead of location GP-60. The transect was moved north to better characterize the expected northern extent of the bioremediation zone. In addition, four borings (GP-70 through GP-73) were added to extend the transect to the northern Upland Unit boundary.

The locations of the completed direct push soil borings are shown in Figure 8 and the boring logs are included in Appendix B.

Groundwater grab samples were collected at the direct push boring locations where groundwater was encountered including four of the 13 locations on the east side of the BNSF railroad tracks (GP-62, GP-64, GP-74, and GP-75) and each of the five locations on the west side of the tracks (GP-65 through GP-69).

Groundwater samples were submitted to ARI for the following analyses:

- Gasoline-range hydrocarbons by NWTPH-G;
- Diesel- and heavy oil- range petroleum hydrocarbons by NWTPH-Dx;
- Benzene and naphthalene by EPA 8260D; and
- Total and WAD cyanide by SM 4500.

Work Plan Addendum 3 identified the collection of one soil sample from each soil boring if field screening indicated the presence of petroleum-related contaminants. Soil samples were collected from GP-58 through GP-64 and GP-70 through GP-75 at the interval with the highest level of contamination based on field screening (e.g., odor, sheen, photoionization detector [PID] readings, etc.).

Soil samples were submitted to ARI for the following analyses:

- Gasoline-range hydrocarbons by NWTPH-G;
- Diesel- and heavy oil- range petroleum hydrocarbons by NWTPH-Dx;
- Benzene and naphthalene by EPA 8260D; and
- Total cyanide by SM 4500 (the total cyanide analyses were subcontracted to Spectra).

The chemical analytical results for the direct push subsurface soil and grab groundwater samples are presented in Tables 2 and 4, respectively. Both sets of direct push data are further discussed in Section 5.

Purge water generated during sampling and soil cuttings were stored in 55-gallon steel drums in a fenced and locked upland staging area.

3.5. Intertidal Sediment and Porewater Sampling

Intertidal sediment and porewater sampling were completed to support nearshore intertidal cap design, to refine the extent of nearshore intertidal cap placement, and to define the extent of contamination. Three rounds of intertidal sediment and/or porewater sampling were completed.

The initial round of intertidal surface and shallow sediment and porewater sampling was completed in June 2021 in accordance with the Work Plan. Follow-up porewater sampling was completed in December 2021 in accordance with Work Plan Addendum 2. Follow-up intertidal surface sediment sampling was completed in March 2022 in accordance with Work Plan Addendum 4.

In addition, Coastal Geologic Services, Inc. (CGS) collected seven intertidal surface sediment samples (0 to 15 centimeters [cm]) for grain size analysis. The CGS intertidal sampling event and the associated grain size data are presented in Appendix H.

The intertidal sediment and porewater sample locations are presented in Figures 9 and 9b and the sediment logs are included in Appendix C. Intertidal sampling was completed in dry conditions during low tides. Sample locations were documented using phone-collected global positioning system (GPS) coordinates.

3.5.1. Initial Intertidal Sediment and Porewater Sampling

Intertidal sampling was conducted on June 22 through 25, 2021 to collect shallow sediment and porewater samples in accordance with the Work Plan.

To inform the components and refine the thickness of the nearshore intertidal cap, sediment samples were collected at 12 intertidal locations (PRDI-1 through PRDI-12) and porewater samples were collected from 11 of the 12 sample locations (porewater was not encountered at location PRDI-9). Sediment samples were collected using a hand auger and hand trowel in dry conditions from two depth intervals (0-15 cm and 15-60 cm) and submitted to ARI for the following analyses:

- Gasoline-range hydrocarbons by NWTPH-G;
- Diesel- and heavy oil- range petroleum hydrocarbons by NWTPH-Dx;
- Benzene and naphthalene by EPA 8260D;
- Additional volatile organic compounds (VOCs) by EPA 8260D. ARI mistakenly analyzed the intertidal sediment samples for the full suite of VOCs in addition to benzene and naphthalene. The additional VOCs that were detected are discussed in Section 6.2;
- Total cyanide by EPA 9014;
- TOC by SW 9060A; and
- Grain size by ASTM International (ASTM) D6913.

To refine the extent of the nearshore intertidal cap, sediment samples were collected at four locations (PRDI-9 through PRDI-12) west and south of the pocket beach and beyond the proposed extent of the intertidal cap. Intertidal sediment samples were not collected from this area during the RI. The intertidal sediment samples from PRDI-9 through PRDI-12 were collected from 0 to 12 cm and 0 to 45 cm to evaluate the bioaccumulation and direct contact exposure pathways, respectively. The sediment samples were submitted to ARI for analysis of cPAHs by EPA 8270E-SIM.

Porewater sampling extraction points were positioned within approximately 5 feet of the sediment sample locations to provide collocated porewater data. Porewater extraction rods were manually advanced to depths of approximately 45 to 60 cm below mud line (bml) to collect porewater representative of shallow subsurface sediment conditions. Porewater was collected during a falling tide or within the first hour of the rising tide. Porewater samples were collected at 11 of 12 sample locations (porewater was not encountered at location PRDI-9). Porewater samples were submitted to ARI for the following analyses:

- Gasoline-range hydrocarbons by NWTPH-G;
- Diesel- and heavy oil- range petroleum hydrocarbons by method NWTPH-Dx;
- Benzene and naphthalene by EPA 8260D; and
- Total and WAD cyanide by EPA 9014 and SM 4500, respectively.

The chemical analytical results for intertidal sediment and porewater samples are presented in Tables 5 through 7. The grain size results are presented in Table 8. The intertidal sediment and porewater results are further discussed in Section 6.

3.5.2. Follow-up Intertidal Porewater Sampling for PRDI-2

Follow-up intertidal porewater sampling was conducted on December 7, 2021 to collect porewater samples at and in the vicinity of location PRDI-2 in accordance with Work Plan Addendum 2.

The porewater concentrations of benzene, naphthalene, gasoline-range hydrocarbons, and diesel-range hydrocarbons at PRDI-2 were significantly higher than concentrations at the other 10 porewater sampling locations during the initial porewater sampling event (Table 7). The benzene (5,580 micrograms per liter [µg/L]) and naphthalene (5,560 µg/L) concentrations were significantly greater than the project cleanup levels (CULs) (1.6 µg/L and 83 µg/L, respectively). The concentrations of gasoline- (47,200 µg/L) and diesel-range (3,320 µg/L) hydrocarbons were significantly greater than MTCA Method A groundwater CULs (800 µg/L and 500 µg/L, respectively).

Five additional porewater samples were collected on December 7, 2021 to further characterize the porewater concentrations in the area of PRDI-2. PRDI-2A was collected at the same location as PRDI-2. PRDI-2B through PRDI-2E were collected at step out locations to the south, north, west, and east of PRDI-2A. The follow-up intertidal porewater sample locations are shown on Figures 9 and 9b.

Porewater samples were submitted to ARI for the following analyses:

- Gasoline-range hydrocarbons by method NWTPH-Gx;
- Diesel- and heavy oil- range petroleum hydrocarbons by method NWTPH-Dx; and
- Benzene and naphthalene by EPA 8260D.

The chemical analytical results for the follow-up intertidal porewater samples are presented in Table 7. The data are further discussed in Section 6.

3.5.3. Follow-up Intertidal Surface Sediment Sampling

Follow-up intertidal surface sediment sampling was conducted on April 20, 2022 in accordance with Work Plan Addendum 4. Intertidal surface sediment samples PRDI-58 through PRDI-62 were collected using hand tools in dry conditions to define the extent of cPAH contamination greater than the sediment CUL north of locations PRDI-13 and PRDI-15. The sample locations are shown in Figure 9. The sediment samples were submitted to ARI for analysis of cPAHs by method EPA 8270E-SIM and to MTC for grain size testing by ASTM D6913.

Chemical analytical results for the follow-up intertidal sediment samples are presented in Table 5. The data are further discussed in Section 6. Grain size results are presented in Appendix H.

3.6. Intertidal Seepage Velocity Testing

Cap modeling will be completed in the Engineering Design Report (EDR) to support design of the nearshore intertidal cap to contain Site contaminants. The cap model requires input for seepage velocity of groundwater to surface water in the nearshore intertidal area where the cap will be placed at the approximate elevation range of 0 to +6 feet mean lower low water (MLLW). Cap modeling incorporates seepage velocity and contaminant concentrations to estimate the contaminant mass flowing through cap material. Groundwater seepage velocity was measured in the field to provide empirical data for use to support cap design.

Intertidal seepage velocity testing was completed on July 9, 21, and 22, 2021 to monitor shallow subsurface groundwater flow in accordance with the Work Plan.

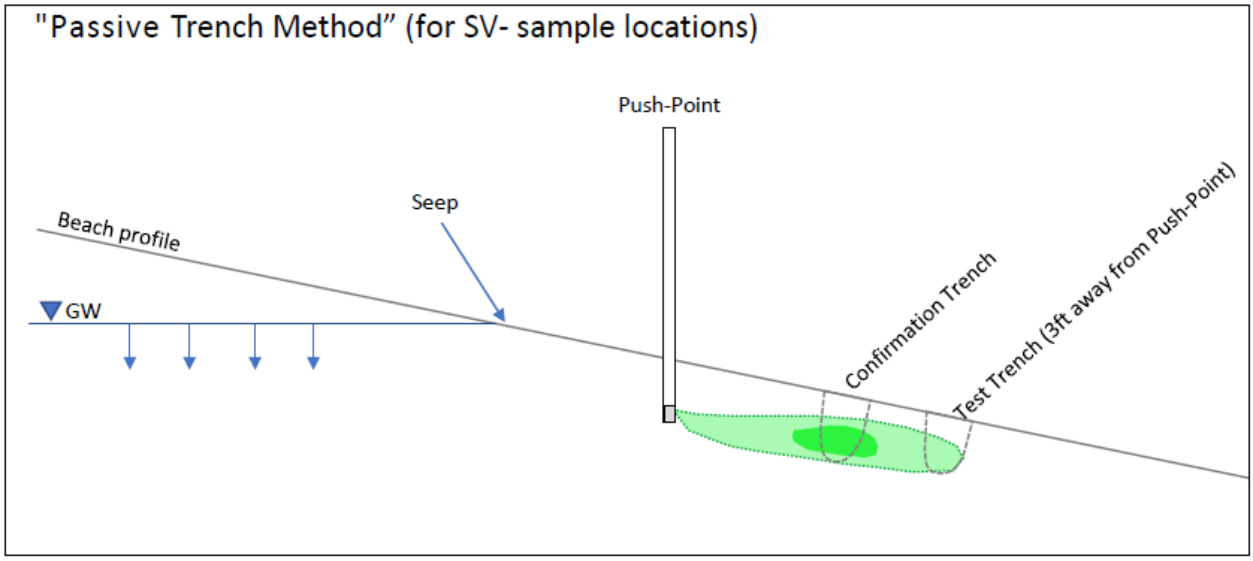
On July 9, 2021, seepage velocity testing was performed to evaluate the planned procedure using the PushPoint probe and fluorescent dye mix. Seepage velocity testing was completed in general accordance with the Work Plan at five locations in the pocket beach. The findings showed that the dye did not become visible on the lower beach during the low tide window. As the tide was rising trenches were completed at three of the five test locations and the dye was visible between 1 and 5 feet downgradient (waterward) of the fluorescent dye injection points. Because the dye was visible in the trenches, the procedure was modified to follow the “passive trench method” and “active seepage test” procedures described and shown below.

The “passive trench method” was used in areas of the beach where active seeps were not visible. Test locations were placed adjacent to intertidal sediment and porewater sample locations where possible. Due to the low quantity of shallow groundwater, some regions of the beach were unsuitable for the passive trench method. In the areas with a low quantity of shallow groundwater there was not sufficient time for the groundwater to accumulate in the trench before the rising tide reached the trench.

The “passive trench method” included the following:

- Digging a test trench 3-feet downgradient (waterward) of the injection point and waiting for water in trench to stabilize;
- Inserting the PushPoint to a depth of 0.5 to 1 foot bml;

- Injecting 1 milliliter (mL) of 20,000 parts per million (ppm) concentrated fluorescein dye;
- Injecting 60 mL of extracted porewater to displace the dye volume in the formation;
- Recording the amount of time it takes the dye to reach the test trench; and
- Digging a confirmation trench to search for peak dye intensity.

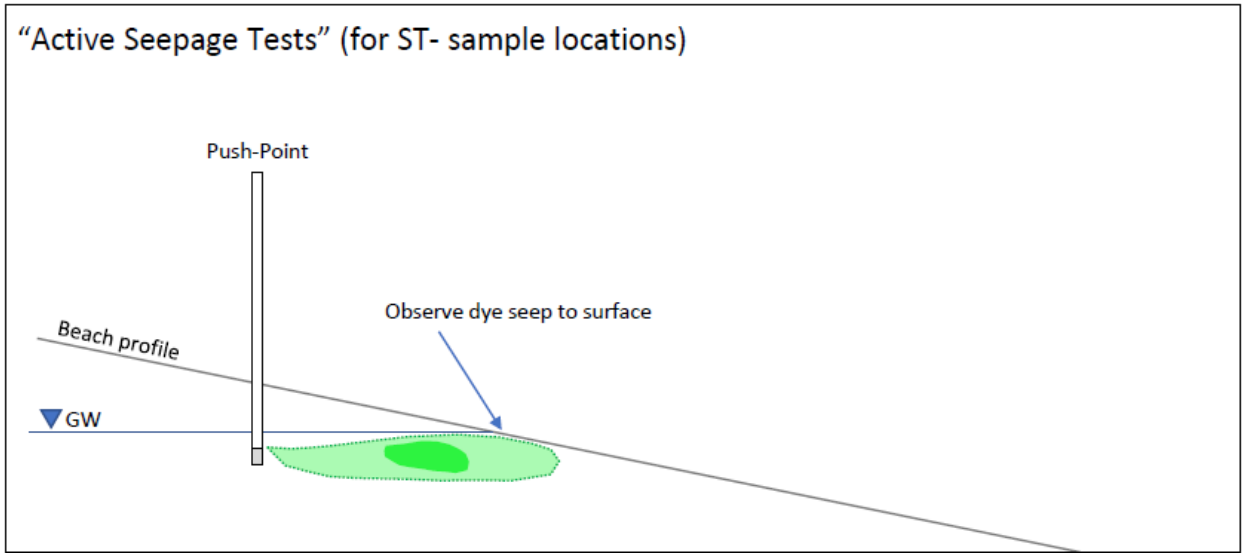


Schematic of "passive trench method" for seepage velocity measurements.

The "passive trench method" was used on July 21 and 22, 2022 to measure seepage velocities (SV) at locations SV-1 through SV-11. Locations SV-1 through SV-4 were identified in the Work Plan; locations SV-5 through SV-11 were completed because time allowed for additional testing during the low tide windows.

Because there was still additional time after completion of tests at locations SV-1 through SV-11, a second method was used to measure seepage velocity. "Active seepage tests" (ST) were conducted on July 22, 2022, at visible seeps along the beach (ST-1 through ST-3). Seep positions on the beach were monitored throughout the day using a wooden stake and did not appear to migrate with the changing tide elevations. During the test, the PushPoint probe was inserted approximately 3-feet upgradient of the visible seep to depths of 0.5 to 1 foot bml. The goal was for the probe to inject concentrated fluorescein dye at the top of the water table and measure the time it takes for the groundwater infused with dye to exit the beach profile at the active seep. Depth to water measurements were conducted using a mini piezometer to determine subsurface water depths for tracer dye emplacement. One mL of 20,000 ppm dye concentrate was inserted using a syringe and added to the injection system with 40 to 60 mL of extracted porewater for delivery to the subsurface. Test start and stop times were recorded, and a tape measurer was used to determine downgradient travel distances.

The test locations are presented in Figure 10 and seepage velocity results are provided in Table 9.



Schematic of "active seepage tests" for measuring seepage velocity.

3.7. Subtidal Sediment Sampling

Subtidal surface sediment sampling and chemical analysis was completed to support design of sediment capping and natural recovery areas and define the extent of cPAH contamination greater than the sediment CUL. Subtidal sediment cores were completed to assess sediment accretion and erosion. Two rounds of subtidal sediment sampling were completed.

The first round of subtidal sampling took place in September 2021 in accordance with the Work Plan and Work Plan Addendum 1. Subtidal surface sediment and sediment core locations were originally presented in the Work Plan. These locations were revised in Work Plan Addendum 1 based on the new cPAH sediment cleanup level of 229 µg/kg TEQ.

Follow-up subtidal surface sediment sampling took place in March 2022 in accordance with Work Plan Addendum 4 to define the extent of cPAH contamination greater than the sediment CUL north of locations PRDI-13 and PRDI-15.

Gravity Environmental (Gravity) was subcontracted to provide the sampling vessel and surface sediment and sediment core sampling equipment. Gravity collected sample location coordinates using a GPS unit integrated into the research vessel. Sample locations are shown in Figure 9.

3.7.1. Subtidal Surface Sediment Sampling and Analysis Field Work

Subtidal sampling was conducted on September 14 and 15, 2021 to collect surface sediment samples in accordance with the Work Plan and Work Plan Addendum 1. Surface sediment samples were collected at 25 locations (PRDI-13 through PRDI-34, PRDI-37, PRDI-40, and PRDI-41) using a Power Grab sampler deployed from Gravity's marine research vessel. Surface sediment samples were collected from the top 12 cm of sediment at each sample location. The sediment samples were submitted to ARI for analysis of cPAHs by method EPA 8270E-SIM and grain size testing by ASTM C-136.

The chemical analytical results for the surface sediment samples are presented in Table 10. The data are further discussed in Section 6. Grain size results are presented in Appendix H.

3.7.2. Subsurface Sediment Vibracore Sampling and Analysis

Subtidal sediment cores were completed on September 14 and 15, 2020 in accordance with the Work Plan and Work Plan Addendum 1. Sediment cores were completed at seven locations (PRDI-35 through PRDI-41) using vibracore sampling equipment deployed from Gravity's marine research vessel. One core was collected at each location except locations PRDI-36, PRDI-37, PRDI-39, and PRDI-40 where two cores were collected.

At each subsurface sediment location, a core was collected, capped, and the undisturbed core was delivered to CGS. CGS inspected and logged the cores and submitted core sediment samples to General Engineering Laboratories (GEL) to analyze sediment accumulation rates and absolute sediment age using ^{210}Pb and ^{137}Cs radiochemistry and to MTC for grainsize analyses. The data are further discussed and interpreted in the Coastal MetOcean Conditions and Geomorphologic Assessment report provided in Appendix H. The report includes core logs and core mosaics and the GEL and MTC data reports.

GeoEngineers inspected and logged the second cores collected at locations PRDI-36, PRDI-37, PRDI-39, and PRDI-40. Sediment samples were collected from each core on 15 cm intervals to a total depth of approximately 90 cm (approximately 3 feet) and submitted to ARI for analysis of cPAHs by method EPA 8270E-SIM. ARI analyzed the samples collected from 0 to 15 cm and 15 to 30 cm for cPAHs. The remaining sediment samples from 30 to 45 cm, 45 to 60 cm, 60 to 75 cm, and 75 to 90 cm were archived at ARI.

Chemical analytical results for the sediment samples are presented in Table 10. The data are further discussed in Section 6.

3.7.3. Follow-up Subtidal Surface Sediment Sampling

Follow-up subtidal surface sediment sampling was conducted on March 30 and March 31, 2022 in accordance with Work Plan Addendum 4 (GeoEngineers 2022b). Subtidal surface sediment samples PRDI-42 through PRDI-57 were collected to define the extent of cPAH contamination greater than the sediment CUL north of locations PRDI-13 and PRDI-15. Sediment was collected using a Power Grab sampler deployed from Gravity's marine research vessel. The sediment samples were submitted to ARI for analysis of cPAHs by method EPA 8270E-SIM and to MTC for grain size testing by ASTM D6913.

The chemical analytical results for the follow-up surface sediment samples are presented in Table 10. The data are further discussed in Section 6. Grain size results are presented in Appendix H.

4.0 INVESTIGATION RESULTS TO SUPPORT UPLAND CAP DESIGN

The cleanup action includes placement of soil caps in the Upland Unit. The primary objective of the upland caps is to provide a 2 foot barrier of clean soil between the park users and contaminants in underlying soil exceeding the direct contact cleanup level for cPAHs. As shown in Figure 5, a permeable vegetated soil cap was proposed in the CAP for the entire upper park area. One of the goals of the PRDI was to refine the area of the cap in the upper park.

The only contaminant that exceeds direct contact cleanup levels in surface soil (0 to 2 feet bgs) in the upper and lower park areas is cPAHs. Therefore, cPAHs were the focus of soil sampling to refine the upper park soil cap.

In addition to comparing the cPAH soil concentrations to the MTCA Method B direct contact cleanup level of 190 µg/kg TEQ, the cPAH soil concentrations are also compared to the park user remediation level of 390 µg/kg TEQ, which was developed and presented in the feasibility study (FS) (Landau and GeoEngineers 2019). The park user remediation level is based on child and adult exposure to shallow soil 2 days per week (or 104 days per year) for a combined 30 years. The park user remediation level is also protective of park workers.

The existing data from the RI for upper park soil indicates that cPAH concentrations meet the cPAH MTCA Method B direct contact and the park user remediation level in shallow soil across a large portion of the upper park. However, at many of the sample locations, soil samples were collected between 0 and 1 foot bgs but were not collected from 1 to 2 feet bgs. Soil samples were collected as part of the PRDI to characterize the soil from 1 to 2 feet bgs where existing data indicates that soil between 0 and 1 foot bgs is below the direct contact cleanup level. In addition, soil samples were collected from 0 to 1 foot and from 1 to 2 feet bgs at locations without existing data.

Data from the PRDI samples are used to refine the cap design to assure that the cPAH MTCA Method B direct contact cleanup level and/or park user remediation level will be achieved in the upper 2 feet of soil throughout the accessible portions of the upper park. This 2-foot-thick, clean layer will consist of imported cap material or existing clean park soil. If soil data shows that cPAH concentrations in the 0 to 1 foot and 1 to 2 foot intervals meet the MTCA Method B direct contact cleanup level or park user remediation level in a large portion of the upper park, then imported cap material will not be necessary in that area unless soil is needed to provide a smooth transition between a capped area and uncapped area to maintain functional use of the park.

4.1. Surface Soil Analytical Results

Chemical analytical results for the surface soil samples are presented in Table 1 and are shown on Figure 11.

Figure 11 presents the surface soil analytical results from the RI and PRDI sampling events. The cPAH surface soil results are presented for the 0 to 1-foot and 1 to 2 foot intervals and are colored coded based on exceedance ratios relative to the MTCA Method B direct contact cleanup level. Figure 11 also identifies sample locations with cPAH concentrations greater than the MTCA Method B direct contact cleanup level, but less than the park user remediation level.

The surface soil data indicate that cPAH soil concentrations are less than the MTCA Method B direct contact cleanup level or the park user remediation level in a large section of the southern portion of upper park. The highest cPAH surface soil concentrations are at or near the two northern most former gas holders in the upper park area and in the slope area (Figure 11).

4.2. Refined Upper Park Cap Area

The CAP identifies a permeable, vegetated soil cap as the cleanup action for the upper park. Figure 12 shows the area of the permeable, vegetated soil cap for the upper park that takes into consideration the additional surface soil data collected as part of the PRDI and site topography.

As shown in Figure 12, within the upland unit boundary the cap in the upper park is divided into three types of areas:

- Proposed Cap Areas – a soil cap is proposed in areas with cPAH concentrations greater than the MTCA Method B direct contact cleanup level, except at location HA-26 as discussed below. A soil cap is also required at sample location GP-24 to address an isolated terrestrial ecological evaluation hotspot with an elevated naphthalene concentration at a depth of 5 to 6 feet bgs. The soil cap also extends onto uncapped areas to provide a smooth transition to adjacent areas not being capped.
- Clean Areas or Existing Asphalt – soil caps are not proposed in areas where cPAH concentrations are less than the MTCA Method B direct contact cleanup level. Existing paved pathways are not proposed to be capped unless they will be replaced as part of cleanup action construction.
- Vegetated Slopes – caps are not proposed in areas with steep vegetated slopes. Capping would be difficult in these areas and due to the steep and vegetated nature of these areas, park user exposure is expected to be minimal in these areas.

Soil caps are not proposed at locations HA-25 and HA-26, which are both near the northern Upland Unit boundary because the cPAH concentrations are less than the park user remediation level. Locations HA-25 and HA-26 are located near asphalt paths close to the South State Street entrance to the park and park user exposure near locations HA-25 and HA-26 is expected to be limited. Regardless, the cPAH soil concentrations at locations HA-25 and HA-26 are protective of park users.

The area that will be capped in the upper park will be refined as part of the EDR based on engineering and park use considerations. The process to refine the cap areas will involve coordination between Ecology, the City of Bellingham, and PSE and will focus on meeting the objective of being protective of park users and park workers.

CPAHs were also detected at concentrations greater than the park user remediation level at location HA-15, located north of the upland unit boundary and the slope area. The City of Bellingham is planning to revise the existing trail that runs from the upper park area to the walking/biking trail at the base of the slope area (the South Bay Trail). The area around location HA-15 with cPAH concentrations greater than the park user remediation level, which is at the beginning of the proposed trail, will be capped as part of constructing the proposed trail. Details on the approach for capping soil at and around HA-15 will be included in the EDR. Construction of the soil caps in the upper park and the proposed trail will be coordinated.

5.0 INVESTIGATION TO SUPPORT USE OF ENHANCED, IN-SITU GROUNDWATER BIOREMEDIATION AND NATURAL ATTENUATION

The cleanup action includes enhanced, in-situ bioremediation and natural attenuation to address groundwater contamination in a portion of the lower park. Enhanced, in-situ bioremediation will be used to address the portion of the lower park where groundwater impacts are greatest, upgradient of the pocket beach. The enhanced, in-situ bioremediation will address organic contaminants (primarily benzene and naphthalene) and potentially cyanide in groundwater. Monitored natural attenuation will be used to address contaminants in groundwater in other parts of the lower park.

Most of the discussion in this section focuses on the three groundwater contaminants of concern (COCs) discussed above (benzene, naphthalene, and cyanide). The benzene, naphthalene, and cyanide results are compared to the groundwater cleanup levels from the CAP (Ecology 2020). The groundwater and porewater samples were analyzed for both total and WAD cyanide. Because the cyanide surface water criterion is based on free or WAD cyanide, the discussion below and the associated figures are limited to WAD cyanide.

While not identified as groundwater COCs, gasoline-, diesel- and heavy oil-range hydrocarbons are also discussed. The gasoline-range, diesel-range, and heavy oil-range hydrocarbon results are compared to MTCA Method A groundwater cleanup levels. To support this comparison, the diesel- and heavy oil-range hydrocarbon results are summed and reported as total diesel/oil.

5.1. Site-Wide Groundwater and Porewater Results to Evaluate Spatial and Temporal Trends

Two Site-wide groundwater monitoring events were completed following installation and development of the new monitoring wells and re-development of the existing wells to evaluate spatial and temporal trends of groundwater contaminants. This section discusses the spatial and temporal trends of the groundwater COCs benzene, naphthalene, and cyanide as well as gasoline-range hydrocarbons and total diesel/oil (the sum of diesel and heavy oil-range hydrocarbons).

The depth to groundwater was measured in each well prior to performing sampling. The depth to groundwater was converted to elevation and mapped to identify the groundwater flow direction. Groundwater elevation maps and flow direction are presented on Figures 13 and 14 for the dry and wet seasons, respectively. Groundwater flow direction at the Site during both monitoring events is generally to the west towards Bellingham Bay.

The site-wide groundwater and porewater monitoring analytical results are presented in Tables 3 and 7, respectively, and are shown in Figures 15 through 17. The figures show exceedance ratios for benzene and naphthalene (Figure 15), gasoline-range hydrocarbons and total diesel/oil (Figure 16) and cyanide (Figure 17). Figure 18 shows the alignment of four geologic Cross Sections A-A' through D-D' (Figures 19 through 22) that depict the geologic conditions at the Site.

5.1.1. Benzene, Naphthalene, Gasoline-Range Hydrocarbons and Total Diesel/Oil Groundwater and Porewater Analytical Results

As shown on Figures 15 and 16, the spatial distribution of benzene, naphthalene, gasoline-range hydrocarbons, and Total diesel/oil are similar. The highest groundwater concentrations are near the railroad tracks and at or near the base of the slope that separates the upper and lower park and in the upper park. There are no exceedances in the shoreline wells. The only porewater exceedances are at locations PRDI-2/PRDI-2A and PRDI-2C.

Groundwater: Benzene and naphthalene groundwater concentrations are greater than cleanup levels in wells adjacent to the railroad tracks including MW-31 located west of tracks and MW-28, MW-29, and MW-62 located east of tracks at the base of the slope. Additionally, exceedances of cleanup levels for benzene and naphthalene were detected at MW-24 and MW-19 in the upper park. The highest benzene concentration in groundwater was detected at MW-28, while the highest concentrations of naphthalene were detected at MW-24, MW-28, and MW-62.

Gasoline-range hydrocarbons and Total diesel/oil were detected at concentrations greater than screening levels (MTCA Method B groundwater cleanup levels) at the same wells where benzene and naphthalene were detected greater than cleanup levels indicating that the contaminants are co-located. The highest concentrations of gasoline-range hydrocarbons and Total diesel/oil were found at wells MW-24, MW-28, and MW-62.

Groundwater analytical results from the wet and dry season groundwater monitoring events do not indicate significant fluctuations in contaminant concentrations of benzene, naphthalene, and total petroleum hydrocarbons (TPH) based on seasonality.

Porewater: Benzene, naphthalene, gasoline-range hydrocarbons, and total diesel/oil were either not detected or detected at concentrations less than cleanup or screening levels at all intertidal porewater sample locations during the June 2021 monitoring event except PRDI-2. Benzene, naphthalene, and gasoline-range hydrocarbons were detected at relatively high concentrations at sample location PRDI-2 during the June 2021 intertidal sampling event. Benzene was detected at PRDI-2 at a concentration more than 1,000 times the groundwater cleanup level, while naphthalene and gasoline-range hydrocarbons were detected at concentrations more than 50 times their respective cleanup/screening levels.

Follow-up porewater sampling was completed at and adjacent to location PRDI-2 in December 2021 (see Section 3.5.2). Results of the follow-up porewater sampling found only low exceedances at PRDI-2A and PRDI-2C (less than 10 times the cleanup level) of benzene and total diesel/oil. There were no other exceedances detected at PRDI-2A or PRDI-2C or at the other follow up porewater sample locations PRDI-2B, PRDI-2D, and PDI-2E. Since the high concentrations in porewater at PRDI-2 were not repeatable, it is believed that the initial porewater sample at PRDI-2 was collected from a specific location with a limited "bubble" of contaminated porewater at the time of sample collection.

Summary: The groundwater results show that petroleum-related contaminants attenuate to below cleanup or screening levels before groundwater reaches the shoreline. Except for one isolated area in the vicinity of location PRDI-2, porewater was demonstrated to not exceed cleanup or screening levels for petroleum-related contaminants.

At porewater locations PRDI-2 and PRDI-2A, benzene was detected at concentrations greater than the groundwater cleanup level. The CAP calls for a thick or amended cap in the pocket beach area to enhance attenuation of contaminants if necessary. The porewater data collected as part of the PRDI, including the results from PRDI-2 and PRDI-2A, will be used to support design of the sediment cap in the EDR.

