Former Jorgensen Forge Property
Interim Action Work Plan

Public Review Draft

8531 E. Marginal Way S.
Tukwila, WA 98108

Prepared for:
Washington State Department of Ecology
In accordance with WAC 173-340

On behalf of:
Star Forge, LLC

Prepared by:
DH Environmental, Inc.

11 February 2022

Former Jorgensen Forge Property
Interim Action Work Plan

Public Review Draft

8531 E. Marginal Way S.
Tukwila, WA 98108

Prepared for:
Washington State Department of Ecology
In accordance with WAC 173-340

On behalf of:
Star Forge, LLC
8531 E Marginal Way S
Tukwila, WA 98108

Prepared by:
DH Environmental, Inc.
1011 SW Klickitat Way, Suite 107
Seattle, WA 98134

David J. Hill, PE, CHMM, CPEA
Principal Engineer

Nathan Moxley, LG, LHG
Principal Hydrogeologist

Table of Contents

List of Figures

List of Tables

Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CAA	Central Accumulation Area
DH Environmental	DH Environmental, Inc.
DWMU	Dangerous Waste Management Unit
Ecology	Washington State Department of Ecology
EMJ	Earle M. Jorgenson Co.
EPA	United States Environmental Protection Agency
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HVOC	Halogenated Volatile Organic Compounds
IACR	Interim Action Completion Report
ICC	International Code Council
ISGP	Industrial Stormwater General Permit
JFC	Jorgensen Forge Corporation
LDW	Lower Duwamish Waterway
MTCA	Washington State Model Toxics Control Act
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
Property	Former Jorgensen Forge Property, 8531 E. Marginal Way S., Tukwila, WA
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SEPA	State Environmental Policy Act
SF	Square Foot
TCLP	Toxicity Characteristic Leaching Procedure
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
WAC	Washington Administrative Code

1 Introduction

DH Environmental, Inc. (DH Environmental) has prepared this Interim Action Work Plan (IAWP) on behalf of Star Forge, LLC (Star Forge), the current owner of the former Jorgensen Forge Facility located at 8531 East Marginal Way South, in Tukwila, Washington (herein referred to as the Property) (Figure 1). This IAWP has been prepared in accordance with the Agreed Order (Star Forge AO) to which this IAWP is attached, entered into by Star Forge and the Washington State Department of Ecology (Ecology), pursuant to the Washington State Model Toxics Control Act (MTCA) and Cleanup Regulation established in Chapter 173-340 of the Washington Administrative Code (WAC). Specifically, Ecology has determined in Section VI.E of the Star Forge AO that an Interim Action is warranted under WAC 173-340-430.

Ecology entered into an Agreed Order in 2018 with a prior owner of the Property, Earle M. Jorgenson Co. (EMJ AO) to investigate and remediate contaminated soils and groundwater at the Property and any locations from the property where hazardous substances have come to be located (the Site). Star Forge bought the property out of bankruptcy in November 2016. The bankruptcy order assigned the overall investigation and remediation of contamination stemming from historic uses of the Property to EMJ. At this time, EMJ is conducting a Remedial Investigation (RI) of the Site. The RI is expected to be completed in 2022.

This Interim Action is planned to be conducted in tandem with demolition of the vacant structures at the Property. All geologic and hydrogeologic work shall be under the supervision and direction of a geologist or hydrogeologist licensed by the State of Washington or under the direct supervision of an engineer registered by the State of Washington, except as otherwise provided for by RCW 18.43 and 18.220. Additionally, all construction work shall be under the direct supervision of a professional engineer or a qualified technician under the direct supervision of a professional engineer.

1.1 Interim Action Scope and Objectives

The purpose of this IAWP is to implement the interim action at the Property. As required by Section VII.A of the Star Forge AO, the interim action includes three specific actions:

1) Underground Storage Tank System Permanent Closure by Removal and Site Assessment Sampling:

   The Property has two Underground Storage Tank (UST) tank-beds, located in two separate concrete structures (North Tank Farm and South Tank Farm), with a total of 18 remaining UST systems as defined in WAC 173-360A-0150(77). The North Tank Farm includes 10 UST systems designated as UST-26 through UST-35 and the South Tank Farm includes 8 UST systems designated as UST-15 through UST-22. The UST locations are shown on Figure 3. The liquid contents of the USTs have been removed, and the UST systems are licensed with Ecology and covered under appropriate financial assurance mechanisms. Sand that has been designated as non-hazardous is present in UST-26, UST-28, and UST-31. The UST systems, including the associated piping, will be permanently closed through decommissioning by removal, per WAC 173-360A. Upon completion of decommissioning and site assessment sampling, a Permanent Closure Report will be prepared and submitted to Ecology to include all necessary closure documentation for the UST systems per WAC 173-360A. The Permanent Closure Report will also be an attachment to the Interim Action Completion Report (IACR) and summarized within the IACR.

2) Clean Closure of Dangerous Waste Management Units:

DH Environmental prepared and submitted a Dangerous Waste Clean Closure Report to Ecology for the purpose of documenting the Clean Closure of Dangerous Waste Management Units (DWMUs) at the Property (DH Environmental, 2020a; 2020b, and 2020c). The Clean Closure Report documented removal of Dangerous Waste from the Property and provided updated records of Dangerous Waste Designations of debris, slag, and the concrete and asphalt slabs in each DWMU. Following demolition of the buildings at each DWMU on the Property, the underlying concrete and asphalt slabs will be removed, and the underlying soil sampled to confirm that clean closure requirements have been met. If concentrations of contaminants identified in Table 1 exceed the applicable standards, underlying soil will be removed and disposed of off-site, and additional samples will be collected. The approximate location of the DWMUs is shown on Figure 2.

3) Limited Exposed Soil Removal:

Certain areas within the main buildings have exposed soil at the surface that is not known to be underlain by pavement. Star Forge believes that this material is "track-in" from the former forging operations at the Property, or imported aggregate for base course, and/or paver base for equipment pads, walkways, or other in-plant facilities. Exposed soil, along with area-wide accumulated dust, has been designated as Non-Dangerous waste (DH Environmental, 2020a). Exposed soil and dust are indistinguishable at the ground surface where pavement is not present or unknown to be present. During demolition and site stabilization, exposed soil may need to be removed to facilitate surface preparation for the application of asphalt pavement. The exposed areas were mapped by Sound Earth Strategies in 2020, and represent approximately 14,000 square feet of unpaved surfaces within the main building. Any soil removed in support of pavement of the Site is expected to be limited in volume (approximately 100 cubic yards) and will be disposed of off-site. Areas identified for removal will be mapped and provided to Ecology for concurrence prior to the actual soil removal being performed. Remaining areas of exposed soil shall be protected according to the February 2021 Demolition Plan (DH Environmental, Inc. and Construction Group International, 2021) and only covered over by clean, imported soils followed by pavement. Where exposed soil is removed, confirmatory soil samples will be collected prior to placement of sub-grade materials and/or pavement and analyzed per the SAP. This IAWP does not address area-wide dust on building surfaces or on pavement. Dust on those surfaces is addressed in the February 2021 Demolition Plan.

The approximate location of each of the three interim action areas is shown on Figure 2.

Consistent with Section VI.E of the Start Forge AO and WAC 173-340-430(1), the interim actions described in this IAWP have been determined by Ecology to be technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance and that corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed. Completion of these interim actions will generate sampling data and other information that can be used during the remedial investigation/feasibility study for the Site (being conducted by EMJ pursuant the EMJ AO) and the subsequent design of a cleanup action plan. Finally, the interim actions described in this IAWP will:

- Achieve cleanup standards for the DWMUs consistent with WAC 173-340-430(2)(a); and
- Not foreclose reasonable alternatives for future cleanup action as required by WAC 173-340-430(3)(b).

This IAWP and the attached SAP / QAPP define and limit the scope of the interims actions that will be conducted pursuant to the IAWP. All data and disposal documentation generated during the implementation of the IAWP will provided to both Ecology and EMJ who will utilize this information as appropriate as part of the ongoing RI and subsequent development of a final cleanup action for the Site.

1.2 Organization

- Section 1, Introduction, presents an overview of the Property, and the objectives and organization of the IAWP.

- Section 2, Property Description, describes existing conditions and data associated with the UST Systems, DWMUs, and the exposed soil.

- Section 3, UST System Permanent Closure, describes decommissioning activities to be followed to safely and permanently close the UST systems on the property and perform a UST Site Assessment.

- Section 4, Dangerous Waste Management Unit Closure, describes the steps that will be taken to close each of the DWMUs, including sampling soil underlying each of the concrete and asphalt pads.

- Section 5, Exposed Soil Removal, describes how above-grade exposed soil inside of the main buildings will be removed, if necessary, to facilitate asphalt pavement.

- Section 6, Interim Action Documentation, presents a description of documents that accompany this IAWP, and how reporting on interim action activities, including the UST Site Assessment Report and Interim Action Completion Report (IACR), will be submitted.

- Section 7, References, lists the documents cited in this IAWP.

A Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP) and site-specific Health and Safety Plan (HASP) are included in Appendix A and B, respectively. The SAP/QAPP details the sample collection and quality control requirements for the UST Site Assessment sampling, DWMU sampling, and characterization sampling beneath any soil removed in the main buildings, if deemed necessary.

The HASP describes the required certifications for field personnel, including Hazardous Waste Operations and Emergency Response (HAZWOPER) and first aid and CPR training, and the steps to safely conduct all portions of the work. The HASP was prepared consistent with the requirements of the Washington State Division of Occupational Safety and Health Hazardous Waste Operation Regulations (WAC 296-843). The HASP includes a description of the project team, the scope of work, site control, site hazard information, site hazard control, and emergency response. Information about the nearest hospital, including a map, is also provided.

DH Environmental also has a COVID-19 policy and supplement to the HASP which will be reviewed and followed by all personnel and subcontractors. All DH Environmental employees and contractors working on the site will be required to review the HASP and sign off upon their review, including the screening requirements related to the COVID-19 supplement. Daily safety briefings will be conducted prior to beginning work each day, and upon arrival of new personnel to the Site.

The Department of Archaeology and Historic Preservation (DAHP) database at https://wisaard.dahp.wa.gov/Map indicates that the site is in an area designated as "Survey Highly Advised: Very High Risk". Attachment 3 of the 2021 Demolition Plan (DH Environmental, 2021) contains a Cultural Resources Inadvertent Discovery Plan (IDP) prepared in 2019. Star Forge will solicit IDP review and concurrence from DAHP and potentially affected tribes (including, but not limited to, the Duwamish, Muckleshoot, and Suquamish Tribes) and will provide Ecology with a copy of the final IDP (and any DAHP or tribal correspondence related to concurrence) prior to initiating fieldwork. Star Forge will follow the procedures outlined in the final IDP during ground disturbing activities at the Site.

1.3 Applicable Permits

Work described in this IAWP will be conducted under, or in conjunction with, the following applicable permits:

- City of Tukwila Fire Permit, Tank Removal or Abandonment
- City of Tukwila Fire Permit, Hot Works (welding, cutting, grinding, etc.)
- City of Tukwila Demolition Permit (Plan Check/Permit No. D19-0311 [in process])
- Washington State Industrial Stormwater General Permit (ISGP) No. WAR003231

In addition, the following Applicable or Relevant and Appropriate Requirements (ARARs) also apply:

- Washington State MTCA; WAC 174-340
- Washington State UST Regulations; WAC 173-360A
- Washington State Dangerous Waste Regulations; WAC 173-303
- Washington State Waste Discharge General Permit Program; WAC 173-226
- Washington State Water Pollution Control; Chapter 90.48 Revised Code of Washington (RCW)
- Washington State Administrative Order Docket No. 18074
- Washington State Administrative Order Docket No. 18160
- Washington State Environmental Policy Act (SEPA); Chapter 43.21C RCW Washington State Hazardous Waste Operations; WAC 296-843
- Occupational Safety and Health Standards; 29 CFR 1910.120
- Pipeline and Hazardous Materials Safety Administration, Department of Transportation Hazardous Materials Regulations; 49 CFR Parts 100-185
- Washington State Archaeological Sites and Resources Act; RCW 27.53
- Toxic Substance Control Act, 15 U.S.C. §§ 2601-2629, 40 CFR Part 761

2 Property Description

The former Jorgensen Forge Property consists of approximately 21.6 acres located in an industrial area along the east bank of the Lower Duwamish Waterway (LDW). The Property is bordered to the north by Boeing Plant 2, and to the south by the Boeing Isaacson property. It is bordered to the west by the LDW, and to the east by East Marginal Way South and the King County Regional Airport.

The Property was used from 1942-1965 for fabrication of structural steel, tractor, and road equipment, including forging and heat-treating operations conducted for the U.S. Navy. It was owned and operated by EMJ from 1965 until 1992, when it was purchased by Jorgensen Forge Corporation (JFC). JFC manufactured specialized large-scale metal parts for the aircraft and marine industries, including open die steel forgings and rolled aluminum rings. They also processed nickel, titanium, and specialized alloys.

Industrial use of the Property contaminated soil and groundwater beneath the Property. Contaminated groundwater may have also migrated onto the Property from off-site sources.

Contaminants of concern at the Property include, but are not limited to:

- Polychlorinated biphenyls (PCBs)
- Volatile organic compounds (VOCs)
- Halogenated volatile organic compounds (HVOCs)
- Metals (including, but not limited to, arsenic, cadmium, chromium, lead, nickel, copper, and zinc)

2.1 Underground Storage Tank Systems

The Property has 18 remaining UST systems (as defined per WAC 173-360A-0150(77)) located in two separate tank-beds within concrete structures. The tanks have been emptied of liquids, licensed with Ecology, and are currently covered under financial assurance mechanisms. These UST systems are associated with Ecology UST identification number 6163 and are grouped into a North Tank Farm area (UST-26 through -35) and a South Tank Farm area (UST-15 through -22), as shown in Figure 3.

Each UST tank-bed includes tanks that are buried below grade but are located within walled structures that extend above grade, so that the base of the concrete structures is approximately 5 feet below the average grade of the Site. The North Tank Farm Area was constructed in the basement of a former building which was previously demolished, after which the basement structure was converted for use as a tank farm. Similarly, the South Tank Farm is located in the basement structure of a former building once used for oil storage. Once the former building was demolished, the UST tank-bed remained and the voids around the tanks were filled with slag that was available from forging operations on-site.

DH Environmental collected samples from the tank contents, including liquids and solids as noted below in Table 1, in both the north and south tank farm areas on April 21 and 22, 2020 for waste designation purposes. A summary of the designation status for the contents of each tank is included in Table 1. Tanks UST-15 through UST-20, UST-22, and UST-35 were empty at the time of sampling. The contents of UST-26 through UST-34 designated as a non-hazardous waste. UST-21 contained red dyed diesel fuel which was removed and recycled under a fuel exemption. USTs -26, -28, and -31 appear to have been previously filled with sand, which was sampled and designated as non-hazardous. The fill-slag surrounding the tanks in both

areas was also sampled in April 2020 and was designated as non-hazardous waste (DH Environmental, 2020a; DH Environmental, 2020b; DH Environmental 2020c).

On May 12, 2020, DH Environmental removed oily water from UST-27, UST-29, UST-30, and UST-32 through UST-34 via a vacuum truck. The liquids were transported to LaFarge Cement in Seattle, Washington for treatment and disposal. On May 15, 2020, Clean Harbors removed the diesel fuel from UST-21 for disposal at Emerald Services in Seattle, Washington. The sand in UST-26, UST-28, and UST-31 remains in place.

Further details regarding the activities required to permanently close the UST systems and conduct the required site assessment are presented in Section 3.

Table 1
UST Contents and Waste Designation Summary
Former Jorgenson Forge Property
Tukwila, Washington

Tank ID	Contents	Designation Status	Comments
UST-15	empty	NA	
UST-16	empty	NA	
UST-17	empty	NA	
UST-18	empty	NA	
UST-19	empty	NA	
UST-20	empty	NA	
UST-21	empty	NA	Fuel was removed for recylcling on May 15th, 2020
UST-22	empty	NA	
UST-26	sand	non-hazardous	
UST-27	empty	NA	Oil-water mixture was removed on May 12th, 2020
UST-28	sand	non-hazardous	
UST-29	empty	NA	Oil-water mixture was removed on May 12th, 2020
UST-30	empty	NA	Oil-water mixture was removed on May 12th, 2020
UST-31	sand	non-hazardous	
UST-32	empty	NA	Oil-water mixture was removed on May 12th, 2020
UST-33	empty	NA	Oil-water mixture was removed on May 12th, 2020
UST-34	empty	NA	Oil-water mixture was removed on May 12th, 2020
UST-35	empty	NA	
N. Tanks Slag		non-hazardous	Slag material overlying the USTs in the N. Tank Farm
S. Tanks Slag		non-hazardous	Slag material overlying the USTs in the S. Tank Farm

Notes:
UST sampling conducted April 21 & 22, 2020
See waste designation packages for analytical details and laboratory analytical reports

NA = "not applicable" because the tank is empty and contains no material to sample and designate.

2.2 Dangerous Waste Management Units

There are three DWMUs on the property, summarized below in Section 2.2.1, that have been identified for closure in accordance with WAC 173-303-200(3)(h). The location of each DWMU is shown on Figure 2. DH Environmental prepared and submitted a Dangerous Waste Clean Closure Report to Ecology in July 2020, providing updated records regarding Dangerous Waste Designations for the concrete and asphalt slabs associated with each DWMU (DH Environmental, 2020a). Ecology provided a letter clarifying Ecology's expectations for completing Clean Closure requirements in the DWMUs (Ecology, 2020), and this

IAWP meets those requirements. Section 2.2.1, below, summarizes each of the DWMUs. Further details about the DWMU slab removal and disposal, and investigation of the underlying soil are presented in Section 4.

2.2.1 Summary of DWMUs

Central Accumulation Area

The Central Accumulation Area (CAA) is one of two former 90/180-day Dangerous Waste accumulation areas on the property. The CAA is an approximately 1,000 square foot (SF) structure with aluminum siding, a concrete slab and an approximately 1-foot tall concrete wall that served as secondary containment. The CAA stored Dangerous Waste in drums and small containers generated from facility maintenance and operations. Based on historical documents and interviews with facility staff, the structure at one time also contained a 300-gallon above ground storage tank of diesel fuel. This structure was also known as the "diesel house".

Tote Storage Central Accumulation Area

The Tote Storage Central Accumulation Area (Tote Storage Area) is the other former 90/180-day Dangerous Waste accumulation area. The Tote Storage Area is located north of the west end of the main building, between the main building and the baghouse. The Tote Storage Area is an approximately 800 SF structure with wooden siding and an asphalt floor. The Tote Storage Area stored Dangerous Waste and used oil totes and drums generated from facility maintenance and operations. Based on historical documents and interviews with facility staff, the structure at one time was used to clean and etch product samples prior to laboratory testing. This structure was also known as the "Acid House" or "Etch House" before it was used as a 90/180-day Dangerous Waste accumulation area in the 1990s.

Baghouse and Baghouse Processing Area

The baghouse and baghouse processing area are located north of the west end of the main building and north of the tote storage building. The baghouse building is approximately 4,000 SF, and housed equipment to capture and contain dust from the baghouse tunnel that conveyed air and dust from the former melt shop to the baghouse. The baghouse dust was designated as a K061 waste stream as it meets the definition of K061 Specific Source Waste from iron and steel sources in accordance with WAC 173-303-9904. The baghouse processing area and concrete slab are divided by a wall thereby creating two separate areas denoted as 'Baghouse North' and 'Baghouse South' for the purposes of cleaning and sampling. Only the Baghouse North slab exceeded Clean Closure cleanup levels.

2.2.2 Summary of DWMUs Closure Status

Central Accumulation Area

The Central Accumulation Area concrete slab has been designated as Non-Hazardous Debris. The concrete slab exceeds MTCA Method A soil cleanup levels for diesel range organics and Star Forge will remove and dispose of the slab as solid waste.

Tote Storage Area

The Tote Storage Area asphalt slab has been designated as Non-Hazardous Debris. The asphalt slab exceeds MTCA Method A cleanup levels for diesel range organics and PCBs. Star Forge will remove and dispose of the slab as solid waste.

Baghouse

The concrete slab in the southern portion of the Baghouse (Baghouse South) meets MTCA Method A cleanup levels and is designated as non-hazardous debris.

The concrete slab in the northern portion of the Baghouse (Baghouse North) exceeds MTCA Method A cleanup levels for diesel range hydrocarbons and hexavalent chromium and has been designated as Hazardous Debris for K061 Listing. This slab will be removed and disposed of off-site as K061 Hazardous Waste after demolition of the Baghouse building. The concrete slab beneath the southern part of the Baghouse will not be removed, as it already meets applicable cleanup levels. Any soils contaminated with federally listed K061 hazardous waste will be removed and disposed of at a permitted treatment, storage, and disposal facility. Alternatively, Star Forge may submit a request to Ecology for a contained-in determination to determine whether contaminated soil no longer contains a listed dangerous waste or is below risk-based levels.

Table 2, below, summarizes the current status of the closure of each DWMU. The locations of the DWMUs are shown in Figure 2.

Table 2
Dangerous Waste Management Units Current Status

DWMU Name	Media Designation	Performance Standard	Status of Numeric Clean Closure Levels
Central Accumulation Area	The DWMU concrete slab and superstructure are Non-Hazardous Debris.	High Pressure Steam and Water Sprays	Exceeds MTCA Method A, Unrestricted, for Diesel Range Organics
Tote Storage Area	The DWMU asphalt slab and superstructure are Non-Hazardous Debris.	High Pressure Steam and Water Sprays	Exceeds MTCA Method A, Unrestricted, for Diesel Range Organics and PCBs
Baghouse	▪ The concrete slab in the northern portion of the Baghouse (Baghouse North) is K061 Hazardous Debris. ▪ The concrete slab in the southern portion of the Baghouse (Baghouse South) is non-hazardous debris. ▪ The DWMU superstructure and baghouse tunnel is Non-Hazardous Debris.	High Pressure Steam and Water Sprays, Physical Abrasion and Scrubbing	▪ The concrete slab in the northern portion of the Baghouse (Baghouse North) exceeds MTCA Method A, Unrestricted, for Diesel Range Organics and Hexavalent Chromium ▪ The concrete slab in the southern portion of the Baghouse (Baghouse South) meets MTCA Method A cleanup levels.

2.3 Exposed Soil Areas

The interior of the main structure comprising the former melt shop, forge shop, and the heat treat area is shown in Figure 2. Star Forge conducted extensive removal of dust, fine particles, and exposed soil (henceforth "area wide dust") from the floor, trusses, and other structural surfaces between 2019 and early 2020. The area wide dust has been referred to as process waste in previous documents and correspondence. This material is a mixture of dust, fine particulates, soil "track-in" and exposed soil that accumulated throughout the Property over many years of operation.

Although most of the area wide dust has been removed from inside the buildings, some of this material remains on the floor and has possibly comingled with areas of exposed soil. Therefore, an area wide statistical analysis of the dust, fine particles, and exposed soil was conducted to designate the remaining material so that it can be properly managed during the forthcoming demolition of the structures.

Based on the statistical analysis of total metals, toxicity characteristic leaching procedure (TCLP) metals, PCBs, VOCs, and the results of fish bioassay tests, the area wide dust has been designated as Non-Dangerous Solid Waste. This designation is meant to apply to dust, fine particles, and above ground exposed soil remaining in the forge Shop, melt shop, and heat treat shop areas in the main Property structure. This designation is not meant to apply to any subsurface environmental media. During the course of demolition and site stabilization, this media may need to be removed and disposed of off-site for stormwater pollutant source control, dust control, and/or surface preparation for asphalt application.

Further details regarding the sampling requirements for areas below where exposed soil is removed, are presented in Section 5. This IAWP does not address the removal of area-wide dust, except where limited amounts may be in contact with exposed soil that is not underlain by pavement.

2.4 Waste Designation Data

Waste designations have been developed for the UST fill-slag in the UST North and South Tank Farms, the concrete slabs underlying the Dangerous Waste Management Units, and the area wide dust. Documentation of these waste designations are included in the initial Dangerous Waste Clean Closure Report and subsequent communications (DH Environmental, 2020a; 2020b; and 2020c).

3 UST System Permanent Closure

This section describes the activities to be followed to safely decommission the 18 UST systems on the property. Following decommissioning, a Site Assessment will be conducted in accordance with WAC 173-360A-0730. The methods described in this IAWP are to be used to guide field personnel involved in the UST system closure and related site assessment sampling activities. Site assessment procedures are summarized in Section 3.3. A detailed SAP is included in Appendix A.

Star Forge will complete permanent closure the 18 UST systems at the Property. Excavation and disposal of solid waste is expected to include fill materials surrounding the tanks, sand currently inside UST-26, -28, and -31, the concrete walls surrounding and beneath each tank group, tanks, piping, soil removed to expose and remove piping, and other media required to remove the tanks and ancillary piping (e.g., rinsate).

Upon completion of UST System permanent closure process (utilizing decommissioning by removal) and site assessment activities, a UST Permanent Closure Report (including all related documentation and photos of the closure process) will be submitted to Ecology within 30-days of data validation completion, as required by WAC 173-360A. This report will be an attachment to the IACR, and it and the IACR will be shared with Ecology and EMJ, so that the results of the site assessment can be considered in conjunction with the Remedial Investigation EMJ is conducting under their AO with Ecology.

3.1 Preliminary Activities

The preliminary activities listed below, as appropriate, may also apply to the DWMU Closure and exposed soil removal tasks.

3.1.1 Ecology 30-day Notice

Prior to conducting the UST permanent closure, Ecology will be notified as required by WAC 173-360A-0810(1). A copy of the 30-day notice form is included in Appendix C.

3.1.2 City of Tukwila Fire Department Permits

The City of Tukwila Fire Department requires a permit for the permanent closure of USTs. The permanent closure permit application will be submitted separately, and a copy will be provided to Ecology upon approval from the City of Tukwila and before permanent closure is scheduled. In addition, the fire department also requires a hot work permit for potential hot work activities such as cutting or grinding the tanks or piping. Copies of both permits will be posted at the Facility prior to starting tank permanent closure activities and will be available until permanent closure activities are completed.

3.1.3 Site Specific Health and Safety Plan

A site-specific HASP covering activities described in this IAWP, including the tank permanent closure activities, is included in Appendix B. The HASP has been developed in accordance with all applicable Federal, State, and local regulations. The plan describes the required certifications for field personnel, including HAZWOPER and first aid and CPR training, and the steps to safely conduct all portions of the work. DH Environmental also has a COVID-19 policy and supplement to the HASP which will be reviewed and followed by all personnel and subcontractors. All DH Environmental employees and subcontractors will be required to review the HASP and sign off upon their review, including the screening requirements related

to the COVID-19 supplement. Daily safety briefings will be conducted prior to beginning work each day, and upon arrival of new personnel to the Site.

3.1.4 Underground Utility Locate Notification

Buried underground utilities pose a unique risk for subsurface excavation and sampling activities. A utility locate request will be submitted by notifying the Washington State Utility Notification Center (811) at least 10 business days prior to beginning field activities. A private utility locate contractor will also be subcontracted to locate the piping from each UST system so that the piping can be removed as part of the permanent closure activities.

3.2 UST System Decommissioning

All decommissioning activities will be conducted under the supervision of an International Code Council (ICC) certified UST Decommissioner. Prior to removing the tanks, the piping runs for each tank will be emptied of all materials in accordance with WAC 173-360A-0810(2)(a)(ii), by carefully exposing the piping run and removing any liquids, if present, from the end of the pipes. At this time the location of the piping runs between the USTs and building, if present, are unknown. Before the piping can be exposed, emptied, and removed, the piping will be located in the field using an underground utility locate subcontractor. The piping may be located using a variety of methods, as necessary, including electromagnetic methods, ground penetrating radar (GPR), and/or direct observation during tank removal activities. Once the piping has been located, if present, it will be exposed along its entire length, emptied of liquids as described above, and removed from the ground.

Once all liquids have been removed from the piping, all USTs except for UST-26, -28, and -31 will be cleaned in accordance with WAC 173-360A-0810(2)(a)(i). These tanks have already been emptied of free liquids, however, there is a potential for residual sludge or rainwater accumulation in the tanks. Therefore, the tanks may require additional cleaning before they can be accepted at an off-site recycling facility. If necessary, properly trained confined space entry crews will enter the tanks and clean the interior surfaces using a pressure washer and potable water. Rinsate water will be removed from each tank using a vacuum truck, and photographs of the interior of each tank will be taken prior to exiting the tank.

Prior to removal from the ground, each tank will be certified inert according to the requirements of the Tukwila Fire Department using a subcontracted, certified Marine Chemist. Once each tank is certified inert, the piping will be disconnected from each tank, and the tank removed from the ground in accordance with WAC 173-360A, using an excavator or crane capable of safely lifting the tank. The tanks will be temporarily staged on plastic, the exterior of the tank swept clean, and loaded to a truck for transport to a recycling facility.

UST-26, -28, and -31 were previously filled with sand. In order to clean the tanks, the top of each tank will be removed along its length using shears and/or cutting torches. The sand, which has previously been designated as non-hazardous, will then be removed from each tank using an excavator. Once all accessible sand has been removed, the inside of the tanks will be cleaned as described above. After the tanks have been cleaned, they will be removed from the ground in accordance with WAC 173-360A.

Once the tanks have been removed from the ground, the concrete walls and floor, if present, that comprise each vault structure will be removed. The concrete vault structures and any concrete removed to expose the piping will be broken in place using an excavator and temporarily stockpiled on plastic sheeting utilizing

temporary berms. The stockpiles will be covered with plastic sheeting until a waste designation and disposal determination can be made, as described in Sections 3.2.1 and 3.2.2.

Soil samples will then be collected from within the tank excavations and along the full length of the piping runs as part of the site assessment activities, as summarized below in Section 3.3, and as detailed in Appendix A.

Best management practices will be implemented to prevent stormwater runoff from entering the excavation areas before they can be backfilled. Any stormwater that collects in the excavations during UST System removal activities will be collected, characterized in accordance with WAC 173-303, and properly disposed of. All disposal documentation, including analytical data, will be submitted in the IACR.

3.2.1 Soil/Slag Management

Although the fill-slag surrounding the USTs and the sand inside tanks UST-26, -28, and -31 have been designated as non-hazardous waste, additional soil may be encountered during the tank and ancillary piping removal process that has not yet been designated. Waste designations for all material that has not yet been designated will be made in accordance with the waste designation requirements of WAC 173-303-070, and pursuant to the exclusion in WAC 173-303-071(3)(t) as applicable. This may include, but is not limited to, soil/slag not previously designated, and/or concrete vaults or paving.

Materials that must be removed during the tank decommissioning process that have been designated in advance of removal will be direct loaded into trucks for off-site disposal to avoid double handling. Where infeasible to direct load the soil for off-site disposal, the soil will be temporarily stockpiled on plastic sheeting utilizing temporary berms, and covered with plastic sheeting until a waste designation and disposal determination can be made. No excavated soil or concrete will be reused on site.

3.2.2 Stockpiled Material Sampling

All stockpiled material for which a waste disposal designation has not been made will be sampled for waste designation purposes in accordance with WAC 173-303. The number of samples will be based on the requirements listed in Table 0730-1 of WAC 173-360A-0730. The analysis of samples from stockpiled material will be conducted for waste designation, profiling, and disposal purposes only, and analytical results will be provided in the IACR. Additional soil sampling will be conducted as part of the Site Assessment, as described in Section 3.3 and detailed in the SAP/QAPP (Appendix A).

3.2.3 Waste Disposal

Wastes requiring disposal are expected to include tank rinsate water, soil and slag fill material surrounding the tanks, sand that was previously placed in UST-26, -28, and -31, the steel tanks and piping, the concrete walls and base comprising the structure surrounding the USTs, and the soil and concrete overlying the piping runs. The rinsate solution from the tanks and piping will be disposed of under the existing waste profile for the tank liquids, which was based on the waste designation by DH Environmental dated May 11, 2020. All liquids in the tanks were designated as a non-hazardous waste. Soil to be disposed of off-site will be disposed of at a properly permitted landfill or solid waste handling facility. Copies of all disposal records will be retained and submitted as part of the IACR. Waste designation records will be retained in the project files of DH Environmental for a period of at least 5-years.

3.2.4 Schedule

The UST System decommissioning work will start a minimum of 30-days, but no more than 90-days, after submittal of the 30-day notice to Ecology. Additional permits from the City of Tukwila Fire Department need to be obtained prior to scheduling the permanent closure work. The start date will be confirmed with Ecology at least three business days prior to starting permanent closure activities, in accordance with WAC 173-360A-0810.

The specific schedule is dependent on the approval of the AO and securing of permits from the City of Tukwila. Tank removal work is expected to occur as soon as possible once the AO is approved and once the City of Tukwila approves the tank removal permit and hot work permit.

The City of Tukwila has indicated the tank removal work is an integral component of the building demolition permit. In this case, tank removal work would not be allowed to commence until the demolition permit is approved. Star Forge will coordinate with Ecology and the City of Tukwila on an ongoing basis regarding the overall schedule as the approval process for the IAWP, AO, and demolition-related permits proceeds.

3.3 UST System Site Assessment Sampling

Following removal of the UST System components described above, a Site Assessment will be performed in accordance with the requirements of WAC 173-360A-0730. The Site Assessment sampling activities are described in further detail in the SAP/QAPP in Appendix A.

Site assessment sampling is expected to be limited to soil sampling only. Groundwater at the facility in three nearby monitoring wells, MW-11, MW-14, and MW-15, is approximately 11- to 12-feet below ground surface (bgs) (Shannon & Wilson, 2020). Both the northern and southern UST systems are located within concrete vaults that are partially above ground, and as-built drawings indicate the bottom of the tanks are approximately 5-feet bgs. Therefore, groundwater is expected to be approximately 6- to 7-feet below the bottom of the tanks. However, in the unlikely event groundwater is encountered in the excavation, grab samples will be collected and analyzed for waste characterization purposes as described in the SAP/QAPP in Appendix A.

The number of site assessment soil samples will be collected as specified in Table 0730-1 in WAC 173-360A-0730. For the northern group of 10 USTs, a minimum of 23 soil samples will be collected. For the southern group of 8 USTs, a minimum of 19 soil samples will be collected. One soil sample will be collected beneath each tank. Another soil sample will be collected beneath the location where the piping run enters the sidewall of the tank excavation. The remaining soil samples will be collected from the tank sidewalls on an approximately even spacing surrounding each group of USTs. As described in the SAP, soil samples will be collected from areas where field screening (headspace screening for VOCs using a photoionization detector [PID], olfactory evidence, sheen testing, or staining) exhibits the greatest potential to encounter contaminated soil. The number and location of piping samples will be determined dependent on the piping layout. A minimum of one soil sample will be collected for every 50-feet of piping located, as specified in Table 0730-1 in WAC 173-360A-0730. Soil samples beneath piping will be targeted in areas of observed contamination, if any, and at locations below fittings such as elbows, where leaks are the most likely to occur. Based on the lack of historic documentation and compliance history of the USTs, Ecology may require a limited number of additional samples be collected and analyzed beyond the minimum noted here based on field observations.

3.4 Backfill Specifications

After the UST systems, soil, slag, and associated concrete have been removed, the UST excavation will be lined with an impermeable sheet barrier and backfill will be imported and placed in the footprint of the former structure(s) to fill the excavation voids to the approximate grade surrounding the tank nests. All fill imported to the property will be in accordance with the "clean fill specifications" developed for the Demolition Work Plan (SoundEarth, 2019), included in Appendix D.

4 Dangerous Waste Management Unit Closure

Star Forge will remove and dispose of the DWMU concrete and asphalt slabs, and conduct sampling of the underlying soil to determine if excavation of any underlying soil is required to complete Clean Closure of the DWMUs in accordance with WAC 173-303-200(3)(h). Prior to demolition of the buildings, the concrete slabs for the DWMU's that require removal, including the Central Accumulation Area, the Tote Storage Area, and the Baghouse North, will be first sealed with an appropriate polyethylene coating for concrete, or asphalt in the case of the Tote Storage Area. The sealant will ensure the slabs are water resistant and can withstand physical and chemical impacts. After sealing the slabs, a removable geomembrane will be placed over the slabs to protect the concrete or asphalt from penetrations due to equipment tracks or falling debris. Tires may be added on top of the geomembrane layer to further protect the slab and geomembrane during demolition activities. The slabs require protection because the demolition of the overlying superstructures will occur prior to the removal of the underlying slabs, and the slabs may be exposed without a roof for an undetermined time depending on the sequencing and timing of the approval of this IAWP and related demolition permits. The demolition of the structures will be conducted under a demolition permit from the City of Tukwila and is not part of the Interim Action.

Star Forge's requirements under the Dangerous Waste clean closure rules are those applicable to a Large Quantity Generator. Therefore, Star Forge must meet closure performance standards in WAC 173-303-610(2) and (5) which call for the "removal or decontamination of dangerous wastes, waste residues, or equipment, bases, liners, soils or other materials containing or contaminated with dangerous wastes or waste residue". Further, environmental media must meet the numeric cleanup levels for unrestricted use established in the Model Toxics Control Act Regulation (WAC 173-340). Primarily, these will be numeric cleanup levels calculated according to MTCA Method B, although MTCA Method A may be used as appropriate (WAC 173-303-610(2)(b)(i)).

In operational terms, this means that after the buildings have been demolished, Star Forge will:

1) Remove and dispose of the DWMU slabs off-site.

2) Sample the underlying soil to determine if the soil exceeds cleanup levels for the contaminants contained in the concrete at concentrations greater than applicable cleanup levels (Table 3).

3) If necessary, excavate soil within the footprint of the DWMU to estimated depths that would result in the area meeting cleanup levels.

4) Collect new confirmation samples after excavation to target depths.

5) Once cleanup levels are confirmed, import backfill in accordance with the clean fill specifications for the site (SoundEarth, 2019), included in Appendix D.

Demonstration of cleanup levels will be achieved by dividing the area beneath each slab into quadrants and collecting a soil sample from each quadrant, similar to the previous sampling conducted of the overlying slab. Details of the DWMU sampling are described in the SAP/QAPP in Appendix A. The applicable soil cleanup levels to achieve Clean Closure for each DWMU are shown below in Table 3.

Table 3 Dangerous Waste Management Units Clean Closure Cleanup Levels		
DWMU Name	**Status of Numeric Clean Closure Levels**	**Applicable Cleanup Level (Soil)**
Central Accumulation Area	Exceeds MTCA Method A, Unrestricted, for Diesel Range Organics	Diesel Range Organics: 2,000 mg/kg
Tote Storage Area	Exceeds MTCA Method A, Unrestricted, for Diesel Range Organics and PCBs	Diesel Range Organics: 2,000 mg/kg Total PCBs: 1 mg/kg
Baghouse	Baghouse North exceeds MTCA Method A, Unrestricted, for Diesel Range Organics and Hexavalent Chromium	Diesel Range Organics: 2,000 mg/kg Hexavalent Chromium: 19 mg/kg

Any excavation and disposal of underlying environmental media conducted pursuant to this IAWP will be for the sole objective of meeting cleanup levels to achieve Dangerous Waste Clean Closure of the DWMUs. Any excavation work conducted by Star Forge, if necessary, is not expected to extend past the footprints of the DWMU's unless data indicates that contamination from the DWMU's spread beyond the footprints of each unit. If necessary, additional expanded perimeter sampling will be incrementally conducted to delineate areas where the constituents identified in Table 3 are present in underlying soil at concentrations greater than applicable cleanup levels. Any additional excavation will be conducted in consultation with Ecology.

Upon removal of the concrete and asphalt slabs at each DWMU, surficial soil will be screened in the field for potential evidence of contamination, including headspace screening for VOCs using a PID, olfactory evidence, sheen testing, or staining. If field screening indicates the underlying soil is likely to be impacted, field staff may elect to remove soil beneath each DWMU prior to sampling. The depth of soil removal will depend on the results of field screening and observations of field staff. If necessary, any removed soil will be temporarily stockpiled on plastic utilizing temporary berms, and covered with plastic until the stockpiled soil can be sampled for waste designation purposes in accordance with WAC 173-303-070.

5 Exposed Soil Removal

Certain areas within the building have exposed soil at the surface. Star Forge does not believe the exposed soil is native soil due to the thickness of the concrete foundations. Star Forge believes this exposed soil is "track-in" from years of operation and, in some cases, may be imported aggregate for base course or paver base for equipment pads, walkways or other in-plant facilities. The area-wide dust and exposed soil has been designated as Non-Dangerous Solid Waste (DH Environmental, 2020a). However, for purposes of the AO and this IAWP, this material is treated as soil where pavement is not known to be present beneath it. These areas were mapped by SoundEarth Strategies (SES) in 2020 and generally represent the areas where dust and soil may be intermingled (see Appendix E). During demolition, these exposed soil areas will be covered with geomembrane liners or heavy duty (15+ mil) tarps that will be installed in a manner to prevent stormwater from running from paved areas to exposed soil beneath the edge of the geomembranes. The liners will be monitored daily and maintained or replaced, as necessary. In addition, rubber tires may be placed on top of the liners to protect them from penetration by falling debris during building demolition.

