Exposure Assessment and Work Plan

Inventech Marine Solutions Site Development/Norseland Cleanup Site

Port of Bremerton

Kitsap County, WA

Prepared for:

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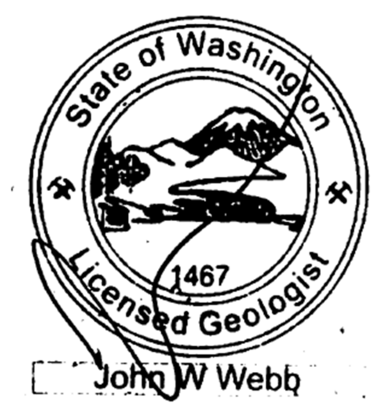

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Acronyms and Abbreviations

bgs	below ground surface
CLARC	Cleanup Levels and Risk Calculations
COPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
FID	Flame Ionization Detector
HAZWOPER	Hazardous Waste Operations and Emergency Response
KWC	Krista Webb Consulting
MCL	Maximum Contaminant Level
MTCA	Model Toxics Control Act
OSHA	Occupational Safety and Health Act
Plan	Construction Soil Handling and Management Plan
PPE	Personal Protective Equipment
PID	Photoionization Detector
RI/FS	Remedial Investigation/Feasibility Study
SDPA	Site Development Permit Application
SVOC	Semivolatile Organic Compound
TPH	Total Petroleum Hydrocarbons
U.S.	United States
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act
Work Plan	Exposure Assessment and Work Plan

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1.0 Introduction

The proposed project consists of site development and construction of a 58,500 square foot manufacturing facility at the Port of Bremerton's Olymic View Industrial Business Park at 8651 Mount Jupiter Way, SW. This parcel is in the vicinity of and partly adjacent to the Norseland Cleanup Site 761.

In the 1940s,the Norseland Cleanup Site was used as a military airfield and camp by the U.S. Navy and the U.S. Army. It was transferred to Kitsap County in 1948. Between 1952 and 1961, the cleanup site was permitted and used for landfilling municipal garbage from the City of Bremerton under contract to the Puget Service Company. The landfill was closed in 1961. In 1962, the County leased part of the property to a developer who developed Norseland Mobile Estates, an adult mobile home park. In 1963, the County gave the property to the Port. In 1982, the Norseland Mobile Estates was expanded to accommodate more mobile homes.

In 1991, the Washington State Department of Ecology (Ecology) received reports of transitory odors and health effects from residents of the Norseland Mobile Estates. In 1992, Ecology ranked the site as as level 2 hazardous waste site under the Washington State Model Toxics Control Act (MTCA) and ordered a Remedial Investigation and Feasibility Study (RI/FS). The Port and County entered into a Consent Decree with Ecology. Consistent with MTCA reglations Washington Administrative Code (WAC) 173-340-430, the County and the Port relocated the mobile home park as an interim remedial action.

Golder performed an RI/FS in 1997, investigating soil, groundwater, skirt air from beneath the mobile homes, and soil gas. Results of investigation sampling are discussed in Section 3.0. The feasibility study concluded that installation of a permeable soil cap on the landfill was the preferred remedial alternative.

After implementation of the preferred alternative, the Norseland Cleanup Site was de-listed and all requirements of the Consent Decree 00 2 02071 8 were satisfactorily completed and a restrictive covenant was placed on the property in 2000. The proposed redevelopment by Inventech Marine Solutions is located within the Norseland Cleanup Site footprint and thus, is subject to the existing restrictive covenant. However, the proposed redevelopment is not within the footprint of the former landfill or the cap.

The restrictive covenant requires the Ecology to approve any activity on the property that may result in the release or exposure to the environment of any hazardous substance that may remain on the property or create a new exposure pathway.

Tamara Welty of Ecology requested this Exposure Assessment and Work Plan (Work Plan) to facilitate review of the Site Development Permit Application (SDPA). The purpose of this Work Plan is to evaluate potential fate and transport of subsurface contamination from the landfill to potential human health and ecological receptors, as a result of the Inventech Marine Solutions Site Development adjacent to the former landfill footprint within the Norseland Cleanup Site. Specific potential concerns regarding redevelopment and a request for information are outlined in an email from Tamara Welty on April 4, 2022.

Included in this Work Plan is a discussion of the potential exposures/issues that could result from the redevelopment: such as contamination migrating during and after construction, how worker exposure will be prevented, and handling and disposal of potentially contaminated soils. This Work Plan includes a discussion of past relevant data/investigations, specifically the RI/FS (Golder, 1997) and where contamination is located as compared to the proposed building (not only the landfill itself but any contaminated media). This Work Plan is designed to help Ecology ensure that development of the site as planned will not pose a threat to human health or the environment. The Work Plan is based on an exposure assessment and preparation of a conceptual site model (CSM). The CSM compares contaminants potentially remaining in soil, groundwater, and vapor to the potential site activities and disturbances and potential receptors and identifies where potentially unacceptable health hazards may be created by the site development. The CSM is based on the SDPA and the RI/FS (Golder, 1997).

2.0 Previous Investigations and Relevant Data

Golder completed an RI/FS for the Norseland Mobile Estates in May 1997 and the landfill was capped and restrictive covenant placed by 2000. Krista Webb Consulting (KWC) reviewed the RI/FS data and two geotechnical soil borings performed at the building location in June 2022. A site visit and walk through was also conducted in June 2022. A summary of relevant issues regarding this data is provided in this section.

2.1.1 Soil

The proposed construction area is not within the landfill; thus, there is no analytical soil data for the proposed construction area because there is no historical source of contamination in that vicinity. No contaminants were detected in RI soil samples collected at the landfill site in concentrations greater than MTCA Method A screening levels. The soil samples collected and analyzed for the RI/FS were taken from TP-7 which is north of the proposed development area on the far side of the former landfill area. No contaminants were detected in the TP-7 sample in concentrations greater than screening criteria.

The most appropriate soil data for the site comes from MW-1 which is south of the cleanup site and just outside the construction area. The boring log suggests soil conditions of sandy silt to silty sand to a depth of about 20 feet. Perched water was found at 15-20 feet, groundwater at 45 feet and is estimated to be 40-60 feet below ground surface (bgs). To the west of the site, till was encountered at about 1 foot bgs.

Two geotechnical soil brings were drilled on June 29, 2022 at the building location to evaluate soils at depth, and a KWC environmental site assessor was present for this work, the boring logs from this event are provided in Appendix A. Soil contained no discernable evidence of contamination such as staining or organic vapors, and no methane was detected in the soil down the boreholes. Soil conditions were extremely dense and dry, with auger refusal at 6-12.5 feet bgs..

