The Boeing Company
P.O. Box 3707
Seattle, WA 98127-2207

August 5, 2024
MHT-2024-068

Mr. David Butler
Washington State Department of Ecology, NW Regional Office
15700 Dayton Ave N
Shoreline, WA 98133

Subject: Boeing Isaacson-Thompson Site
Supplemental Investigation Work Plan

Dear Mr. Butler:

I have enclosed 1 electronic copy of the following documents for your review:

- *Supplemental Investigation Work Plan—Final, Isaacson-Thompson Site, Tukwila, Washington* prepared by Landau Associates, Inc., dated August 2, 2024.
- Updated Ecology comment and response matrix/table.

Please contact me if you have any questions.

Sincerely,

Molly Taptich

Molly Taptich, PG
Environmental Remediation Project Manager
Global Enterprise Sustainability
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LANDAU ASSOCIATES

SUPPLEMENTAL INVESTIGATION WORK PLAN–FINAL

Isaacson-Thompson Site
Tukwila, Washington

August 2, 2024

Prepared for

The Boeing Company

SEATTLE
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Supplemental Investigation Work Plan–Final
Isaacson-Thompson Site
Tukwila, Washington

This document was prepared by, or under the direct supervision of, the technical professionals noted below.

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Principal Engineer

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Project Coordinator:	ljl

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LIST OF ABBREVIATIONS AND ACRONYMS

bgs ..... below ground surface
Boeing ..... The Boeing Company
CAP ..... cleanup action plan
CPOC ..... conditional point of compliance
COC ..... contaminant of concern
cPAH ..... carcinogenic polycyclic aromatic hydrocarbon
Ecology ..... Washington State Department of Ecology
FS ..... feasibility study
ft ..... feet, foot
Landau ..... Landau Associates, Inc.
LDW ..... Lower Duwamish Waterway
mg/kg ..... milligrams per kilogram
MTCA ..... Washington State Model Toxics Control Act
Order ..... Agreed Order No. DE 7088
pCUL ..... preliminary cleanup level
POC ..... point of compliance
Port ..... Port of Seattle
PRB ..... permeable reactive barrier
QAPP ..... quality assurance project plan)
RI ..... remedial investigation
SAP ..... sampling and analysis plan
Site ..... Boeing Isaacson-Thompson Site
UCL 95 ..... 95 percent Upper Confidence Level
WAC ..... Washington Administrative Code
ZVI ..... zero-valent iron

1.0 INTRODUCTION

This document presents a work plan to perform a supplemental investigation at The Boeing Company (Boeing) Isaacson-Thompson Site (Site) located in Tukwila, Washington (Figure 1-1). The objective of the investigation is to further characterize soil conditions at and near the portion of the Site where a shoreline stabilization project planned to take place by Boeing (see Section 1.6). The Site is composed of two parcels of land owned by Boeing that are surrounded by a security fence and a shoreline parcel owned by the Port of Seattle (Port), all with limited access:

- The Isaacson property, owned by Boeing and located in the northern portion of the Site;
- the Thompson property, owned by Boeing and located in the southern portion of the Site; and
- the Port property (also known as the "Sliver property"), owned by the Port and located in the northwestern portion of the Site, west of the Isaacson property.

The soil sampling outlined in this work plan is located within the Thompson property. Boeing has conducted investigations at the Site to characterize soil and groundwater conditions as documented in the remedial investigation (RI) report (Landau Associates, Inc. [Landau] and AMEC 2014). Investigation activities have been supplemented by the Washington State Department of Ecology (Ecology) investigation of the Port property, the results of which are documented in Appendix A1 and A2 of the feasibility study (FS; Landau 2024).

The RI report concluded that a remedial action evaluation was warranted for impacted soil and groundwater at the Site. The subsequent FS developed and evaluated remedial action alternatives for the Site and identified a preferred remedial action that will address the contamination at the Site as required by Washington Administrative Code (WAC) 173-340-360, under the Model Toxics Control Act (MTCA). The FS also developed proposed soil and groundwater preliminary cleanup levels (pCULs) and identified proposed points of compliance (POCs). The cleanup process, including preparation of this supplemental investigation work plan, is currently being implemented under Agreed Order No. DE 7088 (Order) between Boeing and Ecology. The Final RI was submitted to Ecology on April 21, 2014. Ecology determined the RI to be sufficient to proceed with the FS in a letter dated May 11, 2017 (Ecology 2017). The Final FS was submitted on February 14, 2024 and approved by Ecology on February 14 (Ecology 2024a). The draft cleanup action plan (CAP) was submitted on October 30, 2023 (Ecology 2023). Upon completion of a public review period, Ecology will finalize the CAP and a new Order will be executed.

The final remedy, described in the draft CAP, consists of excavation of contaminated soil from the northwestern portion of the Site downgradient of the conditional point of compliance (CPOC; including the Port Property) and the Observed Tar-Like Substance Area, *in situ* groundwater treatment upgradient of the shoreline CPOC using a zero-valent iron (ZVI) permeable reactive barrier (PRB), a low-permeability cap over remaining soil contamination, institutional controls, and groundwater monitoring.

This supplemental investigation work plan describes field activities associated with further characterization in the southwest corner of the Site to support Boeing evaluation of shoreline stabilization in this area. Note: This area of supplemental soil sampling is not within or near the area of proposed remedial activities at the Site as detailed in the draft CAP and is for the purposes of data

collection ahead of construction. Procedures and data management for supplemental field investigation activities and laboratory analytical processes will be performed in accordance with the sampling and analysis plan (SAP; Appendix A) and 2011 Final Uplands Quality Assurance Project Plan (QAPP; Landau 2011).[1] Of particular relevance to this work are those sections of the QAPP and SAP covering field documentation, decontamination procedures, sampling and analysis procedures, and chain-of-custody protocol.

1.1 Site Description

The Site (Figure 1-2) is comprised of two Boeing-owned parcels and one Port-owned parcel of land surrounded by a security fence, with limited access. The northern Boeing parcel is known as the Isaacson property and the southern Boeing parcel is known as the Thompson property. All the work described herein will occur on the Thompson property.

A deteriorating wooden shoreline bulkhead runs from the southern end of the Thompson property approximately 340 feet (ft) north, where the bulkhead transitions to steel construction and runs an additional 160 ft. Construction details of the Thompson wooden bulkhead are not known, but the bulkhead consists of a continuous row of vertical wooden piles and thick horizontal planking and may have been present since at least 1936 based on historical photographs.

1.2 Site Geologic/Hydrogeologic Conditions

The geology of the lower Duwamish River valley is characterized by the historic riverine depositional environment from the river and the anthropogenic changes made to the river that resulted in the current configuration of the Lower Duwamish Waterway (LDW). Naturally occurring soils in the vicinity generally consist of low to moderately permeable alluvial deposits of interbedded silt, clay, silty sand, and sand. The Duwamish River historically meandered across the river valley floor but was channelized in the 1900s for shipping and commerce. The constructed channel resulted in the human movement and deposition of dredge fill and other large quantities of sand, silt, gravel, and other fill sources.

Observations during the RI indicated that subsurface soil conditions at the Site consist of approximately 2 to 19.5 ft of fill overlying river deposits with the thickest layers of fill occurring in the Former Slip 5 Area. The fill generally consists of silty sand to sandy gravel. Fill materials within the Former Slip 5 Area include bricks, wood debris, and slag material. The native deposits typically consist of fine sand and silty fine sand with silt lenses. The native surficial deposits are characterized by the presence of small in-place roots, wood fragments, and peat, which are indicators of the original ground surface elevation prior to filling. Underlying the silt and silty fine sand is a series of interbedded alluvial sand and silt layers that were deposited within the floodplain of the lower Duwamish River. In the area of the mouth of former Slip 5, beneath the interbedded alluvial silt and fine sand is a layer of very dark to black silt. This naturally deposited sand and silt is found throughout the lower Duwamish River valley and was likely deposited from flood waters.

[1] Certain elements of the QAPP, such as laboratory analytical methods, may be out of date. Current and Ecology-approved laboratory methods will be used for this work where applicable.

The near-surface groundwater regime within the lower Duwamish River valley is generally characterized as a shallow, single-aquifer system. The Site is located at and near the east bank of the LDW, at approximately 16.5 to 19.5 ft above mean lower low water. Shallow groundwater is present throughout the area of the Site. River elevations adjacent to the Site and groundwater levels at the Site are tidally influenced proximate to the LDW. Depth to water at the Site measured during the RI (all collected during an intermediate tide) typically ranged from 11 to 17 ft below ground surface (bgs) and on average was 13.5 ft bgs.

Groundwater at the Site generally flows to the west toward the LDW, except at some locations along the immediate shoreline area where groundwater is tidally influenced, and groundwater may be also affected by the various existing bulkheads along the western edge of the Site.

1.3 Previous Site Investigations

Environmental investigations at the Site to date have been conducted to characterize and evaluate the chemical quality and physical condition of soil, groundwater, sediment, and storm drain solids. Investigations have been conducted from 1983 to 2011, including formal RI investigation activities. A full summary of previous investigations is provided in Section 3.0 of the RI report. The results of investigations in the southeastern portion of the Thompson property identified no significant contamination present in shoreline and near-shoreline soils in this area of the Site.

2.0 SUPPLEMENTAL INVESTIGATION OBJECTIVE

The background and objective of the supplemental investigation are provided in this section.

2.1 Planned Shoreline Stabilization Project

The Boeing Isaacson-Thompson facility is proposing improvements to the Thompson property shoreland infrastructure sometime in the next few years (a specific schedule has not been finalized; 2025 has been used for planning purposes and permitting). The proposed project entails installing a sheet pile wall upland of the existing wooden shoreline bulkhead. The proposed sheet pile wall project is not intended to be implemented as a source control or containment measure. Based on soil data in this area of the Site that indicate there is no environmental erosion-to-sediment risk in this area. The purpose of the project is intended solely to provide protection to shoreline property and upland Boeing infrastructure. Therefore, the bulkhead project does not currently meet the definition or requirements of an interim action according to MTCA (WAC 173-340-430).

Potential impacts that the sheet pile wall might have on groundwater flow can be evaluated and incorporated into the design of the final remedy or addressed through modifications to the final remedy, as necessary, depending on the timing of the project.

2.2 Investigation Objective

A supplemental investigation is needed to evaluate nearshore concentrations of metals (and other Site contaminants of concern [COCs]) at and near the shoreline at the southwestern edge of the Site. The investigation will focus on soils on the riverward side and along the alignment of the planned sheet pile wall shoreline stabilization project described in Section 1.6. More specifically, the objective of the supplemental investigation at the Site is to:

1) **Further define the current western extent of metals (and other COCs) contamination in the southwest corner of the Site.** Three soil grab samples were collected from the LDW side of the wooden bulkhead located in the southern portion of the Thompson property in March 2012 to evaluate potential soil erosion as a source of contamination in offshore sediment. Arsenic was detected in one sample at a concentration 7.6 milligrams per kilogram (mg/kg; Landau and AMEC 2014), slightly above the soil pCUL (7 mg/kg; Landau 2024) but at a concentration likely indicative of natural background concentrations for the lower Duwamish River valley.[2] Other detected metals and COC concentrations were below applicable pCULs. Supplemental investigation sampling will be performed in this area to further characterize the extent of metals contamination in the area.

[2] Ecology's July 2024 pCUL workbook for the LDW (Ecology 2024b) identifies a natural background level for arsenic of 7.3 mg/kg; the final FS for the LDW (AECOM 2012) indicates a 90th percentile value of 11.0 mg/kg and a 95 percent Upper Confidence Level (UCL 95) of 7.3 mg/kg.

3.0 SUPPLEMENTAL INVESTIGATION ACTIVITIES

The following sections describe the field activities that will be performed to complete the supplemental investigation in the southwestern corner of the Thompson property. Investigation locations are presented on Figure 3-1.

3.1 Site Reconnaissance and Utility Locate

A Site reconnaissance will be completed prior to conducting investigation activities. The Site visit(s) will involve evaluating potential access issues by noting Site features and/or tenant materials that overlie or impede drilling access to proposed and existing investigation locations.

As appropriate, proposed investigation locations will be marked in white paint per Revised Code of Washington 19.122.030, and a public utility locate request will be submitted through the Washington Utility Notification Center. A private underground utility locate will also be conducted following the Site reconnaissance visit. Investigation locations described elsewhere in this supplemental investigation may be moved based on the results of the Site reconnaissance to avoid subsurface utilities or other infrastructure.

3.2 Bulkhead Area Soil Investigation

To further characterize soil contamination in the southwestern extent of the Thompson Property, additional soil investigation activities will be conducted at and near the existing Thompson Property wooden bulkhead. The soil investigation will consist of collecting and analyzing soil samples from seven locations as shown on Figure 3-1. The following explorations will be conducted and soil samples will be collected from each location for laboratory analysis:

- Three soil borings will be located along the planned sheet pile wall alignment near the southwestern shoreline of the Thompson property.
- Soil samples will be collected at four locations along the LDW shoreline, which will be collected by hand from the river side of the wooden bulkhead located at the southern portion of the Boeing Thompson property.

All soil samples will be analyzed for select Site COCs as defined in the draft CAP including bis(2-ethylhexyl)phthalate, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), polychlorinated biphenyls, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and zinc. Additional information on the methods and techniques to be used are provided in the SAP (Appendix A) and QAPP (Landau 2011). Soil samples will be analyzed for additional constituents if required for waste characterization and profiling by the appropriate disposal facility.

3.2.1 Soil Sampling

Soil samples will be collected from three borings in the southwest corner of the Site (along the planned sheet pile wall alignment) and four grab locations from soil immediately east of the wooden (Figure 3-1).

Each boring will be drilled using a direct-push rig to a total depth of 25 ft bgs or refusal, whichever is encountered first. Lithology will be logged according to the Unified Soil Classification System using the soil cores extracted from the boring during drilling. Soil samples will be collected from approximately 1- to 2-ft intervals at approximately 5-ft depth intervals bgs along the length of the boring.

Four soil samples will be collected along the bank of the river from locations that are accessible between gaps within the wooden bulkhead using hand implements. Soil samples will be collected approximately half the height of the exposed bulkhead that extends approximately 4 to 5 ft above the mudline of the river (i.e., from the bank approximately 2 to 3 ft above the mudline). If soil is not accessible by this method, a hand auger will be used at locations on top of the wooden bulkhead to bore vertically into the soil immediately behind (east of) the bulkhead (Figure 3-1) and samples collected at a comparable depth (i.e., 2 to 3 ft above the mudline).

The river bank sampling locations will either be accessed during low tide from the beach/mudflat a) via a gate in the security fence on the Thompson property (using a ladder to reach the beach/mudflat); or b) via a Landau-owned and operated canoe or flat bottom boat.

3.3 Health and Safety

Sampling activities for the supplemental investigation are covered under the health and safety plan in Appendix B. Physical copies of task-specific health and safety plans will be kept onsite at all times during field activities. Daily tailgate safety meetings will take place before work begins each day; Landau will lead the meetings and all subcontractors, Boeing representatives, and visitors will be required to attend.

Note that Landau has established health and safety protocols for using watercraft to access difficult to reach shoreline locations and for working at heights on ladders (see Section 3.2.1). The relevant health and safety documentation associated with the selected bulkhead access approach will be included in the health and safety plan and provided as a specific management of change document for Boeing's review and approval.