5.1.2. Cyanide Groundwater and Porewater Analytical Results

Groundwater and Porewater: As shown on Figure 17, WAD cyanide exceeds cleanup levels in groundwater throughout most of the upland portion of the Site. However, most of the WAD cyanide detections are less than 10 times the cleanup level in groundwater. The highest concentrations were observed in groundwater at or near the base of the slope that separates the upper and lower park (MW-29), near the railroad tracks (MW-45), and in the upper park (MW-24). Higher WAD cyanide concentrations were also detected in deep groundwater near the shoreline in monitoring wells MW-40 and MW-42 that are screened immediately above bedrock at depths of approximately 30 to 35 feet bgs. WAD cyanide was not detected in shallow groundwater in monitoring well MW-59, which is co-located with MW-40. WAD cyanide was not detected in shallow groundwater during the dry season and was detected at a concentration slightly greater than the

cleanup level during the wet season in MW-60, which is co-located with MW-42 (Figure 17 and Table 3). Monitoring wells MW-59 and MW-60 are screened at depths between approximately 5 and 15 feet bgs.

Groundwater analytical results from the wet and dry season groundwater monitoring events do not indicate significant fluctuations in concentrations of WAD cyanide based on the seasonality.

WAD cyanide was only detected at two out of 11 intertidal porewater sampling locations at a concentration greater than the groundwater cleanup level (Table 7). The intertidal porewater sample results indicate that, although there is elevated WAD cyanide in upland groundwater, the WAD cyanide concentrations generally attenuate before reaching surface water.

WAD cyanide was detected at concentrations exceeding the groundwater cleanup at intertidal porewater sample locations PRDI-4 and PRDI-12. The concentrations at PRDI-4 and PRDI-12 are relatively low at between 2 and 3 times the cleanup level. Groundwater concentrations upgradient of PRDI-12 in monitoring well MW-59 were less than the groundwater cleanup level during both the dry and wet season monitoring events. Figure 19 presents cross section A-A', which shows that groundwater in monitoring well MW-59 is at similar elevation as porewater at PRDI-12 indicating that groundwater is not clearly linked to the porewater exceedance at PRDI-12. Groundwater concentrations upgradient of PRDI-4 in monitoring well MW-46 were greater than the groundwater cleanup level during both the dry and wet season monitoring events. Figure 22 presents cross section D-D', which shows that groundwater in monitoring well MW-46 is at similar elevation as porewater at PRDI-4.

Summary: Porewater cyanide concentrations were only detected at locations PRDI-4 and PRDI-12 at concentrations greater than the groundwater cleanup level. At location PRDI-4, the source could be groundwater and, as discussed in Section 5.2, a permeable reactive barrier will be installed upgradient of location PRDI-4 to address groundwater COCs, including cyanide. Additionally, the CAP calls for a thick or amended cap in the pocket beach area to enhance attenuation of contaminants if necessary. As discussed above, groundwater is not clearly linked to the WAD cyanide at location PRDI-12. The CAP did not include a sediment cap at location PRDI-12. However, based on the WAD cyanide porewater results, the need for sediment capping around PRDI-12 will be evaluated as part of preparation of the EDR.

The porewater data collected in this PRDI will be used to support design of the sediment cap in the EDR.

5.2. Soil and Groundwater Results to Support Enhanced, In-Situ Bioremediation

Soil and groundwater sampling were completed using direct-push borings at the base of the slope area in the lower park to further characterize the lateral and vertical extent of contamination. Figure 18 presents the direct-push boring locations (GP-58 through GP-75). The sampling was completed to characterize the saturated thickness of soil above bedrock and contaminants in groundwater near the base of the slope between the upper and lower park areas to support the design for enhanced, in-situ bioremediation of groundwater.

The boring logs for the direct-push borings are included in Appendix B. Table 2 presents subsurface soil sample analytical results and Table 4 provides the groundwater grab sample analytical results from direct push borings GP-58 through GP-75.

Landau Associates, Inc. (Landau) was subcontracted to support design of the enhanced, in-situ bioremediation element of the cleanup action. Landau reviewed the analytical data and geologic conditions

for the Site to evaluate the potential use of a permeable reactive barrier (PRB) to provide enhanced, in-situ bioremediation to treat contaminants in groundwater. Landau's evaluation is included as Appendix F.

The target treatment zone for the PRB is at the base of the slope area upgradient of the pocket beach. The target treatment zone includes the area of shallow groundwater overlaying bedrock east of the BNSF railroad tracks along the pedestrian path. The geology in this area is illustrated in Figure 21, Cross-Section C-C'. The analytical data indicate that this area contains the highest concentrations of contaminants in groundwater. Although porewater data in the pocket beach shows that contaminant concentrations are generally below cleanup levels, a PRB in this area will help reduce potential upland sources of contamination before the groundwater discharges to surface water at the pocket beach.

Chemical and geochemical data from the PRDI indicate that anaerobic conditions exist in the shallow aquifer within the target treatment zone. Anerobic aquifer conditions are consistent with the presence of TPH contamination in groundwater.

The remedial approach for the target treatment zone is to design and construct a PRB to treat TPH and cyanide. The PRB will be approximately 160 feet long from GP-70 to south of MW-29. The depth of the PRB will extend from above the seasonal high groundwater level to bedrock. Trench backfill will consist of a mix of sand, gypsum and granular zero-valent iron (ZVI). The sand will maintain hydraulic conductivity through the PRB. The gypsum will dissolve over time and will slowly release sulfate to the aquifer to enhance biodegradation of TPH. ZVI will immobilize cyanide in groundwater through adsorption. The percentage mix of the various materials will be determined during future design phases of the project utilizing data collected as part of the PRDI, future bench scale testing, and possibly pilot testing. Appendix F provides further detail on the remedial action approach. Appendix G includes the Draft Work Plan for bench scale testing and pilot testing that are proposed to be completed as part of engineering design. Further details for design of the PRB will be developed and presented in the EDR.

5.3. Soil and Groundwater Results to Support Natural Attenuation

Soil and groundwater samples were also collected for the purpose of evaluating the geochemical conditions that support natural attenuation of contaminants in soil and groundwater. In soil, iron and copper are known to attenuate cyanide and TOC informs the potential for attenuation of organic contaminants. In groundwater, sulfate, nitrate, dissolved iron, total iron, and alkalinity are indicators of natural attenuation mechanisms.

Subsurface soil was collected and analyzed from soil borings completed for new monitoring wells and from direct push soil borings as discussed in Sections 3.2 and 3.4, respectively. Table 2 presents the subsurface soil analytical results. Analytical data for site-wide groundwater monitoring completed for the wet and dry seasons are provided in Table 3. Analytical data for groundwater grab samples collected from temporary well points installed at the direct push boring locations where groundwater was encountered are provided in Table 4.

5.3.1. Cyanide

The primary indication of natural attenuation of cyanide at the Site is the current spatial distribution of cyanide in groundwater relative to the historic sources. Cyanide concentrations in groundwater appear to degrade along the flow path toward the marine area where groundwater discharges to surface water. As described in Section 5.1.2, cyanide was only detected at two out of 11 intertidal porewater sampling

locations (PRDI-4 and PRDI-12) at concentrations greater than the groundwater cleanup level, indicating that, although there is elevated WAD cyanide in upland groundwater, the WAD cyanide concentrations generally attenuate before reaching surface water.

Dissolved cyanide in groundwater is capable of degrading by biological mechanisms as well as attenuating by adsorption and/or complexation with natural materials in soil, particularly iron and copper. Cyanide is capable of biological degradation through aerobic and anaerobic processes (Akcil and Mudder 2003), Groundwater conditions at the Site are likely anaerobic due to the high percentage of organic material in soil. Attenuation of cyanide by adsorption or complexation by copper and iron results in partitioning of the cyanide from groundwater to the soil matrix. The observance of copper and iron in soil, as described below, indicates a capacity for dissolved cyanide to be attenuated through the process of complexation in the soil matrix.

Figure 17 shows cyanide concentrations observed in groundwater across the site, indicating that concentrations are generally lowest toward the shoreline, in the downgradient direction of groundwater flow. The exception to this is the condition observed in deep groundwater immediately above the surface of bedrock in the vicinity of the shoreline. Wells MW-40 and MW-42 are deep wells located near the shoreline in the lower park, which are co-located with new shallow monitoring wells MW-59 and MW-60, respectively. At each of these well pairs, cyanide concentrations in shallow groundwater are substantially less than concentrations in deeper groundwater.

Figure 19 presents a cross-section through wells MW-40, MW-59, and PRDI-12 illustrating the relationship between cyanide in groundwater, soil, sediment and porewater. Cyanide was detected at concentrations approximately 30 times higher than the respective cleanup level in deep well MW-40. However, cyanide was not detected in shallow groundwater at well MW-59 during both the wet season and dry season sampling performed as part of the PRDI. As shown on Figure 19, groundwater within the screened interval of well MW-59 is at approximately the same elevation as sediment and porewater at PRDI-12. The detected concentration of cyanide in porewater sample PRDI-12 is not clearly linked to groundwater concentrations upgradient of the porewater sample location.

Soil samples collected at MW-59 and MW-60 were from the depth of the middle of the well screen at each location. The soil samples from MW-59 and MW-60 were analyzed for total cyanide as well as TOC, copper, and iron. The detected concentration of total cyanide at MW-59 was approximately six times the cleanup level for saturated soil, while total cyanide was not detected in the soil sample collected from MW-60. As described above, cyanide was not detected in groundwater collected from well MW-59, despite the elevated soil concentration. This indicates a high degree of partitioning from dissolved phase in groundwater to the solid phase through sequestration mechanisms. Cyanide was not detected at MW-60 in groundwater during the dry season event but was detected at a relatively low concentration during the wet season event. Despite the detectable cyanide observed at MW-60 during the wet season, cyanide was not detected in nearby sediment porewater sample locations.

Soil samples collected at direct push soil boring locations were also analyzed for total cyanide. The samples were collected from intervals where field screening exhibited the greatest signs of contamination as described in Section 3.4. Soil analytical results from the direct push sample locations indicate cyanide in saturated soil exists at concentrations ranging from below the detection limit (0.10 mg/kg) to approximately 150 times the cleanup level (MW-62) east of the railroad tracks and below the detection limit (0.358 mg/kg) to approximately six times the cleanup level west of the railroad tracks (MW-59). The highest

concentrations of cyanide in soil were observed at direct-push boring GP-59 (Figure 8) and at MW-62 located east of the railroad tracks at the base of the slope between the upper and lower park areas. Soil at these locations also had some of the highest concentrations of other Site contaminants, indicative of residual source concentrations. A consistent spatial distribution of cyanide in soil was not observed as the soil samples collected from the same depth in the area between GP-59 and MW-62 were observed to have significantly lower or undetected concentrations of cyanide.

Soil samples for geochemical analysis were collected from the borings advance to install monitoring wells MW-59 and MW-60 in the lower park area. TOC results ranged from 23.1 to 42 percent organic carbon in the soil samples. The very high organic content at these locations indicates that there is a long-term source of organic carbon as an electron donor supply for natural attenuation and biodegradation. The high organic carbon content also ensures that the geochemical conditions will remain anaerobic. Copper and iron were detected in soil samples collected from monitoring well MW-59 and MW-60 soil borings. Copper was detected at moderate concentrations of 49 to 65 mg/kg. Iron was detected at relatively high concentrations of 10,300 and 15,400 mg/kg or approximately 1 percent and 1.5 percent. The presence of copper and iron in soil indicates a capacity for dissolved cyanide to be attenuated through the process of complexation with iron and copper in the soil matrix. The behavior of cyanide in shallow groundwater, particularly at well MW-59, confirm that dissolved cyanide is degrading and/or partitioning to soil in the downgradient portions of the Site.

5.3.2. TPH, Benzene and Naphthalene

Similar to cyanide, the primary line of evidence for natural attenuation of organic contaminants in groundwater including benzene, naphthalene, and TPH, is the reduction of concentrations with distance away from the source. TPH, benzene, and naphthalene are readily degradable under naturally occurring conditions by multiple biological mechanisms, as well as attenuation by adsorption to organic materials in soil. Figures 15 and 16 show benzene and naphthalene concentrations and gasoline and diesel/heavy oil concentrations, respectively, relative to clean up and screening levels observed in groundwater across the Site. Figures 15 and 16 show that groundwater concentrations of benzene, naphthalene, and TPH decrease significantly as groundwater migrates from the source near monitoring wells MW-24, MW-28, and MW-62 to the shoreline. Benzene, naphthalene, and TPH were generally not detected in monitoring wells along the shoreline. In cases where benzene, naphthalene, or TPH were detected in shoreline wells, the concentrations were below cleanup levels.

The analytical results from the sitewide groundwater sampling events are presented in Table 3. As described in Section 3.3, groundwater was analyzed for TPH, benzene, and naphthalene to further define the extent of contamination in groundwater and porewater. In addition, geochemical parameters including nitrate, nitrite, sulfate, dissolved and total iron, and TOC were analyzed to evaluate current redox conditions and the mechanisms capable of naturally degrading and attenuating petroleum related contaminants. Concentrations of dissolved TOC observed in groundwater samples ranged from approximately 2.5 milligrams per liter (mg/L) to 19 mg/L. The dissolved TOC concentrations for groundwater, combined with the high soil TOC results described above in Section 5.3.1, indicates a high organic content and a strongly anaerobic environment. Other natural electron acceptors used following depletion of oxygen include nitrate, iron, and sulfate, which were also analyzed in groundwater samples. Nitrate was detected at low concentrations, or not detected, indicating depletion as an electron acceptor. As described below, further natural attenuation and bioremediation of organic contaminants will focus on the use of sulfate as an electron acceptor.

The distribution and concentrations of sulfate in groundwater is consistent with sulfate utilization by anerobic bacteria for TPH biodegradation. Background sulfate concentrations in groundwater unaffected by petroleum hydrocarbons appears to be in the 1,000 to 2,000 mg/L range, based on concentrations at monitoring wells MW-38, MW-59, and MW-60 located in the lower park. Sulfate concentrations were generally lowest in the presence of higher concentrations of petroleum related contaminants, such as at well MW-28 at the base of the slope between the upper park and northern portion of the lower park. At well MW-28 gasoline-range hydrocarbons were in the 20,000 to 30,000 µg/L range and sulfate was in the 5 to 10 mg/L range, significantly depleted relative to sulfate concentrations at wells unaffected by petroleum hydrocarbons. At well MW-46, approximately 75 feet downgradient of well MW-28, gasoline-range hydrocarbons appear to have degraded to below detection limits, while sulfate concentrations appear to have returned to near background at concentrations ranging from approximately 600 to 1,400 mg/L. The depletion of sulfate indicates degradation processes are occurring using sulfate-reducing bacteria. However, the high sulfate concentrations in groundwater downgradient of petroleum impacts indicates a strong supply of sulfate and continued TPH degradation.

The one area where petroleum related contaminants were detected greater than cleanup and screening levels in groundwater or porewater along the shoreline is in the pocket beach in the vicinity of porewater sample location PRDI-2. Porewater concentrations at PRDI-2 were significantly higher than nearby upland groundwater, suggesting the porewater concentrations are the result of a limited “bubble” in sediment rather than migration of contaminants in groundwater. This area is planned to be addressed using amended sediment capping methods that will prevent migration of contaminants to surface water.

6.0 SEDIMENT INVESTIGATION TO SUPPORT NEARSHORE INTERTIDAL CAP DESIGN

The remedial action identified in the CAP includes placement of cap material on nearshore intertidal sediment. The nearshore intertidal zone is expected to have the highest groundwater flux from the upland to the Marine Unit and, therefore, requires evaluation of additional cap design considerations to address attenuation of contaminants. The nearshore intertidal sediment cap will protect human health and the environment from exposure (via bioaccumulation and direct contact pathways) to cPAH concentrations greater than the sediment cleanup level and protect surface water and sediment from contaminants in groundwater.

6.1. Intertidal Shallow Sediment Analytical Results to Refine Extent of Sand Cap

One of the goals of the PRDI was to refine the extent of nearshore intertidal cap placement. The existing data collected as part of the RI for nearshore intertidal sediment indicated that the cPAH concentrations were greater than the sediment cleanup level in surface sediment in the pocket beach area (Figure 23). However, samples had not been collected from the nearshore intertidal area at locations west and south of the pocket beach and outside of the area identified to be capped in the CAP. Therefore, samples were collected from PRDI-9 through PRDI-12 to characterize sediment from the bioaccumulation compliance interval (0 to 12 cm) and the direct contact compliance interval (0 to 45 cm) along the shoreline, west and south of the pocket beach. Samples were collected from PRDI-9 through PRDI-12 to determine if additional capping is required west and south of the pocket beach for the remedy to be protective (Figure 23). The data from PRDI-9 through PRDI-12 will be used in the EDR to refine the extent of capping.

As shown on Figure 23, cPAHs were detected at concentrations greater than the cleanup level of 229 µg/kg TEQ at PRDI-9 in the bioaccumulation compliance interval (370 µg/kg TEQ) and direct contact compliance interval (502 µg/kg TEQ). Additionally, cPAHs were detected at a concentration greater than the cleanup level at PRDI-11 in the direct contact compliance interval (309 µg/kg TEQ). cPAH concentrations were less than the cleanup level in samples collected from PRDI-10 and PRDI-12.

The results from the cPAH sediment sample analyses for PRDI-9 through PRDI-12 will be used to refine the extent of the intertidal shoreline cap in the EDR.

6.2. Intertidal Sediment and Porewater Analytical Results for Purposes of Cap Design

As described in Sections 3.5.1 and 3.5.3, near surface (0 to 15 cm) and shallow subsurface (15 to 60 cm) sediment samples and porewater samples (~30 cm bml) were collected at locations PRDI-1 through PRDI-12 to inform the design (thickness and/or use of cap amendments) of the intertidal nearshore cap to protect surface water and sediment from groundwater COCs.

Sections 5.1.1 and 5.1.2 present the sediment porewater analytical results with respect to upland groundwater. Tables 5 and 6 present the intertidal sediment analytical results, Table 7 presents the porewater analytical results, and Table 8 presents grain size data.

Cyanide was not detected in the sediment samples collected at PRDI-1 through PRDI-3 and PRDI-6 through PRDI-12. Cyanide was only detected in the sediment samples collected from 15 to 60 cm at locations PRDI-4 and PRDI-5 at concentrations just above the reporting limit (0.179 µg/kg and 0.192 µg/kg). Gasoline-range hydrocarbons and naphthalene were not detected in the 0 to 15 cm and 15 to 60 cm sediment samples collected from PRDI-1 through PRDI-12. Total diesel/oil was detected in each of the 24 near surface and shallow subsurface sediment samples collected from PRDI-1 through PRDI-12 at concentrations ranging from 26.1 mg/kg to 646 mg/kg. Benzene was detected in 19 of the 24 near surface and shallow subsurface sediment samples collected from PRDI-1 through PRDI-12 at concentrations ranging from 0.27 J µg/kg to 7.09 J µg/kg. Except for PRDI-6, benzene was detected in both the 0 to 15 cm and the 15 to 60 cm samples at sampling locations at or near the pocket beach (PRDI-2 through PRDI-8).

The porewater sample results for benzene, gasoline-range hydrocarbons, and total diesel/oil are discussed in Section 5.1.1 and the cyanide porewater results are discussed in Section 5.1.2. Benzene, naphthalene, gasoline-range hydrocarbons, and total diesel/oil were either not detected or were detected at concentrations less than cleanup or screening levels, except in porewater samples collected from PRDI-2, PRDI-2A, and PRDI-2C. WAD cyanide was detected at concentrations greater than the cleanup level at two of the 11 sampling locations (PRDI-4 and PRDI-12).

As described in Section 5.1.1, elevated concentrations of benzene, naphthalene, and gasoline-range hydrocarbons were detected at location PRDI-2 during the June 2021 sampling event. Follow-up porewater samples collected in December 2021 at and surrounding PRDI-2 detected significantly lower concentrations but confirmed the presence of petroleum-related contaminants in porewater at concentrations greater than cleanup and screening levels in the immediate vicinity of PRDI-2. Since the high concentrations in porewater at PRDI-2 were not repeatable, it is believed that the initial porewater sample at PRDI-2 was collected from a specific location with a limited “bubble” of contaminated porewater at the time of sample collection. Both the initial and follow-up porewater data at PRDI-2 will be used for CapSIM modeling to provide a range of input values to evaluate model sensitivity.

Note that benzene and naphthalene were the only VOCs requested for the laboratory analysis of the intertidal sediment samples, however, the laboratory reported a larger list of VOC analytes. Table 6 presents the results for the additional VOCs for completeness. Most of the additional VOCs were not detected and detected analytes were below MTCA Method B soil cleanup levels and beach play, clamming, and net fishing direct contact risk-based concentrations. Additionally, the laboratory was not able to provide requested reporting limits for gasoline-range hydrocarbons due to the amount of wood debris in the samples.

The nearshore sediment caps will be designed using the CapSIM Version 4.0, a chemical transport numerical model developed to assess chemical migration in sediment and caps. Inputs for this model include near surface and shallow subsurface sediment and porewater concentrations of mobile contaminants (benzene, naphthalene, and cyanide), petroleum hydrocarbons, sediment TOC concentrations, and grain size data. Ultimately, the concentration inputs to the CapSIM model will determine the thickness and amount of cap amendments (organoclay and/or activated carbon) necessary to achieve sediment and groundwater cleanup levels at the respective points of compliance. During development of the EDR, the near surface and shallow subsurface sediment and porewater analytical data will be evaluated to correlate the potential for contaminants in sediment to become mobile via porewater.

The intertidal near surface and shallow subsurface sediment and porewater analytical data obtained during the PRDI provide sufficient information to use as the basis of design for amended cap modeling and design in the intertidal area.

6.3. Seepage Velocities Results for Purposes of Cap Design

As described in Section 3.6, the groundwater seepage velocity was measured in the field to provide empirical data for use in cap design. The seepage velocity testing field methods are also described in Section 3.6. Seepage velocity measurement locations are shown in Figure 10. Field measurements and calculations of seepage velocities are summarized in Table 9.

Calculated seepage velocities ranged from less than 1.3 to 12.9 feet per hour. At four test locations (SV-3, SV-4, SV-6, and SV-8) the tidal elevation fell below the bottom of the trench before the fluorescent dye reached the trench and as a result, the maximum seepage velocities were not calculated for the four locations. At one location (ST-2), the PushPoint probe did not adequately seal when it was inserted and fluorescent dye was observed to leak out at the surface due and, therefore, the seepage velocity could not be calculated.

Overall, the range of seepage velocities collected during the testing represents near maximum seepage velocities in the intertidal area. During the EDR, these maximum values will be evaluated with respect to tide cycles to develop a range of estimated average and maximum seepage velocities for use in the cap model. The CapSIM model requires seepage velocity as an input value. Seepage velocity and porewater contaminant concentrations are used to calculate contaminant mass flux. The mass flux calculation is performed within the CapSIM model and is then used to model cap performance based on the selected cap design.

In addition to the seepage velocity results obtained during the PRDI, groundwater seepage velocity will be estimated as part of the EDR using intertidal grain size results (Table 8), upland soil type, and groundwater elevation information to compare to the maximum seepage velocities measured during the PRDI. The range

of seepage velocities will be evaluated during cap modeling and model sensitivity analysis performed as part of the EDR to support sediment cap design.

7.0 SEDIMENT INVESTIGATION TO DEFINE THE EXTENT OF CONTAMINATION

Surface sediment samples were collected to define the extent of contamination and to support refining the limits of where different elements of the remedial action (e.g., capping, enhanced natural recovery) would be applied as part of the cleanup action. As described in Sections 3.5 and 3.7, nine intertidal and 36 subtidal surface sediment samples were collected as part of the PRDI and analyzed for cPAHs. The intertidal and subtidal surface sediment cPAH results are presented in Tables 5 and 10, respectively and are shown on Figure 24.

A Marine Unit boundary was developed during the RI/FS and CAP based on a cPAH sediment cleanup level of 86 µg/kg TEQ, the Bellingham Bay regional background concentration (see Figure 2). As discussed in Work Plan Addendum 1, the cPAH sediment cleanup level was changed by Ecology to 229 µg/kg TEQ, the cPAH concentration protective of the bioaccumulation exposure pathway.

Figure 24 shows the cPAH surface sediment results compared to the new cPAH sediment cleanup level of 229 µg/kg TEQ. The new Marine Unit boundary, presented in Figure 24, is based on geographic information system (GIS) interpolation of the cPAH surface sediment data (using inverse distance weighting) and also incorporates intertidal sediment and porewater cleanup level exceedances at locations PRDI-11 and PRDI-12 (see Section 6.0). The new Marine Unit boundary also encompasses exceedances of benthic criteria for Site-related contaminants. Updated active remedy areas (i.e., capping and enhance natural recovery) will be delineated in the EDR based on hill-topping[3] of the cPAH surface sediment data to meet a surface-area weighted average concentration (SWAC) of 229 µg/kg TEQ, engineering design considerations and coastal geomorphology data and information discussed in Section 8.0.

8.0 INVESTIGATION OF COASTAL MARINE PROCESSES TO SUPPORT REMEDIAL ACTION DESIGN

The objective of investigating coastal marine processes was to support the design of sediment caps and shoreline protection to be placed as part of the remedial action and to identify where ENR and MNR can be applied. The investigation of coastal marine processes included an assessment of coastal geomorphology and the parameters that affect coastal engineering design for capping and shoreline protection to be performed as part of remedial actions.

Except where noted, the investigation of coastal marine processes is discussed in detail in Appendix H.

[3] In hill-topping, grid cell concentrations in the marine unit are ranked from highest to lowest and the highest concentrations are iteratively removed from the dataset and replaced with the natural background TEQ.

8.1. Site Conditions

Site conditions relevant to design of capping and erosion protection and application of ENR and MNR that are described in Appendix H include geology, historic changes to the shoreline, and coastal processes (net-shore drift). A summary of the site conditions includes the following:

- Geology: Bellingham Bay is generally composed of Chuckanut Formation bedrock and post-glacial deposits along with more recent Nooksack River and Whatcom Creek deposits and fill material. The Chuckanut Formation is comprised of arkosic sandstone with lesser amounts of siltstone and conglomerate. Glacial deposits are outwash comprised of loose, moderately well sorted gravel with boulders, sandy gravel, minor gravelly medium to coarse sand and rare sand to silt. Fluvial deposits from the Nooksack River and Whatcom Creek include silty, fine to medium sand, shell fragments and occasional gravel. Artificial fill material consists of upland soil that has been graded, demolition debris, and refuse. Many wharves and structures were built along the shoreline that have been since removed.
- Historic Shoreline Change: Since the mid-1800s, the eastern Bellingham Bay shoreline has been highly altered by extensive filling. As a result of filling, the position of the shoreline in the vicinity of the Site has moved waterward [to the west] between 100 and 250 feet since predevelopment conditions. Currently, most of the Site shoreline has a low to moderate height embankment and is generally armored with riprap.
- Coastal Processes: Historically, net-shore drift at the Site was to the north (from the Site towards downtown Bellingham). Net-shore-drift conditions in Bellingham Bay were mapped in 1980 and the site shoreline was mapped as “no appreciable net shore-drift.” Historic net shore-drift cells were mapped by Puget Sound Nearshore Ecosystem Restoration Project (PSNERP) in 2008 (MacLennan and Johannessen 2008). This study found the immediate site area was within a cell with northward net shore-drift towards downtown Bellingham.

8.2. MetOcean Conditions

MetOcean (meteorology and physical oceanography) data available and relevant to Site conditions and design of capping and erosion protection and application of ENR and MNR that are described in Appendix H include the following:

- Tides: tidal elevations were obtained from National Oceanic and Atmospheric Administration (NOAA) at the Bellingham Station, WA (9449880). Extreme water level conditions for Bellingham Bay were derived using extreme water level conditions at the NOAA stations at Friday Harbor and known tidal differences between the Bellingham and Friday Harbor stations.
- Currents: tidal and wind-driven currents in Bellingham Bay, modeled by Pacific Northwest National Laboratories (PNNL), were identified, and evaluated. Wind-driven currents, versus tidally driven currents, are expected to have a greater effect on the stability of the caps and erosion protection and will be further evaluated as part of the remedial action design.
- Winds: long-term wind records were obtained and analyzed from two weather stations in the vicinity of the Site. Wind records from the Bellingham International Airport and from the Fairhaven Ferry Terminal Dock will be used to support remedial action design.
- Waves: a 5-year wave data set from PNNL for a location approximately 900-feet offshore from the Site was acquired and analyzed. The data will provide site-specific annual-average wave climate

information, including seasonal variations and occurrence and distributions of wave conditions. Wind-growth wave modeling will be required in the EDR to determine 100 year design wave conditions.

An additional condition that will be included in the coastal analyses to support design of capping and erosion protection is sea level rise. The City of Bellingham has adopted a sea level rise projection of 50 inches by 2120 as a standard for critical shoreline infrastructure and development projects.

8.3. Geomorphologic Assessment

8.3.1. Bathymetric Change Analysis

An assessment of historical changes in Site bathymetry was performed to evaluate bathymetric changes over time and to assess the rates and areas of accretion and erosion of sediment. Three bathymetric data sets were identified for the Site for the assessment that included the following:

- A 2021 multibeam survey completed by DEA as part of the PRDI (see Section 2);
- A 2019 single beam survey completed by United States Geological Survey (USGS); and
- A 2005 multibeam survey completed by NOAA.

The quality and resolution of the 2019 survey resulted in a limited ability to evaluate the changes in bathymetry based on bathymetric survey. The survey resolutions in the 2021 and 2005 surveys were sufficient for CGS to perform the bathymetric change analysis. However, errors are believed to have been introduced into the 2005 dataset when NOAA tidally corrected the survey elevations using data from NOAA's Friday Harbor tidal station (ID 944880). The errors in the 2005 survey prevented the use of the 2021 and 2005 bathymetric surveys to assess the rates and areas of accretion and erosion of sediment.

8.3.2. Historic Seabed Erosion and Accretion

As discussed in Section 3.7.2, Sediment cores were collected at locations PRDI-35 through PRDI-41 (Figure 9) to evaluate sediment erosion and accretion at the Site. Sediment core samples were submitted for radiocarbon and/or radioisotope analysis and for grain size analysis. Sediment accretion rates for the seven cores ranged from 0.77 to 1.8 cm/year with an average of 1.2 cm/year.

The grain size results show that sediment sizes range from coarse sand to fine cobble in the intertidal area, transitioning to finer materials offshore. A comparison of the sediment accretion rates, and grain size results show that the areas with finer surface sediment grain sizes correspond to higher sediment accretion rates.

9.0 REFERENCES

Akcil and Mudder. 2003. Microbial Destruction of Cyanide Wastes in Gold Mining: process Review. Biotechnology Letters 25, 445–450 (2003).

Anchor QEA. 2015. "Final Engineering Design Report, Whatcom Waterway Cleanup in Phase 1 Site Areas," Prepared for Port of Bellingham, February 2015.

GeoEngineers, Inc. 2020. Pre-Remedial Design Investigation Work Plan. South State Street MGP Site, Bellingham, Washington. October 30, 2020.

GeoEngineers, Inc. 2021a. Pre-Remedial Design Investigation Work Plan Addendum, Revised. South State Street MGP Site, Bellingham, Washington. August 6, 2021.

GeoEngineers, Inc. 2021b. Pre-Remedial Design Investigation Work Plan Addendum No. 2, South State Street MGP Site, Bellingham, Washington. November 1, 2021.

GeoEngineers, Inc. 2022a. Pre-Remedial Design Investigation Work Plan Addendum No. 3, South State Street MGP Site, Bellingham, Washington. January 6, 2022.

GeoEngineers, Inc. 2022b. Pre-Remedial Design Investigation Work Plan Addendum No. 4, South State Street MGP Site, Bellingham, Washington. February 2, 2022.

Landau Associates, Inc. and GeoEngineers, Inc. 2019. "Final Remedial Investigation and Feasibility Study Report, South State Street Manufactured Gas Plant." Prepared for the City of Bellingham and Puget Sound Energy. January 22, 2019.