At limited locations as shown on the SES Surface Condition figure in Appendix E, concrete or asphalt is not known to be present beneath the exposed soil/dust. In the areas shown in Appendix E, above-grade exposed soil may be present and require removal to facilitate paving. At these locations, soil characterization samples will be collected beneath any removed exposed soil. It is anticipated that limited exposed soil will require removal to facilitate paving, and is anticipated to be less than approximately 100 cubic yards, total. This is based on the surface area of exposed soil mapped by SES of approximately 14,300 square feet, and assuming minimal excavation may be required to allow for placement of sufficient subgrade material that meets compaction standards prior to the application of asphalt pavement. The frequency and location of soil sampling will depend on the volume of soil that is removed. Areas identified for removal will be mapped and provided to Ecology for concurrence prior to the actual soil removal being performed. At a minimum, one soil sample will be collected beneath each area of exposed soil removal that does not overly concrete. However, if an area greater than 1,500 square feet is graded down, one sample will be collected for every 1,500 square feet of cut area, or portion thereof. Further details on this sampling are described in the SAP included in Appendix A.

6 Interim Action Compliance Monitoring and Reporting

6.1 Monthly Status Report

In accordance with the Agreed Order, Star Forge will submit to Ecology written monthly Progress Reports that describe the actions taken during the previous month to implement the requirements of the Agreed Order. All Progress Reports will be submitted by the tenth (10th) day of the month in which they are due after the effective date of the Agreed Order. Unless otherwise specified by Ecology, Progress Reports and any other documents submitted will be sent by electronic mail to the Ecology project manager. The Progress Reports will include the following:

1. A list of on-site activities that have taken place pursuant to this Order during the previous month.

2. Detailed description of any deviations from required tasks not otherwise documented in project plans or amendment requests.

3. An update on the project schedule, including a summary of significant work expected to occur in the upcoming month.

4. A description of all laboratory data received during the previous month, if not previously submitted to Ecology, together with a detailed description of the underlying samples collected, including samples for disposal profiling.

5. A list of expected deliverables for the upcoming month.

6.2 UST Decommissioning and Site Assessment Report

Upon completion of UST System removal and site assessment activities, a UST Decommissioning and Site Assessment report (including the Site Assessment Checklist) will be submitted to Ecology within 30-days of data validation completion, as required by WAC 173-360A.

6.3 Interim Action Completion Report

Upon completion on the Interim Action activities described in this IAWP, Star Forge will prepare and submit to Ecology an IACR. The IACR will serve four functions:

1. The IACR will document actions taken to meet the requirements of the Agreed Order. All laboratory analytical data, including that conducted for Dangerous and non-Dangerous Waste disposal, and copies of waste manifests and disposal documentation will be included with the IACR.

2. The IACR will serve as supplemental documentation that Dangerous Waste Clean Closure has been achieved for the Dangerous Waste Management Units at the Property. The IACR, along with the existing Clean Closure Report (DH Environmental, 2020a) will comprise the DWMU Clean Closure Documentation for Star Forge's obligations under WAC 173-303-610. The IACR will serve to document dangerous wastes generated during the calendar year, and will be reported by March 1st of the following year, in accordance with the requirements of WAC 173-303-220.

3. The IACR will serve as supplemental documentation that UST Permanent Closure has been achieved for the UST systems at the Property. In addition to being an attachment to the IACR, a UST Decommissioning Checklist and Site Assessment report will be submitted under separate cover to Ecology within 30-days, in accordance with WAC 173-360A, and as described in Section 6.2.

4. The IACR will serve to document the results of soil sampling collected beneath areas of removed above-grade soil that do not overlie concrete surfaces. These results will inform the cleanup work being conducted by EMJ.

All data generated during the implementation of the IAWP that is representative of soil or water that remains in place at the Site will be uploaded to Ecology's Environmental Information Management database (EIM). Data representative of materials removed from the site will not be uploaded to EIM, but will be provided as a separate table in the IACR.

Depending on the timing of the UST System decommissioning, DWMU sampling, and/or removal of soil, separate reports documenting the completion of individual interim actions may be submitted under separate cover. Any reports submitted under separate cover will be included as part of the final IACR.

7 References

DH Environmental, 2020a. Dangerous Waste Clean Closure Report, Former Jorgensen Forge Site, Tukwila, Washington. July 22.

DH Environmental, 2020b. Site Clean Closure at Former Jorgensen Forge Facility, Response to 03 September 2020 Request for Information. Letter to Ms. Katy Harvey. October 5.

DH Environmental, 2020b. Site Clean Closure at Former Jorgensen Forge Facility, Response to 03 September 2020 Request for Information. Letter to Ms. Katy Harvey. October 10.

DH Environmental, Inc. and Construction Group International, 2021. Former Jorgensen Forge Property Demolition Work Plan. February 12th.

Shannon & Wilson, 2020. Remedial Investigation Work Plan, Jorgensen Forge Corporation Property, Tukwila, Washington. April 15.

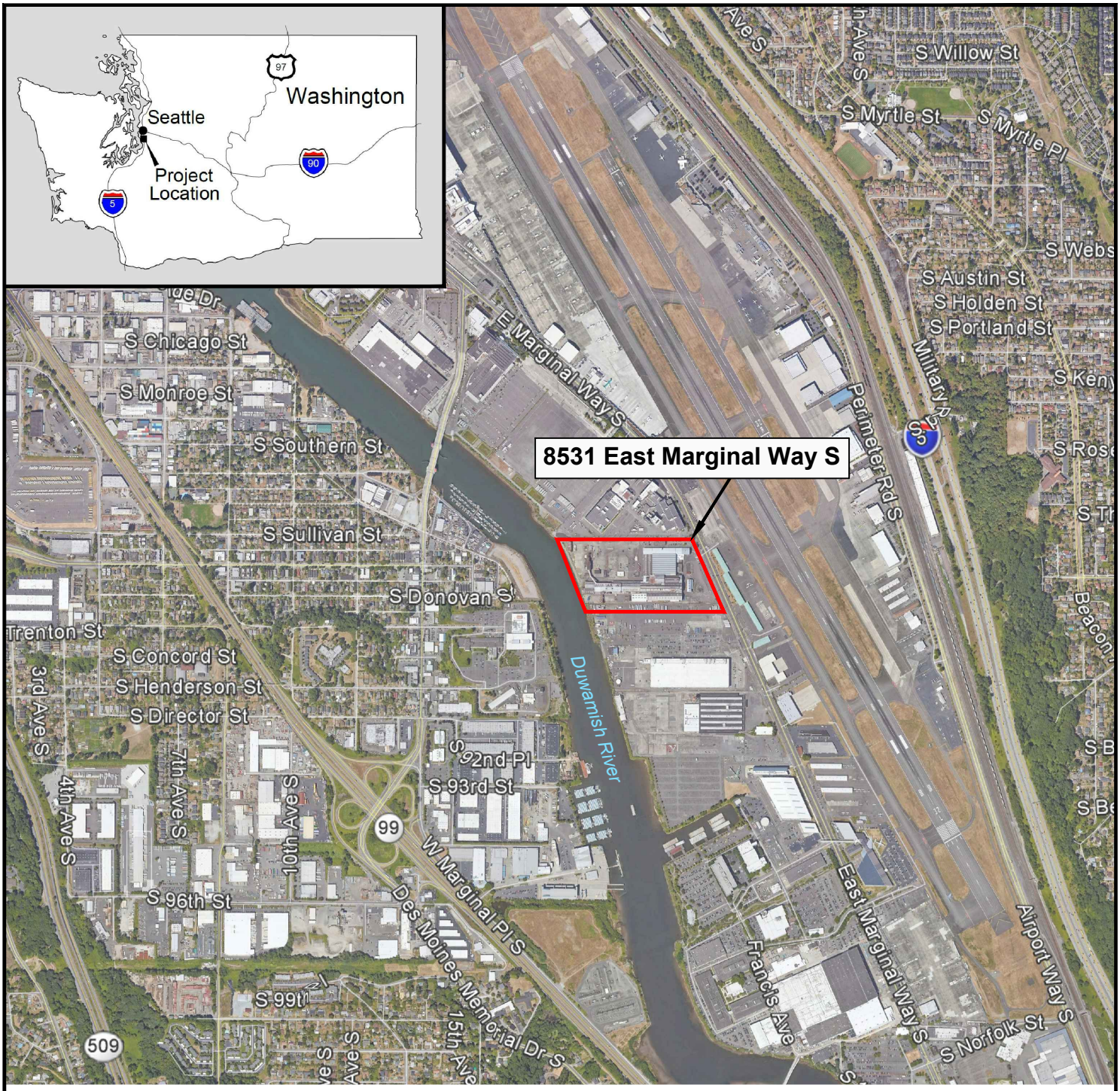
SoundEarth, 2019. Specifications for Suppliers of Fill to the Star Forge LLC Facility. December 2.

SoundEarth, 2020. Figure 1, Surface Condition Investigation Areas on 2/24/2020, Parcel 0001600023.

Washington State Department of Ecology, 2005. Guidance for Clean Closure of Dangerous Waste Units and Facilities. Hazardous Waste and Toxics Reduction Program. Publication No. 94-111.

Ecology, 2020. Site Closure at Star Forge LLC DBA Jorgensen Forge, 8531 East Marginal Way South, Seattle, Washington 98108, RCRA Site ID: WAD000602813. Letter to Mr. Wayne Turk from Ms. Katy Harvey. November 18.

Ecology, 2020b. Department of Ecology comments on the Remedial Investigation Work Plan, Jorgensen Forge Corporation Property, Tukwila, Washington, dated April 15, 2020 (Approval with Conditions). September 15.



PLOT TIME: 5/22/2020 11:18 AM MOD TIME: 5/22/2020 11:17 AM USER: Kelley Begley DWG: P:\DH Environmental\Site\Jorgensen\DH 2020-05 Jorgensen Vic Map.dwg

DH Environmental Inc

VICINITY MAP

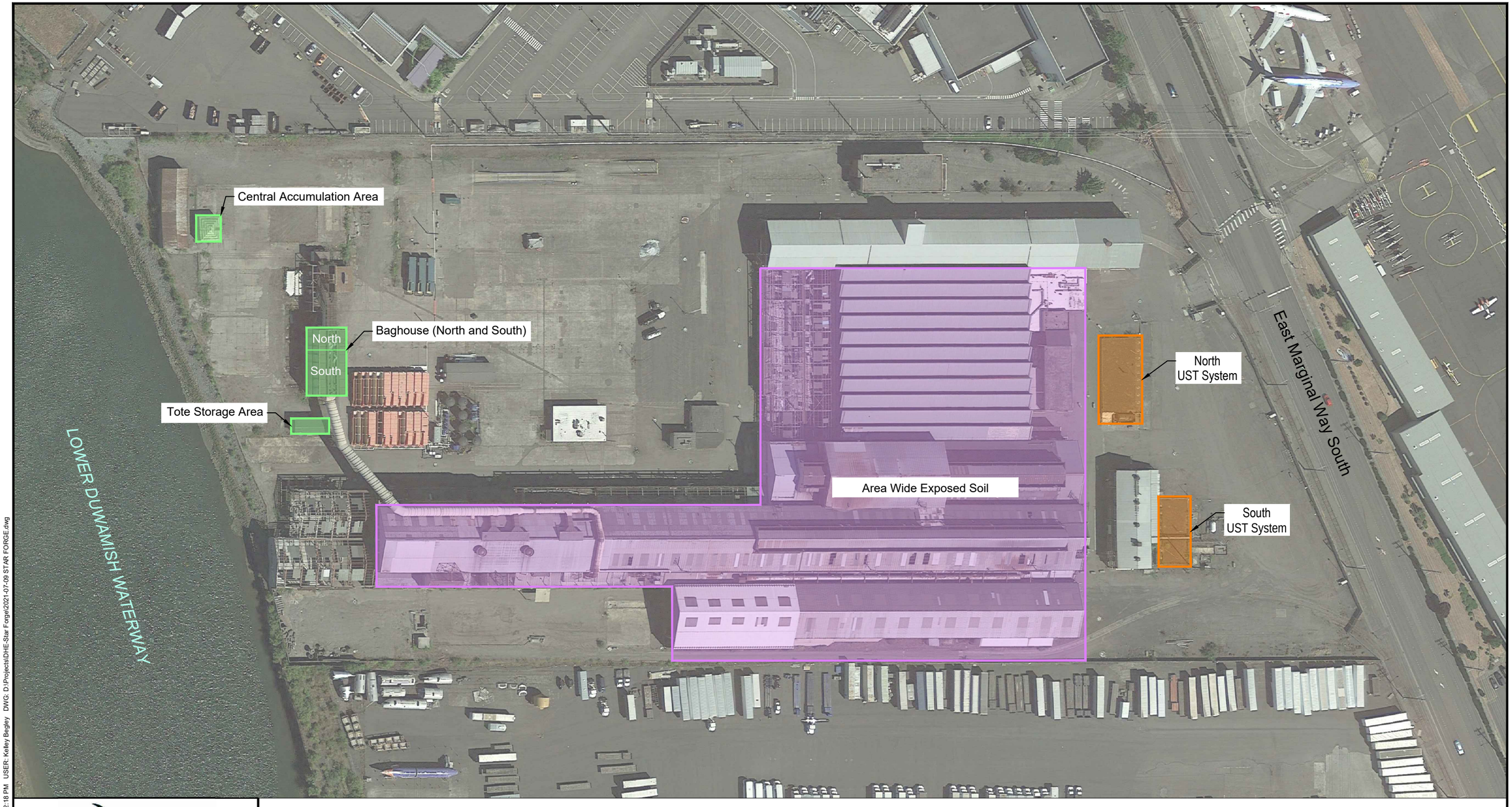
Former Jorgensen Forge Facility 8531 E. Marginal Way S. Tukwila, Washington	05-22-2020	Figure 1

LEGEND

Property Location

N

Background Images Source: Google Earth Pro 5/26/2018



Interim Action Work Areas

Former Jorgensen Forge Facility 8531 E. Marginal Way S. Tukwila, WA, 98108	07/12/2021	Figure 2

Legend

- Former Dangerous Waste Management Units
- Underground Storage Tank Systems
- Area Wide Interior Soil and Dust

Note:

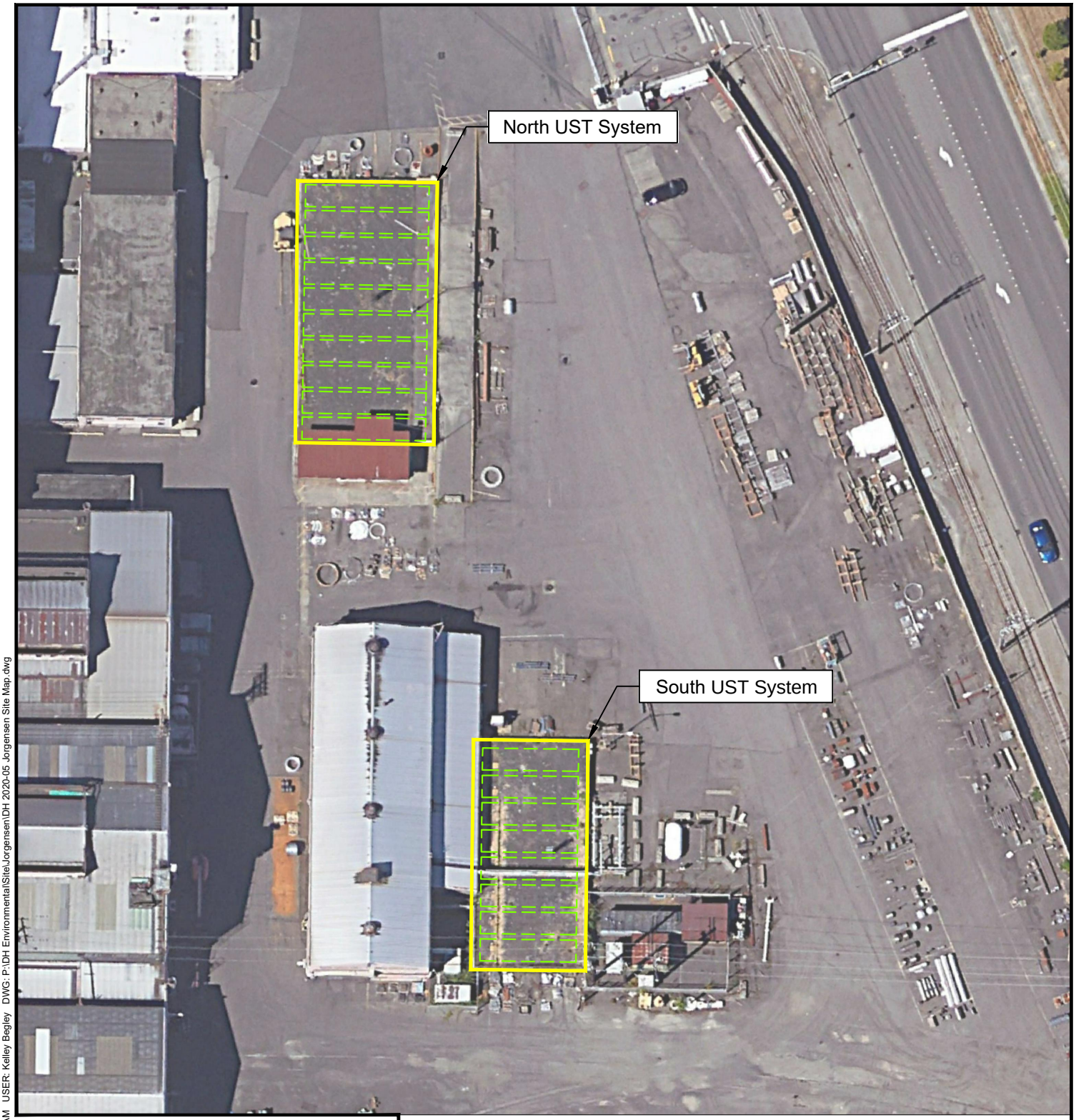
1. Aerial Photography Source: Google Earth Pro, 08/14/2020.

N

0 60 120

Scale in Feet

PLOT TIME: 7/12/2021 2:19 PM MOD TIME: 7/12/2021 2:18 PM USER: Kelley Begley DWG: D:\Projects\DHE-Star Forge\2021-07-09 STAR FORGE.dwg



Note - UST system piping is not shown. Piping will be field located using an underground utility locate subcontractor

0 25 50
Scale in Feet

LEGEND

UST System Location

Underground Storage Tank

N

Background Images Source: Google Earth Pro 5/26/2018

DH Environmental Inc

UST System Location Map

Former Jorgensen Forge Facility 8531 E. Marginal Way S. Tukwila, Washington	05-22-2020	Figure 3

Appendix A

Sampling Analysis Plan/Quality Assurance Project Plan

Former Jorgensen Forge Property
Interim Action Work Plan

8531 E Marginal Way S
Tukwila, WA 98108

Public Review Draft

Prepared for:
Washington State Department of Ecology
In accordance with WAC 173-340-430

On behalf of:
Star Forge, LLC

Prepared by:
DH Environmental, Inc.

11 February 2022

Appendix A

Sampling Analysis Plan/Quality Assurance Project Plan

Former Jorgensen Forge Property
Interim Action Work Plan

8531 E Marginal Way S
Tukwila, WA 98108

Public Review Draft

Prepared for:
Washington State Department of Ecology
In accordance with WAC 173-340-430

On behalf of:
Star Forge, LLC
8531 E Marginal Way S
Tukwila, WA 98108

Prepared by:
DH Environmental, Inc.
1011 SW Klickitat Way, Suite 107
Seattle, WA 98134

David J. Hill, PE, CHMM, CPEA
Principal Engineer

Nathan Moxley, LG, LHG
Principal Hydrogeologist

Table of Contents

List of Figures

List of Tables

List of Appendices

List of Acronyms and Abbreviations

AO	Agreed Order
Baghouse North	Northern portion of the Baghouse
bgs	below ground surface
BTEX	Benzene, toluene, ethylbenzene, and xylenes
COC	Constituent of Concern
cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon
DH Environmental	DH Environmental, Inc.
DOT	Department of Transportation
DRO	Diesel-Range Organics
DQO	Data Quality Objectives
DWMU	Dangerous Waste Management Units
Ecology	Washington State Department of Ecology
EDB	1-2, dibromoethane
EDC	1-2, Dichloroethane
EPA	United States Environmental Protection Agency
FC	Field Coordinator
GPS	Global Positioning System
GRO	Gasoline-range Organics
HAZWOPER	40-hour Hazardous Waste Operations and Emergency Response
HASP	Health and Safety Plan
HVOCs	Halogenated Volatile Organic Compounds
IACR	Interim Action Completion Report
ICC	International Code Council
IDW	Investigation Derived Waste
MDL	Method detection limit
mg/kg	milligrams per kilogram
MS/MSD	matrix spike/matrix spike duplicate
MTBE	methyl tertiary-butyl ether
MTCA	Model Toxics Control Act
Onsite Environmental	Onsite Environmental, Inc.
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PID	Photoionization Detector
Property	Former Jorgensen Forge Facility, 8531 E. Marginal Way, Tukwila, WA
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RL	Reporting Limit
RPD	Relative Percent Difference

SAP	Sampling Analysis Plan
SOP	Standard Operating Procedures
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
IAWP	Interim Action Work Plan

1 Introduction

DH Environmental, Inc. (DH Environmental) of Seattle, Washington has prepared this agency review draft of the Sampling Analysis Plan and Quality Assurance Project Plan (SAP/QAPP) describing the sampling activities to be conducted as part of the proposed interim action at the former Jorgensen Forge Facility located at 8531 East Marginal Way South, in Tukwila, Washington (Property; Figure 1). This SAP/QAPP has been prepared as part of the Interim Action Work Plan (IAWP), to which this document is attached.

The IAWP has been prepared in accordance with the Agreed Order (AO) to which it is an attachment. The AO will be entered into by Star Forge and the Washington State Department of Ecology (Ecology), pursuant to the Washington State Model Toxics Control Act (MTCA) and Cleanup Regulation established in Chapter 173-340 of the Washington Administrative Code (WAC).

Quality Assurance/Quality Control (QA/QC) procedures are described in Section 9 and were prepared consistent with Ecology's Guidance for *Preparing Quality Assurance Project Plans for Environmental Studies* (Ecology, 2016) and the United States Environmental Protection Agency (EPA) *Guidance for Preparation of Quality Assurance Project Plans, EPA Region 10, Quality Data Management Program, QA/R-5* guidance document (EPA, 2002b). Analytical QA/QC procedures were also developed based on the analytical protocols and quality assurance guidance of EPA's *Test Methods for the Evaluation of Solid Waste: Physical/Chemical Methods, 3rd Edition* (EPA, 1986), the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Organic Data Review* (EPA, 1999), and the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Data Review* (EPA, 2004).

1.1 Background and Project Description

This SAP/QAPP describes the sampling procedures to be conducted on the Property as described in the IAWP. The interim action includes the following three tasks:

1) Underground Storage Tank System Permanent Closure by Removal and Site Assessment Sampling:

   The Property has two Underground Storage Tank (UST) tank-beds, located in two separate concrete structures (North Tank Farm and South Tank Farm), with a total of 18 remaining UST systems as defined in WAC 173-360A-0150(77). The North Tank Farm includes 10 UST systems designated as UST-26 through UST-35 and the South Tank Farm includes 8 UST systems designated as UST-15 through UST-22. The UST locations are shown on Figure 3. The liquid contents of the USTs have been removed, and the UST systems are licensed with Ecology and covered under appropriate financial assurance mechanisms. Sand that has been designated as non-hazardous is present in UST-26, UST-28, and UST-31. The UST systems, including the associated piping, will be permanently closed through decommissioning by removal, per WAC 173-360A. Upon completion of decommissioning and site assessment sampling, a Permanent Closure Report will be prepared and submitted to Ecology to include all necessary closure documentation for the UST systems per WAC 173-360A. The Permanent Closure Report will also be an attachment to the Interim Action Completion Report (IACR) and summarized within the IACR.

2) Clean Closure of Dangerous Waste Management Units:

   DH Environmental prepared and submitted a Dangerous Waste Clean Closure Report to Ecology for the purpose of documenting the Clean Closure of Dangerous Waste Management Units (DWMUs) at the Property (DH Environmental, 2020a; 2020b, and 2020c). The Clean Closure Report documented removal of Dangerous Waste from the Property and provided updated records of Dangerous Waste Designations of debris, slag, and the concrete and asphalt slabs in each DWMU. Following demolition of the buildings at each DWMU on the Property, the underlying concrete and asphalt slabs will be removed, and the underlying soil sampled to confirm that clean closure requirements have been met. If the concentration of contaminants identified in Table 1 exceed the applicable standards, underlying soil will be removed and disposed of off-site, and additional samples will be collected. The approximate location of the DWMUs is shown on Figure 2.

3) Removal of Exposed Soil:

   Certain areas within the main buildings have exposed soil at the surface that is not known to be underlain by pavement. Star Forge believes that this material is "track-in" from the former forging operations at the Property, or imported aggregate for base course, and/or paver base for equipment pads, walkways, or other in-plant facilities. Exposed soil, along with area-wide accumulated dust, has been designated as non-dangerous waste (DH Environmental, 2020a). Exposed soil and dust are indistinguishable at the ground surface where pavement is not present or unknown to be present. During demolition and site stabilization, exposed soil may need to be removed to facilitate surface preparation for the application of asphalt pavement. The exposed areas were mapped by Sound Earth Strategies in 2020, and represent approximately 14,000 square feet of unpaved surfaces within the main building. Any soil removed in support of pavement of the Site is expected to be limited in volume (approximately 100 cubic yards) and will be disposed of off-site. Areas identified for removal will be mapped and provided to Ecology for concurrence prior to the actual soil removal being performed. Remaining areas of exposed soil shall be protected according to the February 2021 Demolition Plan (DH Environmental, Inc. and Construction Group International, 2021) and only covered over by clean, imported soils followed by pavement. Where exposed soil is removed, confirmatory soil samples will be collected prior to placement of sub-grade materials and/or pavement and analyzed per the SAP. This IAWP does not address area-wide dust on building surfaces or on pavement. Dust on those surfaces is addressed in the February 2021 Demolition Plan.

The approximate location of each of the three interim action areas is shown on Figure 2.

1.2 Purpose

The purpose of this SAP/QAPP is to ensure that data are generated with sufficiently high quality to support the data quality objectives (DQOs) for the Interim Action. The SAP/QAPP describes sampling procedures and protocol, quantitative and qualitative measures of data quality to ensure that the DQOs are achieved, and it addresses project management responsibilities, sampling and analytical procedures, assessment and oversight, and data reduction, validation, and reporting.

1.3 Schedule

The schedule for UST decommissioning, clean closure of the DWMUs, and removal of exposed soil, if required, is dependent upon Ecology's approval of the IAWP, and securing of all permits required by the City of Tukwila. Once all permits are secured, tasks described in the IAWP are expected to be complete within 1 calendar year.

The UST decommissioning work will start a minimum of 30-days, but no more than 90-days, after submittal of the 30-day notice to Ecology. The start date will be confirmed with Ecology at least three business days prior to starting permanent closure activities, in accordance with WAC 173-360A-0810. Tank removal work is expected to occur as soon as possible once the AO is approved and once the City of Tukwila approves the tank removal permit and hot work permit.

The City of Tukwila has indicated the tank removal work is an integral component of the building demolition permit. In this case, tank removal work would not be allowed to commence until the demolition permit is approved. Star Forge will coordinate with Ecology and the City of Tukwila on an ongoing basis regarding the overall schedule as the approval process for the IAWP, AO, and demolition-related permits proceeds.

1.4 Project Team

This section identifies key individuals and their responsibilities for all sampling efforts on the project.

Key personnel involved in the Interim Action activities are summarized below:

Key Personnel	Phone	Email
Ecology Project Manager: Maureen Sanchez, LHG Toxics Cleanup Program, NWRO	425-240-0454	maureen.sanchez@ecy.wa.gov
Senior UST Inspector: Andrew A. Imke Toxics Cleanup Program, NWRO – UST Unit	(425) 457-3142	Andrew.imke@ecy.wa.gov
Compliance Inspector: Katy Harvey Hazardous Waste & Toxics Reduction Program, NWRO	(425)-457-1830	kgib461@ecy.wa.gov
Star Forge Project Manager: James Robertson	281.785.7875	jrobertson@jorgensenforge.com
DH Environmental Project Manager: Dave Hill, PE, CHMM, CPEA Principal Engineer	206-293-3126	davehill@dhenviro.com
DH Environmental Health and Safety Manager: Brian Johnson, OHST, CIT	206-930-4043	brian.johnson@dhenviro.com

DH Environmental Field Coordinators: Nathan Moxley, LHG Tony Bahnick, LHG	 509-332-9281 206-445-4556	 nathan.moxley@dhenviro.com tony.bahnick@dhenviro.com
Laboratory Project Manager: David Baumeister Onsite Environmental	425-883-3881	dbaumeister@onsite-env.com
Data Validation Manager: Christine Ransom Senior Project Chemist, EcoChem	206-233-9332	cransom@ecochem.net

The Star Forge Project Manager is Mr. James Robertson. Mr. Robertson will commit the resources necessary to meet project objectives and requirements.

The Ecology Project Manager is Ms. Maureen Sanchez, LHG. Ms. Sanchez is responsible for reviewing and approving the work performed during the interim action, and ensuring successful completion of the AO requirements.

The DH Environmental Project Manager is Mr. David Hill, PE, CHMM, CPEA. Mr. Hill will act as the direct line of communication between DH Environmental and Star Forge and Ecology, and is responsible for implementing activities described in this SAP/QAPP. He will also be responsible for production of work plans, producing project deliverables, and performing the administrative tasks needed to ensure timely and successful completion of the interim action. Mr. Hill will provide the overall programmatic guidance to support staff and will ensure that all documents, procedures, and project activities meet the objectives contained within this SAP/QAPP. Mr. Hill will also be responsible for resolving project concerns or conflicts related to technical matters, and he will notify Star Forge and Ecology of any long-term changes in core personnel.

Mr. Brian Johnson, OHST, of DH Environmental, will serve as the Health and Safety manager for the interim action. Mr. Johnson will ensure all personnel on the site have read, understand, and follow the Health and Safety Plan (HASP) and related COVID 19 safety protocols for the project.

Mr. Nathan Moxley, LHG, and Mr. Tony Bahnick, LHG of DH Environmental will serve as the Field Coordinators (FCs). The FCs are responsible for day-to-day technical and QA/QC oversight. They will ensure that appropriate protocols for sample collection, preservation, and holding times are observed and will submit environmental samples to the designated laboratories for chemical and physical analyses. In addition, Mr. Moxley and Mr. Bahnick are both certified UST Site Assessors and will oversee the collection of all Site Assessment samples.

Ms. Christine Ransom of EcoChem will serve as the data validation manager for the project. Ms. Ransom will manage all aspects of data validation to ensure all data validation criteria at met for a Stage 2A data validation (EPA, 2009).

Mr. David Baumeister of Onsite Environmental, Inc. (Onsite Environmental) will serve as the Laboratory Manager. OnSite Environmental, of Redmond, Washington, is a Washington State Department of

Ecology accredited environmental laboratory. Mr. Baumeister will oversee all laboratory operations associated with the receipt of the environmental samples, chemical/physical analyses, and laboratory report preparation for this project. Mr. Baumeister will review all laboratory reports and prepare case narratives describing any anomalies and exceptions that occurred during analysis.

1.4.1 Environmental Consultant – DH Environmental, Inc.

In addition to the individual responsibilities described above, the environmental consultant conducting the sampling activities will complete the following tasks:

- Communicate data quality objectives to the analytical laboratory analyzing samples collected from the project.
- Assemble project teams, implement sample collection activities, and coordinate sample analyses.
- Ensure that the proper number, type, and quantity of sample containers, including preservation requirements, are available for field activities.
- Follow standard sampling protocols as defined in this SAP/QAPP and other relevant site-specific project documents.
- Record and document all field data as specified in this SAP/QAPP.
- Following applicable Standard Operating Procedures (SOPs), ensure that all samples are collected, preserved, labeled, packaged, and shipped to the contract analytical laboratory in an appropriate manner and according to chain-of-custody requirements. Copies of applicable SOPs are included in Appendix A.
- Review analytical laboratory results and QC data.
- Where applicable, report deficiencies in sample collection, preservation, handling, test methods, or documentation.
- Initiate and support technical audits and corrective action that may arise from deficiencies in sample collection, preservation, handling, test methods, or documentation.

1.4.2 Analytical Laboratory – Onsite Environmental

The analytical laboratory analyzing and reporting results for samples collected from the site will:

- Understand and follow sampling objectives outlined in the QAPP.
- Perform requested analyses using appropriate test methods specified in the QAPP.
- Prepare analytical laboratory reports for the environmental consultant, including all relevant data and QC reports.
- Communicate analytical problems, issues, or concerns to the environmental consultant in a timely manner.

- Initiate corrective action when deficiencies in sample collection, preservation, handling, test methods, or documentation are identified internally by the contract analytical laboratory, or by the environmental consultant.

1.4.3 Data Validation - EcoChem

The data validation manager will perform a Stage 2A data validation (EPA, 2009) to assess if the project DQOs have been achieved, by evaluating the following:

- Confirm the consistency and completeness of the laboratory data package. This includes confirming all requested analyses were performed and reported as requested, and that all documentation is complete, including sample receipt documentation.
- Review sample related quality control procedures. This includes confirming that hold times were followed, that sample related quality control data and acceptance criteria are provided, that appropriate spikes have been added, and that QC sample frequency is appropriate. In addition, hold times and QC results will be compared with applicable guidelines.
- Qualify the data based on recommendations from the United States Army Corp of Engineers (USACE, 2005), and the National Functional Guidelines for Organic/Inorganic Superfund Data Review (EPA, 2020a, 2020b).

1.5 Certifications

All personnel involved with the collection of field data are trained in standardized data collection requirements (collection, processing, and handling of soil samples; field screening; inspections; and chain-of-custody procedures) to ensure the data collected are consistent across the project. In addition, the Occupational Safety and Health Administration (OSHA) requires training under 29 CFR 1910.120 to provide employees with the knowledge and skills enabling them to perform their jobs safely and with minimum risk to their personal health. All field personnel will have completed the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course and 8-hour refresher courses, as necessary, to meet the OSHA regulations.

In addition to the above, all field staff involved in supervising the decommissioning of the UST systems will also have current UST decommissioning and Washington State Site Assessor certification through the International Code Council (ICC), as required by WAC 173-360A-0930.

2 Sample Collection Methodology, Labeling, Handling, Delivery, and Documentation

2.1 Sample Collection Methodology

General soil sampling methodology is described in this section. Where applicable, methods specific to a particular work area are described in detail in Sections 3 through 5.

Prior to collecting soil samples, soil will be screened in the field for the potential presence of contaminants using a combination of visual and olfactory observations (presence of rubble or debris indicative of fill materials, staining or unusual colors, and unusual odors), sheen testing for the potential presence of petroleum, and headspace screening for volatile organic compounds (VOCs) using a photoionization detector (PID). If field screening indicates the potential presence of contamination, the location of soil samples will be adjusted in the field to target those areas. If field screening does not indicate potential contamination, the soil samples will be collected from locations described in Sections 3 through 5. The results of field screening will be documented on the sample collection forms.

Each soil sample collected for analysis of non-volatile compounds will be collected using a dedicated (i.e., disposable) stainless-steel sampling spoon to place the sample aliquot directly into laboratory supplied containers. Rocks or other debris greater than approximately 3/8-inch in diameter will be manually removed from the sample container using the stainless-steel spoon. If the sample is collected from an excavator bucket, care will be taken to ensure the sample is not collected from soil in contact with the bucket.

Soil samples collected for analysis of volatile compounds will be collected following Environmental Protection Agency (EPA) Method 5035A. Dedicated, disposable Terra Core® or equivalent samplers will be used as provided by the analytical laboratory. Where entry into the excavation area is safe, samples collected for analysis of volatiles will be collected directly from the sidewall or base of the excavation. If the sample is collected from an excavator bucket, care will be taken to ensure the sample is not collected from soil in contact with the bucket.

Sampling personnel will wear disposable nitrile gloves, or equivalent, and change gloves between every sample. Following collection, the soil samples will be labeled with the sample identification and date and time of collection as described in Section 2.2. QC samples will be collected and analyzed in accordance with the QA procedures detailed in Section 8.

During the UST site assessment sampling, sufficient sample volume will be collected to allow for follow-up analysis based on the initial results for total petroleum hydrocarbons as gas- and diesel-range organics, as described in Section 3.

2.2 Sample Labeling

All sample containers used for the project will be provided by the analytical laboratory in accordance with their specific container requirements (Table 2). Each sample container will be labeled with a

waterproof label and written or printed in waterproof ink. The following information will be recorded on the sample label at the time of sample collection:

- Project name
- Unique sample identification
- Date and time of sample collection
- Initials of the personnel collecting the sample

Specific sample identification nomenclature is described in Sections 3, 4, and 5, as applicable to each interim action area.

2.3 Sample Handling and Delivery

All samples will be packed to prevent breakage and immediately placed and maintained in an iced cooler until they are delivered to the analytical laboratory. Each sample will be clearly labeled as described in Section 3.2, 4.2, and 5.2. Ice will be placed into separate, sealed, plastic bags. The sample shipment will be accompanied by a chain of custody form in a sealed plastic bag.

Each cooler will remain in the possession of the field sampling crew until delivery to the laboratory following standard chain of custody protocols. When possession of the samples is transferred to the analytical laboratory, the person transferring the samples will sign the chain of custody form, along with the laboratory personnel receiving the samples. The samples will be logged in by the laboratory, and a copy of the chain of custody will be retained with the project documentation records, which will be submitted in the IACR with the analytical reports.

2.4 Field Documentation

Field logbooks and/or pre-printed field logs will be used to document where, when, how, and from whom any vital project information was obtained. Log entries will be complete and accurate enough to allow reconstruction of field activities. All entries will be legible, written in blue or black ink, and signed by the individual making the entries. Only factual and objective language shall be used.

The following information will be recorded on a sample collection form for each sample or group of samples at the time of collection:

- Sample location and description
- Site or Sampling area sketch showing sample location and measured distances
- Sampler's name(s)
- Date and Time of each sample collection
- Designation of sample as composite or grab
- Type of sample (e.g., soil, sediment, or water)
- Type of sampling equipment used to collect each sample
- Field instrument readings and field screening observations
- Field observations and details related to analysis or integrity of samples (e.g., sampling conditions, noticeable odors, colors, etc.)

- Preliminary sample descriptions (e.g., for soils: USCS soil description and field screening results; for water: clarity, color, odors, sheen, etc.)
- Sample preservations, if applicable
- Sample identification numbers and any explanatory codes, and chain-of-custody form numbers
- Shipping arrangements if samples are shipped to the lab (overnight air bill number)
- Name of recipient laboratory

In addition to the sampling information listed above, the following specific information will also be recorded in the field logbook for each day of sampling:

- Team members and their responsibilities
- Time of arrival/entry on site and time of site departure
- Other personnel on site
- Summary of any site meetings or discussions with contractors, agency personnel, site personnel, etc.
- Deviations from sampling plans, site safety plans, and QAPP procedures
- Changes in personnel and responsibilities with reasons for the changes
- Levels of safety protection

2.4.1 Sample Locations

The locations of all field samples will be recorded in the field using a mapping grade Global Positioning System (GPS) unit capable of sub-foot accuracy (Trimble GeoXH or equivalent). If samples are collected from areas with limited GPS signal (e.g., inside buildings or adjacent to tall structures), such that sub-foot accuracy cannot be achieved, the sample locations will be manually recorded in relation to site features using tape measures or measuring wheels to the nearest 1-foot. All location data will be provided in the IACR as coordinates using the North American Datum of 1983 (NAD83), Washington State Plane North, and on maps depicting final sample locations.

2.5 Photographs

Photographs will be taken at all sampling areas and at other areas of interest on site. Photographs will serve to verify information entered in the field logbook, and/or to show sample areas, conditions, and individual samples. For each photograph taken, the following information will be recorded in a separate field photo log:

- Time, date, location, direction of photo view, and weather conditions
- Description of the subject photographed
- Name of person taking the photograph, including any personnel in the photograph

A photo log will be included in the IACR.