4.0 REPORTING AND SCHEDULE

After receipt and validation of data, a summary of field activities and the results of the supplemental investigation sampling will be documented in the data report. Sampling results will be compared to the preliminary cleanup levels included in the Ecology-approved FS (Landau 2024). Boeing understands that if the findings of the investigations identify soil contamination above the preliminary cleanup levels, additional investigation or remedial actions may be appropriate to address conditions at the Site. If necessary, additional sampling or remedial actions may be most feasibly or appropriately undertaken prior to implementation of the shoreline stabilization project and/or included in the scope of the project. Ecology approval of these potential additional steps will also be required prior to the start of the project.

An anticipated schedule for the supplemental investigation and associated submittals is summarized below.

Task	Anticipated Date Range or Completion Time
Draft Supplemental Investigation Work Plan submitted to Ecology	July 2024
Final Supplemental Investigation Work Plan submitted to Ecology	Within 30 days of receipt of Ecology comments
Supplemental Investigation field work completed	Within 60 days of Ecology approval of final work plan
Supplemental Investigation Data Report submitted to Ecology	Within 30 days of receipt of final laboratory data

Assuming that this supplemental investigation work plan will be approved by Ecology within 60 days of receipt of the draft work plan, it is anticipated that the implementation and reporting for the supplemental investigation can be completed in 2024. Variations from this schedule may be necessary based on Ecology review and approval of this work plan and the project SAP, unanticipated findings, driller availability, Site access constraints, and weather or other facility-dictated delays. If additional activities are needed to meet the objectives of the supplemental investigation work plan, the scope, schedule, and submittal requirements for this additional work will be developed and discussed with Ecology. Substantial changes/additions will be submitted as supplemental investigation work plan addenda to Ecology for review and approval.

5.0 USE OF THIS REPORT

This supplemental investigation work plan has been prepared for the exclusive use of Boeing and applicable regulatory agencies for specific application to the Isaacson-Thompson Site. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau, shall be at the user's sole risk. Landau warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. Landau makes no other warranty, either express or implied.

6.0 REFERENCES

AECOM. 2012. Final Feasibility Study, Lower Duwamish Waterway, Seattle, Washington. October 31.

Ecology. 2017. Letter: Ecology Request to Proceed with the Feasibility Study for Boeing Isaacson-Thompson Site, Agreed Order No. DE 7088. Washington State Department of Ecology. May 11.

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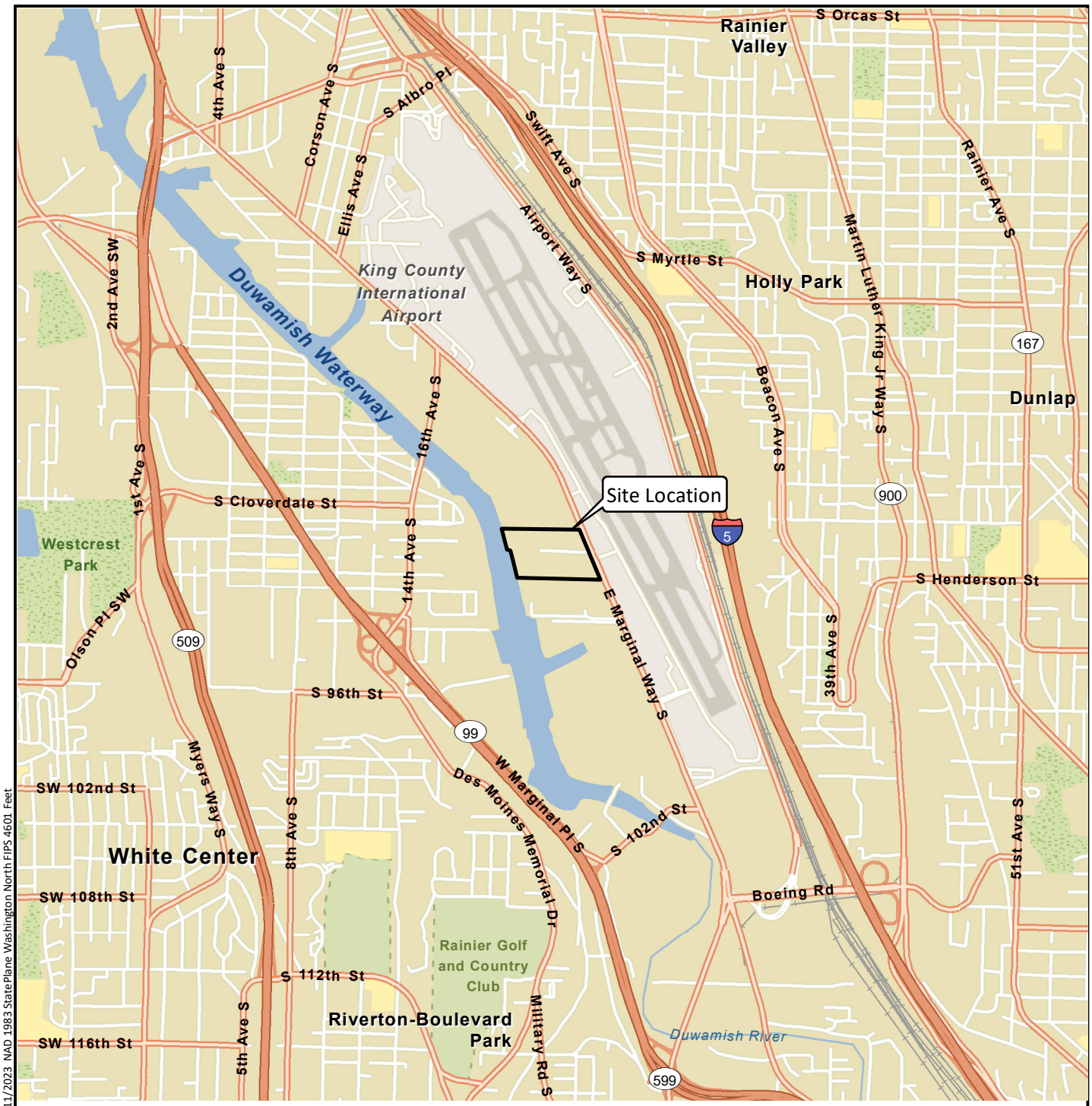
Ecology. 2024b. Lower Duwamish Waterway Preliminary Cleanup Level Workbook. Washington State Department of Ecology. July 30.

Landau. 2011. Final Uplands QAPP, Remedial Investigation/Feasibility Study, Boeing Isaacson-Thompson Site, Tukwila, Washington. Landau Associates, Inc. September 16.

Landau. 2024. Final Feasibility Study Report, Isaacson-Thompson Site, Tukwila, Washington. Landau Associates, Inc. February 14.

Landau and AMEC. 2014. Final: Remedial Investigation Report, Boeing Isaacson-Thompson Site, Tukwila, Washington. Landau Associates, Inc. and AMEC Environment & Infrastructure, Inc. April 21.



Data Source: Esri.

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LANDAU ASSOCIATES

Boeing Isaacson-Thompson Site Tukwila, Washington	**Vicinity Map**	Figure 1-1

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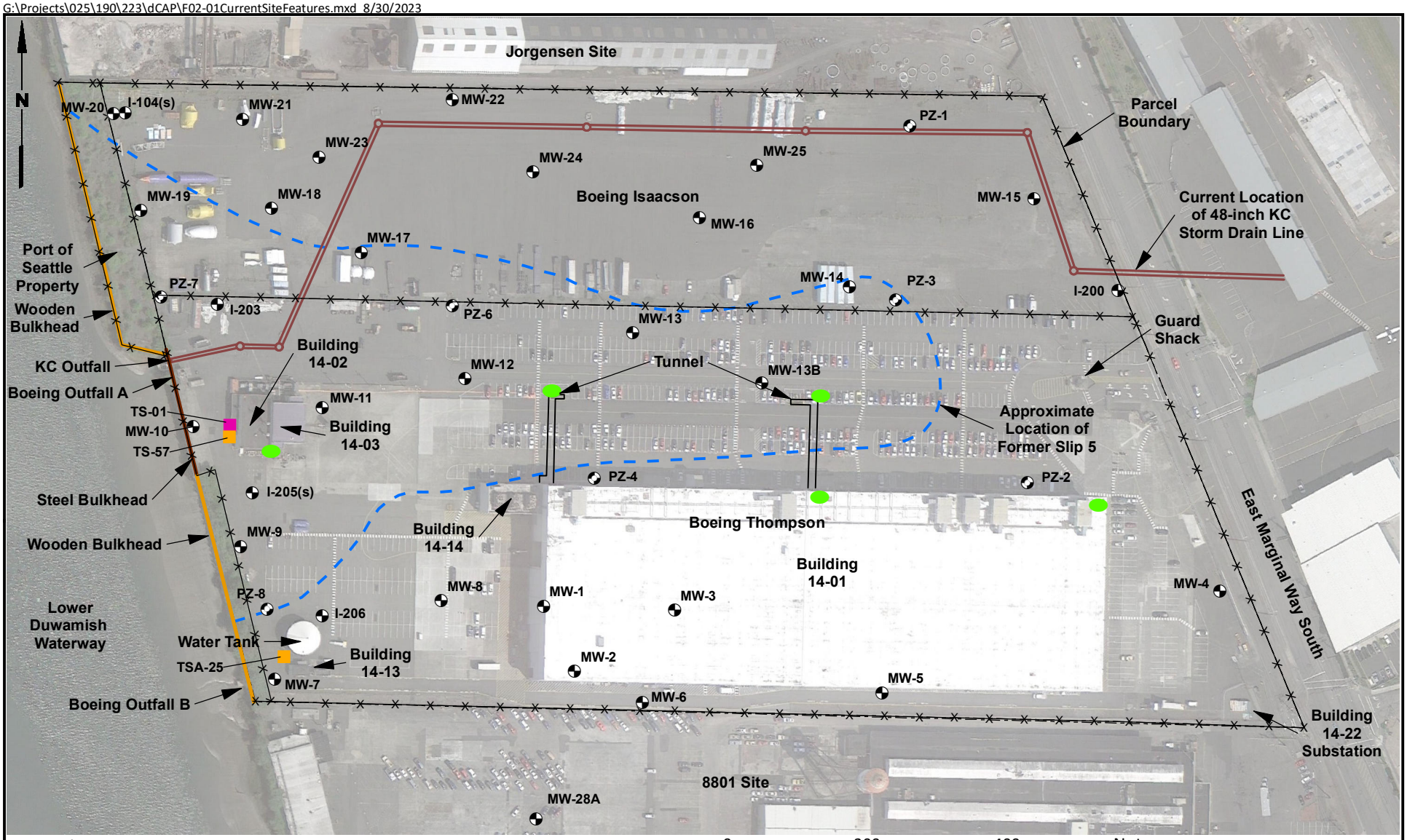

Legend

- Monitoring Well
- Piezometer
- Approximate Location of Former Slip 5
- Fence
- Aboveground Storage Tank
- Underground Storage Tank
- Sump

0 200 400

Scale in Feet

Data Sources: Google Earth Pro 2012; King County Parcel Data.

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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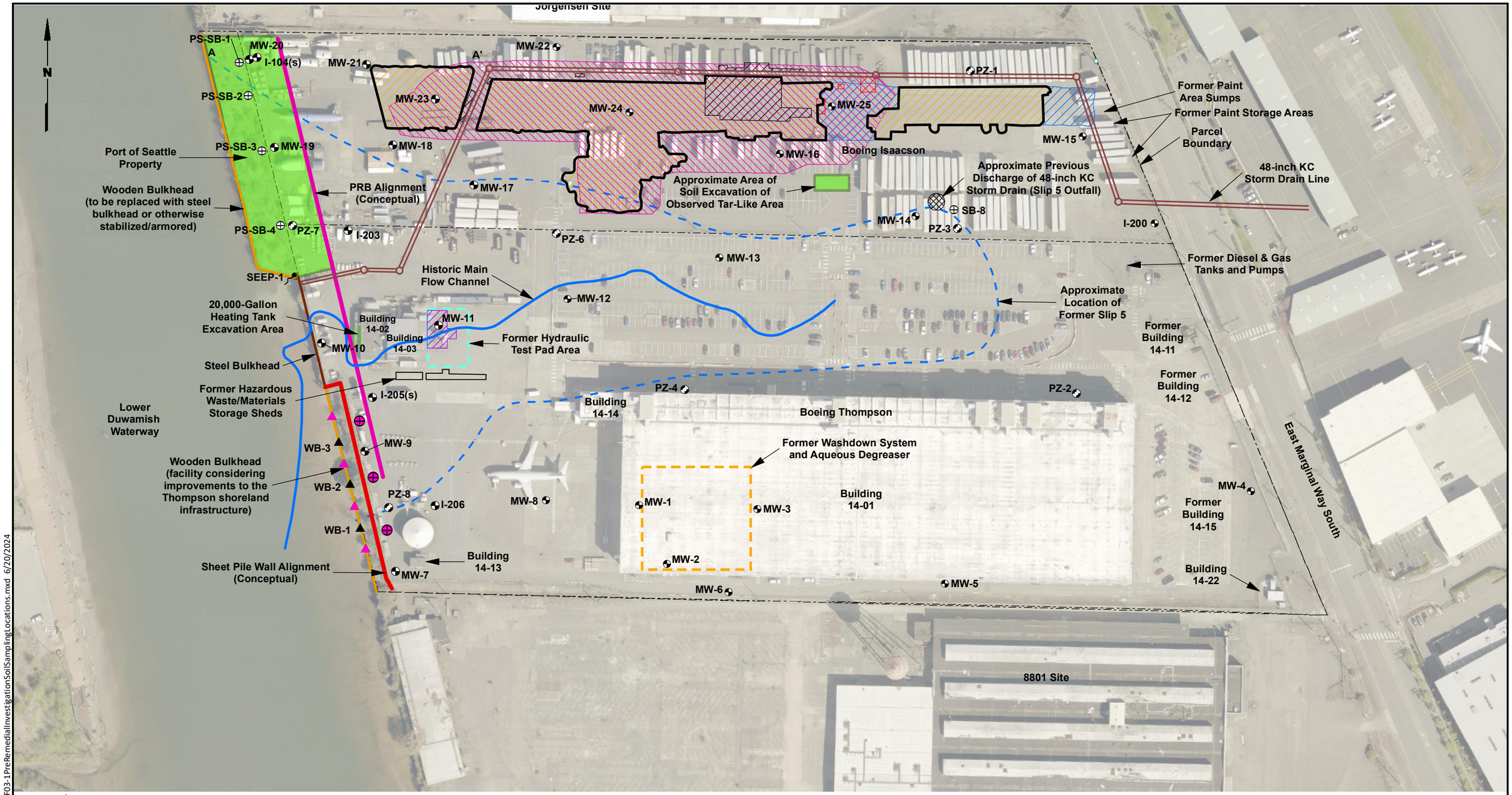
Boeing Isaacson-Thompson Site
Tukwila, Washington

Current Site Features

Figure
2-1



Legend

- Proposed Soil Boring Location
- Proposed Wooden Bulkhead Sample
- Monitoring Well Location
- Piezometer Location
- Direct-Push Boring Groundwater Sample Location
- Seep
- Wooden Bulkhead Sample
- Current Extent of Stabilized Soil Material
- Approximate Location of Former Slip 5
- Approximate Location of Permeable Reactive Barrier
- Approximate Location of Sheet Pile Wall Extension
- 1984 Excavation
- 1988 Excavation
- 1990 Excavation
- 1991 Excavation
- 1993-1995 Excavation
- 2004 Excavation
- 2008 Removal of Stabilized Soil Mound
- Approximate Area of Soil Excavation

0 150 300

Scale in Feet

Data Source: King County GIS.