2.1.2 Groundwater

MW-1 is upgradient of and adjacent to the proposed development area. Perched water was found at 15-20 feet, groundwater at 45 feet and is estimated to be 40-60 feet. There were two data collection events planned for the RI, August 1994 and December 1994. Volatile organic compounds (VOCs) were not detected in groundwater samples. Several semi volatile phthalates were detected in low concentrations. Both filtered and unfiltered data are reported for August but only unfiltered samples were collected in the December 1994 sampling event.

Concentrations of contaminants in MW-1 in the December sampling event were greater than the August sampling event, so Golder sampled MW-1 again in March 1995. Both filtered and unfiltered samples were analyzed. The filtered concentrations of contaminants in MW-1 were greater than the unfiltered (total) concentrations from groundwater collected in MW-2 and MW-3, located downgradient and on the far side of the landfill (to the north). Contaminant concentrations exceeded MTCA Method B screening levels for aluminum, chromium, cobalt, iron, manganese, nickel, vanadium, and zinc in MW-1, but not in MW-2 and MW-3. The concentration of thallium exceeded the MTCA Method B screening level.

2.1.3 Air

During the Golder RI, soil gas was sampled and analyzxed from approximately 50 different locations within the 5 acre landfill mobile home park footprint. Several contaminants were detected in some soil vapor samples in concentrations greater than MTCA Method C sub-slab screening levels, including benzene, chloroform, tetrachloroethene, and trichloroethene.

Skirt air samples (samples are collected between the floor of the mobile home and the ground surface) were collected from mobile homes which were within the footprint of the former landfill. Skirt air is not considered relevant to the planned development.

3.0 Conceptual Site Model

This section presents a conceptual site model (CSM). The CSM evaluates potential exposure pathways, and the mechanisms, media, and routes by which receptors have the potential to be exposed to hazardous substances (Washington Administrative Code (WAC) 173-340- 708[3][e]). The CSM is used to determine the potential for human or ecological receptors to be exposed to potential contaminants from the landfill.

An exposure pathway consists of four main parts (WAC 173-340-200), as follows:

- Source of contamination (e.g., primary sources, such as spills and leaks, and secondary sources, such as impacted soil or groundwater)
- Transport or exposure medium (e.g., a solute moving with groundwater flow and contamination present in soil)
- Point of exposure (e.g., an open excavation)
- Route of exposure (e.g., inhalation and dermal contact).

When all of these parts are present, connecting the source of contamination to a receptor, the exposure pathway is considered complete. If one or more parts are not present, the pathway is incomplete and exposure does not occur.

It is possible to have a potentially complete exposure pathway without health risk if chemicals are not detected or chemical concentrations below an acceptable threshold such as regulatory screening levels or maximum contaminant limits.

Potential human and ecological receptors are identified for the site based on current and reasonable future land use. Current land use is undeveloped land. Future land use is as a commercial development.

The proposed development includes a 58,520 square foot industrial building constructed slab on grade. This building is located approximately 150 feet from the edge of the former landfill cap on top of an approximately 15 foot ridge above the former landfill area, and separated by a road. No subsurface components (except utility lines) are planned for this building.

3.1 Screening Levels

Typically, not all chemicals present at a site pose health risks or contribute significantly to overall site risks. The U.S. Environmental Protection Agency (EPA) guidelines (EPA, 1989) recommend focusing on a group of chemicals of potential concern (COPCs) based on inherent toxicity, site concentration, and behavior of the chemicals in the environment. To identify these COPCs, risk-based screening values are compared to detected chemical concentrations. If site chemical concentrations exceed their respective screening concentrations, then these chemicals are identified as COPCs and retained for further evaluation.

Screening levels appropriate for this site are the MTCA screening levels provided by Ecology in the Cleanup Levels and Risk Calculation (CLARC) database. MTCA screening levels are concentrations of hazardous substances in the environment that are considered sufficiently "protective of human health and the environment under specified exposure conditions" (WAC 173-340-200).

3.1.1 Soil Screening Levels

Soil screening levels were developed for unrestricted land use in accordance with WAC 173-340-740 using MTCA Method A and B. MTCA Methods A and B (for cancer and noncancer) values were identified for each contaminant detected in the remedial investigation. The maximum detected value of each contaminant is compared to the lowest value (MTCA A or B) in the CLARC database.

Table 1 presents the occurrence and distribution of contaminants detected in soil from the RI compared to the soil screening levels.

3.1.2 Groundwater Screening Levels

The Washington Maximum Contaminant Level (MCL), MTCA Method B (for cancer and noncancer), and MTCA Method C (for cancer and noncancer) in groundwater values were identified for each contaminant detected in the remedial investigation. Since this is an industrial site, Method C is the most relevant screening level.

Table 2 presents the occurrence and distribution of contaminants detected in groundwater from the RI compared to the groundwater maximum contaminant levels (MCLs) and MTCA B and C groundwater screening levels.

3.1.3 Air Screening Levels

MTCA Method B (for cancer and noncancer) in air values were identified for each contaminant detected in the remedial investigation. The maximum detected value of each contaminant in skirt air (skirt air samples are collected between the floor of the mobile home and the ground surface) is compared to the lowest value in the CLARC database. Soil vapor samples are compared to MTCA Sub Slab Soil Gas Method C Screening levels.

Table 3 presents the occurrence and distribution of contaminants detected in soil vapor from the RI compared to the sub-slab Method C soil gas screening levels.

3.2 Contaminants of Potential Concern

3.2.1 Soil

No contaminants were detected in soil in concentrations greater than applicable screening levels. The maximum concentration of arsenic is greater than the MTCA Method B cancer screening level; however, it is less than the MTCA Method A screening level. However, MTCA Method A is considered protective of human health; thus, no COPCs are identified in soil.

3.2.2 Groundwater

No VOCs were detected in groundwater. Chromium and nickel were detected in concentrations greater than the Washington MCL, but less than the MTCA B cleanp level. Chromium, manganese, vanadium, and zinc were detected in concentrations greater than the MTCA Method B screening level but less than Method C. The maximum detected concentrations of aluminum, cobalt, and iron were greater than the Method C screening level. Thallium was detected at the range of detection limits and below Washington MCL but above MTCA B and MTCA C screening levels.