MacLennan, A. and Johannessen, J. 2008. Net Shore-drift QA/QC Methods for Puget Sound and the Northwest Straits. Prepared for the USACE and Puget Sound Nearshore Partnership under contract to Anchor Environmental LLC for integration into the Puget Sound Change Analysis Geodatabase.

Washington State Department of Ecology (Ecology). 2019. Agreed Order No. DE 7655, Amendment 2.

Washington State Department of Ecology (Ecology). 2020. Final Cleanup Action Plan, South State Street MGP Site, Bellingham, Washington.

TABLES

GeoEngineers

Table 1

Upland Surface Soil Analytical Results

Pre-Remedial Design Investigation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	HA-15		HA-16		HA-17	HA-18	HA-19		HA-20		HA-21	HA-22		HA-23		HA-24		HA-25	
	Sample ID	HA-15-0-1	HA-15-1-2	HA-16-0-1	HA-16-1-2	HA-17-1-2	HA-18-1-2	HA-19-0-1	HA-19-1-2	HA-20-0-1	HA-20-1-2	HA-21-1-2	HA-22-0-1	HA-22-1-2	HA-23-1-2	DUP-01-1-2	HA-24-0-1	HA-24-1-2	HA-25-0-1	HA-25-1-2
	Sample Date	9/1/2021	9/1/2021	9/1/2021	9/1/2021	9/1/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	9/1/2021	9/1/2021	9/1/2021	9/1/2021	9/1/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021
	Start Depth	0	1	0	1	1	1	0	1	0	1	1	0	1	1	1	0	1	0	1
	End Depth	1	2	1	2	2	2	1	2	1	2	2	1	2	2	2	1	2	1	2
	Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Analysis	**Cleanup/ Remediation Level[1]**																			
Carcinogenic PAHs[2] (cPAHs) (µg/kg)																				
Benzo(a)anthracene	--	**2,630**	**2,040**	**7,490**	**11,700**	**24.7**	**64.0**	**21.7**	**23.7**	**30.2**	**10.9**	**63.1**	**555**	**145**	**146 J**	**37.0 J**	**6.42**	**6.91 J**	**167**	**87.7**
Benzo(a)pyrene	--	**3,060**	**2,200**	**7,480**	**4,270**	**37.0**	**69.5**	**27.6**	**34.1**	**26.6**	**15.4**	**87.3**	**784**	**183**	**137 J**	**52.5 J**	**10.4**	**9.04 J**	**218**	**110**
Benzo(b)fluoranthene	--	**3,600**	**2,790**	**3,390**	**14,900**	**27.3**	**40.7**	**23.1**	**28.6**	**25.8**	**12.0**	**59.2**	**794**	**117**	**81.5 J**	**38.0 J**	**8.49**	**8.64 J**	**154**	**96.9**
Benzo(k)fluoranthene	--	**2,390**	**1,790**	**2,470**	**9,320**	**17.0**	**27.1**	**12.7**	**15.8**	**16.3**	**6.08**	**33.9**	**516**	**75.2**	**39.4 J**	**22.8 J**	**4.48**	**4.73 J**	**95.5**	**57.5**
Chrysene	--	**3,830**	**2,810**	**7,070**	**15,700**	**38.6**	**71.1**	**31.4**	**37.2**	**46.6**	**13.4**	**69.6**	**2,060**	**197**	**155 J**	**55.9 J**	**10.5**	**11.1 J**	**196**	**115**
Dibenzo(a,h)anthracene	--	**1,110**	**827**	**1,310**	**3,400**	**8.03**	**13.6**	**5.95**	**7.44**	**7.78**	**3.13**	**13.9**	**180**	**27.5**	**21.7**	**13.8 J**	**1.88**	**2.23 J**	**56.3**	**38.5**
Indeno(1,2,3-cd)pyrene	--	**3,430**	**2,490**	**3,280**	**11,300**	**26.2**	**37.4**	**18.6**	**24.4**	**21.4**	**12.2**	**58.1**	**576**	**112**	**79.5 J**	**39.6 J**	**7.03**	**7.44 J**	**180**	**110**
Total cPAHs TEQ	190/390	**4,410**	**3,220**	**9,340**	**9,490**	**47.7**	**88.5**	**36.1**	**44.5**	**37.2**	**20.0**	**111**	**1,070**	**233**	**175 J**	**68.2 J**	**13.3**	**12.1 J**	**285**	**150**

Notes:

[1] MTCA Method B direct contact cleanup level of 190 µg/kg and Park User direct contact remediation level 390 µg/kg.

[2] The analytical results for individual compounds were used to calculate the TEQ in accordance with Environmental Protection Agency's toxicity equivalency factor (TEF) methodology. For non-detect results, one-half the practical quantitation limit (PQL) result was used in the TEQ calculations. The calculated TEQ was screened against the cleanup level.

CAS = Chemical Abstract Services

"--" = Not Available

ft = foot/feet

µg/kg = micrograms/kilogram

TEQ = toxic equivalency quotient

J = The analyte was detected and the detected concentration is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration s greater than the MTCA Method B cleanup level, but less than the Park User remediation level.

Orange shading indicates that the detected concentration s greater than the MTCA Method B cleanup level and the Park User remediation level.

Table 1

Upland Surface Soil Analytical Results

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	HA-26		HA-27		HA-28		HA-29		HA-30		HA-31		HA-32		HA-33		HA-34
	Sample ID	HA-26-0-1	HA-26-1-2	HA-27-0-1	HA-27-1-2	HA-28-0-1	HA-28-1-2	HA-29-0-1	HA-29-1-2	HA-30-1-2	DUP-02-1-2	HA-31-0-1	HA-31-1-2	HA-32-0-1	HA-32-1-2	HA-33-0-1	HA-33-1-2	HA-34-1-2
	Sample Date	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021	8/31/2021
	Start Depth	0	1	0	1	0	1	0	1	1	1	0	1	0	1	0	1	1
	End Depth	1	2	1	2	1	2	1	2	2	2	1	2	1	2	1	2	2
	Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Analysis	**Cleanup/ Remediation Level[1]**																	
Carcinogenic PAHs[2] (cPAHs) (µg/kg)																		
Benzo(a)anthracene	--	**42.1**	**182**	**3.63**	**32.5**	**25.9**	**39.7**	**26.2**	**38.2**	**232 J**	**507 J**	**49.6 J**	**289**	**57.6**	**107**	**12.1**	**17.3**	**141**
Benzo(a)pyrene	--	**57.6**	**149**	**6.42**	**113**	**27.0**	**45.9**	**38.3**	**47.5**	**250 J**	**535 J**	**48.2 J**	**203**	**59.8**	**105**	**18.2**	**25.4**	**222**
Benzo(b)fluoranthene	--	**41.1**	**103**	**5.56**	**69.4**	**17.5**	**29.5**	**30.8**	**36.6**	**131 J**	**250 J**	**32.2**	**118**	**39.5**	**64.7**	**14.3**	**17.9**	**110**
Benzo(k)fluoranthene	--	**25.6**	**74.3**	**2.74**	**23.9**	**12.0**	**17.0**	**17.1**	**21.1**	**92.4 J**	**178 J**	**19.2**	**88.0**	**23.4**	**34.5**	**7.72**	**10.3**	**76.8**
Chrysene	--	**69.2**	**191**	**6.06**	**64.8**	**29.4**	**42.5**	**44.4**	**60.6**	**230 J**	**465 J**	**60.6 J**	**282**	**64.9**	**115**	**19.9**	**22.8**	**146**
Dibenzo(a,h)anthracene	--	**14.4**	**30.1**	**2.62**	**36.6**	**5.77**	**9.86**	**8.73**	**11.0**	**40.4 J**	**89.5 J**	**11.3**	**33.9**	**12.3**	**19.2**	**4.23**	**5.59**	**47.4 J**
Indeno(1,2,3-cd)pyrene	--	**41.3**	**88.9**	**10.2**	**157**	**17.1**	**28.0**	**26.5**	**32.0**	**116 J**	**236 J**	**29.2**	**92.9**	**34.7**	**54.3**	**13.1**	**16.6**	**141**
Total cPAHs TEQ	190/390	**74.7**	**199**	**8.96**	**146**	**35.1**	**58.7**	**49.7**	**62.0**	**313 J**	**666 J**	**63.0 J**	**268**	**77.2**	**134**	**23.5**	**32.4**	**275 J**

Notes:

[1] MTCA Method B direct contact cleanup level of 190 µg/kg and Park User direct contact remediation level 390 µg/kg.

[2] The analytical results for individual compounds were used to calculate the TEQ in accordance with Environmental Protection Agency's toxicity equivalency factor (TEF) methodology. For non-detect results, one-half the practical quantitation limit (PQL) result was used in the TEQ calculations. The calculated TEQ was screened against the cleanup level.

CAS = Chemical Abstract Services

"--" = Not Available

ft = foot/feet

µg/kg = micrograms/kilogram

TEQ = toxic equivalency quotient

J = The analyte was detected and the detected concentration is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration s greater than the MTCA Method B cleanup level, but less than the Park User remediation level.

Orange shading indicates that the detected concentration s greater than the MTCA Method B cleanup level and the Park User remediation level.

Table 2

Upland Subsurface Soil Analytical Results

Pre-Remedial Design Investigation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	GP-58	GP-59	GP-60	GP-61	GP-62	GP-63	GP-64	GP-70	GP-71	GP-72	GP-73	GP-74	GP-75	MW-59	MW-60	MW-61	MW-62	MW-62
	Sample ID	GP-58-13-14	GP-59-12-13	GP-60-14-15	GP-61-13-14	GP-62-14-15	GP-63-14-15	GP-64-14-15	GP-70-3-4	GP-71-3-4	GP-72-3-4	GP-73-2-3	GP-74-15-16	GP-75-15-16	HSA-59-9-10.5	HSA-60-9-10.5	MW-61-15-16	HSA-62-13-14	DUP-1-083121
	Sample Date	1/10/2022	1/13/2022	1/10/2022	1/13/2022	1/10/2022	1/10/2022	1/10/2022	1/10/2022	1/10/2022	1/10/2022	1/10/2022	1/13/2022	1/13/2022	8/30/2021	8/30/2021	1/11/2022	8/31/2021	8/31/2021
	Start Depth	13	12	14	13	14	14	14	3	3	3	2	15	15	9	9	15	13	13
	End Depth	14	13	15	14	15	15	15	4	4	4	3	16	16	10.5	10.5	16	14	14
	Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Analysis	**Cleanup Level**																		
Conventionals																			
Total Organic Carbon (%)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**23.1 J**	**42.0**	--	--	--
Total Solids (%)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**38.24**	**27.05**	--	**73.67**	**69.07**
Cyanide (mg/Kg)	0.1	**0.303**	**8.7**	0.100 U	**0.360**	**0.175**	**0.416**	**1.27**	**1.30**	**0.361**	0.100 U	0.100 U	0.100 U	0.100 U	**0.588 J**	0.358 U	**0.461**	**15.7**	**11.4**
Total Petroleum Hydrocarbons (mg/kg) [1]																			
Gasoline-Range Hydrocarbons	30[3]	**5,350**	**1,990**	**422**	**1,030**	**5,020**	4.31 U	5.14 U	6.63 U	5.93 U	5.46 U	8.55 U	**562**	**11,900**	--	--	**7.95**	**5,650**	**5,160**
Diesel-Range Hydrocarbons	2,000	**1,220**	**3,730**	**77.9**	**2,180**	**3,040**	**165**	**60.1**	5.33 U	5.31 U	5.29 U	5.95 U	**1,640**	**1,210**	--	--	**454**	**9,730**	**9,850 J**
Heavy Oil-Range Hydrocarbons	2,000	**331**	**1,060**	**25.8**	**551**	**1,240**	**186**	**37.7**	10.7 U	10.6 U	10.6 U	11.9 U	**337**	**288**	--	--	**329**	**2,880**	**2,770**
Total Diesel/Oil [2]	2,000	**1,550**	**4,790**	**104**	**2,730**	**4,280**	**351**	**97.8**	10.7 U	10.6 U	10.6 U	11.9 U	**1,980**	**1,500**	--	--	**783**	**12,600**	**12,600**
Metals (mg/kg)																			
Copper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**65.4 J**	**49.2**	--	--	--
Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**15,400 J**	**10,300**	--	--	--
Volatile Organic Compounds (VOCs) (µg/kg)																			
Benzene	5	5,530 U	2,340 U	**7,390**	2,420 U	5,860 U	**662**	0.97 U	1.16 U	0.97 U	1.04 U	**0.46 J**	**3,120 J**	6,600 U	--	--	**94.7**	**13,800 J**	**29,500 J**
Naphthalene	120	**850,000**	**160,000**	**32,700**	**268,000**	**286,000**	**21,100**	4.86 U	5.80 U	4.85 U	5.21 U	5.80 U	**431,000**	**917,000**	--	--	**812**	**1,260,000 J**	**3,040,000 J**

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, and total diesel/oil (sum of diesel and heavy oil) are not soil contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the hightest detection limit was used for Total Diesel/Oil.

[3] MTCA Method A criteria for gasoline range hydrocarbons in soil is 30 mg/kg if benzene is present. If benzene is not present in the soil, then the MTCA criteria for gasoline range hydrocarbons is 100 mg/kg.

"--" = Not Available

ft = foot/feet

mg/kg = milligrams/kilogram

µg/kg = micrograms/kilogram

TEQ = toxic equivalent concentration

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Gray shading indicates detected concentration above MTCA Method A criteria that are used for screening purposes.

5.88

Table 3

Upland Groundwater Analytical Results - Monitoring Wells

Pre-Remedial Design Investigation Data Report, South State Street Site

Bellingham, Washington

	Location ID	MW-07			MW-19			MW-24			MW-28			MW-29	
	Sample ID	NS	MW-07-020922	MW-07-040622	NS	MW-19-020922	MW-19-040622	MW-24_092021	MW-24-020922	MW-24-040622	MW-28_092021	MW-28-020922	MW-28-040622	MW-29_092121	MW-29-020822
	Sample Date	9/22/2021	2/9/2022	4/6/2022	9/22/2021	2/9/2022	4/6/2022	9/20/2021	2/9/2022	4/6/2022	9/20/2021	2/9/2022	4/6/2022	9/21/2021	2/8/2022
Analysis	**Cleanup Level**														
Field Measured Parameters															
Top of Casing Elevation (feet NAVD88)	NE	52.94	52.94	52.94	57.67	57.67	57.67	53.34	53.34	53.34	18.90	18.90	18.90	19.12	19.12
Depth to Bottom of Well (feet)	NE	12.28	12.29	12.30	13.25	13.25	13.25	15.19	15.20	15.2	14.69	14.69	14.7	14.80	14.84
Depth to Groundwater (feet)	NE	12.04	8.86	8.90	12.71	8.73	8.77	11.85	7.96	7.99	10.95	7.09	7.57	11.51	9.66
Groundwater Elevation (feet NAVD88)	NE	40.90	44.08	44.04	44.96	48.94	48.90	41.49	45.38	45.35	7.95	11.81	11.33	7.61	9.46
pH	NE	--	6.28	5.87	--	6.51	6.24	6.41	6.89	6.62	6.54	6.64	6.47	6.83	6.36
Conductivity (µS/cm)	NE	--	409	356	--	465	443	983	1,130	1,077	852	604	692	565	499
Turbidity (NTU)	NE	--	29.1	30.0	--	17.4	6.97	10.4	14.3	2.09	0.020	3.75	5.98	6.63	14.6
Dissolved Oxygen (mg/l)	NE	--	5.33	1.82	--	1.92	0.65	0.040	1.57	0.31	0.640	1.80	0.22	0.870	0.570
Temperature (°C)	NE	--	10.5	9.9	--	10.5	10.9	12.9	11.0	10.9	13.3	10.7	10.8	13.3	10.7
Total Dissolved Solids (g/l)	NE	--	0.266	0.231	--	0.302	0.288	0.639	0.734	0.702	0.555	0.387	0.448	0.367	0.325
Oxidation Reduction Potential (mV)	NE	--	119	321	--	53.3	119	-39.2	-14.2	73	-84.6	-38.7	178	195	177
Salinity (ppt)	NE	--	0.20	0.17	--	0.23	0.21	0.49	0.56	0.54	0.42	0.30	0.34	0.28	0.24
Conventionals (mg/L)															
Total Organic Carbon (TOC)	--	--	**3.60**	--	--	**4.90**	--	**6.07**	**14.5**	--	**18.97**	**16.8**	--	**7.17**	**10.5**
Nitrate	--	--	**0.467**	--	--	**0.533**	--	2.00 U	0.0600 U	--	2.00 U	0.0200 UJ	--	**0.0493**	**1.54**
Nitrate-Nitrite	--	--	**0.467**	--	--	**0.548**	--	**1.70**	0.050 UJ	--	1.00 U	0.010 U	--	**0.049**	**1.56**
Nitrite	--	--	0.010 U	--	--	**0.015**	--	**1.62**	**0.011**	--	1.00 U	0.010 UJ	--	0.010 U	**0.025**
Sulfate	--	--	**33.0**	--	--	**27.4**	--	**14.1**	**34.0**	--	**5.40**	**10.6 J**	--	**95.5**	**72.6**
Cyanide	0.005	--	**0.124**	--	--	**0.0560**	--	**0.158**	**0.250**	--	**0.155**	**0.106**	--	**1.14**	**0.955**
WAD Cyanide	0.005	--	**0.018**	--	--	**0.009**	--	**0.052**	**0.069**	--	**0.033**	**0.016**	--	**0.073**	**0.091**
Total Petroleum Hydrocarbons (mg/L)[1]															
Gasoline-Range Hydrocarbons	0.8 [3]	--	0.100 U	--	--	**1.00**	--	**26.9**	**50.0**	--	**22.6**	**32.5**	--	0.100 U	**0.484**
Diesel-Range Hydrocarbons	0.5	--	--	**0.109**	--	--	**0.267**	**4.62**	--	**4.65**	**2.84**	--	**2.50**	**0.521**	**2.53**
Heavy Oil-Range Hydrocarbons	0.5	--	--	0.200 U	--	--	0.200 U	0.200 U	--	0.200 U	0.200 U	--	0.200 U	**0.229**	**0.724**
Total Diesel/Oil [2]	0.5	--	--	**0.109**	--	--	**0.267**	**4.62**	--	**4.65**	**2.84**	--	**2.50**	**0.75**	**3.25**
Metals (µg/L)															
Iron (Total)	--	--	**3,680**	--	--	**633**	--	**5,850**	**7,990**	--	**17,100**	**21,100**	--	**1,700**	**975**
Iron (Dissolved)	--	--	180 U	--	--	**526**	--	**5,930**	**6,420**	--	**17,300**	**18,200**	--	**440**	**455**
Lead (Dissolved)	--	--	0.500 U	--	--	0.500 U	--	0.100 U	0.500 U	--	0.100 U	0.500 U	--	0.100 U	0.500 U
Selenium (Dissolved)	71	--	**1.33 J**	--	--	2.50 U	--	0.500 U	**1.03 J**	--	**0.307 J**	**0.995 J**	--	**0.560**	**0.995 J**
Volatile Organic Compounds (VOCs) (µg/L)															
Benzene	1.6	--	0.20 U	--	--	**75.2**	--	**152**	**271**	--	**4,890**	**3,720**	--	**1.48**	**9.78**
Naphthalene	83	--	0.50 U	--	--	**72.1**	--	**3,720**	**4,390**	--	**4,170**	**3,550**	--	**0.48 J**	**48.6**

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, and total diesel/oil (sum of diesel and heavy oil) are not groundwater contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the hightest detection limit was used for Total Diesel/Oil.

[1] MTCA criterita for gasoline range hydrocarbons in groundwater is 0.8 mg/L if benzene is present. If benzene is not present in the water, then the MTCA criteria for gasoline range hydrocarbons is 1.0 mg/L.

mg/L = milligrams/liter

µg/L = micrograms/liter

WAD = Weak Acid Dissociable

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

NS = Not Sampled. An insufficient quantity of water was present in the well at the time of sampling.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Gray indicates detected concentration above MTCA Method A criteria that are used for screening purposes.

Table 3

Upland Groundwater Analytical Results - Monitoring Wells

Pre-Remedial Design Investigation Data Report, South State Street Site

Bellingham, Washington

	Location ID	MW-31			MW-34		MW-36		MW-38			MW-40	
	Sample ID	NS	MW-31-021022	MW-31-040622	MW-34_092121	MW-34-020822	MW-36_092121	MW-36-020822	MW-38_092121	MW-38-021022	MW-38-040622	MW-40_092121	MW-40-020722
	Sample Date	9/22/2021	2/10/2022	4/6/2022	9/21/2021	2/8/2022	9/21/2021	2/8/2022	9/21/2021	2/10/2022	4/6/2022	9/21/2021	2/7/2022
Analysis	**Groundwater Cleanup Level**												
Field Measured Parameters													
NAVD88)	NE	14.40	14.40	14.4	9.89	9.89	10.63	10.63	11.30	11.30	11.30	10.27	10.27
Depth to Bottom of Well (feet)	NE	10.15	10.20	10.00	13.90	13.85	23.35	23.24	24.70	24.70	24.7	31.60	31.53
Depth to Groundwater (feet)	NE	8.14	7.64	7.74	4.80	3.53	7.02	4.09	6.24	5.30	8.77	5.53	3.71
NAVD88)	NE	6.26	6.76	6.66	5.09	6.36	3.61	6.54	5.06	6.00	2.53	4.74	6.56
pH	NE	–	6.20	6.02	6.46	7.01	6.75	6.93	7.01	7.28	7.06	6.51	6.79
Conductivity (µS/cm)	NE	–	394	371	35,300	34,600	27,200	25,400	28,700	28,500	26,800	30,700	30,500
Turbidity (NTU)	NE	–	136	47.9	4.04	0.02	4.03	2.47	6.21	4.12	9.64	9.16	0.02
Dissolved Oxygen (mg/l)	NE	–	2.16	0.93	1.86	3.96	0.45	0.34	0.02	1.14	0.18	0.24	0.72
Temperature (°C)	NE	–	10.7	10.3	17.8	6.8	13.2	11.6	14.0	11.5	11.3	13.6	11.6
Total Dissolved Solids (mg/l)	NE	–	0.258	242	22.919	22.5160	17.663	16.4795	18.645	18.5510	17.420	19.929	19.79
Oxidation Reduction Potential (mV)	NE	–	117	168	-32.5	207.7	-295.3	-262.4	-163.2	53.5	40	-363.4	-375
Salinity (ppt)	NE	–	0.19	0.18	22.27	21.57	16.71	15.45	17.73	17.59	16.47	19.09	18.89
Conventionals (mg/L)													
Total Organic Carbon (TOC)	--	–	**7.00**	–	**2.48**	**1.90**	**2.73**	**2.60**	**1.62**	**1.60**	–	**10.78**	**11.8**
Nitrate	--	–	**0.239**	–	**0.591**	**0.516**	0.0200 U	**0.851**	**0.0370**	**0.197**	–	0.200 U	0.700 UJ
Nitrate-Nitrite	--	–	**0.239**	–	**0.591**	**0.516**	0.010 U	**0.915**	**0.037**	**0.222**	–	**0.125**	0.200 U
Nitrite	--	–	0.010 U	–	0.010 U	0.010 U	0.010 U	**0.064**	0.010 U	**0.025**	–	0.100 U	0.500 U
Sulfate	--	–	**20.9**	–	**1480**	**1750**	**888**	**1390**	**984**	**1100**	–	**46.7**	**43.0**
Cyanide	0.005	–	**0.254**	–	**0.0230**	**0.0140**	**0.0300**	**0.0590**	**0.0290**	**0.0370**	–	**0.165**	0.0050 U
WAD Cyanide	0.005	–	**0.021**	–	**0.006**	0.005 U	**0.008**	**0.006**	**0.016**	**0.007**	–	**0.054**	**0.140**
Total Petroleum Hydrocarbons (mg/L)[1]													
Gasoline-Range Hydrocarbons	0.8 [3]	100	**5.34**	–	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	–	0.100 U	0.100 U
Diesel-Range Hydrocarbons	0.5	0.10	–	**0.296**	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	–	0.100 U	0.100 U	0.100 U
Heavy Oil-Range Hydrocarbons	0.5		–	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	–	0.200 U	0.200 U	0.200 U
Total Diesel/Oil [2]	0.5	0.20	–	**0.296**	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	–	0.200 U	0.200 U	0.200 U
Metals (µg/L)													
Iron (Total)	--	20.0	**14,600**	–	720 U	720 U	**680**	720 U	**2400**	**822**	–	360 U	720 U
Iron (Dissolved)	--	0.5	**1,690**	–	360 U	720 U	360 U	720 U	**1570**	720 U	–	360 U	720 U
Lead (Dissolved)	--	0.5	**1.04**	–	1.00 U	2.00 U	1.00 U	2.00 U	1.00 U	2.00 U	–	1.00 U	2.00 U
Selenium (Dissolved)	71	0.5	**1.70 J**	–	5.00 U	**19.4**	5.00 U	**13.3**	5.00 U	**11.2**	–	**2.69**	**9.82 J**
Volatile Organic Compounds (VOCs) (µg/L)													
Benzene	1.6	0.2	**190**	–	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	–	**0.07 J**	**0.08 J**
Naphthalene	83	0.5	**1,250**	–	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**1.58**	–	0.50 U	0.50 U

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, and total diesel/oil (sum of diesel and heavy oil) are not groundwater contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the hightest detection limit was used for Total Diesel/Oil.

[1] MTCA criterita for gasoline range hydrocarbons in groundwater is 0.8 mg/L if benzene is present. If benzene is not present in the water, then the MTCA criteria for gasoline range hydrocarbons is 1.0 mg/L.

mg/L = milligrams/liter

µg/L = micrograms/liter

WAD = Weak Acid Dissociable

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

NS = Not Sampled. An insufficient quantity of water was present in the well at the time of sampling.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Gray indicates detected concentration above MTCA Method A criteria that are used for screening purposes.

Table 3

Upland Groundwater Analytical Results - Monitoring Wells

Pre-Remedial Design Investvation Data Report, South State Street Site

Bellingham, Washington

	Location ID	MW-42		MW-44		MW-45			MW-46		MW-53		MW-54		MW-55	
	Sample ID	MW-42_092021	MW-42-020822	NS	NS	MW-45_092121	MW-45-021022	MW-45-040622	MW-46_092121	MW-46-020922	MW-53-092221	MW-53-020722	MW-54_092021	MW-54-020722	MW-55_092021	MW-55-020722
	Sample Date	9/20/2021	2/8/2022	9/20/2021	2/7/2022	9/21/2021	2/10/2022	4/6/2022	9/21/2021	2/9/2022	9/22/2021	2/7/2022	9/20/2021	2/7/2022	9/20/2021	2/7/2022
Analysis	**Groundwater Cleanup Level**															
Field Measured Parameters																
NAVD88)	NE	9.25	9.25	54.04	54.04	15.51	15.51	15.51	8.93	8.93	15.08	15.08	12.08	12.08	10.41	10.41
Depth to Bottom of Well (feet)	NE	34.59	34.55	12.69	12.70	11.68	16.71	12.71	10.95	10.96	11.41	12.00	13.90	13.92	36.68	36.68
Depth to Groundwater (feet)	NE	5.98	2.84	12.47	12.22	10.01	9.55	10.20	3.25	2.34	6.89	7.40	6.93	6.18	5.31	4.35
NAVD88)	NE	3.27	6.41	41.57	41.82	5.50	5.96	5.31	5.68	6.59	8.19	7.68	5.15	5.90	5.10	6.06
pH	NE	6.77	6.95	--	--	6.16	6.23	6.37	7.06	7.42	6.30	6.17	5.94	6.30	6.80	7.1
Conductivity (µS/cm)	NE	38,200	36,400	--	--	11,700	9,560	5,390	34,700	15,700	637	791	36,500	21,600	29,400	29,800
Turbidity (NTU)	NE	1.43	2.01	--	--	3.38	4.25	15.0	1.73	4.83	2.70	4.1	5.59	0.02	0.71	0.02
Dissolved Oxygen (mg/l)	NE	0.530	0.800	--	--	0.990	0.460	2.91	1.25	1.90	0.72	2.16	0.63	0.32	0.01	0.20
Temperature (°C)	NE	13.7	11.3	--	--	15.6	10.1	10.7	16.0	8.90	13.9	9.3	15.1	10.8	13.5	11.8
Total Dissolved Solids (mg/l)	NE	24.8	23.6	--	--	7.62	6.21	3.49	22.5	9.47	0.414	0.514	17.2	14.0	19.1	19.4
Oxidation Reduction Potential (mV)	NE	-341	-341	--	--	42.1	169	150	-82.3	-33.9	196	-29.7	-198	-208	-365	-360
Salinity (ppt)	NE	24.31	22.95	--	--	6.72	5.79	2.90	21.79	8.57	0.31	0.39	16.29	12.95	18.25	18.48
Conventionals (mg/L)																
Total Organic Carbon (TOC)	--	**4.48**	**4.60**	--	--	**3.10**	**2.90**	--	**2.57**	**3.70**	**3.77**	**3.30**	**2.60**	**2.70**	**4.20**	**5.30**
Nitrate	--	**0.105**	0.550 U	--	--	**0.398**	**0.184**	--	**0.0233**	**0.442**	**0.928**	**1.23 J**	0.0200 U	**0.0449 J**	**0.0895**	**0.306 J**
Nitrate-Nitrite	--	**0.105**	0.050 U	--	--	**0.398**	**0.184**	--	**0.023**	**0.456**	**0.928**	**1.23**	**0.014**	**0.045**	**0.090**	**0.306**
Nitrite	--	0.010 U	0.500 U	--	--	0.010 U	0.010 U	--	0.010 U	**0.014**	0.100 U	0.010 U	0.010 U	0.010 U	0.010 U	0.200 U
Sulfate	--	**988**	**1310**	--	--	**470**	**440**	--	**1420**	**590**	**63.6**	**36.6**	**976**	**1070**	**47.0**	**48.6**
Cyanide	0.005	**0.0970**	**0.115**	--	--	**0.246**	**0.214**	--	**0.0780**	**0.224**	**0.218**	0.0050 U	**0.0210**	0.0050 U	**0.132**	0.0050 U
WAD Cyanide	0.005	**0.039**	**0.051**	--	--	**0.088**	**0.015**	--	**0.013**	**0.013**	**0.046**	**0.028**	**0.009**	0.005 U	**0.043**	**0.037**
Total Petroleum Hydrocarbons																
Gasoline-Range Hydrocarbons	0.8 [3]	0.100 U	0.100 U	--	--	0.100 U	0.100 U	--	0.100 U	0.100 U	0.100 U	1.0 U	0.100 U	1.0 U	0.100 U	1.0 U
Diesel-Range Hydrocarbons	0.5	0.100 U	0.100 U	--	--	**0.169**	--	**0.429**	**0.114**	**0.178**	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Heavy Oil-Range Hydrocarbons	0.5	0.200 U	0.200 U	--	--	0.200 U	--	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Total Diesel/Oil [2]	0.5	0.200 U	0.200 U	--	--	**0.169**	--	**0.429**	**0.114**	**0.178**	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Metals (µg/L)																
Iron (Total)	--	360 U	720 U	--	--	**220**	**202 J**	--	**3,550**	**974**	**2,330**	**599**	**253**	720 U	360 U	720 U
Iron (Dissolved)	--	360 U	720 U	--	--	360 U	360 U	--	**3,280**	**941**	**101**	**92.4 J**	**249**	720 U	360 U	720 U
Lead (Dissolved)	--	1.00 U	2.00 U	--	--	1.00 U	1.00 U	--	1.00 U	1.00 U	0.100 U	0.100 U	1.00 U	2.00 U	1.00 U	2.00 U
Selenium (Dissolved)	71	**3.71**	**21.2**	--	--	5.00 U	**3.71 J**	--	**3.70 J**	**5.39**	0.500 U	0.500 U	5.00 U	**10.8**	5.00 U	**6.00 J**
Volatile Organic Compounds (VOCs) (µg/L)																
Benzene	1.6	0.20 U	0.20 U	--	--	0.20 U	0.20 U	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Naphthalene	83	0.50 U	0.50 U	--	--	0.50 U	0.50 U	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, and total diesel/oil (sum of diesel and heavy oil) are not groundwater contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the hightest detection limit was used for Total Diesel/Oil.