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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Boeing Isaacson-Thompson Site Tukwila, Washington	**Supplemental Investigation Soil Sampling Locations**	Figure 3-1

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APPENDIX A

Sampling and Analysis Plan

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SAMPLING AND ANALYSIS PLAN

Isaacson-Thompson Site
Tukwila, Washington

August 2, 2024

Prepared for

The Boeing Company

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Sampling and Analysis Plan
Boeing Isaacson-Thompson Site
Tukwila, Washington

This document was prepared by, or under the direct supervision of, the technical professionals noted below.

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Date:	August 2, 2024
Project No.:	0025190.224.031
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LIST OF ABBREVIATIONS AND ACRONYMS

°C ..... degrees Celsius
bgs ..... below ground surface
Boeing ..... The Boeing Company
COC ..... chain of custody
cPAH ..... carcinogenic polycyclic aromatic hydrocarbon
DI ..... de-ionized
DP ..... direct-push
Ecology ..... Washington State Department of Ecology
EPA ..... US Environmental Protection Agency
ft ..... feet, foot
HASP ..... health and safety plan
ID ..... identification
IDW ..... investigation derived waste
Landau ..... Landau Associates, Inc.
PCB ..... polychlorinated biphenyl
PID ..... photoionization detector
Port ..... Port of Seattle
PPE ..... personal protective equipment
QA/QC ..... quality assurance/quality control
SAP ..... sampling and analysis plan
Site ..... Boeing Isaacson-Thompson Site
USCS ..... Unified Soil Classification System
VOC ..... volatile organic compound
WAC ..... Washington Administrative Code

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1.0 INTRODUCTION

This sampling and analysis plan (SAP) presents detailed descriptions of field procedures for supplemental investigation activities at The Boeing Company (Boeing) Isaacson-Thompson Site (Site) located in Tukwila, Washington (Figure 1-1). The objective of the investigation is to further characterize soil conditions at and near the shoreline at the southeastern portion of the Site in advance of a shoreline stabilization project planned by Boeing as detailed in the Supplemental Investigation Work Plan (Landau Associates, Inc. [Landau] 2024). The Site is composed of two parcels of land owned by Boeing that are surrounded by a security fence and a shoreline parcel owned by the Port of Seattle (Port), all with limited access:

- The Isaacson property, owned by Boeing and located in the northern portion of the Site;
- the Thompson property, owned by Boeing and located in the southern portion of the Site; and
- the Port property (also known as the "Sliver property"), owned by the Port and located in the northwestern portion of the site, west of the Isaacson property.

The objective of this SAP is to provide sampling and analysis procedures and methodologies consistent with accepted procedures such that the data collected will be adequate for use in characterizing environmental conditions at the Site. This document was prepared in accordance with the requirements of Washington Administrative Code (WAC) 173-340-820. This SAP should be used in conjunction with the Boeing Isaacson-Thompson Quality Assurance Project Plan (Landau 2011) and the project-specific Health and Safety Plan (HASP).

This SAP addresses the supplemental investigation field work, with the assumption that the specifics of sampling locations, depths, media, and analyses will be determined in work plans separate from this document. Specific work plans provide additional details related to the Site setting and corrective action work to be conducted. The SAP will be updated as needed with approval from the Washington State Department of Ecology (Ecology) and Boeing. The types of work and procedures in this SAP are considered general and must be adapted, as necessary for the location and phase of work being performed. Various topics discussed in this SAP include:

- Subsurface exploration methods including:
  - Drilling and borehole decommissioning
- Soil sampling
- Other support activities including:
  - Utility locates, permits and access agreements, and surveying
- Sample handling and documentation.

2.0 SUBSURFACE EXPLORATION

This section describes the techniques used for subsurface exploration, including drilling activities. Drilling activities include advancing soil borings for the collection of soil samples for field screening and chemical analysis. Soil borings will also be logged for lithologic information. This section also describes borehole decommissioning activities.

All subsurface explorations involving drilling will be completed by a driller licensed in the State of Washington and will be monitored by an environmental professional. Other subsurface explorations will be completed by personnel trained in operating the required equipment. Prior to initiation of drilling or any other intrusive subsurface activity, available utility maps will be reviewed to identify utilities in the vicinity of the proposed exploration locations. Additionally, a public (One-Call) utility locate will be conducted followed by contracting with a private utility-locating service to confirm the location and identity of other underground utilities in the vicinity of the proposed locations. The final location for each boring will be selected based on the findings of the utility locating and map review. The Boeing Onsite Activities Representative will review the boring locations relative to the utility clearance information and sign a Boeing Pre-Dig Utility Clearance Checklist prior to drilling.

Soil borings will be advanced using direct-push (DP) drilling techniques. The completion depths of soil borings will be as described in pertinent work plans, as influenced by drilling conditions encountered and the depths of the water-bearing units.

2.1 Direct-Push Drilling

DP drilling is accomplished using a truck-mounted, track-mounted, or hand-portable DP rig. Depending on the manufacturer, make, and model, DP drill tooling is advanced by static push, pneumatic impact, or vibratory methods, or a combination thereof. In its standard configuration, DP drilling collects a continuous soil core in a 2.25-inch-diameter core barrel with a removable, dedicated polyethylene liner. Once the desired depth is reached, the core is extracted from the ground and the liner and soil core are removed from the core barrel.

The main advantage to DP drilling is it is a fast way to collect high quality soil and groundwater grab samples in unconsolidated sediments where drilling depths are relatively shallow. Permanent monitoring wells and piezometers can also be installed using DP drilling by using prepacked screens.

Due to the relatively low amount of energy imparted to the subsurface as compared to other drilling methods, DP drilling has significant depth limitations in over-consolidated soils, soils with a high gravel content, and bedrock. Additionally, as there is no way to properly construct a step-down seal with DP drilling, it is not an appropriate method for drilling that crosses more than one aquifer. This limitation is not significant for the supplemental investigation as the soil borings are not anticipated to cross multiple aquifers.

2.2 Wooden Bulkhead Sampling

The wooden bulkhead soil samples described in the supplemental investigation work plan will be collected by hand from between gaps within the wooden bulkhead (Landau 2024). The soil samples will be collected using hand implements such as stainless-steel spoons or trowels. Soil samples to be tested for non-volatile parameters (e.g., metals, carcinogenic polycyclic aromatic hydrocarbons [cPAHs], bis[2-ethylhexyl]phthalate, and polychlorinated biphenyl [PCBs]) will be placed into a decontaminated stainless-steel bowl, homogenized using the stainless-steel spoon, and transferred into the appropriate laboratory-supplied sample container.

2.3 Borehole Decommissioning

Following soil sample collection, all borings will be decommissioned according to Washington State *Minimum Standards for Construction and Maintenance of Wells* (WAC 173-160-460). Per the code, each soil boring not completed as a monitoring well will be decommissioned by sealing the boring from the bottom up to the ground surface using bentonite chips or pellets, bentonite slurry, neat cement grout, or neat cement. Grout and slurry used for sealing the boring below the water table will be placed from the bottom up using methods that avoid segregation or dilution of the sealing material. Application methods include dump bailers and a tremie tube. Above the water table, grout and slurry can be hand-poured into the boring as the casing is being raised. Bentonite chips and/or pellets should be poured into the borehole very slowly and monitored by a weighted sounding tape to minimize bridging.

The ground surface will be returned to its original condition, or better, after decommissioning soil borings that are not completed as monitoring wells. Asphalt and cement will be patched to cover the bentonite (or other material) seal. Vegetation will be replanted, if necessary, and groundcover will be restored by raking or other physical means. If working in a landscaped area, efforts will be made to disrupt existing conditions as little as possible during drilling to minimize restoration work.

2.4 Drilling Documentation

Qualified environmental field personnel will maintain detailed records of drilling activities. These records will consist of soil boring logs, information recorded in field notebooks, and driller's daily field reports. Field forms, including examples of the field logs and development sheets, are included in Appendix A.

2.4.1 Soil Boring Logs

Qualified environmental field personnel will log soil borings using the form provided in Appendix A or an equivalent form. Log entries will include the following:

- Boring location
- Dates and times of drilling
- Drilling equipment (e.g., type of rig, size of bits, drill rod designations, and sampler types)
- Boring dimensions

- Sample depths
- Depth to groundwater
- Stratigraphy—descriptions of soil will be according to the Unified Soil Classification System (USCS). Descriptors will include soil composition, density, color, approximate percentages of grain sizes present, and a qualitative estimate of moisture content.
- Additional sample features such as odor, the presence of volatile organic compounds (VOCs) (based on screening with a photoionization detector [PID]), non-native debris, and the presence of non-aqueous-phase liquids, if present.

2.4.2 Field Screening Documentation

As described in the HASP, the onsite environmental field personnel will use a PID to monitor the field staff breathing zone for volatile organic gases. If action levels exceed the levels listed in the HASP, drilling will be discontinued. Drilling will proceed only when volatile organic gas concentrations have returned to an acceptable level.

Headspace analysis, if required by the pertinent work plan, will be conducted on a sample from each soil core at each boring location. Headspace analysis is performed by collecting a small amount of soil in a clean Ziploc® bag, sealing the bag, breaking up the soil and letting it sit for 2 to 5 minutes, and then screening the headspace in the bag for VOCs using a PID. All field screening results will be entered in the comments section of the soil boring logs.

2.4.3 Daily Driller's Report

The driller will prepare and maintain a daily field drilling report. The drilling report will specify the number of hours worked, material used, unusual problems, and other special comments and observations. The driller will provide a copy of the log for approval to the onsite environmental field personnel at the end of each day.

3.0 SOIL SAMPLING

This section presents procedures for soil logging, field screening, and sampling during remediation activities. This section also presents procedures for other soil sampling that may be required. Soil sampling will be conducted by field personnel trained in soil sampling techniques.

3.1 Soil Logging

Soil samples will be collected during subsurface exploration to classify soil lithology in accordance with the USCS. Soil sample collection methods will depend on the type of exploration. Lithology will be recorded on a Log of Exploration form along with evidence of contamination based on field screening and other pertinent information.

3.2 Field Screening

Soil will be field screened for evidence of chemical impact to environmental media. Field-screening techniques may include visually inspecting the soil for staining, sheen, discoloration, odor, and other evidence of impact. If appropriate, sheen testing may be performed by agitating a small volume of soil in a bowl or pan with clean water to see if a sheen is generated. VOC monitoring for soil will be conducted using headspace analysis. Headspace analysis is performed by collecting a small amount of soil in a Ziploc bag, sealing the bag, breaking up the soil, and letting it sit for 2 to 5 minutes. The tubing from a PID is then inserted into the Ziploc bag, the bag is resealed around the tube, and the highest reading for each compound measured by the PID is recorded.

Soil samples will be selected from the most impacted zone as indicated by field screening, or from pre-defined drilling intervals indicated in the work plan when there is no evidence of contamination. Sampling spoons will be cleaned between samples using an Alconox® wash, tap water rinse, and final de-ionized (DI) water rinse. All samples will be collected in laboratory-provided containers appropriate for the analyses.

3.3 Sample Collection and Analyses

Soil samples for non-volatile constituent analyses including, but not limited to, metals, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), and PCBs will be collected in laboratory-provided jars of an appropriate size for the number of analyses being conducted. Samples will only be collected for volatile or other organic constituent analyses if field screening identifies potential VOC or petroleum contamination. Care will be taken to collect an appropriately representative sample. Larger samples may be mixed in stainless-steel bowls to homogenize the sample before collecting into sample jars. Sampling spoons and bowls will be cleaned between samples using an Alconox wash, tap water rinse, and final DI water rinse. Soil analyses will depend on the location and nature of the release.

All samples will be stored in coolers with ice and transported using proper chain-of-custody (COC) procedures to Boeing's contracted analytical laboratory.

4.0 SUPPORT ACTIVITIES

This section describes various support and preparation activities related to soil sampling. Support activities for other types of environmental fieldwork will be described in work plans.

4.1 Utility Locates

Utility locates will be conducted no more than 2 weeks before any drilling or coring program begins. Each location will be marked in the field with white paint or a stake with flagging. A One-Call Utility Locate form will be filled out for each location (Appendix A) and the One-Call Utility Locate Service will be contacted.[1] For locations within the facility or for other access-restricted areas, a meeting time will be requested. The onsite Boeing representative will need to be present to escort the public utility locator onsite. All utilities listed by the One-Call service will be contacted if specific markings are not visible within the requested locate radius around each boring.

4.2 Traffic Control

Traffic control procedures will be used at all locations where drilling activities will impact a roadway, facility drive paths, or walking path. Drilling locations will not be performed in facility towpaths without approval from and coordination with appropriate facility personnel. Traffic control plans will be prepared and approved by Boeing, as needed.

[1] Contact information for One-Call Utility Locate Service is provided in the website www.callbeforeyoudig.org/washington/ or by calling 1-800-424-5555.

5.0 SAMPLE HANDLING AND DOCUMENTATION

This section describes sample handling and documentation procedures. The procedures described are designed to provide a thorough record of events surrounding the collection of each sample and ensure that data collected in the field are usable.

5.1 Sample Labeling

Gummed paper labels, which adhere strongly to glass or plastic, will be used. Labels will be prepared with waterproof indelible ink and will include the following information:

- Project number
- Sample identification (ID) number
- Date and time of sampling
- Name(s) of sampling personnel
- Analysis and type of preservatives added.

To ensure a consistent sample tracking mechanism, each sample collected will be given a unique sample ID number using a consecutive numbering system or an alphanumeric system. The consecutive numbering system consists of two primary types: borings and wooden bulkhead samples. The sample ID numbers derived from the consecutive numbering system will share the following general structure. In general, the sample ID number will include the Boeing Isaacson-Thompson Site code (IT), a location type (SB for soil boring, WB for wooden bulkhead), a consecutive number provided by Boeing, and a date or a depth (borings). Additional details and examples are provided in the following sections.

Field duplicate samples will share the following general structure. Field duplicate samples will be given fictitious sample ID numbers beginning with a 9 (9000 series numbers for borings). No indication that the sample is a duplicate will be provided on the sample label or the COC form. A cross-reference of sample ID numbers for duplicates will be clearly recorded on the sample collection form.

The following sections below describe the creation of the sample ID number, which will be used for samples collected throughout the project.

5.1.1 Borings

This section describes the creation of the sample ID number used for samples collected from a boring. The sample matrix will not be included in the sample ID number but will be recorded in the field logbook. The sample ID will be created as follows:

- Site code for Boeing Isaacson-Thompson Site (IT)
- Location type: Boring (SB)
- The boring number will be a four-digit consecutive number, assigned by Boeing
- Sample collection depth in feet (ft) below ground surface (bgs).