Butylbenzylphthalate was detected in a concentration slightly greater than the MTCA Method B value for cancer risk. Although MTCA allows for a maximum carcinogenic risk of $1x10^{-5}$, MTCA Method B levels are based on a maximum carcinogenic risk of $1x10^{-6}$. The maximum concentration of butylbenzylphthalate was less than the applicable Method C screening level.

3.2.3 Soil Vapor

Benzene, chloroform, tetrachloroethene, and trichloroethene were detected in some soil vapor samples in concentrations slightly greater than MTCA Method C sub-slab screening levels within the landfill/mobile home park footprint.

Soil vapor samples were collected from soil vapor probes within the footprint of the mobile home park.

Methane from degraded landfill material can act as a carrier gas to transport volatile and semivolatile components upwards through the soil column. No methane was detected in the soil boreholes installed in June 2022 (detector was inserted directly into the drill stem downhole). Soil conditions were extremely dense and highly impermeable above groundwater. During utility trench installation, methane will be screened for to determine if this exposure route is complete. Based on the fact that no contaminants detected in soil gas exceeded screening levels, and that the development is uphill, above the site, and over 150 feet from the former landfill waste footprint, the potential for migration of chemicals via methane carry is considered slight.

3.3 Receptors

3.3.1 Construction Workers

A construction worker may potentially be involved in activities that include installation/maintenance of subsurface utilities and structures, excavation of building foundations, etc. Exposure may be to surface and subsurface soils by ingestion, dermal contact, and inhalation of soil particulates, and vapor by inhalation (e.g., inhalation of off-gassing VOCs from soil under semi-confined exposure conditions).

There are no COPCs in soil; therefore, there is no complete exposure pathway for surface and subsurface soil.

Exposure to groundwater could be by ingestion, dermal contact, and inhalation (e.g., inhalation of off-gassing VOCs from shallow groundwater). Drinking water is supplied to this site by the Bremerton municipal system via pipeline (Golder, 1997); therefore, groundwater is not a source of drinking water. Based on boring logs from the RI, groundwater is was identified between 45-55 feet below ground surface (bgs). Construction worker potential exposure to groundwater is expected to be 15 feet bgs or less. Construction workers are not expected to be exposed to groundwater. No VOCs were detected in groundwater; therefore the inhalation pathway of VOCs in groundwater is not complete.

The site development footprint is not within the vicinity of the landfill or mobile home park; thus, while COPCs were identified in soil gas samples in the landfill and mobile home park, the landfill and mobile home footprint have been capped and there is no complete exposure pathway for construction workers to encounter COPCs in soil vapor in the site development footprint.

3.3.2 Site Employees

A site employee works within buildings located within or near the source areas. The site employee spends a majority of the workday within the buildings but visits outdoor areas. The site employee is potentially exposed to surface soil by ingestion, dermal contact, and inhalation of soil particulates. This receptor may also be exposed to contaminants in subsurface soil and groundwater by inhalation of VOCs in indoor or outdoor air. Groundwater at the site is not a source of drinking water.

There are no COPCs in soil; therefore, there is no complete exposure pathway for surface and subsurface soil. The site development footprint is not within the vicinity of the landfill or mobile home park; thus, while COPCs were identified in soil gas samples in the landfill and mobile home park, the landfill and mobile home footprint have been capped and there is no complete exposure pathway for site employees to encounter COPCs in soil vapor in the site development footprint.

No VOCs were detected in groundwater; therefore the inhalation pathway of VOCs in groundwater is not complete.

3.3.3 Ecological Receptors

No contaminated soil, groundwater, and air has been observed or detected in the site development area. Construction is not expected to expose any contamination that may have an adverse effect on ecological receptors.

3.4 Summary

There are no complete exposure pathways to human receptors from residual contamination in the adjacent former landfill or to current or future receptors (human or ecological) at the development site.

4.0 Construction Soil Management Plan

4.1 Introduction

This Construction Soil Handling and Management Plan (Plan) has been prepared for the Port of Bremerton to facilitate installation of utilities for the site development. See Site Location Map in Figure 1. This work will also be used to characterize the soils to a depth of up to 5 feet along the hillside between the proposed building location and the old landfill. Approximate locations of the existing and proposed buildings are shown on Figure 2.

The project involves clearing and grubbing the area for construction of the new facility, installation of electrical, water, sewer and other utilities along the access road running parallel to the hillside between the old landfill and the proposed building, and evaluation of shallow soils. Two geotechnical soil brings were drilled on June 29, 2022 at the building location to evaluate soils at depth, and the Environmental Site Assessor was present for this work. This Plan includes these soil borings as Appendix A. Soil contained no discernable organic vapors, and no methane was detected in the soil down the boreholes. Soil conditions were extremely dense and dry, with auger refusal at 6-12.5 feet bgs.

Contamination is not expected in the soils at the proposed construction site. However, if contamination is suspected (odor, discoloration, garbage, etc. is identified), the Environmental Site Assessor may collect supplemental soil characterization data. This data may be used to refine boundaries between impacted or contaminated soil areas and clean soil areas and obtain additional information for soil disposal planning in the facility footprint. The environmental soil classification and handling guidelines in this Work Plan may be revised for some areas based on the results of supplemental soil sampling/testing and field observations.

Any soil sampling performed during construction will be conducted in a manner that minimizes impacts to excavation production and schedule. If contamination is observed or detected, laboratory sample results will be used to prepare soil waste profiles and obtain approval from two permitted soil disposal facilities for disposal of “Impacted” or “Contaminated” soil as defined in Section 4.4 of this Work Plan.

As discussed in this Work Plan, contaminated soil and groundwater removed from the construction excavations will be handled and disposed in accordance with MTCA requirements, and workers in contact with contamination will be Hazardous Waste Operations and Emergency Response (HAZWOPER) trained as stated in the MTCA cleanup regulation, and WAC 296-843.

4.2 Background

The location for construction is on the ridge above the old landfill and is unlikely to contain contaminated material associated with the landfill. However, methane can act as a carrier gas and move volatile components upward through the soil column if the soils are highly permeable and act as a path of least resistance for gas transport. Field observations during installation of geotechnical borings in June 2022 demonstrated that the soil column underlying the proposed construction area are extremely dense (auger refusal at 6-12.5 feet bgs), making vertical gas transport extremely unlikely. Previous data associated with soil, groundwater and soil gas are detailed in Section 3.1. No contaminants were detected above screening levels in soil. COPCs were identified in soil vapor samples; however, the soil vapor samples were collected greater than 150 feet from the site development footprint. Methane typically will not carry VOCs laterally. Metal components detected in groundwater would not migrate via carrier gas (methane).