2.6 Sample Analysis

All samples will be submitted to OnSite Environmental Inc., of Redmond, Washington, a Washington State Department of Ecology accredited environmental laboratory. Samples will be analyzed for one or more of the following, depending on their location as described in Sections 3, 4, and 5:

- GRO/BTEX by Ecology Method NWTPH-Gx/BTEX;
- DRO by Method NWTPH-Dx;
- cPAHs and naphthalenes by EPA Method 8270E;
- VOCs including BTEX, EDB, EDC, MTBE and HVOCs by EPA Method 8260D;
- PCBs by EPA Method 8082;
- hexavalent chromium by EPA Method 7196
- Total RCRA 8 metals by EPA Methods 6010D (arsenic, barium, cadmium, chromium, lead, selenium, and silver) and 7471B (mercury)

The analytical methods, bottle type, preservations, and holding times are summarized in Table 2. The analytical methods, method detection limits (MDLs) and reporting limits (RLs) are summarized in Table 3. The number of samples required per task, along with a list of analytes is summarized in Table 4.

3 UST Site Assessment Sampling

Following closure of the UST systems using the procedures described in the Work Plan, a site assessment will be performed in accordance with the requirements of WAC 173-360A-0730. This section describes how samples will be collected as part of the site assessment. The site assessment is being performed to document the in-place concentrations of UST system related contaminants, if present, following completion of permanent closure activities. A site assessment will be performed around both the north and south UST systems, including their associated piping runs, if present. Detailed maps showing the north and south UST systems and proposed sampling locations are included as Figures 4 and 5, respectively.

Site assessment sampling is not expected to include groundwater sampling. Groundwater at the facility in three nearby monitoring wells, MW-11, MW-14, and MW-15, is approximately 11- to 12-feet below ground surface (bgs) (Shannon & Wilson, 2020). Both the north and south UST systems are located within a partially above ground vault (the enclosure sticks up approximately 4-feet above the average grade of the Site), and as-built drawings indicate the bottom of the tanks are approximately 5-feet bgs. Therefore, groundwater is expected to be approximately 6- to 7-feet below the base of the tanks. However, in the unlikely event groundwater is encountered in the excavation, grab samples will be collected for waste characterization purposes, as described in Section 2.4.

3.1 UST Site Assessment Soil Sample Collection

A DH Environmental licensed geologist and ICC certified Site Assessor will collect all site assessment soil samples. Site assessment soil samples will be collected following removal of the UST System components (e.g., USTs, piping, and containment structures) using an excavator. In areas where it is safe to enter the excavation, soil samples may also be collected by hand directly from the sidewall or base of the excavation or piping trench.

The number of soil samples will be collected as specified in Table 0730-1 in WAC 173-360A-0730. For the northern UST system, a minimum of 23 soil samples will be collected. For the southern UST system, a minimum of 19 soil samples will be collected. One soil sample will be collected beneath each tank. Another soil sample will be collected beneath the location where the piping run enters a sidewall. The remaining soil samples will be collected from the sidewalls of the tank excavation on an approximately even spacing. The number and location of piping samples will be determined following the underground utility locate and visual inspection of the excavations necessary to map the piping layout. A minimum of one soil sample will be collected for every 50-feet of piping, as specified in Table 0730-1 in WAC 173-360A-0730. Soil samples beneath piping will be targeted at locations beneath fittings such as elbows or couplers, where leaks are the most likely to occur. Based on the lack of historic documentation and compliance history of the USTs, Ecology may require a limited number of additional samples be collected and analyzed beyond the minimum noted here based on field observations.

The approximate location of the planned soil samples is shown on Figures 4 and 5. Note that the final location of piping samples will be determined once the piping layout has been confirmed by a utility

locator and visual inspection of the tank systems during removal. For this reason, piping samples are not shown on Figures 4 and 5.

As-built drawings for the northern group of USTs indicate the tanks are located in a partially buried vault with a concrete bottom 6-inches below the bottom of the tanks. Therefore, native soil is not expected to be encountered within the vault structure surrounding the northern group of USTs. As-built drawings for the southern group of USTs indicate the tanks are also located in a partially buried vault, however, available drawings indicate the southern vault does not contain a concrete bottom. If the presence of a concrete base and sidewalls are confirmed during tank removal, the concrete structure will be removed prior to the collection of sidewall and bottom samples, and the sidewall and bottom samples will be collected from the interface with native soil beneath the concrete slab.

If concrete is not encountered beneath the tanks during the tank removal process, two test pits will be excavated at least 4-feet below the base of the tanks to confirm the presence or absence of concrete. If a concrete floor is not encountered within 4-feet beneath the tanks, then the bottom samples will be collected from the interface with native soil beneath each tank. Photographs documenting the presence or absence of concrete beneath the tanks will be included with the IACR.

3.2 UST Site Assessment Soil Sample Identification

Site Assessment soil samples will be identified by the prefix “NT” if they were collected adjacent to the northern group of tanks, or “ST” if they were collected adjacent to the southern group of tanks. Samples collected adjacent to piping runs will include an additional prefix of “Piping”. The samples will then be identified by a numerical identifier as shown on Figures 4 and 5, followed by the depth in feet bgs, followed by the date in YYYYMMDD format.

For example, a soil sample identified as ‘NT-SS-1-8.0-20211201’ would correspond to sample SS-1, collected beneath UST-26, from a depth of 8.0-feet bgs on December 1, 2021. A sample identified as ‘NT-piping-SS-24-2.0-20211201’ would correspond to sample SS-24, collected adjacent to the northern tank piping run from a depth of 2.0 feet bgs on December 1, 2021. Figures showing the locations of all samples will be kept and submitted with the IACR and SA reports.

3.3 UST Site Assessment Soil Sample Analysis

All Site Assessment soil samples will be analyzed for diesel-range organics (DRO) by Method NWTPH-Dx and gasoline-range organics (GRO) by Method NWTPH-Gx, in accordance with the requirements listed in Table 830-1 in WAC 173-340-900 for “used or unknown oil” tanks.

At the request of Ecology, and in accordance with the requirements for the testing of waste oil tanks listed in Table 830-1 in WAC 173-340-900, 11 soil samples will also be analyzed for:

- 1-2, dibromoethane (EDB), 1-2, Dichloroethane (EDC), methyl tertiary-butyl ether (MTBE), benzene, toluene, ethylbenzene and xylenes (BTEX) and halogenated VOCs (HVOCs) by EPA Method 8260D,
- Polychlorinated biphenyls (PCBs) by EPA Method 8082, and,
- cPAHs and naphthalenes by EPA Method 8270E/SIM;

- Total RCRA 8 metals plus copper, nickel, and zinc, by EPA Methods 6010D (arsenic, barium, cadmium, chromium, lead, selenium, and silver) and 7471B (mercury).

The 11 soil samples for follow on analysis will consist of the four soil samples with the greatest TPH concentrations collected from each tank nest, the two samples collected closest to former UST-36, and one piping run sample with the highest TPH concentration. Follow-up analysis will be performed in consultation with Ecology. The analytical laboratory will be requested to provide the lowest possible reporting limits available for each analysis, and the request will also be noted on the chain of custody accompanying each set of samples.

The analytical methods, bottle type, preservations, and holding times are summarized in Table 2. QC samples (e.g., field duplicates and trip blanks) will be collected and analyzed in accordance with the QA procedures detailed in Section 8. Management of investigation derived waste (IDW) is described in Section 6.

3.4 UST Site Assessment Groundwater Sample Collection

In the unlikely event that groundwater is encountered in the UST excavation, a grab sample will be collected from each excavation with groundwater present in sufficient volumes to sample. The grab groundwater samples will be collected for the purposes of waste designation in accordance with the requirements of WAC 173-303. Each sample will be collected by placing a dedicated, unpreserved sampling container on the end of an extendable swing sampler and filling the sampling container. The sample aliquot will then be transferred to individual laboratory-provided sampling containers appropriate for analysis of each compound. Following collection, the water samples will be labeled with the sample identification and date and time of collection as described in Section 3.5.

3.5 UST Site Assessment Groundwater Sample Identification

Site Assessment groundwater samples will be identified by the prefix “NT” if they were collected adjacent to the northern group of tanks, or “ST” if they were collected adjacent to the southern group of tanks. The samples will then be identified by the prefix “GW” to indicate a groundwater sample, followed by the sample number, followed by the approximate depth in feet bgs the sample was collected from, followed by the date in YYYYMMDD format.

For example, a groundwater sample identified as ‘NT-GW-1-8.0-20211201’ would correspond to groundwater sample number 1 from the northern UST system, collected from a depth of 8.0-feet bgs on December 1, 2021.

3.6 UST Site Assessment Groundwater Sample Analysis

Each Site Assessment groundwater samples will be analyzed for GRO by Method NWTPH-Gx, DRO by Method NWTPH-Dx, cPAHs and naphthalenes by EPA Method 8270E, VOCs by EPA Method 8260D, and total RCRA 8 metals plus copper, nickel, and zinc by EPA Methods 6010D (arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium, silver, and zinc) and 7471B (mercury).

3.7 Reporting

A UST System Decommissioning and Site Assessment report will be submitted to Ecology within 30-days of completing the data validation process described in Section 8. The report will be prepared and submitted in accordance with the requirements of WAC 173-360A-0730(8). This report will also be attached to the IACR and the results of the Site Assessment summarized in the IACR.

3.8 Schedule

The schedule for the UST System decommissioning will be determined once the AO, and the attached Work Plan, have been approved by Ecology and completed the public comment process. Additional permits are also required by the City of Tukwila Fire Department, which must be obtained prior to scheduling the decommissioning work. The UST System decommissioning work will start a minimum of 30-days, but no more than 90-days, after submittal of the 30-day notice to Ecology. The start date will be confirmed with Ecology at least three business days prior to starting permanent closure, in accordance with WAC 173-360A-0810.

The specific schedule is dependent on the approval of the AO and securing of permits from the City of Tukwila. Tank removal work is expected to occur as soon as possible once the AO is approved and once the City of Tukwila approves the tank removal permit and hot work permit.

The City of Tukwila has indicated the tank removal work is an integral component of the building demolition permit. In this case, tank removal work would not be allowed to commence until the demolition permit is approved. Star Forge will coordinate with Ecology and the City of Tukwila on an ongoing basis regarding the overall schedule as the approval process for the IAWP, AO, and demolition-related permits proceeds.

4 Dangerous Waste Management Units Sampling

As part of clean closure of the DWMUs, the concrete slabs in the northern portion of the Baghouse (Baghouse North) and Central Accumulation Area, and the asphalt slab in the Tote Storage Area, will be removed and disposed of off-site. The area of each of the DWMUs is summarized below:

- Central Accumulation Area - Approximately 1,000 square feet
- Tote Storage Area: Approximately 800 square feet
- Entire Baghouse Building: Approximately 4,000 square feet. The Baghouse North is the northern ¼ of the overall space.

The location of each of the DWMUs is shown on Figure 2.

Following removal of the concrete and asphalt slabs, the underlying soil will be sampled as described in this section. The purpose of this sampling effort is to demonstrate Clean Closure of the DWMUs in accordance with WAC 173-303-610(2) and (5).

This section describes the sample collection program, including the design and implementation of the proposed sampling, and the sample collection procedures. Sample handling is described in Section 5 and analytical methods are summarized in Section 6. Quality assurance and quality control (QA/QC) requirements are described in Section 9. These sampling and analysis protocols are pursuant to the requirements of WAC 173-303-070; the technical requirements of EPA publication SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*; Washington State Department of Ecology (Ecology) Publication #97-407, *Chemical Testing Methods for Designating Dangerous Waste* (Ecology, 2014); and Ecology Publication 94-111, *Guidance for Clean Closure of Dangerous Waste Units and Facilities* (Ecology, 2005).

Contaminants of concern in the soil underlying the DWMU slabs and their associated target cleanup levels are summarized in Table 1.

4.1 Dangerous Waste Management Units Sampling

Once the overlying buildings comprising each DWMU have been demolished, the concrete slabs will be removed and disposed of off-site following the procedures described in the IAWP. The Central Accumulation Area, Tote Storage Area, and the northern portion of the Baghouse (Baghouse North) will then be divided into four quadrants, and one soil sample will be collected from each quadrant. This sample design was selected to be consistent with the design used for the sampling of the overlying concrete and asphalt slabs as part of the Clean Closure Report (DH Environmental, 2020). Proposed sampling locations for the Central Accumulation Area, Tote Storage Area, and northern portion of the Baghouse (Baghouse North) are shown on Figures 6, 7, and 8, respectively.

The soil in each quadrant will be screened in the field for the potential presence of contaminants, as described in Section 2.1, using a combination of visual and olfactory observations, sheen testing, and headspace screening for VOCs using a PID. Samples will be targeted for areas exhibiting evidence of contamination, if present. If field screening does not indicate potential contamination, the sample will be collected from the approximate center of each quadrant.

Once each soil sampling location has been identified, soil samples will be collected using a dedicated (i.e., disposable) stainless-steel sampling spoon as described in Section 2. Soil at each station will be scooped directly into laboratory supplied sampling jars from a depth of approximately 0.0 – 0.25-feet below grade. Rocks or other debris greater than approximately 3/8-inch in diameter will be manually removed from the sample container using the stainless-steel spoon. Following collection, the soil samples will be labeled with the sample identification and date and time of collection as described in Section 4.2. Additional sample labeling details are described in Section 2 along with sample transportation and handling procedures. QC samples will be collected and analyzed in accordance with the QA procedures detailed in Section 8.

4.2 DWMU Sample Identification

Soil samples will be identified by a two or three letter acronym to indicate which DWMU the sample was collected from (Tote Storage Area [TS], Central Accumulation Area [CAA], or Baghouse North [BHN]), followed by 'SS' to indicate sub-slab, followed by a two-letter directional indicator to indicate which quadrant the sample was collected from (NW, NE, SW, SE), followed by the approximate depth in feet below the base of the slab, followed by the date in YYYYMMDD format.

For example, a soil sample identified as 'CAA-SS-NW-0.25-20211201' would correspond to the sub-slab soil sample collected from the northwest quadrant of the Central Accumulation Area, from a depth of 0.25-feet below the base of the slab, on December 1, 2021. Figures showing the locations of all samples will be kept and submitted with the IACR.

4.3 DWMU Soil Sample Analysis

Soil samples collected beneath the Tote Storage Area, Central Accumulation Area, and Baghouse North slabs will be analyzed for DRO by Method NWTPH-Dx. In addition, soil samples collected beneath the Tote Storage Area slab will be analyzed for PCBs by EPA Method 8082, and soil samples collected beneath the Baghouse North slab will be analyzed for hexavalent chromium by EPA Method 7196.

The analytical methods, bottle type, preservations, and holding times are summarized in Section 2 and Table 2. The number of samples required per task, along with a list of analytes is summarized in Table 4.

5 Exposed Soil Removal

Exposed soil in contact with area-wide dust is present in the areas mapped by SoundEarth Strategies in 2020 (Appendix E of the IAWP). These are areas with no underlying pavement or unknown pavement underlying soil or dust accumulations. In areas where above-grade exposed soil is removed from high elevations to facilitate pavement, soil samples will be collected beneath any removed material to characterize soil that will be left in place. The frequency and location of soil sampling will depend on the volume of soil that is removed, but this is anticipated to be less than 100 cubic yards. This is based on the surface area of exposed soil mapped by SES of approximately 14,300 square feet, and assuming a minimal excavation may be required to allow for placement of sufficient subgrade material that meets compaction standards prior to the application of asphalt pavement. Areas identified for removal will be mapped and provided to Ecology for concurrence prior to the actual soil removal being performed. At a minimum, one soil sample will be collected beneath each separate area of soil removal that is not underlain by impervious surfaces (e.g., concrete or asphalt). If an area greater than 1,500 square feet is graded down, one sample will be collected for every 1,500 square feet of cut area, or portion thereof.

5.1 Exposed Soil Sample Collection

Any removed soil will be placed into covered Department of Transportation (DOT) rated bulk shipping containers (e.g., roll-off boxes) or covered dump trucks for offsite disposal.

Once the number of samples to be collected beneath each area of removed soil has been determined, the samples will be collected from an even spacing across the area if the area is greater than 1,500 square feet. If only one soil sample will be collected, it will be collected from the approximate center of each area, unless visual or olfactory evidence indicates that another sample location shall be chosen.

5.2 Soil Sample Identification

Soil samples will be identified by the prefix ‘ES to indicate ‘Exposed Soil, followed by a numerical identifier, followed by the depth interval the sample was collected from in feet bgs, followed by the date in YYYYMMDD format.

For example, a soil sample identified as ‘ES-1-0.0-0.25-20211201’ would correspond to exposed soil sample 1, from a depth of 0.0- to 0.25-feet bgs, on December 1, 2021. Figures showing the locations of all samples will be kept and submitted with the IACR.

5.3 Exposed Soil Sample Analysis

Soil samples collected to characterize any remaining soil beneath areas of removed exposed soil will be analyzed for the same list of analytes as the area-wide soil and dust waste designation sampling which was documented in the Clean Closure Report (DH Environmental, 2020a, 2020b, and 2020c).

Soil characterization samples will be analyzed for:

- total RCRA 8 metals plus copper, nickel, and zinc by EPA Methods 6010D (arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium, silver, and zinc) and 7471B (mercury);
- PCBs by EPA method 8082; and
- VOCs by EPA Method 8260.

The exposed soil characterization analyses are summarized in Section 2. The analytical methods, bottle type, preservation and holding times are summarized on Table 2. The number of samples required per task, along with a list of analytes is summarized in Table 4. Ecology will be consulted if field screening indicates additional analysis is warranted, and Ecology may require limited additional analysis be run.

6 Investigation Derived Waste

Minimal Investigation Derived Waste (IDW) is expected to be generated during sampling activities associated with the interim action. Dedicated sampling equipment will be used for the collection of all environmental samples; therefore, no decontamination water is expected to be generated. Incidental supplies used in the collection of soil samples from the UST systems, from beneath the Tote Storage and Central Accumulation Area slabs, and the exposed soil, including spoons and personal protective equipment (nitrile gloves, Tyvek suits, etc.) will be disposed of as municipal solid waste.

Incidental supplies used in the collection of soil samples from beneath the Baghouse North slab will be disposed of as K061 hazardous waste, along with the concrete slab, as they meet the definition of K061 Specific Source Waste from iron and steel sources in accordance with WAC 173-303-9904.

7 Health and Safety

A project-specific HASP is included in Appendix B of the IAWP. The HASP was prepared consistent with the requirements of the Washington State Division of Occupational Safety and Health Hazardous Waste Operation Regulations (WAC 296-843). The HASP includes a description of the project team, the scope of work, site control, site hazard information, site hazard control, and emergency response. Information about the nearest hospital, including a map, is also provided. Project personnel working at the site will be required to review and sign the HASP.

8 Quality Assurance

This section identifies the QA/QC procedures and criteria required to ensure that data collected during implementation of the interim action are of known quality and are acceptable to achieve project objectives. It is the responsibility of the project personnel performing the sampling and analysis activities to adhere to the requirements of this SAP/QAPP.

The QA/QC protocols described here are necessary to achieve the site-specific objectives for sample collection and analysis. Records will be maintained documenting all sampling activities performed and data generated during implementation of this interim action.

8.1 Data Quality Objectives

The DQOs for the UST site assessment, DMWU soil sampling, and sampling beneath exposed soil are defined below. To evaluate these DQOs, data quality indicators of precision, accuracy, comparability, completeness, representativeness, and sensitivity will be evaluated. All data will be reviewed relative to the DQOs. The quality of analytical data is assessed by the frequency and type of internal QC checks developed for analysis type. Laboratory results will be evaluated against QA objectives by reviewing results for analysis of method blanks, matrix spikes, duplicate samples, laboratory control samples, calibrations, performance evaluation samples, and interference checks as specified by the specific analytical methods.

The overall DQO for the UST site assessment soil sampling is to ensure that the soil analytical data is of sufficient technical quality to determine whether a release has occurred from the UST system that may pose a risk to human health or the environment.

The overall DQO for the DWMU soil sampling is to ensure that the soil analytical data is of sufficient technical quality to determine if constituents of concern (COCs) are present in soil beneath the DWMU slabs at concentrations greater than applicable screening criteria.

The overall DQO for the exposed soil removal sampling is to ensure that the soil analytical data is of sufficient technical quality to characterize the concentrations of potential COCs present in soil being left in place beneath any soil removed to facilitate application of pavement.

8.1.1 Precision

Precision measures the reproducibility of measurements under a given set of conditions. It is a quantitative measure of the variability of a group of measurements compared to their average values. Analytical precision is measured through matrix spike/matrix spike duplicate (MS/MSD) samples for organic analysis and through laboratory duplicate samples for inorganic analyses.

Analytical precision measurements will be carried out on project-specific samples at a minimum lab duplicate frequency of one per investigation area (e.g., DWMU, UST System, or exposed soil), or 1 in 20 samples, whichever is more frequent per matrix analyzed, as practical. Laboratory precision will be evaluated against quantitative relative percent difference (RPD) performance criteria.

Field precision will be evaluated by the collection of blind field duplicates at a minimum frequency of one per investigation area (i.e., North Tank Group, South Tank Group, and each of the three DWMUs). Currently, no performance criteria have been established for field duplicates. Field duplicate precision will therefore be screened against a RPD of 60 percent for all soil samples. However, no data will be qualified based solely on field duplicate precision.

Precision measurements can be affected by the nearness of a chemical concentration to the MDL, where the percent error (expressed as RPD) increases. The equations used to express precision are as follows:

$$RPD = \frac{(C_1 - C_2)\ \mathrm{x}\ 100\%}{(C_1 - C_2)/2}$$

Where:
RPD = relative percent difference
C_1 = larger of the two observed values
C_2 = smaller of the two observed values

8.1.2 Accuracy

Accuracy is an expression of the degree to which a measured or computed value represents the true value. Analytical accuracy may be assessed by analyzing "spiked" samples with known standards (surrogates, laboratory control samples, and/or matrix spike) and measuring the percent recovery. Accuracy measurements on MS samples will be carried out at a minimum frequency of 1 in 20 samples per matrix analyzed. Because MS/MSDs measure the effects of potential matrix interferences of a specific matrix, the laboratory will perform MS/MSDs only on samples from this investigation and not from other projects. Surrogate recoveries will be determined for every sample analyzed for organics.

Laboratory accuracy will be evaluated against quantitative laboratory control sample, matrix spike, and surrogate spike recoveries using limits for each applicable analyte. Accuracy can be expressed as a percentage of the true or reference value, or as a percent recovery in those analyses where reference materials are not available and spiked samples are analyzed. The equation used to express accuracy is as follows:

$$\%R = 100\% \times (S-U)/C_{sa}$$

Where:
%R = percent recovery
S = measured concentration in the spiked aliquot
U = measured concentration in the unspiked aliquot
C_{sa} = actual concentration of spike added

8.1.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent an environmental condition. Care will be taken to ensure sample locations are properly selected, samples

are representative of the sampling locations, and that a sufficient number of samples are collected to accurately reflect conditions at the area being sampled. A sufficient sample volume will be collected at each location to minimize bias or errors associated with sample particle size and heterogeneity.

8.1.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one dataset can be compared to another. To ensure sample results are comparable, samples will be analyzed using standard EPA analytical methods. Calibration and reference standards will be traceable to certified standards and standard data reporting formats will be employed. Data will also be reviewed to verify that precision and accuracy criteria were achieved and, if not, that data were appropriately qualified.

8.1.5 Completeness

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected. Completeness will be calculated as follows:

$$C = \frac{\text{(Number of acceptable data points) x 100}}{\text{Total Number of Data Points}}$$

The DQO for completeness for all components of this project is 95 percent. Data that were qualified as estimated because the QC criteria were not met will be considered valid for the purpose of assessing completeness. Data that were qualified as rejected will not be considered valid for the purpose of assessing completeness.

8.2 Quality Control Procedures

Field and laboratory QA/QC procedures are described below. Quality control steps describing sample identification, labeling, handling, chain of custody protocols, and transportation are detailed in Sections 2 through 5.

8.2.1 Field Samples

Field QA/QC samples will be used to evaluate the efficiency of field collection and processing methods. All field QA/QC samples will be documented in the field logs. Field QC samples will be collected and submitted for analyses to monitor the precision and accuracy associated with field procedures. Field QC samples to be collected and analyzed include field duplicate samples and trip blank samples. The definition and sampling requirements for field QC samples are presented below.

8.2.2 Field Duplicates

Field duplicate samples are used to check for sampling and analysis reproducibility. The field duplicate sample results include variability introduced during both field sampling and laboratory preparation and analysis. A “blind” field duplicate will be submitted to the laboratory as a discrete sample (i.e., given a unique sample identifier to keep the duplicate identity unknown to the laboratory), but will be clearly identified in the field log. A field duplicate sample will be collected at a rate of one duplicate sample

per investigation area (i.e., North Tank Group, South Tank Group, each of the three DWMUs, and the exposed soil removal areas, if any). Therefore, it is expected that six field duplicate samples will be collected. Each field duplicate sample will be collected, handled, and analyzed following the same procedures used to collect the associated primary sample.

8.2.3 Trip Blanks

One trip blank sample provided by the laboratory will be submitted with each cooler containing samples for analysis of VOCs. Soil samples collected for analysis of VOCs will be grouped together to minimize the number of trip blank samples. The trip blank sample will be analyzed for the same set of VOCs being requested for the rest of the samples contained within the cooler.

8.2.4 Laboratory Quality Control

The laboratory analytical procedures must meet requirements specified in the respective analytical methods or approved laboratory SOPs maintained at the selected analytical laboratory. These may include, but are not limited to, instrument performance checks, initial calibration, calibration checks, method blanks, surrogate spikes, internal standards, and/or labeled compound spikes. The laboratory's QA officers are responsible for ensuring that the laboratory implements the internal QA/QC procedures detailed in the laboratory's QA Manual.

8.3 Data Quality Verification and Reporting

Reported analytical results will be qualified by the laboratory to identify QC concerns in accordance with the specifications of the analytical methods. Additional laboratory data qualifiers may be defined and reported by the laboratory to explain QC concerns regarding a particular sample result. All data qualifiers will be defined in the laboratory's narrative reports associated with each case. Once received from the laboratory, DH Environmental will review the data for completeness and data quality. The laboratory will report the following, as applicable:

- Project Narrative. This summary will accompany each lab report and document any issues, if present, encountered during analysis, QC, shipping, or storage.
- Sample IDs. Sample IDs will be clearly identified in the laboratory reports. All blind field duplicates will be clearly identified on sample collection forms and matched to laboratory sample IDs.
- Chain of Custody. Copies of all chain of custody records will be included with each lab report. Each chain of custody will document time of receipt at the laboratory, and any transfer of sample custody prior to delivery to the laboratory (either direct by field personnel, or via courier or third-party shipper).
- Analytical Results. Each lab report will include the analytical results for each sample analyzed, including the following, where applicable:
    - Sample ID and corresponding laboratory identification code, if unique
    - Sample matrix
    - Date of extraction

  - Date and time of analysis
  - Weight or volume used for analysis
  - Percent moisture for solid samples
  - Dilution volumes
  - Instrument identification
  - Method detection limits and laboratory reporting limits
  - Analytical results and units of reporting
  - Data qualifiers and definitions, if applicable
  - Electronic data deliverables (EDDs), if requested

- QA/QC Summary. Results of all QA/QC procedures with the same documentation as the original sample results (see above). Corrections to the data will not be made by the laboratory with respect to laboratory blanks or recoveries. The following summaries will be included as part of the QA/QC data:

  - Method Blanks. The method blank analyses associated with each sample and the concentration of all compounds of interest identified in these blanks will be reported.
  - Surrogate Spike Recovery. All surrogate spike recovery data for organic compounds will be reported. The name and concentration of all compounds added, percent recoveries, and range of recoveries will be listed.
  - Matrix Spike Recovery and Matrix Duplicate. All MS recovery data for metals and organic compounds will be reported. The name and concentration of all compounds added, percent recoveries, and range of recoveries will be listed. The RPD for all duplicate analyses will be reported.
  - Blind Duplicates. Blind duplicates will be reported in the same format as any other sample. RPDs will be calculated for duplicate samples and evaluated as part of the data quality review.

8.4 Data Validation

Once each laboratory data package is received from the laboratory, EcoChem of Seattle, Washington, will perform a Stage 2A data validation (EPA, 2009) to assess if the required DQOs have been achieved. Each data package will be checked for completeness to ensure that data and QA/QC information requested are present. Data quality will be validated and qualified based on recommendations from the United States Army Corp of Engineers (USACE, 2005), and the National Functional Guidelines for Organic/Inorganic Superfund Data Review (EPA, 2020a, 2020b), as appropriate.

A data validation summary will be included with the IACR.

8.5 Data and Records Management

All records related to field documentation and analytical reports will be maintained in the project files of DH Environmental, and electronic copies will be provided to Ecology with the IACR. One hard copy of the IACR will also be provided to Ecology.

9 References

[ASTM] Method D-2488. American Society of Testing and Materials, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

DH Environmental, 2020a. Dangerous Waste Clean Closure Report, Former Jorgensen Forge Site, Tukwila, Washington. July 22.

DH Environmental, 2020b. Site Clean Closure at Former Jorgensen Forge Facility, Response to 03 September 2020 Request for Information. Letter to Ms. Katy Harvey. October 5.

DH Environmental, 2020b. Site Clean Closure at Former Jorgensen Forge Facility, Response to 03 September 2020 Request for Information. Letter to Ms. Katy Harvey. October 10.

Ecology, 2005. *Guidance for Clean Closure of Dangerous Waste Units and Facilities*. Hazardous Waste and Toxics Reduction Program. Publication No. 94-111.

Ecology, 2014. *Chemical Testing Methods for Designating Dangerous Waste*. Ecology Publication No. 97-407. December.

Ecology, 2016. *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies.* Publication No. 04-03-030. July 2004, revised December 2016.

EPA, 1986. Test Methods for the Evaluation of Solid Waste: Physical/Chemical Methods, 3rd Edition.

EPA, 1989. *Methods for Evaluating the Attainment of Cleanup Standards. Volume 1: Soils and Solid Media*. EPA 230/02-89-042. NTIS PB89-234959. Statistical Policy Branch, Office of Policy, Planning, and Evaluation. Washington, DC.

EPA, 2002. *RCRA Waste Sampling Draft Technical Guidance; Planning, Implementation, and Assessment*. EPA Publication EPA530-D-02-002. August.

EPA, 2002b. United States Environmental Protection Agency *Guidance for Preparation of Quality Assurance Project Plans*, EPA Region 10, Quality Data Management Program, QA/R-5 guidance document.

EPA, 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85; EPA 540-R-08-005; January.

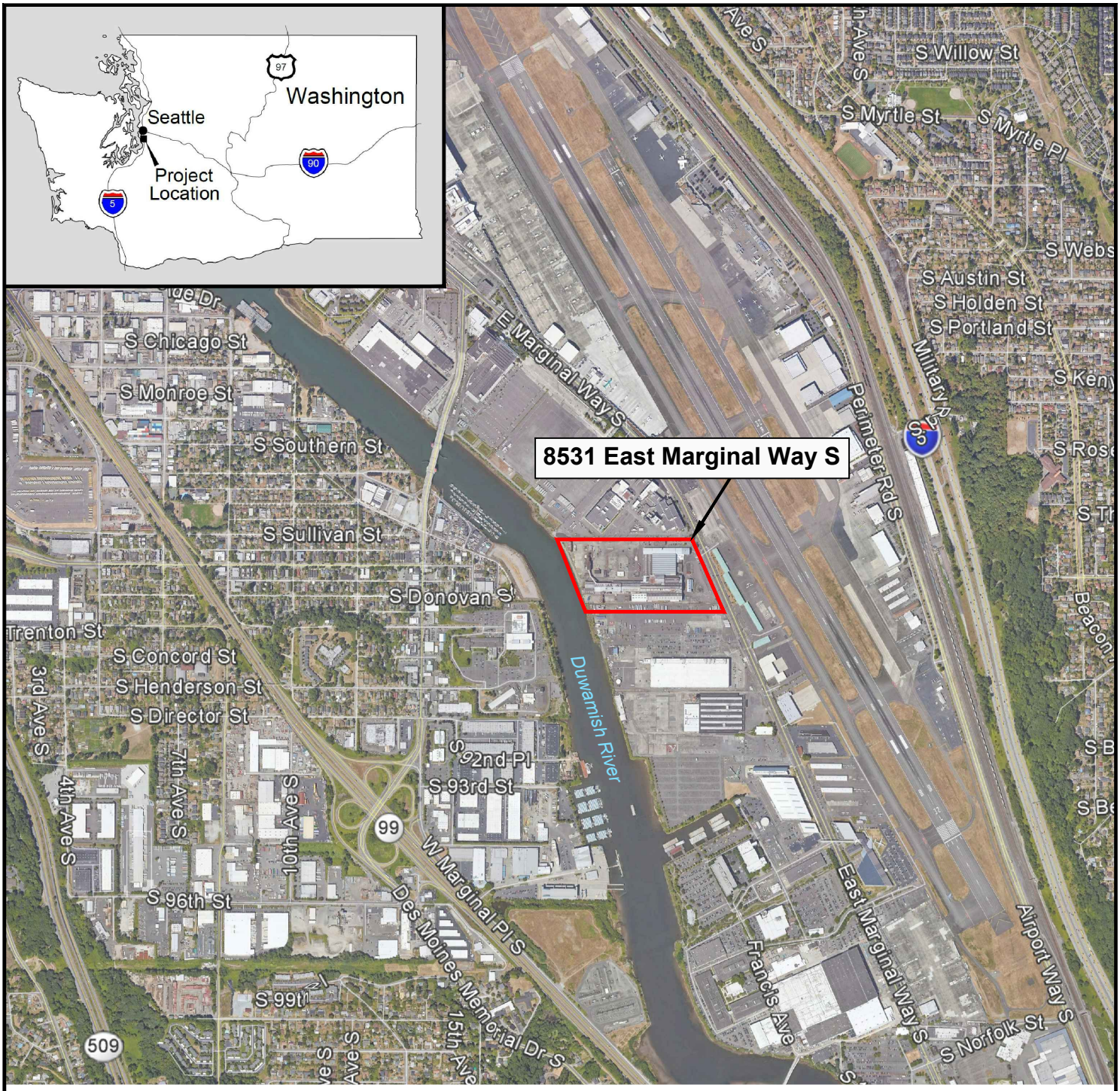
EPA, 2020a. National Functional Guidelines for Organic Superfund Data Review. OLEM 9240.0-51; EPA 540- R-20-005; November.

EPA, 2020b. National Functional Guidelines for Inorganic Superfund Data Review. OLEM 9240.1-66; EPA 542-R-20-006; November.

Shannon & Wilson, 2020. Remedial Investigation Work Plan, Jorgensen Forge Corporation Property, Tukwila, Washington. April 15.

SoundEarth Strategies, Inc., 2019. Letter to Ms. Maureen Sanchez re: October 2019 UST Site Visit. November 21.

USACE, 2005. Guidance For Evaluating Performance Based Chemical Data. Engineer Manual EM 200-1-10. June.



PLOT TIME: 5/22/2020 11:18 AM MOD TIME: 5/22/2020 11:17 AM USER: Kelley Begley DWG: P:\DH Environmental\Site\Jorgensen\DH 2020-05 Jorgensen Vic Map.dwg

DH Environmental Inc

VICINITY MAP

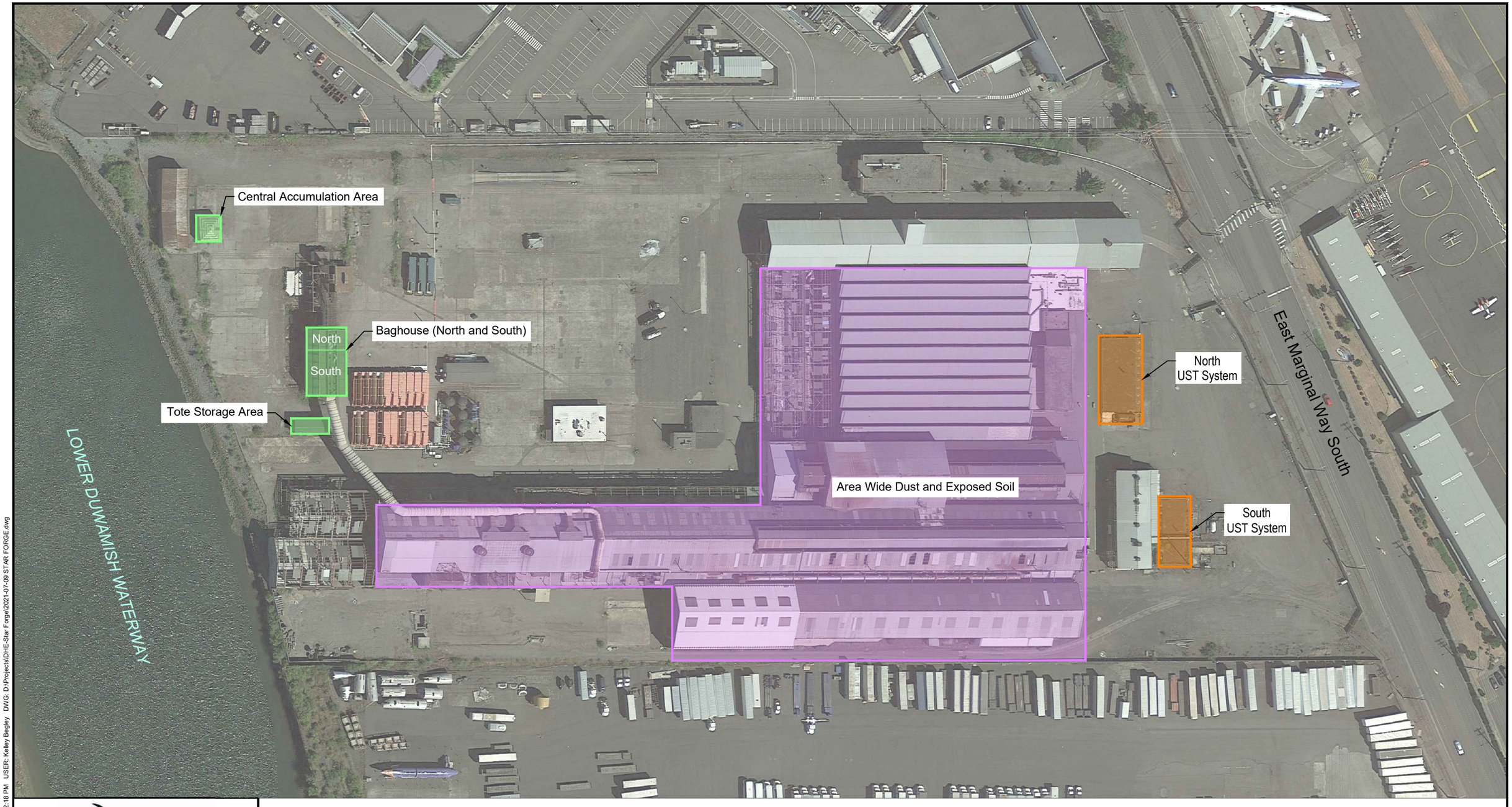
Former Jorgensen Forge Facility 8531 E. Marginal Way S. Tukwila, Washington	05-22-2020	Figure 1

LEGEND

Property Location

N

Background Images Source: Google Earth Pro 5/26/2018



Interim Action Work Areas

Former Jorgensen Forge Facility 8531 E. Marginal Way S. Tukwila, WA, 98108	07/12/2021	Figure 2

Legend

- Former Dangerous Waste Management Units
- Underground Storage Tank Systems
- Area Wide Interior Soil and Dust

Note:

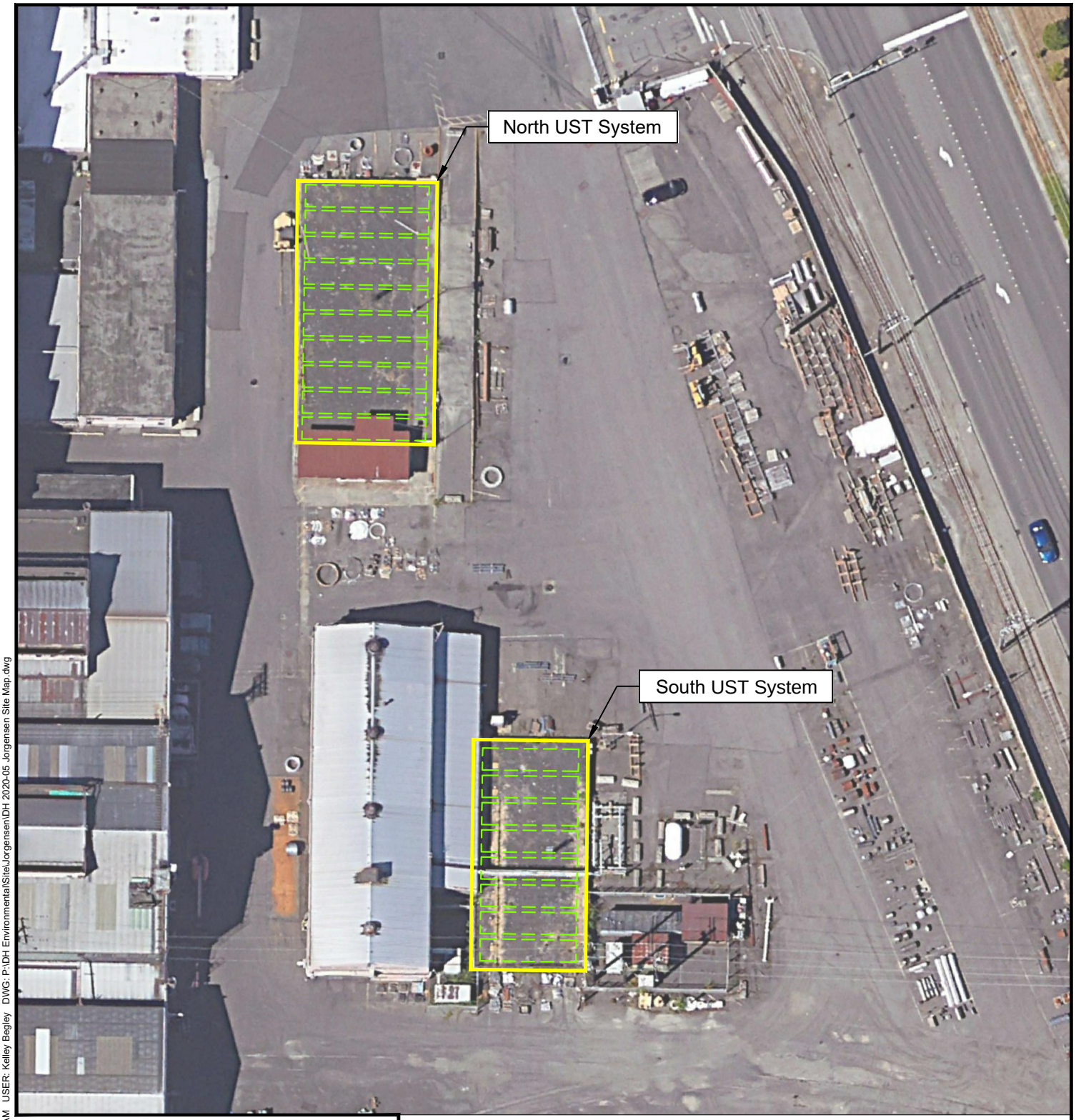
1. Aerial Photography Source: Google Earth Pro, 08/14/2020.