Thus, a soil sample collected from the Boeing Isaacson-Thompson Site at boring number 127 at a depth interval of 12 to 13 ft bgs would be assigned the following sample ID number:

ITSB-127:12-13

IT	SB	127	12-13
Boeing Isaacson-Thompson Site	Location type (boring)	Boring number	Depth interval (ft bgs)

5.1.2 Wooden Bulkhead Sample

This section describes the creation of the sample ID number used for soil samples collected from the wooden bulkhead. The sample ID number will be created as follows:

- Site code for Boeing Isaacson-Thompson Site (IT)
- Location type: wooden bulkhead (WB)
- Location number.

Thus, a sample collected from the Boeing Isaacson-Thompson Site at wooden bulkhead location 4 on August 5, 2024, would be assigned the following sample ID number:

ITWB-4

IT	WB	4
Boeing Isaacson-Thompson Site	Location type (wooden bulkhead)	Location number

5.1.3 Other Samples

This section describes the creation of the sample ID number, which will be used for samples not associated with borings or wooden bulkhead samples (such as composites, drums, and stockpiles). The sample ID number will be determined in the field for specific quick response events. All samples not falling under the criteria listed above (borings or wooden bulkhead samples) will begin with "IT" then additional letters or words representative of the location and media type of sample being collected. The sample ID number will be created as follows:

- Site code for Boeing Isaacson-Thompson Site (IT)
- Other descriptive information, if applicable
- Media type (soil, water)
- Sample collection depth in ft bgs, if applicable.

Thus, a decontamination water sample collected from the Boeing Isaacson-Thompson Site from drum A would be assigned the following sample ID number:

IT-DrumA-DeconWater

IT	GR	Drum	A	DeconWater
Boeing Isaacson-Thompson Site	Location type (all other samples)	Drum	Drum designation	Sampled media (decontamination water)

When composite samples are collected, the Consultant Field Team Leader will ensure that the locations of sub-samples composited to form the project sample are clearly identified in the project field notebook.

5.2 Field Logbooks

Permanently bound field logbooks with waterproof paper may be used in the field because of their compact size, durability, and secure page binding. The pages of the logbook will be numbered consecutively and will not be removed for any reason. For shorter duration events, single sheets of note may be used.

Logbooks or note sheets will document the procedures performed by field personnel. Each entry will be dated, legible, and contain accurate and complete documentation of the individual's activities. Documentation in the field logbook or notes will be at a level of detail sufficient to explain and reconstruct field activities without relying on recollection by the field team members. Because the logbook is a not a complete documentation of field procedures, it will contain only facts and observations suitable to reconstruct the daily events. Language will be objective, clear, concise, and free of personal interpretation or terminology that might be misconstrued.

No erasures are allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change.

Both electronic and paper copies of the field logbooks/notes may be made and stored with the project files.

5.3 Sample Handling and Storage

This section describes the handling and storage requirements of sample containers. Table 1 provides a summary of analyte specific requirements.

5.3.1 Sample Containers

Water and soil samples (primary as well as quality assurance/quality control [QA/QC]) will be collected in glass or plastic containers supplied by the contracted analytical laboratories. The containers will have screw-type lids to ensure the bottles are adequately sealed. Teflon inserts located inside the lids of the containers will prevent sample reaction with the lid and improve the quality of the seal. The sample containers will be pre-cleaned and certified under COC procedures. Commercially available, pre-cleaned containers are acceptable. The contracted laboratories' sample container shipment documentation will

record batch numbers for the containers. With this documentation, containers can be traced and wash analyses can be reviewed, if necessary.

5.3.2 Storage Requirements

Samples will be placed in secure, onsite storage or remain in the possession of the sampling personnel until they are shipped or delivered to the contracted laboratory. Immediately after collection and during shipment to the laboratory, samples will be stored in Ziploc bags (or equivalent) in coolers and, if required, on ice at approximately 4 degrees Celsius (°C). Ice packaged in Ziploc bags will be used to maintain the temperature in the shipping containers at approximately 4°C. Ice will be replenished as needed to ensure adequate cooling of samples during storage and shipping.

5.4 Sample Documentation

Entries into the field logbook or other relevant sampling forms for sampling events may include, but not necessarily be limited to, the following:

- Project name, location, and number
- Name of person maintaining the field logbook
- Rationale for collecting the sample
- Date and time of sampling
- Sample numbers
- Cross-reference of numbers for split and blank samples
- Media sampled
- Field observations
- Geographical location of the sampling point in reference to Site facilities
- Physical location of the sampling point
- Method of sampling, including procedures, equipment, and any departure from the procedures specified in the relevant work plans or the SAP
- Results of field measurements and calibration record (e.g., water quality readings)
- Type and quantity of container used for each sample
- Weather conditions at the time of sampling and previous events that may influence the representative nature of a sample; at a minimum, include temperature and sky cover (partly cloudy, overcast, sunny, etc.)
- Photographic information, when appropriate, to briefly describe what was photographed and why, the date and time, the compass direction of the picture, and the number designation of the picture in the file system
- Sketches, when appropriate, with locations referenced to existing structures in the area (i.e., trees, existing monitoring wells)
- Analyses requested

- Disposition of the sample (i.e., laboratory to where it is being shipped) and point of contact
- Shipping confirmation number of sample shipment, when applicable
- Other pertinent observations, such as the presence of other persons on the Site (those associated with the job or members of the press, special interest groups, or passersby), and actions by others that may affect performance of Site tasks
- Type of personal protective equipment (PPE) used, if other than Level D
- Name(s) of sampling personnel
- Name of Field Team Leader and Site Health and Safety Officer
- Names and time of arrival/departure of visitors and equipment to the Site
- Summary of Site safety meetings and levels of protection.

5.5 Chain-of-Custody Procedures

Verifiable sample custody is an integral part of all field and laboratory operations associated with Site monitoring. The primary purpose of the COC procedures is to document the possession of the samples from collection through storage and analysis to reporting. COC forms will become the permanent record of sample handling and shipment. The Field Investigation Manager or their designee will be responsible to the Project Manager for monitoring compliance with COC procedures.

Field sampling personnel are responsible for the care and security of samples from the time the samples are collected until they have been turned over to the shipping agent or laboratories. A sample is considered to be in one's custody if it is in plain view at all times, in the physical possession of the sampler, or stored in a locked place where tampering is prevented.

Empty coolers containing ice will be available at the study area for use each day in the field. Samples collected during the day will be stored in shipping coolers beginning at the time of collection. The coolers will be locked inside the field vehicle when sampling personnel are not present.

A COC form will be filled out for each cooler that is shipped. Only samples in that cooler will be listed on the COC. An example of the COC records that will be used is shown in Appendix A. Each COC form will contain the following information:

- Site name and contract number
- Company name
- Project number
- Sample ID numbers
- Date and time of sampling
- Type of sample and number of sample containers associated with each sampling point
- List of analyses requested

- Metals analyses will be separated into dissolved or total categories under analyses requested columns; the list of metals for analysis will be specified in the comments section of the form
- Number of containers for each sample
- Name and signature of sampling personnel
- Comments regarding matrix spike/matrix spike duplicate samples, or any other information that is necessary for the lab
- Spaces for transfer of custody acknowledgment.

When the COC form is complete, field team members will crosscheck the form for possible errors. Any corrections made to each record will be marked with a single strike mark that is dated and initialed. The person who initials corrections will be the same person who relinquishes custody of the samples.

5.5.1 Transfer to Project Laboratories

Samples will be delivered to the laboratory, shipped to the contracted laboratory by overnight delivery service, or picked up by a courier for overnight delivery. If samples are to be shipped, the contracted laboratory will provide return shipping labels as well as packing supplies, bubble wrap, secondary containment bags, absorbent pads, etc., to secure samples during transit. The COC form that has accompanied a cooler from the time of sample collection will be signed, dated, placed in a Ziploc bag, and taped to the inside lid of the cooler. If samples are shipped, a custody seal will be signed by the person relinquishing the samples and placed across the cooler lid to ensure that the cooler is not opened during shipment. The contracted laboratory, upon receipt of the cooler, will verify that the custody seal is intact and will sign the COC to accept custody of the samples.

A temperature blank (provided by the lab) may also be included in each cooler depending on the individual laboratory procedures.

6.0 EQUIPMENT DECONTAMINATION

The decontamination procedures described below are to be used by field personnel to clean drilling, sampling, and related field equipment. Deviation from these procedures must be documented in field records.

6.1 Water-Level Indicator

The tape and probe head of the water-level indicator will be rinsed with Alconox soap, tap water, and DI water between each well measurement.

6.2 Sampling Equipment

Non-dedicated sampling equipment will be decontaminated between sample locations. Sampling equipment includes all devices used to collect or contain a sample prior to placement into a laboratory-provided sample container or used downhole in a well or boring (e.g., water level indicator and depth sounding tape). Before initial use, sampling equipment that may contribute to the contamination of a sample must be thoroughly decontaminated, unless specific documentation exists to show that the sampling equipment has already been decontaminated. Pre-cleaned equipment and sample jars in factory-sealed containers do not require decontamination.

Decontamination will be performed according to the following procedure:

- Scrub equipment thoroughly with phosphate-free detergent (Alconox) and potable water using a brush to remove any particulate matter or surface film
- Rinse with potable water
- Final rinse with DI water
- Keep decontaminated equipment in a clean location to prevent recontamination.

6.3 Heavy Equipment

Heavy equipment (i.e., drilling equipment that is used downhole, or that contacts material and equipment going downhole) will be cleaned by a hot water, high-pressure wash before each use and at completion of the project. Potable tap water will be used as the cleaning agent.

Prior to drilling at each location and prior to demobilization offsite, all drilling equipment exposed to soil and groundwater will be cleaned with a high-pressure wash or steam cleaner. Water used for cleaning will be obtained from a potable source and transported to the drilling site or from an approved facility source. Contaminating substances will not be introduced into the borings or wells during any part of the drilling, well installation, or well development process. Containers used to transport drilling water must not have been used for any other purpose. Decontamination water will be contained, characterized, and disposed of in accordance with the procedures presented in Section 7. Containers of decontamination water will be labeled and stored separately from other containers.

7.0 INVESTIGATION-DERIVED WASTE HANDLING AND DISPOSITION

Investigation-derived waste (IDW) generated during Site activities covered by this SAP will be stored, handled, and disposed of according to guidelines described in this section. According to the US Environmental Protection Agency (EPA) guidelines, the most important elements of managing IDW include:

- Leaving the Site in no worse condition than existed before the investigation
- Removing wastes that present an immediate threat to human health or the environment
- Complying with federal and state applicable or relevant and appropriate regulations to the extent practicable
- Planning and coordination of IDW management
- Minimizing the quantity of generated wastes.

The methods for handling and disposing of IDW were developed under the assumption that it is unlikely that any of the IDW generated during this project will require special handling or disposal. IDW is handled by Boeing Site Services in accordance with appropriate waste-handling protocols depending on the characteristics and source of the waste. Onsite staging and temporary storage of IDW containers will be determined during pre-field planning activities with Boeing. The following sections discuss the different types of IDW that will be generated during this project.

7.1 Drill Cuttings

Drill cuttings resulting from soil boring activities will be placed in 55-gallon drums, lined tub skids, or roll-off containers. Disposal will be in accordance with appropriate regulations and Boeing disposal practices.

7.2 Decontamination Solutions

Decontamination solutions will consist of a 1 percent solution of non-phosphatic laboratory detergent (Alconox or equivalent) and distilled water. Alconox is nontoxic, nonhazardous, and biodegradable. Decontamination solutions will be stored along with other decontamination water in 55-gallon drums, pending laboratory analytical results.

7.3 Personal Protective Equipment

Level D PPE will be used while performing sampling tasks for this project, unless additional PPE is required by the applicable HASP. The only PPE that will need disposal will be nitrile gloves. The nitrile gloves will be bagged and disposed with other inert solid wastes. When working in PCB-contaminated soil, protective booties (or rubber boots to be decontaminated), and Tyvek® suits may be needed to protect clothing from becoming contaminated.

7.4 Solid Wastes

Non-hazardous solid wastes such as used paper towels, used gloves, and used sampling hoses will be placed in plastic refuse sacks and discarded into a receptacle identified by the onsite environmental field personnel.

7.5 Drum Sampling for Disposal

All development purge water will be sampled for constituents determined by Boeing. Boeing will provide sample containers, coolers, COCs, and labels. Samples will be returned to the Wastewater Pre-Treatment Plant located on the facility.

7.6 Drum Handling

All drums with soil or water will be returned to the facility at the end of each day and placed in the pre-determined drum storage area. All drums will have labels provided by Boeing. Soil, decontamination rinse water, and concrete slurry drums will have a green non-hazardous waste label. All purge water drums will have a white hazardous waste label. These labels can be acquired from the onsite Boeing field representative. Drums will be stored according to the following procedures:

- The bolt must be over the label and facing down.
- The bolt and label must be facing the side of the pallet the forks slide into so that when a forklift operator picks up the pallet, they can see the labels easily.
- The drums must be wiped clean of soil clumps, and the labels must be easy to read.
- No more than four drums will be placed on a pallet.
- Only drums of like material will be placed on the same pallet.
- Only like-materials will be stored in each drum.

8.0 FIELD CORRECTIVE ACTIONS

The ultimate responsibility for maintaining quality for Site activities rests with the Boeing Remediation Project Manager. The day-to-day responsibility for ensuring the quality of field and laboratory data rests with the Field Investigation Manager and field staff.