4.3 Soil Sampling During Construction

To the greatest extent possible, excavation of soil will proceed based on field observations and field assessment during the utility line excavation. The Environmental Site Assessor will perform supplemental soil sampling/chemical testing to evaluate soil conditions in excavation areas where contamination is suspected and additional data is needed to classify soil for handling and/or disposal purposes. Soil will be evaluated using both a photoionization detector (PID) and a flame ionization detector (FID). The PID will detect the presence of VOCs such as fuel or solvents. The FID will detect the presence of methane gas, in the unlikely event that methane has migrated up from the landfill. The Environmental Site Assessor will also inspect excavated soils for debris or garbage that may have been buried when the site was used as a mobile home park. Any soils that contain obvious or suspected contamination will be submitted to the laboratory for testing. It is not anticipated that any contamination will be observed in these soils.

4.4 Soil Handling and Management

4.4.1 Guidelines for Excavation and Suspect Contamination

An Environmental Site Assessor (from Krista Webb Consulting or Krazan and Associates) will be on site full-time during excavation for in-ground utilities. Site assessment environmental services during construction will include:

1. Field screen soil and assist the contractor as needed in identifying and segregating impacted/ contaminated soil from adjacent-underlying clean soil, and
2. Obtain characterization/confirmation soil sample if necessary.

Based on the data currently available for the proposed construction area, no contaminated soils are anticipated. However, the Site Assessor will field screen suspect soil during construction excavation to evaluate suspect soil (potentially impacted or contaminated) as described below. Suspect soil should be considered impacted orcontaminated if it exhibits one or more of the following physical characteristics:

- Staining;
- Petroleum odors;
- A moderate or heavy sheen when placed in contact with water;
- Elevated concentrations of organic vapors or methane detected using PID and FID field screening methods.
- Garbage or other debris is evident

If soil exhibits none of the above characteristics, it will be treated as clean soil.

4.4.2 Soil Categories

The Environmental Site Assessor will classify the soil for handling and management. The following categories include:

Non-Impacted (Clean) Soil—Stockpiled onsite at existing soil stockpile for site reuse

Soil is considered Non-Impacted (Clean) if one or more of the following conditions are met:

- Contaminants are not detected except for low levels of metals.
- Metals are detected at concentrations equal to or less than natural background concentrations in the Puget Sound region (Ecology, 1994).
- No physical evidence of contamination (sheen, odor, staining, suspect debris etc.) is observed.

Impacted Soil—Local Disposal at and Unpermitted Facility

Soil is considered impacted if one or more of the following conditions are met:

- Physical evidence of low-level contamination (slight sheen, mild odor, staining, garbage) is observed.
- Contaminant concentrations for petroleum exceed laboratory detection limits but are less than 10% of MTCA screening levels.
- Metals are detected at concentrations less than MTCA screening levels and above natural background levels for the Puget Sound region (Ecology, 1994).

Contaminated Soil—Disposal at Landfill

Soil is considered contaminated if one or more of the following conditions are met:

- Physical evidence of contamination (moderate to heavy sheen, strong odor, staining, garbage) is observed.
- Contaminant concentrations for petroleum (over 10% of MTCA Method A screening levels) or metals exceed MTCA Method A screening levels.

4.4.3 Guidelines for Soil Handling

Handling and management requirements for Impacted soil include:

- Waste Profile, Landfill Selection and Soil Disposal: The Environmental Site Assessor will prepare a soil waste profile and obtain approval from a permitted landfill/disposal facility to dispose of impacted soil off-site prior to commencing impacted soil excavation activities. Impacted soil will be transported to disposal facilities that have provided approval to accept Impacted soil from the Site.
- Soil Excavation and Segregation: As the soil is excavated, the Contractor will segregate any impacted soil from adjacent-underlying clean soil to avoid cross-contamination.

- Onsite Reuse: Clean soil and impacted soil with low level petroleum and metals detections may be managed/reused on site as non-structural fill in areas where no bio-retention cells and stormwater control features are planned, provided such soil is considered suitable for use by the project Geotechnical Engineer.
- Temporary Stockpiling of Impacted Soil: Impacted soil will either be loaded directly into trucks for off-site disposal or stockpiled on the Site pending reuse/disposal. If Impacted soil is temporarily stockpiled, the stockpiles will be covered with plastic sheeting at all times and protected from stormwater runoff. Construction best management practices for temporary erosion and sediment control must be followed during stockpiling activities.
- Loading and Transportation: If Impacted soil is not reused on site, the Contractor will load the Impacted material into trucks and transport the material to one of the permitted landfill/disposal facilities.
- Confirmation Soil Sampling: The Environmental Site Assessor will obtain soil samples and analyze them for TPH, Metals, VOCs and SVOCs from potentially Impacted soil in areas that need additional characterization. Confirmation soil samples will be submitted for chemical analysis on a rush (1- to 2-day) turnaround as needed to facilitate construction schedule. If the Impacted soils fail to meet the criteria specified above, they will be treated as Contaminated soils following test results.

Handling and management requirements for Contaminated soil include:

- Waste Profile, Landfill Selection and Soil Disposal: The Environmental Site Assessor will prepare a soil waste profile and obtain approval from a permitted landfill/disposal facility to dispose Contaminated soil off site prior to starting Contaminated soil excavation activities. Contaminated soil will be transported to the Waste Management facility near the site.
- Soil Excavation and Segregation: As the Contaminated soil is excavated, the Contractor will segregate the Contaminated soil from adjacent-underlying soil to avoid cross-contamination.
- Onsite Reuse: Contaminated soil will NOT be reused on site.
- Temporary Stockpiling of Contaminated Soil: Contaminated soil will be temporarily stockpiled pending disposal prior to testing. Stockpiles will be covered with plastic sheeting at all times and protected from stormwater runoff. Construction best management practices for temporary erosion and sediment control must be followed during stockpiling activities.
- Loading and Transportation: The Contractor will load the Contaminated soil into trucks and transport the material to one of the permitted landfill/disposal facility.

Handling and management of Non-Impacted (Clean) Soil.

Soil classified as Non-Impacted (Clean) will be stockpiled onsite at the existing soil stockpile area for reuse onsite as needed.