N

0 60 120

Scale in Feet

PLOT TIME: 7/12/2021 2:19 PM MOD TIME: 7/12/2021 2:18 PM USER: Kelley Begley DWG: D:\Projects\DHE-Star Forge\2021-07-09 STAR FORGE.dwg



Note - UST system piping is not shown. Piping will be field located using an underground utility locate subcontractor

0 25 50
Scale in Feet

LEGEND

UST System Location

Underground Storage Tank

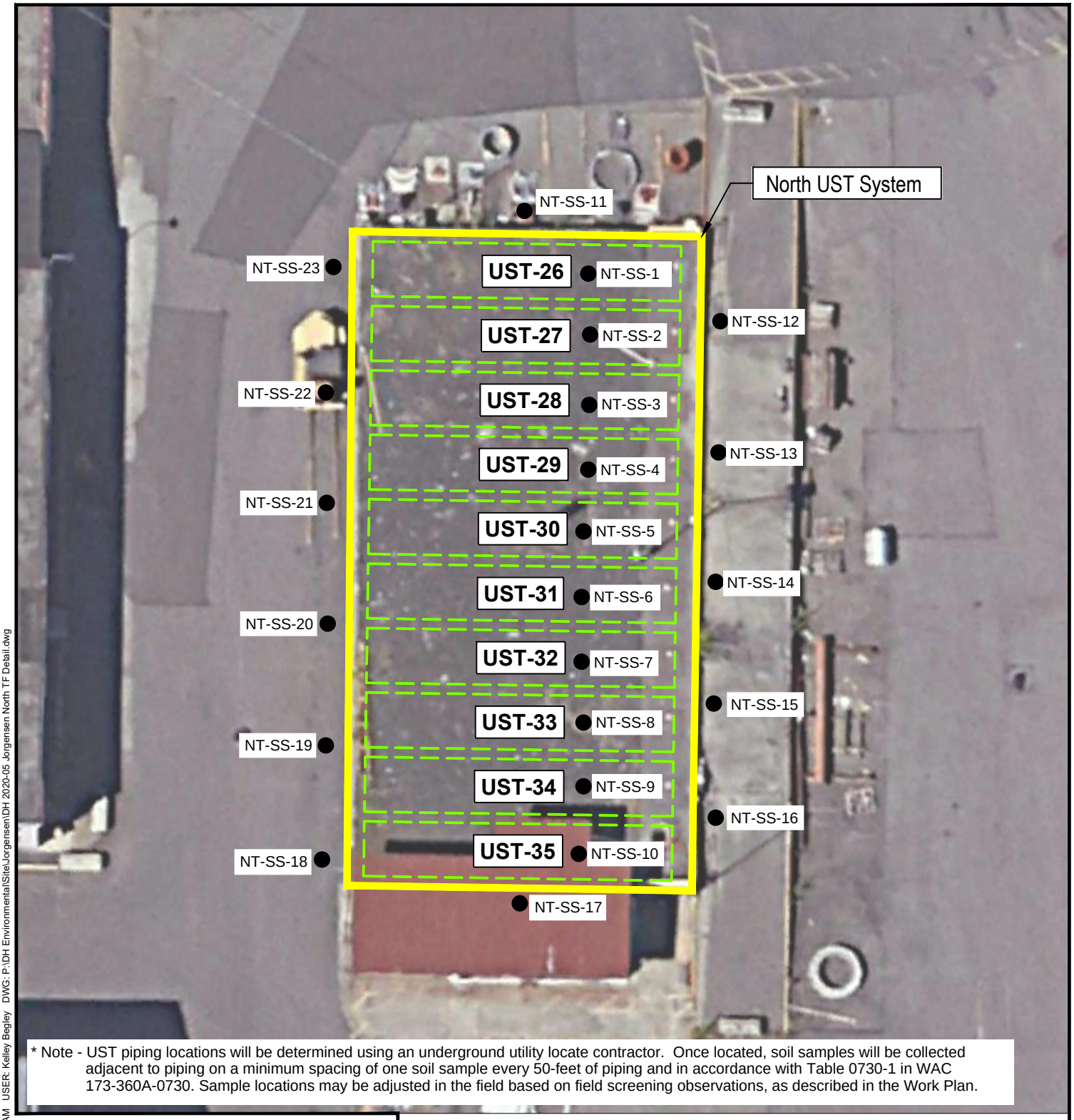
N

Background Images Source: Google Earth Pro 5/26/2018

DH Environmental Inc

UST System Location Map

Former Jorgensen Forge Facility 8531 E. Marginal Way S. Tukwila, Washington	05-22-2020	Figure 3



* Note - UST piping locations will be determined using an underground utility locate contractor. Once located, soil samples will be collected adjacent to piping on a minimum spacing of one soil sample every 50-feet of piping and in accordance with Table 0730-1 in WAC 173-360A-0730. Sample locations may be adjusted in the field based on field screening observations, as described in the Work Plan.

0 10 20
Scale in Feet

Legend

- Soil Sample Location and Designation
- Underground Storage Tank
- UST System Location

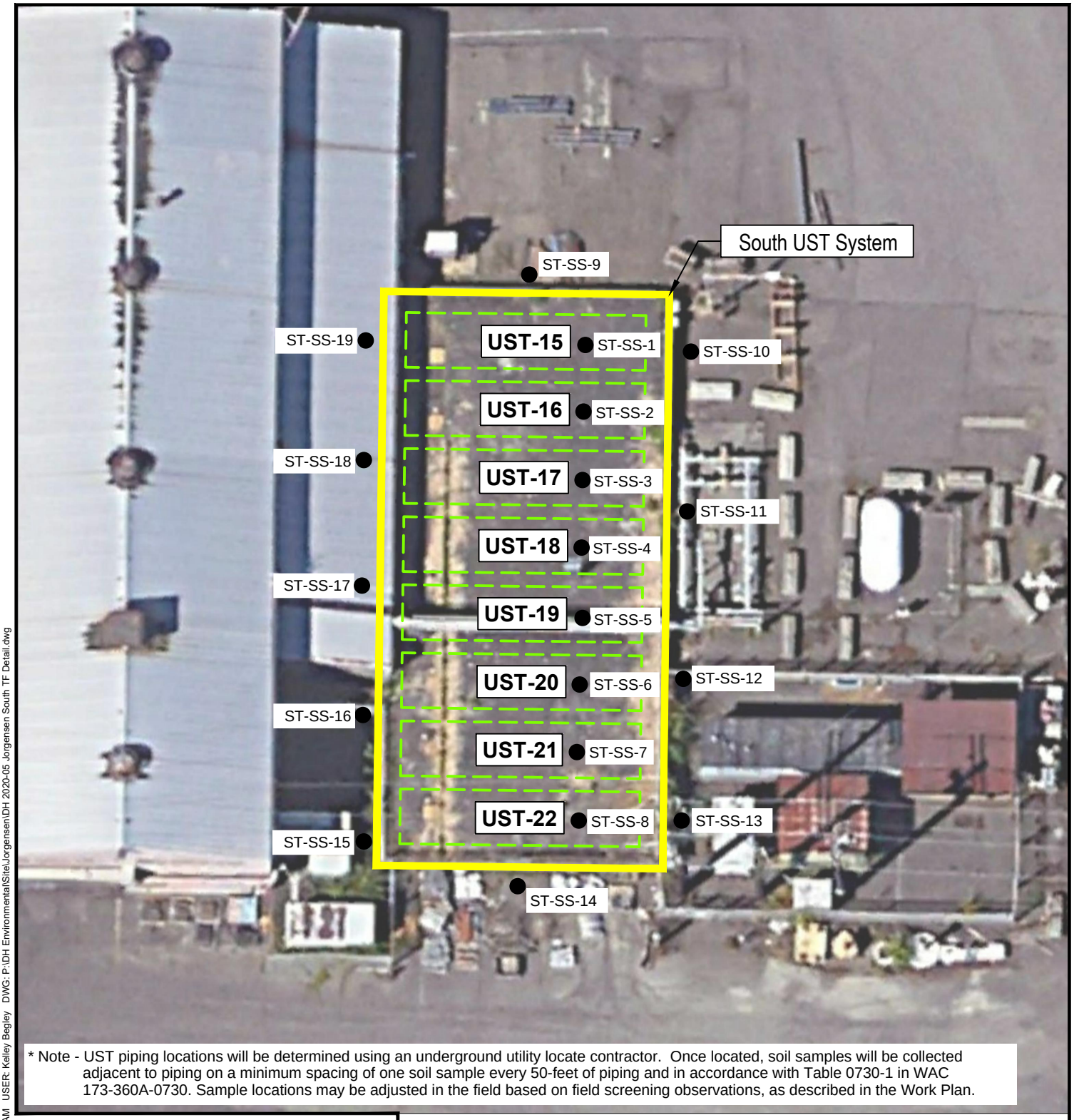
N

Background Images Source: Google Earth Pro 5/26/2018

DH Environmental Inc

North UST System Detail Map

Former Jorgensen Forge Facility 8531 E. Marginal Way S. Tukwila, Washington	05-22-2020	Figure 4



* Note - UST piping locations will be determined using an underground utility locate contractor. Once located, soil samples will be collected adjacent to piping on a minimum spacing of one soil sample every 50-feet of piping and in accordance with Table 0730-1 in WAC 173-360A-0730. Sample locations may be adjusted in the field based on field screening observations, as described in the Work Plan.

0 10 20
Scale in Feet

Legend

- Soil Sample Location and Designation
- Underground Storage Tank
- UST System Location

N

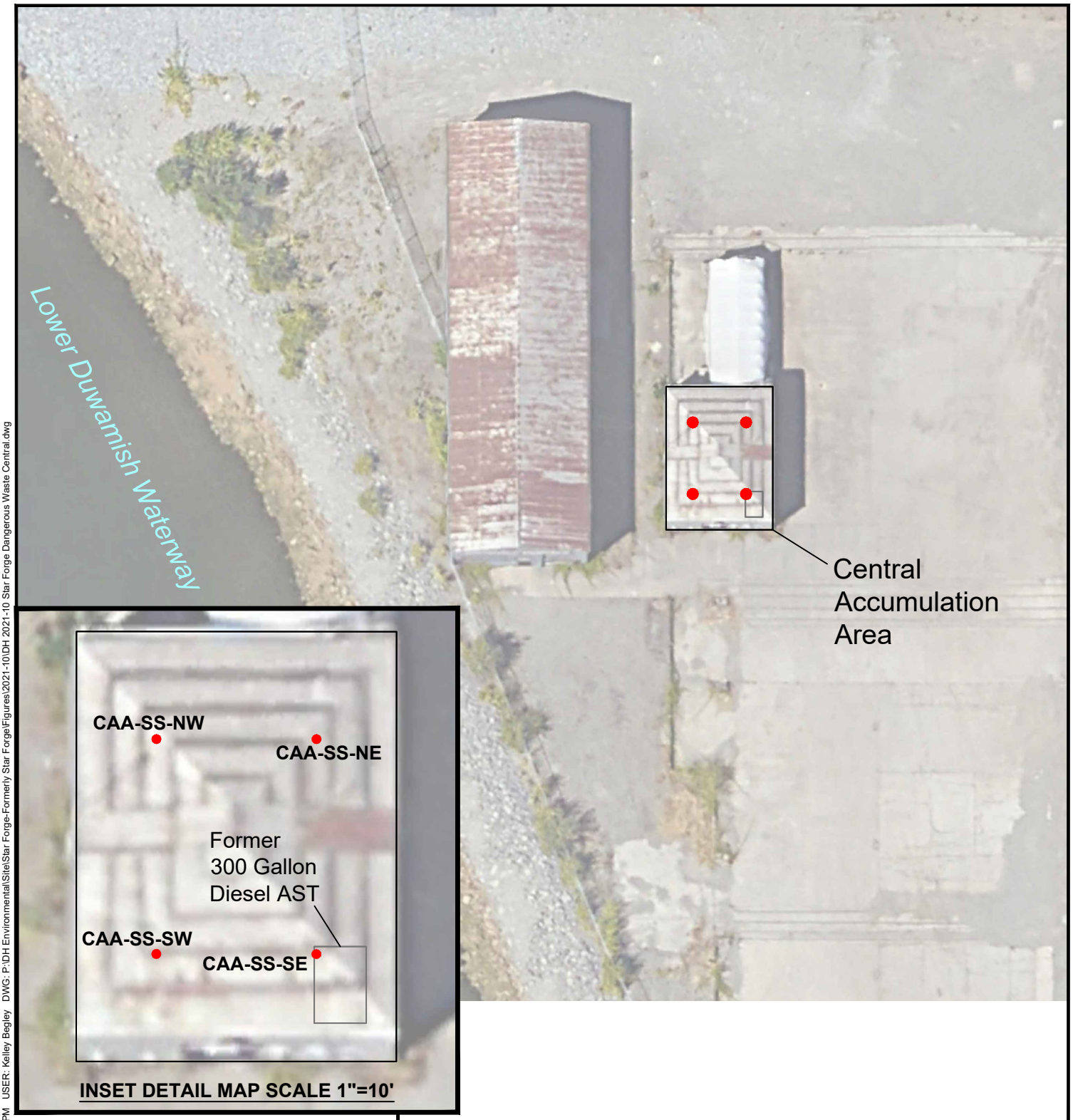
Background Images Source: Google Earth Pro 5/26/2018

DH Environmental Inc

South UST System Detail Map

Former Jorgensen Forge Facility 8531 E. Marginal Way S. Tukwila, Washington	05-22-2020	Figure 5

PLOT TIME: 5/22/2020 11:22 AM MOD TIME: 5/22/2020 11:21 AM USER: Kelley Begley DWG: P:\DH Environmental\Site\Jorgensen\DH 2020-05 Jorgensen South TF Detail.dwg



INSET DETAIL MAP SCALE 1"=10'

LEGEND

- Sub Slab Soil Sample Location and Designation

N

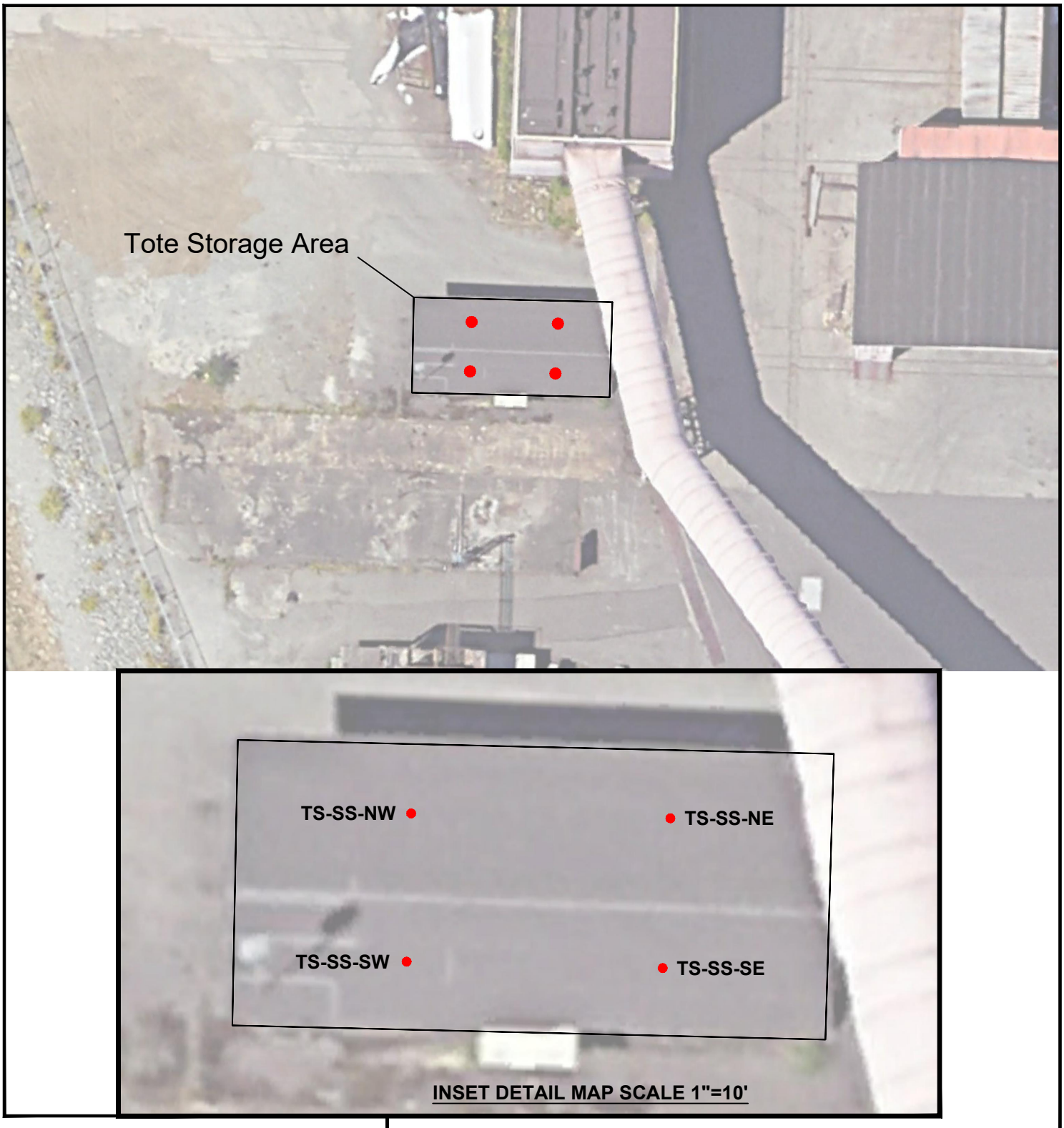
0 15 30

Scale in Feet

DH Environmental Inc

Central Accumulation Area Sub Slab Soil Sample Locations

Former Jorgensen Forge Facility 8531 East Marginal Way S Tukwila, WA, 98108	10-13-2021	Figure 6



DH Environmental Inc

Tote Storage Area
Sub Slab Soil Sample Locations

Former Jorgensen Forge Facility 8531 East Marginal Way S Tukwila, WA, 98108	10-13-2021	Figure 7

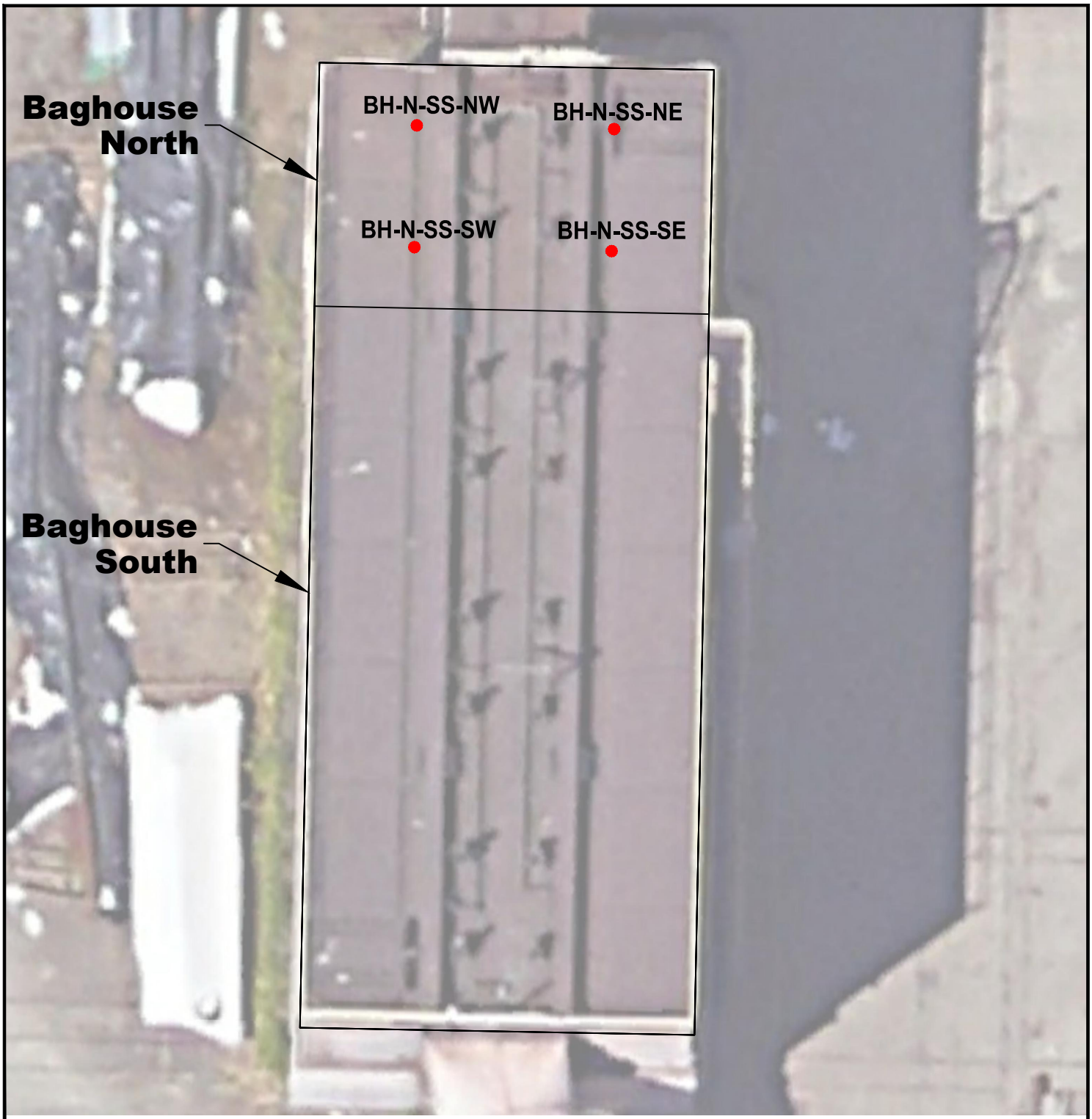
LEGEND

- Sub Slab Soil Sample Location and Designation

N

0 15 30

Scale in Feet



Note: The concrete slab in the southern half of the Baghouse (Baghouse South) meets clean closure standards and sampling is not required

LEGEND

● Sub Slab Soil Sample Location and Designation

N

0 6 12

Scale in Feet

DH Environmental Inc

Baghouse North
Sub Slab Soil Sample Locations

Former Jorgensen Forge Facility 8531 East Marginal Way S Tukwila, WA, 98108	10-13-2021	Figure 8

Table 1
Dangerous Waste Management Units
Clean Closure Cleanup Levels
Star Forge Interim Action, Seattle, Washington

DWMU Name	Contaminants of Concern	Applicable Soil Cleanup Level
Central Accumulation Area	Slab exceeds MTCA Method A, Unrestricted, for Diesel Range Organics	Diesel Range Organics: 2,000 mg/kg
Tote Storage Area	Slab exceeds MTCA Method A, Unrestricted, for Diesel Range Organics and PCBs	Diesel Range Organics: 2,000 mg/kg Total PCBs: 1 mg/kg
Baghouse	Baghouse North slab exceeds MTCA Method A, Unrestricted, for Diesel Range Organics and Hexavalent Chromium	Diesel Range Organics: 2,000 mg/kg Hexavalent Chromium: 19 mg/kg

Abbreviations:

DWMU = Dangerous waste management unit

MTCA = Model Toxics Control Act; Washington Administrative Code 173-340

mg/kg = milligrams per kilogram

PCBs = Polychlorinated biphenyls

Table 2
Containers, Preservatives, and Holding Times for Media Samples
Star Forge Interim Action, Seattle, Washington

Analysis	Matrix	EPA Analytical Method	Sample Container Size/Type	Preservation	Holding Time
Total metals	soil	EPA 6010D (all except Hg & Cr(VI)) EPA 7471B (Hg) EPA 7196 (Cr(VI))	4-oz. clear wide mouth glass jar	None. Store on ice ≤ 6˚C	6-months (all except Hg) 28-days (Hg) 30-days (Cr(VI))
PCBs		EPA 8082	4-oz. clear wide mouth glass jar	None. Store on ice ≤ 6˚C	none
VOCs		EPA 8260	(3) 40-ml VOAs, (2) with a stir bar, (1) without a stir bar	None. Store on ice ≤ 6˚C	48-hours to extract/freeze, 14 days to analyze
cPAHs		EPA 8270/SIM	4-oz. clear wide mouth glass jar	None. Store on ice ≤ 6˚C	14-days to extract, 40-days to analyze
GRO		NWTPH-Gx	(1) 40-ml VOA without stir bar	None. Store on ice ≤ 6˚C	48-hours to extract/freeze, 14 days to analyze
DRO		NWTPH-Dx	4-oz. clear wide mouth glass jar	None. Store on ice ≤ 6˚C	14-days to extract, 40-days to analyze
Total metals	groundwater	EPA 6010D (all except Hg) EPA 7471B (Hg)	500-ml HDPE	HNO3. Store on ice ≤ 6˚C	6-months (all except Hg) 28-days (Hg)
VOCs		EPA 8260	(3) 40-ml VOAs	HCl. Store on ice ≤ 6˚C	14-days to analyze
cPAHs		EPA 8270/SIM	(2) 1-L amber	None. Store on ice ≤ 6˚C	7-days to extract, 40-days to analyze
GRO		NWTPH-Gx	(3) 40-ml VOAs	HCl. Store on ice ≤ 6˚C	14-days to analyze
DRO		NWTPH-Dx	(2) 500-ml amber	HCl. Store on ice ≤ 6˚C	14-days to extract, 40-days to analyze

Abbreviations:

EPA = Environmental Protection Agency
Hg = mercury
Cr(VI) = hexavalent chromium
oz. = ounce
˚C = degrees celsius
PCBs = polychlorinated biphenyls
VOCs = volatile organic compounds
ml = milliliters
VOA = volatile organic analysis (glass vial)
cPAHs = carcinogenic polycyclic aromatic hydrocarbons
DRO = diesel-range organics
HDPE = high density polyethylene
GRO = gasoline-range organics
SIM = selected ion monitoring

Table 3

Analytical Parameters, Method Detection Limits, and Laboratory Reporting Limits
Star Forge Interim Action, Seattle, Washington

Analyte	Method	Soil				Groundwater	
		MDL (mg/kg)	RL (mg/kg)	MDL (µg/kg)	RL (µg/kg)	MDL (µg/L)	RL (µg/L)
Metals							
Arsenic (total)	6010/6020	n/a	10			0.157	5.0
Barium	6010/6020	n/a	2.5			0.208	28
Cadmium	6010/6020	n/a	0.50			0.0548	4.4
Chromium (total)	6010/6020	n/a	0.50			1.03	11
Chromium (VI)	7196	0.221	1.0				
Copper	6010/6020	n/a	1.0			0.587	11
Lead	6010/6020	n/a	5.0			0.392	1.1
Mercury	7470/7471	0.000704	0.25			0.0163	0.50
Nickel	6010/6020	n/a	2.5			0.348	22
Selenium	6010/6020	n/a	10			1.34	5.6
Silver	6010/6020	n/a	1.0			0.163	11
Zinc	6010/6020	n/a	2.5			2.40	56
Polychlorinated Biphenyls (PCBs)							
PCBs (all Aroclors)	8082	0.0296	0.050			0.0257	0.050
Volatile Organic Compounds (VOCs)							
Dichlorodifluoromethane	8260			0.373	1.0	0.0448	0.20
Chloromethane	8260			1.16	5.0	0.197	1.0
Vinyl Chloride	8260			0.312	1.0	0.0652	0.20
Bromomethane	8260			0.552	1.0	0.0751	0.20
Chloroethane	8260			1.94	5.0	0.147	1.0
Trichlorofluoromethane	8260			0.273	1.0	0.0511	0.20
1,1-Dichloroethene	8260			0.330	1.0	0.0844	0.20
Acetone	8260			4.71	10	0.441	5.0
Iodomethane	8260			1.23	5.0	0.249	1.0
Carbon Disulfide	8260			0.436	1.0	0.0909	0.20
Methylene Chloride	8260			1.17	5.0	0.192	1.0
Acrylonitrile	8260					0.140	0.50
(trans) 1,2-Dichloroethene	8260			0.247	1.0	0.0497	0.20
Methyl t-Butyl Ether	8260			0.260	1.0	0.0503	0.20
1,1-Dichloroethane	8260			0.350	1.0	0.0988	0.20
Vinyl Acetate	8260			2.50	5.0	0.173	1.0
2,2-Dichloropropane	8260			0.360	1.0	0.0777	0.20
(cis) 1,2-Dichloroethene	8260			0.214	1.0	0.109	0.20
2-Butanone	8260			1.73	5.0	0.332	5.0
Bromochloromethane	8260			0.785	1.0	0.0701	0.20
Chloroform	8260			0.275	1.0	0.0391	0.20
1,1,1-Trichloroethane	8260			0.210	1.0	0.0293	0.20
Carbon Tetrachloride	8260			0.343	1.0	0.0409	0.20
1,1-Dichloropropene	8260			0.270	1.0	0.0519	0.20
Benzene	8260			0.325	1.0	0.0404	0.20
1,2-Dichloroethane	8260			0.285	1.0	0.0288	0.20
Trichloroethene	8260			0.243	1.0	0.0461	0.20
1,2-Dichloropropane	8260			0.456	1.0	0.0489	0.20
Dibromomethane	8260			0.482	1.0	0.0954	0.20
Bromodichloromethane	8260			0.250	1.0	0.0629	0.20
2-Chloroethyl Vinyl Ether	8260			1.56	5.0	0.220	1.0
(cis) 1,3-Dichloropropene	8260			0.264	1.0	0.0471	0.20
Methyl Isobutyl Ketone	8260			1.76	5.0	0.207	2.0
Toluene	8260			0.244	5.0	0.0349	1.0
(trans) 1,3-Dichloropropene	8260			0.377	1.0	0.0421	0.20
1,1,2-Trichloroethane	8260			0.424	1.0	0.0854	0.20
Tetrachloroethene	8260			0.263	1.0	0.0594	0.20
1,3-Dichloropropane	8260			0.301	1.0	0.0397	0.20
2-Hexanone	8260			1.65	5.0	0.237	2.0
Dibromochloromethane	8260			0.363	1.0	0.0535	0.20
1,2-Dibromoethane	8260			0.335	1.0	0.0516	0.20

Table 3

Analytical Parameters, Method Detection Limits, and Laboratory Reporting Limits
Star Forge Interim Action, Seattle, Washington

Analyte	Method	Soil				Groundwater	
		MDL (mg/kg)	RL (mg/kg)	MDL (µg/kg)	RL (µg/kg)	MDL (µg/L)	RL (µg/L)
Volatile Organic Compounds (VOCs)							
Chlorobenzene	8260			0.229	1.0	0.0363	0.20
1,1,1,2-Tetrachloroethane	8260			0.364	1.0	0.0495	0.20
Ethylbenzene	8260			0.175	1.0	0.0478	0.20
m,p-Xylene	8260			0.524	2.0	0.0562	0.40
o-Xylene	8260			0.311	1.0	0.0391	0.20
Styrene	8260			0.395	1.0	0.0440	0.20
Bromoform	8260			0.301	5.0	0.209	1.0
Isopropylbenzene	8260			0.279	1.0	0.0357	0.20
Bromobenzene	8260			0.297	1.0	0.0496	0.20
1,1,2,2-Tetrachloroethane	8260			0.386	1.0	0.0430	0.20
1,2,3-Trichloropropane	8260			0.459	1.0	0.0626	0.20
(trans) 1,4-Dichloro-2-butene	8260			n/a	n/a	0.148	0.50
n-Propylbenzene	8260			0.339	1.0	0.0280	0.20
2-Chlorotoluene	8260			0.388	1.0	0.0483	0.20
4-Chlorotoluene	8260			0.471	1.0	0.0396	0.20
1,3,5-Trimethylbenzene	8260			0.359	1.0	0.0387	0.20
tert-Butylbenzene	8260			0.377	1.0	0.0446	0.20
1,2,4-Trimethylbenzene	8260			0.241	1.0	0.0285	0.20
sec-Butylbenzene	8260			0.335	1.0	0.0475	0.20
1,3-Dichlorobenzene	8260			0.465	1.0	0.0445	0.20
p-Isopropyltoluene	8260			0.248	1.0	0.0588	0.20
1,4-Dichlorobenzene	8260			0.622	1.0	0.0559	0.20
1,2-Dichlorobenzene	8260			0.402	1.0	0.0249	0.20
n-Butylbenzene	8260			0.376	1.0	0.0682	0.20
1,2-Dibromo-3-chloropropane	8260			1.58	5.0	0.292	1.0
1,2,4-Trichlorobenzene	8260			0.401	1.0	0.0571	0.20
Hexachlorobutadiene	8260			0.466	5.0	0.255	1.0
Naphthalene	8260			1.05	5.0	0.0612	1.0
1,2,3-Trichlorobenzene	8260			0.498	1.0	0.107	0.20
Semivolatile Organic Compounds (SVOCs)							
Benzo[a]anthracene	8270E-SIM	0.000212	0.0067			0.00475	0.010
Chrysene	8270E-SIM	0.000184	0.0067			0.00302	0.010
Benzo[b]fluoranthene	8270E-SIM	0.000162	0.0067			0.00527	0.010
Benzo[j,k]fluoranthene	8270E-SIM	0.000133	0.0067			0.00435	0.010
Benzo[a]pyrene	8270E-SIM	0.000244	0.0067			0.00499	0.010
Indeno(1,2,3-c,d)pyrene	8270E-SIM	0.000212	0.0067			0.00391	0.010
Dibenz[a,h]anthracene	8270E-SIM	0.000292	0.0067			0.00583	0.010
Benzo[g,h,i]perylene	8270E-SIM	0.000199	0.0067			0.00439	0.010
Naphthalene	8270E-SIM	0.000167	0.0067				
Total Petroleum Hydrocarbon Compounds							
Gasoline range organics	NWTPH-Gx	0.214	5.0				
Diesel range organics	NWTPH-Dx	11.4	25			50.40	200
Heavy Oil	NWTPH-Dx	10.6	50			43.90	200

Notes:

Both Method Detection Limits (MDLs) and Reporting Limits (RLs) are highly matrix dependant. In particular, MDLs and RLs will increase for soil samples based on the moisture content. Both MDLs and RLs can also be affected by dilution. Therefore, RLs are provided for guidance and may not always be achievable.

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

µg/L = micrograms per liter

SIM = Selected Ion Monitoring

MDL = Method Detection Limit

RL = Reporting Limit; this value represents the level of the lowest calibration standard (i.e., the laboratory practical quantitation limit [PQL]).

Table 4

Summary of Sample Requirements per Task
Star Forge Interim Action, Seattle, Washington

Interim Action Work Area		Number of Samples Required	Sample Analysis
USTs	Northern USTs	- 23 Soil Samples (tank vault) - 5 soil samples (piping, assumed) [1] - 1 Groundwater Sample (if encountered)	- DRO by Method NWTPH-Dx [2] - GRO by Method NWTPH-Gx [2] - EDB, EDC, MTBE, BTEX, and HVOCs by EPA Method 8260 [3] - PCBs by EPA Method 8082 [3] - cPAHs and naphthalene by EPA Method 8270E/SIM [3] - Total RCRA 8 metals by EPA Methods 6010D [3, 4] (arsenic, barium, cadmium, chromium, lead, selenium, and silver) and 7471B (mercury) - VOCs (full list) by EPA Method 8260 [4] - Total copper, nickel, and zinc by EPA Method 6010D [4]
	Southern USTs	- 19 Soil Samples (tank vault) - 5 soil samples (piping, assumed) [1] - 1 Groundwater Sample (if encountered)	
DWMUs	Central Accumulation Area	- 4 soil samples	- DRO by Method NWTPH-Dx
	Tote Storage Area	- 4 soil samples	- DRO by Method NWTPH-Dx - PCBs by EPA Method 8082
	Baghouse North	- 4 soil samples	- DRO by Method NWTPH-Dx - Hexavalent chromium by EPA Method 7196
Exposed Soil Removal		- Varies [5]	- Total RCRA 8 metals plus copper, nickel, and zinc by EPA Methods 6010D (arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium, silver, and zinc) and 7471B (mercury) - PCBs by EPA Method 8082 - VOCs by EPA Method 8260

Notes

1. Number of piping samples will be determined by piping length, if present, and the requirements in Table 0730-1 in WAC 173-360A-0730. A minimum of 1 soil sample will be collected for every 50-feet of piping.
2. Required for all UST soil samples and groundwater samples (if present)
3. Follow-up soil samples based on initial results, see IAWP Appendix A (SAP/QAPP) for details
4. Additional analyte required for groundwater samples (if present)
5. One soil sample will be collected for every 1,500 square feet of cut area, or portion thereof. See Appendix A of the IAWP (SAP/QAPP) for details
6. If unexpected conditions are encountered based on the results of field screening (e.g., petroluem staining or odors in an area where petroleum compounds are not expected), the Ecology PM must be informed, and Ecology may request additional samples be collected

Abbreviations

UST = Underground Storage Tank
DWMU = Dangerous waste management unit
PCBs = Polychlorinated biphenyls
DRO = diesel range organics
GRO = gasoline range organics
EDB = 1-2, dibromoethane
EDC = 1-2, Dichloroethane
MTBE = methyl tertiary-butyl ether
BTEX = Benzene, toluene, ethylbenzene, and xylenes
HVOCs = halogenated volatile organic compounds
cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbon
VOC = volatile organic compound
RCRA = Resource Conservation and Recovery Act
EPA = Environmental Protection Agency

Appendix A

Standard Operating Procedures

Standard Operating Procedure - Surface/Shallow Soil Sampling

This Standard Operating Procedure (SOP) describes the procedures and equipment to be used by DH Environmental personnel for collecting surface and shallow soil samples.