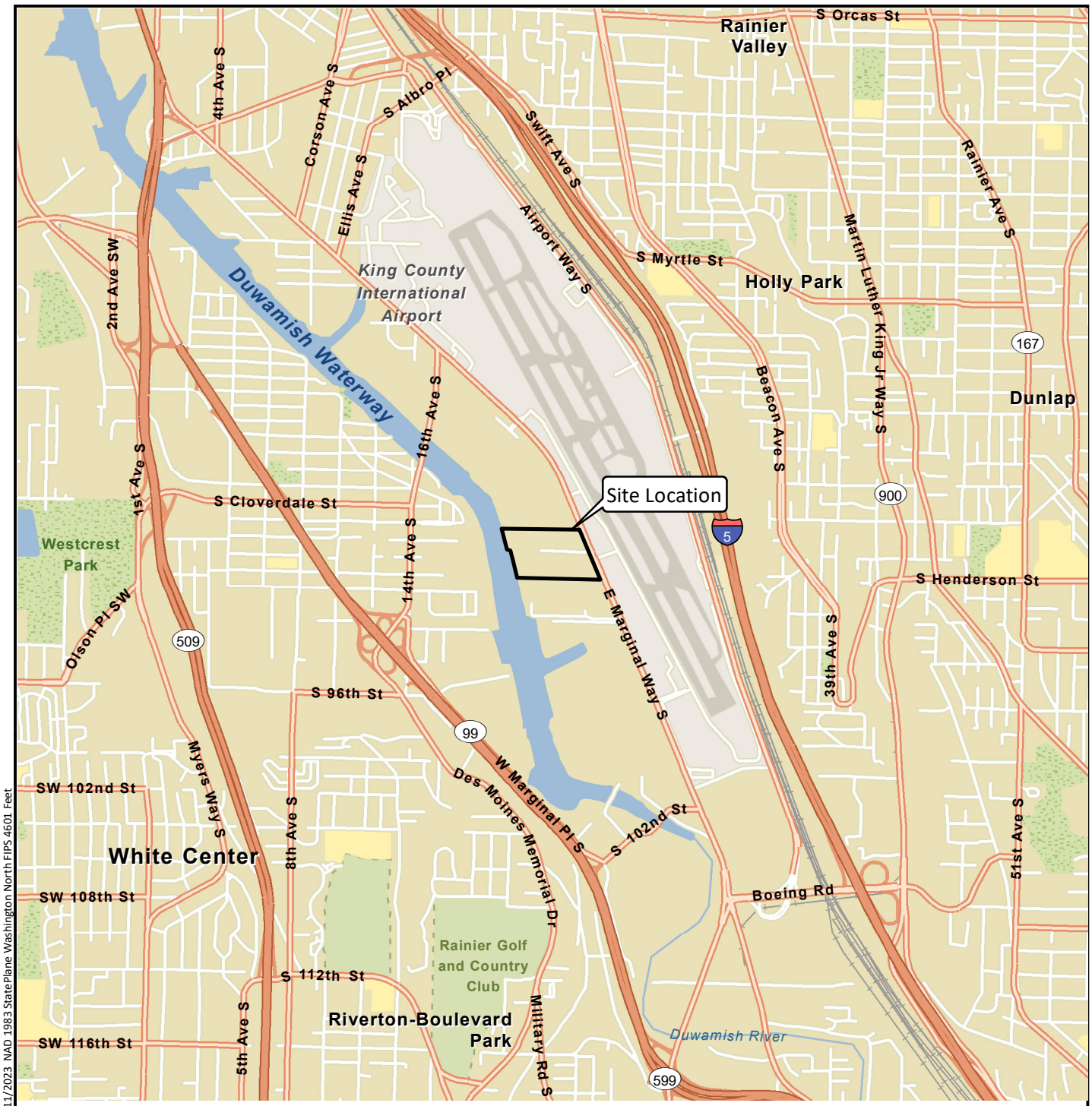
Any nonconformance with the established QA/QC procedures will be expeditiously identified and controlled. If procedures are not in compliance with the established protocol, corrective actions will be taken immediately. Subsequent work that depends on the non-conforming activity will not be performed until the identified non-conformance is corrected.

The Field Investigation Manager will review the procedures being implemented in the field for consistency with the established protocols. Sample collection, labeling, and other procedures will be checked for completeness. Where procedures are not strictly in compliance with the established protocol, the deviations will be field documented and reported to the Boeing Remediation Project Manager. Corrective actions will be determined by the Field Investigation Task Manager, Boeing Remediation Project Manager, and Boeing Project Manager and documented as appropriate.

9.0 REFERENCES

Landau. 2011. Final Uplands QAPP, Remedial Investigation/Feasibility Study, Boeing Isaacson-Thompson Site, Tukwila, Washington. Landau Associates, Inc. September 16.

Landau. 2024. Supplemental Investigation Work Plan—Draft, Isaacson-Thompson Site, Tukwila, Washington. Landau Associates, Inc. July 12.



Data Source: Esri.

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Boeing Isaacson-Thompson Site Tukwila, Washington	**Vicinity Map**	Figure 1-1

Table 1
Sample Containers, Preservatives, and Holding Times
Sampling and Analysis Plan
Boeing Isaacson-Thompson
Tukwila, Washington

Matrix	Analytical Method	Container (c)	Preservative	Holding Time (a)	Laboratory Performing Analyses
Soil	bis(2-ethylhexyl)phthalate and cPAHs by SW-846 8270E scan/SIM	8-oz wide-mouth glass jar	<6 °C	14 days/40 days	AR or ALS-E
Soil	PCB Aroclors by SW-846 8082A	8-oz wide-mouth glass jar	<6 °C	14 days/40 days	AR or ALS-E
Soil	Metals by by SW-846 6020B (b)	8-oz wide-mouth glass jar	<6 °C	6 months	AR or ALS-E
Soil	Mercury by by SW-846 7471B	8-oz wide-mouth glass jar	<6 °C	28 days	AR or ALS-E

Notes:

Level IIA data validation will be conducted for all methods, in accordance with applicable portions of the National Functional Guidelines for Organic and Inorganic Data Review.

(a) Time from sample collection to extraction/time from sample extraction to analysis.

(b) SW-846 6020B target analyte list consists of arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and zinc.
Arsenic, cadmium, copper, nickel, and zinc will be analyzed with UCT.

(c) Organic methods (SW-846 8270E and 8082A) may be combined into one container, as practical.
Inorganic methods (SW-846 6020B and 7471a) may also be combined into one container, as practical.

Abbreviations and Acronyms:

°C = degrees Celsius
ALS-E = ALS-Everett
AR = Analytical Resources, LLC
cPAH = carcinogenic polycyclic aromatic hydrocarbon
oz = ounces
PCB = polychlorinated biphenyl
SIM = selected ion monitoring
UCT = universal cell technology

APPENDIX A

Field Sampling Forms

Boeing Pre- Dig/Excavation Check List

To be completed by Project Focal/ On-site Activity Representative prior to excavation on site.

CAUTION: Prior to any digging or excavation activity please check with your Environmental Representative.

1 Organization/Service Provider has been notified of work location: **Yes /No /NA**

2 Onsite review and job walk by Boeing Representative, construction representative, or Service Provider representative before construction starts: **Yes /No /NA**

3. Digging/Excavation boundaries outlined in white paint **Yes /No /NA**

4 Have locations of underground utilities been established? **Yes /No /NA**

Date Required? _____

List method of line locates: _____

_____

Locator Representative Name:_____ Phone Number: _____

a. Electric (RED) **Yes / NA** Require Shutdown: **Yes / NA**

b. Gas (YELLOW) **Yes / NA** Require Shutdown: **Yes / NA**

c. Water (BLUE) **Yes / NA** Require Shutdown: **Yes / NA**

d. Sewers (GREEN) **Yes / NA** Require Shutdown: **Yes / NA**

e. Communications (ORANGE) **Yes / NA** Require Shutdown: **Yes / NA**

f. Reclaimed Water (PURPLE) **Yes / NA** Require Shutdown: **Yes / NA**

g. Other ( ) **Yes / NA** Require Shutdown: **Yes / NA**

5 Pertinent shut off valves and switches are located for area of work. If any are closed Lock out Tag Try requirements apply. **Yes /No /NA**

6. All Workers assigned to project have been instructed on: **Yes /No /NA**
   a. Location
   b. Type
   c. Hand/Dig Probe (minimum 24" of utility markings)

7. Workers have been instructed how to contact Emergency Services and Company Representative in an emergency: **Yes /No /NA**

8. Estimated time for digging excavation to be open: _____ days

9. Surface Encumbrances: Example**:** walkways, storage tanks, roads, fences: Describe: **Yes /No /NA**

10. Digging/Excavation will require walkway for crossing and/or traffic control: **Yes /No /NA**

11. Comments:

_____

_____

_____

_____

_____

12. Reviewed:

Signature Project Focal: _____ **Date & Time:** _____

Signature Organization/ On-site Activity Representative**:** _____ **Date & Time**

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Exploration No. _____
Date _____ Hour _____

Log of Exploration

Project Name _____ Project No. _____

Client/owner _____ Exploration Operator _____

Exploration Method _____

_____

Logged by _____ Exploration Completed _____

Ground Surface Conditions _____

Weather Conditions _____

Location Sketch (show dimensions to mapped features)

North Arrow

(East) (North)

Coordinates: "x" _____ "y" _____ Method _____

Elevations _____ Datum _____

Sample Depth (top) (ft.) / Sample Length (ft.)	Recovery Length (ft.)	Retained Depth (top) (ft.) / Retained Length (ft.)	Sample Number	Sampler/Hammer Codes	Blow Counts	Other Test Data) _____	USCS Symbol / Unit Contact	Depth Scale (ft)	Sample Description Color, secondary soil type, PRIMARY SOIL TYPE with modifiers and minor components (density/consistency, moisture)(geologic unit)	Comments on Heave, Water Conditions, & Drilling Action
								0		
								1		
								2		
								3		
								4		
								5		
								6		
								7		
								8		
								9		
								0		
								1		
								2		
								3		
								4		
								5		
								6		
								7		
								8		
								9		
								0		

Sampler and Hammer Information

a = 3.25-in. O.D. – D&M	1 = 300-lb./30-in. Drop
b = 2.0-in. O.D. – SPT	2 = 140-lb./30-in. Drop
c = Shelby Tube	3 = Pushed
d = Grab Sample	4 = Vibrocore
g = 2.5-in. O.D.– WSDOT	5 = _____
h = 3.0-in. O.D. – M.Calif.	
i = _____	

Water Level Information

Date		
Time		
Depth to Water		
Hole Depth		
Casing Depth		

Total Depth _____ Finish Date _____ Hour _____ Continued

Subcontractors Daily Activity Record

Project Name _____ Project No. _____

Location _____ Date _____

_____ Landau Rep. _____

Client _____ Weather _____

CONTRACTOR INFORMATION

Contractor _____ Project/Health & Safety Briefing Conducted: ☐ Yes ☐ No

☐ Drilling ☐ Grading

☐ Excavation ☐ Other _____

Contractor Rep. _____

TIME LOG (Documented by Landau Associates Representative at end of each working shift)

Activity	Total Hours	A.M.						A.M.						P.M.						P.M.					
		12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
Mobe/Moves																									
Drilling/Excavation																									
Installation																									
Decontamination																									
Standby																									
Down time																									

Remarks: Explain all down time. Explain all stand-by time and who authorized it, unusual difficulties, etc.

EXPENDABLES: ITEMIZE QUANTITY, SIZE, ETC.

Item	Quantity	Type	I.D.	O.D.	Length	Billing

Subsurface Data	Depth	Samples

PERSONNEL / EQUIPMENT

Position	Name	Hrs	Support Equipment	Status (A.D.S.F.)	Hours Oper.	Down	Standby

A – Available; D – Down; S – Standby; F - Field

Drum/Tank Inventory

Project Name _____ Project Number _____

Location _____ Date _____

Client _____ Landau Representative _____

Drum/Tank Number	Date Generated	Contents	Estimated Quantity	Suspected Contaminants	Generation Source	Disposal Method / Date Disposed	Sketch of Site and Drum/Tank Location

LANDAU ASSOCIATES

Field Report

Project No.: _____ Report No.: _____

Client: _____ Date: _____

Project Name: _____ DPD Permit No.: _____

Location: _____

Weather Conditions: _____

Prepared By: _____

Visitors: _____

Unsatisfactory Conditions & Recommended Correction: _____

Attachments: _____

Signed: _____

LANDAU ASSOCIATES

PHOTOGRAPH LOG

Project Name: _____ Project Number: _____
Location: _____ Date: _____
Client _____ Landau Representative: _____

Roll No./Phone No.	Comments

LANDAU ASSOCIATES

PHOTOGRAPH LOG

Project Name: _____ Project Number: _____
Location: _____ Date: _____
Client _____ Landau Representative: _____

Utility Locate Checklist

Project Name _____ Project No. _____

Location _____ Date _____

Client _____ Landau Rep. _____

Exploration Number (White)	TV & Telep. (Orange)	Lighting & Elect. (Red)	Fuel & Gas (Yellow)	Water (Blue)	Drains & Sewer (Green)	Access / Restriction	O.K. To Drill/Exc.	Remarks

APPENDIX B

Health and Safety Plan

Work Location Personnel Protection and Safety Evaluation Form

Attach Pertinent Documents/Data
Fill in Blanks As Appropriate

Project Number:	0025190.223	Reviewed by:	Ken Reid, LEG
Prepared by:	Elyssa Dixon, PE	Date:	July 11, 2024 and August 2, 2024
Date:	June 19 and August 1, 2024		

A. Work Location Description

1.	**Project Name:**	Boeing Isaacson-Thompson Site
2.	**Location:**	8701 E Marginal Wy S, Tukwila, WA 98108
3.	**Anticipated Activities**	Soil boring advancement (push probe) and soil sampling.
4.	**Size:**	Approximately 29 acres
5.	**Surrounding Population:**	Industrial
6.	**Buildings/Homes/Industry:**	Current Boeing storage, parking, and operations
7.	**Topography:**	Flat
8.	**Anticipated Weather:**	TBD
9.	**Unusual Features:**	None
10.	**Site History:**	Between 1910 and 1917 extensive dredge and fill operations were conducted in the lower Duwamish River valley and the river was channelized and placed in its current location to the west of the Site. The first known development of the Site began in 1917 and included a sawmill on the land south of former Slip 5 and, in 1920, another on the western portion of the Site. Slip 5 was filled in phases between 1936 and about 1966 to allow further development of the Site. The Isaacson property was developed between 1943-1966 and used for various purposes associated with the Jorgensen Steel plant to the north, which included storage of scrap metal prior to it being melted down. A galvanizing plant was constructed and operated between 1943 and 1967. The Mineralized Cell Wood Preserving Company operated on the north side of former Slip 5 for an unknown period to time beginning prior to 1945. Boeing purchased the Isaacson property in 1984. Boeing purchased the Thompson property in 1956 and the southern portion of this property was developed beginning in 1966. Until 2011, the layout of the Thompson property

remained relatively unchanged. In 2011, Building 14-01 was modified and reoccupied.

Environmental investigations at the Site to date have been conducted to characterize and evaluate the chemical quality and physical condition of soil, groundwater, sediment, and storm drain solids. Investigations have been conducted from 1983 to 2011, including formal RI investigation activities.

The following COCs have been identified for Site groundwater: vinyl chloride, PCBs, arsenic, copper, mercury, nickel, and zinc. However, compared to the minimal prevalence of other COCs, indicator hazardous substances (IHSs) for Site groundwater are limited to PCBs, arsenic, copper, nickel, and zinc.

The following COCs have been identified for Site soil at concentrations exceeding the pCULs: total petroleum hydrocarbons (TPH), PCBs, cPAHs, BEHP, arsenic, barium, cadmium, chromium (total), chromium VI, copper, lead, mercury, nickel, and zinc. IHS for Site soil are PCBs, cPAHs, arsenic, copper, lead, mercury, nickel, and zinc.

The area of supplemental soil sampling associated with this HASP is not within or near the area of proposed remedial activities at the Site as detailed in the draft Cleanup Action Plan and is for the purposes of data collection ahead of construction.

Supplemental soil sampling will include soil borings and collection of soil samples from accessible locations between gaps within the wooden bulkhead along the Duwamish River. Riverbank sampling locations will either be accessed during low tide from the beach/mudflat via a gate in the security fence on the Thompson property using a ladder to reach the beach/mudflat or via a Landau-owned and operated canoe or flat bottom boat.

B. Hazard Description

1. Background Review: ☒ Complete ☐ Partial

If partial, why? Click here to enter text.

2. Hazardous Level: ☐ B ☐ C ☒ D ☐ Unknown

Justification: Click here to enter text.

3. Types of Hazards: (Attach additional sheets as necessary)

A. ☒ Chemical ☒ Inhalation ☐ Explosive
☐ Biological ☒ Ingestion ☐ O_2 Def. ☒ Skin Contact

Describe: Contact with contaminated soil or groundwater.