5.0 Health and Safety Plan

The Contractor, in the course of work, shall be aware that the construction area is adjacent to a former landfill which is currently covered with a permeable cap. The Contractor shall assume full responsibility and liability for compliance with all federal, state, and local regulations pertaining to work practices, protection of workers and visitors to the site relative to the presence of Impacted-Contaminated/Contained-In soil during construction. The Contractor will comply with the following provisions:

- The content of WAC 173-340-810 (MTCA Cleanup Regulation, Worker Safety and Health). WAC 173-340-810 states that requirements under the Occupational Safety and Health Act (OSHA) and the Washington Industrial Safety and Health Act (WISHA) are applicable to excavation and handling of Contaminated soil-groundwater.
- Contractors performing excavation, handling or loading of Impacted-Contaminated/ soil and groundwater shall prepare a site-specific Health and Safety Plan that addresses the presence of the contaminants described in this document.
- Workers involved in excavation or handling of Impacted-Contaminated soils and groundwater shall be in compliance with HAZWOPER Training in accordance with WAC 296-843. Workers shall be trained in the purpose, proper selection, fitting, use, and limitations of personal protective equipment (PPE), including gloves, protective clothing and respirators will be obtained in the unlikely event they are needed.

6.0 Other Issues

Ms. Welty of Ecology requested that several other issues be addressed that are not covered in this plan. These issues are described below with brief discussion about how each will be handled.

- No plan is needed to to restore the landfill cap per the Cleanup Action Plan, as the area capped is not affected by this development.
- The project engineer has developed a stormwater plan[1] that evaluates how the development will affect stormwater conveyance over the cleanup site footprint, and what stormwater controls are needed.
- Landfill gas control measures should not be needed at the site, as the proposed development is not on top of the landfill, nor is it anticipated that any subsurface development (except utilities) is planned. Monitoring for methane during the installation of utilities should determine if methane is migrating laterally upward towards the site (highly unlikely) and will be performed along the entire frontage of the development. If methane gas is detected during this monitoring, this issue will be revisited.
- No vapor intrusion assessment is planned to evaluate the potential of vapor intrusion into the new building from soil and groundwater because VOCs were not detected in groundwater and the soil vapors detected were greater than 150 away from the building footprint. The facility will be slab on grade and will not include subsurface structures. It should be noted that previously observed “odors” from the landfill were likely from the mobile homes that actually were located “on” the landfill (Figure 2) and not from the upland area that is currently planned for development. Should contamination be encountered during utility installation, Ecology will be consulted and soil vapor samples may be collected.
- No other potential exposures/issues were identified by the analysis provided in the CSM. Should additional issues be identified during construction, the Site Assessor will be consulted to plan and implemement any and all necessary measures to ensure site worker and future tenant safety.
- Results and or reports (as appropriate, depending on findings) will be submitted to Ecology during and after the redevelopment as necessary. For example, a follow-up report would be appropriate if contaminated soil is encountered during construction excavation.

[1] https://www.dropbox.com/s/ewg0sl0er1wb2ea/6823%20Inventech%20Stormwater%20Report%20REVISED%204-11-22.pdf?dl=0

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TABLES

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Table 1. Occurrence and Distribution of Detected Chemicals in Soil

Chemical	Minimum Detected Concentration (mg/kg)	Maximum Detected Concentration (mg/kg)	Maximum Detected Concentration Qualifier	Location of Maximum Detected Concentration	Detection Frequency	Range of Detection Limits (mg/kg)	Concentration Used for Screening (mg/kg)	MTCA Method A (mg/kg)	MTCA Method B (mg/kg) noncancer	MTCA Method B (mg/kg) carcinogenic
Metals										
Antimony	0.2	0.2	J	TP -7-A	2/2	0.1-0.2	0.2		32	
Arsenic	**1.6**	**4.5**		**TP -7-A**	**2/2**	**0.1-0.9**	**4.5**	**20**	**24**	**0.67**
Beryllium	0.2	0.8		TP -7-A	2/2	0.1-0.2	0.8		160	
Cadmium	ND	0.5		TP -7-A	1/2	0.2-0.3	0.5	2	80	
Chromium	22.5	34.5		TP -7-A	2/2	0.5-0.8	34.5	2000	120000	
Copper	18.2	43.7		TP -7-A	2/2	0.2-0.3	43.7		3200	
Lead	39	50	J	TP -7-A	2/2	1.0-2.0	50	250		
Mercury	0.25	0.23		TP -7-A	2/2	0.06-0.07	0.23	2		
Nickel	26	26		TP -7-A	2/2	1.0-2.0	26		1600	
Selenium	0.2	1.1		TP -7-A	2/2	0.1-0.3	1.1		400	
Silver	0.5	1.1		TP -7-A	2/2	0.3-0.5	1.1		400	
Thallium	0.1	0.8		TP -7-A	2/2	0.1-0.9	0.8		0.80	
Zinc	71.9	91.2		TP -7-B	2/2	0.4-0.6	91.2		24000	
Volatiles										
Acetone	ND	0.095	B	TP - 7-B	1/2		0.095		72000	
2-Butanone	0.016	0.026		TP - 7-B	2/2		0.026			
Benzene	ND	0.0017		TP -7-A	1/2		0.0017	0.03	320	18
Carbon Disulfide	ND	0.0026		TP -7-A	1/2		0.0026		8000	
Ethylbenzene	0.006	0.0069		TP -7-A	2/2		0.0069	6	8000	
Total Xylenes	0.0083	0.0097		TP -7-A	2/2		0.0097	9	16000	
Semivolatiles										
1,4-Dichlorobenzene	ND	0.14		TP -7-A	1/2		0.14			
4-Methylphenol	0.17	0.29		TP -7-A	2/2		0.29			
Naphthalene	0.62	2.1		TP -7-A	2/2		2.1			
2-Methylnaphthalene	0.45	0.77		TP -7-A	2/2		0.77		320	
Diethlyphthalate	0.097	0.13		TP -7-A	2/2		0.13			
Phenanthrene	ND	0.088		TP - 7-B	1/2		0.088			
Di-n-Butylphthalate	ND	0.14		TP - 7-B	1/2		0.14			
bis(2-Ethylhexyl)phthalate	ND	3.8		TP - 7-B	1/2		3.8			
Total Petroleum Hydrocarbons										
TPH	53	84		TP-7-B	2/2		84		100	

Notes:
Bold values are greater than screening levels
g/kg - milligram per kilogram
B - Also found in associated blank
J - estimated value
ND - not detected in more than one sample, reported as highest concentration