Equipment

- Stainless steel spoons
- Shovel/trowels
- Hand auger
- Post hole digger
- Pick
- Breaker bar
- Photoionization detector (PID)
- Measuring tape or wheel
- Mapping grade GPS
- Stakes, flagging, and/or spray paint for marking sampling grids and/or sampling locations
- Decontamination equipment (if required):
    - Stiff-bristle brushes
    - Buckets
    - Phosphate-free soap, (Liquinox, Alconox, or equivalent)
    - Potable water
    - Distilled water
- Coolers
- Ice (double bagged)
- Laboratory supplied sampling containers (refer to project Sample Analysis Plan)
- Personal protective equipment (as specified in Health and Safety Plan)

Typical Procedure

1. Submit public utility location request (811) a minimum of 2-business days prior to any excavation or drilling work
2. Clear locations for underground utilities and structures with public locators and/or private utility locate subcontractors as necessary
3. Prior to each sampling event, wash sampling equipment that may be in contact with the soil sample (trowels, hand auger, stainless steel sampling spoons, etc.) with laboratory grade phosphate-free soap (Liquinox, Alconox, or equivalent). Double-rinse with distilled water
4. If sample locations are known in advance, measure and mark sampling locations prior to initiation of the sampling program. If sampling locations are based on a grid or other defined layout, utilize stakes, flagging, and/or paint to mark the sampling grid. Refer to the project sampling and analysis plan for details

5. If overlying soil is to be removed (as specified in the sampling and analysis plan), use shovels, picks, or post-hole diggers, as needed
6. If applicable, as described in the site safety plan, use a PID to analyze air in the breathing zone and other locations as necessary to evaluate health and safety concerns
7. If applicable, as described in the site safety plan, field screen the soil over the area to be sampled for evidence of potential contamination. Field screening should include visual evidence of staining, sheen, or debris; olfactory evidence of unusual odors; and PID readings to locate areas of potential contamination
8. Collect soil samples for chemical analysis by using precleaned stainless steel spoons or a hand auger as applicable, as described in the Sampling Analysis Plan
9. If applicable, collect soil samples for lithologic logging purposes and log the soils in the field in general accordance with the visual-manual procedure of the Unified Soil Classification System (ASTM D 2488-90)
10. At each sampling interval, as defined in the Sampling Analysis Plan, collect soil and place it in the laboratory supplied sampling container. For samples collected for analysis of non-volatile compounds, fill the sample container and compact the soil to minimize air space. Remove rocks or debris larger than approximately 3/8-inch in diameter
11. Samples collected for analysis of volatile compounds (e.g., VOCs by EPA Method 8260 and/or gasoline by method NWTPH-Gx), should be collected following EPA Method 5035 by collecting a 5-gram aliquot of soil using a Terracore sampler (or equivalent). The Terracore sampler should be provided by the laboratory with the sampling containers. Each Terracore sampler is a single use device and should be discarded after use

    With the plunger seated in the handle, push the plastic Terracore into freshly exposed soil until the sample chamber is filled (chamber is pre-set to deliver approximately 5 grams of soil). Wipe all soil or debris from the outside of the Terracore sampler. Remove excess soil that extends beyond the mouth of the sampler. Rotate the plunger that was seated in the handle, place the mouth of the sampler into the vial and extrude the sample by pushing the plunger down. Secure the cap on each vial after removing any soil or debris from the top and/or threads of the vial for a proper seal
12. Label the samples according to the labeling requirements of the Sampling Analysis Plan and document the samples on a soil sample collection form
13. Place the selected samples in appropriate laboratory supplied containers and store them in an iced cooler until they can be delivered to the laboratory
14. If necessary, mark the sample location in the field with a stake so its location can be surveyed with a GPS or marked based on permanent site features using a measuring tape or wheel

15. Complete chain-of-custody forms in the field and transport the samples to the analytical laboratory. Refer to the Sampling Analysis Plan for trip blank requirements, hold time limits, and other requirements

Equipment Decontamination

If the sampling equipment is not dedicated/disposable, it should be washed using a scrub brush and laboratory grade phosphate-free soap (liquinox, Alconox, or equivalent), in a solution with distilled water, followed by a double rinse with distilled water.

Investigation Derived Waste

Any soil cuttings or decontamination water should be contained in appropriately labeled containers for final disposition by the owner, as described in the Sampling Analysis Plan.

Standard Operating Procedure - Sample Handling, Packing, & Shipping

This Standard Operating Procedure (SOP) describes the methods for handling, packing, and shipping of environmental samples.

Note, this SOP does not describe the shipping of hazardous materials. If samples are known or expected to be hazardous (as defined in 49 CFR 171.8), specific requirements for packaging may apply before they can be shipped by a parcel or shipping service. Refer to the Project specific work plans for sample shipping requirements in this case. UPS and FedEx hold shippers liable for damages in the event of an accident if a hazardous material is shipped as a non-hazardous material.

Equipment

- Coolers
- Sorbent material
- Bubble-wrap
- Packing tape
- Labels and pens
- Chain-of-Custody forms
- Chain-of-Custody seals

Sample Packing

If the sample container contains liquid samples, absorbent pads should be placed in the bottom of the cooler to absorb liquids in the event of sample container breakage. If the samples are going to be shipped using a mail/cargo shipping service (e.g., UPS, FedEx, Alaska Air Cargo, etc.), transportation regulations require absorbent capacity of the material to equal the amount of liquid being shipped. Samples in glass jars or bottles should also be wrapped in plastic bubble wrap. A small amount of air space is desirable for liquid samples in plastic containers. This can minimize chances of the cap coming off the container if the container undergoes compression (due to changes in altitude or direct physical compression due to handling).

Containers for analysis of volatile compounds (e.g., VOCs by EPA Method 8260, or GRO by Method NWTPH-Gx) should be packed in sponge or Styrofoam holders and packed in the same cooler to the extent practical. Each cooler with containers for volatile analysis should include a trip blank.

Sufficient water ice or blue ice packs should be used to keep the samples below 6-degrees Celsius for the duration of the shipment (up to 48 hours if shipping by mail or cargo delivery service). The volume of ice will depend on the location and season the samples are collected in, or where they are being shipped. A minimum of 8-pounds of water ice (or equivalent) should be placed in each cooler. Samples collected during the summer months, or samples being shipped to a laboratory in a southern state, will require more ice than those collected in the winter months (in some cases up to 16-pounds of water ice, or equivalent). Ice should be double bagged to prevent leakage. Sample labels should be marked using waterproof pens and labels as the labels can get wet from condensation in the cooler. Refer to the Sample Analysis Plan for additional details, as containers for certain analysis (e.g. PFAS analysis) should only be marked with pens known to contain PFAS free ink. Bubble wrap should be placed into the coolers to prevent sample containers from moving during transport. If the cooler is equipped with a drain plug, the drain plug should be taped closed to prevent it from accidentally opening during transport.

Once the coolers are packed, they should be sealed closed with packing tape. If a courier or shipping service is being used, the cooler should also be sealed with a chain of custody seal that can indicate if the cooler was opened during transport, prior to its arrival at the laboratory.

Sample Handling

Sample coolers must remain in the possession of the sample collection team at all times. If the cooler is to be left overnight, it should be locked in a secure location (i.e., the project office or DH Environmental office) until it can be delivered to the laboratory. Samples should not be left overnight in a vehicle, unless the vehicle is parked in a secure location (i.e., an access controlled garage), and the vehicle is locked. A sample chain-of-custody (COC) form should accompany the samples at all times. Coolers should be secured in the vehicle during transportation to minimize the potential for sample container breakage. If the coolers are placed in the back of a truck, they should be strapped to prevent the cooler from sliding in either direction, and/or from bouncing. Any time the possession of the samples is transferred to another person, the COC must be signed and dated by both parties documenting the transfer.

Sample Shipping

Samples should remain in the custody of DH Environmental, Inc. employees who collected the samples until they can be delivered to the analytical laboratory. The preference is for sampling personnel to directly deliver the samples to the laboratory at the completion of each phase of a job. However, this may not always be feasible, in which case courier or shipping services should be utilized as required by the project. Most local labs offer courier services, contact the laboratory in advance to arrange these services if required.

Pay attention to hold times and specific laboratory requirements for Saturday delivery, if needed. The sampling schedule may have to be adjusted based on these limitations (e.g., samples with extremely short hold times, samples collected on Friday, Saturday, or Sunday, holidays, etc.), and the schedule should be discussed in detail with the selected analytical laboratory prior to initiating a sampling program. Communicate with the laboratory project manager if the schedule changes, or if unexpected conditions are encountered in the field which may affect the sample delivery schedule.

COC documentation should accompany all shipments of samples to the analytical laboratory. Upon delivery, a copy of the completed COC should be retained in the event that the original form is lost or destroyed. Typically, COC forms provided by the analytical laboratory will include a carbon copy form for this purpose. If the samples are being transferred multiple times (e.g., from one employee to another, then to a courier or shipper), then a copy of the COC should be made at the time of each transfer. If possible, utilize a scanner or photocopier. If a copier is not available, a digital camera can be used.

If a parcel shipping service is used (e.g., UPS, FedEx, Alaska Air Cargo, etc.), samples should be shipped via the fastest available shipping service. Coordinate with the laboratory project manager to make sure someone will be available at the lab to accept the shipment. Where possible, try to avoid shipping samples on a Friday. Although most labs offer Saturday hours, shipping services may experience delays which could result in the samples sitting for 48-hours or more, potentially resulting in samples arriving outside of recommended temperatures, and/or exceeding applicable hold times

Standard Operating Procedure - Water Sampling from an Excavation

This Standard Operating Procedure (SOP) describes the procedures and equipment to be used by DH Environmental personnel for collecting grab water samples from an excavation. Note that collection of a water sample from an excavation is a screening approach used when assessing UST site conditions or performing a UST site check. Ecology guidance specifically states that when water is encountered within an excavation, "*Ecology will not accept a grab water sample as quantitatively representative of groundwater conditions*"[1]. Consult with the Project Manager before implementing this SOP on any project.

Equipment

- Extendable swing sampler
- Snap ties or zip ties
- Mapping grade GPS
- Decontamination equipment (if required):
  - Stiff-bristle brushes
  - Buckets
  - Phosphate-free soap, (Liquinox, Alconox, or equivalent)
  - Potable water
  - Distilled water
- Coolers
- Ice (double bagged)
- Laboratory supplied sampling containers (refer to project Sample Analysis Plan)
- Personal protective equipment (as specified in Health and Safety Plan)
- Sample collection forms and/or field notebooks

Typical Procedure

1. Record field conditions and describe the water observed in the excavation. Does it appear to be groundwater? Is the water entering the excavation from a visible utility trench or adjacent surface area? Take photos to illustrate conditions.
2. Evaluate excavation safety. If necessary, consult with the Project Manager and/or Health and Safety Manager. Do not enter the excavation unless it is deemed safe (e.g., properly sloped sidewalls, safe points of egress, etc.).
3. Place a dedicated, unpreserved sampling container on the end of the extendable swing sampler. Secure the sampling container using zip ties or snap ties.
4. Extend the swing sampler to a length that will allow safe access to the desired sampling location.
5. Remove the cap from the sampling container and slowly lower the sample container into the excavation water. Once the bottle is as full as possible given the angle and orientation of the sample pole and bottle, slowly retrieve the sample bottle.

[1] Ecology publication 21-09-050, January 2021

6. Transfer the sample aliquot from the container on the swing sampler to individual laboratory-provided containers appropriate for analysis of each compound (see project Sampling Analysis Plan). Depending on the number of containers, it may take multiple attempts to fill the required bottles.
7. Once all the sample bottles are full, secure the lids and label each bottle with the sample identification and date and time of collection as described in the Sample Analysis Plan for the project.
8. Record any observations about the water sample (i.e., turbidity, color, the presence of any sheen or odors, etc.) on the field sample collection forms and/or field notebook.
9. Pack the sample in an iced cooler, following the procedures described in the Sample Handling, Packing, and Shipping SOP.
10. Complete the chain of custody forms in the field. Refer to the Sampling Analysis Plan for trip blank requirements, hold time limits, and other requirements.
11. If necessary, mark the sample location in the field with a stake so its location can be surveyed with a GPS or marked based on permanent site features using a measuring tape or wheel
12. Transport the samples to the analytical laboratory.

Appendix B

Health and Safety Plan

Former Jorgensen Forge Site
MTCA Interim Action
8531 East Marginal Way South
Tukwila, WA 98108

Site Specific Health and Safety Plan

Prepared in Accordance with WAC 296-843-12005

PUBLIC REVIEW DRAFT

29 October 2021

Prepared for:

Star Forge, LLC
8531 East Marginal Way South
Tukwila, WA 98108

Prepared by:

DH Environmental, Inc.
1011 SW Klickitat Way, Suite 107
Seattle, WA 98134

TABLE OF CONTENTS

List of Appendices

List of Figures

List of Acronyms and abbreviations

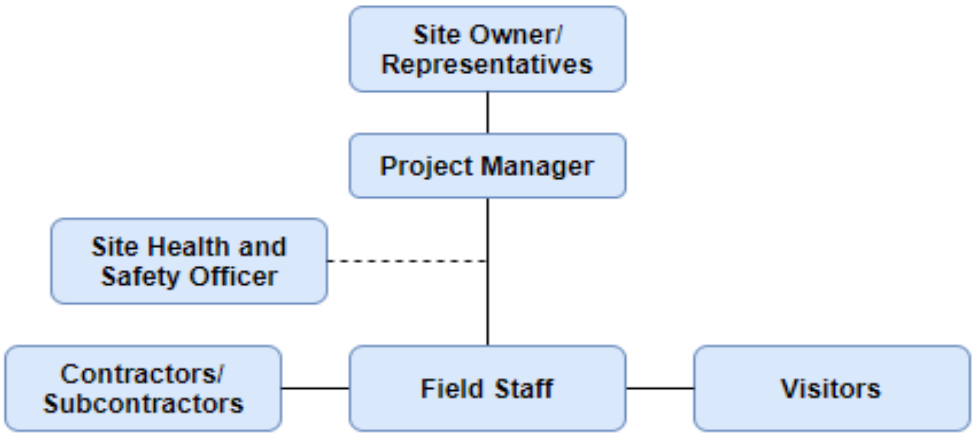
CAA	Central Accumulation Area
CRZ	Contamination Reduction Zone
DWMU	Dangerous Waste Management Unit
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
EZ	Exclusion Zone
HVOC	Halogenated Organic Compounds
IDLH	Immediately Dangerous to Life and Health
LEL	Lower Explosive Limit
MTCA	Washington State Model Toxics Control Act
PAH	Polycyclic Aromatic Hydrocarbons
PEL	Permissible Exposure Limit
PCB	Polychlorinated Biphenyls
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation / Feasibility Study
SAP	Sampling and Analysis Plan
SVOC	Semi volatile Organic Compounds
TCLP	Toxicity Characteristic Leachate Procedure
UST	Underground Storage Tank
VOC	Volatile Organic Compounds

HASP COMPLIANCE CHECKLIST

Health and Safety Plan Requirements	Regulatory Citation	HASP Reference
Hazard Analysis	WAC 296-843-12005(1)(a)	Section 3 – Hazard Analysis Section 3.1 – Chemical Exposure Hazards
Organization Chart / Structure	WAC 296-843-12005(1)(b)	Section 1 – Project Information Section 1.1 – HASP Roles and Responsibilities Section 1.2 – Site Description Section 1.3 – Project Scope and Objectives
Comprehensive Work Plan	WAC 296-843-12005(1)(c)	Section 2 – Comprehensive Work Plan Section 2.1 – General Site Work Section 2.2 – Underground Storage Tank System Permanent Closure by Removal Section 2.3 – Clean Closure of Dangerous Waste Management Units Section 2.4 – Area-Wide Soil and Dust Removal
Site Control Plan	WAC 296-843-12005(1)(d)	Section 4 – Site Control Plan Section 4.1 – Site Map Section 4.2 – Site Access Section 4.3 – Site Security Section 4.4 – Site Work Zones Section 4.5 – Site Communications
Personal Protective Equipment	WAC 296-843-12005(1)(e)	Section 5 – Personal Protective Equipment Section 5.1 – PPE Selection Criteria Section 5.2 – Use of PPE
Additional Elements	WAC 296-843-12005(1)(f)	Section 6 – Additional Elements Section 6.1 – Spill Containment Section 6.2 – Employee Training Section 6.3 – Standard Operating Procedures for Sampling Managing, and Handling Drums and Containers Section 6.4 – COVID-19 response Plan (Appendix 2) Section 6.5 – Confined Space Entry (Appendix 3) Section 6.6 - Medical Surveillance Plan Section 6.7 – Sanitation Section 6.8 – Lighting Section 6.9 – Accident / Exposure Procedures

1 PROJECT INFORMATION

Project Name/Site	Former Jorgensen Forge Site - MTCA Interim Action
Location	8531 East Marginal Way S. Seattle, WA 98108
Site Owner / Representatives	James Robertson Star Forge LLC Executive / Owner Representative Phone: (281) 785-7875 Email: jrobertson@jorgensenforge.com Wayne Turk Star Forge, LLC Project Administrator Phone: (206) 255-8177 Email: wturk@jorgensenforge.com
Project Manager	David Hill, PE, CHMM, CPEA Principal Engineer Phone: (206) 293-3126 Email: davehill@dhenviro.com
Site Health and Safety Officer	Brian Johnson, OHST, CIT EHS Program Director Phone: (206) 930-4043 Email: brian.johnson@dhenviro.com
Estimated Start Date	To be Determined
Estimated End Date	To be Determined (estimated no longer than one year in duration)
Site Team/Crew Size	5-10, depending on task
Will Client, Agency or Other Visitors be on-site?	☒ Yes ☐ No
Will Additional Contractors / Subcontractors be On-site?	☒ Yes ☐ No
Will HAZWOPER Training and Certification be Required for all Field Staff?	☒ Yes ☐ No
Work Hours	TBD
Additional Information: Star Forge, LLC may engage additional contractors to perform this work. This HASP will be made available to and must be acknowledged by all contractors, subcontractors, field staff, and site visitors. Any contractor performing work on this project must conform to the requirements of this HASP. All fieldwork will be conducted by individuals holding current HAZWOPER training and certification in accordance with 29 CFR 1910.120.	



HASP Organization Chart

1.1 HASP Roles and Responsibilities

Site Owner / Representatives

The Site Owner / Representatives will monitor the work and serve as liaison to Star Forge ownership to ensure the project is executed in accordance with all contract agreements, schedules, and budgets. The Site Owner / Representatives will have signatory authority and "stop-work" authority at the site.

Project Manager

The Project Manager will manage all phases of the project and ensure the work is completed in accordance with all applicable regulations, agreements, budgets, and schedules. The Project Manager will work closely with the Site Health and Safety Officer to ensure implementation and execution of the HASP. The Project Manager has responsibility and authority to direct all hazardous waste operations in accordance with WAC 296-843-12005(1)(b)(iv).

Site Health and Safety Officer

The Site Health and Safety Officer (SHSO) will serve as the supervisor responsible for developing and implementing the HASP and verifying compliance in accordance with WAC 296-843-12005(1)(b)(v). Specific duties include the following:

- Implement the HASP and report any observed deviations from site conditions anticipated in the plan to the Project Manager.
- Verify that on-site personnel and visitors are working in a manner consistent with applicable health and safety regulations and requirements, and this project HASP.
- Verify that required personal protective, monitoring, and emergency equipment is functional and being used as appropriately.

- Report observed accidents/incidents or inadequate work practices to the Project Manager.
- Report all accidents/incidents and findings regarding personnel exposure and work practices to the Project Manager.
- Conduct accident investigations and implement corrective actions as soon as it is feasible to do so.
- Conduct daily or pre-entry safety briefings.
- Train and instruct employees so they can perform their work safely.
- Know what personal protective equipment is needed for each task and how this equipment must be properly used, stored, and maintained.
- Take immediate steps to correct unsafe or unhealthful workplace conditions or hazards within their authority and ability to do so. When an unsafe or unhealthful workplace condition or hazard cannot be immediately corrected, the SHSO will take temporary precautionary measures.
- Ensure implementation of COVID-19 plan.

Field Staff

Field Staff includes all individuals performing work on-site with potential to be exposed to or contact hazardous waste and hazardous materials at the site. All Field Staff have the following responsibilities under the HASP:

- Read, understand, and acknowledge the HASP.
- Provide certification and training records to the SHSO upon request.
- Conduct all field work in accordance with the HASP.
- Don the appropriate PPE for the tasks being performed.
- Obtain, maintain, and inspect all equipment used to fulfill their responsibilities.
- Report all near misses and accidents to the SHSO.
- Respond to accidental releases of hazardous materials.
- Notify the SHSO of any unresolved problems or deviations from approved procedures.
- Participate in daily or pre-work safety briefings.

Contractors / Subcontractors and Site Visitors

This HASP will be made available to and must be acknowledged by all contractors, subcontractors, and site visitors, who may also be field staff. Contractors, subcontractors, and site visitors will have their own company or organizational health and safety policies and plans. However, this HASP must be incorporated into their work plans and activities at the site when visiting and performing work at the site.

1.2 Site Description

The former Jorgensen Forge Property consists of approximately 21.6 acres located in an industrial area along the east bank of the Lower Duwamish Waterway ("LDW"). The Property is bordered to the north by Boeing Plant 2, and to the south by the Boeing Isaacson property. It is bordered to the west by the LDW, and to the east by East Marginal Way South and the King County Regional Airport. The property is shown on Figures 1 and 2.

The Property was used from 1942-1965 for fabrication of structural steel, tractor, and road equipment, including forging and heat-treating operations conducted for the U.S. Navy. It was owned and operated by EMJ from 1965 until 1992, when it was purchased by Jorgensen Forge Corporation ("JFC"). JFC manufactured specialized large-scale metal parts for the aircraft and marine industries, including open die steel forgings and rolled aluminum rings. They also processed nickel, titanium, and specialized alloys.

Industrial use of the Property contaminated soil and groundwater beneath the Property. Contaminated groundwater may have also migrated onto the Property from off-site sources.

Contaminants of concern at the Property include, but are not limited to:

- Polychlorinated biphenyls ("PCBs")
- Volatile organic compounds ("VOCs")
- Halogenated volatile organic compounds ("HVOCs")
- Diesel Range Organics ('DRO")
- Metals (including but not limited to arsenic, cadmium, chromium, lead, nickel, copper, and zinc)

1.3 Project Scope and Objectives

The Interim Action (project) scope includes three specific actions:

1) Underground Storage Tank System Permanent Closure by Removal:

   The Property has two Underground Storage Tank ("UST") systems, located in two separate concrete structures (North Tank Farm and South Tank Farm), with a total of 18 USTs. The North Tank Farm includes 10 tanks designated as UST-26 through UST-35 and the South Tank Farm includes 8 tanks designated as UST-15 through UST-22. The liquid contents of the USTs have been removed. The UST systems, including the associated piping, will be permanently closed through decommissioning by removal, per WAC 173-360A. Upon completion of decommissioning and site assessment sampling, a Site Assessment Report will be prepared and submitted to Ecology to include all necessary closure documentation for the UST systems per WAC 173-360A.

2) Clean Closure of Dangerous Waste Management Units:

   DH Environmental prepared and submitted a Dangerous Waste Clean Closure Report to Ecology for the purpose of documenting the Clean Closure of Dangerous Waste Management Units ("DWMUs") at the Property. The Clean Closure Report documented removal of Dangerous Waste from the Property and

provided updated records of Dangerous Waste Designations of debris, slag, and the concrete and asphalt slabs in each DWMU. Following demolition of the buildings at each DWMU on the Property, the underlying concrete and asphalt slabs will be removed, and the underlying soil sampled to confirm that clean closure requirements have been met. If contaminant concentrations exceed the applicable standards, underlying soil will be removed and disposed of off-site, and additional samples will be collected. The location of the DWMUs is shown on Figure 2.

3) Removal of Area Wide Interior Soil and Dust:

Certain areas within the main buildings have exposed soil at the surface. This exposed soil is believed to be "track-in" from the former forging operations at the Property conducted by EMJ and others. It also may be imported aggregate for base course, and/ or paver base for equipment pads, walkways, or other in-plant facilities. This soil, along with area-wide accumulated dust, has been designated as non-Dangerous waste. During demolition and site stabilization, portions of this exposed soil may need to be removed for dust control and/or surface preparation for the application of asphalt pavement. Any soil or dust removed for these purposes will be disposed of off-site.

Each of the three interim action areas as shown on Figure 2.

2 COMPREHENSIVE WORK PLAN

This Comprehensive Work Plan addresses anticipated site activities and normal operating procedures based on general site work and specific tasks.

2.1 General Site Work

This section contains tasks and objectives that are generally applicable to the entire Project. Trainings, briefings, and information (as required by WAC 296-843-200) will be provided to all workers, field staff (including all contractors, subcontractors), and visitors as follows.

Employees, contractors, and subcontractors or their representatives will be informed about:

- The nature, level, and degree of exposure to hazardous substances they're likely to encounter.
- All site-related emergency response procedures.
- Any identified potential fire, explosion, health, safety, or other hazards.

This will be accomplished by dissemination and acknowledgement of the HASP, and additional on-site briefings. Briefings for employees, contractors, and subcontractors (i.e. field staff) will be conducted as follows:

- A pre-entry briefing before any site activity is started.
- Additional briefings, as needed, to make sure that the site-specific HASP is followed.

All employees working on the site will be:

- Informed of any risks identified.
- Trained on how to protect themselves and other workers against the site hazards and risks.

All information will be updated to reflect current site activities and hazards.

The following list of Work Tasks are tasks that have been identified for general site work. Subsequent Job Hazard Analysis (JHAs) are included in the Appendix 1 for each work task. Please note additional Work Tasks and JHAs may be added as necessary.

Work Task	Mobilization / Demobilization
Objective	Mobilize required equipment, materials, and personnel to the site.
How will the Work Task Be Accomplished?	▪ Equipment will be delivered and unloaded via truck and trailers. ▪ Materials will be delivered placed in designated storage areas, or stockpiled in accordance with applicable stormwater BMPs. ▪ Briefings about equipment placement, parking, and location of spill kits, first aid kits, and high-risk areas will be provided.
Personnel and Resource Requirements	▪ All Staff will be 40 Hr HAZWOPER Trained ▪ Briefings about equipment placement, parking, and location of spill kits, first aid kits, and high-risk areas will be provided.

Work Task	Loading, Moving, and Transportation Activities (on-site)
Objective	Placement, removal, and off-site transportation of materials such as import fill, export soil, debris, and contaminated media.
How will the Work Task Be Accomplished?	The Work Task will be accomplished by operation of heavy equipment with support of on-site field staff.
Personnel and Resource Requirements	In addition to heavy equipment (excavators, dump trucks, front end loaders, etc.), field staff will support this task with spotting, material placement, dust control, fire watch, and site control.

Work Task	Site Inspections / Providing Field Staff and Visitor Orientation
Objective	Ensure site inspections and visitor orientations are conducted safely and in accordance with this HASP.
How will the Work Task Be Accomplished?	Inspections and visitor orientation will be conducted by visually observing operations, observing media, and collecting and recording data with instrumentation, if necessary.
Personnel and Resource Requirements	Field Staff and/or Supervisors will conduct the required site inspections and visitor orientations. Equipment resources include cameras, field notebooks, instruments (PID, LEL meter, turbidity meter, etc.) and measuring devices such as a measuring wheel or engineer's tape.

Work Task	Air Monitoring
Objective	Conduct air monitoring for atmospheric air quality and explosivity to make fact-based decisions about PPE, site controls, and engineering controls.
How will the Work Task Be Accomplished?	Air monitoring will be conducted by visually observing operations, observing media, and collecting and recording data with instrumentation. Pre-entry monitoring will be conducted for tank entry, exclusion zone entry, and perimeter monitoring.
Personnel and Resource Requirements	Field Staff and/or Supervisors will conduct the required air monitoring. Equipment resources include instruments (PID, 4-Gas Meter, etc.) and diffusion-detector tubes, vapor monitor badges and/or personal air-sampling pumps.

Work Task	Heavy Machinery Operation
Objective	Operate heavy machinery to move materials, waste, and other equipment.
How will the Work Task Be Accomplished?	Properly trained equipment operators will operate heavy machinery on this project.
Personnel and Resource Requirements	In addition to heavy equipment (excavators, dump trucks, front end loaders, etc.), field staff will support this task with spotting, material placement, dust control, fire watch, and site control.

Work Task	Dust Mitigation (water application and dust removal)
Objective	Control dust to prevent and limit off-site aerial transport of dust and soil.
How will the Work Task Be Accomplished?	Dust control will be accomplished by lightly wetting work areas with garden hoses, Hudson sprayers, and water trucks. Soil and dust may also be carefully broomed, swept and placed into waste containers for off-site disposal.
Personnel and Resource Requirements	Field staff will conduct dust mitigation with garden hoses, Hudson sprayers, and water trucks. Brooms, shovels, and waste containers may also be used to dispose of captured dust and soil.

Work Task	Soil / Waste Sampling
Objective	Collect soil/waste samples for laboratory analysis.
How will the Work Task Be Accomplished?	Collection of soil/waste samples will be conducted by Field Staff in accordance with the site Sampling and Analysis Plan.
Personnel and Resource Requirements	Field Staff will conduct the sampling in accordance with the site Sampling and Analysis Plan. Equipment may include sample jars, sampling devices (trowels, bailers, Sludge Judge Tank Samplers, swing samplers, and hand augers.

Work Task	Equipment Decontamination
Objective	Decontaminate equipment to prevent spread of contaminants and ensure safe use of equipment.
How will the Work Task Be Accomplished?	Decontamination of equipment will be conducted by Field Staff and will involve decontamination of equipment from the exclusion zones (EZ) and the contamination reduction zone (CRZ). Equipment decontamination procedures are designed to minimize the potential for hazardous skin or inhalation exposure, cross-contamination, and chemical incompatibilities. ▪ Equipment in the EZ that can be used again, that is still operable, and that will not pose an increased exposure hazard during reuse is left in the EZ until it is no longer needed. This eliminates unnecessary decontamination and reduces the potential for physical transfer of contaminants outside the EZ. ▪ Decontamination is required for all equipment exiting a contaminated area. Equipment may reenter the Support Zone only after undergoing equipment decontamination procedures. ▪ Equipment that is transported regularly between the contaminated and clean areas of the facility (e.g., monitoring equipment) is carefully decontaminated each time it is removed from the EZ, and the effectiveness of decontamination is monitored to reduce the likelihood that contamination will be spread outside designated work zones.

	▪ Equipment that cannot be successfully decontaminated is designated and disposed of off-site.
Personnel and Resource Requirements	Decontamination of equipment will be conducted by Field Staff and will include tool drop containers, brushes, sprayers, soap, bleach, simple green, and containers for decontamination waste.

Work Task	Field Staff Decontamination
Objective	Decontaminate Field Staff to prevent exposure and spread of contaminants to ensure safe working conditions.
How will the Work Task Be Accomplished?	Decontamination is required for all workers exiting a contaminated area. Personnel may reenter the Support Zone only after undergoing the decontamination procedures described in the next section. ▪ Spent PPE will be removed and disposed of in the CRZ. ▪ PPE that requires maintenance or parts replacement is decontaminated before repairs or service. ▪ PPE is decontaminated or prepared for disposal on the premises. Personnel who handle contaminated equipment have been trained in the proper means to do so to avoid hazardous exposure. ▪ Workers are required and trained to immediately exit the work zone, perform applicable decontamination procedures, and change into uncontaminated clothing if their permeable clothing is splashed or becomes wetted with a hazardous substance.
Personnel and Resource Requirements	Decontamination of Field Staff will be conducted by Field Staff themselves and supporting Field Staff. This will include boot washes, PPE removal stations, containers, brushes, sprayers, soap, bleach, simple green, and containers for decontamination waste. Based on the nature of the hazards and duration of work at this site, showers and change rooms are not necessary and will not be provided for workers. Showers and change rooms may be added if conditions change that warrant showers and change rooms at the site.

2.2 Underground Storage Tank System Permanent Closure by Removal

The Property has two Underground Storage Tank ("UST") systems, located in two separate concrete structures (North Tank Farm and South Tank Farm), with a total of 18 USTs. The North Tank Farm includes 10 tanks designated as UST-26 through UST-35 and the South Tank Farm includes 8 tanks designated as UST-15 through UST-22. The liquid contents of the USTs have been removed. The UST systems, including the associated piping, will be permanently closed through decommissioning by removal, per WAC 173-360A. The tanks will be removed individually, and generally as follows:

1) Remove any remaining or accumulated liquids and residues from the tank with a vacuum truck.

2) If excavation has not already been performed for piping access, remove concrete or asphalt cover. Excavate underlying soils down to the top of the tank. Segregate these soils from those underlying the tank to reduce disposal volumes if these upper soils have no visual or odor contamination. Excavation should be deep and wide enough to allow access to all associated piping and appurtenance tank connections.

3) Remove the fill pipe, gauge pipe, vapor recovery truck connection, submersible pumps, and other tank fixtures. Remove the drop tube, except when it is planned to purge the tank by using an eductor as described previously. Cap or remove all nonproduct lines, such as vapor recovery lines, except the vent line. The vent line should remain connected until the tank is purged. Temporarily plug all other tank openings so that all vapors will exit through the vent line during the inerting process.

4) After the tank has been inerted and before it is removed from the excavation, cap or plug all pipes or bungs at or as near as possible to the tank. Cut any tank hold-down straps. Use a non-sparking cutter, such as pipe cutters, to avoid the generation of any sparks during pipe cutting.

5) To remove the tank:

    a. Attach pulling chain to the tank eyelets or any secure hooks or rungs or use nylon slings that will support the tank weight.

    b. Remove the tank from the excavation, using appropriate lifting devices. Front-end loaders and backhoes cannot be used for lifting unless they are equipped with a factory attached hook designed with adequate lift capacity for the tank, and the tank does not exceed the published lifting capacity for the equipment.

    c. Set tank on the ground and stabilize with wooden blocks. Keep the ventilation cap with the 3-mm (1/8-inch) hole on top.

6) Visually inspect the outside of the tank and use screwed (boiler) plugs to plug any and all corrosion holes in the tank shell.

7) Recheck the oxygen content within the tank as before and reinitiate inerting procedures, if required. It is vital that the internal tank atmosphere be insufficient to support ignition as sparks are possible, and a tank above ground can cause great damage to life and property if ignition occurs.

8) Remove external scale and attached soil from the tank. Non-sparking tools must be used at all times in the vicinity of the tank until such time as the tank interior and exterior surfaces are decontaminated.

9) Contain spills or drips during removal using absorbent booms or other methods.

10) Remove any sludge and decontaminate the interior and exterior of the tank (with a pressure washer and vacuum truck) prior to tank removal from the site or loading onto a truck or trailer.

11) Prior to loading onto a truck or trailer, check with a CGI to ensure that the LEL does not exceed 10 percent of the LEL and the oxygen content of the tank atmosphere is not greater than 8 percent.

12) Secure the tank on a truck for transportation to the storage or disposal site with the 1/8-inch vent hole located at the uppermost point on the tank. Tanks will be transported and disposed of/recycled in accordance with all applicable regulations.

The following list of Work Tasks are tasks that have been identified for Underground Storage Tank System Permanent Closure by Removal. Subsequent Job Hazard Analysis (JHAs) are included in the Appendix 1 for each work task. Please note additional Work Tasks and JHAs may be added as necessary. *Note applicable Job Tasks in Section 2.1 are also applicable to this section.

Work Task	Tank Inerting / Purging
Objective	Once a tank is empty of liquid fuel, the atmosphere inside the tank is a potentially explosive mix of fuel vapors and air. Tank inerting / purging removes one of the ingredients in the fire triangle (either fuel or oxygen) in order to control the atmosphere inside the tank and avoid an explosion. Where possible, the safest way to avoid an explosion is to eliminate both the oxygen and fuel components of the fire triangle.
How will the Work Task Be Accomplished?	Purging Purging is the removal of flammable vapors from a tank either by drawing the vapors out using an eductor or blowing the vapors out using a diffused air blower. Purging eliminates the fuel ingredient of the fire triangle. A combustible gas indicator (CGI), which is also called an explosimeter, is a device used to measure the concentration of combustible gases. A CGI will only operate properly in the presence of sufficient oxygen. Use an oxygen meter in conjunction with a CGI to monitor the progress of the purging operation. Remember that fuel vapors can regenerate inside the tank. Continue purging as long as possible and monitor the tank atmosphere often. Inerting Inerting is the removal or displacement of Oxygen from a tank using a non-reactive or inert gas. Dry ice (which is frozen carbon dioxide or CO2) or Nitrogen (N2) are the gases that are commonly used for inerting. Inerting eliminates the oxygen ingredient of the fire triangle. An oxygen meter is used to monitor the progress of the inerting process. An oxygen meter will be used that will work properly in the presence of the gas being used to inert the tank.
Personnel and Resource Requirements	Field staff (likely including a subcontracted Certified Marine Chemist) will perform the tank inerting / purging at the site. Instrumentation will include a CGI, and/or a 4-Gas meter. Materials will include dry ice and/or compressed nitrogen.

Work Task	Tank Rigging and Removal
Objective	Rig the tank with chains, straps or slings to remove it from the excavation.
How will the Work Task Be Accomplished?	▪ Attach pulling chain to the tank eyelets or any secure hooks or rungs or use nylon slings that will support the tank weight. ▪ Remove the tank from the excavation, using appropriate lifting devices. Front-end loaders and backhoes cannot be used for lifting unless they are equipped with a factory attached hook designed with adequate lift capacity for the tank, and the tank does not exceed the published lifting capacity for the equipment. ▪ Set tank on the ground and stabilize with wooden blocks. Keep the ventilation cap with the 3-mm (1/8-inch) hole on top.

Personnel and Resource Requirements	Field Staff will perform the tank rigging and removal. A combination of equipment operators and Field Support Staff will physically rig the tanks with chains, straps, or slings, and remove the tank with an excavator.

Work Task	Tank Cleaning
Objective	Clean the interior and exterior of the tank in preparation for off-site disposal.
How will the Work Task Be Accomplished?	▪ Remove external scale and attached soil from the tank. Non-sparking tools must be used at all times in the vicinity of the tank until such time as the tank interior and exterior surfaces are decontaminated. ▪ Remove any sludge and decontaminate the interior and exterior of the tank (with a pressure washer and vacuum truck) prior to tank removal from the site or loading onto a truck or trailer.
Personnel and Resource Requirements	Field Staff will perform the tank cleaning with a pressure washer (internal) and through the use of brooms, brushes and non-sparking tools (external). A combination of equipment operators and Field Support Staff will pressure wash the interior and capture any rinsate with a vacuum truck.

Work Task	Concrete Saw Cutting
Objective	Cut surface concrete to expose ancillary piping.
How will the Work Task Be Accomplished?	Concrete saw cutting will be accomplished by first locating the piping runs with sonar or other locating equipment. The concrete above the delineated piping runs will then be cut and removed with heavy equipment to expose the piping.
Personnel and Resource Requirements	Field Staff (or likely a subcontractor) will perform the saw cutting. The following equipment will be required. ▪ Diamond masonry blade ▪ Dust mask ▪ Drop cloths ▪ GFCI extension cord when appropriate ▪ Chalk line ▪ Gas, electric or air-powered concrete saw ▪ Wet/dry vacuum ▪ Mason chisel ▪ Knee pads ▪ Face shield ▪ Ear protection ▪ Broom/dustpan ▪ Pry bar

Work Task	Excavation / Removal of Concrete Walls and Slabs
Objective	Remove Concrete Walls and Slabs
How will the Work Task Be Accomplished?	Using an excavator, the concrete walls and slabs will be removed to the extent necessary to remove the tanks and leave the tank area at a level grade. This will

	be an ongoing process that will occur at various stages throughout the UST removal process.
Personnel and Resource Requirements	Field Staff (including equipment operators and drivers) will perform the removal of the concrete walls and slab.

Work Task	Soil / Slag Removal
Objective	Removal soil and slag surrounding the USTs in the tank farm complexes.
How will the Work Task Be Accomplished?	Using an excavator, the soil and slag will be removed to the extent necessary to remove the tanks and leave the tank area at a level grade. This will be an ongoing process that will occur at various stages throughout the UST removal process.
Personnel and Resource Requirements	Field Staff (including equipment operators and drivers) will perform the removal of the soil/slag surrounding the USTs in the tank farm complexes.

2.3 Clean Closure of Dangerous Waste Management Units

Following demolition of the buildings at each DWMU on the Property, the underlying concrete and asphalt slabs will be removed, and the underlying soil sampled to confirm that clean closure requirements have been met. If contaminant concentrations exceed the applicable standards, underlying soil will be removed and disposed of off-site, and additional samples will be collected. The location of the DWMUs is shown on Figure 2. The following list of Work Tasks are tasks that have been identified for Clean Closure of Dangerous Waste Management Units. Subsequent Job Hazard Analysis (JHAs) are included in the Appendix 1 for each work task. Please note additional Work Tasks and JHAs may be added as necessary. *Note applicable Job Tasks in Section 2.1 are also applicable to this section.

No.	Work Task	Remove Concrete Slabs
17	Objective	Remove and dispose of the concrete slabs of the three DWMUs and expose the underlying soil in order to implement the SAP.
	How will the Work Task Be Accomplished?	Using an excavator, the concrete slabs will be removed to expose the underlying soil so that it can be observed and sampled.
	Personnel and Resource Requirements	Field Staff (including equipment operators and drivers) will perform the removal of the concrete slab.