[1] MTCA criterita for gasoline range hydrocarbons in groundwater is 0.8 mg/L if benzene is present. If benzene is not present in the water, then the MTCA criteria for gasoline range hydrocarbons is 1.0 mg/L.

mg/L = milligrams/liter

µg/L = micrograms/liter

WAD = Weak Acid Dissociable

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

NS = Not Sampled. An insufficient quantity of water was present in the well at the time of sampling.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Gray indicates detected concentration above MTCA Method A criteria that are used for screening purposes.

Table 3

Upland Groundwater Analytical Results - Monitoring Wells

Pre-Remedial Design Investigation Data Report, South State Street Site

Bellingham, Washington

	Location ID	MW-58		MW-59		MW-60			MW-61		MW-62		
	Sample ID	NS	NS	MW-59_092121	MW-59-020722	MW-60_092021	MW-60-021022	MW-60-040622	MW-61-020722	DUP-1-020722	MW-62_092121	DUP-1_092121	MW-62-020822
	Sample Date	9/20/2021	2/7/2022	9/21/2021	2/7/2022	9/20/2021	2/10/2022	4/6/2022	2/7/2022	2/7/2022	9/21/2021	9/21/2021	2/8/2022
Analysis	**Groundwater Cleanup Level**												
Field Measured Parameters													
NAVD88)	NE	19.81	19.81	10.10	10.10	9.47	9.47	9.47	13.57	13.57	19.26	19.26	19.26
Depth to Bottom of Well (feet)	NE	14.02	13.04	13.30	13.57	14.22	14.22	14.02	14.67	14.67	14.93	14.93	14.95
Depth to Groundwater (feet)	NE	13.15	6.78	5.39	3.45	6.10	2.99	8.95	7.10	7.10	11.31	11.31	7.69
NAVD88)	NE	6.66	13.03	4.71	6.65	3.37	6.48	0.52	6.47	6.47	7.95	7.95	11.57
pH	NE	--	--	6.26	6.53	6.15	6.95	6.36	6.82	--	6.70	--	6.37
Conductivity (µS/cm)	NE	--	--	26,894	15,076	33,932	28,760	31,200	32,133	--	1.010	--	579.8
Turbidity (NTU)	NE	--	--	3.58	2.69	0.02	3.77	6.17	0.02	--	0.02	--	16.3
Dissolved Oxygen (mg/l)	NE	--	--	0.11	1.64	0.77	1.17	1.94	2.25	--	0.56	--	2.09
Temperature (°C)	NE	--	--	17.0	8.3	18.3	10.6	10.3	7.7	--	14.5	--	11.1
Total Dissolved Solids (mg/l)	NE	--	--	17.987	9.7955	22.057	18.6942	20.254	20.88	--	0.658	--	0.3763
Oxidation Reduction Potential (mV)	NE	--	--	-237.1	149.2	29.7	140.3	245	-116.2	--	-70.0	--	81.6
Salinity (ppt)	NE	--	--	16.54	8.76	21.35	17.72	19.34	19.84	--	0.50	--	0.28
Conventionals (mg/L)													
Total Organic Carbon (TOC)	--	--	--	**6.06**	**6.20**	**4.18**	**2.80**	--	**3.00**	**2.90**	**12.24**	**11.83**	**5.40**
Nitrate	--	--	--	0.0200 U	**0.0946 J**	0.0200 U	**0.264**	--	**0.126 J**	**0.171 J**	0.200 U	0.200 U	**0.729**
Nitrate-Nitrite	--	--	--	**0.023**	**0.095**	0.010 U	**0.264**	--	**0.126 J**	**0.171 J**	0.100 U	0.100 U	**0.729**
Nitrite	--	--	--	**0.012**	0.010 U	0.010 U	0.010 U	--	0.010 U	0.010 U	0.100 U	0.100 U	0.010 U
Sulfate	--	--	--	**988**	**556**	**1,870**	**1,220**	--	**1,560**	**1,500**	**88.9**	**203**	**172**
Cyanide	0.005	--	--	0.0050 U	0.0050 U	0.0050 U	**0.0250**	--	0.0050 UJ	0.0050 UJ	**0.280**	**0.274**	**0.270**
WAD Cyanide	0.005	--	--	0.005 U	0.005 U	0.005 U	**0.007**	--	**0.009**	**0.011**	**0.048**	**0.048**	**0.058 J**
Total Petroleum Hydrocarbons (mg/L)[1]													
Gasoline-Range Hydrocarbons	0.8 [3]	--	--	0.100 U	1.0 U	0.100 U	0.100 U	--	1.0 U	1.0 U	**27.8**	**27.0**	**2.85**
Diesel-Range Hydrocarbons	0.5	--	--	0.100 U	0.100 U	0.100 U	--	0.100 U	0.100 U	**0.105**	**5.11**	**5.75**	**1.06**
Heavy Oil-Range Hydrocarbons	0.5	--	--	0.200 U	0.200 U	0.200 U	--	0.200 U	0.200 U	0.200 U	**0.231**	**0.273**	0.200 U
Total Diesel/Oil [2]	0.5	--	--	0.200 U	0.200 U	0.200 U	--	0.200 U	0.200 U	**0.105**	**5.34**	**6.02**	**1.06**
Metals (µg/L)													
Iron (Total)	--	--	--	**13,600**	**833**	**6,360**	720 U	--	**378 J**	720 U	**4,050**	**4,210**	**260**
Iron (Dissolved)	--	--	--	**13,300**	**827**	**6,510**	720 U	--	720 U	720 U	**2,990**	**3,000**	**285**
Lead (Dissolved)	--	--	--	1.00 U	**4.26**	1.00 U	2.00 U	--	2.00 U	2.00 U	0.100 U	0.100 U	0.500 U
Selenium (Dissolved)	71	--	--	**3.25**	**4.66 J**	**2.65**	**12.8**	--	**8.70 J**	**12.4 J**	0.500 U	**0.222 J**	2.50 U
Volatile Organic Compounds (VOCs) (µg/L)													
Benzene	1.6	--	--	0.20 U	0.20 U	**0.07 J**	0.20 U	--	0.20 U	0.20 U	**926**	**876**	**58.0**
Naphthalene	83	--	--	0.50 U	0.50 U	0.50 U	0.50 U	--	0.50 U	0.50 U	**6,920**	**6,650**	**780**

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, and total diesel/oil (sum of diesel and heavy oil) are not groundwater contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the hightest detection limit was used for Total Diesel/Oil.

[1] MTCA criterita for gasoline range hydrocarbons in groundwater is 0.8 mg/L if benzene is present. If benzene is not present in the water, then the MTCA criteria for gasoline range hydrocarbons is 1.0 mg/L.

mg/L = milligrams/liter

µg/L = micrograms/liter

WAD = Weak Acid Dissociable

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

NS = Not Sampled. An insufficient quantity of water was present in the well at the time of sampling.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Gray indicates detected concentration above MTCA Method A criteria that are used for screening purposes.

Table 4

Upland Groundwater Analytical Results - Direct Push Grab Samples

Preliminary Remedial Design Investigation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	GP-62	GP-64	GP-65		GP-66	GP-67	GP-68	GP-69	GP-74	GP-75
	Sample ID	GP-62-GW-011022	GP-64-GW-011022	GP-65-GW-011122	DUP-1-GW-011122	GP-66-GW-011222	GP-67-GW-011222	GP-68-GW-011222	GP-69-GW-011222	GP-74-GW-011322	GP-75-GW-011322
	Sample Date	1/10/2022	1/10/2022	1/11/2022	1/11/2022	1/12/2022	1/12/2022	1/12/2022	1/12/2022	1/13/2022	1/13/2022
Analysis	**Cleanup Level**										
Conventionals (mg/L)											
Cyanide	0.005	**0.390**	**0.475**	**0.0470**	**0.0430**	**0.154**	**0.420**	**0.295**	**0.235**	**0.265**	**0.325**
WAD Cyanide	0.005	**0.080**	**0.066**	**0.022**	**0.027**	**0.032**	**0.082**	**0.088**	**0.022**	**0.058**	**0.030**
Total Petroleum Hydrocarbons (mg/L)[1]											
Gasoline-Range Hydrocarbons	0.8 [3]	**10.0 J**	0.100 U	**4.55**	**4.34**	**0.121**	0.100 U	**1.05**	**1.01**	**48.5**	**50.2**
Diesel-Range Hydrocarbons	0.5	**1.47 J**	**4.56 J**	**2.84 J**	**3.56 J**	**1.05**	**1.02**	**2.97**	**45.7**	**7.43**	**14.8**
Heavy Oil-Range Hydrocarbons	0.5	0.200 UJ	**0.786 J**	**0.310 J**	**0.645 J**	**0.691**	**1.08**	**1.27**	**12.7 J**	**1.06 J**	**2.20**
Total Diesel/Oil [2]	0.5	**1.47 J**	**5.35 J**	**3.15 J**	**4.21 J**	**1.74**	**2.10**	**4.24**	**58.4 J**	**8.49 J**	**17.0**
Volatile Organic Compounds (VOCs) (µg/L)											
Benzene	1.6	**76.3**	**0.06 J**	**190**	**186**	**3.97**	**0.95**	**13.7**	**9.64**	**1,350**	**516**
Naphthalene	83	**2,320 J**	**2.61**	**5,040 J**	**5,020 J**	**5.62**	**14.1**	**115 J**	**55.7**	**11,700 J**	**14,400 J**

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, and total diesel/oil (sum of diesel and heavy oil) are not groundwater contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the highest detection limit was used for Total Diesel/Oil.

[3] MTCA criterita for gasoline range hydrocarbons in groundwater is 0.8 mg/L if benzene is present. If benzene is not present in the water, then the MTCA criteria for gasoline range hydrocarbons is 1.0 mg/L.

mg/L = milligrams/liter

µg/L = micrograms/liter

WAD = Weak Acid Dissociable

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Gray indicates detected concentration above MTCA Method A criteria that are used for screening purposes.

Table 5

Intertidal Sediment Analytical Results

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-1		PRDI-2			PRDI-3		PRDI-4		PRDI-5	
	Sample ID	PRDI-1-SC-0-15	PRDI-1-SC-15-60	PRDI-2-SC-0-15	DUP-2-SC	PRDI-2-SC-15-60	PRDI-3-SC-0-15	PRDI-3-SC-15-60	PRDI-4-SC-0-15	PRDI-4-SC-15-60	PRDI-5-SC-0-15	PRDI-5-SC-15-60
	Sample Date	6/23/2021	6/23/2021	6/23/2021	6/23/2021	6/23/2021	6/22/2021	6/22/2021	6/24/2021	6/24/2021	6/22/2021	6/22/2021
	Start Depth	0	15	0	0	15	0	15	0	15	0	15
	End Depth	15	60	15	15	60	15	60	15	60	15	60
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**											
Conventionals												
Total Organic Carbon (TOC) (%)	--	**4.95**	**0.92**	**3.42**	**3.87**	**2.96**	**0.61**	**0.18**	**4.15**	**5.69**	**0.26**	**0.56**
Total Solids (%)	--	**69.51**	**74.46**	**65.14**	**63.31**	**60.45**	**90.33**	**81.72**	**63.05**	**67.60**	**92.78**	**82.02**
Cyanide (mg/kg)	--	0.139 UJ	0.134 U	0.158 U	0.155 U	0.167 U	0.110 U	0.127 U	0.163 U	**0.179**	0.109 U	**0.192**
Total Petroleum Hydrocarbons (mg/kg)[1]												
Gasoline-Range Hydrocarbons	30[3]	6.03 U	2.83 U	7.80 U	9.99 U	8.64 U	2.12 U	2.78 U	9.60 U	7.30 U	2.30 U	4.09 U
Diesel-Range Hydrocarbons	2,000	**48.8**	**53.1**	**74.1**	**87.2**	**91.4**	**7.83**	6.01 U	**99.1**	**225**	5.37 U	**64.5**
Heavy Oil-Range Hydrocarbons	2,000	**195**	**79.5**	**235**	**236**	**243**	**34.1**	**26.1**	**210**	**361**	**42.5**	**119**
Total Diesel/Oil [2]	2,000	**244**	**133**	**309**	**323**	**334**	**41.9**	**26.1**	**309**	**586**	**42.5**	**184**
Volatile Organic Compounds (VOCs) (µg/kg) [1,4]												
Benzene	30	**4.30**	0.50 U	**0.92 J**	**0.63 J**	**1.31**	**0.82**	**0.82**	**0.42 J**	**0.53 J**	**0.81**	**2.78**
Naphthalene	5,000	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
Carcinogenic PAHs[5] (cPAHs) (µg/kg)												
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
Total cPAHs TEQ	229	--	--	--	--	--	--	--	--	--	--	--

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, total diesel/oil (sum of diesel and heavy oil), benzene, and naphthalene are not sediment contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the hightest detection limit was used for Total Diesel/Oil.

[3] MTCA Method A criteria for gasoline range hydrocarbons in soil is 30 mg/kg if benzene is present. If benzene is not present in the soil, then the MTCA criteria for gasoline range hydrocarbons is 100 mg/kg.

[4] Additional VOC intertidal sediment results are presented on Table 6.

[5] The analytical results for individual compounds were used to calculate the TEQ in accordance with Environmental Protection Agency's toxicity equivalency factor (TEF) methodology. For non-detect results, one-half the practical quantitation limit (PQL) result was used in the TEQ calculations. The calculated TEQ was screened against the cleanup level.

mg/kg = milligrams/kilogram

µg/kg = micrograms/kilogram

TEQ = toxic equivalent concentration

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Table 5

Intertidal Sediment Analytical Results

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-6		PRDI-7		PRDI-8		PRDI-9				
	Sample ID	PRDI-6-SC-0-15	PRDI-6-SC-15-60	PRDI-7-SC-0-15	PRDI-7-SC-15-60	PRDI-8-SC-0-15	PRDI-8-SC-15-60	PRDI-9-SC-0-15	PRDI-9-SC-0-45	PRDI-9-SC-15-60	DUP-3-SC	PRDI-9-SS-0-12
	Sample Date	6/22/2021	6/22/2021	6/23/2021	6/23/2021	6/24/2021	6/24/2021	6/24/2021	6/24/2021	6/24/2021	6/24/2021	6/24/2021
	Start Depth	0	15	0	15	0	15	0	0	15	15	0
	End Depth	15	60	15	60	15	60	15	45	60	60	12
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**											
Conventionals												
Total Organic Carbon (TOC) (%)	--	**3.73**	**1.38**	**0.51**	**0.73**	**2.25**	**1.24**	**2.92**	--	**0.91**	--	--
Total Solids (%)	--	**71.63**	**78.05**	**87.24**	**78.59**	**73.04**	**74.59**	**71.02**	--	**83.09**	--	--
Cyanide (mg/kg)	--	0.138 U	0.125 U	0.116 U	0.131 U	0.134 U	0.132 U	0.142 U	--	0.122 U	--	--
Total Petroleum Hydrocarbons (mg/kg)[1]												
Gasoline-Range Hydrocarbons	--	5.40 U	4.71 U	3.25 U	5.04 U	11.5 U	4.06 U	6.07 U	--	4.18 U	3.71 U	--
Diesel-Range Hydrocarbons	--	**43.3**	**28.1**	**14.4**	**15.7**	**40.7**	**16.0**	**37.2**	--	**20.3**	**22.9**	--
Heavy Oil-Range Hydrocarbons	--	**113**	**99.9**	**69.1**	**96.3**	**142**	**54.0**	**130**	--	**81.7**	**71.0**	--
Total Diesel/Oil [2]	--	**156**	**128**	**83.5**	**112**	**183**	**70.0**	**167**	--	**102**	**93.9**	--
Volatile Organic Compounds (VOCs) (µg/kg) [1,4]												
Benzene	--	**0.27 J**	0.52 U	**0.47 J**	**1.53**	**0.59 J**	**3.67**	2.91 U	--	**0.90**	0.62 U	--
Naphthalene	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	--	3.80 U	3.11 U	--
Carcinogenic PAHs[5] (cPAHs) (µg/kg)												
Benzo(a)anthracene	--	--	--	--	--	--	--	--	**362**	--	--	**259**
Benzo(a)pyrene	--	--	--	--	--	--	--	--	**375**	--	--	**286**
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	**304**	--	--	**201**
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	**212**	--	--	**142**
Chrysene	--	--	--	--	--	--	--	--	**333**	--	--	**289**
Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	**83.2**	--	--	**49.8**
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	**275**	--	--	**156**
Total cPAHs TEQ	229	--	--	--	--	--	--	--	**502**	--	--	**370**

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, total diesel/oil (sum of diesel and heavy oil), benzene, and naphthalene are not sediment contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the hightest detection limit was used for Total Diesel/Oil.

[3] MTCA Method A criteria for gasoline range hydrocarbons in soil is 30 mg/kg if benzene is present. If benzene is not present in the soil, then the MTCA criteria for gasoline range hydrocarbons is 100 mg/kg.

[4] Additional VOC intertidal sediment results are presented on Table 6.

[5] The analytical results for individual compounds were used to calculate the TEQ in accordance with Environmental Protection Agency's toxicity equivalency factor (TEF) methodology. For non-detect results, one-half the practical quantitation limit (PQL) result was used in the TEQ calculations. The calculated TEQ was screened against the cleanup level.

mg/kg = milligrams/kilogram

µg/kg = micrograms/kilogram

TEQ = toxic equivalent concentration

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Table 5

Intertidal Sediment Analytical Results

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-10				PRDI-11				PRDI-12		
	Sample ID	PRDI-10-SC-0-15	PRDI-10-SC-15-60	PRDI-10-SC-0-45	PRDI-10-SS-0-12	PRDI-11-SC-0-15	PRDI-11-SC-15-60	PRDI-11-SC-0-45	PRDI-11-SS-0-12	PRDI-12-SC-0-15	PRDI-12-SC-15-60	PRDI-12-SC-0-45
	Sample Date	6/24/2021	6/24/2021	6/24/2021	6/24/2021	6/25/2021	6/25/2021	6/25/2021	6/25/2021	6/25/2021	6/25/2021	6/25/2021
	Start Depth	0	15	0	0	0	15	0	0	0	15	0
	End Depth	15	60	45	12	15	60	45	12	15	60	45
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**											
Conventionals												
Total Organic Carbon (TOC) (%)	--	**0.37**	**1.42**	--	--	**12.1**	**29.1**	--	--	**0.91**	**8.53**	--
Total Solids (%)	--	**90.27**	**74.97**	--	--	**51.83**	**22.86**	--	--	**71.71**	**53.42**	--
Cyanide (mg/kg)	--	0.113 U	0.136 U	--	--	0.194 UJ	0.446 U	--	--	0.143 U	0.192 U	--
Total Petroleum Hydrocarbons (mg/kg)[1]												
Gasoline-Range Hydrocarbons	--	4.40 U	4.09 U	--	--	12.9 U	30.6 U	--	--	4.78 U	10.3 U	--
Diesel-Range Hydrocarbons	--	**13.1**	**41.2**	--	--	**87.6**	**213**	--	--	**11.4**	**69.3**	--
Heavy Oil-Range Hydrocarbons	--	**41.7**	**71.1**	--	--	**189**	**433**	--	--	**43.7**	**160**	--
Total Diesel/Oil [2]	--	**54.8**	**112**	--	--	**277**	**646**	--	--	**55.1**	**229**	--
Volatile Organic Compounds (VOCs) (µg/kg) [1,4]												
Benzene	--	**0.53 J**	0.54 U	--	--	**7.09 J**	**3.16**	--	--	**0.40 J**	3.12 U	--
Naphthalene	--	3.93 U	2.69 U	--	--	9.10 UJ	13.9 U	--	--	4.40 U	15.6 U	--
Carcinogenic PAHs[5] (cPAHs) (µg/kg)												
Benzo(a)anthracene	--	--	--	**102**	**13.0**	--	--	**187**	**129**	--	--	**95.7**
Benzo(a)pyrene	--	--	--	**109**	**14.9**	--	--	**241**	**163**	--	--	**122**
Benzo(b)fluoranthene	--	--	--	**78.4**	**10.0**	--	--	**155**	**101**	--	--	**94.6**
Benzo(k)fluoranthene	--	--	--	**35.8**	**6.01**	--	--	**104**	**70.6**	--	--	**44.6**
Chrysene	--	--	--	**120**	**12.9**	--	--	**181**	**124**	--	--	**96.4**
Dibenzo(a,h)anthracene	--	--	--	**23.1**	**2.87**	--	--	**47.1**	**34.0**	--	--	**24.6**
Indeno(1,2,3-cd)pyrene	--	--	--	**67.6**	**9.84**	--	--	**168**	**102**	--	--	**79.2**
Total cPAHs TEQ	229	--	--	**141**	**19.2**	--	--	**309**	**208**	--	--	**157**

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, total diesel/oil (sum of diesel and heavy oil), benzene, and naphthalene are not sediment contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the hightest detection limit was used for Total Diesel/Oil.

[3] MTCA Method A criteria for gasoline range hydrocarbons in soil is 30 mg/kg if benzene is present. If benzene is not present in the soil, then the MTCA criteria for gasoline range hydrocarbons is 100 mg/kg.

[4] Additional VOC intertidal sediment results are presented on Table 6.

[5] The analytical results for individual compounds were used to calculate the TEQ in accordance with Environmental Protection Agency's toxicity equivalency factor (TEF) methodology. For non-detect results, one-half the practical quantitation limit (PQL) result was used in the TEQ calculations. The calculated TEQ was screened against the cleanup level.

mg/kg = milligrams/kilogram

µg/kg = micrograms/kilogram

TEQ = toxic equivalent concentration

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Table 5

Intertidal Sediment Analytical Results

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-12	PRDI-58		PRDI-59	PRDI-60	PRDI-61	PRDI-62
	Sample ID	PRDI-12-SS-0-12	PRDI-58-SS	PRDI-DUP-2-SS	PRDI-59-SS	PRDI-60-SS	PRDI-61-SS	PRDI-62-SS
	Sample Date	6/25/2021	4/20/2022	4/20/2022	4/20/2022	4/20/2022	4/20/2022	4/20/2022
	Start Depth	0	0	0	0	0	0	0
	End Depth	12	12	12	12	12	12	12
	Depth Unit	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**							
Conventionals								
Total Organic Carbon (TOC) (%)	--	--	--	--	--	--	--	--
Total Solids (%)	--	--	--	--	--	--	--	--
Cyanide (mg/kg)	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (mg/kg)[1]								
Gasoline-Range Hydrocarbons	--	--	--	--	--	--	--	--
Diesel-Range Hydrocarbons	--	--	--	--	--	--	--	--
Heavy Oil-Range Hydrocarbons	--	--	--	--	--	--	--	--
Total Diesel/Oil [2]	--	--	--	--	--	--	--	--
Volatile Organic Compounds (VOCs) (µg/kg) [1,4]								
Benzene	--	--	--	--	--	--	--	--
Naphthalene	--	--	--	--	--	--	--	--
Carcinogenic PAHs[5] (cPAHs) (µg/kg)								
Benzo(a)anthracene	--	**15.2**	**44.9 J**	**28.2 J**	**38.7 J**	**36.1**	**6.52**	**126**
Benzo(a)pyrene	--	**19.3**	**44.7 J**	**25.6 J**	**41.2 J**	**41.5**	**5.98**	**134**
Benzo(b)fluoranthene	--	**18.6**	**29.0 J**	**14.1 J**	**23.8 J**	**20.2**	**5.63**	**89.2**
Benzo(k)fluoranthene	--	**8.84**	**17.6 J**	**9.31 J**	**14.8 J**	**13.4**	**2.78 J**	**59.3**
Chrysene	--	**16.3**	**56.6 J**	**36.7 J**	**43.9 J**	**42.6**	**10.5**	**128**
Dibenzo(a,h)anthracene	--	**4.85**	**7.74 J**	**4.58 J**	**7.55 J**	**5.46**	**2.28 J**	**24.8**
Indeno(1,2,3-cd)pyrene	--	**15.4**	**25.6 J**	**14.1 J**	**21.8 J**	**21.4**	**3.92 J**	**98.3**
Total cPAHs TEQ	229	**25.8**	**57.8 J**	**33.0 J**	**52.3 J**	**51.6**	**8.20 J**	**175**

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, total diesel/oil (sum of diesel and heavy oil), benzene, and naphthalene are not sediment contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the hightest detection limit was used for Total Diesel/Oil.

[3] MTCA Method A criteria for gasoline range hydrocarbons in soil is 30 mg/kg if benzene is present. If benzene is not present in the soil, then the MTCA criteria for gasoline range hydrocarbons is 100 mg/kg.

[4] Additional VOC intertidal sediment results are presented on Table 6.

[5] The analytical results for individual compounds were used to calculate the TEQ in accordance with Environmental Protection Agency's toxicity equivalency factor (TEF) methodology. For non-detect results, one-half the practical quantitation limit (PQL) result was used in the TEQ calculations. The calculated TEQ was screened against the cleanup level.

mg/kg = milligrams/kilogram

µg/kg = micrograms/kilogram

TEQ = toxic equivalent concentration

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Table 6

Intertidal Sediment Analytical Results (Additional VOCs)

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-1		PRDI-2			PRDI-3		PRDI-4		PRDI-5	
	Sample ID	PRDI-1-SC-0-15	PRDI-1-SC-15-60	PRDI-2-SC-0-15	DUP-2-SC	PRDI-2-SC-15-60	PRDI-3-SC-0-15	PRDI-3-SC-15-60	PRDI-4-SC-0-15	PRDI-4-SC-15-60	PRDI-5-SC-0-15	PRDI-5-SC-15-60
	Sample Date	6/23/2021	6/23/2021	6/23/2021	6/23/2021	6/23/2021	6/22/2021	6/22/2021	6/24/2021	6/24/2021	6/22/2021	6/22/2021
	Start Depth	0	15	0	0	15	0	15	0	15	0	15
	End Depth	15	60	15	15	60	15	60	15	60	15	60
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**											
Volatile Organic Compounds (VOCs) (µg/kg)												
1,1,1,2-Tetrachloroethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,1,1-Trichloroethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,1,2,2-Tetrachloroethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	--	2.98 U	1.00 U	3.14 U	2.55 U	2.07 U	0.90 U	1.05 U	2.28 U	1.47 U	1.11 U	1.19 U
1,1,2-Trichloroethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,1-Dichloroethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,1-Dichloroethylene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,1-Dichloropropene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,2,3-Trichlorobenzene	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
1,2,3-Trichloropropane	--	2.98 U	1.00 U	3.14 U	2.55 U	2.07 U	0.90 U	1.05 U	2.28 U	1.47 U	1.11 U	1.19 U
1,2,4-Trichlorobenzene	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
1,2,4-Trimethylbenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,2-Dibromo-3-Chloropropane	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
1,2-Dibromoethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,2-Dichlorobenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,2-Dichloroethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,2-Dichloropropane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,3,5-Trimethylbenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,3-Dichlorobenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,3-Dichloropropane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
1,4-Dichlorobenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
2,2-Dichloropropane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
2-Chloroethyl vinyl ether	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
2-Chlorotoluene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
2-Hexanone	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
4-Chlorotoluene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
4-Isopropyltoluene	--	**1.42 J**	0.50 U	**0.96 J**	**0.46 J**	**1.05**	**0.31 J**	0.53 U	1.14 U	**0.42 J**	0.55 U	0.60 U
Acetone	--	**252**	**39.9**	**123**	**109**	**140**	**23.6**	**32.9**	**133**	**127**	**29.4**	**49.8**
Acrolein	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U

	Location ID	PRDI-1		PRDI-2			PRDI-3		PRDI-4		PRDI-5	
	Sample ID	PRDI-1-SC-0-15	PRDI-1-SC-15-60	PRDI-2-SC-0-15	DUP-2-SC	PRDI-2-SC-15-60	PRDI-3-SC-0-15	PRDI-3-SC-15-60	PRDI-4-SC-0-15	PRDI-4-SC-15-60	PRDI-5-SC-0-15	PRDI-5-SC-15-60
	Sample Date	6/23/2021	6/23/2021	6/23/2021	6/23/2021	6/23/2021	6/22/2021	6/22/2021	6/24/2021	6/24/2021	6/22/2021	6/22/2021
	Start Depth	0	15	0	0	15	0	15	0	15	0	15
	End Depth	15	60	15	15	60	15	60	15	60	15	60
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**											
Volatile Organic Compounds (VOCs) (µg/kg)												
Acrylonitrile	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
Bromobenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Bromochloromethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Bromoform	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Bromomethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Carbon Disulfide	--	**53.3**	**1.42**	**4.63**	**5.62**	**11.1**	**2.06**	**4.83**	**7.21**	**6.94**	**3.06**	**7.17**
Carbon Tetrachloride	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Chlorobenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Chloroethane	--	2.98 U	1.00 U	3.14 U	2.55 U	2.07 U	0.90 U	1.05 U	2.28 U	1.47 U	1.11 U	1.19 U
Chloroform	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	**0.47 J**
Chloromethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
cis-1,2-Dichloroethylene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
cis-1,3-Dichloropropene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Dibromochloromethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Dibromomethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Dichlorobromomethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Dichlorodifluoromethane	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Ethylbenzene	--	1.49 U	0.50 U	**0.43 J**	**0.31 J**	**0.89 J**	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Hexachlorobutadiene	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
Isopropylbenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Methyl ethyl ketone (MEK)	--	**19.6**	**1.74 J**	**8.34**	**5.63 J**	**11.1**	**1.28 J**	**2.02 J**	**17.9**	**11.4**	**1.74 J**	**2.90 J**
Methyl Iodide	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Methyl isobutyl ketone	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
Methyl tert-butyl ether	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Methylene Chloride	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
n-Butylbenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
n-Propylbenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Sec-Butylbenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Styrene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Tert-Butylbenzene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Tetrachloroethylene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Toluene	--	1.49 U	0.50 U	1.57 U	**0.40 J**	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Total Xylenes	--	2.98 U	1.00 U	3.14 U	2.55 U	2.07 U	0.90 U	1.05 U	2.28 U	1.47 U	1.11 U	1.19 U
trans-1,2-Dichloroethylene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U

	Location ID	PRDI-1		PRDI-2			PRDI-3		PRDI-4		PRDI-5	
	Sample ID	PRDI-1-SC-0-15	PRDI-1-SC-15-60	PRDI-2-SC-0-15	DUP-2-SC	PRDI-2-SC-15-60	PRDI-3-SC-0-15	PRDI-3-SC-15-60	PRDI-4-SC-0-15	PRDI-4-SC-15-60	PRDI-5-SC-0-15	PRDI-5-SC-15-60
	Sample Date	6/23/2021	6/23/2021	6/23/2021	6/23/2021	6/23/2021	6/22/2021	6/22/2021	6/24/2021	6/24/2021	6/22/2021	6/22/2021
	Start Depth	0	15	0	0	15	0	15	0	15	0	15
	End Depth	15	60	15	15	60	15	60	15	60	15	60
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**											
Volatile Organic Compounds (VOCs) (µg/kg)												
trans-1,3-Dichloropropene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
trans-1,4-Dichloro-2-butene	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
Trichloroethylene	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Trichlorofluoromethane	--	2.98 U	1.00 U	3.14 U	2.55 U	2.07 U	0.90 U	1.05 U	2.28 U	1.47 U	1.11 U	1.19 U
Vinyl Acetate	--	7.46 U	2.51 U	7.85 U	6.39 U	5.17 U	2.24 U	2.64 U	5.70 U	3.68 U	2.77 U	2.99 U
Vinyl Chloride	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U
Xylene, m-,p-	--	2.98 U	1.00 U	3.14 U	2.55 U	2.07 U	0.90 U	1.05 U	2.28 U	1.47 U	1.11 U	1.19 U
Xylene, o-	--	1.49 U	0.50 U	1.57 U	1.28 U	1.03 U	0.45 U	0.53 U	1.14 U	0.74 U	0.55 U	0.60 U