Table 2. Occurrence and Distribution of Detected Chemicals in Groundwater*

Chemical	Minimum Detected Concentration (mg/L)	Maximum Detected Concentration (mg/L)	Location of Maximum Detected Concentration	Detection Frequency	Range of Detection Limits (mg/L)	Concentration Used for Screening converted to (µg/L)	WA State Maximum Contaminant Level (µg/L)	MTCA Method B Noncancer (µg/L)	MTCA Method B Cancer (µg/L)	MTCA Method C Noncancer (µg/L)	MTCA Method C Cancer (µg/L)
Metals											
Aluminum	**0.03**	**83**	**MW-1**	**5/7**	**0.02**	**83000**		**16000**		**35000**	
Arsenic	0.001	0.002	MW-2	2/7	0.001	2	10	5	0.06	11	0.58
Barium	0.006	0.329	MW-1	7/7	0.001	329	2000	3200	7000		
Beryllium	ND	0.0002	MW-1	1/7	0.001	0.2	4	32		70	
Calcium	9.41	67.2	MW-1	7/7	0.01	67200					
Chromium	**0.017**	**0.354**	**MW-1**	**3/7**	**0.005**	**354**	**100**	**24000**		**53000**	
Cobalt	**0.018**	**0.038**	**MW-1**	**2/7**	**0.003**	**38**		**5**		**11**	
Copper	0.005	0.093	MW-1	4/7	0.002	93	1300	640		1400	
Iron	**0.017**	**96.8**	**MW-1**	**7/7**	**0.005**	**96800**		**11000**		**25000**	
Lead	0.005	0.014	MW-1	4/7	0.001	14	15				
Magnesium	2.86	35.9	MW-1	7/7	0.02	35900					
Manganese	**0.023**	**1.56**	**MW-1**	**7/7**	**0.001**	**1560**		**750**		**1600**	
Nickel	**0.02**	**0.3**	**MW-1**	**3/7**	**0.01**	**300**	**100**	**320**		**700**	
Potassium	0.5	4.7	MW-1	6/7	0.4	4700					
Selenium	0.001	0.002	MW-1	2/7	0.001	2	50	80		180	
Silicon	14.1	79	MW-1	7/7	0.02	79000					
Silver	ND	0.004	MW-1	1/7	0.003	4		80		180	
Sodium	4.32	14.2	MW-1	7/7	0.01	14200					
Thallium	**0.001**	**0.001**	**MW-2**	**2/7**	**0.001**	**1**	**2**	**0.16**		**0.35**	
Vanadium	**0.002**	**0.262**	**MW-1**	**6/7**	**0.002**	**262**		**80**			
Zinc	**0.007**	**0.188**	**MW-1**	**7/7**	**0.004**	**188**		**4.8**		**11000**	
SemiVolatiles											
Butylbenzylphthalate	0.001	0.054	MW-1	4/6		54		3200	46	7000	460
bis(2-Ethylhexyl)phthalate	0.001	0.0028	MW-1	6/6		2.8		320	6.3	700	63
Diethylphthalate	ND	0.0015	MW-3	1/6		1.5		13000		28000	
Di-n-Octyl phthalate	0.0014	0.005	MW-1	3/6		5		160		350	

Notes:
Bolded chemical exceeded its screening value.
mg/L - milligram per liter
µg/L - micrograms per liter
ND - not detected in more than one sample, reported as highest concentration
**GW samples are mix of filtered and unfiltered, all potential COPC exceedences are from unfiltered, except Thallium*

Table 3. Occurrence and Distribution of Detected Chemicals in Soil Vapor

Chemical	Minimum Detected Concentration (µg/m³)	Minimum Detected Concentration Qualifier	Maximum Detected Concentration (µg/m³)	Maximum Detected Concentration Qualifier	Location of Maximum Detected Concentration	Detection Frequency	Range of Detection Limits (µg/m³)	Concentration Used for Screening (µg/m³)	Sub-Slab Soil Gas Screening Level Method C Noncancer (µg/m³)	Sub-Slab Soil Gas Screening Level Method C Cancer (µg/m³)
Volatiles and Semivolatiles										
Benzene	**2.3**		**48**		**63**	**17/48**	**2.2-18**	**48**	**30**	**3.2**
Chloroform	**7.3**		**7.3**		**SV-22**	**3/48**	**3.4-10**	**7.3**	**98**	**1.1**
Chloromethane	1.8		2.9		54	3/48	1.5	2.9	90	
Ethylbenzene	7.4		17		122	4/48	3.0-3.9	17	1000	
Freon 11	ND		4.2		64	1/48	3.9	4.2		
Freon 12	3.5		89		121	16-48	3.2-10	89		
Freon 113	ND		15		SV-42	1/48	5.4	15		
Freon 114	6.2		31		SV-10	2/48	4.9-13	31		
m,p-Xylene	3.9		78		122	14/48	3.0-8.7	78	100	
Methylene Chloride	ND		4.2		SV-19	1/48	2.4	4.2	600	2500
o-Xylene	6.5	J	31		122	6/48	3.0-8.7	31	100	
Styrene	3.1		5.1		SV-45	5/48	3.0-3.4	5.1	1000	
Tetrachloroethene	**11**		**150**		**44**	**6/48**	**4.8-8.1**	**150**	**40**	**96**
Toluene	3.1		64		54	25/48	2.5-7.9	64	5000	
Trichloroethene	**ND**		**5.4**		**122**	**1/48**	**3.8**	**5.4**	**2**	**6.1**
1,2,4-Trimethylbenzene	6.4	J	32		122	5/48	3.4-5.4	32	60	
1,3,5-Trimethylbenzene	3.8		11		122	2/48	3.4	11	60	
Aldehydes										
Acetaldehyde	0.29		2		SV-19	20/23	0.18	2	300	380
Formaldehyde	0.12		0.66		SV-26	18/23	0.12	0.66		
Atmospheric Gases										
Methane	ND		14000000		SV-10	1/21		14000000		
Total Non-Methane Hydrocarbons	ND		560000		SV-10	1/21		560000		

Notes:

Bold values are greater than screening levels

µg/m³ - micrograms per cubic meter

J - estimated value

ND - not detected in more than one sample, reported as highest concentration

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FIGURES

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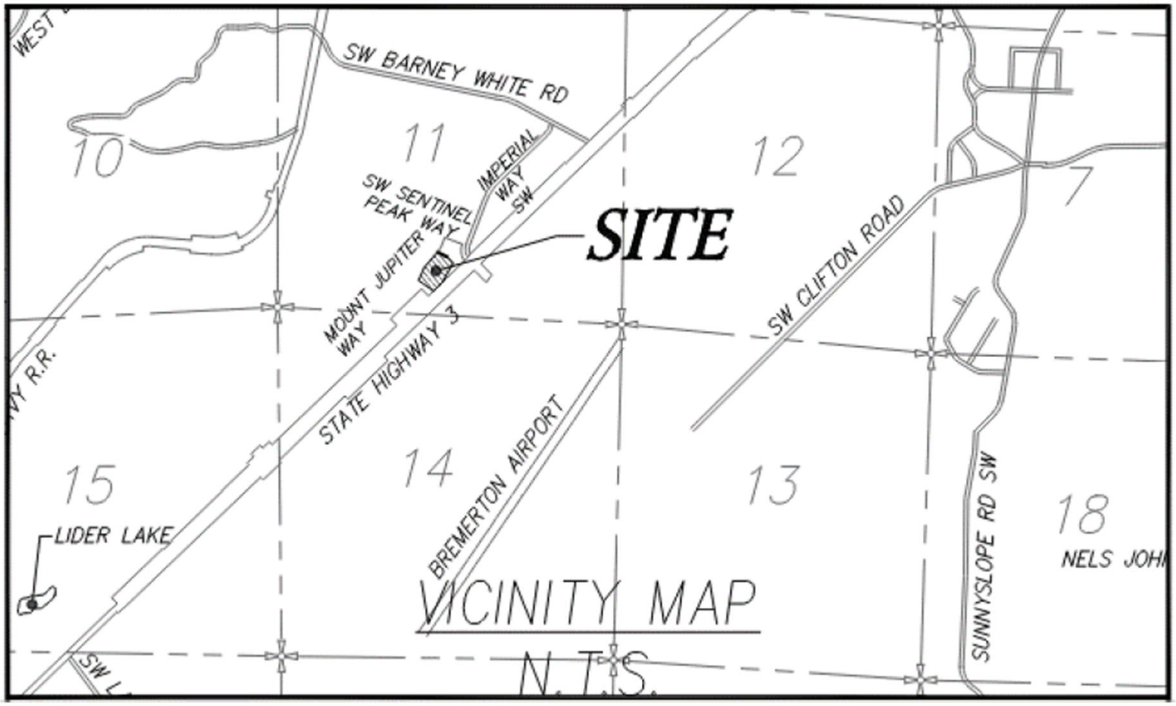
Figure 1. Site Vicinity Map



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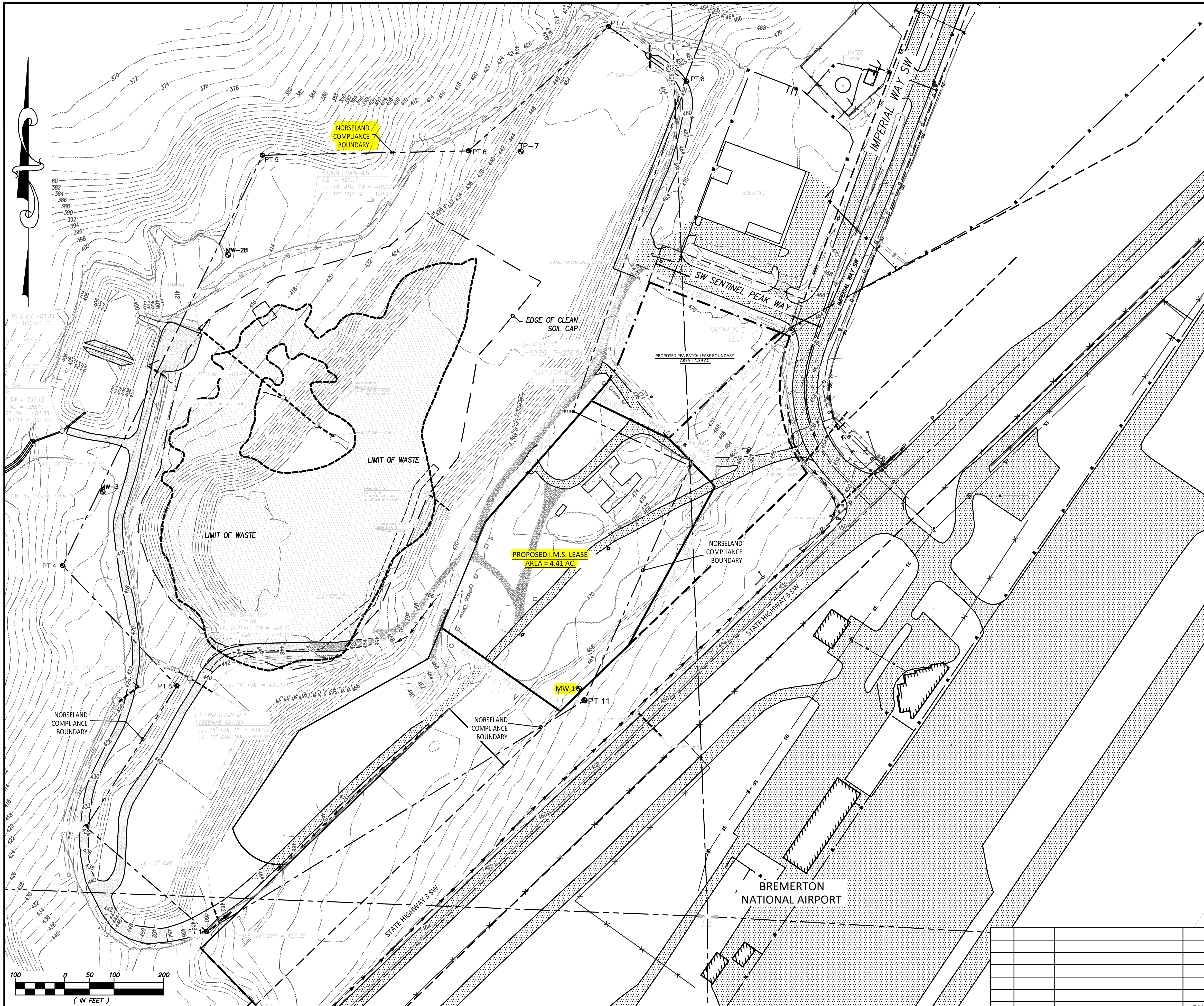

LEGEND

(S)	SANITARY SEWER MANHOLE
—SS—	SANITARY SEWER LINE
	FIRE HYDRANT
	WATER VALVE
—W—	WATER LINE
(T)	TELECOMMUNICATIONS MANHOLE
	UTILITY PEDESTAL
	UTILITY POLE
	UTILITY POLE GUY ANCHOR
—OHU—	OVERHEAD UTILITIES LINE
—T—	TELECOMMUNICATIONS LINE
—P—	POWER LINE
—G—	GAS LINE
	DITCH LINE
	ASPHALT
	CONCRETE
	GRAVEL
	LIMIT OF WASTE

Figure 2.