2.4 Area-Wide Soil and Dust Removal

Certain areas within the main buildings have exposed soil at the surface. This exposed soil is believed to be "track-in" from the former forging operations at the Property conducted by EMJ and others. It also may be imported aggregate for base course, and/ or paver base for equipment pads, walkways, or other in-plant facilities. This soil, along with area-wide accumulated dust, has been designated as non-Dangerous waste. During demolition and site stabilization, portions of this exposed soil may need to be removed for dust control and/or surface preparation for the application of asphalt pavement. Any soil or dust removed for these purposes will be disposed of off-site. The

following list of Work Tasks are tasks have been identified for Area-Wide Soil and Dust Removal. Subsequent Job Hazard Analysis (JHAs) are included in the Appendix 1 for each work task. Please note additional Work Tasks and JHAs may be added as necessary.

*Note applicable Job Tasks in Section 2.1 are also applicable to this section.

Work Task	Sweeping / Brooming of Dust / Soil
Objective	Remove area wide dust and exposed soil for dust control and/or surface preparation for the application of asphalt pavement
How will the Work Task Be Accomplished?	The area-wide soil and dust will be removed with brooms, shovels, and possibly a skid steer loader. Any soil or dust removed for these purposes will be disposed of off-site.
Personnel and Resource Requirements	Field Staff (including equipment operators and HAZWOPER technicians will removal the area-wide soil and dust). brooms, shovels, and possibly a skid steer loader will be required.

3 HAZARD ANALYSIS

General on-site safety hazards have been identified in the following table, along with mitigation and prevention measures to be taken for the duration of the project. A JHA has been completed for each specific Work Task identified in Section 2. Potential Chemical exposure hazards haven been identified and are listed in Section 3.1.

ITEM	HAZARD	PREVENTION

Ambient weather / PPE load	Heat stress
	
	Dehydration
		• Must follow WAC 296-62-095 regulation for heat illness prevention.
		• Implement heat stress plan for personnel for any of the following temperature.
		  o 52° - Nonbreathing clothes including vapor barrier clothing or PPE such as chemical resistant suits
		  o 77° - Double-layer woven clothes including coveralls, jackets, and sweatshirts
		  o 89° - All other clothing
		• Provide shaded rest area for personnel.
		• Shall provide one quart of water per employee per hour for drinking for the entire shift.
		• Supervisor to track site temperature conditions to monitor for weather.

Mobilization to site	Site Security Slips, Trips, Falls Traffic Overhead Hazards	• Clear & Mark off drop off area with barrier tape (if required). • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations.
Air monitoring	Inhalation Over exposure	• Ensure current calibration of equipment. • Fresh air calibration. • Monitor work zone area. • Monitor work area perimeter.
General work area	Slip / trip / fall	• Designated pathways. • Maintain pathways cleared of debris. • Enforce good construction housekeeping.
General work area – lifting	Lifting	• Plan and stage to minimize long distance carrying. • Split heavy loads into smaller loads. • Use mechanical lifting aids (i.e., forklift or excavator bucket) where possible and can be done safely. • Use assistant for heavy (>30 lbs.) or awkward load. • Use proper lifting techniques with good footing.
General work area – traffic	Struck by	• Set up visible barricades on access roads. • Wear high visibility safety vests (except in exclusion zone).

ITEM	HAZARD	PREVENTION
Traffic	Struck by	• Set up visible barricades. • Wear high visibility safety vests. • Only authorized personnel in work zones. • Set of Traffic Control and flagging if work is performed in the right of way.
Break time	Ingestion	• Thoroughly wash hands before eating, drinking, smoking.
Delivery of site equipment & supplies	Back Strains, Hand Injuries	• Verify before lifting that all hoses are bundled and secured in roll. • Do not throw equipment from truck. • Lift any object over 30lbs with assistance. If in doubt of the weight, ask for HELP first. • Lift properly with legs and maintain footing.
Loading, moving, and transportation activities (on-site)	Struck by Noise	• Level D PPE. • Hearing protection. • Back up alarms or rotating beacons. • Keep unauthorized personnel out of operating areas. • Train personnel on working safely around equipment. • Wear reflective vests. • Make eye to eye contact between operator/driver. • Signal or communicate movements. • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area. • Stay clear of swing zone of equipment.
Heavy Machinery	Equipment failure Slips, trips, falls Overhead hazards Not in use	• Conduct pre-operation inspection of all parts including connections. • Ensure grease and spare parts are available in case of failure. • Inspect fire extinguishers on equipment. • Never operate machinery outside of manufacturer's specifications. • Never alter equipment. • Boarding machinery use handrails & maintain three contact points at all times. • Ensure surfaces and boots are dry and free form debris. • When equipment is not in use, ensure parking brake is set & equipment is staged on level ground, not blocking entry /exit paths.
Use of pressure washer	Struck by Noise Injection	• Use lower pressure flushing technique when cleaning in corners and tight areas, this will minimize blow back to the operator. • Hearing protection.

ITEM	HAZARD	PREVENTION
	Difficult- positions	• Use proper technique when operating, never point energized pressure washer gun at any body part. • Avoid awkward body positioning while operating pressure washer.
Spills	Worker safety Environmental impact	• In the event of a spill during the project cleanup personnel will don Level D PPE, which will consist of chemical protective clothing, safety glasses, chemical protective footwear or boot covers, appropriate gloves, and a high visibility vest. • All drains that may be potentially impacted will be identified prior to the start of work. • Use all resources available to limit the impact to storm drains e.g., storm drain covers, dirt berms, absorbents…etc. • Use all resources available to limit the impact to land e.g., dirt berms, absorbents…etc.
Confined space entry / rescue	IDLH atmosphere Death	• See **Appendix A** DHE Confined Space Program for more information.
Use of hand tools	Pinch points Strain-sprain Difficult- positions Cut hazards	• Use proper holding and supporting techniques when turning wrenches, screwdrivers, and other torque-enhancing tools • Ensure proper direction and grip on plumbing fixtures prior to use of full body weight for counterbalance – use proper footing stance • Verify correct pipelines prior to disassembly
Falling	Bodily injury Death	• Fall protection will be used while accessing and egressing the trenches. • A 50’ self will be secured to an anchor point of at least 5,000lbs. • Only authorized personnel will be allowed in fenced areas where fall hazards exist.
Dust Mitigation (if required)	Dust levels visible	• Water will be sprayed periodically over exposed work area
Debris Removal /Material Handling	Struck by Overhead Skin irritation	• Establish visual contact with operator prior to any movement of excavator bucket • Ground personnel to wear high visibility vest • Avoid skin contact with poison ivy /oak
COVID-19	Sickness	See **Appendix B** for the COVID 19 plan.

3.1 Chemical Exposure Hazards

The following chemicals may be encountered at the site. This information is based on historic data and information about the site. This information will be used to evaluate ongoing PPE requirements, identification of potential exposure, and prevention of chemical exposure.

CHEMICAL / CAS	CHEMICAL PROPERTIES	EXPOSURE LIMITS	ROUTES OF ENTRY	SYMPTOMS
Barium 7440-39-3	▪ Flash Point: NA ▪ Odor: Odorless ▪ LEL = NA ▪ UEL = NA ▪ Vapor Density: NA (Air =1)	PEL-TWA: 0.5 mg/m³ IDLH: N.D.	▪ Inhalation ▪ Ingestion ▪ Skin contact ▪ Absorption	Irritates eyes, nose, upper respiratory system; nausea, vomiting, diarrhea, irregular heartbeat, muscle weakness, kidney damage.
Mercury 7439-97-6	▪ Flash Point: NA ▪ Odor: Odorless liquid ▪ LEL = NA ▪ UEL = NA ▪ Vapor Density: NA (Air =1)	PEL-TWA: 0.05 mg/m³ IDLH: 10 mg/m³	▪ Inhalation ▪ Ingestion ▪ Skin absorption ▪ Skin and/or eye contact	Irritates eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria.
Selenium 7782-49-2	▪ Flash Point: NA ▪ Odor: Odorless solid ▪ LEL = NA ▪ UEL = NA ▪ Vapor Density: NA (Air =1)	PEL-TWA: 0.2 mg/m³ IDLH: 1 mg/m³	▪ Inhalation ▪ Ingestion ▪ Skin and/or eye contact	Irritates eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; In Animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage
Silver 7440-22-4	▪ Flash Point: NA ▪ Odor: Odorless solid ▪ LEL = NA ▪ UEL = NA ▪ Vapor Density: NA (Air =1)	PEL-TWA: 0.01 mg/m³ IDLH: 10 mg/m³	▪ Inhalation ▪ Ingestion ▪ Skin and/or eye contact	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance.

CHEMICAL / CAS	CHEMICAL PROPERTIES	EXPOSURE LIMITS	ROUTES OF ENTRY	SYMPTOMS
Copper 7440-50-8	▪ Flash Point: NA ▪ Odor: Odorless solid ▪ LEL = NA ▪ UEL = NA ▪ Vapor Density: NA (Air =1)	PEL-TWA: 1 mg/m³ IDLH: 100 mg/m³	▪ Inhalation ▪ Ingestion ▪ Skin and/or eye contact	Irritates eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; In Animals: lung, liver, kidney damage; anemia.
Nickel 7440-02-0	▪ Flash Point: NA ▪ Odor: Odorless solid ▪ LEL = NA ▪ UEL = NA ▪ Vapor Density: NA (Air =1)	PEL-TWA: 0.015 mg/m³ IDLH: Ca 1 mg/m³	▪ Inhalation ▪ Ingestion ▪ Skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen].
Zinc 1314-13-2	▪ Flash Point: NA ▪ Odor: Odorless solid ▪ LEL = NA ▪ UEL = NA ▪ Vapor Density: NA (Air =1)	PEL-TWA: 5 mg/m³ IDLH: 500 mg/m³	▪ Inhalation	Metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function.
Arsenic 7440-38-2	▪ Flash Point: NA ▪ Odor: Odorless solid ▪ LEL = NA ▪ UEL = NA	PEL/TWA: 0.010 mg/m3 REL: C 0.002 mg/m3 IDLH: Ca (5 mg/m3)	▪ Inhalation ▪ Ingestion ▪ Skin contact ▪ Absorption	Ulceration of nasal septum, GI disturbances, respirator irritation, peripheral neuropathy, dermatitis, hyperpigmentation of skin.

CHEMICAL / CAS	CHEMICAL PROPERTIES	EXPOSURE LIMITS	ROUTES OF ENTRY	SYMPTOMS
Cadmium 7440-43-9	▪ Flash Point: NA ▪ Odor: Odorless solid ▪ LEL = NA ▪ UEL = NA	PEL/TWA: 0.005 mg/m3 REL: Ca IDLH: Ca (9 mg/m3)	▪ Inhalation ▪ Ingestion	Pulmonary edema, breathing difficulty, cough, chest tightness, substernal pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, loss of sense of smell, emphysema, proteinuria, mild anemia.
Chromium 7440-47-3	▪ Flash Point: NA ▪ Odor: Odorless solid ▪ LEL = NA ▪ UEL = NA	PEL/TWA: 0.5 mg/m3 REL: 0.5 mg/m3 IDLH: 250 mg/m3	▪ Inhalation ▪ Ingestion ▪ Skin contact	Irritation eyes, skin; lung fibrosis (histologic).
Hexavalent Chromium	▪ Flash Point: NA ▪ Odor: Odorless solid ▪ LEL = NA UEL = NA	PEL/TWA: 0.1 mg/m3 REL: 0.05 mg/m3 IDLH: 250 mg/m3	▪ Inhalation ▪ Ingestion ▪ Skin contact	occupational asthma, eye irritation and damage, perforated eardrums, respiratory irritation, kidney damage, liver damage, pulmonary congestion and edema, upper abdominal pain, nose irritation and damage, respiratory cancer, skin irritation, and erosion and discoloration of the teeth.
Lead 7439-92-1	▪ Flash Point: NA ▪ Odor: Odorless solid ▪ LEL = NA ▪ UEL = NA	PEL/TWA: 0.050 mg/m3 REL (8-hour): 0.050 mg/m3 IDLH: 100 mg/m3	▪ Inhalation ▪ Ingestion ▪ Skin contact	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension.
Poly Chlorinated Biphenyl 53469-21-9	▪ Flash Point: NA ▪ Odor: Mild hydrocarbon odor ▪ LEL = NA ▪ UEL = NA	PEL: 1 mg/m3 (skin) TWA: 0.001 mg/m3 IDLH: Ca (5 mg/m3)	▪ Inhalation ▪ Ingestion ▪ Skin contact ▪ Absorption	Irritates eyes, chloracne, liver damage, reproductive effects.

CHEMICAL / CAS	CHEMICAL PROPERTIES	EXPOSURE LIMITS	ROUTES OF ENTRY	SYMPTOMS
Gasoline Range Hydrocarbons 8006-61-9	▪ Flash Point: -45F ▪ Odor: Benzene like odor ▪ LEL = 1.4 ▪ UEL = 7.6		▪ Inhalation ▪ skin absorption, ▪ ingestion, ▪ skin/eye contact	irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage; [potential occupational carcinogen]
Diesel Fuel 68476-34-6	▪ Flash Point: >100.0 °F ▪ Odor: Oily liquid with a strong characteristic odor ▪ LEL = 0.4% ▪ UEL = 8% ▪ Vapor Density: 3 (Air =1)	PEL-TWA: 100 mg/m3 IDLH: N.D.	▪ Inhalation ▪ Ingestion ▪ Skin contact ▪ Absorption	Irritation of nose and throat, irritation of eyes and mucous membranes, skin irritation, unconsciousness, corneal damage, narcosis, decrease in motor functions, behavioral changes, edema, liver enlargement, jaundice, conjunctivitis, proteinuria, defatting of the skin, rash.
Nitric Acid 7697-37-2	▪ Flash Point: -N/A ▪ Odor: suffocating odor ▪ LEL = N/a ▪ UEL = N/A pH = 1.08	REL TWA: 2 ppm (5 mg/m3) ST 4 ppm (10 mg/m3) PEL: TWA 2 ppm (5 mg/m3) IDLH: 25 ppm	▪ inhalation, ▪ ingestion ▪ skin and/or eye contact	irritation eyes, skin, mucous membrane; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion
Hydrochloric Acid	▪ Flash Point: -N/A ▪ Odor: suffocating odor ▪ LEL = N/a ▪ UEL = N/A pH = 1.08		▪ inhalation, ▪ ingestion, ▪ skin and/or eye contact	irritation eyes, skin, mucous membrane; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion

4 SITE CONTROL PLAN

The SHSO is responsible for evaluating site conditions and for verifying that the site control program functions effectively. The site control program is updated regularly to reflect current site conditions, work operations, and procedures.

Site control measures are implemented at the site to protect the public and personnel working on-site. The site control program is designed to reduce the spread of hazardous substances from contaminated areas to clean areas, to identify and isolate contaminated areas of the site, to facilitate emergency evacuation and medical care, to prevent unauthorized entry to the site, and to deter vandalism and theft.

4.1 Site Map

Figure 2 is a map of this site, showing site boundaries, designated work zones, and points of entry and exit.

4.2 Site Access

Access to this site is restricted to reduce the potential for exposure to its safety and health hazards. During hours of site operation, site entry and exit are authorized only at the point(s) identified in the site map. Entry and exit at these points are monitored by site security at all times.

Visitors to the site must register with the SHSO and are escorted at all times. Visitors are expected to comply with the requirements of this HASP. Visitors who want to enter contaminated areas of the site must provide documentation that they have the required training and medical evaluation and must receive a site-specific briefing about protecting themselves from site hazards, recognizing site zones demarcations, and following emergency evacuation procedures before entry.

4.3 Site Security

Star Forge has contracted with is responsible for establishing and maintaining site security during working hours. Wayne Turk, Project Administrator, is responsible for establishing and maintaining site security during nonworking hours.

Security at this site is maintained during both working hours and nonworking hours to prevent unauthorized entry; removal of contaminated material from the Exclusion Zone (EZ); exposure of unauthorized, unprotected people to site hazards; and increased hazards due to vandalism and theft.

The following security measures are followed during working hours:

- Security is maintained to ensure that only authorized entrants access the site.
- A chain link fence is erected around the perimeter of the site to prevent unauthorized entry or exit.
- Signs have been posted around the perimeter of the site to warn of the site dangers and to prohibit unauthorized entry.
- Site personnel patrol the perimeter of the site.

The following measures have been taken for security during nonworking hours:

- Site personnel are used for site surveillance.
- All doors to buildings and/or trailers are locked and equipment is secured.
- Security conducts site surveillance during working hours.

4.4 Site Work Zones

This site is divided into *the Interim Action Areas* as shown in the site map. The zones are characterized by presence or absence of specific hazards and the activities performed within them. Zone boundaries are clearly marked at all times, and the flow of personnel and equipment among them is controlled.

Zone Adjustments

The site is monitored for changing conditions that may warrant adjustment of zone boundaries. The boundaries are adjusted as necessary to protect personnel and clean areas. Whenever boundaries are adjusted, boundary markings are also changed, and workers are immediately notified of the change.

The following criteria were considered in establishing the site work zones:

- Required cleanup activities
- Sampling results for soil contaminants
- Inside traffic patterns
- Site security

Exclusion Zones

The EZ is the area where hazardous substances are known or suspected to be present and pose the greatest potential for exposure. Remediation operations are performed in the EZ. At this site, the EZ boundaries are marked with the following:

- Hazard tape and/or enclosed by physical barriers, such as chains, barricades, or ropes.]
- Cones
- Signs

Personnel and equipment enter and exit the EZ from the designated access points in the Contamination Reduction Zone (CRZ), as shown on the site map. Personnel in the EZ adhere to Standard Operating Procedures (SOPs).

Exclusion Zone SOPs

Following are the SOPs for working in the EZ:

- Check in and out of this zone at the designated access point.

- Use the buddy system at all times.
- Wear the PPE required for this zone (see the ***PPE*** section of this HASP).
- Do not smoke, eat, or drink.
- Monitor self and buddy for signs of heat stress and other difficulties.
- Alert supervisor to signs of unanticipated hazards.
- Monitor self and buddy for PPE improper fittings, rips, tears, and/or damage.
- Use monitoring equipment and tools that are safe for the working environment.

Buddy System

While working in the EZ, site workers use the buddy system. The buddy system means that personnel work in pairs and stay in close visual contact to be able to observe one another and summon rapid assistance in case of an emergency. Workers using the buddy system:

- Remain in close visual contact with the partner.
- Provide the partner with assistance as needed or requested.
- Observe the partner for signs of heat stress or other difficulties.
- Periodically check the integrity of the partner's PPE.
- Notify the supervisor or other site personnel if emergency assistance is needed.

Contamination Reduction Zones

The CRZ is located between the EZ and the Support Zone (clean zone). Its primary purpose is for decontamination of workers and equipment. The CRZ also serves as a buffer between the EZ and Support Zone to limit the potential for contamination to spread to the Support Zone and outlying areas.

Adjustment of CRZ Boundaries

Based on monitoring results, the CRZ boundaries may be adjusted to ensure that the Support Zone remains uncontaminated. Workers and equipment exit the EZ through the designated access point(s) into the CRZ. Workers and equipment are then decontaminated in the CRZ, according to the procedures specified in the Decontamination section of this HASP. Workers and equipment then exit the CRZ into the Support Zone through the designated access points, shown in the site map. If necessary, emergency decontamination procedures are implemented. Emergency decontamination procedures are described in the site Emergency Response Plan (ERP).

4.5 Site Communications

Daily site operations, including response to emergencies, are monitored and managed by means of communications equipment and other resources used to support on-site communications. Following are the types and locations of communication resources for the site:

- Telephones at this site are provided by individual cell phones.
- A current list of emergency contact numbers is posted in the site office.

5 PERSONAL PROTECTIVE EQUIPMENT

Initial Level of Protection	Based off our evaluation of the work site, and the tasks that are to be completed, we have determined Level C & Level D PPE to be adequate.
Training Requirements for Site Workers	HAZWOPER 40, Current 8 Hour Refresher, First Aid /CPR, HAZWOPER Supervisor
Decontamination Procedures	Boots and hands will be decontaminated with soap and water as necessary.

Health and Safety Equipment Checklist	
☒ Respirator with Cartridges	☒ Fire Extinguisher — located in field vehicle (2 per truck)
☒ Protective Clothing (coveralls, FRCs)	☒ Drinking Water
☒ Chemical Protective Gloves	☒ Rain Gear
☒ Decontamination equipment	☒ High Visibility Vest
☒ Steel-toed Boots	☒ Cell Phone
☒ Disposable Boot Covers	☒ Radios
☒ Safety Glasses — use when appropriate	☒ Tychem Coveralls
☒ Hard Hat	☒ Emergency Eye Wash Bottles
☒ Caution Tape, Traffic Cones, or Barriers	☒ First Aid Kit: located in field Vehicle
☒ Fall Protection Harness	

PPE is used to provide adequate personnel protection only after feasible engineering and administrative control options have been exhausted. All personnel engaged in the project work activities use the appropriate level of protection as required by the activity to be performed and as presented in the Job Hazard Analysis section of this HASP.

All PPE is selected to ensure that it is constructed and designed to protect employees against known or anticipated hazards. PPE is selected that properly and appropriately fits the employee. These provisions follow the requirements of all applicable regulations (29 CFR 1910.120(c)(5), 29 CFR 1910.132 to 1910.140, and 29 CFR 1926.28). It is the responsibility of the user to ensure that it is used and maintained in a sanitary and reliable condition.

5.1 PPE Selection Criteria

Where hazards are still present after engineering controls and work practices have been implemented, a combination of engineering controls, work practices, and PPE is used to protect employees. An initial level of PPE is assigned to each task to provide an adequate barrier to exposure hazards. Initial PPE ensembles are selected based on the anticipated route(s) of entry of chemical and other hazards and their concentrations. Ensemble materials are selected using permeation data supplied by individual manufacturers. Materials providing the greatest duration of protection have been chosen. Tear and seam strength of the PPE are also considered to ensure ensemble durability while work is performed. When necessary, multiple layers of protection are used to accommodate the range of hazards that may be encountered. Where possible, employees are provided with a range of component sizes to ensure properly fitted PPE.

The following criteria are used in selecting PPE levels at this site.

Level B Protection

This level of protection is appropriate when the highest level of respiratory protection is necessary but a lesser level of skin protection is needed. Employees use Level B protection during tasks that have or potentially have the following characteristics:

- Exposures are known and the highest degree of respiratory protection is needed.
- The atmosphere is oxygen-deficient (<19.5%).
- There are no warning properties for the identified gases, vapors, or particulates.
- The atmosphere contains incompletely identified vapors or gases (indicated by a direct-reading instrument) not suspected of containing high levels of hazardous substances harmful to skin or capable of being absorbed through the skin.
- Atmospheres with immediately dangerous to life and health (IDLH) concentrations of specific substances present severe inhalation hazards but do not represent a skin absorption hazard.

Level C Protection

Employees use Level C protection during tasks where measured concentrations of known atmospheric contaminants for which an air-purifying respirator (APR) can be used and when liquid splashes or other direct contact with hazardous substances does not adversely affect employee health nor can be absorbed through any exposed skin.

APRs can be used only when the contaminant(s) is known, cartridges/canisters exist, and concentrations are within the substance-specific standard guidelines or within the maximum use concentration (MUC) for the APR used. A cartridge/canister change schedule has been determined, according to the respiratory protection regulation (29 CFR 1910.134(d)(3)(iii)(B)(2)). Cartridges and canisters used with APRs on this site are replaced when any of the following occurs:

- A National Institute for Occupational Safety and Health (NIOSH)-approved end-of-service life indicator (ESLI) is activated.
- The PPE service time has passed.
- Inhalation is restricted.
- Breakthrough is encountered

If warning properties (chemical odors, tastes, or physical irritation) are detected, employees immediately leave the work area and notify their site supervisor or the site safety and health officer.

Level D Protection

Employees use Level D protection during tasks where the atmosphere contains no known hazard and work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous

levels of any biological or chemical substances. A Level D PPE work uniform affords minimal protection and is used for nuisance contamination only.

5.2 Use of PPE

Site-specific PPE ensembles and materials are identified in the below Table (PPE by Task). All PPE will be used in accordance with manufacturers' recommendations and in conjunction with the procedures outlines in this HASP.

TASK	Level	MASK /CARTRIDGE /AIR	ADDITIONAL PPE
Site Preparation / site security / site postings and notifications	D	N/A	Hardhats, safety glasses, cotton coveralls or Tyvek (as needed), hi-visibility safety vest, leather gloves (as needed), steel toe boots
Decontaminate equipment	D	N/A	Hardhats, poly-coated Tyvek suit, nitrile inner gloves, neoprene outer gloves, leather gloves as appropriate, PVC or boot covered steel toe boots.
Conduct daily safety meeting (before shift & after shift)	D	N/A	Hardhats, safety glasses, cotton coveralls or Tyvek, hi-visibility safety vest, steel toe boots (each as appropriate)
Purge fuel from dispensers and lines into USTs	C	GME P-100 Cartridge	Hardhat, FR Coveralls, Nitrile inner and outer gloves, steel toe boots or boot covers.
Drain tank with vacuum truck	C/D	GME P-100 Cartridge	Hardhat, FR Coveralls, Nitrile inner and outer gloves, steel toe boots or boot covers.
Operator – vac truck	D	N/A	Hardhats, safety glasses, hearing protection, coveralls, canvas/leather outer gloves, leather steel toe boots, high visible traffic vests
Pressure wash tank interior	C	GME P-100 Cartridge	Hardhat, FR Coveralls, Nitrile inner and outer gloves, steel toe neoprene boots or boot covers, full three-point harness with rescue line
Slag excavation	C/D	GME P-100 Cartridge	Hardhats, safety glasses, cotton coveralls or Tyvek (as needed), hi-visibility safety vest, gloves (as needed), steel toe boots.
Triple rinse USTs from outside space, cap remaining lines and inert tanks.	C	GME P-100 Cartridge	Hardhat, FR Coveralls, Nitrile inner and outer gloves, steel toe neoprene boots or boot covers.

TASK	Level	MASK /CARTRIDGE /AIR	ADDITIONAL PPE
Remove and dispose of tanks	D	N/A	Hardhats, safety glasses, cotton coveralls or Tyvek (as needed), hi-visibility safety vest, gloves (as needed), steel toe boots.
Soil excavation	C/D	GME P-100 Cartridge	Hardhats, safety glasses, cotton coveralls or Tyvek (as needed), hi-visibility safety vest, gloves (as needed), steel toe boots.
Soil transport and disposal	D	N/A	Hardhats, safety glasses, cotton coveralls or Tyvek (as needed), hi-visibility safety vest, gloves (as needed), steel toe boots.
Confirmation sampling	D	N/A	Hardhats, safety glasses, cotton coveralls or Tyvek (as needed), hi-visibility safety vest, gloves (as needed), steel toe boots.
DWMU slab removal	C/D	GME P-100 Cartridge	Hardhats, safety glasses, cotton coveralls or Tyvek (as needed), hi-visibility safety vest, gloves (as needed), steel toe boots.
Inspect appropriate equipment each day / monitor perimeter	D	N/A	Hardhats, safety glasses, cotton coveralls or Tyvek (as needed), hi-visibility safety vest, leather gloves (as needed), steel toe boots
Area wide soil/dust removal	C/D	GME P-100 Cartridge	Hardhats, safety glasses, cotton coveralls or Tyvek (as needed), hi-visibility safety vest, gloves (as needed), steel toe boots.
Decontaminate equipment	D	N/A	Hardhats, poly-coated Tyvek suit, nitrile inner gloves, neoprene outer gloves, leather gloves as appropriate, PVC or boot covered steel toe boots.
De-mobilize	D	N/A	Hardhats, safety glasses, cotton coveralls or Tyvek (as needed), hi-visibility safety vest, leather gloves (as needed), steel toe boots

6 ADDITIONAL ELEMENTS

6.1 Spill Containment

This section describes the response and cleanup procedures in the event of a spill onsite. An important goal of an effective emergency response procedure during an oil or hazardous substance release incident is to prevent the spilled material from reaching a point where discharge to navigable waters or other aspects of the environment could occur. Further, a spill or release must be mitigated in a manner that eliminates or minimizes threats to human health and the environment. Every effort will be made to prevent spills and emphasize substance containment at the source rather than attempt to separate out and recover spilled material from the environment to which it has spread. If a spill discharge to surface water is imminent, the appropriate emergency response agencies will be notified as described below.

In general, the following steps will be taken:

- Notify your supervisor and the Project Pollution Control Officer.
    - Stop the product flow. Secure pumps, close valves, cover drains.
    - Warn/ evacuate personnel. Enforce security and safety measures.
    - Identify source. Make certain you know what is spilled. If you are unfamiliar with the material, check material safety data sheets references.
    - Shut off ignition source. Shut off motors, electrical circuits, open flames, etc.
    - Contain the material released. Dikes, booms, and other absorbent materials must be used to contain/clean up a release.
- The Project Pollution Control Officer will notify the following, as necessary:
    - 911 and the Tukwila Fire Marshall (206-575-4407).
    - Washington Emergency Management Division (1-800-258-5990). If you cannot reach an Environmental Officer, notify the State directly.
    - National Response Center (1-800-424-8802) to notify the U.S. Coast Guard for water spills and the EPA for land spills.
    - DH Environmental (206-777-5159) for environmental compliance assistance.
    - Clean Harbors (253-639-4240), NRC Environmental (800-899-4672), or Marine Vacuum (206-762-0240) for vacuum services.
    - Provide courtesy notifications to surrounding businesses if there is a potential for impact to their operations.
    - Collect and dispose of recovered products according to regulation. Decontaminate tools and equipment used in clean up.

6.2 Employee Training

General Site Workers

General site workers have successfully completed 40-hour initial HAZWOPER training consistent with the requirements of 29 CFR 1910.120(e)(3)(i) or have received equivalent training consistent with the provisions of 29 CFR 1910.120(e)(9) in order to work in contaminated areas. In addition, such personnel have received 3 days of supervised field experience applicable to this site.

The initial training provided to these workers addresses:

- Names of personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on the site
- Use of PPE
- Work practices by which the employee can minimize risks from hazards
- Safe use of engineering controls and equipment on the site
- The site control plan detailed in the *Site Control* section of this HASP
- Medical surveillance requirements
- The spill containment program
- Decontamination procedures
- The ERP
- Recordkeeping
- Confined space entry procedures

Management and Supervisor Training

On-site managers and supervisors who are directly responsible for or who supervise workers engaged in hazardous waste operations receive, in addition to the appropriate level of general site worker training, 8 additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

Refresher Training

All workers on this site, including managers and supervisors, receive annual refresher training consistent with the requirements of 29 CFR 1910.120(e)(8).

6.3 Standard Operating Procedures for Sampling, Managing, and Handling Drums and Containers

Before moving drums or containers at the site, the following will be conducted:

- Inspect the drums before movement then for damage, leaks, bulging, or extreme temperature.
- Move the drums slowly and carefully; use a drum dolly or forklift to move the drums – do not roll the drum freely.

- Stage the drums in containment, near spill kits and fire extinguishers.
- Drums in staging areas should be arranged to give employees easy access and egress.
- The opening of drums and sampling operations must be isolated if the contents are unknown.
- Stock equipment such as salvage drums or containers, absorbent material, shovels, and PPE for spill response.
- All containers transported off-site must have proper DOT labels, bills of lading, etc.

Any container or drum showing signs of pressure buildup such as bulging or swelling cannot be moved until the source of the pressure is found and relieved. Lab waste packs must be opened only when necessary and only by knowledgeable personnel. If crystalline material is found in the lab pack(s), it must be treated as shock-sensitive material until proven otherwise.

Tanks and vaults containing hazardous substances must be handled like drums and containers, taking into account the size of the tank or vault. If tanks or vaults will be entered, appropriate entry procedures must be identified in the HASP and be followed by employees conducting the entry.

6.4 COVID-19 Response Plan

The written COVID-19 Response Plan is included as Appendix 2. This plan is designed to meet the guidance requirements of the Phase 2 COVID-19 job site requirements for Washington State. The plan will be distributed to all Trade Partners and others working on site. All contractors working on site shall be required to incorporate Phase 2 job site requirements before being allowed to work on the site.

6.5 Confined Space Entry

The written Confined Space Entry Program is included as Appendix 3. This plan is a means of protecting the health and safety of workers while entering, working in, and exiting confined spaces. Before entry, the worker will be made aware of the hazards of the confined space work and the safe work practices necessary.

6.6 Medical Surveillance Plan

Medical surveillance requirements are based on a worker's potential for exposure as determined by the site characterization and JHA documented in this HASP and as required by 29 CFR 1910.120(f)(2).

Based on limited worker exposure to hazardous substances at or above the PELs or other published exposure limits (less than 30 days per year); limited use of respirators (less than 30 days per year); and the absence of an employee-staffed hazmat team, the medical surveillance program required at this site is limited. The site medical surveillance program provides that:

- Workers assigned to tasks requiring the use of respirators receive medical examinations in accordance with 29 CFR 1910.134(e) to ensure they are physically capable of performing the work and using the equipment.

- Workers who could potentially be exposed to a specific contaminant or hazard are covered by a medical protocol addressing the exposure.
- If a worker is injured, becomes ill, or develops signs or symptoms of possible overexposure to hazardous substances or health hazards, medical examinations are provided to that worker as soon as possible after the occurrence and as required by the attending physician.

Medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided to employees free of cost, without loss of pay, and at a reasonable time and place. The need to implement a more comprehensive medical surveillance program is reevaluated in the event of an overexposure incident.

6.7 Sanitation

Portable bathrooms with hand washing stations will be provided on-site. In addition, additional soap, decontamination equipment, and running water is available for sanitation purposes.

6.8 Lighting

The site is illuminated at night with light plants for safety and security purposes. During daylight, most of the site is sufficiently luminated with the exception of interior small rooms. If these rooms must be accessed, flashlights will be available.

6.9 Accident / Exposure Procedures

TYPE CONTACT	FIRST AID
Eyes	• Flush each eyes continuously for 15 minutes • Tilt head to side to ensure liquid runs onto floor not in the other eye • Refer to EMT for evaluation
Skin	• Remove contaminated clothing immediately. • Wash skin continuously for 15 minutes • Refer to physician if redness, swelling, or pain persists after washing
Not Breathing	• Call 911 • Remove to fresh air immediately if respiratory distress develops. • Begin CPR until EMT arrives
Ingestion	• Aspiration hazard • Do not induce vomiting • Do not give anything by mouth
Accident Reporting	• Employees immediately report all accidents or incidents to the Site Project Manager / Safety Officer • Project Manager / Safety Officer will relay information to Contract Manager • Determination will be made regarding need for post-accident drug testing

	• Notify Client immediately in the event of any incident

Nearest Hospital

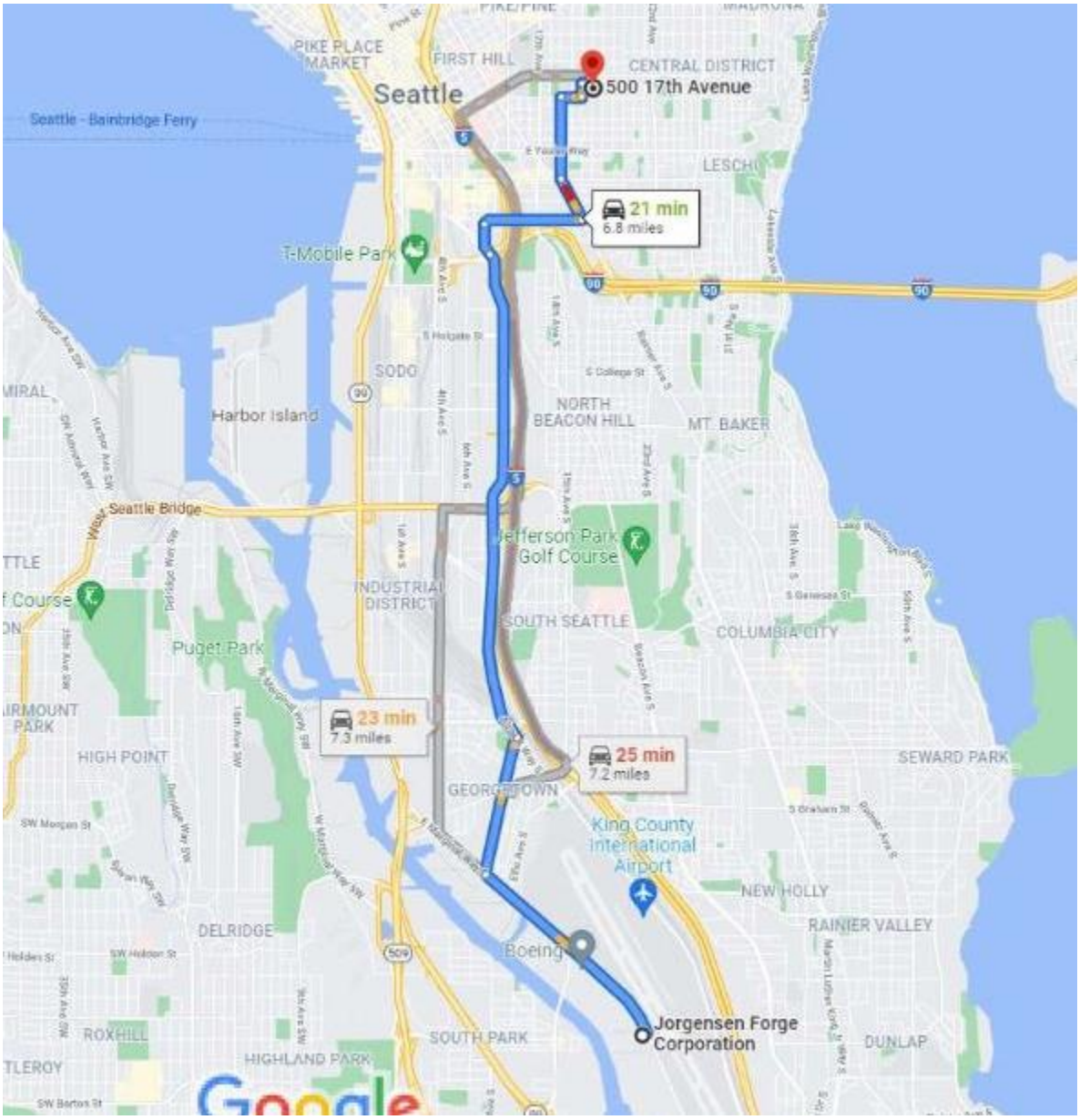
The nearest hospital to the site is Swedish Cherry Hill Campus located at:

500 17th Ave
Seattle, WA 98122

Phone (296) 320-2000
Emergency: 911

A map with the quickest route to the hospital is provided as Figure 3.