Notes:

µg/kg = micrograms/kilogram

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Table 6

Intertidal Sediment Analytical Results (Additional VOCs)

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-6		PRDI-7		PRDI-8		PRDI-9		
	Sample ID	PRDI-6-SC-0-15	PRDI-6-SC-15-60	PRDI-7-SC-0-15	PRDI-7-SC-15-60	PRDI-8-SC-0-15	PRDI-8-SC-15-60	PRDI-9-SC-0-15	PRDI-9-SC-15-60	DUP-3-SC
	Sample Date	6/22/2021	6/22/2021	6/23/2021	6/23/2021	6/24/2021	6/24/2021	6/24/2021	6/24/2021	6/24/2021
	Start Depth	0	15	0	15	0	15	0	15	15
	End Depth	15	60	15	60	15	60	15	60	60
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**									
Volatile Organic Compounds (VOCs) (µg/kg)										
1,1,1,2-Tetrachloroethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,1,1-Trichloroethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,1,2,2-Tetrachloroethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	--	1.57 U	1.03 U	1.46 U	1.93 U	2.98 U	1.96 U	5.82 U	1.52 U	1.25 U
1,1,2-Trichloroethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,1-Dichloroethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,1-Dichloroethylene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,1-Dichloropropene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,2,3-Trichlorobenzene	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
1,2,3-Trichloropropane	--	1.57 U	1.03 U	1.46 U	1.93 U	2.98 U	1.96 U	5.82 U	1.52 U	1.25 U
1,2,4-Trichlorobenzene	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
1,2,4-Trimethylbenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,2-Dibromo-3-Chloropropane	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
1,2-Dibromoethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,2-Dichlorobenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,2-Dichloroethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,2-Dichloropropane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,3,5-Trimethylbenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,3-Dichlorobenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,3-Dichloropropane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
1,4-Dichlorobenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
2,2-Dichloropropane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
2-Chloroethyl vinyl ether	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
2-Chlorotoluene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
2-Hexanone	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
4-Chlorotoluene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
4-Isopropyltoluene	--	0.78 U	0.52 U	0.73 U	**0.64 J**	1.49 U	**1.78**	2.91 U	**0.61 J**	0.62 U
Acetone	--	**106**	**65.5**	**64.5**	**73.2**	**287**	**78.4**	**281**	**85.6 J**	**227 J**
Acrolein	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U

	Location ID	PRDI-6		PRDI-7		PRDI-8		PRDI-9		
	Sample ID	PRDI-6-SC-0-15	PRDI-6-SC-15-60	PRDI-7-SC-0-15	PRDI-7-SC-15-60	PRDI-8-SC-0-15	PRDI-8-SC-15-60	PRDI-9-SC-0-15	PRDI-9-SC-15-60	DUP-3-SC
	Sample Date	6/22/2021	6/22/2021	6/23/2021	6/23/2021	6/24/2021	6/24/2021	6/24/2021	6/24/2021	6/24/2021
	Start Depth	0	15	0	15	0	15	0	15	15
	End Depth	15	60	15	60	15	60	15	60	60
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**									
Volatile Organic Compounds (VOCs) (µg/kg)										
Acrylonitrile	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
Bromobenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Bromochloromethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Bromoform	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Bromomethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	**0.43 J**	0.62 U
Carbon Disulfide	--	**5.56**	**9.32**	**9.25**	**11.7**	**18.0**	**40.8**	**5.99**	**19.9 J**	**4.77 J**
Carbon Tetrachloride	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Chlorobenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Chloroethane	--	1.57 U	1.03 U	1.46 U	1.93 U	2.98 U	1.96 U	5.82 U	1.52 U	1.25 U
Chloroform	--	0.78 U	0.52 U	0.73 U	**2.44**	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Chloromethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
cis-1,2-Dichloroethylene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
cis-1,3-Dichloropropene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Dibromochloromethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Dibromomethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Dichlorobromomethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Dichlorodifluoromethane	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Ethylbenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Hexachlorobutadiene	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
Isopropylbenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Methyl ethyl ketone (MEK)	--	**9.23**	**6.55**	**4.48**	**4.74 J**	**25.6**	**4.35 J**	**20.0**	**9.57 J**	**28.4 J**
Methyl Iodide	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Methyl isobutyl ketone	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
Methyl tert-butyl ether	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Methylene Chloride	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
n-Butylbenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
n-Propylbenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Sec-Butylbenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Styrene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Tert-Butylbenzene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Tetrachloroethylene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Toluene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	**0.96 J**	2.91 U	**0.46 J**	0.62 U
Total Xylenes	--	1.57 U	1.03 U	1.46 U	1.93 U	2.98 U	1.96 U	5.82 U	1.52 U	1.25 U
trans-1,2-Dichloroethylene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U

	Location ID	PRDI-6		PRDI-7		PRDI-8		PRDI-9		
	Sample ID	PRDI-6-SC-0-15	PRDI-6-SC-15-60	PRDI-7-SC-0-15	PRDI-7-SC-15-60	PRDI-8-SC-0-15	PRDI-8-SC-15-60	PRDI-9-SC-0-15	PRDI-9-SC-15-60	DUP-3-SC
	Sample Date	6/22/2021	6/22/2021	6/23/2021	6/23/2021	6/24/2021	6/24/2021	6/24/2021	6/24/2021	6/24/2021
	Start Depth	0	15	0	15	0	15	0	15	15
	End Depth	15	60	15	60	15	60	15	60	60
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**									
Volatile Organic Compounds (VOCs) (µg/kg)										
trans-1,3-Dichloropropene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
trans-1,4-Dichloro-2-butene	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
Trichloroethylene	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Trichlorofluoromethane	--	1.57 U	1.03 U	1.46 U	1.93 U	2.98 U	1.96 U	5.82 U	1.52 U	1.25 U
Vinyl Acetate	--	3.92 U	2.58 U	3.66 U	4.81 U	7.44 U	4.89 U	14.6 U	3.80 U	3.11 U
Vinyl Chloride	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U
Xylene, m-,p-	--	1.57 U	1.03 U	1.46 U	1.93 U	2.98 U	1.96 U	5.82 U	1.52 U	1.25 U
Xylene, o-	--	0.78 U	0.52 U	0.73 U	0.96 U	1.49 U	0.98 U	2.91 U	0.76 U	0.62 U

Notes:

µg/kg = micrograms/kilogram

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Table 6

Intertidal Sediment Analytical Results (Additional VOCs)

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-10		PRDI-11		PRDI-12	
	Sample ID	PRDI-10-SC-0-15	PRDI-10-SC-15-60	PRDI-11-SC-0-15	PRDI-11-SC-15-60	PRDI-12-SC-0-15	PRDI-12-SC-15-60
	Sample Date	6/24/2021	6/24/2021	6/25/2021	6/25/2021	6/25/2021	6/25/2021
	Start Depth	0	15	0	15	0	15
	End Depth	15	60	15	60	15	60
	Depth Unit	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**						
Volatile Organic Compounds (VOCs) (µg/kg)							
1,1,1,2-Tetrachloroethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,1,1-Trichloroethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,1,2,2-Tetrachloroethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	--	1.57 U	1.07 U	3.64 UJ	5.57 U	1.76 U	6.25 U
1,1,2-Trichloroethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,1-Dichloroethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,1-Dichloroethylene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,1-Dichloropropene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,2,3-Trichlorobenzene	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U
1,2,3-Trichloropropane	--	1.57 U	1.07 U	3.64 UJ	5.57 U	1.76 U	6.25 U
1,2,4-Trichlorobenzene	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U
1,2,4-Trimethylbenzene	--	0.79 U	0.54 U	**1.04 J**	2.79 U	0.88 U	3.12 U
1,2-Dibromo-3-Chloropropane	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U
1,2-Dibromoethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,2-Dichlorobenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,2-Dichloroethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,2-Dichloropropane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,3,5-Trimethylbenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,3-Dichlorobenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,3-Dichloropropane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
1,4-Dichlorobenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
2,2-Dichloropropane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
2-Chloroethyl vinyl ether	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U
2-Chlorotoluene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
2-Hexanone	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U
4-Chlorotoluene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
4-Isopropyltoluene	--	0.79 U	0.54 U	**3.49 J**	**2.08 J**	0.88 U	**1.49 J**
Acetone	--	**132**	**42.7**	**49.9 J**	**178**	**60.1**	**270**
Acrolein	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U

	Location ID	PRDI-10		PRDI-11		PRDI-12	
	Sample ID	PRDI-10-SC-0-15	PRDI-10-SC-15-60	PRDI-11-SC-0-15	PRDI-11-SC-15-60	PRDI-12-SC-0-15	PRDI-12-SC-15-60
	Sample Date	6/24/2021	6/24/2021	6/25/2021	6/25/2021	6/25/2021	6/25/2021
	Start Depth	0	15	0	15	0	15
	End Depth	15	60	15	60	15	60
	Depth Unit	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**						
Volatile Organic Compounds (VOCs) (µg/kg)							
Acrylonitrile	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U
Bromobenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Bromochloromethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Bromoform	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Bromomethane	--	**0.70 J**	0.54 U	1.82 UJ	2.79 U	0.88 U	**1.45 J**
Carbon Disulfide	--	**58.6**	**1.94**	**4.64 J**	**4.18**	**6.55**	**16.3**
Carbon Tetrachloride	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Chlorobenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Chloroethane	--	1.57 U	1.07 U	3.64 UJ	5.57 U	1.76 U	6.25 U
Chloroform	--	0.79 U	0.54 U	**0.73 J**	2.79 U	0.88 U	3.12 U
Chloromethane	--	0.79 U	0.54 U	1.82 UJ	**4.55**	0.88 U	3.12 U
cis-1,2-Dichloroethylene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
cis-1,3-Dichloropropene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Dibromochloromethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Dibromomethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Dichlorobromomethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Dichlorodifluoromethane	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Ethylbenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Hexachlorobutadiene	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U
Isopropylbenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Methyl ethyl ketone (MEK)	--	**12.0**	2.69 U	9.10 UJ	13.9 U	**3.75 J**	**11.8 J**
Methyl Iodide	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Methyl isobutyl ketone	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U
Methyl tert-butyl ether	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Methylene Chloride	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	**14.7 J**
n-Butylbenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
n-Propylbenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Sec-Butylbenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Styrene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Tert-Butylbenzene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Tetrachloroethylene	--	0.79 U	0.54 U	**1.51 J**	2.79 U	0.88 U	3.12 U
Toluene	--	**0.32 J**	**0.14 J**	**1.70 J**	**1.44 J**	**0.30 J**	**1.57 J**
Total Xylenes	--	1.57 U	1.07 U	3.64 UJ	5.57 U	1.76 U	6.25 U
trans-1,2-Dichloroethylene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U

	Location ID	PRDI-10		PRDI-11		PRDI-12	
	Sample ID	PRDI-10-SC-0-15	PRDI-10-SC-15-60	PRDI-11-SC-0-15	PRDI-11-SC-15-60	PRDI-12-SC-0-15	PRDI-12-SC-15-60
	Sample Date	6/24/2021	6/24/2021	6/25/2021	6/25/2021	6/25/2021	6/25/2021
	Start Depth	0	15	0	15	0	15
	End Depth	15	60	15	60	15	60
	Depth Unit	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**						
Volatile Organic Compounds (VOCs) (µg/kg)							
trans-1,3-Dichloropropene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
trans-1,4-Dichloro-2-butene	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U
Trichloroethylene	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Trichlorofluoromethane	--	1.57 U	1.07 U	3.64 UJ	5.57 U	1.76 U	6.25 U
Vinyl Acetate	--	3.93 U	2.69 U	9.10 UJ	13.9 U	4.40 U	15.6 U
Vinyl Chloride	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U
Xylene, m-,p-	--	1.57 U	1.07 U	3.64 UJ	5.57 U	1.76 U	6.25 U
Xylene, o-	--	0.79 U	0.54 U	1.82 UJ	2.79 U	0.88 U	3.12 U

Notes:

µg/kg = micrograms/kilogram

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Table 7

Intertidal Porewater Results

Pre-Remedial Design Investigation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-1	PRDI-2		PRDI-2A		PRDI-2B	PRDI-2C	PRDI-2D	PRDI-2E	PRDI-3	PRDI-4	PRDI-5	PRDI-6	PRDI-7	PRDI-8	PRDI-10	PRDI-11	PRDI-12
	Sample ID	PRDI-1-PW-	PRDI-2-PW-	DUP-1-PW-	PRDI-2A-PW	DUP-101-PW	PRDI-2B-PW	PRDI-2C-PW	PRDI-2D-PW	PRDI-2E-PW	PRDI-3-PW-	PRDI-4-PW-	PRDI-5-PW-	PRDI-6-PW-	PRDI-7-PW-	PRDI-8-PW-	PRDI-10-PW-	PRDI-11-PW-	PRDI-12-PW-
	Sample Date	6/23/2021	6/23/2021	6/23/2021	12/7/2021	12/7/2021	12/7/2021	12/7/2021	12/7/2021	12/7/2021	6/22/2021	6/24/2021	6/22/2021	6/22/2021	6/23/2021	6/24/2021	6/24/2021	6/25/2021	6/25/2021
Analysis	**Cleanup Level**																		
Conventionals (mg/L)																			
Cyanide	0.005	**0.0080**	**0.0080**	**0.0070**	--	--	--	--	--	--	0.0050 U	**0.100**	0.0050 U	**0.0250**	0.0050 U	0.0050 U	0.0050 U	**0.0280**	**0.0620**
WAD Cyanide	0.005	0.005 U	0.005 U	0.005 U	--	--	--	--	--	--	0.005 U	**0.015**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	**0.011**
Total Petroleum Hydrocarbons (mg/L)[1]																			
Gasoline-Range Hydrocarbons	0.8 [3]	0.100 U	**47.2**	**41.1**	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.500 U
Diesel-Range Hydrocarbons	0.5	0.100 U	**3.32**	**3.31**	0.100 U	**0.156**	0.100 U	**0.198**	**0.115**	0.100 U	0.100 U	**0.110**	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Heavy Oil-Range Hydrocarbons	0.5	0.200 U	0.200 U	**0.2**	0.200 UJ	**0.403 J**	0.200 U	**0.370**	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Total Diesel/Oil [2]	0.5	ND	**3.32**	**3.51**	0.200 U	**0.559 J**	0.200 U	**0.568**	**0.115**	0.200 U	0.200 U	**0.110**	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Volatile Organic Compounds (VOCs) (µg/L)																			
Benzene	1.6	0.20 U	**5,580**	**5,550**	**2.71 J**	**5.08 J**	**1.10**	**6.07**	0.20 U	0.20 U	**0.12 J**	0.20 U	**0.13 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.00 U
Naphthalene	83	0.50 U	**5,560**	**6,250**	**0.75**	**0.83**	0.50 U	**3.87**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	2.50 U

Notes:

[1] Gasoline-range hydrocarbons, diesel-range hydrocarbons, heavy oil-range hydrocarbons, and total diesel/oil (sum of diesel and heavy oil) are not groundwater contaminants of concern. MTCA Method A criteria use as screening levels.

[2] Total Diesel/Oil is the sum of diesel-range and heavy oil-range hydrrocarbons. If diesel- and oil-range hydrocarbons were not detected, the hightest detection limit was used for Total Diesel/Oil.

[3] MTCA criterita for gasoline range hydrocarbons in groundwater is 0.8 mg/L if benzene is present. If benzene is not present in the water, then the MTCA criteria for gasoline range hydrocarbons is 1.0 mg/L.

mg/L = milligrams/liter

µg/L = micrograms/liter

WAD = Weak Acid Dissociable

"--" = Not Available

U = The analyte was not detected at a concentration greater than the value identified.

J = The analyte was detected and the detected concentration is considered an estimate.

UJ = The analyte was not detected at a concentration greater than the value identified, which is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Gray indicates detected concentration above MTCA Method A criteria that are used for screening purposes.

Table 8

Intertidal Sediment Grain Size Results

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

Location ID	PRDI-1	PRDI-2	PRDI-3	PRDI-4	PRDI-5	PRDI-6	PRDI-7	PRDI-8	PRDI-9	PRDI-10	PRDI-11	PRDI-12	PRDI-58	PRDI-59	PRDI-60	PRDI-61	PRDI-62
Sample ID	PRDI-1-SC-15-60	PRDI-2-SC-15-60	PRDI-3-SC-15-60	PRDI-4-SC-15-60	PRDI-5-SC-15-60	PRDI-6-SC-15-60	PRDI-7-SC-15-60	PRDI-8-SC-15-60	PRDI-9-SC-15-60	PRDI-10-SC-15-60	PRDI-11-SC-15-60	PRDI-12-SC-15-60	PRDI-58-SS	PRDI-59-SS	PRDI-60-SS	PRDI-61-SS	PRDI-62-SS
Sample Date	6/23/2021	6/23/2021	6/22/2021	6/24/2021	6/22/2021	6/22/2021	6/23/2021	6/24/2021	6/24/2021	6/24/2021	6/25/2021	6/25/2021	4/20/2022	4/20/2022	4/20/2022	4/20/2022	4/20/2022
Start Depth	15	15	15	15	15	15	15	15	15	15	15	15	0	0	0	0	0
End Depth	60	60	60	60	60	60	60	60	60	60	60	60	12	12	12	12	12
Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis																	
Grain Size (%)																	
Percent passing 3 inches	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Percent passing 1.5 inches	100	100	100	100	100	100	100	100	100	100	100	100	92	87	94	92	98
Percent passing 1.25 inches	100	100	100	100	100	100	98	100	98	99	100	100	88	81	92	88	97
Percent passing 1 inches	100	100	100	100	100	100	97	100	97	98	100	100	84	74	89	84	97
Percent passing 3/4 inches	88	97	95	100	100	100	93	96	93	94	100	100	84	74	75	75	81
Percent passing 5/8 inches	88	94	91	98	96	97	89	93	90	90	100	97	79	72	68	69	76
Percent passing 1/2 inches	88	91	86	96	92	93	85	90	86	85	100	64	74	69	60	62	71
Percent passing 3/8 inches	86	88	79	93	87	86	79	84	78	78	91	87	69	67	68	60	66
Percent passing 1/4 inches	84	83	69	89	78	74	73	78	73	72	86	81	64	64	48	53	58
Percent passing 4750 microns	83	81	65	88	74	68	70	74	70	69	83	77	62	62	45	50	55
Percent passing 2000 microns	75	70	48	75	59	52	58	60	57	58	67	63	51	53	32	39	36
Percent passing 850 microns	66	56	31	71	48	42	48	49	43	46	58	55	27	33	16	26	18
Percent passing 150 microns	19	14	5	22	9	9	9	13	9	13	17	16	16	21	4.0	9.0	4.0
Percent passing 75 microns	12.1	8.6	4.1	9.7	6.7	5.8	5.8	10.2	7.4	9.3	13.8	11.2	3.8	5.0	2.7	5.5	2.7

Notes:

% = percent

cm = centimeter

Table 9

Intertidal Seepage Velocity Results

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

Test Type and Location ID[1]	Test Date	Start Time	End Time	Elapsed Test Time (hours)	Distance from Injection Point to Trench or Seep (feet)	Calculated Seepage Velocity[2] (feet per hour)
Passive Trench Tests						
SV-1	07/21/2021	07:35 AM	08:17 AM	0.70	3	4.3
SV-2	07/21/2021	07:56 AM	08:34 AM	0.63	3	4.7
SV-3	07/22/2021	08:37 AM	09:00 AM	0.38	3	--[3]
SV-4	07/21/2021	08:30 AM	09:00 AM	0.50	3	--[3]
SV-5	07/21/2021	08:35 AM	11:00 AM	2.25	3	<1.3[4]
SV-6	07/21/2021	08:59 AM	09:30 AM	0.52	3	--[3]
SV-7	07/22/2021	08:16 AM	08:39 AM	0.38	3	7.8
SV-8	07/22/2021	08:40 AM	09:10 AM	0.50	3	--[3]
SV-9	07/22/2021	09:14 AM	11:45 AM	2.31	3	<1.3[4]
SV-10	07/22/2021	09:22 AM	09:56 AM	0.57	3	5.3
SV-11	07/22/2021	09:40 AM	10:09 AM	0.48	3	6.2
Active Seepage Tests						
ST-1	07/22/2021	10:53 AM	11:07 AM	0.23	3	12.9
ST-2	07/22/2021	11:17 AM	12:02 PM	0.75	3	--[5]
ST-3	07/22/2021	11:23 AM	12:10 PM	0.78	3	<3.8

Notes:

[1] Passive Trench Test and Active Seepage Test methods are described in Section 3.6 of the PRDI Data Report.

[2] Seepage velocities were calculated by dividing tracer dye travel distance in feet by elapsed test time in hours.

[3] Test trench porewater dropped below maximum depth of trench (approximately 1 foot bml) before dye arrived. Seepage velocity was not calculated.

[4] The incoming tide ended the test early and a maximum seepage velocity was calculated using the total elapsed time recorded.

[5] PushPoint probe did not seal and flourescent dye leaked to the surface so seepage velocity was not calculated.

bml = below mudline

ST = Seep Test

SV = Seepage Velocity

Table 10

Subtidal Sediment Analytical Results

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-13	PRDI-14	PRDI-15	PRDI-16	PRDI-18	PRDI-19	PRDI-20	PRDI-22	PRDI-23	PRDI-24	PRDI-25	PRDI-26
	Sample ID	PRDI-13-SS	PRDI-14-SS	PRDI-15-SS	PRDI-16-SS	PRDI-18-SS	PRDI-19-SS	PRDI-20-SS	PRDI-22-SS	PRDI-23-SS	PRDI-24-SS	PRDI-25-SS	PRDI-26-SS
	Sample Date	9/15/2021	9/15/2021	9/15/2021	9/14/2021	9/15/2021	9/14/2021	9/14/2021	9/15/2021	9/15/2021	9/15/2021	9/15/2021	9/14/2021
	Start Depth	0	0	0	0	0	0	0	0	0	0	0	0
	End Depth	12	12	12	12	12	12	12	12	12	12	12	12
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**												
Carcinogenic PAHs[1] (cPAHs) (µg/kg)													
Benzo(a)anthracene	--	**676**	**96.8**	**646**	**169**	**1560**	**100**	**65.8**	**3590**	**102**	**507**	**139**	**43.2**
Benzo(a)pyrene	--	**706**	**106**	**623**	**365**	**1520**	**108**	**66.7**	**4200**	**142**	**559**	**193**	**70.6**
Benzo(b)fluoranthene	--	**456 J**	**78.3 J**	**326**	**164**	**686**	**62.2**	**37.4**	**2120**	**102 J**	**359**	**130**	**32.4**
Benzo(k)fluoranthene	--	**290 J**	**42.9 J**	**233**	**110**	**499**	**40.3**	**24.1**	**1690**	**62.3 J**	**207**	**91.1**	**22.6**
Chrysene	--	**692**	**143**	**670**	**190**	**1490**	**108**	**71.6**	**3370**	**143**	**547**	**160**	**49.3**
Dibenzo(a,h)anthracene	--	**113 J**	**19.3 J**	**114**	**59.3**	**246**	**17.8**	**10.9**	**678**	**26.4 J**	**92.9**	**27.3 J**	**10.8 J**
Indeno(1,2,3-cd)pyrene	--	**347 J**	**55.2 J**	**260**	**187**	**590**	**47.5**	**29.4**	**2020**	**79.0 J**	**292**	**119**	**31.5 J**
Total cPAHs TEQ	229	**901 J**	**137 J**	**788**	**436**	**1,893**	**136**	**84.2**	**5,240**	**181 J**	**710**	**245 J**	**85.1 J**

Notes:

[1] The analytical results for carcinogenic PAHs were used to calculate the TEQ in accordance with Environmental Protection Agency's toxicity equivalency factor (TEF) methodology. For non-detect results, one-half the practical quantitation limit (PQL) result was used in the TEQ calculation. The calculated TEQ was screened against the cleanup level.

µg/kg = micrograms/kilogram

TEQ = toxic equivalent concentration

"--" = Not Available

J = The analyte was detected and the detected concentration is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Table 10

Subtidal Sediment Analytical Results

Pre-Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-27	PRDI-29	PRDI-30	PRDI-31	PRDI-32	PRDI-34	PRDI-36			PRDI-37		
	Sample ID	PRDI-27-SS	PRDI-29-SS	PRDI-30-SS	PRDI-31-SS	PRDI-32-SS	PRDI-34-SS	PRDI-36-SC-0-15	PRDI-DUP-1-SC	PRDI-36-SC-15-30	PRDI-37-SS	PRDI-37-SC-0-15	PRDI-DUP-2-SC
	Sample Date	9/14/2021	9/15/2021	9/14/2021	9/14/2021	9/14/2021	9/14/2021	9/16/2021	9/16/2021	9/16/2021	9/14/2021	9/16/2021	9/16/2021
	Start Depth	0	0	0	0	0	0	0	0	15	0	0	0
	End Depth	12	12	12	12	12	12	15	15	30	12	15	15
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**												
Carcinogenic PAHs[1] (cPAHs) (µg/kg)													
Benzo(a)anthracene	--	**40.7**	**303 J**	**26.2**	**172**	**14.3**	**61.2**	**2210**	**2520**	**2570**	**206**	**86.0**	**96.5**
Benzo(a)pyrene	--	**45.7**	**344 J**	**34.8**	**195**	**18.5**	**72.3**	**2780**	**3240**	**3430**	**279**	**109 J**	**120**
Benzo(b)fluoranthene	--	**30.6**	**209**	**27.5**	**123**	**13.6**	**68.0 J**	**1460**	**1850**	**1900**	**156**	**70.9 J**	**69.8**
Benzo(k)fluoranthene	--	**20.8**	**133**	**17.1**	**81.6**	**8.17**	**39.2 J**	**1160**	**1420**	**1550**	**103**	**39.7 J**	**41.1**
Chrysene	--	**41.4**	**282 J**	**34.4**	**168**	**17.4**	**83.9**	**2130**	**2690**	**2740**	**203**	**96.9 J**	**104**
Dibenzo(a,h)anthracene	--	**9.44**	**38.1 J**	**7.62**	**31.3**	**3.61**	**14.9 J**	**409**	**500**	**507**	**51.9**	**21.1**	**21.4**
Indeno(1,2,3-cd)pyrene	--	**28.3**	**196 J**	**25.9**	**104**	**11.3**	**46.1 J**	**1200**	**1490**	**1540**	**155**	**55.9 J**	**60.3**
Total cPAHs TEQ	229	**59.1**	**435 J**	**45.6**	**248**	**23.8**	**96.1 J**	**3,450**	**4,040**	**4,260**	**348**	**137 J**	**150**

Notes:

[1] The analytical results for carcinogenic PAHs were used to calculate the TEQ in accordance with Environmental Protection Agency's toxicity equivalency factor (TEF) methodology. For non-detect results, one-half the practical quantitation limit (PQL) result was used in the TEQ calculation. The calculated TEQ was screened against the cleanup level.

µg/kg = micrograms/kilogram

TEQ = toxic equivalent concentration

"--" = Not Available

J = The analyte was detected and the detected concentration is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Table 10

Subtidal Sediment Analytical Results

Pre-Remedial Design Investigation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-37	PRDI-39		PRDI-40			PRDI-42	PRDI-43	PRDI-44	PRDI-45
	Sample ID	PRDI-37-SC-15-30	PRDI-39-SC-0-15	PRDI-39-SC-15-30	PRDI-40-SS	PRDI-40-SC-0-15	PRDI-40-SC-15-30	PRDI-42-SS	PRDI-43-SS	PRDI-44-SS	PRDI-45-SS
	Sample Date	9/16/2021	9/16/2021	9/16/2021	9/14/2021	9/16/2021	9/16/2021	3/30/2022	3/30/2022	3/30/2022	3/30/2022
	Start Depth	15	0	15	0	0	15	0	0	0	0
	End Depth	30	15	30	12	15	30	12	12	12	12
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**										
Carcinogenic PAHs[1] (cPAHs) (µg/kg)											
Benzo(a)anthracene	--	**134**	**2150**	**873**	**57.3**	**35.8**	**78.1**	**162 J**	**698 J**	**1120**	**1430 J**
Benzo(a)pyrene	--	**165**	**2290**	**1590**	**67.4**	**43.7**	**89.6**	**173 J**	**603 J**	**1130**	**1330 J**
Benzo(b)fluoranthene	--	**109**	**1400**	**1150**	**39.3**	**35.7**	**77.2**	**116 J**	**296 J**	**565**	**616 J**
Benzo(k)fluoranthene	--	**78.8**	**1080**	**905**	**29.3**	**20.5**	**41.1**	**68.9 J**	**186 J**	**356**	**399 J**
Chrysene	--	**149**	**2070**	**897**	**59.3**	**41.5**	**87.1**	**213 J**	**798 J**	**1330**	**1590 J**
Dibenzo(a,h)anthracene	--	**29.1**	**328**	**278**	**12.5**	**8.55**	**17.9**	**27.8 J**	**91.6 J**	**174**	**177 J**
Indeno(1,2,3-cd)pyrene	--	**89.2**	**1090**	**879**	**40.4**	**29.5**	**53.1**	**77.8 J**	**273 J**	**558**	**542 J**
Total cPAHs TEQ	229	**211**	**2,920**	**2,010**	**85.9**	**57.1**	**117**	**220 J**	**765 J**	**1,420**	**1,660 J**

Notes:

[1] The analytical results for carcinogenic PAHs were used to calculate the TEQ in accordance with Environmental Protection Agency's toxicity equivalency factor (TEF) methodology. For non-detect results, one-half the practical quantitation limit (PQL) result was used in the TEQ calculation. The calculated TEQ was screened against the cleanup level.

µg/kg = micrograms/kilogram

TEQ = toxic equivalent concentration

"--" = Not Available

J = The analyte was detected and the detected concentration is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Table 10

Subtidal Sediment Analytical Results

Pre-Remedial Design Investigation Data Report, South State Street MGP Site

Bellingham, Washington

	Location ID	PRDI-46	PRDI-47	PRDI-48	PRDI-49	PRDI-50	PRDI-51	PRDI-52	PRDI-53	PRDI-55
	Sample ID	PRDI-46-SS	PRDI-47-SS	PRDI-48-SS	PRDI-49-SS	PRDI-50-SS	PRDI-51-SS	PRDI-52-SS	PRDI-53-SS	PRDI-DUP-01
	Sample Date	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/31/2022
	Start Depth	0	0	0	0	0	0	0	0	0
	End Depth	12	12	12	12	12	12	12	12	12
	Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis	**Cleanup Level**									
Carcinogenic PAHs[1] (cPAHs) (µg/kg)										
Benzo(a)anthracene	--	**436 J**	**252 J**	**230**	**285**	**58.9**	**71.6**	**73.8**	**92.5**	**41.9 J**
Benzo(a)pyrene	--	**395 J**	**376 J**	**238**	**262**	**65.7**	**73.1**	**78.9**	**104**	**44.5 J**
Benzo(b)fluoranthene	--	**190 J**	**265 J**	**245**	**150**	**44.3**	**90.7**	**60.8**	**68.5**	**36.7 J**
Benzo(k)fluoranthene	--	**119 J**	**161**	**102**	**88.9**	**25.4**	**37.4**	**32.7**	**41.5**	**19.9 J**
Chrysene	--	**553 J**	**426 J**	**298**	**325**	**82.3**	**97.1**	**99.2**	**118**	**68.6 J**
Dibenzo(a,h)anthracene	--	**71.5 J**	**57.2**	**61.0**	**42.6**	**11.6**	**22.0**	**12.9**	**17.7**	**10.3 J**
Indeno(1,2,3-cd)pyrene	--	**166 J**	**198 J**	**135**	**129**	**37.6**	**40.4**	**41.9**	**52.6**	**29.4 J**
Total cPAHs TEQ	229	**499 J**	**474 J**	**318**	**335**	**84.3**	**100**	**102**	**132**	**59.0 J**

Notes:

1 The analytical results for carcinogenic PAHs were used to calculate the TEQ in accordance with Environmental Protection Agency's toxicity equivalency factor (TEF) methodology. For non-detect results, one-half the practical quantitation limit (PQL) result was used in the TEQ calculation. The calculated TEQ was screened against the cleanup level.