B. ☒ Physical ☒ Cold Stress ☒ Noise ☒ Heat Stress ☐ Other
Describe: Physical hazards associated with drilling, soil sampling, work on water (if applicable), and work at heights and using a ladder (if applicable). Cold or heat stress potential will be dependent on the time of year.
C. ☐ Radiation
Describe: Click here to enter text.

4. Nature of Hazards:

☐ Air Describe: Click here to enter text.

☒ Soil Describe: Potential for contact with or ingestion of contaminated soil during drilling and soil sampling.

☐ Surface Water Describe: Click here to enter text.

☒ Groundwater Describe: Potential for contact with or ingestion of contaminated groundwater during drilling.

☐ Other Describe: Click here to enter text.

5. Chemical Contaminants of Concern ☐ N/A

Contaminant	PEL (ppm)	IDLH (ppm)	Source/Quantity Characteristics	Route of Exposure	Symptoms of Acute Exposure	Instruments Used to Monitor Contaminant
PCBs	0.5	NA	Groundwater: maximum concentration of 0.024 ug/L Soil: maximum concentration of 0.66 mg/kg	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, chloracne; liver damage; reproductive effects; [potential occupational carcinogen]	--
Arsenic	0.010	5.0	Groundwater: maximum concentration of 274,000 ug/L Soil: maximum concentration of 24.5 mg/kg	inhalation, skin absorption, skin and/or eye contact, ingestion	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]	--
Copper	1.0	100	Groundwater: maximum concentration of 1,790 ug/L Soil: maximum concentration of 97.1 mg/kg	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; In Animals: lung, liver, kidney damage; anemia	--
Nickel	1.0	10	Groundwater: maximum concentration of 309 ug/L Soil: maximum concentration of 40.8 mg/kg	Inhalation, ingestion, skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	--

Zinc	5	500	Groundwater: maximum concentration of 610 ug/L Soil: maximum concentration of 633 mg/kg	Inhalation, ingestion, skin and/or eye contact	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	--
cPAHs protective to benzo(a)pyrene	NV	80	Soil: maximum TEQ concentration of 0.537 mg/kg	Inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	--
Lead	NV	100	Soil: maximum concentration of 139 mg/kg	Inhalation, ingestion, skin and/or eye 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	--
Mercury	0.10	10	Groundwater: maximum concentration of 1.75 ug/L	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor,	--

			Soil: maximum concentration of 0.25 mg/kg		insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	
Petroleum distillate protective to GRO	100	400	Soil: maximum concentration of 150 mg/kg	Inhalation, skin absorption, ingestion, skin and/or eye contact.	Central nervous system depression, confusion, unconsciousness, coma; irritation of skin, eyes, and mucous membranes; defatting of skin; dermatitis; liver and kidney damage.	PID
Bis(2-ethylhexyl) phthalate	NV	5	Soil: maximum concentration of 0.590 mg/kg	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, mucous membrane; In Animals: liver damage; teratogenic effects; [potential occupational carcinogen]	--

Notes:
NA – not available
NV – no occupational exposure value established in Washington State.

6. Physical Hazards of Concern ☐ N/A

Hazard	Description	Location	Procedures Used to Monitor Hazard
Drill rig, forklift, and support vehicles	Moving parts of drill rig, forklift, and the support vehicles can be locations of falling and flying objects and pinch/crush points	Near drill rig for drilling and installation of monitoring wells	Alert observation of surroundings; minimize time spent near drill rig and get drillers attention before approaching drill rig, forklift, or any vehicle; no loose clothing
Weather Stress	Exposure to hot or cold temperatures, wind, and or rain.	All areas of the site	Have drinking water accessible, wear appropriate clothing (light for heat, warm for cold), wear sunscreen protection, avoid caffeine, work in the shade when possible, and take short breaks in the shade as needed.
Slips, Trips, and Falls	Uneven terrain and drilling equipment	All areas of the site	Visual observations of terrain and hazards. Keep work area clear of debris.
Overhead and Underground Utilities	Damage to utilities through drilling and excavations	Around work area	Client to provide utility maps and a public and private utility locating service will be utilized. No raised drill rig towers within 20 ft of overhead power lines.
Travel to and from site	Operating motor vehicle in traffic on highways and rural roads.	Route to and from site from Landau Associates office.	Operate motor vehicle while well rested and physically able to drive safely. Conduct pre-trip vehicle inspection, all vehicles to be maintained and in good working order. Obey all traffic laws including no cell phone use while driving. Secure all cargo properly to avoid shifting. Allow sufficient time for travel to site at safe speeds. Engage emergency brake when parking vehicles. Establish a planned route prior to departure. Be observant of unsafe road conditions and erratic/dangerous drivers.
Non-motorized watercraft operations (pending selected wooden bulkhead access approach)	See attached Job Safety Assessment Form	Wooden bulkhead sampling	See attached Non-Motorized Watercraft Operations Job Safety Assessment Form (Attachment B)

Working at heights (pending selected wooden bulkhead access approach)	See attached Standard Operating Procedures for Fall Protection	Wooden bulkhead sampling	See attached Standard Operating Procedures for Fall Protection (Attachment C)
Ladder use (pending selected wooden bulkhead access approach)	See attached Standard Operating Procedures for Ladder Safety	Wooden bulkhead sampling	See attached Standard Operating Procedures for Ladder Safety (Attachment D

7. Work Location Instrument Readings ☐ N/A

Location:	Click here to enter text.		
Percent O_2:	Click here to enter text.	Percent LEL:	Click here to enter text.
Radioactivity:	Click here to enter text.	PID:	Click here to enter text.
FID:	Click here to enter text.	Other:	Click here to enter text.
Other:	Click here to enter text.	Other:	Click here to enter text.
Other:	Click here to enter text.	Other:	Click here to enter text.

Location:	Click here to enter text.		
Percent O_2:	Click here to enter text.	Percent LEL:	Click here to enter text.
Radioactivity:	Click here to enter text.	PID:	Click here to enter text.
FID:	Click here to enter text.	Other:	Click here to enter text.
Other:	Click here to enter text.	Other:	Click here to enter text.
Other:	Click here to enter text.	Other:	Click here to enter text.

Location:	Click here to enter text.		
Percent O_2:	Click here to enter text.	Percent LEL:	Click here to enter text.
Radioactivity:	Click here to enter text.	PID:	Click here to enter text.
FID:	Click here to enter text.	Other:	Click here to enter text.
Other:	Click here to enter text.	Other:	Click here to enter text.
Other:	Click here to enter text.	Other:	Click here to enter text.

Location:	Click here to enter text.		
Percent O_2:	Click here to enter text.	Percent LEL:	Click here to enter text.
Radioactivity:	Click here to enter text.	PID:	Click here to enter text.
FID:	Click here to enter text.	Other:	Click here to enter text.
Other:	Click here to enter text.	Other:	Click here to enter text.
Other:	Click here to enter text.	Other:	Click here to enter text.

8. Hazards Expected in Preparation for Work Assignment ☐ N/A

Describe: Click here to enter text.

C. Personal Protective Equipment

1. Level of Protection

☐ A ☐ B ☐ C ☒ D

Location/Activity: All

☐ A ☐ B ☐ C ☐ D

Location/Activity: Click here to enter text.

2. Protective Equipment (specify probable quantity required)

Respirator ☐ N/A

- ☐ SCBA, Airline
- ☐ Full-Face Respirator
- ☐ Half-Face Respirator (Cart. organic vapor) (Only if upgrade to Level C)
- ☐ Escape mask
- ☐ None
- ☐ Other:
- ☐ Other:

Clothing ☐ N/A

- ☐ Fully Encapsulating Suit
- ☐ Chemically Resistant Splash Suit
- ☐ Apron, Specify:
- ☐ Tyvek Coverall
- ☐ Saranex Coverall
- ☐ Coverall, Specify
- ☒ Other: Dedicated field clothing, highly visible safety vest, harness (if applicable), life jacket (if applicable)

Head & Eye ☐ N/A

- ☒ Hard Hat
- ☐ Goggles
- ☐ Face Shield
- ☒ Safety Eyeglasses
- ☐ Other:

Hand Protection ☐ N/A

- ☒ Undergloves; Type: Nitrile
- ☐ Gloves; Type:
- ☐ Overgloves; Type:
- ☐ None
- ☐ Other:

Foot Protection ☐ N/A

- ☐ Neoprene Safety Boots with Steel Toe/Shank
- ☒ Disposable Overboots
- ☒ Other: Chemical-Resistant Steel-Toe

3. Monitoring Equipment ☐ N/A

0 CGI
0 O2 Meter
0 Rad Survey
0 Detector Tubes (optional)
Type:

0 PID
0 FID
0 Other

D. Decontamination

Personal Decontamination ☒ Required ☐ Not Required

If required, describe: Decontaminate exposed skin before each break in the work shift and before eating or drinking using hot water and soap. Use disposable PPE and discard as solid waste. Avoid hand to mouth contact.

Equipment Decontamination ☒ Required ☐ Not Required

If required, describe: Decontamination of non-dedicated sampling equipment soil sampling equipment with Alconox/tap water solution followed by tap water rinse and deionized water rinse. Field staff will be prepared to set up a wash sink on site. All contaminated water will be stored onsite in 55-gallon drums.

E. Activities Covered Under This Plan

Task No.	Description	Preliminary Schedule
1	Soil boring and soil sampling	Fall 2024
2	Soil sampling through wooden bulkhead	Fall 2024
Click here to enter text.	Click here to enter text.	Click here to enter text.
Click here to enter text.	Click here to enter text.	Click here to enter text.
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Click here to enter text.	Click here to enter text.	Click here to enter text.
Click here to enter text.	Click here to enter text.	Click here to enter text.

F. Subcontractor's Health and Safety Program Evaluation ☒ N/A

Name and Address of Subcontractor: Assumed Boeing will direct contract the drillers (section not applicable)

Item	Evaluation Criteria: Adequate	Evaluation Criteria: Inadequate	Comments
Medical Surveillance Program	☐	☐	Click here to enter text.
Personal Protective Equipment Availability	☐	☐	Click here to enter text.
Onsite Monitoring Equipment Availability	☐	☐	Click here to enter text.
Safe Working Procedures Specification	☐	☐	Click here to enter text.
Training Protocols	☐	☐	Click here to enter text.
Ancillary Support Procedures (if any)	☐	☐	Click here to enter text.
Emergency Procedures	☐	☐	Click here to enter text.
Evacuation Procedures Contingency Plan	☐	☐	Click here to enter text.
Decontamination Procedures Equipment	☐	☐	Click here to enter text.
Decontamination Procedures Personnel	☐	☐	Click here to enter text.

General Health and Safety Program Evaluation: ☐ Adequate ☐ Inadequate

Additional Comments: Click here to enter text.

Evaluation Conducted by: Click here to enter text. Date: Click here to enter text.

Emergency Facilities and Numbers

Hospital: First Hill Medical Swedish Hospital, 1124 Columbia St, Seattle, WA 98104

Directions: Attachment E

Telephone: (206) 386-6000

Emergency Transportation Systems (Fire, Police, Ambulance) -- 911

Emergency Routes – Map (Attachment E)

Emergency Contacts:

Name	Offsite	Onsite
Piper Roelen	(425) 503-6784	(425) 329-0319
Elyssa Dixon	425-802-3112	(425) 967-2004
Chris Kimmel	425-778-0907	206-786-3801

In the event of an emergency, do the following:

1. Call for help as soon as possible. Call 911. Give the following information:
    - WHERE the emergency is – use cross streets or landmarks
    - PHONE NUMBER you are calling from
    - WHAT HAPPENED – type of injury
    - WHAT is being done for the victim(s)
    - YOU HANG UP LAST – let the person you called hang up first.
2. If the victim can be moved, paramedics will transport to the hospital. If the injury or exposure is not life-threatening, decontaminate the individual first. If decontamination is not feasible, wrap the individual in a blanket or sheet of plastic prior to transport.

Health and Safety Plan
Approval/Sign Off Form

I have read, understood, and agreed with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing.

Click here to enter text.		Click here to enter text.
Name	Signature	Date
Click here to enter text.		Click here to enter text.
Name	Signature	Date
Click here to enter text.		Click here to enter text.
Name	Signature	Date
Click here to enter text.		Click here to enter text.
Name	Signature	Date
Click here to enter text.		Click here to enter text.
Name	Signature	Date
Click here to enter text.		Click here to enter text.
Site Safety Coordinator	Signature	Date
Click here to enter text.		Click here to enter text.
Landau Health and Safety Manager	Signature	Date
Click here to enter text.		Click here to enter text.
Project Manager	Signature	Date

Personnel Health and Safety Briefing Conducted by:

Click here to enter text.		Click here to enter text.
Name	Signature	Date

Attachment A
Action Levels for Respiratory Protection

Monitoring Parameter	Reading	Level of Protection
Organic Vapors	PID reading >15 ppm at point of operations for more than 1 minute	Establish 25 ft diameter exclusion zone around work area, monitor worker's breathing zone
	PID reading >15 ppm in worker's breathing zone for more than 1 minute	Evacuate area or upgrade to Level C-half face respirator with organic vapor/HEPA cartridge, establish contamination reduction
	PID reading >75 ppm in worker's breathing zone for more than 1 minute	Evacuate area and move upwind to allow vapors to dissipate, may resume work in Level C PPE after vapors dissipate.
	PID reading >100 ppm in worker's breathing zone for more than 1 minute OR >300 ppm instantaneous	Evacuate area and move upwind. Notify onsite contact and Landau Associates health and safety manager.

Attachment B

JOB SAFETY ASSESSMENT FORM		
JOB TITLE/TASK: Non-Motorized Watercraft Operations		
PROJECT ID: Boeing Isaacson-Thompson		PROJECT MANAGER: Piper Roelen
DATE: 3/23/23	REVISION: V1	HEALTH/SAFETY DIRECTOR: Chris Kimmel
RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE): __ Reflective Clothing __ Steel-toed Boots __ Hard Hat __ Nitrile Gloves __ Leather Work Gloves _ X_ Life Jackets _X_ Marine Air Horn		
JOB STEP	**POTENTIAL HAZARDS**	**PREVENTATIVE/CORRECTIVE ACTION**
Watercraft Operation	Drowning	All Landau staff will be evaluated by the Health and Safety Director or their appointee, prior to being allowed to operate any watercraft while. Evaluation may include discussion of prior experience operating watercraft and demonstration of necessary skills.
		The *Buddy System* is required (i.e. watercraft operation will only occur when two people are available).
		Being able to swim proficiently is required for all on-water work.
		Wear properly fitting lifejackets at all times while working on/over the water.
		Pre-work inspection of all throwable safety device and the associated pull rope to verify the equipment is in good working order.
		Pre-work insection of watercraft for any cracks or leaks that would impact the "seaworthiness" of the watercraft before each use and report problem or repair
		Do not conduct sampling activities during a inclement weather or hazardous condition, like winds over 15 mph, large waves, lightning/thunderstorm event, and
Watercraft Transportation	Watercraft falling off vehicle during transport	Rowboats should be transported in the back of a suitably wide pickup truck and securely fixed to the vehicle with at least 1 ratchet strap. Canoes should be securely fixed to a cargo rack on top of any appropriate vehicle with at least 2 ratchet straps around the mid-section of the canoe and, if shorter vehicles are used, the bow and stern of the canoe should be tied off to the ends of the vehicle. If the watercraft extends more than 4 ft beyond the back of the truck, a red or orange safety flat will be affixed to the end of the boat. Before transporting the boat, all ropes and straps will be double-checked to insure that they are tight and securely connected to the vehicle.
	Heavy Materials Handling	Use proper bending/lifting techniques by bending and lifting with legs and legs and not with back. Two people are required to load boats into or onto vehicles.
Watercraft Ingress/Egress	Drowning	Watercrafts should be suitably stable before ingress or egress. If at a dock, the boat should be securely tied fore and aft. If not at a dock, the watercraft should be adequately beached: for canoes this means beaching the canoe parallel to the shoreline, while for row boats, this means nosing straight into the shoreline. Only one person at a time enters or exits the watercraft while the other person stabilizes the watercraft by shifting their weight, if necessary.