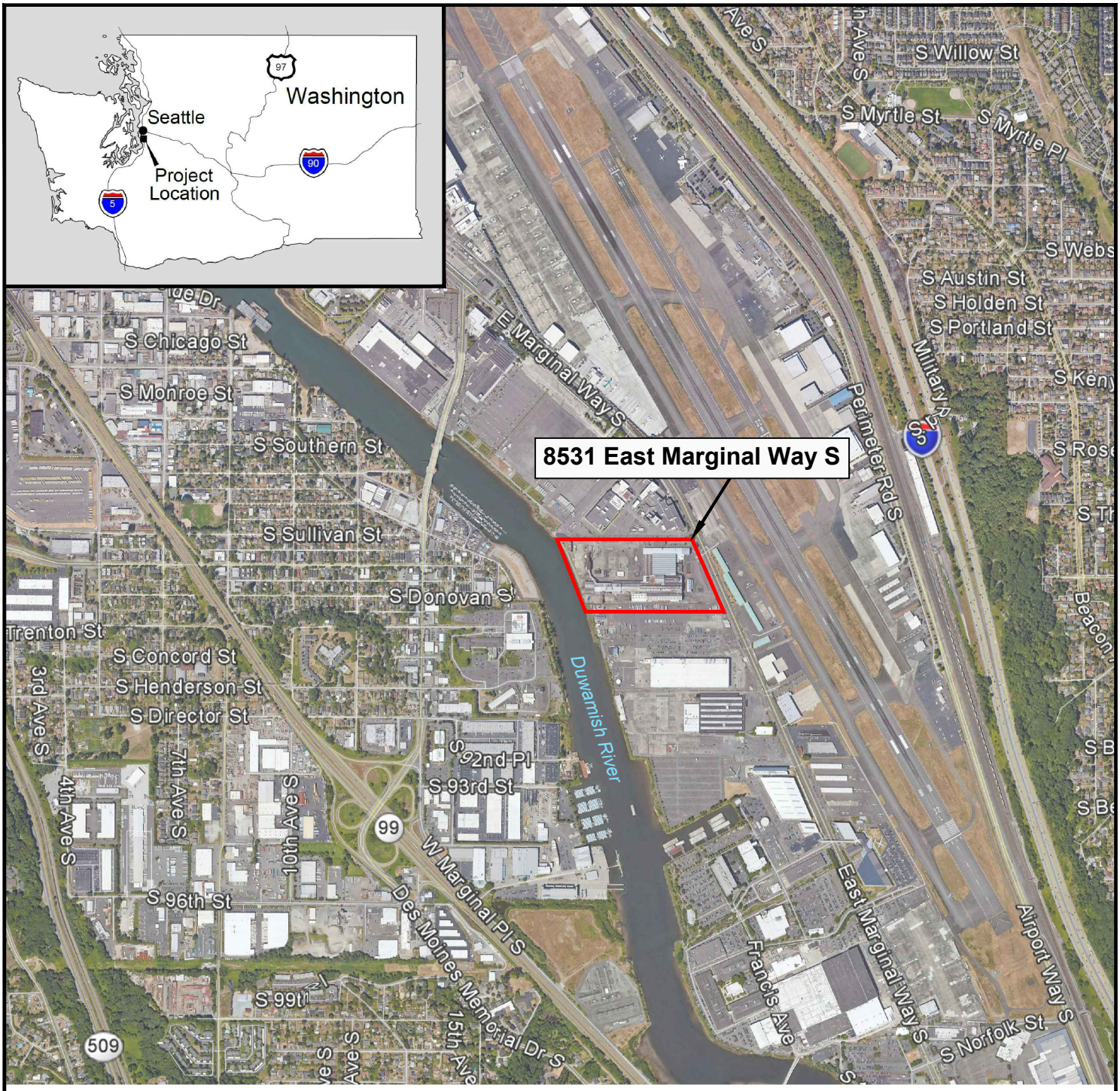
Figure 3 – Map to Hospital



Directions

1.	Head northwest on E. Marginal Way S.	1.3 mi
2.	Turn right on Corson Ave S.	0.8 mi
3.	Turn left on Airport Way S.	2.9 mi
4.	Continue on 7th Ave S.	0.2 mi
5.	Turn right on S. Dearborn St.	0.6 mi
6.	Turn left onto Rainier Ave S.	0.3 mi
7.	Turn right before Rainier Center	0.5 mi
8.	Turn right onto E. Jefferson St.	0.1 mi

9.	Turn left onto 16th Ave	430 ft
10.	Turn right	52 ft
11.	Turn right, destination will be on the left 500 17th Ave Seattle, WA 98122	36 ft



PLOT TIME: 5/22/2020 11:18 AM MOD TIME: 5/22/2020 11:17 AM USER: Kelley Begley DWG: P:\DH Environmental\Site\Jorgensen\DH 2020-05 Jorgensen Vic Map.dwg

DH Environmental Inc

VICINITY MAP

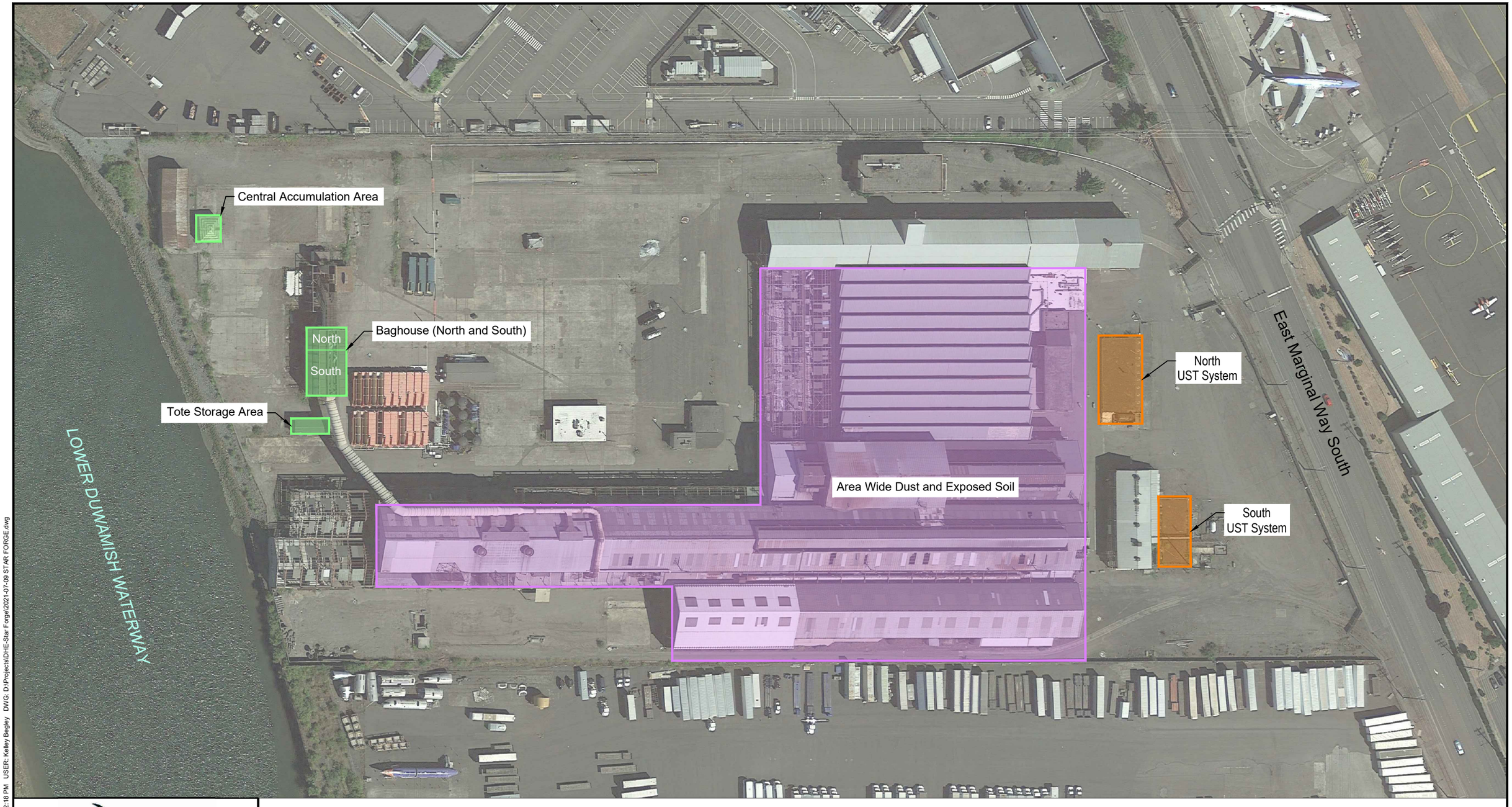
Former Jorgensen Forge Facility 8531 E. Marginal Way S. Tukwila, Washington	05-22-2020	Figure 1

LEGEND

Property Location

N

Background Images Source: Google Earth Pro 5/26/2018



Interim Action Work Areas

Former Jorgensen Forge Facility 8531 E. Marginal Way S. Tukwila, WA, 98108	07/12/2021	Figure 2

Legend

- Former Dangerous Waste Management Units
- Underground Storage Tank Systems
- Area Wide Interior Soil and Dust

Note:

1. Aerial Photography Source: Google Earth Pro, 08/14/2020.

N

0 60 120

Scale in Feet

PLOT TIME: 7/12/2021 2:19 PM MOD TIME: 7/12/2021 2:18 PM USER: Kelley Begley DWG: D:\Projects\DHE-Star Forge\2021-07-09 STAR FORGE.dwg

JOB HAZARD ANALYSIS

The purpose of a JSA is to identify hazards associated with specific tasks and the proper techniques for mitigating, controlling, and eliminating those hazards.

JOB HAZARD ANALYSIS (TITLE): Underground Storage Tank System Permanent Closure by Removal			Client: Star Forge	
Task Description: UST Decommissioning and Removal			Job: Interim Action Work Plan	Date: 10.21.2021
Date of Initial Development: 10.21.2021	By: Brian Johnson	Last Revised/reviewed:	By:	

To request a revision of this document, or to assign a number, please contact the EHS Program Manager brian.johnson@dhenviro.com

Task Based JSA (List all principal steps required to complete the task; **all** hazards and/or potential causes of injury; detailed plans to control, mitigate or eliminate the hazard)

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Mobilization / Demobilization	Low	• Slips, trips, falls • Traffic • Overhead Hazards • Back strain • Repetitive motion • Pinch points • Struck by	• Clear & Mark off drop off area with barrier tape (if required) • Visual barriers will be in place during work hours, and when site is unattended • Limit all walking and access to designated paths / destinations • Plan and stage to minimize long distance carrying • Split heavy loads into smaller loads • Use mechanical lifting aids (i.e. forklift or excavator bucket) where possible and done safely • Do not throw equipment from truck • Lift properly with legs and maintain footing • Use assistance for heavy (>30 lbs.) or awkward loads • Use proper lifting techniques with good footing • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area • Stay clear of swing zone of equipment • Always maintain good housekeeping

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Loading, Moving, and Transportation Activities (on-site)	Low/Medium	• Slips, trips, falls • Traffic • Overhead hazards • Back strain • Repetitive motion • Pinch points • Struck by	• Clear & Mark off drop off area with barrier tape (if required) • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Plan and stage to minimize long distance carrying • Split heavy loads into smaller loads • Use mechanical lifting aids (i.e. forklift or excavator bucket) where possible and done safely • Do not throw equipment from truck • Lift properly with legs and maintain footing • Use assistance for heavy (>30 lbs.) or awkward loads • Use proper lifting techniques with good footing • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area • Stay clear of swing zone of equipment • Always maintain good housekeeping
Site Inspections / Providing Field Staff and Visitor Orientation	Low	• Slips, trips, falls • Traffic • Overhead hazards • Struck by	• Be aware of visual barriers that will be in place during work hours • Limit all walking to designated pathways • Only authorized personnel in work zones • Never travel under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate, hearing protection may be required in noisy environments • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area • Stay clear of swing zone of equipment • Always maintain good housekeeping

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Air Monitoring	Low/Medium	• Inhalation of vapors • Inhalation of particulates • Skin contact • Eye contact • Sudden site condition changes • Struck by • Overhead hazards • Slips, trips, falls • Traffic	• Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Only authorized personnel in work zones • If air monitor alarms or exceeds a safe working limit, STOP WORK and clear the area • Stay uphill, upwind, or upstream of the area of concern • Re-evaluate the site and decide if it is safe to enter the work zone • If needed, temporarily upgrade PPE to ensure worker safety • Only re-enter the work zone after it has been deemed safe by the Site Health and Safety Officer • Hearing protection may be required in noisy environments • Be aware of visual barriers that will be in place during work hours • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Stay clear of swing zone of equipment • Always maintain good housekeeping
Heavy Machinery Operation	Medium/High	• Slips, trips, falls • Traffic • Overhead hazards • Struck by	• Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Set up visible barricades • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Always maintain good housekeeping
Field Staff Decontamination	Medium	• Slips, trips, falls • Traffic • Skin contact • Eye contact • Inhalation	• Discuss decontamination procedures being used (e.g., wet, or dry decon) • Identify locations for boot wash • Identify locations for personal protective equipment change areas • Ensure decontamination procedures are understood • Only authorized personnel in work zones • Always maintain good housekeeping

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Dust Mitigation (water application and dust removal)	Low/Medium	• Slips, trips, falls • Traffic • Inhalation of particulates • Skin contact • Eye contact • Strain / sprain • Difficult working positions • Repetitive motion	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Ensure proper hand tools are being used for the task (e.g., brooms, shovels, Hudson sprayers etc.) • Ensure proper ergonomics are being utilized for the task being performed • Be aware of back up alarms or rotating beacons • Equipment operator controls movement of personnel in and out of equipment travel area • Only authorized personnel in work zones • Always maintain good housekeeping
Soil / Waste Sampling	Low	• Slips, trips, falls • Traffic • Inhalation of particulates • Skin contact • Eye contact • Strain / sprain • Difficult working positions • Repetitive motion	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Ensure proper ergonomics are being utilized for the task being performed • Ensure proper hand tools are being used for the task • Be aware of back up alarms or rotating beacons • Equipment operator controls movement of personnel in and out of equipment travel area • Only authorized personnel in work zones • Always maintain good housekeeping
Equipment Decontamination	Medium	• Slips, trips, falls • Traffic • Skin contact • Eye contact • Inhalation	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Discuss decontamination procedures being used (e.g., wet, or dry decon) • Identify locations for equipment decontamination • Ensure decontamination procedures are understood and field staff understand their individual roles • Only authorized personnel in work zones • Always maintain good housekeeping
Concrete Saw Cutting	Medium	• Skin contact • Eye contact • Inhalation (silica) • Slips, trips, falls • Back strain	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Ensure proper ergonomics are being utilized for the task being performed • Always maintain good housekeeping

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Incidental Hazardous Materials Release (Spills)	Medium/High	• Slips, trips, falls • Traffic • Skin contact • Eye contact • Inhalation • Environmental impact	• In the event of a spill during the project cleanup personnel will don Level D or C PPE, which will consist of chemical protective clothing, safety glasses, chemical protective footwear or boot covers, appropriate gloves, high visibility vest, and if needed respiratory protection • If the event is beyond your level of training notify the Project Manager and or the Site Safety Health Officer, if needed call 911 • Ensure emergency decontamination procedures are understood prior to spill cleanup • All drains that may be potentially impacted will be identified prior to the start of work • Use all resources available to limit the impact to storm drains e.g., storm drain covers, dirt berms, absorbents…etc. • Use all resources available to limit the impact to land e.g., dirt berms, absorbents…etc. • Always maintain good housekeeping
Tank Inerting / Purging	Medium/High	• Ignition sources • Skin contact • Eye contact • Fire • Inhalation • Slips, trips, falls • Traffic	• This task will be performed by a Certified Marine Chemist and will be updated prior to the start of the project • Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Identify and eliminate ignition sources • Always maintain good housekeeping • Be aware of back up alarms or rotating beacons • Equipment operator controls movement of personnel in and out of equipment travel area • Only authorized personnel in work zones
Tank Rigging and Removal	Medium/High	• Pinch points • Struck by • Slips, trips, falls • Overhead hazards • Back strain	• Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves • Ensure proper ergonomics are being utilized for the task being performed • Use 4 gas air monitor to ensure atmosphere near the tank is safe for field staff • Ensure proper lifting devices are available and in good working order (e.g., inspect lifting straps for damage, inspect chains for cracks, breaks, or deformity) DO NOT USE lifting devices if they fail inspection, take out of service immediately • Ensure field staff rigging the tanks have appropriate access and egress to the tanks (e.g., ladders, or stepped/sloped excavation) • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area • No work will be performed under a suspended load • NEVER touch a live load, utilize tag lines at all times • Only authorized personnel in work zones • Always maintain good housekeeping • In case of emergency call 911

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Tank Cleaning	Medium/High	• Skin contact • Eye contact • Inhalation • Injection • Slips, trips, falls • Back strain • Fire • Confined space entry	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Only authorized personnel in work zones • Ensure proper ergonomics are being utilized for the task being performed • While pressure washing avoid pockets of loose material that may blow back onto the operator • DO NOT USE pressure washer as a means to decontaminate field staff • The use of sparking tools will be closely monitored and if needed will not be allowed • Fire extinguishers will be onsite and readily available if needed • Attempt cleaning tanks without making a confined space entry • If needed, see attached Confined Space Entry Program (Appendix B)
Excavation / Removal of Concrete Walls and Slabs	Medium/High	• Slips, trips, falls • Traffic • Overhead hazards • Struck by	• Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Set up visible barricades • Only authorized personnel in work zones • No work will be performed under a suspended load • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Always maintain good housekeeping
Pipe Cutting (with blow torch)	Medium/High	• Skin contact • Eye contact • Inhalation • Slips, trips, falls • Fire	• Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Always maintain good housekeeping • Field staff will be mindful of spark stream and avoid contact with flammables and surrounding personnel • The use of sparking tools will be closely monitored and if needed will not be allowed • Fire extinguishers will be onsite and readily available if needed • Call 911 if emergency occurs

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Soil / Slag Removal	Medium/High	• Slips, trips, falls • Traffic • Overhead hazards • Struck by	• Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Set up visible barricades • Only authorized personnel in work zones • No work will be performed under a suspended load • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area • Always maintain good housekeeping
COVID-19	High	• Illness • Death	• See attached COVID-19 Response Plan (Appendix A)

Documentation of Personnel in attendance of Site Specific JSA Meeting:

PRINTED NAME	SIGNATURE		PRINTED NAME	SIGNATURE

JOB HAZARD ANALYSIS

The purpose of a JSA is to identify hazards associated with specific tasks and the proper techniques for mitigating, controlling, and eliminating those hazards.

JOB HAZARD ANALYSIS (TITLE): Clean Closure of Dangerous Waste Management Units			**Client: Star Forge**
Task Description: Excavation / Removal of Concrete Slabs		**Job: Interim Action Work Plan**	**Date: 10.21.2021**
Date of Initial Development: 10.21.2021	**By: Brian Johnson**	**Last Revised/reviewed:**	**By:**

To request a revision of this document, or to assign a number, please contact the EHS Program Manager brian.johnson@dhenviro.com

Task Based JSA (List all principal steps required to complete the task; **all** hazards and/or potential causes of injury; detailed plans to control, mitigate or eliminate the hazard)

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Mobilization / Demobilization	Low	• Slips, Trips, Falls • Traffic • Overhead Hazards • Back strain • Repetitive motion • Pinch points • Struck by	• Clear & Mark off drop off area with barrier tape (if required) • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Plan and stage to minimize long distance carrying • Split heavy loads into smaller loads • Use mechanical lifting aids (i.e. forklift or excavator bucket) where possible and can be done safely • Do not throw equipment from truck • Lift properly with legs and maintain footing • Use assistance for heavy (>30 lbs.) or awkward loads • Use proper lifting techniques with good footing • Set up visible barricades • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swingor equipment travel area • Stay clear of swing zone of equipment

Loading, Moving, and Transportation Activities (on-site)	Low/Medium	• Slips, Trips, Falls • Traffic • Overhead Hazards • Back strain • Repetitive motion • Pinch points • Struck by	• Clear & Mark off drop off area with barrier tape (if required) • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Plan and stage to minimize long distance carrying • Split heavy loads into smaller loads • Use mechanical lifting aids (i.e. forklift or excavator bucket) where possible and can be done safely • Do not throw equipment from truck • Lift properly with legs and maintain footing • Use assistance for heavy (>30 lbs.) or awkward loads • Use proper lifting techniques with good footing • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Stay clear of swing zone of equipment
Site Inspections / Providing Field Staff and Visitor Orientation	Low	• Slips, Trips, Falls • Traffic • Overhead Hazards • Struck by	• Be aware of visual barriers that will be in place during work hours • Limit all walking to designated pathways • Only authorized personnel in work zones • Never travel under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate. Hearing protection may be required in noisy environments • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Stay clear of swing zone of equipment
Concrete Saw Cutting	Medium	• Skin contact • Eye contact • Inhalation (silica) • Slips, trips, falls • Back strain	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Ensure proper ergonomics are being utilized for the task being performed • Always maintain good housekeeping
Air Monitoring	Low/Medium	• Inhalation of vapors • Inhalation of particulates	• Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges

		• Skin contact • Eye contact • Sudden site condition changes • Struck by • Overhead Hazards • Slips, Trips, Falls • Traffic	• Only authorized personnel in work zones • If air monitor alarms or exceeds a safe working limit, STOP WORK and clear the area. Stay uphill, upwind, or upstream of the area of concern • Re-evaluate the site and decide if it is safe to enter the work zone • If needed, temporarily upgrade PPE to ensure worker safety • Only re-enter the work zone after it has been deemed safe by the Site Health and Safety Officer • Hearing protection may be required in noisy environments • Be aware of visual barriers that will be in place during work hours • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Stay clear of swing zone of equipment
Heavy Machinery Operation	Medium/High	• Slips, Trips, Falls • Traffic • Overhead Hazards • Struck by • Sudden site condition changes	• Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Set up visible barricades • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing or equipment travel area
Dust Mitigation (water application and dust removal)	Low/Medium	• Slips, Trips, Falls • Traffic • Inhalation of particulates • Skin contact • Eye contact • Strain / sprain • Difficult working positions • Repetitive motion	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Ensure proper hand tools are being used for the task (e.g., brooms, shovels, Hudson sprayers etc.) • Ensure proper ergonomics are being utilized for the task being performed • Be aware of back up alarms or rotating beacons • Equipment operator controls movement of personnel in and out of equipment travel area • Only authorized personnel in work zones
Excavation / Removal of Concrete Slabs	Medium/High	• Slips, trips, falls • Traffic • Overhead hazards • Struck by	• Wear appropriate PPE including: High visibility vest, safety glasses, hard hat, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Set up visible barricades • Only authorized personnel in work zones • No work will be performed under a suspended load

			• Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Always maintain good housekeeping
Soil / Waste Sampling	Low	• Slips, Trips, Falls • Traffic • Inhalation of particulates • Skin contact • Eye contact • Strain / sprain • Difficult working positions • Repetitive motion	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Ensure proper ergonomics are being utilized for the task being performed • Ensure proper hand tools are being used for the task • Be aware of back up alarms or rotating beacons • Equipment operator controls movement of personnel in and out of equipment travel area • Only authorized personnel in work zones
Field Staff Decontamination	Medium	• Slips, Trips, Falls • Traffic • Skin contact • Eye contact • Inhalation	• Discuss decontamination procedures being used (e.g., wet, or dry decon) • Identify locations for boot wash • Identify locations for personal protective equipment change areas • Ensure decontamination procedures are understood • Only authorized personnel in work zones
Equipment Decontamination	Medium	• Slips, Trips, Falls • Traffic • Skin contact • Eye contact • Inhalation	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Discuss decontamination procedures being used (e.g., wet, or dry decon) • Identify locations for equipment decontamination • Ensure decontamination procedure are understood and field staff understand their individual roles • Only authorized personnel in work zones
Incidental Hazardous Materials Release (Spills)	Medium/High	• Slips, Trips, Falls • Traffic • Skin contact • Eye contact • Inhalation • Environmental impact	• In the event of a spill during the project cleanup personnel will don Level D or C PPE, which will consist of chemical protective clothing, safety glasses, chemical protective footwear or boot covers, appropriate gloves, high visibility vest, and if needed respiratory protection • If the event is beyond your level of training notify the Project Manager and or the Site Safety Health Officer, if needed call 911 • Ensure emergency decontamination procedures are understood prior to spill cleanup • All drains that may be potentially impacted will be identified prior to the start of work • Use resources available to limit impact to storm drains e.g., drain covers, dirt berms, absorbent etc. • Use all resources available to limit the impact to land e.g., dirt berms, absorbents…etc.
COVID-19	High	• Illness • Death	• See attached COVID-19 Response Plan (Appendix A)

Documentation of Personnel in attendance of Site Specific JSA Meeting:

PRINTED NAME	SIGNATURE		PRINTED NAME	SIGNATURE

JOB HAZARD ANALYSIS

The purpose of a JSA is to identify hazards associated with specific tasks and the proper techniques for mitigating, controlling, and eliminating those hazards.

JOB HAZARD ANALYSIS (TITLE): Area-Wide Soil and Dust Removal		**Client: Star Forge**	
Task Description: Excavation / Removal of Soil and Dust with Skid-Steer (i.e. Bobcat) or Front-End Loader		**Job: Interim Action Work Plan**	**Date: 10.21.2021**
Date of Initial Development: 10.21.2021	**By: Brian Johnson**	**Last Revised/reviewed:**	**By:**

To request a revision of this document, or to assign a number, please contact the EHS Program Manager brian.johnson@dhenviro.com

Task Based JSA (List all principal steps required to complete the task; **all** hazards and/or potential causes of injury; detailed plans to control, mitigate or eliminate the hazard)

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Mobilization / Demobilization	Low	• Slips, Trips, Falls • Traffic • Overhead Hazards • Back strain • Repetitive motion • Pinch points • Struck by	• Clear & Mark off drop off area with barrier tape (if required) • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Plan and stage to minimize long distance carrying • Split heavy loads into smaller loads • Use mechanical lifting aids (i.e. forklift or excavator bucket) where possible and can be done safely • Do not throw equipment from truck • Lift properly with legs and maintain footing • Use assistance for heavy (>30 lbs.) or awkward loads • Use proper lifting techniques with good footing • Set up visible barricades • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area • Stay clear of swing zone of equipment

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Loading, Moving, and Transportation Activities (on-site)	Low/Medium	• Slips, Trips, Falls • Traffic • Overhead Hazards • Back strain • Repetitive motion • Pinch points • Struck by	• Clear & Mark off drop off area with barrier tape (if required) • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Plan and stage to minimize long distance carrying • Split heavy loads into smaller loads • Use mechanical lifting aids (i.e. forklift or excavator bucket) where possible and can be done safely • Do not throw equipment from truck • Lift properly with legs and maintain footing • Use assistance for heavy (>30 lbs.) or awkward loads • Use proper lifting techniques with good footing • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area • Stay clear of swing zone of equipment
Site Inspections / Providing Field Staff and Visitor Orientation	Low	• Slips, Trips, Falls • Traffic • Overhead Hazards • Struck by	• Be aware of visual barriers that will be in place during work hours • Limit all walking to designated pathways • Only authorized personnel in work zones • Never travel under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection may be required in noisy environments • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area • Stay clear of swing zone of equipment

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Air Monitoring	Low/Medium	• Inhalation of vapors • Inhalation of particulates • Skin contact • Eye contact • Sudden site condition changes • Struck by • Overhead Hazards • Slips, Trips, Falls • Traffic	• Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Only authorized personnel in work zones • If air monitor alarms or exceeds a safe working limit, STOP WORK and clear the area. Stay uphill, upwind, or upstream of the area of concern • Re-evaluate the site and decide if it is safe to enter the work zone • If needed, temporarily upgrade PPE to ensure worker safety • Only re-enter the work zone after it has been deemed safe by the Site Health and Safety Officer • Hearing protection may be required in noisy environments • Be aware of visual barriers that will be in place during work hours • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area • Stay clear of swing zone of equipment
Heavy Machinery Operation	Medium/High	• Slips, Trips, Falls • Traffic • Overhead Hazards • Struck by • Sudden site condition changes	• Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Set up visible barricades • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing zone or equipment travel area
Field Staff Decontamination	Medium	• Slips, Trips, Falls • Traffic • Skin contact • Eye contact • Inhalation	• Discuss decontamination procedures being used (e.g., wet, or dry decon) • Identify locations for boot wash • Identify locations for personal protective equipment change areas • Ensure decontamination procedures are understood • Only authorized personnel in work zones

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Dust Mitigation (water application and dust removal)	Low/Medium	• Slips, Trips, Falls • Traffic • Inhalation of particulates • Skin contact • Eye contact • Strain / sprain • Difficult working positions • Repetitive motion	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Ensure proper hand tools are being used for the task (e.g., brooms, shovels, Hudson sprayers etc.) • Ensure proper ergonomics are being utilized for the task being performed • Be aware of back up alarms or rotating beacons • Equipment operator controls movement of personnel in and out of equipment travel area • Only authorized personnel in work zones
Soil / Waste Sampling	Low	• Slips, Trips, Falls • Traffic • Inhalation of particulates • Skin contact • Eye contact • Strain / sprain • Difficult working positions • Repetitive motion	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Ensure proper ergonomics are being utilized for the task being performed • Ensure proper hand tools are being used for the task • Be aware of back up alarms or rotating beacons • Equipment operator controls movement of personnel in and out of equipment travel area • Only authorized personnel in work zones
Equipment Decontamination	Medium	• Slips, Trips, Falls • Traffic • Skin contact • Eye contact • Inhalation	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Discuss decontamination procedures being used (e.g., wet, or dry decon) • Identify locations for equipment decontamination • Ensure decontamination procedure are understood and field staff understand individual roles • Only authorized personnel in work zones
Incidental Hazardous Materials Release (Spills)	Medium/High	• Slips, Trips, Falls • Traffic • Skin contact • Eye contact • Inhalation • Environmental impact	• In the event of a spill during the project cleanup personnel will don Level D or C PPE, which will consist of chemical protective clothing, safety glasses, chemical protective footwear or boot covers, appropriate gloves, high visibility vest, and if needed respiratory protection • If the event is beyond your level of training notify the Project Manager and or the Site Safety Health Officer, if needed call 911 • Ensure emergency decontamination procedures are understood prior to spill cleanup • All drains that may be potentially impacted will be identified prior to the start of work • Use resources available to limit impact to storm drains e.g.drain covers, dirt berms, absorbent etc. • Use all resources available to limit the impact to land e.g., dirt berms, absorbents…etc.

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
COVID-19	High	• Illness • Death	• See attached COVID-19 Response Plan (Appendix A)

Documentation of Personnel in attendance of Site Specific JSA Meeting:

PRINTED NAME	SIGNATURE		PRINTED NAME	SIGNATURE

JOB HAZARD ANALYSIS

The purpose of a JSA is to identify hazards associated with specific tasks and the proper techniques for mitigating, controlling, and eliminating those hazards.

JOB HAZARD ANALYSIS (TITLE): Area-Wide Soil and Dust Sweeping		**Client: Star Forge**	
Task Description: Sweeping / Brooming of Dust / Soil		**Job: Interim Action Work Plan**	**Date: 10.21.2021**
Date of Initial Development: 10.21.2021	**By: Brian Johnson**	**Last Revised/reviewed:**	**By:**

To request a revision of this document, or to assign a number, please contact the EHS Program Manager brian.johnson@dhenviro.com

Task Based JSA (List all principal steps required to complete the task; **all** hazards and/or potential causes of injury; detailed plans to control, mitigate or eliminate the hazard)

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Mobilization / Demobilization	Low	• Slips, Trips, Falls • Traffic • Overhead Hazards • Back strain • Repetitive motion • Pinch points • Struck by	• Clear & Mark off drop off area with barrier tape (if required) • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Plan and stage to minimize long distance carrying • Split heavy loads into smaller loads • Use mechanical lifting aids (i.e. forklift or excavator bucket) where possible and can be done safely • Do not throw equipment from truck • Lift properly with legs and maintain footing • Use assistance for heavy (>30 lbs.) or awkward loads • Use proper lifting techniques with good footing • Set up visible barricades • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Stay clear of swing zone of equipment

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Loading, Moving, and Transportation Activities (on-site)	Low/Medium	• Slips, Trips, Falls • Traffic • Overhead Hazards • Back strain • Repetitive motion • Pinch points • Struck by	• Clear & Mark off drop off area with barrier tape (if required) • Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Plan and stage to minimize long distance carrying • Split heavy loads into smaller loads • Use mechanical lifting aids (i.e. forklift or excavator bucket) where possible and can be done safely • Do not throw equipment from truck • Lift properly with legs and maintain footing • Use assistance for heavy (>30 lbs.) or awkward loads • Use proper lifting techniques with good footing • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Stay clear of swing zone of equipment
Heavy Machinery Operation	Medium/High	• Slips, Trips, Falls • Traffic • Overhead Hazards • Struck by • Sudden site condition changes	• Visual barriers will be in place during work hours, and when site is unattended. • Limit all walking and access to designated paths / destinations • Set up visible barricades • Only authorized personnel in work zones • No work will be performed under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection when working around loud equipment, may be required • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing or equipment travel area

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Site Inspections / Providing Field Staff and Visitor Orientation	Low	• Slips, Trips, Falls • Traffic • Overhead Hazards • Struck by	• Be aware of visual barriers that will be in place during work hours • Limit all walking to designated pathways • Only authorized personnel in work zones • Never travel under a suspended load • Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Hearing protection may be required in noisy environments • Be aware of back up alarms or rotating beacons • Train personnel on working safely around equipment • Make eye to eye contact between operator/driver • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Stay clear of swing zone of equipment
Air Monitoring	Low/Medium	• Inhalation of vapors • Inhalation of particulates • Skin contact • Eye contact • Sudden site condition changes • Struck by • Overhead Hazards • Slips, Trips, Falls • Traffic	• Wear appropriate PPE including: High visibility vests, safety glasses, hard hats, steel toed boots and gloves when appropriate • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Only authorized personnel in work zones • If air monitor alarms or exceeds a safe working limit, STOP WORK and clear the area. Stay uphill, upwind, or upstream of the area of concern • Re-evaluate the site and decide if it is safe to enter the work zone • If needed, temporarily upgrade PPE to ensure worker safety • Only re-enter the work zone after it has been deemed safe by the Site Health and Safety Officer • Hearing protection may be required in noisy environments • Be aware of visual barriers that will be in place during work hours • Equipment operator controls movement of personnel in and out of swing or equipment travel area • Stay clear of swing zone of equipment
Dust Mitigation (water application and dust removal)	Low/Medium	• Slips, Trips, Falls • Traffic • Inhalation of particulates • Skin contact • Eye contact • Strain / sprain • Difficult working positions • Repetitive motion	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Ensure proper hand tools are being used for the task (e.g., brooms, shovels, and Hudson sprayers etc.) • Ensure proper ergonomics are being utilized for the task being performed • Be aware of back up alarms or rotating beacons • Equipment operator controls movement of personnel in and out of equipment travel area • Only authorized personnel in work zones

WORK TASKS	RISK LEVEL	HAZARD OR POTENTIAL FOR INJURY	PLAN TO CONTROL, MITIGATE OR ELIMINATE THE HAZARD
Soil / Waste Sampling	Low	• Slips, Trips, Falls • Traffic • Inhalation of particulates • Skin contact • Eye contact • Strain / sprain • Difficult working positions • Repetitive motion	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Ensure proper ergonomics are being utilized for the task being performed • Ensure proper hand tools are being used for the task • Be aware of back up alarms or rotating beacons • Equipment operator controls movement of personnel in and out of equipment travel area • Only authorized personnel in work zones
Equipment Decontamination	Medium	• Slips, Trips, Falls • Traffic • Skin contact • Eye contact • Inhalation	• Wear appropriate PPE including: Chemical protective clothing (Tyvek or equivalent), high visibility vests, safety glasses, hard hats, steel toed boots and gloves • Wear appropriate respiratory protection (if needed): N95 dust mask, half / full face cartridge style mask with GME-P100 cartridges • Discuss decontamination procedures being used (e.g., wet, or dry decon) • Identify locations for equipment decontamination • Ensure decontamination procedure are understood and field staff understand their individual roles • Only authorized personnel in work zones
Field Staff Decontamination	Medium	• Slips, Trips, Falls • Traffic • Skin contact • Eye contact • Inhalation	• Discuss decontamination procedures being used (e.g., wet, or dry decon) • Identify locations for boot wash • Identify locations for personal protective equipment change areas • Ensure decontamination procedures are understood • Only authorized personnel in work zones
Incidental Hazardous Materials Release (Spills)	Medium/High	• Slips, Trips, Falls • Traffic • Skin contact • Eye contact • Inhalation • Environmental impact	• In the event of a spill during the project cleanup personnel will don Level D or C PPE, which will consist of chemical protective clothing, safety glasses, chemical protective footwear or boot covers, appropriate gloves, high visibility vest, and if needed respiratory protection • If the event is beyond your level of training notify the Project Manager and or the Site Safety Health Officer, if needed call 911 • Ensure emergency decontamination procedures are understood prior to spill cleanup • All drains that may be potentially impacted will be identified prior to the start of work • Use resources available to limit impact to storm drains e.g.,drain covers, dirt berms, absorbent etc. • Use all resources available to limit the impact to land e.g., dirt berms, absorbents…etc.
COVID-19	High	• Illness • Death	• See attached COVID-19 Response Plan (Appendix A)

Documentation of Personnel in attendance of Site Specific JSA Meeting:

PRINTED NAME	SIGNATURE		PRINTED NAME	SIGNATURE

COVID-19 Response Plan

COVID-19 Job Site Requirements

Date Produced: 06/25/2020

Revision Date: 09/17/2021

Table of Contents

Please note that DH Environmental is not a construction company and some of the requirements below may not be implemented on certain projects. If DH Environmental was the prime contractor on a project then all of the below requirements would be met. If DH Environmental is a sub-contractor on a project then we will follow the prime contractor's COVID-19 plan as well as all DH Environmental policies and State and Federal regulations regarding COVID-19.

Purpose and Scope

DH Environmental (DHE), Trade Partners, and vendors have a general obligation to keep a safe and healthy worksite in accordance with state and federal law and must comply with the following COVID-19 worksite-specific safety practices, as outlined in Gov. Jay Inslee's "Washington Ready" Proclamation 20-25.14, and in accordance with the Washington State Department of Labor & Industries General Requirements and Prevention Ideas for Workplaces and the Washington State Department of Health Workplace and Employer Resources & Recommendations.

This plan is designed to meet the guidance requirements of the Phase 2 COVID-19 job site requirements for Washington State.

This plan shall be distributed to all Trade Partners and others working on site. All contractors working on site shall be required to incorporate Phase 2 job site requirements before being allowed to work on the site.

General Information

How COVID-19 Spreads

Although the first human cases of COVID-19 likely resulted from exposure to infected animals, infected people can spread SARS-CoV-2 to other people.

The virus is thought to spread mainly from person-to-person, including:

- Between people who are in close contact with one another (within about 6 feet).
- Through respiratory droplets produced when an infected person coughs or sneezes. These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs.

It may be possible that a person can get COVID-19 by touching a surface or object that has SARS-CoV-2 on it and then touching their own mouth, nose, or possibly their eyes, but this is not thought to be the primary way the virus spreads.

People are thought to be most contagious when they are most symptomatic (i.e., experiencing fever, cough, and/or shortness of breath). Some spread might be possible before people show symptoms; there have been reports of this

type of asymptomatic transmission with this new coronavirus, but this is also not thought to be the main way the virus spreads.

Although the United States has implemented public health measures to limit the spread of the virus, it is likely that some person-to-person transmission will continue to occur.

L&I COVID-19 Requirements

DHE will ensure operations follow the main L&I COVID-19 requirements to protect workers, including:

- Educate workers in the language they understand best about coronavirus and how to prevent transmission and DHE COVID-19 policies.
- Maintain minimum six-foot separation between all employees (and customers) in all interactions at all times.
- When strict physical distancing is not feasible for a specific task, other prevention measures are required, such as use of barriers, minimize staff or customers in narrow or enclosed areas, stagger breaks, and work shift starts.
- Provide personal protective equipment (PPE) such as gloves, goggles, face shields and face masks as appropriate or required to employees for the activity being performed. Cloth facial coverings must be worn by every employee not working alone (with no chance of human interaction) on the jobsite unless their exposure dictates a higher level of protection under Department of Labor & Industries safety and health rules and guidance. Refer to Coronavirus Facial Covering and Mask Requirements for additional details. A cloth facial covering is described in the Department of Health guidance.
- Ensure frequent and adequate hand washing with adequate maintenance of supplies. Use disposable gloves where safe and applicable to prevent transmission on tools or other items that are shared.
- Establish a housekeeping schedule that includes frequent cleaning and sanitizing with a particular emphasis on commonly touched surfaces.
- Screen employees for signs/symptoms of COVID-19 at start of shift. Make sure sick employees stay home or immediately go home if they feel or appear sick. Cordon off any areas where an employee with probable or confirmed COVID-19 illness worked, touched surfaces, etc. until the area and equipment is cleaned and sanitized. Follow the cleaning guidelines set by the CDC to deep clean and sanitize.

A worker may refuse to perform unsafe work, including hazards created by COVID-19 at any time. DHE will not take adverse action against a worker who has engaged in safety-protected activities under the law if their work refusal meets certain requirements.

Employees who choose to remove themselves from a worksite because they do not believe it is safe to work due to the risk of COVID-19 exposure may have access to certain leave or unemployment benefits. DHE will provide high-risk individuals covered by Proclamation 20-46 with their choice of access to available employer- granted accrued leave or unemployment benefits if an alternative work arrangement is not feasible. Other employees may have access to expanded family and medical leave included in the Families First Coronavirus Response Act, access to use unemployment benefits, or access to other paid time off depending on the circumstances.