INVENTECH MARINE SOLUTIONS

RELEVANT SITE FEATURES

NO.	DATE	DESCRIPTION	BY

FOR
INVENTECH MARINE SOLUTIONS
5626 Imperial Way SW
Bremerton WA 98312

CONTACT
MICAH BOWERS
(360) 674-7019 ext 200

MAP LTD
P.O. Box 720 • 10045 Old Frontier Road N.W.
Silverdale, Washington 98383
(360) 692-5525
ENGINEERING • SURVEYING
PLANNING

CALCULATED	DESIGN	DRAWN	CHECKED	DATE	SCALE	JOB NO.	SHEET
		QJD		8-24-21	1" = 50'	6823	3 of 19

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APPENDIX A

2022 Soil Boring Logs

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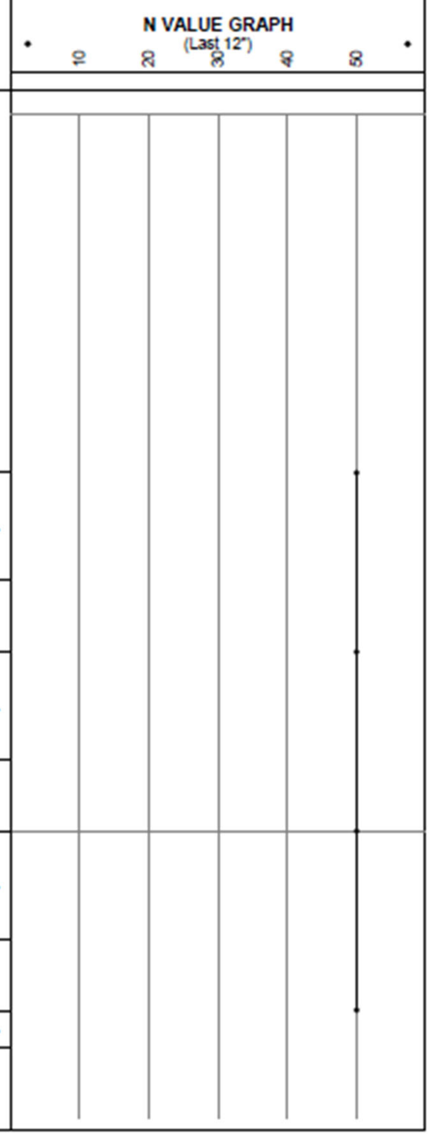
Krazan & Associates, Inc.

LOG OF BORING No. B-1

Date Drilled: 06/28/2022	**Project: Port of Bremerton Building Pad**	**Notes:**
Location: Bremerton, WA	**Ground Elevation: ~487 ft**	**Logged By: SEW**
Hammer Type: Manual ☑ Automatic ☐ Other ☐		
Water Level: Not encountered	**Drilling Method: HSA**	

Depth (ft)	MATERIAL DESCRIPTION	Sample No. /Type	1st 6"	2nd 6"	3rd 6"	N Value
	Ground Surface					
0	Organic top soil with weeds at surface					
1	Gray, silty sand with coarse gravel (moist, dense to very dense)					
4	Gray, silty sand with gravel and occational reddish tan, fine to medium sand lenses (moist, very dense)					
5–6.5		S-1	21	32	33	50+
7.5–9	-Iron-oxide staining	S-2	18	50+	50+	50+
10–11.5		S-3	24	20	40	50+
12.5–13		S-4	50+			50+
13	End of Exploratory Boring					



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings-	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	D C - Driving Casing	

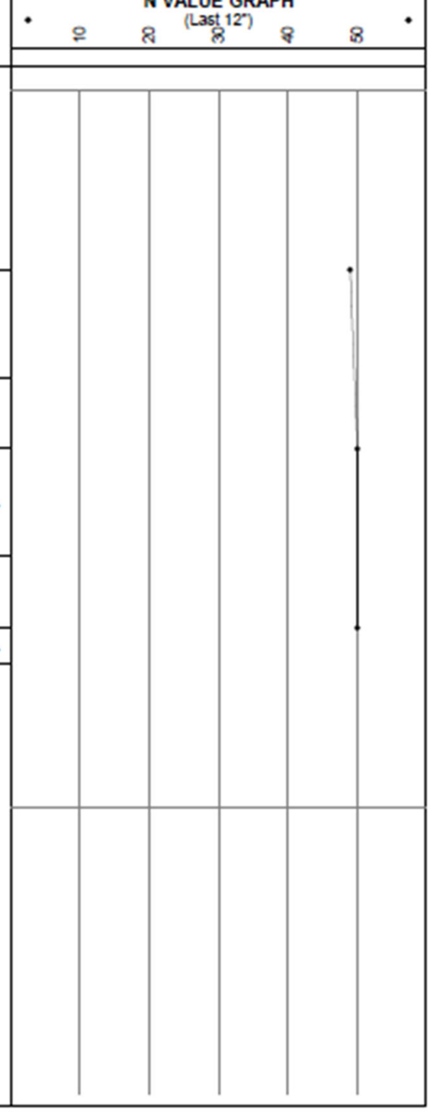
Krazan & Associates, Inc.

LOG OF BORING No. B-2

Date Drilled: 06-28-2022	Project: 104-22030 Port of Bremerton Building Pad		Notes:
Location: Bremerton, WA	Ground Elevation: ~486 ft	Logged By: ag	
Hammer Type: Manual ☑ Automatic ☐ Other ☐			
Water Level: Not encountered	Drilling Method: HSA		

Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample No. /Type	1st 6"	2nd 6"	3rd 6"	N Value
	Ground Surface						
0	Organic topsoil with weeds at surface (moist, loose)						
0.5–5	Gray and reddish tan silty sand with trace gravels (moist, medium dense to dense)		S-1	20	20	29	49
5–6.5	Gray sandy silt with trace gravels (moist, very dense)		S-2	46	50		50+
6.5–8	Dark brown, sandy silt with trace gravels (moist, very dense)		S-3	50			50+
8	End of Exploratory Boring						

N VALUE GRAPH (Last 12")



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings-	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	D C - Driving Casing	