1.0 FALL PROTECTION-STANDARD OPERATING PROCEDURES

The objective of the Landau Associates, Inc., (Landau) Fall Protection Program standard operation procedures (SOPs) is to make sure that employees are protected from the hazards of working at heights. These SOPs outline the requirements for assessment and mitigation of fall hazards.

2.0 POLICY

It is Landau's policy to protect employees from occupational injuries by implementing and enforcing safe work practices and appointing a competent person(s) to manage the Fall Protection Program. The Landau Fall Protection Program SOPs shall comply with the Federal Occupational Safety and Health Administration (OSHA) and relevant states (Washington, Oregon, and Idaho). A copy of the state and federal Fall Protection Standards shall be made available to all employees, and may be obtained from the Health and Safety Manager (HSM).

3.0 RESPONSIBILITIES

3.1 MANAGEMENT

It is the responsibility of Landau managers to provide fall protection equipment and training to affected employees, and to ensure that all employees understand and adhere to the procedures of these SOPs and follow the instructions of the HSM.

3.2 HEALTH AND SAFETY MANAGER

It is the responsibility of the HSM and the Fall Protection Program Manager to implement this program by:

1. Performing routine safety checks of work operations.
2. Coordinating or perform fall protection hazard assessments for job tasks.
3. Enforcing Landau safety SOPs.
4. Correcting any unsafe practices or conditions immediately.
5. Training employees and supervisors in recognizing fall hazards and the use of fall protection systems.
6. Maintaining records of employee training, equipment issue, and fall protection systems used at the workplace.
7. Investigating and documenting all incidents that result in employee injury.

3.3 EMPLOYEES

It is the responsibility of all employees to:

1. Understand and adhere to the procedures outlined in these Fall Protection Program SOPs.
2. Bring to management's attention any unsafe or hazardous conditions or practices that may cause injury to either themselves or any other employees.
3. Report any incident that causes injury to an employee, regardless of the nature of the injury.

4.0 DEFINITIONS

Anchorage: A secure point of attachment for lifelines, lanyards, or deceleration devices.

Body belt: A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

Body harness: Straps that may be secured about the person in a manner that distributes the fall-arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with a means for attaching the harness to other components of a personal fall arrest system.

Connector: A device that is used to couple (connect) parts of a personal fall arrest system or positioning device system together.

Controlled access zone: A work area designated and clearly marked in which certain types of work (such as overhand bricklaying) may take place without the use of conventional fall protection systems (guardrail, personal arrest, or safety net) to protect the employees working in the zone.

Deceleration device: Any mechanism, such as a rope, grab, rip stitch lanyard, specially-woven lanyard, tearing lanyard, deforming lanyard, or automatic self-retracting lifeline/lanyard, which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.

Deceleration distance: The additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which a deceleration device begins to operate.

Guardrail system: A barrier erected to prevent employees from falling to lower levels.

Hole: A void or gap two (2) inches (5.1 centimeters) or more in the least dimension in a floor, roof, or other walking/working surface.

Lanyard: A flexible line of rope, wire rope, or strap that generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage**.**

Leading edge: The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as a deck) that changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed.

Lifeline: A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), that serves as a means for connecting other components of a personal fall arrest system to an anchorage.

Low slope roof: A roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

Opening: A gap or void 30 inches (76 centimeters) or more high and 18 inches (46 centimeters) or more wide in a wall or partition through which employees can fall to a lower level.

Personal fall arrest system: A system including, but not limited to, an anchorage, connectors, and a body harness used to arrest an employee in a fall from a working level.

Positioning device system: A body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning backwards.

Rope grab: A deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest a fall.

Safety monitoring system: A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

Self-retracting lifeline/lanyard: A deceleration device containing a drum-wound line that can be slowly extracted from, or retracted onto, the drum under minimal tension during normal employee movement and which, after onset of a fall, automatically locks the drum and arrests the fall.

Snaphook: A connector consisting of a hook-shaped member with a normally closed keeper, or a similar arrangement, which may be opened to permit the hook to receive an object and, when released automatically, closes to retain the object.

Steep roof: A roof having a slope greater than 4 in 12 (vertical to horizontal).

Toe board: A low protective barrier that prevents material and equipment from falling to lower levels and that protects personnel from falling.

Unprotected sides and edges: Any side or edge (except at entrances to points of access) of a walking/working surface (e.g., floor, roof, ramp, or runway) where there is no wall or guardrail system at least 39 inches (1 meter) high.

Walking/working surface: Any surface, whether horizontal or vertical, on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork, and concrete reinforcing steel. Does not include ladders, vehicles, or trailers on which employees must be located to perform their work duties.

Warning line system: A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

5.0 WORK THAT REQUIRES FALL PROTECTION

As a general rule, any work that occurs ten (10) or more feet above a lower level must involve the use of fall protection. Employees must also use fall protection if there is a danger of falling into hazardous equipment. A supervisor competent in the use of fall protection shall evaluate the workplaces(s) and determine the specific type(s) of fall protection to be used in the situations described below. An alternative Fall Protection Plan will only be used if conventional fall protection is impractical and increases the hazards to the employees.

5.1 FRAMEWORK AND REINFORCING STEEL

Fall protection will be provided when an employee is climbing or moving at a height of over 24 feet when working with rebar assemblies.

5.2 HOIST AREAS

Guardrail systems or personal fall arrest systems will be used in hoist areas when an employee may fall ten (10) feet or more. If guardrail systems must be removed for hoisting, employees are required to use personal fall arrest systems.

5.3 HOLES

Covers or guardrail systems shall be erected around holes (including skylights) that are ten (10) feet or more above lower levels. If covers or guardrail systems must be removed, employees are required to use personal fall arrest systems.

5.4 LEADING EDGES

Guardrail systems, safety net systems, or personal fall arrest systems shall be used when employees are constructing a leading edge that is ten (10) feet or more above lower levels. An alternative Fall Protection Plan shall be used if the HSM determines that the implementation of conventional fall protection systems is infeasible or creates a greater hazard to employees. All alternative Fall Protection Plans for work on leading edges shall:

- Be written specific to the particular workplace needs
- Include explanation of how conventional fall protection is infeasible or creates a greater hazard to employees
- Explain what alternative fall protection will be used for each task
- Be maintained in writing at the workplace
- Meet the requirements of 29 CFR 1926.502(k).

5.5 OVERHAND BRICKLAYING AND RELATED WORK

Guardrail systems, safety net systems, personal fall arrest systems, or controlled access zones shall be provided to employees engaged in overhead bricklaying or related work ten (10) feet or more above the lower level. All employees reaching more than ten (10) inches below the walking/working surface shall be protected by guardrail systems, safety net systems, or personal fall arrest systems.

5.6 PRECAST CONCRETE ERECTION

Guardrail systems, safety net systems, or personal fall arrest systems shall be provided to employees working ten (10) feet or more above the lower level while erecting or grouting precast concrete members. An alternative Fall Protection Plan shall be used if the HSM determines that the implementation of conventional fall protection systems is infeasible or creates a greater hazard to employees. All alternative Fall Protection Plans for precast concrete erection shall:

- Be written specific to the particular jobsite needs
- Include explanation of how conventional fall protection is infeasible or creates a greater hazard to employees
- Explain what alternative fall protection will be used for each task
- Be maintained in writing at the workplace
- Meet the requirements of 29 CFR 1926.502(k).

5.7 RAMPS, RUNWAYS, AND OTHER WALKWAYS

Employees using ramps, runways, and other walkways ten (10) feet or more above the lower level shall be protected by guardrail systems.

6.0 TYPES OF FALL PROTECTION SYSTEMS

6.1 COVERS

- All covers shall be secured to prevent accidental displacement.
- Covers shall be color-coded or bear the markings "HOLE" or "COVER".
- Covers located in roadways shall be able to support twice the axle load of the largest vehicle that might cross them.
- Covers shall be able to support twice the weight of employees, equipment, and materials that might cross them.

6.2 GUARDRAIL SYSTEMS

Guardrail systems shall be erected at unprotected edges, ramps, runways, or holes where it is determined that erecting such systems will not cause an increased hazard to employees.

6.3 PERSONAL FALL ARREST SYSTEMS

Personal fall arrest systems shall be issued to and used by employees as determined by the HSM and may consist of anchorage, connectors, body harness, deceleration device, lifeline, or suitable combinations. Personal fall arrest systems shall:

- Limit the maximum arresting force to 1800 pounds.
- Be rigged so an employee cannot free fall more than ten (10) feet or contact any lower level.
- Bring an employee to a complete stop and limit the maximum deceleration distance traveled to three and a half (3-½) feet.
- Be strong enough to withstand twice the potential impact energy of an employee free falling ten (10) feet (or the free fall distance permitted by the system, whichever is less).
- Be inspected prior to each use for damage and deterioration.
- Be removed from service if any damaged components are detected.
- Meet the design requirements of the OSHA Fall Protection standard.

All components of a fall arrest system shall meet the specifications of the OSHA Fall Protection Standard, and shall be used in accordance with the manufacturer's instructions:

- The use of non-locking snaphooks is prohibited.
- Dee-rings and locking snaphooks shall:
  - have a minimum tensile strength of 5000 pounds
  - be proof-tested to a minimum tensile load of 3600 pounds without cracking, breaking, or suffering permanent deformation.

- Lifelines shall be:
  - Designed, installed, and used under the supervision of a competent site safety coordinator.
  - Protected against cuts and abrasions.
  - Equipped with horizontal lifeline connection devices capable of locking in both directions on the lifeline when used on suspended scaffolds or similar work platforms that have horizontal lifelines that may become vertical lifelines.
  - Able to maintain a safety factor of at least 2.
- Self-retracting lifelines and lanyards must have ropes and straps (webbing) made of synthetic fibers, and shall:
  - Sustain a minimum tensile load of 3600 pounds if they automatically limit free fall distance to two (2) feet.
  - Sustain a minimum tensile load of 5000 pounds (includes rip stitch, tearing, and deforming lanyards).
- Anchorages must support at least 5000 pounds per person attached and shall be:
  - Designed, installed, and used under the supervision of a competent site safety coordinator.
  - Capable of supporting twice the weight expected to be imposed on it.
  - Independent of any anchorage used to support or suspend platforms.

6.4 POSITIONING DEVICE SYSTEMS

Body belt or body harness systems shall be set up so that an employee cannot fall, and shall be secured to an anchorage capable of supporting twice the potential impact load or 3,000 pounds, whichever is greater. Body belts will not be used for fall arrest. Requirements for snaphooks, dee-rings, and other connectors are the same as detailed in these SOPs for fall arrest systems.

6.5 SAFETY MONITORING SYSTEMS

In situations when no other fall protection has been implemented, a competent site safety coordinator shall monitor the safety of employees in these work areas. This person shall be:

1. Competent in the recognition of fall hazards.
2. Capable of warning workers of fall hazard dangers or when they are working in an unsafe manner.
3. Operating on the same walking/working surfaces as the employees and able to see them.
4. Close enough to work operations to communicate orally with employees.
5. Free of other job duties that might distract them from the monitoring function.

No employees other than those engaged in the work being performed under the Safety Monitoring System shall be allowed in the area. All employees under a Safety Monitoring System are required to promptly comply with the fall hazard warnings of the site safety coordinator.

6.6 SAFETY NET SYSTEMS

- Safety net systems must be installed no more than thirty (30) feet below the walking/working surface with sufficient clearance to prevent contact with the surface below, and shall be installed with sufficient vertical and horizontal distances as described in the OSHA Fall Protection Standard.
- All nets shall be inspected prior to project setup for wear, damage, or deterioration. Defective nets shall be disposed and replaced with acceptable nets.
- All nets shall be in compliance with mesh, mesh crossing, border rope, connection specifications, and drop tests as described in the OSHA Fall Protection Standard.
- When nets are used on bridges, the potential fall area from the walking/working surface shall remain unobstructed.
- Objects that have fallen into safety nets shall be removed as soon as possible and at least before the next working shift.

6.7 WARNING LINE SYSTEMS

Warning line systems consisting of supporting stanchions and ropes, wires, or chains shall be erected around all sides of roof work areas:

- Lines shall be flagged at no more than six (6)-foot intervals with high-visibility materials.
- The lowest point of the line (including sag) shall be between 34 and 39 inches from the walking/working surface.
- Stanchions of warning line systems shall be capable of resisting at least 16 pounds of force.
- Ropes, wires, or chains must have a minimum tensile strength of 500 pounds.
- Warning line systems shall be erected at least six (6) feet from the edge, except in areas where mechanical equipment is in use. When mechanical equipment is in use, warning line systems shall be erected at least six (6) feet from the parallel edge, and at least ten (10) feet from the perpendicular edge.

7.0 CONTROLLED ACCESS ZONES

When approved by a supervisor, masons are the only authorized employees permitted to enter controlled access zones and areas from which guardrails have been removed. All other workers are prohibited from entering controlled access zones.

Controlled access zones shall be defined by control lines consisting of ropes, wires, tapes, or equivalent material, with supporting stanchions, and shall be:

- Flagged with a high-visibility material at six (6)-foot intervals.
- Strong enough to sustain stress of at least 200 pounds.
- Extended along the entire length of an unprotected or leading edge.
- Parallel to the unprotected or leading edge.
- Connected on each side to a guardrail system or wall.
- Erected between ten (10) feet and 25 feet from an unprotected edge, except in the following cases:
  - When working with precast concrete members: between ten (10) feet and 60 feet from the leading edge, or half the length of the member being erected, whichever is less
  - When performing overhand bricking or related work: between ten (10) feet and fifteen (15) feet from the working edge.

8.0 EXCAVATIONS

Fall protection will be provided to employees working at the edge of an excavation that is ten (10) feet or deeper. Employees in these areas are required to use the fall protection systems as designated in this program.

- Excavations that are ten (10) feet or deeper shall be protected by guardrail systems, fences, barricades, sloped side walls, or covers.
- Walkways that allow employees to cross over an excavation that is ten (10) feet or deeper shall be equipped with guardrails.
- Excavation greater than four (4) feet will not be entered by a person without properly engineered and properly operating shoring systems or side walls sloped at a 1 to 1 slope.