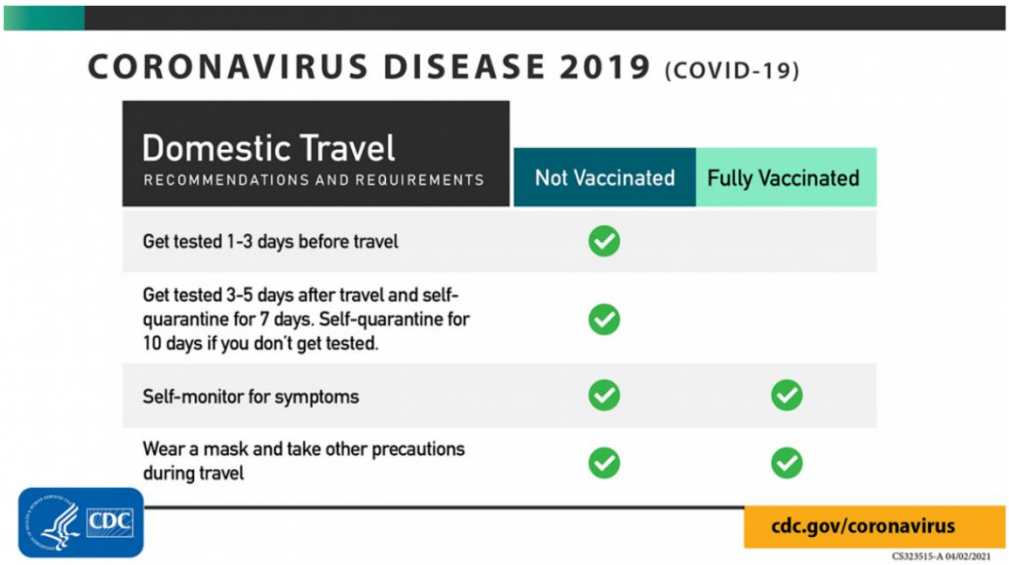
Phase 2 Job Site Requirements

COVID-19 Site Supervisor

1. DHE will designate a COVID-19 Supervisor at every job site to monitor the health of employees and enforce the COVID-19 job site safety plan. A designated COVID-19 Supervisor will be present at all times during construction activities. The name and contact information for the site specific COVID-19 Supervisor will be clearly displayed on all jobsite COVID-19 required postings.
2. DH Environmental has trained three individuals that can act as the COVID-19 Supervisor on this project.
    - Brian Johnson, EHS Program Manager (206) 930-4043
    - Travis Forslund, Project Manager (206) 795-7092
    - Jacob Briere, Project Supervisor (425) 591-8223

COVID-19 Safety Training

3. DHE will conduct a tailgate training on all job sites on the first day of returning to work, and weekly thereafter, to explain the protective measures in place for all workers. Social distancing will be maintained at all gatherings.
4. Attendance of the tailgate training will be communicated verbally and the trainer will sign in each attendee.
5. DHE will train workers to the latest CDC guidance on travel. In addition, CDC travel guidance will be posted at the job site.



Social Distancing

6. Social distancing of at least 6 feet of separation will be maintained by every person on the worksite at all possible times. In instances where the 6 feet separation cannot be maintained, a Job Hazard Analysis will be thoroughly reviewed by all workers performing the work prior to commencing those tasks.

7. Gatherings of any size will be precluded by taking breaks and lunch in shifts when. Any time two or more persons must meet, ensure minimum 6 feet of separation.

8. DHE will identify “choke points” and “high-risk areas” on job sites where workers typically congregate. These areas will be controlled so social distancing is always maintained.

9. DHE personnel or sub-contractors to DHE will minimize interactions when picking up or delivering equipment or materials, ensure minimum 6- foot separation.

Personal Protective Equipment (PPE)

10. Appropriate eye protection for all hazards will be worn at all times by every employee while on the worksite.
11. If appropriate PPE cannot be provided, then the site will be temporarily shut down until the proper PPE is available.

Sanitation and Cleanliness

12. DHE will use restroom facilities inside the building that is located near the work area. The facility has hand-washing stations, with soap and running water.

13. Workers will be encouraged to leave their workstations to wash their hands regularly, before and after going to the bathroom, before and after eating and after coughing, sneezing or blowing their nose.

14. Alcohol-based hand sanitizers with greater than 60% ethanol or 70% isopropanol will also be used, but are not a replacement for washing stations, with soap and water.

15. DHE will post, in areas visible to all workers, required hygienic practices, including not to touch face with unwashed hands or with gloves; washing hands often with soap and water for at least 20 seconds; use hand sanitizer with at least 60% alcohol; cleaning and disinfecting frequently touched objects and surfaces such as workstations, keyboards, telephones, handrails, machines, shared tools, elevator control buttons, and doorknobs; covering the mouth and nose when coughing or sneezing as well as other hygienic recommendations by the U.S. Centers for Disease Control (CDC).

16. Disinfectants will be available to workers throughout the worksite. DHE will ensure cleaning supplies are frequently replenished.

17. DHE will frequently clean and disinfect high-touch surfaces on job sites and in offices, such as shared tools, machines, vehicles and other equipment, handrails, doorknobs, and portable toilets. If these areas cannot be cleaned and disinfected frequently, the jobsite will be shut down until such measures can be achieved and maintained.

18. Shared tools and other equipment will be wipe sanitized between users.

19. If an employee reports feeling sick and goes home, the area where that person worked will be immediately disinfected.

Employee Health/Symptoms

20. DHE has created policies which require workers to stay home or leave the worksite when feeling sick or when they have been in close contact with a confirmed positive case. If the employee develops symptoms of acute respiratory illness, they must seek medical attention and inform DHE Health & Safety Manager.

21. DHE will have employees inform their supervisors if they have a sick family member at home with COVID-19 If an employee has a family member sick with COVID-19, that employee must follow the isolation/quarantine requirements as established by the State Department of Health. Remember, COVID-19 symptoms may appear 2-14 days after exposure to the virus.

22. DHE will screen all workers at the beginning of their day by asking them if they have a fever, cough, shortness of breath, fatigue, muscle aches, or new loss of taste or smell.

23. DHE will instruct employees to take their temperature at home prior to arriving at work or take their temperature when they arrive. Thermometers used shall be 'no touch' or 'no contact' to the greatest extent possible. If a 'no touch' or 'no contact' thermometer is not available, the thermometer must be properly sanitized between each use. Any worker with a temperature of 100.4°F or higher is considered to have a fever and must be sent home. Surfaces in their workspace will be cleaned and disinfected. Information on persons who had contact with the ill employee during the time the employee had symptoms, and 2 days prior to symptoms, will be compiled. Others at the site with close contact within 6 feet of the employee during this time will be considered exposed.

24. DHE will instruct workers to report to their supervisor if they develop symptoms of COVID-19 (e.g., fever, cough, shortness of breath, fatigue, muscle aches, or new loss of taste or smell). If symptoms develop during a shift, the worker will be immediately sent home. If symptoms develop while the worker is not working, the worker will not return to work until they have been evaluated by a healthcare provider.

25. Failure of employees to comply will result in employees being sent home during the emergency actions. For example, if an employee refuses to wear the appropriate facial covering they would be sent home.

26. If an employee is confirmed to have COVID-19 infection, DHE will inform fellow employees of their possible exposure to COVID-19 in the workplace but maintain confidentiality as required by the Americans with Disabilities Act (ADA). The employer will instruct fellow employees about how to proceed based on the CDC Public Health Recommendations for Community-Related Exposure.

27. Employees who have had contact with a positive COVID-19 case but come to the workplace within 14 days of exposure will adhere to the following practices prior to and during each work shift:
    - Pre-Screen: DHE will determine the employee's temperature and assess symptoms prior to their starting work. Employees will be asked to pre-screen at home before travelling to work (including measuring temperature), and will not be permitted to enter the workplace if they have symptoms of COVID-19; temperature equal to or higher than 100.4 degrees Fahrenheit; or are waiting for the results

of a viral test ordered because they are symptomatic or had close contact to a person known or suspected to have COVID-19 symptoms. Temperature checks will happen before the individual enters the site.

- Screen at the workplace: DHE will conduct an on-site symptom assessment, including temperature screening, prior to each work shift. Screening will happen before the employee enters the site.
- Regular Monitoring: As long as the employee doesn't have a temperature or symptoms, they will self-monitor. DHE Health and Safety Manager will supervise self-monitoring. DHE will consult with an occupational health provider and state and/or local health officials to ensure the medical monitoring is conducted appropriately.
- Wear a Mask: The employee will wear a face mask while in the workplace unless there is a medical reason prohibiting its use. DHE will issue facemasks or can approve worker supplied cloth face coverings in the event of shortages.
- Social Distance: The employee will maintain 6 foot separation and practice social distancing as work duties permit in the workplace. Where duties do not permit social distancing, DHE will institute other controls as practicable to protect other workers. Barriers or fans may be effective in many circumstances.
- Disinfect and Clean Work Spaces: Clean and disinfect all areas such as offices, bathrooms, common areas, and shared electronic equipment routinely.

28. DHE's return to work criteria states that employees who experience cold or flu-like symptoms return to work under the following conditions.
    If the worker will not have a test to determine if they are still contagious, they may return to work after these three things have happened:
    - The worker has not had a fever for at least 72 hours (that is three full days of no fever without the use of medicine that reduces fevers) **AND**
    - Other symptoms have improved (for example, when your cough or shortness of breath have improved) **AND**
    - At least 7 days have passed since your symptoms have first appeared.

29. DHE will allow workers that have tested positive for COVID-19 to return to work if the following requirements are met.
    If the worker will be tested to determine if they are still contagious, you can return to the jobsite after these three things have happened (your doctor will follow CDC guidelines):
    - The worker no longer has a fever (without the use of medicine that reduces fevers) **AND**
    - Other symptoms have improved (for example, when your cough or shortness of breath have improved) **AND**
    - The worker has received two negative tests in a row, 24 hours apart.

Additional Information and Resources:

- https://www.cdc.gov
- https://www.osha.gov/
- www.Lni.wa.gov/agency/outreach/novel-coronavirus-outbreak-covid-19-resources

PURPOSE

The purpose of this procedure is to establish confined space entry standards for all DHE employees and subcontractors. This procedure exceeds the guidelines contained in the Occupational Safety and Health Administration (OSHA) Permit-required Confined Spaces standard 29 CFR 1910.146 and requirements outlined in Cal OSHA Article 108 -5157 and WAC 290-809.

DHE shall enforce this procedure as a means of protecting the health and safety of workers while entering, working in, and exiting confined spaces. Before entry, the worker will be made aware of the hazards of confined space work and the safe work practices necessary.

Employees are solicited for input regarding the confined space program or any elements of it. This input can be provided during training classes or on actual confined space job sites.

DEFINITIONS

Acceptable entry conditions: The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Attendant: An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

Authorized entrant: An employee who is authorized by the employer to enter a permit space.

Blanking or blinding: The absolute closure of a pipe, line, or duct by fastening a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore. It is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Classification of Confined Spaces: DHE evaluates all confined spaces for potential hazards; however, all spaces are considered permit-required confined spaces; specifically, a permit will be used for all confined space entries.

Confined Space: A space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
- Is not designed for continuous employee occupancy.

Double block and bleed: The closure of a line, duct, or pipe by closing and locking or tagging 2 in-line valves and by opening and locking or tagging a drain or vent valve in the line between the 2 closed valves.

Emergency: Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit-required confined space that could endanger authorized entrants.

Engulfment: The surrounding capture of a person by a liquid or finely divided (flowable) solid substance that can be inhaled to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry supervisor: The person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section. An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

Entry permit (permit): The written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified in paragraph (f) of this section.

Enter (entry): The action by which a person passes through an opening into a permit-required confined space and includes work activities in that space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Hazardous atmosphere: An atmosphere that may expose employees to the risk of death, incapacitation, and impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10 percent of its lower explosion limit (LEL);
- Airborne combustible dust at a concentration that meets or exceeds its Lower Flammable Limit (LFL);
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
- Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of 29 CFR 1910, or WAC 296-62 parts F, G and I, or WAC 296-841 for airborne contaminants and which could result in employee exposure in excess of its dose or permissible exposure limit;
- Any other atmospheric condition that is immediately dangerous to life or health.

Hot work permit: A written authorization to perform operations, for example, riveting, welding, cutting, burning, and heating, that can provide a source of ignition.

Immediately dangerous to life or health (IDLH): Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space. (Note: in virtually all instances, spaces that are 10% LFL or below, may still be in excess of the IDLH for that substance.)

Inerting: The displacement of the atmosphere in a permit-required confined space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible. Note: This procedure produces an IDLH oxygen-deficient atmosphere.

Isolation: The process by which a permit-required confined space is removed from service and completely protected against the release of energy and material into the space by such means as: Blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

Line breaking: The intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Non-permit confined space: A confined space that does NOT contain actual hazards or potential hazards capable of causing death or serious physical harm. Oxygen deficient atmosphere. An atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen deficient atmosphere: An atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen enriched atmosphere: An atmosphere containing more than 23.5 percent oxygen by volume.

Permit-required confined space program: An overall program for: (a) Controlling and appropriately protecting employees from permit-required confined space hazards; and (b) Regulating employee entry into permit-required confined spaces.

Permit-required confined space (permit space): A confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant;
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross- section;
- Contains any other recognized serious safety or health hazard;
- DHE considers all confined spaces as permit required.

Prohibited condition: Any condition in a permit-required confined space that is not allowed by the permit during the authorized entry period.

Rescue service: The personnel designated to rescue employees from permit-required confined spaces. Retrieval system. The equipment used for nonentry rescue of persons from permit-required confined spaces, such as a retrieval line, full-body harness or wristlets, and a lifting device or anchor.
Retrieval system: The equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Testing: The process of identifying and evaluating the hazards that entrants may be exposed to in a permit-required confined space. Testing includes specifying the tests that are to be performed in the permit-required confined space.

RESPONSIBILITIES

Designated employees will be listed by name for each position or responsibility including: attendant, authorized entrants, entry supervisor and air monitor.

Attendants shall:

- Know the hazards that may be faced during entry in the permit-required confined space, including the signs, symptoms and consequences of over-exposure;
- Be aware of possible behavioral effects of hazard exposure to the entrants;
- Continuously maintain an accurate count of authorized entrants;
- Remain outside the permit-required confined space during entry operations until relieved by another attendant. A single attendant will NOT monitor multiple spaces;
- Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space if necessary;
- Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit-required confined space immediately if necessary;
- Summon rescue and other emergency services if necessary;
- Take the appropriate actions when unauthorized persons approach or enter a permit space while entry is underway;

- Perform non-entry rescues as specified by this procedure;
- Perform no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

Authorized entrants shall:

- Know the hazards that may be faced during entry, including information on the route of entry, signs or symptoms, and consequences of the exposure;
- Properly use the required equipment;
- Communicate with the attendant, as necessary, to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate as necessary;
- Alert the attendant whenever the entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or the entrant detects a prohibited condition;
- Exit from the permit-required confined space as quickly as possible whenever:

  -An order to evacuate is given by the attendant or the entry supervisor;
  -The entrant recognizes any warning sign or symptom of exposure to a dangerous situation;
  -The entrant detects a prohibited condition; or
  -An evacuation alarm is activated.

Entry Supervisors shall:

- Perform a Hazard Assessment of all Confined Spaces before employees enter them. Entry Supervisors shall identify and evaluate the hazards that may be faced during entry, including information on the routes of entry, signs or symptoms, and consequences of the exposure. This assessment shall be conducted and documented before employees enter;
- Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following: (A) Specifying acceptable entry conditions; (B) Isolating the permit space; (C) Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards; (D) Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards; and (E) Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry;

- Verify, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;

- Terminate the entry and cancel the permit when entry operations covered by the permit are complete or when a prohibited condition arises in or near the space;

- Verify that the DHE rescue plan is complete and that proper equipment / trained employees are available;

- Take the following actions when unauthorized persons approach or enter a permit space while entry is underway: (A) Warn unauthorized persons that they must stay away from the permit space; (B) Advise unauthorized persons that they must exit immediately if they have entered the permit space; and (C) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

- Determines that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

RESCUE SERVICES

Rescue Plan:

Prior to any confined space work, a site-specific written rescue plan will be developed that addresses minimum requirements. The rescue plan will be addressed on the confined space permit and covered with the entrants prior to initial entry.

Basic Rescue Requirements:

- DHE Entry Supervisor shall ensure that at least one standby personnel at the site is trained and immediately available to perform rescue and emergency services.

- A trained attendant will be assigned to each confined space with a fully charged SCBA or airline and egress unit in the event that monitoring indicates Oxygen deficient or atmospheres >PELs. The attendant is to keep life lines clear, to maintain contact with all workers within the confined space and to summon help if needed.

- If Fire Department rescue teams will be utilized, the supervisor must ensure that the rescue team has been contacted in advance and has the capability to perform a rescue. The Fire Department teams must be provided the opportunity to examine the rescue site, practice a rescue and decline if appropriate.

- It should be understood, that the time required to recognize the need for rescue, to contact the fire department and allow them to safely perform the rescue may require at least 45 minutes. For this reason, any rescue plan should be realistic. It should be noted that in many states or cities, Fire Department rescue is not an option.

- The equipment required to rescue an unconscious victim must be in place before the first person enters the confined space. This means that personnel must be wearing harnesses, and rescue tripod /winch is set-up and operational.

Client Host Rescue Service:

- If the confined space rescue plan relies upon the client host to provide the rescue, this must be specifically stated and agreed to in attached contract language.

- DHE Entry Supervisor shall ensure that each member of the rescue service is provided with, and is trained to use properly, the personal protective equipment and rescue equipment necessary for making rescues from permit spaces on an annual basis.

Training Requirements for Rescue Team Members:

- Each member of the rescue service must have been trained to perform the assigned rescue duties.

- Each member of the rescue service must also receive the training required of authorized entrants.

- Each member of the rescue service must practice making permit space rescues at least once every 12 months by means of a simulated rescue operation (i.e. remove dummies, manikins or actual persons) from spaces representative of the type they may encounter.

- Each member of the rescue team shall be trained in basic first-aid, cardiopulmonary resuscitation. At least one member of the rescue service holding a current certification in First Aid shall be available on the team.

Entry Rescue Procedures:

Entry rescue procedures should be specifically designed for each permit-required confined space and should be included, where applicable, in the written site health and safety plan. The rescue plan shall: Include provisions for emergency communication;

State how the rescue team and other emergency services will be summoned to the site;

State what level of personal protective equipment is necessary for rescue operations;

State what other types of equipment may be needed, including escape personal protective equipment for injured entrant(s), if necessary.

Attendants may perform entry rescue operations only if properly trained and if relieved of the attendant duties by another qualified attendant.

IDLH / Inert Conditions:

It is the policy of DHE that personnel do not enter IDLH situations for work or rescue. Ventilation will be used to eliminate IDLH conditions and non-entry rescue procedures will be used to extract personnel. In the extreme event that DHE employees must enter an inert space for rescue, the following additional procedures will be initiated:

Special training will be provided for all employees whose duties include working in or around an inert space.
A Job Site Analysis will be written specific to the vessel being entered and the work undertaken. The JSA will address all risks associated with the task such as: setting up the inert entry and catalyst handling equipment at the work site, access and egress to the equipment, provisions for adequate lighting, control of employee access, lifting and rigging activities, removal of vessel internals and installation of warning signs.

The DHE Confined Space Supervisor will communicate the JSA to involved contractor personnel.

DHE will have a documented heat stress plan, including a work/rest regiment, based on the ACGIH Threshold Limit Values.

Inert entry requires specialized equipment. Ensure it is inspected and in good working order before initiating entry.

Personnel must maintain a communication system for use by the employees working inside the inert atmosphere and those monitoring the work from the outside. Entry system must be capable of simultaneous communication with all entry and support personnel. If for any reason the primary communication link fails, the persons working inside the space must be evacuated.

Entrants must wear a helmet sufficiently secured to prevent inadvertent removal (example of a clam type helmet with integral breathing air).

Air supply must be Certified Grade D quality breathing air and must be checked and tagged by Regional Safety Manager before use at the site. Only bottled air is permitted, i.e. no ‘rebreathers’.

The entrant must wear an auxiliary escape air bottle in addition to supplied air. Ensure that the escape bottle is turned off to prevent supplied air flowing through it.

DHE Confined Space Supervisor will write an emergency plan.

The emergency plan must include, but is not limited to the following elements: loss of Nitrogen supply, high Nitrogen pressure, high vessel oxygen, high/increasing vessel temperature, loss of breathing air supply, emergency inside the vessel, and plant emergency outside the vessel.

Stand by DHE employees cannot leave their post until relieved.

Trained personnel shall be made available to respond in a timely manner to provide emergency first aid and cardiopulmonary resuscitation.

DHE shall maintain a periodic log or checklist of continuous air monitoring results. Log entries should not exceed 15-minute intervals.

The area around the Inert Entry Operation must be barricaded to limit personnel in the area. The perimeter of this regulated area will be a minimum of 4 feet from the vessel opening or manway.

Non-entry Rescue Procedures:

- Non-entry rescue operations shall be facilitated as much as possible in order to decrease the risks associated with emergency entry into a confined space. All company attendants shall be trained to perform non-entry procedures.

- Retrieval systems or methods shall be used for all entries into permit-required confined spaces unless the retrieval system would increase the overall risk of the entry or would not work adequately in the space being entered.

- Retrieval systems shall consist of chest or body harnesses with a retrieval line attached to the center of the entrant's back, near shoulder level. The retrieval line shall be attached to either a fixed point or, for spaces more than five feet deep, a mechanical device. The fixed point or mechanical device shall be located outside the confined space.

- Wristlets may be used in lieu of the chest or full body harness if it can be demonstrated that the use of a chest or full body harness is infeasible or creates a hazard and that the use of wristlets is the safest and most effective alternative.

Site Specific Contingency / Emergency Plan / Drills:

- DHE employees working on high hazard gas sites or confined space entries, will be aware of site owner's specific contingency / emergency plan provisions including evacuation routes and alarms.

- Employees should participate in emergency evacuation drills and practice rescue procedures on site.

CONFINED SPACE ENTRY PROCEDURE

Permit System:

DHE requires a confined space permit for each confined space regardless of characterization of space. This provides a documented work plan for each employee and ensures that all cautionary steps have been taken prior to entry.

All "permit required confined space" entries will be preceded by the completion of a confined space entry permit.

All confined space entry permits will address the following:

- Location
- Past and present contents of the tank
- Hazards isolation
- Lock out / tag out
- PPE and special equipment
- Designate who will perform air monitoring
- Air monitoring requirements and results of such monitoring
- Personal monitoring
- Training required
- Specifically designate Confined Space Supervisor
- Specifically, designate attendant(s) by name
- Specifically, designate entrants by name
- Attendants to be present as alternates
- Communication procedures
- Emergency / rescue procedures
- Confined space classification
- Posting of notification

Reviewing Permit Prior / During Entry:

Confined Space Supervisor will ensure that all entrants and attendants are providing opportunity to review permit and provide input regarding data that does not seem to be covered or explained (unauthorized entry, hazards not covered by the permit, injury response, etc.).

Canceling the Permit:

The Confined Space Supervisor will ensure that the permit has been cancelled after operations have been completed each day or when there has been a change in conditions from those originally identified on the permit.

Review of Air Monitoring Data Prior to / During Entry:

- The Confined Space Supervisor will ensure that each entrant and attendant have reviewed, understand and have faith in the air monitoring data used to determine confined space conditions and required protective equipment.

- Additionally, entrants and attendants will agree upon method of communication of ventilation and air monitoring results change during confined space work.

Changes of Conditions / Declassification of Space:

If any hazards that differ from original permit conditions arise within a space, each employee in the space shall exit the space. The DHE entry supervisor shall then reevaluate the space and determine whether a new permit and entry procedures must be issued.

Use of Contractors in Confined Space:

When an employer (host employer) arranges to have employees of another employer (contractor) perform work that involves permit space entry or confined space entries, the host employer shall:

(A) Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space program meeting the requirements of this section, (B) Apprise the contractor of the elements, including the hazards identified and the host employer's experience with the space, that make the space in question a permit space; (C) Apprise the contractor of any precautions or procedures that the host employer has implemented for the protection of employees in or near permit spaces where contractor personnel will be working; (D) Coordinate entry operations with the contractor, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by subsection (d)(11); and (E) Debrief the contractor at the conclusion of the entry operations regarding the permit spaced program followed and regarding any hazards confronted or created in permit spaces during entry operations.

Multi-employers working in Confined Space:

It is DHE policy that multi-employers will not work simultaneously in the confined space. Each employer will write their own confined space permit and assume responsibility for their own employees and work duties.

Re-evaluation of Space:

Confined Space Supervisor will ensure that entrants and attendants are aware of method of communicating a possible change in space condition and the opportunity to reevaluate the space. Employees and their representatives are entitled to request additional air monitoring at any time. The request for reevaluation may occur during a scheduled break or communicated to the attendant depending upon potential safety risk. This change in condition may necessitate a work stoppage, egress and reevaluation of the entire permit prior to re-entry.

Permit Retention:

DHE shall retain each cancelled entry permit for at least one year to facilitate review of the permit space program by a qualified person as required by subsection (d)(4). Any problems encountered during an entry operation shall be noted on the pertinent permit and communicated to the DHE Safety Director so that appropriate revisions to the permit space program can be made.

TRAINING / DOCUMENTATION

Training:

- DHE will train all employees whose duties include working in or around a confined or inert space; in confined space entry, gas hazards, confined space rescue and the hazards associated with confined space work.

  Training shall be provided to each affected employee:

- Before the employee is first assigned duties under this section; (B) Before there is a change in assigned duties; (C) Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained; (D) Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures required by subsection (d)(3) or that there are inadequacies in the employee's knowledge or use of these procedures.
- DHE must certify that the required training has been accomplished. The training / certification will include the employee name, trainer, signature/initials and dates of training.

- This training, including gas hazards, will be conducted before initial assignment and annually thereafter.
- Training will cover the following:

General Confined / Inert Space Training:

- Hazard recognition
- Air monitoring, capabilities and limitations
- Respirator use
- First aid
- Lockout procedures
- Safety equipment
- Rescue drills
- Permit system
- Safe work practices
- Emergency entrance / exit
- Communication requirements
- Inert space

Gas Hazard Awareness Training:

- Location of alarm stations
- Gas monitoring equipment – portable and fixed
- Gas alarms
- Gas hazards-characteristics of gases including oxygen deficiency, oxygen / nitrogen enrichment, carbon monoxide, hydrogen sulfide
- Any plant, department or confined space gases of concern
- Signs and symptoms of over exposure
- Personnel rescue procedures
- Staging areas-primary and secondary
- Use and care of SCBA including donning and emergency procedures (if applicable)
- Evacuation procedures

Appendix C

Ecology 30-day Notice Form for Underground Storage Tank Systems

DEPARTMENT OF ECOLOGY
State of Washington

30-DAY NOTICE

FOR UNDERGROUND STORAGE TANK SYSTEMS

UST ID #: _____

County: _____

This form provides Ecology 30-days' advanced notice for projects, as required by Chapter 173-360A WAC. Instructions are on the back page.

Please ✓ the appropriate box: ☐ Intent to Install ☐ Intent to Close ☐ Change-in-Service

I. SITE INFORMATION	II. OWNER/OPERATOR INFORMATION
Tag or UBI # (if applicable):	Owner/Operator Name:
UST ID # (if applicable):	Business Name:
Site Name:	Mailing Address:
Site Address:	City: State: Zip:
City:	Phone:
Phone:	Email:

III. CERTIFIED SERVICE PROVIDER(S)

Check the appropriate boxes. If more than one service provider is required for this project, fill out both sections.

Note: Individuals performing UST services MUST be ICC-certified or have passed another qualifying exam approved by the Department of Ecology.

1) ☐ Installer ☐ Decommissioner ☐ Site Assessor

Company Name:	Certification Type:
Service Provider Name:	Cert. No.: Exp. Date:
Provider Phone:	Provider Email:

2) ☐ Installer ☐ Decommissioner ☐ Site Assessor

Company Name:	Certification Type:
Service Provider Name:	Cert. No.: Exp. Date:
Provider Phone:	Provider Email:

IV. TANK AND/OR PIPING INFORMATION

TANK ID	TANK CAPACITY	SUBSTANCE STORED	PIPING INSTALLATION OR REPLACEMENT ONLY (Y/N)	DATE PROJECT IS EXPECTED TO BEGIN	COMMENTS

30-DAY NOTICE

FOR UNDERGROUND STORAGE TANK SYSTEMS

GENERAL INSTRUCTIONS

Under WAC 173-360A-0300, 173-360A-0810 and 173-360A-0820, owners and/or operators are required to notify the Department of Ecology (Ecology) **at least 30 days prior** to beginning underground storage tank (UST) and/or piping installation, decommissioning, or change-in-service projects by mailing this notice to the address below. A separate form must be used for each project type (e.g. install, removal). Once this form is received by Ecology, it is date-stamped and returned to the owner/operator listed on the form. Installation and decommissioning projects cannot begin within the first 30 days after the date stamped on this form unless the wait-period has been waived by a regional Ecology UST inspector. If a project cannot meet the deadlines described below, an additional 30-Day Notice may be required.

Department of Ecology
Underground Storage Tank Section
PO Box 47655
Olympia, WA 98504-7655

SITE AND OWNER/OPERATOR INFORMATION

Fill in the site/owner information completely. The contact person listed on this form must confirm the exact date an installation or decommissioning project will begin by contacting the regional UST inspector **at least 3 business days** before proceeding.

INSTALLATION/REPLACEMENT OF TANK AND/OR PIPING

Installation projects must begin within 90 days of the date stamped on this notice. Complete the Tank Information section by assigning Tank ID numbers that have not previously been used at the facility. Once processed, this form allows a one-time drop of product for UST system testing purposes only. The fuel drop is not required to occur within the 90-day period. Once your tank(s) store more than one inch of product, leak detection equipment and monitoring must be in place.

To receive additional deliveries and operate the new tanks/piping, you must submit the Business License application, UST Addendum, and the tank/piping Manufacturer's Installation Checklists to the Department of Revenue (DOR) **within 30 days** of completing the installation. This activates the mailing of your Business License with tank endorsement(s) from DOR and the facility compliance tag from Ecology.

If only piping is being installed or replaced piping, the ICC-certified installer must certify the installation by completing the Retrofit/Repair Checklist with the Manufacturer's Installation Checklist and submitting it to the owner/operator. The form packet must be submitted by the owner/operator to Ecology **within 30 days** of completing the piping installation.

PERMANENT CLOSURE OF TANK AND/OR PIPING

Decommissioning projects must be completed within 90 days after the date stamped on this returned notice. Complete the Tank Information section using Tank ID numbers listed on the Business License. Use the Comments box to include additional information, such as the date when product was removed from both the piping and the tank to less than one inch.

Contact your local fire marshal and planning department prior to tank closure to procure any permits required by county or other local jurisdictions. Compliance with the State Environmental Policy Act (SEPA) Rules, Chapter 197-11 WAC may also apply.

A site assessment is required at the time of closure. If contamination is not discovered, a site assessment report must be submitted to the above address **within 30 days**. If contamination is discovered or confirmed, it must be reported to the appropriate Ecology regional office **within 24 hours** and a site characterization report must be submitted to the above address **within 90 days**.

The following are some examples of tanks that are exempt from the UST regulations.

- Farm or residential tanks, 1,100 gallons or less, used to store motor fuel for personal or farm use only. The fuel must be used for farm purposes and cannot be for resale.
- Tanks used for storing heating oil that is used solely for the purpose of heating the premises.
- Tanks with a capacity of 110 gallons or less.
- Emergency overflow tanks, catch basins, or sumps.

Appendix D

Fill Specifications Letter

SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102

DATE: DECEMBER 2, 2019

SUBJECT: Specifications for Suppliers of Fill to the Star Forge LLC Facility

The 1 1/4-inch minus crushed rock supplied for use at the Star Forge LLC Facility located at 8531 East Marginal Way South, Tukwila, Washington, must meet the requirements of "clean fill."

"Clean fill" shall have no contaminant concentrations above the Preliminary Cleanup Levels (PCULs) as shown on the Washington State Department of Ecology's Lower Duwamish Waterway PCUL Workbook, Soil Summary page, Column F ("Most Stringent Soil PCUL Saturated Zone Nonpotable GW") which can be found as "Preliminary Cleanup Levels for the Lower Duwamish Waterway" dated April 5, 2019, at the following link: <https://apps.ecology.wa.gov/gsp/CleanupSiteDocuments.aspx?csid=1643>.

Fill material will be tested for the following analytes:

- Total polychlorinated biphenyls Aroclors
- Gasoline-, diesel-, and oil-range total petroleum hydrocarbons
- Volatile organic compounds
- Semivolatile organic compounds
- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, vanadium, zinc, and cobalt)

In addition, fill shall be Select Borrow or Gravel Borrow, meeting the requirements of section 9-3.14(1) or 9-03.14(2) of the 2020 Washington State Department of Transportation Standard Specifications.

If the chemical analytical results for the fill material can be provided, please send the results to Mindy Graddon at <mgraddon@soundearthinc.com>. If this information is not available, SoundEarth will complete sampling and analysis of the fill material.

Respectfully,

SoundEarth Strategies, Inc.

Tom Cammarata, LG, LHG
Principal Geochemist

ASW/TJC/MLG:hsb/rt/dnm

SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102

Date: December 6, 2019
Revised: February 17, 2020

WORK PLAN
Fill Material Sampling
Jorgensen Forge Property
8531 East Marginal Way South
Tukwila, Washington 98108
SoundEarth Project No.: 0995-002

PURPOSE

The purpose of this work plan is to confirm and document the chemical composition of the fill material to be used at the above-referenced location in Tukwila, Washington, which is owned by Star Forge LLC, d/b/a Jorgensen Forge (Star Forge). The fill material will be analyzed for chemicals of concern identified in Column B of the Washington State Department of Ecology's (Ecology) Lower Duwamish Waterway Preliminary Cleanup Levels (PCULs) Workbook, Soil Summary page, which can be found as "Preliminary Cleanup Levels for the Lower Duwamish Waterway" dated April 5, 2019, at the following link: <https://apps.ecology.wa.gov/gsp/CleanupSiteDocuments.aspx?csid=1643>.

The results will be compared to Column F ("Most Stringent Soil PCUL Saturated Zone Nonpotable GW") of that same page.

Analyses will be performed using the currently accepted applicable analytical methods for the chemicals of concern and utilize the lowest possible detection limits. Some PCULs are below the practical quantitation limit[1] and method detection limit.[2] For chemicals of concern that are reported as not detected but are above the PCUL, the Washington State Model Toxics Control Act Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code, Publication No. 94-06, Revised November 2007, states that, "In some cases, cleanup levels calculated using the methods specified in this chapter are less than natural background levels or levels that can reliably be measured. In those situations, the cleanup level shall be established at a concentration equal to the practical quantitation limit or natural background concentration, whichever is higher."

The initial sampling for the fill material that will be used to fill the pits and vaults has been completed (the Initial Sampling). The Initial Sampling results have been compared to the PCULs and were found to be acceptable for this property and its location adjacent to the Lower Duwamish Waterway. Once approved,

[1] "Practical Quantitation Limit means the lowest concentration that can reliably be measured within specific limits of precision, accuracy, representativeness, completeness, and comparability during routine laboratory operating conditions, using department approved methods." Defined by Ecology Publication No. 94-06, dated October 12, 2007.

[2] "Method Detection Limit means the minimum concentration of a compound that can be measured and reported with ninety-nine percent (99%) confidence that the value is greater than zero." Defined by Ecology Publication No. 94-06, dated October 12, 2007.

fill material will be stockpiled on-site and tested in accordance with the following plan (the Additional Sampling).

The contractor expects to use approximately up to 35,000 tons of fill material throughout the duration of the project. Approximately 10,000 tons of material will be initially be stockpiled on-site by the contractor; subsequent material will be delivered as needed. When approximately 10,000 tons of material have been delivered to the project site, SoundEarth will be notified by the contractor that fill material is available for Additional Sampling. Additional Sampling will be coordinated when additional fill material has been stockpiled at the project site.

In the event analytical results indicate that chemicals of concern are present at unacceptably elevated concentrations, the contractor will be required to remove the fill material from the site and will source material from a different quarry.

SCOPE OF FILL SAMPLING FIELD WORK

Initial and Additional Sampling Events

- Conduct tailgate and health and safety meeting. Collect signatures on Health and Safety Plan (HASP) from SoundEarth Strategies, Inc. staff and contractors.
- Confirm approximate volume and location of stockpile and note on field map.
- Confirm that sample containers include two 4-ounce jars and one 5035 kit per sample.
- Collect discrete samples according to the Ecology stockpile sampling guidance.[3]

Cubic Yards of Soil	Number of Samples for Chemical Analysis
0–100	3
101–500	5
501–1,000	7
1,001–2,000	10
>2,000	10 + 1 for each additional 500 cubic yards

- Submit samples for the following analyses:
  - Total polychlorinated biphenyls Aroclors by US Environmental Protection Agency (EPA) Method 8082A
  - Gasoline-, diesel-, and oil-range total petroleum hydrocarbons by Northwest Total Petroleum Hydrocarbon (NWTPH) Methods NWTPH-Gx and NWTPH-Dx
  - Volatile organic compounds by EPA Method 8260C
  - Semivolatile organic compounds by EPA Method 8270D SIM

[3] Table 6.9 of the Washington Department of Ecology's June 2016 "Guidance for Remediation of Petroleum Contaminated Sites," available here: <https://fortress.wa.gov/ecy/publications/documents/1009057.pdf>, indicates the number of samples needed based on volume of material in a stockpile.

  - Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, vanadium, zinc, and cobalt) by EPA Methods 200.8/6020.

- Label as SP01-1-YYYYMMDD for stockpile 01, sample number 1, and date. The next stockpile to be sampled would be labeled SP02-1-YYYYMMDD, and so on.
- Submit samples for analysis to Friedman & Bruya, Inc. in Seattle, Washington.
- Confirm the turnaround time with the Project Manager (Mindy Graddon).
- Deliver daily field form package to Project Manager (Mindy Graddon).
- Project Manager to provide results to Star Forge and CGI.

EQUIPMENT AND SUPPLIES

___ Field forms (HASP, daily logs, field map)
___ Personal protective equipment/health and safety equipment (hard hat, steel toe rubber boots, safety glasses, Nitrile gloves)
___ Soil sampling kit
___ Deionized water and Citranox
___ Sample containers for soil samples, chains of custody, labels, and coolers
___ Ice
___ Ziplock bags, garbage bags

LABORATORY

Friedman & Bruya, Inc.
Mike Erdahl or Eric Young
3012 16th Avenue West
Seattle, Washington 98119
206-285-8282

FIELD DELIVERABLES

- Daily field report
- Daily HASP sign-in forms
- Chain of custody
- Boring logs
- Well construction form
- Drum inventory form
- Drum inventory map
- Purge forms
- Personnel and field equipment expense reports

Appendix E

Surface Conditions Figure, SoundEarth Strategies, 2020

2/28/2020

P:\0995 JORGENSEN FORGE CORPORATION\0995-002 JORGENSEN FORGE\TECHNICAL\CAD\2020\0995-002-10 2020 SURF-COND-AREA.DWG

LOWER DUWAMISH WATERWAY

BLACK SHACK

OIL STORAGE SHED

TRUCK SCALE

PARKING AREA

MAIN OFFICE

HOLLOWBORE

SOUTH 86TH PLACE

MAIN ENTRY

MELT BAG HOUSE

DELIVERED MATERIAL STORAGE AREA

EMPLOYEE PARKING AREA

TOOL ROOM / SHIPPING

SEE FIGURE 5 FOR SURFACE CONDITION LOCATIONS

MAINTENANCE OFFICES

LABORATORY

MACHINE SHOP

TANK FARM 2

TOTE STORAGE SHED

METAL SHOP LOCKERS

POWER HOUSE

TANK FARM 1

MELT SHOP

FORGE SHOP

FINISHED MATERIAL STORAGE AREA

EAST MARGINAL WAY SOUTH

MELT SHOP WAREHOUSE

MELT STEEL SLAG AND MILL SCALE STORAGE AREA

SCRAP AND MAGNETIC SCRAP STORAGE

BILLET AND GRINDING STORAGE AREA

SEE FIGURE 2 FOR SURFACE CONDITION LOCATIONS

SEE FIGURE 3 FOR SURFACE CONDITION LOCATIONS

SEE FIGURE 4 FOR SURFACE CONDITION LOCATIONS

N

0 30 60 120

APPROXIMATE SCALE IN FEET

LEGEND

- PROPERTY BOUNDARY
- BUILDING OUTLINE
- GRAVEL SURFACE
- SURFACE CONDITION INVESTIGATION AREAS
- CONCRETE NOT ENCOUNTERED
- CONCRETE CONFIRMED
- CONCRETE UNCERTAIN
- SOIL AT SURFACE
- DEBRIS AT THE SURFACE
- STANDING WATER

NOTE:

ANYTHING NOT SHADED IS EXPOSED CONCRETE AT THE SURFACE.

SoundEarth Strategies

WWW.SOUNDEARTHINC.COM

JORGENSEN FORGE FACILITY
8531 EAST MARGINAL WAY SOUTH
TUKWILA, WASHINGTON
SOUNDEARTH PROJECT #0995-002

FIGURE 1

SURFACE CONDITION INVESTIGATION AREAS ON 02/24/20
PARCEL# 0001600023