µg/kg = micrograms/kilogram

TEQ = toxic equivalent concentration

"--" = Not Available

J = The analyte was detected and the detected concentration is considered an estimate.

Bold font indicates the analyte was detected at the reported concentration.

Yellow shading indicates that the detected concentration is greater than the cleanup level.

Table 11

Subtidal Sediment Grain Size Results

Preliminary Remedial Design Investivation Data Report, South State Street MGP Site

Bellingham, Washington

Location ID	PRDI-42	PRDI-43	PRDI-44	PRDI-45	PRDI-46	PRDI-47	PRDI-48	PRDI-49	PRDI-50	PRDI-51	PRDI-52	PRDI-53	PRDI-55	PRDI-56
Sample ID	PRDI-42-SS	PRDI-43-SS	PRDI-44-SS	PRDI-45-SS	PRDI-46-SS	PRDI-47-SS	PRDI-48-SS	PRDI-49-SS	PRDI-50-SS	PRDI-51-SS	PRDI-52-SS	PRDI-53-SS	PRDI-DUP-01	PRDI-56-SS
Sample Date	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/30/2022	3/31/2022	3/31/2022
Start Depth	0	0	0	0	0	0	0	0	0	0	0	0	0	0
End Depth	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Depth Unit	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
Analysis														
Grain Size (%)														
Percent passing 3 inches	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Percent passing 1.5 inches	100	100	98	100	100	100	100	100	100	100	100	100	100	100
Percent passing 1.25 inches	100	100	97	100	100	100	100	100	100	100	100	100	100	100
Percent passing 1 inches	100	100	96	100	100	100	100	100	100	100	100	100	100	100
Percent passing 3/4 inches	99	100	95	100	100	100	100	100	100	100	100	100	100	100
Percent passing 5/8 inches	99	100	95	100	100	100	100	100	100	100	100	100	100	100
Percent passing 1/2 inches	99	100	94	100	99	100	100	100	100	100	99	100	100	100
Percent passing 3/8 inches	99	100	93	98	98	100	99	100	100	100	99	100	100	100
Percent passing 1/4 inches	97	98	89	93	92	100	95	97	100	100	99	100	100	100
Percent passing 4750 microns	97	98	87	91	89	99	93	96	100	100	99	100	100	100
Percent passing 2000 microns	89	92	71	67	66	98	71	74	93	81	98	84	99	100
Percent passing 850 microns	79	87	66	63	63	95	68	72	92	81	97	83	99	99
Percent passing 150 microns	40	47	50	54	59	88	63	69	91	80	97	81	99	99
Percent passing 75 microns	30.5	37.1	46.4	52.2	57.7	86.8	61.9	68.4	90.9	79.6	96.4	80.8	98.4	98.3

Notes:

% = percent

cm = centimeter

FIGURES

GeoEngineers

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2017

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

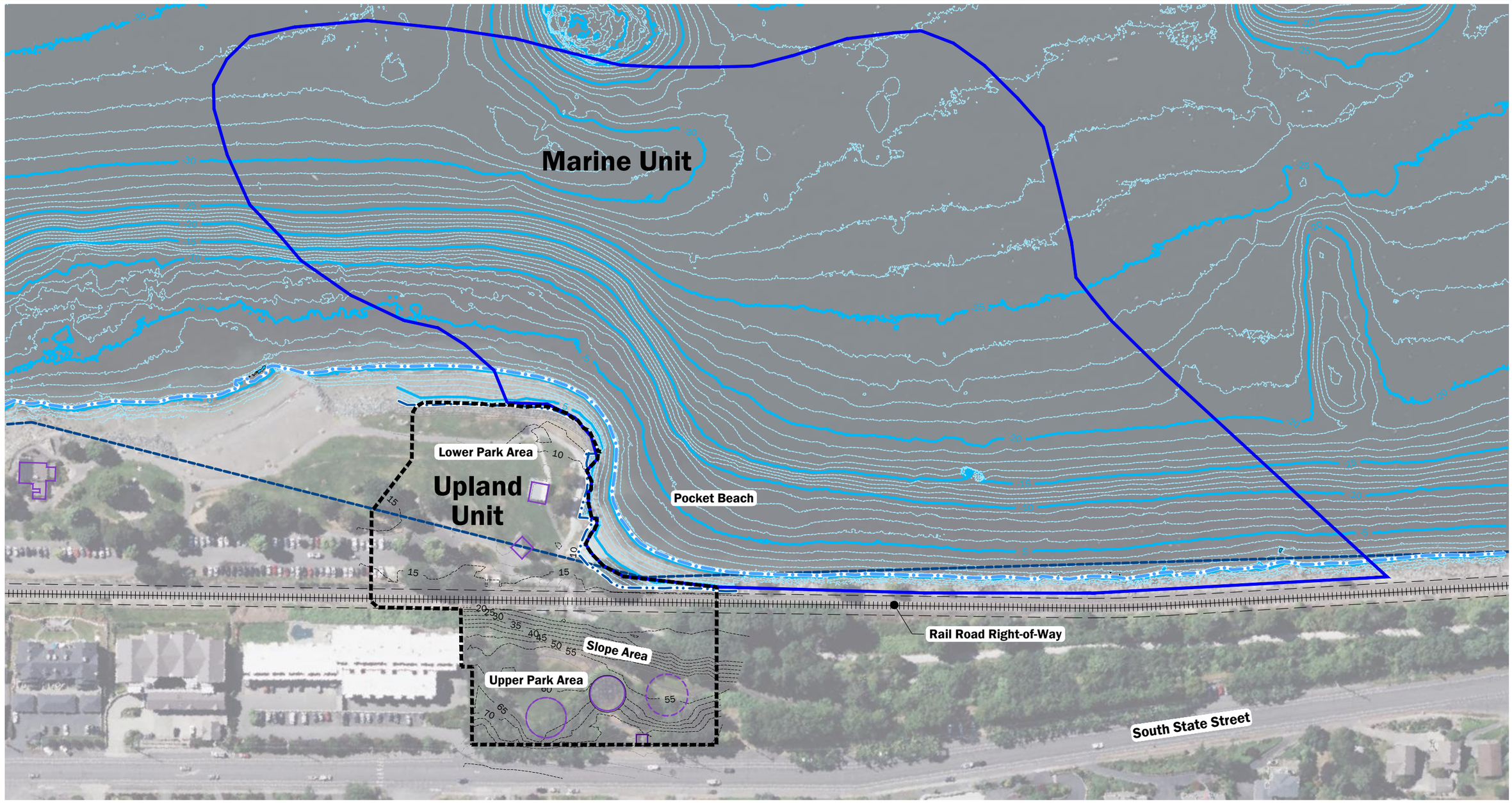
Vicinity Map

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 1

P:\0\0186890\GIS\MXDs\018689001_F01_VicinityMap_MGP.mxd Date Exported: 10/14/19 by maugust



Notes:

1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey data from Larry Steele and Assoc., 2022. Base bathymetric survey from David Evans and Associates, 2021. Aerial from Bing.

Projection: NAD83 WA State Planes, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Marine Unit Boundary
- Upland Unit Boundary
- Inner Harbor Line
- Mean Lower Low Water (el. -0.48' NAVD88)
- Ordinary High Water (el. 9.70' NAVD88)
- -15- Bathymetry Contours (5ft Interval - NAVD88)
- 15 Topographic Contours (5ft Interval - NAVD88)

W S N E Project North

W N S E True North

150 0 150
Feet

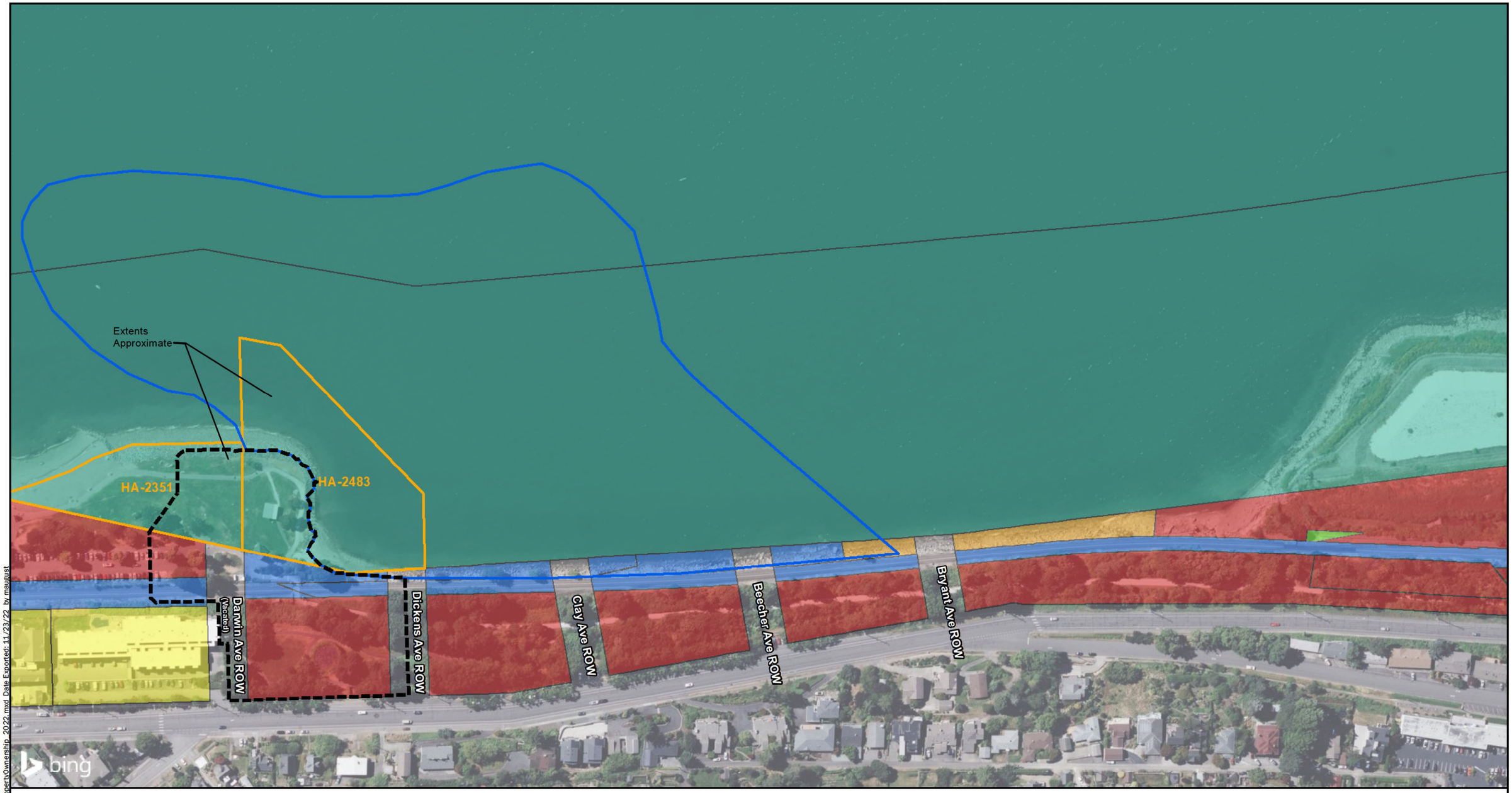
South State Street Site Units

SSS MGP Site
Bellingham, Washington

GeoEngineers

Figure 2

P:\0\0186890\CAD\03\PDRI Data Report - Final\0186890003_F02_Site Units.dwg 11x17 Land - Site Plan Date Exported:9/26/2022 1:00 PM - by Tyler J. Michaud



Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base data from City of Belligham, Larry Steele & Associates, 2010.
City of Bellingham - DNR Harbor Lease No. HA-2483, October 1978 & HA-2351, June 1975.
Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Upland Unit Boundary
- Marine Unit Boundary
- Harbor Area Lease Boundary

Owner

- BNSF Railway
- City of Bellingham
- Port of Bellingham
- Private Residence
- State Owned Aquatic Lands
- Whatcom County
- ROW

Project North

True North

200 0 200

Feet

South State Street Site and Property Ownership

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 3

P:\0\0186890\GIS\MXDs\0186890001_F03_PropertyOwnership_2022.mxd Date Exported: 11/23/22 by maugust

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Aerial imagery provided by ESRI.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

- South State Street MGP Site
- Whatcom Waterway MTCA Cleanup Site Unit
- Other MTCA Cleanup Site

Project North

True North

1,000 0 1,000

Feet

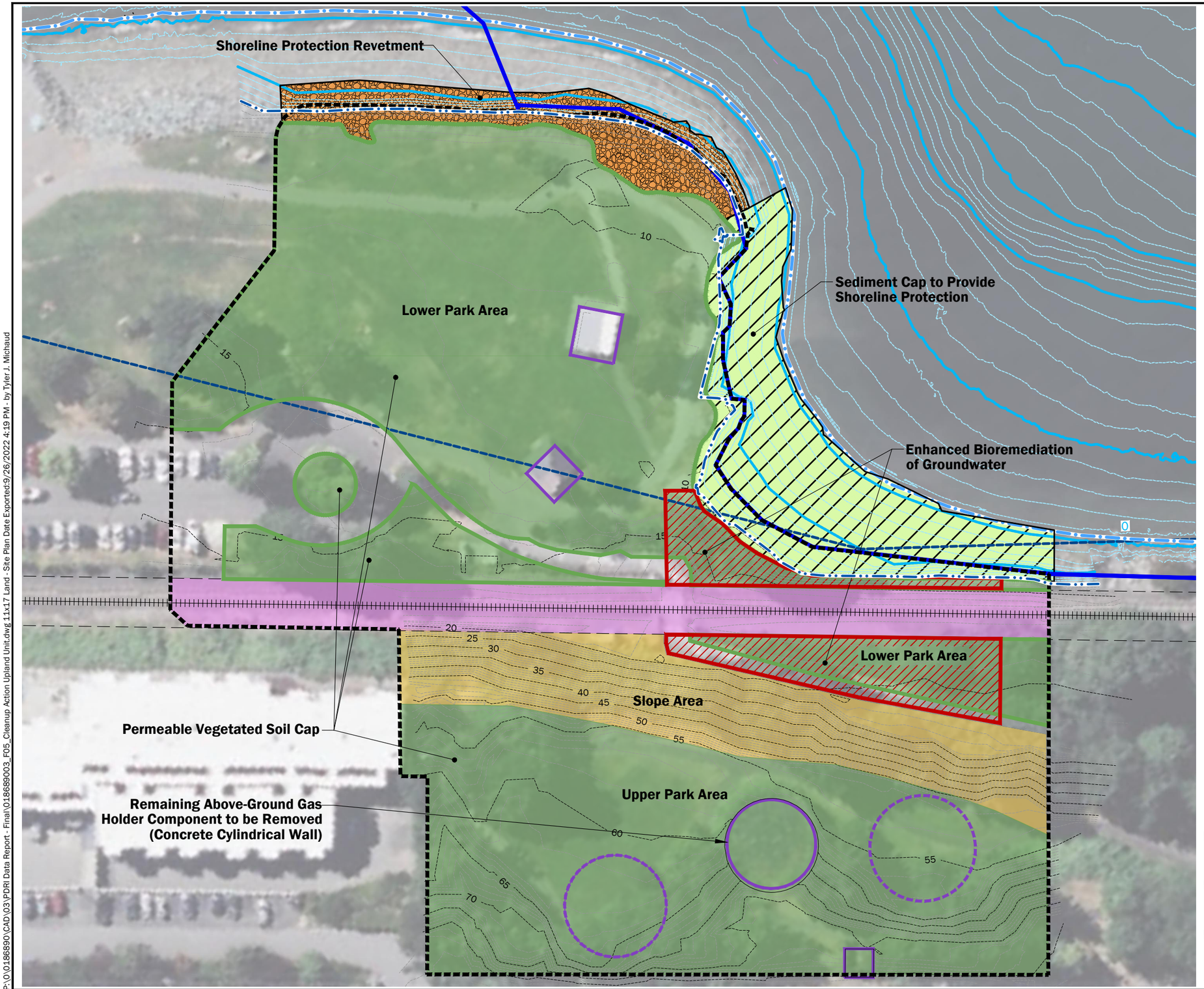
MTCA Cleanup Sites in Bellingham Bay

SSS MGP Site
Bellingham, Washington

GeoEngineers

Figure 4

P:\0\0186890\GIS\MXDs\0186890001_Fig_04_MTCA_Sites.mxd Date Exported: 09/22/22 by maugust



Legend

- Permeable Vegetated Soil Cap
- Enhanced Bioremediation (Groundwater)
- Shoreline Protection Revetment
- Sediment Cap to Provide Shoreline Protection
- Slope Area - Monitor Vegetation and Slope Stability
- Railroad Right-of-Way Institutional Controls
- Site Structures
- Former Gas Holder
- Gravel Path
- -15 Bathymetry Contours (5ft Interval - NAVD88)
- 15 Topographic Contours (5ft Interval - NAVD88)
- Mean Lower Low Water (el. 0' NAVD88)
- Ordinary High Water (el. 10.47' NAVD88)
- Inner Harbor Line
- Upland Unit Boundary
- Marine Unit Boundary

Notes:

1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey data from Larry Steele and Assoc., 2022. Base bathymetric survey from David Evans and Associates, 2021. Aerial from Bing.

Projection: NAD83 WA State Planes, N Zone, US Foot
Vertical Datum: NAVD88

W S N E
Project North

W N S E
True North

60 0 60
Feet

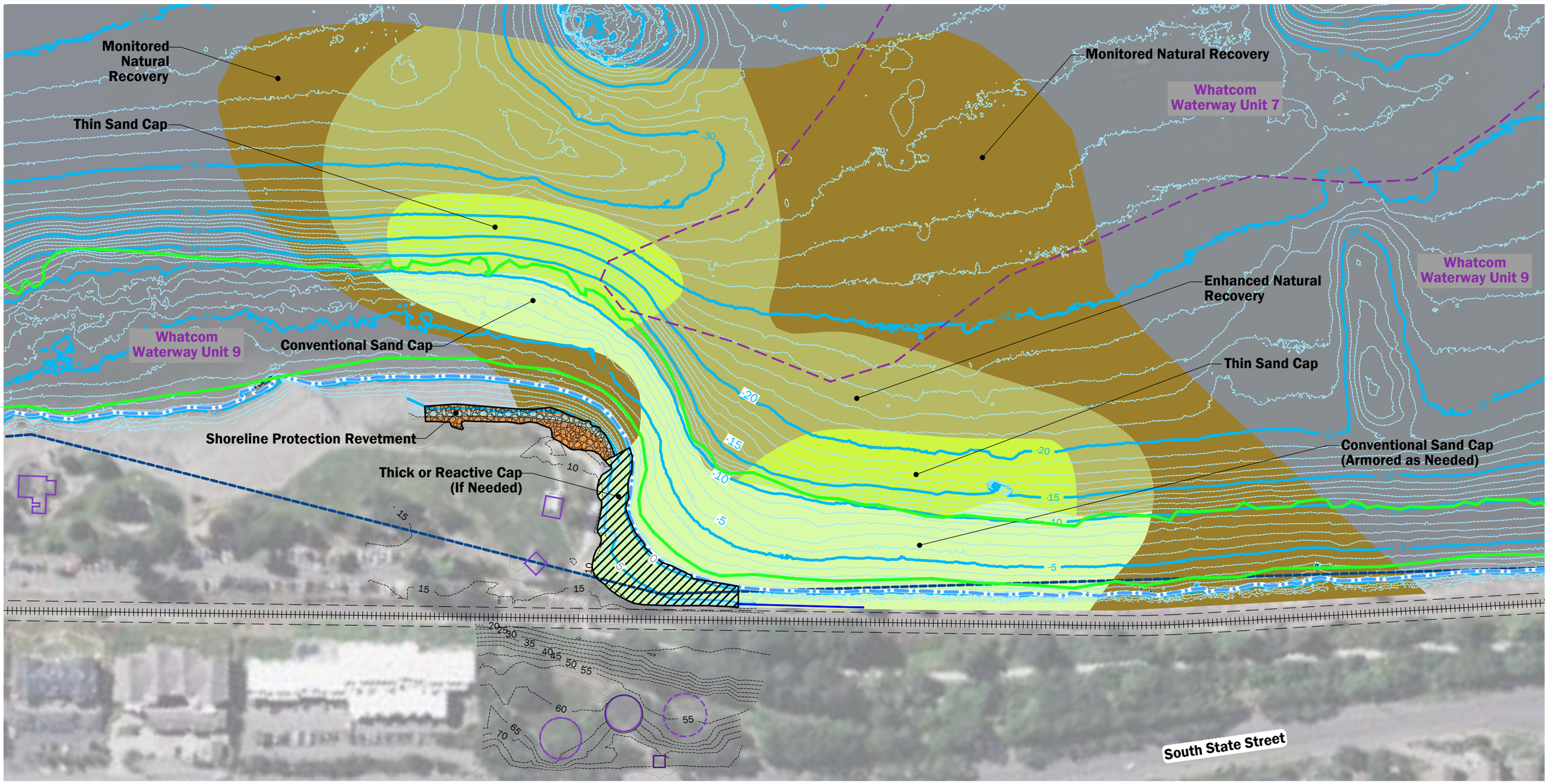
Cleanup Action Upland Unit

SSS MGP Site
Bellingham, Washington

GeoEngineers

Figure 5

P:\0\0186890\CAD\03\PDRI Data Report - Final\0186890003_F05_Cleanup Action Upland Unit.dwg 11x17 Land - Site Plan Date Exported:9/26/2022 4:19 PM - by Tyler J. Michaud



Legend

- Conventional Sand Cap (Armored as Needed)
- Cap Modification as Needed (Thick Cap or Reactive Cap)
- Thin Sand Cap
- Enhanced Natural Recovery
- Monitored Natural Recovery
- Shoreline Protection Revetment
- Marine Unit Boundary
- Upland Unit Boundary
- Mean Lower Low Water (el. 0' NAVD88)
- Ordinary High Water (el. 10.47' NAVD88)
- -15 Bathymetry Contours (5ft Interval - NAVD88)
- 15 Topographic Contours (5ft Interval - NAVD88)
- Approximate Limits of Aquatic Vegetation

Project North

True North

150 0 150

Feet

Notes:

1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey data from Larry Steele and Assoc., 2022. Base bathymetric survey from David Evans and Associates, 2021. Aerial from Bing.

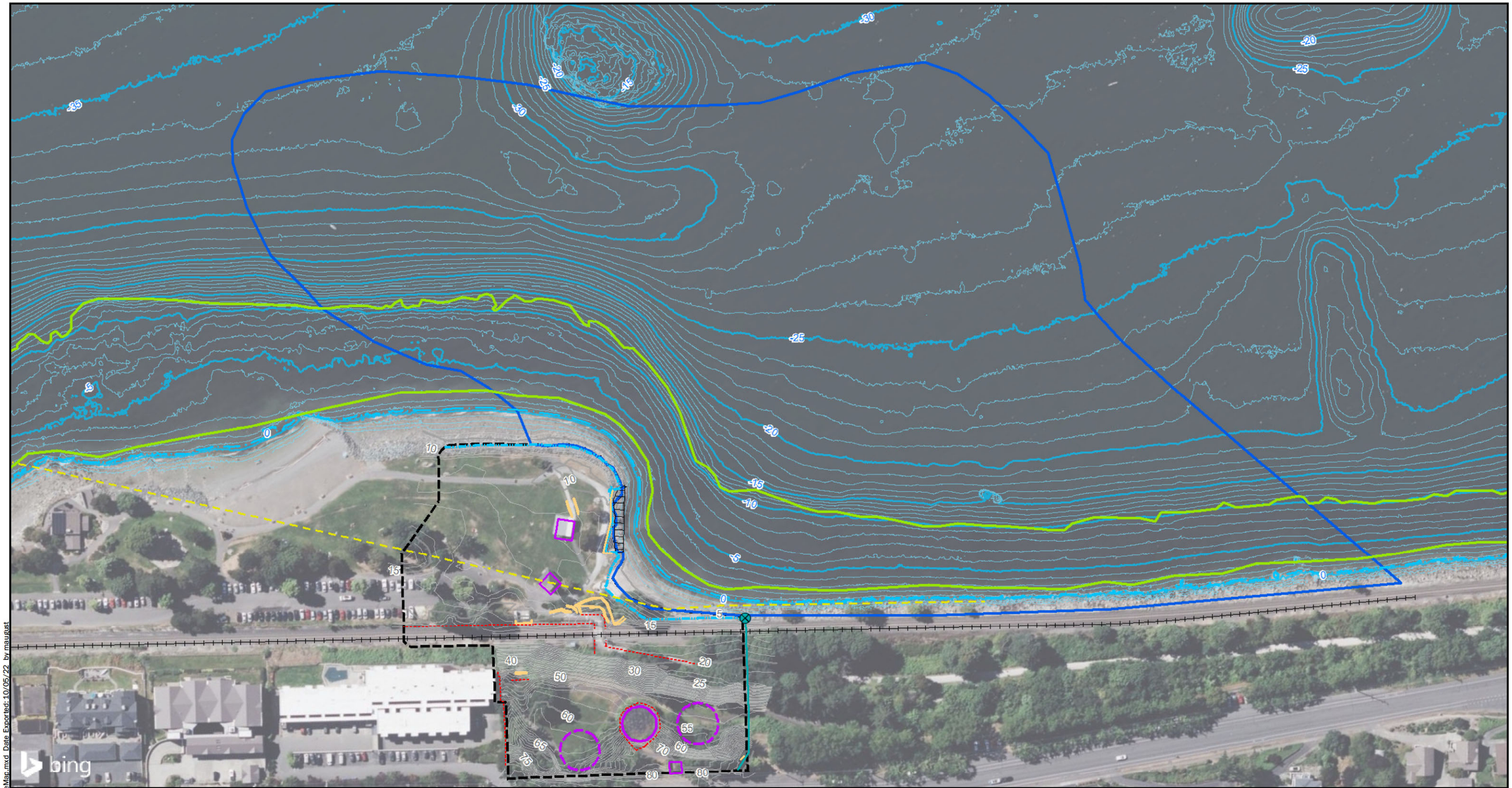
Projection: NAD83 WA State Planes, N Zone, US Foot
Vertical Datum: NAVD88

Cleanup Action Marine Unit

SSS MGP Site
Bellingham, Washington

GeoEngineers

Figure 6



Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.

Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Stormwater Outfall
- Approximate Limits of Aquatic Vegetation
- Fence
- Stormwater Pipe
- Retaining Wall
- BNSF Centerline
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. -0.48' NAVD88)
- Wood Pilings Area
- Site Structures
- Former Gas Holder
- Marine Unit Boundary
- Upland Unit Boundary

Bathymetry Contours
- 1-Foot Contour
- 5-foot Contour

Upland Contours
- 1-Foot Contour
- 5-foot Contour

Project North / True North

75 0 75
Feet

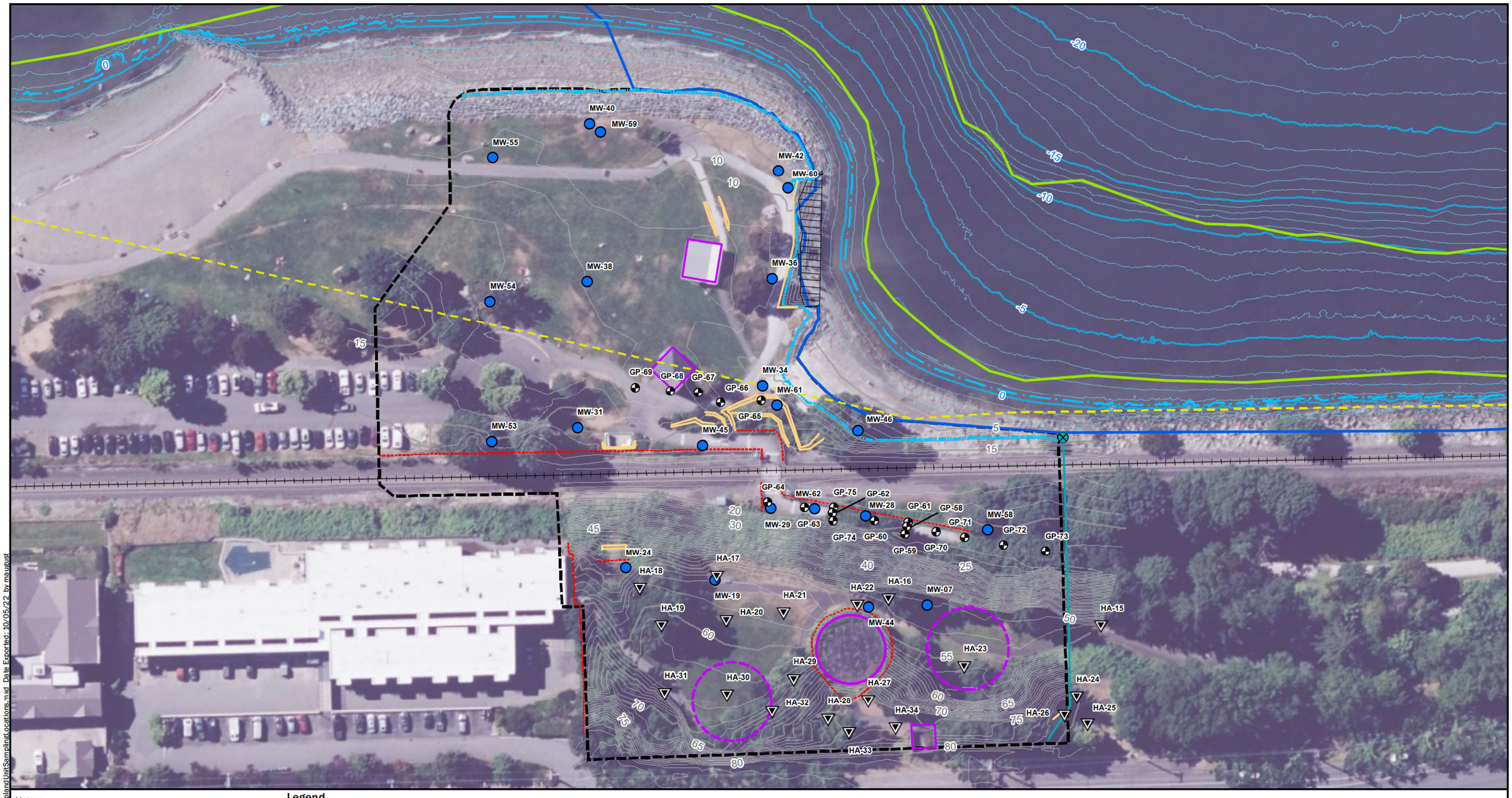
Updated Site Survey

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 7

P:\0186890\GIS\MXDs\0186890001_F07_BaseMap.mxd Date Exported: 10/05/22 by maurust



Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.

Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Direct Push Soil Boring
- Shallow Hand Auger Soil Boring
- Monitoring Well
- Stormwater Outfall
- Stormwater Pipe
- Approximate Limits of Aquatic Vegetation
- Fence
- Retaining Wall
- BNSF Centerline
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. -0.48' NAVD88)
- Wood Pilings Area
- Site Structures
- Former Gas Holder
- Marine Unit Boundary
- Upland Unit Boundary

Bathymetry Contours
- 1-Foot Contour
- 5-foot Contour

Upland Contours
- 1-Foot Contour
- 5-foot Contour

Project North

True North

75 0 75
Feet

Upland Unit Sampling Locations

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 8

P:\0186890\GIS\MXDs\0186890001_F08_UplandUnitSamplingLocations.mxd Date Exported: 10/05/22 by maurust

Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base data from AECOM. Survey data from David Evans and Associates, 2021. Actual sample location data collected during sediment sampling with GPS mounted on research vessel.
Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Upland Unit Boundary
- Marine Unit Boundary
- Surveyed Extent of Eelgrass (Grette and Associates, 2008a and 2009)
- Approximate Limits of Aquatic Vegetation
- Haley Marine Unit Boundary
- Cornwall Unit MU2

Bathymetry Contours

- 1-Foot Contour
- 5-foot Contour

- Sediment Core and Surface Sediment Sample Location
- Sediment Cores (two) and Surface Sediment Sample Location
- Sediment Cores (two) Location
- Sediment Core Location
- Surface Sediment Sample Location
- Subsurface Sediment and Porewater Sample Location
- Surface Sediment, Subsurface Sediment, and Porewater Sample Location
- Surface Sediment Sample Not Collected

Project North / True North

150 0 150

Feet

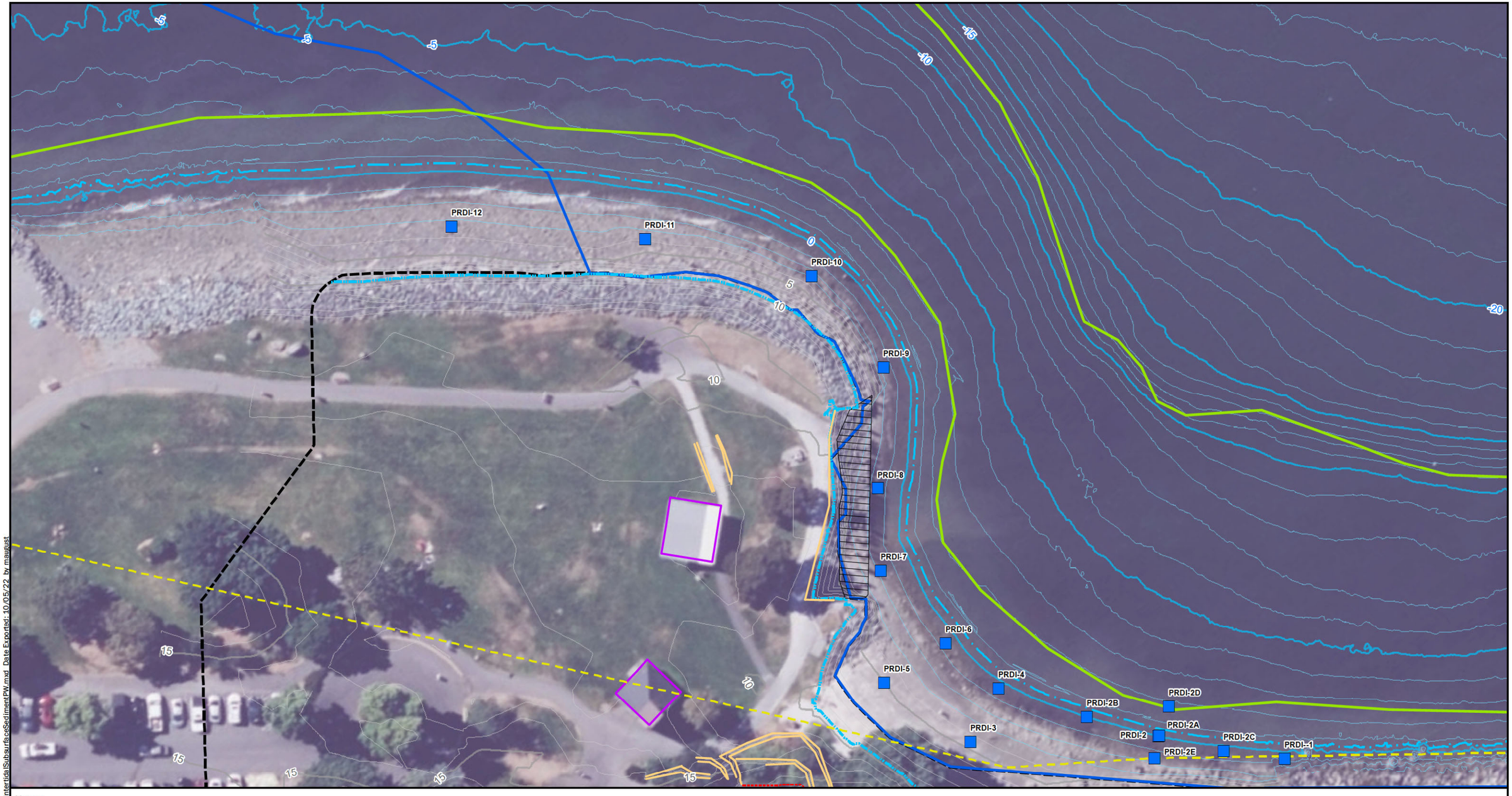
Marine Unit Sampling Locations

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 9

P:\0186890\GIS\MXDs\0186890001_F09_MarineUnitSamplingLocations_fix.mxd Date Exported: 10/05/22 by maugust



Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.

Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Subsurface Sediment and Porewater Sample Location
- Approximate Limits of Eelgrass
- Fence
- Retaining Wall
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. 0.48' NAVD88)
- Wood Pilings Area
- Site Structures
- Marine Unit Boundary
- Upland Unit Boundary

Bathymetry Contours
- 1-Foot Contour
- 5-foot Contour

Upland Contours
- 1-Foot Contour
- 5-foot Contour

Project North

True North

50 0 50
Feet

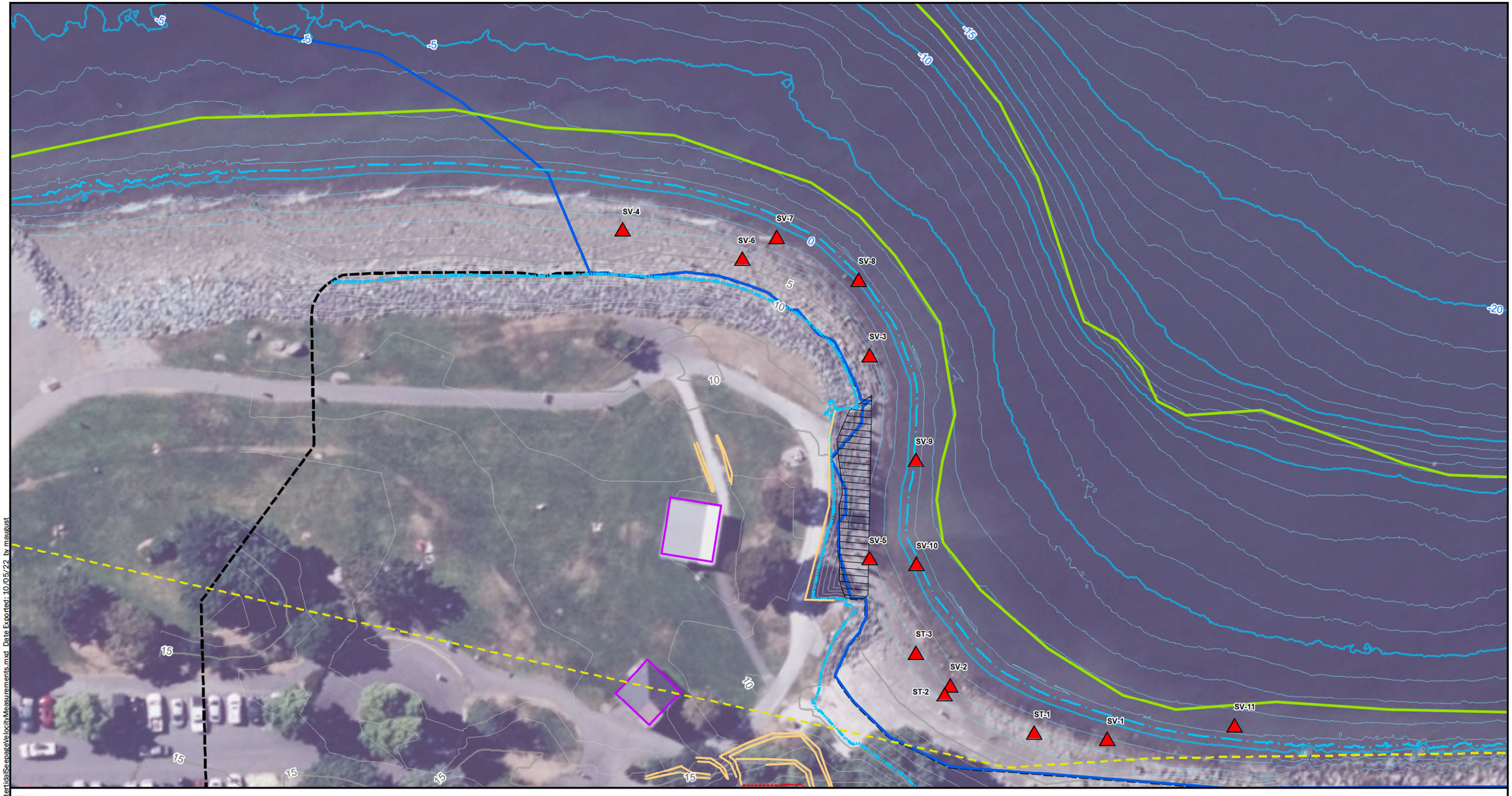
Intertidal Subsurface Sediment and Porewater Sampling Locations

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 09b

P:\0186890\GIS MXDs\186890001_F09B_IntertidalSubsurfaceSedimentPW.mxd Date Exported: 10/05/22 by maujust



Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.

Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Seepage Velocity Measurement Location
- Approximate Limits of Eelgrass
- Fence
- Retaining Wall
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. -0.48' NAVD88)
- Wood Pilings Area
- Site Structures
- Marine Unit Boundary
- Upland Unit Boundary

Bathymetry Contours
- 1-Foot Contour
- 5-foot Contour

Upland Contours
- 1-Foot Contour
- 5-foot Contour

Project North

True North

50 0 50
Feet

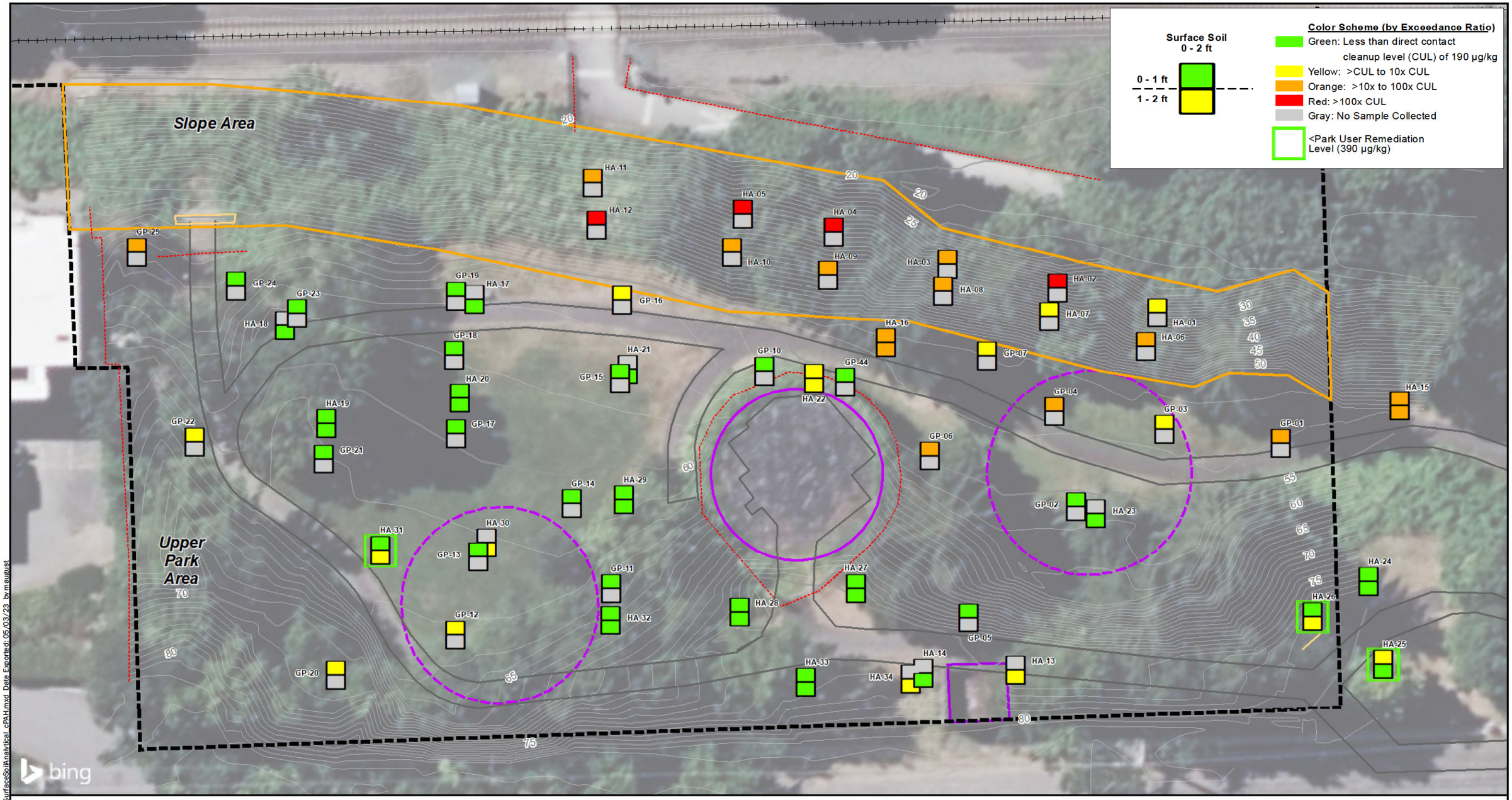
Intertidal Seepage Velocity Measurement Locations

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 10

P:\0186890\GIS MXDs\186890001_F10_IntertidalSeepageVelocityMeasurements.mxd Date Exported: 10/05/22 by maurust



Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey from Larry Steel Associates, 2022. Aerial Imagery, Bing Maps 2021.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

- Fence
- Retaining Wall
- Paved Areas
- BNSF Centerline
- Upland Unit Boundary
- Site Structure
- Former Gas Holder
- Slope Area

Upland Contours

- 5-Foot Contour
- 1-Foot Contour

Project North

True North

30 0 30

Feet

Surface Soil Analytical Results cPAHs

SSS MGP Site
Bellingham, Washington

GeoEngineers

Figure 11

P:\0\0186890\GIS\MXDs\0186890000_F11_SurfaceSoilAnalytical_cPAH.mxd Date Exported: 05/03/23 by maurust

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. Proposed Trail from City of Bellingham, Trail Plan and Profile, 30 percent submittal dated July 20, 2018.

Data Source: Base upland survey from Larry Steel Associates, 2022. Aerial Imagery, Bing Maps 2021.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

- Fence
- Retaining Wall
- Paved Areas
- BNSF Centerline
- Upland Unit Boundary
- Site Structure
- Former Gas Holder
- Proposed Cap Areas
- Vegetated Slopes
- Clean Areas or Existing Asphalt
- Slope Area

The extent of the Proposed Cap Areas and Vegetated Slopes will be refined in the the Engineering Design Report

Upland Contours

- 5-Foot Contour
- 1-Foot Contour

Project North

True North

30 0 30

Feet

Surface Soil Analytical Results (cPAHs) and Proposed Cap Areas

SSS MGP Site
Bellingham, Washington

GeoEngineers

Figure 12

P:\0\0186890\GIS\MXDs\0186890_F12_SurfaceSoilAnalytical_cPAH_Caps.mxd Date Exported: 06/22/23 by maugust

Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
4. MW-58 groundwater elevation not used because the well screen is located in bedrock and does not represent actual aquifer groundwater elevation.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.
Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Monitoring Well and Elevation in ft NAVD88
- Stormwater Outfall
- Groundwater Contour 1ft
- Inferred Groundwater Contour
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. 0.48' NAVD88)
- Upland Unit Boundary
- Marine Unit Boundary
- Slope Area
- Groundwater Flow Direction

Project North

True North

75 0 75

Feet

Groundwater Elevation Contour Map
Dry Season

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 13

P:\0186890\GIS\MXDs\0186890001_F13_GW_DrySeason.mxd Date Exported: 10/05/22 by maurus

Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
4. MW-58 groundwater elevation not used because the well screen is located in bedrock and does not represent actual aquifer groundwater elevation.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.
Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Monitoring Well and Elevation in ft NAVD88
- Stormwater Outfall
- Groundwater Contour 1ft
- Inferred Groundwater Contour
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. 0.48' NAVD88)
- Upland Unit Boundary
- Marine Unit Boundary
- Slope Area
- Groundwater Flow Direction

Project North

True North

75 0 75

Feet

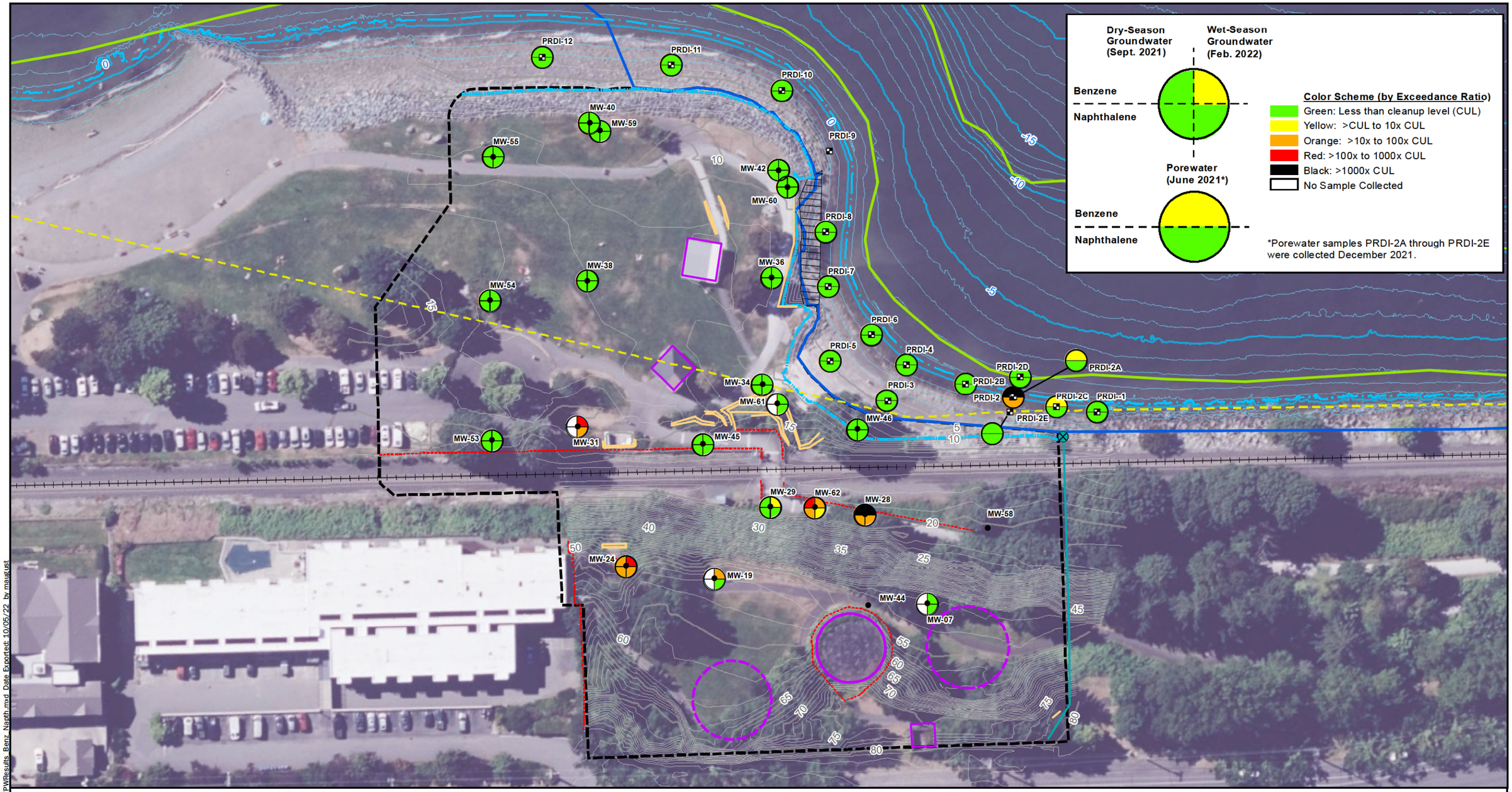
Groundwater Elevation Contour Map Wet Season

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 14

P:\0\0186890\GIS\MXDs\0186890001_F14_GW_WetSeason.mxd Date Exported: 10/05/22 by mauriust



Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.

Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Monitoring Well
- Intertidal Sediment and Porewater Sample Location
- Stormwater Outfall
- Stormwater Pipe
- Approximate Limits of Aquatic Vegetation
- Fence
- Retaining Wall
- BNSF Centerline
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. 0.48' NAVD88)
- Wood Pilings Area
- Site Structures
- Former Gas Holder
- Marine Unit Boundary
- Upland Unit Boundary

Bathymetry Contours
- 1-Foot Contour
- 5-foot Contour

Upland Contours
- 1-Foot Contour
- 5-foot Contour

Project North | True North

75 0 75
Feet

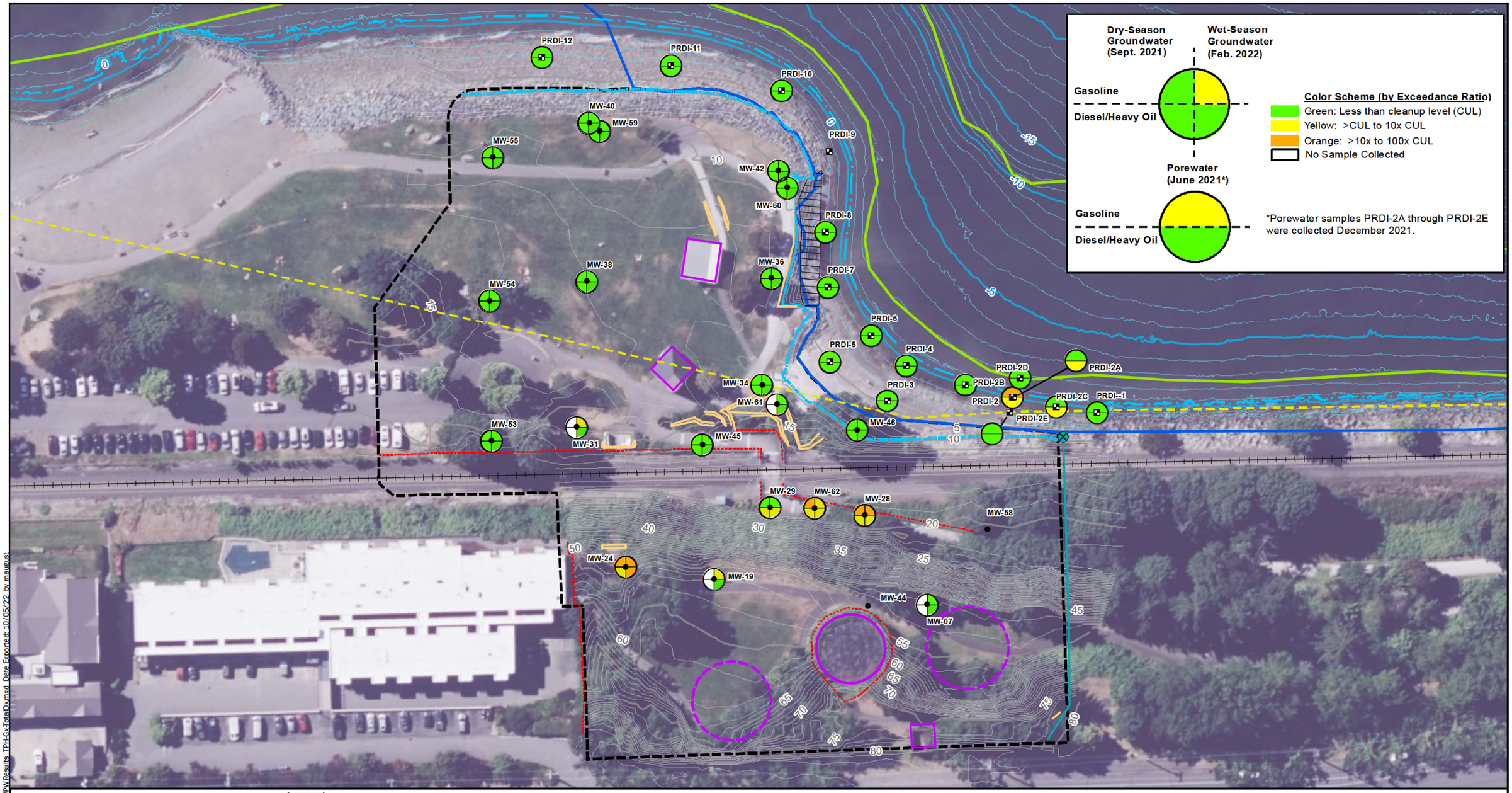
Groundwater/Porewater Analytical Results Benzene & Napthalene

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 15

P:\0018689\00\GIS\MXDs\018689001_F15_GWPWResults_Benz_Narth.mxd Date Exported: 10/05/22 by maug.ust



Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.

Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Monitoring Well
- Intertidal Sediment and Porewater Sample Location
- Stormwater Outfall
- Stormwater Pipe
- Approximate Limits of Aquatic Vegetation
- Fence
- Retaining Wall
- BNSF Centerline
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. 0.48' NAVD88)
- Wood Pilings Area
- Site Structures
- Former Gas Holder
- Marine Unit Boundary
- Upland Unit Boundary

Bathymetry Contours
- 1-Foot Contour
- 5-foot Contour

Upland Contours
- 1-Foot Contour
- 5-foot Contour

Project North | True North

75 0 75
Feet

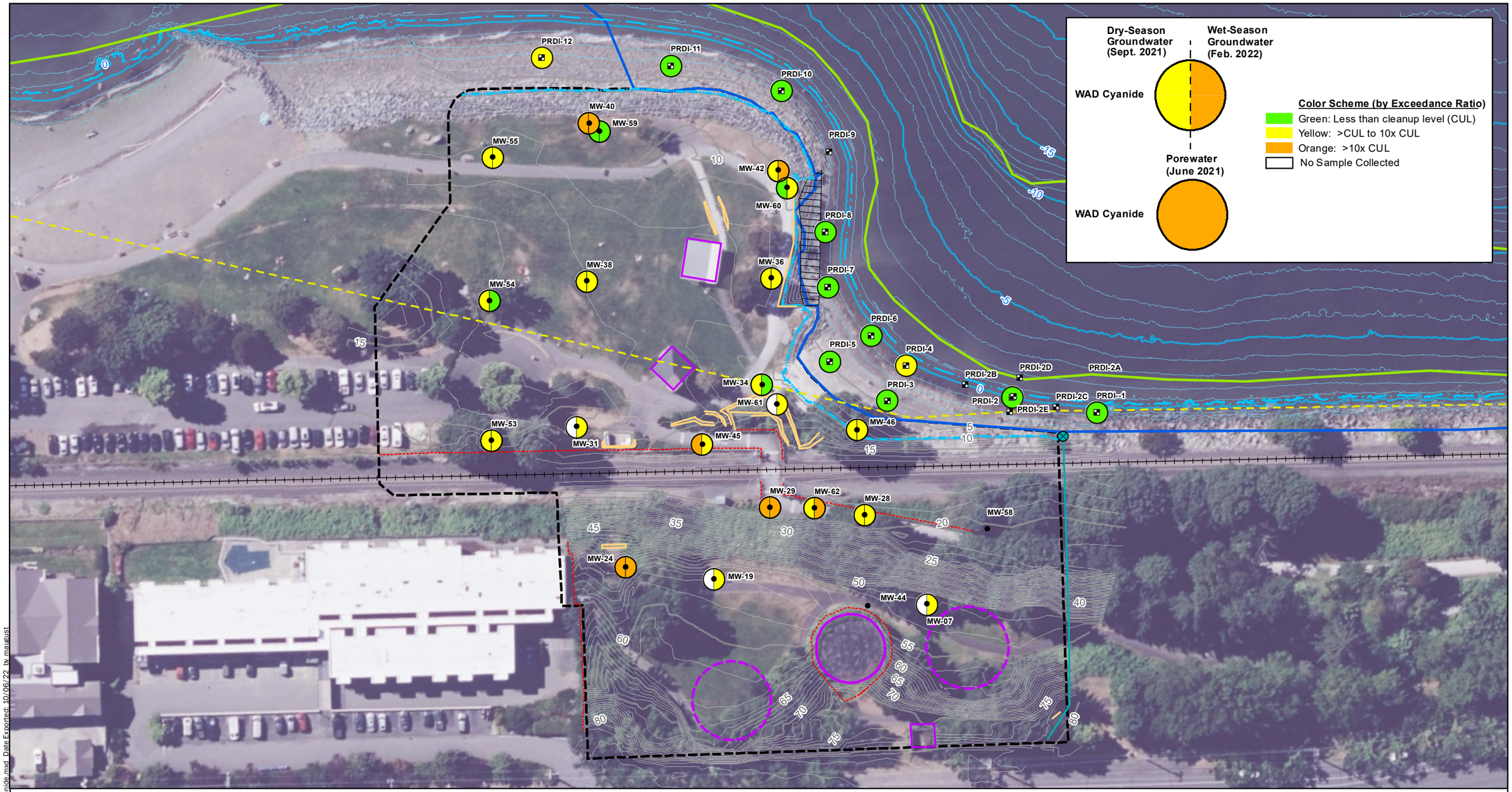
Groundwater/Porewater Analytical Results Gasoline & Diesel/Heavy Oil

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 16

P:\0\0186890\GIS\MXDs\0186890001_F16_GWPWResults_TPH-GxTotalDx.mxd Date Exported: 10/05/22 by maulust



Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.

Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Monitoring Well
- Intertidal Sediment and Porewater Sample Location
- Stormwater Outfall
- Stormwater Pipe
- Approximate Limits of Aquatic Vegetation
- Fence
- Retaining Wall
- BNSF Centerline
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. 0.48' NAVD88)
- Wood Pilings Area
- Site Structures
- Former Gas Holder
- Marine Unit Boundary
- Upland Unit Boundary

Bathymetry Contours
- 1-Foot Contour
- 5-foot Contour

Upland Contours
- 1-Foot Contour
- 5-foot Contour

Project North | True North

75 0 75
Feet

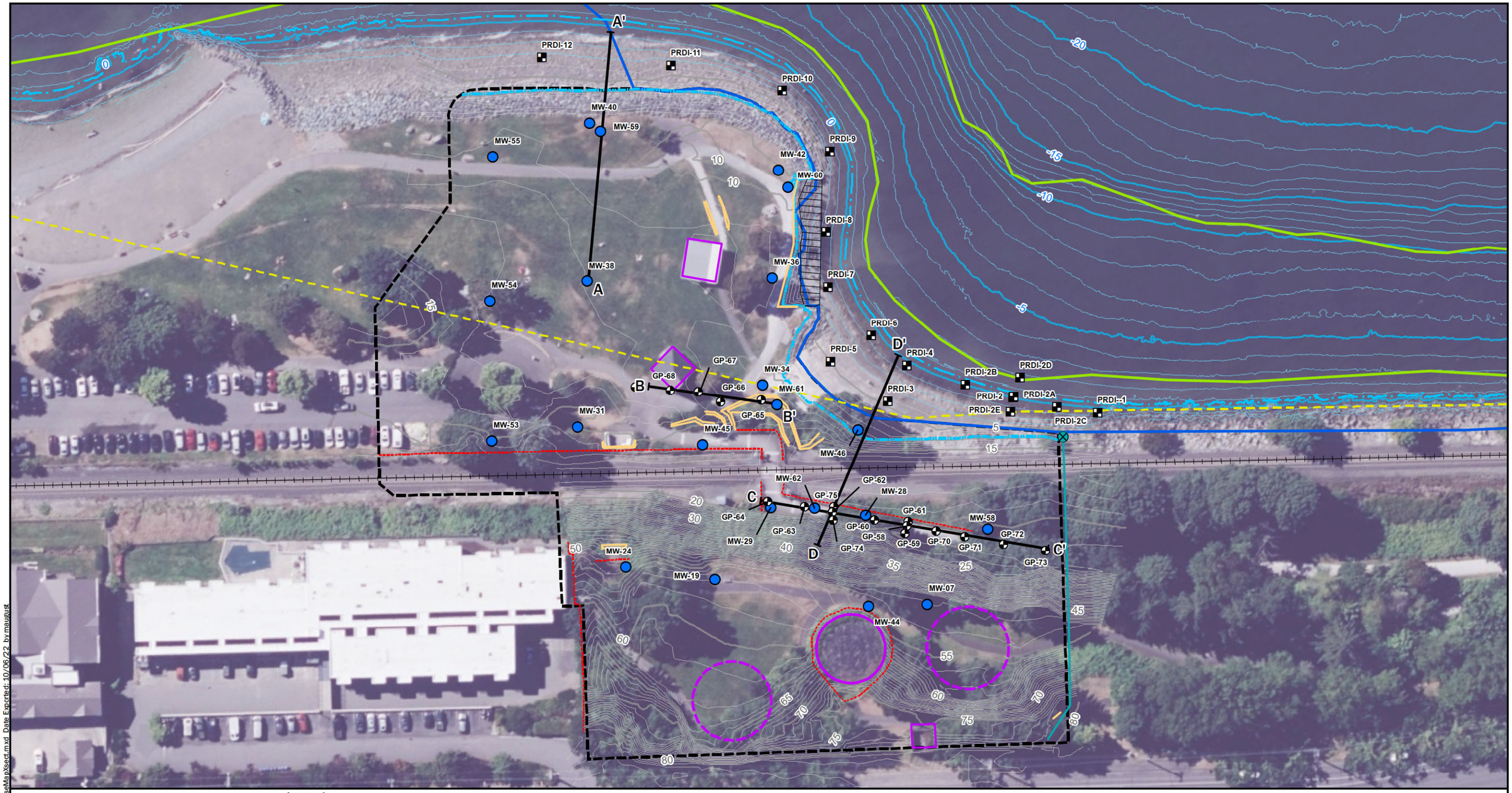
Groundwater/Porewater Analytical Results WAD Cyanide

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 17

P:\0186890\GIS\MXDs\0186890001_F17_Cyanide.mxd Date Exported: 10/06/22 by maueust



Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.

Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Direct Push Soil Boring
- Monitoring Well
- Intertidal Sediment and Porewater Sample Location
- Stormwater Outfall
- Stormwater Pipe
- Approximate Limits of Aquatic Vegetation
- Fence
- Retaining Wall
- BNSF Centerline
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. 0.48' NAVD88)
- Wood Pilings Area
- Site Structures
- Former Gas Holder
- Marine Unit Boundary
- Upland Unit Boundary

Bathymetry Contours
- 1-Foot Contour
- 5-foot Contour

Upland Contours
- 1-Foot Contour
- 5-foot Contour

Project North

True North

75 0 75
Feet

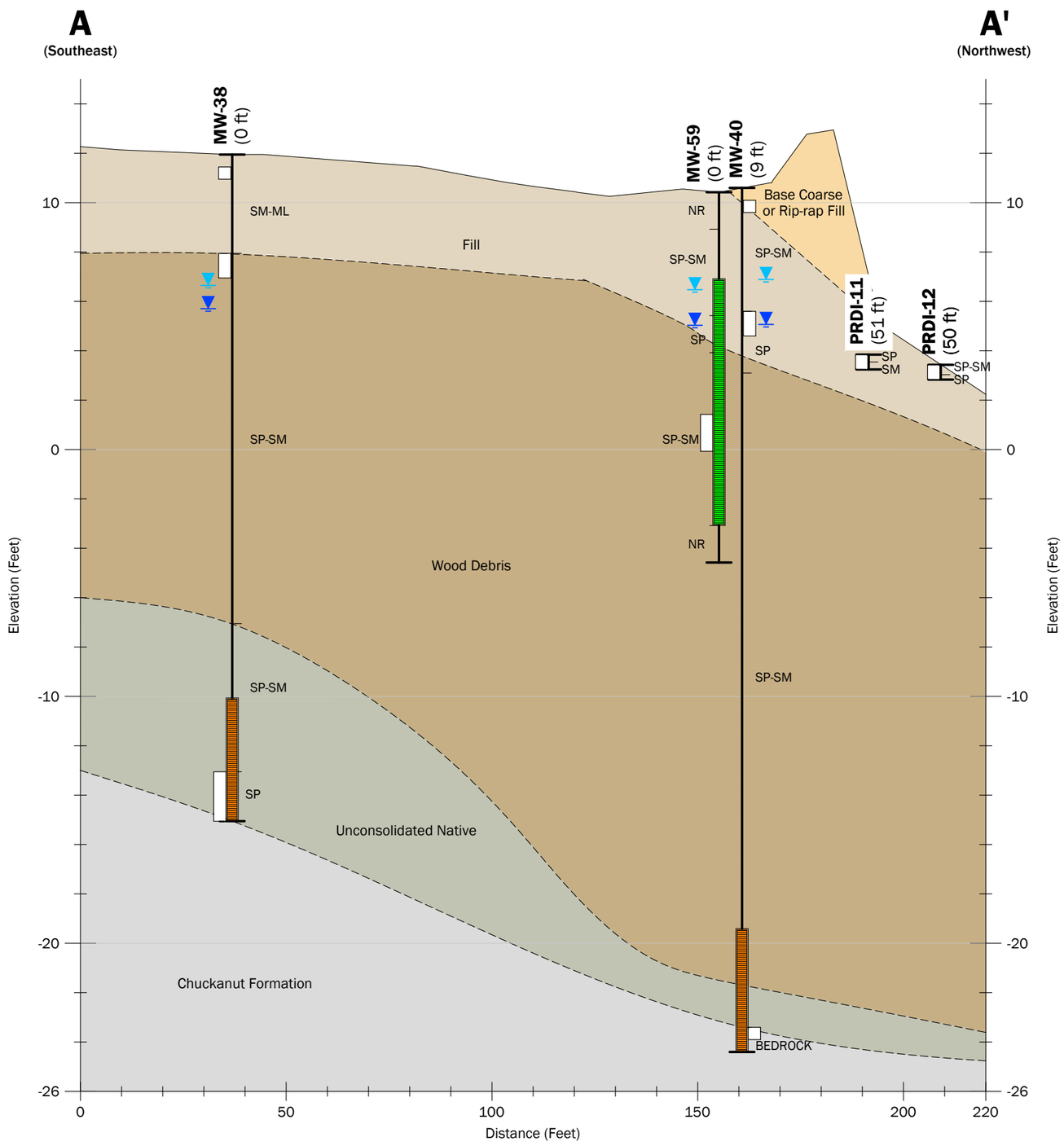
Geologic Cross Section Alignment

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 18

P:\0\0186890\GIS\MXDs\0186890001_F18_BaseMapXsect.mxd Date Exported: 10/06/22 by maurus



Legend

- Boring ID (Offset)
- Boring
- Inferred Soil Contact
- SM — Soil Classification
- Groundwater Measured February 2022
- Groundwater Measured September 2021
- Well Screen
- Below WAD Cyanide Groundwater Cleanup Levels
- Above WAD Cyanide Groundwater Cleanup Levels
- Soil Sample Interval Collected for Analysis (See Data Tables)
- Base Coarse or Rip-rap Fill
- Fill with Debris
- Wood Debris
- Fill
- Unconsolidated Native
- Chuckanut Formation

Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

Datum: NAVD 88, unless otherwise noted.

30 0 30
Horizontal Scale in Feet

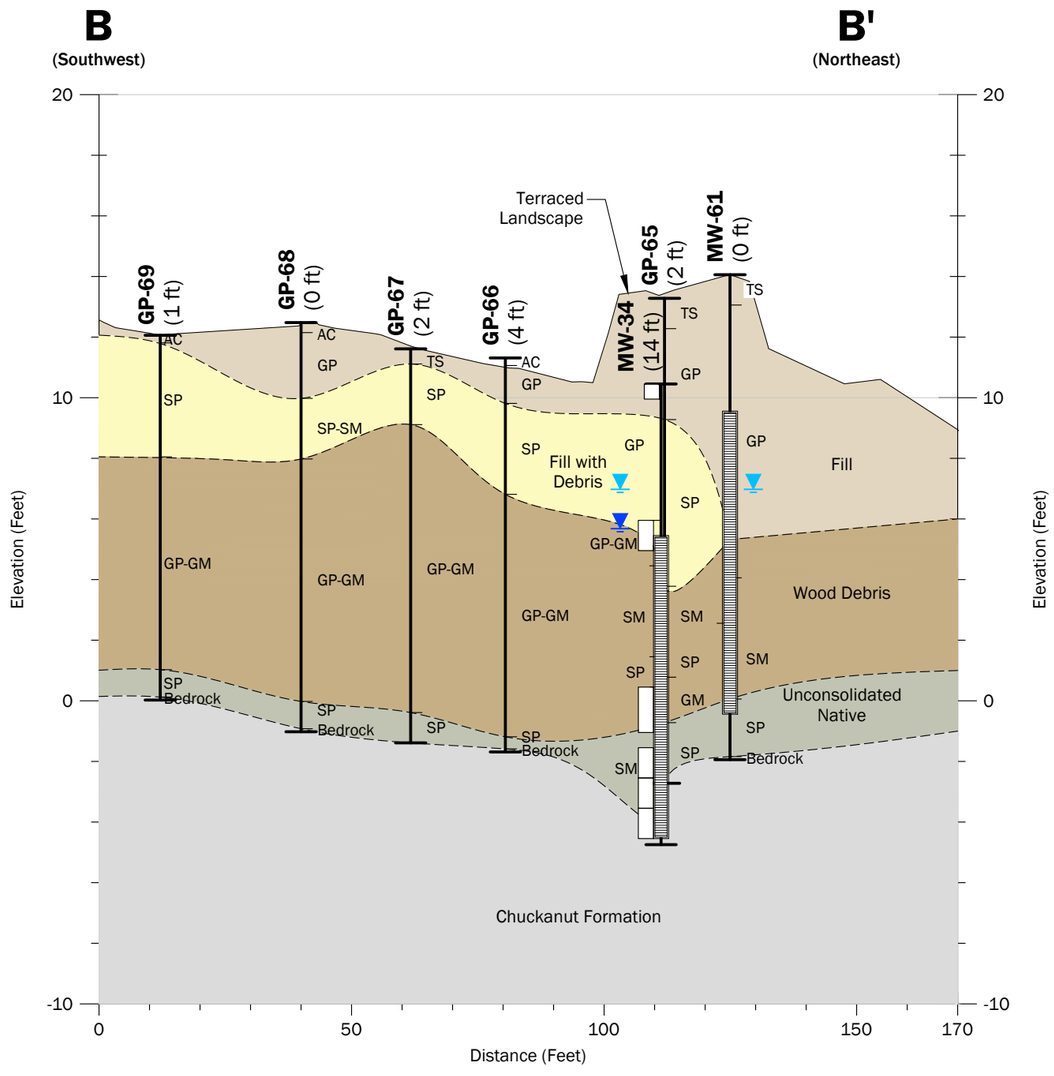
5 0 5
Vertical Scale in Feet
Vertical Exaggeration: 6X

Geologic Cross Section A-A'

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 19



Legend

- Boring ID (Offset)
- Boring
- Inferred Soil Contact
- SM — Soil Classification
- Groundwater Measured February 2022
- Groundwater Measured September 2021
- Well Screen
- Soil Sample Interval Collected for Analysis (See Data Tables)

- Base Coarse or Rip-rap Fill
- Fill with Debris
- Wood Debris
- Fill
- Unconsolidated Native
- Chuckanut Formation

Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

Datum: NAVD 88, unless otherwise noted.

30 0 30
Horizontal Scale in Feet

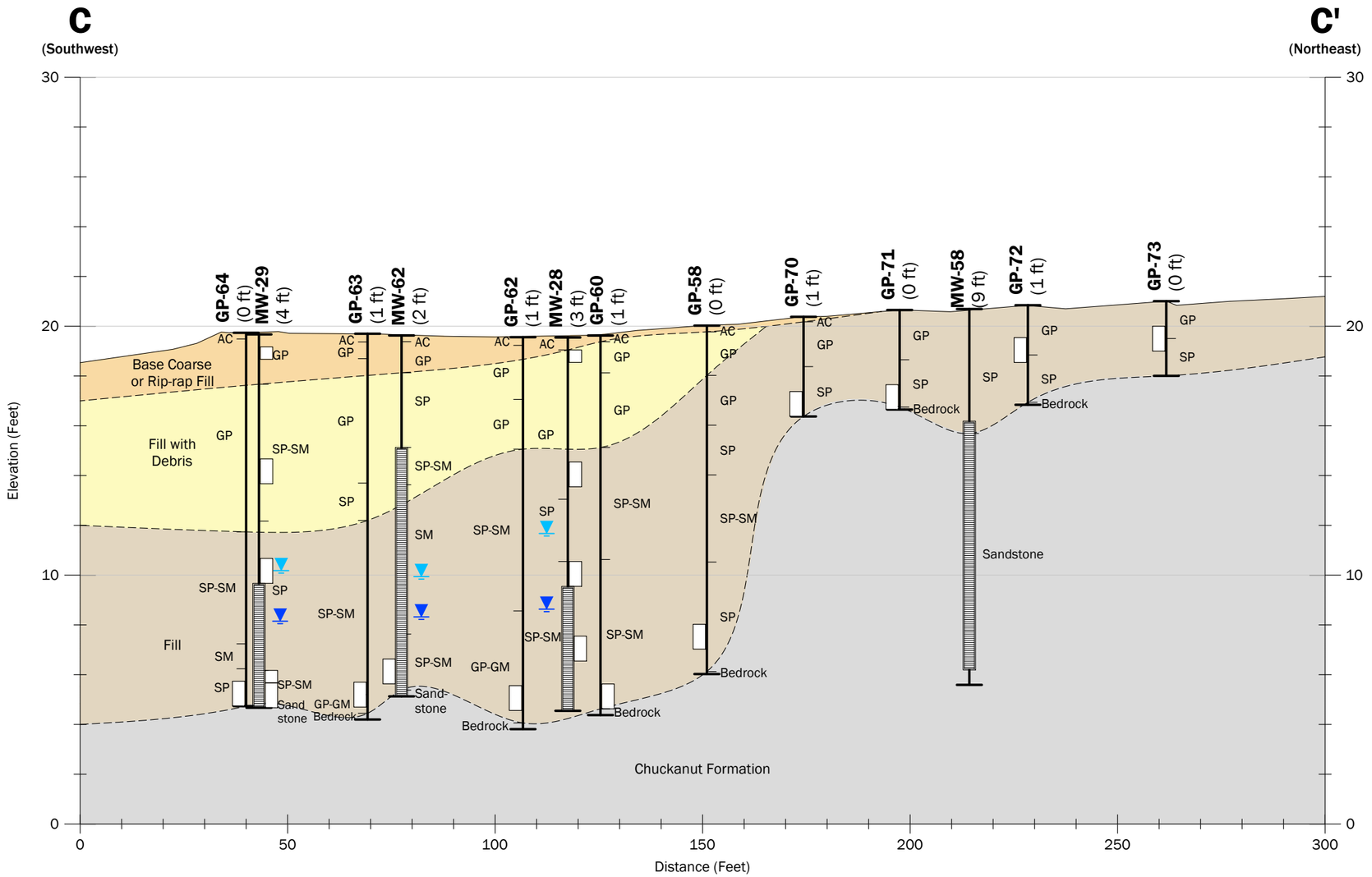
5 0 5
Vertical Scale in Feet
Vertical Exaggeration: 6X

Geologic Cross Section B-B'

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 20



Legend

Boring ID (Offset)

- Boring
- Inferred Soil Contact
- SM — Soil Classification
- Groundwater Measured February 2022
- Groundwater Measured September 2021
- Well Screen
- Soil Sample Interval Collected for Analysis (See Data Tables)

- Base Coarse or Rip-rap Fill
- Fill with Debris
- Wood Debris
- Fill
- Unconsolidated Native
- Chuckanut Formation

Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

Datum: NAVD 88, unless otherwise noted.

30 0 30
Horizontal Scale in Feet

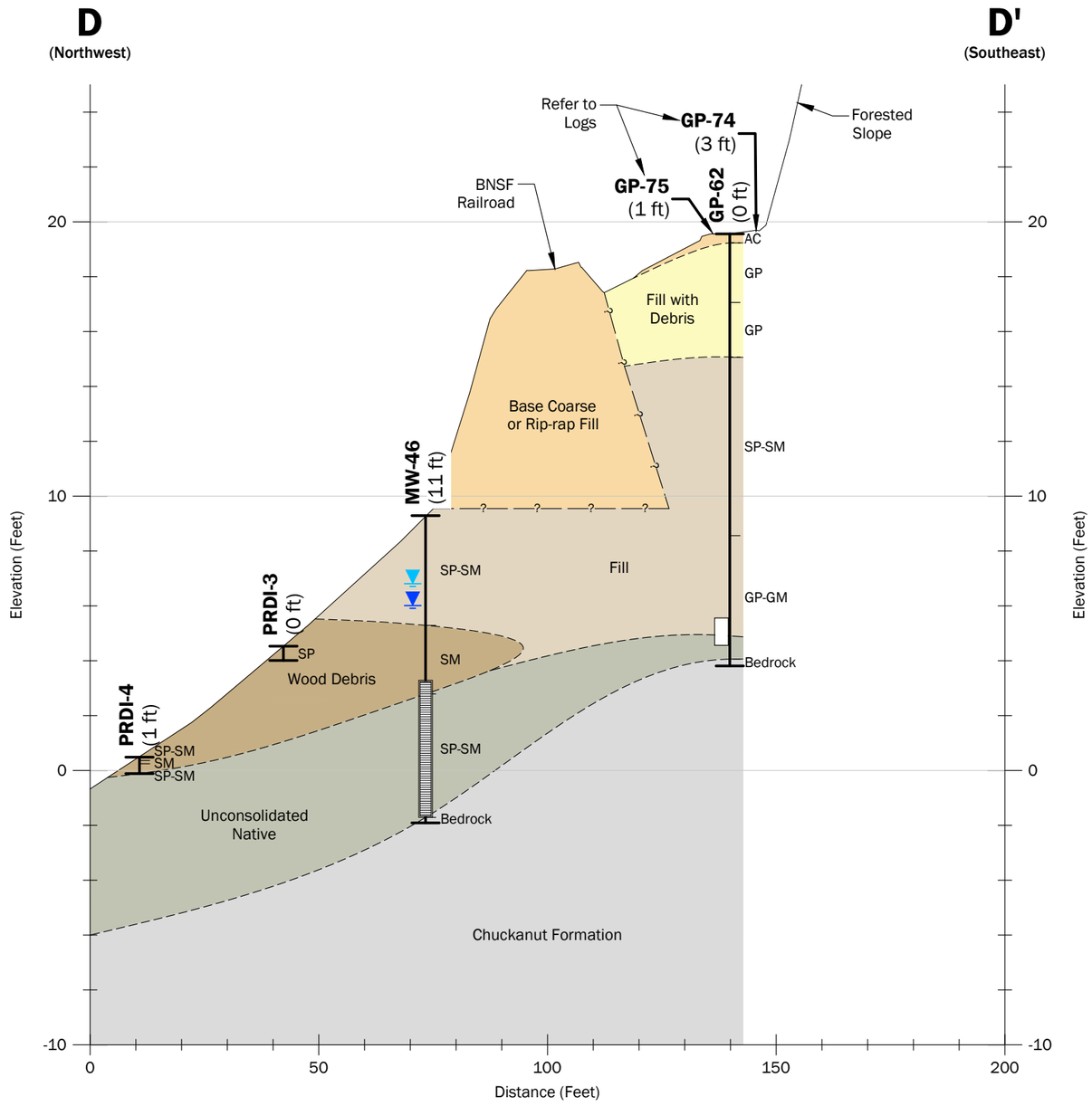
5 0 5
Vertical Scale in Feet
Vertical Exaggeration: 6X

Geologic Cross Section C-C'

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 21



Legend

Boring ID (Offset)

- Boring
- Inferred Soil Contact
- SM — Soil Classification
- Groundwater Measured February 2022
- Groundwater Measured September 2021
- Well Screen
- Soil Sample Interval Collected for Analysis (See Data Tables)

- Base Coarse or Rip-rap Fill
- Fill with Debris
- Wood Debris
- Fill
- Unconsolidated Native
- Chuckanut Formation

Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

Datum: NAVD 88, unless otherwise noted.

30 0 30
Horizontal Scale in Feet

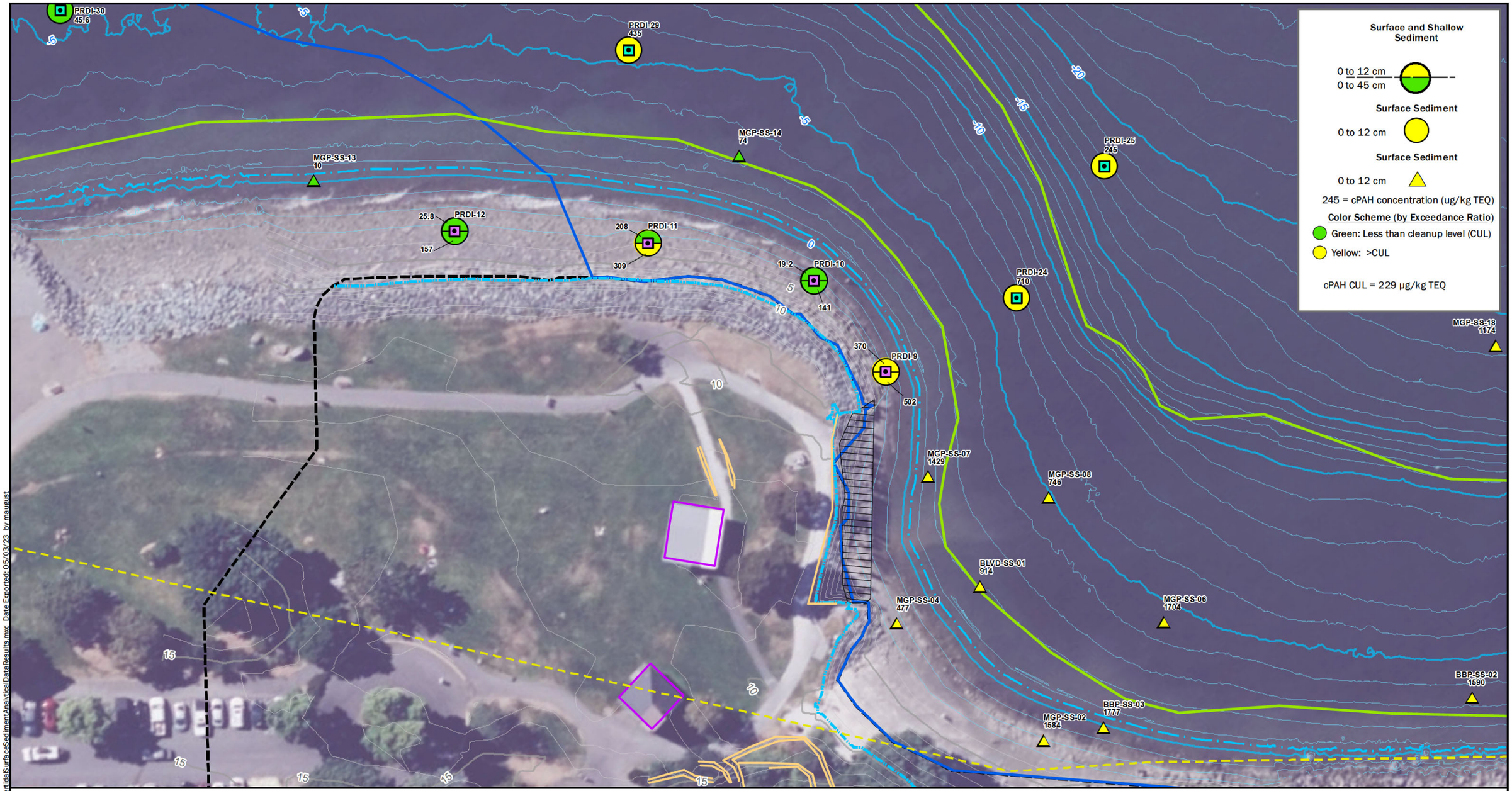
5 0 5
Vertical Scale in Feet
Vertical Exaggeration: 6X

Geologic Cross Section D-D'

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 22



P:\0186890\GIS\MXDs\186890001_F23_IntertidalSurfaceSedimentAnalyticalDataResults.mxd Date Exported: 05/03/23 by maugust

Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base upland survey from Larry Steel Associates, 2022. Base bathymetric survey from David Evands and Assocates, 2021. Aerial from Bing.

Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- PRDI Intertidal Surface Sediment (0 to 12 cm) and Shallow Sediment (0 to 45 cm) Sample Location
- PRDI Subtidal Surface Sediment (0 to 12 cm) Sample Location
- Existing Surface Sediment (0 to 12 cm) Sample Location
- Approximate Limits of Eelgrass
- Retaining Wall
- Inner Harbor Line
- OHWM (9.70' NAVD88)
- MLLW (el. 0.48' NAVD88)
- Wood Pilings Area
- Site Structures
- Marine Unit Boundary
- Upland Unit Boundary

Bathymetry Contours
- 1-Foot Contour
- 5-foot Contour

Upland Contours
- 1-Foot Contour
- 5-foot Contour

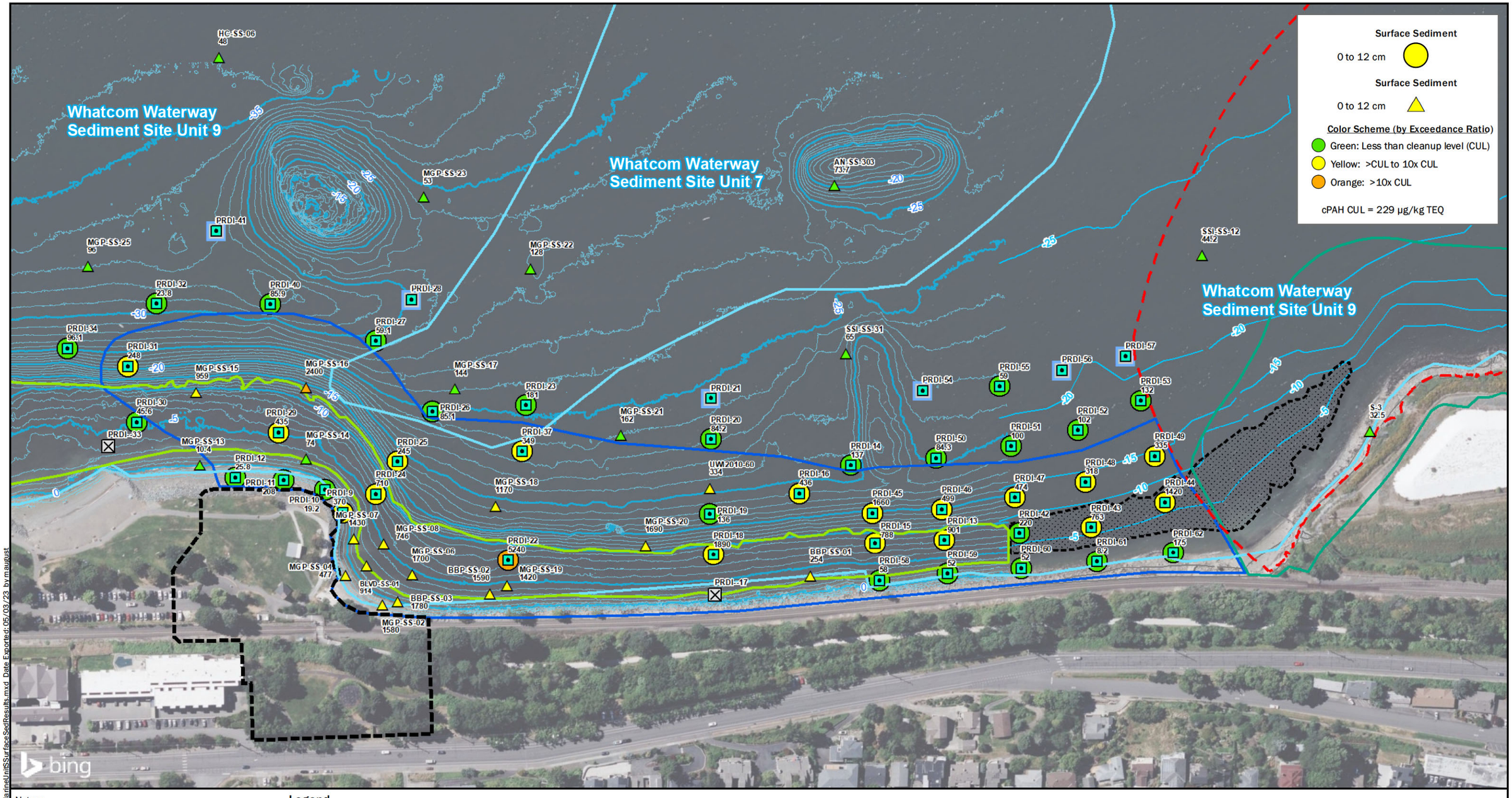
Project North
True North
50 0 50
Feet

Intertidal Surface Sediment (0 to 12 cm) and Shallow Sediment (0 to 45 cm) Analytical Results cPAHs

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 23



Notes:
1. The locations of all features shown are approximate.
2. Mean High Tide defines the boundary between the Upland Unit and Marine Unit.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Cornwall 60% Design, Landau Associates, 2021.
Survey data from David Evans and Associates, 2021.
Actual sample location data collected during sediment sampling with GPS mounted on research vessel.
Projection: NAD83 WA State Plane, N Zone, US Foot
Vertical Datum: NAVD88

Legend

- Upland Unit Boundary
- Marine Unit Boundary
- Surveyed Extent of Eelgrass (Grette and Associates, 2008a and 2009)
- Approximate Limits of Aquatic Vegetation
- Haley Marine Unit Boundary
- Cornwall Sediment Cap and Shoreline Stabilization Boundary (60% Design)
- Whatcom Waterway Sediment Site Units 7 and 9 Boundaries

Bathymetry Contours

- 1-Foot Contour
- 5-foot Contour

- PRDI Surface Sediment Sample Location
- Existing Surface Sediment Sample Location
- Archived
- Surface Sediment Sample Not Collected

*Whatcom Waterway Sediment Site Unit 9 encompasses the entire in-water area shown on this figure except the area represented by Whatcom Waterway Sediment Site Unit 7.

Project North / True North

150 0 150
Feet

Intertidal and Subtidal Surface Sediment (0 to 12 cm) Analytical Results - cPAHs

South State Street MGP Site
Bellingham, Washington

GeoEngineers

Figure 24

P:\0186690\GIS MXDs\186690001_F24_MarineUnitSSurfaceSedResults.mxd Date Exported: 05/03/23 by maugust