9.0 PROTECTION FROM FALLING OBJECTS

When guardrail systems are in use, the openings shall be small enough to prevent potential passage of falling objects. The following procedures must be followed by all employees to prevent hazards associated with falling objects:

- No materials (except masonry and mortar) shall be stored within four (4) feet of working edges.
- Excess debris shall be removed regularly to keep work areas clear.
- During roofing work, materials and equipment shall be stored no less than ten (10) feet from the roof edge unless guardrails are erected at the edge.
- Stacked materials must be stable and self-supporting.
- Canopies shall be strong enough to prevent penetration by falling objects.
- Toe boards erected along the edges of overhead walking/working surfaces shall be:
  - Capable of withstanding a force of at least 50 pounds
  - Solid with a minimum of three and a half (3-½) inches tall and no more than one quarter (1/4) inch clearance above the walking/working surface.
- Equipment shall not be piled higher than the toeboard unless sufficient paneling or screening has been erected above the toeboard.

10.0 INSPECTION, MAINTENANCE, AND STORAGE

The following procedures must be followed by all employees:

1. As with all protective equipment, the equipment is only protective when it is functioning properly. The same holds true for fall protection equipment. Fall protection equipment must be visually inspected by the user prior to each use to ensure the equipment is in good working order and ready for use.
2. Fall protection equipment must be inspected to ensure the equipment is properly functioning. Manufacturer's recommendations must be followed for inspection, maintenance, and storage of fall protection equipment.
3. If a fall arrest system is used to control a fall, affected components of the system must be taken out of service and inspected to ensure they are in functional condition. Some components, such as the shock absorbing lanyard or retractable lifeline, must be returned to the manufacturer for recertification following their use in a fall situation.
4. Soiled or contaminated body wear (harnesses) can be cleaned in warm water using a mild soap and scrub cloth. The equipment must be thoroughly rinsed with fresh water following any detergent cleaning. Other fall protection equipment can be surface cleaned with water. Harsh chemicals should never be used to clean the fall protection equipment. Upon the completion of cleaning, the equipment must be allowed to dry thoroughly and placed in a clean and dry location to allow for proper storage.
5. Labels must be visible and legible on all fall protection equipment. If not, they must be disposed, regardless of equipment condition.

11.0 RESCUE PLANS

Every workplace or work evolution must have a documented rescue plan that provides direction in the event that a fall occurs and an employee requires rescue. There are two options for rescue:

1. Emergency Services Rescue – If Landau relies on emergency services for rescue, the following considerations must be met:
    a. They must be able to reach the location of a fallen worker in a timely manner.
    b. Emergency Services must be on duty the entire time work is being performed.
    c. Emergency Services must have the training and equipment to reach the worker at height.
    d. Emergency Services must have sufficient backup capacity to provide assistance even if there is another emergency.
    e. Emergency Services must be informed on the hazards of suspension trauma.
2. Employee Provided Rescue – If employees are designated to perform rescue, Landau will:
    a. Designate an experienced Competent Rescuer who is an individual designated by Landau who, by training, knowledge, and experience is capable of the implementation, supervision and monitoring of Landau's fall protection rescue program.
    b. Designate Authorized Rescuers who have been trained by a Competent Rescuer on rescue equipment and procedures.

12.0 ACCIDENT INVESTIGATIONS

All incidents that result in injury to workers, as well as near misses, regardless of their nature, shall be reported and investigated. Investigations shall be conducted by the HSM and the safety committee. The investigation will occur as soon after an incident as possible to identify the cause and means of prevention to eliminate the risk of reoccurrence.

In the event of such an incident, the Fall Protection Program (and alternative Fall Protection Plans, if in place) shall be re-evaluated by the HSM and the safety committee to determine if additional practices, procedures, or training are necessary to prevent similar future incidents.

13.0 TRAINING

All employees who may be exposed to fall hazards are required to receive training on how to recognize such hazards, and how to minimize their exposure to them. Employees shall receive training as soon after employment as possible, and before they are required to work in areas where fall hazards exist.

A record of employees who have received training and training dates shall be maintained by Landau's Human Resources Department. Training of employees shall include:

- Nature of the fall hazards employees may be exposed to.
- Correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems.
- Use and operation of controlled access zones, guardrails, personal fall arrest systems, safety nets, warning lines, and safety monitoring systems.
- Limitations of the use of mechanical equipment during roofing work on low-slope roofs (if applicable).
- Correct procedures for equipment and materials handling, and storage and erection of overhead protection.
- Role of each employee in alternative Fall Protection Plans (if used).
- Requirements of the OSHA Fall Protection Standard, 29 CFR 1926, Subpart M.
- Landau's requirements for reporting incidents that cause injury to an employee.

Additional training shall be provided on an annual basis, or as needed when changes are made to this Fall Protection Program, an alternative Fall Protection Plan, or the OSHA Fall Protection Standard.

14.0 CHANGES AND REVIEW

Any changes to the Fall Protection Program (and alternative Fall Protection Plans, if in place) shall be approved by the HSM or Project Manager, and shall be reviewed by a qualified person as the job progresses to determine additional practices, procedures, or training needs necessary to prevent fall injuries. These SOPs will be reviewed annually and after every fall. Affected employees shall be notified of all procedure changes, and trained, if necessary. A copy of these SOPs, and any additional alternative Fall Protection Plans, shall be maintained at each workplace.

1.0 LADDER SAFETY-STANDARD OPERATING PROCEDURES

The purpose of this program is to establish the Ladder Safety Program Standard Operating Procedures (SOP) and requirements for using ladders and stairways. Landau Associates, Inc. (Landau) is committed to providing a safe work environment for all employees. All employees who are involved with the construction, usage, or maintenance of ladders and stairways on a project site or in the office must be familiar with the SOP.

2.0 PROGRAM RESPONSIBILITIES

2.1 MANAGEMENT

Management has the following responsibilities:

1. To provide ladders and stairways that are safe and meet the safety requirements of Occupational Safety and Health Administration (OSHA).
2. To develop a ladder safety policy and revise it when necessary.
3. To identify employees who are affected by this policy and ensure that they receive the required training.
4. To provide required personal protective equipment (PPE) to employees.
5. To provide technical support to employees for ladder and stairway issues.
6. To ensure Landau is operating in accordance with this SOP by performing periodic reviews and audits.
7. To review this SOP for effectiveness periodically and when deficiencies are discovered.

2.2 HEALTH AND SAFETY MANAGER

The health and safety manager (HSM) has the following responsibilities:

1. To ensure that no employees perform work on ladders and stairways without receiving the required safety training.
2. To provide communication between employees and management on safety issues.
3. To make sure that employees have available, and use, all required PPE.
4. To monitor employees to verify they are using safe workplace practices.

2.3 EMPLOYEES

Employees have the following responsibilities.

1. To complete all required safety training before using ladders and stairways.
2. To wear all required PPE.
3. To work in accordance with the rules of this SOP.
4. To immediately report any safety issues to management.

3.0 TRAINING REQUIREMENTS

All operators and employees who build, maintain, or perform work on ladders or stairways must be trained on their safety requirements. This training consists of both theory and demonstration of competency.

3.1 THEORY

Employees must be trained by a competent person on the following ladder safety subjects:

1. The nature of fall hazards in the work area.
2. The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used.
3. The proper construction, use, placement, and care in handling of all stairways and ladders.
4. The maximum intended load-carrying capacities of ladders.
5. The standards contained in the OSHA Ladder and Stairway subpart.

3.2 PERFORMANCE REQUIREMENTS

Once employees have completed their safety theory training, employees must demonstrate the ability to work safely on ladders and stairways. An employee must be retrained when they demonstrate a lack of competency, a safety incident occurs, or when required by management.

4.0 LADDER REQUIREMENTS

All portable and fixed ladders must meet the design specifications of the OSHA Ladders and Stairways subpart. It is the responsibility of management to provide ladders that meet these requirements.

5.0 LADDER INSPECTIONS

Ladders must be inspected by a competent person for visible defects on a periodic basis and after any occurrence that could affect their safe use.

5.1 PORTABLE LADDERS

Portable ladders should be inspected for:

1. Broken or missing rungs
2. Broken cleats
3. Damaged steps
4. Broken or split rails
5. Corroded components
6. Faulty or defective components.

5.2 FIXED LADDERS

Fixed ladders should be inspected for:

1. Broken or missing rungs
2. Broken or missing cleats
3. Broken or missing steps
4. Broken or split rails
5. Corroded components
6. Faulty or defective components.

5.3 REMOVING LADDERS FROM SERVICE

Defective ladders must be removed from service and tagged "Do Not Use." Additionally, defective portable ladders should be removed from the work area and fixed ladders should be tagged and physically blocked to prevent usage.

5.4 RETURNING LADDERS TO SERVICE

Ladders may not be returned to service until the ladder condition is restored to its original design criteria.

6.0 LADDER SAFE WORK PRACTICES

All employees will adhere to the following safe work practices:

- Read and follow all labels/markings on the ladder.
- Avoid electrical hazards – Look for overhead power lines before handling a ladder. Avoid using a metal ladder near power lines or exposed energized electrical equipment.
- Always inspect the ladder prior to using it. If the ladder is damaged, it must be removed from service and tagged until repaired or discarded.
- Do not use a self-supporting ladder (e.g., step ladder) as a single ladder or in a partially closed position.
- Do not use the top step/rung of a ladder as a step/rung unless it was designed for that purpose.
- Always maintain a three-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Keep your body near the middle of the step and always face the ladder while climbing.
- Only use ladders and appropriate accessories (ladder levelers, jacks, or hooks) for their designed purposes.
- Ladders must be free of any slippery material on the rungs, steps, or feet.
- Use a ladder only on a stable and level surface, unless it has been secured (top or bottom) to prevent displacement.
- Do not place a ladder on boxes, barrels, or other unstable bases to obtain additional height.
- Do not move or shift a ladder while a person or equipment is on the ladder.
- An extension or straight ladder used to access an elevated surface must extend at least 3 feet above the point of support. Do not stand on the three top rungs of a straight, single, or extension ladder.
- The proper angle for setting up a ladder is to place its base a quarter of the working length of the ladder from the wall or other vertical surface.
- A ladder placed in any location where it can be displaced by other work activities must be secured to prevent displacement or a barricade must be erected to keep traffic away from the ladder.
- Be sure that all locks on an extension ladder are properly engaged.
- Do not exceed the maximum load rating of a ladder. Be aware of the ladder's load rating and of the weight it is supporting, including the weight of any tools or equipment.

7.0 ELECTRICAL HAZARDS

If work is being performed in an area where the employee or the ladder could contact exposed energized electrical equipment, ladders with nonconductive side rails must be used. In addition, the employee is required to follow all Landau SOPs and policies for performing work near exposed energized electrical equipment.

8.0 INCLEMENT WEATHER

The following special requirements apply to work on ladders during inclement weather conditions:

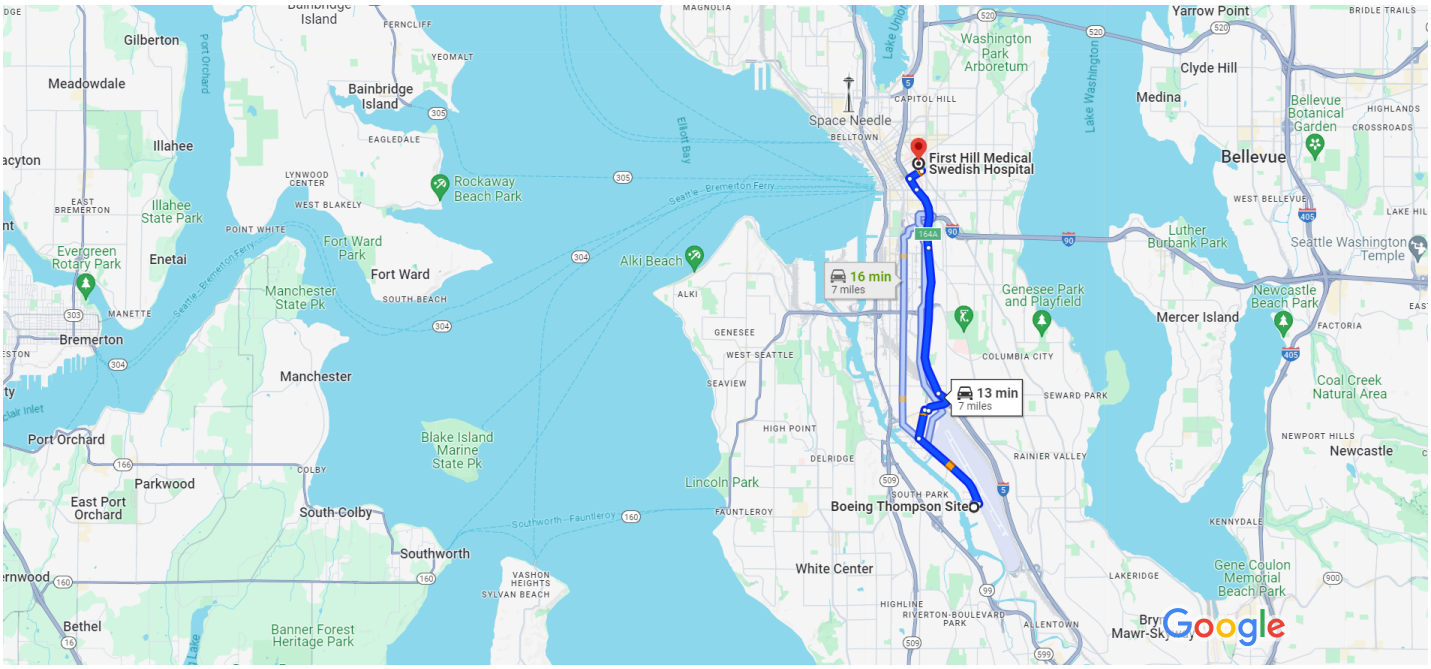
Snow / Ice Employees may not work during snowy conditions unless the snow has stopped and all ice and snow has been removed from the ladder surfaces.

High Winds Employees may not work during high wind situations unless special precautions are taken. A competent person must determine that work can proceed safely by recommending the use of fall protection systems and wind screens that are used in accordance with OSHA standards.

Lightening Employees are not allowed to perform work while lightening conditions exist, and must wait a suitable amount of time after storm passage to recommence work.

Attachment E. Boeing Thompson Site to First Hill Medical Swedish Hospital - Google Maps

Boeing Thompson Site, 8701 E Marginal Wy S, Tukwila, WA 98108 to First Hill Medical Swedish Hospital, 1124 Columbia St, Seattle, WA 98104 — Drive 7.0 miles, 13 min



Map data ©2024 Google 1 mi

Boeing Thompson Site
8701 E Marginal Wy S, Tukwila, WA 98108

Get on I-5 N in Seattle from E Marginal Wy S

7 min (2.8 mi)

1. Head east toward E Marginal Wy S

456 ft

2. Turn left onto E Marginal Wy S

1.5 mi

3. Turn right onto Corson Ave S

0.5 mi

4. Turn right onto S Bailey St

328 ft

5. Use the left 2 lanes to turn left to merge onto I-5 N

0.6 mi

Take exit 164A from I-5 N

5 min (3.8 mi)

6. Merge onto I-5 N

2.5 mi

7. Use the 2nd from the right lane to take exit 164A for Dearborn St toward James St/Madison St

1.1 mi

8. Take the James St exit

0.2 mi

Continue on James St. Drive to Columbia St

3 min (0.4 mi)

9. Turn right onto James St

0.2 mi

10. Turn left onto Boren Ave

0.1 mi

11. Turn right onto Columbia St

Destination will be on the left

95 ft

First Hill Medical Swedish Hospital
1124 Columbia St, Seattle, WA 98104